LUANG PRABANG POWER COMPANY LIMITED
Luang Prabang HPP

Environmental and Social Impact Assessment
Contact

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STRUCTURE OF THE FEASIBILITY STUDY

VOLUME 1: EXECUTIVE SUMMARY

VOLUME 2: MAIN REPORT

VOLUME 3: DRAWINGS

VOLUME 4: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
   REPORT 1: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
   REPORT 2: SOCIAL IMPACT ASSESSMENT
   REPORT 3: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN
   REPORT 4: SOCIAL MANAGEMENT AND MONITORING PLAN
   REPORT 5: RESETTLEMENT AND ETHNIC MINORITY DEVELOPMENT PLAN

VOLUME 5: TRANSBOUNDARY ENVIRONMENTAL IMPACT ASSESSMENT AND CUMULATIVE IMPACT ASSESSMENT

VOLUME 6: ANNEXES
LUANG PRABANG POWER COMPANY LIMITED
Luang Prabang HPP

Environmental and Social Impact Assessment

Report – Volume 4

Report 3 of 5: Environmental Management and Monitoring Plan
Contact

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<th>Complete Expression</th>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>APHA</td>
<td>American Public Health Association</td>
</tr>
<tr>
<td>AWWA</td>
<td>American Water Works Association</td>
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<tr>
<td>BOD</td>
<td>Biological Oxygen Demand</td>
</tr>
<tr>
<td>CA</td>
<td>Concession Agreements</td>
</tr>
<tr>
<td>CFU</td>
<td>Colony forming units</td>
</tr>
<tr>
<td>COD</td>
<td>Chemical Oxygen Demand</td>
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<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
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<tr>
<td>EHS</td>
<td>Environmental Health and Safety</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>EMMP</td>
<td>Environmental Management and Monitoring Plan</td>
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<tr>
<td>EMO</td>
<td>Environmental Management Office</td>
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<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
</tr>
<tr>
<td>EMU</td>
<td>Environmental Management Unit</td>
</tr>
<tr>
<td>ESMMP-CP</td>
<td>Environmental Social Management and Monitoring Plan – Construction Phase</td>
</tr>
<tr>
<td>ESMMP-OP</td>
<td>Environmental Social Management and Monitoring Plan – Operation Phase</td>
</tr>
<tr>
<td>EPC</td>
<td>Engineering Procurement and Construction</td>
</tr>
<tr>
<td>EPL</td>
<td>Environmental Protection Law</td>
</tr>
<tr>
<td>ERP</td>
<td>Emergency Response Plan</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental Social Impact Assessment</td>
</tr>
<tr>
<td>FOG</td>
<td>Fat Oil and Grease</td>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<tr>
<td>GoL</td>
<td>Government of Lao PDR</td>
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<tr>
<td>HCP</td>
<td>Hearing Conservation Programme</td>
</tr>
<tr>
<td>HDPE</td>
<td>High Density Polyethylene</td>
</tr>
<tr>
<td>HSAP</td>
<td>Hydropower Sustainability Assessment Protocol</td>
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<tr>
<td>IEE</td>
<td>Initial Environmental Evaluation</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IHA</td>
<td>International Hydropower Association</td>
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<tr>
<td>LNTP</td>
<td>Limited Notice to Proceed</td>
</tr>
<tr>
<td>LP HPP</td>
<td>Luang Prabang Hydroelectric Power Plant</td>
</tr>
<tr>
<td>MAF</td>
<td>Ministry of Agriculture and Forestry</td>
</tr>
<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>MPN</td>
<td>Most Probable Number</td>
</tr>
<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet</td>
</tr>
<tr>
<td>NTU</td>
<td>Nephelometric Turbidity unit</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Definition</td>
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<tr>
<td>PDR</td>
<td>People’s Democratic Republic (Lao PDR, Laos)</td>
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<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>PR</td>
<td>Public Relations</td>
</tr>
<tr>
<td>PS</td>
<td>Performance Standards</td>
</tr>
<tr>
<td>RPM</td>
<td>Revolutions per minute</td>
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<tr>
<td>SMMP</td>
<td>Social Management and Monitoring Plan</td>
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<tr>
<td>SESMMPs</td>
<td>Site-Specific Environmental and Social Management and Monitoring Plans</td>
</tr>
<tr>
<td>TDS</td>
<td>Total Dissolved Solid</td>
</tr>
<tr>
<td>UNESCO</td>
<td>The United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>UNTP</td>
<td>Unlimited Notice to Proceed</td>
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<tr>
<td>UXO</td>
<td>Unexploded Ordnance</td>
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<tr>
<td>WEF</td>
<td>Water Environment Federation</td>
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<tr>
<td>WSC</td>
<td>Waste Segregation Center</td>
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1 INTRODUCTION

1.1 Terms and Definitions

The following are common terms and definitions used in the EMMP:

- **Environmental Management and Monitoring Plan (EMMP)**: EMMP represents the key mitigation and enhancement measures for major impacts, which are translated into concrete action programs/projects and defines the institutional framework and mechanisms for ensuring their appropriate implementation. It likewise provides the estimated investment requirements and commitments/guarantees to carry out the proposed plan under the concession agreements.

- **Ministry of Natural Resources and Environment (MONRE)**: MONRE is the key agency act on behalf of the Lao government, with a role in overseeing and management natural environment, including land, water, air, biodiversity, and environmental aspects.

- **Environmental Management Unit (EMU)**: MONRE will establish an EMU with the responsibility to monitor the project company’s compliance with the environmental measures, standards, permits, and all other environmental obligations under CA.

- **Environmental Management Office (EMO)**: The main unit formed by the project company for implementation of the environmental management plan.

- **Engineering, Procurement, and Construction (EPC)**: EPC is a particular form of contracting arrangement used in a project where the project proponent and EPC contractor is made responsible for all the activities from design, procurement, construction, commissioning and handover of the project to the owner at the agreed schedule and budget.

- **Environmental Health and Safety (EHS)**: EHS is the department in an organization tasked with ensuring that the work undertaken by the company does not cause undue environmental damage, put the workers’ health and safety at high risk, complies with applicable legislation, and follows best practices. EHS aims to prevent and reduce accidents, emergencies, and health issues at work, along with any environmental damage that could result from work practices.

- **Commercial Operation Date**: As used for electricity, the date under a long term power purchase agreement when the commissioning tests have been passed and the facility starts to generate power to earn revenue.

- **Concession Agreements (CA)**: A concession agreement is a negotiated contract between a company and a government that gives the company the right to operate a specific business within the government’s jurisdiction, subject to certain conditions.
1.2 Project Overview
A detailed overview of the project is given in the ESIA volume 1, chapter 1.

1.3 Structure of the EMMP Report
The content of this EMMP report as suggested in concerned guidelines covers the following:

   Chapter 1    Introduction
   Chapter 2    Overview of EMMP Related Policy, Legal and Institutional Framework
   Chapter 3    EMMP Organization, Roles and Responsibilities
   Chapter 4    Authorities and other Stakeholders
   Chapter 5    Environmental Management and Monitoring Plan during Construction Phase
   Chapter 6    Environmental Management and Monitoring Plan during Operation Phase
   Chapter 7    Required Environmental Monitoring Plans
   Chapter 8    Mandatory Environmental Management and Monitoring Plans and Sub-Plans
   Chapter 9    Management Procedures
   Chapter 10   Auditing / Compliance Checking
   Chapter 11   Management Review and Cross Reference
OVERVIEW OF EMMP RELATED POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Developer’s Environmental and Social Policies

The developer is committed to protecting the environment, sustainable use of natural resources and socially responsible activities. The developer holds a declaration of environmental responsibility and an ecological management system which were developed in compliance with international best practices.

The developer is committed to transparent processes through information disclosure and stakeholder engagement; principles which are formalized in their communication strategy, corporate ethics code, corporate governance code, regulations on insider information, and regulations on information and communications.

2.2 EMMP related Policy and Legal Framework

Over recent years, the GoL has developed and updated a number of regulations and policies for environmental management. The legislation and policies relevant to the preparation of environmental and social impact assessment (ESIA), Environmental management and monitoring plan (EMMP) for hydroelectric power projects that is relevant to the proposed LP HPP include the following:

1) Environmental Protection Law, 2013

The key document of environmental legislation in Lao PDR is the revised Environmental Protection Law (EPL) which was approved on January 17, 2013. The EPL defines principles, regulations, and measures related to environmental management and monitoring to mitigate the impacts of anthropogenic developments in Lao PDR. The aim of this law is to “sustain and protect natural resources and public health. Basic principles of environmental protection are that all persons, households, legal entities and organizations have commitments of protecting, improving, rehabilitating, controlling, monitoring and inspecting the environment based on regulations to avoid creating impacts on the environment, causing degradation and polluting that exceeds the pollution control standard and the national environmental quality standard, aiming to ensure good quality of the environment and sustainable development”.

2) Electricity Law 2012, Amended May 2017

The law provides the basis for developing a concession agreement to construct and operate a hydropower project and provides the requirements for construction of transmission lines. The electricity law requires electricity projects to conform to national development plans; to be more efficient, economical and sustainable; and to protect the natural and social environment.

3) Decree on Environmental Assessment, No. 21/PM, January 2019

The decree is the country’s principal environmental legislation regarding IEE and EIA. MONRE is the central authority to coordinate with the local agencies and administration to disseminate and enforce this decree. The decree was enacted to implement article 8 of the law on environmental protection, in relation to environmental impact assessment. Also, the decree includes a clause that state “All project must prepare mitigation measures, environmental management and monitoring plan (EMMP) and social management and monitoring plan (SMMP)”.

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4) Ministerial Instruction on Environmental Impact Assessment, December 2016

The EIA Guidelines were developed by MONRE to guide developers and consultants on how to conduct and report environmental impact assessment studies for projects in Lao PDR and ensure that these studies included adequate project descriptions, impact assessments and mitigation measures using sound, professional and scientific tools and methods. The guideline also indicate the requirement for environmental and social management and monitoring Plan (EMMP & SMMP).

5) Environmental Management Standard for Electricity Project, 2001

Ministry of Energy and Mines, Department of Electricity, established four environmental management standards for all electricity projects in Lao PDR. The purpose of these standards is to manage the environmental affairs in the power sector of Lao PDR. The related EMMP and SMMP documents are stated in environmental management plans for electricity projects (No: 584/MIH.DOE, dated 4 October 2001).

Other key laws and guidelines that have been determined as applicable to the environmental and social management of the proposed project are:

- Step-by-Step environmental guidelines for biomass removal from hydropower reservoirs in Lao PDR, MONRE (2012)
- Law on hygiene, disease prevention and health promotion (2012)

2.3 Related International Policies and Guidelines

In addition to the Lao PDR statutes and regulations listed above, the GoL is also a signatory of the following international policies and guidelines that are relevant to EMMP of hydropower projects as following:

1) IFC Policy and Performance Standards on Social and Environmental Sustainability, 2012

The implications on the ESIA of adopting IFC’s performance standards (PS) in addition to the national requirements are assessment and management of environmental and social risks and impacts, labor and working conditions, resource efficiency and pollution prevention, community health, safety, and security, land acquisition and involuntary resettlement, biodiversity conservation and sustainable management of living natural resources, indigenous peoples, and cultural heritage.

2) International Hydropower Association (IHA) Sustainability Protocol

The International hydropower association (IHA) is a non-profit membership organization committed to advancing sustainable hydropower. Formed under the auspices of UNESCO in 1995 as a forum to promote and disseminate good practice about hydropower. The Hydropower Sustainability Assessment Protocol (HSAP) is a tool for assessing projects across a range of social, environmental, technical and economic criteria. There are 2 related documents including:

- Hydropower Sustainability Assessment Protocol, July 2018
- IHA Sustainability Guidelines, February 2004

3) IFC EHS Guidelines

The General EHS Guidelines contain the following information.
2.4 Lao PDR Government Institutional Framework

The institutional structure for environmental management in Lao PDR consists of the following:

- National committees that guide inter-sectoral coordination among agencies.
- MONRE, as the main body, monitors and coordinates environment matters at the national level, and provides oversight of other relevant ministries with the mandate to mitigate environmental and social issues arising from their sectoral development activities.
- Provincial and district entities that have devolved responsibility for environmental protection at the local level.
- Organizations which support the government in promoting participation and awareness.
3 **EMMP ORGANIZATION, ROLES, AND RESPONSIBILITIES**

The responsibilities for environmental management and monitoring plan (EMMP) implementation of pre-construction, construction and operation phases will be coordinated between GoL and the project company under the CA and concerned Lao law and legal framework as shown in Table 3-1.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Pre-Construction and Construction Phases</th>
<th>Operation Phase</th>
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<tbody>
<tr>
<td>GoL</td>
<td>From start to the end of construction</td>
<td>From start of operation to the end of CA</td>
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<tr>
<td>- MONRE/EMU</td>
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<td>- Provincial and District Offices</td>
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<td>- Other concerned Ministries</td>
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<td>- EMMP Contractor</td>
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### 3.1 Government of Lao PDR (GoL) Organization

The implementation of the EMMP for LP HPP is governed by the CA and the environmental management law and legal framework of Lao PDR. Institutional issues of the LP HPP are centered upon the GoL’s ministries level role in instituting concerned ministries and Provincial/District level in the concurring implementation plan of mitigation measures and monitoring their compliance and effectiveness. The provincial/district officer’s responsibilities will be primarily in the area of human issues and public participation and involvement.

#### 3.1.1 MONRE/EMU

MONRE as the GoL’s direct line ministry, responsible for environmental management will establish an environmental management unit (EMU) to oversee EMMP implementation of LP HPP in accordance with the environmental protection law with the authority to concurring and closely monitor project’s compliance with environmental measures, standards, and permits throughout the construction and operation phases.

The EMU will have the following responsibilities:

1. Representing MONRE in reviewing and approving EMMP.
2. Coordinating with other Government Authorities in the implementation of EMMP.
3. Monitoring and inspecting the implementation and compliance of the environmental obligations of the Project Company under terms and conditions started in CA.
4) Advising MONRE and relating Government Authorities on the adequacy of environmental mitigation measures and recommending adjustment/amendments following findings from project monitoring.

5) Liaising with external organizations in relation to environmental issues relating to the Project.

3.1.2 Provincial/District Offices

The provincial/district offices organization to be established for the implementation of the EMMP of LP HPP shall include:

- Provincial governor or designated vice governor
- Concerned provincial cabinet officer
- District chiefs
- Provincial energy and mines officer
- Provincial forestry officer
- Provincial land officer
- A representative from other concerned authorities

At this level, the concerned officers will mainly be part of monitoring task force of EMU in monitoring the EMMP compliance.

3.1.3 Other Ministry

EMU shall comprise a representative from a concerned representative from departments at the central, district level as follows:

- Public health care department, Ministry of Health
- Department of forestry, Ministry of Agriculture and Forestry
- Department of livestock and fisheries, Ministry of Agriculture and Forestry
- Ministry of Labor and Social Welfare
- Department of public culture, Ministry of Information, Culture, and Tourism
- Other relevant units as needed.

3.1.4 Project Company Organization

The project proponent organization in the implementation of comprise Environmental Management Office (EMO), EPC contractor, project operator, and EMMP contractor. Their responsibilities are as follows.
3.1.5 EMO

The project company shall establish and maintain an Environmental Management Office (EMO). The company’s EMO shall commence operation from the start of the construction to end of the concession agreement (CA).

During the construction and operation phases, the EMO shall be responsible for implementing and monitoring environmental commitment which includes the following:

a) Implementing or causing to be implemented the environmental mitigation measures of the EMMP and other related environmental action plans.

b) Liaising and cooperating in good faith, with the government authorities given responsibility for implementing the EMMP.

c) Developing the monitoring program and preparing work and cost schedules for the mitigation and monitoring program.

d) Undertake all necessary record keeping functions and make periodic reports to the company and to the EMU.

e) Undertake such internal and external audits as may be necessary to comply with the CA and the procedures of the company.

f) Assist the GoL in conducting public consultation programs, documenting the feedback and incorporating that feedback into program planning.

3.1.6 EPC Contractor

The EPC Contractor, under the contract with the project company, shall be responsible to undertake all EMMP activities within the construction area during pre-construction and construction phase.

EHS staff will work alongside and in close coordination with construction staff. Their responsibility includes the following tasks:

- Together with sub-contractors, prepare a compilation of method statements that will specify how potential environmental impacts in line with the requirements of the EMMP will be managed, and relevant environmental best practices and how they will practically ensure that the objectives of the EMMP are achieved.

- Convey the contents of this EMMP to the construction site staff and discuss the contents in detail with sub-contractors.

- Undertake regular and comprehensive inspection of the construction site and surrounding areas in order to monitor compliance with the EMMP.

- Take appropriate action if the specifications contained in the EMMP are not followed.

- Monitor and verify that environmental impacts are kept to a minimum, as far as possible.

- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMMP.

- Report any non-compliance or remedial measures that need to be applied to EMO, in line with the requirements of the EMMP.

- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.
- Ensuring that the list of transgressions issued by the EMO is available on request.
- Maintain an EMS register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints.
  - Health and safety incidents.
  - Incidents involving hazardous materials stored on site.
  - Non-compliance incidents.

### 3.1.7 Project Operator

The project operator will be primarily responsible for the operation of environmental management and implementing mitigation measures within the project premises, which include environmental, health, and safety (EHS) performance of the HPP.

MONRE and other government agencies will monitor and evaluate compliance of the LP HPP in line with legal requirements and prescribed conditions in the environmental license or the permit for operation.

The main responsibilities of the project operator are:

- Facilitate site inspection or visits of officials from MONRE/EMU, other government agencies, and representatives of communities in the vicinities.
- Cooperate with EMU in investigations related to public complaints.
- Prepare monthly monitoring reports for internal use as feedback to the EMO.
- Prepare annual monitoring reports for submitting to MONRE/EMU.

### 3.1.8 EMMP Contractor

EMMP Contractor is the party that is awarded to undertake EMMP activities outside the construction area such as water quality monitoring / aquatic ecology monitoring, etc. The works will mainly cover the period from pre-construction to construction and operation phases with responsibility as agreed with the project company. The responsibility of EMMP Contractor is thus the same as EPC contractor but covering the area and those programs outside the construction area.
4 AUTHORITIES AND OTHER STAKEHOLDERS

The authority of overseeing the compliance of EMMP implementation of GoL will be delegated through Ministry of Natural Resources and Environment (MONRE) by establishing an Environmental Management Unit (EMU) in accordance with the Environmental Protection Law with the authority to monitor Project Company’s performance and compliance with the environmental measures, standards, and permits. Authorities and other stakeholders that will participate in the project EMMP implementation are as follows:

4.1 Central Level EMU

The Central EMU shall have the following mandate:

- Coordinating with central and local government authorities and the project company in relation to the implementation of the EMMP.
- Managing and distributing the EMU budget for all activities to be conducted in relation to the EMMP (monitoring and inspection, capacity building, meetings, etc.).
- Conducting independent or joint, as required, field monitoring and inspection of the project company’s compliance with its environmental obligations, as presented in CA, and conditions contained in the various relevant permits/certificates.
- Issuing non-compliance notifications and imposing penalties as applicable.
- Proposing for approval by MONRE of the appointment plan of staffs, national and international consultants, as required by the work plan.
- Exercising other rights as designated by MONRE.
- Nominate the technical staff to work with the provincial natural resources and environment division and the district EMU in order to monitor and inspect the implementation of the EMMP.
- Recruit the national and international consultants for reviewing and appraising the implementation results of the EMMP.
- Coordinate directly with the project company.
- Auditing, approving or commenting on the implementation of the EMMP.
- Authority to sign all the official documents related to the project EMMP.
- Monitoring the results of the activities of the provincial and district EMUs related to the monitoring of the EMMP.

4.2 Provincial EMU

The Provincial EMU shall be authorized to the following mandate:

- Participating with the central and district EMU and EMO in monitoring implementation of the EMMP.
- Proposing the alternatives or commenting to EMU manager and related sectors in relation to any proposal for environmental measures.
• Disbursing the budget in accordance with the defined plan.
• Commending outstanding compliance or giving suggestions and warnings in cases of poor implementation of the EMMP.
• Exercising other authority as assigned.

4.3 District EMU
District EMU shall be authorized to following mandate.

• Nominating technical staff for monitoring the implementation of the EMMP.
• Participating in auditing the implementation of the EMMP outside construction area.

4.4 Outside Auditor or Third Party Monitoring
In order to achieve the best result of EMMP implementation an outside auditor or third party shall be engaged to undertake independent review/monitoring of EMMP implementation from time to time. The monitoring shall cover compliance and focus on both qualitative and quantitative aspect of EMMP.
5 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN DURING PRE-CONSTRUCTION AND CONSTRUCTION PHASE

A detailed description of the environmental impacts during pre-construction and construction phase is presented in the ESIA volume 1 in chapter 5. In the following only a short summary is presented.

5.1 Introduction

The EMMP is part of the commitment of the project developers to the GoL under the CA that they must undertake all necessary measures to mitigate all impacts resulting from project implementation within affected sites. Compliance monitoring of EMMP implementation will be under the responsibility of the environmental management unit (EMU) to be formed and operated through MONRE with the joint support of other agencies.

5.2 Description of Project Activities of Pre-Construction and Construction Phase

During the pre-construction phase, the major project activities causing impacts on environmental components comprise;

- Land clearance.
- Access road improvement/construction.
- Construction of worker camps, offices, other supporting facilities.

For the construction phase, the major activities causing impacts on environmental components comprise;

- Construction of the project main structure and appurtenant structures, i.e. navigation lock, spillway, powerhouse, closure dam, and switchyard and transmission line.
- Construction of supporting facilities, utilities, and others to support construction works e.g. construction camps manufacturing and assembly shops for certain components offices, residences/villages for construction personnel, etc.

The impacts considered for EMMP are described in the table below.

<table>
<thead>
<tr>
<th>Environmental Resources / Values</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Components</strong></td>
<td></td>
</tr>
<tr>
<td>Topography, Geology and Geomorphology</td>
<td>Land clearance, backfill, excavation of quarry and soil borrow areas.</td>
</tr>
<tr>
<td>Soil / Erosion</td>
<td>Loss of topsoil, soil erosion due to construction work activities and impoundment.</td>
</tr>
<tr>
<td>Surface Water Hydrology</td>
<td>Partial obstruction of Mekong River flows during the construction of the dam and other project components</td>
</tr>
<tr>
<td>Ambient Air quality</td>
<td>Increased fugitive dust from construction activities.</td>
</tr>
<tr>
<td></td>
<td>Increased air pollutants from the operation of heavy machineries and vehicles.</td>
</tr>
<tr>
<td>Ambient Noise</td>
<td>The increased noise level from quarry blasting, heavy equipment, and vehicles.</td>
</tr>
<tr>
<td>Environmental Resources / Values</td>
<td>Potential Impact</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Surface water quality</td>
<td>Contamination in Mekong River due to impacts of construction site and impoundment.</td>
</tr>
<tr>
<td><strong>Biological Components</strong></td>
<td></td>
</tr>
<tr>
<td>Terrestrial Ecology</td>
<td>Loss of forest area, agricultural land and habitats from land clearance before impoundment of the reservoir area</td>
</tr>
<tr>
<td>Aquatic Ecology</td>
<td>Damage, stress to aquatic ecology due to physical impacts to the surface water and possible contamination.</td>
</tr>
</tbody>
</table>
6 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN DURING OPERATION PHASE

A detailed description of the environmental impacts during operation phase is presented in the ESIA volume 1 in chapter 5. In the following only a short summary is presented.

6.1 Introduction

The EMMP is part of the commitment of the project developers to the GoL under the CA that they must undertake all necessary measures to mitigate all impacts resulting from project during its operation.

6.2 Description of Potential Impact during Operation Phase

During the operation phase, the major impacts to the environmental components are resulting from water impoundment and power plant operation. The impacts considered for EMMP are described in the table below.

Table 6-1: potential environmental impacts

<table>
<thead>
<tr>
<th>Environmental Resources / Values</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Components</td>
<td></td>
</tr>
<tr>
<td>Soil / Erosion</td>
<td>- Some slopes, especially in the reservoir area, will be prone to erosion</td>
</tr>
<tr>
<td>Sedimentation</td>
<td>- Change in sediment transport capacity and sedimentation</td>
</tr>
<tr>
<td>Surface Water Hydrology</td>
<td>- Backwater effect cause monotonous river morphology upstream</td>
</tr>
<tr>
<td>Surface water quality</td>
<td>- Possible little contamination from wastewater release from permanent camps.</td>
</tr>
<tr>
<td>Biological Components</td>
<td></td>
</tr>
<tr>
<td>Aquatic Ecology</td>
<td>- Reduction in populations due to limited migration (even migration system is provided) and the change in river morphology and flow conditions.</td>
</tr>
</tbody>
</table>
7 REQUIRED ENVIRONMENTAL MONITORING PLANS

The purpose of monitoring activities is to assess the environmental status, identify and detect trends, prevent and control exceedance of regulatory standards. To evaluate the efficiency of environmental management programs, regular monitoring programs will be carried out during the construction and operation phases. The schedule, duration, and parameters to be monitored are listed in this chapter.

7.1 Surface Water Quality Monitoring

Legal Requirements
- Concession Agreement and the Agreement on the National Environmental Standards 2017.
- The monitoring location, sampling, and method are subjected to change according to the Concession Agreement.

Responsibility
- Main contractor during the construction (under the supervision of the Project Owner)
- Project operator during the operation (under the supervision of the Project Owner)

7.1.1 Quarterly Monitoring

Monitoring locations

1) Mekong River – the proposed locations are located as shown in Figure 7-1. The sampling location is subject to change according to the Concession Agreement or actual local conditions.

Figure 7-1: Proposed Location for Quarterly surface water quality monitoring

2) Any surface water – according to the Concession Agreement requirement.

Monitoring Sampling and Method

Copyright © Pöyry Energy Ltd.
• Horizontal Water Grab Sampler at one-meter depth if applicable.

• All equipment will be calibrated with the appropriate method and frequency according to the quality control instruction before used.

• The monitoring parameters for Quarterly Monitoring during construction and operation are defined (see Table 7-1). Water quality analysis method will be referred to as the Concession Agreement or Agreement on the National Environmental Standards 2017.

Table 7-1: Surface Water Quarterly Monitoring Programs during Construction and Operation

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Temperature</td>
</tr>
<tr>
<td>2</td>
<td>pH</td>
</tr>
<tr>
<td>3</td>
<td>Turbidity</td>
</tr>
<tr>
<td>4</td>
<td>Secchi depth</td>
</tr>
<tr>
<td>5</td>
<td>Electrical Conductivity (EC)</td>
</tr>
<tr>
<td>6</td>
<td>Total Suspended Solid (TSS)</td>
</tr>
<tr>
<td>7</td>
<td>Alkinity/Acidity</td>
</tr>
<tr>
<td>8</td>
<td>Dissolved Oxygen (DO)</td>
</tr>
<tr>
<td>9</td>
<td>Chemical Oxygen Demand (COD)</td>
</tr>
<tr>
<td>10</td>
<td>Biochemical Oxygen Demand (BOD)</td>
</tr>
<tr>
<td>11</td>
<td>Ammonium (NH₄⁺)</td>
</tr>
<tr>
<td>12</td>
<td>Total Nitrate and Nitrite</td>
</tr>
<tr>
<td>13</td>
<td>Total Phosphorus</td>
</tr>
<tr>
<td>14</td>
<td>Sulfate (SO₄²⁻)</td>
</tr>
<tr>
<td>15</td>
<td>Chloride (Cl⁻)</td>
</tr>
<tr>
<td>16</td>
<td>Calcium (Ca)</td>
</tr>
<tr>
<td>17</td>
<td>Sodium (Na)</td>
</tr>
<tr>
<td>18</td>
<td>Potassium (K)</td>
</tr>
<tr>
<td>19</td>
<td>Magnesium (Mg)</td>
</tr>
<tr>
<td>20</td>
<td>Fecal Coliforms</td>
</tr>
</tbody>
</table>

7.2 Aquatic Ecology and Fish Migration Monitoring

1) Legal Requirements
   • Concession Agreement. The monitoring location, sampling, and method are subject to change according to the Concession Agreement.

2) Monitoring Programs
   • Parameters:
     o Phytoplankton
     o Zooplankton
     o Benthos
     o Fish species
     o Fish population
     o Fish migration species and population through fish passing facilities
   • Monitoring Method:
- Plankton and Benthos Using standard methods for the examination of water and wastewater of APHA, AWWA, and WEF.
- Fish Species identification by classification guidance books (Kottelat, 2001 and Rainboth, 1996).

- **Number of Station**: 5 stations in Reservoir and Mekong River and monitoring station at the fish passing facility
- **Frequency**: 4 times/year (Every 3 months)

### 7.3 Drinking and Supply Water Monitoring

#### 7.3.1 Legal Requirements
- Concession Agreement and the Agreement on the National Environmental Standards 2017.
- The monitoring location, sampling, and method are subjected to change according to the Concession Agreement and actual condition at the site.

#### 7.3.2 Responsibility
- Main contractor during the construction (under the supervision of the Project Owner)
- Project operator during the operation (under the supervision of the Project Owner)

#### 7.3.3 Monitoring locations, Parameter, and Method
- All equipment will be calibrated with the appropriate method and frequency according to the quality control instruction before use.
- Drinking and Supply Water Monitoring at the dam site during construction and operation will be following as listed in Table 7-2.
- Quality control measure shall be defined by the respective testing laboratory or according to international testing standards. The monitoring shall be conducted by an accredited testing laboratory

**Table 7-2: Drinking and Supply Water Monitoring Programs during Construction and Operation**

<table>
<thead>
<tr>
<th>Water</th>
<th>Parameters</th>
<th>Method</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment plant of the drinking water and potable water for drinking propose.</td>
<td>Temperature</td>
<td>Thermometer</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>pH Meter</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Turbidity meter</td>
<td>NTU</td>
</tr>
<tr>
<td></td>
<td>Electrical Conductivity (EC)</td>
<td>Electrical Conductivity Meter</td>
<td>μS/cm</td>
</tr>
<tr>
<td></td>
<td>Total Dissolved Solids (TDS)</td>
<td>Total Dissolved Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Total Suspended Solid</td>
<td>Total Suspended Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td>Water</td>
<td>Parameters</td>
<td>Method</td>
<td>Unit</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------</td>
<td>-------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Total Coliform</td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td>CFU/mL and conversion to MPN/100mL</td>
</tr>
<tr>
<td>Drinking water and potable</td>
<td><em>E.coli (Escherichia coli)</em></td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td></td>
</tr>
<tr>
<td>water for drinking propose.</td>
<td>Temperature</td>
<td>Thermometer</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>pH Meter</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Turbidity meter</td>
<td>NTU</td>
</tr>
<tr>
<td></td>
<td>Electrical Conductivity (EC)</td>
<td>Electrical Conductivity Meter</td>
<td>μS/cm</td>
</tr>
<tr>
<td></td>
<td>Total Dissolved Solids (TDS)</td>
<td>Total Dissolved Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Total Suspended Solid</td>
<td>Total Suspended Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Total Coliform</td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td></td>
</tr>
<tr>
<td>Treatment plant of the supply</td>
<td><em>E.coli (Escherichia coli)</em></td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td></td>
</tr>
<tr>
<td>water for household cooking</td>
<td>Temperature</td>
<td>Thermometer</td>
<td>°C</td>
</tr>
<tr>
<td>and washing propose.</td>
<td>pH</td>
<td>pH Meter</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Turbidity meter</td>
<td>NTU</td>
</tr>
<tr>
<td></td>
<td>Electrical Conductivity (EC)</td>
<td>Electrical Conductivity Meter</td>
<td>μS/cm</td>
</tr>
<tr>
<td></td>
<td>Total Dissolved Solids (TDS)</td>
<td>Total Dissolved Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Chlorine Residual</td>
<td>Photometer</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Chlorine Dose</td>
<td>Recording of Chlorine dose</td>
<td>kg, L</td>
</tr>
<tr>
<td></td>
<td>Total Suspended Solid</td>
<td>Total Suspended Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Total Coliform</td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td></td>
</tr>
<tr>
<td>Supply water for household</td>
<td><em>E.coli (Escherichia coli)</em></td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td></td>
</tr>
<tr>
<td>cooking and washing propose.</td>
<td>Temperature</td>
<td>Thermometer</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>pH Meter</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Turbidity meter</td>
<td>NTU</td>
</tr>
<tr>
<td></td>
<td>Electrical Conductivity (EC)</td>
<td>Electrical Conductivity Meter</td>
<td>μS/cm</td>
</tr>
<tr>
<td></td>
<td>Total Dissolved Solids (TDS)</td>
<td>Total Dissolved Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Chlorine Residual</td>
<td>Photometer</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Chlorine Dose</td>
<td>Recording of Chlorine dose</td>
<td>kg, L</td>
</tr>
<tr>
<td></td>
<td>Total Suspended Solid</td>
<td>Total Suspended Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Total Coliform</td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>E.coli (Escherichia coli)</em></td>
<td>3M Petrifilm E.coli/Coliform Count Plates</td>
<td></td>
</tr>
</tbody>
</table>

### 7.4 Wastewater Monitoring

#### 7.4.1 Legal Requirements

- Concession Agreement and the Agreement on the National Environmental Standards 2017.
The monitoring location, sampling, and method are subjected to change according to the Concession Agreement and actual condition at the site.

Contractor or Operator’s Sub-plans 02: Solid Waste Management in Chapter 8.2.4;

7.4.2 Responsibility

- Main contractor during the construction (under the supervision of the Project Owner)
- Project operator during the operation (under the supervision of the Project Owner)

7.4.3 Monitoring locations, Parameter, and Method

- All equipment will be calibrated with the appropriate method and frequency according to the quality control instruction before used.
- Wastewater Monitoring at the dam site during construction and operation will be follow as listed in
- Table 7-3.
- Quality control measure shall be defined by the respective testing laboratory or according to international testing standards. The monitoring shall be conducted by an accredited testing laboratory

Table 7-3: Monthly Wastewater Monitoring Programs during Construction and Operation

<table>
<thead>
<tr>
<th>Wastewater</th>
<th>Parameters</th>
<th>Method</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge of treatment plant or any sewage wastewater discharged</td>
<td>Temperature pH</td>
<td>Thermometer</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Electrical Conductivity (EC)</td>
<td>Electrical Conductivity Meter</td>
<td>μS/cm</td>
</tr>
<tr>
<td></td>
<td>Total Dissolved Solids (TDS)</td>
<td>Total Dissolved Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Total Suspended Solids (TSS)</td>
<td>Standard Method or Concession Agreement</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Dissolved Oxygen (DO)</td>
<td>Modified Winkler Titration or Winkler Titration or DO Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Chemical Oxygen Demand (COD)</td>
<td>Photometer</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Biological Oxygen Demand (BOD5)</td>
<td>Standard Method or Concession Agreement</td>
<td>mg/L</td>
</tr>
<tr>
<td>Discharge outlet of all sediment basins and vehicle washing facilities</td>
<td>Temperature pH</td>
<td>Thermometer</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Electrical Conductivity (EC)</td>
<td>Electrical Conductivity Meter</td>
<td>μS/cm</td>
</tr>
<tr>
<td></td>
<td>Total Dissolved Solids (TDS)</td>
<td>Total Dissolved Solid Meter</td>
<td>mg/L</td>
</tr>
<tr>
<td></td>
<td>Total Suspended Solids (TSS)</td>
<td>Standard Method or Concession Agreement</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

7.5 Waste Management Monitoring

7.5.1 Legal Requirements

- Concession Agreement and the Agreement on the National Environmental Standards 2017.
- Contractor or Operator’s Sub-plans 04: Solid Waste Management in Chapter 8.2.4.
• Contractor or Operator’s Sub-plans 05: Landfills and Spoil Disposal Management Plan in Chapter 8.2.5.

