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MINISTRY OF PUBLIC WORKS AND TRANSPORT
Department of Waterways

Southeast Asia Disaster Risk Management Project

Project ID No: P170945

Component 1: Integrated Urban Flood Risk Management
in Pakxan City, Bolikhamxay Province

Draft Environmental and Social Management Plan (ESMP)

Volume 1 Main Report (Revised)

25 July 2022

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Executive Summary

The South East Asia Disaster Risk Management Project for Lao PDR and its additional financing (LDRM-AF, AF, or the Project) is being implemented with financing from the World Bank (WB) with the aim of reducing the risk of flooding and enhancing the disaster risk financing capacity of Lao PDR. The activities are implemented through the following five components: Component 1. Integrate Urban Flood Risk Management, Component 2. Hydromet Modernization and Early Warning System, Component 3. Financing Planning for Disaster Resilience, Component 4. Knowledge and Coordination, and Component 5. Contingency Emergency Response. In late 2019, additional budget of about US$25 million has been added to expand the implementation of Component 1 including expansion of infrastructure investments in Oudomxay (ODX), Bolikhamxay (BKX), and Louang Phabang (LPB) provinces.

This Environmental and Social Management Plan (ESMP) is prepared for the BKX subproject in accordance with the Environment and Social Management Framework (ESMF) approved by WB and applicable to the subproject. An abbreviated Resettlement Action Plan (ARAP) applicable to the subproject was prepared in according to the Resettlement Policy Framework (RPF) approved by WB and it is submitted separately.

Key Objective of ESMP

This document is the ESMP of BKX subproject, expected to be constructed in late 2022 to end of 2024. The ESMP provides details on the environmental and social (E&S) issues and mitigation measures, management and monitoring requirements that will need to be carried out by the Department of Water Ways (DOW) of Ministry of Public Works and Transport (DOW/MPWT) and its contractors during the implementation of the subproject. The ESMP briefly identifies description of the subproject, results from the E&S screening and application of WB safeguard and Government regulations, E&S background of the subproject areas and the affected area including the area of influence, and key issues and mitigation measures to be conducted during preconstruction, construction, and operation phases including the implementation arrangement and budget. More details are provided in specific attachments.

Project Location and Description

Pakxan is a capital town of BKX province and is connected to the south of Lao PDR by the national road number 13 south (NR13S). The Nam Xan River joins the Mekong River at Pakxan on the border with Thailand. The proposed subproject site comprises two specific locations along the Mekong River upstream (652 m) and downstream (550 m) of the Nam Xan River Mouth. The area is vulnerable to flood and river bank erosion.

Based on detailed design, the proposed subproject works will comprise (a) construction of two embankments and riverbank protection structures along the Mekong River (Lao side) with a total length of around 1.2 km comprising 652m upstream (B. Houaysiat or Section 1) and 550 m downstream (B. Pakxan-Tai or Section 2) and (b) rehabilitation/extension of the existing pump and pipe for a small irrigation area located at Km 0+310 downstream of the Section 2. The proposed works for the embankment and the river bank protection aim to mitigate flood damage

of T-50-year return period of flood as recommended in the feasibility study with a total investment of about US$ 4.9 million. For easy access from inland to the riverside after the embankment construction, five stairways (W=3.0m, L=34.0m) will be constructed to provide access to the river bank and to facilitate recreational activities along the Mekong River (Lao side). Construction of the subproject is expected to be completed in 15 months considering rainy season.

The embankment and river bank protection works will require about 196,000m3 of soil for embankment and 78,700m3 of rock and gravel for rip-rap which will be used mainly for construction of the foundation of the riverbank protection structure and toe protection structure. About 14,548m3 of excavated surplus soil that are not suitable to be used as construction materials for the subproject works will be disposed of in an area assigned as a spoil disposal site. The proposed worker camp site is located in a 1.5ha private-owned land in B. Houysiat about 1.5Km to the Section 1 site and 100m to the Mekong River and no other sensitive spots (hospitals schools, temples) are located nearby the proposed camp site.

The existing local roads and NR13S will be used for transportation of construction materials to the subproject sites. The borrow pits, quarry sites and disposal site are located about 7Km to 25Km from the subproject sites. Based on the estimated quantity of construction material provided above (about 210,548 m^3 of soil and 78,000 m^3 of rip-rap), It will require around totally 16,602 trips of 15 ton dump truck during 7 months of earth works of approximately 64 – 80 rounds trips/day for transportation. There are natural trees, bushes, residential and sensitive receptors along transport routes to sites.The impacts and mitigation measures are provided in Section 2.6.

Legal and Policy Framework

The 2019 EIA decree will be applied to the proposed BKX subproject. For this subproject, it has been agreed that two IEEs will be prepared for PONRE. ISAN has prepared two IEEs and submitted it to PONRE to obtain two ECCs from PONRE before commencement of civil works.

Risks, Impacts, and Proposed Mitigation measures

It is expected that the proposed subproject investments in Pakxan will have overall positive impacts both from environment and social aspects. Construction of the proposed embankment and riverbank protection at two proposed Sections will prevent people who own land (public and private) along the subproject sites from being affected by floods. Meanwhile, the general public can come to enjoy the beauty and activities along the Mekong River all year round. With other investments undertaken by the GOL in BKX[1], the subproject investment contributes to the GOL's efforts in reducing potential negative impacts of flooding to local land and livelihoods while prevent riverbank erosion in Pakxan. Rehabilitation/extension of existing irrigation system will also increase the benefits to farmers.

[1] ADB is providing support on infrastructure while WB (BETF/RETF) is conducting a preliminary flood risk assessment including baseline data collection and preparation of a digital elevation models (DEM) for Pakxan and Vientiane Capital and results are expected in mid 2022.

It is expected that the direct beneficiaries of BKX subproject will include communities in the urban area of Pakxan which is home to 45,042 people. Indirect subproject beneficiaries include travelers passing through or visit Pakxan which is the most important traffic junction between Northern and Southern province, and the province is not very far from Vientiane Capital.

The potential negative impacts of the proposed embankment and river bank protection structure to be constructed will be moderate, localized, and most of them are temporary and can be mitigated through effective management of construction and contractor. During preconstruction, compensation to be provided to about 20 affected households including a fish farm and detailed information and specific measures are provided in the ARAP. During construction, most of the E&S risks and impacts will be limited to generation of noise, vibration, dust, and other air pollution, wastes, water pollution, and disturbance to local environment as well as increased safety risks related to safety and behavior of workers, road safety for contractors' workers and local inhabitants, waterways safety for boat owners and other local water users, etc. Potential negative Impacts during operations (after the construction is completed) will be limited to safety of the waterways user, the possible change (erosion and/or deposition) of the river bank profile upstream and downstream of the subproject sites, and increasing disposal of garbage into the Mekong River.

Potential negative impacts of the proposed rehabilitation/extension of the existing pump and pipe for a small irrigation area located downstream of the Section 2 will be minor during construction and the proposed mitigation measures to be implemented by the contractor will also be implemented and monitored. As part of the training and capacity building to PIU and SMWG, EDPD/PTI will also provide training on safe use of fertilizers, pesticides, and insecticides being used by the farmers including safe storage and disposal of their containers/packages.

To mitigate the impacts during construction, the following measures will be planned and implemented: (a) Ensuring that the contractor prepare and implement a good contractor-ESMP (C-ESMP) for submission to the Construction Supervision Consultant (CSC) and/or PMU/PTI given due attention on the installation of adequate and appropriate safety and warning signs visible day and night at all key locations on land and waterways and effective application of good construction practices and housekeeping and also initiate and maintain close consultation with local authorities and local communities during the preparation and implementation of the C-ESMP; (b) Ensuring that the CSC and/or PMU/PTI review and approve the C-ESMP inline with the ESMP approved by WB and also conduct day-to-day monitoring and reporting on performance of contractor; and (c) Ensuring that the PIU/DPWT, the Safeguard Monitoring Working Group (SMWG), EDPD/PTI, and DOW conducted safeguard monitoring and reporting periodically and submit the results in the safeguard monitoring repot (ESMR to be submitted to WB every 6 months.

Specific attention will be given to reduce the risks and impacts to the people and general public who come to the provincial hospital, school, and temple around the subproject site by (a) Installation of a temporary fence around the construction sites (on land) with appropriate warning and safety signs while appropriate markers/screen and/or signage visible during day

and night time will be used for the water area in the Mekong River; (b) Ensuring that contractor apply machine and equipment with low noise and vibration during construction and that piling is not expected; (c) Ensure effective implementation of measures on limit working hour, control speed limit, fully cover all trucks, no overload, road safety, etc.; (d) Periodic watering of the construction site and roads in front of the provincial hospital, school, and temple; and (e) Close consultation with and participatory monitoring of local authorities and local communities (LA/LC) and provision of information to the general public.

Appropriate application of the generic ECOP and COC provided in Attachment 6A and 6B as well as site-specific measures as identified in Section 5 and Attachment 5 and specific measures will be adequate to mitigate these risks and potential impacts during construction. An Environment, Social, Health, and Safety (ESHS) requirements will be prepared and included as part of the bidding and/or contract documents and be used to guide the preparation and implementation of the C-ESMP while the CSC, PIU/SMWG, EDPD/PTI, and DOW will monitor the compliance periodically.

Before construction begins, ECC will be issued by PONRE and not less than 6 months before construction is completed, PIU will conduct the baseline data collection on the river bank profile that can be used to monitor potential change of the river bank erosion and/or deposition upstream and downstream of the subproject sites and follow-up data collection once/year (or any period as agreed with LA/LC) for 3 years after construction is completed.

In addition to this ESMP, a Resettlement Plan (ARAP) has been prepared to address the involuntary resettlement impacts of the proposed subproject. A District Resettlement Committee (DRC) has been established.

Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) will be established to help record, assess, and resolve grievances and complaints during the implementation of the proposed subproject.

Community Engagement and Consultation

In line with specific requirements on consultation and information disclosure identified in the ESMF and RPF of the LDRM-AF, consultation and meetings with the subproject affected peoples (PAPs) were conducted during the preparation of this ESMP, ARAP, and IEE (to be submitted to PONRE).

Four rounds of consultations were conducted from November 2020 to November 2021 in Houaysiat, Pakxan-Tai and Anousonxay villages with the particiption of a total of 214 people (78 of them are female). Consultation methods applied include: a) public meetings, b) household interview (survey), c) and key informant interview. The consultations aimed to:

- Disseminate key subproject information such as the design of the proposed structures for riverbank protection; and extension of irrigation pipe;
- Present anticipated environmental and social risks and impacts associated with construct ion of the subproject and proposed mitigation measures;

- Disseminate eligibility criteria and entitlements of PAP for loss of assets attached to affe cted (public) land and assets in river (fish farming cages), and compensation measures;
- Obtain opinions, concerns and recommendations from representatives of affected people and other stakeholders on subproject design, implementation;
- Conduct Inventory of Loss (IOL);
- Collect household data for development of ARAP, ESMP, and IEE.

Implementation Arrangements

In line with the LDRM-AF implementation arrangement for Component 1, DOW through the Project Management Unit (PMU) will sign a contract with the contractor and the CSC for the subproject while the Department of Public Works and Transport of BKX (DPWT-BKX) will be the subproject Implementation Unit (PIU) and responsible for supervision and monitoring of the works contract including ensuring effective and timely implementation of the ESMP and ARAP. EDPD/PTI will provide technical assistance to PMU/DOW and consultants to ensure quality of the reports, especially during the preparation of RAP and ESMP and the E&S monitoring reports (ESMR) to be submitted to WB. EDPD/PTI will also provide training and capacity building supports to PIU/DPWT and the PRC and SMWG in line with the RAP and ESMP approved by WB and GOL requirements. It was determined that two IEEs will be required for the subproject and two Environmental Compliance Certificates or ECCs will be required for the subproject. The Safeguard Monitoring Working Group (SMWG) which is the same PRC committee has been established by BKX province (Attachment 3 of ARAP). The SMWG is chaired by DPWT of BKX and comprise representatives from key agencies responsible for ensuring compliance with GOL regulations during construction including key local communities to be affected during construction and those to be involved during operations phase.

Budget for ESMP Implementation

For BKX subproject, cost for compensation of PAPs is part of RAP implementation while those to be implemented by the contractor (including a technical survey for UXO) is part of the construction cost. Additional budget of US$50,000 has been allocated for (a) monitoring and training to ensure compliance with the WB safeguard requirements and GOL regulations and (b) capacity building activities and consultation of the PMU/DOW, EDPD/PTI, and PIU/DPWT to performance their tasks related to E&S safeguard during construction including cost for national consultant to assist them. The budget also include those to be allocated for DPWT and SMWG to monitor the river bank erosion (about 1.2 km along the Mekong River upstream (652 m) and downstream (550 m) of the Nam Xan Mouth) to ensure safety of the subproject structure as well as monitor the potential change of the river bank erosion/deposition upstream and downstream of the subproject sites before construction begins. GOL will be responsible for the cost of monitoring on safety and river bank profile. Local community engagement in the river bank monitoring program is strongly encouraged. DOW will ensure that the budgets can timely flow to PIU and the SMWG and they are effectively used for this purpose.

Acronyms and Abbreviations

AF	Additional Financing
AHH	Affected Households
ARAP	Abbreviated Resettlement Action Plan
ASEAN	Association of Southeast Asian Nations
BD	Bidding Document
CD	Contract Document
CBO	Community Based Organizations
COC	Code of Conduct on GBV
COI	Corridor of Impacts
C&R	Compensation and Resettlement
CSC	Construction Supervision Consultant
CSO	Civil Society Organization
DAFO	District Agriculture and Forestry Office
DDMC	District Disaster Management Committee
DCC	Department of Climate Change
DMS	Detailed Measurement Survey
DOE	Department of Environment
DONRE	Department of Natural Resources and Environment
DOW	Department of Waterways
DPCI	Department of Pollution Control and Inspection
DPWT	Department of Public Works and Transport
DRM	Disaster Risk Management
DRO	District Resettlement Office
DRR	Disaster Risk Reduction
DUPH	Department of Urban Planning and Housing
EIA	Environmental Impacts Assessment
ECC	Environmental Compliance Certificate
ECOP	Environmental Code of Practice
EDPD	Environmental Research and Disaster Prevention Division (of PTI)
EG	Ethnic Group
EGEF	Ethnic Group Engagement Framework
EGEP	Ethnic Group Engagement Plan
EPL	Environmental Protection Law
ESHS	Environmental, Social, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FE	Field Engineer
GBV	Gender-Based Violence

GDP	Gross Domestic Product
GIS	Geographic Information System
GCLS	Grievance and Complaints Logging System
GOL	Government of Lao PDR
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
ICT	Information Communication Technologies
IEE	Initial Environmental Examination
ISWS	Implementation Support and Works Supervision
Lao PDR	Lao People's Democratic Republic
LA/LC	Local Authority/ Local Community
LDRM-AF	Lao Disaster Risk Management – Additional Financing
LFND	Lao Front for National Development
LWU	Lao Women's Union
MASL	Metre Above Sea Level
M&E	Monitoring and Evaluation
MOF	Ministry of Finance
MONRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
MPWT	Ministry of Public Works and Transport
NPA	National Protected Areas
NSEDP	National Socio-economic Development Plan
NUOL	National University of Laos
ODX	Oudomxay Province
O&M	Operation and Maintenance
OP/BP	Operational Policies/ Bank Procedures
PA	Protected Area
PAH	Project Affected Household
PAP	Project Affected People
PDNA	Post Disaster Needs Assessment
PDO	Project Development Objective
PDR	People's Democratic Public
PFA	Protected Forest Area
PIU	Project Implementation Unit
PMU	Project Management Unit
PONRE	Provincial Department of Natural Resources and Environment
PTI	Public works and Transport Institute
RAP	Resettlement Action Plan
ROW	Right of Way
RPF	Resettlement Policy Framework
SEA	Sexual Exploitation and Abuse
TA	Technical Assistance

TOR	Terms of Reference
UDAA	Urban Development Administration Authority
UNDRR	United Nation Office for Disaster Risk Reduction
UXO	Unexploded Ordinance
VAC	Violence Against children
WB	World Bank
WBG	World Bank Group

1 INTRODUCTION

1.1 Background

1. The South East Asia Disaster Risk Management Project for Lao PDR (LDRM or Parent Project) is being implemented with financing from the World Bank (WB) with an aim to reduce the risk of flooding and enhance disaster risk financing capacity of Lao PDR[2]. The Parent Project was approved on July 6, 2017 and became effective on 11 October 2017, with a commitment amount of US$30 million. The LDRM activities are implemented through the following 5 components: (1) Integrated Urban Flood Risk Management implemented by the Department of Waterways (DOW) of the Ministry of Public Works and Transport (MPWT); (2) Hydromet Modernization and Early Warning Systems implemented by the Department of Meteorology and Hydrology (DMH) of the Ministry of Natural Resources and Environment (MONRE); (3) Financing Planning for Disaster Resilience implemented by the State Reserve Department in the Ministry of Finance (MOF); (4) Knowledge and Coordination implemented by the Department of Planning of Ministry of Planning and Investment (MPI); and (5) Contingent Emergency Response Component. The Component 1 supports investment (structure and on-structure) in Moung Xay of Oudomxai (ODX) province.

2. In late 2019, additional fund (AF) of about $25 million has been provided to increase scope of the Component 1 implementation to cover larger investment in ODX and expand priority investment in Luang Prabang (LPB), and Bolikhamxay (BKX). The AF (LDRM-AF or the Project) is effective in early 2020 and the closing date is 31 December 2024. During the approval of the LDRM-AF, a set of environmental and social (E&S) safeguard instruments namely the Environmental and Social Management Framework (ESMF), the Resettlement Policy Framework (RPF), and the Ethnic Group Engagement Framework (EGEF) were prepared and approved by WB and they are being applied to all the Project activities and subprojects. For the AF, ISAN has also been assigned to be responsible for completing the feasibility studies, detailed designs, and preparation of safeguard documents (ESMPs, RAPs, EGEPs) for the additional works for ODX, LPB, and BKX as well as for supervision of construction works in ODX subproject.

3. This Environmental and Social Management Plan (ESMP) is prepared for the BKX subproject in accordance with the Project's ESMF. The BKX subproject is part of the Component 1 which has been designed to reduce the flood damages from the Mekong River in Pakxan City and enhance the Government's capacity for disaster risk management while the subproject scope is described in Chapter 2. Since the subproject involves minor amount of

1. [2] The parent project (LDRM) was approved on July 6, 2017 and became effective on 11 October, 2017, with a commitment amount of US$30 million. The Project Development Objective (PDO) is to reduce the impacts of flooding in Muang Xay of Oudomxay (ODX) Province and enhance capacity of the Government of Lao PDR (GOL) to provide hydro-meteorological services and disaster response.

land acquisition and compensation of a fish farm, an abbreviated Resettlement Action Plan (ARAP) is separately prepared as a standalone document in line with the Project's RPF.

