

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

August 2023

LAO PEOPLE'S DEMOCRATIC REPUBLIC:
SUSTAINABLE RURAL INFRASTRUCTURE AND WATERSHED
MANAGEMENT SECTOR PROJECT (SRIWMSP)

SUBPROJECTS: XENGKHUANG PROVINCE

NAM PIEW RIVER 1, 2, 3 AND 4 IRRIGATION SYSTEM SUB-PROJECT
NAM MAD RIVER 1 AND 2 IRRIGATION SYSTEM SUB-PROJECT

Prepared by the Ministry of Public Works and Transport for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of August 2023)

Currency unit - Lao Kip (K)

K1.00 = \$0.0000555

\$1.00 = K 18,000

ABBREVIATIONS

ADB	-	Asian Development Bank
CSA	-	Climate Smart Agriculture
DALAM	-	Department of Agricultural Land Management
DOI	-	Department of Irrigation
DoNRE	-	Department of Natural Resources and Environment
DoPF	-	Department of Planning and Finance
DRDC	-	Department of Rural Development and Cooperatives
DTEAP	-	Department of Technical Extension and Agro-Processing
EARF	-	Environmental Assessment and Review Framework
EHS	-	Environmental Health and Safety
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EPL	-	Environmental Protection Law
GRM	-	Grievance Redress Mechanism
IEE	-	Initial Environmental Examination
MAF	-	Ministry of Agriculture and Forestry
MOF	-	Ministry of Finance
MOIC	-	Ministry of Industry and Commerce
MoNRE	-	Ministry of Natural Resources and Environment
NAPA	-	National Adaptation Program of Action
NFSCC	-	National Food Security and Commodities Committee
NPMO	-	National Project Management Office
PIC	-	Project Implementation Consultants
PPIU	-	Provincial Project Implementation Unit
PSC	-	Project Steering Committee
SAEMR	-	Semi Annual Environmental Monitoring Report
SPS	-	Safeguards Policy Statement, 2009
UNFCCC	-	United Nations Framework Convention on Climate Change
UXO	-	Unexploded Ordnance
VDC	-	Village Development Committee

WEIGHTS AND MEASURE

ha	-	Hectare
m	-	Meter
km	-	Kilometer
l/s	-	Liters per second
masl	-	Meters above sea level
mm	-	Millimetre
oC	-	Degree Centigrade
dBa	-	Decibel
mg/l	-	Milligram per liter
oC	-	Degree Centigrade
dBa	-	Decibel
mg/l	-	Milligram per liter

NOTE

In this report, "\$" refers to US dollars.

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1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

1. This IEE for the Nam Piew River 1, 2, 3 and 4 Irrigation and Nam Mad River 1 and 2 Irrigation Sub-Projects in Xengkhuang Province presents an assessment of the environmental impacts and the detailed Environmental Management Plan (EMP) for the subproject based on detailed engineering design. The preparation of this IEE is guided by the Environmental Assessment and Review Framework (EARF) of the Sustainable Rural Infrastructure and Watershed Management (SRIWSM), ADB Safeguard Policy Statement (SPS, 2009), ADB Operational Manual Section F1/BP (2013), Access to Information Policy (ADB AIP, 2018), IFC-World Bank Environment, Health and Safety (EHS) Guidelines, the Government of Lao PDR's Environmental Protection Law (2013), and other Government environmental laws, policies, rules and regulations applicable for irrigation projects.

2. The Nam Piew River 1, 2, 3 and 4 Irrigation and Nam Mad River 1 and 2 Irrigation Sub-Projects in Xengkhuang Province are the second batch of subprojects of the SRIWSM. The SRIWSM is expected to have a net positive impact on subproject catchments as it will reduce the risk from dry season cropping of the irrigation command areas. It will also support a potential increase in income from higher crop values. This will reduce the pressure on land conversion for upland cropping. Such land conversion is identified as a major driver of forest loss as crops are grown on steep, bare ground subject to high rates of soil erosion in the wet season.

1.2 DESCRIPTION OF SUB-PROJECTS

3. The proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project involves the upgrading and rehabilitation of 4 existing headworks/weirs and the ancillary canals and structures along the Nam Piew River. The proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project is located at the Kham District, Xengkhuang Province.

4. The proposed Nam Mad River 1 and 2 Irrigation System Sub-Project involves the upgrading of the headwork/weir at Nam Mad River 1 and the rehabilitation of the existing headwork/weir at Nam Mad River 2. The proposed Nam Mad River 1 and 2 Irrigation System Sub-Project is located on the Nam Mad River in Kham District, Xengkhuang Province.

1.3 ENVIRONMENTAL POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

5. The law governing the protection of the environment, including the assessment and management of projects in Lao PDR is the Environmental Protection Law (EPL), which was issued in 1999 and amended in 2013. The *Decree on Environmental Assessment, No.21/PM, January 2019* is the country's principal environmental legislation regarding Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA). The Decree was enacted to implement Part III of the Law on Environment Protection, in relation to Environmental Protection and Environmental Assessment.

6. The project screening is the first step of the environmental assessment stated in Article 8 of the said Law. By using the list of the project and activities that have to conduct the IEE or EIA No. 8056/MoNRE, dated 17 December 2013, irrigation facilities (Item 3.52) fall under Category 1 so an IEE is required by Government. The requirements for the securing of the requisite Environmental Compliance Certificate (ECC) from PoNRE Xengkhuang have been complied with and the ECC has been issued on 24 May 2022.

1.4 DESCRIPTION OF THE ENVIRONMENT

7. The proposed Nam Piew River 1, 2, 3 and 4 Irrigation System and Nam Mad River 1 and 2 Irrigation System Sub-Projects are both located in Northern Lao in Kham District, Xengkhuang Province in Northern Lao. Xengkhuang Province is the largest flat plateau in the Lao PDR while Kham District has the highest potential for agricultural development in the whole country.

8. The temperature in Kham District is totally different as compared to other districts in the country. The weather and climate are more or less similar to central part of Laos, which is suitable for growing crops and rice as well as for fishpond farming and livestock raising.

9. There are many waterways in Kham district, however, the main water resource supplying most of the irrigation facilities in the district is Nam Piew and Nam Mad Rivers. As per observation and regular monitoring, both rivers have a year-round flow and can sustain the many users of the waterway.

10. The climate in Xiengkhuang Province is characterized by two seasons, the dry and wet seasons. The dry season occurs between October and March while the wet season occurs between April and September. The climate in Lao PDR is highly influenced by the southeast monsoon with significant rainfall and high humidity.

11. A survey on the presence of unexploded ordnance (UXO) was commissioned by the PAFO Xengkhuang Province. The survey revealed that there are no UXO remaining in the area. Local residents also reported no known occurrence of UXO in the vicinity of the proposed developments. DOI is in the process of coordinating with the National Regulatory Authority for the UXO/Mine Action Sector for confirmation and validation of the findings of the PAFO Houaphan that there are no UXO remaining in the area.

1.5 ENVIRONMENTAL IMPACTS

12. In general, the benefits of the subproject outweigh the anticipated negative environmental impacts. Most of the environmental impacts are expected to occur during the construction phase and could be mitigated through implementation of appropriate mitigating measures. The following paragraphs describe the expected negative impacts that have to be considered during project design and implementation.

1.6 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

13. During the preparation of the IEE Public/Stakeholder consultations were held in the village meeting halls of villages of 7 villages with the Provincial Agriculture and Forestry Office (PAFO) and Project Consultants from 12 to 14 October 2022. Stakeholders who participated during the public consultation process included villagers, local government officers and staff. In general, consultees were of the view that the project would result in more benefits than negative impacts.

1.7 GRIEVANCE REDRESS MECHANISM

14. A Grievance Redress Mechanism (GRM) was developed in compliance with the National regulations of the Government of Lao PDR (GoL) and with ADB Safeguards Policy Statement (2009). The GRM will provide the means to resolve grievance and complaints in a timely and satisfactory manner. The details of the PGT, GRM Focal Contact Persons and Construction Manager will be prominently displayed in the respective construction areas for the reference of the affected communities/persons. Complaints and grievances can be directly

filed, both written and verbal, to the concerned entities. The procedures for the GRM are outlined in Section 8 of this IEE.

1.8 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

15. The EMP has been prepared, outlining the institutional responsibilities and management arrangements to ensure effective implementation and monitoring of mitigation measures. Throughout the construction period, the contractors will submit monthly environmental compliance progress reports to the PAFO with a copy furnished to the PGT.

16. The implementation of the EMP during the operational phase of the subproject will be undertaken by the PAFO, with verification by the PGT who will report to ADB the project's adherence to the EMP, information on project implementation, and environmental compliance through semi-annual integrated safeguards monitoring reports. The monitoring parameter during the operational phase is outlined in the EMP.

2 INTRODUCTION

17. The Sustainable Rural Infrastructure and Watershed Management Sector Project (SRIWSM) aims to improve rural incomes from market-driven diversified farm output, watershed health, and community nutrition in the four northern provinces of Houaphan, Louang Prabang, Xayabouli, and Xengkhouang. The Project is aligned with the following impacts: market-driven and safe agricultural products developed, and rural areas integrated into the national economy. SRIWSM will have the following outcome: high value agricultural production, natural resources management, status of women and community nutrition improved. There are four outputs as follows: Output 1: Market-oriented agricultural production increased; Output 2: Watershed ecological services protected; Output 3: Command area irrigation reliability improved; and Output 4: Nutrition awareness and facilities improved.

18. There are a total of 18 subprojects to be implemented under Outputs 2 and 3, of which four representative subprojects (RSPs) and a further 14 additional subprojects (ASPs) in subsequent stages of the sector Project. SRIWSM aligns and integrates with the Partnerships for Irrigation and Commercialization of Smallholder Agriculture (PICSA) in all four provinces for Output 3 funded by the International Fund for Agricultural Development (IFAD), and the Lao PDR Emission Reductions Program (ERP) through Implementation of Governance, Forest Landscapes and Livelihoods Program funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), in the three provinces of Houaphan, Xengkhuang and Xayabuly for Output 1 and in the province of Houaphan for Output 2.

19. The Ministry of Agriculture and Forestry (MAF) is the Executing Agency and the Provincial Agriculture and Forestry Offices (PAFOs) are the Implementation Agencies. Within the MAF, the Department of Irrigation (DOI) is responsible for, among other things, the development of irrigation infrastructure in Laos.

20. This IEE for the Nam Piew River 1, 2, 3 and 4 Irrigation and Nam Mad River 1 and 2 Irrigation Sub-Projects in Xengkhuang Province presents an assessment of the environmental impacts and the detailed Environmental Management Plan (EMP) for the subproject based on detailed engineering design. The preparation of this IEE is guided by the Environmental Assessment and Review Framework (EARF) of the SRIWSM, ADB Safeguard Policy Statement (SPS, 2009), ADB Operational Manual Section F1/BP (2013), Access to Information Policy (ADB AIP, 2018), IFC-World Bank Environment, Health and Safety (EHS) Guidelines, the Government of Lao PDR's Environmental Protection Law (2013), and other Government environmental laws, policies, rules and regulations applicable for irrigation projects. The Rapid Environmental Assessment (REA) checklist is presented in Appendix A.

2.1 METHODOLOGY

21. This Initial Environmental Examination (IEE) is prepared according to the Environmental Assessment and Review Framework (EARF) of the SRIWSM, ADB Safeguard Policy Statement (SPS, 2009), ADB Operations Manual Section F1/P, Access to Information Policy (ADB AIP, 2018), International Finance Corporation - World Bank Environment, Health and Safety (EHS) Guidelines, and the GoL Environmental Protection Law (2013), and other environmental laws, policies, rules and regulations applicable for system projects. The potential impacts have been analyzed and mitigation measures identified following site visits to the locations of the subproject component facilities and service area in June 2022. The visits included an assessment of the proposed sites, discussions with Provincial and District officials and village representatives.

2.2 PROJECT CATEGORY

22. The requisite screening was carried out during the preparation phase of the SRIWSM using the ADB Rapid Environmental Assessment (REA) checklist. The SRIWSM was classified Environment Category B requiring the preparation of IEE and EMP. This IEE confirms the sub-project remains Category B. The potential adverse environmental impacts are site-specific, reversible, and can be readily mitigated via an environmental management and monitoring plan (EMP).

3 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

3.1 ENVIRONMENTAL SAFEGUARDS POLICIES, ADB

23. The environment safeguards requirements of ADB are presented in the following guidelines:

- Safeguard Policy Statement (2009);
- Operations Manual Section F1/P¹; and
- Access to Information Policy (2018).

24. The Safeguards Policy Statement (SPS, 2009) of the Bank governs the environmental and social safeguards of ADB's operations. When a project has been identified for ADB financing, it is screened and categorized to determine the following:

- Significance of potential impacts or risks of the project to the environment;
- Level of assessment and institutional resources required to address the safeguard issues; and
- Information disclosure and consultation requirements.

25. The Environmental Safeguard Requirements 1 (SR1) of the SPS outlines the environmental safeguards requirements that borrowers/clients have to comply with. These requirements include assessing impacts, planning and managing impact mitigations, preparing environmental assessment reports, disclosing information and undertaking stakeholder consultations, establishing a grievance redress mechanism, and monitoring and reporting. It also includes specific environmental safeguard requirements pertaining to biodiversity conservation and sustainable management of natural resources, pollution prevention and abatement, occupational and community health and safety, and conservation of physical cultural resources.

¹ Operations Manual Bank Policies (BP) issued on 1 October 2013, based on ADB Safeguard Policy Statement, 2009.

26. Every project is initially categorized for potential environmental impacts and risks:

- Category A – if a proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented; impacts may affect an area larger than the sites or facilities subject to physical works. A full-scale environmental impact assessment (EIA) including an EMP is required.
- Category B – if a proposed project's potential environmental impacts are less adverse and fewer in number than those of category A projects; impacts are site-specific, few if any of them are irreversible, and impacts can be readily addressed through mitigation measures. An IEE, including an EMP is required.
- Category C – if a proposed project is likely to have minimal or no adverse environmental impacts. No EIA or IEE is required although environmental implications need to be reviewed.
- Category FI – is assigned to projects that involve investment of ADB funds to or through a financial intermediary.
- There are eleven basic principles in the ADB safeguards policy on environment, which are summarized in Table 1 below.

TABLE 1. ENVIRONMENTAL SAFEGUARD POLICY PRINCIPLES IN SPS (2009)

ENVIRONMENT POLICY PRINCIPLE	REQUIREMENT
Screening and categorization	Use of a screening process for each proposed project to determine the extent and type of environmental assessment commensurate with the significance or potential impacts and risks.
Environmental assessment	Conduct of an environmental assessment for each proposed project to identify potential impacts and risks to environment and people.
Alternatives examination	Examine alternatives to project's location, design, technology, and components and their potential environmental and social impacts. Also consider the "no project" alternative.
Environmental mitigation and monitoring plans	Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.
Consultation and GRM	Carry out meaningful consultation with affected people and facilitate their informed participation early in the project preparation process and ensure that their views and concerns are taken into account. Establish a GRM to receive and facilitate resolution of the affected people's (AP's) concerns regarding the project's environmental performance.
Public disclosure	Disclose the environmental assessment, including the EMP, in a form and language understandable to AP and other stakeholders.
EMP implementation and monitoring	Implement the EMP and monitor its effectiveness. Document the monitoring results, including corrective actions and disclose the monitoring reports.
Protection of critical habitats	Do not implement project activities in areas of critical habitats unless (i) there are no measurable adverse impacts on the critical habitat, (ii) there is no reduction in the population of any recognized endangered or critically endangered species and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, additional programs to promote and enhance the conservation aims of the protected area will be implemented.
Pollution prevention and control technologies	Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank's Environmental, Health, and Safety (EHS) Guidelines.
Occupational health and safety	Provide workers with safe and healthy working conditions and prevent accidents, injuries and diseases in the workplace. Minimize adverse impacts and risks to the health and safety of local communities.
Preservation of physical cultural resources	Conserve physical cultural resources and provide a "chance find" procedure and conservation approach for materials that may be discovered during project implementation.

AP = affected people, EHS = Environmental, Health, and Safety; EMP = environmental management plan, GRM = grievance redress mechanism.

27. Aside from the SPS (2009), ADB also prescribes the Access to Information Policy (2018), which requires consultations, participation, and disclosure of information to enhance stakeholders' trust in, and ability to engage with, ADB. The policy promotes transparency, accountability, and participatory development. It establishes the disclosure requirements for documents produced or to be produced through ADB assistance. The IEE, EMP, and environmental monitoring reports (EMRs) of the project are to be disclosed on the ADB website in accordance with the AIP (2018). As a Category B project, the draft IEE report should be available to interested stakeholders before project approval and posted on the ADB's website upon Board approval of the project in compliance with the SPS (2009) and the AIP (2018).

3.2 LEGAL AND INSTITUTIONAL FRAMEWORK ON ENVIRONMENTAL MANAGEMENT IN LAO PEOPLE'S DEMOCRATIC REPUBLIC

3.2.1 Law on Environmental Protection (2013)

28. The law governing the protection of the environment, including the assessment and management of projects in Lao PDR is the Environmental Protection Law (EPL), which was issued in 1999 and amended in 2013.

3.2.2 Law on Environmental Impact Assessment of Development Projects (2019)

29. ***Decree on Environmental Assessment, No.21/PM, January 2019.*** The decree is the country's principal environmental legislation regarding IEE and EIA and was enacted to implement Part III of the *Law on Environment Protection* in relation to environmental protection and assessment. MONRE is the central authority to coordinate with the local agencies and administration to disseminate and enforce this decree. Key features of the decree are:

- Development project must undertake environmental assessment (EA) in accordance with the regulation of the concerned line ministry.
- Projects must prepare environmental management and monitoring plans (EMMPs), and social management and monitoring plans (SMMPs).
- Large-scale or complex project with significant impact need to conduct EIA.
- Small-scale projects or with minor environmental impact need to conduct IEE.
- Investment projects not listed in the Ministerial Decree MONRE/8056 are not subject to the requirements

3.2.2.1 Project Screening

30. The project screening is the first step of the environmental assessment stated in Article 8 of the said Law. Investment projects are categorized according to a schedule to the EIA Decree into:

- Category 1: small scale investment projects with minor environmental and social impacts, for which initial environmental examination is required;
- Category 2: Large scale investment projects which are complicated or create significant environmental and social impacts, for which environmental impact assessment is required.

31. For irrigation projects, those with a command area of between 100 and 2,000 hectares are in category 1, and those with a command area greater than 2,000 hectares are in category 2. The implication is that an irrigation project with a command area less than 100 hectares and with negligible environmental impacts would not qualify as either. In the EIA Decree, where a project is of a type that is not in either category, an investment application is submitted to the MONRE for further screening.

32. By using the list of the project and activities that have to conduct the IEE or EIA No. 8056/MoNRE, dated 17 December 2013, irrigation facilities (Item 3.52) fall under Category 1 so an IEE is required by the Government.

3.2.2.2 Public Consultations

33. Stakeholder consultation is an integral part of the domestic EIA process. The guidelines in the conduct of stakeholder and community consultations, as part of the environmental and social assessment process, are outlined in the Ministerial Instruction on Public Involvement (2012). The guidelines provide the principles and process of engaging and consulting with project stakeholders and project-affected persons (PAPs) in project preparation, design, and implementation. It aims to ensure that stakeholders and PAPs are adequately consulted and provided with the opportunity to articulate their feedback and suggestions on project design and implementation to avoid or mitigate potential impacts on their livelihood and environment.

34. The requirements for the securing of the requisite Environmental Compliance Certificate (ECC) from PoNRE Xengkhuang have been complied with and the ECC has been issued on 24 May 2022. Appendix B shows the Environmental Compliance Certificate for the irrigation sub-projects in Xengkhuang Province.

3.2.3 Law on Forestry No. 08/NA (2019)

35. This Forestry Law determines the principles, regulations and measures for the management, protection, development, utilization and inspection of forests and forestland, promoting tree plantations, regenerating and increasing forest resources; aims to make forest resources rich, increase forest cover, as a source for tourism and for sustainable use in people's livelihoods; ensures the protection of soil quality, air quality, water sources, biodiversity, and environmental protection in a green and sustainable manner; and contributes to the socio-economic development of the country.

36. The Forest Law classifies forests into: (i) conservation forests; (ii) protection forests; and (iii) production forests. Conservation Forests are forests classified for the purposes of conserving nature, preserving and propagating plant species, aquatic animals and wildlife species, protecting forest ecosystems and others of natural, historical, cultural, touristic, environmental and educational value and for scientific research experiments.

37. Conservation Forests consist of national, provincial, district and village conservation forests which as specified in a specific regulation. Conservation Forests are rich in biodiversity, have unique natural scenery, are of outstanding importance at national, regional and global levels and may be proposed as wildlife conservation areas, national parks, regional or world heritage sites.

38. Protection Forests are forests classified for the function of maintaining water sources, riverbanks and road sides, for preventing soil erosion and improving soil quality, strategic areas for national defence and security, safeguarding against natural disasters and providing environmental protection and other functions. Protection Forests comprise national, provincial, district and village protection forests, as specified in a specific regulation.

39. Production Forests are forests including natural forests and planted forests designated for the supply of wood and NTFPs as commodities to fulfil the requirements of national socio-economic development and people's livelihoods.

3.2.4 Decree on Protected Area No. 134/G (May 2015)

40. This decree determines the principles, regulations, and standards related to the establishment, allocation, protection, development, utilization, and inspection of protected areas in order to make the areas become abundant and sustainable by focusing on environmental protection, watershed protection, prevention from erosion, protection of soil quality, protection of strategic zones for national defence and security, adaptation and reduction of climate change, solutions to global warming, contributing to the improvement of the living condition of people of all ethnic groups and the development of the national economy.

41. The government allows the use of protected areas only in an allocated zone which must be used in accordance with related regulation to ensure that there are no negative impacts on forests, quality of soil, and the natural and social environment. The use of protected areas for public benefit are for research and testing, recreation and tourism, source of medicines, and for protection of the watershed, biodiversity, natural and historical environmental and cultural resources. The use of protected areas for the public benefit is permitted by MONRE. Local people who reside in and around protected areas and contribute to the protection and regeneration of forest and non-timber forest products (NTFPs) in the protected areas have the right to use the forest and forest products as determined in the allocation plan of the protected area and related regulation.

3.2.5 Law on National Heritage No. 08/PDR (2005)

42. This law provides the regulations and measures for the administration, use, protection, conservation, restoration, and rehabilitation of national cultural, historical, and natural heritage. Any individual is prohibited from causing damage to the national cultural and historical heritage, such as archaeological and anthropological sites, encroaching onto historical sites, occupying land in national heritage conservation areas, and changing the original condition of any heritage.

43. Under the law, the protected area of heritage sites is divided into three zones:

- Zone 1, or the central area where the heritage is located and which must be protected and where no construction is permitted;
- Zone 2, or the area surrounding the central area where some activities are permitted to increase the value of zone 1, provided that no damage is caused to the surrounding area; and
- Zone 3, or the administrative area where construction is permitted to serve zones 1 and 2 for the accommodation of tourists.

3.2.6 Law on Water Resources (2017)

44. This law prescribes the regulations related to the protection, administration, exploitation, use, and development of water and water resources, protection against damage to water or water resources, and rehabilitation of affected areas to assure quality and quantity of water to respond to the people's living requirements. It also prescribes the protection of natural and social environment, river basin management, and flood management. The law covers water diversion, abstraction, impoundment, wastewater discharge, construction along riverbanks, return of water after use into natural water sources, emergency response during drought, flood, and reservoir safety including irrigation systems.

3.2.7 Decree on Pesticide Management (2017)

45. This Decree defines the principles, regulations and measures regarding the use of pesticides, management and monitoring of pesticide activities to ensure the quality, efficiency and safety for humans, animals, plants and environment with the aim of allowing the agricultural and forest production to be carried out in line with clean, green and sustainable agriculture, capable to ensure regional and international integration, and contribute to the national socio-economic development.

3.2.8 Law on Irrigation (2012)

46. This law establishes guidelines, rules, and measures for the management and monitoring of irrigation operations it requires that all sizes and types of irrigation construction be carried out effectively and in compliance with technical and regulatory standards, with the goal of ensuring water supply, preventing droughts and floods, avoiding damage to agricultural production, enhancing food security, promoting production and reducing poverty.

3.2.9 Wildlife and Aquatic Law No. 07/NA (2008)

47. The law prescribes the regulations to promote sustainable regeneration and utilization of wildlife and aquatic life, without any harmful impact on natural resources or habitats. It restricts anthropogenic pressure on decreasing species and the extinction of wildlife and aquatic resources by encouraging people to understand and recognize the significance of managing, monitoring, conserving, protecting, developing, and utilizing wildlife in a sustainable manner.

3.2.10 Law on Construction No. 197/NA (November 2009)

48. This law prescribes the requirements of all construction activities, including requirements for public works and transportation sector, water supply and sanitation, irrigation and flood protection, among others. Individuals or organizations intending to construct, install, repair, or demolish any structure are required to obtain a permit for construction of the project (Article 31) prior to implementation. Article 34 also specifies the requirements on safety during project execution, such as provision of tools for workers (helmets, shoes, gloves, and glass) and measures to be implemented in case of natural calamities at the construction site.

3.2.11 Labor Law (2013)

49. This law defines the principles, regulations, and measures on administration, monitoring, labor skills development, recruitment, and labor protection. Section IV of the law prescribes the regulations related to labor protection, safety, and the rights of employees.

3.2.12 Law on Handling Petitions 012/NA (December 2014)

50. The Revised Law on Handling Petitions 012/NA or the Grievance Redress Law was approved by the National Assembly on 5 December 2014 and by the President in 2015. The law provides the objectives, principles, and process of applying and handling different types of grievances, petitions, and complaints that may be raised by citizens.

3.3 ENVIRONMENTAL STANDARDS

51. The national environmental standards in Lao PDR are based on the Environmental Protection Law No. 29/NA (December 2012) and Decree on National Environmental Standards issued by the government on 21 February 2017. The standards on water, soil, air, and noise are set under the decree as basis for environmental monitoring and pollution control. The limits set in these national standards are aligned with international standards such as the World Health Organization (WHO) noise guidelines shown in Table 2.

TABLE 2. NOISE STANDARDS IN LAO PDR AND WHO GUIDELINE VALUES

AREA	LAO PDR NOISE STANDARDS			WHO/EHS NOISE LEVEL GUIDELINES	
	06H00 – 18H00	18H00 – 22H00	22H00 – 06H00	DAYTIME 07H00 – 22H00	NIGHTTIME 22H00 – 07H00
Quiet areas: hospitals, libraries, kindergarten, and schools	50	45	40	55	45
Residential areas: hotels and houses	55	55	45		
Commercial and service areas	70	70	50	70	70
Small industrial factories located in residential areas	70	70	50		

EHS = Environment, Health, Safety, Lao PDR = Lao People's Democratic Republic; WHO = World Health Organization.

3.4 INTERNATIONAL CONVENTIONS

52. Lao PDR is signatory to a number of international conventions, such as:

- Stockholm Conventions on Persistent Organic Pollutants (POPs): Lao PDR signed the Stockholm Convention in 2002 and ratified it in June 2006. The MONRE (previously the Water Resources and Environment Administration or WREA) serves as contact for the Stockholm Convention. A National Implementation Plan (NIP) was prepared with assistance from UNIDO.
- Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal. Lao PDR became a signatory to the Basel Convention on 21 September 2010.
- RAMSAR Convention on Wetlands. Lao PDR is a contracting party to the Ramsar Convention to which it acceded in 2010. It has two sites designated as wetlands of international importance, i.e., Being Kiat Ngong wetlands in Champasak and the Xe Champone wetlands in Savannakhet. Lao PDR pursues an active policy in biodiversity conservation and has taken initiatives to support wetlands conservation and sustainable use.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Lao PDR was a signatory to CITES, which entered into force on 1 July 1975.
- Kyoto Protocol and the United Nations Framework Convention on Climate Change (UNFCCC). The latter was ratified by Lao PDR in 1995 and the Kyoto Protocol in 2003. The national strategy of Lao PDR on climate change builds on the country's commitment to the UNFCCC.
- Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Lao PDR became the 157th party to the Rotterdam Convention on 10 September 2010.
- Vienna Convention for the Protection of the Ozone Layer. Lao PDR became a signatory to the Vienna Convention on 19 November 1998.

4 DESCRIPTION OF THE SUB-PROJECTS

53. The Nam Piew River 1, 2, 3 and 4 and Nam Mad River 1 and 2 Irrigation Sub-Projects are the second batch of subprojects of the SRIWSM. The SRIWSM is expected to have a net positive impact on subproject catchments as it will reduce the risk from dry season cropping of the irrigation command areas. It will also support a potential increase in income from higher crop values. This will reduce the pressure on land conversion for upland cropping. Such land conversion is identified as a major driver of forest loss as crops are grown on steep, bare ground subject to high rates of soil erosion in the wet season. Figure 1 shows the location of the Sub-Projects in Xengkhuang Province. Plate 1 provides the imagery of the locations of the proposed sub-projects in Xengkhuang Province.

4.1 NAM PIEW RIVER 1, 2, 3 AND 4 IRRIGATION SYSTEM SUB-PROJECT

4.1.1 Existing Conditions

54. Nam Piew River Irrigation Project has four headwork structures: Lae Irrigation (Nam Piew River 1) at Ban Lae Na Bor; Na Oung Irrigation (Nam Piew River 2) at Ban Na Oung; Na Xon Irrigation (Nam Piew River 3) at Ban Phonkham; and Na Pa Irrigation (Nam Piew River 4) at Ban Na Yong (Na Pa Commune). The project is about 60 km from Phonsavan to the east and about 8 km from Kham District Municipality along road No. 7. According to the Topographic Map of the National Geographic Department, the project lies within 345000.00 E – 365000.00 E and 2160000.00 N – 2180000.00 N (WGS 1984 UTM Zone 48 N). The headworks are located at the rectangular coordinate points as follows: the headworks of Lae Irrigation is located at 353643.058 E and 2173653.305 N, the headworks of Na Oung Irrigation is located at 353399.585 E and 2171034.827 N, the headworks of Na Xon Irrigation is located at 354400.651 E and 2170.015 N, and the headworks of Na Pa Irrigation is located at 358586.878 E and 2167276.59 N (WGS 1984 UTM Zone 48 N).

55. The project is a hillside area with plateaus found along the creek that accommodate rice fields and gardens. The Nam Piew River Irrigation Project bounded to the North by Ban Na Doo and Ban Kor Khaiy to the South by road No. 7 and Nam Piew River to the East by Ban Pha Thang and by Ban Long Ping and Ban Chomthong to the West.

56. The project area is more than 320 hectares, of which Lae Irrigation (Nam Piew River 1) has an area of 73.9 hectares, Na Oung Irrigation (Nam Piew River 2) has an area of 80.6 hectares, Na Xon Irrigation (Nam Piew River 3) has an area of 64.5 hectares and Na Pa Irrigation (Nam Piew River 4) has an area of 73.9 hectares. Most of the people are engaged in farming and animal husbandry. The project area is suitable with level areas for agriculture and animal husbandry. The population growth rate in the project area is high, while the food production area is limited. Years with limited rainfall and resulting low yields of paddy rice production create food security challenges for the local population. In these years there is increased pressure on the upland forests and natural streams to supplied food.

4.1.2 Proposed Development

57. The proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project is located in Kham District, Xengkhuang Province Northern Lao. The proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project would involve the rehabilitation and upgrading of four exiting weirs/headworks and the ancillary canals and structures namely Nam Piew River 1 at Ban Le-Nador Village about 16km North of Kham District center; Nam Piew River 2 at Oung Village about 15km Southwest of Kham District center; Nam Piew River 3 at Nasone Village approximately 14km North of Kham District center and Nam Piew River 4 at Napa Village about 14km Southwest of Kham District center. The proposed development will also include the provision of fish passages in the headworks/weirs.

