



Mekong Timber Plantation Wood Processing Mill

Executive Summary

prepared for

Mekong Timber Plantations Ltd.

by

Earth Systems



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Earth Systems

ABN 42 120 062 544
14 Church St
Hawthorn, Victoria 3122
Australia
Tel: +61 (0)3 9810 7500
Fax: +61 (0)3 9853 5030
Web: www.earthsystems.com.au

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1. INTRODUCTION

This Environmental and Social Impact Assessment (ESIA) of the Mekong Timber Plantations (MTP) Wood Processing Mill Project (hereafter the 'Project' or 'Mill') has been prepared by Earth Systems on behalf of MTP. The Project comprises the construction and operations of a veneer, sawmill, and wood chipping facility in Hinboun District, Khammouane Province (Figure 1-1). The Mill will process Eucalyptus and Acacia plantation trees from MTP tree plantations and from small farmer outgrower plantations associated with the MTP Plantation Operation. A separate ESIA update has been conducted for the MTP plantation operations, which is in the final consultative process with the Ministry of Natural Resources and Environment and additional Lao PDR Government ministries. This ESIA considers the transport of raw logs, processing, and transport of finished wood product.

This ESIA Executive Summary provides an overview of the baseline setting, the potential environmental and social risks and impacts associated with Project construction and operations, and the proposed approach to manage and mitigate potential impacts to minimise residual impacts and comply with national legislative requirements and specific international standards that MTP is committed to.

The structure of the ESIA submission is comprised of the following volumes:

- ▶ Volume A: Executive Summary (this report);
- ▶ Volume B: ESIA Main Report;
- ▶ Volume C: Environmental and Social Management and Monitoring Plan (ESMMP); and
- ▶ Volume D: Public Consultation and Disclosure Plan (PCDP).

The ESIA has been developed to meet requirements of the Government of Lao PDR (GOL). The ESIA also aims to align with international standards (e.g. the International Finance Corporation (IFC) Performance Standards and Good International Industry Practice (GIIP).

The objectives of the ESIA are to:

- ▶ Provide a description of the proposed Project and alternatives considered;
- ▶ Describe the physical, biological, and social setting of the proposed Project site and its area of influence;
- ▶ Identify key environmental and social management issues associated with construction and operations of the Project;
- ▶ Adopt a mitigation hierarchy to avoid, or where not possible, minimise impacts; and where residual impacts remain, compensate/offset for risks and impacts to affected communities and the receiving environment;
- ▶ Describe how MTP will plan, construct and operate the Project to prevent and mitigate adverse environmental and social impacts;
- ▶ Describe how MTP will monitor and manage residual environmental and social impacts; and
- ▶ Evaluate the risk of any significant environmental and social hazards associated with the proposed Project.

2. BRIEF PROJECT DESCRIPTION

The Project, preliminarily planned for commencement of construction in October 2020, would comprise the construction and operations of the MTP Wood Processing Mill that would process primarily Eucalyptus and Acacia logs into veneer product, sawn timber and wood chips. The development of the Project is currently at Feasibility Stage. The Mill will source trees from MTP plantations, farmers participating in the MTP outgrower scheme, with potential for processing timber from additional sources if the supply chain management meets corporate standards and national legislation.

The proposed mill would be located on approximately 6.7 hectares of current MTP concession land replacing Eucalyptus plantation in the village of Ban Danhi in Hinboun District approximately 290 km southeast of Vientiane by road (refer to Figure 2-3) and centrally located with respect to MTP plantations. The mill would comprise three primary facilities: a veneer-manufacturing unit, a sawmill, and a wood chipping unit. An existing 700 m access connecting National Road 13 to the site would be upgraded. An additional 2.8 ha of land is also identified for potential future Mill expansion.

At full capacity, the Mill will process approximately 150,000 m³ of Eucalyptus and Acacia logs per annum into the following end products:

- ▶ Veneer – approximately 50,000 m³ of veneer product;
- ▶ Sawn logs - approximately 10,000 m³ of sawn timber;
- ▶ Woodchips - approximately 25,000 m³ bone dry metric tonnes of woodchips; and



MTP Mill products: veneer, sawn hardwood, and woodchips

A transport contractor will haul logs to the site, with all haulage, loading, and unloading confined to 18 hours per day. The logs will be sorted, with the highest-grade logs utilised for veneer production and sawn timber. Lower grade logs will be separated out for chipping.

During operations, the Mill will provide approximately 93 full-time employment opportunities. The majority of staffing will comprise men and women from the local communities.

2.1 Project Benefits

The MTP Plantation Project currently has a concession area that is approximately 24,000 ha. Approximately 18,000 ha of this land is comprised of plantation timberlands, with Eucalyptus and Acacia trees at various stages of maturity. The plantations are intended for short-rotation cycles (e.g. 7-10 years). Many of the plantation trees have reached maturity and are ready to harvest for processing. To provide for a more viable operation, MTP requires minimal hauling distance from its plantations to processing facilities. The development of the Mill will provide value added opportunity for MTP with the conversion of its raw logs to market products with viable national and

international markets. The Mill will also provide an important outlet for participants in the MTP Outgrower Scheme.

The Mill will also provide employment opportunities for approximately 93 people, most of which will be men and women from local communities. Products sold domestically and internationally will generate benefits for the regional and national economy via taxes and royalties.

2.2 Process Flow

The following process flow and site layout (Refer to Figure 2-2) is based on the current stage of Project design (Feasibility Study). The Mill will comprise 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 seven ha of land, with approximately two ha considered for expansion, if needed.

The Project will include:

- ▶ A veneer manufacturing line (two 4 foot and one 8 foot), comprised of peelers, conveyors, and veneer dryers;
- ▶ A sawmill;
- ▶ Wood chipping facilities;
- ▶ A timber stockyard to prepare and store material for processing; and:
- ▶ Ancillary equipment / facilities including:
 - Boiler and dryer;
 - Offices and child-care centre,
 - Maintenance facilities, equipment and materials storage;
 - Electricity transmission from the local grid;
 - Borehole water abstraction;
 - An access road and road infrastructure within the site.

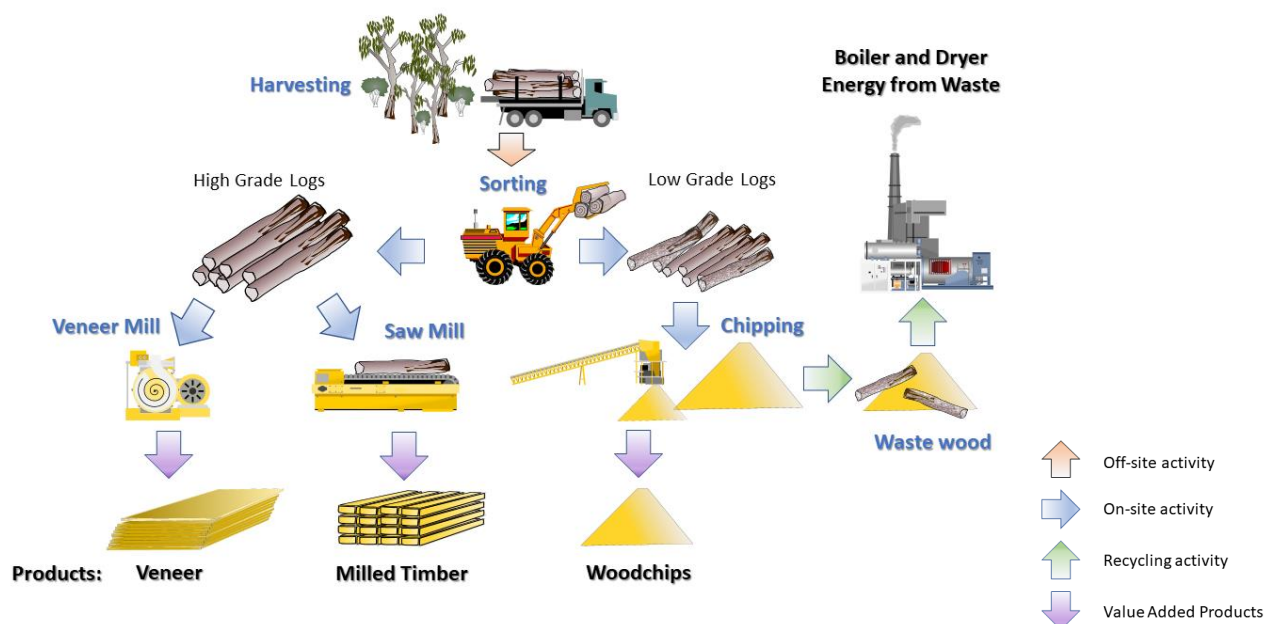


Figure 2-1: Flowchart of simplified processing and manufacturing stages for the Project

2.2.1 Veneer Line

According to Project Feasibility Study (Indufor, 2019), the primary components of the veneer line include a log infeed deck, transfers, veneer peeler, and veneer stacker. The current plan comprises use of an 8 ft and two 4 ft peelers for veneer production. After peeling, the product is dried by jet-ventilated automatic roller track dryer, heated by the Project boiler.



Plate 2-1: Example of veneer production



Plate 2-2: Typical veneer wood dryer

2.2.2 Sawmill

The proposed sawmill is a Wood-Mizer smart log processing line, capable of processing logs with a diameter of up to 300 mm (Indufor, 2019). The line allows for logs from 0.9 to 2.4 m to be processed into thin boards.



Plate 2-3: Wood-Mizer SLP Line (source Wood-Mizer, via Indufor, 2019)

2.2.3 Chip Mill

The chip mill will process logs having quality defects or diameters that preclude veneer production or sawmilling, as well as some of the waste wood from veneer / sawmill production. The chip mill will have the capacity to process approximately 30 tons/hr, with wood chips produced, that will likely be utilised for paper production by a third-party.



Plate 2-4: Example Industrial Chipper (MTP will be housed)