1.2 Objective and Scope of the ESMP

4. This ESMP aims to identify and mitigate potential environmental and social (E&S) risks and impacts associated with the Subproject activities during construction and operation phases. The ESMP describes (1) subproject background; (2) brief description of the subproject; (3) the GOL legal requirements and the application of WB's safeguard policies; (4) general E&S conditions of BKX province and Pakxan where the Subproject is located and site-specific E&S conditions; (5) risks and potential negative impacts and proposed mitigation measures to be conducted during construction and operations; (6) consultation and information disclosure; (7) grievance redress mechanism (GRM); and (8) ESMP implementation and monitoring arrangement and budget. More details are provided in the following attachments:

- Attachment 1: Key National Legislation and International Regulatory Framework to be applied
- Attachment 2: Subproject Location and Description
- Attachment 3: Safeguard Screening of BKX Subproject
- Attachment 4: E&S Conditions and Historical Floods in BKX
- Attachment 5: Key Issues and Proposed Mitigation Measures
- Attachment 6A: Subproject Environmental Code of Practice (ECOP)
- Attachment 6B: Subproject Code of Conduct (COC)
- Attachment 7: Sample Forms on GRM Monitoring and Accident Report
- Attachment 8: Contingency Planning for Response to COVID-19
- Attachment 9: Notes from Consultation Meetings

1.3 Project Location

5. Bolikhamxay (BKX) Province is located in the south of Vientiane in central Lao PDR. The province is a center for ecotourism activities with its two national protected areas and an extensive system of wetlands. The province borders with Xiengkouang province to the northwest, Vietnam to the east, Khammoune province to the south and Thailand to the west. The province also includes the Annamite range, stretching east to Vietnam, while to the west are the Mekong River and Thailand. The province consists of seven districts and covers an area of 14,863 km2,

6. Pakxan is a capital town of BKX province and connected to the south of Lao PDR by the national road number 13 south (NR13S). The Nam Xan River joins the Mekong River at Pakxan on the border with Thailand. The proposed subproject site comprises two specific locations along the Mekong River upstream (652 m) and downstream (550 m) of the Nam Xan Mouth (see Figure 2-1). The area is vulnerable to flood and river bank erosion. The total length of two subproject sites is around 1.2 km along the Mekong River comprising

652m upstream (B. Houaysiat or Section 1) and 550 m downstream (B. Pakxan-Tai or Section 2).

2 PROJECT DESCRIPTION

2.1 Project Works

7. Based on detailed design, the proposed subproject works will comprise (a) construction of two embankments and riverbank protection structures along the Mekong River (Lao side) at locations upstream and downstream of the Nam Xan River Mouth and (b) rehabilitation/extension of the existing pipeline to irrigate a small area located at Km 0+310 in the Section 2. The proposed works for the embankment and the river bank protection aim to mitigate flood damage of T-50-year return period of flood as recommended in the feasibility study with a total investment of about US$ 4.9 million. The proposed embankment and river bank protection works will be extended about 7 to 10m from the existing riverbank toward the Mekong River and about 2m higher that the road elevation (see Figure 2.1).

8. It is anticipated that the area of influence of the subproject would cover the followings:

- Construction areas where the two embankments and two river bank protections will be built (covering an estimated area of about 10,300 m2 on land and about 16,700 m2 in the river water body for the Section 1 and about 24,657m2 on land and about 10,569m2 in the river water body for the Section 2);
- Construction areas where irrigation pipeline (length 38m and 500mm diameter) will be installed (extended from an existing pipeline);
- Roads that will be used to transport construction materials from two initially identified borrow pits, and or construction material workshop, etc. to above mentioned construction sites. This includes also roads used to transport spoil materials from construction site to identified disposal site(s);
- Roads that will be used to transport construction materials from quarry sites/concrete plants to construction sites;
- Waterways that may be used to transport construction material from the above borrow pits to the construction sites;
- Workers' camps and working area (about 120m away from the construction sites);
- Any other areas that are potentially affected by noise, vibration, and air pollution; and
- Any other inland and waterway that may be additionally used to transport construction materials and spoil materials.

9. Table 2-1 below provides a summary of the subproject structural components and more details are provided in Attachment 2.

Table 2-1 Structural components

No.	Project Activities	Section	Location	Details

1	Two embankments and two Riverbank Protections of 1.2km on the left side of Mekong River	Section 1 no elevation of the embankment at left side of the Mekong River upstream of the Nam Xan Mouth	Ban Houysiat	500 (Houysiat Tributary 152 m)
		Section 2 with elevation of the embankment at left side of the Mekong River downstream of the Nam Xan Mouth	Ban Pakxan-Tai.	550
2	Stairways (for easy access from inland to the riverside after completing embankment construction, five stairways will be constructed as part of embankment structures to provide access to the river bank and to facilitate recreational activities along the Mekong River)	Both sections	Ban Houysiat and Ban Pakxan-Tai	5 points (W 3.0 m, L 34.0m)
3	Extension of an existing irrigation pipeline located downstream of the subproject site	Section 2	Section 2	38m and 500mm

Figure 2-1 Subproject Location and Proposed Alignment (2 sections)

2.2 Design of Embankment for River Bank Protection

10. With regards to the design of an embankment for river bank protection at the subproject sites, the design team have carefully reviewed the hydraulic and hydrological factors to

determine design dimensions, including conducting analysis to check the stability of the proposed riverbank sections. The construction aspects such as material, workability, cost, and period were also considered. The basic principles and design are provided in Attachment 2. It is estimated that construction of these embankments will require about 196,000 m^3 of soil, 78,700m^3 of rock and gravel, and 14,548 m^3 of disposal spoil.

11. The embankment structure was designed in a manner that achieves cost-effective functional flood embankment – in the face of limited budget. In line with this, various factors are considered as part of the design, including maintenance requirements, use of economical materials, and harmonization with existing infrastructures to inform the technical design. The following key design criteria were considered:

- Flood embankment will be safe against inundation;
- Costs of materials used for embankment construction are affordable and locally available;
- Structure of embankment slopes are stable under river flooding conditions; and
- Seepage flow through embankment and foundation will be controlled so that no internal erosion occurs and so there is no sloughing in the area where the seepage emerges.

12. Through the stability analysis of the riverbank, review on various design standards for embankment, and case studies of similar previous projects in Lao PDR, the following engineering details are proposed:

1) Levee Crest:

- The width of levee crest shall be wider than 7.0 m along the Mekong River considering design floods of 26,209 m3/s at Vientiane Station near the subproject site with the free board of 0.5 m considering the aspects of land acquisition and resettlement, and construction costs.

2) Slope of Levee:

- The design slope of the levee has been determined as 1:2.0 for the riverside slope and 1:2.0 for the landside slope of the proposed levee.

3) Levee Berm:

- The design width of levee berm has been determined as 3.0 m which is the critical width to ensure levee stability based on levee stability analysis as well as design of walking path for use by local residents.

4) Embankment Materials:

- River sand and borrow materials will be used as the main materials for construction of embankment and levee (See **Figure A2-2 to A2-8 in Attachment 2**).

13. Bank protection means revetments to protect levee surface from the risks of erosion and scour on the levee safety, which may cause levee failure. The riverbank protection consists of the slope protection and embankment's retaining wall which is the foundation of the bank protection structure and to protect the bottom part of the riverbank from being scoured and eroded due to water movement. The length and location of bank protection structure have

been decided considering hydraulic characteristics and the current status of riverbank erosion of the subproject site.

14. Basic design of the slope and embankment's retaining wall technology will follow those being applied in Vientiane Capital (see **Figure A2-2 to Figure A2-8 in Attachment 2**).

1) Slope Protection:

- Type of slope protection are determined based on levee stability, construction cost and time period. The design team has compared designed slope with several other slope protection types, including rip-rap, environmental block, masonry, gabion box and gabion mattress, before an optimum type is determined.
- Through the comparison of various types, rip-rap protection type has been proposed for the whole Subproject area. It is estimated that the thickness of rip-rap protection will be 0.7 ~ 1.0 m (size 0.4~0.6m) considering the depth of the flow at each part of the riverbank.
- Filter Materials: the suction of backfill material and the seepage can be the major causes of levee failure. To prevent those causes of levee failure, bedding geotextiles and rubbles as filter materials between slope covering and backfill materials have been employed under slope protection.
- The bedding layer under slope protection is usually recommended to have the designed thickness of more than 9 inch (about more than 20cm) and it may improve the stability of rip-rap slope covering. The bedding rubbles with its thickness of 20cm and geotextiles under slope protection are employed from top of the levee to footing along the whole Subproject area.

2) Toe Protection

- Retaining wall serves as the foundation of slope protection against falling down of the embankment and slope covering materials.
- The dumping rip-rap for retaining wall is also considered to be efficient construction method because it can be used as construction road to implement embankment works.
- The design level of retaining wall by sections has been determined considering construction period in the dry season, it means that the retaining wall works shall be the first step in the levee works, and after that, the retaining wall will be used as construction road for the other levee works such as embankment and slope protection works.
- The design width of retaining wall has been determined to be 3.5m considering the stability analysis of riverbank and the accessibility of heavy equipment for construction.

2.3 Other Facilities

15. In the subproject site, there is one fish farm being operated on the Mekong River by the resident and this operation will be terminated (See Location Map in Attachment 4, Figure

A4-21). For easy access from inland to riverside after levee construction, the subproject will construct five (5) stairways (W=3.0m, L=34.0m) on the slope protection at both sections (Section 1 and Section 2). The subproject will also install a small pumping station (about 38m downstream of the riverbank protection site at Section 2) to provide water service to the existing irrigation facility pipe (See Figure A4-21 in Attachment 4). Details of the proposed stairway are shown in **Figure A2-7 and Figure A2-8 in Attachment 2** respectively.

2.4 Construction Materials, Borrow Pits, and Quarry Site

16. Soil is used as main materials for construction of embankment for riverbank protection. Concrete and rip-rap are supplied from adjacent borrow pits, quarry sites and concrete plant. The laboratory tests have been performed to check the suitability of the materials from selected borrow pits, excavated soils, and quarry sites.

17. ***Borrow pits:*** The detailed design consultant (ISAN) has identified two borrow pits with a total quantity of 196,000m^3 which can provide the necessary quantity of materials for the Subproject. The borrow pits are located in private land[3] in Saeneoudom and Tungyai villages which are about 7km from the subproject site and 15Km from the nearest National Protection Areas. It will require around totally 16,602 trips of 15 ton dump truck during 7 months of earth works of approximately 64 – 80 rounds trips/day. **Table 2-2** below provides brief information on the locations and use of materials while location of the borrow pits are provided in **Figure A2-9 in Attachment 2**. The borrow pits are located in private land with natural trees and bushes. The transportation route will be using the Nation Road 13 South (NR13S) and the local roads connecting NR13S to the subproject sites. There are natural trees, bushes, residential and sensitive receptors along transport routes to sites. The impacts and mitigation measures are provided in Section 2.6. Agreement with land owner will be obtained and included in the C-ESMP to be submitted to WB. DPWT of BKX and SMWG will facilitate discussion and conduct consultation with land owner and facilitate for agreement between contractor and land owner. The contractor will be responsible for ensuring that the final conditions of the borrow-pit are accepted by the land owner and this condition will be part of the C-ESMP submission. Similar arrangement will be made for soil disposal sites.

18. ***Quarry sites/ cement concrete mixing plants****:* It is estimated that construction of these embankments will require about 78,700m^3 of rock and gravel for rip-rap which will be used mainly for construction of the foundation of the riverbank protection structure and toe protection structure will be supplied from quarry sites. Rip-rap materials will be tested on different criteria such as unit weight, uniaxial compressive strength and etc. to see if they meet technical requirement for use as construction materials. The quarry site and batch plant will be sourced from existing concession sites located in Harngsing and Phameaung villages which are about 25km to 55km from the subproject site (See **Table 2-2 below and Figure A2-9 in Attachment 2**). Similar to the transportation of the materials from borrow pits, the Nation Road 13 South (NR13S) and the local roads connecting the quarries sites and concrete plants will be used for transportation of construction materials. Agreement with

[3] Owned by local household

land owner will be obtained and included in the C-ESMP to be submitted to WB. DPWT of BKX will consult with land owners and facilitate agreement between contractors and concerned village authorities and land owners. Similar arrangement will be made for the quarry site, location of cement concrete mixing plants, borrow pits, and spoil disposal sites.

Table 2-2 List of Construction Materials

No.	Types of Materials	Distance from Subproject Site and NPA	Estimated Available Quantity (m^3)	Soil Classification		Potential Uses
				AASHTO M-145	USCS	
BP01	Yellowish brown, clayey sands	7km and 15km	>60,000	A-2-6(0)	GC	Embankment, subbase
BP02	Reddish brown, organic clays	7km and 15km	>136,000	A-7-5(15)	OH	
				A-7-6(16)	MH	
Q01	Reddish brown, sandstone	25km and 15km	>600,000			Rip-rap
Q02	Bluish gray, limestone	55km and 15km	>80,500			Rip-rap

BP= Borrow Pit; Q= Quarry Site

2.5 Disposal of surplus excavation soils

19. About 14,548m^3 of excavated surplus soil that are not suitable to be used as construction materials for the subproject works will be disposed of in an area assigned as a spoil disposal site. DPWT of BKX (as the PIU) is in the process of identifying suitable locations for spoil disposal. Different factors have been considered such as urban master plan, social and environmental impact, and cost. The following key criteria have been established by PIU for selection of soil disposal site: (a) The site will be located within the 2-10km away from the subproject site; (b) mountainous, areas prone to erosion, environmentally sensitive areas such as water sources, wetland and sensitive forest will not be used as spoil disposal site. Also, removal of tree to establish disposal site will be avoided or minimized; (c) as a priority, if subproject affected households need surplus excavated soil as fill material for their lands, they will be provided.

20. It is expected that a disposal site will be an empty private land (about 6.4ha in area) located along the NR13S which is about 7km away from the subproject site and 26km away from the nearest NPA. There are no residential houses located close to this proposed disposal site (Please refer to **Figure A2-9 in Attachment 2**). To make an agreement between PIU and land owner, the following terms are being used during consultation and negotiation process: (i) contractor will improve the access road and (ii) spray water to control dust emission.

2.6 Transportation Routes and Proposed Worker Camp Site

21. The existing local roads and NR13S will be used for transportation of construction materials to the subproject sites. The borrow pits, quarry sites and disposal site are located about 7Km to 25Km from the subproject sites. Based on the estimated quantity of construction material provided above (about 210,548 m^3 of soil and 78,000 m^3 of rip-rap), it will require around totally 16,602 trips of 15 ton dump truck during 7 months of earth works of approximately 64 – 80 rounds trips/day for transportation of all estimated construction materials. There are natural trees and bushes and some residential house located along the transportation routes. To mitigate the impacts related to noise, dust, vibration, and risks concerning road safety for local residents along the road (including damage to road due to heavy loads), contractor will be required to ensure the followings:

a) All trucks used for the subproject shall be in full compliance with GOL regulations on speed limit, load permit, vehicle safety, etc.), and are properly maintained to reduce noise/vibration/dust generation. When passing through local roads (from NR13S to site 2, which pass through communities and hospital and school), the speed limit should be slower (within 25-30km/hr) than national road.

b) Truck under load shall be fully covered with appropriate sheet to prevent materials from falling off the truck.

c) All vehicles used for the subproject should have subproject sticker that provides information on name of the subproject and contact person who are in charge of the car operation;

d) Transport road and construction sites are watered at least 3 times daily during the dry season or sunny day;

e) Conduct weekly consultation with, or weekly update local authority/local community of the most updated construction plan/ schedule, including detailed plan for transportation of construction and spoil materials, including transporation times through populated areas;

f) All drivers are aware of the above regulations and are committed to observing these regulations;

g) Contractor's staff is appointed to be responsible for monitoring the compliance of these regulations and keeping proper transportation records, especially those for areas such as routes near the provincial hospital, school, and temple and other areas considered sensitive and/or as agreed with LA/LC;

h) Transportation during rush hours are not allowed; and

i) Damages to roads due to operation of trucks shall be repaired immediately to ensure road safety. Accidents caused by contractors must be reported immediately to PIU and after that the World Bank within 24 hours for timely resolution. After completion of construction work, all remaining road damages shall be repaired/ restored by the contractor as part of their obligations.

j) In case water transport is proposed by contractor as option for construction materials transport, C-ESMP shall include measures to ensure safety for local people who are involved in fishing or use waterways, including the place where barges are harbored for offloading the materials, safety for barge operator, and to eensure that boats and

barges do not release fuel/oil, pollutants into the water and have adequate mooring or anchoring facilities for material delivery to subproject sites.

k) Emergency Preparedness and response plan need to include measures for water transport.

See details on risks and proposed mitigation measures in Sections 5.3 to 5.6.

22. The proposed worker camp site will be a private-owned land (1.5ha) located in B. Houysiat. The proposed camp site is about 1.5km from Section 1 site and 100m away from the Mekong River. There are no other sensitive spots such as hospitals schools, temples located adjacent to the proposed camp site (See **Figure A2-10 in Attachment 2)**. The total number of workers that will be likely engaged during the subproject implementation is 45 people (maximum). Agreement with land owner will be obtained and included in the C-ESMP to be submitted to WB. DPWT of BKX will consult with land owners and facilitate agreement between contractors and concerned village authorities and land owners. Efforts will be made to hire local workers (including skilled workers). Sufficient accommodation (supplied with water, sanitation, hygiene and first aid facilities) will be provided to Contractors' workers. Adequate measures for effective prevention of COVID-19 will be provided to non-local and local workers. See details on ES risks and proposed mitigation measures in Sections 5.3 to 5.6.

2.7 Construction Plan and Schedule

23. The construction of the subproject is expected to be completed in 15 months after the contract signing. Construction period will take into account rainy season (See Table 2-3 below)

Table 2-3 Construction Schedule

Work Items	Month														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Mobilization															
2. Earthworks															
3. Toe Protection Works															
4. Riverbank Protection Works															
5. Levee, walk paths and etc.															
6. Tests on Completion															

3 LEGAL FRAMEWORKS

3.1 National Laws and Regulation Related to Environmental and Social Safeguards

26. In Lao PDR, various laws and regulations govern the utilization and management of natural resources management, such as land, forest, water, aquatic and wildlife, etc. These laws and regulations have been enacted since late 1990s and many of them have been updated. The Environmental Protection Law (EPL) (enacted in 1999 and revised in 2012) provides principles, regulations and measures for managing, monitoring, restoring, and protecting the environment including the pollution control, environmental impact assessment processes and natural disaster. In accordance with the EPL, the Ministry of Natural Resources and Environment (MONRE) is responsible for establishment and ensuring effective implementation of follow-up regulations and guidelines as needed. MONRE is also responsible for reviewing Environmental Impact Assessment (EIA) reports and issuing Environmental Compliance Certificate (ECC) while the provincial Departments of Natural Resources and Environment (PONRE) are responsible for reviewing Initial Environmental Evaluation (IEE) process and issuance of an ECC. Efforts are being made to update the EPL and relevant regulations and guidelines.

27. On EIA/IEE process, in 2013, two regulations on EIA and IEE requirements were published and they are being updated taking into account the new EIA decree approved by the Prime Minister in early 2019 (EIA decree No 21, date January 31, 2019). The list of projects and activities that require preparation of IEE or EIA is being updated. Similarly, the compensation and resettlement decree established in 2005 (Decree 192/PM) was revised and approved in 2016 (Decree 84/PM) and is being reviewed in light of the WB's comments and the promulgation of several relevant laws during 2017-2018 as well as the 2019 Land Law. A number of decrees, regulations, and guidelines established and applied during 2000's are under revision process.

28. The 2019 EIA decree will be applied to the proposed subproject. MONRE's Decision No. 8056/MONRE provides a list of investment projects and activities which require an IEE or, as necessary, an EIA to prevent or mitigate potential impacts that may occur during all phases of an investment project. For this subproject, it has been agreed with PONRE of BKX that 2 IEEs will be prepared and 2 ECCs will be issued by PONRE. ISAN will prepare the IEEs and submit them to PONRE to obtain an ECC from PONRE (See brief information on other key regulations applicable to the subproject in Attachment 1).

3.2 World Bank's Safeguard Policies Applied to the Subproject

29. In line with the ESMF requirement, a safeguard screening was conducted for the BKX subproject. The screening result (see **Attachment 3)** confirmed the EA scope for the BKX subproject as category B (Environment) and three Bank's safeguard policies, including OP 4.01 (Environmental Assessment) and OP 4.12 (Involuntary Resettlement) and OP 7.50 (International Waterway) applies to the BKX subproject. OP 7.50 is triggered for Lao DRM-AF activities which include this subproject activities. Notification to the riparian countries

was included as part of the original project and AF project safeguards requirements. Installation of appropriate safety and warning signs (visible day and night time) at the subproject sites will be made to mitigate potential impacts on safety of the local boats.

