



Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity



Ministry of Public Works and Transport
Department of Water Supply



Scaling-Up Water Supply, Sanitation, and Hygiene Project

IDA Project No.: SWSSH (P-164901)

**Jointly Implemented by the Ministry of Public Works and
Transport & the Ministry of Health of Lao PDR**

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
FOR WATER SUPPLY SYSTEM (WSS)
IN XIENKHOANG PROVINCE

January 2025

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ABBREVIATIONS

CLTS	: Community-Led Total Sanitation
DHHP	: Department of Hygiene and Health Promotion
DONRE	: District Natural Resources and Environment Department
DPWT	: Department of Public Works and Transport
DWS	: Department of Water Supply
ECOPs	: Environmental Codes of Practice
EHS	: Environmental Health and Safety
ESMF	: Environmental and Social Management Framework
ESMP	: Environmental and Social Management Plan
HGNDP	: Health Governance and Nutrition Development Project
HMIS	: Health Management Information System
ICT	: Information and Communication Technologies
Lao PDR	: Lao People's Democratic Republic
MOH	: Ministry of Health
MONRE	: Ministry of Natural Resources and Environment
M&E	: Monitoring and Evaluation
MPWT	: Ministry of Public Works and Transportation
Nam Saat	: National Center for Environmental Health and Water Supply
NGPES	: National Growth and Poverty Eradication Strategy
NSEDP	: National Social Economic Development Plan
O&M	: Operation and Maintenance
ODF	: Open Defecation Free
PNP	: Provincial Nam Papa
PDO	: Project Development Objective
PONRE	: Provincial Natural Resources and Environment Department
PSC	: Project Steering Committee
SBCC	: Social and Behavior Change and Communications
SDG	: Sustainable Development Goal
VDC	: Village Development Committee
WASH	: Water Supply, Sanitation and Hygiene
WSP	: Water and Sanitation Program
WSS	: Water Supply Systems (Nam Papa)

1. Introduction

1. The Scaling-Up Water Supply, Sanitation and Hygiene Project (SWSSHP, the Project) supports the multi-sector convergence on nutrition. The Project budget is US\$25 million, funded by the Government of Lao PDRs and the World Bank. SWSSHP is implemented by the Ministry of Public Works and Transport (MPWT) and the Ministry of Health (MOH). A Project Management Unit (PMU) has been established in the Department of Water Supply (DWS) under the MPWT and a Component Management Unit (CMU) has been established in the Department of Hygiene and Health Promotion (DHHP) under the MOH.

2. The SWSSHP aims to provide access to improved water supply, sanitation and hygiene services in selected rural and peri-urban areas. The Project has four components, including: (1) Delivery of infrastructure and sustainability of water supply and sanitation, (2) Sustainability of community water supply, sanitation, and hygiene support, (3) Implementation support and sector development, and (4) Contingency emergency response. The project has been being implemented in 12 districts of four provinces located in the northern mountainous region of Lao PDR including Phongsaly, Oudomxay, Houaphan and Xiengkhouang provinces. The Project planned to support Water Supply Systems (WSS) in 12 Clusters and 68 Community Water Supply Systems (CWSSs, of very small scale), and 90 sanitation facilities (SF) at existing schools and health centers. For Xiengkhouang province, 2 Clusters of WSS (Namthae and Phienghong) and 10 CWSS were proposed.

3. The Project's Environmental and Social Management Framework (ESMF) was prepared during Project preparation. Accordingly, Environmental and Social Screening (ESS) was conducted for the WSS subprojects. Meanwhile, Environmental and Social Codes of Practices (ESCOPs, introduced in the ESMF) has been/will be applied for the construction of smaller Community Water Supply Systems (CWSS) and SF.