FIGURE 1. LOCATION MAP OF THE XENGKHUANG PROVINCE SUB-PROJECTS

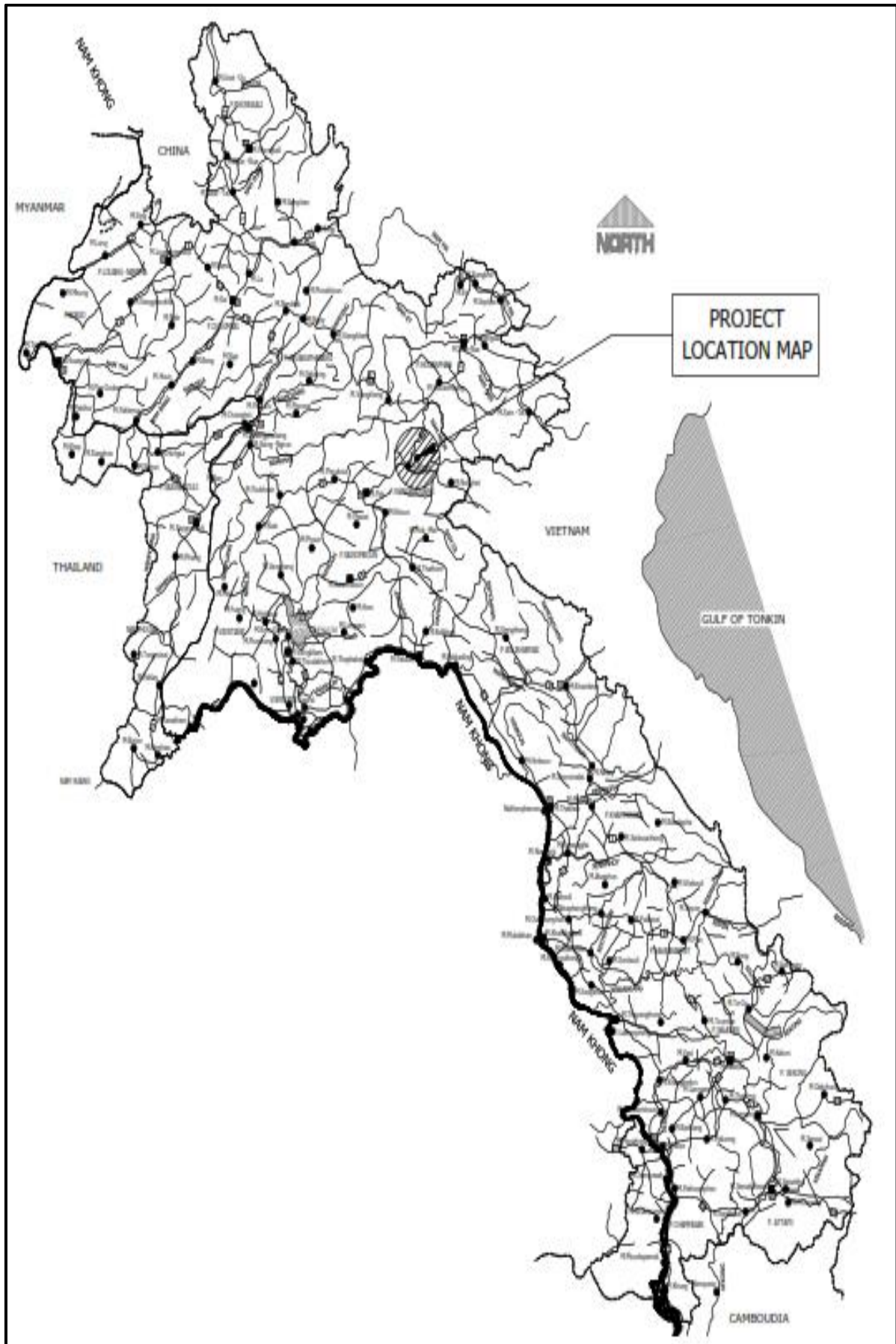
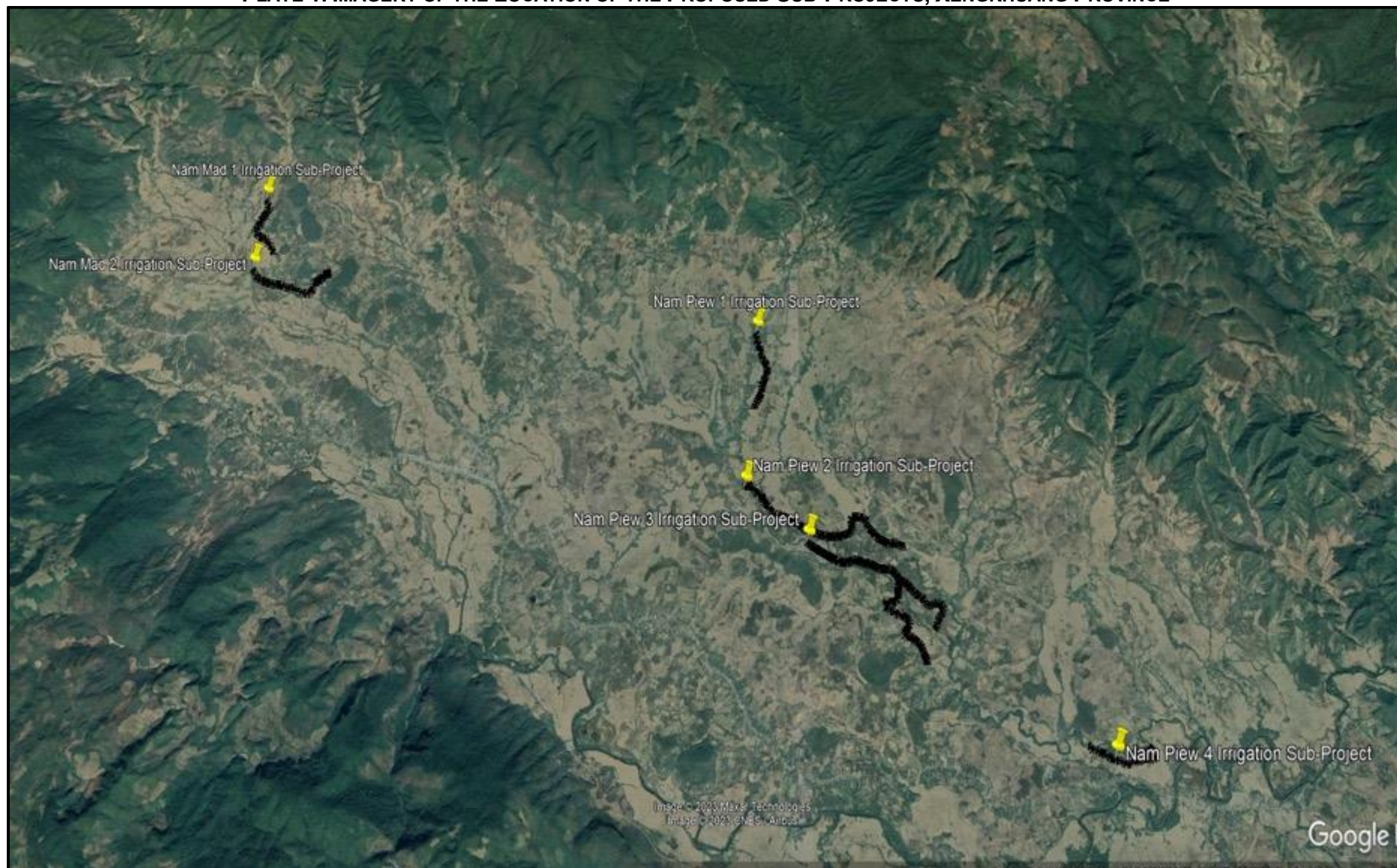


PLATE 1. IMAGERY OF THE LOCATION OF THE PROPOSED SUB-PROJECTS, XENGKHUANG PROVINCE



58. The Nam Piew River irrigation system has been designed as a gravity fed system consisting of four overflow headworks and a canal distribution system to service 293 hectares. The canal layout is based on the original schemes and considers the irrigated area and construction cost. The details of the canal system are shown in the Table 3 below while Table 4 presents the canal design dimensions.

TABLE 3. CANAL SYSTEM OF THE PROPOSED NAM PIEW RIVER IRRIGATION SUB-PROJECT

CANAL LEVEL	LENGTH (M)	TOTAL COMMAND AREA (HECTARE)	TOTAL AREA BY CANAL SUPPLY (HECTARE)
LAE IRRIGATION			
MC	1,470.00	73.915	73.915
NA OUNG IRRIGATION			
MC	3,500.00	80.591	80.591
NA XON IRRIGATION			
MC	3,490.00	64.524	33.59
LSC	1,100.00	30.938	30.938
NA PA IRRIGATION			
MC	655.24	44.11	1.83
RSC	365.00	24.54	24.54
LSC	470.00	17.73	17.73

TABLE 4. CANAL DESIGN DIMENSIONS

CANAL	AREA (HA)	IRRIGATION COEFFICIENT (L/S~HA)	WATER AMOUNT	SCALES						
			Q (M ³ /S)	B (M)	H (M)	Q* (M ³ /S)	FR (M)	DL (M)	DR (M)	H (M)
MC	73.915	2.50	0.185	0.40	0.40	0.241	0.20	1.00	1.00	0.60
MC	80.591	2.50	0.201	0.65	0.65	0.340	0.20	1.00	1.00	0.85
MC	64.524	2.50	0.161	0.65	0.65	0.247	0.20	1.00	1.00	0.85
LSC	30.938	2.50	0.077	0.40	0.40	0.129	0.20	1.00	1.00	0.60
MC	44.11	2.50	0.110	0.65	0.65	0.182	0.20	1.00	1.00	0.85
RSC	24.54	2.50	0.061	0.40	0.40	0.112	0.20	1.00	1.00	0.60
LSC	17.73	2.50	0.044	0.40	0.40	0.103	0.20	1.00	1.00	0.60

59. The hydraulic calculations for the structures along the canal were undertaken to ensure that the supply of water through the structures will meet the irrigation water needs and also considers ease of management. Table 5 presents the summary of structures along the canals.

60. The main and secondary canals are constructed of concrete for ease of maintenance. The canal design is based on the experience of the previous irrigation projects to ensure the efficiency of water use, and to minimize the loss of production area.

61. Figures 2 to 6 shows the typical designs for the canal and structures. Figure 7 shows the canal cross sections while Figures 8 to 12 presents the design of the structures along the canals.

TABLE 5. SUMMARY OF STRUCTURES ALONG THE CANALS

CANAL NAME	STRUCTURE	QUANTITY
LAE IRRIGATION		
MC	Drainage Building	1
	Pipeline under the road	1
	Pipe for rice fields	7
	Building at the canal end	1
NA OUNG IRRIGATION		
MC	Pipeline under the road	4
	Bridge over the canal	3
	Waterfall building	4
	Pipe for rice fields	23
	Building at the canal end	1
NA XON IRRIGATION		
MC	Pipeline under the road	2
	Water distribution building	1
	Bridge over the canal	3
	Waterfall building	2
	Pipe for rice fields	11
	Building at the canal end	1
LSC	Pipeline under the road	2
	Bridge over the canal	1
	Pipe for rice fields	7
	Building at the canal end	1
NA PA IRRIGATION		
MC	Water distribution building	1
	Bridge over the canal	2
	Pipe for rice fields	1
	Building at the canal end	1
RSC	Water drainage building	1
	Bridge over the canal	1
	Pipe for rice fields	1
	Building at the canal end	1
LSC	Water distribution building	1
	Drainage building	1
	Water leveling building	1
	Pipe for rice fields	2
	Building at the canal end	1

FIGURE 2. TYPICAL DESIGNS FOR CANALS AND STRUCTURES

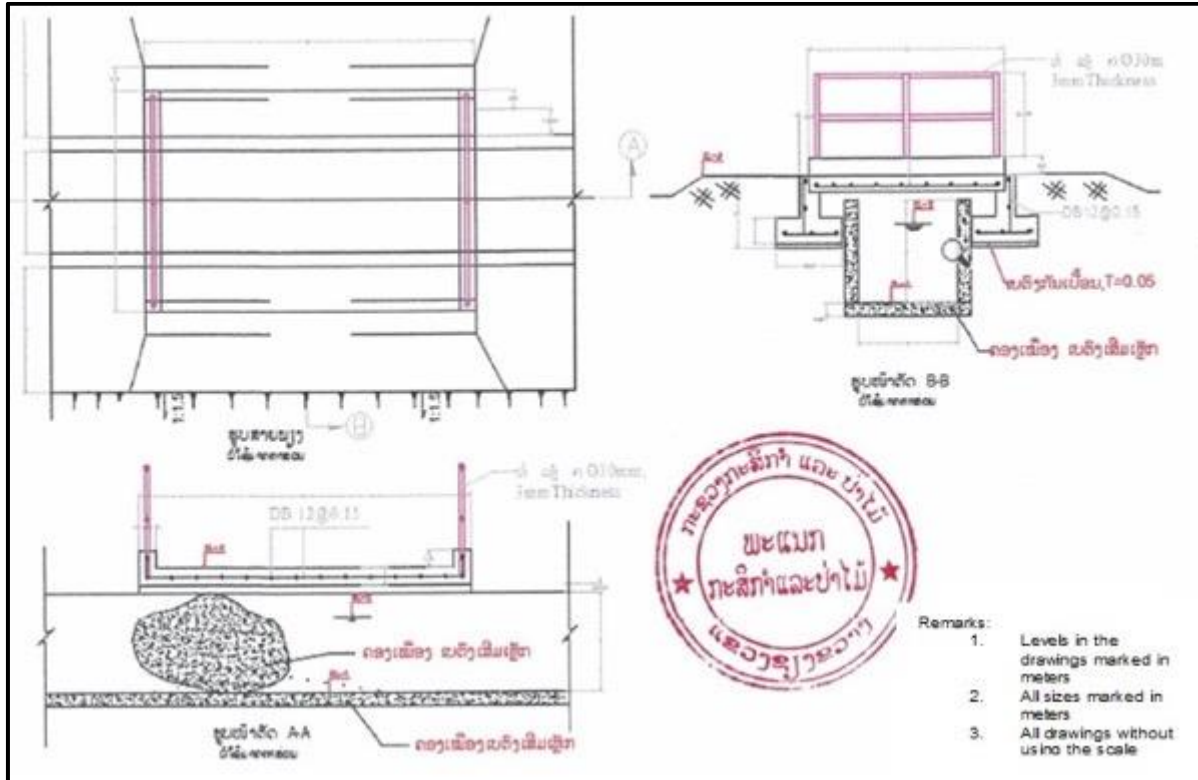


FIGURE 3. TYPICAL DESIGNS FOR CANALS AND STRUCTURES

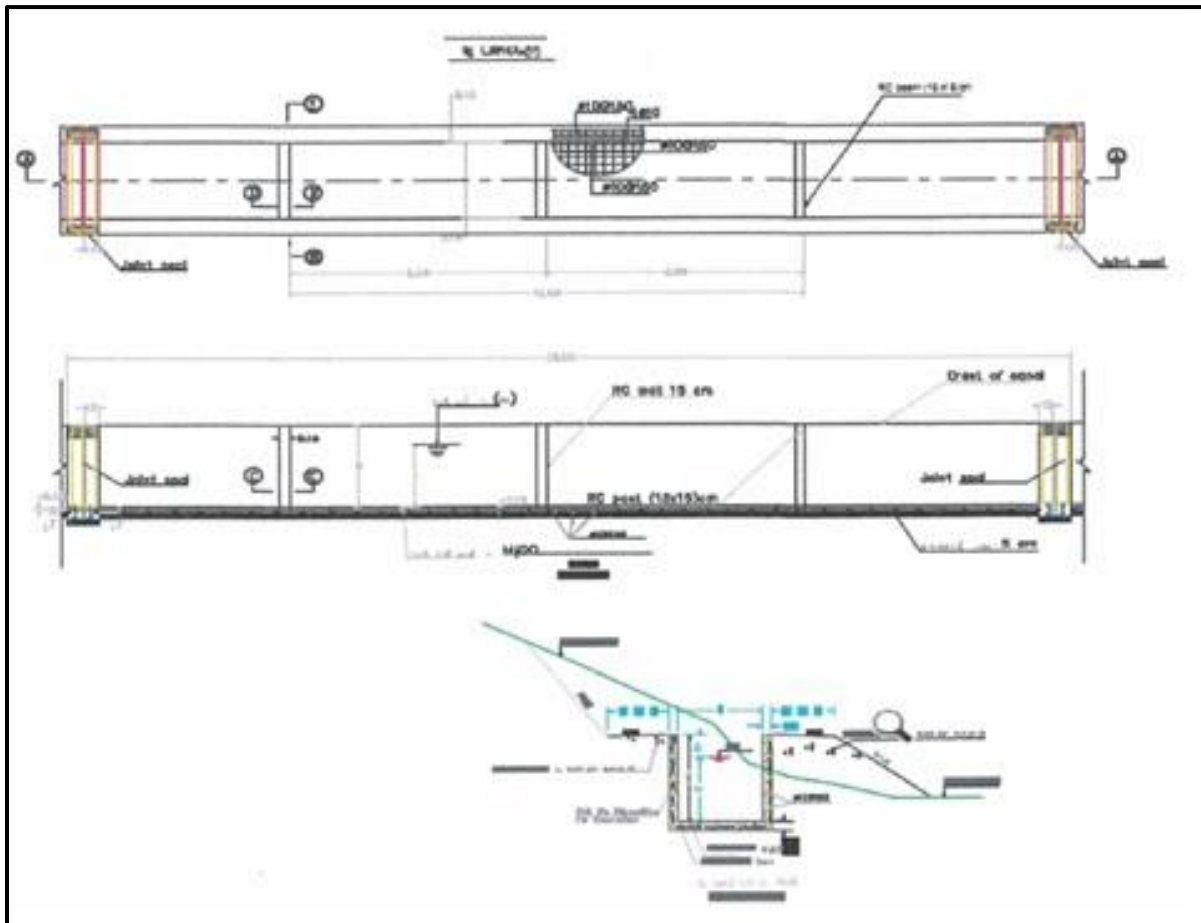


FIGURE 4. TYPICAL DESIGNS FOR CANALS AND STRUCTURES

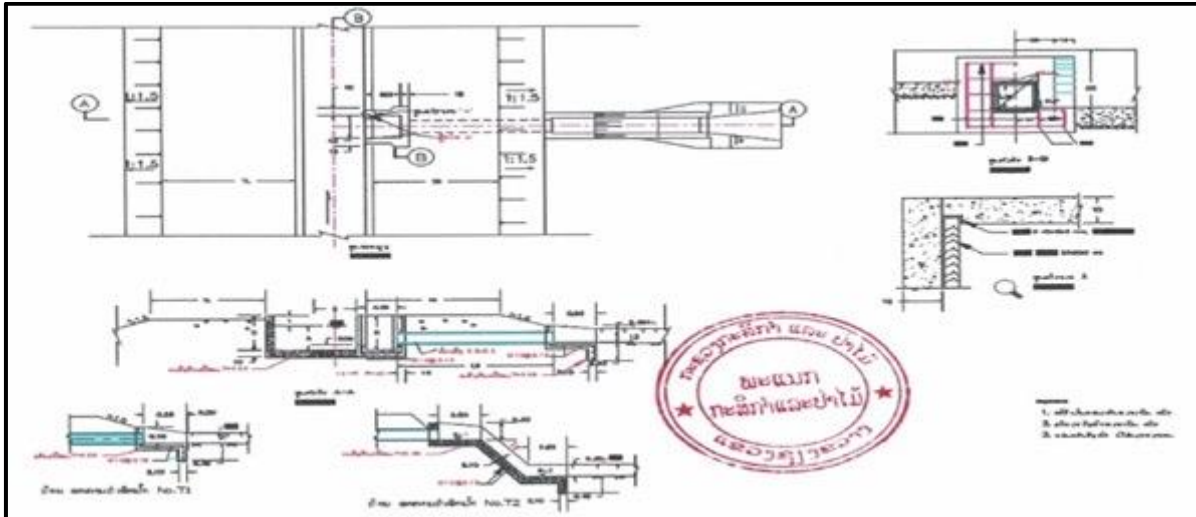


FIGURE 5. TYPICAL DESIGNS FOR CANALS AND STRUCTURES

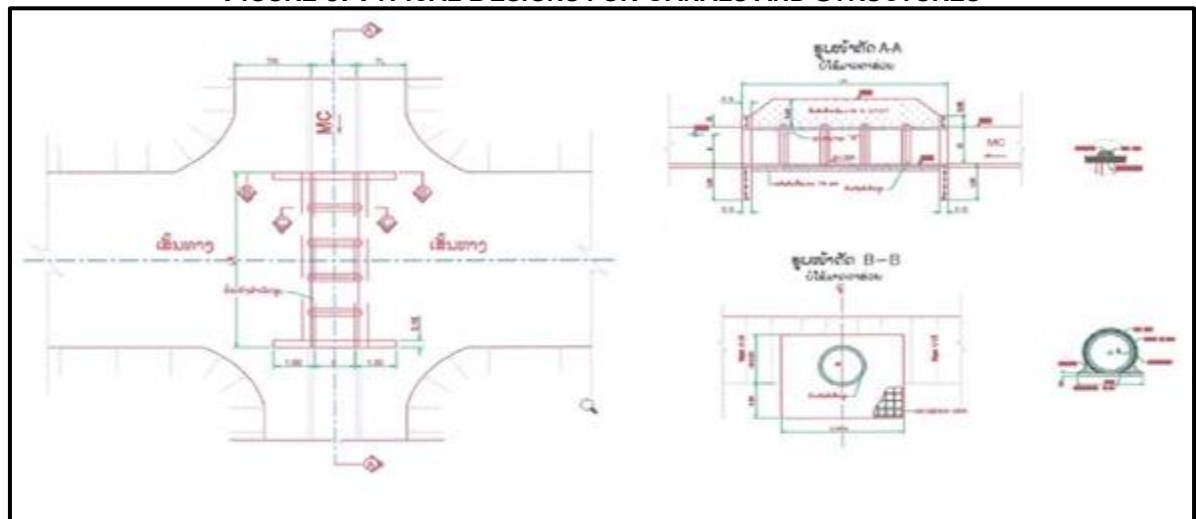


FIGURE 6. TYPICAL DESIGNS FOR CANALS AND STRUCTURES

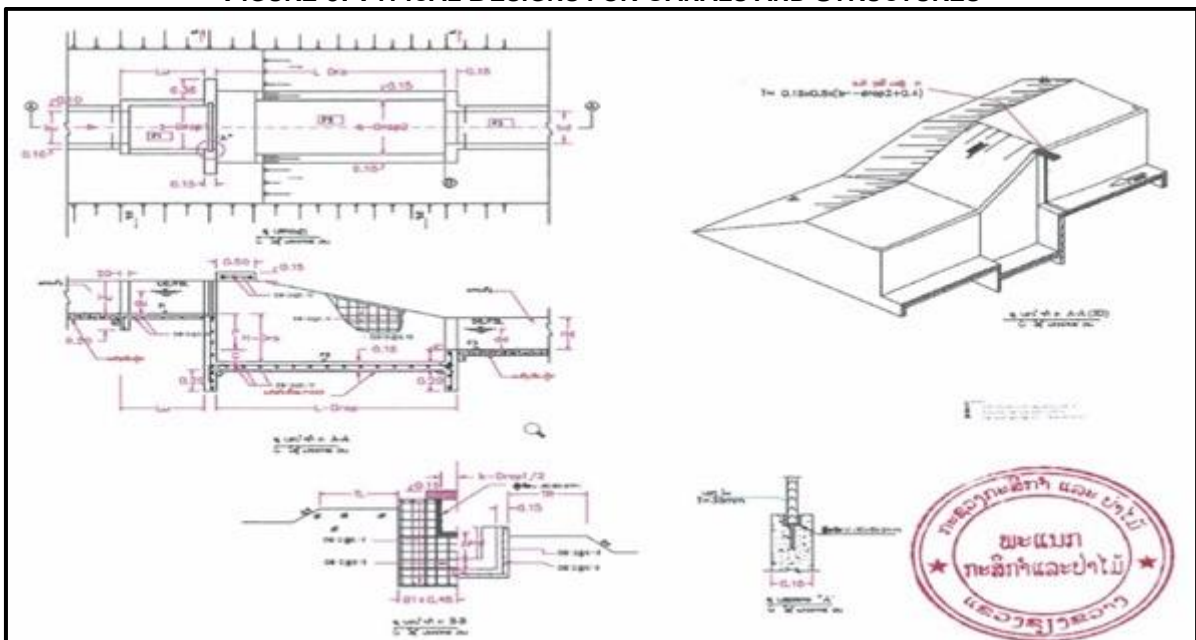


FIGURE 7. CANAL CROSS SECTIONS

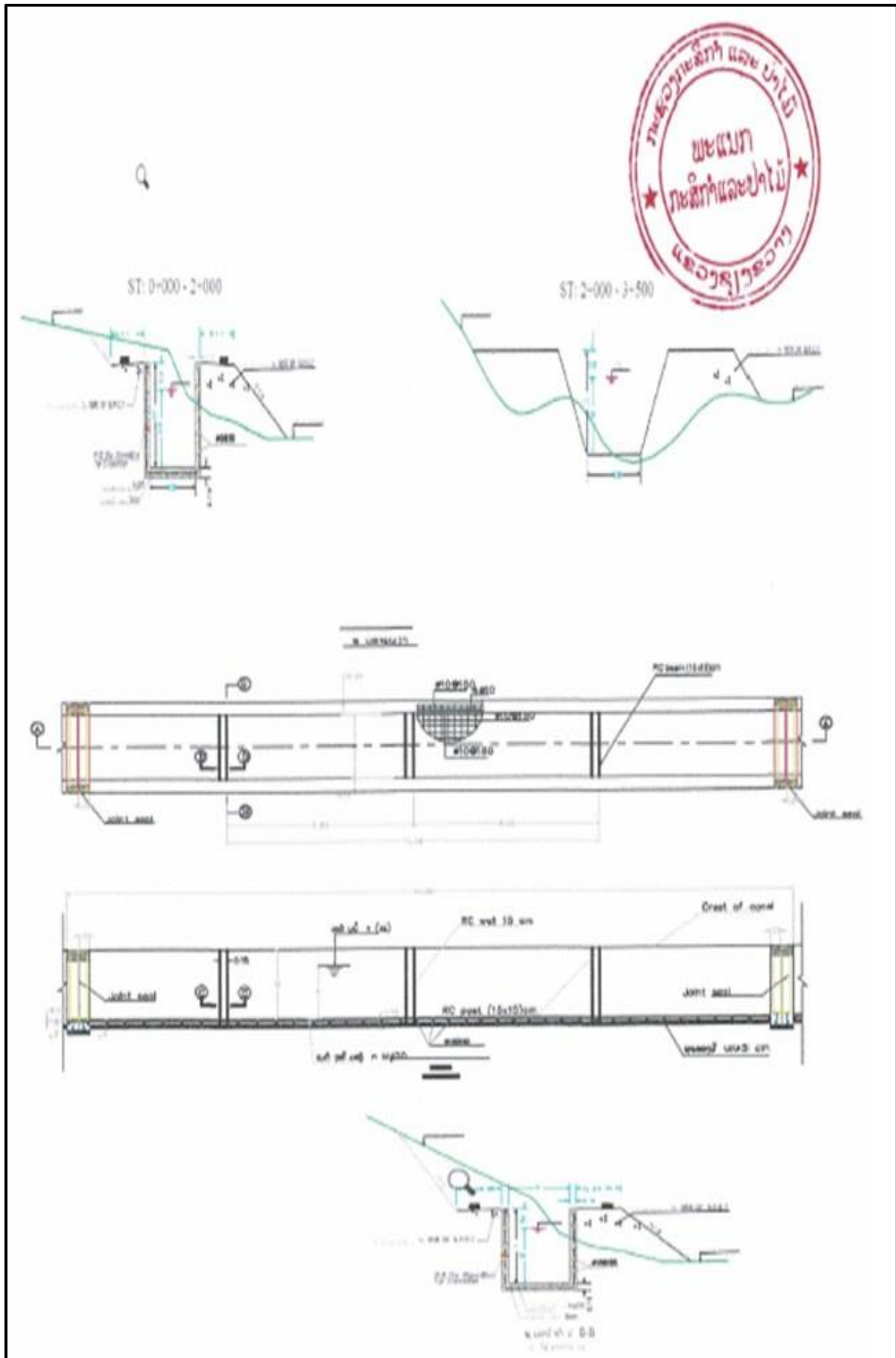


FIGURE 8. DESIGN OF THE STRUCTURES ALONG THE CANALS

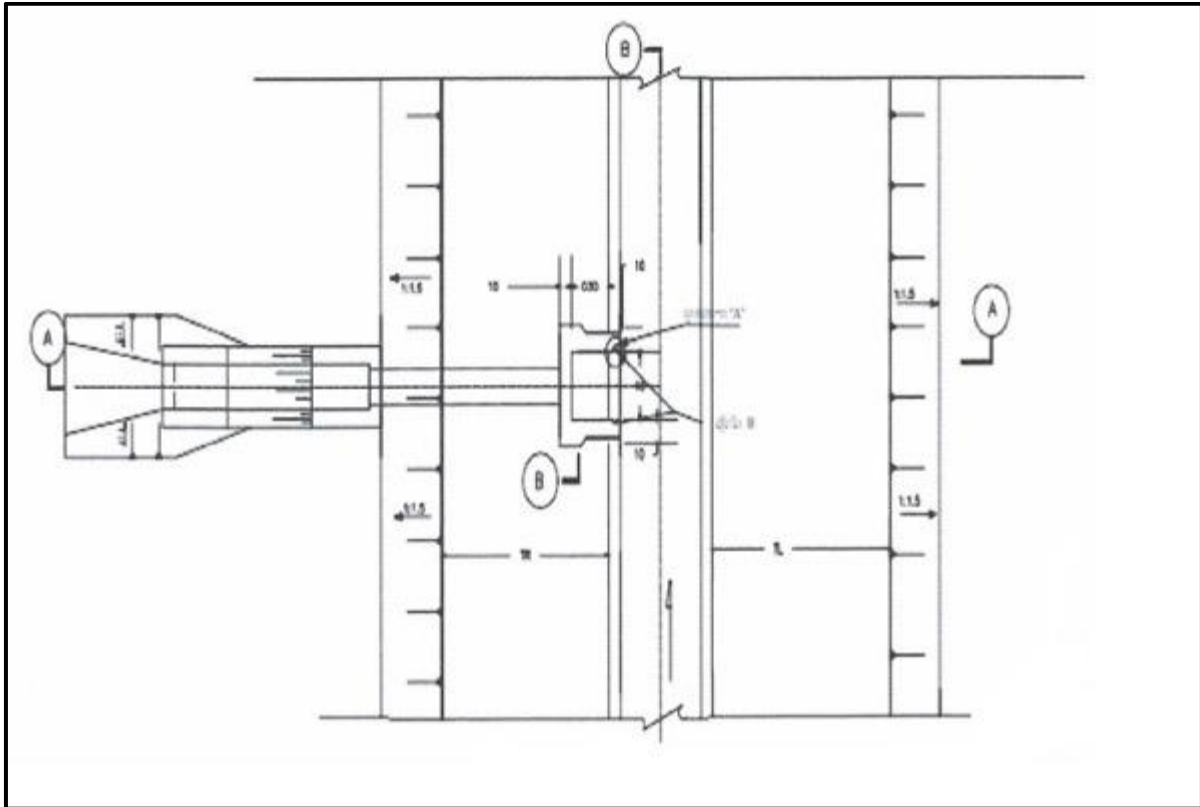
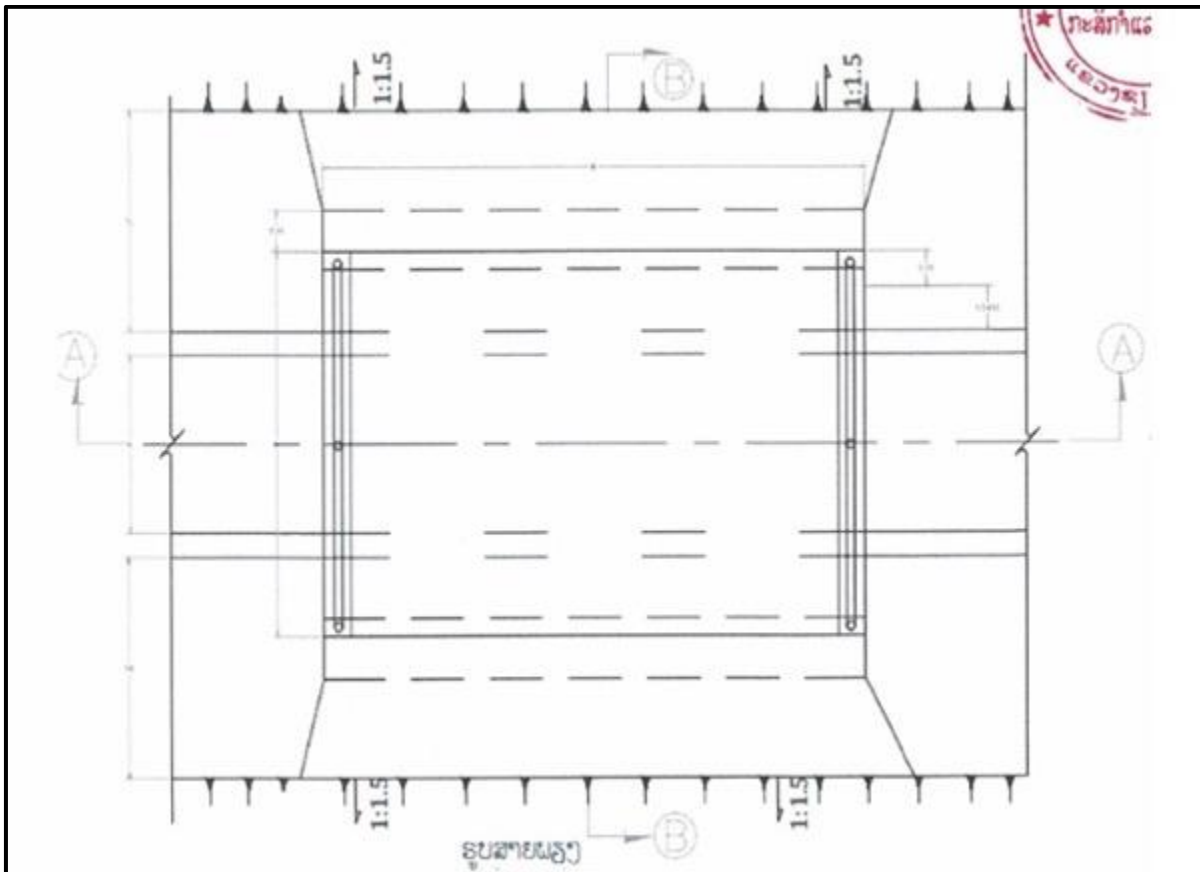


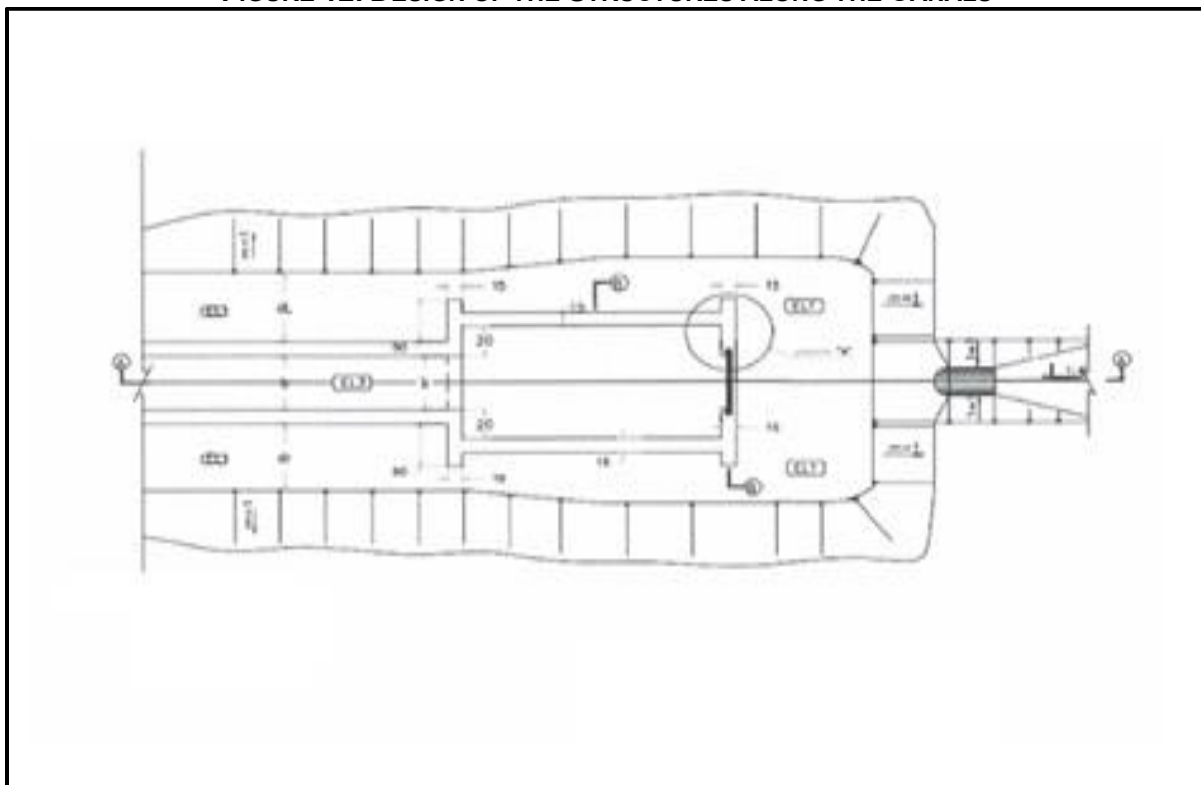
FIGURE 9. DESIGN OF THE STRUCTURES ALONG THE CANALS



The drawing illustrates the design of a rectangular box culvert. The plan view (top) shows the culvert's footprint with dimensions: total length L , total width B , and internal width b . It includes a central section with a width of 0.180 and a length of L_d . The side slopes are indicated as $1:1.5$. The elevation view (bottom) shows the culvert's profile with a height of $H \times 1 + 0.2$. It details the internal structure, including a central section with a width of 0.180 and a length of L_d . The side slopes are indicated as $1:1.5$. The drawing also shows the culvert's connection to the existing structure, with dimensions TR and TL for the transition sections. A note indicates "11 steel for strap lag" for the connection. A red stamp in the bottom right corner reads "The City of...".