30. There are houses and other structures located along the riverbanks. Within the three subproject villages, there are four ethnic minority households (from Hmong and Khmu ethnic groups) who have been living in the villages for a long time and are well integrated into local Lao community. Since these households are not adversely affected as a result of land acquisition and the number of the households is small, preparation of a standalone Ethnic Group Engagement Plan (EGEP) is not required. During subproject preparation, these ethnic minority households were invited to consultation. Construction of the embankment for river bank protection will require some land acquisition, physical relocations of two households whose houses will be affected, and other secondary structures, including a fish farm (fish cage farming) located near the Section 2. An Abbreviated Resettlement Action Plan (ARAP) has been prepared in line with the Project's RPF (See ARAP for details). There are no critical natural habitats and critical physical cultural resources near the subproject sites. Thus, OP 4.04 (Natural Habitats) and OP 4.11 (Physical Cultural Resources) are not applied. However, "Chance Find" procedures and measures to mitigate impacts on local temples and/or those due to borrow pits, spoil disposal, etc. will be incorporated in the ESHS requirements to be included in the bidding and contract documents (BD/CD). These measures will be designed to address the issues as required by OP 4.01 (Environmental Assessment). Actions related to OP 7.50 (International Waterways) were addressed as part of the LDRM-AF preparation process.

31. Efforts have been made during detailed design to avoid the needs for land acquisition and physical relocations of house and assets on land. However, complete avoidance of land impact is not possible due to technical requirement. There are 20 households whose houses and assets are located in the land under government management (public reserved land). Thus, an ARAP for BKX subproject is prepared as a standalone document. Among the 20 PAHs, three PAHs (two PAHs from Pakxan-Tai Village and one PAH from Houaysiat Village) will have their houses affected and need to rebuild their new houses in their land which is located adjacent to existing house locations. Two PAHs (in Pakxan-Tai Village) who have small restaurants (small huts) and operating a fish farm (8 fish cages) will also be affected because of the subproject.

32. The environmental and social risks and impacts before construction, during construction and operation stages of the subproject are discussed in more details in Chapter 5.

4 ENVIRONMENTAL AND SOCIAL BACKGROUND

33. Since the subproject area is located in the urban area of Pakxan town and is prone to heavy flooding, it is important that the environmental setting of the subproject be examined to understand the environmental and social risks and impact of the subproject in relation to environment, including people who live in the subproject's area of influence. This section

provides a brief overview of the E&S background of Pakxan town. Information on natural condition of the Mekong River and additional data on E&S conditions are provided in **Attachment 4.**

4.1 Environmental Conditions of the Subproject Area

4.1.1 Geographical Features

(a) Topographic Location

34. Pakxan is located in the central plain region of Lao PDR and is approximately 146 km to the east of Vientiane Capital. The Pakxan town is situated along the National Road 13 - South (NR13-S) and the left bank of the Mekong River. It is characterised as an alluvial basin and is relatively flat in terms of topography. Thus, it is vulnerable to floods coming from the Mekong River overflow (from the east) as well as flash floods from the Annamite Range (from the west). Pakxan is part of the Mekong Plain with recent alluvial deposits that are acidic and shallow. The younger alluvial soils of the floodplain are fertile but are often subject to wet season inundation (ICEM 2003)[4]

35. The proposed subproject, which includes construction of two embankments located along the Mekong River for the purpose of river bank protection (at Section 1 and Section 2), is situated on a relatively flat terrain area that is prone to flooding and thus riverbank erosion during flooding seasons. The detailed design team conducted a technical survey in April 2021 to prepare topographic map, cross sections and longitudinal sections, etc. for the construction of the proposed river bank protection embankments. Section 1 of the subproject which is located in Houaysiat Village (hereinafter Section 1) has an elevation from 147 to 156 metres above sea level (masl) while in Section 2 which is located in Pakxan-Tai Village, have an elevation range between 154 to 157 masl.

A separate riverbank protection project has been funded by the ADB and implemented in 2021 - 2022. The bank protection is located at two separate sections in the eastern bank of the Nam Xan River (i) from the confluence of the Nam Xan and Mekong Rivers up to the the road bridge with a length of 976.24 m and (ii) a further 579.82m upstream of the road bridge to where houses are no longer situated along the riverbank. The BKX subproject will extend the existing riverbank projection that has been supported by the ADB.

(b) Geology and Soil

36. Soil survey was conducted by LTEC in April 2021 in Ban Houaysiat for Section 2 of river bank protection site to identify geotechnical characteristics of the Subproject area and to determine the types of construction materials that will be used. The soil testing results indicated that soil layers (at depth between 0.0 ~15.0 m) are very stiff, brownish yellow, silty clays, and are of low plasticity. According to the field laboratory test results, the soil around the proposed Subproject sites is cohesive soil which is very stiff. Further information of soil survey is provided in Detailed Design Report (December 2021).

[4] Profile on Environmental and Social Considerations in Lao PDR. December 2012 Japan International Cooperation Agency.

37. Soils in wider region of Pakxan are fairly uniform, almost entirely comprised of Cambisols and Acrisols. Soils in BKX Province are typically derived from siliceous sedimentary formations and are typically mildly to moderate acidic, nutrient poor, and dispersive in nature[5]. Soils are generally well leached by rainfall.

(c) Rainfall and Climatic Characteristics

38. Climate and rainfall in Lao PDR are strongly influenced by large scale atmospheric circulations, including the El Niño-Southern Oscillation and the Interdecadal Pacific Oscillation (IPO). The climate in Pakxan is sub-tropical to tropical with extremes of wet and dry seasons associated with the passage of the East Asian and Indian Monsoons. The dry season (November and April) has prevailing winds from the North-East Monsoon, associated with cool and dry air. Driest months last from January to February. The wet season lasts from May to October characterised with prevailing winds from the South-West Monsoon from the Indian Ocean. On average 80% of the annual regional rainfall occurs during the wet season. July – August are typically the wettest months (Lacombe et al., 2014 [6]).

(d) Surface Water Resources and Quality

39. Pakxan lies within the floodplain north and northeast of the confluence of the Mekong River and Xan River. Hydrological data measured at the Pakxan gauging station from 1985 to 2019 (**Figure A4-9 in Attachment 4)** that there have been considerable variation in water level during flooding season (June to October) (147.0–153.5 masl) whereas the variation is not that much during dry season (November to May) with average water level ranging 3.0–3.5m (144.5–148.5 masl, mean=145.5 m, average water level variation of 1.0 m - 1.5 m). Big variation in water level does not only make it difficult for human activities on the Mekong River such as fishing, traffic etc. but also affects the aquatic ecosystems significantly.

40. The Xan River is only a small tributary of the Mekong River while the activities on the river are limited, especially in the dry season. The Parkpheng wetland is about 1.5-2.0 km far from the riverbank protection in the West. During dry season, average water level is 153 m (masl), water depth is 1m, surface water area is 324,900 m^2 and water volume of the wetland is 322,200 m^3. During rainy season, these numbers increase up to 155 m (masl), 3m, 2,677,500 m^2 and 7,385,400 m^3, respectively.

41. As mentioned above, the Pakxan riverbank protection is located in a high area with the average elevation of 142m–158 m (masl). Climate risk mitigation options were considered during the detailed engineering design such as the detailed analysis of historical and expected future flood levels taking into account potential impacts of climate change, increased rainfall, and land use changes. Embankment top and stepped section will be constructed to the elevation of +156.5 m (masl) and +148.5m (masl), respectively, to prevent flooding to the riverbank protection areas during flooding season.

[5] Eswaran, H., Vearasilp, T., Reich, P. and Beinroth, F., 2005, November. Sandy soils of Asia: a new frontier for agricultural development. In Management of Tropical Sandy Soils for Sustainable Development. Proceedings of the International Conference on the Management of Tropical Sandy Soils, Khon Kaen (pp. 22-30).
[6] Assessing hydrologic changes across the Lower Mekong Basin

42. Under this subproject, surface water samples were taken from the Mekong River (at two proposed construction sites) to test as a quality baseline. The testing in the Mekong River near Pakxan was conducted by Faculty of Engineering of the National University of Laos (NUOL) in two sites on 10 May 2021 (beginning of wet season) for the BKX subproject (see **Figure A4-15 in Attachment 4).** The results showed that surface water quality in the Mekong River was still good. Test results show that common test criteria for surface water are within the national standards. However, the concentrations of COD, lead, mercury and arsenic exceeded the national standards for both samples taken from both locations (refer to **Table A4-9 in Attachment 4**). The elevated values of these water quality parameters may be associated with the urban and industrial wastewater discharge without appropriate treatment. It is understood that there are several industries and factories are operating upstream of Nam Xan and Mekong Rivers, including tapioca and rubber processing facilities.

(f) Groundwater Quality

43. Groundwater data are collected form the recent groundwater quality monitoring undertaken in December 2017 to prepare the IEE for the Fourth Greater Mekong Subregion Corridor Towns Development Project financed by the ADB (2021). Ground water collected from a well in the Nasommor village (geographical coordinates of 18°22′36.2"N 103°43′01.7"E) located approximately 5 Km from the Section 1 of the proposed embankment site. The study indicated that the results of the analysed parameters include Pb, As, Cd, total coliform and E coli (Faecal coliform) exceeded the national standards for drinking water as well as WHO Guidelines for Drinking Water Quality (see **Table A4-10 in Attachment 4**).

(g) Air Quality

44. On ground traffic is considered the main reason for air pollution although traffic volume in Pakxan is low compared to other major urban centers such as Vientiane. Suspension of dust is also caused by traffic and wind at roads that are not paved with asphalt. Air quality at the proposed riverside embankment site and the vicinity is largely affected by emissions from traffic along the NR13S.

45. Under BKX subproject, air quality in the Pakxan was measured during the baseline environmental quality survey by the Faculty of Engineering of the National University of Laos (NUOL). Air quality was measured on 10 May 2021 at two locations near the proposed Section 1 (at the Provincial Hospital) and Section 2 (At residential house) of the subproject (**Figure A4-15 in Attachment 4).** The result suggested that ambient air quality in Pakxan, in general, is clean. All test parameters (See **Table A4-10 in Attachment 4**) are lower than the National Environmental Standard of Lao PDR (No. 81/NA - General Air Quality Standard, dated on 21 February 2007).

(h) Environmental Noise

46. Ambient noise in the main urban area is brought about by vehicles, construction activities, small-scale industry involving metal forming and equipment maintenance and repairs. Noise level in the Pakxan was measured during the baseline environmental quality

survey by Faculty of Engineering of the National University of Laos (NUOL) at two sites of the proposed subproject on 10 May 2021 (**Figure A4-15 in Attachment 4**). The result suggested that noise level in Pakxan, in general, are within the National Environmental Standard of Lao PDR (No. 81/NA - General Air Quality Standard) dated on 21 February 2007 (**Table A4-12 in Attachment 4**).

(i) Waste Disposal for Hazardous and Non-hazardous Materials

47. Pakxan is currently undergoing a significant improvement of municipal waste management thanks to an ADB funded project, namely "Lao PDR: Fourth Greater Mekong Subregion Corridor Towns Development Project". The support includes (i) construction of sewage networks and fifteen decentralised wastewater treatment systems to improve sanitation, (ii) construction of two controlled landfills and solid waste collection vehicles for municipal waste to improve waste collection and management, and (iii) improvement of drainage and riverbank protection [7] (ADB, 2021).

48. Of the 22 villages of the subproject district, only 15 villages have access to solid waste collection service (covering 15% - 65% of total waste generated of the 22 villages). Of the 3,420 households living in the current collection route, only 44% of them have a contract with the Urban Development Administration Authority (UDAA). Collection of domestic waste is maintained once a week while collection of commercial/market wastes is carried based on the demand. The UDAA plans to expand the service area to cover all villages in the near future. Currently, only areas those are accessible by truck of UDAA benefits from UDAA service (using 2 trucks and one skip loader). The collection fee for domestic waster is LAK25,000/month per household (about 4 bags) and LAK50,000/month - LAK250,000/ month for a hotel.

4.1.2 Biological Component

(j) Forest and Land Use

49. Bolikhamxay province has a total of 1.167 million hectares of forest. This accounts for 70.4% of the provincial area. The total forest area includes protection forests (617,084 ha); production forests (181,182 ha); and protected area (368,887 ha). Forest offers high biodiversity, characterised by various types of vegetation, and wildlife of national and international conservation significance. See **Table A4-13 in Attachment 4** for specific details for each protected area by national, provincial, and district levels.

50. The Pakxan District is located between two National Protected Areas (NPA) of Nam Kading to the east and Phu Khao Khouay to the west. Phu Khao Khouay is not only a NPA but also an Important Bird Area (IBA). The Pakxan city is approximately 8 km away from the border of Phu Khao Khouay. The Integrated Assessment Biodiversity Tool (IBAT) was used to identify any critical habitats and protected areas in the subproject area. IBAT indicates that the nearest key biodiversity area to Pakxan bank-protection sites is the Parkpheng wetland, approximately 1.2 – 1.5 km from the Nam Xan River. This site has two species (White-bowed Reed-warbler and Yellow-breasted Bunting) which means, according

[7] https://www.adb.org/sites/default/files/project-documents/50099/50099-003-iee-en_9.pdf

to IBAT, it triggers Key Biodiversity Area criteria but is not classified an Important Bird Area. The Parkpheng wetland is functioning as area that receives urban drainage and floodwaters during rainy season. The Subproject site including construction material sources and camp sites is located about 8Km-15Km away from the NPA. **See Figure A4-18 in Attachment 4 for Forestry Map and Figure A2-9 in Attachment 2 for Location of Construction Material Sources.**

(k) Terrestrial Fauna and Flora

51. According to the IEE prepared for the Pakxan Riverbank Protection for Xan River Project (2021) located less than 1km which was funded by the Asian Development Bank (ADB), the terrestrial flora in the riverbank protection areas consist of mainly grasses, crops, perennial fruit trees and wide canopy trees such as *imperata cylindrical, Echinochloa colona*, *Microsorum pteropus*, *Zea mays*, *Ipomoea batatas L.*, *Mangitera*, *Chrysophullum caimito*, *Dimocarpus longan*, *Manilkara zapota*, *Anacadiaceae*, *Terminalia catappa*, *Delonix regia*, *Dracontometon duperreanum*, *Choerospondias axillaris*, *Dracontomelon dao*, *Chukrasia tabularis*, *Ficus bengalensis*, *Ficus racemose*, *Cleistocalyx Operculatus etc.*.

52. Terrestrial fauna includes domestic animals such as buffalo, cow, pig, chicken, duck, geese. Reptiles include Snake (*Colubridae*), Cobra (*Ophiophagus Hannah*), Viper (*Viperidae*), birds include Sparrow (*Passer domesticus*), Worm Bird (*Zosterops japonicus*), Gray-crested Finch (*Lophospingus griseocristatus*), Stork (*Egretta garzetta*) etc.

(l) Aquatic Fauna and Flora

53. The Mekong and its tributaries in Lao PDR are home to a wide variety of species. There are 590 species of freshwater fish in Laos [8], of which more than 481 fish species have been identified (Kottelat, 2001). There are more than 20 common fish species that can be found from the Mekong River, the Xan River and the Parkpheng Wetland such as Mud carp *Cirrhinus molitorella* (pa keng), Black sharkminnow *Labeo chrysophekadion* (pa phia ii kam), and Elephant ear gourami *Osphronemus exodon* (pa men)[9]. These species are not on the IUCN Red List or the National Protected List of Lao PDR. The Mekong River, Xan River and the Parkpheng Wetland offer local people great opportunities to fish, not only during dry season but also during rainy season, particularly in areas that flooded, including areas of the Mekong River plains and paddy lands are also part of the capture fishing activities.

[8] https://tropicalfreshwaterfish.com/data/Laos.htm
An Introduction to the Fisheries of Lao PDR, MRC, Mekong Development Series No. 6, May 2013.

[9] Including also *Puntioplites falcifer* (pa sa kang), Hampala barb *Hampala macrolepidota* (pa sood), Broad-head walking catfish *Clarias* macrocephalus (pa duk oui), Small-scaled mud carp *Cirrhinus microlepis* (pa phon), Jullienien's golden carp *Probarbus jullieni* (pa ern ta deng), Mystus catfish *Hemibagrus spilopterus* (pa kot leuang), Asian red-tail catfish *Hemibagrus wyckioides* (pa kheung), Walking catfish *Clarias batrachus* (pa duk), Krempf's catfish *Pangasius krempfi* (pa suay hang leuang), Bocourt's catfish *Pangasius bocourti* (Pa phoc), Giant gourami *Osphronemus gouramy* (pa men), River carp *Hypsibarbus wetmorei* (pa pak), Striped snakehead *Channa striata* (pa khoh), Nilem carp *Osteochilus melanopleurus* (pa nok kow), Giant snakehead *Channa micropeltes* (pa doh), Climbing perch *Anabas testudineus*, Malayan Leaffish *Pristolepis fasciata*, False black lance catfish *Bagrichthys macracanthus*, Spotfin spiny eel *Macrognathus siamensis*, Bony-lipped barb *Osteochilus vittatus*, Marble goby *Oxyeleotris marmorata*, Iridescent glassy perchlet *Parambassis apogonoides*, and *Laides longibarbis*.

54. In Pakxan, aquatic species include varieties of mussels, snails, turtles, frogs, shrimps and crabs, and other shellfish. However, the populations of these species are still little Other aquatic animals and plants are still poorly known in terms of systematic stock assessment. In terms of aquatic flora, commonly found species includes Adenosma indianum, Alisma plantago-aquatica, Blyxa echinosperma, and Caesulia axillaris (to name a few[10], Curanga amara, Cyanotis axillaris, Dentella repens, Eclipta angustata, Eichhornia crassipes; species of Limnophila, Lindernia and Marsilea, Microcarpaea minima, Mimulus orbicularis, Monochoria species, Oldenlandia diffusa, Ottelia alismoides, Sagittaria pygmaea, Salvinia auriculata, Spirodela polyrhiza, Typhonium flagelliforme and Zeuxine strateumatica). These are mainly emergent or marginal species that are , particularly well adapted to temporary water bodies environment such as rice fields. Weeds (that are more ephemeral herbs), include some species, which are typically found in rice fields and can be seen found when these fields places are wet. These include *Dopatrium acutifolium, Utricularia bifida var. bifid*a, and *U. minutissima, Eriocaulon quinquangulare,* and *Burmannia coelestis. Grangea maderaspatana, and Sphaeranthus indicus* and Ammannia baccifera are species which offer flower and fruit when the fields are dry. Species found in sandy, often seasonally inundated areas, include *Spilanthes paniculata, Glinus lotoides, Polycarpon prostratum, Polygonum plebeium, Cyperus pygmaeus; Digitaria bicornis, Eragrostis amabilis* and *Eleusine indica.* In recent years, species have been decreasing in abundance due to deforestation, pollution and from other development stressors. These species are not on the IUCN Red List or the National Protected List of Lao PDR.

55. Also, there are no critical or sensitive aquatic species and habitats reported within the subproject area of influence.

4.1.3 Sensitive Environmental Receptors/ Hotspots

56. The subproject site is located in the urban or city of Pakxan District which is about 8 km away from the border of Phu Khao Khouay NPA. The subproject area is used mainly for residential purpose. There is no sensitive forest in the subproject area. Plants found in the subproject area are common ones, such as seasonal crops, fruit trees, industrial trees and bamboo which are commonly found in residential and agricultural areas in Pakxan district. Pakxan lies within the floodplain north and northeast of the confluence of the Mekong River and Xan River. There are more than 20 common fish species that can be found from the Mekong River, the Xan River and the Parkpheng Wetland. These, altogether, offer local people with access to aquatic resources, not only during dry season but also during rainy season. These fish species are not on the IUCN Red List or the National Protected List of Lao PDR.