• Contractor or Operator’s Sub-plans 06: Hazardous Substances Management Plan in Chapter 8.2.6.

7.5.2 Responsibility
• Main contractor during the construction (under the supervision of the Project Owner)
• Project operator during the operation (under the supervision of the Project Owner)

7.5.3 Monitoring locations, Parameter, and Method
• As required in Chapter 7.5.1.

7.6 Air pollution and Dust Control Monitoring

7.6.1 Legal Requirements
• Concession Agreement and the Agreement on the National Environmental Standards 2017.
• Contractor’s Sub-plans 09: Air pollution and Dust Control in Chapter 8.2.9.

7.6.2 Responsibility
• Main contractor during the construction (under the supervision of the Project Owner)
• Project operator during the operation (under the supervision of the Project Owner)

7.6.3 Monitoring locations, Parameter and Method
• All equipment will be calibrated with the appropriate method and frequency according to the quality control instruction before use.
• The particulate monitoring parameters during construction and operation are defined (see Table 7-4). The location and frequency will depend on the location of the receptors.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Methods</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Direction</td>
<td>Windsock</td>
<td>Direction</td>
</tr>
<tr>
<td>Wind Speed</td>
<td>Anemometer</td>
<td>km/h, m/s</td>
</tr>
<tr>
<td>Total Suspended Particulate (TSP)</td>
<td>Particulate Meter</td>
<td>mg/m$^3$</td>
</tr>
<tr>
<td>Particulate Matter $&lt; 10$ µm (PM$_{10}$)</td>
<td>Particulate Meter</td>
<td>mg/m$^3$</td>
</tr>
<tr>
<td>Particulate Matter $&lt; 2.5$ µm (PM$_{2.5}$)</td>
<td>Particulate Meter</td>
<td>mg/m$^3$</td>
</tr>
</tbody>
</table>

7.7 Vehicle Exhaust Monitoring

7.7.1 Legal Requirements
• Concession Agreement and the Agreement on the National Environmental Standards 2017.
7.7.2 Responsibility

- Main contractor during the construction (under the supervision of the Project Owner)
- Project operator during the operation (under the supervision of the Project Owner)

7.7.3 Monitoring locations, Parameter, and Method

- All equipment will be calibrated with the appropriate method and frequency according to the quality control instruction before use.
- Vehicle exhaust and noise emission during construction and operation will be following as listed in Table 7-5.

### Table 7-5: Vehicle Exhaust Emission Monitoring and Frequency

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Pollution</th>
<th>Standard</th>
<th>Measurement</th>
<th>Method</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel Engine</td>
<td>Black Smoke</td>
<td>50%</td>
<td>Paper Filter</td>
<td>Measure while parking, the engine is accelerated to a maximum RPM.</td>
<td>All Vehicle, every 6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45%</td>
<td>Transmissiometry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40%</td>
<td>Paper Filter</td>
<td>Measure while driving; the engine is accelerated to 60% of maximum RPM.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>35%</td>
<td>Transmissiometry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gasoline Engine</td>
<td>Carbon monoxide</td>
<td>4.5%</td>
<td>Non-Dispersive Infrared Detection</td>
<td>Measure while parking, no load</td>
<td>All Vehicle, every 6 months</td>
</tr>
<tr>
<td></td>
<td>Hydro Carbon</td>
<td>600 mg/km</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorbike</td>
<td>Carbon monoxide</td>
<td>4.5%</td>
<td>Non-Dispersive Infrared Detection</td>
<td>Measure while parking, no load</td>
<td>All Vehicle, every 6 months</td>
</tr>
<tr>
<td></td>
<td>Hydro Carbon</td>
<td>10,000 mg/km</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>White Smoke</td>
<td>350%</td>
<td>Smoke Meter, Full Flow Opacity System</td>
<td>Measure while parking, no load, the engine is accelerated to 75% of maximum RPM.</td>
<td></td>
</tr>
</tbody>
</table>

Source/Note: Agreement on the National Environmental Standards 2017.

7.8 Ambient Sound Level and Noise Emission Monitoring

7.8.1 Legal Requirements

- Concession Agreement and the Agreement on the National Environmental Standards 2017.

7.8.2 Responsibility

- Main contractor during the construction (under the supervision of the Project Owner)
- Project operator during the operation (under the supervision of the Project Owner)
7.8.3 Monitoring locations, Parameter, and Method

- Ambient Sound Level and Noise Emission Monitoring will be measure with Sound Level Meter at least met the International standard IEC 61672 (Electro acoustics – Sound level meters Class 2 or equivalent standards.

- All equipment will be calibrated with the appropriate method and frequency according to the quality control instruction before use.

- Location and frequency for Ambient Noise Level and Noise from Mining and Quarry monitoring during construction and operation will be following as listed in Table 7-6.

- Vehicle noise emission monitoring during construction and operation will be following as listed in Table 7-7.

Table 7-6: Ambient Sound Level Monitoring Location and Frequency

<table>
<thead>
<tr>
<th>Ambient Sound Standards</th>
<th>Calculation</th>
<th>Monitoring Location and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maximum Sound Level ($L_{max}$) should not exceed 115 dB(A)</td>
<td>Equivalent Sound Level ($L_{eq}$) from Fluctuating Noise</td>
<td>Location: Construction site, residential area, sensitive receptors e.g. clinic. Frequency: Monthly</td>
</tr>
<tr>
<td>2. A-weighted Equivalent Continuous Sound Level ($L_{eq}$) 24 hours should not exceed 70 dB(A)</td>
<td>Equivalent Sound Level ($L_{eq}$) from Steady Noise</td>
<td></td>
</tr>
</tbody>
</table>

Noise from Mining and Quarry Standard

- Maximum Level not Exceed 115 dBA
- A-weighted Equivalent Continuous Sound Level ($L_{eq}$) for 8 hours should not exceed 75 dBA
- A-weighted Equivalent Continuous Sound Level ($L_{eq}$) for 24 hours should not exceed 70 dBA

Location: any blasting activity includes earth work and quarry. Frequency: Monthly

Table 7-7: Vehicle Noise Emission Monitoring and Frequency

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Standard</th>
<th>Method</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat Engine</td>
<td>100 dB(A) measured at 0.5 m</td>
<td>While Parking, maximum RPM.</td>
<td>All Vehicle, every 6 months</td>
</tr>
<tr>
<td>Car and Truck Engine</td>
<td>100 dB(A) measured at 0.5 m</td>
<td>While Parking, 3/4 of maximum RPM.</td>
<td>All Vehicle, every 6 months</td>
</tr>
<tr>
<td>Motorbike</td>
<td>85 dB(A) measured at 7.5 m</td>
<td>While Parking, maximum RPM.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>95 dB(A) measured at 0.5 m</td>
<td>Less than 5,000 RPM engine, 3/4 of maximum RPM</td>
<td>All Vehicle, every 6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher than 5,000 RPM engine, 1/3 of maximum RPM</td>
<td></td>
</tr>
</tbody>
</table>

7.9 Vibration Monitoring

7.9.1 Legal Requirements

- Concession Agreement and the Agreement on the National Environmental Standards 2017.
### 7.9.2 Responsibility
- Main contractor during the construction (under the supervision of the Project Owner)

### 7.9.3 Monitoring locations, Parameter, and Method
- The selection of the location of the monitoring site, monitoring distance, monitoring method, and equipment shall comply with the relevant standards for the assessment of the exposure of people to vibrations ISO 2631-1 and ISO 2613-2. The number of the monitoring station should correspond to the sensitive receptors which could be affected by vibrations such as buildings, historical monuments, residences, sensitive receptors, archaeological site, etc.
- All equipment will be calibrated with the appropriate method and frequency according to the quality control instruction before use.
- Location and frequency for vibration monitoring during construction will be following as listed in Table 7-8.

<table>
<thead>
<tr>
<th>Frequency (Hertz)</th>
<th>Velocity (mm/s)</th>
<th>Displacement (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not Exceed 4.7</td>
<td>Not Exceed 0.75</td>
</tr>
<tr>
<td>2</td>
<td>Not Exceed 9.4</td>
<td>Not Exceed 0.75</td>
</tr>
<tr>
<td>3</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.67</td>
</tr>
<tr>
<td>4</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.51</td>
</tr>
<tr>
<td>5</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.40</td>
</tr>
<tr>
<td>6</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.34</td>
</tr>
<tr>
<td>7</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.29</td>
</tr>
<tr>
<td>8</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.25</td>
</tr>
<tr>
<td>9</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.23</td>
</tr>
<tr>
<td>10</td>
<td>Not Exceed 12.7</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>11</td>
<td>Not Exceed 13.8</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>12</td>
<td>Not Exceed 15.1</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>13</td>
<td>Not Exceed 16.3</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>14</td>
<td>Not Exceed 17.6</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>15</td>
<td>Not Exceed 18.8</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>16</td>
<td>Not Exceed 20.1</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>17</td>
<td>Not Exceed 21.4</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>18</td>
<td>Not Exceed 22.6</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>19</td>
<td>Not Exceed 23.9</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>20</td>
<td>Not Exceed 25.1</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>21</td>
<td>Not Exceed 26.4</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>22</td>
<td>Not Exceed 27.6</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>23</td>
<td>Not Exceed 28.9</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>24</td>
<td>Not Exceed 30.2</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>25</td>
<td>Not Exceed 31.4</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>26</td>
<td>Not Exceed 32.7</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>27</td>
<td>Not Exceed 33.9</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>28</td>
<td>Not Exceed 35.2</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>29</td>
<td>Not Exceed 36.4</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>30</td>
<td>Not Exceed 37.7</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>31</td>
<td>Not Exceed 39.0</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>32</td>
<td>Not Exceed 40.2</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>33</td>
<td>Not Exceed 41.5</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>Frequency (Hertz)</td>
<td>Velocity (mm/s)</td>
<td>Displacement (mm)</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>34</td>
<td>Not Exceed 42.7</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>35</td>
<td>Not Exceed 44.0</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>36</td>
<td>Not Exceed 45.2</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>37</td>
<td>Not Exceed 46.5</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>38</td>
<td>Not Exceed 47.8</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>39</td>
<td>Not Exceed 49.0</td>
<td>Not Exceed 0.20</td>
</tr>
<tr>
<td>40 and above</td>
<td>Not Exceed 50.8</td>
<td>Not Exceed 0.20</td>
</tr>
</tbody>
</table>
8 MANDATORY ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS AND SUB-PLANS

8.1 Mandatory Environmental Management and Monitoring Plans

To minimize the negative environmental and social impacts from the project, list of required documents and specific plans have been prepared as guidelines. Most of the listed plans are probably required by the Concession Agreement; therefore, the descriptions in the table are subject to change. The development of the plans shall guide and support implementation and management during construction and operation. The Construction Contractors shall prepare relevant Environmental Management and Monitoring Plans including the Sub-plans listed in Table 8-1.

The Environmental Plans and the Sub-plans shall detail the relevant scope of works and serve as the basis for all implementation requirements, in order to prevent or avoid, alleviate, mitigate, remedy and/or compensate or otherwise address project impacts to comply with the additional Project Obligations including Concession Agreement. The listed Environmental Plans and Sub-plans will have to be prepared by the Contractor in the early stages of construction site development, and they will have to be approved by the Project Owner. They need to be in place and functional before the main work starts. It is important that this EMMP shall be part of the Tender Documents, in order to make sure that the Contractor knows EMMP requirements in detail.

The scope of this EMMP should be effective and must be carried out by all Contractors including all sub-Contractors works for the LP HPP within the project site boundary including other sites in Lao PDR.

Table 8-1: Required Environmental Plans

<table>
<thead>
<tr>
<th>Required Plans</th>
<th>Description</th>
<th>Prepared by</th>
<th>Approved by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial ESMMP-CP</td>
<td>In respect of all preliminary construction and / or time-sensitive work which the Company may wish to undertake pursuant to the issuance of a Limited Notice to Proceed (LNTP) or otherwise prior to the Company's issuance of an Unlimited Notice to Proceed (UNTP) for the Project, which initial ESMMP-CP shall be submitted to MONRE for review not later than sixty (60) days prior to the date on which the Company intends to commence such work or to issue the LNTP, whichever is earlier.</td>
<td>Project Owner / Contractors</td>
<td>MONRE</td>
</tr>
<tr>
<td>Revised and Comprehensive ESMMP-CP</td>
<td>A revised and comprehensive ESMMP-CP covering all other construction work comprising the Project to be executed subsequent to the issued UNTP, which comprehensive ESMMP-CP shall be submitted to MONRE for review not later than sixty (60) days prior to the date on which the Company intends to issue the UNTP. Continuous revision of the ESMMP-CP and incorporation of Measures shall be conducted by the Company throughout the Construction Period.</td>
<td>Project Owner / Contractors</td>
<td>MONRE</td>
</tr>
<tr>
<td>Required Plans</td>
<td>Description</td>
<td>Prepared by</td>
<td>Approved by</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ESMMP-OP</td>
<td>To the extent relevant to the scope of such ESMMP-OP, comply fully with the Company’s Assessments and Plans and Management System and all Additional Project Obligations, incorporate therein the Measures and establish the scope and serve as the basis for all implementation requirements, in order to prevent or avoid, alleviate, mitigate, remedy and / or compensate or otherwise address Project impacts (including Adverse Impacts) caused in the Operating Period to the Standards required by the Concession Agreement</td>
<td>Contractors</td>
<td>Project Owner / Operator</td>
</tr>
</tbody>
</table>
| Contractor’s EMS | Following topics shall be included (including but not limited to) in the report:  
- Environmental Policy;  
- Legal and Other Requirements;  
- Structure and Responsibility Procedures;  
- Setting and Tracking Environmental Objectives and Targets Procedures;  
- Environmental Aspects Identification Procedures;  
- Control of EMS Documents Procedures;  
- Environmental Training Plans;  
- Records Procedures;  
- Environmental Management System Audit Procedures (Internal and External); and  
- Management Review Procedures. | Contractors | Project Owner |
| Contractor’s EMMP | The Company shall contractually require its Contractors (and that they contractually require their Sub-contractors) to prepare and implement the Contractor’s EMP through the Management System in accordance with Standards, the Assessments and Plans, the Concession Agreement, and all Permits.  
- Sub-plan 01: Erosion and Sediment Control;  
- Sub-plan 02: Water Availability and Pollution Control;  
- Sub-plan 03: Wastewater and Runoff Management;  
- Sub-plan 04: Solid Waste Management;  
- Sub-plan 05: Landfills and Spoil Disposal Management Plan;  
- Sub-plan 06: Hazardous Substances Management;  
- Sub-plan 07: Fuel and Hazardous Material Storage and Station Management Plan;  
- Sub-plan 08: Mechanical and Electrical Equipment Depots Management Plan (Environmental related);  
- Sub-plan 09: Air pollution and Dust Control;  
- Sub-plan 10: Noise and Vibration;  
- Sub-plan 11: Unexploded Ordnance (UXO) Survey and Disposal;  
- Sub-plan 12: Vegetation Clearing;  
- Sub-plan 13: Landscaping and Re-vegetation; | Contractors | Project Owner and submit to MONRE |
<table>
<thead>
<tr>
<th>Required Plans</th>
<th>Description</th>
<th>Prepared by</th>
<th>Approved by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-plan 14: Biodiversity, Wildlife and Aquatic Life Management;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 15: Processing Plant, Quarry and Borrow Pit Management Plan;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 16: Transport, traffic and road/river/Reservoir safety;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 17: Training and Awareness;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 18: Dam Site and Camps Management Plan;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 19: Labor and Personnel Management;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 20: Emergency Management and Planning;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 21: Capacity Building Plans and Programs;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 22: Community Relations;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-plan 23: Health and Safety; and</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Site-Specific Environmental and Social Management and Monitoring Plans
The Company shall ensure that the Site-Specific Environmental and Social Management and Monitoring Plans (SSESMMPs) shall be prepared by the relevant Contractors and/or Subcontractors in compliance with the ESMMP-CP.

Monthly Report
During the period commencing from the first day of the month immediately following the commencement of the Construction Period through and including the end of the Concession Period, the Company shall prepare and submit to the Project Owner within the first week of the following month:
1) Progress made to date on the implementation of the Measures against the submitted implementation program,
2) Difficulties encountered in implementing the Measures and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar difficulties in the future,
3) The number and type of instances of non-conformance with the Measures and proposed remedial measures and timelines for the completion of the remediation,
4) Relevant information from reports received by the Company from its Contractors and Subcontractors (if any),
5) Accidents or incidents relating to the health, safety, and welfare of stakeholders occurring in such month, and
6) Monitoring data of parameters and conditions as committed in the Assessments and Plans, and the Permits.

Annual Report
The Contractors shall prepare and submit to the Project Owner not later than sixty (30) days following the
### 8.2 Sub-plans for Environmental Management and Monitoring Plans

To minimize the negative environmental impacts from the project, specific preliminary plans have been prepared as guidelines. The following plans shall guide and support during implementation and management during construction and operation.

- Sub-plan 01: Erosion and Sediment Control;
- Sub-plan 02: Water Availability and Pollution Control;
- Sub-plan 03: Wastewater and Runoff Management;
- Sub-plan 04: Solid Waste Management;
- Sub-plan 05: Landfills and Spoil Disposal Management Plan;
- Sub-plan 06: Hazardous Substances Management;
- Sub-plan 07: Fuel and Hazardous Material Storage and Station Management Plan;
- Sub-plan 08: Mechanical and Electrical Equipment Depots Management Plan (Environmental related);
- Sub-plan 09: Air pollution and Dust Control;
- Sub-plan 10: Noise and Vibration;
- Sub-plan 11: Unexploded Ordnance (UXO) Survey and Disposal;
- Sub-plan 12: Vegetation Clearing;
- Sub-plan 13: Landscaping and Re-vegetation;
- Sub-plan 14: Biodiversity, Wildlife, and Aquatic Life Management;

<table>
<thead>
<tr>
<th>Required Plans</th>
<th>Description</th>
<th>Prepared by</th>
<th>Approved by</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS Performance Report</td>
<td>EMS Performance Report shall be submitted for Project Owner and MONRE for review and approval at least once every two (2) years</td>
<td>Contractors</td>
<td>Project Owner and MONRE</td>
</tr>
</tbody>
</table>

The Data Sheets on the next Chapter describe each of the required Sub-plans. They serve as a basis for the Contractors who will have to prepare his own Environmental Management and Monitoring Plans not necessarily limited to the 24 Sub-plans (Table 8-1).
- Sub-plan 15: Processing Plant, Quarry, and Borrow Pit Management Plan;
- Sub-plan 16: Transport, traffic, and road/river/Reservoir safety;
- Sub-plan 17: Training and Awareness; (SMMP)
- Sub-plan 18: Dam Site and Camps Management Plan; (SMMP)
- Sub-plan 19: Labor and Personnel Management; (SMMP)
- Sub-plan 20: Emergency Management and Planning;
- Sub-plan 21: Capacity Building Plans and Programs;
- Sub-plan 22: Community Relations;
- Sub-plan 23: Health and Safety; (SMMP)
### 8.2.1 Sub-plan 01: Erosion and Sediment Control

<table>
<thead>
<tr>
<th>Sub-plan 01</th>
<th>Erosion and Sediment Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>• To minimize the impact on soil erosion which consequently increases sediment discharging into the river, affecting its water quality and storage capacity as well as aquatic ecology.</td>
</tr>
<tr>
<td><strong>Locations</strong></td>
<td>• Construction site;</td>
</tr>
<tr>
<td></td>
<td>• Excavation material, borrow areas and dumping sites;</td>
</tr>
<tr>
<td></td>
<td>• Quarries; and</td>
</tr>
<tr>
<td></td>
<td>• Roads.</td>
</tr>
<tr>
<td><strong>Required Measures</strong></td>
<td>• Schedule construction activities in the river course during the dry season, where possible;</td>
</tr>
<tr>
<td></td>
<td>• Minimize the area of land clearance, and retain vegetation in riparian and other suitable locations to maximize filtration of sediment from turbid runoff;</td>
</tr>
<tr>
<td></td>
<td>• Re-vegetation as soon as possible after vegetation clearing or excavation, where applicable;</td>
</tr>
<tr>
<td></td>
<td>• Erodible construction stockpile shall be at least 30 m from drainage lines or waterway;</td>
</tr>
<tr>
<td></td>
<td>• In windy conditions, the stockpiles shall be covered or watered to prevent the excessive dust generated;</td>
</tr>
<tr>
<td></td>
<td>• Carefully monitor land clearance activities throughout the Preparatory Stage to ensure that vegetation is not cleared beyond pre-defined project boundaries;</td>
</tr>
<tr>
<td></td>
<td>• Sediment controls such as sediment trap and silt fences shall be installed with adequate capacity;</td>
</tr>
<tr>
<td></td>
<td>• Sediment collection devices (including sediment basins, silt fences, and sediment traps) will be emptied when the capacity of the collection pool reaches 50%;</td>
</tr>
<tr>
<td></td>
<td>• Monitoring will be conducted to inspect erosion and sediment control facilities to ensure protection and maintenance; and</td>
</tr>
<tr>
<td></td>
<td>• Install drainage control structures at suitable locations to divert clean runoff away from any disturbed area.</td>
</tr>
<tr>
<td><strong>Required Monitoring</strong></td>
<td>• Visual observation for steep slopes, excavation areas, and areas where the vegetation has been cleared;</td>
</tr>
<tr>
<td></td>
<td>• Total Suspended Solid (TSS) monitoring at upstream and downstream locations of the Mekong River to evaluate the riverbank and sediment transport by erosion; and</td>
</tr>
<tr>
<td></td>
<td>• Weekly visual observation and TSS monitoring during the dry season and more frequent during the wet season.</td>
</tr>
<tr>
<td><strong>Management and Monitoring Responsibility</strong></td>
<td>• Main Contractor during the Construction Phase</td>
</tr>
<tr>
<td></td>
<td>• Operator during the Operation Phase</td>
</tr>
</tbody>
</table>

### 8.2.2 Sub-plan 02: Water Availability and Pollution Control

<table>
<thead>
<tr>
<th>Sub-plan 02</th>
<th>Water Availability and Pollution Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>• To ensure sufficient safe drinking water and water supply for construction workers and construction activities;</td>
</tr>
<tr>
<td></td>
<td>• To minimize impacts in terms of disturbance of water sources used by local people nearby project sites; and</td>
</tr>
<tr>
<td></td>
<td>• To prevent negative impact on the surrounding environment, aquatic life, human health and to avoid contamination of soil and water sources.</td>
</tr>
<tr>
<td><strong>Locations</strong></td>
<td>• Construction site;</td>
</tr>
</tbody>
</table>
• Construction and permanent camp;
• Quarries;
• Workshops; and
• Canteen.

### Required Measures

• Prepare sufficient safe potable drinking water and supply water for workers according to the World Health Organization (WHO) Guideline for Drinking-water Quality, 4th edition, 2017;
• Prepare sufficient and appropriate water tanks to provide water for worker consumption; and
• Avoid the use of the shallow well and tap water channeled from mountains for worker consumption since they are main water sources for nearby villages.

### Required Monitoring

• Water quality monitoring will begin at project and construction start, in order to control the quality of drinking water, water supply, and runoff water;
• Continuous regulation of maintenance and technical monitoring of water treatment plant by the Contractor’s Environmental Management Unit;
• The monitoring results will be audited by the project owner periodically during construction;
• Based on the results of water quality monitoring, the project owner will be notified immediately in case of a condition that could cause harm to humans or the environment; and
• As shown in Table 7-2: Drinking and Supply Water Monitoring Programs during Construction and Operation.

### Management and Monitoring Responsibility

• Main Contractor during the Construction Phase
• Operator during the Operation Phase

### 8.2.3 Sub-plan 03: Wastewater and Runoff Management

#### Sub-plan 03: Wastewater and Runoff Management

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Wastewater and Runoff Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• To prevent negative impact to the surrounding environment, surface water quality, groundwater quality, aquatic life, human health and contamination of soil and water sources; and</td>
<td>• To prevent negative impact to the surrounding environment, surface water quality, groundwater quality, aquatic life, human health and contamination of soil and water sources; and</td>
</tr>
<tr>
<td>• To protect against flooding, preserve water balance and avoid environmental and health impact.</td>
<td></td>
</tr>
</tbody>
</table>

#### Locations

• Construction site;
• Construction and Permanent camp;
• Quarries;
• Workshops; and
• Canteen.

#### Required Measures

The reasonable treatment will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC Environmental, Health, and Safety Guidelines for Water and Sanitation 2007. The water treatment systems must be adequately sized and structurally capable to treat water for consumption as well as wastewater.

#### Sewage wastewater

• Black water, wastewater from toilets from all construction and permanent campsites must be collected and treated in septic tanks before discharge;
Wastewater and Runoff Management

- Sewage from portable toilets must be collected in portable containers and treated before discharge; and
- Canteen wastewater must be filtered with grease trap and treated before discharge;

Quarry wastewater
- All the water draining from the quarry must lead to settling and neutralization ponds and has to be treated prior to discharge;
- All waters from the concrete production facilities such as crushing and batching plants must be collected and lead to the settlement facilities and treated before discharge;
- Wastewater from the concrete production plant contains high pH and TDS values. Therefore, pH adjustment systems and TDS removal systems are required; and
- Water discharged into a natural water body shall comply with the relevant national including relevant standard listed in the Concession Agreement;

Workshop and Car wash wastewater
- All workshops and Car wash facilities shall be equipped with appropriate oil separators and treated before discharge.

Required Monitoring

- Water quality monitoring will begin at project and construction start, in order to control the quality of discharged wastewater and wastewater treatment efficiency;
- Continuous regulation of maintenance and technical monitoring of the wastewater treatment plant by the Contractor’s Environmental Management Unit;
- The monitoring results will be audited by the project owner periodically during construction;
- Based on the results of wastewater quality monitoring, the project owner will be notified immediately in case of a condition that could cause harm to humans or the environment; and
- As shown in Table 7-3: Monthly Wastewater Monitoring Programs during Construction and Operation.

Management and Monitoring Responsibility

- Main Contractor during the Construction Phase
- Operator during the Operation Phase

8.2.4 Sub-plan 04: Solid Waste Management

Objectives

- To manage the solid waste with appropriate methods to minimize the adverse effect on the environment and human health.

Locations

- Construction site;
- Construction and permanent camp;
- Quarries;
- Workshops; and
- Canteen and market place.

Required Measures

The practical treatment and management will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC General Guidelines Environmental, Health, and Safety 2007 and IFC
### Sub-plan 04  Solid Waste Management

Environmental, Health, and Safety Guidelines for Waste Management Facilities 2007. The measure includes but not limited to:

- Provide adequate garbage bins for different types of waste (organic, non-organic, and hazardous);
- Waste bins and containers will have to be marked clearly with “Non-hazardous waste” (dry waste or wet waste) and “hazardous waste” for waste separation and sorting;
- Waste containers must have secure lids to prevent scavenging;
- The waste reduction shall be enforced by reducing, reuse, and recycle waste;
- Different types of solid waste have to be separated and disposed of separately according to the environmental guidelines;
- Prohibit open dumping, open burning and burning waste in the construction area and worker campsite;
- Design and operate incinerators in accordance with applicable national requirements and internationally accepted standards, in particular, the EU and USA emission standards for the municipal solid wastes shall be followed;
- The unusable wastes will be disposed of a disposal area or landfill site to be selected by the contractor with approval of the project owner;
- Saleable waste (i.e. used oil, woods, etc.) will be collected at a temporary warehouse before disposed of by contractors with approval of the project owner;
- Solid waste disposal procedures will comply with solid waste management regulations, as well as any additional disposal facility requirements;

#### Non-hazardous waste

- All non-hazardous waste will be collected and taken to a WSC;
- Organic waste (e.g. food waste) will be separated and applied to a composting process;
- Combustible waste will be separated, and will be burned by appropriate incinerators;
- Ash and other residues from the incinerators will be considered hazardous waste.
- Bottom ashes are taken to the hazardous waste landfill to avoid any risk related to remaining heavy metals or biohazards;

#### Construction waste

- Construction waste will be separated and reused if possible before disposal at the construction waste landfill;
- Non-reusable and non-recyclable construction waste will be disposed at the construction waste landfill;
- No construction materials or debris are allowed to become waterborne. Any materials/debris that enters the aquatic environment must be removed immediately and disposed of in an approved manner;
- All temporary structures, piles, false works, debris, etc. will be removed from the waterway upon completion of the work;

#### Hazardous waste

- Hazardous waste will be collected and taken to the WSC;
Sub-plan 04  | Solid Waste Management
---|---
• Combustible hazardous waste will be separated, and burnt in appropriate incinerators;
• Oil contaminated water will be led through an oil separator before being treated;
• Small batteries (e.g. AAA) from the use in electronic devices are considered hazardous waste and will be collected separately and forwarded to an appropriate recycling facility;
• Used oil will be stored in closed drums and in a secure and in a closed storage building before being transferred to appropriate treatment facilities outside of the project area;
• There will be no sources of ignition permitted within 50m of the perimeter of the storage area;
• Hazardous waste disposal and storage areas must be appropriately labeled in relevant languages and with symbols;
• Containers must be adequately labeled with “hazardous waste” in Lao and English and with symbols;
• Hazardous waste must be stored and disposed of in the most suitable manner to minimize the impact on the environment;
• Availability of spill kits and absorbents in all areas with hazardous waste (storage area, workshops, etc.);

Infectious Waste
• Clinical waste must not be mixed with any other waste (hazardous and household waste);
• Make bins for infectious waste available. Bins shall have closable covers and red medical waste bags;
• Sharp objects will be kept in puncture and cut-resistant containers designed for sharp and infectious waste;
• Label the containers in written (relevant languages) and with symbols for biological hazardous substances;
• Minimize the storage time of infectious waste and prohibit access to infectious storage areas;
• Do not store the medical waste at the WSC. Incinerate immediately after arrival at the WSC; and
• Appropriate handling implies incineration in a dual chamber incinerator at temperatures of at least 800°C and a constant exhaust temperature of more than 1,000°C.

Required Monitoring
• Proper waste management must be regularly monitored to address and ensure that arising issues are identified and handled properly;
• Information of all solid waste movements from generation, type of wastes, storage, incinerate, and to waste disposal sites will be registered and recorded; and
• Frequent visual observation of containers, labels, collection register, management, etc. at least on a weekly basis.

Management and Monitoring Responsibility
• Main Contractor during the Construction Phase
• Operator during the Operation Phase

8.2.5 Sub-plan 05: Landfills and Spoil Disposal Management Plan

<table>
<thead>
<tr>
<th>Sub-plan 05</th>
<th>Landfills and Spoil Disposal Management Plan</th>
</tr>
</thead>
</table>
| Objectives | • To manage the solid waste with appropriate methods to minimize the adverse effect on the environment and human health; and
• To avoid inappropriate spoil dumping activities. |
<p>| Locations | • Landfills and disposal areas. |</p>
<table>
<thead>
<tr>
<th>Sub-plan 05</th>
<th>Landfills and Spoil Disposal Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Measures</strong></td>
<td>The practical treatment and management will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC General Guidelines Environmental, Health, and Safety 2007 and IFC Environmental, Health, and Safety Guidelines for Waste Management Facilities 2007. The measures include but are not limited to:</td>
</tr>
<tr>
<td></td>
<td>• The landfill should be further than 500 meters from the site perimeter of drinking, irrigation, or livestock water supply wells;</td>
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<td>• The landfill should be further than 300 meters from a perennial stream;</td>
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<tr>
<td></td>
<td>• Residential development should be typically further than 250 meters from the perimeter of the landfill cells;</td>
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<tr>
<td></td>
<td>• Landfills should be sited outside of a floodplain subject to a 100-year flood to eliminate the potential for washout;</td>
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<td></td>
<td>• Groundwater’s seasonally high table level of 10 year high should be at least 1.5 meters below the proposed base of any excavation or site preparation to enable landfill cell development;</td>
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<tr>
<td></td>
<td>• Liner systems for landfills shall be installed with an overlying bottom liner and leachate drainage layer. Permeability and thickness of 1.6 mm High-Density Polyethylene (HDPE) are required.</td>
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<tr>
<td></td>
<td>• At least 60 cm of compacted soil with a hydraulic conductivity of 1 x 10^{-7} cm/sec overlying bottom liner is required;</td>
</tr>
<tr>
<td></td>
<td>• Installation of leachate treatment onsite. Potential treatment methods include aerated lagoons, activated sludge, anaerobic digestion, artificial wetlands, re-circulation, membrane filtration, ozone treatment, peat beds, sand filters, and methane stripping; and</td>
</tr>
<tr>
<td></td>
<td>• The unusable wastes will be disposed of a disposal area or landfill site to be selected by the contractor with approval of the project owner.</td>
</tr>
<tr>
<td><strong>Spoil Disposal Management Plan</strong></td>
<td>Spoil Disposal Management Plan shall include the following:</td>
</tr>
<tr>
<td></td>
<td>• The spoil disposal area shall be located at low land to not easily be washed into drainage channels and at least 100 m away from water bodies;</td>
</tr>
<tr>
<td></td>
<td>• Use topsoil to cover the spoil disposal after completion;</td>
</tr>
<tr>
<td></td>
<td>• Reuse of spoil material for other construction platforms of the project components;</td>
</tr>
<tr>
<td></td>
<td>• Re-vegetation of the spoil dumping sites by local vegetation species;</td>
</tr>
<tr>
<td></td>
<td>• Monitor erosion, landslides, and rock movement particularly in wet seasons;</td>
</tr>
<tr>
<td></td>
<td>• Installation of adequately sized settlement basins or retention ponds for leaching and draining the spoil area. The settlement system shall consist of at least two serial basins for efficient treatment;</td>
</tr>
<tr>
<td></td>
<td>• Sediment in settled basin shall be removed and disposed of when it reaches half of the capacity of the basin;</td>
</tr>
<tr>
<td></td>
<td>• Water sprinkling to reduce dust emission, if necessary;</td>
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<tr>
<td></td>
<td>• Spoil disposal area site must be identified and designed in an appropriate size;</td>
</tr>
<tr>
<td></td>
<td>• Install drainage channel around the spoil disposal to collect the storm water; and</td>
</tr>
<tr>
<td></td>
<td>• Wastewater discharged from the settlement basin shall be monitored to ensure the compliance with water quality standards.</td>
</tr>
</tbody>
</table>
Sub-plan 05 | Landfills and Spoil Disposal Management Plan
--- | ---
**Required Monitoring** | • Proper waste management must be regularly monitored to address and ensure that arising issues are identified and handled properly;  
• Information of all solid waste movements to the landfills will be registered and recorded;  
• Measure and record the quantity and quality of leachate generated and effluent;  
• Install at least three groundwater monitoring wells outside the landfill perimeter at locations and depths sufficient to evaluate whether leachate is migrating from the landfill into the uppermost groundwater unit. At least one monitoring well located in the upgradient groundwater flow direction from the landfill. At least two monitoring wells located in the downgradient direction. The groundwater monitoring system should be consistent with applicable Lao PDR regulation and internationally recognized standards;  
• Visual site inspection to verify the spoil disposal area in particular erosion and damages at the drain channels; and  
• As shown in Table 7-3: Monthly Wastewater Monitoring Programs during Construction and Operation.