Plate 2-5: Proposed MTP Wood Chip Conveyor



Figure 2-2: MTP Mill Project Location

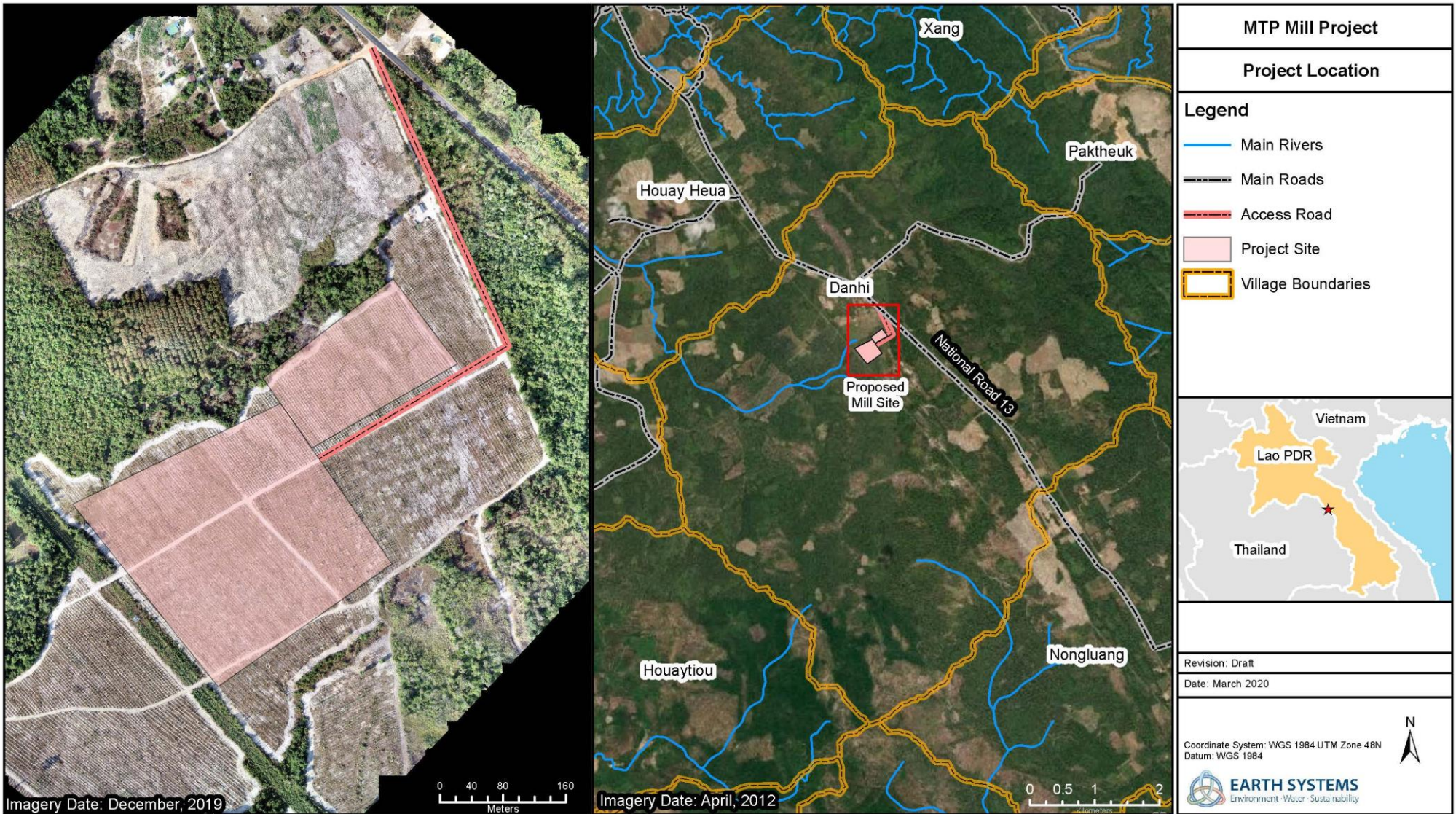


Figure 2-3: MTP Mill Project Regional Location

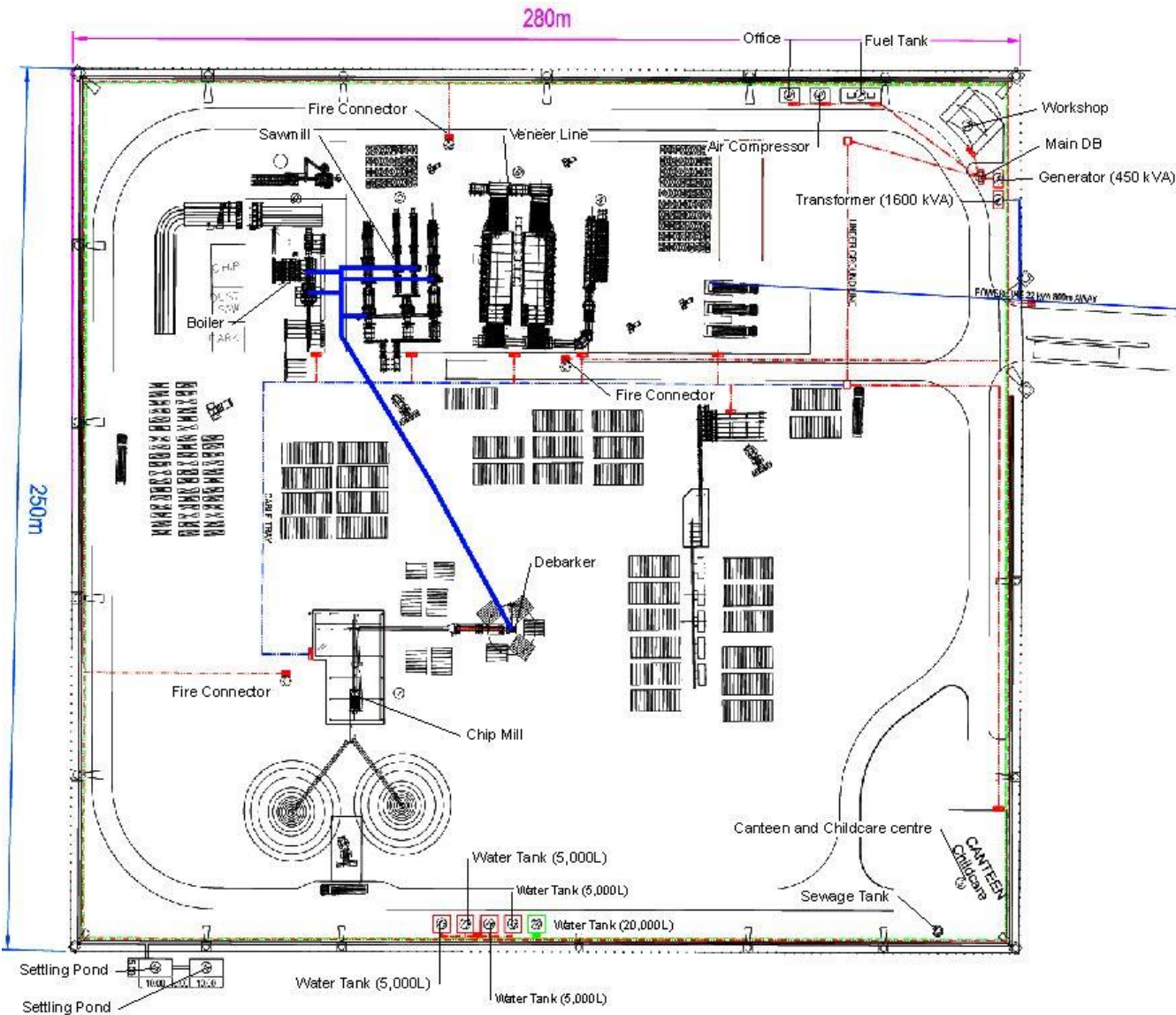


Figure 2-4: MTP Mill Project Layout

3. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A comprehensive list of the key laws, decrees, regulations and policies relevant to the MTP's Wood Processing Mill Project are provided in Chapter 3 of the ESIA (Volume B).

3.1 Environmental and Social Policies of the Project Proponent

3.1.1 Mekong Timber Plantations

MTP was formally established in 2017, following a change in majority stakeholder for the Oji LPFL plantation project that commenced in 1999. The Company's Environmental and Social Management System (ESMS), Draft ESIA and ESMMP (2019) document a series of commitments to environmental and social sustainability for its plantation operations and nursery. MTP commits to the same level of rigour for environmental, health, and social management for its proposed Mill project.

The Company has established a Sustainability Department which will be responsible for the implementation of the plantation operations ESMMP, the Mill ESMMP, and compliance with environmental guidelines and standards.

MTP is committed to constructing and operating the Mill in compliance with applicable national laws and regulations for the industry as well as adherence to the Internal Finance Corporation Performance Standards and Forest Stewardship Council Chain-of-Custody certification.

3.2 POLICY, LEGAL AND INSTITUTION FRAMEWORK

3.2.1 Lao PDR Policy and Legal Framework

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

Principal Governing Bodies

There are several applicable line agencies with lead responsibilities during construction and operations, including the Ministry of Industry and Commerce and the Ministry of Natural Resources and Environment,

4. PHYSICAL SETTING AND ASSESSMENT

The ESIA assesses each of the physical aspects considered in the risk assessment for this ESIA. This Executive Summary briefly describes the results of evaluation for key parameters, identified as such either because of inherent risks requiring significant management or due to the relative importance of the parameter for people and the environment, irrespective of risk ratings. The parameters evaluated in Section 4 of the Executive Summary include:

- ▶ Hydrology;
- ▶ Water quality;
- ▶ Air quality; and
- ▶ Noise.

The following additional physical parameters summarised below were found to provide low, negligible, or nil risk for residual impacts:

- ▶ Climate, greenhouse gas and climate change;
- ▶ Natural disasters;
- ▶ Geology, topography and soils;
- ▶ Hazardous and non-hazardous materials; and
- ▶ Traffic and road congestion.

4.1 Hydrology

4.1.1 Baseline Conditions

Surface Water

The Project site is located within the Houay Heua stream catchment, a low volume 6.8 km long perennial stream with a catchment area of approximately 16 km² (Figure 4-1). The stream is spring fed, thus flows throughout the year, though dry season flow was measured at less than 2 L/s during December 2019 surveys. Several small tributaries feed water to the stream downstream of the Project Area, before the Houay Heua discharges to the significantly higher flow volume Houay He stream. Modelling conducted for this ESIA estimates minimum stream flow of < 1 L/s to more 8 m³/s during peak flow for a median flow year.

The top of the Houay Heua stream catchment forms a plateau or area of relatively flat relief within two kilometers of (and including) the Project Footprint, and then becomes steeper toward the middle section of the catchment. Water from this stream is used for a variety of purposes, including paddy rice irrigation, typical domestic water uses, and provides habitat for fish that are regularly caught in the region.

The Houay He is a considerably larger perennial stream, with a catchment area of approximately 117 km², and is a first order tributary to the Mekong River. Hydrology modelling for this ESIA estimates Houay He flow ranging from < 1 m³/s to 45 m³/s for a median flow year.

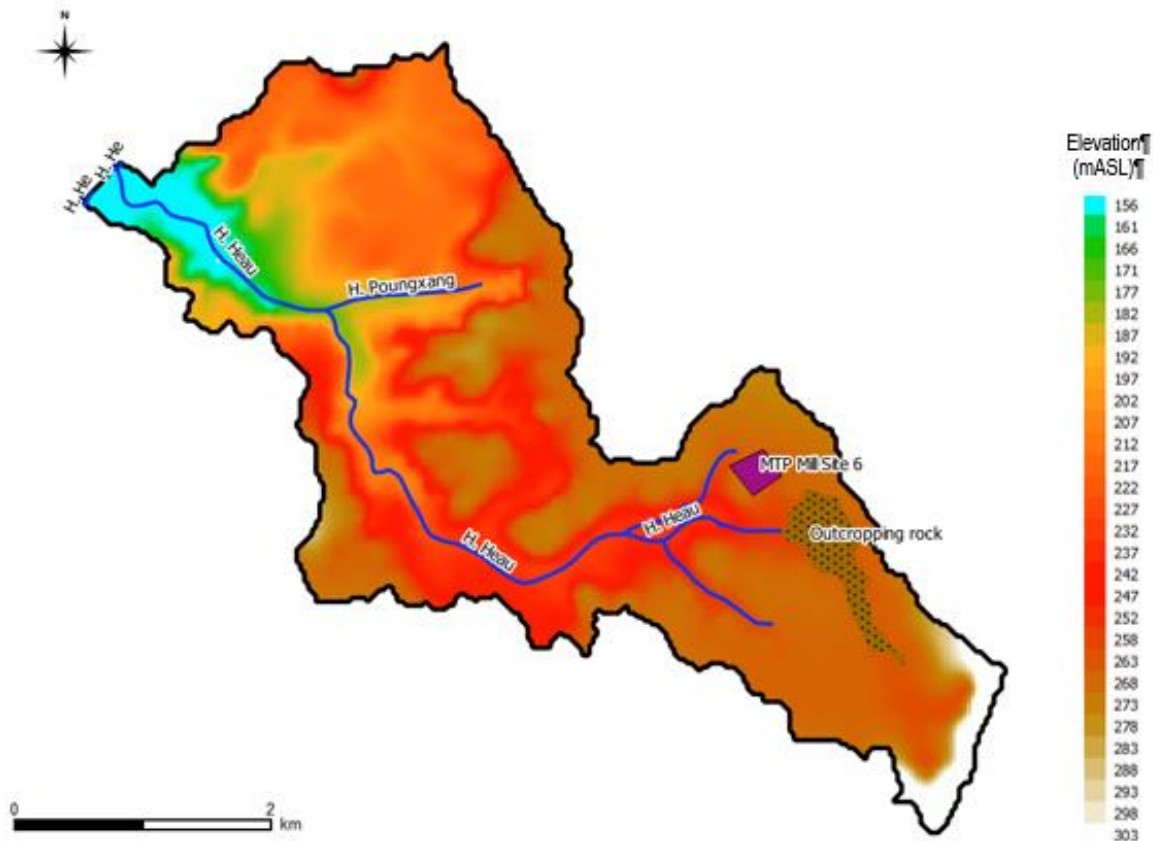


Figure 4-1 Project Site hydrology of Houay Heua catchment and topography.

Groundwater

Groundwater levels are high in the Project region with groundwater from higher elevation land to the south pushed through surface sands overlying shallow bedrock. At the Project site, groundwater levels were found to be very near the surface, evidenced by the many springs in the region where groundwater sustains surface flow during the dry season.

Groundwater recharge and flow occurs through the surficial Quaternary alluvial sand aquifer and underlying low permeability Mesozoic sandstone after seasonal rainfall recharge events, with groundwater flow generally following surface water hydrology. Outcroppings of the sandstone aquifer form ponds and low discharge springs, creating low level perennial flow in the Houay Heua. Two small tributaries of the Houay Heua flow episodically, based on rainfall in the catchment and may receive very small discharges from spring areas. Surface flow in these streams may develop quickly with little or no antecedent rainfall.

4.1.2 Issue and Findings

The Mill footprint avoids the two small streams on each side of the site that comprise the highest reach of the Houay Heua stream. Rainfall that lands on the Mill footprint will be conveyed to a two-celled settling / passive treatment pond, with the surface water channelled back to the Houay Heua, the same downstream receiving water for which it currently flows. Surface water volume in the Houay Heua is not expected to be impacted.

The Mill operations will abstract groundwater for household (drinking, ablution) facilities, a vehicle wash bay and will provide standby water for fire-fighting purposes. Approximately 5,000 litres of groundwater per day will be required. Given the shallow depth to groundwater, Project groundwater abstraction is not expected to impact the aquifer relative to recharge rates.

4.1.3 Management

MTP operations have been designed to ensure no surface water is utilised for construction or operations. Channels developed to convey surface water from the Project footprint back to receiving waters (after passive water quality treatment) will ensure that changes to downstream flow volumes and seasonal fluctuations remain relatively unchanged.

MTP will mitigate impacts to the aquifer by limiting abstraction rates and have designed the Mill for no operational water requirements.

4.1.4 Conclusions and Residual Risk and Impact

The Mill construction and operations is not expected to present significant risk for impacts for surface water hydrology in the Houay Heua catchment. Surface water draining from the site will be conveyed to the same receiving water bodies as per pre-Project conditions. Residual impacts will be **Negligible**.

Groundwater use is not planned for Mill processing. Restricting groundwater abstraction to 5,000 litres per day will limit the risk for impact on groundwater reserves. Given the perched water table, groundwater flow direction from the south, and limited use of groundwater in the region, residual impacts are similarly expected to be **Negligible**.

4.2 Water Quality

Baseline conditions

The results of the water quality field and laboratory analyses for the Houay Heua indicate that water quality in the stream was generally good for the comprehensive set of measured parameters and is (with few exceptions) within the Lao National Ambient Water Quality Standards (MONRE, 2017) and WHO Drinking Water Quality Guidelines (2011). The only water quality parameters that exceeded international water quality standards were bacterial, where samples analyses for E. Coli (16.1 MPN/100 mL), total coliform (1,610 MPN/100 mL), and faecal coliform (23 MPN/100 mL) had elevated concentrations for ambient surface water and high concentrations for untreated drinking water.

Issues and Findings

The headwater channels of the Houay Heua stream occur to the north and south of the Mill site. The Project footprint will be a minimum of 15 m from these streams, with riparian vegetation between. Downstream surface water use includes habitat for fishing and water for irrigation and domestic purposes. Some residents of Ban Houay Heua abstract drinking water from a spring within the Houay Heua stream channel (but outside the stream flow during the dry season). Design controls have been developed to minimise potential for impacts to the integrity of water quality discharged from the Mill site is paramount.