[illegible]

FIGURE 12. DESIGN OF THE STRUCTURES ALONG THE CANALS



4.1.3 Hydrological Study

62. The requisite hydrologic study was undertaken during the design stage of the sub-project. The details of this study are provided in the Feasibility Study for the proposed sub-project. It can be provided upon request.

63. The Nam Piew River Irrigation Project consists of four sub-projects: Lae, Na Oung, Na Xon, and Na Pa irrigation schemes. These four sub-projects are found in the Nam Piew River watershed. The physical characteristics of the watersheds for each of the four sub-projects are shown in Table 6.

TABLE 6. NAM PIEW RIVER WATERSHED CHARACTERISTICS

WATERSHED	AREA (KM ²)	SLOPE (%)		LENGTH (KM)		LENGTH OF TRIBUTARIES (KM)	REMARK
		WATERSHED	RIVER	ALL RIVERS	MAIN RIVER		
Nam Piew 1	25.8	16.28		21.1	4.2	16.9	Lae Irrigation
Nam Piew 2	69.4	18.49		66.0	10.1	55.9	Na Oung Irrigation
Nam Piew 3	106.9	18.30		107.0	16.5	90.	Na Xon Irrigation
Nam Piew 4	167.6	18.28		146.7	23.7	122.9	Na Pa Irrigation

64. The project area is more than 320 hectares, of which Lae Irrigation (Nam Piew River 1) has an area of 73.9 hectares, Na Oung Irrigation (Nam Piew River 2) has an area of 80.6 hectares, Na Xon Irrigation (Nam Piew River 3) has an area of 64.5 hectares and Na Pa Irrigation (Nam Piew River 4) has an area of 73.9 hectares.

65. For the design, 2.50 l/s/ha was used to guarantee a sufficient water supply. The calculation of water requirements is presented in the Feasibility Study for the proposed sub-project and considers recent precipitation, and evaporation data. According to the parameters used in the design, the annual rainfall was set as 600 mm. The design guarantee of a safe water supply was set as P=85% of the volume. The results are shown in Table 7 below.

TABLE 7. WATER AVAILABILITY BY SUB-PROJECT

WATERSHED	WATERSHED AREA (KM ²)	ANNUAL VOLUME OF WATER (M ³ /S)	VOLUME P=85 (M ³)*10 ⁶	METHOD
Nam Piew 1 (Lae Irrigation)	25.845	0.66	13.52	Average Monthly Rainfall
Nam Piew 2 (Na Oung Irrigation)	69.448	1.76	36.34	Average Monthly Rainfall
Nam Piew 3 (Na Xon Irrigation)	106.936	2.71	55.95	Average Monthly Rainfall
Nam Piew 4 (Na Pa Irrigation)	167.571	4.25	87.67	Average Monthly Rainfall

66. The 100-year maximum flood discharge was estimated using two standard Lao methods. The results are shown in the Tables 8, 9 and 10 below.

TABLE 8. MAXIMUM 100-YEAR FLOOD

IRRIGATION SCHEME	METHOD (100-YEAR) (M ³ /S)	
	SOKOLOV	PA MONG
Nam Piew 1 (Lae Irrigation)	104.67	105.50
Nam Piew 2 (Na Oung Irrigation)	140.63	118.35
Nam Piew 3 (Na Xon Irrigation)	168.42	263.45
Nam Piew 4 (Na Pa Irrigation)	188.52	600.14

TABLE 9. DETERMINATION OF YEAR-ROUND SAFE WATER SUPPLY VOLUME

ATTRIBUTE	AVE	50%	75%	80%	85%	90%	95%
KP MEAN	1.00	0.96	0.75	0.70	0.65	0.61	0.56
VOLUME (10 ⁶ M ³)	94.95	91.05	70.83	66.46	62.10	57.73	53.36
WATER QUANTITY (M ³ /S)	3.01	2.89	2.25	2.11	1.97	1.83	1.69

TABLE 10. DISTRIBUTION OF MONTHLY WATER FLOW IN THE YEAR (85%)

ATTRIBUTE	DAYS	31	28	31	30	31	30	31	31	30	31	30	31
	MONTH	1	2	3	4	5	6	7	8	9	10	11	12
%		1.00	1.33	2.80	7.48	11.93	13.85	18.05	20.80	12.92	6.63	2.14	1.08
WATER QUANTITY Q: (M ³ /S)		0.353	0.520	0.993	2.738	4.230	5.073	6.398	7.374	4.732	2.350	0.785	0.382
WATER VOLUME W: 106(M ³)		0.947	1.259	2.659	7.098	11.330	13.150	17.137	19.751	12.266	6.294	2.034	1.023

67. The plant water requirements were calculated considering present climate information. The plant water requirements are as follows:

- 2.26 l/s/ha for dry season rice
- 1.77 l/s/ha for rainy season rice
- 0.57 l/s/ha for dry season beans

68. The water requirements for rice fields and dry season crops use a design requirement of $q=2.50$ l/s/ha. The Feasibility Study provides the detailed calculations for rice fields and dry season crops. Table 11 and 12 presents the water requirements of rice and sweet corn respectively.

69. Plates 2, 3 and 4 presents the imageries of the location of the Proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project. Plates 5, 6, 7 and 8 presents the command areas of the proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project while Plates 9, 10, 11 and 12 the photos of the proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project.

TABLE 11. RICE WATER REQUIREMENT (RIWR)

DAY	30	30	30	28	30	30	30	30	30	30	30	30
MONTH	11	12	1	2	3	4	5	6	7	8	9	10
PRODUCTION SEASON	DRY SEASON						RAINY SEASON					
GROWTH PERIOD		SOIL PREPARATION SEEDING	GROWTH PERIOD	MID TERM	FINAL TERM		SOIL PREPARATION SEEDING	GROWTH PERIOD			MID TERM	FINAL TERM
SEASONAL KC COEFFICIENT/MONTH		1.10	1.23	1.18	1.00			1.10	1.10	1.20	1.15	1.00
EVAPORATION ETO CROP (MM/M)	-	33.29	44.23	58.77	29.75			52.30	43.34	41.55	36.95	14.55
SEEDING (MM)	40.00						40.00					
SOIL SATURATED WITH WATER (MM)	200.00						200.00					
WATER INFILTRATION RATE		134.85	269.70	269.70	269.70		134.85	269.70	269.70	269.70	269.70	269.70
WATER LEVEL (MM)		100.00						50.00				
USEFUL RAIN, PE (MM/M)					12.76		103.77	124.46	169.78	199.49	114.42	46.54
RIWR (MM/M)	240.00	275.47	324.71	340.41	294.35		271.08	245.80				
RIWR (MM/D)	8.00	9.18	10.82	11.35	9.81		9.04	8.19				
EFFICIENCY OF RECEIVING WATER	0.60	0.60	0.60	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60
AWR (L/S/HA)	1.54	1.77	2.09	2.19	1.89		1.74	1.58	-			
EFFICIENCY OF SUPPLYING WATER IN THE SUB-CANAL	0.90	0.90	0.90	0.90	0.90		0.90	0.90	0.90	0.90	0.90	0.90
SUB-CANAL WATER REQUIREMENT (L/S/HA)	1.71	1.97	2.32	2.43	2.10		1.94	1.76				
EFFICIENCY OF SUPPLYING WATER IN THE MC	0.95	0.95	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95
MC WATER REQUIREMENT (L/S/HA)	1.80	2.07	2.44	2.56	2.21		2.04	1.85				

TABLE 12. SWEET CORN WATER REQUIREMENT

DAY	30	30	30	28	30	30	30	30	30	30	30	30
MONTH	11	12	1	2	3	4	5	6	7	8	9	10
PRODUCTION SEASON		DRY SEASON						RAINY SEASON				
GROWTH PERIOD			IS	CDS	MSS	LSS						
SEASONAL KC COEFFICIENT/MONTH			0.53	0.98	1.05							
EVAPORATION ETO CROP (MM/M)	-	-	23.80	58.73	52.25	-	-	-	-	-	-	-
USEFUL RAIN, PE (MM/M)					12.67	55.07	103.77	124.46	169.78	199.49	114.42	46.54
CIWR (MM)	-	-	23.80	58.73	39.58		-	-				
CIWR (MM/D)	-	-	0.79	1.96	1.32		-	-				
EFFICIENCY OF RECEIVING WATER	0.60	0.60	0.60	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60
AWR (L/S/HA)	-	-	0.15	0.38	0.25							
EFFICIENCY OF SUPPLYING WATER IN THE SUB-CANAL	0.90	0.90	0.90	0.90	0.90		0.90	0.90	0.90	0.90	0.90	0.90
SUB-CANAL WATER REQUIREMENT (L/S/HA)	-	-	0.17	0.42	0.28		-	-				
EFFICIENCY OF SUPPLYING WATER IN THE MC	0.95	0.95	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95
WATER REQUIREMENT THROUGH THE MC (L/S/HA)	-	-	0.18	0.44	0.30		-	-				

PLATE 2. IMAGERY OF THE LOCATION OF THE PROPOSED NAM PIEW RIVER 1 IRRIGATION SYSTEM SUB-PROJECT



PLATE 3. IMAGERY OF THE LOCATION OF THE PROPOSED NAM PIEW RIVER 2 AND 3 IRRIGATION SYSTEM SUB-PROJECTS

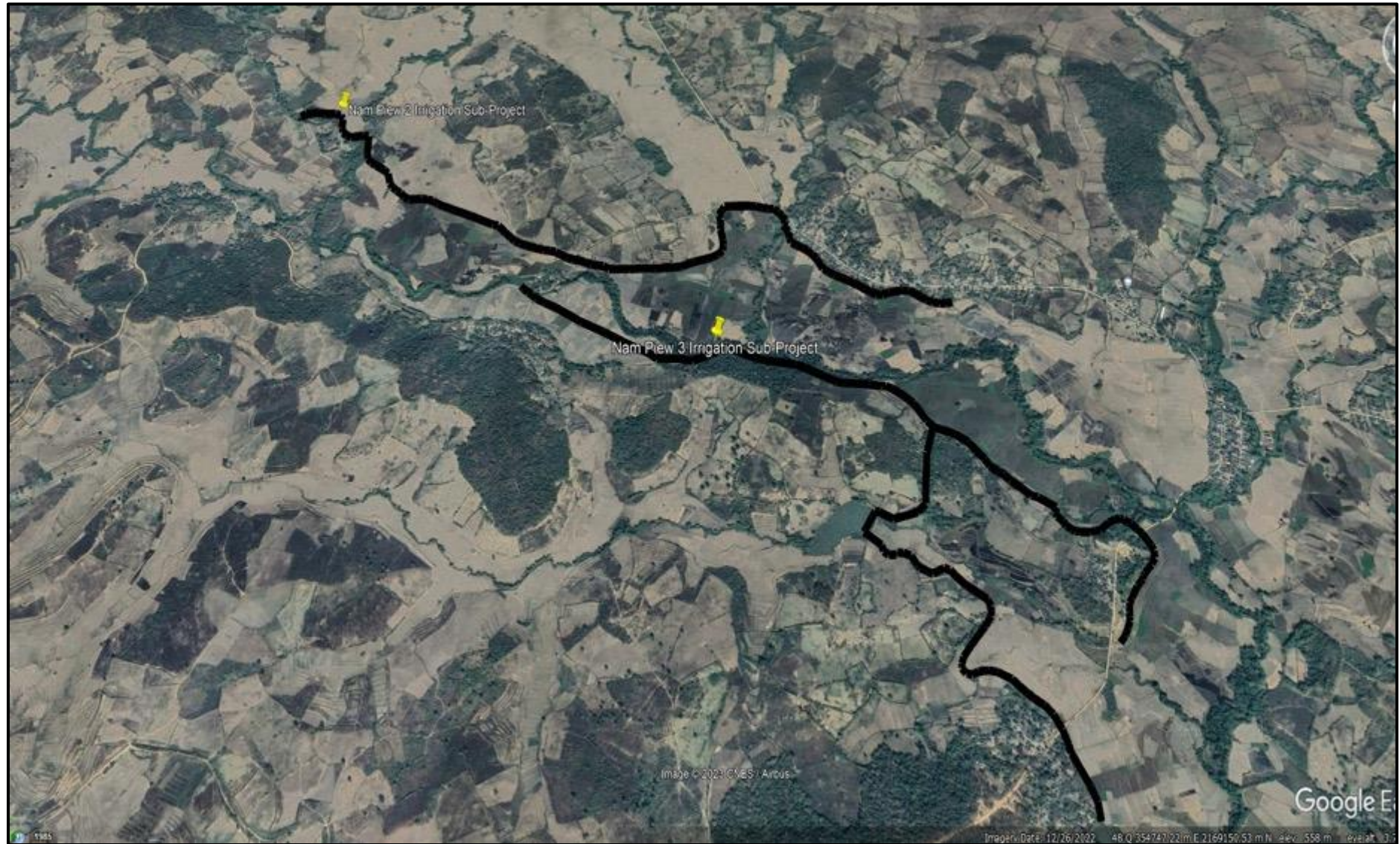


PLATE 4. IMAGERY OF THE LOCATION OF THE PROPOSED NAM PIEW RIVER 4 IRRIGATION SYSTEM SUB-PROJECT



PLATE 5. COMMAND AREA OF NAM PIEW RIVER 1 IRRIGATION SYSTEM SUB-PROJECT

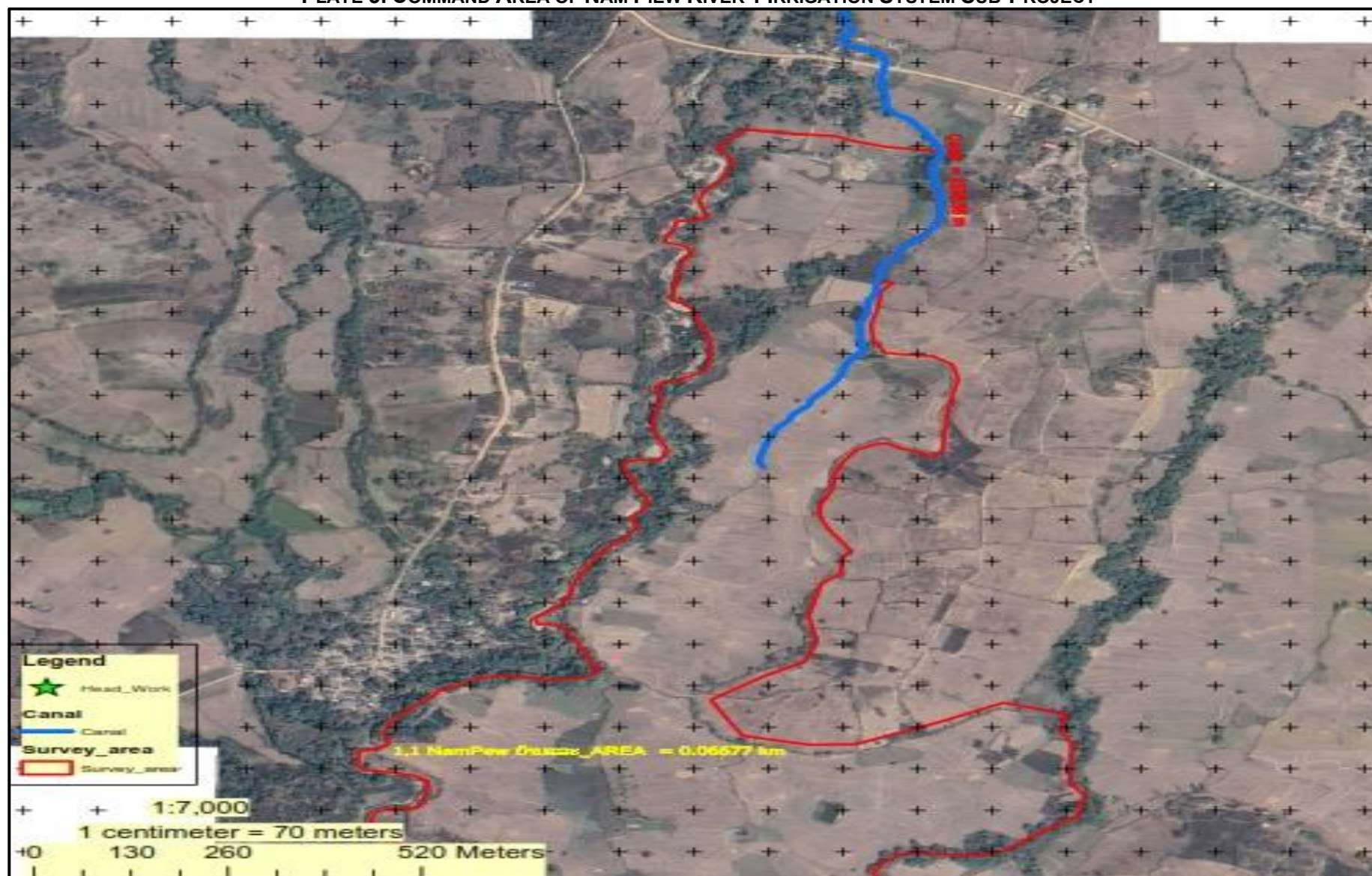


PLATE 6. COMMAND AREA OF NAM PIEW RIVER 2 IRRIGATION SYSTEM SUB-PROJECT

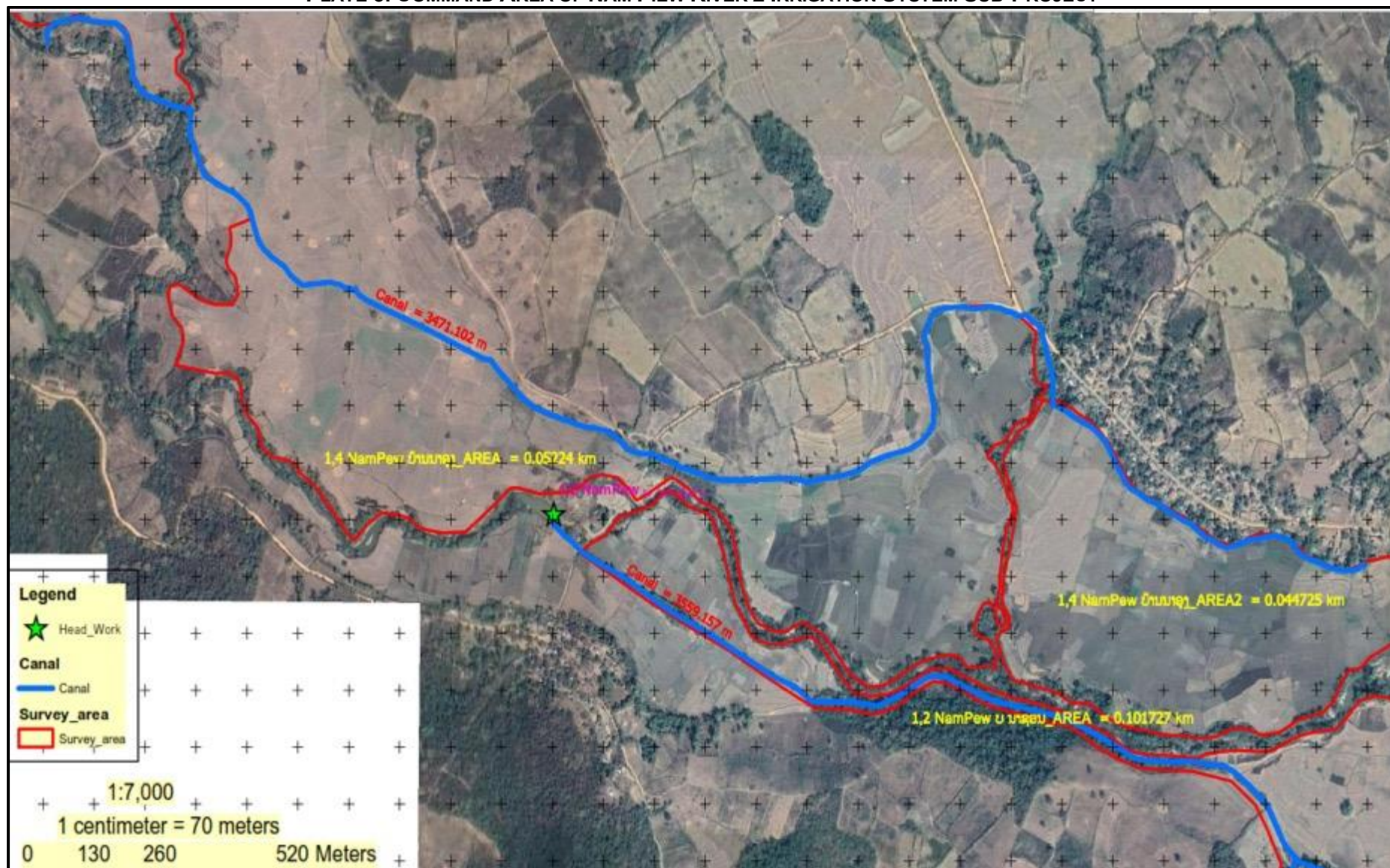


PLATE 7. COMMAND AREA OF NAM PIEW RIVER 3 IRRIGATION SYSTEM SUB-PROJECT

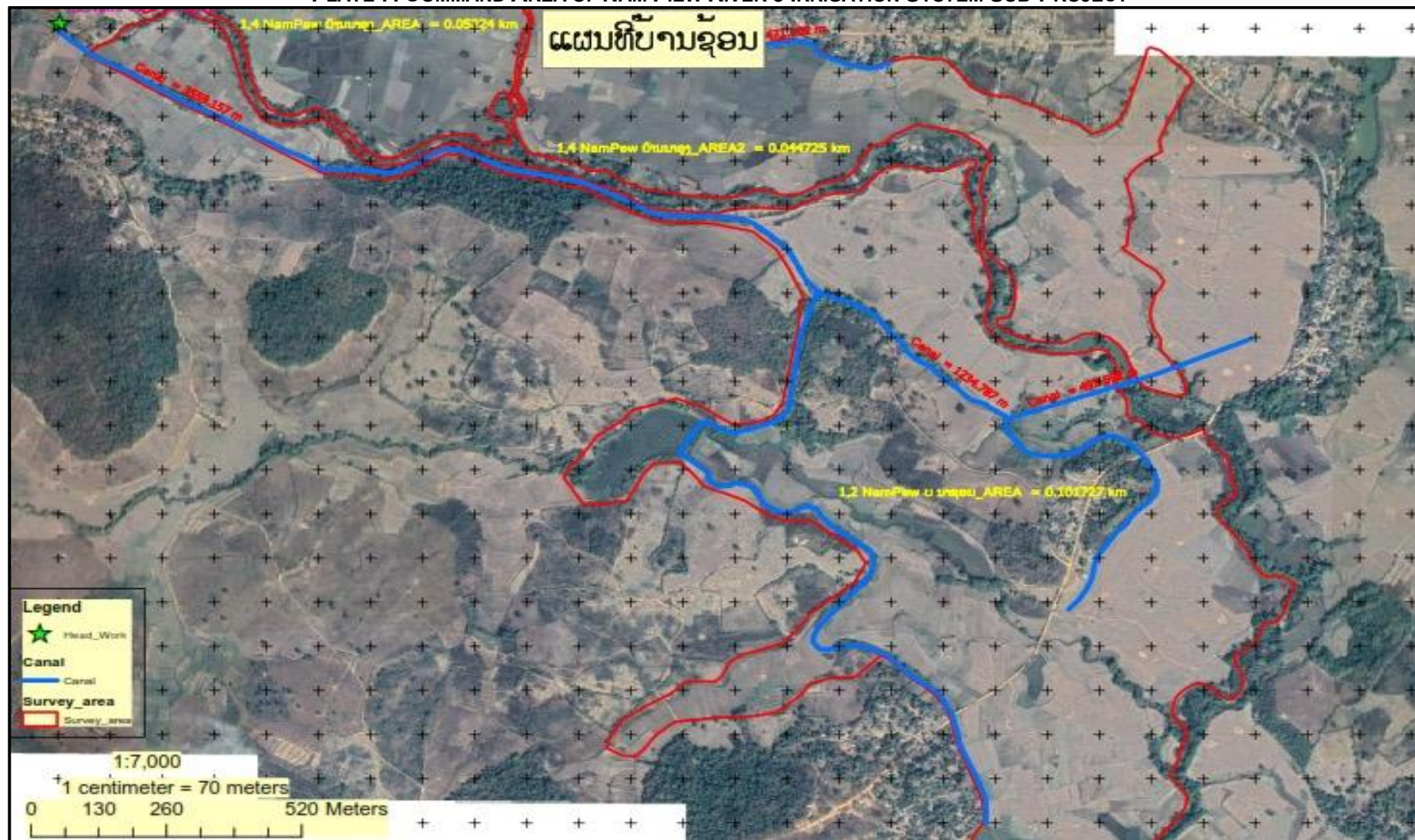


PLATE 8. COMMAND AREA OF NAM PIEW RIVER 4 IRRIGATION SYSTEM SUB-PROJECT

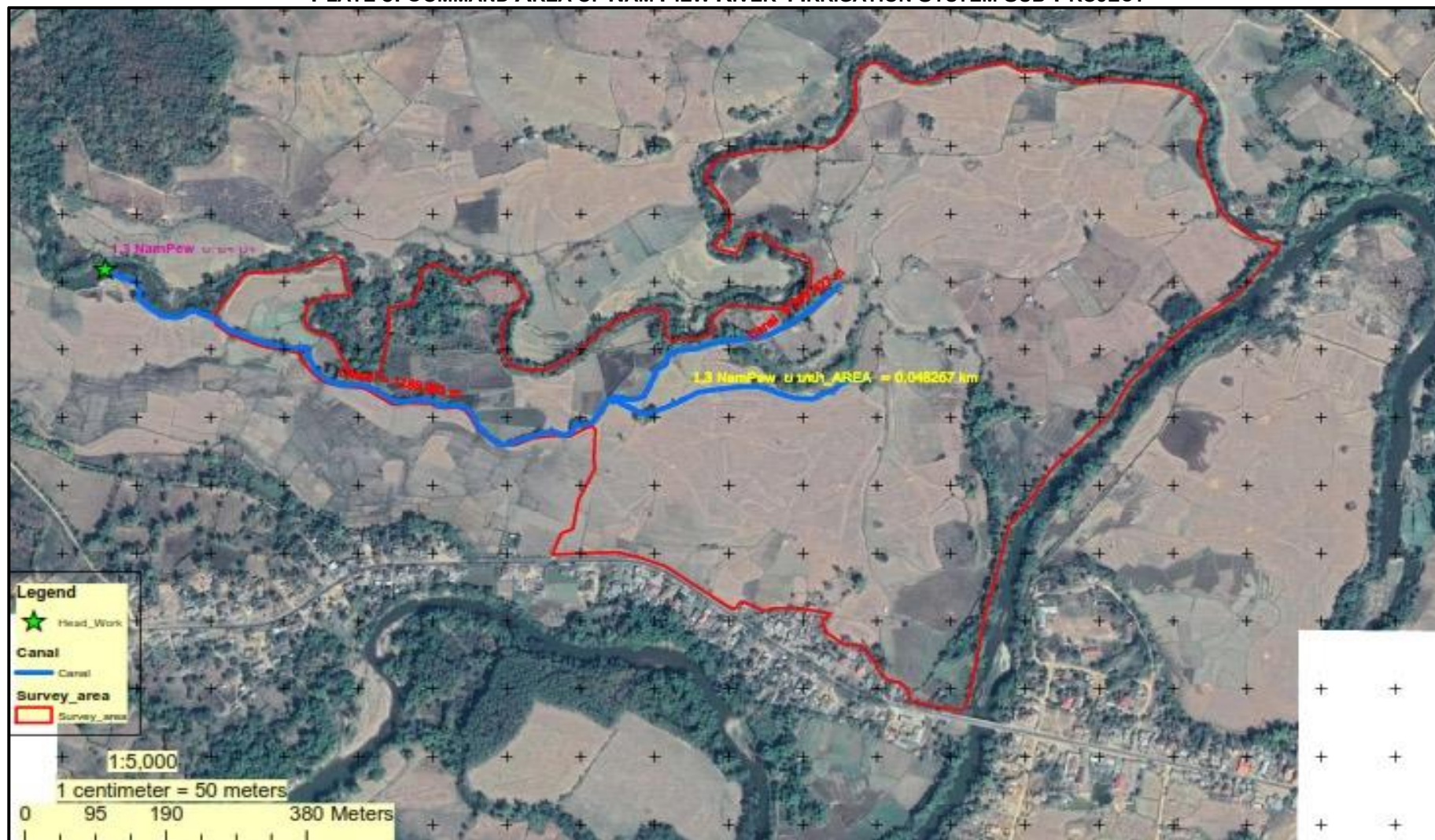


PLATE 9. PHOTOS OF PROPOSED NAM PIEW RIVER 1 IRRIGATION SYSTEM SUB-PROJECT



PLATE 10. PHOTOS OF PROPOSED NAM PIEW RIVER 2 IRRIGATION SYSTEM SUB-PROJECT



PLATE 11. PHOTOS OF PROPOSED NAM PIEW RIVER 3 IRRIGATION SYSTEM SUB-PROJECT



PLATE 12. PHOTOS OF PROPOSED NAM PIEW RIVER 4 IRRIGATION SYSTEM SUB-PROJECT



4.3 NAM MAD RIVER 1 AND 2 IRRIGATION SYSTEM SUB-PROJECT

4.3.1 Existing Conditions

71. The Nam Mad River irrigation project consists of two sub-projects namely Nam Mad River 1 and Nam Mad River 2 (Pheung Weir and Hor Kang Weir respectively) located in Chomsy Village and Phoxai Village, Kham District, Xiengkhuang Province. The project is expected to increase food security and to reduce poverty in the Kham District through more efficient agricultural production during the wet and dry seasons. The Nam Mad River Irrigation Project is a medium-sized project, located in a mountainous area. It is one of the projects identified in the Socio-Economic Development Plan of Xiengkhuang Province for the fiscal year 2021-2022. It is a priority project that focuses on sustainable agricultural production with the goal of poverty reduction in Xiengkhuang Province as a whole and Kham District in particular.