Management and Monitoring Responsibility | • Main Contractor during the Construction Phase  
• Operator during the Operation Phase

8.2.6 Sub-plan 06: Hazardous Substances Management

Sub-plan 06 | Hazardous Substances Management
--- | ---
**Objectives** | • To prevent and minimize the contamination of surface water and groundwater from spills or leaks during use, storage, transportation, and disposal of hazardous substances and chemicals; and  
• To prevent environmental and health impacts of inappropriate hazardous substances handling.

**Locations** | • Construction site;  
• Quarries;  
• Workshops; and  
• Storage.

**Required Measures** | The practical management will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC General Guidelines Environmental, Health, and Safety 2007 and IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction 2007. The measure includes but not limited to:  
• Management and disposal of hazardous materials will be in accordance with applicable regulations;  
• Hazardous materials use will only be handled by personnel who are well trained and qualified and in accordance with the manufacturer’s instructions and government regulations;  
• Dumping of any contaminated material into the environment is prohibited;  
• Discharge of oil or chemical contaminated water into the environment is prohibited;  
• Material safety data sheets (MSDS) must be located in close proximity to all areas where hazardous materials are handled and inventory is to be made available upon request.
<table>
<thead>
<tr>
<th>Sub-plan 06</th>
<th>Hazardous Substances Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The hazardous materials will be stored and managed according to the Material Safety Data Sheet;</td>
</tr>
<tr>
<td></td>
<td>Any oil-contaminated waste will be considered hazardous waste and disposed of appropriately;</td>
</tr>
<tr>
<td></td>
<td>Hazardous substances including fuel and lubricants must be stored away from waterways, in tight containers placed on sealed surfaces and stored in suitable storage locations with appropriate labeling in relevant languages and with symbols;</td>
</tr>
<tr>
<td></td>
<td>There will be no sources of ignition permitted within 50m of the perimeter of the storage area and labeled “Hazardous Material Storage Area” and “No Smoking” labels and posters will be placed wherever fuel is handled or stored in both Lao and English;</td>
</tr>
<tr>
<td></td>
<td>Appropriate secondary containment structures consist of berms, dikes, or walls shall be installed with the capable of containing the larger of 110 percent of the largest tank or 25 percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 liters;</td>
</tr>
<tr>
<td></td>
<td>Containers with hazardous material or chemicals must be labeled with: “Hazardous Material”, date of storage, exact scientific and brand name and physical state (gas, solid, liquid), hazardous character (corrosive, toxic, reactive, ignitable), danger to the user (poison, burning, etc.);</td>
</tr>
<tr>
<td></td>
<td>Spill kits and absorbents must be made available at handling and storage areas;</td>
</tr>
<tr>
<td></td>
<td>Any spillage must be retained and cleaned as soon as practically possible;</td>
</tr>
<tr>
<td></td>
<td>Storage facilities will be locked and the access limited to authorized staff only;</td>
</tr>
<tr>
<td></td>
<td>Vehicles maintenance must be away from waterways and in specifically allocated sites (workshops) on impermeable flooring such as concrete floor to prevent contamination of soil and water;</td>
</tr>
<tr>
<td></td>
<td>Store facilities including workshop have impermeable flooring where wash water, sludge, and spills can be drained and collected for proper disposal;</td>
</tr>
<tr>
<td></td>
<td>All workshops shall be equipped with appropriate oil separators;</td>
</tr>
<tr>
<td></td>
<td>Explosive material will be stored in the protected facilities e.g. underground or bund wall;</td>
</tr>
<tr>
<td></td>
<td>Explosives will be labeled with appropriate signs and the explosives storage area with “Explosive Storage Area” and “No Smoking” labels and posters. Labeling must be in relevant languages (Lao and English);</td>
</tr>
<tr>
<td></td>
<td>For any movement of explosives the quantity and type of explosives and the name of the user and date will be registered and recorded;</td>
</tr>
<tr>
<td></td>
<td>Adequate fire-fighting equipment will be available in the explosives and hazardous material storage facilities;</td>
</tr>
<tr>
<td></td>
<td>Personal protective equipment (PPE) including emergency eye-wash and shower stations will be made available and be enforced to use; and</td>
</tr>
<tr>
<td></td>
<td>Preparation of an emergency plan for all material used or store onsite the plan will cover planning, response and training measure for various scenarios.</td>
</tr>
</tbody>
</table>
### Sub-plan 06: Hazardous Substances Management

#### Required Monitoring
- Information of all hazardous materials movements from storage and to waste disposal sites will be registered and recorded;
- Proper hazardous material management must be regularly monitored to address and ensure that arising issues are identified and handled properly; and
- Frequent visual observation of containers, labels, collection register, management, etc. at least on a weekly basis.

#### Management and Monitoring Responsibility
- Main Contractor during the Construction Phase
- Operator during the Operation Phase

### 8.2.7 Sub-plan 07: Fuel and Hazardous Material Storage and Station Management Plan

#### Objectives
- To prevent and minimize the contamination of surface water and groundwater from spills or leaks during use, storage, transportation, and disposal of fuel and hazardous substances and chemicals; and
- To prevent environmental and health impacts of inappropriate fuel and hazardous material handling.

#### Locations
- Fuel storage;
- Fuel station;
- Workshops.

#### Required Measures
The practical management will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC General Guidelines Environmental, Health, and Safety 2007 and IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction 2007. The measure includes but not limited to:

- Management, handling, transport, and disposal of fuel and hazardous materials will be in accordance with applicable regulations;
- Fuel and hazardous materials use will only be handled by personnel who are well trained and qualified and in accordance with the manufacturer’s instructions and government regulations;
- Discharge of fuel, oil or chemical contaminated water into the environment is prohibited;
- Material safety data sheets (MSDS) must be located in close proximity to all areas where hazardous materials are handled and inventory is to be made available upon request;
- The hazardous materials will be stored and managed according to the Material Safety Data Sheet;
- Any oil-contaminated waste will be considered hazardous waste and disposed of appropriately;
- Hazardous substances including fuel and lubricants must be stored away from waterways, in tight containers placed on sealed surfaces and stored in suitable storage locations with appropriate labeling in relevant languages and with symbols;
- There will be no sources of ignition permitted within 50m of the perimeter of the fuel and chemical storage area and labeled “Fuel Storage Area” and “No Smoking” labels and posters will be placed wherever fuel is handled or stored in both Lao and English;
- Spill kits and absorbents must be made available at handling and storage areas;
## Sub-plan 07: Fuel and Hazardous Material Storage and Station Management Plan

1. Any spillage must be retained and cleaned as soon as practicably possible;
2. Storage facilities will be locked and the access limited to authorized staff only;
3. Fuel station and fuel storage must be away from waterways and in specifically allocated sites (workshops) on impermeable flooring such as concrete floor to prevent contamination of soil and water where wash water, sludge, and spills can be drained and collected for proper disposal;
4. Appropriate secondary containment structures consist of berms, dikes, or walls shall be installed with the capable of containing the larger of 110 percent of the largest tank or 25 percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 liters;
5. All fuel station and fuel storage shall be equipped with appropriate oil separators.
6. Adequate fire-fighting equipment will be available in the Fuel station and fuel storage facilities;
7. Preparation of emergency plan for all material used or store onsite the plan will cover planning, response and training measure for various scenarios;
8. All containers, hoses, and nozzles will be free of leaks. All fuel nozzles will be equipped with functional automatic shut-offs; and
9. When static electricity discharge occurs with combustible vapors present, a fire or explosion may result while fueling vehicles or equipment. Static electrical grounding at the fuel stations must be installed. The entire system must be properly grounded and bonded.

### Required Monitoring

- Information of all hazardous materials movements from storage and to waste disposal sites will be registered and recorded;
- Proper hazardous material management must be regularly monitored to address and ensure that arising issues are identified and handled properly; and
- Frequent visual observation of containers, labels, collection register, management, etc. at least on a weekly basis.

### Management and Monitoring Responsibility

- Main Contractor during the Construction Phase
- Operator during the Operation Phase

## Sub-plan 08: Mechanical and Electrical Equipment Depots Management Plan

### Sub-plan 08: Mechanical and Electrical Equipment Depots Management Plan

#### Objectives

- To ensure full compliance with Standards including without limitation emission limit values for discharges to water and to air, quantities of such discharges, waste management, ambient water, air and noise limits or standards, and any other measures necessary for environmental protection as part of the Concession Agreement requirements, the Contractors are mandatory to prepare the “Mechanical and Electrical Equipment Depots Management Plan”. The plan shall contain all necessary engineering drawings, specifications, layout plans, location maps, cross-sections, transects, aerial photos and satellite imagery including staffing, qualifications and responsibilities for project operations, monitoring, checking, and control.

#### Locations

- Mechanical workshops; and
### Sub-plan 08: Mechanical and Electrical Equipment Depots Management Plan

<table>
<thead>
<tr>
<th>Required Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>The practical management will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC General Guidelines Environmental, Health, and Safety 2007 and IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction 2007.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information of all hazardous materials movements from storage and to waste disposal sites will be registered and recorded;</td>
</tr>
<tr>
<td>Proper hazardous material management must be regularly monitored to address and ensure that arising issues are identified and handled properly; and</td>
</tr>
<tr>
<td>Frequent visual observation of containers, labels, collection register, management, etc. at least on a weekly basis.</td>
</tr>
</tbody>
</table>

### Management and Monitoring Responsibility

| Main Contractor during the Construction Phase |
| Operator during the Operation Phase |

### Sub-plan 09: Air pollution and Dust Control

<table>
<thead>
<tr>
<th>Sub-plan 09</th>
<th>Air pollution and Dust Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td></td>
</tr>
<tr>
<td>To prevent and minimize the negative impact on air quality and health of the workforce;</td>
<td></td>
</tr>
<tr>
<td>To minimize the fugitive dust generated by the construction activities and operation of heavy construction equipment and transportation vehicles to as low a level as practicable; and</td>
<td></td>
</tr>
<tr>
<td>To minimize the gaseous emission generated by the construction activities and operation of heavy construction equipment and transportation vehicles to as low a level as practicable.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction site;</td>
</tr>
<tr>
<td>Excavation;</td>
</tr>
<tr>
<td>Blasting area and Quarries; and</td>
</tr>
<tr>
<td>Roads.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>The practical management will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC General Guidelines Environmental, Health, and Safety 2007 and IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction 2007. The measure includes but not limited to:</td>
</tr>
</tbody>
</table>

**Fugitive Dust Control:** At all the construction sites, measures should be implemented to reduce fugitive dust emission. The most common measures are:

- Spray water at and around the construction areas, access roads, and stockpiles;
- Limiting the spread of dust through enclosures for transport and crusher, filter bag, wet drilling, automatic sprinklers at strategic points, etc.;
- Enforce a speed limit for vehicles and trucks in the construction sites;
- Ensure all loose earth and similar material spilled or otherwise deposited within the construction sites and the transport routes is cleared and removed from trafficked areas as soon as practicable.
### Sub-plan 09: Air pollution and Dust Control

**Objectives**

- Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance;
- Re-scheduling activities and operations with excessive dust emissions to reduce negative impacts;
- Prohibit the open burning in the project area;
- Waste burning in incinerators and designated areas only. Using a standard solid waste incinerator, the waste incinerators shall be in compliance with emission standards as defined in the Concession Agreement;
- Use of effective PPE, in particular, anti-pollution masks or N95 masks which eliminate up to almost 90% of the PM2.5 particles (Surgical Mask unable to stop the PM10 and PM2.5 particles);

**Diesel Exhaust Emissions**; The Contractor will be required to adopt best practices to minimize gaseous emissions at sources through the following measures:

- Use the equipment fitted engines with latest low emission technologies (i.e. electric drives or installation of pollution control equipment); and
- Maintain all construction equipment in proper working conditions according to the manufacturer’s specifications. The engines of the construction equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during operations;

**Required Monitoring**

- Frequent visual observation of dust and smoke at least on a weekly basis; and
- As shown in Table 7-4: Particulate Matter Monitoring Programs during Construction and Operation and Table 7-5: Vehicle Exhaust Emission Monitoring and Frequency.

### Sub-plan 10: Noise and Vibration

**Objectives**

- To ensure the emission of noise is in accordance with the applicable standard;
- To avoid or minimize the excessive noise and vibration due to the construction activities; and
- To prevent health impact from excessive noise to the workers, local communities and wildlife.

**Locations**

- Construction site;
- Excavation;
- Blasting area and Quarries; and
- Roads.

**Required Measures**

The practical management will be implemented to reach the targets of the Lao National Environmental Standard including relevant standard listed in the Concession Agreement, in particular, the IFC General Guidelines Environmental, Health, and Safety 2007 and IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction 2007. The measure includes but not limited to:
- Use of explosives only during daylight hours and avoid any intensive noise works during night time. Blasting activities should be announced and communicated in advance;
- Prohibit close access to blasting sites during blasting activities;
- Maintain vehicles and stationary equipment in good working order;
- Using hearing protection for exposure that equals or exceeds 80 dB(A); and
- Implementation of Hearing Conservation Programme (HCP) at a workplace to minimize the risk associated with workplace noise exposure.

<table>
<thead>
<tr>
<th>Required Monitoring</th>
<th>As shown in Table 7-6: Ambient Sound Level Monitoring Location and Frequency, Table 7-7: Vehicle Noise Emission Monitoring and Frequency, and Table 7-8: Vibration from Mining and Quarry Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management and Monitoring Responsibility</td>
<td>Main Contractor during the Construction Phase; Operator during the Operation Phase</td>
</tr>
</tbody>
</table>

### 8.2.11 Sub-plan 11: Unexploded Ordnance (UXO) Survey and Disposal

#### Objectives
- To prevent injury or death and cause destruction to the property; and
- To prevent the threat to construction workers and resettled villagers.

#### Locations
- The entire construction and new resettlement area.

#### Required Measures
- UXO survey and disposal must be implemented in all construction components and areas before the construction;
- UXO survey and disposal at the relocation and resettlement areas. Any UXO must be defused and safely removed;
- Qualified organizations or companies will be engaged to carry out the survey and disposal of UXO; and
- Cleared and not-cleared areas must be appropriately marked.

#### Required Monitoring
- Visual site inspection;
- Survey with appropriate equipment; and
- Review the survey and disposal report.

#### Management and Monitoring Responsibility
- Institutional responsibilities: Project Owner or GOL (to be defined).
- The responsible inspector shall supervise UXO clearance activities.

### 8.2.12 Sub-plan 12: Vegetation Clearing

#### Objectives
- To reduce negative impacts from organic materials on reservoir ecology and the utilization of the reservoir including air pollution by greenhouse gases.
- To minimize the impact to the flora, terrestrial and aquatic fauna, erosion and water quality in the reservoir.

#### Locations
- Forest Area along the banks of river poundage area upstream from the dam site.

#### Required Measures
- After reservoir demarcations, all timber will be registered by the Ministry of Agriculture and Forestry (MAF). Then, those timbers will then be removed by the Contractor;
• The use of herbicides and chemical substances are prohibited for vegetation clearing;
• A benchmark (clear disclosure of the biomass clearing level) shall be marked prior to the clearing activities;
• Selected and marked trees shall be cut only. Cutting activities and extend will be monitored;
• Endangered tree species will be clearly marked, recorded and moved, if possible; and
• Fire control zones around the clearing area shall be established, if required, to prevent uncontrolled burning.

Required Monitoring
• Visual site inspection and verify the compliance with the specific Biomass Clearing Plan and the Guidelines for Biomass Removal from Hydropower Reservoirs in Lao PDR, December 2012.

Management and Monitoring Responsibility
• Institutional responsibilities: This may include Project Owner, Contractor, or Third parties (e.g. logging contractor) depending on the agreements.

8.2.13 Sub-plan 13: Landscaping and Re-vegetation

<table>
<thead>
<tr>
<th>Sub-plan 13</th>
<th>Landscaping and Re-vegetation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>To restore the landscape to a pre-construction state; and</td>
</tr>
<tr>
<td></td>
<td>To minimize the impacts to the environment by planting, seeding, and transplanting the initial vegetation.</td>
</tr>
<tr>
<td>Locations</td>
<td>Reservoir, dam site including quarry area.</td>
</tr>
<tr>
<td>Required Measures</td>
<td>Appropriate local vegetation species will be used for re-vegetation;</td>
</tr>
<tr>
<td></td>
<td>Replacing withered or damaged plants.</td>
</tr>
<tr>
<td></td>
<td>Special attention is required for slope stabilization by adding appropriate fertile soil before re-vegetation.</td>
</tr>
</tbody>
</table>

Required Monitoring
• Visual site inspection;
• Area assessment by aerial map or satellite image, remote sensing data for GIS mapping; and
• Monitoring the cultivation success, the planting/ seeding activities, and the conditions of re-vegetation.

Management and Monitoring Responsibility
• Institutional responsibilities: This may include Project Owner, Contractor, or Third parties (e.g. logging contractor) depending on the agreements.

8.2.14 Sub-plan 14: Biodiversity, Wildlife, and Aquatic Life Management

<table>
<thead>
<tr>
<th>Sub-plan 14</th>
<th>Biodiversity, Wildlife, and Aquatic Life Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>To minimize the impact and degradation of habitat, wildlife and, aquatic species; and</td>
</tr>
<tr>
<td></td>
<td>To implement wildlife rescue program and promote wildlife protection and conservation awareness.</td>
</tr>
<tr>
<td>Locations</td>
<td>Entire project area including reservoir area.</td>
</tr>
<tr>
<td>Required Measures</td>
<td>Establish and enforce rules for workers to prohibit hunting, fishing, and wood-cutting in the project area;</td>
</tr>
<tr>
<td></td>
<td>Engage villagers in the conservation of wildlife and their habitats;</td>
</tr>
<tr>
<td></td>
<td>Educate all construction staff and villagers on wildlife conservation, anti-poaching regulations and relevant penalties for violation of regulations;</td>
</tr>
</tbody>
</table>
|             | Rescue wildlife which might be affected by inundation and relocate such wildlife to a new location outside the inundation zone as an
### Sub-plan 14: Biodiversity, Wildlife, and Aquatic Life Management

<table>
<thead>
<tr>
<th>Required Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visual site inspection;</td>
</tr>
<tr>
<td>• Verify the compliance according to the Biodiversity Management Plan;</td>
</tr>
<tr>
<td>• Monitoring of fish and aquatic ecosystem; and</td>
</tr>
<tr>
<td>• Water quality monitoring at the upstream and the downstream of Mekong River will be undertaken as described in Error! Reference source not found. and Table 7-1: Surface Water Quarterly Monitoring Programs during Construction and Operation to ensure the compliance with relevant environmental regulations.</td>
</tr>
</tbody>
</table>

#### Management and Monitoring Responsibility

- Project Owner and Contractors

### 8.2.15 Sub-plan 15: Processing Plant, Quarry, and Borrow Pit Management Plan

<table>
<thead>
<tr>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>• To prevent and minimize the negative impact from earthworks, quarrying, and processing plant through blasting, excavating, crushing, screening, stockpiling, transporting and process of aggregate; and</td>
</tr>
<tr>
<td>• To minimize the impact from Noise, dust emission, loss of vegetation, erosion and sediment transport, water quality and visual intrusion.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Processing Plant, Quarry, and Borrow Pit.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Implementation of Erosion and sediment controls in accordance with the Sub-plan 01: Erosion and Sediment Control;</td>
</tr>
<tr>
<td>• Implementation of Wastewater Management and Solid Waste Management in accordance with the Sub-plans 03: Wastewater and Runoff Management and Sub-plans 04: Solid Waste Management;</td>
</tr>
<tr>
<td>• Implementation of dust emission controls in accordance with the Sub-plans 09: Air pollution and Dust Control;</td>
</tr>
<tr>
<td>• Implementation of Noise and vibration in accordance with the Sub-plans 10: Noise and Vibration; and</td>
</tr>
<tr>
<td>• Implementation of vegetation clearing and re-vegetation in accordance with the Sub-plans 12: Vegetation Clearing and Sub-plans 13: Landscaping and Re-vegetation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Visual site inspection and verify the compliance according to the EMMP;</td>
</tr>
</tbody>
</table>
### Sub-plan 15: Processing Plant, Quarry, and Borrow Pit Management Plan

| Water quality monitoring of wastewater discharge from quarry and excavation works as described in Error! Reference source not found. and Table 7-1: Surface Water Quarterly Monitoring Programs during Construction and Operation to ensure the compliance with relevant environmental regulations. |

### Management and Monitoring Responsibility

- Main Contractor during the Construction Phase
- Operator during the Operation Phase

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### Sub-plan 16: Transport, traffic, and road/river/Reservoir safety

#### Objectives

- To minimize transportation impact during pre-construction and Construction Stages avoid damage on transportation routes and accidents to passers and local villagers who are located near the transportation route to the project site; and
- To minimize the environmental impact from transportation includes dust emission, air pollution, and oil spill.

#### Locations

- Access road and water transport.

#### Required Measures

- Strictly enforce drivers in following traffic regulations during transporting material, workers, and equipment during project construction the following topic shall be included speed limits, load limits, training, routes to follow, avoidance of sensitive areas, regular maintenance;
- Ferry boat and vessel shall be in compliance with Lao PDR and relevant regulations;
- Traffic and freight of hazardous goods (flammable hazardous petroleum products) must be in compliance with applicable rules and regulations;
- Vehicles exhaust and noise compliance with Lao PDR standards;
- Speed limits of 40 km/h will be applied to minimize dust emission and risk of accidents;
- Enforce maximum load restrictions;
- Cover material by canvas during transportation to prevent falling and spreading of material;
- Implementation of Erosion and sediment controls in accordance with the Sub-plan 01: Erosion and Sediment Control along the access roads and vehicles washing facilities;
- Dirt roads in the construction area shall be regularly sprayed with water to reduce dust generation in accordance with Sub-plans 09: Air pollution and Dust Control;
- Install adequate signs, warnings, barriers and sufficient lighting to prevent accidents and maintenance program for access roads, lights and signs must be maintained for safety;
- Repair the damaged road surfaces that are caused by project transportation;
- Make best efforts to keep public roads accessible at all times. Any closures (transport of large equipment) shall be notified in advance the relevant authorities;
- Security as needed to prevent unauthorized access to the project locations;
- Only registered vehicles will be used in the dam construction areas; and
- No driving allowed under the influence of drugs or alcohol.
### 8.2.17 Sub-plan 17: Training and Awareness; (SMMP)

#### Sub-plans 17

<table>
<thead>
<tr>
<th>Training and Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
</tr>
<tr>
<td>• Environmental, health and safety awareness shall be strengthened through regular training. Reduce possible negative impacts by applying proper procedures and practices; and</td>
</tr>
<tr>
<td>• To prevent inappropriate work and activities due to missing or a lack of awareness, understanding and competence for environmental, health, and safety.</td>
</tr>
<tr>
<td><strong>Locations</strong></td>
</tr>
<tr>
<td>• Entire project area; and</td>
</tr>
<tr>
<td>• Workforce, employees including visitors.</td>
</tr>
<tr>
<td><strong>Required Measures</strong></td>
</tr>
<tr>
<td>All workers must complete the EH&amp;S training program but not limited to as followed:</td>
</tr>
<tr>
<td>o Fire drill and evacuation;</td>
</tr>
<tr>
<td>o First aid and use of first aid box;</td>
</tr>
<tr>
<td>o Using relevant PPE;</td>
</tr>
<tr>
<td>o Waste management;</td>
</tr>
<tr>
<td>o General health, disease control and prevention;</td>
</tr>
<tr>
<td>o Traffic regulations;</td>
</tr>
<tr>
<td>o Hunting, fishing, and logging restrictions; and</td>
</tr>
<tr>
<td>o Camp regulations (e.g. fire arm possession, disturbance, etc.)</td>
</tr>
<tr>
<td>• Contractor’s Environmental Managers and staff must have relevant training, specific experience and a professional certification; and</td>
</tr>
<tr>
<td>• All personnel handling hazardous material have to be specifically trained (safe operating procedures, handling procedures, safe work practices, and emergency procedures, using of Spill response kits) and Material Safety Data Sheet shall be made available according to SP06: Hazardous Material Management.</td>
</tr>
<tr>
<td><strong>Required Monitoring</strong></td>
</tr>
<tr>
<td>• Ensure and verify that all staff attend the required training on environmental, health, safety and emergency according to the standards;</td>
</tr>
<tr>
<td>• Registration of training attendance for the entire training and awareness program.</td>
</tr>
<tr>
<td>• Examine workers’ knowledge of EH&amp;S during audits; and</td>
</tr>
<tr>
<td>• Check all documents relevant to training materials.</td>
</tr>
<tr>
<td><strong>Management and Monitoring Responsibility</strong></td>
</tr>
<tr>
<td>Main Contractor during the Construction Phase</td>
</tr>
<tr>
<td>Operator during the Operation Phase</td>
</tr>
</tbody>
</table>

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### 8.2.18 Sub-plan 18: Dam Site and Camps Management Plan; (SMMP)

#### Sub-plans 18

<table>
<thead>
<tr>
<th>Dam Site and Camps Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
</tr>
<tr>
<td>• To prevent health risks due to lack of sanitation and hygiene.</td>
</tr>
<tr>
<td><strong>Locations</strong></td>
</tr>
<tr>
<td>• Dam site and construction camps.</td>
</tr>
<tr>
<td>Sub-plans 18</td>
</tr>
<tr>
<td>-------------</td>
</tr>
</tbody>
</table>
| Required Measures | • Protection against mosquitos must be made available in all construction camps. Doors and windows shall be installed with screens and mosquito nets;  
• Regular pest control services will be carried out;  
• Installation/ Provision of appropriate and clean toilet facilities and sewage collection system;  
• Provision of first aid centers;  
• Community awareness program on Malaria, Tuberculosis and other communicable diseases;  
• A Big Cleaning Day will be carried out every month. All sanitary facilities around the camp including drainage channels will be cleaned;  
• The design of the construction camps must comply with Lao PDR regulations or with international standards and provide adequate space, ventilation and temperature;  
• The sewage system and storm water channels in the camps must be built according to standards (drainage) and maintained in good condition through regular and frequent monitoring to avoid stagnant water and insect breeding;  
• Provide adequate camps with clean housing and sanitation facilities, garbage collection, hygiene, supply water and drinking water, electricity;  
• Provide adequate facilities for feeding the workers, make sure food is sufficient and of good quality;  
• Provide adequate facilities for leisure time;  
• Install and provide suitable lighting for security and amenity;  
• Provide adequate and appropriate firefighting equipment and fire drill practices at least twice is year;  
• Supply and drinking water monitoring will be carried out as required in Sub-plans 02: Water Availability and Pollution Control;  
• Establish and enforce rules to prohibit hunting, fishing, wood cutting in the surrounding areas and possessing firearms;  
• Children under the age of 18 are not allowed in the project area, dam site, and camps. The unauthorized access by visitors with no awareness of prevailing risks (in particular children) may lead to unpredictable accidents and incidents; and  
• Regulation and rules for camps residents will be provided in written, presented regularly and displayed in the area. |
| Required Monitoring | • Visual site inspection and verify the compliance according to the EMMP. |
| Management and Monitoring Responsibility | Main Contractor during the Construction Phase  
Operator during the Operation Phase |

**8.2.19 Sub-plan 19: Labor and Personnel Management; (SMMP)**

<table>
<thead>
<tr>
<th>Sub-plans 19</th>
<th>Labor and Personnel Management</th>
</tr>
</thead>
</table>
| Objectives | • To minimize the negative impacts on health, and safety from the routine activity of workers during construction period; and  
• To ensure the compliance of the labor law applies to all employers, registered and unregistered employees. |
<p>| Locations | Dam site and construction camps. |
| Required Measures | The government of Lao PDR facilitates the traveling in and out of the country, transit and stay for foreigners and stateless persons, |</p>
<table>
<thead>
<tr>
<th>Sub-plans 19</th>
<th>Labor and Personnel Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>and protects their life, property, rights and benefits in accordance with the laws of Lao PDR and international conventions to which Lao PDR is a party toForeigners living in Lao PDR must respect its laws, culture and traditions.</td>
<td></td>
</tr>
<tr>
<td>Foreign workers working in Lao PDR under any employment contract cannot exceed a period of 12 months. After the initial 12 month period they can apply for an extension for another 6 to 12 months each time;</td>
<td></td>
</tr>
<tr>
<td>In case it is necessary for the foreign workers for a business operation to expand production activities to introduce new technology, consideration can be made to allow for another extension of the work permit depending on the necessity of the business operations in compliance with the employment contract;</td>
<td></td>
</tr>
<tr>
<td>The permission for the foreign workers to work in Lao PDR has a term of 2 years and extension can be provided for another 2 years but the maximum period must not exceed 4 years. After the termination of the period of 4 years, foreign workers have to return to their home countries without receiving any further consideration for the extension of work permits until a period of 2 years has past whereby they can be reconsidered;</td>
<td></td>
</tr>
<tr>
<td>Develop and implement a personal health awareness program to guide all related activities during site preparation, construction, and operation;</td>
<td></td>
</tr>
<tr>
<td>Raising awareness of risks of accidents, instruction on accident prevention;</td>
<td></td>
</tr>
<tr>
<td>Water and waste will be appropriately treated and managed to minimize impacts on human health according to the Sub-plan 02: Water Availability and Pollution Control, Sub-plan 03: Wastewater and Runoff Management, and Sub-plan 04: Solid Waste Management;</td>
<td></td>
</tr>
<tr>
<td>Provide clean and good housekeeping, maintaining good hygiene;</td>
<td></td>
</tr>
<tr>
<td>Elimination of breeding sites of pest and diseases vectors;</td>
<td></td>
</tr>
<tr>
<td>Vector control at individual level such as using of mosquito nets or repellents;</td>
<td></td>
</tr>
<tr>
<td>Carry out health check of all workers once they are hired and before they start working;</td>
<td></td>
</tr>
<tr>
<td>Provide basic medical services, medical check-ups, equipment, ambulance, and personnel to meet requirements of emergency response;</td>
<td></td>
</tr>
<tr>
<td>Provide first aid kits at all working sites (and instructions on how to use it to all personnel);</td>
<td></td>
</tr>
<tr>
<td>Prevention of alcohol abuse and use during working hours; and</td>
<td></td>
</tr>
<tr>
<td>Appropriate and sufficient PPE available for all workers; control and strictly enforce use of the equipment.</td>
<td></td>
</tr>
<tr>
<td>Required Monitoring</td>
<td></td>
</tr>
<tr>
<td>Visual site inspection and verify the compliance according to the EMMP.</td>
<td></td>
</tr>
<tr>
<td>Review on labor activities and contract against the Lao PDR labor law.</td>
<td></td>
</tr>
<tr>
<td>Management and Monitoring Responsibility</td>
<td>Main Contractor during the Construction Phase</td>
</tr>
<tr>
<td>Operator during the Operation Phase</td>
<td></td>
</tr>
</tbody>
</table>
### 8.2.20 Sub-plan 20: Emergency Management and Planning

<table>
<thead>
<tr>
<th>Sub-plan 20</th>
<th>Emergency Management and Planning</th>
</tr>
</thead>
</table>
| **Objectives** | • To minimize the relevant potential risk such as dam break, fire, flood, spills, severe injuries or fatalities; and  
• To ensure preparedness to react with accidental hazardous substance spills. |
| **Locations** | • Project boundary, access roads and other modes of transport. |
| **Required Measures** | • Providing emergency treatment and first aid for major accident/injuries and also emergency patient transfer. An ambulance shall be also provided. The connection can extend to neighboring countries;  
• Provide suitable and sufficient relevant hazardous prevention tools, PPE and equipment in case of emergency;  
• Train all workers regularly on environmental emergency response procedures; and  
• To inspect on a monthly basis if fire extinguishers, exit lights, emergency lighting, and other fire protection systems are in good condition. |
| **Required Monitoring** | • Visual site inspection and verify the compliance according to the EMMP; and  
• Review the compliance and ensure that Emergency Management and Planning has been implemented. |
| **Management and Monitoring Responsibility** | • Main Contractor during the Construction Phase  
• Operator during the Operation Phase |

### 8.2.21 Sub-plan 21: Capacity Building Plans and Programs

<table>
<thead>
<tr>
<th>Sub-plan 21</th>
<th>Capacity Building Plans and Programs</th>
</tr>
</thead>
</table>
| **Objectives** | • To obtain, improve, and retain the skill, knowledge, tools, equipment and other resources needed for the Environmental Management;  
• Enhancing or strengthening the ability that will allow the Environmental Unit to achieve measurable and sustainable results in environmental management. |
| **Locations** | • Project boundary. |
| **Required Measures** | • The capacity Building Plans and Programs shall enables individual and the organization aware and performs environmental protection efficiently by the include but not limited to the following:  
1) Organizational Structure and Responsibilities.  
   Organizational development, management structures, processes, and procedures.  
2) Environmental Policy, Environmental Objectives, and Targets.  
   Method and plan to enhance the organizational capacities to achieve the institutional and legal framework.  
3) Relevant Legislations, Standard, and Guidelines.  
   Lao PDR Law, Concession Agreement, IFC, ISO14001, etc.  
4) Procedural and Method of Environmental Development.  
5) Capability Assessment  
   To which an organization uses their assessment information to understand performance and bring about improvement. E.g., the level of success towards achieving the objectives and targets, non-conformity report, the status of incident investigations and corrective and preventive actions;  
6) Environmental Performance Evaluation |
### Sub-plan 21: Capacity Building Plans and Programs

<table>
<thead>
<tr>
<th>Sub-plan 21</th>
<th>Capacity Building Plans and Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To evaluate its environmental performance against its Environmental Policy, Environmental Objectives, and Targets. The Environmental Performance Evaluation uses indicators for gathering the information and compares current and previous performance with criteria for environmental performance established by the organization itself.</td>
</tr>
<tr>
<td>7)</td>
<td>Environmental Management Audit</td>
</tr>
<tr>
<td></td>
<td>Including legal and other requirements, environmental aspects, training, monitoring data, nonconformance information, environmental audits, management reviews, etc. It can be an internal or external audit.</td>
</tr>
<tr>
<td>8)</td>
<td>Environmental Management Review</td>
</tr>
<tr>
<td></td>
<td>Improvement against the results of the previous audits and compliance evaluations/inspections.</td>
</tr>
<tr>
<td>9)</td>
<td>Follow-up actions from previous Management Reviews and Recommendations for improvement.</td>
</tr>
<tr>
<td>10)</td>
<td>Reporting</td>
</tr>
<tr>
<td></td>
<td>Describing the relevant environmental report, e.g., EHS Monthly report, EHS Annual report, Environmental Performance report, Environmental Audit result, etc.</td>
</tr>
</tbody>
</table>

#### Required Monitoring
- Visual site inspection and verify the compliance according to the EMMP; and
- Review the compliance and ensure that the Capacity Building Plans has been implemented.