4. ESS was conducted by the Project Implementation Units (PIUs) based on two ESS checklist forms in the ESMF. The results of ES screenings for the two WSSs (Namthae and Phienghong Cluster) in Xiengkhouang Province are summary below:

- None of the proposed Namthae WSS in Kham District and Phienghong WSS in Nonghet District are in the Negative List (Annex 1) of ESMF. The main elements of each proposed WSS (such as water treatment plan and office, access roads, raw water intake and clean water distribution pipes) are not located in protected areas. Therefore, both WSSs are eligible for receiving financing (for more refer to annex-1 screening form).
- Affected Households (AHs) are considered affected on agricultural land and residential land during the laying of the pipeline, but the impact is temporary during construction because the pipeline will be laid underground at a depth between 0.7-1.2 meters, the laying of the pipeline should be at the edge of agricultural land plots where possible and completed during the off-season when there are no crops in the field. In the Namthae cluster, the pipeline will pass through the agricultural land of 21 households (4 in Phakok village and 17 in Phahan village) covering total 4,620 meters length and 11 households (5 in Keochia village and 6 in Phienghong village) of the Phienghong WSS cluster covering total 2,100 meters length. Although Keochia is not covered under the Phienghong WSS cluster, Kumban Phienghong has agreed with the villagers of Keochia to allow the passing of the raw water pipelines through the edges of their agricultural land. The pipelines will be laid underground at a depth between 0.7-1.2 meters throughout the land, and the trenches will be refilled to their original condition after the pipeline is laid. During construction, the contractor will lay the pipelines at the boundary of the fields and avoid laying the pipelines through the middle of the fields as much as

possible. Overall, the laying of the pipeline is considered a temporary impact during construction, and as the siting of the WSS facilities (including the intakes, WTP, pipelines, access roads, etc.) has already avoided residential houses and existing structures, no resettlement will be required. There will be temporary environmental and social (ES) impacts and risks during the construction period of each WSS. The potential impacts and risks include ground disturbance leading to reduced or loss of some vegetation cover and trees, nuisances to communities related to generation of dusts, noise, and exhaust emissions, occupational and community health and safety risks, generation of wastes and excavated materials, traffic disturbance and increased traffic safety risks, community disturbance due to construction activities, and increased erosion/landslide risks especially on steep topography. Most of the potential ES impacts and risks during the construction phase are anticipated to be localized, temporary and short term, at low to moderate levels. These ES risks and impacts should be manageable by the measures incorporated into project detail design and construction practices (readily known and available in the form of Environmental and Social Codes of Practices – ESCOPs) and site-specific mitigation measures to be determined based on specific baseline conditions and types of construction activities. During operation phase, there will be occupational health and safety risks, and waste/wastewater will be generated. These can be managed through engineering design of the WTP and operational procedures.

5. Sites for the construction of WTP both in Namthae and Phienhong cluster are located at the communal land. No private land will be affected by WTP. The impacts of the construction of Namthae and Phienhong water supply subprojects are temporary and insignificant, and there is no requirement for a RAP/ARAP. Temporary impacts on agricultural and residential lands by Namthae and Phienhong WSSs in Xiengkhouang Province will occur during the pipeline laying, which will be mitigated by laying the pipeline underground and completing the work during the off-season. The construction phase will involve localized, short-term, and low to moderate environmental and social impacts, which can be managed through ESCOPs and site-specific mitigation measures. No resettlement of houses is required. During the operation phase, any risks can be managed through proper engineering design and operational procedures.

6. Screening results confirmed that the Project is classified as Environment Category B (according to OP/BP 4.01). In accordance with the ESMF, an Environmental and Social Management Plan (ESMP, this document) is prepared for the two Water Supply Systems (WSS) clusters in Xiengkhouang Province.

7. The ESMP (in language understandable to the local communities) will be disclosed at public accessible places in project areas before construction is started. Relevant parts of the ESMP (particularly the mitigation measures, contractors' responsibilities) will be included in the Construction Bidding Documents and contractual documents.

2. Policy, Legal and Administrative Framework

2.1 Responsible Agencies

8. MPWT has been traditionally mandated with the planning and development of urban water supply and sanitation systems, it also increasingly takes care of water supply systems for rural clusters. Survey and design of gravity-fed piped water supply systems being increasingly transferred to DWS and with time, increasing numbers of water supply systems moving to the purview of the water utilities, or Provincial Nam Papa (PNP). The development of community water supply systems (CWSS) also comes under the PNP. The focus of MOH will be on the

reduction of open defecation, promotion of sanitation and hygiene, water quality improvement, and collection and validation of sector information.