72. According to the Topographic Map of the National Geographic Department, the project lies within 343976.698 E - 345891.163 E and 2174152.382 N - 2176395.289 N (WGS 1984 UTM Zone 48 N). The headworks are located at: 344481.961 E and 2176296.609 N for the Pheung Weir and at 344485.270 E and 2174931.800 N for the Hor Kang Weir).

73. The project is a hillside area found along the Nam Mad River with plateaus to accommodate rice fields and gardens. The Nam Mad River irrigation project has the following boundaries: (1) The north side is bordered by Xom Village; (2) The south side is bordered by Nathong Khineg Village, Yod Kheua Village; (3) The east side is bordered by Samohan Village; and (4) The west side is bordered by Vieng Chor Village. The project area has suitable land to support irrigated agricultural production and animal husbandry. The project has an area of 182 ha, of which Nam Mat 1 has 36.6 ha, and Nam Mat 2 has 145.5 ha.

74. The Nam Mad River irrigation project is 50 kilometers east of Phonsavan town and consists of two overflow weir headworks, the Pheung overflow Weir which is 8 km from the municipality of Kham District to the north and Hor Kang overflow Weir located 7. km from the municipality of Kham District to the south, Xieng Khouang Province. Both weirs are on the main Nam Mad River. There are several tributaries in the project area that with flow throughout the year. The population growth rate in the project area is high, while the food production area is limited. Years with limited rainfall and resulting low yields of paddy rice production creates food security challenges for the local population. In these years there is increased pressure on the upland forests and natural streams to supplied food.

4.3.2 Proposed Development

75. The proposed Nam Mad River 1 and 2 Irrigation System Sub-Project is located in Kham District, Xenghuang Province Northern Lao. The proposed Nam Mad River 1 and 2 Irrigation System Sub-Project is located on the Nam Mad River. The proposed Nam Mad River 1 and 2 Irrigation System Sub-Project involves the upgrading of the existing headwork/weir at Nam Mad River 1 (Feung Weir) located approximately 8 km from the Center of Kham District and at Nam Mad River 2 (Horkang Weir) located approximately 7km from the Center of Kham District and the provision of fish passages in the headworks/weirs.

76. The Nam Mad River irrigation system has been designed as a gravity fed system consisting of two overflow headworks and a canal distribution system to service 182 hectares. The canal layout is based on the original schemes and considers the irrigated area and construction cost. The details of the canal system are shown in the Table 13 below while Table 14 presents the canal design dimensions.

TABLE 13. DETAILS OF THE CANAL SYSTEM

NO	CANAL LEVEL	LENGTH (M)	TOTAL COMMAND AREA (HA)	AREA TO BE SUPPLIED (HA)
NAM MAD RIVER 1 -PHEUNG WEIR				
1	MC	1,525	36.5	36.5
NAM MAD RIVER 2 - HOR KANG WEIR				
2	MC	1,875	145.5	145.5

TABLE 14. CANAL DESIGN DIMENSIONS

CANAL	LENGTH	AREA (HA)	IRRIGATION COEFFICIENT (L/S~HA)	WATER AMOUNT	SCALES						
				Q (M³/S)	B (M)	H (M)	Q* (M³/S)	FR (M)	DL (M)	DR (M)	H (M)
NAM MAD RIVER 1 - PHEUNG WEIR											
MC	1,525.00	36.552	2.50	0.091	0.40	0.40	0.248	0.20	1.00	1.00	0.60
NAM MAD RIVER 2 - HOR KANG WEIR											
MC	1,875.00	145.451	2.50	0.104	0.60	0.60	0.585	0.20	1.00	1.00	0.80

77. The hydraulic calculations for the structures along the canal were undertaken to ensure that the supply of water through the structures will meet the irrigation water needs and also considers ease of management.

78. The main and secondary canals are constructed of concrete for ease of maintenance. The canal design is based on the experience of the previous irrigation projects to ensure the efficiency of water use, and to minimize the loss of production area. Table 15 presents the summary of structures along the canals Figure Nos.13 to 16 shows the canal layout. while Figure No. 17 shows the typical design for the canal and structures.

TABLE 15. SUMMARY OF STRUCTURES ALONG THE CANALS

CANAL NAME	STRUCTURE	QUANTITY
NAM MAD RIVER 1 - PHEUNG WEIR		
MC	Diversion Headworks	1
	Pipe under the road	1
	Water diviation building	1
	Bridge to cross the canal	1
	Pipe on the right side	12
	Building at the end of canal	1
NAM MAD RIVER 2 - HOR KANG WEIR		
MC	Diversion Headworks	1
	Pipe under b the road	2
	Drop structures	2
	Pipe on the right side	11
	Building at the end of canal	1
	Drainage building	1
	Water leveling building	1
	Pipe for rice fields	2
	Building at the canal end	1

FIGURE 13. CANAL LAYOUT NAM MAD RIVER 1 IRRIGATION SUB-PROJECT

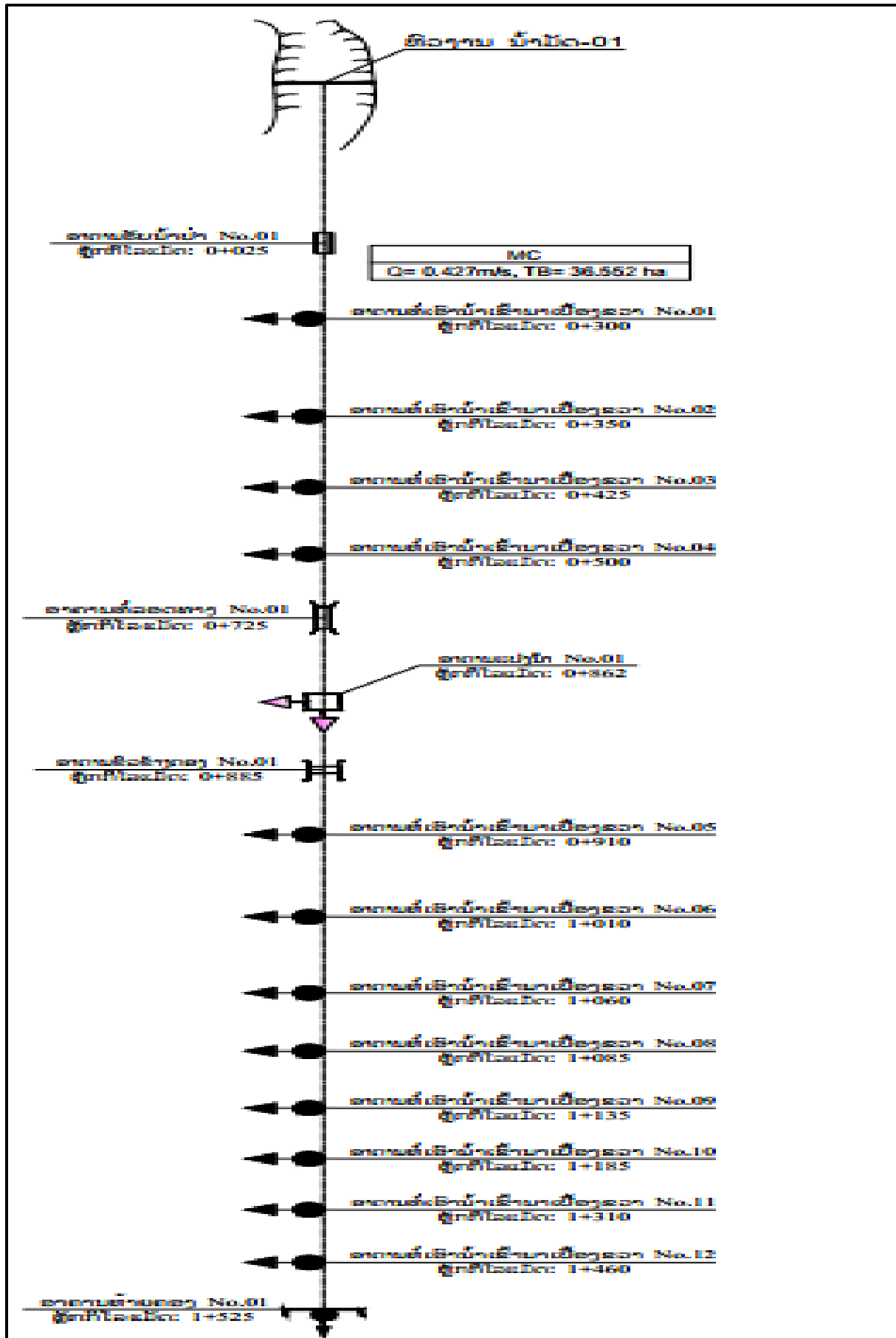


FIGURE 14. CANAL LAYOUT NAM MAD RIVER 1 IRRIGATION SUB-PROJECT

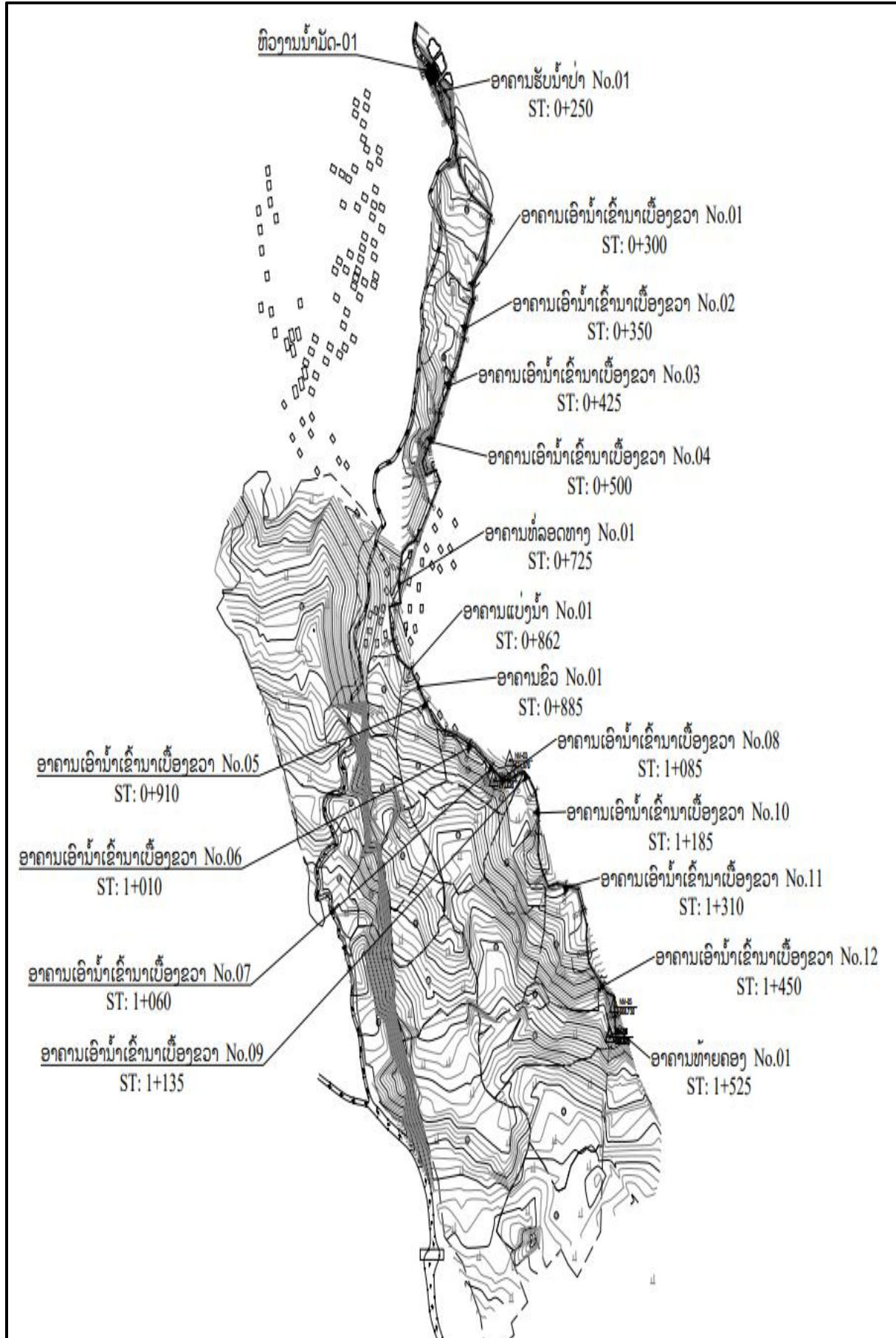


FIGURE 15. CANAL LAYOUT NAM MAD RIVER 2 IRRIGATION SUB-PROJECT

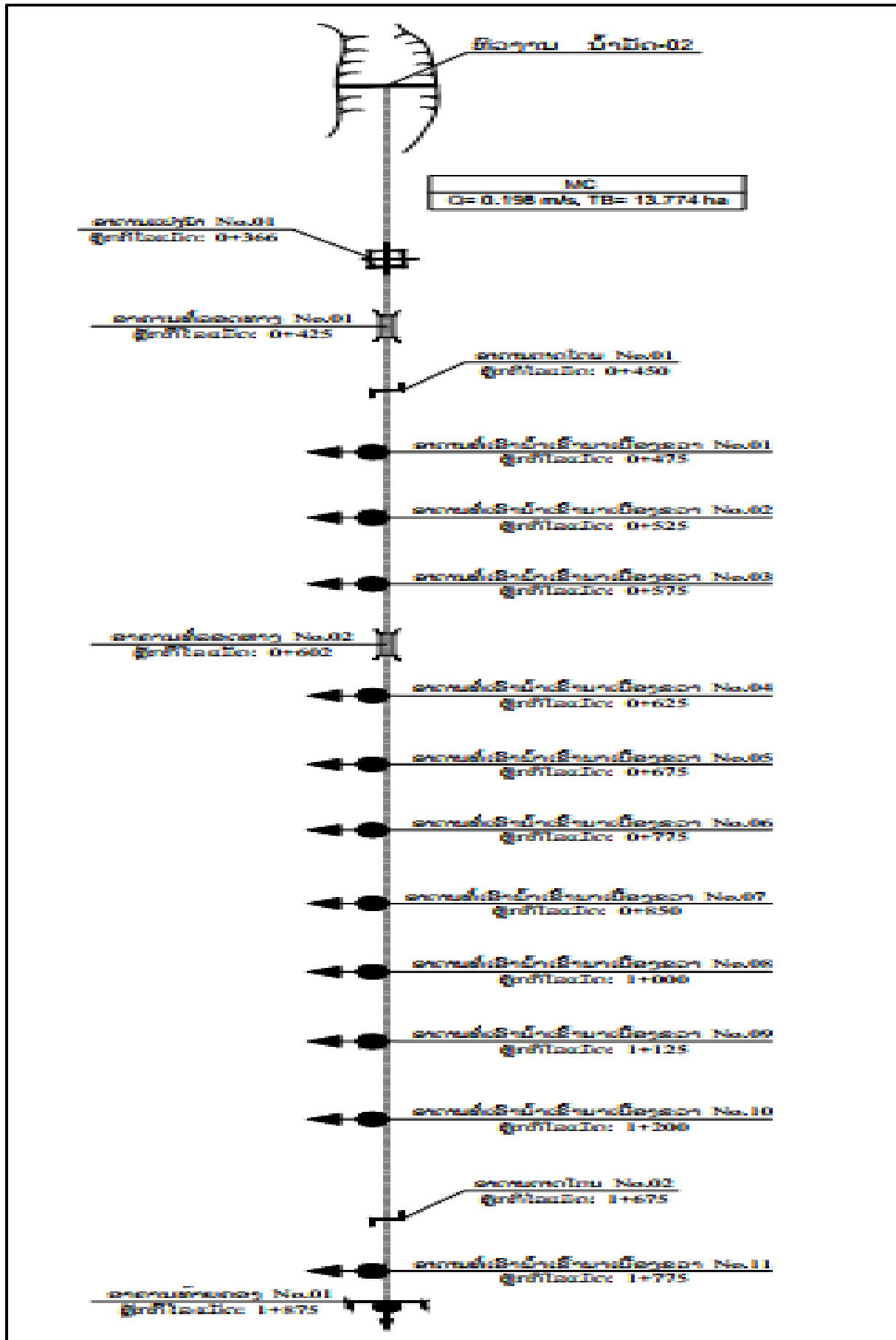
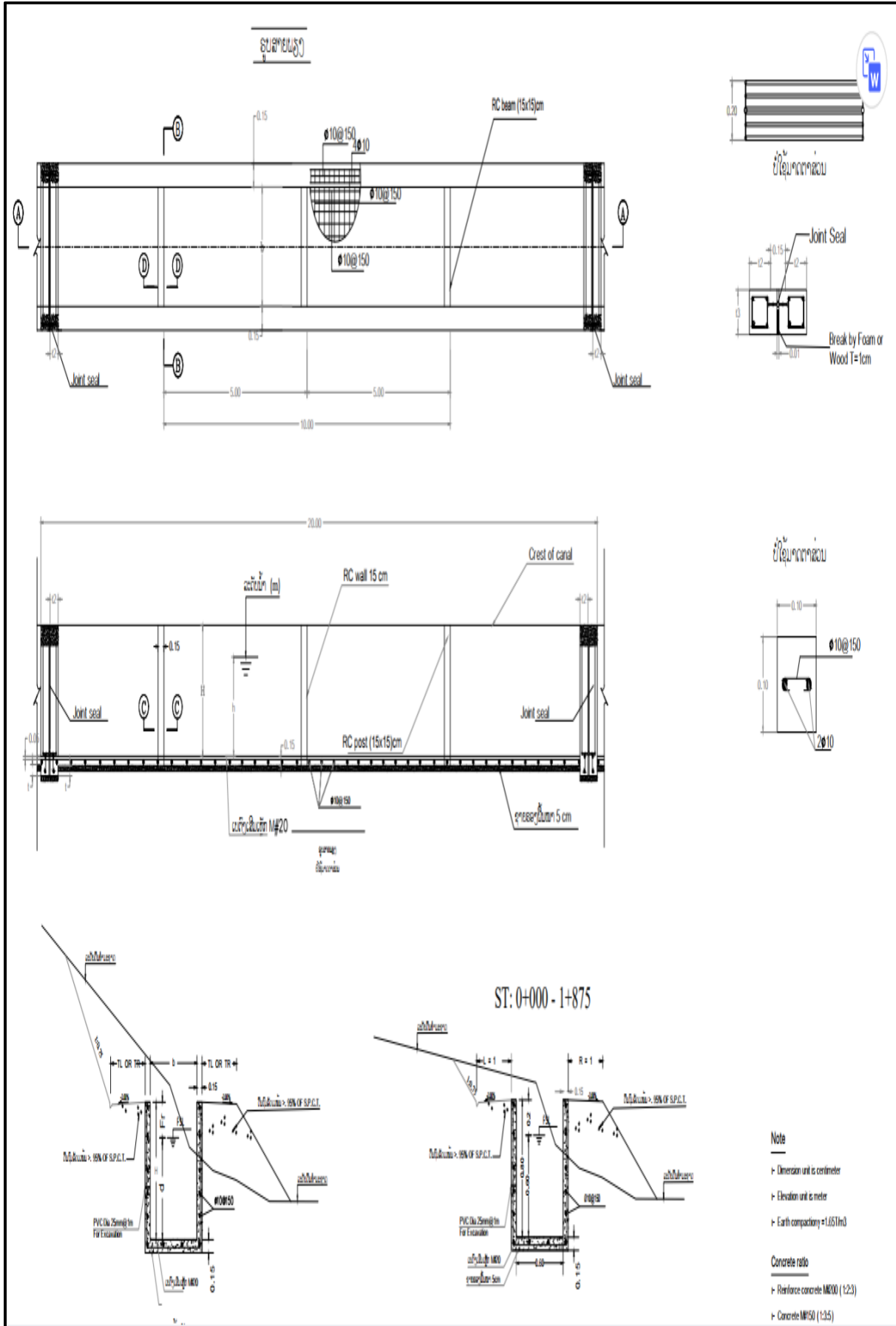


FIGURE 17. TYPICAL DESIGNS FOR THE CANALS AND STRUCTURES



4.3.3 Hydrological Study

79. The requisite hydrologic study was undertaken during the design stage of the sub-project. The details of this study are provided in the Feasibility Study for the proposed sub-project. It can be provided upon request. The Nam Mad River irrigation project consists of two sub-projects, the Nam Mad River 1 associated with the Pheung Weir and Nam Mad River 2 associated with the Hor Kang Weir. The physical characteristics of the two watersheds are shown in Table 16 below.

TABLE 16. NAM MAD RIVER WATERSHED CHARACTERISTICS

WATERSHED	AREA (KM ²)	SLOPE (%)		LENGTH (KM)		
		WATERSHED	RIVERS	ALL RIVERS	MAIN	TRIBUTARIES
Nam Mad 1 - Pheung Weir	9.1	354	0.9	9.1	1.8	7.3
Nam Mad 2 - Hor Kang Weir	101.9	33.6	3.5	91.4	34.1	57.3

80. For the design, 2.50 l/s/ha was used to guarantee a sufficient water supply. The calculation of water requirements is presented in the Feasibility Study for the proposed sub-project and considers recent precipitation, and evaporation data. According to the parameters used in the design, the annual rainfall was set as 800 mm. The design guarantee of a safe water supply was set as P=85% of the volume. The results are shown in Table 17 below. The 100-year maximum flood discharge was estimated using two standard Lao methods. The results are shown in the Tables 18, 19 and 20.

TABLE 17. WATER AVAILABILITY BY SUB-PROJECT

WATERSHED	WATERSHED AREA (KM ²)	ANNUAL VOLUME OF WATER (M ³ /S)	VOLUME P=85 (M ³)*10 ⁶	METHOD
Nam Mat-Pheung Weir	9.1	0.23	4.77	Average Monthly Rainfall
Nam Mat-Hor Kang Weir	101.9	2.58	53.29	Average Monthly Rainfall

TABLE 18. MAXIMUM 100-YEAR FLOOD

IRRIGATION SCHEME	METHOD (100-YEAR) (M ³ /S)	
	SOKOLOV	PA MONG
Nam Mat-Pheung Weir	367	65
Nam Mat-Hor Kang Weir	1145	220

TABLE 19. DETERMINATION OF YEAR-ROUND SAFE WATER SUPPLY VOLUME

ATTRIBUTE	AVE	50%	75%	80%	85%	90%	95%
KP MEAN	1.00	0.96	0.75	0.70	0.65	0.61	0.56
VOLUME (10 ⁶ M ³)	1.00	0.96	0.75	0.70	0.65	0.61	0.56
WATER QUANTITY (M ³ /S)	81.48	78.14	60.79	57.04	53.29	49.54	45.79

TABLE 20. DISTRIBUTION OF MONTHLY WATER FLOW IN THE YEAR (85%)

ATTRIBUTE	DAYS	31	28	31	30	31	30	31	31	30	31	30	31
	MONTH	1	2	3	4	5	6	7	8	9	10	11	12
	%	0.91	0.66	4.07	9.94	12.69	13.16	20.02	20.42	10.47	4.64	2.09	0.92
WATER QUANTITY Q: (M ³ /S)		0.353	0.278	0.222	1.238	3.126	3.851	4.137	6.090	6.231	3.291	1.412	0.658
WATER VOLUME W: 106(M ³)		0.947	0.745	0.536	3.316	8.102	10.341	10.723	16.313	16.642	8.530	3.783	1.706

81. The plant water requirements were calculated considering present climate information. The plant water requirements are as follows:

- 2.26 l/s/ha for dry season rice
- 1.24 l/s/ha for rainy season rice
- 0.57 l/s/ha for dry season beans

82. Tables 21 to 22 present the water requirements of rice and sweet corn respectively. Table 23 shows the summary of the water requirements for crops per season. Table 24 shows the water balance.

TABLE 21. RICE WATER REQUIREMENT (RIWR)

DAY	30	30	30	28	30	30	30	30	30	30	30	30
MONTH	11	12	1	2	3	4	5	6	7	8	9	10
PRODUCTION SEASON	DRY SEASON						RAINY SEASON					
GROWTH PERIOD		SOIL PREPARATION SEEDING	GROWTH PERIOD	MID TERM	FINAL TERM		SOIL PREPARATION SEEDING	GROWTH PERIOD			MID TERM	FINAL TERM
SEASONAL KC COEFFICIENT/MONTH		1.10	1.23	1.18	1.00			1.10	1.10	1.20	1.15	1.00
EVAPORATION ETO CROP (MM/M)	-	60.45	78.30	90.97	47.76			50.08	41.43	42.75	47.10	25.88
SEEDING (MM)	40.00						40.00					
SOIL SATURATED WITH WATER (MM)	200.00						200.00					
WATER INFILTRATION RATE		134.85	269.70	269.70	269.70		134.85	269.70	269.70	269.70	269.70	269.70
WATER LEVEL (MM)		100.00						50.00				
USEFUL RAIN, PE (MM/M)					21.33		143.58	144.56	-	234.82	106.84	18.30
RIWR (MM/M)	240.00	265.30	288.00	300.67	236.13		201.27	165.22				
RIWR (MM/D)	8.00	8.84	9.60	10.02	7.87		6.71	5.51				
EFFICIENCY OF RECEIVING WATER	0.60	0.60	0.60	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60
AWR (L/S/HA)	1.54	1.71	1.85	1.93	1.52		1.29	1.06	-			
EFFICIENCY OF SUPPLYING WATER IN THE SUB-CANAL	0.90	0.90	0.90	0.90	0.90		0.90	0.90	0.90	0.90	0.90	0.90
SUB-CANAL WATER REQUIREMENT (L/S/HA)	1.71	1.90	2.06	2.15	1.69		1.44	1.18				
EFFICIENCY OF SUPPLYING WATER IN THE MC	0.95	0.95	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95
MC WATER REQUIREMENT (L/S/HA)	1.80	2.00	2.17	2.26	1.78		1.51	1.24				

TABLE 22. SWEET CORN WATER REQUIREMENT

DAY	30	30	30	28	30	30	30	30	30	30	30	30
MONTH	11	12	1	2	3	4	5	6	7	8	9	10
PRODUCTION SEASON			DRY SEASON						RAINY SEASON			
GROWTH PERIOD			IS	CDS	MSS	LSS						
SEASONAL KC COEFFICIENT/MONTH			0.53	0.98	1.05							
EVAPORATION ETO CROP (MM/M)	-	-	33.88	75.55	66.87	-	-	-	-	-	-	-
USEFUL RAIN, PE (MM/M)					21.33	82.79	143.58	144.56	229.97	234.82	106.84	18.30
CIWR (MM)	-	-	33.88	75.55	45.54		-	-				
CIWR (MM/D)	-	-	1.13	2.52	1.52		-	-				
EFFICIENCY OF RECEIVING WATER	0.60	0.60	0.60	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60
AWR (L/S/HA)	-	-	0.22	0.49	0.29							
EFFICIENCY OF SUPPLYING WATER IN THE SUB-CANAL	0.90	0.90	0.90	0.90	0.90		0.90	0.90	0.90	0.90	0.90	0.90
SUB-CANAL WATER REQUIREMENT (L/S/HA)	-	-	0.24	0.54	0.33		-	-				
EFFICIENCY OF SUPPLYING WATER IN THE MC	0.95	0.95	0.95	0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95
WATER REQUIREMENT THROUGH THE MC (L/S/HA)	-	-	0.25	0.57	0.34		-	-				

TABLE 23. SUMMARY OF THE WATER REQUIREMENTS FOR CROPS PER SEASON

DRY SEASON RICE							
MONTHS	11	12	1	2	3	4	TOTAL
Rice Water Requirement RIWR(mm)	240.00	265.30	288.00	300.67	235.67		1329.417
Volume of water P (mm/m)	41.11	19.51	21.25	10.11	53.35		145.333
Water flowing coefficient	0.34	0.34	0.34	0.34			
Water flowing into basin (mm)	13.979	6.635	7.226	3.436	18.138		49.413
Water demand usage (mm)	226.02	258.66	280.77	297.23	217.32		1,280.00
Water demand usage (m ³ /ha)	2,260.21	2,586.60	2,807.72	2,972.31	2,173.19		12,800.04
WET SEASON RICE							
MONTHS	5	6	7	8	9	10	TOTAL
Rice Water Requirement RIWR (mm)	213.199	189.810			147.977	212.136	763.12
Volume of water P (mm/m)	195.813	181.213			167.280	55.733	600.04
Water flowing coefficient	0.34	0.34			0.34	0.34	
Water flowing into basin (mm)	66.577	61.613			56.875	18.949	204.01
Water demand usage (mm)	146.623	128.198			91.101	193.186	559.11
Water demand usage (m ³ /ha)	1,466.228	1,281.976			911.014	1,931.862	5,591.08
HVC FOR DRY SEASON							
MONTHS	1	2	3	4	5	6	TOTAL
Rice Water Requirement RIWR(mm)	33.876	75.459	44.862				154.287
Volume of water P (mm/m)	21.253	10.107	53.347				84.707
Water flowing coefficient	0.34	0.34	0.34				
Water flowing into basin (mm)	7.226	3.436	18.138				28.800
Water demand usage (mm)	26.650	72.113	26.724				125.487
Water demand usage (m ³ /ha)	266.499	721.129	267.244				1,254.872

TABLE 24. WATER BALANCE

DETAIL	AREA (HA)	WATER DEMAND PER SEASON (M3/HA)	VOLUME OF WATER USED	
			RAINY SEASON	DRY SEASON
NAM MAT 1 (PHEUNG WEIR)				
Volume of water flowing into the basin			5,943,362.26	1,357,437.74
Dry season	36.55	5,591.08	204,353.94	
Wet season	36.55	12,800.04		467,841.42
HVC Plants	10.00	1,254.87		12,548.72
Calculate the water balance per area per year	83.10	1,254.87		12,548.72
NAM MAT 2 (HOR KANG WEIR)				
The volume of water flowing into the basin			66,332,377.37	15,150,022.36
Dry season	145.45	5,591.08	813,222.46	
Wet season	145.55	12,800.04		1,861,765.63
HVC Plants	50.00	1,254.87		62,743.61
Calculate the water balance per area per year	340.90		65,519,154.90	13,225,513.39

83. Plates 13 and 14 presents the imageries of the location of the Proposed Nam Mad River 1 and 2 Irrigation System Sub-Projects. Plates 15 presents the command areas of the proposed sub-projects while Plates 16 and 17 shows the photos of the proposed Nam Mad River 1 and 2 Irrigation System Sub-Projects.