57. However, there is one fish farm located in the subproject area (Section 2), and one highschool (about 120m away), the provincial hospital (150 m away), and one temple (250m away) located nearby the Section 2 in Pakxan-Tai village. This requires special attention on

[10] *), Curanga amara, Cyanotis axillaris, Dentella repens, Eclipta angustata, Eichhornia crassipes; species of Limnophila, Lindernia and Marsilea, Microcarpaea minima, Mimulus orbicularis, Monochoria species, Oldenlandia diffusa, Ottelia alismoides, Sagittaria pygmaea, Salvinia auriculata, Spirodela polyrhiza, Typhonium flagelliforme and Zeuxine strateumatica*

the mitigation measures and close monitoring during transportation of construction and spoil materials, and during construction. Locations of these communities as well as those of the fish farm, high school, provincial hospital, and temples are provided in Attachment 4. Mitigation measures are discussed in Chapter 5. Compensation will be provided for the affected fish farm.

4.2 Socioeconomic Profile

4.2.1 Demographic Information

58. Bolikhamxay Province consists of seven districts, including Pakxan, Thaphabath, Pakkading, Bolikhan, Viengthong, Khamkeuth and Xay Champhone. The population of the province is 273,691 people (See population by district in **Table A4-14 and Figure A4-19 in Attachment 4**). The subproject district (Pakxan District) has a population of 45,042 people (2015). About 57% of the population live in the urban area.

59. The subproject will cover some parts of three villages, including Houaysiat, Anousonxay and Pakxan-Tai (See **Table A4-15 in Attachment 4**). These three villages are home to a total of 956 households (4,878 people).

4.2.2 Ethnic Groups in the Subproject Area

60. Lao PDR has 50 ethnic groups which are divided into four main language family groups, including Lao-Tai (62.4%), Mon-Khmer (23.7%), Hmong-Iu Mien (9.7%), and Chine-Tibetan (2.9%). The 50 ethnic groups in the country can be classified into more than 200 ethnic subgroups[11]. Mon-Khmer and Hmong-Iw Mien family groups are generally considered 'ethnic minority' groups.

61. Typically, the Lao-Tai (the largest ethnic group) resides in urban area and in lowland areas. The Mon-Khmer traditionally lives in midland rural areas whilst the Hmong- Iw Mien in the Northern uplands and highland mountains. Further information on key characteristics of these ethnic groups is presented in **Table A4-17 in Attachment 4.** Lao Language, the official national language, is the main language used by Lao Tai.

62. There are three main language family groups in Bolikhamsay province. These include Lao Tai, Mon-Khmer, and Hmong-Mien. The Lao Tai group live in the lowland area of the province and practices Buddhism. The Khmu – a major ethnic minority group often referred to as Lao Theung, is part of the Mon-Khmer language family group. The Khmu traditionally live in the middle–hill areas. They practices swidden agriculture and adopt animism as their religion. The livelihood activities of the Khmu depend mainly on forest products. Their living activities are relatively isolated from the mainstream population in the lowland albeit subjecting to certain degree of assimilation and integration with the mainstream population over the past centuries.

[11] Ethnic minorities and indigenous people | Open Development Laos (opendevelopmentmekong.net)

63. Pakxan district is the capital town of Bolikhamsay province. The district has 55 villages with a population of 8,816 people[12] who are from various ethnic minority groups, including Lao Tai, Khmu and Hmong. The major ethnic minority groups in Pakxan include Khmu and Hmong. Within the three villages broadly defined as subproject area including Houaysiat, Anousonxay, and Pakxan-Tai, 99.5% of total population (4,855 people) are Lao Tai. Only 0.5% (23 people) are from ethnic minority. Out of these 23 ethnic minority peoples (4 households), 17 people are Hmong and 6 are Khmu. Most of the largest ethnic group (Lao Tai, 99.5%) practice Buddhism whereas 100% of two ethnic minority groups (Hmong and Khmu) follow animism. Both Hmong and Khmu ethnic minority households have been living in the subproject area for a long time and are well integrated into the mainstream Lao Tai population. These people can speak both Lao and their own ethnic languages. They speak their own languages in their family and with people of the same ethnic groups. They speak Lao to other ethnic groups[13].

64. As these ethnic minority households and individuals are well integrated into the mainstream society, they are small in population and are not adversely affected by the subproject, preparation of an EGEP is not required. However, these ethnic minority households have been engaged in the process of subproject's consultation to ensure that their voice and concern are heard and reflected into the ESMP, as well the subproject design and implementation.

4.2.3 Cultural and Historical Infrastructure

65. Each village in the subproject district has a temple for conducting traditional and cultural practices. There is one temple with few local stupas located close to the subproject site. During the consultation with local communities, the subproject was recommended to conduct traditional ceremony asking for permission from land and water spirits before starting construction activities. Also, working on big Buddha day is not allowed. The subproject is not anticipated to cause any adverse impacts on any local and national archaeological, paleontological or cultural sites within the subproject's area of influence. However, a "Chance Finds Procedure" has been prepared and incorporated in the ECOP to ensure procedures are in place and are to be followed in case any artifacts, sacred sites, cemeteries, etc. are discovered in subproject's area of influence during construction stage. See **Attachment 4, Figure A4-20 for Map of Sensitive Hotspots.**

4.2.4 Livelihoods

66. The main livelihood activities of people in Pakxan District are agricultural production. This include horticulture and animal husbandry. In addition, handicrafts and harvesting of natural resources are also activities that bring additional income to local people. For horticulture, cash crops grown include rice, maize, cassava and sugar cane. Industrial trees include rubber, eucalyptus, teak and agarwood trees.

[12] ປະຫວັດ ແລະ ຄວາມເປັນມາຂອງແຂວງ – BOLIKHAMXAY PROVINCE
[13] Source: Chazee, 1999 and NSC, 2015

67. The main livelihood activities of people in the Subproject area include lowland rice cultivation, animal husbandry, river fishing, cage fish farming, collection of non-timber forest products (NTFPs), timber forest products (TFPs) and a variety of non-agricultural activities.

68. Livelihood activities of people in subproject area vary from village to village. While local people are generally dependent on land-based agriculture, some are not, particularly those live in fast-growing areas located along the National Road 13 – South who have opportunity to diversify their income sources by undertaking non-agricultural activities such as trading or working as wage workers.

69. According to the census survey conducted for the subproject, there is a marked difference in terms of job distribution by gender, particularly among farmers, businesses, state officials, employees of state-owned enterprises. More than 50 % of female are engaged in different occupation. However, females described themselves as household traders and state enterprise officials. Males are more significantly engaged as farmers, hired workers, and government officials than females.

4.2.5 Infrastructures and Facilities

70. The village survey indicated that all three affected villages have relatively good infrastructure and public utilities. Within the three villages, there are a total of nine major companies, one main market, 135 small shops, 15 guesthouses. In addition, there are more than 691vehicles including sedans, pickups, and trucks. Every household has at least one motorbike. Village people have access to a wide range of public facilities and services such as electricity, clean water supply, rural road, market, schools and healthcare services, etc.

71. *Project Affected Households:* Households who are affected by land acquisition have access to piped water supply, household sanitation (e.g. latrines). They have access to clean water for personal hygiene and sanitation. All of the affected households currently buy drinking water from local service providers who deliver bottled water to their house once a week. They can easily buy food and household supplies from various small shops nearby. The census survey shows that each PAH has at least 1 car and/or 2 motorbikes (See ARAP for more details).

4.2.6 Education and Health Facilities

72. In the three villages broadly covered by the subproject, there are nine primary schools with a total of 50 classrooms that are attended by 28 teachers. There are four secondary school and high schools with a total of 32 classrooms and 56 teachers. Students typically go to school by bicycle or motorbike. Schools are about 500m to 4km away. People in the three villages can read and write. The highest enrolment rate is primary school, followed by secondary school, high school, and university. Most of the people affected by land acquisition completed secondary school.

73. In term of health, according to the census survey, there is no malnutrition in the last two years. When people are sick, they visit health centre nearby. There is also a provincial

hospital located in Pakxan-Tai village to serve local people who live about 200m to 4km away. Local people may buy medicine from local clinic or drugstore for their own diseases. The current situation of COVID-19 pandemic has impacted the socioeconomic status of the villages as a whole. The provincial health authorities as well as the provincial authorities from other sectors have implemented mitigation measures based on relevant Prime Minister's Instructions and Orders. Between May and June 2021, two COVID-19 cases were found in Pakxan but no death was reported in the province. As of 27 June 2021, 33,623 people in the province have received the first dose of COVID-19 vaccine and 29,250 have gotton the second dose.

74. Since there are one high school, one provincial hospital and one temple that are located near (120m to 250m) the subproject site (Section 2). During the consultation with local communities, the subproject was recommended not to transport construction materials during time when students go to schools and vice versa. Special attention should be paid to mitigating the generation of noise and dust. Local schools and health officials should be updated regularly on construction schedule and specific construction activities to avoid/minimize potential impacts on school and healthcare activities near construction sites.

4.3 UXO Risk

75. An unexploded ordinance (UXO) is military ammunition or explosive device which has failed to function. Lao PDR is the country in the world that was most bombed (per capita). Despite past clearing efforts, UXO is still present in most part of the country. More than 10,000 villages in Laos PDR are contaminated with UXO. The Lao National Regulatory Authority (NRA) estimates that there are 80 million UXO scattered throughout the country. Most of them are cluster munitions. Most of UXO data was supplied by the US government. However, these data are not comprehensive, and bombing undertaken by the Thai and Lao governments has not been fully documented or mapped.

76. At national level, Lao PDR is know for its high risk of UXO. A National Survey of UXO Victims and Accidents was conducted in 2014 by the National Regulatory Authority (NRA). The survey covers 7 districts of Bolikhamxay province, including Pakxan, Thaphabath, Pakkkading, Bolikhanh, Khamkeuth, Viengthong and Xay Champhone. The survey covered 305 villages (out of total 327 villages). The report found a total of 1,394 UXO victims reported from the 305 villages during 2008-2013. Pakxan district has the lowest number of UXO victims (160 people from 59 surveyed villages).[14] Although the subproject area is located in the low UXO risk area, effort will be made to complete the technical survey before construction and this effort will be part of the construction contract.

[14]https://data.opendevelopmentmekong.net/dataset/125d72a8-086f-48ff-980f-a396d590a839/resource/461fe954-ffaa-474a-94f1-ee6d898a92b2/download/nra-phase-1-va-report-final.pdf

4.4 Floodings

77. According the national survey conducted by the United Nation Office for Disaster Risk Reduction (UNDRR) from 1990 to 2012[15], flooding is among the leading causes of death – just after epidemics. Flood and storm affected people the most – particularly people's livelihoods, income generation activities, and their properties.

78. In 2008 and 2009, Kammuri and Ketsana typhoons caused severe damages in central and south regions of Lao PDR. The 2008 flood alone (in central Lao PDR) resulted in damage estimated at 55 million US$. This damage was five times bigger than the average damage caused by floods during 1966 to 2007. In BKX, the flood in 2008 was the most severe flood that resulted in damage and human injury estimated at LAK 34.6 billion. In 2013, heavy rain in the Nam Xan River basin in two days also causes flooding in BKX which damaged the riverbank along the Mekong River and affected about 5,000 people from nine villages.

79. According to the Annual Reports (MRC, 2020), there have been numerous flash floods happening in the mountainous regions of Lao PDR. In BKX alone, about 41,396 people were affected (see details in Attachment 4).

80. In the past, erosion to the riverbanks along the Mekong River was an entirely natural process since the river has a high hydraulic gradient in this reach. Such conditions combined with erodible bank material cause the river to meander. Surveys undertaken by the MRC found that river erosion become more active towards the end of the flooding season (October and November) when soil moisture increased due to rains. However, with a number of large dams being in operation upstream, the pattern of riverbank erosion along the Mekong River has been changed significantly. This potentially affects the stability and effectiveness of the subproject's structure.

5 ENVIRONMENTAL AND SOCIAL RISKS, IMPACTS AND PROPOSED MITIGATION MEASURES

5.1 Overall Positive Impacts

81. It is expected that the proposed subproject investments in Pakxan will have overall positive impacts both from environment and social aspects. As mentioned, BKX province experienced the highest floods in 2008 and 2013 that caused severe damages to infrastructure and casualties. The construction of the proposed embankment and riverbank protection at two proposed Sections of the Mekong River will prevent land located along the subproject sites from being affected by annual flooding. Meanwhile, the structures serve as a place where the general public can come for sightseeing along the Mekong River all the year

[15] www.desinventar.net

round. With other investments undertaken by the GOL in BKX[16], the subproject investment contributes to the GOL's ongoing efforts in reducing potential negative impacts of flooding to local land and livelihoods while preventing riverbank erosion. Rehabilitation/extension of existing irrigation system will also increase irrigation benefits for local farmers.

82. It is expected that the direct beneficiaries of BKX subproject include communities in the urban area of Pakxan (45,042 people). Since Pakxan is the most important traffic junction between Northern and Southern province, and the province is not very far from Vientiane Capital, indirect beneficiaries of this subproject include also people who pass through or visit Pakxan.

5.2 Risks, Impacts, and Mitigation Measures

83. *Safeguards Screening and Risks:* Despite overall positive impacts (as mentioned above), implementation of the subproject will cause negative impacts on local environment and some specific groups of local people during preconstruction, construction, and operation stage of the proposed structures, especially those related to construction of the embankments and riverbank protection in Sections 1 and 2. However, given the nature and locations of the proposed works, the potential E&S risks and impacts during construction will be localized, temporary, and can be mitigated through effective ESMP implementation. The overall E&S risks are also considered "moderate". Attention will be given to addressing effectively potential E&S risks and impacts at locations of public concerns, such as the provincial hospital, the school and the temple located in Panxan-Tai village (near Site 2) as well as the safety and other disturbance along the transportation routes (road and waterways) to and from the borrow-pits, spoil disposal sites, quarry sites, and the construction areas (see locations in **Figure A2-9 in Attachment 2**).

84. To mitigate these environmental and social risks and impacts, during design, pre-construction, construction, and operations stages, efforts have been made to apply the following basic principles:

1. Strive to prevent or mitigate potentially adverse environmental or social impacts that may result from subproject implementation;
2. To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities, and the environment;
3. Maximize beneficial impacts and minimize unavoidable negative impacts to an acceptable level for the receiving environment and communities; and
4. Meet environmental and social commitments and measures as well as comply with national legislation as well as the WB Safeguard Policies triggered for the BKX subproject.

85. In summary, key mitigation measures include (a) Avoid/minimize potential social impacts, such as physical resettlement of local people as well as provide compensation cost

[16] ADB is providing support on infrastructure while WB (BETF/RETF) is conducting a preliminary flood risk assessment including collection of baseline data and preparation of a digital elevation models (DEM) for Paksan and Vientiane Capital. Results of these undertakings are expected by mid 2022.

in accordance with the ARAP approved by the WB; (b) Identify and include all specific mitigation measures considered to be responsible by contractors and subcontractors into the bidding/contract documents and ensuring that appropriate C-ESMP is prepared and implemented by the contractor; (c) Ensure that the Construction Supervision Consultant (CSC) review and approve the C-ESMP in line with the ESMP approved by WB; and (d) periodic monitoring by LA/LC to ensure compliance of the ECC as well as ES safeguard obligations and reporting.

86. Key risks and mitigation measures during preconstruction, construction, and operations are discussed below in Sections 5.3 to 5.6 while more details are provided in **Attachments 5, 6, 7 and 8**.

87. Table 5.1 (below) provides a summary assessment of E&S risks and potential impact of the proposed subproject during preconstruction, construction, and operations phases. Component 1.1 means the activities related to the construction of embankment and riverbank protection at Sections 1 and 2 while Component 1.2 means the activities related to rehabilitation of the small irrigation area.

Table 5-1 Environmental and social risks and impacts of the BKX Subproject (assessment)

No.	Subproject Activities	Environmental & Social Risks & Impacts	Estimated Ratings
	Component 1.1: Preconstruction/ Relocation and Compensation		**Moderate**
1	River bank improvement and river bank protection works	**Impacts.** Land acquisition from private land is not required but relocation of small-scale private assets located in public land, including a small fish farm, are required. Effort has been made during detailed design stage to minimize such potential impacts and compensation acceptable to WB will be provided to those effected PAHs.	Moderate
		Impacts. Physical resettlement (two houses and two shops/restaurants (see Section 5.4)	Low
		Risks. UXO risks (see Section 5.4)	Low
	Component 1.1: Construction phase		**Moderate**
1	River bank improvement (Excavation, construction of embankment and riverbank protection structures	**Impacts.** Construction of embankment and riverbank protection structure (width 7 m at the top and 20m at the embankment's retaining wall) and work zones may limit activities of other water users (boat, fishermen, etc.) in the area. However, there is light waterway transport or local fishermen boats.	Moderate
		Risks. Transportation of construction materials and workers behaviors (about 45 max) can create social conflicts, increase disturbance and safety risks to local residents, and damage public road conditions.	Moderate
		Impacts. Noise, vibration, dust, and other air pollution, and road safety, especially at the provincial hospital, school, and temple that are located near the subproject site 2 and those located nearby other construction sites	Moderate

No.	Subproject Activities	Environmental & Social Risks & Impacts	Estimated Ratings
		and transportation routes.	
		Impact. Water pollution and disposal of construction wastes and garbage (in the Mekong River)	Low
		Impacts. Soil erosion and sediment transport to the Mekong River)	Moderate
		Impacts. Alteration of hydrological regime (in the Mekong River)	Moderate
		Impacts. Impacts on terrestrial flora and fauna habitat (in the Project area)	Low
		Impacts. Impacts on aquatic resources (in the Mekong River)	Low
		Impacts. Increase safety risks during transportation of construction materials and disposal of unused spoil	Moderate
		Risks. Safety of boat users along the shallow areas in the Mekong River (such as fishing boats during night time)	Moderate
		Risk. Spread of diseases such as COVID-19 (due to contractor staff and workers).	Moderate
		Impact. Waste management (at subproject sites). The camp site is located about 108m away from the Mekong River.	Moderate
		Impacts. Disposal of spoil and/or surplus soils (at selected disposal area)	Moderate
2	Specific social issues	**Risk.** Livelihood disruption	Low
		Risk. Community disruption (during transportation of construction materials and construction)	Moderate
		Risk. Cultural heritage site disturbance. There is one temple with few local stupas located close to the subproject boundary.	Moderate
		Risk. Loss of access to aquatic resources from the river (for food, economic activities or medicine)	Low
		Risk. STD such as HIV/AIDS infection due to labor influx	Low
		Risk. Increased work burdens on women and children	Low
3	Gender related	**Risks.** Low access to natural resources including land and NTFPs for women	Low
		Risks. Exclusion of female from decision-making process during subproject planning and implementation	Low
		Risks. Limited employment opportunity for local women (compared to men)	Moderate
		Risks. Sexual Harassment (SH), Sexual Exploitation and Abuse (SEA) and Violence Against Children (VAC).	Low to Moderate[17]

[17] Depending on a) labor to be engaged by contractors: local vs external, and the portion of local labor/community workers; b) location/proximity of workers 'camps to local communities and sensitive

No.	Subproject Activities	Environmental & Social Risks & Impacts	Estimated Ratings
4	Community Health and Safety	Dumping of solid wastes and wastewater into the river and safety of local boat users	Moderate
	Component 1.1: During operation phase		
1	Improvement of the embankment and riverbank protection	**Risk.** Embankment and riverbank protection structure will help protect subproject sites from erosion and improve public safety. However, incremental risks on river bank erosion/deposition in the areas upstream and downstream to subproject site 1 and 2 could be possible and should be observed to monitor the risks and impacts. There are also safety risk for the local boat users, especially during night-time.	Moderate[18]
		Risks. Dumping of solid wastes and wastewater into the Mekong River[19]	
	Component 1.2 During rehabilitation phase		Low
1	Rehabilitation of water supply pumping and pipeline	**Impacts.** Increase noise and dust	Low
		Risks. Safety of local boats	
	Component 1.2 During operation phase		Low
1	Rehabilitation of water supply pumping and pipeline	Risks. Possible unsafe use of pesticides, insecticides, and other chemicals (fertilizers) including the risk during storage and disposal of the containers/packages.	Low

5.3 Mitigation Measures Considered during Detailed Design

88. During detailed design, effort had been made to avoid and minimize the needs for land acquisition, relocations of private assets, physical resettlement while ensuring safety for community members who may come to the Mekong River for water collection, leisure activities, waterway transportation, etc. The following key activities were carried out:

- Conduct public consultation on technical design, ES risks and potential impacts, proposed mitigation measures, grievance redress procedures, compensation payment and support for livelihoods restoration;
- Complete the design of appropriate warning signs to be installed before construction and after construction to ensure public safety during construction, and ensure waterway safety

receptors, and c) accessibility and availability of local monitoring system and law enforcement agencies (police, village security). To be updated as part of C-ESMP.