2.2 Lao PDR Environmental and Social Legislation for Water Supply

9. The Key government legislation applicable to the project includes the following.
- Environmental Protection Law (2012) EPL specifies necessary principles, rules and measures for managing, monitoring, restoring and protecting the environment from pollution. The aim is to protect the public, natural resources and biodiversity, and to ensure the sustainable socio-economic development of the nation.
 - The Law on Water and Water Resources (2017)
 - The Law on Water Supply (2009)
 - Wildlife and Aquatic Law (2008)
 - Land Law (2003)
 - Ministerial Instruction No. 8029
 - Drinking Water Quality Standards
 - Decree #84 on Compensation and Resettlement of People Affected by Development Projects (2016)
 - Technical Guidelines on Compensation and Resettlement of People Affected by Development Project (2005)
 - Decree on the Preservation of Cultural, Historical and Natural Heritage (1997)
 - Guideline on Consultation with Ethnic Groups (2013).
10. Screening of the investment project can be conducted by the project proponent by applying the list of Investment Projects and Activities issued by the Natural Resource and Environment authorities as per the Ministerial Instruction No. 8029 of MONRE. The Provincial Department of Natural Resource and Environment (PONRE), who has joined the site visit in early state of project implementation, issued an official letter, advising that Initial Environmental Examination (IEE) (normal regulations) is not required for the WSS, but the PMU/PIU should submit the ESMP to PONRE for approval and monitoring.

2.3 World Bank Safeguards Policies

2.3.1 World Bank Safeguard Policies Triggered for the Project

11. The Project triggers the World Bank safeguard policies presented in table below.

Table 2-1 List of WB safeguard policies triggered for the project.

	WB Safeguard Policies	Triggered	Safeguard instruments
1	Environmental Assessment OP/BP 4.01	Yes	ESMF/ESMP/ECOP
2	Natural Habitats OP/BP 4.04	No	
3	Forests OP/BP 4.36	No	
4	Pest Management OP 4.09	No	
5	Physical Cultural Resources OP/BP 4.11	Yes	Chance Finds in ESMP/ECOP
6	Indigenous Peoples OP/BP 4.10	Yes	EGDF/EGDP
7	Involuntary Resettlement OP/BP4.12	Yes	RPF/RAP/ARAP/ESMP

8	Safety of Dams OP/BP 4.37	No	
9	Projects on International Waterways OP/BP7.50	Yes	The World Bank, on behalf of, and at the request of the Lao PDR government has notified the Mekong riparian countries including China, Vietnam, Myanmar, Thailand and Cambodia.
10	Projects in Disputed Areas OP/BP 7.60	No	

2.3.2 Environmental, Health, and Safety (EHS) Guidelines

12. The World Bank Group’s Environmental, Health, and Safety Guidelines (EHSG) and industry-specific Good International Industry Practice will also be applicable to the proposed investments where relevant. These guidelines can be accessed from the following links.

http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines

<https://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf>

3 Descriptions of the Proposed Investments

13. Two water supply systems (WSS) have been proposed for Xiengkhouang Province, the Namthae Cluster WSS in Kham District and Phienghong Cluster WSS in Nonghet District. The location map of two districts in the project is shown in the Figure 3-1 below.