#### Management and Monitoring Responsibility
- Main Contractor during the Construction Phase
- Operator during the Operation Phase

### 8.2.22 Sub-plan 22: Community Relations

<table>
<thead>
<tr>
<th>Sub-plan 22</th>
<th>Community Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>To ensure that intended information reaches the target groups;</td>
</tr>
<tr>
<td></td>
<td>To inform the community about the project policies, operations, problems, and what it contributed to the social and economic life of the locality;</td>
</tr>
<tr>
<td></td>
<td>To inform the employees of the projects about its operations and how to pass this information along to the community;</td>
</tr>
<tr>
<td></td>
<td>To find out what the community is thinking about the project and its operations and stimulate two-way communication; and</td>
</tr>
<tr>
<td></td>
<td>To promote the welfare of the community.</td>
</tr>
<tr>
<td>Locations</td>
<td>Project boundary and neighborhood community</td>
</tr>
</tbody>
</table>

#### Required Measures
- Design an effective public information program to ensure the intended information reaches the target groups;
- Corporate Social Responsibility (CSR) activities should be initiated as soon as possible in the pre-construction and construction phases;
- Ensure that the tripartite committee (proposed in the ESIA) has a clear understanding of the project impacts;
- Intensive Public Relations (PR) program focusing on the clarity and adequacy of the information on impacts of the Project using non-technical language that could be easily understood by villagers;
- Maintain and ensure a good relationship between the Project personnel and the surrounding communities;
Sub-plan 22  Community Relations

- Maintaining effective public relations programs and community sharing of project advantages;
- Public complaints could be filed against the Project and could lead to litigations, or bad publicity to the Project. The complaints must be evaluated. This evaluation includes responses regarding complaint handling and appropriate or corrective actions;
- The Project Owner and the Contractors shall establish a complaint and grievance mechanism related to environmental, health, safety and social issues. It shall guarantee to treat and resolve grievances in confidentiality; and
- Community requests, problems, and complaints shall be taken care of in an effective and efficient way.

Required Monitoring

- Number of complaints filed through the complaint response channel;
- Visual site inspection and verify the compliance according to the EMMP; and
- Review the compliance and ensure that the Community Relations Plans has been implemented.

Management and Monitoring Responsibility

Main Contractor, Operator, and Project Owner

8.2.23 Sub-plan 23: Health and Safety

<table>
<thead>
<tr>
<th>Sub-plans 23</th>
<th>Health and Safety</th>
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<tr>
<td>Objectives</td>
<td>To minimize the negative impacts on occupational health, and safety from the project to workers and the communities;</td>
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<tr>
<td>Locations</td>
<td>Project boundary, neighborhood community, and access of transport</td>
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<tr>
<td>Required Measures</td>
<td>The Health and Safety Plans is a plan that outlines the safety measures and procedures implemented in a workplace. It shall be designed in accordance with the legislative requirements in particular the requirements and standard as defined in the Concession Agreement (e.g. Lao PDR Labor law, IFC Environmental Health and Safety Guidelines, The Occupational Health and Safety Management OHSAS18001, etc.). The plans and programs shall enables individual and the organization aware and performs health and safety protection and measures efficiently by the include but not limited to the following:</td>
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<tr>
<td></td>
<td>o Contractors Health &amp; Safety Policy/Statement</td>
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<td>o Legal Framework;</td>
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<td>o Schedule of Appointed Responsible Persons</td>
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<td>o Management &amp; Supervision Organizational Chart</td>
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<td>o Construction Risk Assessment and Prevention</td>
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<td>o Health and Safety Control Measures;</td>
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<td>o Specific Health and Safety Plans includes:</td>
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<td>1) General Safety Rules;</td>
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<td>2) Slips, Trips, Falls;</td>
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<td>3) Housekeeping;</td>
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<td>4) Personal Protective Equipment;</td>
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<td>5) Working at height;</td>
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<td>6) Sun Protection and Dehydration;</td>
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<td>7) Chemical hazards;</td>
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<td>8) Respiratory Protection;</td>
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<td>9) Noise;</td>
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<td>10) Electrical Safety;</td>
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<td>11) Lighting and Illumination;</td>
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<td>24) Water Supply, Drinking water and Hygiene; and</td>
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<td>25) Unexploded Ordnance (UXO)</td>
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<tr>
<td>- Personal Protective Equipment Requirements</td>
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<td>- Equipment Inspection and Repair Registers includes: ladders, scaffolding, portable electrical tools, safety equipment and PPE.</td>
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<td>- Emergency Action Plan</td>
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<tr>
<td>- Construction Site Signage</td>
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</table>

**Required Monitoring**

- Verify the compliance according to the EMMP and Health and Safety Plan.

### Sub-plan 24: Transmission Line Corridor Management Plan

#### Objectives

- To minimize the adverse environmental health and safety impacts of overhead transmission lines by integrating the corridors with the surrounding natural vegetation; and

#### Locations

- Transmission line corridor, neighborhood community, and access to transport

#### Required Measures

- The Transmission Line Corridor Management Plan is a plan that outlines the procedures to avoid and minimize impacts to environment and safety of the workers and communities during the construction, operation, and maintenance. The plan will cover the transmission lines, switchyard, substations and neighbor communities. It shall be designed in accordance with the legislative requirements, in particular, the requirements and standard as defined in the Concession Agreement (e.g. Lao PDR laws and regulations, GoL guidelines, IFC Performance Standards, IFC Environmental Health and Safety Guidelines, ADB Applicable Standards, etc.).

**Required Monitoring**

- Verify the compliance according to the Transmission Line Corridor Management Plan and relevant regulations.

#### Management and Monitoring Responsibility

- Main Contractor during the Construction Phase
- Operator during the Operation Phase
9 MANAGEMENT PROCEDURES

9.1 Environmental Management Plan within the Construction Area

1) Context

The project activities during pre-construction and construction phases mainly occur in the construction area (site installation) and access road. Those activities will cause of negative potential impact on the environment and personal health of villagers and construction workers.

According to the Concession Agreement, the project developer is committed to mitigating alleviate impacts from construction works in the construction area. The project company will assign these commitments to EPC Contractor and cascade deployment to sub-Contractors. EPC Contractor will be responsible for preparation of detailed environmental management plans for mitigation of environmental impacts in the construction area and its sub-Contractors will be responsible for the implementation of those plans.

2) Objectives

- To undertake necessary measures to minimize the adverse impacts caused by the projects pre-construction and construction activities in the construction area and along the access road.
- To report the performance of the management action or mitigation measures and assess compliance with applicable standards and CA commitment.

3) Legal Requirements

- Environmental Management Standard for Electricity Project, 2001
- National Standard in Environmental Quality Standards of Lao PDR, 2017
- Concession Agreement
- EPC Contracts

4) Mitigation Measures

Mitigation measures for impact mitigation in the construction area shall include the following program.

- Air Quality Management
  - Fugitive Dust Control activities
  - Vehicles Exhaust Emission Control Activities
- Noise Level Control
  - Inspection and control of excessive noise source activities.
  - Public information activities for excessive noise occurrence.
• Water Quality Discharge Control
  - Control of water quality discharge from the construction area to a natural wa-
tercourse.
• Water Use and Supply
• Wastewater Management
• Solid Waste Management
• Hazardous Material Management
• Occupational Health and Safety Management

5) **Performance Specification**

The detailed program for the above list shall at least contain the following information.

• Activities to be undertaken
• Location
• Responsible unit
• Duration and Frequency
• Performance indicator
• Reporting format and plan

6) **Implementation Schedule**

EPC Contract is required to prepare a detailed program of the above mitigation measures for impacts in the construction area and submit to EMO / Project Company for approval as part of the EPC contract.

7) **Responsibility**

EPC Contractor

9.2 **Environmental Monitoring Plan Outside Construction Area**

1) **Context**

The project activities during pre-construction and construction phases that will cause negative potential impact to the environment outside the construction area that needs mitigation measures during the construction phase are mainly relating to Water Quality and Aquatic Ecology Sampling programs and vegetation clearing in the proposed reservoir area.

2) **Objectives**

• To minimize the adverse impacts caused by the impoundment of the reservoir area from the decomposition of organic materials on reservoir ecology and downstream.
• To report the performance of the management action or mitigation measures and assess compliance with the CA commitment.
3) Legal Requirements
   - Concession Agreement

4) Monitoring Programs
   - Surface Water Quality Sampling Program
     - **Parameters:** pH, Temperature, Transparency, Dissolved Oxygen, Conductivity, Depth, Turbidity, Suspended Solids, Total Dissolved Solids, Total Hardness, BOD, Nitrate-Nitrogen, Total Nitrogen, Total Phosphorus, Ammonia-Nitrogen, and Total Coliform Bacteria.
     - **Monitoring Method:** Using standard methods for the examination of water and wastewater of APHA, AWWA, and WEF.
     - **Number of Station:** 5 stations
     - **Frequency:** 4 times/year
     - **Location:** 3 stations upstream and 2 stations downstream from LP HPP (the same stations with baseline data sampling during ESIA study).
   - Aquatic Ecology Sampling Program
     - **Parameters:** Phytoplankton, Zooplankton, Benthos, Fish species.
     - **Monitoring Method:** Plankton and Benthos Using standard methods for the examination of water and wastewater of APHA, AWWA, and WEF. Fish Species identification by classification guidance books (Kottelat, 2001 and Rainbow, 1996).
     - **Number of Station:** 5 stations and 3 stations (Fish species)
     - **Frequency:** 4 times/year
     - **Location:** At the same station of water quality sampling
   - Logging and Vegetation Clearing in the proposed reservoir area
     - After reservoir demarcations, all timber will be registered by Ministry of Agriculture and Forestry (MAF). Then, those timbers will then be removed by the Contractor.
     - Also, the remaining vegetation, bushes, undergrowth shall be cleared up to the reservoir margin of 312 m asl.

5) Performance Specifications
   - Records of mitigation measure conducted every campaign be submitted to EMO.
   - Result of monitoring water quality is within the national standards.
   - Record the number of complaints filed through the complaint response channel.
   - Logging and vegetation clearing activities are in accordance with the planned schedule.

6) Implementation Schedule
   Throughout pre-construction and construction phases on the planned schedule
7) **Responsibilities**

Project Company through EMMP Contractor

9.3 **Management Arrangement**

9.3.1 **Implementation Facilitation by EMU**

Effective facilitation of all stages of the EMMP implementation could be managed through a full-time group of a specialist team called Environmental Management Unit (EMU). The team members would be appointed from related authorities with special knowledge in related activities of the program. International consultants would bring in their experience from other projects and give advice in specific fields e.g. environmental development expert, environmental scientist, and other personnel as to be identified during implementation.

The principal aim of the EMU would be assisting MONRE about the best practicable means for implementation of EMMP.

The EMU will have the main responsibility for the following tasks:

1) Coordinating with concerned Government Authorities in relation to the implementation of the EMMP and the Project Company.

2) Periodic monitoring and compliance inspection of the EMMP and the Project Company.

9.3.2 **Grievance Redress Procedure**

Procedures proposed to be adopted for filing complaints, review and response to deficiency of EMMP are as following:

1) All complaints and grievances relating to any aspect of EMMP should be properly documented by EMO/EMU and addressed through consultations conducted in a transparent manner and aimed at resolving matters.

2) If the affected person does not receive any response from the EMO within 20 days of filing the complaint, or if the matter is not resolved to the satisfaction of the affected person, the representatives of mass organization, on behalf of the affected person, can submit the complaint to the head office of the project proponents. Project authorities and representatives of the affected person will follow-up the case on behalf of the affected person.

3) If the matter still remains unresolved within 20 days of filing the complaint to the project company, and at the request of the affected person, the representatives of the mass organization will, on behalf of the affected person, forward the complaint to the Court of Law and follow up with the relevant authorities.

The concerned EMO/EMU will document all complaints received in writing (or written when received verbally) from the affected person in pursuant to the grievance redress procedures at every stage.

9.3.3 **Emergency Response Plan (ERP)**

1) **Context**
This Emergency Response Plan (ERP) is to be prepared by the EPC Contractor and submit to EMO for concurrence. The ERP covers emergency incidents that may occur in the construction sites during the construction of the LP HPP. The emergency incidents could have adverse impacts on the environment, and on health and safety of construction workers and nearby communities.

2) Objectives
- To ensure that all concerned personnel of the EPC Contractor will efficiently and effectively discharge their assigned responsibilities in handling emergency situations occurring in the construction of the LP HPP and its associated facilities to minimize adverse impacts on the environment and health and safety of the construction workers and the nearby communities; and
- To ensure public confidence in the readiness of the Contractor to efficiently and effectively respond to emergency situations occurring in the construction.

3) Legal Requirements
- Environmental Protection Law, 2013
- Concession Agreement
- EPC Contract

4) Mitigation Measures

Emergency Response Plan (ERP) should include the following components:

- **Hazard Identification/Assessment**: The process of hazard identification and assessment involves a thorough review. For each potential hazard, it is important to identify resources necessary for appropriate emergency response. For most events in construction, a simple analysis based on the experience of the people involved in the project is likely sufficient.

- **Emergency Resources**: It is important to identify which resources are available and have contingency plans in place to make up for any deficiencies. Other on-site resources such as fire extinguishers, spills containment equipment, and first aid kits must be maintained and clearly identified.

- **Communication Systems**: An important key to effective emergency response is a communications system that can relay accurate information quickly. To do this, reliable communications equipment must be used, procedures developed, and personnel trained. A Backup system is required in place, in case the system is rendered useless by the emergency. The type and location of emergency communication systems must be posted on the project. This will include the location of telephones, a list of site personnel with cellular phones or two-way radios, and any other equipment available.

- **Administration of the Plan**: The task of administering and organizing the plan is vital to its effectiveness. The person who has this task will normally be the person in charge of the emergency response operation. It is very important to review the emergency plan on a regular basis and especially after an emergency has occurred. Changes may be necessary where deficiencies became apparent as the plan went into operation.
- **Emergency Response Procedure**: An emergency can be reported from any source a worker on site, an outside agency, or the public. The circumstances may change during the course of an emergency. Any procedures developed must be able to respond to the ongoing situation.

- **Communication of the Procedure**: To be effective, an Emergency Response Procedure must be clearly communicated to all site personnel.

- **Debriefing and post-traumatic stress procedure**: The recovery process, or what happens after the emergency response has been completed, is a critical step in the plan. Debriefing is necessary to review how well the plan worked in the emergency and to correct any deficiencies that were identified. Debriefing is critical to the success of future emergency response planning.

The plan should be used to set emergency procedures, implement and communicate the procedures, and ensure that any required training has been completed. The plan should also be evaluated regularly to ensure that it conforms to current operations and actual conditions at specific sites.

5) **Performance Specification**

- Compliance with international standard and best practices available.

6) **Implementation Schedule**

- Preparation of ERP should be complete within 3 months after the EPC contract signed and review / update on a quarterly basis.

7) **Responsibility**

- EPC Contractor
9.4 Documentation and Control of Documents

The EMMP and its supplementary documents will be stored in the respective EMO and EPC Contractor’s document control systems. The document control systems will ensure that only the latest version is available for use, with older versions being archived as historical records.

The EMO Environmental Manager and EPC Contractor’s EHS Manager are respectively responsible for the establishment of their specific environmental documentation and revision of existing documentation. As part of the document control system, an Environmental Document Control Register will be established and maintained by both the EMO Environmental Manager and EPC Contractor’s EHS Manager:

When any document is reviewed and revised, any changes will be tracked electronically to enable readers to understand the changes. Distribution of any EMMP documentation by electronic file will be done only using Adobe PDF encrypted standard in order to avoid uncontrolled changes in the document.

9.5 Awareness and Capacity Building Training Program

The implementation of the EMMP will require the full participation of MONRE, Central EMU, Provincial EMU and District EMU assigned officers. As such, training EMU personnel in relation to awareness and capacity building of assigned staffs will be also critical to the success of the EMMP implementation.

Project Company has a responsibility to assist GoL concerned organizations in acquiring knowledge and skills through on-the-job training and other training programs including:

- Provide funds annually for environmental (and social) capacity building to the assigned staffs from the Ministry of Natural Resources and Environment (MONRE) in planning, managing and conducting delivery capacity building and environmental awareness programs.
- Provide budget to support the training program for awareness and capacity building of concerned other ministries provincial, district and village committees responsible for EMMP implementation.

Specific Government obligations concerning capacity building include:

- MONRE will utilize Project funds for capacity building in environmental management and monitoring at the central, provincial and district levels of MONRE and other GoL agencies;
- MONRE’s Environment Management Unit, in coordination with the project company and other GoL organizations, will plan, manage and conduct public consultation and awareness activities (including training) on environmental and social aspects.
10 AUDITING / COMPLIANCE CHECKING

10.1 Auditing

The objective of auditing is to follow up the actual implementation of EMMP and to provide feedback on implementation and to identify problems and successes as early as possible to facilitate timely adjustment of implementation arrangements. Auditing of EMMP implementation comprises 2 types of activities.

(1) Internal Auditing: During the commencement of EMMP Implementation, the EPC, Contractors, and EMMP are required to develop a monitoring and reporting framework for all activities. Central to this framework should be the environmental impact that constituted the basis for the agreed EMMP. The organizational unit responsible for project reporting on environmental (EMU) should oversee the progress in EMMP implementation through regular progress reports, submitted through normal channels, monitoring key activities against the plan.

The specific objective of the internal audit and supervision is to: (i) verify that the baseline information of all environmental impact has been carried out; (ii) oversee that the EMMP is implemented as designed and approved; and (iii) verify that funds for implementation of the EMMP are provided in a timely manner and in amounts sufficient for their purposes, and that such funds are used in accordance with the provisions of the EMMP.

(2) External Auditing: In addition to internal auditing, external (or independent) auditing is normally required to provide an independent periodic assessment of EMMP implementation, and to suggest an adjustment of delivery mechanisms and procedures as required. To function effectively, the organization responsible for external monitoring should be independent of the governmental agencies involved in EMMP implementation. Project Company are responsible to contract suitable and experienced external auditing agency and budget for the same should be provided in the EMMP.

10.2 Non-Compliance, Corrective Action and Prevention Action

An important element of the auditing process is the organized relay of non-conformance information. To prioritize management attention on the most important issues, noncompliance observations should be separated into three levels on the basis of importance, and communications requirements for the observations should be commensurate with the severity of the non-compliance situation.

The three levels of non-compliance situations are:

1) Non-Compliance Level I

Definition: A non-compliance situation not consistent with EMMP requirements, but not believed to represent an immediate or severe threat to people or to the environment. Repeated Level I concerns may become Level II concerns if left unattended.
2) **Non-Compliance Level II**

Definition: A non-compliance situation that has not yet resulted in clearly identified damage or irreversible impact, but which potential significance requires expeditious corrective action and site-specific attention to prevent severe effects. Repeated Level II concerns may become Level III concerns if left unattended.

3) **Non-Compliance Level III**

Definition: A critical non-compliance situation, typically including observed significant damage on people or the environment or a reasonable expectation of very severe impending damage. Intentional disregard of specific prohibitions is also classified as a Level III concern.

10.3 **Auditing Schedule and Following up Actions**

The project company through EMO should initiate scheduled audits of the Project activities, construction sites and Contractors against the requirements established in this EMMP and relevant Sub-plans.

The Audit Schedule anticipates one Internal Audit every year. Additional audits may be programmed should a system non-conformance indicate significant areas of concern. Non-conformances or observations identified during audits should be subject to the provisions of corrective action.

Audit findings should be reported to the Project Company and discussed with the EMU. An Action Plan for corrective action required from the audit should be prepared by EMO, submitted to the Project Company for non-objection and then implemented in a timely manner. Follow up monitoring should be undertaken to verify the implementation of approved corrective actions and their effectiveness in preventing a recurrence.

At the end of construction activities for each main Contractor, a Post-Construction Environmental Audit should be carried out. This will establish the success or otherwise of Mitigation and rehabilitation work. An Action Plan for any outstanding issues should be developed by the EMO in consultation with EMU.
11 MANAGEMENT REVIEW AND CROSS REFERENCE

11.1 Management Review

As per the Concession Agreement, the EMMP needs to be reviewed and revised every 2-years during the Construction Phase. In this conjunction, as part of the Project Company’s policy commitment to continual improvement, prior to the revision of the EMMP, senior management will conduct a review of the performance of the EMMP.

Senior management from Project Company should review annually the EMMP implementation to ensure its continuing suitability, adequacy, and effectiveness regarding the project construction progress, and the Developer’s commitment to continual improvement.

The review should utilize information collected by the EMO carrying out monitoring specified above, and results of audits. The EMO is responsible for ensuring that relevant information is collected for the Senior Management Environmental Review.

The review should address any need for changes to the environmental policy and objectives, and to the environmental activities and practices of the EMMP, in light of the audit results, of changing circumstances and of the commitment to continual improvement.

The Management review should be documented and the results communicated to the EMU involved in the EMMP implementation.

11.2 Cross Reference

Implementation of EMMP should be cross-referenced to applicable laws, regulation international policies / guidelines and contractual commitment as following.

- **Applicable Laws**
  - The Constitution of the Lao PDR, dated 2003
  - The Environmental Protection Law National Assembly No.O2/99/NA, dated 2013
  - The Electricity Law, dated 2012
  - Decree on Environmental Assessment, No. 21/PM, January 2019
  - Ministerial Instruction on Environmental Impact Assessment, December 2016
  - Environmental Management Standard for Electricity Project, 2001
  - Agreement on the National Environmental Standards, 2017

- **International Policies / Guideline and Contractual Commitments**
  - IFC Policy and Performance Standards on Social and Environmental Sustainability, 2012
  - International Hydropower Association (IHA) Sustainability Protocol
  - IFC EHS Guidelines
  - Concession Agreement
  - Project Company Policy and Commitments
LUANG PRABANG POWER COMPANY LIMITED
Luang Prabang HPP

Environmental and Social Impact Assessment
Report 4 of 5: Social Management and Monitoring Plan
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STRUCTURE OF THE FEASIBILITY STUDY

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VOLUME 2: MAIN REPORT

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VOLUME 4: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
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REPORT 2: SOCIAL IMPACT ASSESSMENT
REPORT 3: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN
REPORT 4: SOCIAL MANAGEMENT AND MONITORING PLAN
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<tr>
<th>Abbreviation</th>
<th>Complete Expression</th>
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</thead>
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<tr>
<td>CA</td>
<td>Concession Agreement</td>
</tr>
<tr>
<td>CIA</td>
<td>Cumulative Impact Assessment</td>
</tr>
<tr>
<td>COD</td>
<td>Commercial Operation Date</td>
</tr>
<tr>
<td>DGC</td>
<td>District Grievance Committee</td>
</tr>
<tr>
<td>DRC</td>
<td>District Resettlement Committee</td>
</tr>
<tr>
<td>EMO</td>
<td>Environmental Management Office</td>
</tr>
<tr>
<td>EMMP</td>
<td>Environmental Management and Monitoring Plan</td>
</tr>
<tr>
<td>EPC</td>
<td>Engineering, Procurement and Construction</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental Social Impact Assessment</td>
</tr>
<tr>
<td>FSL</td>
<td>Full Supply Level</td>
</tr>
<tr>
<td>GoL</td>
<td>Government of Lao</td>
</tr>
<tr>
<td>HPP</td>
<td>Hydroelectric Power Plant</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IMA</td>
<td>Independent Monitoring Agency</td>
</tr>
<tr>
<td>LPCL</td>
<td>Luang Prabang Power Company Limited</td>
</tr>
<tr>
<td>LP HPP</td>
<td>Luang Prabang Hydroelectric Power Plant</td>
</tr>
<tr>
<td>masl</td>
<td>Meters above sea level</td>
</tr>
<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>MRC</td>
<td>Mekong River Commission</td>
</tr>
<tr>
<td>NA</td>
<td>National Assembly</td>
</tr>
<tr>
<td>NSEDP</td>
<td>National Socio-Economic Development Plan</td>
</tr>
<tr>
<td>NTFP</td>
<td>Non-timber Forest Product</td>
</tr>
<tr>
<td>PAP</td>
<td>Project Affected Person</td>
</tr>
<tr>
<td>PDA</td>
<td>Project Development Agreement</td>
</tr>
<tr>
<td>PDR</td>
<td>People’s Democratic Republic (Lao PDR, Laos)</td>
</tr>
<tr>
<td>PNPC A</td>
<td>Procedures for Notification, Prior Consultation and Agreement</td>
</tr>
<tr>
<td>PRC</td>
<td>Provincial Resettlement Committee</td>
</tr>
<tr>
<td>REMDP</td>
<td>Resettlement and Ethnic Minority Development Plan</td>
</tr>
<tr>
<td>RMU</td>
<td>Resettlement Management Unit</td>
</tr>
<tr>
<td>ROR</td>
<td>Run-of-river</td>
</tr>
<tr>
<td>SIA</td>
<td>Social Impact Assessment</td>
</tr>
<tr>
<td>SMMP</td>
<td>Social Management and Monitoring Plan</td>
</tr>
<tr>
<td>SMO</td>
<td>Social Management Office</td>
</tr>
<tr>
<td>TBIA</td>
<td>Transboundary Impact Assessment</td>
</tr>
<tr>
<td>UNESCO</td>
<td>The United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>VGU</td>
<td>Village Grievance Redress Unit</td>
</tr>
<tr>
<td>VRC</td>
<td>Village Resettlement Committee</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

1.1 Terms and Definitions

The following are common terms and definitions used in the SMMP:

- **Social Management and Monitoring Plan (SMMP):** SMMP documents the main social activities, establishes methodology and measures to prevent and mitigate social impacts which have been identified and discussed in the SIA, and determines institutional arrangement with responsibilities, timeline and sufficient budgets for the implementation of the SMMP.

- **Government of Lao PDR (GoL):** GoL is the institution in Lao PDR that officially manages and controls all activities in the country including creating laws, collecting taxes, providing public services, etc.

- **Ministry of Natural Resources and Environment (MONRE):** MONRE is the apparatus of government, in the role of aiding the government and entrusted with the responsibility of overall management of natural resources and environment. This includes, land, water, air, biodiversity, natural and social environment as well as issues related to natural disaster and prevention of hazard of climate change, meteorology and hydrology countrywide.

- **Social Management Office (SMO):** The main mechanism for implementation of the social management plan will be SMO for the project which will be a team of project developer. The SMO plants, implements the resettlement and social development plan, besides conducting internal monitoring and following up on the progress of the project.

- **Engineering, Procurement, and Construction (EPC):** EPC is a particular form of contracting arrangement used in project where the Project Proponent and EPC Contractor is made responsible for all the activities from design, procurement, construction, commissioning and handover of the project to the end-user or owner.

- **Independent Monitoring Agency (IMA):** IMA is an external agency engaged by the government and funded by the project to monitor and evaluate the project’s compliance with regards to environmental and social safeguards and measures specified in EMMP, SMMP and REMDP of the project.

- **Commercial Operation Date (COD):** As used in power generation; the date under a long-term power purchase agreement when the commissioning tests have been passed and the facility starts to generate power to earn revenue.

- **Concession Agreement (CA):** A concession agreement is a negotiated contract between a company and a government that gives the company the right to operate a specific business within the government's jurisdiction, subject to certain conditions, liabilities and commitments.

1.1.1 Project Impact Area

Determination of the location of environmental and social changes that will likely result from construction and operation of the project shall cover the following areas.

- Dam, power house, appurtenant structures and immediate surroundings: this will be a focal area for the impact assessment, since it will be affected in a relevant and permanent way by the Project, and since project activities, mainly during the construction phase,
will be concentrated in this area. It includes the area affected by construction activities (construction sites, construction camps, quarries, borrow and disposal areas, etc.).

- Reservoir impoundment area: the future reservoir, i.e. the area which will be covered by water, is also an area in which the effects of the Project will be very much apparent, and which therefore needs to be investigated in detail. Given the fact that Luang Prabang HPP will be a Run of the River (ROR) plant with no substantial storage and regulating capacity, the reservoir will be comparatively small; nevertheless, it will stretch upriver over a considerable distance (about 150 km upstream).

- Immediate reservoir catchment (about 2-3 km from reservoir margin): This is the area directly surrounding the reservoir, which can be influenced by the project or can influence project operation in different ways e.g. change in groundwater regime, triggering of landslides, increasing pressure on habitats and settlements, etc.

- Upper catchment area: The upper catchment area is the area upstream of the dam which feeds the river. Problems in this area mainly include, erosion influenced by human activities, water contamination, and change in river discharge patterns by storage dams located upstream which can have effects on the project.

- River downstream of LP HPP: This area may not be that much affected with significant impacts (i) since the project will be operated as a ROR scheme, and (ii) the upper end of Xayaburi HPP is only a short distance away, and from there onwards water level is controlled by the already existing HPP. Still, these assumptions will have to be checked during ESIA preparation.

- Other areas: This comprises of resettlement areas, access road or areas to be occupied for the necessary relocation of infrastructure etc.

- In terms of project implementation phase, impacts on environmental resources / value will be assessed for each stage of project implementation as follows:

  - **Pre-Construction Phase**: this will start from the project studies and planning, financial preparation, concession agreement finalization to financial closing. At the construction area, there will be land clearance, construction of camps, access road, utilities and offices. These activities will take about 1.5-2 years before construction starts.

  - **Construction Phase**: This stage will take about 6.5 years. Construction of all project components will be done according to construction schedule that takes seasonal constraint into consideration. Major impact will be those associated with construction activities. In addition, during this stage, those activities relating to social impact mitigation/resettlement will be implemented.

  - **Operation Phase**: After completion of construction works, power generation equipment installed, construction of switch yard and transmission line completed, Project Commercial Operation Date (COD) will be commenced and will continue to operate as specified in the Concession Agreement.
1.2 **Structure of the SMMP Report**

The content of this SMMP report as suggested in concerned guidelines cover the followings:

- **Chapter 1**   Introduction
- **Chapter 2**   Overview of SMMP Related of Policy, Legal and Institutional Framework
- **Chapter 3**   SMMP Organization, Roles and Responsibilities
- **Chapter 4**   Social Management and Monitoring Plan during Construction Phase
- **Chapter 5**   Social Management and Monitoring Plan during Operation Phase
- **Chapter 6**   Management Procedures
- **Chapter 7**   Auditing / Compliance Assessment
- **Chapter 8**   Management Review and Cross Reference
2 OVERVIEW OF SMMP RELATED OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Developer’s Environmental and Social Policies

Developer is committed towards protecting the environment, sustainable use of natural resources and socially responsible activities. The developer holds a declaration of Environmental Responsibility and an Ecological Management System which were developed in compliance with International best practices.

The developer is committed to transparent processes through information disclosure and stakeholder engagement; principles which are formalized in their Communication Strategy, Corporate Ethics Code, Corporate Governance Code, Regulations on Insider Information, and Regulations on Information and Communications.

2.2 SMMP related Policy and Legal Framework

Over recent years, the GoL has developed and updated a number of regulations and policies for environmental and social management. The legislation and policies relevant to preparation of Environmental and Social Impact Assessment (ESIA), Social Mitigation and Monitoring Program (SMMP) for Hydroelectric Power Project that are relevant to the proposed LP HPP include the followings.


In terms of environmental protection, Article 19 of the 2015 Constitution states that “All organizations and citizens must protect the environment and natural resources: land surfaces, underground resources, forests, animals, water sources and the atmosphere.”

2) The 8th Five Year National Socio-Economic Development Plan (NSEDP) for 2016 to 2020

This plan promotes the expansion of hydropower as a main driver for poverty alleviation for the country to graduate from the Least Developed Country (LDC) list by 2020 where LDCs was officially established in 1971 by the UN General Assembly with a view to attracting special international support for the most vulnerable and disadvantaged members of the UN family. In the NSEDP, hydropower is identified as the development to bring more households onto the national grid, ensure domestic electricity supply meets demand, and for foreign export to surrounding countries. Specifically, the exportation of power is highlighted as a main driver to achieve graduation from the LDC list.

3) Allocation of Land and Occupation Law, No. 45/NA, June 2018

This law describes the required, procedure, authorities and obligation of Developer for the project that involve allocation of land and occupation as followings;

- Article 21 The Project Study and Plan for Allocation of Land
- Article 22 Compensation for the Loss from Allocation of Land
- Article 26 Livelihood Development Program during Transitional Period and Article 41 Allocation of Land and Occupational Project at National Level
- Article 42 Allocation of Land and Occupational Project at Province Level

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• Article 43  Allocation of Land and Occupational Project at District Level
• Article 45  Obligation of Project Developer

4) Decree No. 84 on Compensation and Resettlement of People Affected by Development Projects, 2016

Established in 2005 and revised in 2016, the Decree on Compensation and Resettlement of People Affected by Development Projects has relevance to the proposed Project. The decree aims to ensure that PAP and households are compensated and assisted to improve or maintain their pre-project incomes and living standards and are not made worse off than they would have been without the project.

5) Decree No. 21 on Environmental Impact Assessment, 2019

This decree is the latest legislation particularly relevant to environmental impact assessment of all investment projects in the Lao PDR including LP HPP, which was approved by the government on 31 January 2019. The objective of the decree is to establish principles, rules and measures related to managing and monitoring environmental impact assessment works to make sure that they are implemented in proper, transparent and agreed manners, aiming to prevent, mitigate, remedy adverse impacts on the environment, ensure reasonable compensation, allocation of land and occupation, and improvement of living standard of project-affected persons.

6) Other applicable Lao PDR Laws, Regulations and Guidelines

Other relevant local laws, regulations and guidelines are summarised in the Table 2-1 below:

<table>
<thead>
<tr>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decree on the Preservation of Cultural, Historical and Natural Heritage</td>
<td>1997</td>
</tr>
<tr>
<td>Land Law</td>
<td>2003</td>
</tr>
<tr>
<td>National Policy on Environmental and Social Sustainability of the Hydropower Sector in Lao PDR</td>
<td>2006</td>
</tr>
<tr>
<td>PM Decree on Implementation of the Land Law</td>
<td>2008</td>
</tr>
<tr>
<td>PM Decree on State Land Lease or Concession No.135</td>
<td>2009</td>
</tr>
<tr>
<td>Technical Guidelines for Resettlement and Compensation of People Affected by Development Projects</td>
<td>2010</td>
</tr>
<tr>
<td>Law on Hygiene, Disease Prevention and Health Promotion</td>
<td>2012</td>
</tr>
<tr>
<td>Decree on Land and Service Fees No. 003/PSD</td>
<td>2012</td>
</tr>
<tr>
<td>Labour Law</td>
<td>2013</td>
</tr>
<tr>
<td>Ministerial Instruction on Public Involvement in the Process of Environmental and Social Impact Assessment of Investment Project</td>
<td>2013</td>
</tr>
<tr>
<td>Guideline on Consultation with Ethnic Groups</td>
<td>2013</td>
</tr>
<tr>
<td>Law on Grievance Redress 012/NA</td>
<td>2014</td>
</tr>
</tbody>
</table>

2.3  Related International Policies and Guidelines

1) Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC), 1972
Under this Convention, the GoL agrees to take the appropriate legal, scientific, technical, administrative and financial measures necessary for identification, protection, conservation, presentation and rehabilitation of designated heritage sites in Lao PDR. The GoL ratified this Convention on March 20, 1987.

2) **IFC Policy and Performance Standards on Social and Environmental Sustainability, 2012**


3) **International Hydropower Association (IHA) Sustainability Protocol**

The International Hydropower Association (IHA) is a non-profit membership organization committed to advancing sustainable hydropower. Formed under the auspices of UNESCO in 1995 as a forum to promote and disseminate good practice about hydropower. The Hydropower Sustainability Assessment Protocol (HSAP) is a tool for assessing projects across a range of social, environmental, technical and economic criteria. There are 2 related documents including:

- Hydropower Sustainability Assessment Protocol, July 2018
- IHA Sustainability Guidelines February 2004

4) **IFC EHS Guidelines**

The General EHS Guidelines contain the following information.