PLATE 13. IMAGERY OF THE LOCATION OF THE PROPOSED NAM MAD RIVER 1 IRRIGATION SYSTEM SUB-PROJECT



PLATE 14. IMAGERY OF THE LOCATION OF THE PROPOSED NAM MAD RIVER 2 IRRIGATION SYSTEM SUB-PROJECT

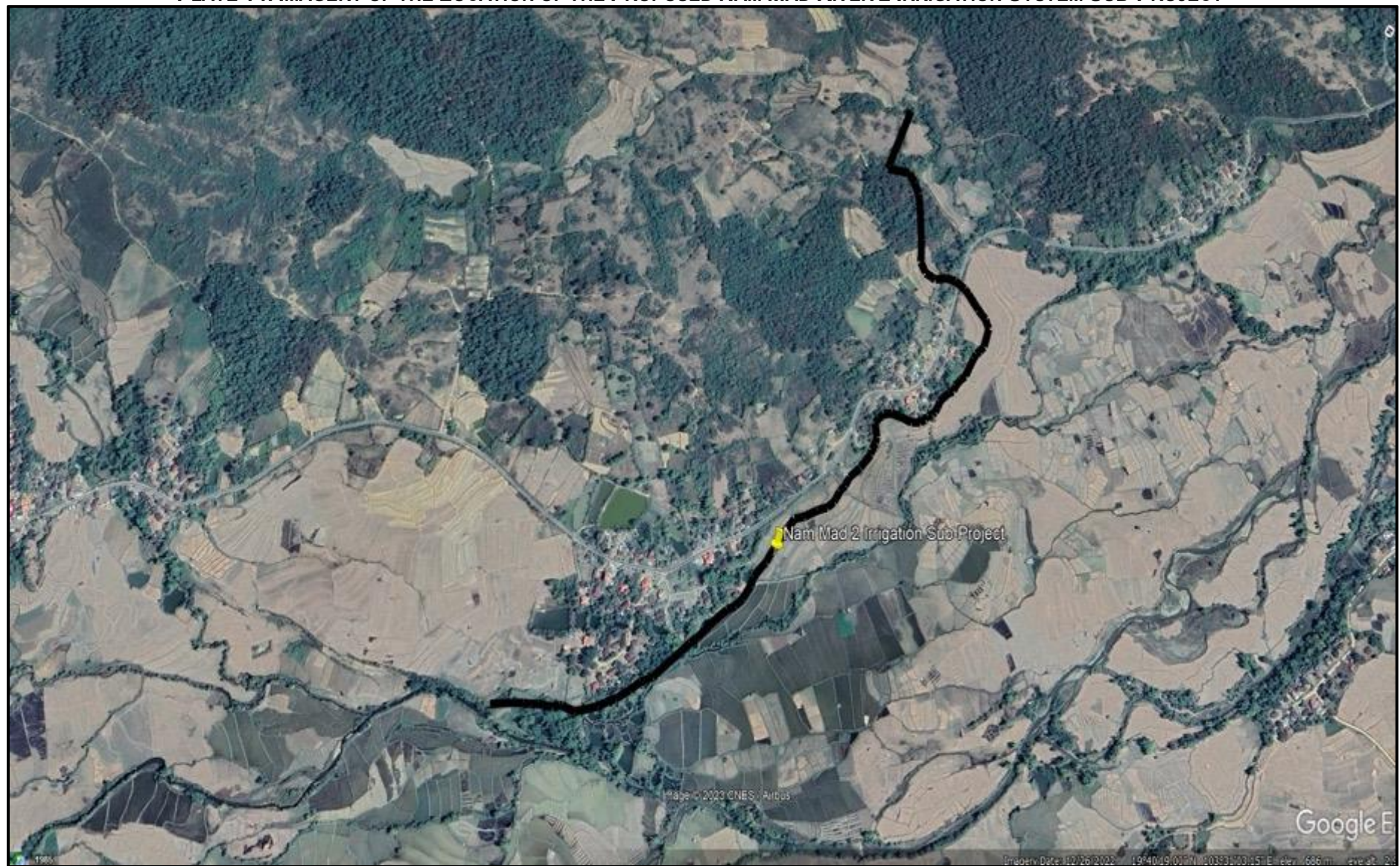


PLATE 15. COMMAND AREAS OF NAM MAD RIVER 1 AND 2 IRRIGATION SYSTEM SUB-PROJECT

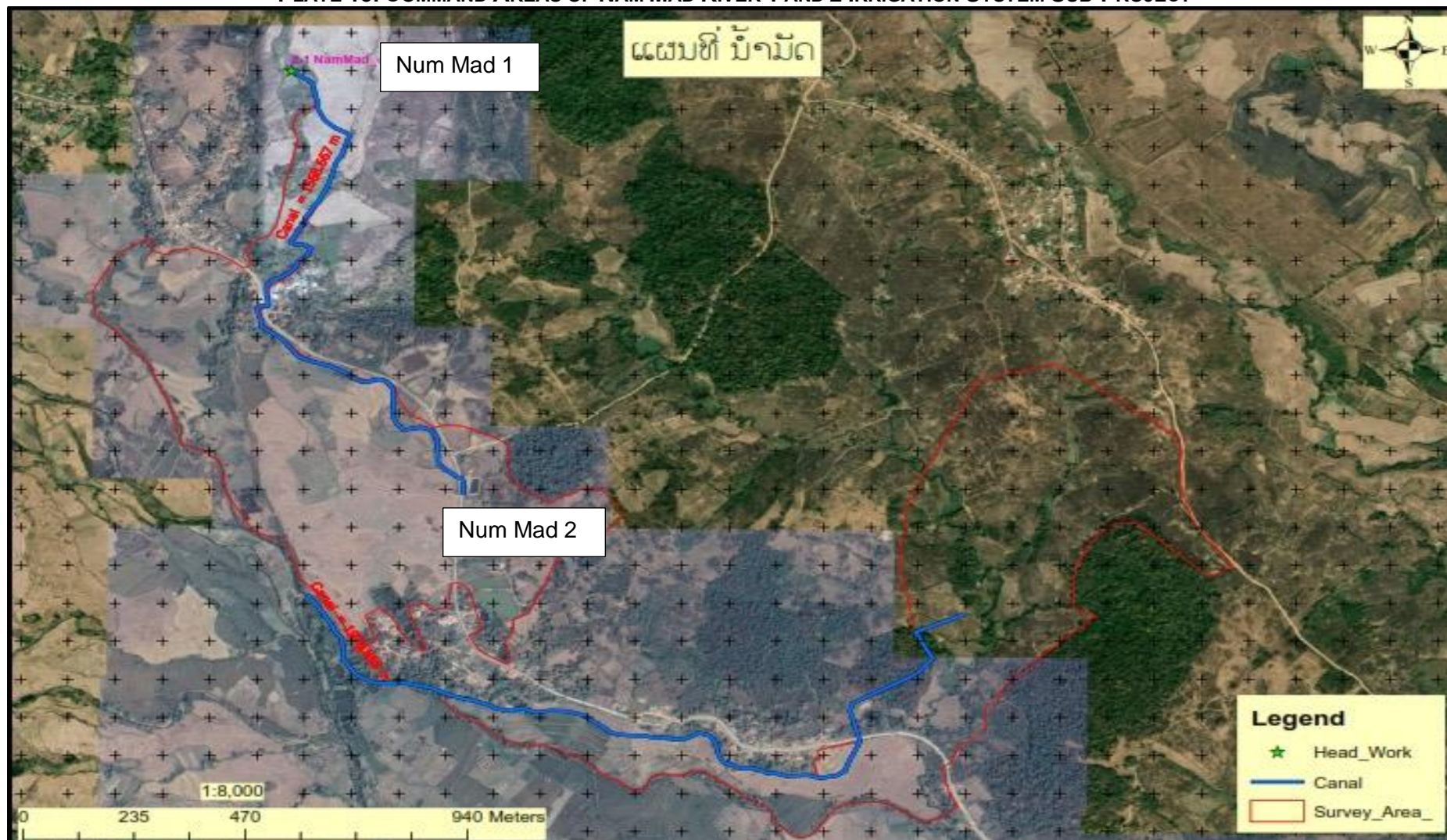


PLATE 16. PHOTOS OF PROPOSED NAM MAD RIVER 1 IRRIGATION SYSTEM SUB-PROJECT



PLATE 17. PHOTOS OF PROPOSED NAM MAD RIVER 2 IRRIGATION SYSTEM SUB-PROJECT



5 DESCRIPTION OF THE ENVIRONMENT

5.1 PHYSICAL RESOURCES

84. The proposed Nam Piew River 1, 2, 3 and 4 and Nam Mad River 1 and 2 Irrigation System Sub-Projects are located in Kham District, Xengkuang Province Northern Lao. Kham District is the district with highest potential for agriculture development among all the districts in the Province of Xengkuang.

5.2 GEOLOGY AND NATURAL HAZARDS

85. Small to moderate earthquakes have occurred within Lao PDR over recorded history. Xengkuang Province is not among the areas vulnerable to earthquake hazards. Lao PDR is also prone to flooding, mainly associated with the presence of large river basins. Eight rivers have been identified as being at particular risk of causing flooding throughout the country but the Nam Piew River and Nam Mad River are not included in the identified rivers that cause extreme flooding. The terrain within the province is relatively flat and is not prone to landslides.

5.3 AIR QUALITY AND NOISE

86. Air quality in Xengkuang Province is generally good. There are no industries producing discharges/emissions which result in atmospheric pollution and pollution from vehicular exhaust emissions are not significant given the low levels of traffic and absence of any traffic congestion. The only detrimental effect on air quality is the dust arising from the passage of vehicles over unsealed roads during the dry season. This is an intermittent problem with a minor effect over a limited area of 5 to 10 meters either side of the road. The locations of the project components are relatively far from noise generating activities. There are no industries within the proposed sites so ambient noise levels can be considered very well.

5.4 CLIMATE

87. The climate in Xiengkhuang Province is characterized by two seasons, the dry and wet seasons. The dry season occurs between October and March while the wet season occurs between April and September. The climate in Lao PDR is highly influenced by the southeast monsoon with significant rainfall and high humidity.

88. The annual precipitation in Xengkuang Province is about 1,000 to 2,400 mm/year. The average temperature is between 20°C to 26°C. The average humidity is 75%. Table 25 presents the monthly precipitation for the period 2007 to 2019 in Kham District.

TABLE 25. PRECIPITATION IN KHAM DISTRICT

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2007	115.8	114.3	201.0	111.5	85.4	83.8	49.0	43.5	50.1	76.4	74.0	79.2	1084.0
2008	93.3	117.7	129.6	111.2	79.8	59.4	52.5	38.7	53.8	68.8	59.2	72.2	936.2
2009	96.1	92.6	107.2	75.3	76.6	63.4	46.6	46.8	64.1	71.2	97.1	86.5	923.5
2010	97.1	139.5	160.2	101.6	101.8	81.6	55.9	63.3	63.0	68.0	96.8	78.7	1107.5
2011	82.5	68.6	100.6	78.5	69.1	53.6	53.4	54.2	58.0	68.1	85.7	77.9	850.2
2012	109.5	127.6	151.8	85.8	78.7	54.5	46.6	61.7	70.0	77.1	102.1	93.6	1059.0
2013	89.2	130.4	157.5	156.5	87.4	90.5	73.6	57.1	53.7	76.3	111.0	83.3	1166.5
2014	74.4	110.0	94.7	76.5	71.0	57.0	63.5	55.9	56.1	87.0	102.5	86.3	934.9
2015	96.7	118.4	141.5	90.0	64.6	54.0	49.8	43.0	58.1	71.9	50.8	60.5	899.3
2016	58.5	82.2	120.6	101.3	74.8	52.6	47.2	44.7	58.2	74.5	60.7	66.8	842.1
2017	72.5	104	110.4	64.5	46.5	52.9	49.8	58.5	64.1	86.1	69.7	78.7	857.7
2018	93.8	91.8	112.7	103.0	81.6	66.9	67.0	49.4	57.9	68.9	62.9	52.9	908.8
2019	67.7	87.6	133.1	144.2	88.5	78.3	61.9	62.5	66	74.6	67.6	63.4	995.4
Mean	88.2	106.5	132.4	100.0	77.4	65.3	55.1	52.3	59.5	74.5	80.0	75.4	966.5

5.5 WATER RESOURCES

89. The main water resource supplying the sub-projects is the Nam Piew and Nam Mad Rivers. The Nam Piew and Nam Mad Rivers have year-round flows and can sustain the requirements of the proposed irrigation systems identified command areas during the dry season. Tables 26 to 31 presents measurements at the headworks of the proposed irrigation systems along Nam Piew and Nam Mad Rivers.

TABLE 26. NAM PIEW RIVER AT NA-OUNG VILLAGE

DATE	CROSS SECTION (M ²)	VELOCITY (M/S)	Q (M ³ /S)
14/2/2019	0.682	0.429	0.293
21/2/2019	0.536	0.429	0.23
03/01/2019	0.448	0.429	0.192
03/08/2019	0.439	0.429	0.188
15/3/2019	0.51	0.429	0.219
03/03/2019	0.582	0.429	0.25
04/04/2019	0.682	0.429	0.293
18/4/2019	7.43	0.429	3.187
24/4/2019	0.795	0.429	0.341
05/09/2019	1.54	0.429	0.661
16/5/2019	3.21	0.429	1.377
23/5/2019	3.39	0.429	1.454
30/5/2019	7.21	0.429	3.093
06/06/2019	2.5	0.429	1.073
30/6/2019	2.3	0.429	0.987
07/05/2019	1.6	0.429	0.686
30/7/2019	1.5	0.429	0.644
08/05/2019	1.3	0.429	0.558
30/8/2019	1.4	0.429	0.601
09/05/2019	1.9	0.429	0.815
30/9/2019	2	0.429	0.858
10/05/2019	2.3	0.429	0.987
30/10/2019	2.2	0.429	0.944
11/05/2019	1.7	0.429	0.729
30/11/2019	1.8	0.429	0.772
12/05/2019	2.4	0.429	1.03
30/12/2019	2.3	0.429	0.987
01/05/2020	2.5	0.429	1.073
30/1/2020	2.6	0.429	1.115
02/05/2020	3.3	0.429	1.416
28/2/2020	3.2	0.429	1.373
03/05/2020	2.9	0.429	1.244
30/3/2020	2.8	0.429	1.201
04/05/2020	2	0.429	0.858
30/4/2020	1.9	0.429	0.815
05/05/2020	1.7	0.429	0.729
30/5/2020	1.6	0.429	0.686
06/05/2020	1.6	0.429	0.686
30/6/2020	1.8	0.429	0.772
07/05/2020	1.9	0.429	0.815
30/7/2020	1.5	0.429	0.644
08/05/2020	1.2	0.429	0.515
30/8/2020	1.2	0.429	0.515
09/05/2020	1.3	0.429	0.558
30/9/2020	1.2	0.429	0.515
10/05/2020	1.1	0.429	0.472
30/10/2020	1.2	0.429	0.515
11/05/2020	1.5	0.429	0.644
30/11/2020	1.4	0.429	0.601
12/05/2020	1.3	0.429	0.558
30/12/2020	1.2	0.429	0.515
01/05/2021	2.2	0.429	0.944

DATE	CROSS SECTION (M ²)	VELOCITY (M/S)	Q (M ³ /S)
30/1/2021	2.4	0.429	1.03
02/05/2021	3	0.429	1.287
28/2/2021	2.8	0.429	1.201
03/05/2021	2.5	0.429	1.073
30/3/2021	2.7	0.429	1.158
04/05/2021	2	0.429	0.858
30/4/2021	1.8	0.429	0.772
05/05/2021	2	0.429	0.858
30/5/2021	2.5	0.429	1.073
06/05/2021	3	0.429	1.287
30/6/2021	3.5	0.429	1.502
07/05/2021	3.5	0.429	1.502
30/7/2021	3.7	0.429	1.587
08/05/2021	3.5	0.429	1.502
30/8/2021	3.2	0.429	1.373
09/05/2021	3.4	0.429	1.459
30/9/2021	3.5	0.547	1.915
10/05/2021	3.6	0.547	1.969
30/10/2021	3.55	0.547	1.942
11/05/2021	3.4	0.547	1.86
30/11/2021	3.35	0.547	1.832
15/12/21	1.414	0.76	1.075
30/12/21	1.405	0.76	1.0678
15/1/22	1.4	0.76	1.064
30/1/22	1.396	0.76	1.061
15/2/22	1.372	0.76	1.043
30/2/22	1.365	0.76	1.037
15/3/22	1.361	0.76	1.034
30/3/22	1.42	0.76	1.079
30/4/2022	1.39	0.760	1.06
15/4/22	1.385	0.76	1.0526
30/5/22	1.81	0.760	1.38

TABLE 27. NAM PIEW RIVER AT NAZON WEIR, PHONKHAM VILLAGE

DATE	CROSS SECTION (M²)	VELOCITY (M/S)	Q (M3/S)
14/2/19	0.588	0.547	0.322
21/2/19	0.562	0.547	0.307
03/01/2019	0.37	0.547	0.202
03/08/2019	0.41	0.547	0.224
15/3/19	0.39	0.547	0.213
22/3/19	0.628	0.547	0.344
04/04/2019	0.729	0.547	0.399
18/4/19	13.34	0.547	7.297
24/4/19	0.49	0.547	0.268
05/01/2019	0.52	0.547	0.284
05/09/2019	1.04	0.547	0.569
16/5/19	3.55	0.547	1.942
23/5/19	0.45	0.547	0.246
30/5/19	11.19	0.547	6.121
17/6/19	0.536	0.547	0.293
07/12/2019	0.951	0.547	0.52
08/02/2019	0.893	0.547	0.488
22/8/19	2.81	0.547	1.537
09/06/2019	2.123	0.547	1.161
19/9/19	0.951	0.547	0.52
30/9/19	2.2	0.547	1.203
10/05/2019	2.3	0.547	1.258
30/10/19	2.2	0.547	1.203
11/05/2019	1.7	0.547	0.93
30/11/19	1.5	0.547	0.821
12/05/2019	2.4	0.547	1.313
30/12/19	2.3	0.547	1.258
01/05/2020	2.5	0.547	1.368
30/1/20	2.4	0.547	1.313
02/05/2020	3.1	0.547	1.696
28/2/20	3	0.547	1.641
03/05/2020	2.8	0.547	1.532
30/3/20	2.8	0.547	1.532
04/05/2020	2	0.547	1.094
30/4/20	1.9	0.547	1.039
05/05/2020	1.7	0.547	0.93
30/5/20	1.5	0.547	0.821
06/05/2020	1.6	0.547	0.875
30/6/20	1.8	0.547	0.985
07/05/2020	2	0.547	1.094
30/7/20	1.5	0.547	0.821
08/05/2020	1.2	0.547	0.656
30/8/20	1.2	0.547	0.656
09/05/2020	1.3	0.547	0.711
30/9/20	1.2	0.547	0.656
10/05/2020	1.1	0.547	0.602
30/10/20	1.2	0.547	0.656
11/05/2020	1.5	0.547	0.821
30/11/20	1.4	0.547	0.766
12/05/2020	1.2	0.547	0.656
30/12/20	1.1	0.547	0.602
01/05/2021	2.1	0.547	1.149
30/1/21	2.3	0.547	1.258
02/05/2021	3	0.547	1.641
28/2/21	2.8	0.547	1.532
03/05/2021	2.5	0.547	1.368
30/3/21	2.7	0.547	1.477
04/05/2021	2	0.547	1.094
30/4/21	1.7	0.547	0.93
05/05/2021	2	0.547	1.094
30/5/21	2.5	0.547	1.368

DATE	CROSS SECTION (M ²)	VELOCITY (M/S)	Q (M3/S)
06/05/2021	2.9	0.547	1.586
30/6/21	3.5	0.547	1.915
07/05/2021	3	0.547	1.641
30/7/21	3.7	0.547	2.024
08/05/2021	3	0.547	1.641
30/8/21	2.7	0.547	1.477
09/05/2021	2.7	0.547	1.477
30/9/21	2.75	0.547	1.504
10/05/2021	2.65	0.547	1.45
30/10/21	2.5	0.547	1.368
11/05/2021	2.6	0.547	1.422
30/11/21	2.68	0.45	1.206
15/12/21	2.64	0.45	1.188
30/12/21	2.61	0.45	1.175
15/1/22	2.57	0.45	1.157
30/1/22	2.55	0.45	1.148
15/2/22	2.5	0.45	1.125
28/2/22	2.47	0.45	1.112
15/3/22	2.61	0.45	1.175
30/3/22	2.53	0.45	1.145
15/4/22	2.56	0.45	1.15
30/5/22	0.75	0.585	0.439
15/5/22	1.79	0.760	1.36
30/5/22	3.11	0.450	1.40

TABLE 28. NAM PIEW RIVER LAN WEIR, LAE DOR VILLAGE

DATE	CROSS SECTION (M2)	VELOCITY (M/S)	Q (M3/S)
30/11/21	0.78	0.585	0.456
15/12/21	0.77	0.585	0.45
30/12/21	0.753	0.585	0.441
15/1/22	0.74	0.585	0.433
30/1/22	0.732	0.585	0.428
15/2/22	0.725	0.585	0.424
28/2/22	0.69	0.585	0.404
15/3/22	0.74	0.585	0.433
30/3/22	0.735	0.585	0.43
15/4/22	0.741	0.585	0.433
30/4/22	0.94	0.660	0.62
15/5/22	1.15	0.585	0.673
30/5/22	1.23	0.585	0.720

TABLE 29. NAM PIEW AT NAPA WEIR AT NAYONG VILLAGE

DATE	CROSS SECTION (M ²)	VELOCITY (M/S)	Q (M ³ /S)
30/11/21	0.96	0.66	0.634
15/12/21	0.95	0.66	0.627
30/12/21	0.935	0.66	0.617
15/1/22	0.921	0.66	0.608
30/1/22	0.91	0.66	0.601
15/2/22	0.89	0.66	0.587
30/2/22	0.87	0.66	0.574
15/3/22	0.921	0.66	0.608
30/3/22	0.89	0.66	0.59
15/4/22	0.91	0.66	0.6
30/4/2022	0.94	0.660	0.62
15/5/22	1.44	0.450	0.65
30/5/22	1.64	0.660	1.08

TABLE 30. NAM MAD RIVER, PEUNG WEIR AT CHORMSY VILLAGE

DATE	CROSS SECTION (M ²)	VELOCITY (M/S)	Q (M ³ /S)
30/11/21	0.55	0.82	0.451
15/12/21	0.53	0.82	0.435
30/12/21	0.51	0.82	0.418
15/1/22	0.5	0.82	0.41
30/1/22	0.49	0.82	0.402
15/2/22	0.46	0.82	0.377
30/2/22	0.45	0.82	0.369
15/3/22	0.543	0.82	0.445
30/3/22	0.491	0.82	0.403
15/4/22	0.51	0.82	0.418
30/4/2022	2.88	0.720	2.074
15/5/22	3.28	0.720	2.362
30/5/22	1.15	0.820	0.943

TABLE 31. NAM MAD RIVER, HORKANG WEIR AT PHOXAI VILLAGE

DATE	CROSS SECTION (M ²)	VELOCITY (M/S)	Q (M ³ /S)
30/11/21	6.39	0.67	4.281
15/12/21	6.21	0.67	4.161
30/12/21	6.2	0.67	4.154
15/1/22	6.12	0.67	4.1
30/1/22	5.81	0.67	3.893
15/2/22	5.72	0.67	3.832
30/2/22	5.67	0.67	3.799
15/3/22	5.84	0.67	3.913
30/3/22	5.51	0.67	3.69
15/4/22	5.58	0.67	3.74
30/4/22	5.6	0.670	3.75
15/5/22	6	0.670	4.02
30/5/22	6.01	0.670	4.03

5.6 ECOLOGICAL RESOURCES

90. There are no components of the proposed development that will be located within a protected, conservation or biodiversity area. The nearest biodiversity/protected areas in the proposed sub-project areas the Nam Et Phou Louey National Biodiversity Conservation Area which is 59.30 kilometres and Nam Xam National Biodiversity Conservation Area which is approximately 76.73 kilometres at the nearest point from the proposed sub-project areas. See Plate 18.

PLATE 18. LOCATION MAP OF NAM ET PHOU LOUEY AND NAM XAM NATIONAL BIODIVERSITY CONSERVATION AREA FROM PROPOSED SUB-PROJECTS



5.7 HISTORICAL AND ARCHAEOLOGICAL SITES

91. There are no sites of archaeological or cultural significance within and around the areas of the proposed development. The project components will not affect any historical and archaeological sites such as temples and burial sites.

5.8 UNEXPLODED ORDNANCE

92. The PAFO Xengkhuang has commissioned a survey to be conducted on the presence of unexploded ordnance (UXO) in the proposed sub-project areas. The results of the survey conducted by the PAFO Xengkhuang for UXO is attached here as Appendix C.

5.9 SOCIO-ECONOMIC CONDITIONS

5.9.1 Population

93. The proposed Nam Piew River 1, 2, 3 and 4 and Nam Mad River 1 and 2 Irrigation System Sub-Projects covers a total of 7 villages. The villages within the command area of the proposed Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project are Laeng, Lae-Nador, Phonkham, Nayong (Napa area) and Na-Oung Villages while the villages within the command area of the proposed Nam Mad River 1 and 2 Irrigation System Sub-Project are Chormsy and Phosai Villages. The majority ethnic groups in the two subprojects are Lao-tai and Khmu with the ethnic group Tai Dam existing only in Chormsy Village. Tables 32 and 33 presents details of the population in the proposed Nam Piew River 1, 2, 3 and 4 and Nam Mad River 1 and 2 Irrigation System Sub-Projects respectively.

TABLE 32. POPULATION OF NAM PIEW RIVER 1, 2, 3 AND 4 IRRIGATION SYSTEM SUB-PROJECT

VILLAGE	ETHNIC GROUP	HOUSEHOLD	FAMILY	POPULATION	FEMALE
Laeng	Lao-Tai, Khmu	108	115	622	289
Lae-Nador	Lao-Tai	132	169	657	330
Phonkham	Lao-Tai, Khmu	56	66	379	179
Nayong Napa area	Lao-Tai	48	55	306	154
Na-Oung	Lao-Tai	65	84	328	170
TOTAL		409	489	2,292	1,122

TABLE 33. POPULATION OF NAM MAD RIVER 1 AND 2 IRRIGATION SYSTEM SUB-PROJECT

VILLAGE	ETHNIC GROUP	HOUSEHOLD	FAMILY	POPULATION	FEMALE
Chormsy	Lao-Tai, Khmu, Tai-Dam	170	185	918	434
Phosai	Lao-Tai	75	101	398	182
TOTAL		245	286	1,316	616

5.9.2 Income and Poverty Levels

94. The income of the communities in the sub-project areas are mainly sourced from agriculture - 53%, handicraft - 43%, selling/trading - 1% and government sector – 35%. The income level in the sub-project areas is low with an annual income of 32,640,000 LAK or US\$1,900 with an annual per capita income is very low at approximately 700,000 LAK or about 40 USD. Tables 34 and 35 shows the income sources in the Sub-Project Villages. Tables 36 and 37 presents the household income in sub-project areas.

TABLE 34. INCOME SOURCES IN SUB-PROJECT VILLAGES, NAM MAD RIVER SUB-PROJECTS

WORKING SECTOR	NO. OF FAMILY	%
Cultivation and animal husbandry	244	56
Handicraft	175	40
Selling/trading	5	1
Govt Staff	13	3

TABLE 35. INCOME SOURCES IN SUB-PROJECT VILLAGES, NAM PIEW RIVER SUB-PROJECTS

WORKING SECTOR	NO. OF FAMILY	%
Cultivation and animal husbandry	377	77
Handicraft	33	7
Selling/trading	19	4
Govt Staff	52	10
Labor/Service	8	2

TABLE 36. HOUSEHOLD INCOME OF SUB-PROJECT VILLAGE, NAM PIEW RIVER SUB-PROJECT

VILLAGE	INCOME (LAK)			
	TOTAL INCOME/YR	FAMILY INCOME/YR	CAPITA/YR	PERSON/M
Na-Oung	4,411,000,000	67,861,538	13,448,170	1,120,680
Phonkham	5,460,000,000	40,255,875	4,000,000	333,333
Nayong Napa area	3,744,000,000	55,000,000	25,400,000	830,000
Lae-Nador	4,120,000,000	46,000,000	9,000,000	750,000
Laeng	4,118,400,000	30,000,000	4,500,000	375,000

TABLE 37. HOUSEHOLD INCOME OF SUB-PROJECT VILLAGE, NAM MAD RIVER SUB-PROJECT

VILLAGE	INCOME (LAK)			
	TOTAL INCOME/YR	FAMILY INCOME/YR	CAPITA/YR	PERSON/M
Chormsy	6,242,400,000	32,640,000	680,000	566,666
Phosai	2,502,600,000	25,800,000	4,300,000	358,333

6 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

95. The environmental impacts were evaluated in the areas of influence at the subproject component sites. At the headworks, the area of influence includes the upstream and downstream sections from the headworks considering the potential effects to water quality, sustainability of the water supply source, and potential conflict on river water use. At the locations of the main and secondary canals, the affected area may extend to an average of 1-50 meters along the excavated area of the canals.

96. At the proposed sites, temporary disruption and nuisance impacts may be experienced, mainly during the construction and rehabilitation/upgrading period. These affected areas may experience direct impacts associated with temporary disturbance from construction activities. The potential environmental impacts were identified based on the project activities that may occur in each component and evaluation of the environmental and social baseline situation at the subproject area. The identification of environmental impacts was mainly based on the technical information related to project component design and operation, field visits, information from stakeholders, and feasibility study.

6.1 ENVIRONMENTAL IMPACTS RELATED TO LOCATION (PRE-CONSTRUCTION PHASE)

6.1.1 Impact on Community Assets

97. There will be no land acquisition required for the development of the requisite project component facilities. Likewise, it is anticipated that there will be minimal acquisition required for temporary use of land or loss or damage to assets. The Compensation Plan for the subproject has been prepared separately to ensure that any loss of land, trees or damage to property will be subject to compensation in accordance with the existing regulations of the National Government and the safeguards requirements of the Bank.

6.1.2 Impact on Natural Resources and Protected Areas

98. The location of the proposed sub-projects and its components will have no impact on any Biodiversity, Conservation or Protected Areas. The nearest biodiversity/protected areas in the proposed sub-project areas are the Nam Et Phou Louey National Biodiversity Conservation Area which is 59.30 kilometres and Nam Xam National Biodiversity Conservation Area which is approximately 76.73 kilometres.

6.1.3 Impact on Historical and Archaeological Sites

99. The proposed subprojects will not affect nor impact any historical, archaeological or culturally important sites as there are no historically/culturally/archeologically important areas within or around the proposed sub-project areas. Should there be accidental finds during the implementation of the works, all activities will be halted and the concerned Lao Government Agencies notified for proper disposition and handling of the artefacts and relics.

6.2 ENVIRONMENTAL IMPACTS DURING CONSTRUCTION, REHABILITATION/UPGRADING

100. Construction and rehabilitation/upgrading activities that may be undertaken for the proposed subprojects would include land clearing, excavation, filling, disposal of excavated soil and movement of construction vehicles, operation of heavy equipment, and operation of worker camps. The works for the proposed sub-projects are expected to generate the following adverse impacts:

- Loss of vegetation as a result of clearing and grubbing
- Contamination of raw water source
- Generation of excavated material
- Runoff of silt
- Temporary loss of access to houses and establishments
- Occurrence of acute increase in ambient Noise
- Acute increase in generation of dust
- Generation of wastes, i.e. domestic wastewater, solid and hazardous wastes
- Community hazards as a result of open excavations
- Hazards to occupational health and safety.

101. It should be noted that during the conduct of the works, there will be no diversion or cutting of the water flow as this is not necessary. The mitigation measures to address the adverse environmental impacts during the construction phase of the subproject implementation are discussed in the succeeding sections. The Subprojects will conform to the Environmental, Health, and Safety General Guidelines of 30 April 2007 (IFC-WB).

6.2.1 Air Pollution

102. The potential sources of air pollution during the construction and rehabilitation/upgrading activities stage include dust from earth works concentrated within a 50-meter radius of the work site; emissions from the operation of construction equipment and machineries; fugitive emissions from vehicles plying the area; fugitive emissions during the transport of construction materials; and localised increased traffic congestion in work areas. Most of the emissions will be in the form of coarse particulate matter and will settle down in close vicinity of the work sites.

103. The impacts will be minor, local, short-term, direct and reversible. The best management practices will be adopted during conduct of the works to minimize dust and release of combustion emissions from operation of the requisite heavy equipment and machineries. Excavated material and stockpiles will be kept moist while transport vehicles will be required to install tarpaulin covers or other suitable material to prevent spillage of the hauled materials.

104. Furthermore, construction equipment and vehicles will, at all times, be well maintained and in good working condition to reduce fugitive emissions. Speed limits on areas will be imposed to minimize dust emission and to reduce the risk of traffic accidents in the work sites. Information about planned construction activities will be provided to residents in the area and will be planned to minimize public disturbance and nuisance.

105. Moreover, spraying of unpaved areas shall be undertaken at least twice a day or as required especially in areas where haul vehicles and heavy equipment operate and areas in close proximity to settlement areas. This is undertaken to minimize, or if at all possible, eliminate the generate of dust/suspended particulates.

6.2.2 Noise

106. Construction and rehabilitation/upgrading activities may cause noise and vibration impacts for a short duration. The operation of equipment may cause nuisance to adjacent residential houses. Diesel generators will also be required during the works. Ambient Noise levels in these areas may reach 88dBA at a distance of about 15m away from the source or operation of equipment. Along the haul roads, the average ambient noise level will also experience an acute increase because of increased vehicular traffic.

107. As mitigation for the adverse impacts identified, work at the sites will be limited only during the daytime from 0700H to 1800H. There will no works that will be permitted beyond this period. Furthermore, the community will be provided with updated information about the schedule of the construction activities through billboards/sign. Stationary equipment like the diesel generators will be installed as far as practical from sensitive receptors. Buffers will also be established, especially in sensitive areas, as further mitigation.

6.2.3 Impact on Ecological Resources

108. During the implementation of the construction activities, workers and labourers of the contractors may undertake hunting of wildlife and cutting of wood. The contractors will be instructed to orient their workers and staff that such activities are strictly prohibited. The contractors is responsible for the provision of the requisite kitchen facilities, food and cooking fuel for their workers and staff.

6.2.4 Clearing of Vegetation

109. The construction and rehabilitation/upgrading works will require the clearing and grubbing of the sites. The impact of the clearing and grubbing works will be minimal because there will be minimal area that will be cleared as the works will mainly be in the existing headworks in the Nam Piew and Nam Mad Rivers. The requisite roads and paths will be established with limited width enough only to accommodate vehicles and equipment for construction and operation. This is to minimize the impact on the receiving environment. The vegetative cover that will be cleared will be disposed in the existing disposal facility of the district. The volume of the cleared material is not expected to be substantial as the works will mainly be in the existing headworks in the Nam Piew and Nam Mad Rivers. Upon completion of works, the exposed surfaces will be planted with the appropriate vegetation to prevent soil erosion.