[18] Need effective management of the river bank infrastructure, especially on garbage and other waste from small shops and restaurants along the improved river bank sections as well as monitoring of the river bank erosion upstream and downstream of the Project site. Development of a plan to will need a practical engage local community on waste management and on river bank erosion monitoring will be prepared and approved before the construction is completed. *Efforts should be made to engage local authorities and communities (LA/LC) to prevent solid wastes and wastewater into the river.*

during operation phase;

- Design staircases at appropriate locations along the embankments to allow resident and tourists to access the River safely;
- Ensure appropriate construction materials are selected for structure building to achieve both cost-effectiveness of the subproject and structural stability, and public safety, particularly during operation phase;

5.4 Mitigation Measures for Pre-Construction

5.4.1 Land Acquisition and Resettlement.

89. The subproject will affect 20 subproject affected households (PAHs) with 120 subproject affected people (PAPs). Among the 20 PAHs, three PAHs will be affected with their one-story housing structures (two households from Pakxan-Tai Village and one from Houaysiat Village) and two PAHs from Pakxan-Tai Village with small hut shops.

90. The Inventory of Loss (IOL) had been conducted from 7-9 July 2021 based on the current design and alignment of the Subproject within the offset ranging from 13m to 15m from riverbank alignment. The subproject will not affect private land but will affect assets established on public land (government reserved land) by 20 households from three villages of Houaysiat, Anousonxay and Pakxan-Tai villages. Affected assets include three one-story houses (total area of 50.46m2), two restaurants/shops with 54m2 and 569.38m2 of secondary structures, 13 fish farming cages, and 225 trees (fruits, industrial trees and bamboo) (See ARAP for details).

91. Consultations with affected households indicated that the affected household will relocate their houses and business to their existing land in the same district. Compensation cost for affected assets such as houses, secondary structures, businesses, and trees was calculated based on the compensation rate approved by the Governor of BKX province (No. 147/BKX, dated 15 March 2022). This includes also income restoration support for loss of business and for physical relocation. The unit rate for the affected assets had been discussed and agreed with the PAHs during the consultation meetings. The total cost for compensation for affected houses, shops, trees, allowance for relocations, and income restoration is estimated at **LAK506,619,682** (**USD30,230**) (See ARAP for details).

92. To mitigate the risks and impacts related to relocation of private and public assets, PIU will be working closely with the resettlement committee to implement ARAP as approved by WB. It is noted that during detailed design, efforts have been made to (a) avoid and minimize the need for land acquisition and relocation of assets, (b) inform local authorities and representative from local communities during the preparation of this ESMP, and (c) incorporate the final ECOP and COC in the bidding and contract documents. During bidding, PIU will ensure that the bidders are aware of this E&S commitment and understand that the mitigation measures and costs is part of the contract cost. Details are below.

93. Compensation and support for affected households are based on the following principles:

- All households affected with their assets in or within the subproject area before the cut-off will be compensated. Those who physically resettle and/or lose their income and/or livelihood will be supported financially to restore their livelihood based on eligibility criteria identified in the associated ARAP, particularly the poor and vulnerable AHs/PAPs. If affected households' livelihood are not restored to the pre-project level, additional measures will be taken to assist them in fully restore their livelihoods to the pre-project level;
- Methods used for valuation of loss of assets are based on full replacement cost principle. For affected houses and other structures, cost valuation is based on the market prices of construction materials and labor costs to build a replacement house of equal or better quality. Compensation for affected houses and structures will be made without deduction for depreciation and or deduction for any salvaged materials for any other fixed assets;
- Execute resettlement activities as a sustainable development program, providing sufficient resources to enable displaced persons to benefit directly from the subproject. Affected individuals may be offered job opportunities by contractors that are suitable to them. Unavoidable adverse social and economic impacts from land acquisition will be addressed by (a) providing timely compensation for loss of assets at replacement costs and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of subproject implementation, whichever is higher.
- Ensure all PAPs' grievances on any aspects of land acquisition, compensation and resettlement are addressed in a timely and satisfactory manner. All PAPs can send any questions to PIU related to their entitlements. PAPs are not required to pay any fee associated with grievance redress resolution.

5.4.2 UXO Risk and Site Clearance

94. The risk of unexploded ordnance (UXO) is generally high for Lao PDR. However, for Pakxan, compared to other districts within BKX province, this risk is considered low. Consultation with local communities and local authorities suggested that UXO risk in BKX may be low except for some specific area upstream of the watershed. However, to address the risk, a budget of $20,000 will be included as construction contractor's cost for contractor to conduct an UXO screening survey to obtain an UXO clearance certificate to be issued by the National Regulatory Agency (NRA).

5.4.3 Other Safety Risks

95. There are also other risks related to safety of road and/or waterways users as well as on increase in local traffic and disturbance (noise, vibration, dust, etc.) to local residents along the transportation routes and the local people visiting/using the provincial hospital, school children, and temple located nearby the construction sites, including those related to transportation of construction materials and worker behaviors. To mitigate these risks of community health and safety and disturbance, PIU will be required to hire a health and

safety consultant to monitor the work and contractor's compliance with the ESHS requirements and secure approval of local authorities as well as inform local communities on the construction plan/schedule and measures to mitigate the impacts. The contractor will be required to install a number of proper safety/warning signs (visible day and night) both along the road, at the subproject construction sites, and before and after the construction areas in the Mekong River and provide specific training and instruction to all staff and workers to follow the code of conduct. These requirements will be included in BD/CD and closely supervised by the construction supervision consultant (CSC). The contractor will be required to comply with all measures proposed to mitigate impacts during construction as described in Section 5.5 below.

5.4.4 Conclusion

96. Before full construction, the contractor will be required to (i) Complete UXO technical survey and secure obtainment of a NRA certificate; (ii) Install appropriate fence/screen with adequate warning and safety signs (visible at day and night) around the construction sites, worker camp, and in specific areas (hospital, school, temple) and road/waterways transportation routes; (iii) Complete consultation with local authorities and communities and obtained written permission from local authorities including the ECC and/or land owners for the use of borrow-pit, quarry, and disposal sites; (iv) Ensure that compensation to affected people/assets has been completed; and (v) Submit and obtain approval of the Contractor-ESMP (C-ESMP) from DOW and/or CSC[20] as assigned.

97. It is noted that the Provincial Resettlement Committee (PRC) with assistance from PIU will be responsible for completing all compensation while two ECCs will be issued by PONRE. Permissions from other relevant local authorities may also be required for construction of the proposed infrastructure along the riverbank as well as those related to UXO and/or COVID-19 pandemic.

5.5 Mitigation Measures for Construction Stage

5.5.1 Impacts on Local Environment and Mitigation Measures

98. Issues, impacts, and mitigation will differ markedly depending upon the type and scope of the activities and their locations as well as construction methods. For the proposed embankment and river bank protection to be constructed along the Mekong River near the Nam Xan River confluence, potential adverse impacts will be moderate, localized, and most of them are temporary and can be mitigated through effective management of construction and contractor. Most of the potential impacts will be limited to generation of noise, vibration, dust, and other air pollution, wastes, water pollution, and disturbance to local environment as well as increased safety risks related to safety and behavior of workers, road safety for contractors' workers and local inhabitants, waterways safety for boat owners and other local water users, etc. These impacts can be mitigated through application of good construction practices and housekeeping combined with close monitoring of contractor

[20] *Construction Supervision Consultant (CSC) / Field Engineer (FE) will be part of the Implementation Support and Works Supervision Consultant (ISWS)*

performance and awareness and participation of local people during the design and construction phases.

99. However, specific attention will be given to reduce these risks and impacts to the people and general public who come to the provincial hospital, school, and temple nearby the subproject site by (a) Installation of a temporary fence around the construction sites (on land) with appropriate warning and safety signs (visible for day and night time) while appropriate markers/screen and signage (visible during day and night time) will be used for the water area in the Mekong River; (b) Ensuring that contractor apply machine and equipment with low noise and vibration during construction and that piling is not expected; (c) Limit working hour, control speed limit, fully cover all trucks, no overload, road safety, etc.; (d) Periodic watering of the construction site and roads in front of the provincial hospital, school, and temple; and (e) Initiate and maintain close consultation with and facilitate participatory monitoring of local authorities and local communities (LA/LC) and the SMWG.

100. To mitigate potential negative impacts during construction, the generic ECOP and COC provided in Attachments 6A and 6B will be incorporated into the bidding and contract documents (BD/CD) and they will be applied during the preparation of the C-ESMP in line with the ESMP approved by WB. The C-ESMP will be submitted to the CSC for review and approval before implementation. The CSC will conduct day-to-day monitoring of contractor compliance and include the results in the monthly monitoring report. PIU and SMWG will monitor the ESMP on a monthly and quarterly basis. EDPD/PTRI and DOW will monitor on a six-month basis and submit an ESMR to WB. The potential cumulative negative impacts[21] are not expected.

101. It is also expected that most of the construction will be carried out during dry season. It is thus important that transportation of large amounts of rock and gravel, soil, and spoil is expected and that all the trucks carrying out construction materials including sediment and spoil will have to be fully covered while the drivers will also be required to respect driving speed and avoid using horns in area sensitive to noise and vibration along the road and nearby the provincial hospitals, schools, and temples located near the subproject sites and transportation routes. Close consultation with local authorities and local communities (LA/LC) will have to be made throughout the subproject implementation.

102. Key issues and potential impacts on local environment of the subproject will include, but not limited to, the followings:

- *Degradation of local environmental quality, borrow-pits, and quarries*. Subproject implementation will require large amount of natural resources (stone, sand, laterite, soil, etc.) extraction and a source of fill (borrow) materials, quarries, as well as spoil disposal area will need to be established in the area where the civil works will be implemented. It is also important to ensure that the natural resources use and/or extraction are legally

[21] Cumulative impacts are defined as are those that result from the incremental impact of the proposed Project when added to other past, present and reasonably foreseeable future actions.

permitted by GOL and that as part of the C-ESMP, a subplan on transportation of construction materials and transportation route will be prepared (see also below). If available, an established borrow pit should be employed. If a new borrow pit is needed, a rehabilitation plan should also be prepared and safeguards procedures will need to be established in the C-ESMP. **Attachment 2, Figure A2-9** provides specific locations of the main quarry sites, borrows pits and disposal site.

- *Increase local traffic and damage local road conditions.* Subproject implementation will involve large number of big trucks for transportation of construction materials including stone, sand, laterite, soil, etc. and it will increase road traffic since the subproject will use existing roads, especially NR13S which is also being rehabilitated and this will increase local traffic congestion and also degradation of road structures. Where possible water transportation should be considered as an alternative and detailed will be proposed by contractor as part of their construction plan and C-ESMP. In principle, the mitigation measures will include restrictions on work load on the vehicles and on movement of contractor's vehicles on designation routes; deploy traffic man at the village to control the traffic as needed and ensure that the access tracks, which are prone to dust emissions and disturbance to local resident are managed by daily water spraying daily and speed control at areas sensitive to reduce noise and vibration; no transportation during rush hours; andfully compensate and remedy if damages and accidents caused by contractors. After completion of construction work, all damaged roads/tracks will be restored by the contractor as part of their obligations.

- *Increase noise, vibration, and air quality (mostly dust).* The baseline data indicated that air quality in dry season in Pakxan exceeded the National Ambient Air Quality Standard while the ambient noise levels were well within the National Standard. To reduce additional generation of dust and small air pollution (PM2.5, smoke, etc.), the contractor will be required to ensure the following (a) All subproject trucks and/or barges are fully compliance with GOL regulations (speed limit, no overload, etc.), properly maintained to reduce noise/vibration/dust generation, and fully covered with appropriate materials at all time including provide information to the public on who to contact when needed (all subproject vehicles should have subproject sticker); (b) Watering the road and construction sites at least 3 times daily during dry season; (c) Weekly consult/inform LA/LC on construction plan/schedule; (d) All drivers are aware and committed to these obligations; and (e) Assign specific staff to be responsible for monitoring compliance of these obligations and keep proper records, especially near the provincial hospital, school, and temple and other areas considered sensitive and/or as agreed with LA/LC.

- It is important to note that noise, vibration, dust, and other air pollution can come from other sources, mitigation measures through effective management of construction activities, equipment, and contractor/ workers/drivers will be implemented and details will be described as part of the C-ESMP (as a sub plan/measures). The CSC will ensure that the contractor takes all measures to reduce (a) safety risks and other impacts to local residents and (b) emission of dust, air quality, noise, and vibration during construction and transportation of construction materials.

- *Increase sedimentation due to runoff from construction areas:* Erosion and sediment transport down the Mekong River can also be a major impact during subproject construction. Removal of vegetation and earthworks on the river banks and in-stream works will detach sand, silt, and clay which will be suspended in the water column for

eventual deposition in downstream areas. The Mekong River will be turbid during the construction phase downstream of the subproject areas until the embankment and riverbank protection works are completed and following vegetation has re-established and the river bed substrate has stabilized. Observation suggested that during dry season, the water in Nam Xan and Mekong River (near the subproject site) in Pakxan is turbid however change in water level due to change in upstream flow could have some effect during construction.

- The results of water sample taking from the Mekong River in May 2021 and the laboratory analysis confirmed that that surface water quality was still good. The most common parameters of interest were within the national guidelines where available. The concentrations of mercury and arsenic however exceeded the national guidelines in both locations (**refer to Table A4-9 and Figure A4-15 in Attachment 4**). It is expected that the subproject will improve river profile, urban environmental condition and then water quality accordingly. Pipe water is available for all residents. Nonetheless, in-river works may also create large amount of sedimentation while there are some fish farms along the river bank (**See Attachment 4, Figure A4-20 Location Map of Sensitive Hotspots and Figure A4-21 for Location Map of Irrigation Facility and Fish Farm**). At the subproject site Section 2, there is one fish farm to be affected. Compensation payment will be provided to the owner with the agreed compensation amount. If there are impacts to other fish farms during construction, installation of silt screen at locations agreed with CSC and/or LA/LC may be necessary. If needed, a sedimentation control plan, as a sub-plan of the C-ESMP, will be prepared by the contractor as instructed by the CSC.
- *Increase generation of construction wastes, garbage and refuse.* These wastes including waste oil and chemicals as well as those generated form the worker camps should be contained on site and ultimately disposed of off-site in an environmentally acceptable manner. Procedures for on-site management and off-site waste management and disposal need to be addressed in the C-ESMP to be prepared by contractor. This can be considered as a sub plan on construction waste management and/or recycles and/or a sub plan for management of non-hazardous and hazardous wastes.
- *Environmental, Social, Health, and Safety (ESHS).* This requirement has been incorporated as part of the WB standard bidding and contract documents (BD/CD). The ESHS in the BD/CD will include the mitigation measures identified in Attachment 5 (Table A5.2) as well as the ECOP and COC provided in Attachments 6A and 6B. The ECOP has also incorporated the Environmental, Health, and Safety Guideline (EHSG) applied to the WB Group (WBG) which provides general guidance on the Occupational Health and Safety (OHS) of workers, pollution prevention and abatement measures and workplace, and community health and safety (also see discussion below).
- *Community health and safety including risks on water users (boat, fishermen, etc.).* To avoid and reduce the safety risks on communities, water users, boats and fishermen, etc during the construction, the contractor is required to fence construction area and provide safety boom for construction activities in the Mekong River with sufficient and highly visible warning signs in day time and night time (signs with lighting in the night time).
- *Physical Cultural Properties and Sensitive Areas.* The subproject is not expected to create any adverse impacts on any national archaeological, paleontological or cultural sites. However, during construction, to mitigate this, a “Chance Finds Procedure”

describing the process will be followed when artifacts, sacred sites, cemeteries, etc. are found in the subproject area (see Box 5.1). The "Chance Finds Procedure" has been incorporated into the ECOP.

Box 5.1 Chance Finds Procedures (that has been incorporated in the ECOP)
Stop construction activities in the area of the chance find; delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects; notify the supervisory Engineer who, in turn, will notify the responsible local authorities; responsible local authorities would conduct a preliminary evaluation of the findings to be performed by archaeologists who will assess the significance and importance of the findings according to various criteria, including aesthetic, historic, scientific or research, social and economic values; decisions on how to handle the finding shall be taken by the responsible authorities which could result in changes in layout, conservation, preservation, restoration and salvage; implementation for the management of the finding communicated in writing; and construction work could resume only after permission is given from the responsible local authority concerning safeguard of the heritage.

5.5.2 Impacts on Workers and Local Community and Mitigation Measures

103. During construction, potential risks and issues on occupation health and safety (OHS), community health and safety (CHS), labor influx and possible impacts associated with labor influx including sexual exploitation and abuse (SEA), sexual harassment (SH), violence against children (VAC), and other social impacts. Key impacts will include, but not limited to, the issues identified below.

5.5.2.1 Occupational and Community Health and Safety

104. This aspect has become mandatory to all projects with WB financing. It is closely connected to those related to construction material extraction and transportation mentioned under section above. Subproject construction poses OHS risks to workers and subproject staff while community health and safety (CHS) has received attention in several respects, ranging from potential for serious injury / death to nuisance level of impacts. In summary key risks for communities include:

- *Traffic and road safety:* Haul truck drivers and other staff driving to and from the subproject sites may be exposed to traffic conditions, unsafe drivers, poor quality road conditions, pedestrians and other obstacles, etc. that may lead to accidents and injury;
- *Noise and dust* pose risks for impacts ranging from nuisance level to serious health impacts;
- *Accident/safety risks* to local people, road user, pedestrians or bicycle rider in settlements, subproject sites and between settlements along the hauling route for construction materials / disposal of construction wastes;
- Potential for introduction or increased incidences of communicable and infectious diseases resulting from the influx of construction workers into the region.

5.5.2.2 Emergency Preparedness and Response Plan (EPRP)

105. Any large construction works may involve small to major accidents as well as cause small to major injury to contractor's workers and staff, local residents, and/or general public. For the subproject, these risks are quite high since there are school, temple and the provincial hospital nearby the construction sites. Thus, as part of C-ESMP, the contractor will be required to prepare an EPRP as well as provide training, routine maintenance, monitoring, and implementation of all aspects of all staff and workers. This is to minimise the residual impacts to an acceptable level. With robust management, OHS risks and anticipated residual impacts remain moderate – high, particularly for vehicular accidents. The most significant potential impact requiring diligent management is the potential for the company/contractor vehicle to strike of a pedestrian or other vehicle. With a well-developed driver training program, and staff adherence to local traffic regulations, the risks for impact to pedestrians/occupants of other vehicles in the subproject area may be considered substantial if not effectively managed. The risk for accident in Pakxan is significant, as other drivers may be at fault while there are many community activities near roads, and/or illegal used of local road users. Design controls, induction and routine training, and consistent management to provide for a culture of OHS will be critical for contractor's staff/drivers throughout subproject construction.