- Environmental
- Occupational Health and Safety
- Community Health and Safety
- Construction and Decommissioning

5) **World Commission on Dams (WCD) Report**

The WCD report acknowledges the contribution of dams to human development, but also notes the severe and often unnecessary impacts in numerous cases.

The WCD identified five core values as an overall basis for decision-making: equity, efficiency, participatory decision-making, sustainability and accountability. Furthermore, the Commission lists seven strategic priorities for an equitable and sustainable development of water and energy resources as follows:

- Strategic Priority 1: Gaining Public Acceptance
- Strategic Priority 2: Comprehensive Options Assessment
- Strategic Priority 3: Addressing Existing Dams
- Strategic Priority 4: Sustaining Rivers and Livelihoods
- Strategic Priority 5: Recognizing Entitlements and Sharing Benefits
6) **Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention)**

The Aarhus Convention establishes several rights of the public (individuals and their associations) with regard to the environment. The Parties to the Convention are required to make the necessary provisions so that public authorities (at national, regional or local level) will contribute to these rights to become effective.

7) **The Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (MRC Agreement), 1995**

The Mekong River Commission (MRC) agreement signed on April 5, 1995 by four Mekong countries (Lao PDR, Vietnam, Cambodia and Thailand). Signatories to this treaty agreed that transfer of Mekong River and tributary water outside of the Mekong River Basin can occur only by consensus among the four country members. Member countries agreed to coordinate in water project planning and monitoring of basin waters.

Since the 1995 Agreement, the MRC has launched a process to ensure "reasonable and equitable use" of the Mekong River system, through a participatory process with National Mekong Committees in each country to develop procedures for water utilization. The MRC supports a joint basin-wide planning process with the four countries, called the Basin Development Plan, which is the basis of its Integrated Water Resources Development Programme. The MRC is also involved in fisheries management, promotion of safe navigation, environmental protection, irrigated agriculture, watershed management, environment monitoring, flood management and exploring hydropower options.

In November 2003, the MRC Council approved two sets of procedures followed by a third in June 2006:

- **Procedures for Notification, Prior Consultation and Agreement (PNPCA)**, which require member countries to alert each other on planned river developments that could significantly affect their neighbours and to provide information regarding the developments, including technical specifications and environmental assessments;
- **Procedures for Water Use Monitoring** provide a legal basis for a water use monitoring system to be established in the Lower Mekong Basin; and
- **Procedure for the Maintenance of Flows on the Mainstreams**. The 2006 MRC agreements provide a definition of water use, covering uses of the Mekong "which may have a significant impact to the water quality or flows regime of the mainstream of the Mekong". These agreements confirm that uses of water on the Mekong tributaries will also be subject to notification and monitoring. For the purposes of the agreement, a Mekong tributary is defined as "a natural stream of the Mekong River System whose flows have a significant impact on the mainstream." The new agreements confirm the basin-wide approach to be maintained as the legal framework for operations of the Mekong River Commission.

8) **Guidelines for hydropower environmental impact mitigation and risk management in the Lower Mekong mainstream and tributaries (ISH0306), March 2018**

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The MRC Hydropower Mitigation Guidelines (2018) are aimed at providing mitigation guidance for design and operation of hydropower facilities, focused on long term sustainability in the Mekong Basin, to support whole of basin planning and management as well as immediate project development requirements.

These Guidelines support the MRC’s Preliminary Design Guidance (PDG, 2009), which may be used by developers during project preparation and then by the MRC to assess projects through its Procedure for Notification, Prior Consultation and Agreement (PNPCA). The Guidelines detail the application of regional and global “good industry practice” for mitigation of hydropower impacts in the Mekong context and shall further enhance the PDG as being updated during 2018.

2.4 Lao PDR Government Institutional Framework

The institutional structure for environmental management in Lao PDR consists of the following:

- National committees that guide inter-sectoral coordination among agencies;
- MONRE, as the main body, that monitors and coordinates environmental matters at the national level with other relevant ministries based on the mandate to mitigate environmental and social issues arising from their sectoral development activities;
- Provincial and district entities that have devolved responsibility for environmental protection at the local level; and
- Organizations which support the government in promoting participation and awareness.
3 SMMP ORGANIZATION, ROLES AND RESPONSIBILITIES

The responsibilities for Social Management and Monitoring Plan (SMMP) implementation during Pre-Construction, Construction and Operation phases will be taken by the project developer in coordination with the GoL (through different GoL agencies) as shown in Figure 3-1.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Pre-Construction and Construction Phases</th>
<th>Operation Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>GoL</td>
<td>From start to end of construction</td>
<td>From start COD to end of CA</td>
</tr>
<tr>
<td>- PRC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Other Provincial and District Offices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- RMU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Other concerned Ministries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SMO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SMMP / REMDP Contractor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-1: Organization and Duration of Responsibility for SMMP Implementation

3.1 GoL Organization

Implementation of SMMP for LP HPP shall be governed by the CA and existing legal framework in Lao PDR. Institutional issues of SMMP for LP HPP shall be centred upon the GoL’s inter-ministries role in instituting concerned Provincial/District authorities. The relevant GoL agencies shall be concurrently involved in implementation plan of social mitigation measures and monitoring their compliance and effectiveness. The provincial/district level responsibilities will be primarily around REMDP and public participation and involvement.

3.1.1 PRC

Provincial Resettlement Committee (PRC), as proposed by MONRE will be assigned by the GoL to be its representative, with mandate to oversee the project’s SMMP and REMDP implementation with the authority to closely manage, inspect and monitor Project’s compliance with social mitigation measures, permits and applicable laws throughout the construction and operation phases. The PRC is mostly headed by the governor of the province with most significant environmental and social impacts while the governors of provinces less affected by the project are vice-chief of the committee. The committee further includes district governors of the impacted districts and other members as nominated by MONRE.

The PRC will have the following responsibilities (as per Decree no. 84):

1) Supervise and manage the project’s planning and implementation of plans for compensation, resettlement and rehabilitation of the livelihood of project-affected persons (PAPs), Resettlement Management Unit/RMU;

2) Appoint RMU to manage the compensation and resettlement, and a working group to be responsible for compensation and resettlement;
3) Consider and approve SMMP and REMDP before proposing to MONRE to consider as the final approval;
4) Formulate a policy determine rate of compensation, set the duration of maintenance of the resettlement sites, transitional period and the period of livelihood restoration for PAPs;
5) Consider and timely settle the request(s) relating to compensations, resettlement and livelihood restoration for PAPs according to its mandate and responsibilities;
6) Report periodically on its performance to GoL and make copies to submit to the MONRE;
7) Issue decisions or notices as references for the implementation of compensation, resettlement and livelihood restoration plan;
8) Provide information for PAPs and other stakeholders concerning the development of the project, benefits and impacts, progress in the implementation of compensation, resettlement and livelihood restoration plan throughout a period of the project implementation;
9) Exercise other rights and perform other duties as assigned by GoL.

3.1.2 RMU

Main rights and duties of the RMU are the followings:
1) Serving as aide of PRC to co-ordinate with all relevant governmental organizations and the project owner to implement the compensation, resettlement and livelihood restoration plans as specified in the SMMP/REMDP;
2) Acting as a coordinator to coordinate with relevant parties at central and local levels to cooperate and facilitate the project owner to implement compensation, resettlement and livelihood restoration for PAPs;
3) Develop work and budget plan for implementation of works relevant to compensation, resettlement and livelihood restoration for PAPs;
4) Review and comment on documents relevant to compensation, resettlement and livelihood restoration for PAPs; and
5) Report periodically on its performance to PRC, MONRE and other relevant parties.

3.1.3 Other Ministries

The main ministries involved in the implementation of the SMMP and REMDP of the project include, but not limited to, the followings:
- Ministry of Energy and Mines
- Ministry of Public Health
- Ministry of Agriculture and Forestry
- Ministry of Labour and Social Welfare
- Ministry of Information, Culture and Tourism
- Ministry of Public Work and transportation.

3.2 Project Company Organization

The project company organization responsible for implementation of SMMP / REMDP comprises Environmental Management Office (EMO) and or Social Management Office (SMO) which will be established by the project company once the project’s CA signed and be maintained throughout the project’s concession period. Their responsibilities are as following.
3.2.1 SMO

SMO’s responsibilities include the following:

a) Oversee detail confirmation surveys of PAPs and entitlements;

b) Acting on behalf of the project to manage and monitor the implementation of environmental and social mitigation measures specified in the EMMP, SMMP and REMDP;

c) Reviewing and proposing revisions to the social measures;

d) Provide sufficient funding for implementation of compensation and social development activities;

e) Provide prompt and fair compensation for all Project Affected People (PAPs) in accordance with policy and entitlements, including sustainable livelihood systems;

f) Provide for any other unforeseen costs and mitigation measures that may impact PAPs because of project construction and operation;

g) Carry out meaningful consultations with PAPs that allows for participation of all groups and incorporation of local knowledge, including the participation of women, vulnerable groups and ethnic minorities;

h) Assist GoL organizations in acquiring knowledge and skills during implementation through on-the-job training and other programs;

i) Prepare and disseminate information to the PAPs and GoL;

j) Organize and facilitate public consultations;

k) Preparing and submitting report to PRC.

3.2.2 SMMP / REMDP Contractor

SMMP / REMDP Contractor is an outside party which is hired to undertake SMMP / REMDP implementation. Their works will be mainly covering the period from pre-construction to construction and operation phases with responsibility as agreed with Project Company. The responsibility of SMMP / REMDP Contractor is thus the same as EPC Contractor in undertaking SMMP / REMDP implementation but covering the area and those programs outside the construction land and working more on the social and resettlement part. The SMMP/REMDP contractor assists and reports to the SMO to perform its responsibilities as identified in Section 3.2.1 above.

3.3 External Independent monitoring agency

To ensure that the project is fulfilling its obligations as per the CA, SMMP, REMDP and to independently monitor and verify the implementation and set milestones/targets, an independent auditor or third party shall be engaged to undertake independent review/monitoring of SMMP / REMDP implementation from time to time. The monitoring shall cover compliance and focus on both qualitative and quantitative aspect of SMMP / REMDP including the targets and commitments set as per the CA.
4 SOCIAL MANAGEMENT AND MONITORING PLAN DURING PRE-CONSTRUCTION AND CONSTRUCTION PHASE

4.1 Introduction

The Social Management and Monitoring Plan (SMMP) proposed in this Chapter is the commitment from LP HPP Developer to undertake all necessary measures to mitigate all social impacts resulting from project implementation across all affected locations and group of PAPs.

The SMMP proposed herein cover mainly those of Socio-economic Component and Cultural Component. Most of the specific social mitigation measures related to relocation/resettlement are specifically addressed in Resettlement and Ethnic Minority Development Plan (REMDP) and thus in terms of management aspect this plan is called SMMP.

4.2 Description of Project Activities and Potential Impacts during Pre-construction and Construction Phase

Pre-construction and Construction Phase: From the beginning of the project studies and planning, financial preparation, concession agreement finalization until financial closing. During this period, some preparatory work can already be done at the construction site, e.g., land clearing, construction of camps, access road, utilities and offices. Major activities of this type are expected to start about 1.5 years before construction as such starts. Construction of all project components will be done according to the construction schedule that takes seasonal constraints into consideration. Major impacts will be those associated with construction activities on all sites used for this purpose. Towards the end of the construction phase, before commissioning of the power plant, the reservoir will be filled up to FSL, and this is the time when the major impact in the reservoir, the submersion of all land below FSL, will become manifest.

4.2.1 Project Activities and Potential Impact during Pre-Construction Phase

During the pre-construction phase, the major project activities causing social impacts comprise:
- Land clearance,
- Relocation of village within construction area,
- Access road improvement/ construction,
- Construction of worker camps, offices, other supporting facilities.

The social impacts in detail have already been discussed in Vol 2, Social Impact Assessment. A summary of social impacts at this phase are as follows:
- Impact on public health and occupational health in construction land and construction related area.
- Loss of livelihood and associated changes due to relocation.
- Loss of houses, public facilities/ infrastructure, cultural site and some agricultural land at Ban Houaygno and may be Ban Nasang (proposed resettlement area). Ban Houaygno will be converted to area for construction of the project’s facilities, while some area of Ban Nasang is proposed to be the new resettlement site for Ban Houaygno.

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Possible social conflict between the locals and outsiders, such as construction workers and camp followers.

Increased health risks, nutritional deficiency during transition, loss of days of work, stress due to relocation and resettlement for villagers of Houaygno.

Significant increase in traffic volume by construction related vehicles in certain sections of public roads resulting in more dust and possibility of road accidents.

Aliens communicable disease from workers to local communities including HIV/STD and other diseases.

The resettlement will affect existing vulnerable households and may push some other marginal families into vulnerability.

Impact on water use and fish rearing in cages of villagers living downstream from the construction site due to increased water turbidity from sediment from the construction site.

Project Activities and Potential Impact during Construction Phase

During the construction phase, the major activities causing social impacts comprise:

- Construction of the project main structures i.e. navigation lock, spillway, powerhouse, embankment dam, fish migration system; and
- Construction of appurtenant structures i.e., switch yard and transmission line.
- Land clearance and construction of facilities for new resettlement area.

The potential impacts are summarized as follows:

- Loss of houses, public infrastructure and agricultural land in villages to be relocated within reservoir area.
- Loss of livelihood and resulting change from the livelihood restoration program.
- Conflict between locals and labor (& camp followers) from outside
- Increased health risks, nutritional deficiency during transition, loss of days of work, stress due to relocation and resettlement of PAP1 and PAP2 villagers.
- Significant increase in traffic volume by construction related vehicles in certain sections of public roads resulting in more dust and possibility of road accidents.
- Disruption in normal boat transport along the Mekong River.
- Potential accidents from construction activities.
- Aliens communicable disease from workers to local communities including HIV/STD and other diseases.
- Impact on public health and occupational health in construction land and construction related area.
- The resettlement and relocation will affect existing vulnerable households and may push some other marginal families into vulnerability.
- Significant cash injection into the local economy and possible increased income for local communities in the vicinity of construction areas.
- etc.
4.3 Proposed Social Management during Pre-Construction and Construction Phase

4.3.1 Compensation, Resettlement and Livelihood Restoration Program

(1) Context

Acquisition of construction land for construction works and reservoir impoundment for project operation will necessitate relocation / resettlement / compensation to Project Affects Persons (PAPs) from 4 main groups based on extent of potential impacts from project development;

- PAPs Group 1 the village will be fully submerged or totally affected by land acquisition for construction, need complete relocation to other location. There are 6 villages with 581 households.
- PAPs Group 2 the village will be partially submerged, need relocation only the affected household. There are 9 villages with 259 households.
- PAPs Group 3 the village who lose only agricultural land/cultivation area and/or lose opportunity for income generation in drawdown zone but need no relocation. There are 8 villages with 671 households.
- PAPs Group 4 the villages that locate in the vicinity downstream from dam site that are likely to be affected during project construction and operation stages. There are 3 villages with 189 households.

Compensation, Resettlement and Livelihood Restoration programs is thus required as a planned mitigation measure to fully assist and compensate the affected population. This will comprehensively incorporate all resettlement and rehabilitation measures as required to ensure compensation for the lost assets and restoration or enhancement of livelihood for all PAPs families. In addition, the host villagers shall also be considered when compensation measures for PAP’s are developed.

(2) Objectives

- To compensate the PAPs for the loss of houses, land and other assets as well as the public infrastructures and facilities.
- To enhance or at least restore the quality of life and income level of PAPs.
- To possible extent, to prevent or minimize adverse social impacts.
- To ensure that the PAPs are able to adapt to new means of livelihood and the project induced remain sustainable over the time.

(3) Mitigation Measures

i) Compensation Program

- Compensation for land, river bank gardens, teak plantations, crops, fruits trees and other production assets that will be lost.
- Compensation for the loss any other form of income source such as loss from fish cage production due to deteriorating water quality, loss of income from reduced boat travel and tourist halts, etc.
- Rehabilitation assistance via income restoration program

1 At the time of the writing this report, the ground survey and truthing is still ongoing and the data may change marginally over the time when the survey is finalised
PAP’s consultation and finalization of compensation program
Grievance Redress Procedure

ii) Resettlement Program

- Target beneficiaries: PAP1 & PAP2 households.
- Replacement of residential land and built up properties
- Replacement site and asset for the lost cultural/religious properties & institution
- Provision of new community infrastructures and facilities at the new communities
- Transition Subsistence Allowance
- Restoring livelihood and income generating activities with provision for agricultural land
- Rehabilitation Assistance
- PAP’s consultation and finalization of resettlement program
- Grievance Redress Procedure

iii) Livelihood Restoration Program

- Target Beneficiaries: PAP1, PAP2, PAP3 households.
- Program for income generation: The program shall deal with occupational issues of the resettlers and PAPs on how to earn target annual income. Tentative sources of income will be from orchard tree plantation, rubber tree plantation, livestock husbandry, off-farm occupation e.g. handicraft, food processing
- Occupational training should be undertaken comprising of cultivating techniques for annual crops and perennial trees to be grown in farm plot, livestock raising and animal husbandry such as poultry, cattle and buffaloes, etc., and other occupational development that can create new economic products and source of incomes.

(4) Implementation Schedule

The implementation schedule of these program with initial estimation of total budget are provided in Chapter 7 Implementation Schedule and Budgets of the REMDP

(5) Responsibility

The project developer through its Social Management office is responsible to implement the Compensation, Resettlement and Livelihood Restoration Program. However, the SMO will be supported by the REMDP contractor for implementation.

4.3.2 Community/Social Development Program

(1) Objectives

Community/social development program is a measure to support PAPs after they have been relocated/resettled at the new villages thereby benefitting the greater community and contributing to its well-being/quality of life. This program shall be planned with
consideration on ethnic group’s characteristics, development capacity and way of life, and therefore it can also be addressed as a “social and ethnic development measure”. The program will include the followings sub-plans.

i) **Community Institution Development Program**

In case of changes of community administration, participation of PAPs in organizing themselves in the new village/community organization will be performed under the support of VRC, DRC and concerned local authorities.

- Target Beneficiaries: PAP1, PAP2 households
- Establish/improve village organization
- Training for village authority, village Lao youth, Lao women union, village soldier, village police, village Lao front for national construction
- Participatory meeting on vision and village development plan
- Training for village development planning

ii) **Public Health Support Program**

- Target Beneficiaries: PAP1, PAP2 households
- Provision of public health equipment
  - Establishment and improvement of village medicine fund
  - Provision of medical and non-medical supplies and equipment.
  - Provide fund for health improvement within the affected villages
- Capacity building
  - Establishment of village health volunteers network.
  - Training for health personnel, health volunteer and midwife
  - Study Tour
- Diseases control/Health promotion
  - Provision of preventive health care, health promotion and treatment of common illnesses/diseases.
  - Subsidized treatment and medicines,
  - Establishment of patient’s referral system
  - Provision of essentials drugs and other supplies necessary
- Health education and awareness among PAPs
  - Promotion of health education among the school going kids.
  - Public health education on health care, family planning, hygiene, endemic disease prevention and etc., for PAPs.
  - Health care, hygiene, endemic disease prevention, family planning, STD, HIV/AIDs campaign
  - Development of health information materials and Information Education Communication (IEC)

iii) **Education Support Program**
Formal and informal education will be provided to PAPs that help to reduce their illiteracy rate.

- Target Beneficiaries: PAP1, PAP2 households
- Construction of schools and associated infrastructure which is as per Lao government standards and the replacement infrastructure is equivalent or better than project in terms of number of classrooms/buildings. Moreover, the classroom sizes should also have consideration for future population trends.
- Provide adequate number of teachers to maintain Lao government standards or teacher to pupil ratio.
- Provide sufficient educational and sports equipment.
- Provide training to improve teaching skill for teachers.
- Provide fund for school lunch.

iv) Traditional and Cultural/Ethnic Development Program

Traditional and Cultural Development Program should be supported for Conservation and Enhancement on way of life, tradition, and culture of ethnic groups:

- Target Beneficiaries: PAP1, PAP2 households
- Allocation of land for cemetery or other specific ethnic beliefs (such as sacred forest) for each individual ethnic group.
- Individual and community infrastructure should have considerations for individual ethnic group beliefs especially house designs and layout.
- A social cohesion program to preserve the cultural identity of each ethnic group, equal rights on access to production and community resources and to prevent domination of one ethnic group on the other.
- Document ethnic oral history, beliefs, way of life, social calendars and keep the record at school.
- Promote activities to support the continuation of ethnic customs in form of songs, music, clothes, sports and cultural events.
v) **Gender Development Program**

The Project should support training to develop skills of women and girls in the project area for PAP1 & PAP2 households. Emphasis should be on food processing, food preservation and food preparation from local products of natural resources, agriculture and fishery. Food hygiene and sanitation should be included in the training. These trainings will not only assist them to improve nutritional value of local foods but also create income through increased sale of processed and preserved foods during construction period.

Training to develop skills of women and girls will be on-going activities and gradually changed over time, depending on needs of villagers and market.

Training to promote women empowerment, participation and more roles and responsibilities in community level institutions, participation in education and other training programs, engagement in various livelihood activities and creating a platform where the women have a say in various issues affecting the village.

vi) **Vulnerable Families Support Program**

The number of household with vulnerable people living in the affected villages are is about 31% of the total number of affected households. The Project should necessary support to vulnerable families so that they can access and utilise the benefits of the livelihood support program. The target beneficiaries shall be PAP1 & PAP2 households. Moreover, some additional focussed support to help them overcome their vulnerability and to be able meet basic income and nutrition levels and shall also be envisaged. These may include the following

- Facilitating access to village facilities
- Give priority access to credit or grant funds to help them improve their standard of living and productivity in the short-term.
- Provide assistance for the establishment of sustainable partnerships such as relatives and neighbourhood to increased capacity for household income and improve their quality of life

vii) **Public Awareness on Environment Protection Program**

- **Target Beneficiaries:** Entire project area.
- Educate the people on environmental issues through local outreach, media and classroom education.
- Establish village environmental volunteer
- Public consultation on solid waste management in the villages
- Organize community cleaning day.

(2) **Implementation Schedule**

The implementation schedule of these programs with initial estimation of total budget are provided in Chapter 7 Implementation Schedule and Budgets of the REMDP.
(3) **Responsibility**

The project developer through its Social Management office is responsible to implement the Community/Social Development Program. However, the SMO will be supported by the REMDP contractor in its implementation.

4.3.3 **Land Tenure and Use Management Program**

1) **Context of impact on land tenure and use**

During the construction period, land clearing, camp site setting, project construction and installation of structures will affect land use and ownership that create Permanent loss by land clearing of the existing land cover and crops grown in construction areas of about 3-5 km² area.

After construction completed and COD, the reservoir impoundment will create a reservoir for LP HPP covering a total area of 4,900 ha. It is estimated that approximately 5% of this inundated is of productive use. This includes teak plantation (2.60%), paddy field (0.97%), vegetation plots (0.53%), and other crops (0.28%). These areas will be inundated under water.

2) **Objective**

To compensate for the lost land and mitigate the impact from inundation of productive land in the proposed reservoir area for PAP1, PAP2 and PAP3 households.

3) **Mitigation Measure**

Mitigation measures for impact on land use / land ownership shall cover the followings measures:

- Delay the land acquisition date of the impacted productive land until the crops have been harvested;
- In case of land acquisition which cannot be delayed, compensation for lost crops will have to be made based on the return from the crops expected yield at the prevailing market price and requirements of applicable laws; this is applicable especially for long term plantation, in the case of LP HPP mainly teak.
- Rehabilitation and/or re-forestation of temporarily used areas as soon as this temporary land use ends;
- Establish additional community forest to compensate for the loss of NTFP source at all resettlement sites.

4) **Implementation Schedule**

The implementation schedule of these programs with initial estimation of total budget are provided in Chapter 7 Implementation Schedule and Budgets of the REMDP.

5) **Responsibility**

The project developer through its Social Management office is responsible to implement the Land Tenure and Use Management Program. However, the SMO will be supported by the REMDP contractor in its implementation.
4.3.4 Public Health / Occupational Health and Safety

(1) Context

Influx of construction workers and camp followers in project area will result in a significant increase in wastewater discharge, solid waste, increased demand for infrastructure and utilities, and an increase in communicable diseases within construction area, surrounding communities and nearby towns, etc.

Furthermore, during the construction period of the project there may be adverse effects on occupational health including safety risk of accidents among project personnel and communities in the vicinity of the construction sites.

HIV/AIDS and other sexually transmitted diseases are at risk to spread in the nearby communities/town if proper control and management are not enforced.

These additional mitigation measure shall be included in the EHS management in construction area by EPC Contractor with regular monitoring by EMO.

(2) Objective

To mitigate impact on Public Health / Occupational Health / Safety.

(3) Mitigation Measures

During the construction phase, two areas of influence, and therefore two very different sets of mitigation measures have to be distinguished, namely (i) the construction site as such, including construction related activities, and (ii) nearby communities, and here mainly communities directly affected by the project. Some of the respective important measures are listed below.

i) Construction site and related activities:
   a. Develop and implement a comprehensive Health and Safety Management Plan for the construction site.
   b. Establish appropriate health care structures in the construction site (clinic, adequately equipped and staffed; ambulances; first aid kits, etc.).
   c. Provide health check-up for all workers at the moment of employing them, to be repeated regularly.
   d. Promote safety and health awareness among workers.
   e. Provide adequate personal protective equipment and supervise its use.
   f. Prepare plans for clean water supply systems, proper management of hazardous material, treatment of waste water prior to discharge, waste management on site, and appropriate site drainage management, traffic management, etc., and implement them.
   g. Minimize dust through water spraying on road surface.
   h. Arrangement of appropriate disease surveillance and response, general good housekeeping in the construction offices and work camps, etc.

ii) Affected villages:
   a. Develop a comprehensive health management and monitoring program for all PAPs form the start of construction phase as some PAPs will be relocated to a new site at the very beginning of the project construction phase.
   b. Promote health awareness programs in affected villages.
   c. For new communities in the resettlement site construction of health facilities, provision of equipment, vehicle, necessary treatment and free
health care, are necessary. Special focus on stress related disorders, psychological impacts, vector borne diseases and other potential health problems are also required after PAPs are relocated to new communities.

(5) **Implementation Schedule**
   - During Construction Phase.

(6) **Responsibility**

   EPC Contractor

### 4.3.5 Transportation Management Plan

(1) **Context**
   Project activities during pre-construction and construction phase would cause an increase in traffic volume in project access road and local roads to be used by all types of project construction related vehicles.

(2) **Objective**
   To minimize the impact on transportation during project pre-construction and Construction Stages and avoid damage on transportation routes and road accidents within the project area.

(3) **Mitigation Measures**
   - Strictly enforce compliance with traffic regulations during transporting material and equipment, and the daily commute of workers.
   - The speed of trucks will be limited to a maximum of 40 km/hr.
   - Repair the damaged road surface caused by project transportation.
   - Cover materials on trucks with tarpaulin sheet during transportation to prevent falling and spreading of materials.
   - Provide sufficient and prominent traffic signs to clearly inform and warn drivers about potential danger.
   - In case of accident, the concerned sections must promptly follow the construction Emergency Response Plan.
   - Regular drug and alcohol test of drivers.
   - Avoid night operation where possible.
   - The heavy equipment and vehicles should be checked regularly.
   - Drivers will have to be instructed and trained for respecting traffic regulations and minimizing risks for the affected population.

(5) **Implementation Schedule**
   - Pre-Construction and extending into construction Phase

(6) **Responsibility**

   EPC Contractor
4.3.6 Chance Find Management Program

(1) Context
LP HPP site is in proximity and not very far from Luang Prabang which besides being a culturally and historically important site is also an UNESCO World Heritage site. It is possible that during site clearance, earth moving, quarrying and biomass clearance within the proposed project reservoir, archaeological objects or archaeological deposits may be discovered and damaged.

(2) Objective
The objective of the plan is to ensure that any chance – find physical cultural resources that might be identified during pre-construction and construction period are dealt with in an appropriate manner and there is no theft or destruction of physical cultural resources.

(4) Mitigation Measures
- As per relevant GOL regulations and international standard, the project proponent is required to notify the relevant GOL authority of a chance find physical cultural resources. In this case, the District Office of Department of Museums and Archaeology under the Ministry of Information, Culture and Tourism needs to be informed as soon as possible, in not more than 3-days of any ‘chance find’, physical cultural resources.
- Upon discovery of a physical cultural resource, the Chance Find Procedure for physical cultural resource will be followed.
- Ensure that all construction workers are aware of a Physical Cultural Resource program upon arrival at site. Training will include identification of Physical Cultural Resource and their responsibility in terms of the Chance Find Procedure for Physical Cultural Resource.
- Construction workers will be informed of the rules on prohibition of stealing or trading historic artefacts and this rule will be included in the project staff’s code of conduct.

(5) Implementation Schedule
Mitigation measures must be performed during pre-construction and construction periods when there is “Chance-Find” of Physical Cultural Resource.

(6) Responsibilities
- The EPC Contractor / Project Company and Department of Museum and Archaeology under the Ministry of Information and Cultural.

4.4 Social Monitoring Plans during Pre-Construction and Construction Phase
To ensure that the social management plan has been properly implemented, each program need to be routinely monitored and the results thus should be used to adjust the management plan to achieve the planned results.
4.4.1 Compensation Monitoring Program

(1) **Context:** To regularly monitor the progress against actual planned implementation; to include monitoring of Compensation payment against the planned schedule and payment besides grievance raised if any.

(2) **Monitoring Method**

- Checking the compensation documents such as sheet evaluations of the properties, copies of receipts and paid checks, complaint forms and conflict records;
- Interview with those involved and responsible for the compensation program;
- PAPs sampling interview.
- Grievance redressal system.

(3) **Frequency:** During and after completion of compensation payment for each group of PAPs

(4) **Location:** 26 affected villages

(5) **Implementation Schedule**

- Pre-construction phase for affected villages in construction land.
- Construction Phase for reservoir inundation area.

(6) **Responsibilities**

PRC (supported by RMU and SMO); IMA on sample basis

4.4.2 Resettlement Monitoring Program

(1) **Context:**

The key monitoring issues are:

- Resettlement site development have been completed as per schedule and per the standards provided by the resettlement policy and the concession agreement.
- Relocation of PAPs following the standards and processes as established through the resettlement policy and the concession agreement.
- Satisfaction of local people on relocation.
- Efficacy and functioning of the Grievance redressal system.

(2) **Monitoring Method**

These issues are to be monitored by:

- Checking the resettlement documents, monthly reports and activity completion reports to be filed to RMU (resettlement monitoring unit).
- Interview with those involved and responsible for the resettlement program
- PAPs sampling interview

(3) **Frequency:** On monthly basis of relocation and resettlement activities.
(4) **Location**: 2 affected villages in construction land and 9 villages in the reservoir area (partly relocation)

(5) **Implementation Schedule**

First years of relocation / resettlement of each affected village.

(6) **Responsibilities**

PRC (supported by RMU and SMO); IMA on sample basis

4.4.3 **Livelihood Restoration, Community/Social development Monitoring Program**

(1) **Context**

Key monitoring issues are;
- Livelihood Restoration Program Target
- Ethnic Development Program Target
- Community Development Program Target
- Gender Assistance Program Target
- Vulnerable Group Assistance Program Target

(2) **Monitoring Method**

The monitoring method are;
- Survey on socio-economic conditions and opinions by interview key informant, household heads, women and vulnerable people. Main issues including occupation, employment, income and expense, relationships between villager and contractor and developers and worries and opinions about the project.
- Assessing the efficacy of the grievance redressal system, records of which should be publicly available.

(3) **Frequency**: During construction phase on annual basis.

(4) **Location**: For all villages which have been resettled or partially relocated.

(5) **Implementation Schedule**

On annual basis after the completion of resettlement/relocation of all affected villages.

(6) **Responsibilities**

PRC (Provincial resettlement committee) shall be the responsible organization to oversee this undertaking and be reported on annual basis. An Independent Monitoring Agency, other than the SMMP/REMPD contractor to be responsible to undertake the above monitoring activities with facilitation with RMU and other local agencies such as VRC/DRC, etc.

4.4.4 **Public Health / Occupational Health Monitoring Program**

(1) **Context**
Need to monitor the actual implementation against the planned activities.

(2) Monitoring Method

- Inspection of medical care unit, its screening and caring of important infectious diseases among workers, necessary services and records.
- Inspection of machinery maintenance records, occupational health and safety records of workers.
- Inspection of construction camp’s sanitation and living conditions.
- Inspection of accident precaution measures such as traffic signs, use of seat belts, alcohol drinking.

(3) Frequency: 12 times/year (Monthly)

(4) Location: Project construction area and communities in nearby vicinity.

(5) Implementation Schedule: During Pre-construction and Construction Phases

(6) Responsibility: EPC Contractor

4.4.5 Transportation Monitoring Program

(1) Context

Need to monitor traffic related impact on;
- Number of complaints filed through the complaint response channel.
- Number of Transportation Trip at project access road (2 times/year).
- Accidents related to Transportation activity at project access road (Everyday) and results to be included in monthly report.

(2) Monitoring Method: Recorded on monthly basis

(3) Frequency: 12 times/year (Monthly)

(4) Location: Access road, local road to be used for transportation of construction material and equipment.

(5) Implementation Schedule: During Pre-construction and Construction Phases

(6) Responsibility: EPC Contractor

5 SOCIAL MANAGEMENT AND MONITORING PLAN DURING OPERATION PHASE

5.1 Introduction

After the end of construction works, with power generation equipment installed, switch yard and transmission line completed, commercial operation of the project will start at the Commercial Operation Date (COD) and continue until the end of the duration of the Concession Agreement (CA), and beyond, under a different management.
The Social Management and Monitoring Plan (SMMP) for operation phase proposed in this Chapter is the continuation of most of the social mitigation measures that have been implemented from pre-construction and construction phase. The same will be continued as mitigation measures during operation phase. However, all the programs continuing from the previous phase of the project under this plan will need to be responsive and adaptable to altering circumstances on the ground to maximize effectiveness of the plan.

5.2 Project Activities and Potential Impact during Operation Phase

During the operation phase, the major activities causing social impacts are water impoundment and power plant operation which may create the following potential impacts:

- Livelihood changes due to relocation/resettlement.
- Other health related issues such as stress anxiety owing to new surroundings of inability to cope up with new lifestyle or means of livelihood.
- The resettlement will affect existing vulnerable households and may further push some other marginal families into vulnerability.
- Alteration of boat services/practices along upstream and downstream of Mekong River from LP HPP.

5.3 Proposed Social Management and Monitoring Plan during Operation Phase

The plan is to ensure that all the PAPs are sustainably better off in terms of social and economic status. The main programs are as follows:

5.3.1 Livelihood Restoration Program

At this phase, social management plan will be a tool to maintain and further improve the livelihood of the PAP1, PAP2 and PAP3 households in the project area. Following activities shall be implemented:

- Efforts will have to be made to preserve the present livelihood of affected persons. If this is not possible, alternatives will have to be developed. In such a case, it is very important to include the affected persons directly in the development of such alternatives, and to provide training etc. as may be required, to achieve the desired results. A few possibilities are listed hereunder.

- Program for income generation: This program will support the PAPs by improving the means of livelihood available to them thereby increasing their income levels. Different sources of income shall be from agriculture, orchards, commercial tree plantation, rubber tree plantation, livestock husbandry, off-farm occupation e.g. handicraft, food processing.

- Occupational training should be undertaken comprising of cultivating techniques for annual crops and perennial trees to be grown in farm plot, livestock raising and animal husbandry such as poultry, cattle and buffaloes, etc. and other occupational development that can create new economic products and source of incomes.