6.2.5 Water Pollution

6.2.5.1 Impacts of Sediment Runoff

110. The construction and rehabilitation/upgrading of the facilities may result in erosion of unstable areas during earthworks, especially during heavy rainfall events. Sedimentation of nearby watercourses and channels from runoff heavily laden with material from the work sites may occur as a result of the works. These impacts are transient and short-term. As mitigation, the contractors will be required to implement proper measures which would include the provision of silt traps, ditches, and sump pits to intercept the flow silt laden runoff from the worksites into the nearby channels and watercourses. Moreover, activities, especially earthworks, will be scheduled during the dry season or be stopped during heavy rainfall.

6.2.5.2 Domestic Wastewater from Contractors Facilities and Worker's Camps

111. The contractor and workers camps will generate domestic wastewater. Contamination of surface and groundwater sources and surrounding land is a potential risk that should be addressed accordingly by the contractor. Potential adverse impacts are minimal and temporal in duration and can be readily mitigated through measures established in the EMP. Proper management of the domestic wastewater from the contractor's facilities and workers camps should be undertaken at all times. Appropriate latrines shall be installed in the camps and facilities of the Contractors.

6.2.6 Generation of Construction Wastes

6.2.6.1 Excavated Soil

112. The construction and rehabilitation/upgrading works will require excavation and levelling works. Excavated materials will also be generated. The excavated materials will be utilized as backfill in the other work sites where required. Any surplus material will be disposed properly and given for free to interested villagers as backfill materials in coordination with the village authority. There is no anticipated need for spoil disposal sites.

6.2.6.2 Domestic Waste

113. Solid waste will be generated at the work sites and the worker's camp. Wastes may include domestic solid waste, inert construction waste, and hazardous waste. Domestic waste is not anticipated to be a significant volume as only small temporary camps will be established at the sites. It is projected that the temporary camps will generate an estimated 0.4 to 0.5 kg/person/day and would consist mainly of plastic and glass bottles, paper, cardboard, food

wastes, and packaging wastes. This will be collected and properly disposed in the approved disposal facility of the Townships.

6.2.6.3 Inert Construction Waste

114. The inert waste that will be generated during the works will consist mainly of scrap wood and metal, cement bags, aggregates and concrete debris. These wastes are generally disposed of and/or land filled in appropriate sites and represents no direct danger to health. The scrap metal and wood can be collected for recycling.

6.2.7 Impact on Community Health and Safety

115. During the works, the community may be exposed to the health and safety risks from increased vehicular movements in the area, open excavation and operation of heavy equipment. As mitigation and to prevent accidents and hazards to motorists, pedestrians and residents in the area of the worksites, barricades and wood/steel plate covers will be provided in open excavations during non-working time. The worksites will be properly secured with fences and access to the area restricted.

116. The contractor is to ensure that all vehicles and transport equipment and materials that may be required to pass through villages are operated safely without endangering these communities. All loads are to be secured and all loads with fugitive materials (e.g., excavated soil and sand) are to be covered with tarpaulins. The contractor is to immediately remove any drivers that ignore any of the community safety requirements. The required warning signage will be installed in all the worksites.

6.2.8 Occupational Health and Safety

117. During the construction and rehabilitation/upgrading phase, the implementation of the works may result in hazards to the safety of workers such as tripping, slippery surfaces, carrying heavy loads, and during operation of machines and equipment. The contractor will be required to prepare a site safety plan and designate a safety supervisor who will ensure that safety measures during construction are implemented. These safety measures include the use of personnel protective clothing and equipment, placing of hazard warning signs, and excavation covers and barriers. Arrangements for prompt medical attention in the event of accidents will also be made. The contractor will be required to: (i) provide environmental health and safety training to all workers (ii) provide priority hiring of qualified skilled and 100% unskilled workers from the villages, (iii) consult with local people to avoid conflict if migrant workers will be brought to the site, (iv) installation of suitable toilets such as pit latrines and grey water drainage facilities such as soakage pits, (v) arrangement for the proper disposal of solid wastes, (vi) briefing of workers and the villagers on the dangers of communicable diseases, and (vii) assignment of responsibility to workers and local peoples' welfare to a senior member of the contractor's staff.

6.2.9 COVID 19 Risk Management

118. Given the current situation with the COVID 19 Pandemic, a risk management plan for COVID 19 should be prepared and implemented by the Contractor during the construction period. The Contractor shall develop and implement a COVID-19 risk management plan in compliance with most relevant GOL regulations and policies, or in the absence thereof, in accordance with international good practice as issued by the World Health Organization. The Contractor shall implement an awareness and information dissemination campaign on COVID-19 risk management and provide training to workers on necessary risk mitigation and management measures/procedures.

6.3 ENVIRONMENTAL IMPACTS DURING OPERATION

119. Impacts during the operation phase are characteristically spread over a longer period of time and means that environmental impacts can become progressively more significant if they are not adequately mitigated. Environmental mitigation in the operation period is principally the responsibility of the DAFO and the subproject beneficiaries represented by the WUG

6.3.1 Impacts of Water Offtake

120. During operation of the facilities, an impact that may accrue relate to the volumes of water taken off the rivers, and the effects of downstream users and ecology. Disruption of downstream hydrological flows due to offtake from river may occur during the operation of the facilities. This impact is however low as water offtake will be fine-tuned and managed on the basis of environmentally allowable volumes. Once scheme operation commences, the gauged river flows and water offtake volumes must be reassessed. These, plus any complaints from downstream users, must be used to recalculate the allowable offtake. The scheme must then be revised accordingly.

6.3.2 Water Pollution

121. Upstream land uses may cause a decline in the quality of water available for the irrigation scheme. Pro-soil conservation watershed management schemes will be implemented as part of the subproject implementation. This will mitigate deterioration of water quality of the waterway. Water quality will be improved through upper watershed management and within the command area the ability to control water movement will limit contamination risk and the proposed cropping agrichemical use is low.

122. A catchment land use plan must be prepared and implemented to ensure that the scheme is safeguarded throughout its operational life. The primary objective of the plan is the upstream catchment protection to ensure that the subproject irrigation scheme is safeguarded in terms of water supply and limited sediment supply. Arrangements for implementation of the plan must be maintained.

6.3.3 Loss of Aquatic Biodiversity

123. The aquatic resources may decline as a result of the operation of the facilities; however, the river is already a highly altered environment, the changes to the flow regime are expected to be modest and have been the subject of detailed assessment. In addition, long term monitoring and refinement is a required mitigation measure. Headworks weirs will be improved from the environmental perspective by the construction of fish passes.

6.3.4 Increased Utilization of Fertilizers and Pesticides

124. The risk from increased fertilizer and pesticide use is considered to be very low in the short to medium term, however with increased areas and extent of vegetable crops pest populations may build up and require more direct intervention. This period of possible build up needs to be used to introduce the understanding of pests and pest population management through the LAO GAP certification best practice systems. Only agrichemicals approved by the Government of Lao PDR may be used. Strong extension support must be provided to encourage the responsible use of fertilizers and pesticides. The uses of agrichemicals by farmers must be monitored and action taken against anyone using banned substances.

7 ANALYSIS OF ALTERNATIVES

7.1 ALTERNATIVES TO THE SUBPROJECT

125. The beneficiary villages in and around Kham District have been selected as the site of the subproject. The selection process adopted for SRIWMSP involves screening and prioritizations, following which candidate projects were selected for the feasibility study. The feasibility study then confirms subproject eligibility. Prioritization, which was conducted during the Project Preparation phase, was based on a set of criteria as prescribed in the Project Administration Manual (PAM) aimed primarily at ensuring alignment with Government priority, maximizing impact in terms of number of populations to be served, maximizing the contribution to economic development and poverty alleviation and also.

126. Relative to safeguards requirements, identified sub-projects should comply with Government and ADB safeguard guidelines and involve minimal adverse environmental and resettlement impacts, i.e., only MONRE category 1 and ADB safeguard categories B or C will be considered. Preference where works are maintained within existing footprint or right of way to minimize land acquisition costs to Government. Alternative technical options were reviewed with a preference to use existing infrastructure to the maximum extent possible. As such no additional canals or land take is required. There were no logical alternatives to these options, and so none were given serious consideration.

7.2 ALTERNATIVES WITHIN THE SUBPROJECT

127. In the context of the selection and prioritization conducted during the project preparation phase, the Nam Piew River 1, 2, 3 and 4 Irrigation System Sub-Project and Nam Mad River 1 and 2 Irrigation System Sub Project were identified for Implementation. There were no other alternatives presented as these were the only proposed sub-projects that were deemed eligible.

7.3 “NO PROJECT” ALTERNATIVE

128. The “No Project” alternative would mean, inter alia, (i) that the opportunity to provide irrigation water to a significant rural population toward meeting GoL goals and priorities would not be realized, (ii) that an increase in market-oriented agricultural production would not take place; (iii) that watershed ecological services protected would not be realized.

8 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

8.1 CONSULTATIONS AND INFORMATION DISCLOSURE DURING SUBPROJECT DESIGN

129. During the preparation of the IEE, Public/Stakeholder consultations were held in the seven villages with the Provincial Agriculture and Forestry Office (PAFO) and Loan Implementation Consultants (LIC) from 12 to 14 October 2022 and 16 January 2023. Stakeholders who participated during the public consultation process included villagers, local government officers and staff.

130. The consultations were conducted to discuss with the stakeholders the proposed sub-projects to elicit the environmental concerns/issues of the community. In general, consultees were of the view that the proposed sub-projects would result in more benefits than negative impacts.

131. During project implementation, communities within the sub-project impact areas should be appropriately and in a timely manner, informed of the construction activities particularly those which are likely to cause noise and dust nuisance, disruption to roads and pathways.

132. Prior to project implementation, the IEEs for the proposed sub-projects were prepared and the requisite Environmental Compliance Certificate (ECC) secured from PoNRE. The approved IEE shall be posted on the ADB and DOI website. Table 38 presents the summary of the public consultations conducted for the proposed sub-projects.

TABLE 38. SUMMARY OF PUBLIC/STAKEHOLDERS CONSULTATIONS

TABLE 55: SUMMARY OF PUBLIC/STAKEHOLDERS CONSULTATIONS					
DATE	LOCATION	PARTICIPANTS			
		AGENCY	TOTAL	MALE	FEMALE
NAM PIEW RIVER 1, 2, 3 AND 4 IRRIGATION SYSTEM SUB-PROJECT					
13/10/2022	Lae-Dor Village	PAFO/DAFO/Villager	17	14	3
13/10/2022	Na-Oung Village	PAFO/DAFO/Villager	27	22	5
14/10/2022	Laeng Village	PAFO/DAFO/Villager	23	17	6
14/10/2022	Phonkham Village	PAFO/DAFO/Villager	38	31	7
14/10/2022	Nayong (Napa)	PAFO/DAFO/Villager	32	24	8
NAM MAD RIVER 1 AND 2 IRRIGATION SYSTEM SUB-PROJECTS					
12/10/2022	Phosai Village	PAFO/DAFO/Villager	19	15	4
12/10/2022	Chormsy Village	PAFO/DAFO/Villager	31	25	6
DISTRICT-PROVINCIAL CONSULTATION					
16/01/2023	PAFO XKh	All related partners	46	35	11

133. During the consultations with the provincial and district authorities and stakeholders, suggestions, opinions and responses from the community on the proposed sub-project have recorded and noted and feedback from the LIC and DOI provided on how concerns and recommendations will be addressed.

134. The consultees were all in agreement that the proposed sub-projects would be beneficial to the community and interposed no objections. Table 39 summarizes the main comments that were raised during the village consultation meetings. Appendix D presents the proceedings of the Public Consultations.

TABLE 39. SUMMARY OF MAIN CONCERNS RAISED DURING PUBLIC CONSULTATIONS

COMMENTS	RESPONSES OF PAFO/LIC-DOI
The villages' leaders and villagers agreed on the project concept and objectives and happy to receive those subprojects.	-
During the project implementation, if any impact, the related responders shall immediately solve the problems, to prevent the lose which is maybe happen	LIC-DOI/PAFO/DAFO/CONTRACTOR
Proper covers of irrigation canals pass by or near by the villages/community, as well as the erosion protection is needed for the risk areas.	LIC-DOI/PAFO/DAFO/CONTRACTOR
The technical specification during the construction phase need to be payed attention	LIC-DOI/PAFO/DAFO/CONTRACTOR
The compensation of affected land areas will need to follow the national law and project regulation	LIC-DOI/PAFO/DAFO
Dust control properly	PAFO, LIC-DOI, Contractor
Learn from the past failure	PAFO, LIC-DOI, Contractor, O&M team

8.2 INFORMATION DISCLOSURE

135. Prior to project implementation, a copy of the approved IEE and EMP will be submitted to the DoNRE. The IEE will also be posted on the ADB and DOI website. During construction and operation, communities within the impact area of the subproject area will be kept informed of construction activities through billboards or information boards about the construction activities and schedules.

9 GRIEVANCE REDRESS MECHANISM

136. Article 13 of Decree 192/PM requires the subproject to establish an effective mechanism for grievance resolution. GoL legal requirements for this mechanism are further described in Part VI of the Decree's implementing regulations, and in detail in the Technical Guidelines. The loan covenants stipulate the GRM requirements of the ADB for the project. The mechanism to address any grievances on environmental safeguards issues is the same as that designed to address grievances related to compensation.

137. The objective of the grievance redress mechanism (GRM) is to resolve complaints as quickly as possible at the local level through a process of conciliation, and if that is not possible, to provide clear and transparent procedures for appeal. All affected persons will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through an effective public information campaign. An aggrieved affected person (AP) or affected household (AH) will be free from any fees in connection with the lodging and resolution of complaints, as the costs will be borne by the Executing Agency and the appointed contractors. The GRM committee will be established for the district with assignment of the GRM focal person.

138. During construction and operation, communities within the impact area of the subproject area will be kept informed of construction activities through billboards or information boards about the construction activities and schedules. The details of the PAFO, PGT, GRM Focal Contact Persons and Construction Managers will be prominently displayed in the respective construction areas for the reference of the affected communities/persons. Consultations will be undertaken on a need basis with the date, time and venue to be agreed with the Village Heads and concerned government officials. Complaints and grievances can be directly filed, both written and verbal, to the concerned entities. This will be an alternative to the village complaint system.

139. All suggestions, opinions and responses from the community on the sub-project should be taken into account and feedback provided on how concerns and recommendations have been addressed.

9.1 TYPE OF GRIEVANCES

140. Complainants are entitled to lodge complaints regarding any aspect of the project. Any affected person will be able to submit a grievance if they believe a practice is having a detrimental impact on the community, the environment, or on their quality of life. Eligible grievances or complaints include:

- Negative impacts on a person or a community (e.g. financial loss such as from loss of water, loss of roadside trees, health and safety issues, nuisances, etc.).
- Dangers to health and safety or pollution of the environment.
- Hazards due to construction activities (e.g., noise, dust, loss of access, etc.)
- Impacts on social infrastructure.
- Failure to comply with standards or legal obligations.

- Improper conduct or unethical behaviour of contractor leading to nuisance of affected person(s).
- Misuse of funds and other irregularities.
- Grievances due to compensation and unaddressed losses.
- Complaints related to gender issues.

9.2 GRIEVANCE RESOLUTION PROCESS

141. Complaints can be made verbally or in written form. It is recognized that in many cases, complainants do not have the writing skills or ability to express their grievances verbally, however, complainants are encouraged to seek assistance from family members or village heads, to have their grievances recorded in writing and to ensure that where disputes do occur and all the details have been recorded accurately enabling all parties to be treated fairly.

142. In the case of verbal complaints, a written record of the complaint will be made during the first meeting with the complainant. Complainants who present their complaints within the prescribed procedures will be exempt from all administrative fees incurred. In addition, complainants who lodge complaints and appeals to district courts will be provided with free legal representation.

143. Grievances are issues, concerns, or complaints that may be raised by stakeholders about the implementation of the project. The GRM provides a systematic process for receiving, validating, and resolving complaints from AP and is designed to achieve the following:

- Serving as an open channel for effective communication of environmental and social issues arising from the project;
- Allowing prompt action or resolution of any complaint or adverse impacts that may occur during project construction and operation;
- Serving as a means to hear community suggestions on the project; and
- Promoting transparency in project implementation.

144. Any PAP may raise and submit a grievance if the activity has a detrimental impact on the environment, the community, or the quality of life of people. Examples of grievances are hazards to community health and safety; construction-related nuisances, such as noise and dust and improper disposal of wastes; adverse changes on way of life and livelihood; peace and order problems due to presence of migrant workers; and failure of the project to comply with environmental policies, safety clearance requirements, and other legal obligations.

9.2.1 Arbitration Committees

145. The sub-project's GRM will rely on the existing village arbitration units that have already been established in the villages. The Village Development Committee (VDC) generally consists of the village chief, deputy chief, village secretary, and village representative of the Lao Women's Union, Lao Front for National Construction, village elders, youth, and village land taxation unit. The VDC is responsible for settling disputes between villagers through conciliation and negotiation. In the absence of these units, the members of the village committee (if formed) or the village leaders will act as grievance officers.

146. The affected households (AHs) may present their complaints to the concerned local administrative officials and resettlement committees. The complaint can be filed first at the village level and can be elevated to the highest or provincial level if the affected persons (APs) are not satisfied with the decisions made by the VDC at village level. At the district and provincial levels, the district and provincial steering committees of the project will act on grievances or complaints that have not been resolved at the VDC.

9.2.2 Grievance Redress Procedures

147. All complaints and resolutions will be properly documented by the Village Development Committee (VDC) and be available for public review and for monitoring purposes. As a general policy, the PAFO and PGT will work proactively toward preventing grievances through the implementation of impact mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. Nonetheless, during construction and operation it is possible that unanticipated impacts may occur if the mitigation measures are not properly implemented, or unforeseen issues occur. The procedures for the grievance resolution process for the subproject are detailed in Table 40.

TABLE 40. GRIEVANCE REDRESS PROCEDURES

NO.	STAGES
1	Stage 1 (Village – Subproject Area). In the first instance, complainants will raise complaints or grievances to the Village Development Committee or other designated village grievance officers. The committee will organize a meeting with the complainants to resolve the issue using its traditional methods of conciliation and negotiation. The meeting will be held in a public place and will be open to other members of the community to ensure transparency. The VDC aims at clarifications and amicable solution with the complainant. This mediation aims at a village internal immediate solution agreed with the subproject. If the complaint cannot be solved at this stage, the next step will apply.
2	Stage 2 (District Implementing Level). If within 5 days of lodging the complaint and no understanding or amicable solution can be reached or no response is received from the Village Development Committee, the complainant can bring the complaint to the Provincial Agriculture and Forestry Office (PAFO). The PAFO will meet with the complainant to discuss the complaint and provide a decision within 10 days of receiving the appeal.
3	Stage 3 (Provincial Implementing Level). If the complainant is not satisfied with the decision of the PAFO or in the absence of any response, the complainant can appeal to the Project Governance Team (PGT) with contribution of authorities and village representative/s. The PGT will meet the complainant to clarify the complaint and will inform the complainant about its decision aiming to solve the complaint. The PGT will provide a decision on the complaint within 10 days.
4	Stage 4 (Ministerial Project Executive Level). If the AP is still not satisfied with the decision of the PGT, or in the absence of any response within the stipulated time, the complainant can submit his/her grievance to Department of Irrigation (DOI). The DOI might consider an independent external opinion in this matter. The DOI will render a decision within 10 days of receiving the complaint. Before the next stage is applied additional efforts should be made to find an agreement with the AP.
5	Stage 5 (Country Level). As a last resort, the complainant may submit his/her case to the Court of Law. The complaint will be lodged with the Court of Law. The Court will take note and register the case and will provide the final juristic decision. The DOI will be responsible for forwarding the complaint and ensuring its process in the courts.

148. Normally complaints related to construction and environmental issues are resolved at the VDC level wherein the conciliation and negotiation are promptly attended to by the PAFO and contractors. Complaints related to resettlement and land disputes are normally elevated to the district and provincial levels, and at times to the Court. At each stage of the grievance redress process, written records will be maintained. The VDC will submit reports to the PAFO documenting: (i) complaints received; (ii) names and other pertinent information about complainants; (iii) dates of the original complaint, meetings and any other actions; and (iv) outcomes and/or resolution. The records of grievances with a full inventory of the complaints received will be incorporated in regular progress reporting, including the SAEMR, on the subproject. If efforts to resolve complaints or disputes remain unresolved and unsatisfactory following the GoL GRM, the affected persons/households have the right to send their concerns or problems directly to ADB's Operations Department, i.e., Urban and Water Division, Southeast Asia Department (SERD) or through ADB Lao PDR Resident Mission. If the AP is still not satisfied with the responses of SERD, he/she can directly contact the ADB's Office of the Special Project Facilitator (OSPF) as outlined in the "Information Guide to the Consultation Phase of the ADB Accountability Mechanism". The Information Guide can be downloaded through this link: <https://www.adb.org/documents/information-guide-consultation-phase-adb-accountability-mechanism>. Those who want to make a complaint with the ADB can refer to the sample letter of complaint adapted from the Information Guide as shown in Figure 18.

FIGURE 18. SAMPLE COMPLAINT LETTER

Date:

Office of the Special Project Facilitator
Asian Development Bank
6 ADB Avenue, 1550 Mandaluyong City
Metro Manila, Philippines

Tel: (+632) 632-4825

Fax: (+632) 636-2490

Email: spf@adb.org

Dear Special Project Facilitator,



We, _____ *[(name of your group) or name of representative authorized by your group]*, whose
names and addresses are attached, live in _____ *[(location and country)]*.

We hereby present this complaint to the Special Project Facilitator. *[If the complaint is filed through a representative, please provide the names of the project-affected people with their addresses and evidence of authority to represent them.]*

1. We are currently experiencing problems due to an ADB-assisted project *[specify name and description of project, and specify the site and country where it is located]*.
2. The direct harm we experience is/are the following: *[describe the problem]*.
3. We seek the following outcomes and remedies through the help of the Special Project Facilitator: *[describe what you would like to happen, how the harm or problem can be resolved]*.
4. We have previously made efforts to address our problem with the EA/IA and ADB Operations Department concerned in the following manner: *[list and attach correspondence, details of meetings, emails, and other communications]*.
5. We do not request that our identities be kept confidential
[or]
We request that our identities be kept confidential for the following reason: *[state reason]*.
6. You can contact us at: *[specify directions how to set a meeting with you and/or your authorized representative]*.

Signatures: _____

Names:

Addresses:

Other contact information:

Tel:

Fax:

Email:

Attachments: *[complete list of complainants and addresses; representative's letter of authorization, if any]*

Some matters not eligible for complaints/requests

- Allegations of fraud and corruption
- Procurement of goods, services, and consulting services
- Projects with a project completion report
- ADB personnel matters



10 ENVIRONMENTAL MANAGEMENT AND MONITORING

149. The matrix of mitigation measures in Table 41 presents all the required measures and monitoring responsibilities corresponding to the impacts as assessed that are considered necessary through the environmental assessment process. The mitigation measures required cover all stages of the contract and are separated into pre-construction, construction and operation phases. This EMP is based on the type, extent and duration of the environmental impacts identified at the design stage. In the event that unexpected impacts occur during implementation, the EMP will be amended to take into account of unexpected impacts and mitigation measures will be amended as necessary.

150. The EMP will be included in the Bid Documents and Construction Contract as such the appointed construction contractor are contractually obligated to (i) allocate sufficient budget to implement the EMP; (ii) appoint an environmental health and safety (EHS) officer to support in EMP implementation; (iii) provide training to his workers on EHS; and (iv) prepare and submit a monthly report on EMP implementation.

TABLE 41. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
I. PRE-CONSTRUCTION PHASE				
Impact on community assets Loss of community assets due to damage to properties.	Implement the compensation plan that was approved by the ADB for the subproject. Design headworks, canals and related structures within the Right-of-Way when feasible.	External LACP monitoring report	c/o DOI operations cost	PGT
Impact of location of headworks on other water users Downstream river uses such as irrigation, bathing, washing, and fishing will be affected if excessive water abstraction will occur.	There is minimal conflict with other water users of Nam Piew and Nam Mad Rivers because there is still enough water in the river that will meet the other river uses at the downstream.	River level assessments at the headworks on a monthly basis	c/o PAFO operations cost	PGT
Impact to Natural resources and protected areas Impact on natural resources and protected areas from cutting/clearing of trees and other vegetation.	Cutting of trees will be undertaken as per approved design and only upon approval. Avoid cutting of trees as much as possible and minimize damage to native vegetation. Trees that need to be cut in private land will be compensated in cash.	N/A	N/A	N/A
Impact on Historical and Archaeological Sites Damage to relics and artifacts during the conduct of the works.	The Contractor will ensure that the workforce are briefed that in the event of accidental finds relics they should immediately cease any works in the area and promptly report the find to their supervisor.	Accidental finds	c/o PAFO operations cost	PGT
II. CONSTRUCTION PHASE				
<u>Temporary disruption of existing community roads.</u>	Walking access will be maintained to affected properties and access routes	Periodic monitoring and reporting by	Included in civil works cost	PAFO, PGT Contractor

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
<p><u>pathways, and accesses</u></p> <p>Rehabilitation/upgrading of headworks, canals and related structures will cause temporary disruption of community services and access to properties.</p> <p>Particularly at road crossings, rehabilitation/upgrading activities along narrow roads may lead to temporary blockage or closure of roads and hamper movement of vehicles and people in the community.</p> <p>Community access to areas in the vicinity of schools, temples, village offices, market places and meeting halls will be affected during rehabilitation/upgrading works.</p>	<p>will be temporarily lined with timber or similar material. Particular attention will be given to ensuring safety along roads and paths used by pedestrians.</p> <p>Side street parking of construction vehicles on prolonged basis will not be allowed.</p> <p>Install barriers and safety warning signs on road sections and if necessary, deploy traffic aides/ flag persons at affected locations. Information boards at blocked roads will provide information about the temporary closure of roads, schedule of works and the traffic-rerouting plan.</p> <p>Require the contractor to immediately rehabilitate the excavated areas and any damaged road and path sections.</p> <p>Enclose the facilities perimeters so that pathway use and stream access remains unimpeded.</p>	<p>Supervision Consultant</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>		
<p><u>Air pollution</u></p> <p>Dust and air emissions from earthworks and movement of vehicles can pose nuisance to nearby communities</p>	<p>Require the contractor to cover materials with tarpaulin or other suitable materials while in transit to avoid spillage of materials.</p> <p>Moisten earthen roads during dry and dusty conditions, particularly roads near residences and through the town core area.</p> <p>Impose speed limits on construction vehicles.</p> <p>Conduct regular maintenance on construction equipment and vehicles to control air emissions during vehicle operation.</p>	<p>Periodic monitoring and reporting by Supervision Consultant</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	Included in civil works cost	PAFO, PGT Contractor
<p><u>Noise</u></p> <p>Operation of construction equipment such as jackhammer will cause excessive noise resulting in</p>	<p>Limit rehabilitation and upgrading activities, particularly operation of noise generating equipment at night.</p> <p>Position any stationary equipment that produce high noise levels such as diesel</p>	<p>Periodic monitoring and reporting by Supervision Consultant</p> <p>Report any complaint received from the</p>	Included in civil works cost	PAFO, PGT Contractor

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
nuisance to communities.	<p>generators as far as practical from sensitive receptors.</p> <p>Erect temporary barriers around construction sites especially near schools, hospitals, and houses.</p> <p>Install noise suppression devices to noise generating equipment.</p> <p>Require drivers to minimize blowing of horn and to comply with speed limits.</p> <p>Provide information to community on schedule of rehabilitation and upgrading activities through billboard/signs.</p>	community to PAFO and document in safeguard monitoring reports.		
<p><u>Impact on ecological resources</u></p> <p>Construction workers may undertake hunting of wildlife and cutting of wood.</p>	The contractors will prohibit activities such as cutting wood for cooking, hunting, or wildlife trade.	<p>Periodic monitoring and reporting by Supervision Consultant</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	Included in civil works cost	PAFO, PGT Contractor
<p><u>Clearing of vegetation</u></p> <p>Poor planning and execution of tree clearing/vegetation removal at project facilities and along headworks, canals and related structures will result in loss of vegetation and general landscape</p>	<p>Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid cutting of trees as much as possible and minimize damage to native vegetation. Trees that need to be cut in private land will be compensated in cash accordance with the approved Compensation Plan.</p> <p>Roads and paths to the facilities will only be sufficiently wide to accommodate construction vehicles/equipment to minimize land take.</p> <p>Manual labor will be utilized in sloping terrain where use of heavy equipment would cause unnecessary damage. Steep exposed slopes will be graded and covered with bush and grass to minimize erosion.</p> <p>Implement landscaping and planting of trees/vegetation at sites of the proposed facilities.</p>	<p>Periodic monitoring and reporting by Supervision Consultant</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	Included in civil works cost	PAFO, PGT Contractor

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
<u>Water pollution - Sediment runoff</u> Sediment runoff undertaken during excavation, earthworks and grading in the rainy season will cause siltation of rivers	Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials.	Periodic monitoring and reporting by Supervision Consultant Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	Included in civil works cost	PAFO, PGT Contractor
<u>Water Pollution - Worker's camp</u> Domestic wastewater from worker's camp would result to the discharge of sewage into drainage canals. Unsanitary conditions at the worker's camp will occur without the provision of necessary sanitation arrangements.	Provide adequate water supply and temporary toilet facilities at the worker's camp.	Periodic monitoring and reporting by Supervision Consultant Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	Included in civil works cost	PAFO, PGT Contractor
<u>Generation of construction waste - Generation of excavated soil</u> Generation of excavated materials during rehabilitation and upgrading of headworks, canals and related structures.	During rehabilitation and upgrading of headworks, canals and related structures excavated material will be utilized to backfill the trench. The contractor will be required to properly reinstate the excavated trench after completion of works. Surplus excavated material/cut soil from rehabilitation and upgrading of headworks, canals and related structures will be used as backfill material for low-lying areas that have been identified by the village authority.	Periodic monitoring and reporting by Supervision Consultant Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	Included in civil works cost	PAFO, PGT Contractor
<u>Generation of construction wastes – Solid, Inert and Hazardous Wastes</u> Solid wastes, inert construction wastes, and hazardous wastes during construction will result to pollution of land and receiving water bodies.	Provide appropriate segregation bins or areas for construction wastes. Secure and control storage of all hazardous materials including fuels. Reuse recyclable construction wastes such as wood, steel, and scaffoldings or sell to junk shops. Solid waste to be collected and disposed in approved disposal site of the Townships.	Periodic monitoring and reporting by Supervision Consultant Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	Included in civil works cost	PAFO, PGT Contractor

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
<u>Community health and safety</u> Community may be exposed to dangers of open excavation	Install barricades/barriers and sturdy plate covers in open excavations during non-working time. Install warning signs in the area.	Periodic monitoring and reporting by Supervision Consultant Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	Included in civil works cost	PAFO, PGT Contractor
<u>Occupational health and safety</u> Construction activities may pose hazards to workers because of the use of heavy equipment, lifting of heavy loads, and exposure to open excavations and chemicals. Potential conflict with local people will occur if migrant workers will be brought to the site.	Require the contractor to implement the construction health and safety plan in accordance with the World Bank EHS Guidelines (http://www.ifc.org/ehsguidelines) as a minimum standard. The contractor will appoint an environment, health and safety officer to ensure implementation of the plan. The plan will at minimum include: <ul style="list-style-type: none"> • Provision of first-aid facilities readily accessible by workers. • Provision of personal protective equipment (PPEs) such as hard hats, gloves, rubber boots, etc., • Wearing of PPEs while working onsite will be a mandatory requirement for workers. • Posting of safety signs/reminders in strategic areas within the construction area. • Installation of sufficient lighting at night. • Ensure that vehicle and equipment operators are properly licensed and trained. • Provide staff with communicable disease and HIV-and COVID 19 related awareness training. The contractor will be required to provide priority hiring of qualified workers from the villages and to consult with the local to avoid conflict if migrant workers will be brought to the site.	Periodic monitoring and reporting by Supervision Consultant Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	Included in civil works cost	PAFO, PGT Contractor
<u>COVID-19 risk management</u>	Siting of Camps and Field Offices	Periodic monitoring and reporting by	Included in civil works cost	PAFO, PGT Contractor

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
Working Camp Siting and Management	<ul style="list-style-type: none"> • Not in area liable to flooding, landslide or other natural disaster • Not in area affected by construction dust, noise, sewage or other pollution • Not in a residential area <p>Minimum housing standards</p> <ul style="list-style-type: none"> • separate bed for each worker • beds should not be arranged in tiers of more than two; • separate accommodation of the sexes or to accommodate couples • adequate natural light during the daytime and adequate artificial light • adequate ventilation to ensure sufficient movement of air • adequate supply of safe potable water • adequate sanitary facilities • adequate drainage • adequate furniture for each worker to secure his or her belongings, such as a locker. • common dining rooms, canteens or mess rooms, located away from the sleeping areas • appropriately situated and furnished laundry facilities • reasonable access to plug sockets for charging telephones and other devices • rest and recreation rooms and health facilities, where not available in the community <p>Minimum accommodation sizes</p> <ul style="list-style-type: none"> • Sleeping space <ul style="list-style-type: none"> □ inside dimensions over 198 centimetres by 80 centimetres; • Sleeping room <ul style="list-style-type: none"> □ headroom of over 203 centimetres allowing full free movement □ Beds minimum 2m apart for COVID-19 risk management <p>Sanitation Facilities</p> <ul style="list-style-type: none"> • One toilet, one tap / basin, one toilet for every 6 people 	<p>Supervision Consultant</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>		