5.5.2.3 Labor Working Conditions

106. The subproject contractors must follow the required national Labor Law (amended in 2018) with regards to treating their national and local workers. The employment opportunities under the SubProject, particularly for national and local workers, will be based on basis of gender equality and fair treatment. Discrimination on the basis of gender and others such as people with disability, ethnic minority should not be allowed, particulalry in recruitment, compensation rate and payment (including wages and benefits), and working conditions, etc. People under 18 years of age will not be employed or engaged in implementing any subproject activities. Key issues and actions are identified as follows:

- *Worker Camps.* It is expected that three worker camps will be set up as shown in **Figure A2-10 in Attachment 2**. Contractor is required to prepare a worker camp management plan during the preparation of C-ESMP (see also Section 5.5.3.2 below). The camp site is located in empty private land in Houysiat village with an area of 1.5 ha and 100 away from the subproject site. PIU will facilitate an agreement between contractors and identified land owners. This will be provided as part of C-ESMP.
- *Labor Influx.* The total number of workers that will likely be engaged during subproject implementation is 45 people (maximum). The subproject may require a portion of the labor force that is not local. It is expected that the non-local workers will be recruited nationally and should have a similar socioeconomic and cultural background to that of the local community. Efforts will be made to hire local workers (including skilled workers) and provide sufficient accommodation, water, sanitation and hygiene and first aid facilities to the non-local workers, including adequate measures for effective prevention of COVID-19.
- The contractor will be required to provide a list of key staff, engineers, and workers to be

working on site during day time and night time. The information will be included, but not limited to, personal data, criminal records and health data to ensure that all employees are free of the following diseases (communicable or transmitted diseases including COVID-19 and STD/HIVAID) and the following information: names and surnames, ages, address (village, district, province, contact details, status (single, married), health (good), family information (number of children, name of wife, address and contact details) and among others. The list of employees will need to be attached in C-ESMP and distribute to all subproject affected communities/villages.

5.5.2.4 Potential Impacts on SH/SEA and VAC

107. To mitigate the potential social impacts during construction, Code of Conduct (COC) on Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), and Violence Against Children (VAC) is provided in **Attachment 6B.** This will be required to be complied with by the contractor and its workers as part of the works contract. During pre-qualification, contractors are required to declare whether any contracts have been suspended, or cancelled, or bid bonds called, for incidents related to SH/SEA/VAC. Workers' Codes of Conduct are now mandatory for all projects with WB financing and will include prohibitions against SEA/SH/VAC, including a prohibition of sexual activities with children (under 18 years of age). This standard must hold even when national standards, laws and policies have a different age of consent. All contracts should set explicit expectations for monitoring contractor performance of its SEA/SH/VAC obligations, with a protocol in place for immediate, timely mandatory and confidential reporting to the Government and to the WB in cases of egregious (for example, sexual assault) allegations. Training on environmental, social, health and safety measures including the COC to minimize the risk of SEA/SH/VAC will be carried out by the Construction Supervision Consultant (CSC) or Implementation Support and Works Supervision (ISWS). At the end of the training, the supervision consultant will ensure that all contactor's workers trained sign the COC before beginning of their works.

108. Contractors are required to assign a focal point to monitor and report on implementation of occupation health and safety and labor management plans. She/he will receive, address and manage the resolution process of grievances that may be raised by contractor's workers and local community or victims. These include, but should not be limited to, employment contracts, working conditions, compliance with COC by workers, SEA/SH/VAC issues.

109. In the event if severe environmental and social incident/accident including serious accident cases and fatality associated with the subproject happens during the subproject implementation, the Contractor Focal point of OHS and CHS will promptly notify or report on such incident to the CSC, PIU and the local Public Security Office respectively. For resolution of SEA/SH and VAC incidents, a representative of District and Provincial Lao Women's Union (LWU) will be engaged in a committee to be set up. PIU/PMU is required to immediately and within 24 hours, after becomes aware of the incident/accident, notify the World Bank if severe environmental and social incident has occurred during construction. Severe environmental and social including clearing of sensitive areas, serious accident cases

and fatality, forced or child labor, abuses of community members by project workers (including GBV), trafficking in endangered species, etc.

5.5.2.5 COVID-19 Preparedness and Response Plan

110. Contractor has to apply or comply with GOL's guidelines and requirements as well as the guideline provided by the WBG on "Response to COVID-19 Advisory Note on Contingency Planning for Existing Operations" dated March 16, 2020 (see **Attachment 8**) for effective COVID-19 management. It is worth noting that the WBG's Response to COVID-19 Advisory note may be updated from time to time. Where there is a conflict with government or WHO guideline, the government or WHO guideline prevails.

5.5.2.6 Ethnic Group and Gender Considerations

111. 99.5% of the population in the three SubProject affected villages (4,855 people) is Lao Tai. Only 0.5% (23 people from 4 households) are from Hmong and Khmu ethnic minority groups. The primary religion in the affected villages is Buddhism almost 99.5% (956 Lao Tai families) and only 0.5% (4 HHs) of Hmong and Khmu ethnic groups in Houaysiat village practice animism. Both Hmong and Khmu ethnic groups have been living in the area for a long time and they are well integrated into Lao's mainstream population.

112. ***Gender consideration***. A gender-responsive social assessment has been considered during consultation in preparation of the ESMP and ARAP to identify potential impacts for different populations (ethnic peoples and vulnerable groups – women and female/male youth and children, the elderly and disabled, landless, and poor, etc.) in relation to their health and safety concerns. Both male and female participants shared similar concerns and recommendations related to community health and safety, dust and noise and compensation issues (See Attachment 9 for details).

5.5.3 ES Implementation and Management of Contractor

113. As mentioned above, to ensure effective implementation of the mitigation measures during construction, it is important to ensure that the PIU and key agencies can control and manage performance of contractor starting from bidding and throughout contraction and closure of construction site. To be practical and in line with the ESMF, the generic ECOP has been adjusted and finalized and it will be included in the BD/CD and monitored closely by CSC. This section describes specific requirements regarding (i) Key actions to be conducted by the responsible agencies (DOW and DPWT) before commencement of construction, during construction, and completion of construction phase; (ii) Labor Management, Worker Camp and Storage Area; (iii) Guidance for the Preparation of C-ESMP; (iv) Non-Compliance Reporting Procedures; (v) Community Relations; and (vi) Supervision, Monitoring, and Reporting.

5.5.3.1 Key Actions to be Conducted

(a) E&S Requirements before commencement of construction

114. Before construction begins at each subproject site, all the following requirements will be completed, checked and approved by PIU/DWPT, PMU/DOW, PONRE and/or EDPD/PTI as agree:

- Submission and approval of the C-ESMP with adequate measures to mitigate potential ne gative impacts including installation of temporary fence and safety/warning signs around the construction sites, consultation with LA/LC, and training of staff and workers on OH S and obligations on social code of conduct before construction begins. The C-ESMP wil l be prepared in line with this ESMP (see **Attachment 5**) after contract awarded and it wi ll be reviewed and approved by the Project owner and/or the CSC as assigned. The CSC/ FE is responsible for day-to-day monitoring of the C-ESMP compliance and report the re sults in the subproject progress report.
- As agreed with PMU/DOW, recruitment of key E&S safeguards staff of the contractor to be responsible for environmental, social and safety aspects. Specifically, contractors are r equired to recruit a) a full time environmental and social specialist to ensure effective im plementation of C-ESMP and full time Community Relation or Community Health and S afety (CHS) Specialist to deal with CHS related issues (including SEA/SH/VAC) and co mplaints that may be raised by the local community.
- Establishment of worker camps with quality health services and sanitary equipment and a ll required supporting facilities and workshop/material storage area in comply with sectio n on Labor Management, Worker Camp and Storage Area below (Section 5.6.2). Worker camps and storage areas will be checked and approved by DPWT and PONRE before mo ving or utilization of the area. Worker camp management plan may be included in Labor Management Plan.
- Development of Code of Conducts (COC) and Company Project Rules for the subproject regarding health and safety of workers and local communities to prevent and address pote ntial risks and issues associated with possible labor influx including SEA/SH/ VAC. The contractor will provide training to all contractor staffs and workers of the subproject. Co de of Conducts and Company Project Rules will be signed by all staff members and work ers and are stamped by company's management. **Attachment 6A and 6B** provide guidan ce on ECOP and COC on SH/SEA and VAC. COC and Company Project Rules may form part of the Labor Management Plan.
- Consultation with affected communities/villages on subproject activities, risks/impacts, p revention and mitigation measures and other community health and safety information. S ubmission of consultation report to DWPT and EDPD/PTI with list of participation and minutes of consultation.

115. The Contractor will also install signaling of works, safety signs and fences, ensure no blockage of access to households during construction and/or provide alternative access, provide footbridges and access of neighbors and endure construction of proper drainage on the site.

116. The Contractor will also be required to prepare a plan on OHS-CHS and complete at least one training for all contractor staff and workers working for the subproject with records of any training and induction. Periodic and follow-up training will be conducted at least 1 time in every 3 months.

(b) ESS Requirements during Construction Phase:

117. The Contractor will be required to implement all measures identified in the C-ESMP, including any sub plans as required in this ESMP, requested by GOL, and/or suggested by EDPD/PTI, and approved by CSC/FE. The Contractor will also manage all activities in compliance with laws, rules and other permits related to site construction regulations (what is allowed and not allowed on work sites) and will protect public properties. Degradation and demolition of private properties will be avoided. Paying compensation to damage to the public facilities and/or private property will be required. The Contractor will inform PMU of the subproject and DPWT on issue and/or damages that may unexpectedly occur.

118. As identified in the generic ECOP, the Contractor is responsible for protection of local environment against dust, air, noise, vibration, exhaust fuels and oils, and other solid wastes generated from the work sites. The Contractor will manage waste properly and do not burn them on site and will also provide proper storage for construction materials, organize parking and displacements of machines in the site. Used oil and construction waste materials must be appropriately disposed off and adequate waste disposal and sanitation services will be provided at the construction site next to the generated areas. In order to protect soil, surface and ground water the Contractor will avoid any wastewater discharge, oil spill and discharge of any type of pollutants on soils, in surface or ground waters, in sewers and drainage ditches. Compensation measures may be required.

119. The Contractor is required to comply with OHS-CHS plan as one of main part of overall ESHS requirements. The Contractor is encouraged to hire local labors including community and female workers to extent possible. Where local labors are not adequately available in the sub-project sites, labor or camp site management plan and is required to be prepared and implemented and monitored potential external labor influx and associated risks including SEA/SH and VAC. Code of Conducts (COC) and Company Project Rules regarding health and safety of workers and local communities will be applied by the contractors and their sub-contractors and workers to be hired under the subproject to manage the risks anticipated.

120. The Contractor will also be responsible for maintaining good hygiene, safety, and social welfare security of the work sites, including protection of and health and safety of staff and workers. The Contractor will prevent standing water in open construction pits, quarries or fill areas to avoid potential contamination of the water table and the development of a habitat for disease-carrying vectors and insects. Safe and sustainable construction materials and construction method should be used.

121. The Contractor will use a quarry of materials according to the regulations and compensate by planting of trees in case of deforestation or tree felling. When possible, the Contractor should develop maintenance and reclamation plans, protect soil surfaces during construction and re-vegetate or physically stabilize eligible surfaces, preserve existing fauna and flora and preserve natural habitats along streams, steep slopes, and ecologically sensitive areas.

122. During construction, the Contractor will specifically take serious actions on the following:

- To control dust and noise emission, runoff and sediment transportation and construction waste, garbage and refuse in comply with ECOP;
- To work with local authority and management local traffic effectively and ensure traffic a ccess of road safety of local residents and road users during the works. Speed limit at wo rk sites and community area will be applied to all vehicles and cars. All vehicles and thei r drivers must be identified and registered, and the drivers are properly trained;
- To respect the cultural sites as well as cultural norm and traditional practice, ensure securi ty and privacy of women and households in close proximity to the camps and the use of a sbestos containing materials is not allowed;
- To conduct daily monitoring and inspection of construction activities to ensure environm ental and social impacts are managed and mitigated appropriately in local communities. T hese potential impacts include wastes, discharge, dust, community health and safety, OH S-CHS plan, construction waste contaminated on private land, social issues and social sec urity, etc.;
- To implement and maintain a good community-relations in comply with requirements in t he section on Community Relation below (Section 5.6.5); and
- To comply with Non-compliance Reporting Procedures as specified in the section below.

123. The Contractor will also be required to submit the Contractor E&S monitoring report as part of Contractor monthly progress report to DPWT and PONRE (with a copy to EDPD/PTI and the SMWG) on every 25th of each month. The report can be submitted electronically as agreed.

(c) ESS Requirements during Subproject-Site Closure

124. Before each subproject site is considered completed, the following actions will be undertaken:

- Clean up all wastes and disruption and removal of construction equipment, construction waste and general wastes from the subproject areas and all location used by the subprojec t during construction such as worker camps, parking bays, and storage areas, borrow pits, quarries and ancillary facilities.
- Stabilize all borrow pits or implement all agreed measures in accordance with agreements stipulated in minutes or documents signed between the Contractor and landowners. If ne eded, signing of a handover document for borrow pits will be required.
- Stabilize and/or rehabilitate all subproject sites to ensure community safety and erosion c ontrol.
- Together with DPWT and PONRE, provide training on road safety to all affected commu nity. All training will be recorded and affected communities will sign the training receive d sheet.
- Submission of E&S Site Closure Report to DPWT, SMWG, and EDPD/PTI one month b efore cubproject completion inspection.

5.5.3.2 Labor Management, Worker Camp and Storage Area

125. On this aspect, the following, but not limited to, actions will be considered:

- The Worker Camp and workshop storage area will be located on areas far enough from water points, houses and sensitive areas in consultation with the community and the subproject owner. Worker camps will not be located within 100 meters of any sensitive receptors, urban area and at least 100 meters from any surface water course and not within 2km of a protected area. If this is not possible, justification will be provided to ensure that adequate measures are undertaken to avoid impacts on the sensitive receptors.
- Worker camps, cooking facilities, and toilets will be provided with roofs, walls and wooden floors or paved with concrete while the camp yards and storage can be compacted or paved with gravels. If possible, the worker camps should be fenced and provided with entrance gates to prevent unauthorized entry. In addition, the worker camps will be provided with storm water drainage system around the camp facilities to prevent flooding, mud, erosion and sediment transport to natural environment.
- Worker camps will be provided with basic facilities and utilities including but not limited to: office, notice boards and regulations of the company and about the subproject, beds, mosquito nets, blankets, clean drinking water and safe portable water, sufficient waste bins, first aid kits and necessary medicines, fire extinguishers, etc.
- For bathing and toilets, the Contractor will ensure that (1) separate toilets for males and females and sewage and wastewater will be retained in sediment pond(s); (2) Toilet chambers will be designed appropriately to be able to treat sludge and sewage prior to discharge to closed retention ponds without exposure to vectors and/or diseases; (3) building of toilet rooms, sewage chambers and retention ponds will be away from natural water bodies, streams, and wetland areas. The floor of retention chambers will be above the aquifer layer.
- Material storage facilities and workshop will be in proximity or within work camp area with fences, compacted ground or paved with gravel and drainage system.
- Hazardous material storage area will be provided with roof, walls and concrete floor and bunds, storm water drainage and oil traps. Engine oil change requires steel trays on the floor to prevent hydrocarbon spills on soils. If spill is found, immediate cleaning is required by collecting contaminated soil and to a temporary container and maintained in hazardous storage area.

5.5.3.3 Preparation of Contractor ESMP (C-ESMP)

126. Following the award of the contract and prior to construction commencing the Contractor will review the issues identified in the ESMP (**Attachment 5**) and develop detailed mitigation in the C-ESMP including identification of key persons who will be responsible for supervising the work within the Contractor's team. Details can be presented in a series of site-specific plans covering specific site or the whole section during construction phase as reviewed and approved by the CSC/FE. Priority plans will include, but not limited to, the followings:

- Waste Management and Recycling Plan (recycling plan for construction waste)

- Site Clearance and Restoration Management Plan;
- General Construction Site Management Plan including spill and emergency response, cha nce find procedures, etc.;
- Labor Influx Management Plan which could cover Worker Camp Management Plan and l inked with Occupational and Community Health and Safety Plan below;
- Quarry Site Management Plan;
- Borrow Pit Management Plan;
- Spoil/Surplus Material Disposal plan including temporary spoil storage
- Runoff/Erosion and Sedimentation Control Plan;
- Environmental Quality Management Plan including water, air, noise and vibration;
- OHS-CHS plan including measures and Code of Conduct to be complied by contractor' s taffs and workers to address and prevent potential SEA/SH/ VAC issues;
- Traffic Management Plan.

127. These plans will be submitted as part of C-ESMP to CSC/FE for review and approval prior to the Contractor taking possession of any work site. The approved C-ESMP and/or specific plans will be submitted to DOW/PMU and shared with the World Bank. The CSC will provide training to contractor to ensure effective implementation and compliance with the C-ESMP while EDPD/PTI will provide training to the SMWG and LA/LC on monitoring the implementation and compliance with the C-ESMP and/or specific plans.

5.5.3.4 Non-compliance Reporting Procedures

128. The Contractor and its subcontractors if any must comply with the ECOP and C-ESMP covering the specific instruments listed above. To ensure that necessary action has been undertaken and that steps to avoid adverse impacts and/or reoccurrence have been implemented, the Contractor shall immediately report to CSC/FE to further report to the PIU, the PIU/DPWT who will then report to PMU/DOW, EDPD/PTI, and WB within 24 hours of any serious (severe) incidents associated with non-compliance with the ECOP and C-ESMP that may have serious consequence (see form in **Attachment 7**). In the event of working practices being deemed dangerous either by PMU/DOW, EDPD/PTI, PIU/DPWT, the local authorities, or the other concerned agencies, immediate remedial action must be taken by the Contractor. The Contractor must keep records of any incidents and any remedial action taken. The records of non-compliance that could be practically addressed (not cause serious impacts) will be reported to PMU/DOW and PIU/DPWT with a copy to EDPD/PTI and/or SMWG on a monthly basis.

129. The Contractor will be responsible for responding and dealing with any work contract related grievances that may be raised by the local communities, subproject affected people and reports forwarded by the subproject owner (DOW), Police or other agencies (by following instruction from the subproject owner representative as appropriate) as soon as practicable, preferably within one hour but always within 24 hours of receipt by either the

Contractor. The Subproject Manager will monitor and ensure that the Contractor has taken appropriate action. Where appropriate, approval remedial actions may require an agreement from the local authorities and/or other Government agencies. Procedures should be put in place to ensure, as far as is reasonably practical, that necessary actions can be undertaken to avoid recurrence and/or serious damage (see form in **Attachment 7**).

5.5.3.5 Community Relations

130. The Contractor will assign one community-relation personnel or Community Relation Officer, who will be focused on engaging with the community to provide appropriate information and to be the first line of response (focal point) to resolve grievances and issues of concern including SEA/SH/VAC incidents. Contractor will take reasonable steps to engage with residents of ethnic backgrounds and residents with disabilities (or other priority groups as appropriate), who may be differentially affected by construction impacts. The Community Relation Officer (CRO) will work closely with subproject staff assigned by PIU/PDPW and PMU/DOW and consultants specialized on community health and safety to prevent and address potential SEA/SH/VAC issues. CRO will monitor and report on SEA/SH/VAC incidents if any and participate in the victim-centred process of investigation and resolution as required by the applicable national law. A representative from Lao Women Union (LWU) at the provincial level and as required a specialized consultant will be engaged in the victim-centered process.

131. The Contractor will ensure that local residents and communities nearby the construction sites will be informed in advance of works taking place, including the estimated duration and any possible issues including communicable or infectious disease (including COVID-19) related cases that may be found and suspected. In the case of work required in response to an emergency, local residents shall be advised as soon as reasonably practicable that emergency work is taking place. Potentially affected residents will also be notified of the 'Hotline' number, which will operate during working hours. The "Hotline" will be maintained to handle enquiries regarding construction activities from the general public as well as to act as a first point of contact and information in the case of any emergency. All calls will be logged, together with the responses given and the callers' concerns action and a response provided promptly. The helpline will be widely advertised and displayed on site signboards.