- Additional support to income generation with various activities such as:
  - Handicrafts, such as basketry, textile weaving
- Food processing
  - Additional targeted livelihood restoration program for poor and vulnerable household may also be required.

5.3.2 Community/Social Development Program

Each affected village will be involved in community/social development program with following activities;

- Continuous support on community/social development in 15 affected villages. Main activities are as follows:
  - Public health support including provision of public health equipment, subsidized treatment and medicines, health personnel capacity building, disease control/health promotion and health education and awareness among PAPs
  - Education support including educational and sports equipment, teacher training and scholarship for student.
  - Traditional and Cultural/Ethnic Development Program
  - Gender Development Program
  - Vulnerable Families Support Program
  - Training Program

- Additional community/social development program for some lagging villages may be required.

5.3.3 Monitoring program

Key monitoring issues are;

- Livelihood Restoration Program Target
- Ethnic Development Program Target
- Community Development Program Target
- Gender Assistance Program Target
- Vulnerable Group Assistance Program Target

1) Monitoring Method

The monitoring method are;

- Survey on socio-economic conditions and opinions by interview key informant, household heads, women and vulnerable people. Main issues including occupation, employment, income and expense, relationships between villager and contractor and developers and worries and opinions about the project.
- Assessing the efficacy of the grievance redressal system, records of which should be publicly available.

2) Frequency

During operating phase on annual basis.

3) Location

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For all villages which have been resettled or partially relocated.

4) **Implementation Schedule**

The above monitoring program to be conducted on annual basis from the first year after the relocation/resettlement of each affected village has been completed until the 8th year of Operation Phase.

5) **Responsibilities**

PRC (Provincial resettlement committee) shall be the responsible organization to oversee this undertaking and be reported on annual basis. An Independent Monitoring Agency, other than the SMMP/REMPD contractor to be responsible to undertake the above monitoring activities with facilitation with RMU and other local agencies such as VRC/DRC, etc.
6 MANAGEMENT PROCEDURES

6.1 Management Arrangement

6.1.1 Management by the governmental body

The implementation of this SMMP as well as REMDP will be managed by PRC with roles and responsibilities specified in Chapter 3 of this SMMP. PRC is a government-established body to oversee the implementation of SMMP/REMDP by the project developer and on behalf of the GoL. The PRC considers and approves compensation and resettlement related documents, including entitlement policy for PAPs as well as this SMMP/REMDP prior to the final approval by MONRE. It’s also the PRC role to establish RMU with roles and responsibilities specified in Chapter 3. The RMU is supposed to act as its secretariat and works closely with the project developer on all issues related to compensation, resettlement, livelihood restoration, resolution of grievance, etc. It also acts as a facilitator and coordinator with concerned governmental organizations involved in the implementation process of SMMP/REMDP. RMU will be also in charge of monitoring and inspecting the implementation and compliance of the social obligations of the Project Company and reports the same to PRC.

6.2 Grievance Redress Procedure

Procedures proposed to be adopted as “Grievance Redress Procedure” for resolving, review and decision-making on grievances reported by PAPs are described below:

1) **Step 1**: Complainant, PAP(s) who is not satisfied with the compensation provided or due to other reasons, such PAP(s) will have a right to complain in written form to Village’s Grievance Redress Unit (VGU).

2) **Step 2**: After receiving the complaint, VGU will promptly confirm the receipt in written form and complete an investigation within 15 days after the day of receipt. Within 30 days after the day of receipt, the VGU will organise a meeting with the complainant to discuss the grievance and advise the complainant of result of investigation. If the complainant is not satisfied with the result, the complaint and pertinent documents will be sent to District Grievance Coordinator (DGC) for the next step of resolution of the complaint.

3) **Step 3**: Within 15 days of receiving all the unsolved complaint, if required, DGC contacts the project developer, RMU and any relevant district offices to collaborate in collecting information and evidence for investigation which takes another 30 days. Within 45 days of receiving the complaint, DGC invites the project developer, RMU and the complainant to discuss the complaint and the complainant will be informed of result of the investigation. If the complainant is satisfied with the decision made by the DGC, the process of the resolution is ended. If within these 45 days, the complaint cannot be addressed, or the complainant is not still satisfied with the result or decision made by the DGC, the complainant is required to submit an appeal with additional relevant documents for re-investigation to the DGC within 21 days.

4) **Step 4**: Within 15 days of the receipt of the appeal with additional documents, if required, DGC then contacts the project developer, RMU and any relevant district offices to collaborate in collecting additional information and evidence for re-investigation which takes another 30 days. Within 45 days of receiving the appeal, DGC invites the project developer, RMU and the complainant to discuss the appeal and the
The complainant will be informed of the result of the re-investigation. If the complainant is satisfied with the decision re-made by the DGC, the process of the resolution is ended. If within these 45 days, the complaint cannot be addressed or the complainant is not still satisfied with the result or decision re-made by the DGC, the complainant can then submit the complaint to the district Cluster People’s Court at the complaint’s district of residence for consideration based on the GOL’s judicial procedure.

6.3 Documentation and Control of Documents

The SMMP / REMDP and its supplementary documents in both electronic and paper forms will be stored in the respective Company’s and SMMP / REMDP Contractor’s document control systems. The document control systems will ensure that only the latest version is available for use, with older versions being archived as historical records.

When any document is reviewed and revised, any changes will be tracked electronically to enable readers to understand the changes. Distribution of any SMMP / REMDP documentation by electronic file will be done only using Adobe PDF encrypted standard to avoid uncontrolled changes in the document.

6.4 Awareness and Capacity Training Program

The implementation of the SMMP / REMDP will also require the participation of all level of Provincial and district officers. It is the responsibility of the project developer to assist GoL organizations and in acquiring the necessary knowledge and skills through on-the-job training and other training programs including:

- Providing funds annually for social capacity building to PRC and RMU, and assist them in planning, managing, conducting and delivering capacity building and social awareness programs; and
- Providing budget to support the development of GoL committees and units (at provincial and district levels) and village committees responsible for resettlement, compensation, livelihood restoration and community development – and collaborate with them on the implementation of GoL and community training and capacity building initiatives.

Specific Government obligations concerning capacity building include:

- PRC will utilise Project funds for capacity building in social management and monitoring at the provincial and district levels and other GoL agencies;
- GoL committees and units responsible for the oversight / implementation of resettlement, compensation and livelihood restoration aspects of the Project will ensure internal capacity and village level capacity for the implementation of these initiatives:
7 AUDITING / COMPLIANCE ASSESSMENT

7.1 Auditing

The objective of auditing is to provide feedback on implementation of SMMP / REMDP, and to identify problems and successes as early as possible to facilitate timely adjustment of implementation arrangements. Auditing SMMP / REMDP implementation will be carried out through internal and external monitoring as described below.

7.2 Internal Monitoring:

During project preparation, and as part of the SMMP / REMDP, the implementing agency is required to develop a monitoring and reporting framework for all activities. Central to this framework should be the social impact that constitute the basis for the agreed SMMP / REMDP. The organizational unit responsible for project reporting should oversee the progress in social implementation through regular progress reports, submitted through normal channels, monitoring key indicators of finance, inputs and activities.

The specific objective of the internal monitoring and supervision is to: (i) verify that the baseline information of all social impact has been carried out and valuation of damages; (ii) oversee that the SMMP / REMDP is implemented as designed and approved; and (iii) verify that funds for implementation of the SMMP / REMDP are provided in a timely manner and in amounts sufficient for their purposes, and that such funds are used in accordance with the provisions of the SMMP / REMDP.

7.3 External Monitoring:

In addition to internal monitoring, external (or independent) monitoring is normally required to provide an independent periodic assessment of SMMP / REMDP and to suggest adjustment of delivery mechanisms and procedures as required. To function effectively, the organization responsible for external monitoring should be independent of the governmental agencies involved in environmental implementation. The GoL authorities are responsible to contract suitable and experienced external monitoring agency and budget for the same should be provided in the SMMP / REMDP and paid by the project developer.

7.4 Non-Compliance, Corrective Action and Prevention Action

An important element of the internal communication process is the organized relay of non-conformance information. To prioritize management attention on the most important issues, noncompliance observations should be separated into three levels based on importance. Further communications requirements for the observations should be commensurate with the severity of the non-compliance situation.

The three levels of non-compliance situations are:

1) Non-Compliance Level I

Definition: A non-compliance situation not consistent with SMMP requirements, but not believed to represent an immediate or severe threat to people or to the environment. Repeated Level I concerns may become Level II concerns if left unattended.
2) **Non-Compliance Level II**

Definition: A non-compliance situation that has not yet resulted in clearly identified damage or irreversible impact but is of potential significance and requires expeditious corrective action and site-specific attention to prevent severe effects. Repeated Level II concerns may become Level III concerns if left unattended.

3) **Non-Compliance Level III**

Definition: A critical non-compliance situation, typically including observed significant damage on people or the environment or a reasonable expectation of very severe impending damage. Intentional disregard of specific prohibitions is also classified as a Level III concern.

### 7.5 Audit

The project company should initiate scheduled audits of the Project activities, construction sites and contractors against the requirements established in this SMMP / REMDP and relevant sub-plans.

The Audit Schedule anticipates one Internal Audit every year. Additional audits may be programmed, should a system non-conformance indicate significant areas of concern. Non-conformances or observations identified during audits should be subject to the provisions of corrective action.

Audit findings should be reported to the Project Company and discussed with the PRC. An Action Plan for corrective action required from the audit should be prepared and submitted to the Project Company for non-objection and then implemented in a timely manner. Follow up monitoring should be undertaken to verify implementation of approved corrective actions and their effectiveness in preventing recurrence.
8 MANAGEMENT REVIEW AND CROSS REFERENCE

8.1 Management Review

As per the Concession Agreement, the SMMP / REMDP needs to be reviewed and revised every 2-years during the Construction Phase. In conjunction, as part of the Project Company’s policy commitment to continual improvement, prior to the revision of the SMMP / REMDP, senior management will conduct a review of the implementation of the SMMP / REMDP.

Senior management from Project Company should review annually the SMMP / REMDP implementation to ensure its continuing suitability, adequacy and effectiveness regarding the project construction progress, and the developer's commitment to continual improvement.

The review should utilize information collected from PRC and SMMP / REMDP Contactor carrying out monitoring specified above, and results of audits.

The review should address any need for changes to the social policy and objectives, and to the activities and practices of the SMMP / REMDP, in light of the audit results, of changing circumstances and of the commitment to continual improvement.

The Senior Management review should be documented, and the results communicated to the PRC involved in the SMMP / REMDP implementation.

8.2 Cross Reference

8.2.1 Applicable Laws

- The Constitution of the Lao PDR, dated 2003
- The 8th Five Year National Socio-Economic Development Plan (NSEDP) for 2016 to 2020
- Allocation of Land and Occupation Law, No. 45/NA, June 2018
- Decree No. 84 of Compensation and Resettlement of People Affected by Development Projects, 2016

8.2.2 Contractual and Corporate Commitments

- Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC), 1972
- IFC Policy and Performance Standards on Social and Environmental Sustainability, 2012
- International Hydropower Association (IHA) Sustainability Protocol
- Concession Agreement
- Project Company Policy and Commitment
### Sub-plans 17: Training and Awareness

<table>
<thead>
<tr>
<th>Sub-plans</th>
<th>17 Training and Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>• Environmental, health and safety awareness shall be strengthened through regular training. Reduce possible negative impacts by applying proper procedures and practices; and  &lt;br&gt; • To prevent inappropriate work and activities due to missing or a lack of awareness, understanding and competence for environmental, health, and safety.</td>
</tr>
<tr>
<td>Locations</td>
<td>• Entire project area; and  &lt;br&gt; • Workforce, employees including visitors.</td>
</tr>
<tr>
<td>Required Measures</td>
<td>All workers must complete the EH&amp;S training program but not limited to as followed:  &lt;br&gt; o Fire drill and evacuation;  &lt;br&gt; o First aid and use of first aid box;  &lt;br&gt; o Using relevant PPE;  &lt;br&gt; o Waste management;  &lt;br&gt; o General health, disease control and prevention;  &lt;br&gt; o Traffic regulations;  &lt;br&gt; o Hunting, fishing, and logging restrictions; and  &lt;br&gt; o Camp regulations (e.g. fire arm possession, disturbance, etc.)  &lt;br&gt; • Contractor’s Environmental Managers and staff must have relevant training, specific experience and a professional certification; and  &lt;br&gt; • All personnel handling hazardous material have to be specifically trained (safe operating procedures, handling procedures, safe work practices, and emergency procedures, using of Spill response kits) and Material Safety Data Sheet shall be made available according to SP06: Hazardous Material Management.</td>
</tr>
<tr>
<td>Required Monitoring</td>
<td>• Ensure and verify that all staff attend the required training on environmental, health, safety and emergency according to the standards;  &lt;br&gt; • Registration of training attendance for the entire training and awareness program.  &lt;br&gt; • Examine workers’ knowledge of EH&amp;S during audits; and  &lt;br&gt; • Check all documents relevant to training materials.</td>
</tr>
<tr>
<td>Management and Monitoring Responsibility</td>
<td>Main Contractor during the Construction Phase  &lt;br&gt; Operator during the Operation Phase</td>
</tr>
</tbody>
</table>

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Sub-plans 18: Dam Site and Camps Management Plan

<table>
<thead>
<tr>
<th>Sub-plans</th>
<th>18 Dam Site and Camps Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>• To prevent health risks due to lack of sanitation and hygiene.</td>
</tr>
<tr>
<td>Locations</td>
<td>• Dam site and construction camps.</td>
</tr>
<tr>
<td>Required Measures</td>
<td>• Protection against mosquitoes must be made available in all construction camps.</td>
</tr>
<tr>
<td></td>
<td>- Doors and windows shall be installed with screens and mosquito nets;</td>
</tr>
<tr>
<td></td>
<td>- Regular pest control services will be carried out;</td>
</tr>
<tr>
<td></td>
<td>- Installation/ Provision of appropriate and clean toilet facilities and sewage collection system;</td>
</tr>
<tr>
<td></td>
<td>- Provision of first aid centers;</td>
</tr>
<tr>
<td></td>
<td>- Community awareness program on Malaria, Tuberculosis and other communicable diseases;</td>
</tr>
<tr>
<td></td>
<td>- A Big Cleaning Day will be carried out every month. All sanitary facilities around the camp including drainage channels will be cleaned;</td>
</tr>
<tr>
<td></td>
<td>- The design of the construction camps must comply with Lao PDR regulations or with international standards and provide adequate space, ventilation and temperature;</td>
</tr>
<tr>
<td></td>
<td>- The sewage system and storm water channels in the camps must be built according to standards (drainage) and maintained in good condition through regular and frequent monitoring to avoid stagnant water and insect breeding;</td>
</tr>
<tr>
<td></td>
<td>- Provide adequate camps with clean housing and sanitation facilities, garbage collection, hygiene, supply water and drinking water, electricity;</td>
</tr>
<tr>
<td></td>
<td>- Provide adequate facilities for feeding the workers, make sure food is sufficient and of good quality;</td>
</tr>
<tr>
<td></td>
<td>- Provide adequate facilities for leisure time;</td>
</tr>
<tr>
<td></td>
<td>- Install and provide suitable lighting for security and amenity;</td>
</tr>
<tr>
<td></td>
<td>- Provide adequate and appropriate firefighting equipment and fire drill practices at least twice a year;</td>
</tr>
<tr>
<td></td>
<td>- Supply and drinking water monitoring will be carried out as required in Sub-plans 02: Water Availability and Pollution Control;</td>
</tr>
<tr>
<td></td>
<td>- Establish and enforce rules to prohibit hunting, fishing, wood cutting in the surrounding areas and possessing firearms;</td>
</tr>
<tr>
<td></td>
<td>- Children under the age of 18 are not allowed in the project area, dam site, and camps. The unauthorized access by visitors with no awareness of prevailing risks (in particular children) may lead to unpredictable accidents and incidents; and</td>
</tr>
<tr>
<td></td>
<td>- Regulation and rules for camps residents will be provided in written, presented regularly and displayed in the area.</td>
</tr>
<tr>
<td>Required Monitoring</td>
<td>• Visual site inspection and verify the compliance according to the EMMP.</td>
</tr>
<tr>
<td>Management and Monitoring Responsibility</td>
<td>Main Contractor during the Construction Phase</td>
</tr>
<tr>
<td></td>
<td>Operator during the Operation Phase</td>
</tr>
</tbody>
</table>
Sub-plans 19: Labor and Personnel Management

<table>
<thead>
<tr>
<th>Sub-plans</th>
<th>19 Labor and Personnel Management</th>
</tr>
</thead>
</table>
| Objectives | • To minimize the negative impacts on health, and safety from the routine activity of workers during construction period; and  
• To ensure the compliance of the labor law applies to all employers, registered and unregistered employees. |
| Locations | • Dam site and construction camps. |
| Required Measures | • The government of Lao PDR facilitates the traveling in and out of the country, transit and stay for foreigners and stateless persons, and protects their life, property, rights and benefits in accordance with the laws of Lao PDR and international conventions to which Lao PDR is a party to Foreigners living in Lao PDR must respect its laws, culture and traditions.  
• Foreign workers working in Lao PDR under any employment contract cannot exceed a period of 12 months. After the initial 12 month period they can apply for an extension for another 6 to 12 months each time;  
• In case it is necessary for the foreign workers for a business operation to expand production activities to introduce new technology, consideration can be made to allow for another extension of the work permit depending on the necessity of the business operations in compliance with the employment contract;  
• The permission for the foreign workers to work in Lao PDR has a term of 2 years and extension can be provided for another 2 years but the maximum period must not exceed 4 years. After the termination of the period of 4 years, foreign workers have to return to their home countries without receiving any further consideration for the extension of work permits until a period of 2 years has past whereby they can be reconsidered;  
• Develop and implement a personal health awareness program to guide all related activities during site preparation, construction, and operation;  
• Raising awareness of risks of accidents, instruction on accident prevention;  
• Water and waste will be appropriately treated and managed to minimize impacts on human health according to the Sub-plan 02: Water Availability and Pollution Control, Sub-plan 03: Wastewater and Runoff Management, and Sub-plan 04: Solid Waste Management;  
• Provide clean and good housekeeping, maintaining good hygiene;  
• Elimination of breeding sites of pest and diseases vectors;  
• Vector control at individual level such as using of mosquito nets or repellents;  
• Carry out health check of all workers once they are hired and before they start working;  
• Provide basic medical services, medical check-ups, equipment, ambulance, and personnel to meet requirements of emergency response;  
• Provide first aid kits at all working sites (and instructions on how to use it to all personnel);  
• Prevention of alcohol abuse and use during working hours; and  
• Appropriate and sufficient PPE available for all workers; control and strictly enforce use of the equipment. |
| Required Monitoring | • Visual site inspection and verify the compliance according to the EMMP.  
• Review on labor activities and contract against the Lao PDR labor law. |
| Management and Monitoring Responsibility | Main Contractor during the Construction Phase  
Operator during the Operation Phase |
### Sub-plans 23: Health and Safety

<table>
<thead>
<tr>
<th>Sub-plans</th>
<th>23 Health and Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>To minimize the negative impacts on occupational health, and safety from the project to workers and the communities;</td>
</tr>
<tr>
<td><strong>Locations</strong></td>
<td>Project boundary, neighbourhood community, and access of transport</td>
</tr>
<tr>
<td><strong>Required Measures</strong></td>
<td>The Health and Safety Plans is a plan that outlines the safety measures and procedures implemented in a workplace. It shall be designed in accordance with the legislative requirements in particular the requirements and standard as defined in the Concession Agreement (e.g. Lao PDR Labor law, IFC Environmental Health and Safety Guidelines, The Occupational Health and Safety Management OHSAS18001, etc.). The plans and programs shall enable individual and the organization aware and performs health and safety protection and measures efficiently by the include but not limited to the following:</td>
</tr>
<tr>
<td></td>
<td>o Contractors Health &amp; Safety Policy/Statement</td>
</tr>
<tr>
<td></td>
<td>o Legal Framework;</td>
</tr>
<tr>
<td></td>
<td>o Schedule of Appointed Responsible Persons</td>
</tr>
<tr>
<td></td>
<td>o Management &amp; Supervision Organizational Chart</td>
</tr>
<tr>
<td></td>
<td>o Construction Risk Assessment and Prevention</td>
</tr>
<tr>
<td></td>
<td>o Health and Safety Control Measures;</td>
</tr>
<tr>
<td></td>
<td>o Specific Health and Safety Plans includes:</td>
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<tr>
<td></td>
<td>1) General Safety Rules;</td>
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<td>2) Slips, Trips, Falls;</td>
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<td>3) Housekeeping;</td>
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<td>4) Personal Protective Equipment;</td>
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<td>5) Working at height;</td>
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<td>6) Sun Protection and Dehydration;</td>
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<tr>
<td></td>
<td>7) Chemical hazards;</td>
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<td>8) Respiratory Protection;</td>
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<td>9) Noise;</td>
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<td></td>
<td>10) Electrical Safety;</td>
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<td></td>
<td>11) Lighting and Illumination;</td>
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<td></td>
<td>12) Heavy Equipment Operation;</td>
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<td>13) High Pressure Washing;</td>
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<td></td>
<td>14) Confined Spaces;</td>
</tr>
<tr>
<td></td>
<td>15) Manual Lifting and Handling of Heavy Object;</td>
</tr>
<tr>
<td></td>
<td>16) Fire and Explosion prevention;</td>
</tr>
<tr>
<td></td>
<td>17) Storage and use of Explosives;</td>
</tr>
<tr>
<td></td>
<td>18) Warning of Blasting;</td>
</tr>
<tr>
<td></td>
<td>19) Communication and Emergency Signals;</td>
</tr>
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<td></td>
<td>20) Site Security;</td>
</tr>
<tr>
<td></td>
<td>21) Vector disease controlling plan;</td>
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<td></td>
<td>22) Traffic control;</td>
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<tr>
<td></td>
<td>23) Safety of Public;</td>
</tr>
<tr>
<td></td>
<td>24) Water Supply, Drinking water and Hygiene; and</td>
</tr>
<tr>
<td></td>
<td>25) Unexploded Ordnance (UXO)</td>
</tr>
<tr>
<td></td>
<td>o Personal Protective Equipment Requirements</td>
</tr>
<tr>
<td>Equipment Inspection and Repair Registers includes: ladders, scaffolding, portable electrical tools, safety equipment and PPE.</td>
<td></td>
</tr>
<tr>
<td>Health and Safety Checklists</td>
<td></td>
</tr>
<tr>
<td>Health and Safety Training</td>
<td></td>
</tr>
<tr>
<td>Fire Prevention and Control Measures</td>
<td></td>
</tr>
<tr>
<td>Use and Control of Hazardous Chemical Substances</td>
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<tr>
<td>First Aid Arrangements and Medical Monitoring</td>
<td></td>
</tr>
<tr>
<td>Emergency Response</td>
<td></td>
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<tr>
<td>Emergency Action Plan</td>
<td></td>
</tr>
<tr>
<td>Construction Site Signage</td>
<td></td>
</tr>
</tbody>
</table>

Required Monitoring

- Verify the compliance according to the EMMP and Health and Safety Plan
LUANG PRABANG POWER COMPANY LIMITED
Luang Prabang HPP

Environmental and Social Impact Assessment

Report 5 of 5: Resettlement and Ethnic Minority Development Plan
Contact

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STRUCTURE OF THE FEASIBILITY STUDY

VOLUME 1: EXECUTIVE SUMMARY

VOLUME 2: MAIN REPORT

VOLUME 3: DRAWINGS

VOLUME 4: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
  REPORT 1: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
  REPORT 2: SOCIAL IMPACT ASSESSMENT
  REPORT 3: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN
  REPORT 4: SOCIAL MANAGEMENT AND MONITORING PLAN
  REPORT 5: RESETTLEMENT AND ETHNIC MINORITY DEVELOPMENT PLAN

VOLUME 5: TRANSBOUNDARY ENVIRONMENTAL IMPACT ASSESSMENT AND CUMULATIVE IMPACT ASSESSMENT

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<td>Concession Agreement</td>
</tr>
<tr>
<td>CIA</td>
<td>Cumulative Impact Assessment</td>
</tr>
<tr>
<td>COD</td>
<td>Commercial Operation Date</td>
</tr>
<tr>
<td>CIA / TBIA</td>
<td>Cumulative and Transboundary Impact Assessment</td>
</tr>
<tr>
<td>CRU</td>
<td>Climate Research Unit of the University of East Anglia</td>
</tr>
<tr>
<td>DESIA</td>
<td>Department of Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>DGC</td>
<td>District Grievance Committee</td>
</tr>
<tr>
<td>DO</td>
<td>Dissolved Oxygen</td>
</tr>
<tr>
<td>DRC</td>
<td>District Resettlement Committee</td>
</tr>
<tr>
<td>DSMP</td>
<td>Discharge and Sediment Monitoring Project</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EMO</td>
<td>Environmental Management Office</td>
</tr>
<tr>
<td>EMMP</td>
<td>Environmental Management and Monitoring Plan</td>
</tr>
<tr>
<td>EPC</td>
<td>Engineering, Procurement and Construction</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental Social Impact Assessment</td>
</tr>
<tr>
<td>FSL</td>
<td>Full Supply Level</td>
</tr>
<tr>
<td>GOL</td>
<td>Government of Lao</td>
</tr>
<tr>
<td>GPCC</td>
<td>Global Precipitation Climatology Centre</td>
</tr>
<tr>
<td>HPP</td>
<td>Hydroelectric Power Plant</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IMA</td>
<td>Independent Monitoring Agency</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>LPCL</td>
<td>Luang Prabang Power Company Limited</td>
</tr>
<tr>
<td>LP HPP</td>
<td>Luang Prabang Hydroelectric Power Plant</td>
</tr>
<tr>
<td>masl</td>
<td>Meters above sea level</td>
</tr>
<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>MRC</td>
<td>Mekong River Commission</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>NA</td>
<td>National Assembly</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>NSEDP</td>
<td>National Socio-Economic Development Plan</td>
</tr>
<tr>
<td>NTFP</td>
<td>Non-timber Forest Product</td>
</tr>
<tr>
<td>PAP</td>
<td>Project Affected Person</td>
</tr>
<tr>
<td>PDA</td>
<td>Project Development Agreement</td>
</tr>
<tr>
<td>PDR</td>
<td>People’s Democratic Republic (Lao PDR, Laos)</td>
</tr>
<tr>
<td>PNPPCA</td>
<td>Procedures for Notification, Prior Consultation and Agreement</td>
</tr>
<tr>
<td>PRC</td>
<td>Provincial Resettlement Committee</td>
</tr>
<tr>
<td>REMDP</td>
<td>Resettlement and Ethnic Minority Development Plan</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Complete Expression</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>RMU</td>
<td>Resettlement Management Unit</td>
</tr>
<tr>
<td>ROR</td>
<td>Run-of-river</td>
</tr>
<tr>
<td>SIA</td>
<td>Social Impact Assessment</td>
</tr>
<tr>
<td>SMMP</td>
<td>Social Management and Monitoring Plan</td>
</tr>
<tr>
<td>SMO</td>
<td>Social Management Office</td>
</tr>
<tr>
<td>TBIA</td>
<td>Transboundary Impact Assessment</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>TRRM</td>
<td>Tropical Radar Rainfall Mission</td>
</tr>
<tr>
<td>TSS</td>
<td>Total Suspended Solids</td>
</tr>
<tr>
<td>UNESCO</td>
<td>The United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>UXO</td>
<td>Unexploded Ordinance</td>
</tr>
<tr>
<td>VECs</td>
<td>Valued Environmental and Social Components</td>
</tr>
<tr>
<td>VGU</td>
<td>Village Grievance Redress Unit</td>
</tr>
<tr>
<td>VRC</td>
<td>Village Resettlement Committee</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

Development of Luang Prabang Hydropower Project will affect a number of villages located along the Mekong River bank. Results from investigations reveal that there are 26 communities to be directly affected by the project development. There will be 6 communities needing full relocation and 9 communities need partially relocation while 8 communities need no relocation but require compensation to their affected properties. Among those Project Affected Persons (PAP), there are three ethnics residing in those affected communities. A Resettlement and Ethnic Minority Development Plan (REMDP) is, thus, required as a planned mitigative measure to fully assist those affected people by incorporating all resettlement and rehabilitation measures necessary to ensure compensation for the lost assets and restoration or enhancement of livelihood for all Project Affected Persons in line with all concerned ethnics interests.

Formulation of this Resettlement and Ethnic Minority Development Plan of Luang Prabang Hydro Power Project is in compliance with the provision of the National Policy on Resettlement and Compensation, Decree on the Compensation and Resettlement of the Development Projects, Environmental Management Standard for Electricity Projects and Technical Guidelines on Compensation and Resettlement in Development Projects following three basic principles:

(1) To mitigate all possible adverse social impacts among PAPs of all ethnic groups.
(2) To the extent possible, restore their livelihood at new resettlement communities, and
(3) To enhance the quality of life for all PAPs after settling at new resettlement communities.

This REMDP report presents the results of analysis and planning of REMDP in the following sequence: -

1. Introduction
2. Overview of Policy, Legal and Institutional Framework
3. Project Overview
4. Stakeholder Involvement Process
5. Proposed Resettlement and Ethnic Development Plan
6. Organizational Structure and Management arrangement
7. Implementation Schedule and Budget
8. Conclusion and Recommendations
OVERVIEW OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Developer’s Environmental and Social Policies

The project developer is committed towards protecting the environment, a sustainable use of natural resources and socially responsible activities. Developer holds a declaration of Environmental Responsibility and an Ecological Management System which were developed in compliance with International best practices.

Developer is committed to transparent processes through information disclosure and stakeholder engagement; principles which are formalized in their Communication Strategy, Corporate Ethics Code, Corporate Governance Code, Regulations on Insider Information, and Regulations on Information and Communications.

2.2 Lao PDR Policy and Legal Framework

Over recent years, the GoL has developed and updated a number of regulations and policies for environmental management. The legislation and policies relevant to preparation of Social Impact Assessment (SIA), and Social Mitigation and Monitoring Program (SMMP) and further to implementation stage of Land Acquisition, Resettlement Action Plan for Hydroelectric Power Project that are relevant to the proposed LPHPP include.


In terms of environmental protection, Article 19 of the 2015 Constitution states that “All organizations and citizens must protect the environment and natural resources: land surfaces, underground [resources], forests, animals, water sources and the atmosphere.”

2) The 8th Five Year National Socio-Economic Development Plan (NSEDP) for 2016 to 2020 (Ref 2-2)

This plan promotes the expansion of hydropower as a main driver for poverty alleviation for the country to graduate from the Least Developed Country (LDC) list by 2020 where LDCs was officially established in 1971 by the UN General Assembly with a view to attracting special international support for the most vulnerable and disadvantaged members of the UN family. In the NSEDP, hydropower is identified as the development to bring more households onto the national grid, ensure domestic electricity supply meets demand, and for foreign export to surrounding countries. Specifically, the exportation of power is highlighted as a main driver to achieve graduation from the LDC list.

3) Allocation of Land and Occupation Law, No. 45/NA, June 2018 (Ref 2-3)

This law describes the required, procedure, authorities and obligation of Developer for the project that involve allocation of land and occupation as followings:

- Article 20 Procedure for Allocation of Land
- Article 21 The Project Study and Plan for Allocation of Land
- Article 22 Compensation for the Loss from Allocation of Land
- Article 26 Livelihood Development Program during Transitional Period and Article 41 Allocation of Land and Occupational Project at National Level
• Article 42 Allocation of Land and Occupational Project at Province Level
• Article 43 Allocation of Land and Occupational Project at District Level
• Article 45 Obligation of Project Developer

4) Decree No. 84 on Compensation and Resettlement of People Affected by Development Projects, 2016 (Ref 2-4)

Established in 2005 and revised in 2016, the Decree on Compensation and Resettlement of People Affected by Development Projects has particular relevance to the proposed Project. The decree aims to ensure that PAPs and households are compensated and assisted to improve or maintain their pre-project incomes and living standards and are not made worse off than they would have been without the project.

5) Decree No. 21 on Environmental Impact Assessment, 2019

This decree is the latest legislation particularly relevant to environmental impact assessment of all investment projects in the Lao PDR including LPHPP, which has been approved by the government on 31 January 2019. The objective of the decree is to establish principles, rules and measures related to managing and monitoring environmental impact assessment works to make sure that they are implemented in proper, transparent and agreed manners, aiming to prevent, mitigate, remedy adverse impacts on the environment, ensure reasonable compensation, allocation of land and occupation, and improvement of living standard of project-affected persons.

Other key laws, regulations and guidelines applicable to the implementation of the REMDP of the proposed Project are summarized below.

Other Applicable Lao PDR Laws, Regulations and Guidelines

<table>
<thead>
<tr>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decree on the Preservation of Cultural, Historical and Natural Heritage</td>
<td>1997</td>
</tr>
<tr>
<td>Land Law</td>
<td>2003</td>
</tr>
<tr>
<td>National Policy on Environmental and Social Sustainability of the Hydropower Sector in Lao PDR</td>
<td>2006</td>
</tr>
<tr>
<td>PM Decree on Implementation of the Land Law</td>
<td>2008</td>
</tr>
<tr>
<td>PM Decree on State Land Lease or Concession No.135</td>
<td>2009</td>
</tr>
<tr>
<td>Technical Guidelines for Resettlement and Compensation of People Affected by Development Projects</td>
<td>2010</td>
</tr>
<tr>
<td>Law on Hygiene, Disease Prevention and Health Promotion</td>
<td>2012</td>
</tr>
<tr>
<td>Decree on Land and Service Fees No. 003/PSD</td>
<td>2012</td>
</tr>
<tr>
<td>Labour Law</td>
<td>2013</td>
</tr>
<tr>
<td>Ministerial Instruction on Public Involvement in the Process of Environmental and Social Impact Assessment of Investment Project</td>
<td>2013</td>
</tr>
<tr>
<td>Guideline on Consultation with Ethnic Groups</td>
<td>2013</td>
</tr>
<tr>
<td>Law on Grievance Redress 012/NA</td>
<td>2014</td>
</tr>
<tr>
<td>Electricity Law (amended)</td>
<td>2017</td>
</tr>
</tbody>
</table>

2.3 Institutional Framework

The proposed GoL’s institutional arrangements to manage the implementation of this REMDP of the project are described as the following.
1) PRC

Provincial Resettlement Committee (PRC), as proposed by MONRE will be assigned by the GoL to be its representative, with mandate to oversee the project’s SMMP and REMDP implementation with the authority to closely manage, inspect and monitor Project’s compliance with social mitigation measures, permits and applicable laws throughout the construction and operation phases. The PRC is mostly headed by the governor of the province with most significant environmental and social impacts while the governors of provinces less affected by the project are vice-chief of the committee. The committee further includes district governors of the impacted districts and other members as nominated by MONRE.