Primary risks to water quality include:

- ▶ Sediment transport (turbidity) in receiving waters during construction;
- ▶ Leaching of tannin and lignin from log stockyards, having high biological and chemical oxygen demand potentially impacting dissolved oxygen concentrations in the receiving water (and thus aquatic habitat); and
- ▶ Potential for sewage or hydrocarbon discharge in the event of inadequate facilities or accidental spillage.

Management

MTP will mitigate for potential water quality impacts accordingly:

- ▶ Stormwater, erosion, and sediment control will be developed at the onset of construction during the dry season. Stormwater will be conveyed through purpose-built channels to a two-celled settling pond of

adequate size to retain stormwater, allowing for deposition of sand and silt before water is discharged from the site;

- ▶ All bare ground throughout the Project footprint will be compacted, requiring a moisture content for suitable engineering that will minimise wind and water erosion. Gravel will be applied to the surface to minimise erosion during the rainy season;
- ▶ Robust hazardous materials management measures will minimise the likelihood of hydrocarbon spills during transport, storage, handling, and disposal;
- ▶ Engineering for the septic system is suitable for the number of staff. With routine maintenance and emptying, sewage will not discharge to receiving waters;
- ▶ The settling ponds will serve as passive treatment ponds, with microbial breakdown of tannin and lignin mitigating potential impacts to dissolved oxygen concentration in the receiving waters;
- ▶ Staff will be trained in the ***Project Emergency Preparedness and Response Plan***, with appropriate materials on-hand in the event of an incident; and
- ▶ In consultation with applicable GOL authorities, including at the village level, MTP will reach agreement on provision or assistance with implementation of a bore / well in Ban Houay Heua to ensure continued access to safe untreated drinking water.

Conclusions and Residual Risks and Impacts

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 Houay Heua, creating localised and short-term (i.e. one rainy season) **Moderate** level impacts in the Houay Heua, with dilution mitigating impacts considerably for the downstream Houay He and Mekong River to **Negligible** residual impact.

Management and mitigation measures for the transport, storage, handling and disposal of hazardous and non-hazardous waste (refer to ESMMP) will minimise risk of discharge, and emergency preparedness and response requirements will minimise the impacts in the event of accidental release. Residual impacts from hazardous materials and waste are considered **Nil**.

Operations

Discharge is expected to meet Lao PDR and IFC effluent standards. With the application of management and mitigation measures and ongoing monitoring, it is expected that water discharge from the site will have a very little residual impact on water quality.

Passive treatment of water from the log stockyard will effectively treat tannin and lignin, with the same ponds mitigating potential sediment transport. Operations phase impacts for sediment and nutrient loading present low risk, with **Negligible** downstream residual impacts anticipated.

Strict adherence to management of hazardous materials and non-hazardous waste throughout transport, storage, handling, and disposal will minimise risk to very low, with **Nil** residual impacts anticipated.

4.3 Air Quality

Baseline Conditions

The air quality in the region is general considered good, due to the distance from major population centres. However, a large-scale white charcoal manufacturing facility is located 750 m to the northeast of the proposed Mill site and residents of Ban Danhi – including those within 400 m of the Mill site conduct smaller scale charcoal

manufacturing. Charcoal production likely played a significant role in particulates measured at the ambient air quality monitoring station for this ESIA, located within the cluster of households nearest the Mill site.

The ambient air quality was found to have high particulate concentrations, with significant variability throughout the 48-hour measurement. Air quality measured for PM_{2.5} and PM₁₀ routinely exceeded national and international standards at the monitoring site (Figure 4-2). This is presumably associated with charcoal production and vehicular transit on unsealed roads. Figure 4-3, measured in nearby Ban Houaysakoup in September 2019 during alternatives analysis for this ESIA, provides data that is likely more representative of air quality in the region, with the few measured peaks in concentrations likely associated with passing vehicles on the unsealed road.

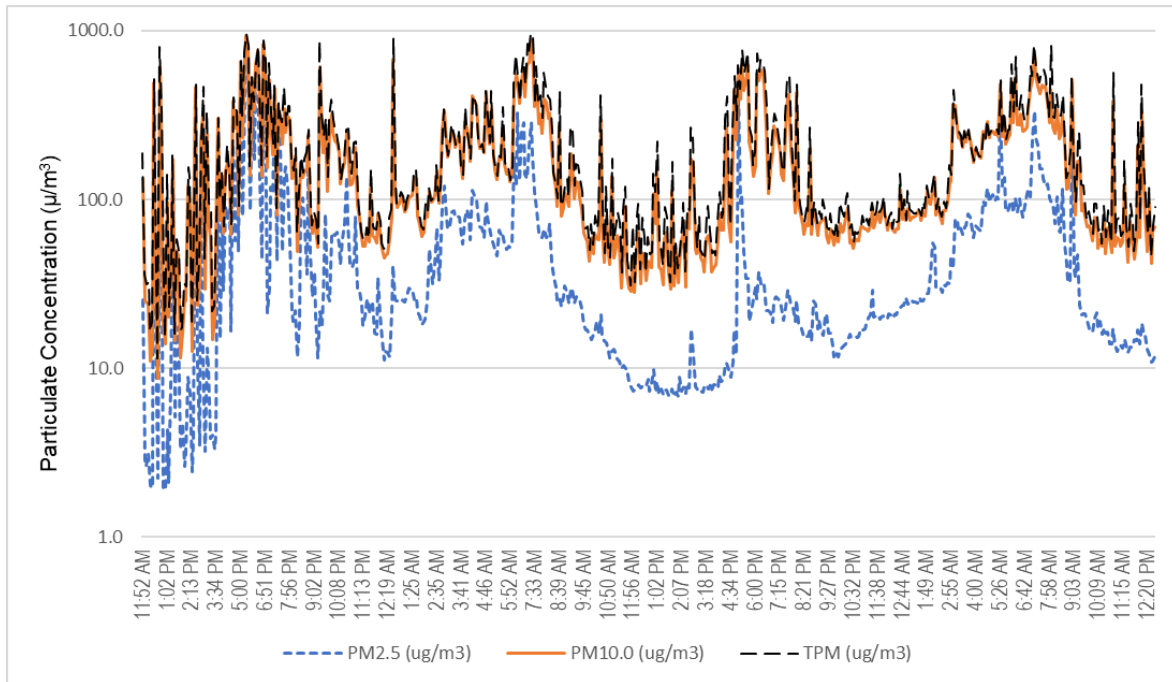


Figure 4-2 Ambient PM_{2.5}, PM₁₀, and TPM Concentrations, 21-23 December 2019

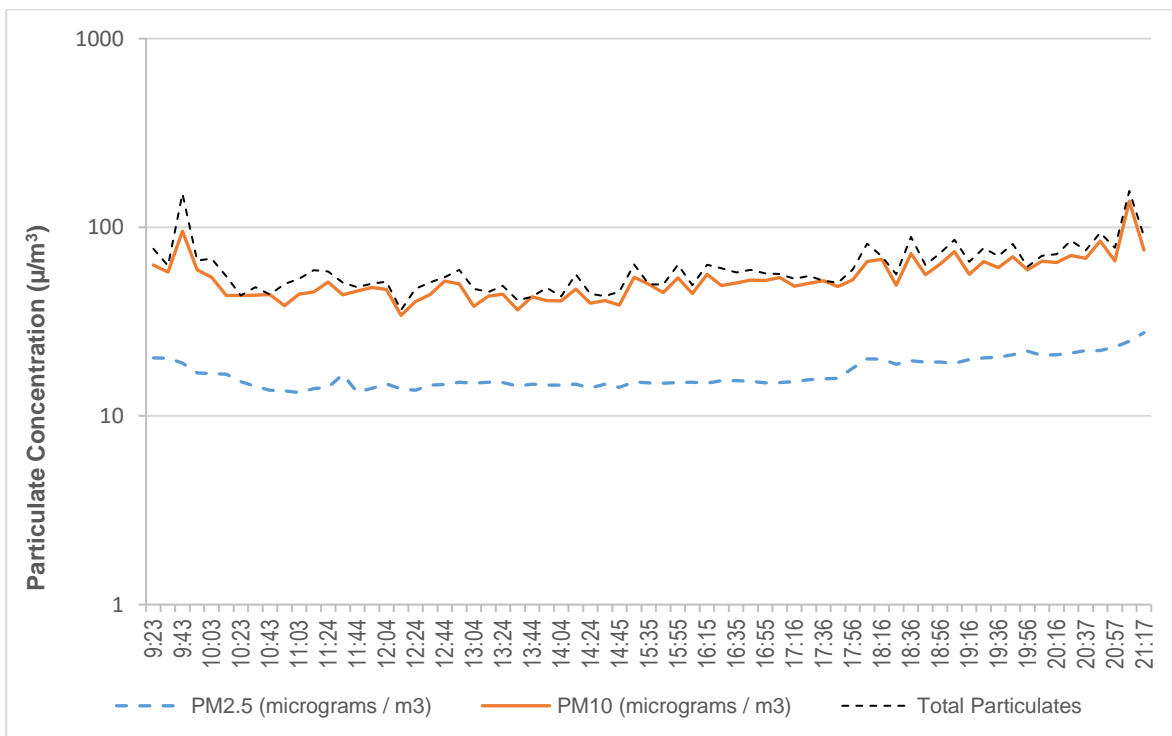


Figure 4-3 Ambient PM_{2.5}, PM₁₀, and TPM Concentrations, 23 September 2019 (daytime)

Vehicles on the heavily travelled National Road 13 emit volatile organic compounds (VOCs), nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂) and various particulates. A traffic survey indicated fairly heavy road use (1,870 counted over a ten-hour day in September 2019), but nearly consistent use throughout the day without congestion in the Project Area. Emissions from vehicles in the area do not likely pose a significant health risk and dissipate rapidly with distance from the highway.

Issues and Findings

Ban Danhi was found to have poor air quality within the village cluster nearest the Project footprint due to household and large-scale charcoal manufacturing in the immediate area. There is some risk for additional particulate generation during construction, with vegetation clearing and earthworks for the Mill site and access road upgrades. During dry season construction, Mill contributions to particulates in the airshed may provide for cumulative impacts. Impacts from the site alone are expected to be fairly minor due to water application needs (refer to management).

During operations, sawdust particulates comprise potential for pollutant emissions, with significant risk for staff if unmitigated. With processing conducted inside facilities, sawdust will not affect the airshed and nearby residents. Impacts from inhalation of wood dust range from nuisance level to very serious health hazards. Issues are associated with inhalation of sawdust having natural chemicals of the wood, bacteria, moulds, or fungi that can impair health. The primary risk for impacts is to the Project workforce that have the potential for acute and chronic exposure to those components of sawdust that pose a health risk.

Trucks hauling raw logs through settlements having MTP plantations will present risk for nuisance level dust emissions and impacts to roadside households where community access and plantation access roads are shared. This will only occur approximately every seven years, during harvest and site preparation for the next rotation.

Management

Construction phase dust will be minimised through water application. To compact the footprint to meet engineering requirements, the surface will need to be sufficiently moist. This will minimise dust emissions to the airshed. Once compacted, gravel will be added to areas not having facilities, minimising potential for dust generation.

Management to minimise risks for community health and safety comprise Mill design controls. Activities that will generate sawdust will be conducted within closed areas, limiting the volume that will be emitted to the airshed.

MTP and contracted staff exposed to sawdust will be provided appropriate dust masks. Formal weekly monitoring throughout construction and operations and informal daily monitoring during operations will include assurance that appropriate PPE is used by those at risk to exposure.

During hauling operations through settlements, MTP will apply water as a dust suppressant on unsealed roads within the settlement area when hauling is conducted during the dry season.

Conclusions and Residual Risk and Impacts

Communities

Water application to the Project footprint during construction will limit the concentration of particulates added to the airshed, minimising the risks for nuisance impacts at neighbouring households. With appropriate management, residual impacts are expected to be **Low**.

Water application to sections of timber haul roads in settlement areas will reduce the significant but short-duration unmitigated risk for nuisance dust impacts to anticipated **Low** residual impacts four household adjacent haul roads.

Staff

During construction, staff may be subjected to exposure to significant volumes of airborne dust. During operations, potential air quality impacts for Mill workers is expected to be limited to airborne sawdust. The provision of appropriate PPE (i.e. dust masks, goggles), and routine monitoring to ensure correct and on-going PPE usage will minimise the potential for impacts from particulates and sawdust to an acceptable level, with residual impacts considered **Negligible**.

4.4 Noise

Baseline ambient noise conditions reflect the cumulative existing noise emissions in the Project Area. Due to the Project Area proximity to National Road 13, vehicular traffic has been identified as the primary source of noise emissions in the Project Area.

The results of the noise baseline surveys are provided in Table 4-1 and Table 4-2. LAeq (ambient continuous equivalent sound in dB(A) does not exceed IFC guidelines or Lao PDR noise standards, however LMax was above IFC guidelines during each monitoring day.

Table 4-1 Baseline noise emissions at Project ambient monitoring site, December 21-23 2019

Parameter	21/22 Dec	22/23 Dec	Guideline Levels		
			IFC Noise Guideline (daytime) (dBA)	IFC Noise Guideline (nighttime) (dBA)	Lao PDR ambient noise standard (24 hr) (dBA)
Maximum dB(A)	75.7	76.0	55.0	45.0	70.0
Average dB(A)	45.3	45.6			
LAeq (dBA)	50.8	50.8			

Road traffic was the primary contributor to noise emissions at the nearest sensitive receptor (ambient monitoring location). Village activities also contributed to ambient noise at the nearest households to the Mill site.