132. The Contractor will assign a full-time staff to respond quickly to emergencies, complaints or other contacts made via the 'Hotline' or any other recognized means and liaise closely with the emergency services, local authority officers and other agencies (based on established contacts) who may be involved in incidents or emergency situations.

133. The Contractor will manage the work sites, work camps, and monitor their workers conducts and compliance with COC workers in a way that is acceptable to local residents and will not create any social impacts due to workers. Any construction workers, office staff, Contractor's employees, sub-contractors, suppliers and service providers or any other persons directly hired or associated with the subproject found violating the "prohibitions"

activities listed in **Attachment 6A and 6B** may be subject to disciplinary actions that can range from a simple reprimand to termination of his/her employment depending on the seriousness of the violation.

5.5.3.6 Site Management, Monitoring and Reporting

134. Following approval of the C-ESMP, the Contractor will be required to attend a series of meetings with the Construction Supervision Consultant and its field engineer (CSC/FE) to ensure that all compliance conditions and procedures are clearly understood and actions can be implemented on the ground. As part of the day-to-day supervision of works, the CSC/FE is also responsible for day-to-day monitoring of compliance of the C-ESMP implementation and reports the results in the progress report. The PIU and SMWG will also ensure that the Contractor will be responsible for ensuring that all sub-contractors abide by the conditions of the C-ESMP.

135. Contractors Reporting - The Contractor will prepare two levels of environmental reports:

- Weekly Environmental Checklists – These will be prepared weekly by the Contractor's E &S management (ESM) team and the checklist will be submitted to the CSC/FE on a wee kly basis. EDPD/PTI will provide a sample for the checklist.
- Monthly Summary Report - in respect of compliance with C-ESMP will be submitted to t he PMU/DOW through the CSC/FE.

5.6 Mitigation Measures for Operations Stage

5.6.1 Risks on Riverbank Profile

136. The impacts of the river flow and change in water levels during dry and wet seasons in the Mekong River has been significant in the past and there are some records (although limited) available in some areas. However, with changes of water level and water flows due to cumulative operations of the many large dams upstream of the Mekong mainstream, there are risks that the proposed structures may be damaged and/or cause damage due to the river bank erosion upstream and/or downstream of the subproject sites. It is therefore important for the subproject owner to engage LA/LC and establish a riverbank monitoring program by establishing/collecting baseline data (at least rough observation at specific/reference points) before construction begins and also after the construction for at least 3 years (**See Attachment 5, Table A5-2**). The river slop profile within 50m upstream and downstream of the project location is almost the same with about 5 cm differences. The condition of upstream and downstream project area is shown in Attachment 4, Figure A4-1. After the subproject is completed, GOL and local communities will monitor the river bank erosion program for at least 3 years. For the risks on the proposed structure stability, an analysis to check the stability of the proposed riverbank sections was carried, design criteria to ensure that embankment and river protection structure will be safe have been included during the detailed design.

5.6.2 Other Risks

137. Given location of Pakxan, the nature of floods, and the current design of the proposed infrastructures to be constructed under the BKX subproject, it is anticipated that the subproject will not create negative impacts on local flooding during operations phase. However, there are safety risks for other waterway users in the Mekong River and installation of proper safety signs visible day and night at the subproject structure will be necessary. To enhance potential positive impacts to local residences in addition to protection of the river bank in the subproject area and provision of the public facilities for people to enjoy the beauty of Mekong River and other recreation activities as well as an opportunity to increase local income and enhance local socio-economic conditions of Pakxan, it is important for the LA/LC to establish capacity and resources to ensure effective operations and maintenance of the subproject infrastructure and effective engagement with local communities on solid waste management, cleanliness and maintenance, and safety of the new river park and public place.

138. Consultation with LA/LC (below) suggested that the contractor must keep close consultation with LA/LC to minimize potential negative impacts during construction while LA/LC must also be prepared to use and/or benefits from the proposed infrastructure/facilities to be provided and it clean and safe. A plan is prepared as shown in Table 6-3 below.

5.6.3 Risks during Operations of the Irrigation Scheme

139. Operations of the proposed rehabilitation of the water supply for the existing irrigation scheme located downstream of Site 2 may increase the risks due to unsafe use (including storage and disposal of containers/packaging). To mitigate this risk, EDPD/PTI will also provide training (and appropriate guidelines) for the farmers and SMWG on this aspect and report the results in the ESMR.

6 CONSULTATION AND INFORMATION DISCLOSURE

6.1 Consultation during subproject design

140. In line with specific requirements on consultation and information disclosure identified in the ESMF and RPF of the LDRM-AF, consultation and meetings with Subproject affected peoples (PAPs) were conducted during the preparation of this ESMP, ARAP, and IEE (to be submitted to PONRE).

141. PAPs are invited to participate in public meetings in the early stages of the ARAP preparation. They were provided with information on the proposed infrastructure, its environmental and social risks and potential impacts, mitigation measures proposed for such risks and impacts, including measures that will be implemented to support livelihood restoration activities for adversely affected households, particularly those who lose assets and means of livelihood as a result of land acquisition to allow subproject construction. Information publicly disclosed includes criteria for cut-off date for the BKX subproject,

eligibility criteria for affected people and entitlements, modalities of compensation, grievance redress procedures, including the unit rate for compensation (See ARAP for more details). The consultations were undertaken with participation of provincial, district and village authorities, representatives of the affected people (men, women, ethnic minorities, and disadvantaged people such as the elderlies). The PAP had presented their ideas and provided suggestions for ARAP preparation and unit rate preparation process through a series of participatory exercises and focus group discussion (FGD) to ensure that affected people have opportunities to engage and raised their concerns.

142. Four rounds of consultations have been conducted from November 2020 to November 2021 in Houaysiat, Pakxan-Tai and Anousonxay villages with the particiption of a total of 214 people (78 of them are female) (See Attachment 9 for details). Consultation methods applied include: a) public meetings, b) household interview (survey), c) and key informant interview. The consultations aimed to:

- Disseminate key subproject information such as the design of the proposed structures for riverbank protection; and extension of irrigation pipe;
- Present anticipated environmental and social risks and impacts associated with constructi on of the subproject and proposed mitigation measures;
- Disseminate eligibility criteria and entitlements of PAP for loss of assets attached to affec ted (public) land and assets in river (fish farming cages), compensation measures and ass isstance for livelihood restoration;
- Obtain opinions, concerns and recommendations from representatives of affected people and other stakeholders on subproject design, implementation;
- Inform participants of the process of how an Inventory of Loss would be conducted (IOL);
- Inform how household data would be collected for development of the ARAP, ESMP, and IEE.
- Explain about the Grievance Redress Procedure and how affected people could use it to r aise their concerns or lodge a complaint during subproject planning and implementation.

143. Table 6-1 below provided the number of participants while Table 6-2 presents a summary of consultation results (See List of Participants in **Attachment 9).**

Table 6-1 Number of Participants

No.	Dates	Locations	Male	Female	Total
1st Consultation	9-13 Nov 2020	DPWT Meeting Room	17	11	28
2nd Consultation	18-19 Feb 2021	Houaysiat and Pakxan-Tai Villages	29	21	50
3rd Consultation	7-9 Jul 2021	Houaysiat, Pakxan-Tai and Anousonxay Villages	66	42	108
4th Consultation	3-5 Nov 2021	Houaysiat, Pakxan-Tai and	24	4	28

		Anousonxay Villages			
		Total	**136**	**78**	**214**

Table 6-2 Summary of Consultation Results

Positive Impacts	Negative Impacts	Feedback from consulted people
• All participants agreed with the subproject development plan. • The subproject should start as soon as possible as it will help prevent the river bank erosion as erosion increases about 50-100cm-each year. • The subproject will prevent erosion of river bank and protect the land people lands, properties and lives especially those who live along the river bank. • Villagers will have beautiful riverbank and a nice place for recreational activities. • It will be easy to local people to go fishing as the subproject will install stairways. • The subproject will provide local people with more opportunities for income generation activities (e.g. more shops and tourist	• Land acquisition would affect lands and properties such as houses, small shops, fish cage farm, and garden near the riverbank (with seasonal crops and income). • Risks of community health and safety from transportation of construction materials (e.g. traffic safety), noise and dust emissions, solid waste and waste water from worker camps, and risks of Covid-19 infection. • Social risks related to labor influx such as thieves, drug, drinking, violence such as SH/SEA and VAC. • Poor waste management from people selling foods if no proper management of the improved river bank.	• The design shall be designed to minimize the impacts on people's lands and properties. • The Inventory of Loss and proposed compensation rates for all affected assets shall be checked and confirmed with PAPs. • The compensation payment shall be fully completed before starting any construction activities. • Village authorities and villagers will be informed two months in advance before construction takes place. • Measures shall be taken to ensure community health and safety. These may include driving speed limit, water spraying, noise control, cover the truck when transporting construction materials to prevent materials from falling on the road and so on. Transportation of materials should avoid time when children go to school from their home and vice verse. Schools, local health stations, authorities will be informed of detailed construction plan and material transportantion plan, including routes that would be used for transporation. • Implement good solid waste and wastewater management for worker camp and storage areas. • Implement measures to avoid social issues and risks of COVID-19. These include, among other things, ensuring that all subproject workers have been vaccinated against COVID-19 before coming to work at subproject site. • For construction works, local people (men and women) are given job opportunities by subproject's contractors, particularly jobs that are appropriate to them. • Request the subproject to improve the access road to the temple in Houaysiat village. • Request the subproject to install fences along river bank to prevent the children falling in the river. • After the construction is completed, can

Positive Impacts	Negative Impacts	Feedback from consulted people
businesses).		villagers use the improved river bank for selling foods and fish cage farming? • Request for campaigns on community engagement in keeping the improved river bank clean, green and beautiful especially community solid waste management. • Request to conduct spiritual ceremony to ask for permission from the river and soil spirits before construction. • Request to not working on Buddha Day "Van Sin". • Regular consultations with local communities and temples on the construction activities and schedules during the construction phase.

6.2 Consultation during subproject pre-construction phase

144. During ARAP implementation, monthly meetings will be held with PAP to gather their feedback on how the process can be improved. There will also be face-to-face meetings with individual PAPs throughout the process, as well as a meeting to finalize and sign the compensation agreement.

145. PAP and PAH will be involved in various committees, including the grievance redress committee (to be established), which will ensure their participation in the decision-making process throughout various stages of the ARAP process, including preparation and implementation.

6.3 Consultation following completion of subproject construction

Following BKX subproject completion, a survey could be undertaken by the ISWS/CSC amongst PAP to assess their level of satisfaction with the process and results of the ARAP. An assessment will be carried out by the ISWS consultant to verify completion of ARAP and compensation before recommending the PMU to hand over the sub-project site to the contractor. The ARAP completion report will be prepared and sent to the WB for review.

6.4 Information Disclosure

146. The draft and final ESMP (both English and Lao version) will be submitted to WB for review and clearance.

147. Once the ESMP and ARAP are accepted by WB, the documents will be re-disclosed (in both English and Lao languages) on the MPWT's website and locally at village level where the subproject construction will take place. This aims to ensure potentially affected people in the subproject's area of influence are updated of subproject's environmental and social risks and impacts, proposed mitigation measures, and grievance redress procedure, etc. DOW will (a) instruct the contractor and construction supervision consultant to ensure

compliance with the mitigation measures during construction and maintain close consultation with local authorities and local communities; (b) advise PIU to plan and implement the mitigation measures during operational phase and provide timely and sufficient budget; and (c) ensure PTI shall conduct periodic monitoring of compliance and prepare subproject implementation progress report to be submitted to WB per agreed schedule.

148. The consultation reports of each consultation were made with minutes of meeting along with attendance records and the signatures of all participants. Table 6-3 presents a consultation plan that have been conducted in 2021-2022.

Table 6-3 Consultation Sessions

No.	Consultation	Objectives	Methods	Implementing Body	Timeline
Pre-construction					
1	Consultation with PAHs and concerned stakeholders at provincial, district and village levels	To finalize draft Provincial Agreement on Compensation Unit Rate	Public meeting (PM), household interview (HI), key informant interview (KII)	PTI/EDPD and DPWT/PIU	5 Nov 2021 and 7 Jan 2022
2	Consultation on draft ARAP, ESMP and IEE Reports: consultation meeting with concerned local authorities (provincial and district levels) and representatives from affected villages.	To obtain comments on the draft IEE report and incorporate all comments into the revised IEE report	Public meeting, household interview	MONRE/PTI /EDPD and DOW	Early of Mar 2022
3	ARAP Implementation: Consultation with concerned authorities and affected households on confirmation of loss and compensation amount and method. Separate consultations may need to be conducted with vulnerable households and individuals to ensure that their concerns and needs have been met.	To confirm and verify and obtain consent from PAP on their losses and compensation amount	Public meeting	PTI/EDPD and DPWT/PIU	Mar – Nov 2022
Construction Phase					
4	Consultations with affected communities on subproject activities, impacts, construction	To inform PAP on subproject construction activity and	Public meeting	Contractors, CSC, DPWTs	Throughout construction phase

No.	Consultation	Objectives	Methods	Implementing Body	Timeline
	schedule and work plan	schedule and environmental and social risks, including risks related to community health and safety			
5	Consultation on livelihood restoration measures and other community development initiatives.	To obtain opinion/ideas and proposal from PAP on livelihood restoration initiatives.	Public meeting, Focused Group Discussion and Key Informant Interview	PTI/EDPD and DPWT/PIU	Throughout construction phase
6	Dissemination of community health and safety with affected communities	To educate PAP on community health and safety and measures to prevent subproject related accidents	Public meeting	Contractor, CSC, DPWTs	Throughout construction phase
7	Ad hoc meetings where there are substantial changes that have been made, or conflict has arisen due to accident, misunderstanding, or other causes.	To address or solve conflicts	Open Meeting, Focused Group Discussion and In-depth Interview	Contractor, CSC, DPWT, PIU, PTI	Throughout construction phase
Operation Phase					
8	Consultation on Green Clean and Beautiful (GCB) community network on waste management in Bolikhamxay (Moving towards GCB for Bolikhamxay)	To obtain opinion of local community on participatory GCB community network on waste management	Public Meeting, Focused Group Discussion and Key Informant Interview	PTI/EDPD and DPWT/PIU	O&M Phase
9	Consultation on the riverbank monitoring program (1 km upstream and 1 km downstream of the subproject sites) for at least 3 years after construction is completed.	Same as above	Same as above	Same as above	Same as above
10	Installation of proper warning and safety signs (visible day and night) at the construction sites to ensure safety of other waterways users. Installation of safety	Same as above	Same as above	Same as above	Same as above

No.	Consultation	Objectives	Methods	Implementing Body	Timeline
	utensils to enhance safety for people who come to the embankment for recreational, fishining, or transporation purposes				

7 GRIEVANCE REDRESS MECHANISAM

149. A grievance redress mechanism (GRM) will be established and functioning during the implementation of the ESMP for the BKX subproject. The GRM, covering three types of grievances, is in place during construction and operation of the subproject. These include grievances from a) community members b) households affected by land acquisition, and c) SH/SEA victims. To achieve the above objective, the following key elements are incorporated into the subproject's GRM:

- **Channels.** Different channels are established to enable complainant to submit their grievances, including submission to village committee, as well as district and provincial levels . Grievance can also be submitted to PMU/PIU via designated email or phone administered by PMU/PIU GRM focal points.
- **Forms.** Grievances can be submitted in writing and verbally, and either directly by the complainants, or by person delegated by the complainant who are sick, the elderly, or people with physical disabilities, or with vision or hearing impairment, etc.
- **Documentation.** A grievance logbook will be maintained at village, district and provincial levels to record all subproject related grievances registered in writing and verbally. A grievance database will be established and maintained by PMU/PIU (through GRM focal point within PMU/PIU).
- **Disclosure.** GRM procedures are disclosed in public domain (e.g. websites of PMU, or at public notice board located at village hall…). GRM procedure will be explained to people attending consultation meetings, and provided to consultation participants in hard copy (through subproject's information leaflet).
- **Predictability.** Where possible, GRM procedures specify length of time complainant may expect to wait for acknowledgement, response, and outcome for the resolution of their grievances.
- **Transparency.** The grievance procedures include steps, expected time frame grievance resolution for each step, notification to complainants, how decision is made, decision makers, mediation options, and
- **Appeal.** Complainant may resort court of law at any stage of grievance resolution if unsatisfied with grievances resolution decision issued by the agency in charge.
- **Monitoring.** All grievances received are processed in the given timeframe, and are monitored by those in charge of grievance resolutions, and by PMU/PIU.

7.1.1 GRM for community members

150. Community members who are concerned about any issues related to the subproject construction, such road safety, air pollution, vibration, restriction of access to local public or private facilities, etc., can make verbal or written complaints directly to PMU/ PIU (through PMU/PIU GRM focal points), or through village heads/committee. Complaints directly related to contractors' responsibilities can also be directed to Site Representative of the main Contractor(s). In case complainant is not satisfied with the resolution from the steps above, they can initiate their case to the local court.

7.1.2 GRM for individuals/households affected by land acquisition

151. Article 25 of decree 84/PM (on compensation and resettlement of people affected by development project, 2016) requires the subproject to establish an effective mechanism for grievance resolution and that the subproject owner (i.e., DOW and Provincial DWPT of BKX Waterway Sector or PIU) are responsible for coordinating and working with PONRE and DONRE to set up a grievance redress mechanism (GRM) and to take actions to solve/resolve issues, if any. Grievances related to any aspect of a proposed sub-project will be dealt with through negotiations with the aim to reach a consensus. All complaints will be received in writing, or if given verbally from PAP and PAH will be duly and timely recorded by each level of the grievance redress committee. Grievance procedures should include reasonable standard procedure (e.g. time required to respond to complainants for each step), and should be provided at no cost to the aggrieved persons).

152. The ESMF and RPF of the LDRM-AF also requires DOW, EDPD/PTRI, and DPWT of BKX to establish and implement a GRM related to environmental and social issues related to subproject activities. As mentioned in the ESMF, the complaints can be sent to the PIU and resolved by a Grievance Redress Committee through the subproject grievance redress mechanism. However, complainant can bypass this procedure and lodge their grievance directly to the Provincial office of Bolikhamxay, DOW or the national assembly, and/or EDPD/PTRI (as provided for by law in Lao PDR) as well as the WB's Grievance Redres Services (GRS). For information on how to submit complaints to the WB's GRS, please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. At each grievance level, details, discussions, and outcomes will be recorded in a grievance logbook. The status of grievances submitted and grievance redress will be reported to the PIU of BKX through the monthly report and to WB as part of the subproject implementation progress report (see **Attachment 7 for GRM Monitoring Form**).

153. In order to effectively and quickly resolve grievances, people may follow the process described below:

- **Stage 1**: If PAPs are not satisfied with the resettlement plan or its implementation, PAPs can issue a verbal or written complaint to the village committee or the district resettlement office (DRO). If it is a verbal complaint, the village should deal with this complaint and document the grievance immediately at the time. The village committee or DRO should resolve the complaint or grievance within two weeks;

- **Stage 2**: If the PAPs are not satisfied with the result of Step 1, PAP can file an appeal with the subproject resettlement office (PRO) after PAP and PAH receives the decision made in Step 1. The PRO should make a decision within two weeks;
- **Stage 3**: If the PAPs are not satisfied with the result of step 2, PAP can file an appeal with the provincial resettlement committee for administrative arbitration after receiving the decision made by the PRO. The administrative arbitration organization (AAO) should make the arbitrated decision within 10 days; and
- **Stage 4**: If the PAPs are still unsatisfied with the arbitrated decision made by the AAO, after receiving the arbitrated decision, PAP can file a lawsuit in a civil court according to the relevant laws and regulations of Lao PDR.