The PRC, as referred to the decree No. 84, will have the following responsibilities:
- Supervise and manage the project’s planning and implementation of plans for compensation, resettlement and rehabilitation of the livelihood of project-affected persons (PAPs), Resettlement Management Unit/RMU;
- Appoint RMU to manage the compensation and resettlement and a working group to be responsible for compensation and resettlement;
- Consider and approve SMMP and REMDP before proposing to MONRE to consider as the final approval;
- Formulate a policy determine rate of compensation, set the duration of maintenance of the resettlement sites, transitional period and the period of livelihood restoration for PAPs;
- Consider and timely settle the request(s) relating to compensations, resettlement and livelihood restoration for PAPs according to its mandate and responsibilities;
- Report periodically on its performance to GoL and make copies to submit to the MONRE;
- Issue decisions or notices as references for the implementation of compensation, resettlement and livelihood restoration plan;
- Provide information for PAPs and other stakeholders concerning the development of the project, benefits and impacts, progress in the implementation of compensation, resettlement and livelihood restoration plan throughout a period of the project implementation;
- Exercise rights and perform other duties as assigned by GoL.

2) RMU

Main rights and duties of the RMU are the followings:
- Serving as aide of PRC to co-ordinate with all relevant governmental organizations and the project owner to implement the compensation, resettlement and livelihood restoration plans as specified in the SMMP/REMDP;
- Acting as a coordinator to coordinate with relevant parties at central and local levels to cooperate and facilitate the project owner to implement compensation, resettlement and livelihood restoration for PAPs;
- Develop work and budget plan for implementation of works relevant to compensation, resettlement and livelihood restoration for PAPs;
- Review and comment on documents relevant to compensation, resettlement and livelihood restoration for PAPs; and
- Report periodically on its performance to PRC, MONRE and other relevant parties.
Some other GOL agencies engaging throughout the period of the implementation of this REMDP comprise the following:

<table>
<thead>
<tr>
<th>Agency</th>
<th>Main Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Agriculture and Forestry/Provincial/District Agriculture and Forestry Office</td>
<td>To manage and provide technical support related to the implementation of agricultural, forestry and fishery activities specified in the SMMP/REMDP.</td>
</tr>
<tr>
<td>Ministry of Energy and Mines/Provincial/District Energy and Mines Office</td>
<td>To manage and provide technical support related to design of electric supply system in the resettlement site.</td>
</tr>
<tr>
<td>Ministry of Public Health/Provincial/District Public Health Office</td>
<td>To manage and provide technical support for implementation of activities related to public health specified in the SMMP/REMDP including design of health facilities.</td>
</tr>
<tr>
<td>Ministry of Education and Sport/Provincial/District Education and Sport Office</td>
<td>To manage and provide technical support for implementation of education related activities including design of schools, etc.</td>
</tr>
<tr>
<td>Ministry of Public Work and Transportation/Provincial/District Public Work and Transportation Office</td>
<td>To manage and provide technical support for establishment of new resettlement sites including designs of new houses and community infrastructures.</td>
</tr>
<tr>
<td>Village Chief/Village Coordinating Committee(s)</td>
<td>To co-ordinate between project developer and PAPs; To facilitate land and property inventory; and To participate in resettlement site selection and resettlement planning.</td>
</tr>
</tbody>
</table>
3 PROJECT OVERVIEW

3.1 Background

The LPHPP is planned on the Mekong River approximately 25 km upstream of Luang Prabang city, and about 4 km upstream of the confluence with Nam Ou River (Figure 3-1). The scheme will be part of a Low-Head Hydropower Cascade System along the Mekong River, with Pak Beng HPP approximately 170 km upstream, and Xayaburi HPP approximately 130 km downstream of the proposed site.

The LPHPP is a Run-of-River (RoR) plant planned for hydropower generation to export electricity to Thailand.

It is a barrage type hydroelectric run-of-river scheme which comprises:

- Powerhouse equipped with 7 Kaplan turbine/generator sets (200 MW each). The total installed capacity for the main units is 1,400 MW, and the maximum gross head is 36.80 m
- Auxiliary units using water from fish attraction flow for the upstream and downstream migration facilities (approx. 180 m$^3$/s), totaling to a maximum of 60 MW capacity
- Spillway structure with six (6) radial surface gates (19 m x 25 m, sill level 288.0 m). Three (3) low level outlets (12 m x 16 m, sill level 275.0 m asl)
- Two-step Navigation lock system for 2x500 DWT vessels
- Fish pass system for up- and downstream migration
- A left bank Closing Structure formed by an approx. 50 m high RCC concrete gravity dam, in total 281.23 m long.
- 500 kV transmission line to Vietnam with an approximate length of 400 km to the Vietnamese border and 200 km to the next suitable substation. Alternatively to Thailand with an approximate length 250 to 300 km.

3.2 Project Alternatives and Optimization

An alternative and optimisation study for the LPHPP has been carried out. The Alternative Study comprises the following:

- Project Site: Two alternative sites have been assessed and compared, one alternative at km 2036 and a second alternative further downstream at km 2035. A techno-economic assessment found alternative 1 to be more promising and was selected to be further developed.
- Arrangement of the main structures: An arrangement (from the right bank) of Navigation Lock - Spillway – Powerhouse was found favourable mainly due to a lower construction risk and slightly lower construction costs.
- Fish Migration concept: The Fish Migration System has to provide facilities for upstream and downstream migration and has to meet the requirements of the MRC Design Guidance. In general, the LPHPP will provide similar functionality like the system developed for the Xayaburi HPP.
The installed capacity was optimised based on an incremental benefit/cost analysis. The optimum arrangement was found to be 7 units, resulting in a total design discharge of 5,355 m$^3$/s for the main units.

3.3 Project Justification

Government of Lao PDR has declared and focused in implementing national energy policy, particularly hydropower as it is the most abundant energy resource in the country as follows:

(i) Maintain and expand affordable, reliable, and sustainable electricity supply to promote economic and social development;

(ii) Promote power exports as well as domestic power supply to earn revenues to meet government development objectives with particular emphasis on poverty eradication;

(iii) Develop and enhance the legal and regulatory framework to facilitate power sector development by either public, private or public-private partnership;

(iv) Gain capacity building through international technical know-how and expertise; and

(v) Ensure accountability and transparency of environmental and social impacts, thereby achieving sustainable development.

The LPHPP Project is fully in line with the GOL’s national energy policy considering that:

(i) it is a private participation project; (ii) it will export most of the generated electricity; and (iii) the project developer shall commit to ensure fulfillment of item (v) of the policy.
3.4 Construction Plan and Schedule

The implementation of the LPHPP starting from preparation of the Tender Documents to commissioning of the run-of-river plant can be briefly divided into the following main phases:

1) Pre-construction Phase;

This stage is also regard as preparatory stage.

The pre-award activities cover all activities until financial close, e.g. preparation of the tender documents, tendering and procurement, permitting process, financial set-up, preparation of Power Purchase Agreements.

The overall time required for tendering is estimated to be 12 months, but the time required for the permitting process (including land acquisition, ESIA, PNPCA, etc.) depends on many factors that might be between one and two years.

2) Construction Phase and Commissioning;

The construction of the LPHPP is planned to be done within one major construction stage, i.e. all major structures will be erected within a large single construction pit while the Mekong River is diverted. After completion of the main construction works (concrete works and installation of the main hydro-mechanical equipment, Spillway and Navigation Lock operational, intake gates and draft-tube stoplogs at Powerhouse in place and set) the Mekong River will be diverted through the Spillway (Low Level Outlets) and the left bank closing structure (e.g. RCC dam) will be constructed while wet testing and commissioning can start.

The initial schedule, as of now, indicates that the first unit of the run-of-river plant would be ready for operation in 72 months from the decision to commence construction of the project (financial close); the full capacity would be available within 84 months.

3.5 Project Impact Area

Determination of the location of environmental and social changes that will likely result from construction and operation of the project shall cover the following areas:

- Barrage including power house, spillway, navigation lock and appurtenant structures and immediate surroundings: this will be a focal area for the impact assessment, since it will be affected in a relevant and permanent way by the Project, and since project activities, mainly during the construction phase, will be concentrated in this area. It includes the area affected by construction activities (construction sites, construction camps, quarries, borrow and disposal areas, etc.).

- Reservoir impoundment area: the future reservoir, i.e. the area which will be covered by water, is also an area in which the effects of the Project will be very apparent, and which therefore needs to be investigated in detail. Given the fact that LPHPP will be a Run of the River (ROR) plant with no substantial storage and regulating capacity, the reservoir will be comparatively small; nevertheless, it will stretch upriver over a considerable distance (about 150 km upstream).

- Immediate reservoir catchment (about 2-3 km from reservoir margin): this is the area directly surrounding the reservoir, which can be influenced by the project or can...
influence project operation in different ways e.g. change in groundwater regime, triggering of landsides, increasing pressure on habitats and settlements, etc.

- **Upper catchment area**: problems in this area mainly: erosion influenced by human activities, water contamination, and change in river discharge patterns by storage dams located upstream can have effect on the project.

- **River downstream of LPHPP**: this area will have less impact (i) it will be operated as a ROR scheme, and (ii) the upper end of Xayaburi HPP is only a short distance away, and from there onwards water level is controlled by this already existing HPP. Still, these assumptions will have to be checked during ESIA preparation.

- **Other areas**, this comprises resettlement areas, access road or areas to be occupied for the necessary relocation of infrastructure etc.

In terms of project implementation phase, impacts of environmental resources / value will be assessed for each stage of project implementation as followings:

- **Pre-Construction Phase**: From the beginning of the project studies and planning, financial preparation, concession agreement finalization until financial closing. At the construction area, there will be land clearing, construction of camps, access road, utilities and offices. These will be about 1 year before construction start.

- **Construction Phase**: This stage will be about 7 years. Construction of all project components will be done according to construction schedule that takes seasonal constraints into consideration. Major impacts will be those associated with construction activities. Also, during this stage, those activities relating to social impact mitigation/RAP will be implemented.

- **Operation Phase**: After construction works finish, power generation equipment installed, switchyard and transmission line completed, Project Commercial Operation Date (COD) start and will last upto the year as specified in the Concession Agreement.

### 3.6 Project Affected Communities

There are 26 Project Affected Villages that are located along both banks of the Mekong River from LPHPP dam site up to the end of the impoundment area. These affected villages have been categorized into 4 groups according to the nature of impact as follows:

- **Affected Villages Group 1**: the village is fully submerged or totally affected by land acquisition for construction, need complete relocation to other location (6 villages).
- **Affected Villages Group 2**: the village is partially submerged, need relocation only the affected household (9 villages).
- **Affected Villages Group 3**: those villages that will lose only farmland, do not need relocation (8 villages).
- **Villages Group 4**: those villages that will have environmental impact other than relocation 3 villages).

List of Project Affected Villages and their location are shown in **Table 3-1** and **Figure 3-2** respectively.
Table 3-1: Potential Affected Villages Within Project Area

<table>
<thead>
<tr>
<th>No</th>
<th>Village Name</th>
<th>District</th>
<th>Province</th>
<th>Coordinate</th>
<th>ELV (m asl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Houaygno</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>221586</td>
<td>205589</td>
</tr>
<tr>
<td>2</td>
<td>Nakang</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2219126</td>
<td>203556</td>
</tr>
<tr>
<td>3</td>
<td>Houaykhang</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2223500</td>
<td>198831</td>
</tr>
<tr>
<td>4</td>
<td>Kengkhen</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2219397</td>
<td>192138</td>
</tr>
<tr>
<td>5</td>
<td>Khokham</td>
<td>Pak Ou</td>
<td>Luang Prabang</td>
<td>2219867</td>
<td>208562</td>
</tr>
<tr>
<td>6</td>
<td>Lat Han</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2224163</td>
<td>799847</td>
</tr>
</tbody>
</table>

Affected Villages Group 1: the village is fully submerged or totally affected by land acquisition for construction, need complete relocation to other location (AVG1)

<table>
<thead>
<tr>
<th>No</th>
<th>Village Name</th>
<th>District</th>
<th>Province</th>
<th>Coordinate</th>
<th>ELV (m asl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Khoklouang</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2217890</td>
<td>809924</td>
</tr>
<tr>
<td>2</td>
<td>Tone</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2214139</td>
<td>806072</td>
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<tr>
<td>3</td>
<td>Khokpho</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2222922</td>
<td>194688</td>
</tr>
<tr>
<td>4</td>
<td>Yoyhai</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2221340</td>
<td>193778</td>
</tr>
<tr>
<td>5</td>
<td>Houayhin</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2220441</td>
<td>188241</td>
</tr>
<tr>
<td>6</td>
<td>Phonsavang</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2220660</td>
<td>812819</td>
</tr>
<tr>
<td>7</td>
<td>Latkhmoun</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2219292</td>
<td>810729</td>
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<tr>
<td>8</td>
<td>Latkum</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2216437</td>
<td>807315</td>
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<tr>
<td>9</td>
<td>Lat En</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2215619</td>
<td>806646</td>
</tr>
</tbody>
</table>

Affected Villages Group 2: the village is partially submerged, need relocation only the affected household (AVG2)

<table>
<thead>
<tr>
<th>No</th>
<th>Village Name</th>
<th>District</th>
<th>Province</th>
<th>Coordinate</th>
<th>ELV (m asl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Khoklouang</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2217890</td>
<td>809924</td>
</tr>
<tr>
<td>2</td>
<td>Tone</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2214139</td>
<td>806072</td>
</tr>
<tr>
<td>3</td>
<td>Khokpho</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2222922</td>
<td>194688</td>
</tr>
<tr>
<td>4</td>
<td>Yoyhai</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2221340</td>
<td>193778</td>
</tr>
<tr>
<td>5</td>
<td>Houayhin</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2220441</td>
<td>188241</td>
</tr>
<tr>
<td>7</td>
<td>Latkhmoun</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2219292</td>
<td>810729</td>
</tr>
<tr>
<td>8</td>
<td>Latkum</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2216437</td>
<td>807315</td>
</tr>
<tr>
<td>9</td>
<td>Lat En</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2215619</td>
<td>806646</td>
</tr>
</tbody>
</table>

Affected Villages Group 3: those villages that will lose only farmland, do not need relocation (AVG3)

<table>
<thead>
<tr>
<th>No</th>
<th>Village Name</th>
<th>District</th>
<th>Province</th>
<th>Coordinate</th>
<th>ELV (m asl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lae</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2210660</td>
<td>802625</td>
</tr>
<tr>
<td>2</td>
<td>Pakkone</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2209039</td>
<td>799724</td>
</tr>
<tr>
<td>3</td>
<td>Kenghang-Hadsako</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2207560</td>
<td>794177</td>
</tr>
<tr>
<td>4</td>
<td>Hat Kham</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2210961</td>
<td>801656</td>
</tr>
<tr>
<td>5</td>
<td>Houayhing</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2209216</td>
<td>799225</td>
</tr>
<tr>
<td>6</td>
<td>Hatter</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>2206660</td>
<td>812819</td>
</tr>
<tr>
<td>7</td>
<td>Khok Ek</td>
<td>Hongsa</td>
<td>Xayaburi</td>
<td>2216437</td>
<td>807315</td>
</tr>
<tr>
<td>8</td>
<td>Thanoun</td>
<td>Hongsa</td>
<td>Xayaburi</td>
<td>2215619</td>
<td>806646</td>
</tr>
</tbody>
</table>

Affected Villages Group 4: those villages that will have environmental impact other than relocation (AVG4)

<table>
<thead>
<tr>
<th>No</th>
<th>Village Name</th>
<th>District</th>
<th>Province</th>
<th>Coordinate</th>
<th>ELV (m asl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mouangkeo</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>2219951</td>
<td>207539</td>
</tr>
<tr>
<td>2</td>
<td>Khok Seangsuriya</td>
<td>Pak-Ou</td>
<td>Luang Prabang</td>
<td>2220325</td>
<td>207922</td>
</tr>
<tr>
<td>3</td>
<td>Pak Ou</td>
<td>Pak-Ou</td>
<td>Luang Prabang</td>
<td>2219896</td>
<td>208436</td>
</tr>
</tbody>
</table>

Figure 3-2: Location of Affected Villages in the Project Area
4 STAKEHOLDER INVOLVEMENT PROCESS

4.1 Activities Undertaken

Stakeholder involvement activities undertaken to date for REMDP preparation comprising various meetings with potential PAPs and representatives of relevant governmental agencies at provincial and district levels were conducted from January-March 2019 as a part of Public Consultation and Disclosure for overall project implementation planning process. Records of the activities are summarized in Table 4-1.

Table 4-1 : Stakeholder Involvement Activities Undertaken during REMDP Preparation Process

<table>
<thead>
<tr>
<th>Consultation Activities</th>
<th>Name of Agency / Village</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation meeting with relevant governmental agencies</td>
<td>3-Provincial Office of Natural Resource and Environment</td>
<td>15 and 21 January 2019</td>
</tr>
<tr>
<td></td>
<td>3-District Office of Natural Resource and Environment</td>
<td></td>
</tr>
<tr>
<td>Consultation meeting at village level</td>
<td>6-Affected villages</td>
<td>16-17 January 2019</td>
</tr>
<tr>
<td>Consultation meeting at village level during Environmental and Social Survey</td>
<td>23-Affected villages</td>
<td>19 February – 13 March 2019</td>
</tr>
</tbody>
</table>

4.2 Opinions toward Relocation and Resettlement Scheme

In each consultation meeting at village level, the Consultant first briefed the participants on the Project background, objective, scope of study, components and current status of the project’s development. Public concerns related to compensation and resettlement then were discussed and recorded as the following.

Main comments and concerns expressed by the villagers about compensation and relocation/resettlement scheme are the following:

- Fair compensation should be provided, and cash compensation is preferred by some PAPs.
- Villagers are willing to prepare documents proving their right over land and properties to be ready for survey on inventory of loss at the later stage.
- The villagers expect that LPHPP developer will support them to improve quality of life.
- Villagers in some impacted villages including Ban Houaygno, Ban Khokkham and Ban Khokphou proposed to the project developer that their new resettlement site should not be far from the current village location, the Mekong River and main road connected to district municipality. In addition, water supply, electricity and sufficient residential and agricultural land should be provided in the proposed resettlement site.

- Ban Houaykhae’s village committee suggested the fair compensation and proper public infrastructure and facilities should be provided in new resettlement site, and the current
2-cluster housing areas (one for Hmong group and the other one for Kmou group) should be maintained in the new resettlement site.

- The resettlement site should be located near the project’s construction site, so male villagers can have opportunity to work for the project.

- Occupational training scheme, fund for loan and farming group should be established once the villagers settle in the new resettlement site.
5 PROPOSED RESETTLEMENT AND ETHNIC MINORITY DEVELOPMENT PLAN

5.1 Project Affected Person (PAP)

5.1.1 Definition of PAP(s)

As per the Decree on Compensation and Resettlement of People Affected by Development Projects no.84, PAP means an individual, a legal entity or an organization who is permanently or temporarily affected by development projects and registered as a Project-Affected Person on Cut-Off-Date.

PAPs can be affected by the project in various forms including:

(a) PAPs’ standard of living is adversely affected;
(b) PAPs’ benefits from and rights over land or other assets are affected due to full or partial land acquisition and/or possession by the project permanently or temporarily;
(c) PAPs’ business, occupation, place of work, residence and access to forest or community resources are adversely affected by the project.

5.1.2 Number of PAPs in the Project Affected Villages

Project-Affected Persons (PAPs) are categorized into 4 main groups according to extent of potential impacts from project development:

- PAPs Group 1: those villages that will be fully submerged or totally affected by land acquisition for construction and need complete relocation to other location. There are 6 villages with 581 households.
- PAPs Group 2: those villages that will be partially submerged and need relocation only the affected households. There are 9 villages with 259 households.
- PAPs Group 3: those village who lose only agricultural land/cultivation area and/or lose opportunity for income generation in drawdown zone but need no relocation. There are 8 villages with 671 households.
- PAPs Group 4: those villages that locate in the vicinity downstream from dam site that are likely to be affected during project construction and operation stages. There are 3 villages with 189 households.

The data related to administration, Households, Population is shown in Table 5-1.
Table 5-1: Household and Population in each Group of Project Affected Villages

<table>
<thead>
<tr>
<th>No</th>
<th>Village Name</th>
<th>District</th>
<th>Province</th>
<th>Total HHs</th>
<th>Total Family</th>
<th>Total Population</th>
<th>Female</th>
<th>Total HHs to be relocated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Affected Village Group 1 (AVG1)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Houaygno</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>72</td>
<td>72</td>
<td>330</td>
<td>150</td>
<td>72</td>
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<tr>
<td>2</td>
<td>Nasang</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>43</td>
<td>43</td>
<td>170</td>
<td>75</td>
<td>43</td>
</tr>
<tr>
<td>3</td>
<td>Houaykhao</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>113</td>
<td>113</td>
<td>638</td>
<td>288</td>
<td>113</td>
</tr>
<tr>
<td>4</td>
<td>Kengkhen</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>125</td>
<td>130</td>
<td>596</td>
<td>229</td>
<td>125</td>
</tr>
<tr>
<td>5</td>
<td>Khokham</td>
<td>Pak Ou</td>
<td>Luang Prabang</td>
<td>50</td>
<td>51</td>
<td>263</td>
<td>119</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>Lat Han</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>178</td>
<td>187</td>
<td>888</td>
<td>430</td>
<td>178</td>
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<tr>
<td><strong>Total AVG 1</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>581</strong></td>
<td><strong>596</strong></td>
<td><strong>2,885</strong></td>
<td><strong>1,291</strong></td>
<td><strong>581</strong></td>
</tr>
<tr>
<td><strong>Affected Village Group 2 (AVG2)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Khoklouang</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>36</td>
<td>36</td>
<td>158</td>
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<td>Tone</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>41</td>
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<tr>
<td>3</td>
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<td>Nga</td>
<td>Oudomxay</td>
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<td>Nga</td>
<td>Oudomxay</td>
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<td>88</td>
<td>372</td>
<td>172</td>
<td>31</td>
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<tr>
<td>5</td>
<td>Houayhin</td>
<td>Nga</td>
<td>Oudomxay</td>
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<tr>
<td>6</td>
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<td>Nga</td>
<td>Oudomxay</td>
<td>46</td>
<td>46</td>
<td>245</td>
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</tr>
<tr>
<td>7</td>
<td>Latkhamoun</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>78</td>
<td>98</td>
<td>451</td>
<td>229</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total AVG 2</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>692</strong></td>
<td><strong>743</strong></td>
<td><strong>3,855</strong></td>
<td><strong>1,858</strong></td>
<td><strong>259</strong></td>
</tr>
<tr>
<td><strong>Affected Village Group 3 (AVG3)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lao</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>33</td>
<td>33</td>
<td>151</td>
<td>78</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Pakkone</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>46</td>
<td>55</td>
<td>252</td>
<td>150</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Kenghang-Hadsako</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>73</td>
<td>73</td>
<td>427</td>
<td>220</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Hat Kham</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>31</td>
<td>42</td>
<td>178</td>
<td>84</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Houayhing</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>42</td>
<td>50</td>
<td>234</td>
<td>117</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Hatter</td>
<td>Nga</td>
<td>Oudomxay</td>
<td>131</td>
<td>184</td>
<td>720</td>
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<tr>
<td>7</td>
<td>Khok Ek</td>
<td>Hongsa</td>
<td>Xayaburi</td>
<td>260</td>
<td>262</td>
<td>1,570</td>
<td>763</td>
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</tr>
<tr>
<td>8</td>
<td>Thanoun</td>
<td>Hongsa</td>
<td>Xayaburi</td>
<td>55</td>
<td>56</td>
<td>368</td>
<td>186</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total AVG 3</strong></td>
<td></td>
<td></td>
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<td><strong>671</strong></td>
<td><strong>755</strong></td>
<td><strong>2,330</strong></td>
<td><strong>1,938</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Affected Village Group 4 (AVG4)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mouangkho</td>
<td>Chomphet</td>
<td>Luang Prabang</td>
<td>42</td>
<td>42</td>
<td>215</td>
<td>106</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Khokseangsuriya</td>
<td>Pak-Ou</td>
<td>Luang Prabang</td>
<td>48</td>
<td>46</td>
<td>230</td>
<td>114</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Pak Ou</td>
<td>Pak-Ou</td>
<td>Luang Prabang</td>
<td>99</td>
<td>98</td>
<td>459</td>
<td>233</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total AVG 4</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>189</strong></td>
<td><strong>186</strong></td>
<td><strong>904</strong></td>
<td><strong>453</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Total 4 Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,113</strong></td>
<td><strong>2,280</strong></td>
<td><strong>9,974</strong></td>
<td><strong>5,540</strong></td>
<td><strong>840</strong></td>
</tr>
</tbody>
</table>

1 At the time of the writing this report, the ground survey and truthing is still ongoing and the data may change marginally over the time when the survey is finalised.

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5.2 Proposed Mitigation Measures and Entitlement Framework

The measures proposed to mitigate adverse social impacts of the project development are adopted in accordance to national legal framework and international standards relevant to compensation and resettlement as described in Chapter 2 of this REMDP.

Conceptually, the project’s entitlement policy has to be established as a reference for the implementation of compensation for affected land, assets and infrastructure, livelihood of PAPs and additional assistance for PAPs as well as the implementation of resettlement and livelihood restoration.

The proposed entitlement policy for each group of PAPs is formulated based on types of loss as presented in Table 5-2.

<table>
<thead>
<tr>
<th>Affected Group</th>
<th>Type of Loss</th>
<th>Entitlement Policy</th>
</tr>
</thead>
</table>
| PAPs Group 1 and 2: | Permanent loss of residential land | • A 600m² land plot with land title should be provided in new resettlement sites (the actual land area ideally adequate for house construction and home garden will be finalised based on agreement between the Project Company and PRC).  
• The land plot should be properly levelled and cleared of UXO and maintain comparable location to gain access to economic opportunities and public facilities |
| PAPs Group 1, 2 and 3: | Permanent loss of agricultural land | • Comparable productive land with at least equivalent area and land title should be ideally provided (the actual land area will be finalised based on agreement between the project company and PRC).  
• The land plot should be cleared of UXO.  
• In case of insufficiency of land area provided, cash compensation should be applied for the rest of land area as per the Decree no.135. |
| PAPs Group 1 and 2: | Permanent loss of houses       | • Replacement of new houses with size and design as agreed by PRC/RMU and installation of a latrine, water and electricity supply and drainage system.  
• In case of the cost of new house provided in new resettlement site is lower than the cost of impacted house, cash compensation should be provided for the remaining cost of the house. |
<table>
<thead>
<tr>
<th>PAPs Group 1 and 2:</th>
<th>Permanent loss of commercial structures</th>
<th>Cash compensation should be provided based on size and conditions calculated by the project and approved by PRC/RMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPs Group 1 and 2</td>
<td>Permanent loss of cultural/religious structures/cemetery</td>
<td>Replacement of cultural/religious sites e.g. establishment of new temples and cemeteries with size and design as agreed by PRC/RMU in new resettlement sites.</td>
</tr>
<tr>
<td>PAPs Group 1 and 2</td>
<td>Permanent loss of public infrastructures</td>
<td>Replacement of new infrastructures with water and electricity supply and drainage system in place and facilities with location, size and design as agreed by PRC/RMU at new resettlement site</td>
</tr>
<tr>
<td>PAPs Group 1 and 2 and 3:</td>
<td>Loss of livelihood due to relocation/resettlement (loss of access to regular sources of income and common natural resources)</td>
<td>Lump sum of cash allowance should be provided based on actual number of PAPs presenting on the day of relocation/resettlement. Assistance during transitional period after relocation/resettlement in the form of food provision (rice and protein). Provision of livelihood restoration program. Rehabilitation assistance via income restoration program.</td>
</tr>
<tr>
<td>PAPs Group 1, 2 and 3:</td>
<td>Loss of Crops and fruit and industrial Trees</td>
<td>Cash compensation calculated based on market price should be provided</td>
</tr>
<tr>
<td>PAPs of Group 4:</td>
<td>Loss of fish cage production</td>
<td>Compensation of product loss</td>
</tr>
<tr>
<td></td>
<td>Loss of income due to impact on income generating sources</td>
<td>Other suitable measures to mitigate the impact (construction of fish lift and ship lock)</td>
</tr>
<tr>
<td></td>
<td>Disconnect accessibility / transportation route or other community infrastructure / facilities</td>
<td></td>
</tr>
</tbody>
</table>

5.2.1 Entitlement for PAPs – Group 1

This group is the most severely impacted from project implementation. Their existing village area, properties and income sources will be totally disrupted. They are subjected to be relocated from their existing villages to the new resettlement area. They are entitled to obtain full compensation scheme under this REMDP as the following:

(i) Replacement of new houses with installation of a latrine, water and electricity supply and drainage system in land plot ideally adequate for house construction and home garden. In case of the cost of new house provided in new resettlement site is lower than the cost of impacted house, cash compensation should be provided for the remaining cost of the house.
(ii) Replacement of at least equivalent productive agricultural land which should be cleared of UXO. In case of insufficiency of land area provided, cash compensation should be applied for the rest of land area as per the Decree no.135.

(iii) New infrastructures and facilities will be provided at the new communities; At the new resettlement communities, besides those items discussed in (i) above, new community infrastructures and facilities will be provided including roads, water supply, electricity, communication, health and education facilities as well as those facilitating livelihood and income restoration scheme such as co-operative irrigation system, etc.

(iv) Livelihood Restoration and income generating activities will be provided through livelihood restoration program. Provision of opportunity for suitable income generating activities are prerequisite for improvement or at least restoration of PAP’s livelihood to their previous condition.

(v) Transition Subsistence Allowance: Added to lump sum of cash allowance should be provided based on actual number of PAPs presenting on the day of relocation/resettlement, allowance in terms of food should be provided for a certain period once PAPs move to the new community, as there will be some down time period normally required for readjustment to new social-economic situation.

(vi) Rehabilitation Assistance; In order to enable all households in this group of PAPs to fully integrate into the proposed livelihood and income generating scheme, assistance measures will be provided. This type of assistance depends upon PAPs’ needs and their skill level for each recommended activity. The rehabilitation assistance may include, but not limited to, the followings.

- Training for new mode of production;
- Support for credit for micro-enterprise;
- Promotion of existing government-run programs to assist in providing job opportunities; and
- Implementation phasing and handing over procedure for sustainability of PAPs’ income generation.

(vii) Replacement of the lost cultural/religious properties: Those lost cultural/religious properties will be fully replaced by establishment of the new temples, shrines, burial sites, cemeteries, ceremonial structures, etc. at the location and ceremony in accordance with PAPs’ ethnic preference.

5.2.2 Entitlement for PAPs - Group 2

PAPs - Group 2 are those villages that will be partially flooded under 312 m.asl. reservoir and only those affected households are required to relocate to the upper part of their current villages, as there are areas still available on the upper part of their present villages. In all villages of this group, the existing socio-economic settings and organizations would not be changed, thus PAPs can still use already available infrastructures. Therefore, the affected households are entitled to items (i), (ii), (iv), (v) and (vi) of those provided for PAPs - Group 1;
5.2.3 Entitlement for PAPs – Group 3

This group comprises those people who only lose their farmland or income generation source but their residences are not affected, thus, need no relocation. Therefore, they are entitled to items (ii) and (iv) of those provided for PAPs - Group 1.

5.2.4 Entitlement for PAPs – Group 4

This group are downstream villages, comprising those households affected by change of environmental conditions particularly water quality and stream velocity due to the project’s construction and operation that somehow cause interruption to their economic activities and way of life. Therefore, they are entitled to the compensation for the any loss of production for example the loss of fish cage production if caused by deteriorate of water quality during construction and operation of the project.

5.3 Resettlement Site Selection and Investigation

5.3.1 Resettlement Site Selection for PAPs-Group 1

Proposed criteria for selection of resettlement site for PAPs-Group 1 include the following:

- Size of available land for homestead (600 m²/hh)
- Topographical suitability for residential purpose
- Accessible
- Availability of water for domestic consumption
- Potential for PAPs to earn a living
- Distance from project site (concerning project environmental impact)

Tentative resettlement sites for these fully resettlement villages as recommended by Government authorities as well as villagers suggestion during consultation meeting in February – March 2019 were preliminary visited and presented in Error! Reference source not found., and the location mapping is shown in Appendix A.

5.3.2 Resettlement Site Selection for PAPs-Group 2

The following are criteria for selection of site for partially submerged villages (PAPs Group 2):

- Availability of Vacant Area in the Upper Part of Affected Villages: In case that there is the available land for constructing new houses on the higher elevation area of the existing villages, PAPs can be relocated to the higher ground of their existing village (on-site resettlement). PAPs’s opinion, suggestion and requests of village headmen and key-informants from the affected villages will be also taken into consideration for development of this resettlement scheme.

However, in case that the flooding condition and remaining resources are affected to the following described extent, the above plan is required to be reconsidered:
- Flooding Condition: If more than 50 percent of total number of households in the village are flooded and PAPs want to relocate to new resettlement site, the entire village will be relocated.

- Remaining Resources: If the remaining resources are not adequate for generating income to achieve PAPs’ living target, additional suitable occupation will be provided, and if this income restoration program is expected to fail based on the remaining resources available in the village area, the entire village will be relocated to the location with conditions that can fully facilitate the income restoration program.
Table 5-3: General Information of Tentative Resettlement Sites of PAPs-Group 1

<table>
<thead>
<tr>
<th>Village Name</th>
<th>Location and Conditions of Tentative Resettlement Sites</th>
</tr>
</thead>
</table>
| Houaygno     | • Resettlement Site locates about 3 km from the current village.  
               • Accessible by local road connected to Chomphet District municipality.  
               • Topography of the site is undulating.  
               • Land owners are Ban Nasang villagers who agreed to be compensated for the use of this area.  
               • PAPs in Ban Houaygno agreed to resettle to this site. |
| Nasang 2     | • Resettlement site is tentative 1 km from the current village.  
               • Topography of the site is undulating.  
               • Land owners are Ban Nasang villagers who agreed to be compensated for the use of this area. |
| Houaykhae    | • 2 tentative resettlement sites situated on the upper part of village were considered during consultation with PAPs.  
               • Topography of the sites is undulating.  
               • Land owner are Ban Houaykhae villagers who agree to be compensated their teak plantation land. |
| Kengkhen     | • 2 tentative resettlement sites situated on the upper part of village were considered during consultation with PAPs.  
               • Topography of the sites is undulating.  
               • The site, alternative 2 has already been considered 2010 by Government authority. |
| Khokkham     | • 2 tentative resettlement sites situated on the upper part of village were considered during consultation with PAPs.  
               • Topography of the site is undulating.  
               • Accessible by local road to Chomphet District municipality.  
               • The site alternative 2 has already been considered in 2010 by Government authority. |
| Lat Han      | • 2 tentative resettlement sites situated on the upper part of village were considered during consultation with PAPs.  
               • Topography of the site is undulating  
               • Accessible by local road to Pak Ou District municipality.  
               • The site alternative 1 has already been considered in 2010 by Government authority. |

5.4 Relocation / Resettlement Program

Main activities to be conducted under relocation / resettlement program for LPHPP comprise the followings.

5.4.1 Detailed Property Survey and Valuation

Survey on inventory loss due to the project implementation will be conducted at the beginning of the program. Detailed types, size, and photographs of houses and other structures will be recorded and registered and other fixed-assets such as land and trees will be also included in this survey.

---

2 Nasang village is not likely to be resettled, however will be impacted (and benefitted) as the new resettlement site will be in Nasang area.

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5.4.2 Detailed Survey and Preparation of Physical Development Program for each Resettlement Site

Detailed survey at each resettlement site will be conducted to cover the followings:
- Size
- Topography
- Accessibility
- Availability of water source for agriculture and household consumption
- Land use and land cover
- Distance from current residence

Alternative physical development program for each site will then be developed and used for further consultation with PAPs.