Table 4-2 Emissions recorded at variable distances from National Road 13

Distance from NR13	6 metres	15 metres	122 metres
Sampling Duration	10 hours	22 hours	17 minutes
Maximum dB(A)	88.0	81.0	73.4
Average dB(A)*	58.2	45.4	47.8
LAeq (dBA)	70.2	61.8	47.8

*Duration is variable; thus, averages and LAeq reflect sampling time (only 15m location including night time sampling).

Issues and Findings

Unmitigated noise emissions from construction and Mill operations would provide significant risk for impacts to nearby households. The site is approximately 375 metres from the nearest household.

Noise modelling conducted for this site indicates that daytime noise emissions at the nearest households from the Mill will peak at approximately 52 dB(A) during the day and night-time noise emissions will peak at approximately 38 dB(A). These noise levels do not exceed national standards nor Project international standards for noise emissions. Though modelling was conducted for peak emissions, modelling results are estimates and monitoring will be needed to confirm noise levels at receptor sites.

Modelling indicated that the nearest households are at risk for nuisance level noise, because it is likely to be nearly constant throughout the day, but at moderately low decibels. Night-time emissions from the Mill are significantly

less than noise emitted from vehicles on National Road 13, due to Project limitations on operational activities that may be conducted during the day.

Noise levels will be significantly higher within the Mill (i.e. > 110 dB(A) at noisiest sites). Unmitigated noise at these levels pose a significant occupational, health, and safety risk from acute or chronic exposure. In the absence of suitable hearing protection, some staff would be exposed to noise emissions that exceed thresholds considered safe (e.g. 85 dB(A) for 8 hours per day or higher for shorter periods of exposure).

Management

Construction phase noise will primarily be mitigated by: (i) restricting construction to daylight hours; (ii) placement of mobile noise emitters (e.g. diesel powered generators) as far as practicable from sensitive receptors; and (iii) requiring contractors and MTP staff to adhere to speed limits, hauling hour restrictions, and additional measures listed in the ESMMP Traffic Management Subplan.

During operations, noise abatement measures to minimise impacts for community receptors is primarily managed through Project design. The veneer production line, sawmill, and wood chipping facilities will be inside steel-sided enclosed structures. The site will be surrounded by a vegetated buffer, which will further abate noise emissions at receptor sites.

Noisier activities (sawmilling, and wood chipping production lines) will be limited to nine hours per day during daylight hours. Veneer peeling will be limited to 12 hours per day. Veneer drying and hauling activities will be limited to 18 hours per day, avoiding peak sleeping hours.

Contractors and MTP staff will be provided appropriate noise protection PPE, with earplugs required in all areas where noise exceeds 85 dB(A). Formal weekly monitoring will be conducted throughout construction and operations, with daily informal monitoring to enhance the safety culture at the site.

Noise monitoring will be conducted routinely throughout construction and operations. If guidelines are exceeded, or local residents lodge grievances; adaptive management will be required. The primary measure for minimising noise during operations would be enclosing the debarker in a facility.

Conclusions and Residual Impacts

Noise from construction and operations of the Mill poses a high risk for nuisance level impacts and a low risk for health impacts to neighbouring residents. The Mill has been designed to minimise emissions to an acceptable level during the day, and prohibition of noisy activities during night-time hours will mitigate risk, with worst case scenario impacts expected to be nuisance emissions at community receptors. The MTP **Grievance Mechanism** will be an important feature in determining whether households are impacted, and adaptive management strategies required. Residual impacts are expected to be **Moderate** during the day (due to frequency) and **Low / Negligible** at night for community receptors.

Noise emissions in the Mill may be high enough to cause hearing damage (and associated impairments) for staff. Provision of appropriate PPE, and monitoring for its continued use will mitigate risk for construction and operations staff to an acceptable level, with residual impacts expected to be **Nil**.

4.5 Additional Impacts

Climate, greenhouse gas and climate change

Predicted Scope 1 (direct) and Scope 2 (indirect) emissions were modelled for the ESIA. During Project construction, Scope 1 emissions were modelled at approximately 1,244 tCO_{2e}; comprising (by order of magnitude) stationary fuel use, land clearing activity, and transport fuel. Construction phase Scope 2 emissions, modelled at approximately 0.01 tCO_{2e}, comprise grid electricity use. During operations, Scope 1 emissions modelling predicted emissions of 4,276 tCO_{2e} per year, by decreasing order of magnitude comprising: transport fuel (diesel), grid

electricity, stationary fuel (diesel), transport fuel (petrol), and grease. Scope 2 emissions modelling predicted emissions of 1,483 tCO_{2e} per year, comprising grid electricity use.

As the Mill will be powered by grid electricity and the facility requires haulage of raw logs to the site and products to gate, greenhouse gas emissions will occur. On a regional, national, international scale; the contribution to greenhouse gasses and global warming is considered **Low**.

Fire

There is some potential for combustion of sawdust in wood manufacturing facilities. Processing equipment, if unmaintained, may be a source of combustion within the Mill. Smoking, or outdoor fires within or adjacent the Mill footprint provide risk for igniting sawdust, woodchips, hydrocarbons, etc. MTP has included fire-fighting water storage tanks, will provide a suitable number of well-maintained fire extinguishers in appropriate locations, and will have electrical lockouts at appropriate locations to cut electricity supply. By incorporating management in the ESMMP into MTP's Emergency Preparedness and Response Plan, it is anticipated that fire would be extinguished quickly in the Mill, with the likelihood for significant occupational, health, and safety risk considered **Low**.

Hazardous and non-hazardous materials

The Mill will store diesel on-site which would severely impact localised water quality and soils if discharged, will have a septic system that would increase pathogen loading in surface waters if discharged, and will generate non-hazardous wastes that have the potential to impact water quality and visual amenity if unmanaged. MTP's commitments to hazardous and non-hazardous materials are considered suitably robust to minimise the likelihood of discharge to **Negligible**.

Traffic and road infrastructure.

A traffic survey conducted for this ESIA found that 1,870 vehicles passed the Project site on September 25, 2019 between the hours of 08:00 to 18:00, with 150 of these vehicles being heavy trucks. MTP anticipates an average of 16 haul trucks per day for raw logs and 10 haul trucks per day for finished product. MTP operations will not significantly impact traffic / road congestion. However, adding 17% to the heavy truck use on National Road 13 provides some risk of accelerating road deterioration and maintenance requirements. With National Road 13 being well maintained in the Project Area, impacts are expected to be **Low**.

5. BIOLOGICAL SETTING AND ASSESSMENT

Whilst risk assessment for terrestrial and aquatic biodiversity identified low risk for impacts resulting from Project implementation, a summary evaluation for each is included in this Executive Summary due to the importance of natural resources in the region.

5.1 Terrestrial Biodiversity

Baseline Conditions

The proposed Project footprint, planned for development within the MTP concession area for its forestry operations, is currently comprised of two year old Eucalyptus trees (Plate 5-1), with several native and non-native herbaceous and shrub species in between tree rows that are actively controlled as part of the operations' weeding regime. During botanical surveys of the Project footprint, including the access road and adjacent land, no flora species of conservation significance were identified. The terrestrial flora species composition and habitat value within the disturbance area of the Project footprint is very low. The site is surrounded by additional Eucalyptus and Acacia plantations, agricultural land including lemongrass and downstream paddy rice, settlement area, and significant vehicle use of nearby National Road 13, each decrease the value of the land for terrestrial biodiversity and habitat connectivity. The only moderately high value habitat occurs alongside the Houay Heua, where riparian vegetation, though disturbed, is relatively intact in some areas (Plate 5-2).

Small populations of terrestrial fauna may be found within the Project footprint, most of which are likely transient, passing through the area due to its poor habitat value. Several species such as small mammals (e.g. rodents) and reptiles may inhabit the site.



Plate 5-1: Vegetation on Project footprint



Plate 5-2: Disturbed riparian forest adjacent Houay Heua

Issues and Findings

The proposed Mill site currently has poor quality habitat for terrestrial fauna. The site was previously cleared of native vegetation for the former LPFL plantation forestry project. Remnant natural vegetation on the footprint comprises native and non-native shrubs and herbaceous plants that have survived periodic weeding operations. The site is also 450 m from National Road 13, further diminishing its habitat value.

The plantation at the site was harvested in 2017, with a new plantation established in 2018. The site is currently comprised of 1-2-metre-high Eucalyptus trees with scattered native and non-native shrubs. None of the plants on-site were found to be of conservation significance during the conduct of botanical surveys for this ESIA (December 2019).

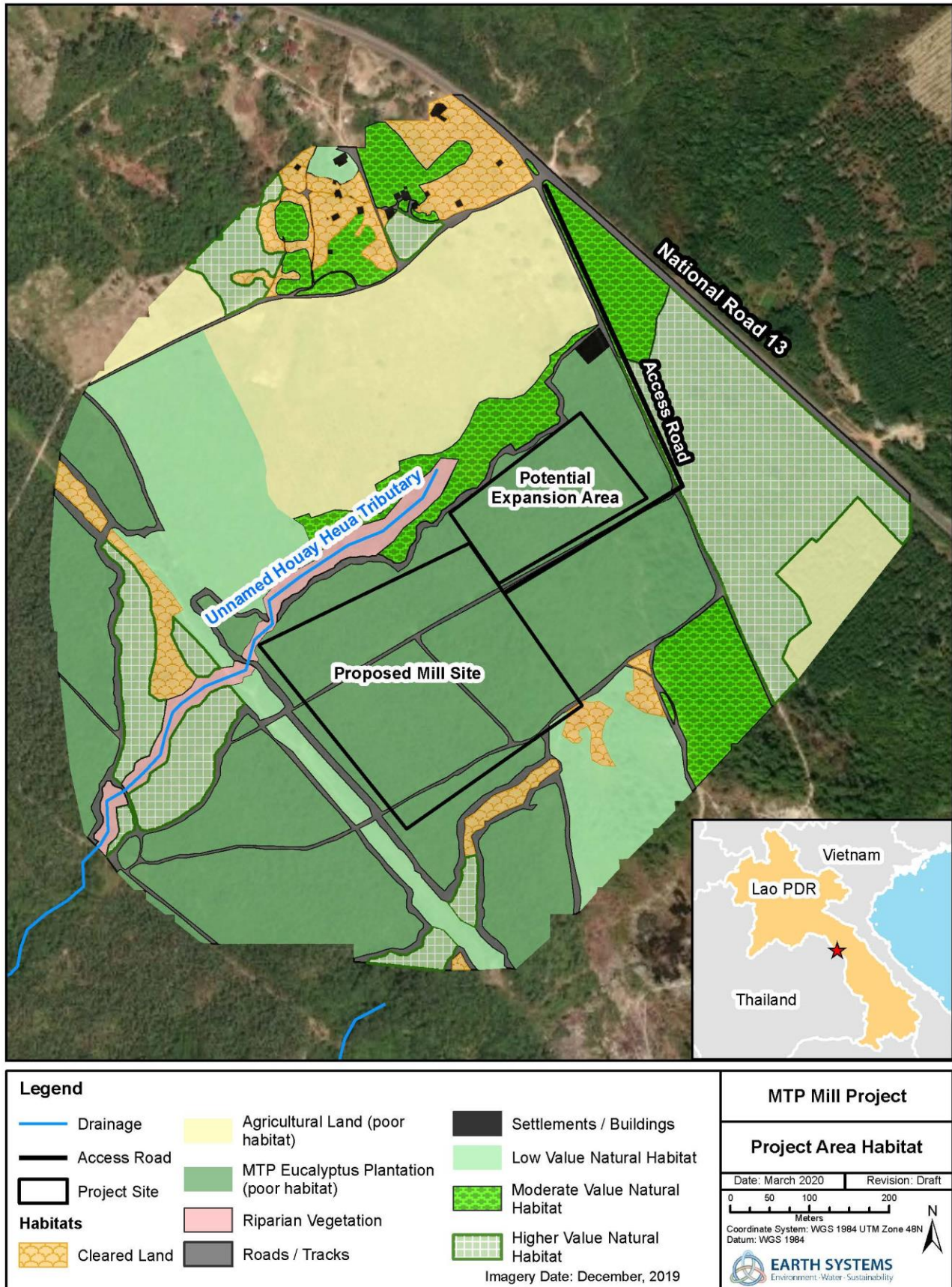


Figure 5-1: Indicative Project Area terrestrial habitat value

Database searches (IBAT and IUCN) and village consultation identified several terrestrial fauna species of conservation significance that may occur in the region (refer to Table 5-1). No mammals have current ranges that include the Project Area. Two bird and two reptile species are considered potential candidates for impacts to threatened fauna. It is considered unlikely that Project implementation will impact these species, with the likelihood for significant populations at the site considered very low.

Table 5-1: Terrestrial fauna identified in site surveys and village consultations

Scientific name	Lao name	Common name	IUCN status
Birds			
<i>Gallinago nemoricola</i>	Nok khee ka deuan / Nok thaeng ien	Wood snipe	VU
<i>Picus rabieri</i>	Nok sai sy deng	Red-collared woodpecker	NT
Reptiles			
<i>Indotestudo elongata</i>	Tao Pheung/ Tao pheak	Elongated Tortoise	CR
<i>Ophiophagus hannah</i>	Ei la khor lueam	King cobra	VU

LC= Least Concern; VU = Vulnerable; NT = Near Threatened; CR = Critically Endangered; NA = Not Assessed

Management

The site will be surrounded by a chain-link fence, prohibiting all but the smallest fauna from entering and being impacted by operations. The construction workforce will be prohibited from hunting or collecting timber forest products or non-timber forest products in and adjacent the Project footprint.

The Project footprint and road alignment have been minimised to the area needed for the Mill operations. Impacts will be confined to the removal of low value habitat and replacement with no habitat for terrestrial biodiversity.