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
	<ul style="list-style-type: none"> Convenient location to accommodation Provision of soap Separate facilities for men and women Ventilation to open air Fresh cold running water Clean and hygienic Septic tank/sewage treatment facility, or pit latrines located at least 200m from surface waters, and in areas of suitable soil profiles and above the groundwater levels <p>Health and Safety within worker accommodation</p> <ul style="list-style-type: none"> Separate area for sick workers to prevent transmission of disease Smoke detector in sleeping area Fire safety throughout accommodation such as fire extinguishers, fire alarms, fire blankets Worker training in fire prevention and procedures Fire exit sign, adequate means of escape and clearly maintained exit Security lighting within camp and for sanitation block and lighting for route from sleeping area to sanitation block Electrical cables to be in safe condition, elevated and not in areas liable to flood <p>Inspection</p> <ul style="list-style-type: none"> 2 weekly inspections to inspect for cleanliness, state of repair of building, accommodation and fire equipment Record inspection results and retain for review 			
<u>COVID-19 risk management</u> <u>Construction site working conditions</u>	<p>Form a joint team to plan and organize commencement and/or return to work</p> <ul style="list-style-type: none"> Develop or convene a joint occupational safety and health committee with members representing the employer and workers Train team members on the basic principles for the formulation and implementation of occupational safety and health preventive and control measures. 	<p>Periodic monitoring and reporting by Supervision Consultant</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	Included in civil works cost	PAFO, PGT Contractor

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
	<ul style="list-style-type: none"> • Develop and communicate a work plan on safe working for COVID-19 • Such plan should be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof, with international good practice guidelines as may be updated from time to time <p>Risk assessment to decide when to work, who works and how</p> <ul style="list-style-type: none"> • Undertake a risk assessment to determine the preventive and control measures • Ensure preventative measures are in place before resuming or beginning construction work <p>Adopt engineering, organizational and administrative measures</p> <ul style="list-style-type: none"> • Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy, or in the absence thereof, international good practice • Ventilate enclosed workplaces including work camps and communal spaces • Avoid concentration of workers - limit the capacity of common areas such as work camp dining rooms and changing rooms to allow the minimum separation of 2 meters and organize one-way systems. This includes sleeping areas which must be a minimum of 2 meters between <ul style="list-style-type: none"> • beds • Put in place training and information on COVID-19 and measures required for its management. • The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all time 			

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
	<ul style="list-style-type: none"> Stagger break and lunch schedules to minimize the number of people in close proximity to one another <p>Regularly clean and disinfect</p> <ul style="list-style-type: none"> Increase the frequency of cleaning and disinfection, in particular heavily trafficked areas and common areas, including work camps All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal areas are wiped down at least twice a day with a disinfectant Discourage the sharing of items such as cups, glasses, plates, tools <p>Promote personal hygiene</p> <ul style="list-style-type: none"> Provide workers with the conditions and means necessary for frequent hand washing (soap, water or alcohol gel) with a posted hand washing protocol at site entries, exits, bathrooms, communal areas, offices, and any other areas with commonly touched surfaces Inform workers of the need to avoid physical contact when greeting, and avoid touching eyes, nose and mouth Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or the crook of their arm Dispose of tissues in a lined and covered waste bin and wash hands afterwards <p>Provide personal protective equipment (PPE) and inform workers of its correct use</p> <ul style="list-style-type: none"> Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge 			

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
	<p>and in sufficient number, along with instructions, procedures, training and supervision</p> <ul style="list-style-type: none"> Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper handwashing <p>Health surveillance and insurance</p> <ul style="list-style-type: none"> Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms Monitor the health status of workers, develop protocols for cases of suspected and confirmed COVID-19. The protocol will state that: <ul style="list-style-type: none"> workers with symptoms or confirmed cases must be isolated within the construction camp or stay at home for 7 days after symptoms started <ul style="list-style-type: none"> If symptoms persist after 7 days, the person must isolate until the symptoms stop People who have been in close contact with the person with confirmed COVID-19 be quarantined for 14 days All workers in quarantine or isolation must be provided with adequate food, water, medical assistance and sanitation Identify workers who have had close contact with people infected with COVID-19 and follow national medical guidance Communicate confirmed cases of COVID-19 infection to the appropriate authorities All workers should be provided with health insurance that includes COVID-19 treatment <p>Consider other hazards, including psychosocial</p>			

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
	<ul style="list-style-type: none"> Promote a safe and healthy working environment free from violence and harassment. Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work life balance Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19 <p>Review emergency preparedness plans</p> <ul style="list-style-type: none"> Develop an emergency plan adapted to COVID-19 and regularly review it <p>Review and update preventive and control measures as the situation evolves</p> <ul style="list-style-type: none"> Periodically monitor prevention and control measures to determine whether they have been adequate to avoid or minimize risk, and identify and implement corrective actions for continuous improvement Establish and maintain records related to work-related injuries, illnesses and incidents, worker exposures, monitoring of the work environment and workers' health 			
III. OPERATION PHASE				
<u>Impacts of Water Offtake</u> Disruption of downstream hydrological flows due to offtake from river may occur.	Water offtake will be fine-tuned and managed on the basis of environmentally allowable volumes.	Weekly monitoring of water quantity and water offtake.	Part of DOI operations cost	PGT
<u>Water Pollution</u> Upstream land uses may cause a decline in the quality of water available for the irrigation scheme.	A catchment land use plan must be prepared and implemented to ensure that the scheme is safeguarded throughout its operational life.	Weekly monitoring of water quality.	Part of DOI operations cost	PGT
<u>Loss of Aquatic Biodiversity</u>	Headworks weirs will be improved from the environmental perspective by the construction of fish passes.	Weekly monitoring of aquatic flora and fauna.	Part of DOI operations cost	PGT

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	BUDGET	RESPONSIBLE OFFICE
Aquatic resources may decline as a result of the operation of the facilities.				
<u>Increased Utilization of Fertilizers and Pesticides</u> Increased areas and extent of vegetable crops pest populations may build up and require more direct intervention	Only agrichemicals approved by the Government of Lao PDR may be used. Strong extension support must be provided to encourage the responsible use of fertilizers and pesticides.	Weekly monitoring of pesticide and fertilizer use of farmers.	Part of DOI operations cost	PGT
<u>Community health and safety</u> Potential hazards to residents in affected communities.	Facilities properly fenced and secured.	Daily log of security personnel	Part of DOI operations cost	PGT

10.1 INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARDS

151. The Program Governance Team (PGT) will appoint a qualified environmental safeguards officer to supervise and co-ordinate implementation of environmental safeguard requirements with support of the LIC International and National Environment Specialists. The PGT Project Director will be responsible for submitting semi-annual environmental safeguard reports to ADB for clearance and disclosure. They will also carry out regular monitoring during implementation and prepare a summary of progress of EMP and GRM implementation for the quarterly project progress reports. They will participate in ADB loan review missions, ensure that semi-annual environmental safeguards monitoring reports are submitted to ADB on time and follow-up on agreed actions.

152. Each Provincial Project Implementation Team (PPIT) will nominate an environmental safeguards focal point to support LIC Environment Specialists and PGT with co-ordination at the province level. The PPIT environmental safeguards focal point will undertake joint site visits with subproject Supervision Staff and Contractors to review implementation of EMP and GRM and report issues to PGT and LIC. PPIT will co-ordinate environmental quality monitoring with PONRE and invite PONRE to join site visits and ADB loan review missions. To ensure compliance and to empower PONRE in oversight of the EMP requirements within the works contracts, the PGT and PAFO construction supervision experts will ensure that all findings are fully recorded and shared in the reports to the Provincial Steering Committee. The LIC environmental specialists will provide capacity building for PONRE on construction site reviews.

153. The project implementation consultant (PIC) will assist the executing agency (i.e. the PGT within DOI), the implementing agency (i.e. PAFO) and the other project stakeholders in the design and construction of the subproject. For this reason, the Program Governance Team will contract a LIC with two environmental specialists (9 months International Environment Specialist and 17 months National Environmental Specialist)- See PAM for detailed ToRs to support subproject designs and the preparation of IEE and for the supporting and monitoring of the EMP during subproject implementation.

154. The LIC environmental specialists work with the WUG, PAFO and DAFO and the contractors for the subproject, to ensure the IEE and EMP are properly implemented, with the required environmental mitigation measures incorporated into the final engineering designs and administrative arrangements. During the construction period, they must work with the subproject implementation partners to ensure that all of the environmental management and mitigation measures are fully complied with, as agreed in each IEE and as outlined in every EMP. The LIC Environment Specialists will provide safeguards and GRM capacity development training for PGT, PPIT, LIC, Contractors and GRM focal points on EMP mitigation and monitoring measures, Contractor EMP preparation, templates for environmental monitoring and report.

155. All contract documents must include the EMP (category B) or Environmental Code of Conduct (category C) and an environment section in the terms of reference for bidders, and environmental contract clauses for contractors that include special conditions for the protection of the physical, biological and socio-economic environments. These will underpin the obligations towards the environment that must be upheld by all contractors. There is a need to ensure that contractors, as the stakeholders with the shortest-term involvement in the subproject, do not give rise to long term liabilities for the subproject owners and other stakeholders through reckless practices.

156. While the contractors themselves must fulfil their environmental responsibilities, in most cases success in this respect requires strict management and supervision of the contractor during site works: this is the responsibility of PAFO. Because of the competitive bidding process and the emphasis on engineering works, there is often a tendency for environmental safeguards to be delayed by contractors in the hope that costs can be saved and overlooked by management staff as being of lower importance than the primary functional infrastructure. This must not be allowed to happen, or it will mean that the subproject and therefore the overall SRIWSM is non-compliant with respect to both government and ADB safeguards.

157. Additional attention must be paid to subcontractors. It must be made clear to the main contractor at all times that they are fully responsible for the actions of his subcontractors, and that retention money is at risk if there is not full compliance with this plan. The contractor should be encouraged to start this process with an orientation for each subcontractor before they start work, and sub-contractual conditions to ensure that the subcontractor complies. The project implementation consultant should be able to assist the contractor in this process.

158. The Contractor will be required to develop a site-specific Construction Environmental Management Plan (CEMP) in accordance with the IEE/EMP and designate an environmental health and safety (EHS) Officer to supervise and train workers on occupational and community health and safety practices and to monitor and report on implementation of EMP/CEMP and corrective actions. A GRM focal point/community liaison officer should also be designated to ensure public disclosure of planned construction to affected persons and monitoring and reporting on GRM. Each works Contractor EHS Officer will prepare a monthly report on EMP/CEMP and GRM implementation for submission to PPIT, PGT and LIC.

159. The construction supervision consultants (CSC) will ensure a CEMP is prepared for each Category B subproject and an Environmental Code of Conduct for each Category C subproject. The CSC will be responsible for day-to-day monitoring of implementation of health and safety and EMP/Code of Conduct requirements and issuing instructions for corrective actions, as needed. ADB will visit project sites and review project performance against the EMPs and legal agreements and as documented in periodic environment monitoring reports submitted by the PGT. If any of the safeguard requirements that are covenanted in the legal agreements are found not to be satisfactorily met, ADB will require the PGT to develop and implement an appropriate corrective action plan (CAP) agreed upon with ADB. If unanticipated

environmental impacts become apparent during project implementation, ADB will require the PGT with support of LIC ES to (i) assess the significance of such unanticipated impacts; (ii) evaluate the options available to address them; and (iii) prepare or update the IEE and EMPs.

10.2 TRAINING AND CAPACITY BUILDING

160. The LIC Environment Specialists will provide training and capacity building on environmental safeguards and GRM as set out in Table 42 below. At provincial, district and subproject levels, it will use formal seminars and training courses focused on the needs of the individuals working with each of the stakeholder organizations, as well as guided on-the-ground action learning-through-doing.

TABLE 42. ENVIRONMENTAL SAFEGUARD CAPACITY STRENGTHENING PLAN

TOPIC	TRAINEE	WHEN	TRAINING RESPONSIBILITY
Project Awareness	WUG Official PONRE assigned staff and Section Head PAFO Safeguard Focal Point PAFO Construction Supervision	Q1-2 Project year 1	PGT Project Management Advisor
ADB and Govt Environment Safeguard Requirements	DONRE PONRE assigned staff and Section Head	Q2 Py 1	LIC National Environmental Consultant and
	PAFO Safeguard Focal Point PAFO Construction Supervision PPIT Director		National Project Management Advisor
Environmental Documentation – Additional Subproject Processing	WUG, Assigned staff PONRE and DONRE PAFO – construction supervision	Q2-3 PY 1	LIC Project Management Advisor –PGT LIC International and National Consultant
Environmental Monitoring – RSP	WUG Assigned staff PONRE and DONRE PAFO – construction supervision	Q3 PY 1	LIC International and National Environmental Consultant Lt National Construction Supervision Consultant
Environmental Reporting	Assigned staff PONRE and DONRE PAFO – construction supervision PPIT Project Management Advisor	Q4 PY1 and Q1 PY2	LIC International and National Consultant
Environmental Sampling and water Flow data analysis	Assigned staff PONRE and DONRE PAFO – construction supervision PPIT Project Management Advisor	Q1 Py 2Q2 PY 2	LIC International and National Consultant

10.3 REPORTING

161. Pre-construction Phase. The EMP monitoring during the pre-construction phase of the subproject will be undertaken by the LIC consultant (Appendix E - Template of Project Environmental Safeguards Monitoring Report). Semi-annual Integrated Safeguards Monitoring Reports will be prepared by the PAFO with support of the LIC and submitted to ADB for review and disclosed on the ADB project website. Appendix F shows the Semi-Annual Integrated Safeguards Monitoring Report.

162. Construction Phase. Throughout the construction period, the contractors will submit monthly environmental compliance progress reports to the PAFO, copy furnished to the PGT. The contractor should be able to highlight the summary of the progress of construction, activities undertaken within the reporting period to implement the measures outlined in the EMP, record any community complaints received and how the complaint was resolved.

163. The PAFO will consolidate the results of the monthly environmental monitoring through a quarterly progress report that will be submitted to the PGT which is based at the Department of Irrigation of the MAFF. The quarterly report will summarize the significant findings and measures undertaken to address any adverse environmental impacts during construction and also present any unforeseen environmental impacts and suggested remedial actions for the next monitoring period. PGT with support from the LIC will consolidate information from quarterly progress reports, compile and submit integrated safeguards monitoring report semi-annually to ADB.

164. Once the reports are received by the PGT, these will be reviewed relative to subproject compliance with the indicators defined in the EMP. The PGT will submit the quarterly reports to the Department of Irrigation of MAFF and other national agencies (MONRE, MOF, MOPC, etc.), and to ADB. The PGT with support from the LIC will also prepare the quarterly Project Progress Reports including the main points of environmental monitoring and Semi-annual Integrated Safeguards Monitoring Reports in English to be submitted to ADB.

165. Operational Phase. The EMP monitoring during the operational phase will be undertaken by the PAFO. Semi-annual reports will be submitted by the PAFO to the PGT. The PGT, with support from the LIC, will review the report and check the project's adherence to the EMP and then submit the Semi-annual Integrated Safeguards Monitoring Reports to ADB until the Project Completion Report (PCR) is prepared. The monitoring parameters during the operational phase is outlined in the EMP. Table 43 presents the EMP Reporting Plan.

TABLE 43. EMP REPORTING PLAN

TYPE OF REPORT	BASIC CONTENT	PREPARED BY	SUBMITTED TO	FREQUENCY
PRE-CONSTRUCTION THROUGH OPERATIONAL PHASE				
Progress Reports	Integrated Safeguards Monitoring Report including EMP implementation and monitoring	PAFO, PGT, Department of Irrigation	MAFF ADB	Semi-annual until project completion report (PCR)
CONSTRUCTION PHASE				
Construction Progress Report	Progress of construction, including EMP monitoring results, complaints received and actions taken	Contractor	PAFO copy furnished to PGT	Monthly
Progress Report	Progress of construction, safeguards (EMP) implementation, complaints received and actions taken	PAFO, PGT, Department of Irrigation	MAFF, MONRE, and other national agencies ADB	Quarterly
OPERATIONAL PHASE				
Progress Report	Subproject progress report including EMP implementation and monitoring	PAFO	PGT	Semi-annual until project completion report (PCR)

TYPE OF REPORT	BASIC CONTENT	PREPARED BY	SUBMITTED TO	FREQUENCY
Integrated Safeguards Monitoring Report	Subproject progress report including EMP implementation and compliance with ADB's policies and regulations	PAFO, PGT, Department of Irrigation	MAFF ADB	Semi-annual until project completion report (PCR)
Project Completion Report	Project evaluation, lessons learned and recommendations	PGT	MAFF ADB	After physical completion of the sub-project.

10.4 ENVIRONMENTAL MANAGEMENT AND MONITORING COSTS

166. The cost for the environmental safeguard activities during rehabilitation and upgrading works, i.e. environmental management, review, and monitoring, for the subprojects will be primarily included in the civil works cost. The cost of environmental management and monitoring activities during the operational phase will be borne by the PGT, as part of operation and maintenance activities.

11 CONCLUSION AND RECOMMENDATIONS

167. This IEE for the Nam Piew River 1, 2, 3 and 4 and Nam Mad River 1 and 2 Irrigation Systems Sub-Project in Xengkhuang Province was undertaken to determine the environmental issues and concerns associated with the proposed irrigation system subproject. The assessment confirms that the subproject remains classified as Category B for environment based on ADB Safeguards Policy Statement (SPS, 2009). The subprojects will have beneficial impacts on the social and economic well-being of the people because of improved accessibility to irrigation.

168. Most of the environmental impacts are expected to occur during the rehabilitation/upgrading phase. The environmental impacts are not expected to cause irreversible and significant adverse environmental impacts and are easily controllable by appropriate and conventional mitigation measures. Based on the assessment of environmental impacts, the anticipated adverse impacts during project implementation are related to nuisances which may happen during the rehabilitation/upgrading works of the subproject components such as temporary alienation of access, temporary disruption of community facilities, noise, and sediment runoff, release of dust and engine gas emissions. Recommendations formulated in the EMPs, its inclusion in the contractual framework, and an effective inspection of construction sites will reduce these risks to an acceptable level.

169. Environmental mitigation measures have been designed as outlined in the subproject EMP to address any adverse impacts during the various phases of project implementation. The EMP also presents the institutional responsibilities for implementing the mitigation measures. All Subproject activities prior to construction, during construction and during operation will be managed as provided in the EMP and the Contractor's compliance and implementation of the mitigation measures shall be monitored. An environmental monitoring plan has been provided to ensure water quality is maintained according to the prevailing Lao standards.

170. The IEE concludes that the subproject combined with available information on affected environment is sufficient to identify the scope of environmental impacts of the subproject. No further environmental assessment is therefore required.

APPENDIX

APPENDIX A
RAPID ENVIRONMENTAL ASSESSMENT
(REA) CHECKLIST

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

INSTRUCTIONS:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Sustainable Development and Environmental Safeguards (SDS) for endorsement by the Director, SDCC and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

COUNTRY/PROJECT TITLE: LAO PDR: SUSTAINABLE RURAL INFRASTRUCTURE AND WATERSHED MANAGEMENT SECTOR PROJECT (SRIWMSP)

SECTOR DIVISION:

SCREENING QUESTIONS	Yes	No	REMARKS
PROJECT SITE			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
Cultural heritage site		X	Not applicable
Protected area		X	There is no protected area within the component sites and immediate vicinity.
Wetland		X	Not applicable
Mangrove		X	Not applicable
Estuarine		X	Not applicable
Buffer zone of protected area		X	Not applicable
Special area for protecting biodiversity		X	Not applicable
Underground utilities		X	Not applicable
POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE ...			
Loss of precious ecological values (e.g. result of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of hydrology of natural waterways, regional flooding, and drainage hazards)?		X	Not applicable
Conflicts in water supply rights and related social conflicts?		X	Not applicable
Impediments to movements of people and animals?		X	Not applicable
Potential ecological problems due to increased soil erosion and siltation, leading to decreased stream capacity?		X	Not applicable
Insufficient drainage leading to salinity intrusion?		X	Not applicable
Over pumping of groundwater, leading to salinization and ground subsidence?		X	Not applicable. Groundwater abstraction is not included in the scheme.

SCREENING QUESTIONS	Yes	No	REMARKS
Impairment of downstream water quality and therefore, impairment of downstream beneficial uses of water?		X	Not applicable
Dislocation or involuntary resettlement of people?		X	Not applicable
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	Not applicable
Potential social conflicts arising from land tenure and land use issues?		X	Not applicable
Soil erosion before compaction and lining of canals?		X	Not applicable
Noise from construction equipment?	X		Noise may be generated during the rehabilitation/upgrading of the subproject components (headworks, canals and gates). Mitigating measures are incorporated in the EMP.
Dust during construction?	X		Dust may be generated during the rehabilitation/upgrading of the subproject components (headworks, canals and gates). Mitigating measures are incorporated in the EMP.
Waterlogging and soil salinization due to inadequate drainage and farm management?		X	Not applicable
Leaching of soil nutrients and changes in soil characteristics due to excessive application of irrigation water?		X	Not applicable
Reduction of downstream water supply during peak seasons?		X	Not applicable
Soil pollution, polluted farm runoff and groundwater, and public health risks due to excessive application of fertilizers and pesticides?		X	Not applicable
Soil erosion (furrow, surface)?		X	Temporary silt runoff from excavation activities may be generated. Silt traps and other measures to control sediment flow into rivers are included in the EMP.
Scouring of canals?		X	Not applicable
Clogging of canals by sediments?		X	Canals will be maintained and cleaned regularly.
Clogging of canals by weeds?		X	Canals will be maintained and cleaned regularly.
Seawater intrusion into downstream freshwater systems?		X	Not applicable
Introduction of increase in incidence of waterborne or water related diseases?		X	Not applicable
Dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation?		X	Workers and staff will be properly inducted and oriented on the health and safety protocols in work sites.
Large population influx during project construction and operation that causes increased burden on social		X	Workers will be sourced from the affected communities minimizing/eliminating the need for migrant workers.

SCREENING QUESTIONS	Yes	No	REMARKS
infrastructure and services (such as water supply and sanitation systems)?			
Social conflicts if workers from other regions or countries are hired?		X	Workers will be sourced from the affected communities minimizing/eliminating the need for migrant workers.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		X	Not applicable
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., irrigation dams) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		X	Not applicable

A CHECKLIST FOR PRELIMINARY CLIMATE RISK SCREENING

Country/Project Title: LAO PDR: Sustainable Rural Infrastructure and Watershed Management Sector Project (SRIWMSP)

Sector: Irrigation

Subsector:

Division/Department:

SCREENING QUESTIONS		SCORE	REMARKS
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	The river has not dried up even during the dry months. The facilities will not be affected by extreme floods.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1	Design of headworks needs to consider highest and lowest flows of the river and rainfall intensity. River level assessments will be undertaken as part of the monitoring plan.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro- power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

RESPONSE	SCORE
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high risk project.

Result of Initial Screening (Low, Medium, and High): Total score is 1 thus MEDIUM RISK Other
Comments:

Prepared by:

APPENDIX B
ENVIRONMENTAL COMPLIANCE
CERTIFICATE (ECC)



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດຖະນະຖາວອນ

ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ

ເລກທີ 2288./ ພຊສ,ຊຂ
ຊຽງຂວາງ, ວັນທີ 31.1. 2023

ໃບຢັ້ງຢືນສິ່ງແວດລ້ອມ

- ອີງຕາມ ກົດໝາຍ ວ່າດ້ວຍ ການປົກປັກຮັກສາສິ່ງແວດລ້ອມ (ສະບັບປັບປຸງ) ສະບັບເລກທີ 29/ສພຊ, ລົງວັນທີ 18 ທັນວາ 2012;
- ອີງຕາມ ດຳລັດ ວ່າດ້ວຍ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ສະບັບເລກທີ 389/ລບ, ລົງວັນທີ 20/10/ 2022;
- ອີງຕາມ ສິດ ແລະ ໜ້າທີ່ ຂອງຫົວໜ້າ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມຂັ້ນແຂວງ ກຳນົດໄວ້ໃນຂໍ້ຕົກລົງ ສະບັບເລກທີ 4983/ກຊສ, ລົງວັນທີ 03 ພະຈິກ 2020;
- ອີງຕາມ ບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ໂຄງການກໍ່ສ້າງ-ສ້ອມແປງ ຊົນລະປະທານນ້ຳມັດ, ເມືອງ ຄຳ, ແຂວງຊຽງຂວາງ ສະບັບເດືອນ ຕຸລາ 2022.

ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງຊຽງຂວາງເຫັນດີ :

- 1) ເຫັນດີຮັບຮອງເອົາບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ, ແຜນຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການກໍ່ສ້າງ-ສ້ອມແປງ ຊົນລະປະທານນ້ຳມັດ, ເມືອງຄຳ, ແຂວງຊຽງຂວາງ, ສະບັບເດືອນ ຕຸລາ 2022.
- 2) ເຈົ້າຂອງໂຄງການ ຫຼື ບໍລິສັດຮັບໜ້າກໍ່ສ້າງ ຕ້ອງປະຕິບັດຕາມດັ່ງນີ້:
 - ກ). ຮັບຜິດຊອບໂດຍກົງຕໍ່ຜົນກະທົບສຶກສາ ແລະ ຂໍ້ມູນ ທີ່ລະບຸໄວ້ ໃນບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ, ແຜນຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ພ້ອມທັງຈັດຕັ້ງປະຕິບັດທຸກມາດຕະການປ້ອງກັນ ແລະ ຫຼຸດຜ່ອນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ທີ່ກຳນົດໄວ້ໃນບົດລາຍງານໂຄງການ ຢ່າງເຄັ່ງຄັດ ແລະ ໃຫ້ມີປະສິດທິຜົນສູງ;
 - ຂ). ໃນກໍລະນີມີບັນຫາດ້ານສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດເກີດຂຶ້ນ ໂດຍທີ່ບໍ່ໄດ້ກຳນົດໄວ້ໃນບົດລາຍງານ ການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມຂອງໂຄງການ ເຈົ້າຂອງໂຄງການ ຕ້ອງຮັບຜິດຊອບເພີ່ມເຕີມ ໃນການສ້າງແຜນຄຸ້ມຄອງສິ່ງແວດລ້ອມ ແລະ ມີມາດຕະການແກ້ໄຂບັນຫາເຫຼົ່ານັ້ນ, ພ້ອມທັງຮັບປະກັນ ໃຫ້ມີງົບປະມານພຽງພໍ ໃນການແກ້ໄຂບັນຫາດັ່ງກ່າວ ໃຫ້ທັນເວລາ;
 - ຄ). ປະຕິບັດການຄຸ້ມຄອງສິ່ງແວດລ້ອມ ແລະ ພັນທະດ້ານສິ່ງແວດລ້ອມເຊັ່ນ: ມາດຕະການປ້ອງກັນ ແລະ ຫຼຸດຜ່ອນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ, ການທົດແທນຄ່າເສຍຫາຍ (ຖ້າມີ) ແລະ ງົບປະມານການຕິດຕາມກວດກາການຄຸ້ມຄອງສິ່ງແວດລ້ອມທີ່ກຳນົດໄວ້ໃນບົດລາຍງານຂອງໂຄງການ ຢ່າງເຄັ່ງຄັດພ້ອມທັງສ້າງແຜນດຳເນີນງານລະອຽດ ກ່ຽວກັບ ການປະຕິບັດແຜນການຄຸ້ມຄອງ ແລະ ການຕິດຕາມກວດກາສິ່ງແວດລ້ອມ ໃນແຕ່ລະໄລຍະແລ້ວສິ່ງໃຫ້ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ ເພື່ອຊາບກ່ອນດຳເນີນໂຄງການ;
 - ງ). ສ້າງບົດລາຍງານປະຈຳເດືອນ ແລະ ປະຈຳໄຕມາດ ກ່ຽວກັບ ການຕິດຕາມກວດກາການຈັດຕັ້ງປະຕິບັດແຜນຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມຂອງໂຄງການ ສົ່ງໃຫ້ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ, ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງຄຳ ແລະ ຂະແໜງການທີ່ກ່ຽວຂ້ອງ ເພື່ອຊາບ ແລະ ຕິດຕາມຢ່າງເປັນປົກກະຕິ.
- 3) ມອບໃຫ້ຂະແໜງສິ່ງແວດລ້ອມ, ນ້ຳ, ອຸຕຸນິຍົມ ແລະ ອຸທິກກະສາດ ສົມທົບກັບຂະແໜງການທີ່ກ່ຽວຂ້ອງຂອງແຂວງ ແລະ ເມືອງ ເຮັດໜ້າທີ່ກວດກາການຈັດຕັ້ງປະຕິບັດວຽກງານສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດຂອງໂຄງການດັ່ງກ່າວ ພ້ອມທັງລາຍງານໃຫ້ຂັ້ນເທິງຊາບເປັນປົກກະຕິ.

ໃບຢັ້ງຢືນສະບັບນີ້ ມີອາຍຸການນຳໃຊ້ 2 ປີ ແລະ ມີຜົນນຳໃຊ້ໄດ້ນັບແຕ່ມີລົງລາຍເຊັນເປັນຕົ້ນໄປ.

ຫົວໜ້າພະແນກ



ບຸນຈັນ ຂັນຕິພຸດທະວົງ

ໝາຍເຫດ: ຫ້າມຮ່ວມແປງໃບຢັ້ງຢືນເດັດຂາດ,
ຖ້າລະເມີດຈະໄດ້ຮັບໂທດຕາມກົດໝາຍ



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດຖະນະຖາວອນ

ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ

ເລກທີ 23/ ພຊສ,ຊຂ
ຊຽງຂວາງ, ວັນທີ 21/ 11/ 2023

ໃບຢັ້ງຢືນສິ່ງແວດລ້ອມ

- ອີງຕາມ ກົດໝາຍ ວ່າດ້ວຍ ການປົກປັກຮັກສາສິ່ງແວດລ້ອມ (ສະບັບປັບປຸງ) ສະບັບເລກທີ 29/ສພຊ, ລົງວັນທີ 18 ທັນວາ 2012;
- ອີງຕາມ ດໍາລັດ ວ່າດ້ວຍ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ສະບັບເລກທີ 389/ລບ, ລົງວັນທີ 20/10/ 2022;
- ອີງຕາມ ສິດ ແລະ ໜ້າທີ່ ຂອງຫົວໜ້າ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມຂັ້ນແຂວງ ກຳນົດໄວ້ໃນຂໍ້ຕົກລົງ ສະບັບເລກທີ 4983/ກຊສ, ລົງວັນທີ 03 ພະຈິກ 2020;
- ອີງຕາມ ບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ໂຄງການກໍ່ສ້າງ-ສ້ອມແປງ ຊົນລະປະທານນ້ຳປົວ, ເມືອງ ຄຳ, ແຂວງຊຽງຂວາງ ສະບັບເດືອນ ຕຸລາ 2022.

ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງຊຽງຂວາງເຫັນດີ :

- 1) ເຫັນດີຮັບຮອງເອົາບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ, ແຜນຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການກໍ່ສ້າງ-ສ້ອມແປງ ຊົນລະປະທານນ້ຳປົວ, ເມືອງຄຳ, ແຂວງຊຽງຂວາງ, ສະບັບເດືອນ ຕຸລາ 2022.
- 2) ເຈົ້າຂອງໂຄງການ ຫຼື ບໍລິສັດຮັບໜ້າທີ່ກໍ່ສ້າງ ຕ້ອງປະຕິບັດຕາມເງື່ອນໄຂດັ່ງນີ້:
 - ກ). ຮັບຜິດຊອບໂດຍກົງຕໍ່ຜົນກະທົບ ແລະ ຂໍ້ມູນ ທີ່ລະບຸໄວ້ ໃນບົດລາຍງານການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ, ແຜນຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ພ້ອມທັງຈັດຕັ້ງປະຕິບັດທຸກມາດຕະການປ້ອງກັນ ແລະ ຫຼຸດຜ່ອນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ທີ່ກຳນົດໄວ້ໃນບົດລາຍງານໂຄງການ ຢ່າງເຄັ່ງຄັດ ແລະ ໃຫ້ມີປະສິດທິຜົນສູງ;
 - ຂ). ໃນກໍລະນີມີບັນຫາດ້ານສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດເກີດຂຶ້ນ ໂດຍທີ່ບໍ່ໄດ້ກຳນົດໄວ້ໃນບົດລາຍງານ ການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມຂອງໂຄງການ ເຈົ້າຂອງໂຄງການ ຕ້ອງຮັບຜິດຊອບເພີ່ມເຕີມ ໃນການສ້າງແຜນຄຸ້ມຄອງສິ່ງແວດລ້ອມ ແລະ ນິມາດຕະການແກ້ໄຂບັນຫາເຫຼົ່ານັ້ນ, ພ້ອມທັງຮັບປະກັນ ໃຫ້ມີງົບປະມານພຽງພໍ ໃນການແກ້ໄຂບັນຫາດັ່ງກ່າວ ໃຫ້ທັນເວລາ;
 - ຄ). ປະຕິບັດການຄຸ້ມຄອງສິ່ງແວດລ້ອມ ແລະ ພັນທະດ້ານສິ່ງແວດລ້ອມເຊັ່ນ: ມາດຕະການປ້ອງກັນ ແລະ ຫຼຸດຜ່ອນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ, ການທົດແທນຄ່າເສຍຫາຍ (ຖ້າມີ) ແລະ ງົບປະມານການຕິດຕາມກວດກາການຄຸ້ມຄອງສິ່ງແວດລ້ອມທີ່ກຳນົດໄວ້ໃນບົດລາຍງານຂອງໂຄງການ ຢ່າງເຄັ່ງຄັດພ້ອມທັງສ້າງແຜນດຳເນີນງານລະອຽດ ກ່ຽວກັບ ການປະຕິບັດແຜນການຄຸ້ມຄອງ ແລະ ການຕິດຕາມກວດກາສິ່ງແວດລ້ອມ ໃນແຕ່ລະໄລຍະແລ້ວສົ່ງໃຫ້ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ ເພື່ອຊາບກ່ອນດຳເນີນໂຄງການ;
 - ງ). ສ້າງບົດລາຍງານປະຈຳເດືອນ ແລະ ປະຈຳໄຕມາດ ກ່ຽວກັບ ການຕິດຕາມກວດກາການຈັດຕັ້ງປະຕິບັດແຜນຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມຂອງໂຄງການ ສົ່ງໃຫ້ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ, ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງຄຳ ແລະ ຂະແໜງການທີ່ກ່ຽວຂ້ອງ ເພື່ອຊາບ ແລະ ຕິດຕາມຢ່າງເປັນປົກກະຕິ.
- 3) ມອບໃຫ້ຂະແໜງສິ່ງແວດລ້ອມ, ນ້ຳ, ອຸຕຸນິຍົມ ແລະ ອຸທິກກະສາດ ສົມທົບກັບຂະແໜງການທີ່ກ່ຽວຂ້ອງຂອງແຂວງ ແລະ ເມືອງ ເຮັດໜ້າທີ່ກວດກາການຈັດຕັ້ງປະຕິບັດວຽກງານສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດຂອງໂຄງການດັ່ງກ່າວ ພ້ອມທັງລາຍງານໃຫ້ຂັ້ນເທິງຊາບເປັນປົກກະຕິ.

ໃບຢັ້ງຢືນສະບັບນີ້ ມີອາຍຸການນຳໃຊ້ 2 ປີ ແລະ ມີຜົນນຳໃຊ້ໄດ້ນັບແຕ່ມີລົງລາຍເຊັນເປັນຕົ້ນໄປ.

ໄ ຫົວໜ້າພະແນກ



ບຸນຈັນ ຂັນຕິພຸດທະວົງ

ໝາຍເຫດ: ຫ້າມຢອມແປງໃບຢັ້ງຢືນເດັດຂາດ,
ຖ້າລະເມີດຈະໄດ້ຮັບໂທດຕາມກົດໝາຍ

National Symbol of Laos

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Natural Resource and Environment Department

No. 238/NR&ES. XK
Xiengkhuang, 31st January 2023

Environmental Certificate

- Pursuant to Law on Environmental Protection, No. 29/NA, dated 18th December 2012;
- Pursuant to Decree on Environmental Impact Assessment, No. 389/GL, dated 20th October 2022;
- Pursuant to rights and duties of General Director of Natural Resource and Environment Department of Province that is defined in the agreement No. 4983/MoNRE, dated 3rd November 2020;
- Pursuant to the preliminary study on Environmental Impact Assessment of Construction – Repairing Irrigation Project for Nam Mat, Kham District, Xiengkhuang Province, No. October 2022.

The Department of Natural Resources and Environment of Xiengkhuang Province agrees:

1. Agree to adopt the preliminary study report on the impact on the environment, the management and monitoring plan for the social and natural environment, the construction-repair project of Nammat irrigation, Kham district, Xiengkhuang province, version of October 2022.
2. The project owner or construction contractor must comply with the following conditions:
 - A. Be directly responsible for the study results and information specified in the preliminary study report on environmental impacts, environmental and nature management and monitoring plans as well as implementing all measures to prevent and reduce environmental impacts specified in the report carefully and effectively;
 - B. In the event that impacts on the social and natural environment occur in the project area that is not specified in the environmental management plan, the project owner must take additional responsibility in defining measures to prevent, reduce and correct the impact as well as ensure that there is sufficient budget for the implementation of such measures;
 - C. Carry out environmental management and environmental obligations, such as measures to prevent and reduce the impact on the environment, compensation for damages (if any) and the environmental management monitoring budget specified in the project report carefully, as well as create a detailed plan on the implementation of the management plan and monitoring of the environment in each period and send it to the Provincial Department of Natural Resources and Environment for information before proceeding.
 - D. Create a monthly and quarterly report on the monitoring of the implementation of the management plan and follow up on the environmental inspection of the project and send it to the Provincial Department of Natural Resources and Environment, the Office of Natural Resources and Environment in Kham District and related sectors for information and follow up regularly.
3. Assigned to the environment, water, meteorology and hydrology sectors in conjunction with the relevant sectors of the province and district to supervise the implementation of the project's environmental, social and natural work as well as report to the upper level on a regular basis

This certificate is valid for 2 years and is effective from the date of signature

Deputy Director of Department

Signed and sealed by:

Bounchan KHANTIPHOUTHAVON

National Symbol of Laos

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Natural Resource and Environment Department

No. 238/NR&ES. XK
Xiengkhuang, 31st January 2023

Environmental Certificate

- Pursuant to Law on Environmental Protection, No. 29/NA, dated 18th December 2012;
- Pursuant to Decree on Environmental Impact Assessment, No. 389/GL, dated 20th October 2022;
- Pursuant to rights and duties of General Director of Natural Resource and Environment Department of Province that is defined in the agreement No. 4983/MoNRE, dated 3rd November 2020;
- Pursuant to the preliminary study on Environmental Impact Assessment of Construction – Repairing Irrigation Project for Nam Mat, Kham District, Xiengkhuang Province, No. October 2022.

The Department of Natural Resources and Environment of Xiengkhuang Province agrees:

4. Agree to adopt the preliminary study report on the impact on the environment, the management and monitoring plan for the social and natural environment, the construction-repair project of Nammat irrigation, Kham district, Xiengkhuang province, version of October 2022.
5. The project owner or construction contractor must comply with the following conditions:
 - E. Be directly responsible for the study results and information specified in the preliminary study report on environmental impacts, environmental and nature management and monitoring plans as well as implementing all measures to prevent and reduce environmental impacts specified in the report carefully and effectively;
 - F. In the event that impacts on the social and natural environment occur in the project area that is not specified in the environmental management plan, the project owner must take additional responsibility in defining measures to prevent, reduce and correct the impact as well as ensure that there is sufficient budget for the implementation of such measures;
 - G. Carry out environmental management and environmental obligations, such as measures to prevent and reduce the impact on the environment, compensation for damages (if any) and the environmental management monitoring budget specified in the project report carefully, as well as create a detailed plan on the implementation of the management plan and monitoring of the environment in each period and send it to the Provincial Department of Natural Resources and Environment for information before proceeding.
 - H. Create a monthly and quarterly report on the monitoring of the implementation of the management plan and follow up on the environmental inspection of the project and send it to the Provincial Department of Natural Resources and Environment, the Office of Natural Resources and Environment in Kham District and related sectors for information and follow up regularly.
6. Assigned to the environment, water, meteorology and hydrology sectors in conjunction with the relevant sectors of the province and district to supervise the implementation of the project's environmental, social and natural work as well as report to the upper level on a regular basis

This certificate is valid for 2 years and is effective from the date of signature

Deputy Director of Department

Signed and sealed by:

Bounchan KHANTIPHOUTTHAVON

APPENDIX E
TEMPLATE OF PROJECT
ENVIRONMENTAL SAFEGUARDS
MONITORING REPORT

1. INTRODUCTION AND PROJECT OVERVIEW

PROJECT NUMBER AND TITLE:	
REPORTING PERIOD:	<p>This section can include, among others, the following:</p> <ul style="list-style-type: none"> ▪ Activities of Proponent ▪ Progress of Work (% physical completion) ▪ Changes of Surrounding Environment ▪ Status of Permits
MONITORING PERIOD COVERED	
KEY SUB-PROJECT ACTIVITIES IMPLEMENTED SINCE LAST REPORT:	
REPORT PREPARED BY:	

2. ENVIRONMENTAL PERFORMANCE MONITORING

A. STATUS OF COMPLIANCE WITH EMP REQUIREMENTS (ENVIRONMENTAL PERFORMANCE)

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
I. PRE-CONSTRUCTION PHASE			
<u>Impact on community assets</u> Loss of community assets due to damage to properties.	Implement the compensation plan that was approved by the ADB for the subproject. Design headworks, canals and related structures within the Right-of-Way when feasible.	External LACP monitoring report	
<u>Impact of location of headworks on other water users</u> Downstream river uses such as irrigation, bathing, washing, and fishing will be affected if excessive water abstraction will occur.	There is minimal conflict with other water users of Nam Piew River and Nam Mad because there is still enough water in the river that will meet the other river uses at the downstream.	River level assessments at the headworks on a monthly basis	
<u>Impact to Natural resources and protected areas</u> Impact on natural resources and protected areas from cutting/clearing of trees and other vegetation.	Cutting of trees will be undertaken as per approved design and only upon approval. Avoid cutting of trees as much as possible and minimize damage to native vegetation. Trees that need to be cut in private land will be compensated in cash in accordance with the approved Compensation Plan	N/A	
<u>Impact on Historical and Archaeological Sites</u> Damage to relics and artifacts during the conduct of the works.	The Contractor will ensure that the workforce are briefed that in the event of accidental finds relics they should immediately cease any works in the area and promptly report the find to their supervisor.	Accidental finds	
II. CONSTRUCTION PHASE			
<u>Temporary disruption of existing community roads, pathways, and accesses</u> Rehabilitation/ upgrading of headworks, canals and related structures will cause temporary disruption of community services and access to properties. Particularly at road crossings, rehabilitation/ upgrading activities	Walking access will be maintained to affected properties and access routes will be temporarily lined with timber or similar material. Particular attention will be given to ensuring safety along roads and paths used by pedestrians. Side street parking of construction vehicles on prolonged basis will not be allowed.	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and document in	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
<p>along narrow roads may lead to temporary blockage or closure of roads and hamper movement of vehicles and people in the community.</p> <p>Community access to areas in the vicinity of schools, temples, village offices, market places and meeting halls will be affected during rehabilitation/ upgrading works.</p>	<p>Install barriers and safety warning signs on road sections and if necessary deploy traffic aides/ flag persons at affected locations. Information boards at blocked roads will provide information about the temporary closure of roads, schedule of works and the traffic-rerouting plan.</p> <p>Require the contractor to immediately rehabilitate the excavated areas and any damaged road and path sections.</p> <p>Enclose the facilities perimeters so that pathway use and stream access remains unimpeded.</p>	<p>safeguard monitoring reports.</p>	
<p><u>Air pollution</u></p> <p>Dust and air emissions from earthworks and movement of vehicles can pose nuisance to nearby communities</p>	<p>Require the contractor to cover materials with tarpaulin or other suitable materials while in transit to avoid spillage of materials.</p> <p>Moisten earthen roads during dry and dusty conditions, particularly roads near residences and through the town core area.</p> <p>Impose speed limits on construction vehicles.</p> <p>Conduct regular maintenance on construction equipment and vehicles to control air emissions during vehicle operation.</p>	<p>Periodic monitoring and reporting by Supervision Consultant..</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	
<p><u>Noise</u></p> <p>Operation of construction equipment such as jackhammer will cause excessive noise resulting in nuisance to communities.</p>	<p>Limit rehabilitation and upgrading activities, particularly operation of noise generating equipment at night.</p> <p>Position any stationary equipment that produce high noise levels such as diesel generators as far as practical from sensitive receptors.</p> <p>Erect temporary barriers around construction sites especially near schools, hospitals, and houses.</p> <p>Install noise suppression devices to noise generating equipment.</p> <p>Require drivers to minimize blowing of horn and to comply with speed limits.</p> <p>Provide information to community on schedule of rehabilitation and upgrading activities through billboard/signs.</p>	<p>Periodic monitoring and reporting by Supervision Consultant..</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	
<p><u>Impact on ecological resources</u></p>	<p>The contractors will prohibit activities such as cutting wood for cooking, hunting, or wildlife trade.</p>	<p>Periodic monitoring and reporting by</p>	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
Construction workers may undertake hunting of wildlife and cutting of wood.		Supervision Consultant.. Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	
<u>Clearing of vegetation</u> Poor planning and execution of tree clearing/vegetation removal at project facilities and along headworks, canals and related structures can result in loss of vegetation and general landscape	Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid cutting of trees as much as possible and minimize damage to native vegetation. Trees that need to be cut in private land will be compensated in cash accordance with the approved Compensation Plan. Roads and paths to the facilities will only be sufficiently wide to accommodate construction vehicles/equipment to minimize land take. Manual labor will be utilized in sloping terrain where use of heavy equipment would cause unnecessary damage. Steep exposed slopes will be graded and covered with bush and grass to minimize erosion. Implement landscaping and planting of trees/vegetation at sites of the proposed facilities.	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	
<u>Water pollution - Sediment runoff</u> Sediment runoff undertaken during excavation, earthworks and grading in the rainy season will cause siltation of rivers	Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials.	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	
<u>Water Pollution - Worker's camp</u> Domestic wastewater from worker's camp would result to the discharge of sewage into drainage canals. Unsanitary conditions at the worker's camp will occur without the provision of necessary sanitation arrangements.	Provide adequate water supply and temporary toilet facilities at the worker's camp.	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
		document in safeguard monitoring reports.	
<u>Generation of construction waste - Generation of excavated soil</u> Generation of excavated materials during rehabilitation and upgrading of headworks, canals and related structures.	During rehabilitation and upgrading of headworks, canals and related structures excavated material will be utilized to backfill the trench. The contractor will be required to properly reinstate the excavated trench after completion of works. Surplus excavated material/cut soil from rehabilitation and upgrading of headworks, canals and related structures will be used as backfill material for low-lying areas that have been identified by the village authority.	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	
<u>Generation of construction wastes – Solid, Inert and Hazardous Wastes</u> Solid wastes, inert construction wastes, and hazardous wastes during construction will result to pollution of land and receiving water bodies.	Provide appropriate segregation bins or areas for construction wastes. Secure and control storage of all hazardous materials including fuels. Reuse recyclable construction wastes such as wood, steel, and scaffoldings or sell to junk shops. Solid waste to be collected and disposed in approved disposal site of the Townships.	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	
<u>Community health and safety</u> Community may be exposed to dangers of open excavation	Install barricades/barriers and sturdy plate covers in open excavations during non-working time. Install warning signs in the area.	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	
<u>Occupational health and safety</u> Construction activities may pose hazards to workers because of the use of heavy equipment, lifting of heavy loads, and exposure to open excavations and chemicals. Potential conflict with local people will occur if migrant workers will be brought to the site.	Require the contractor to implement the construction health and safety plan in accordance with the World Bank EHS Guidelines (http://www.ifc.org/ehsguidelines) as a minimum standard. The contractor will appoint an environment, health and safety officer to ensure implementation of the plan. The plan will at minimum include: <ul style="list-style-type: none"> • Provision of first-aid facilities readily accessible by workers. • Provision of personal protective equipment (PPEs) such as hard hats, gloves, rubber boots, etc., 	Periodic monitoring and reporting by Supervision Consultant.. Report any complaint received from the community to PAFO and document in safeguard monitoring reports.	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
	<ul style="list-style-type: none"> • Wearing of PPEs while working onsite will be a mandatory requirement for workers. • Posting of safety signs/reminders in strategic areas within the construction area. • Installation of sufficient lighting at night. • Ensure that vehicle and equipment operators are properly licensed and trained. • Provide staff with communicable disease and HIV-and COVID 19 related awareness training. <p>The contractor will be required to provide priority hiring of qualified workers from the villages and to consult with the local to avoid conflict if migrant workers will be brought to the site.</p>		
<p><u>COVID-19 risk management</u></p> <p>Working Camp Siting and Management</p>	<p>Siting of Camps and Field Offices</p> <ul style="list-style-type: none"> • Not in area liable to flooding, landslide or other natural disaster • Not in area affected by construction dust, noise, sewage or other pollution • Not in a residential area <p>Minimum housing standards</p> <ul style="list-style-type: none"> • separate bed for each worker • beds should not be arranged in tiers of more than two; • separate accommodation of the sexes or to accommodate couples • adequate natural light during the daytime and adequate artificial light • adequate ventilation to ensure sufficient movement of air • adequate supply of safe potable water • adequate sanitary facilities • adequate drainage • adequate furniture for each worker to secure his or her belongings, such as a locker. • common dining rooms, canteens or mess rooms, located away from the sleeping areas • appropriately situated and furnished laundry facilities • reasonable access to plug sockets for charging telephones and other devices • rest and recreation rooms and health facilities, where not available in the community <p>Minimum accommodation sizes</p> <ul style="list-style-type: none"> • Sleeping space 	<p>Periodic monitoring and reporting by Supervision Consultant..</p> <p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
	<ul style="list-style-type: none"> □ inside dimensions over 198 centimetres by 80 centimetres; • Sleeping room <ul style="list-style-type: none"> □ headroom of over 203 centimetres allowing full free movement □ Beds minimum 2m apart for COVID-19 risk management <p>Sanitation Facilities</p> <ul style="list-style-type: none"> • One toilet, one tap / basin, one toilet for every 6 people • Convenient location to accommodation • Provision of soap • Separate facilities for men and women • Ventilation to open air • Fresh cold running water • Clean and hygienic • Septic tank/sewage treatment facility, or pit latrines located at least 200m from surface waters, and in areas of suitable soil profiles and above the groundwater levels <p>Health and Safety within worker accommodation</p> <ul style="list-style-type: none"> • Separate area for sick workers to prevent transmission of disease • Smoke detector in sleeping area • Fire safety throughout accommodation such as fire extinguishers, fire alarms, fire blankets • Worker training in fire prevention and procedures • Fire exit sign, adequate means of escape and clearly maintained exit • Security lighting within camp and for sanitation block and lighting for route from sleeping area to sanitation block • Electrical cables to be in safe condition, elevated and not in areas liable to flood <p>Inspection</p> <ul style="list-style-type: none"> • 2 weekly inspections to inspect for cleanliness, state of repair of building, accommodation and fire equipment • Record inspection results and retain for review 		
<u>COVID-19 risk management</u> <u>Construction site working conditions</u>	<p>Form a joint team to plan and organize commencement and/or return to work</p> <ul style="list-style-type: none"> • Develop or convene a joint occupational safety and health committee with members 	<p>Periodic monitoring and reporting by Supervision Consultant..</p>	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
	<p>representing the employer and workers</p> <ul style="list-style-type: none"> • Train team members on the basic principles for the formulation and implementation of occupational safety and health preventive and control measures. • Develop and communicate a work plan on safe working for COVID-19 • Such plan should be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof, with international good practice guidelines as may be updated from time to time <p>Risk assessment to decide when to work, who works and how</p> <ul style="list-style-type: none"> • Undertake a risk assessment to determine the preventive and control measures • Ensure preventative measures are in place before resuming or beginning construction work <p>Adopt engineering, organizational and administrative measures</p> <ul style="list-style-type: none"> • Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy, or in the absence thereof, international good practice • Ventilate enclosed workplaces including work camps and communal spaces • Avoid concentration of workers - limit the capacity of common areas such as work camp dining rooms and changing rooms to allow the minimum separation of 2 meters and organize one-way systems. This includes sleeping areas which must be a minimum of 2 meters between <ul style="list-style-type: none"> • beds • Put in place training and information on COVID-19 and measures required for its management. • The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all time • Stagger break and lunch schedules to minimize the number of people in close proximity to one another 	<p>Report any complaint received from the community to PAFO and document in safeguard monitoring reports.</p>	

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
	<p>Regularly clean and disinfect</p> <ul style="list-style-type: none"> • Increase the frequency of cleaning and disinfection, in particular heavily trafficked areas and common areas, including work camps • All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal areas are wiped down at least twice a day with a disinfectant • Discourage the sharing of items such as cups, glasses, plates, tools <p>Promote personal hygiene</p> <ul style="list-style-type: none"> • Provide workers with the conditions and means necessary for frequent hand washing (soap, water or alcohol gel) with a posted hand washing protocol at site entries, exits, bathrooms, communal areas, offices, and any other areas with commonly touched surfaces • Inform workers of the need to avoid physical contact when greeting, and avoid touching eyes, nose and mouth • Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or the crook of their arm • Dispose of tissues in a lined and covered waste bin and wash hands afterwards <p>Provide personal protective equipment (PPE) and inform workers of its correct use</p> <ul style="list-style-type: none"> • Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient number, along with instructions, procedures, training and supervision • Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper handwashing <p>Health surveillance and insurance</p> <ul style="list-style-type: none"> • Before entering the site, staff and visitors must confirm that 		

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
	<p>they are not currently exhibiting flu-like symptoms</p> <ul style="list-style-type: none"> • Monitor the health status of workers, develop protocols for cases of suspected and confirmed COVID-19. The protocol will state that: <ul style="list-style-type: none"> • workers with symptoms or confirmed cases must be isolated within the construction camp or stay at home for 7 days after symptoms started <ul style="list-style-type: none"> □ If symptoms persist after 7 days, the person must isolate until the symptoms stop □ People who have been in close contact with the person with confirmed COVID-19 be quarantined for 14 days • All workers in quarantine or isolation must be provided with adequate food, water, medical assistance and sanitation • Identify workers who have had close contact with people infected with COVID-19 and follow national medical guidance • Communicate confirmed cases of COVID-19 infection to the appropriate authorities • All workers should be provided with health insurance that includes COVID-19 treatment <p>Consider other hazards, including psychosocial</p> <ul style="list-style-type: none"> • Promote a safe and healthy working environment free from violence and harassment. • Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work life balance • Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19 <p>Review emergency preparedness plans</p> <ul style="list-style-type: none"> • Develop an emergency plan adapted to COVID-19 and regularly review it <p>Review and update preventive and control measures as the situation evolves</p> <ul style="list-style-type: none"> • Periodically monitor prevention and control measures to 		

ENVIRONMENTAL IMPACT	MITIGATION MEASURES	MONITORING	COMPLIANCE
	<p>determine whether they have been adequate to avoid or minimize risk, and identify and implement corrective actions for continuous improvement</p> <ul style="list-style-type: none"> Establish and maintain records related to work-related injuries, illnesses and incidents, worker exposures, monitoring of the work environment and workers' health 		
III. Operation Phase			
<u>Impacts of Water Offtake</u> Disruption of downstream hydrological flows due to offtake from river may occur.	Water offtake will be fine-tuned and managed on the basis of environmentally allowable volumes.	Weekly monitoring of water quantity and water offtake.	
<u>Water Pollution</u> Upstream land uses may cause a decline in the quality of water available for the irrigation scheme.	A catchment land use plan must be prepared and implemented to ensure that the scheme is safeguarded throughout its operational life.	Weekly monitoring of water quality.	
<u>Loss of Aquatic Biodiversity</u> Aquatic resources may decline as a result of the operation of the facilities.	Headworks weirs will be improved from the environmental perspective by the construction of fish passes.	Weekly monitoring of aquatic flora and fauna.	
<u>Increased Utilization of Fertilizers and Pesticides</u> Increased areas and extent of vegetable crops pest populations may build up and require more direct intervention	Only agrichemicals approved by the Government of Lao PDR may be used. Strong extension support must be provided to encourage the responsible use of fertilizers and pesticides.	Weekly monitoring of pesticide and fertilizer use of farmers.	
<u>Community health and safety</u> Potential hazards to residents in affected communities.	Facilities properly fenced and secured.	Daily log of security personnel	

Summary of EMP Compliance Status: _____

B. RESULTS OF ENVIRONMENTAL MONITORING

- PAFO operational report
- Complaints resolution
- EMP implementation

C. ISSUES FOR FURTHER ACTION

ISSUE	REQUIRED ACTION	RESPONSIBILITY AND TIMING	RESOLUTION
OLD ISSUES FROM PREVIOUS REPORTS			
List of EMP measures or activities not completed (last column of previous table)			
NEW ISSUES FROM THIS REPORT			

3. CONCLUSION

- Important results from the implementation of EMP monitoring
- Recommendations to improve EMP management, implementation, and monitoring

4. ATTACHMENTS

- Permits
- Monitoring data (water quality, etc.)
- Photographs
- Maps

APPENDIX F
SEMI-ANNUAL INTEGRATED
SAFEGUARDS MONITORING REPORT
TEMPLATE

Safeguards Monitoring Report

Semiannual Report
xxx {month} 20xx

Lao PDR: xxx {Project name}, xxx {sub-project name, if report covers only one sub-project}

Prepared by the Project Management Unit of {complete name of Implementing Agency} for the {complete name of the borrower} and the Asian Development Bank.

NOTE

In this report, "\$" refers to US dollars.

This safeguards monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

1. Executive Summary

{Read and delete: Provide short summary of the following items:

Summary of EMP/RP Implementation

Description of monitoring activities carried out (e.g. field visits, environment effect monitoring, survey questionnaire, public consultation meetings, focus group discussions, etc)

Key issues, any corrective actions already taken, and any grievances

Key activities planned in the next reporting period

Recommendations

Use the paragraph numbering format provided below throughout the report}

1. xxx

2. xxx

2. Project Overview, General safeguard matters

2.1 Project Overview

{Read and delete: Briefly describe project objectives, scope and components – can be taken from PAM or other relevant document}

3. xxx

4. xxx

2.2 Project Progress

{Read and delete: Using most recent project progress report, describe status of project implementation, including full list of contracts, status of contract awarding and implementation, name of contractor, Engineer, Project Supervision Consultant.}

5. xxx

6. xxx

Table 1: Project Overview, Snapshot of Project Progress

Project Number and Title:		
Safeguards Category	Environment	
	Indigenous Peoples	
	Involuntary Resettlement	
Reporting period:		
Last report date:		
Key sub-project activities since last report:	{Read and delete: This section should include, among others, the following: Contract awarding Progress of Work (% physical completion) Status of Safeguard Approvals / Permits / Consents	
Report prepared by:		

2.3 Safeguard Plans Implementation Arrangements

{Read and delete: Describe institutional arrangements and responsibilities for EMP and RP implementation, internal and external monitoring, and reporting, defining roles of PMU, Engineer, Implementation Consultant, Contractors. (Table format as needed)}

7. xxx

8. xxx

2.4 Updated EMPs and RPs, Incorporation of Safeguards Requirements into Project Contractual Arrangements

{Read and delete: Define manner by which EMP and RP requirements are incorporated into bidding documents, contracts.

Indicate when updated EMPs and RPs were submitted for approval to ADB (Table format appropriate).}

9. xxx

10. xxx

3. Environmental Performance Monitoring

3.1 Status of EMP Implementation (Mitigation Measures)

{Read and delete: Summarize main mitigation/protection measures implemented in the reporting period (narrative section). Structure in accordance to phases (detailed design, construction preparation, construction, and operation).}

11. xxx

12. xxx

{Read and delete: Include EMP table or updated EMP table if applicable. Assess compliance of environmental management activities with the original or updated EMP. For that purpose, include additional columns entitled "Compliance Status", "Comment or Reasons for Non-Compliance", and "Issues for Further Action". Example is provided below.}

Table 2: Compliance with EMP Requirements (Environmental Performance)

EMP Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non- Compliance	Issues for Further Action
Use environmental impact as main heading and EMP as listing (see example below)	Use EMP list as basis for rating/evaluating compliance (see example below)		
Rise of employment opportunities: Job openings of the project should give priority to local communities. Recruitment of local laborers should be stipulated in the contract for construction	Field inspections and interviews with communities - DONE Note each complaint case in the field – 3 COMPLAINTS RECEIVED Set up grievance centre and report as part of monitoring action plan – NOT DONE		

Table 3: Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of EMP measures or activities not completed (last column of previous table)			
New Issues from This Report			

3.2 Health and Safety

{Read and delete: Provide narrative of occupational and community health and safety issues that occurred during the reporting period. Any accident involving injury or death of workers or community members must be reported. Include investigation report of DOLISA as attachment to the report. Provide details in the Table below}.

13. xxx

14. xxx

Table 4: Health and Safety Issues

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

3.3 Environment Effect Monitoring

15. Monitoring plan. xxx {Read and delete: Present the environment effect monitoring plan as defined in the EMP or the updated monitoring plan. Refer to Table 4. Describe monitoring responsibilities}

16. Monitoring activities in the reporting period. Xxx {Read and delete: Describe the environment effect monitoring activities in the reporting period, including number of monitoring campaigns, number of samples, etc. Confirm compliance with the monitoring plan, or justify any deviation from the plan}

Table 4: Environment Effect Monitoring Results in the Reporting Period

{Read and delete: Present monitoring result in a Table (see example below, adjust as needed). Any non-compliance should be highlighted for attention and follow-up.}

Location	Parameter	Date	Monitoring value	Relevant government standard, standard value

17. Assessment. Xxx {Read and delete: Compare monitoring results with baseline conditions (if baseline data is available) and relevant government standards in qualitative terms. Additional explanatory comments should be provided as necessary. Possible reasons for non-compliance should be identified.}

4. Involuntary Resettlement Performance Monitoring

{Read and delete: Provide narrative of status of implementation of the RP(s), including but not limited to: status of RP or Resettlement Framework updating; number of households relocated during the reporting period; outstanding resettlement activities; etc}.

18. xxx

19. xxx

Table 6: Summary of Compliance with RP Requirements

RP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non- Compliance	Issues for Further Action ²
Establishment of personnel in PMU/PIU			
Public consultation and socialization process		Provide information on: Public consultation, participation activities carried out Inclusive dates of these activities To be elaborated on in Item 5	
Land area to be acquired is identified and finalized			
Resettlement plan(s) updated after detailed design			
Land acquisition completed			
Establishment of Resettlement Site(s)		Please state: Number of AHs to be relocated as per agreed RP Number of AHs already relocated Number of houses built Status of installation of community facilities to be provided as per agreed RP	
Compensation payments for affected assets is completed		Please state: Total Number of Eligible AHs and APs (as per agreed RP) Number of AHs and APs compensated as of this monitoring period Total Budget allocation as per agreed RP Total budget disbursed to AHs as of this monitoring period	

² To be elaborated further in table 3.b (Issues for Further Action)

Transport assistance for relocating affected households		As above	
Additional assistance to vulnerable affected household		Please state: Total Number of vulnerable AHs and APs (as per agreed RP) Agreed forms of assistance as per RP Number of AHs and APs assisted as of this monitoring period	
Income Restoration Program		Please state progress per income restoration feature/activity and actual period of implementation	
Temporary impacts have been addressed (affected properties restored to at least pre-project conditions)		Please state: Total Number of AHs affected by temporary impacts as per agreed RP Actual Number of AHs and total area affected by temporary impacts (if this differs from the projected number, such as in cases of unforeseen project impacts) Status of restoring affected property	
Capacity building activities			

Table 7: Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of RP activities not completed (last column of previous table)			
New Issues from This Report			

5. Compliance with safeguards related project covenants

{Read and delete: List all environment and resettlement related loan covenants, and assess project's compliance with the covenants (Table format is appropriate, with concluding statement on compliance, partial compliance or non-compliance, and corrective actions as needed)}

Schedule	Para No.	Covenant	Remarks/Issues (Status of Compliance)
Schedule 5	xxx		Complied with / Partially complied with / Not complied with. {Identify reason for partial or non-compliance}

6. Public consultation, Information Disclosure, Capability Building

{Read and delete: Describe public consultation activities during the reporting period. Confirm compliance with consultation plan defined in the IEE/EMP and the RP(s), or justify deviation from these plans. Present planned consultation activities in next reporting period. Use Tables as appropriate.}

Field Visits (sites visited, dates, persons met)

Public Consultations and meetings (Date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)

Training (Nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)

Press/Media Releases

Material development/production (e.g., brochure, leaflet, posters)

Information disclosure

7. Grievance Redress Mechanism

{Read and delete: Describe mechanisms established to address and redress public complaints and grievances related to social and environment safeguards. Summarize grievances received, if any, and measures implemented to redress them.}

Number of new grievances, if any, since last monitoring period: _____

Number of grievances resolved: _____

Number of outstanding grievances: _____

Type of Grievance	Details (Date, address, person, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

8. Conclusion

{Read and delete: Highlight important results from the implementation of EMP and RP monitoring; recommendations to improve EMP and RP management, implementation, and monitoring; key activities planned in next reporting period}.

20. xxx

21. xxx

9. Attachments

Consents / permits

Monitoring data (water quality, air quality, etc.)

Inspection checklists

Photographs

Others