154. PAP and PAH can make a complaint or appeal on any aspects of subproject design and implementation, including issues related to resettlement. Alternative means of communication publicly accessible such as a helpline phone or WhatsApp will be established with dedicated staff assigned to so that PAPs or complainants will not be charged for their phone calls and their complaints are responded in an efficient manner. PAP and PAH will be clearly informed of the complaint and grievance redress mechanism and appeal channels described herewith through village meetings and other channels. In addition, a complaint box will be made available in a convenient location of the village.

7.1.3 GRM for SEA/SH

155. Under this Subproject, the GRM for SH/SEA mainly serves to: (i) refer complainants to local Gender-Based Violence service provider; and (ii) record resolution of the complaint. The following principles will be applied. These principles recognize victim as principal decision makers in their own care, and treat them with agency, dignity and respect for their needs and wishes.

- **Multiple channels** are in place for easy access and lodge complaints;
- **SH/SEA victims will be referred to local SEA/SH service provider** for immediate support if they make a complaint directly to PMU;
- **Confidentiality of victims are protected.** GM operator of PMU will keep SH/SEA allegation report confidential;
- **No identifiable information on the victim shall be collected and stored** in subproject Grievance Logbook;
- **Costs of operating the SH/SEA GRM will be financed by the subproject**.

156. Channels for lodging SH/SEA complaints:

- **Channel 1** – AP can submit a complaint, verbally or in writing, to the PMU
- **Channel 2** –Alternatively, AP can lodge their complaint, verbally or in writing, GRM Focal Point of PIU.
- **Channel 2** – AP can submit a complaint to relevant Contractors, if relevant.

157. All SH/SEA related grievance will be addressed directly by the Lao Women Union (LWU) who will be engaged by PMU to assist in addressing potential grievances on SEA/SH.

158. The Subproject and organizations resolving PAP complaint and appeal process will not charge any fees. Any expenses incurred due to submission of complaints and/or appeals and phone calls should be classified as unexpected expenses and covered by the subproject.

8 ESMP IMPLEMENTATION AND BUDGET

8.1 ESMP Implementation Arrangements

159. In line with the LDRM-AF implementation arrangement, for Component 1, DOW through the Project Management Unit (PMU)[22] and the Project Implementation Unit (PIU) are responsible for ensuring effective and timely oversee and/or facilitate the implementation of ESMP and ARAP and submit monitoring reports periodically to WB while EDPD/PTI will provide technical assistance to PMU/DOW and PIU. It was determined that an Initial Environment Examination (IEE will be required for the subproject and compliance with an Environmental Compliance Certificate (ECC) will be monitored by a Safeguard Monitoring Working Group (SMWG) to be established by BKX province. The SMWG will be chaired by DPWT of BKX and comprise representatives from key agencies responsible for ensuring compliance with GOL regulations during construction including key local communities to affected during construction and those to be involved during operations phase.

160. For the subproject, the PIU (PIU/DPWT of BKX) is responsible for ensuring timely and effective implementation of the ESMP during preconstruction, construction, and operations including those related to ARAP planning and implementation and monitoring of the riverbank monitoring program, and all safety related on the ground while PMU/DOW and EDPD/PTI will be responsible for supervision, monitoring, and reporting to WB. Key roles are responsibilities can be highlighted as follows:

- During preconstruction, the PIU/DPWT will establish the subproject resettlement committee (PRC) to be responsible for timely implementation of ARAP as approved by WB and take all actions to mitigate potential risks and impacts identified for preconstruction (UXO, safety fence and warning signs, safety of waterways users, etc.), including engagement with LA/LC to collect baseline data and setting up the reference points for the riverbank monitoring program. DOW will provide funds for implementation of ARAP and other associated costs.
- During construction, the PIU/DPWT and the CSC/FE will be responsible for the day-to-day compliance monitoring on sites, including ensuring close consultation

[22] At Project level, the PMU/DOW is responsible for management, procurement, contracting and financial management of the LDRPM-AF project as well as monitoring the implementation progress against the agreed performance indicators and produce period progress reports. The PMU/DOW is responsible for managing the FS and detailed design and also provide oversight of Project implementation and consultation with key stakeholders and the public including the management of the supervision consultant (CSC) during subproject implementation.

between contractor and LA/LC and submit monthly progress reports to PMU/DOW and EDPD/PTI. The PIU/DPWT will also liaise with the concerned local agencies and authorities to ensure effective and timely coordination among contractor, CSC, and LA/LC, and identify issues arising from sites and propose solutions to the PMU/DOW and/or higher-level management. The PIU/DPWT will also be responsible for establishment of the SMWG to ensure compliance with the ECC and other GOL regulations while PMU/DOW will sign a contract with the CSC and the contractor and also provide budget for PIU for the planning and monitoring by the SWMG and other associated costs while DOE will ensure effective fund flow from DOW to SMWG to performance their functions.

- Not less than 6 months before construction is completed, PIU will conduct another data collection on the riverbank profile and follow-up data collection once/year one time (or any period as agreed with LA/LC) for 3 years after construction is completed.

161. Table 8-1 illustrates roles and responsibilities of key agencies during the implementation of the ESMP and ARAP. **Attachment 7** provides a sample GRM monitoring and accident reporting form. In light of wide spreading of Corona Virus (COVID-19), additional measures will be required during construction for the subproject staff and subproject contractor to address COVID-19 issues (see **Attachment 8** for a generic guidance**).** These guidance will be incorporated into the bidding/contract documents (BD/CD), and it should be finalized taking into account the GOL orders on specific procedures related to COVID-19.

Table 8-1 Key responsibilities for ESMP implementation

Objectives	ES Safeguard Action/Scope	Responsible Entities	Remarks
To mitigate impacts due to land acquisition and/or resettlement before construction			**Complete the compensation payment before construction.**
1.1 Provide brief information on ARAP in the ESMP of the subproject. RAP implementation will be proceeded section by section. ARAP budget is provided separately	ARAP preparation in line with the project's RPF and secure WB clearance	PMU/DOW and EDPD/PTI assist by NC prepare RAP and secure WB clearance	• Project resettlement committee (PRC) has been established 6 October 2020. Training for PRC/DRC/GRM was conducted during 09-14 March 2021. • GRM will be established, operationalized, and monitored before compensation and resettlement implementation.
	Implementation ARAP according to the approved ARAP	PIU/DPWT (assisted by NC) and PRC	Implementation progress will be included in the ES safeguard monitoring report.
	Monitoring to verify	Third party	

Objectives	ES Safeguard Action/Scope	Responsible Entities	Remarks
	compliance with ARAP	monitoring	
1. To mitigate impacts during construction			
2.1 Prepare ESMP for the subproject focusing on mitigating ES risks and impacts during pre-construction, construction, and operation	• Prepare ESMP in line with ESMF and secure WB clearance. • Also prepare an IEE and secure PONRE approval	PMU/DOW assisted by EDPD/PTI (and NC)	
2.2 Mitigate risk of UXO	Ensure that UXO risk is minimized by making consultation with responsible agencies for UXO risk and clearance	PIU/DPWT assisted by EDPD/PTI	This requirement can be included in BD/CD. A standalone action can be made.
2.3 Ensure that contractor is performed in compliance with mitigation measures during construction. WB standard BD/CD has a provision on ESHS. Performance guarantee for ESHS will be required.	<u>During BD/CD:</u> • Incorporate the ES measures identified in the ESMP to be responsible by contractor under the ESHS section of the draft BD/CD. <u>During bidding:</u> • Ensure that the bidders are aware and commit to the ESHS obligation. • The contractor is required to prepare C-ESMP (as identified under the ESHS topic of the contract) within 28 days after contract signing. • Implementation cost of the C-ESMP is part of the contractor'		• The C-ESMP will be prepared and implemented by Contractor in line with approved ESMP to address issues and mitigation identified in the ESMP and as per MONRE requirement as outlined in the approved ECC. The C-ESMP is a living document and will be approved by PMU/DOW with support from CSC and advice from EDPD/PTI before construction begins. • The ECOP can also be used, especially for small contract. The compliance monitoring will be made by SMWG, PMU, EDPD, and WB. • The responsibility for review and approval of C-ESMP and day-to-day monitoring of C-ESMP compliance is included in TOR of the CSC/FE.

Objectives	ES Safeguard Action/Scope	Responsible Entities	Remarks
	cost.		
2.4 During construction	Contractor to prepare C-ESMP within 28 days after contract signing and secure approval from DOW/PMU before construction begin, and implement construction	Contractor	• Contractor is required to hire qualified staff to be responsible to all aspects as required in the C-ESMP.
	Consultations with affected communities on subproject activities, impacts, construction schedule and work plan	Contractor	• This should be included in the C-ESMP
	Monitor the approved C-ESMP and report the progress in the ES monitoring report. If complaints occur (as monitored via GRM), following up actions will be conducted as agreed with the concerned agencies and complainants.	+ CSC/FE conduct day-to-day monitoring and reporting to PIU and PMU (progress report) + SMWG conduct Q monitoring and overall impacts on the ground and report to PIU/DPWT, EDPD/PTI and PMU/DOW. + EDPD/PTI and PMU/DOW conduct 6m monitoring, and report to WB	• Contractor may be required to submit its own monitoring report to PIU/DPWT. • Contractor may be required to conduct specific monitoring for specific area.
2. **To mitigate impacts during operations of BKX subproject**			
3.1 Ensure proper design of the Pakxan City facilities	Design to minimize impacts on land and resettlement, apply appropriate technology to avoid/mitigate negative impacts while maximizing positive impacts	PMU/DOW assisted by EDPD/PTI.	The CSC/FE is responsible for finalization of FS, DD/BD, SG documents, and supervision (as the CSC/FE) works during implementation

Objectives	ES Safeguard Action/Scope	Responsible Entities	Remarks
4.3 Prepare and implement a LA/LC plan to achieve Green Clean and Beautiful agenda (GCB) for BKX by (a) Reducing wastes (solid and liquid) discharge into Pakxan and Mekong Rivers in Pakxan City by setting up waste management scheme to be implemented by local communities	Prepare the plan through consultation with LA/LC so that some priority activities can be conducted in 2021. Due to limited fund, priority will be given to address waste management first.	PIU/DPWT (assist by NC), EDPD/PTI, and PMU/DOW.	• GCB Lao PDR is a national agenda for 2030. • Gender and youth integration are important.
Riverbank monitoring	Consultation on the riverbank monitoring program (1 km upstream and 1 km downstream of the subproject sites) for at least 3 years after construction is completed.	DPWT and PONRE	local community can help identify and collect baseline data
Safety of waterways users	Installation of proper warning and safety signs (visible day and night) at the construction sites to ensure safety of other waterways users.	PIU/DPWT (assist by NC), EDPD/PTI, and PMU/DOW.	• The CSC/FE is responsible for finalization of FS, DD/BD, SG documents, and supervision (as the CSC/FE) works during implementation

8.2 Monitoring and Reporting

162. PMU/DOW (who is responsible for the day to-day implementation and operation of the Project, including contracting and supervision of all consultants for the Project) is responsible for ensuring effective implementation of the ESMP including adequate allocation of budget. PMU/DOW will also ensure that the Construction Supervision Consultant (CSC) is responsible for supervision and monitoring of works contracts will also be responsible for day-to-day monitoring of contractor compliance with the C-ESMP. EDPD/PTI is responsible for providing technical guidance on the ESS requirements and periodical monitoring of the ESS compliance including training, capacity building, and management of the ESMP budget for the BKX subproject. EDPD/PTI will conduct 6-month monitoring of ES compliance and submit a report to WB. EDPD/PTI will also ensure that the subproject is also in compliance with GOL requirements regarding ES requirements and standards.

163. At provincial level, DPWTs of BKX will assign specific staff and/or engineer (at least 1 full-time or 2 part-time) to be responsible (as the ESU/DPWT) for ensuring full compliance with the E&S safeguard requirements on the ground and prepare E&S safeguard implementation monthly or quarterly monitoring report as agreed with EDPD/PTI. The ESU/DPWT is considered part of the Project team responsible for ensuring compliance with the ESMP of the BKX subproject.

164. The SMWG comprising DPWT, PONRE, LWU, and other related local be responsible for undertaking periodic monitoring of the ESMP and ARAP implementation including GRM tracking and Contractor performance of the approved C-ESMP. For land acquisition and relocation of assets, the PRC or the DRC that have been established will be responsible for the review and oversight of ARAP implementation. The Village Grievance Committee (VGC) will be established to be responsible for overseeing the GRM implementation using the existing structures with a village mediation committees and fiduciary agencies (District and Provincial Office of Justice, Provincial Assembly, PWTOs and District Governor Office). EDPD/PTI will also be required to (a) review/adjust the current monitoring and reporting forms to enhance effectiveness of the monitoring and reporting process and (c) ensure that adequate budget can be transferred to the DPWT and the SMWG and timely submission of the ES monitoring report to WB.

8.3 Capacity Building and Training Plan

165. The DPWT and local agencies (including SMWG) in BKX have some experience in the implementation of safeguard measures with WB financing, as well as with other international donors such as the ADB. However, it is expected that additional training on specific measures identified for the subproject will be necessary and the key one are identified as follows: (a) Training for the planning and implementation of ARAP, (b) Training on the monitoring of the riverbank profile (local appropriate measures), (c) Training on the preparation and monitoring of contractor's ESMP including those related to ESHS and OHS and safety of local communities and waterways users. This section identifies priority areas that need capacity building and training plan for contractors as well as for PIU and staff of local agencies. To be effective, the training will be designed to (a) ensure compliance with GOL requirements on E&S safeguards during construction and operations and those required by WB under this ESMP and (b) building capacity of the LA/LC responsible for taking actions to mitigate ES risks and potential impacts during operation phase.

166. Implementation experience of the LRSP2 suggested that to mitigate potential negative impacts during construction phase, more detailed specific guidelines and more extensive training and capacity building on environmental, social, and occupational health and safety (ESOHS) will be necessary to enhance ES performance on the ground. Improving effective site management, effective application of Personal Protection Equipment (PPE), active participation of local communities, and effective application of GRM logbook will be necessary with proper tracking records. The training plan is provided below; it can be revised as per requirements during the subproject implementation. The training plan to achieve this objective is provided in Table 8-2.

167. To mitigate potential negative impacts of the subproject during operation, it is necessary for DPWT to build and maintain active engagement with local authorities and local communities (LA/LC) to (a) Manage solid waste to be generated from small shops and restaurant installed in the improved river bank and (b) Monitor the river bank erosion/profile before construction as well as after construction is completed. Capacity building on these aspects will be made through active involvement of local communities and mass organizations such as Lao Women Unions (LWU), Lao Front for National Development (LFND), Lao Youth Union (LYU), and Lao Labour Union (LLU). "Learning by doing" approach will be used during meetings, discussion, workshops, field visits, etc.. MONRE policy on Green, Clean, and Beautiful (GCB) Lao PDR should also be applied in BKX (Moving towards GCB in BKX). Table 8-2 identifies priority activities to achieve this objective.

Table 8-2 Training Plan

No.	Training Topic	Trainer	Trainee	Timeline
Objective: To ensure compliance during preparation and construction				
1	Training on the Implementation of ARAP, ESMP and IEE	EDPD/PTI	Resettlement Committee (PRC and DRC)	09-14 Mar 2021
2	Training of Trainers on environmental, social, and occupational health and safety including monitoring the implementation of C-ESMP, ECOP, COC on SEA/SH/VAC, and GRM.	EDPD/PTI	DPWTs, CSC/FE, SMWG	Jun 2022
3	Environmental, social, and occupational health and safety including monitoring the implementation of C-ESMP, ESCOP, COC on SEA/SH /VAC, and GRM	EDPD/PTI, PIU and CSC	Contractors	Within 28 days since construction contract awarded; During construction as required
4	C-ESMP implementation, Worker health and safety as required in the ECOP and COC on SEA/SH//VAC	Contractor	Workers	Before commencement of construction and during construction
5	Community health and safety	EDPD/PTI, PIU	Affected communities	Before commencement of construction, during construction and

No.	Training Topic	Trainer	Trainee	Timeline
				post-construction completion
To build capacity of DPWT to mitigate impacts during operations and moving towards GCB BKX				
1	GCB community network on solid waste management in BKX (Moving towards GCB for BKX)	ES consultant assisting DPWT	DPWT and staff local authority and mass organizations and local community	Training will be made through the learning by doing approach (adaptation). Budget will be provided to initiated the process
2	Training on the safety use of waterways	Same as above	Same as above	Same as above

8.4 Budget for ESMP Implementation

168. For the BKX subproject, it is expected that a budget of about US$50,000 will be needed for supervision and monitoring by PMU/DOW, EDPD/PTI, PIU/DPWT, and the SMWG while cost for implementation of the ES activities is included in construction costs and is thus under contractor's implementation responsibility during construction, including those related to UXO clearance. Cost for compensation and ARAP implementation will be provided separately and detailed under subproject A-RAP for BKX.

169. Table 8-3 below presents an indicative budget allocation for (a) monitoring and training to ensure compliance with the WB safeguard requirements and GOL regulations and (b) capacity building activities and consultation of the PMU/DOW, EDPD/PTI, PIU/DPWT, and SMWG to performance their tasks related to E&S safeguard during construction and operations including cost for national consultants to assist them. This will also include the budget for SMWG to establish the river bank erosion monitoring program with local communities upstream and downstream of the proposed sites (about 1.2 km along the Mekong River upstream (652 m) and downstream (550 m) of the Nam Xan River Mouth) to ensure safety of the subproject structures as well as to minimize potential negative impacts on the river bank erosion upstream and downstream of the subproject sites during operations. GOL and local communities will monitor the river bank erosion program for at least 3 years. This cost will also include cost for training of farmers on safe use (including storage and disposal of containers/packaging) of toxic chemicals, herbicides, and pesticides.

170. To plan and implement this river bank monitoring program, it is necessary to engage local authorities and communities in the monitoring process, especially on establishing the monitoring sites/locations and how and when data from these sites are collected, process, analized for monitoring purpose. DOW will ensure that the budget is timely provided to PIU and the SMWG and they are effectively used for this purpose.

Table 8-3 Indicative budget allocation for ESMP implementation

Key Activities	Three – years (2022-2024)			Total (USD)
	Y-2022	Y-2023	Y-2024	
1. Training and workshop for E&S Safeguard Capacity building for Resettlement committee in BKX	2,000	2,000	0	4,000
2. Monitoring and Survey for Resettlement and Compensation plan for BKX as well as the establishment of the river bank monitoring program (1 km upstream and 1 km downstream of the subproject sites.	6,000	1,500	1,500	9,000
Conduct a gender analysis to identify gender issues and guidance on gender mainstreaming under ARAP and ESMP implementation process. Develop a gender action plan (GAP) based on the gender analysis during subproject planning, construction and implementation, and post-project O&M for BKX (PTI and SMWG)	2,000	2,000	0	4,000
3. On the job training on ESMP implementation, Monitoring and Report Writing with PIU, DPWT, and SMWG and PTI Monitoring during construction	4,000	2,000	0	6,000
4. Conduct consultation and meeting with local authorities to identify fields as dumping site	3,000	0	0	3,000
5. Field Monitoring by SMWG led by DPWT and PONREs and local authorities with support from supervision consultant and ES consultants of PTI during construction for BKX 6. Bi-annual and Annual Supervision, Monitoring and Reporting (with summary of ES implementation status and main findings included in biannual and annual subproject progress reports 7. GCB community network on community solid waste management in BKX (Moving towards GCB for BKX) 8. Training on safe use of pesticides, insecticides, and fertilizers by farmers of	8,000	8,000	8,000	24,000

Key Activities	Three – years (2022-2024)			Total (USD)
	Y-2022	Y-2023	Y-2024	
the irrigation area where water supply is rehabilitated and extended.				
Grand Total	**25,000**	**15,500**	**9,500**	**50,000**