No riparian vegetation will be cleared during Mill construction. A buffer from streams has been applied to design engineering to avoid the only higher value terrestrial habitat in the Study Area

Conclusions and Residual Impacts

The risks for impacts to terrestrial flora are very low during Project construction and operations. No high-quality habitat exists on the site, with vegetation having been cleared recently and multiple times. During December 2019 surveys on the site, no threatened species were found within or adjacent the site. Residual Impacts to terrestrial biodiversity will be **Negligible**.

Project development and operations will not pose a risk to terrestrial fauna in the area due to the highly degraded nature of the current habitat and proximity to neighbouring villages, industry, and National Road 13. Vehicular movements of construction personnel and MTP staff poses a Moderate risk for fauna from vehicle strike, but not to populations of species. With driver training and enforcement of safe driving practices (identified in the ESMMP) it is anticipated that impacts will be **Negligible**.

5.2 Aquatic Biodiversity

Baseline Conditions

The proposed Project footprint is adjacent but outside (by at least a 15 m buffer) the Houay Heua stream. The Project footprint resides adjacent the headwaters of this stream, with very low water volume relative to further downstream. The streams immediately adjacent the Project site support fish populations and may be important for spawning.

According to village surveys for this ESIA, fish and other aquatic fauna populations in the Houay Heua have declined over recent decades, reportedly a result of overfishing. More information is known about the fish species than any other aquatic fauna. During the conduct of focus group discussions for this ESIA, Ban Danhi and neighbouring village residents recorded catching at least eight different species in the Houay Heua, with none

listed as threatened according to the IUCN Red List (2020). Due to a lack of robust sampling in the stream system, it is considered likely that more fish species reside in the system or migrate up the streams to spawn in headwaters or flooded areas adjacent the streams. Database searches for the area identified several threatened fish that have potential to inhabit or seasonally migrate to the stream.

The Houay Heua discharges to the Houay He, a first order tributary to the Mekong River. Some species will migrate from the Mekong into the Houay He and Houay Heua during the rainy season to spawn in-streams or flooded areas and will return to the Mekong at variable times, pending species.

Issues and Findings

Aquatic biodiversity is not expected to be directly impacted by Project construction or operational activities. There is some potential for impacts to water quality (as above) which, in the extreme, may compromise the integrity of aquatic habitat and aquatic biodiversity.

The primary impact to water quality is expected to be some sediment loading in the upper reaches of the Houay Heua during construction, with considerable dilution of downstream waters. The many tributaries of the Houay He provide sufficient water to mitigate the effect of finer fraction sediment that is not captured by the Project settling ponds.

Tannin and lignin, which have high biological oxygen demand (BOD) and chemical oxygen demand (COD), present a risk for consuming dissolved oxygen in receiving waters and thus degrading aquatic habitat. As dissolved oxygen was measured at slightly above 6 ppm during December 2019 monitoring, this impact could be significant if the volume of leachate from the stockpiled Eucalyptus is discharged to the Houay Heua.

Accidental spillage of hydrocarbons presents a significant risk (low likelihood / high consequences) to aquatic biodiversity.

Management

Management to mitigate potential impacts will be similar to water quality management measures, focusing on:

- ▶ Implementation of stormwater, erosion, and sediment control at the construction site during the early phases of construction. Surface waters from outside the construction area will be conveyed via purpose-built channels to the Houay Heua;
- ▶ Surface water from within the Project footprint will be conveyed in channels to passive treatment ponds, which will allow for microbial breakdown of nutrients, tannin, lignin, and other potential water quality parameters of concern for aquatic fauna and habitat and settling of coarser grained particulates;
- ▶ Hazardous chemicals (hydrocarbons) will be transported, stored, and handled according to a robust strategy detailed in the ESMMP;
- ▶ Emergency preparedness and response planning will require spill kits and training of staff in the event of a spill;
- ▶ Water quality in the treatment ponds will be monitored, to ensure that water discharging from the site meets national and select international standards; and
- ▶ Contractors and staff not hired from Ban Danhi will be prohibited from fishing or collecting any aquatic fauna from within the village boundaries.

Conclusions and Residual Impacts

The design controls to mitigate potential impacts to receiving waters are considered suitably robust. Stormwater, erosion, and sediment controls implemented at the onset of construction will limit sediment loading of the Houay Heua and dilution from the downstream tributaries of the Houay He will reduce risk of residual downstream impacts to **Low**, with Moderate likelihood but Minor consequences.

While the potential risk for hydrocarbon spill cannot be completely mitigated, the management measures prescribed for water quality and hazardous materials are considered suitably robust to minimise risk for residual impacts to **Negligible**.

The design of the passive treatment ponds is considered suitable to provide for microbial breakdown of much of these elements. This, along with dilution, minimises the risk for residual impacts to **Low**.

6. SOCIO-ECONOMIC SETTING AND ASSESSMENT

6.1 Land and Assets

Baseline Setting

The proposed Mill site resides within the administrative boundary of Ban Danhi village, comprised of approximately 75 households.

The Mill site and access road are currently within the MTP Plantation Operations Concession Area and would comprise the conversion of a young Eucalyptus plantation to a Mill site. The MTP concession for the Plantation Project commenced in 1999 with a 50-year Concession Agreement. The MTP lease agreement (also through 2049) allows for infrastructure development in support of MTP operations.

A current access road connects the site to National Road 13. The Project will upgrade this road, requiring little or no land acquisition.

Predominant local land uses in the Project Area includes additional MTP Eucalyptus plantation, a 1 ha rubber plantation, a 12 ha commercial lemongrass agricultural plot, Ban Danhi settlement area, an industrial white charcoal facility (700 m to the north), a 1.3 ha downstream rice paddy (not currently utilised), and remnant disturbed though higher value riparian habitat (refer to Figure 6-2).

Issues and Findings

MTP will implement the Mill under their current concession agreement and lease agreement. The land, currently comprised of MTP Eucalyptus plantation, currently provides no land use benefits to the community. Short-to moderate term land impacts will be limited to the conversion of this land from a plantation to a mill site. This conversion will provide benefits (e.g. job opportunities and other socio-economic benefits) and potential impacts (e.g. noise, dust, visual amenity). The direct and indirect benefits and impacts of conversion from plantation to industrial mill are discussed in applicable sections of this report, the ESIA and ESMMP.

During the conduct of surveys for this ESIA, and during stakeholder consultation conducted by MTP with Ban Danhi village authorities and community, residents were supportive of Mill development due to the prospect of job opportunities.

There will be no physical displacement of households or impacts to land currently utilised by Ban Danhi villagers or other landowners (Figure 6-1). The access road will utilise a current road connecting National Road 13 to the proposed Mill site. This road will be upgraded to withstand heavy trucks (i.e. shaped, contoured, compacted, and gravelled). Road widening may require acquisition and compensation for a small area of land adjacent the first 175 m of the road. If land outside the MTP concession area is required, an agreement for fair and equitable compensation would be required.

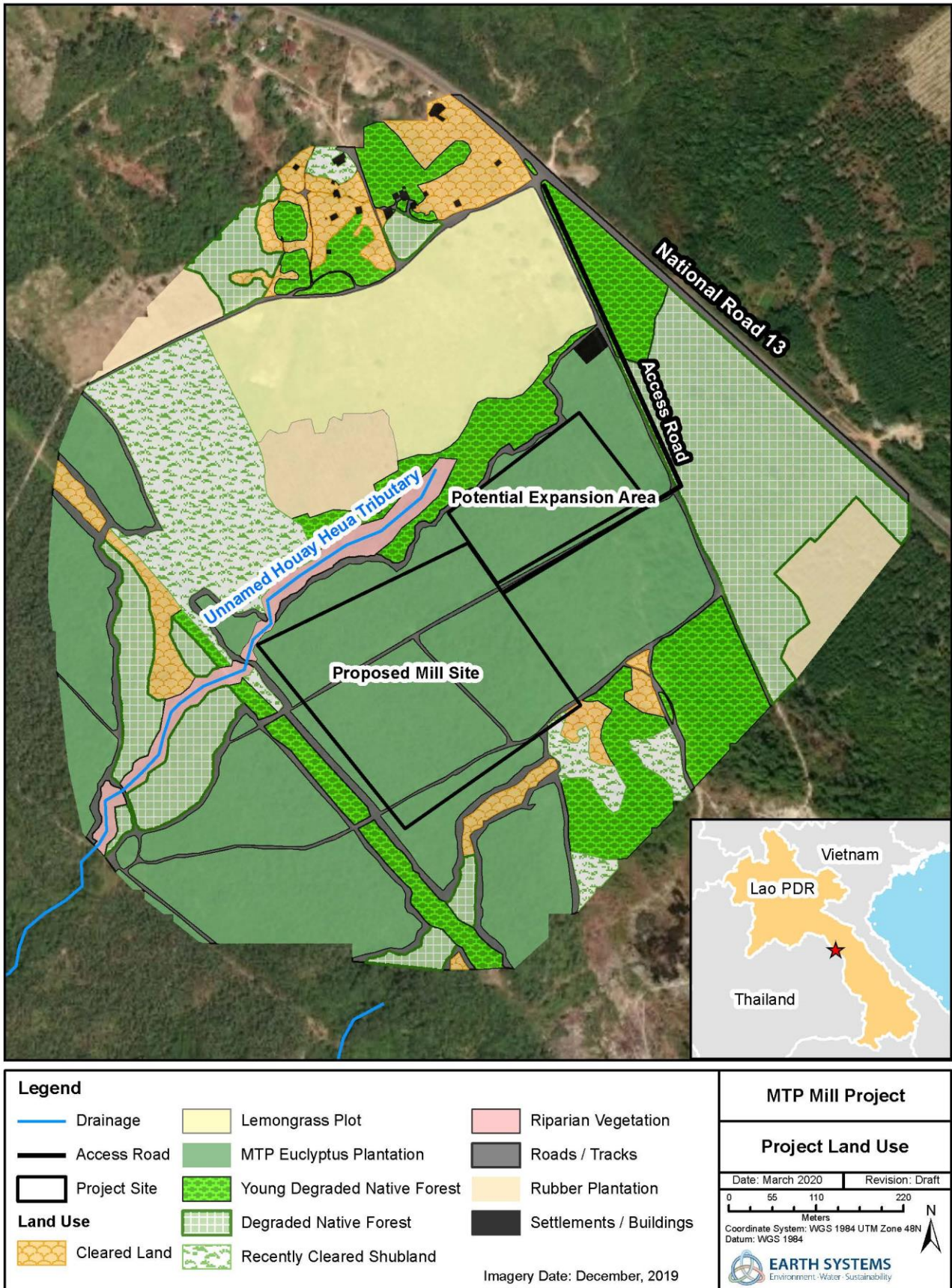


Figure 6-1: MTP Mill Footprint and nearby land use

Management

MTP and Earth Systems have conducted separate stakeholder engagement, to inform the village and acquire consent for the conduct of the ESIA, respectively. Village authorities and those interviewed for this ESIA were supportive of Mill development.

MTP and Earth Systems will need to continue consultation with the Ban Danhi community throughout the ESIA process to ensure the Project development is in-line with national regulatory obligations.

This is currently being managed through a stakeholder consultation process with the Ban Danhi community and village authority as well as applicable District and Central Government authorities (refer to Volume D, Public Consultation and Disclosure Plan). Ongoing stakeholder engagement will be required of MTP, with agreement from applicable Government authorities a pre-requisite for Project development.

Conclusions and Residual Impacts

Project related impacts to land and assets will be limited to the conversion of approximately 7 - 10 hectares of land within the administrative boundary of Ban Danhi from plantation to an industrial wood processing facility. As the area is currently utilised only by MTP, there will be no physical or economic displacement or new direct land loss related to Mill development.

Associated direct and indirect benefits and impacts from conversion of MTP land use are discussed in applicable sections below.

Ban Danhi villagers surveyed for this ESIA were receptive to the proposed Mill implementation, with none interviewed objecting to its development, reportedly due to potential job opportunities. Given the proportion of Ban Danhi the Mill footprint comprises, and reported support from the community, impacts are considered **Low**, with potential for benefits for those that gain employment.

To ensure the Project compensates for land use changes adjacent the settlement, it is recommended that an agreement for employment and community development planning is formed between Ban Danhi and MTP.

Prior to relinquishment of the land upon Project closure, MTP will need to investigate for land contamination associated with hydrocarbon storage and use and sewage facilities, ensuring Ban Danhi community land is suitable for post-industrial land use.