The generic housing layout plan and facilities in the proposed resettlement site are shown in Figure 5-1 as example for physical layout proposed by the project.

![Figure 5-1: Proposed Layout of Resettlement Village](image)

5.4.3 PAPs’ Consultation on and Finalization of Resettlement Site and Development Plan

RMU with support from District Coordinating Committee (DCC) and Village Coordinating Committee (VCC) is required to organize a number of focus group meetings and site visits with PAPs from each affected village to discuss and finalize selection of resettlement site and development plan. This is to ensure that the final resettlement site selection and resettlement development plan meet the needs of PAPs.

The following topics will be incorporated in discussion during the focus group meetings:
- Location and layout of new village
- Housing design
- Design and location of public infrastructure and supporting facilities to be provided
- Community development programs at new resettlement site
- Relocation process to new resettlement site
  - Reception facilities / initial assistance
  - Assistance in dismantling and transporting assets
- Livelihood restoration programs in new resettlement site
  - Cropping
  - Livestock
  - Fisheries
  - Forestry and non-agriculture occupation
- Training need for PAPs in new resettlement site
  - Community development training
  - Occupational training
- Ethnic, traditional and cultural aspects of relocation and resettlement at new location
- Other concerned issues

5.4.4 Acquisition of Resettlement Site

After finalization of resettlement site selection, the process of land acquisition will be performed through PRC. This is an official acquiring to use the land for resettlement site construction. With support from RMU the project developer will prepare a set of documents displaying data on locations and detailed maps of the resettlement sites.

5.4.5 Detailed Design and Construction of Public Infrastructures and Community Supporting Facilities

The detailed design of public infrastructures and supporting facilities to be constructed at the new resettlements sites include:

- Detailed engineering surveys of the sites required to be conducted at this stage including topographic survey, water sources survey, road and access alignment, etc.
- Layout of new communities.
- Design of access road and internal road system
- Design of water and electricity supply system
- Design of community supporting facilities including schools, health centers, village halls and administrative offices, markets and temples.

After the detailed design completed, RMU will submit to PRC for approval.
After detailed design is approved by PRC, houses and all public infrastructures and supporting facilities in new resettlement sites will be constructed based on the project’s construction schedule.

5.4.6 Relocation to Resettlement Site

When the construction works at the new resettlement sites are completed, PAPs will relocate from their current villages to the new resettlement sites. The assistance needed during this process include dismantling and transporting assistance and reception and initial assistance.

(i) Dismantling and Transportation Assistance

The VCC and DCC will also handle the relocation scheme to address:

- Individual household schedule of moving;
- Logistics support from old sites to new site;
- Vehicles for hauling belongings, livestock, structure materials.

(ii) Reception Facilities and Initial Assistance

The VCC and DCC with the assistance of local authorities will provide and support PAPs on the following items;

- Information disseminating schedule to PAPs and host population;
- Provision of reception facilities such as temporary shelters etc.;
- Provision of necessities such as food and medicine, drinking water, etc.

5.4.7 Financial Assistance during Transition Period

During initial transition period (resettlement) budgets for food and living cost will be regularly allocated for resettlers.

As per the Decree no. 84, the project developer is required to assist resettlers at least 3 years after resettlement takes place and provide income compensation for the resettlers on the day of the resettlement takes place according to the actual number of PAPs presenting on such a day with amount of cash agreed by PRC and the project developer.

5.5 Livelihood Restoration Program

Tentative livelihood restoration program that are to be considered for further application is attached herewith in Appendix B and summarized as the followings.

5.5.1 Tentative Program for Income Generation

The program is dealing with occupational issues of the resettlers on how to earn target annual income. The tentative sources of income will be mainly from:

- Orchard tree plantation
- Rubber tree plantation
- Livestock husbandry
• Off-farm occupation e.g. handicraft, food processing,

5.5.2 Training Program

Occupational training should be undertaken in line with tentative program for income generation as the following:
• Training on effective and efficient cultivating techniques for annual crops and perennial trees to be grown in farm plot.
• Training on livestock raising and animal husbandry such as poultry, fish, goat, etc.
• Other occupational development that can create new village economic products and incomes.

5.6 Ethnic Minority Development Program

5.6.1 Description of Ethnic minority in the PAPs

Apart from Lao Loum which the dominant group in the project area there are 3 ethnic minority groups namely, Khamu, Hmong and Tai Dam living in the area impacted by LPHPP. Khmu people live in 11 impacted villages, while Hmong ethnic live in 4 impacted villages and Tai Dam people live in a village named Ban Nasang where is tentative to be relocated due to land acquisition as shown in Table 5-4. Way of life and specific cultural practice of each ethnic are the following briefs:

i) Khmu:
• Beliefs and Cultural events: Khmu ethnic group believe in their ancestors and guardian spirit. The annual cultural event is called Boun Ker Lee which takes place in the end of January or early February each year. However, recently, some of Khmu people practice other religions such as all of Khmu villagers of Ban Houaykhae have converted to Christian.
• Occupational practices: Khmu people earn their living by upland crop slash and burn cultivation, perennial tree plantation, animal husbandry and harvesting non-timber forest products.

Table 5-4: Ethnic Group and Gender in Project Affected Villages

<table>
<thead>
<tr>
<th>No</th>
<th>Village Name</th>
<th>District</th>
<th>Total HHs</th>
<th>Total Population</th>
<th>Female</th>
<th>Ethnic Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Houaygno</td>
<td>Chomphet</td>
<td>72</td>
<td>330</td>
<td>150</td>
<td>Lao Loum</td>
</tr>
<tr>
<td>2</td>
<td>Nasang</td>
<td>Chomphet</td>
<td>43</td>
<td>170</td>
<td>75</td>
<td>Tai Dam</td>
</tr>
<tr>
<td>3</td>
<td>Houaykhae</td>
<td>Chomphet</td>
<td>113</td>
<td>638</td>
<td>288</td>
<td>Khmu / Hmong</td>
</tr>
</tbody>
</table>

3 At the time of the writing this report, the ground survey and truthing is still ongoing and the data may change marginally over the time when the survey is finalised.
<table>
<thead>
<tr>
<th></th>
<th>Affected Village Group 2 (AVG2)</th>
<th>Affected Village Group 3 (AVG3)</th>
<th>Affected Village Group 4 (AVG4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Kengkhen</td>
<td>Chomphet</td>
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</tr>
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<td>5</td>
<td>Khokham</td>
<td>Pak Ou</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Lat Han</td>
<td>Nga</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Khoklouang</td>
<td>Chomphet</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tone</td>
<td>Chomphet</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Khokpho</td>
<td>Nga</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Yoyhai</td>
<td>Nga</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Houayhin</td>
<td>Nga</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Phonsavang</td>
<td>Nga</td>
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<tr>
<td>7</td>
<td>Latkhamoun</td>
<td>Nga</td>
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<td>8</td>
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<td>Nga</td>
<td></td>
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<tr>
<td>9</td>
<td>Lat En</td>
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</tr>
<tr>
<td>1</td>
<td>Lae</td>
<td>Chomphet</td>
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<td>2</td>
<td>Pakkone</td>
<td>Chomphet</td>
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<td>3</td>
<td>Kenghang-Hadsako</td>
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<tr>
<td>4</td>
<td>Hat Kham</td>
<td>Nga</td>
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<td>5</td>
<td>Houayhing</td>
<td>Nga</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Hatter</td>
<td>Nga</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Khok Ek</td>
<td>Hongsa</td>
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<tr>
<td>8</td>
<td>Thanoun</td>
<td>Hongsa</td>
<td></td>
</tr>
</tbody>
</table>

|   |                                 |                                 |                                 |

Source: Socio-economic Survey and Household Sampling Survey in March 2019
ii) Hmong:

- Beliefs and Cultural events: Hmong believe in animistic spirits such as the spirits of their ancestors, the spirits of the house, and spirits of the region. The most important traditional festival of the Hmong people is the Nor Peh Chao or New Year Festival (Boun Kin Jiang). This is time of celebration and feasting which the event usually takes place at the village playground.

- Occupation practices: The Hmong practice mainly slash-and-burn cultivation of rice and maize and tree plantation, while some of Hmong families also run small trading business.

iii) Tai Dam:

- Beliefs and Cultural events: The Tai Dam practice belief in their ancestors’ spirits as the most important spirits. There are spirits which are both malevolent and helpful. Tai Dam worship their ancestors during the 7th to 8th month of the Lunar Year.

- Occupational practices: Tai Dam people earn their living by cultivating paddy rice as well as upland crop cultivation, perennial tree plantation, animal husbandry and collecting non-timber forest products.

Social development program to alleviate social impact and to restore livelihood of PAPs has been prepared with consideration on ethnic group’s characteristics, development capacity and livelihood. Therefore, this program can be considered as “social and ethnic development”.

5.6.2 Traditional and Cultural Development Program

The Activities relating to Ethnic Social Development are mainly relating to Traditional and Cultural Development Program.

Traditional and Cultural Development Program for Ethnic Minority Groups should be implemented for the purpose of Conservation and Enhancement of livelihood, tradition, and culture through the following actions.

- Provide a piece of land to be used for cemetery in accordance with ethnic belief.
- Document ethnic oral history, beliefs, way of life, social calendars and keep the record at school.
- Promote activities to support the continuation of ethnic customs in form of songs, music, clothes and sports

5.7 Community Development Program

(1) Public Health

Before moving to new village, knowledge on daily basic hygienic practice in and how to protect themselves from communicable diseases, and where they could obtain services if they have health problems. In addition, basic physical health checkup for all PAPs will be provided.
- Health Care and Sanitary Condition in Community should be improved by the following actions
  - Provide health personnel with necessary equipment for health service and sanitary condition improvement in the resettlement community
  - Provide fund for health improvement within the community.
  - Organize activities to enhance health and sanitation by educating villagers on health care and diseases prevention for people of all ages.

After relocation or resettlement, environmental health and sanitation knowledge should be provided to the PAPs. VCC and DCC with guidance and support from RMU and local health authorities that will join force to administer the health program.

(2) Community Institution

In case of changes of community administration grouping, participation of PAPs in organizing themselves in the new village/community organization such as election of community leaders, community administration office and staffs, cooperative office and staffs, chiefs of village’s Lao front for National Construction, Women and Youth’s Unions will be promoted under guidance and support of VCC, DCC and concerned local authorities.

(3) Education

The formal and informal education and other educational supports will be provided to PAPs that help to reduce their illiteracy rate by taking the following actions.

- Education Support in the form of scholarship
- Provide adequate number of teachers when compared to number of students.
- Provide sufficient educational and sport equipments.
- Provide training to improve teaching skill for teachers.
- Provide fund for school lunch.

The education programs will be managed by VCC and DCC with guidance and support from RMU and concerned local authorities.
6 REMDP ORGANIZATIONAL ARRANGEMENT AND GRIEVANCE REDRESS PROCEDURE

The responsibilities for Resettlement and Ethnic Minority Development Plan (REMDP) implementation during Pre-Construction, Construction and Operation phases will be taken by the project developer in coordination with the GoL (through different GoL agencies).

6.1 GoL organisation

Implementation of REMDP for LPHPP shall be governed by the CA and existing legal framework in Lao PDR. Institutional issues of SMMP for LPHPP shall be centred upon the GoL’s inter-ministries role in instituting concerned Provincial/District authorities. The relevant GoL agencies shall be concurrently involved in implementation plan of social mitigation measures and monitoring their compliance and effectiveness. The provincial/district level responsibilities will be primarily around REMDP and public participation and involvement.

6.1.1 PRC

Provincial Resettlement Committee (PRC), as proposed by MONRE will be assigned by the GoL to be its representative, with mandate to oversee the project’s SMMP and REMDP implementation with the authority to closely manage, inspect and monitor Project’s compliance with social mitigation measures, permits and applicable laws throughout the construction and operation phases. The PRC is mostly headed by the governor of the province with most significant environmental and social impacts while the governors of provinces less affected by the project are vice-chief of the committee. The committee further includes district governors of the impacted districts and other members as nominated by MONRE.

The PRC will have the following responsibilities (as per Decree no. 84):

1) Supervise and manage the project’s planning and implementation of plans for compensation, resettlement and rehabilitation of the livelihood of project-affected persons (PAPs), Resettlement Management Unit/RMU;
2) Appoint RMU to manage the compensation and resettlement, and a working group to be responsible for compensation and resettlement;
3) Consider and approve SMMP and REMDP before proposing to MONRE to consider as the final approval;
4) Formulate a policy determine rate of compensation, set the duration of maintenance of the resettlement sites, transitional period and the period of livelihood restoration for PAPs;
5) Consider and timely settle the request(s) relating to compensations, resettlement and livelihood restoration for PAPs according to its mandate and responsibilities;
6) Report periodically on its performance to GoL and make copies to submit to the MONRE;
7) Issue decisions or notices as references for the implementation of compensation, resettlement and livelihood restoration plan;
8) Provide information for PAPs and other stakeholders concerning the development of the project, benefits and impacts, progress in the implementation of compensation, resettlement and livelihood restoration plan throughout a period of the project; and
9) Exercise other rights and perform other duties as assigned by GoL

6.1.2 RMU

Main rights and duties of the RMU are the followings:
1) Serving as aide of PRC to co-ordinate with all relevant governmental organizations and the project owner to implement the compensation, resettlement and livelihood restoration plans as specified in the SMMP/REMDP;
2) Acting as a coordinator to coordinate with relevant parties at central and local levels to cooperate and facilitate the project owner to implement compensation, resettlement and livelihood restoration for PAPs;
3) Develop work and budget plan for implementation of works relevant to compensation, resettlement and livelihood restoration for PAPs;
4) Review and comment on documents relevant to compensation, resettlement and livelihood restoration for PAPs; and
5) Report periodically on its performance to PRC, MONRE and other relevant parties.

6.1.3 Other Ministries

At the district level, a District Resettlement Committee will be appointed by PRC.

The main ministries involved in the implementation of the SMMP and REMDP of the project include, but not limited to, the followings:
- Ministry of Energy and Mines
- Ministry of Public Health
- Ministry of Agriculture and Forestry
- Ministry of Labour and Social Welfare
- Ministry of Information, Culture and Tourism
- Ministry of Public Work and transportation.

6.2 Project Company Organisation

The project company organization responsible for implementation of SMMP / REMDP comprises Environmental Management Office (EMO) and or Social Management Office (SMO) which will be established by the project company once the project’s CA signed and be maintained throughout the project’s concession period. Their responsibilities are as following.

6.2.1 SMO

SMO’s responsibilities include the followings:

a) Oversee detail confirmation surveys of PAPs and entitlements;

b) Acting on behalf of the project to manage and monitor the implementation of environmental and social mitigation measures specified in the EMMP, SMMP and REMDP;

c) Reviewing and proposing revisions to the social measures;

d) Provide sufficient funding for implementation of compensation and social development activities;
e) Provide prompt and fair compensation for all Project Affected People (PAPs) in accordance with policy and entitlements, including sustainable livelihood systems;

f) Provide for any other unforeseen costs and mitigation measures that may impact PAPs because of project construction and operation;

g) Carry out meaningful consultations with PAPs that allows for participation of all groups and incorporation of local knowledge, including the participation of women, vulnerable groups and ethnic minorities;

h) Assist GoL organizations in acquiring knowledge and skills during implementation through on-the-job training and other programs;

i) Prepare and disseminate information to the PAPs and GoL;

j) Organize and facilitate public consultations;

k) Preparing and submitting report to PRC

6.2.2 SMMP / REMDP Contractor

SMMP / REMDP Contractor is an outside party which is hired to undertake SMMP / REMDP implementation. Their works will be mainly covering the period from pre-construction to construction and operation phases with responsibility as agreed with Project Company. The responsibility of SMMP / REMDP Contractor is thus the same as EPC Contractor in undertaking SMMP / REMDP implementation but covering the area and those programs outside the construction land and working more on the social and resettlement part. The SMMP/REMDP contractor assists and reports to the SMO to perform its responsibilities as identified in Section 6.2.1 above.

6.2.3 External Independent monitoring agency

To ensure that the project is fulfilling its obligations as per the CA, SMMP, REMDP and to independently monitor and verify the implementation and set milestones/targets, an independent auditor or third party shall be engaged to undertake independent review/monitoring of SMMP / REMDP implementation from time to time. The monitoring shall cover compliance and focus on both qualitative and quantitative aspect of SMMP / REMDP including the targets and commitments set as per the CA.

6.3 Grievance Redress Procedure

Procedures proposed to be adopted as “Grievance Redress Procedure” for resolving, review and decision-making on grievances reported by PAPs are described below:

1) **Step 1:** Complainant, PAP(s) who is not satisfied with the compensation provided or due to other reasons, such PAP(s) will have a right to complain in written form to Village’s Grievance Redress Unit (VGU).

2) **Step 2:** After receiving the complaint, VGU will promptly confirm the receipt in written form and complete an investigation within 15 days after the day of receipt. Within 30 days after the day of receipt, the VGU will organise a meeting with the complainant to discuss the grievance and advise the complainant of result of investigation. If the complainant is not satisfied with the result, the complaint and pertinent documents will be sent to District Grievance Coordinator (DGC) for the next step of resolution of the complaint.

3) **Step 3:** Within 15 days of receiving all the unsolved complaint, if required, DGC contacts the project developer, RMU and any relevant district offices to collaborate in
collecting information and evidence for investigation which takes another 30 days. Within 45 days of receiving the complaint, DGC invites the project developer, RMU and the complainant to discuss the complaint and the complainant will be informed of result of the investigation. If the complainant is satisfied with the decision made by the DGC, the process of the resolution is ended. If within these 45 days, the complaint cannot be addressed, or the complainant is not still satisfied with the result or decision made by the DGC, the complainant is required to submit an appeal with additional relevant documents for re-investigation to the DGC within 21 days.

4) **Step 4:** Within 15 days of the receipt of the appeal with additional documents, if required, DGC then contacts the project developer, RMU and any relevant district offices to collaborate in collecting additional information and evidence for re-investigation which takes another 30 days. Within 45 days of receiving the appeal, DGC invites the project developer, RMU and the complainant to discuss the appeal and the complainant will be informed of result of the re-investigation. If the complainant is satisfied with the decision re-made by the DGC, the process of the resolution is ended. If within these 45 days, the complaint cannot be addressed, or the complainant is still not satisfied with the result or decision re-made by the DGC, the complainant can then submit the complaint to the district Cluster People’s Court at the complaint’s district of residence for consideration based on the GOL’s judicial procedure.
7 IMPLEMENTATION SCHEDULE AND BUDGET

7.1 Implementation Schedule

The implementation schedule of REMDP is based on the following key project implementation milestone.

- Civil Work Construction – when pre-construction phase starts to 8th year
- Commercial Operation – by the end of 8th year of construction (COD) starts to the end of CA

Implementation of SMMP and REMDP schedule is shown in Figure 7-1 with description of main activities as follows.

- Additional Survey of Resettlement Site
- Survey / Design and Physical Development Options
- Consultation with PAPs and Finalization of Resettlement Sites and Development Plan
- Acquisition of Resettlement Site
- Detailed Design and Construction of Infrastructure and Community Facilities
- Relocation to New Sites
- Implementation of Social and Community Development Plan
- Continuous monitoring

The resettlement of 2 villages situated in the construction area will be taken during pre-construction phase, while relocation of 9 villages and resettlement of 4 villages will be taken once the construction of the dam and other project’s components completed and reservoir impoundment started.

7.2 Estimated Budget

The Budget for integrated REMDP implementation is primarily based on the number of PAPs, number of resettlement villages to be developed and social development programs to be implemented. These components are to be finalised during the detail public consultation process that shall be conducted in the next phase of project implementation. The project’s entire resettlement scheme with key items are presented below.

1. Preparatory cost
2. Compensation cost for inventory losses
3. Cost of development of new communities including construction of houses, public infrastructures and supporting facilities
4. Cost Income Restoration Program
5. Cost of Community Development Program
6. Management and Operation Cost
7. Contingency cost
FIGURE 7-1
TENTATIVE SCHEDULE OF REMDP FOR LUANG PRABANG HPP

<table>
<thead>
<tr>
<th>Description</th>
<th>-1</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
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<tbody>
<tr>
<td>1. Pre-Construction Phase</td>
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<tr>
<td>2. Construction Phase</td>
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<tr>
<td>3. Operation Phase</td>
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<tr>
<td>4. Concession Period</td>
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</tbody>
</table>

1. Compensation Program
   a) Formulation of Compensation Entitlement and Asset Valuation Policy
   b) Detailed Property Survey and Valuation
   c) PAP's Consultation/Finalization on Entitlement and Valuation
   d) Compensation Payment/Grievance Process

2. Resettlement Program
   a) Additional Survey of Resettlement Site
   b) Survey/Design and Physical Development Option for Resettlement Site
   c) PAP's Consultation and Finalization of Resettlement Sites and Development Plan
   d) Acquisition of Resettlement Site
   e) Detailed Design and Construction of Infrastructure and Community Facilities
   f) Relocation to New Sites

3. Social and Community Development Program
   a) Community Institution Development
   b) Public Health Development
   c) Education Support
   d) Traditional/Cultural/Ethnic Development
   e) Gender Development
   f) Vulnerable Family Support
   g) Livelihood Restoration
   h) Training

4. Monitoring, Evaluation

For PNPCA Only
8 CONCLUSION AND RECOMMENDATION

8.1 Conclusion

Implementation of LPHPP would necessitate relocation of 840 households from 15 villages to resettle in the new community together with compensation for cultivated land and other inventory losses. This REMDP has been prepared to document mitigation measures for the impacts on the project affected households. Policy, legal and institutional framework related to REMDP has been reviewed. Project Affected Persons (PAPs) have been identified and classified into 4 groups according to degree of impacts. Stakeholder Involvement has been carried out during January to March 2019 and their concerns on resettlement issues have been recorded and taken into consideration. Alternative resettlement site selection has been identified based on consultation with PAPs and local authorities. Livelihood restoration and social development programs have been proposed. Budget for implementation has been estimated; organization of the implementing bodies has also been recommended.

REMDP includes four main groups of activities as follows:

- Compensation Program
- Resettlement Program
- Social and Ethnic Minority Development Program
- Organization Management Arrangement

The Compensation Program includes formulation of compensation entitlement and asset valuation policy, detailed property survey and valuation, PAPs’ consultation and compensation payment / grievance redress process.

The Resettlement Program encompasses additional survey of resettlement site, preparation of development program for resettlement site, PAPs’ consultation, land acquisition for resettlement, detailed design and construction of infrastructure and facilities, and relocation to the new site.

The Social and Ethnic Minority Development Program includes community development, livelihood restoration, community institution development, public health support, education support, traditional/cultural/ethnic development, gender development, vulnerable family support, and public awareness on environmental protection, training program for PAPs to ensure that their socio-economic condition will be fully restored.

The budget for the implementation of REMDP is preliminarily estimated at this stage to be around 65 million USD. However, this budget amount needs to be adjusted / updated / revised when more project information and results of PAPs’ Consultation are finalized in the next stage of the project implementation.

\(^4\) At the time of the writing this report, the ground survey and truthing is still ongoing and the data may change marginally over the time when the survey is finalised.

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8.2 Recommendation

(1) All of the plan / program / activities and procedures proposed in this REMDP are based on results of preliminary study on the project potentially affected land and properties including potential resettlement sites and preliminary consultation with PAPs and local authorities. Therefore, in the implementation phase, it is recommended that a detailed inventory survey on project affected land and properties needs to be conducted as well as consultation with PAPs on their needs especially the livelihood restoration options they prefer, social development, ethnic minority development, etc, which will be incorporated in the revised version of REMDP.

(2) Co-ordination with concerned governmental authorities at all levels on confirmation of resettlement site and support on resettlement site development and PAPs’ livelihood restoration is required.

(3) Implementing agencies and supervisory committees should be promptly established before construction begins.

(4) Occupational training for PAPs is the main part of livelihood restoration which make possible adoption of new ways to earn their living in the new environment is to be planned with PAPs’ Consultation.

(5) Subsistence fund should be provided during the non-productive period e.g. during the first 12 months of resettlement.

(6) For efficient and effective implementation of REMDP an experienced contractor should be assigned to be responsible for the task and a reputable consultant should be engaged to supervise the contractor’s performance.
Appendix A: Tentative Resettlement Sites for Selected Affected Villages

Appendix A-1 Proposed Resettlement Site for Ban Houaygno

Appendix A-2 Proposed Resettlement Site for Ban Nasang
Appendix A-3 Proposed Resettlement Site for Ban Houaykhae

Appendix A-4 Proposed Resettlement Site for Ban Kengkhen
Appendix A-5 Proposed Resettlement Site for Ban Khokkham

Appendix A-6 Proposed Resettlement Site for Ban Lathan
Appendix B : Likelihood Restoration Program

B-1 PRESENT INCOME EARNING ACTIVITY

Based on Socio-economic survey, it reveals that total income of the household is the following:

- Average income of PAPs group 1 where to be resettled all communities is 4188 USD/household/year,

- Average income of PAPs group 2 where to be resettled some part of communities is 4530 USD/household/year and

- Average income of PAPs group 3, or people who loss only cultivated land but no need to be resettled, is 4866 USD/household/year

As per the decree on Poverty and Development Criteria (2009), the poverty line for rural area stands at 180,000 LAK/month/person. The decree was replaced by another decree in 2018, but the new decree doesn’t establishes the poverty line as a monetary number but a set of qualitative criteria to adjudge poverty. Adjusting the figure of 180,000 LAK/month/person even by a 3% inflation in costs, the poverty line in 2018 can be adjudged to be around 235,000 LAK/person month. As evident from income table above, the average income per person per month for all PAP categories is 2.5 to 3 times of this figure.

Overall, the 3 major sources of household income in the affected villages are crop production (~22%), livestock (~21%), wages/service (~19%), while the income from handicraft has the minimum contribution to the total income.

For farm income, main activities comprise paddy, upland rice, crop (including vegetable cultivation in drawdown zone), and animal husbandry. Off-farm income such as labor wage and service also share high percentage. In addition, cash from selling non-timber forest product is also reported high in remote villages.

B-2 ANALYSIS OF ADVANTAGE POINT OF FARM PRODUCT

Farm production in Luang Prabang Area having advantage factors to support the product in many ways as list follows;

(i) Production to serve demand of tourist; since there are many tourists have visited Luang Prabang every year. Demand of food is the opportunities for farmer to produce. High quality – chemical free farm product is to consider promotion for PAPs restoration plan. In addition, off-farm occupation particularly handicraft is to be considered to promote as supplementary income sources.

(ii) Advantage from one road one belt corridor; concerning the rapid train that to be complete within the next few years. So that, this will help to transport the mass of farm product to supply China within the short time and low cost. Promotion of industrial crops or crops production in a large-farm with contact to Consumers Company is to be considered.

B-3 POTENTIAL INCOME GENERATING ACTIVITIES AFTER RESETTLEMENT
Potential income generating activities that can recover the PAP’s livelihood economy. Concerning this issue, the results of meetings among project developer, local authorities and RAP planners indicate the potential income generating activities that are compatible with PAP’s skills as follows:

**The activities are categorized as the followings:**

A. Intensive crops production
B. Crop production as big scale farm e.g. peanut, maize, sesame and job’s tear.
C. Perennial crop production of goods: Para rubber
D. Livestock and animal production
E. Handicraft Development Program
F. Hiring labor force: workers, laborers for enterprises during construction period.
G. Promote trade and business groups: selling rice, drinks, clothes, groceries, stationeries, handicraft items, fuel, etc.

Each affected family is able to attend various activities mention above according to household labor and conditions. Detail of typical type of farm product including input and expect income is presented as below:

(1) **Rice Cultivation**

Since rice is the main food of people in the project area it is recommended that every household of PAPs is to be provided with 1 ha of paddy field. Cultivation will be conducted in rainy season during June to November. Rice production will be for domestic consumption and export. Investment cost and income from growing rice are shown in Table B-1.

**Table B-1 : Investment Cost and Income from Growing Rice**

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Yield (kg/ha)</th>
<th>Price (USD/kg)</th>
<th>Income (USD/hh)</th>
<th>Cost (USD/ha)</th>
<th>Net benefit /ha (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>3,500</td>
<td>0.200</td>
<td>700</td>
<td>150</td>
<td>550</td>
</tr>
<tr>
<td>Upland rice</td>
<td>2,000</td>
<td>0.20</td>
<td>450</td>
<td>150</td>
<td>300</td>
</tr>
</tbody>
</table>

(2) **Upland crops Plantation**

In case of upland crop cultivation, new land plots allocated should have capability to grow various kinds of annual field crops. Cultivation will be carried on in rainfed agricultural system which planting can be conducted in rainy season. In some case farmers can grow 2 crops using overlap cropping system such as maize-sesame, soy bean-mung bean, peanut-mung bean. Products of upland crops will be used for domestic consumption or export. Examples of upland crops recommended are pine apple, soy bean, mung bean, peanut, upland rice, maize, wheat, cabbages, sesame, chili. Income from upland crops range around 250-700 USD per ha. Land plot size to be allocated for these purpose should be 1 ha/hh. Investment cost and income of upland crops are shown in Table B-2.

**Table B-2 : Income, Investment Cost, And Benefit For Upland Crop Cultivation Plantation Area 1 Ha**

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Yield (kg/ha)</th>
<th>Price (USD/kg)</th>
<th>Income (USD)</th>
<th>Investment (USD)</th>
<th>Net benefit (USD)</th>
</tr>
</thead>
</table>
### Table 1: Crop Production Costs and Yields

<table>
<thead>
<tr>
<th>Crop</th>
<th>Seed Cost (KIP)</th>
<th>Seed Rate</th>
<th>Harvestable Yield (Kg/ha)</th>
<th>Yield (Kg/ha)</th>
<th>Revenue (KIP)</th>
<th>Cost (KIP)</th>
<th>Net Profit (KIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pineapple</td>
<td>20,000</td>
<td>0.055</td>
<td>1,100</td>
<td>400</td>
<td>700</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>Soy bean</td>
<td>1,500</td>
<td>0.30</td>
<td>450</td>
<td>130</td>
<td>320</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>Peanut</td>
<td>1,600</td>
<td>0.30</td>
<td>480</td>
<td>140</td>
<td>340</td>
<td>A3</td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>4,000</td>
<td>0.12</td>
<td>480</td>
<td>150</td>
<td>330</td>
<td>A4</td>
<td></td>
</tr>
<tr>
<td>Job’s tear</td>
<td>1,800</td>
<td>0.24</td>
<td>432</td>
<td>100</td>
<td>332</td>
<td>A5</td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>12,000</td>
<td>0.05</td>
<td>600</td>
<td>200</td>
<td>400</td>
<td>A6</td>
<td></td>
</tr>
<tr>
<td>Chilli</td>
<td>600</td>
<td>0.8</td>
<td>480</td>
<td>100</td>
<td>380</td>
<td>A7</td>
<td></td>
</tr>
<tr>
<td>Sesame</td>
<td>500</td>
<td>0.8</td>
<td>400</td>
<td>100</td>
<td>300</td>
<td>A8</td>
<td></td>
</tr>
<tr>
<td><strong>Average (USD/ha) for single crops</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>535</td>
</tr>
<tr>
<td><strong>Average (USD/ha) for overlap cropping system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>900</td>
</tr>
</tbody>
</table>

### (3) Rubber Plantation Program

There is a high demand for para rubber tree in the world market. Recently, an agency from abroad has invested and promoted rubber tree plantation in this area with some supporting and guarantee. Moreover, results of land capability investigation reveal that it is possible for para rubber cultivation. Farmers can gain yield from the tree within 7 years after planting. Before that, in the first 4 years, annual field crops can be grown as inter cropping to provide some income for farmer.

### (4) Livestock

#### (4.1) Cattle Husbandry

In case resettled villagers need to raise cattle herd as their former occupation before evacuation, committee will arrange land plot for pasture production with appropriate amount of financial assistance from Developer. Land plot requirement for cattle is around 1 hectare per head. Thus, need 10 hectare for herd of 10 cattle that will provide sufficient benefit for villagers. Deep and fertile soils are not necessary for this propose because pasture can be well grown in shallow soils. However, water source such as natural stream with year round water flow should be considered. Pasture land will be scattered with seeds of grasses and legumes for cattle grazing. Land plot will be divided into 4 subplots by fence and cattle will graze 20 days for each subplot then move to another one. For this method, each subplot of pasture can be rehabilitated and can yield within 40 days. Farmers are able to gain income from selling offspring in 3rd year with net benefit around 4.9 million Kip per year (Table B-3).
Table B-3: Cash Flow Analysis For Cattle Husbandry Raising 10 Cattle In Pasture Land 10 Hectares

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6++</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle</td>
<td>USD</td>
<td>265</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasture seed</td>
<td>USD</td>
<td>550</td>
<td>275</td>
<td>275</td>
<td>275</td>
<td>275</td>
<td>275</td>
</tr>
<tr>
<td>Medicine &amp; Supplement food</td>
<td>USD</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>Sum</td>
<td>USD</td>
<td>930</td>
<td>390</td>
<td>390</td>
<td>390</td>
<td>390</td>
<td>390</td>
</tr>
<tr>
<td>Income</td>
<td>USD</td>
<td></td>
<td>920</td>
<td>920</td>
<td>920</td>
<td>920</td>
<td></td>
</tr>
<tr>
<td>(sell offspring 8 head @ 115 USD/head)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Benefit</td>
<td>USD</td>
<td>-930</td>
<td>-390</td>
<td>530</td>
<td>530</td>
<td>530</td>
<td>530</td>
</tr>
</tbody>
</table>

(4.2) Other Livestocks

Based on socio-economic survey, it reveals that either cattle or other livestock were carried out such as buffaloes, goat and pig both for home consumption and sell, the returns for those livestock is presented in Table B-4.

Table B-4: Income, Cost and Net Benefit of Other Livestocks

<table>
<thead>
<tr>
<th>Livestock</th>
<th>Yield (kg./ha)</th>
<th>Unit Price (USD/kg.)</th>
<th>Income (USD/ha)</th>
<th>Cost (USD/ha)</th>
<th>Net Benefit (USD/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffaloes</td>
<td>3 head/hh/yr</td>
<td>3</td>
<td>285</td>
<td>500</td>
<td>355</td>
</tr>
<tr>
<td>Goat</td>
<td>10 head/hh/yr</td>
<td>10</td>
<td>4.5</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td>Pig</td>
<td>15 head/hh/yr</td>
<td>1,350</td>
<td>1.42</td>
<td>1,371</td>
<td>546</td>
</tr>
<tr>
<td>Poultry</td>
<td>100 head/hh/yr</td>
<td>100</td>
<td>2.85</td>
<td>85</td>
<td>200</td>
</tr>
</tbody>
</table>

(5) Handicraft Development Program

Handicraft skill of PAPs such as products from bamboo was observed during the surveys. These products may attract tourists and art markets. The handicraft development centre could be organized to provide supplementary household income for PAPs. This can generate income of about 100 USD/hh/year.

(6) Hiring Labor Working as the Project Labor

This activity will be provided for PAPs who affected from the project during construction period and actually all of the need for relocation to new resettlement site near to their old residential area but out of concession area. The hiring labor working will generate income about 900 USD/hh/year.

(7) Promote Trade and Business Group

Activities proposed: selling rice, drinks, clothes, groceries, stationeries, handicraft items, fuel etc. This group of income generating activities will be promoted for PAPs who interested in small trading or business group. The project developer will provide financial support as revolving funds for the interest group the amount of funding depend on site of business and capability of PAPs.