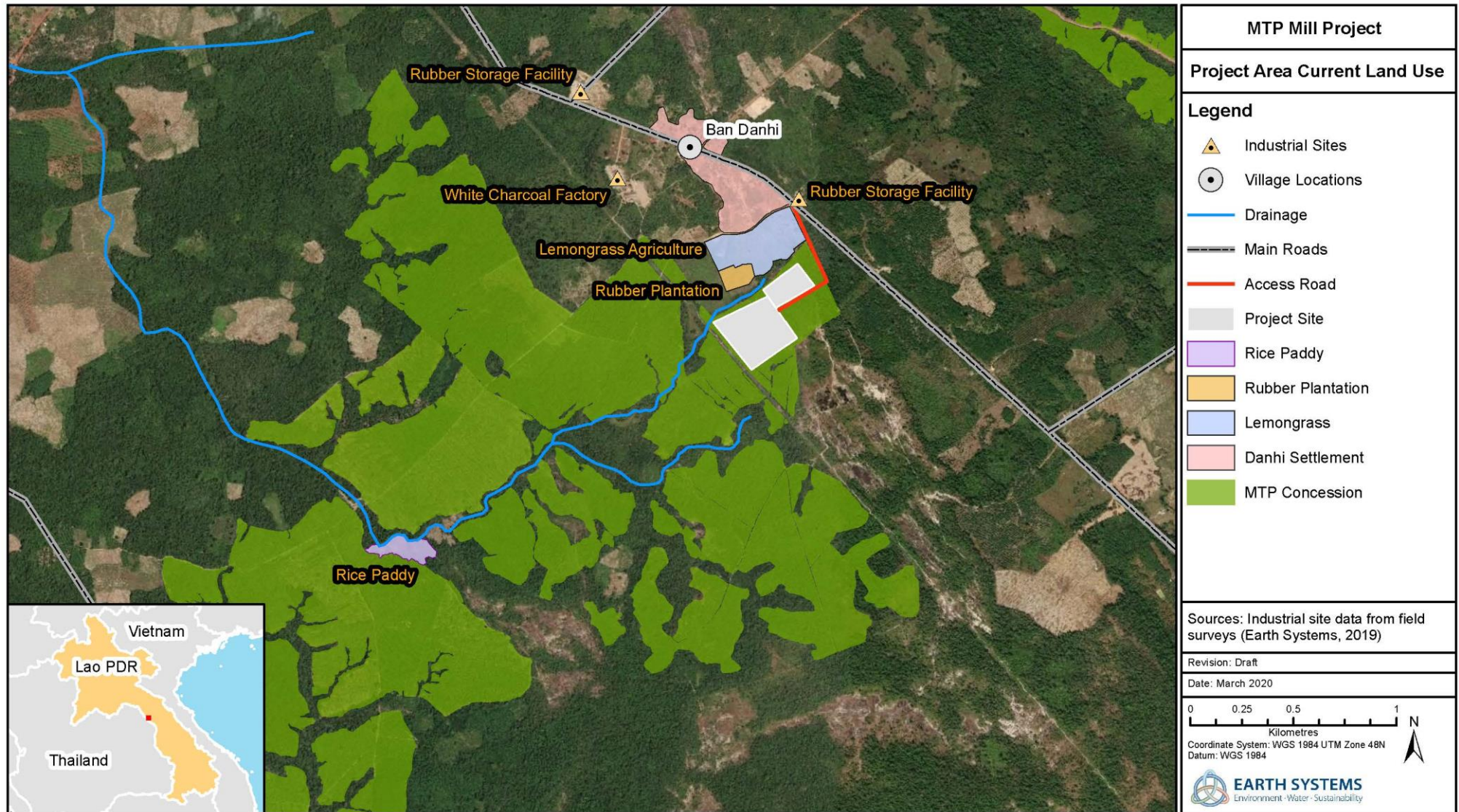


Figure 6-2: Mill footprint and nearby land use

6.2 Economic Development and Employment

Baseline Conditions

Wealth and Poverty

The region is experiencing a growing industrial sector. This may be attributed to the establishment of the Special Economic Zones / Areas near the capital district (Thakhek), the development of the East-West link where the Thakhek Friendship Bridge was built and completed in 2011, and the location adjacent National Road 13. In 2015, Lao census data indicated that Hinboun District had the second highest District Gross Domestic Product (GDP), individual GDP, and GDP growth, behind only Thakhek District for Khammouane Province for each category.

Surveyed villagers for this ESIA were asked to categorise their respective households into one of the four following categories: 'very well-off', 'sufficiently well-off', 'poor with some land' or 'poor with no land', with indicative average income provided for each category.

Four of the five nearest village surveyed for this ESIA indicated that the greater majority perceive themselves 'sufficiently well-off' or 'very well off', with perceptions of poverty ranging from 2 – 6% of households. Alternatively, residents of Ban Houay Heua, with the primary settlement further from National Road 13 reported significantly lower perceptions of wealth and poverty (Table 6-2).

Table 6-1: 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	
	% HH	Ave. annual income (M kip)	% HH	Ave. annual income (M kip)	% HH	Ave. annual income (M kip)	% HH	Ave. annual income (M kip)
Ban Danhi	-	-	94	28	6	7.2	-	-
Ban Houay Heua	1	10	11	6	65	2.5	12	1
Ban Phonsoung	-	-	83	15	2	2	-	-
Ban Thasomhong	-	-	85	12	2	0.9	-	-
Ban Nongluang	16	20	84	10	-	-	-	-

Source: ES Village Survey 2019

Disadvantage People

Figure 6-3 presents data regarding disadvantaged households in the Project Area. Disadvantages 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 dependants and low income;
- ▶ Households with no labour; and
- ▶ Households with infirm or elderly persons.

According to the data collected from each of the Project Village, 26% of the Project households fall into one of the disadvantaged categories. The proportion of 'single-female-headed' households shows the greatest percentage (16%) of all, followed by households 'below poverty line' constituting 5%. Households with 'no labour' and 'with disabled persons' each share 3%. There is no report on households without land in the Project Area.

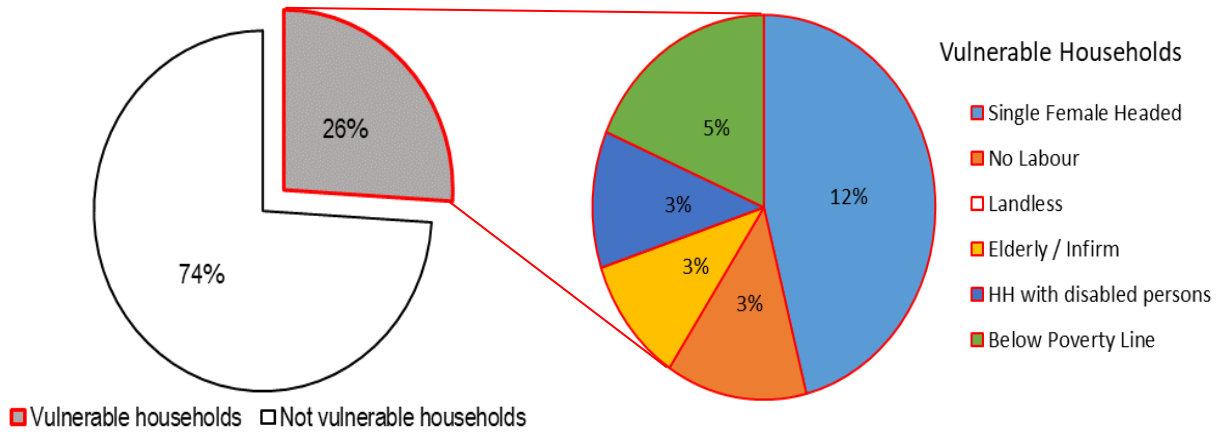


Figure 6-3: Percentage of vulnerable households by categories in the Project Area

Ethnicity and Religion

Data on ethnicity and religion in the Project Area was collected during the Village Survey in December 2019 and is presented in Table 6-2. It is reported by all the village authorities that 100% of the Project population is Laoloum and practice Buddhism.

Table 6-2: Ethnicities of the surveyed population in the Project Area

Village Name	Ethnicity (% of population)				Religion (% of population)		
	Laoloum	Khmu	Hmong	Other	Buddhist	Christian	No religion and not identified
Ban Danhi	100	-	-	-	100	-	-
Ban Houay Heua	100	-	-	-	100	-	-
Ban Phonsoung	100	-	-	-	100	-	-
Ban Thasomhong	100	-	-	-	100	-	-
Ban Nongluang	100	-	-	-	100	-	-
Hinboun District*	98	-	-	2	95.3	2	2.7

Issues and Findings

Implementation of the Mill is not expected to provide risks for any negative economic impacts. Mill construction will require approximately 40 personnel and operations is expected to require 93 personnel.

MTP is committed to hiring employees from local communities. Therefore, it is anticipated that a significant proportion of these 133 employees will be local, with increased revenue potential. Cash injection into the region may create some spin-off benefits, as local employees are likely to spend money at local shops.

An additional indirect benefit is for the MTP plantation outgrowers, who are expected to have Eucalyptus growing in small plots in the region as part of the MTP Outgrower Scheme. This will provide an outlet for these farmers, and increase their competitive advantage, with more options for selling their timber.

In Lao PDR, ethnicity rather than indigenous peoples (e.g. for IFC Performance Standard 7) is more applicable with respect to evaluation of potentially disproportionate impacts. There was no ethnic diversity found in the villages surveyed, with the nearest villages comprised of Lao Loum, which is not an ethnic minority group. Ethnic minorities therefore will not be disproportionately impacted.

Disadvantaged people will not be disproportionately impacted by Mill development, as the small land area currently comprises Eucalyptus plantation, with no NTFP or TFP collecting reportedly conducted by the local

community, and land use rights prohibiting agricultural development on the approximately 7 ha plot. Disadvantaged people will have opportunity for employment with MTP.

Management

MTP will manage human resources by:

- ▶ Implementing its 'locals first' hiring policy. Unskilled labour positions will be provided to residents of Ban Danhi or neighbouring communities to the extent practicable;
- ▶ Prioritising local resident employment for skilled labour positions;
- ▶ Prioritising hiring from disadvantaged households to the extent practicable;
- ▶ Provision of employment without bias with respect to gender, ethnicity, religion, etc.; and
- ▶ Implementing a training programme to enhance the skills of select employees working in unskilled labour positions to transition into skilled labour positions over time.

To the extent practicable MTP will procure supplies for Mill construction and operations from local communities or Hinboun District industrial suppliers. Local procurement will be favoured if quality standards are met and unless cost prohibitive.

Conclusions and Residual Impacts

The construction and operation of the Mill will not create negative socio-economic impacts. Ethnic minorities and vulnerable households will not be disproportionately impacted by the Project, with equal opportunity employment policies and hiring without bias.

With most of the 93 Mill employees hired from the nearest villages, the Mill will provide a **Moderate** benefit to the regional economy and a **High** benefit to select households.

6.3 Archaeology and Cultural Heritage

Baseline Conditions

According to the results of village interviews, field surveys by a specialist, and literature review; there are no known sites of archaeological significance within or near the proposed Mill site.

Each of the villages surveyed in the Project Area have several sites of cultural significance, ranging from temples and other permanent structures to natural areas having spiritual importance. Ban Danhi was inhabited only approximately 30 years ago after residents moved from nearby Ban Pongfan. Several natural features exist in the region that are culturally significant. Ban Houay Heua, located approximately four kilometres downstream of the proposed Mill site, has been inhabited for more than 300 years, and has a greater number of constructed sites and natural areas of cultural significance.

In Ban Danhi, several sandstone formations exist within the village boundaries. These features, including Dan Phachanh, Dan Morkhang, and 'Houay Heua Barge' (a reach of the stream where stone on each side resembles a barge), and additional formations are of spiritual importance for some residents of the village. None of these formations occur within the Project footprint or access road. The nearest formation of significance is more than 500 m to the southeast of the Mill site.

Some natural features of cultural significance occur within the Houay Heua stream channel and therefore are of significance to the Project. These sites could be impacted in the event of a significant impact to water quality in the Houay Heua stream, including:

- ▶ **Water sanctuary** - there are some large rocks that form an islet surrounded by water flow of Houay Heua stream. Cumulatively, the islet, some wetland vegetation and trees provide the atmosphere which serves as an ideal place for conducting some sacred ceremonies, particularly the ordination ceremony. The deputy chief of Ban Houay Heua explained to the ESIA survey team that this place has been used by

monks and laic people for ordination ceremony by making a temporary wooden shelter in the middle of the stream;

- ▶ **Taurus stone** - On the western tip of the village where sandstone formations shape various stone features on Houay Heua creek, residents come to enjoy bathing and picnic at this place. Approximately 100 m downstream of the bridge there are a complex of ceremonial settings cover the area about 50 m radius e.g. Taurus shape stone, stone stupa and water sanctuary; and
- ▶ **Water well** - On the right bank of Houay Heua creek there is an 'ancient communal water well' which is considered as the only source of clean water for a portion of the village for all seasons. Though to the outsider the site may seem more utilitarian than cultural, the deputy chief included this site as an area of cultural significance for inclusion in the survey.

Several additional natural and anthropic significant sites occur within Ban Houay Heua. These will not be affected by the Project noise or other emissions.

Issues and Finding

It is considered unlikely that sites or artefacts of archaeological significance will be uncovered during earthworks for Project construction, though it is feasible given the relative proximity to the Mekong and Hinboun Rivers enhancing the likelihood of ancient inhabitation.

Anthropic and natural sites of cultural significance exist in each of the five villages surveyed for this ESIA. For all but a few, there is no risk for impact related to Mill construction or operation.

Impacts in Ban Danhi should be limited to potential noise disturbance during prayer or otherwise culturally significant activities.

There are several natural sites of cultural significance within the Houay Heua stream channel. Surface water from the Mill will discharge to the Houay Heua. Impacts to water quality provide risk for indirect impacts to cultural values, as features such as the Ban Houay Heua Water Sanctuary were reportedly selected based on their visual amenity. Turbid or polluted discharge from the Mill site presents risk for impacts to cultural values, particularly if ceremonial activities or leisure activities occur concurrently. This risk is expected to be a short duration, with impacts likely limited to the first rainy season during construction.

Management

The ESMMP specifies the ***Chance Find Procedure*** that will be followed in the event of discovery of an artefact or site of archaeological or cultural heritage. Work will be halted in the area until the appropriate Government authority authorises a resumption of activity following assessment.

Most of the sites of current cultural significance are easily avoided and will not be impacted by Project construction or operations.

Design controls have been included to minimise noise emissions, and potential impacts to cultural or religious activities will need to be managed via the Project ***Grievance Mechanism*** (ESMMP).

The existence of sites of significance within the Houay Heua stream channel provides added priority for robust water quality management. The management measures identified for erosion and sediment control, sewage management, and hazardous and non-hazardous waste management will need to be diligently applied. Adaptive management will be considered in the event of a grievance lodged through the Project ***Grievance Mechanism***.

Risks and Residual Impacts.

The risk to archaeological sites of significance is considered **Very Low**. With implementation of the Chance Find Procedure (ESMMP), the risk for impacts is considered **Negligible**.

Sites of cultural significance are within relatively close proximity, providing some risk for noise impacts (e.g. temple). This issue will require careful management and potentially adaptive management if grievances are lodged. The risk for impacts to cultural sensitivity in Ban Danhi is considered **Moderate**.

Downstream natural sites of cultural significance will likely have **Moderate** level impacts due to increased turbidity for 1-2 rainy seasons during construction. Operations phase impacts are expected to be **Nil**.

6.4 Community Health and Safety

Baseline Conditions

Data from the village survey reveals that most people suffered from various types of illnesses at some point during 2019, including: diarrhoea, seasonal flu/cold, measles and ulcer. Table 6-3 shows the ranking of five top illnesses reported by the Project Villagers. Number 1 represents the most frequent illnesses that occur, while number 4 represents the least frequent illnesses. According to the data, seasonal flu/cold is the most common illnesses for many villages. Other diseases reported include stomach-ache, malaria, joint pain etc. Four in five villages reported that the most common cause of death is old age. Only Ban Phonsoung stated that various diseases are the cause of death in their village.

Table 6-3: Top five illnesses reported in the last 12 months in the Project villages

Village	Ranking (1 - 4)				Common cause of death
	1	2	3	4	
Ban Danhi	Diarrhoea	Seasonal flu/cold	Nervous disease	-	Old age
Ban Houay Heua	Seasonal flu/cold	Stomach-ache	Gout	-	Old age
Ban Phonsoung	Seasonal flu/cold	Diarrhoea	-	-	Various diseases
Ban Thasomhong	Measles	Seasonal flu/cold	Joint pain	-	Old age
Ban Nongluang	Ulcer	Malaria	Arthritis	Seasonal flu/cold	Old age

Source: ES Village Survey 2019

Project villages have good access to health facilities and services. Table 6-4 identifies that there are three main types of healthcare facilities available in the region, which comprise health centres, clinics and hospitals. Ban Nongluang is located nearest to the district hospital, whilst residents of Ban Phonsoung need to travel the furthest (Table 6-4).

The GOL has made a concerted effort to improve vaccination rates for various ailments in the region, with monthly visits (on average) for four of the five Project villages, and quarterly visits for Ban Phonsoung.

Table 6-4: Access to health facilities in the Project Area

Village	Location / distance from village to health service (km)				Most common medical facility used	Times of GOL Vaccination last 12 months
	Medicine Box	Health Centre	Clinic	Hospital		
Ban Danhi	NA	12	13	13	Souksala	12
Ban Houay Heua	NA	5	6	10	District hospital	12
Ban Phonsoung	8	8	8	19	Souksala	4
Ban Thasomhong	NA	3	15	15	Souksala	12
Ban Nongluang	NA	95	15.3	8	District hospital	12

Issues and Findings

Project construction and operations poses community health and safety risks in several respects, ranging from potential for serious injury / death to nuisance level impacts. In summary key risks for communities include:

- ▶ Injury / death to pedestrians or bicycle rider in settlements and between settlements along the hauling route for raw logs / finished product;
- ▶ Injury / death for drivers of motorbikes or vehicles along the MTP hauling route; and
- ▶ Potential for introduction or increased incidences of disease resulting from the influx of construction workers into the region.

Management

The most significant potential impact requiring diligent management is the potential for company / contractor vehicle strike of a pedestrian or other vehicle. MTP will implement a driver training program. Driver training will be job specific, such that drivers of haul trucks, excavators, dozers, forklifts, etc. will have certification of training. Issues such as maximum speed limits (particularly through towns), log load and weight restrictions, alcohol and drug prohibitions, ensuring drivers are well-rested, etc. will comprise a component of the driver induction program. Routine follow-up training will be also be provided. MTP will require construction contractors to provide written verification of driver experience and training.

As part of induction, MTP employees will have a health check, verifying that they are fit for their respective jobs and do not have communicable disease.

The MTP Mill Grievance Mechanism will be an important component of community relations for MTP. Community members will have multiple avenues for lodging complaints. MTP will need to resolve complaints in a manner that is considered acceptable to all parties. This will be particularly important for community health and safety related issues.

The ESMMP is benchmarked against national legislation and IFC Performance Standard 4 for Community Health, Safety, and Security. Standard Operating Procedures, Construction Phase Environmental Management Plans, and additional components of the MTP ESMS will similarly need to be developed and implemented to meet these obligations.

Conclusions and Residual Risk and Impacts

With a well-developed driver training program, and staff adherence to MTP driving policies, the risks for impact to pedestrians / occupants of other vehicles is considered **High**, with management measures reducing the likelihood of an accident but the consequences remaining potentially severe. The risk for accident in Lao PDR is significant, as other drivers may be at fault and community activity near roads is often considerable.

With proper screening of staff, the risk for significant illness from in-migration of the workforce is considered **Low**.

6.5 Occupational Health and Safety

Issues and Findings

There is inherent occupational, health, and safety risks for construction staff, Mill staff, and contracted drivers. Whilst these risks cannot be entirely mitigated, diligent management should reduce the likelihood for impacts. In summary, the following require management to reduce the likelihood of injury and response measures to expedite first aid / clinical care:

- ▶ Haul truck drivers and other staff driving to and from the Mill may be exposed to traffic conditions, unsafe drivers, poor quality road conditions, pedestrians and other obstacles, etc. that may lead to accidents and injury;
- ▶ Staff working near forklifts and other moving equipment may be injured through vehicle strike;
- ▶ Staff tasked with working with sawmilling equipment, veneer production, and wood chipping may be exposed to sharps and other equipment that pose serious injury risk;

- ▶ Machinery powered by electricity poses a risk for electrocution or fire if not properly engineered and maintained; and
- ▶ Noise and dust pose risks for impacts ranging from nuisance level to serious health impacts.

Management

The ESIA and ESMMP specify specific management to minimise potential impacts to MTP staff, contractors, and visitors. In summary, these include:

- ▶ Job specific training requirements for drivers, construction personnel (specified in contractor CEMP), and Mill staff to ensure each understand how to safely conduct their responsibilities and understand the inherent risks in their respective jobs;
- ▶ Working requirements such as PPE use and prohibition of alcohol or drugs that impair function;
- ▶ Engineered design that minimise the chance for staff contact with blades, electrical cords, etc.;
- ▶ Development, dissemination, and training of an **Emergency Preparedness and Response Plan** based on the Project ESMMP;
- ▶ Routine maintenance program for Mill equipment;
- ▶ Requirement for at least two trained first aid providers at the Mill site at all times;
- ▶ Appropriate first aid materials located in clearly marked and accessible locations; and
- ▶ Electrical lockout whereby equipment can be turned off from a central location in the event of an emergency.

Conclusions and Residual Impacts

There are inherent risks in Mill operations that cannot be entirely mitigated. The risk for vehicular accidents, hazards associated with working in proximity to heavy equipment, exposure to sharps, etc. present significant risk with potential for major consequences in the event of an accident. Training, routine maintenance, monitoring, and implementation of all aspects of the MTP **Emergency Preparedness and Response Plan** are required to minimise the residual impacts to an acceptable level. With robust management, OHS risks and anticipated residual impacts remain **Moderate – High**, particularly for vehicular accidents.

Additional risks, such as exposure to dust and noise are significant if unmanaged. However, PPE requirements, and diligent training and monitoring are expected to minimise the likelihood of impacts to **Low**.

Design controls, induction and routine training, and consistent management to provide for a culture of occupational health and safety will be paramount for MTP / contractor staff throughout Mill construction and operations.

6.6 Additional Potential Impacts

Ecosystem services

Residents of each of the surveyed villages reported a high reliance on natural resources for subsistence and livelihoods. However, none of those services are currently provided by the Eucalyptus plantation that currently comprises the Project footprint. Resource collection will not be impacted by converting Eucalyptus plantation to the Mill. Discharge of tannin and lignin, having high Biological oxygen demand and chemical oxygen demand, if unmanaged, has the potential to impact aquatic habitat and therefore fish populations and supply for fishers. However, the passive water treatment design for the Mill is considered suitably robust to allow for microbial breakdown of these phenols. Impacts are expected to be **Low**.

As is discussed above, there is risk for short-term **Moderate** impacts to water quality from sedimentation during construction, which has the potential to impact downstream cultural heritage sites. With stormwater, erosion,

and sediment management, this impact will likely be limited to construction phase and will be less than that from clearing of larger swaths of land during plantation harvest.

Community health and nutrition

Data from village surveys indicate that though residents are exposed to various illnesses, the morbidity and mortality rates are consistent with District and Provincial data. As the Project will employ almost solely local people, the likelihood of increased exposure to viruses, bacteria, etc. from the Project are considered **Negligible**.

Food security, qualitatively measured as rice sufficiency for this assessment, varies in the Project Area villages, with most households not cultivating rice to provide sufficiency for 12 months a year. However, due to the growing cash-based economy in the region, small scale agricultural production is not the key indicator for nutrition as for more rural communities. Assessment of wealth and poverty indicate that food insecurity is not a significant issue in the region. The Mill footprint currently provides no land for agriculture, nor NTFP for consumption. Conversion to the Mill will be limited to the permanent loss of potential agricultural area for approximately 0.2% of the Ban Danhi village administrative area. Project related impacts are expected to be **Low**, with benefits to those households that gain employment.

Fishing and aquatic resource use

Households in the five surveyed villages depend on fish for consumption and in some cases livelihoods, though the Houay Heua is not the stream fished for those that sell fish. As with ecosystem services and water quality, management for nutrients, phenols, and hazardous / non-hazardous waste will minimise the risk for impacts to surface water quality and the aquatic resources in the Houay Heua, Houay He, and Mekong River.

Visual amenity

The Mill will be visible from National Road 13 and a small portion of the Ban Danhi settlement for several years. Visual amenity will be impacted. However, Eucalyptus trees and shrub vegetation will grow in a buffer surrounding the Mill, with the upper canopy blocking direct line of site within approximately 5-7 years. Impacts to visual amenity will be **Low**, and short-term in nature.

Unexploded ordnances

Aerial bombing data indicates no / very low probability of unexploded ordnances within the Project footprint. The risk is considered **Negligible to Nil**.

6.7 Cumulative Impacts

The Project has the potential to contribute to the following cumulative environmental and social impacts in the region:

- ▶ Greater industrial activity and industrialised agriculture - The continued shift towards a market-based economy and the increase in available jobs due to the Mill Project and other developments in the area (i.e. the Hinboun Hydropower Project, White Charcoal Factory) will lead to an increased opportunity for further industrial development in the region;
- ▶ Water Resources – The Mill will utilise very little water with respect to regional groundwater availability and other water abstractors and is not expected to contribute to cumulative impacts on current and potential projects and water resource availability;
- ▶ Land Pressure – The majority of land in the region has been converted from natural vegetation / habitat to agriculture, plantation forestry, settlement, and industry. The small area of land required for Mill development will have a negligible impact on land availability and utilisation in the broader area;
- ▶ Airshed – The air quality in the region is generally good, with the exception of dry season air quality in specific locations (including Ban Danhi), due largely to intensive charcoal production, vegetation burning for agricultural site preparation, and vehicular emissions. The Mill contribution of particulates to the

airshed during construction and minor sawdust / particulate emissions during operations will have a negligible impact on air quality in the region;

- ▶ Traffic pressure – National Road 13 was designed to accommodate traffic volumes monitored for the ESIA. The continual industrialisation of the region may lead to increases in traffic volumes that will require increased road works and the potential widening of National Road 13, however the MTP Mill's contribution to this will be minimal.
- ▶ Non-timber and timber forest products – Local communities rely on NTFP and TFP for food, medicine, building material, income (e.g. for charcoal production), etc. The collection of TFP and NTFP is not currently practised within MTP concessions, therefore the loss of land for the Project will not affect current practices. However, the construction of the Mill ensures that the 6.7 (potential 9.5) ha of land necessary for the mill will not be relinquished at the end of the concession therefore, this land will permanently be inaccessible.
- ▶ The potential for future increases in plantation concessions in the region as a result of Mill operations may have a more significant impact on local communities, further restricting access to viable forested areas. However, the increasing shift to market-based economies in rural Laos (particularly in communities with direct access to major highways) may reduce the reliance of local communities on TFP and NTFP.

Key Conclusions

The Mill will make a contribution to paid employment and jobs outside of the agricultural sector in the Hinboun District and has the potential to influence further development. The development of the Mill is not expected to have any significant cumulative impact on biodiversity, water resources, the airshed and the availability of viable land due to the scale of impact and the current setting of the site.

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.

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.

7.1 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 Proximity to the Mill

Five villages within five kilometres of the proposed Mill site have been consulted and will be included in future ESIA consultations. These include: Ban Danhi (Project village), Ban Houay Heua, Ban Nongluang, Ban Thasomhong, and Ban Phonsoung. Residents of these villages have been engaged in initial discussion regarding the potential for project implementation, provided summary information on the project, and provided inputs regarding potential benefits and impacts.

MTP Industrial Plantation Villages

As many as 133 villages across Khammouane and Bolikhamxay Provinces have MTP plantations within their respective administrative boundaries. These villages were consulted as part of the MTP plantation operations ESIA. Considerably less than this number will be affected by log transport, as the active timberlands area for MTP is less than for the former LPFL Project, and not all villages share access roads with the plantation operations. These villages are considered stakeholders for consideration of impacts, due to hauling activity from plantations within their administrative boundaries approximately every seven years. These villages have not been included in the Mill ESIA consultation process due to their recent inputs into the MTP plantation project ESIA, and discussion of relevant impacts associated with vehicular transport through their respective settlement areas.

Government of Lao PDR

- ▶ District Government and line offices for Hinboun;
- ▶ Provincial Government and Khammouane Provinces line departments; and
- ▶ Central Government line agencies.

Other Stakeholders

Other stakeholders identified for the Project include:

- ▶ Mekong Timber Plantations Ltd.;
- ▶ New Forests Asia Pty. Ltd.;
- ▶ Key international organisations (e.g. World Bank / IFC, FAO, IUCN, and UNDP);
- ▶ Forest Stewardship Council (FSC);
- ▶ Non-Governmental Organisations;
- ▶ Private companies near the Project area; and
- ▶ Other villages near the Project area and likely transport routes.

7.2 Summary of Consultation Activities

Initial Consultations

A series of initial consultations have been conducted during the ESIA period (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: Consultations conducted during the ESIA investigations

Date	Consultation	Stakeholders
Central		
5 September 2019	Kick-off meeting	MONRE, DESIA and technical staff
Provincial		
23 September 2019	Kick-off meeting	PONRE, Department of Planning and Investment
District		
23 September 2019	Kick-off meeting	DONRE, Department of Planning and Investment
14 December 2019	Separate Archaeology / Cultural Heritage and Biodiversity Focus Group Discussion	Ban Danhi
14 December 2019		Ban Houay Hua
21 December 2019	Village survey, Focus Group Discussion and Village Mapping Exercise	Ban Danhi community and village authority
21 December 2019		Ban Thasonhong community and village authority
22 December 2019		Ban Houay Hua community and village authority
22 December 2019		Ban Phonsoung community and village authority
25 September 2019		Ban Nong Louang community and village authority
October – December 2019	Phone surveys	Landowners and / or those with land use rights adjacent the proposed Project footprint

Throughout the Project, MTP and Earth Systems will undertake formal and informal consultation and information dissemination with all Project stakeholders (Table 7-2).

Through these engagements, NFAM and Earth Systems will endeavour to ensure that all Project stakeholders are informed of Project activities and have input into the development of management, mitigation and compensation measures.

Table 7-2: Proposed formal consultations with the Government of Lao PDR during the ESIA process

Workshop / Consultation Activity	Description
Village consultations	Formal village level consultation is to discuss project description and receive feedback & concerns regarding Draft ESIA.
District consultation	Formal District level consultation to discuss project description and receive feedback & concerns regarding previous workshops and Draft ESIA.
Government of Lao Technical workshop	Internal government workshop bringing together key ministries at the Central level to provide feedback on the draft ESIA. To be organised by MONRE following submission of Draft ESIA.
Joint technical workshop with Developer	Formal Provincial and Central Government level consultation with all concerned GOL agencies. Discuss final project description, Draft ESIA, and receive feedback & concerns to be incorporated into Final ESIA. The joint technical workshop with the developer and the site visit will be conducted as a single site visit. The Final Provincial and Central level consultations will be combined into a single workshop
Site visit to Project area	
Final Provincial/Central Workshop	

The ESIA public consultation and information dissemination process will be consistent with GOL legislation and guidelines, particularly the *Public Involvement Guidelines* (2013).

The following best practice guidelines will also be considered in the implementation of the stakeholder engagement activities:

- ▶ Doing Better Business through Effective Public Consultation and Disclosure. A Good Practice Manual. IFC (1998);
- ▶ Stakeholder Engagement: A Good Practice Handbook for Companies doing Business in Emerging Markets. IFC (2007); and
- ▶ World Bank Guidance Note on Tools for Pollution Management – Stakeholder Engagement and Grievance Mechanisms (2012).
- ▶ Forest Stewardship Council (FSC) Principles and Criteria (2012).

7.3 Disclosure

Adequate disclosure regarding the details of the Project to stakeholders will be ensured throughout the ESIA process. Key aspects of ensuring adequate disclosure will include:

- ▶ Making information regarding the Project available to the Earth Systems office in Vientiane;
- ▶ Providing a description of the Project at the household and village level during household 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.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT

8.1 Management Planning

The key overarching environmental and social management plan for the Project is the ***Environmental and Social Management and Monitoring Plan*** (ESMMP). The ESMMP sets out the legal obligations and environmental, social and health management requirements and commitments associated with the development and operation of the Project. The suite of environmental, social and health management and monitoring programs to be implemented during the Construction and Operations Phases of the Project are provided. The ESMMP applies to those processes and activities under MTP's direct control and management. MTP will require applicable management and mitigation strategies provided in this ESMMP in contractual obligations with its contractors, suppliers, and service providers to ensure adverse impacts associated with the Project are adequately managed.

The ESMMP is a dynamic document that should undergo regular review and update (e.g. every 3-5 years or if there are significant changes to the Project) to incorporate any significant changes during the life of the Project. With each revision of the ESMMP, management strategies should be reviewed to ensure continuous improvement of environmental and social management of the Project.

A site-specific **Emergency Preparedness and Response Plan** (EPRP) will be developed for the Project 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 wood processing 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 Systems

The MTP Mill Project will require monitoring throughout construction and operations. Monitoring will be undertaken by MTP staff (or independent third-party monitors engaged by MTP), contractors, and representatives from the GOL. GOL and independent third-party monitoring / auditing is addressed in Section 8.4.2.

8.2.1 MTP Internal Monitoring

MTP will ensure an appropriate monitoring strategy is implemented as part of the ESMMP. The monitoring strategy will ensure existing management measures are effective and identify the need for improved or additional measures, where appropriate. The Project's overall monitoring program will include six categories of monitoring:

- ▶ **Construction Monitoring** will be conducted by a suitably qualified MTP monitor weekly. This monitoring will be conducted 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** will be conducted by a suitably qualified MTP monitor on a monthly basis at the Mill and ancillary facilities to ensure design controls are effective and proposed management measures are implemented. Where applicable, corrective actions will be identified and logged in a database to facilitate continual improvement.
- ▶ **Social Monitoring** of key indicators will be undertaken annually, with from Project Affected Communities considered. This monitoring will be conducted to identify and quantify the direct and indirect impacts of the Project on the surrounding communities including variability in economic benefits from Project employment.

- ▶ **Occupational Health and Safety Monitoring** will be conducted throughout the working environment for potential risks and hazards. Accredited professionals should design and implement monitoring as part of an occupational health and safety monitoring program with recognition of potentially acute and long-term health concerns. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents. OH&S monitoring should be an integral component of the working culture, with informal monitoring occurring daily throughout operations in addition to formal OH&S monitoring.
- ▶ **Discharge (emission) monitoring** will include in-situ measurement of effluent / air discharged or emitted from the Project to the environment (e.g. water, air, noise), measured at or near the point of discharge. Discharge monitoring will provide direct information concerning the concentrations and loads of contaminants (if applicable) discharged from the operation and will serve as a link between ambient monitoring results and the operation itself.
- ▶ **Ambient monitoring** will capture background conditions and the natural environment that may be affected by Project activities. Ambient monitoring will be undertaken in downstream surface waters. Ambient monitoring will be conducted for additional parameters if communities file a complaint through the Grievance Mechanism (e.g. noise, dust). While operational and discharge monitoring will determine if environmentally significant releases have occurred, effects on sensitive receptors within the receiving environment can only be determined by ambient monitoring.
- ▶ **Investigation monitoring** is undertaken to determine the extent of impact following an environmental incident (oil leakage, etc.) or an occupational or community health and safety incident to identify the extent of impact; facilitate determination or the most appropriate corrective actions; verify that corrective actions have been implemented satisfactorily; facilitate refining management to minimise the likelihood of a repeat event; or to verify / refute third-party claims of environmental impact.

8.3 Auditing and Performance Evaluation

8.3.1 Internal Audits

Periodic internal audits will be conducted to assess compliance and conformance with ESMS requirements, procedures, and plans. Internal audits will be conducted every six months during construction and annually throughout operations.

8.3.2 External Audits and Monitoring

It is anticipated the GOL will monitor the facility quarterly to ensure that construction and operations are conducted in compliance with Lao law.

An independent consultant will conduct audits for FSC Chain-of-Custody certification. These audits are expected to occur annually, and will consider issues including (but not limited to) sources of raw logs and supply chain documentation; health and safety at the mill and for suppliers; labour laws and provisions as per the FSC Principles and Criteria; and management for environmental and social receptors.

8.3.3 Performance Evaluation and Continuous Improvement

MTP has developed an ESMS with a range of policies and procedures for auditing and reviewing their plantation operations. The company will need to develop a similar ESMS or incorporate management of the Mill into its current management system. Site-specific management reviews and audits will be carried out on a regular basis throughout the Project life. Continuous improvement of management systems will require ongoing diligence to ensure the Project is implemented and managed effectively. The Applicable MTP Departments (e.g. Sustainability, Human Resources, Community Relations) will be responsible for overseeing the continuous improvement of environmental and social aspects associated with the Project in accordance with the 'Plan-Do-Check-Act' approach.

For evaluating the Project's environmental and social performance, MTP will develop improvement and performance targets measured by Key Performance Indicators (KPIs) derived from accepted standards and the 'SMART' model approach (i.e. Specific, Measurable, Achievable, Realistic and Timely). Environmental and social performance results will be reviewed regularly and reported in regulatory and operations reports. KPIs will be reviewed and adapted as the Project progresses.

8.4 Reporting

MTP will prepare both routine reports and incident specific reporting throughout construction and operations. The reporting program is described in the ESMMP (Volume C), and includes:

- ▶ **Quarterly reporting** - for submission to the GOL throughout construction. Reporting requirements during operations will be determined during consultation with relevant GOL authorities. Monthly reports will summarise MTP environmental and social performance and significant activities, incidents and events for each quarterly period, and priorities for the following quarter;
- ▶ **Annual reporting** - MTP will prepare an Annual Environmental Report that will be submitted to the MONRE and potentially additional ministries and / or line agencies.
- ▶ **Incident Reporting** - MTP will need to develop an incident reporting system to document any reportable events such as injury, hazardous spills, or community incidents. Accidents / incidents should be classified according to their actual and potential safety risk, environmental or social impact using a standard consequence matrix to ensure consistency.
- ▶ **Non-Compliance Reporting** - Non-compliance reporting is the MTP site monitors' tool for addressing contractor or staff failure to fulfil environmental / social - related objectives and targets according to specifications of the Project Concession Agreement, Project ESMMP and/or agreed-upon management and mitigation measures and implementation dates for remedial actions.

8.5 Management Review Program

The Project will require a formal management review program to be developed that includes a full review and update of the ESMMP and ESMS every 3-5 years during operations (or when major revisions to the ESMMP are required) and annual progress reviews during the cycle.

The formal review will be led by the MTP Sustainability Manager, with support from MTP Senior Management. All major revisions to the ESMMP will need to be provided to MONRE for review and approval.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

The Project will support the Government of Lao PDR economic objectives for providing a value-added wood processing facility linked to a sustainably managed plantation operation. On a regional and local level, the Project will generate significant direct and indirect benefits including investment into the Lao economy, direct employment, government revenue, and spin-off benefits (e.g. cash injection and local spending).

The siting of the Mill is low impact from an ecological perspective, as the small site will replace a young non-native plantation. 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. Robust training, management, and monitoring are required to mitigate risks for community and occupational health and safety.

Impacts and risks will need to be managed through implementation of planned design controls and diligent application of the ESMMP. Successful implementation of the measures specified in the ESMMP should ensure that environmental and social aspects are appropriately managed and that the benefit to the Ban Danhi community and the Government of Lao PDR is maximised.

9.2 Key Recommendations

The following are recommended as key issues for MTP to address scope of this assessment:

1. To compensate for conversion of plantation to Mill near the village settlement, , it is recommended that an agreement for employment and community development initiative is formed between the Ban Danhi village authority and MTP.
2. Continue consultation and collaboration with applicable GOL authorities and village representatives throughout the ESIA process, construction, and operations;
3. In consultation with the GOL and applicable landowners / formal land users; negotiate compensation for access road widening where impacts are outside the MTP footprint, if applicable;
4. Engage applicable GOL authorities and Ban Houay Heua authorities / representatives regarding the potential for providing a bore for drinking water in this village;
5. Develop and implement a **Vehicle Use Standard Operating Procedure** and **Driver Training Module(s)** to minimise community and occupational risks;
6. Develop and implement a **Waste Management SOP** comprised of ESMMP requirements, but with site-specific details including disposal methods and locations;
7. Develop and implement an **Emergency Preparedness and Response SOP** that builds upon the ESMMP Sub-plan with provision of phone number, training frequency, specific clean-up and disposal materials, etc.;
8. Develop and implement an **Occupational Health and Safety SOP** that identifies training requirements, PPE requirements, design / safety controls, etc. for the specific equipment, job functions; and
9. Provide sufficient budgeting for environmental and social monitoring and reporting.

REFERENCES

- IFC (1998). Doing Better Business through Effective Public Consultation and Disclosure. A Good Practice Manual.
- IFC (2007). Stakeholder Engagement: A Good Practice Handbook for Companies doing Business in Emerging Markets.
- ISO 31000: 2018. Risk Management – Guidelines, Second Edition. International Organisation for Standardization.
- ISO 31010: 2009. Risk Management – Risk Assessment Techniques, Second Edition. International Organisation for Standardization.
- IUCN (2020). The IUCN Red List of Threatened Species. www.iucnredlist.org, International Union for Conservation of Nature.
- Ministry of National Resource Extraction (2017). Lao National Ambient Water Quality Standards.
- World Bank (2012). World Bank Guidance Note on Tools for Pollution Management – Stakeholder Engagement and Grievance Mechanisms.
- World Health Organisation (2011). WHO Drinking Water Quality Guidelines.

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BRISBANE BRISTOL DAKAR KIGALI MELBOURNE PERTH SHANGHAI VIENTIANE