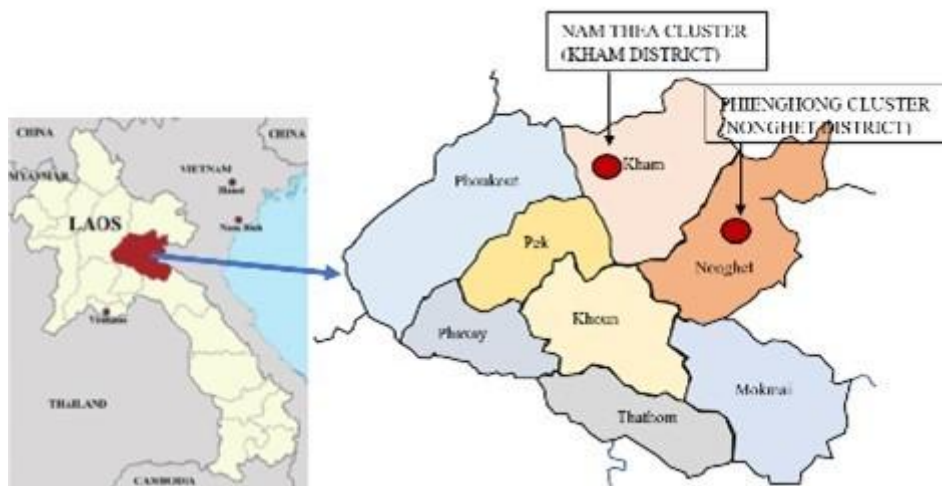


Figure 3-1 Location map of Xiengkhouang Province and Two WSSs

3.1 Serviced Areas and General System Lay out.

14. The Namthae Cluster Water Supply System (WSS) in Kham District is designed to provide a reliable source of safe and clean water to essential community facilities and households. This system will benefit six villages, namely B. Phakok, B. Phanhan, B. Phonchaeng, B.

Namthoum, B. Phonkham, and B. Phonhhom. These improvements will not only supply potable water to individual households but also ensure that schools and healthcare centers in these villages have consistent access to safe water, thereby enhancing the overall quality of life and health standards within the community. The Namthae Cluster is located approximately 42 kilometers north of the Kham District Center and roughly 55 kilometers northeast of Phonsavanh town of Pek District. The implementation of the Namthae Cluster WSS will bridge the gap in water accessibility for these remote areas, contributing significantly to the sustainable development of the region. The general layout of core service area and the system's general layout Figure 3-2 below:

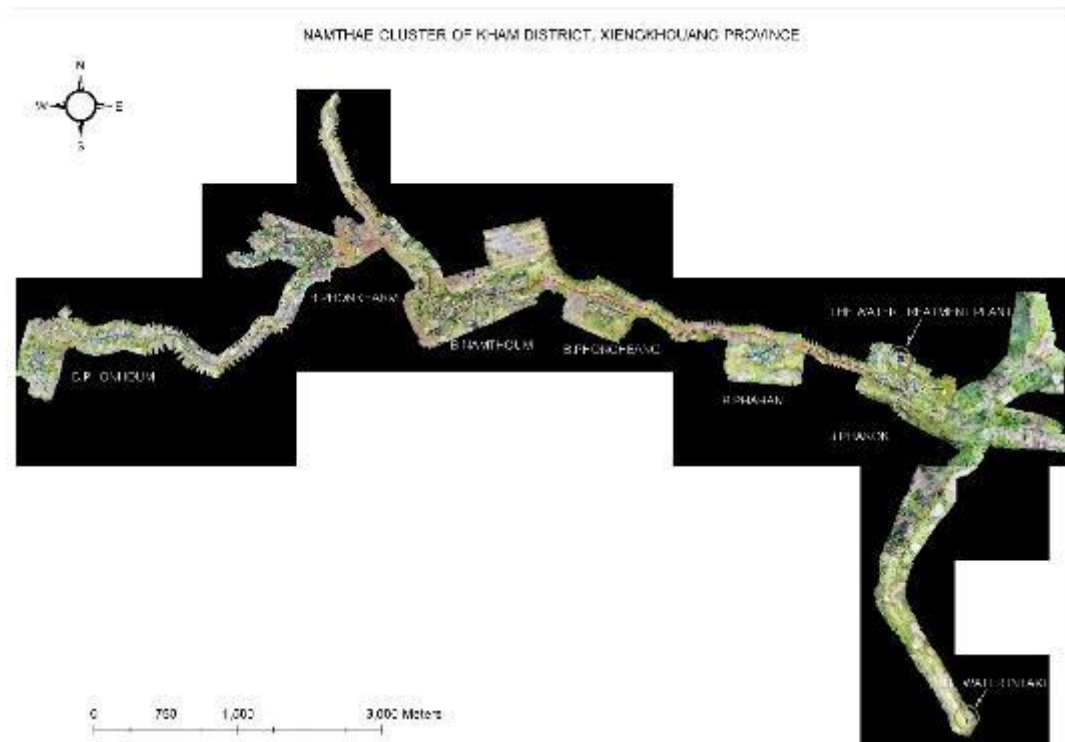


Figure 3-2 General Lay Out of Namthae WSS in Kham District

15. The Phienghong Cluster WSS in Nonghet District will provide safe water to households and a school in Phienghong village which is located along the main road from Xiengkhouang to Xamtay District in Houaphan Province with approximately 47Km of Nonghet town. Village has a border with Xamtay Houamuang District in Houaphan Province to the north, a border with Mork District and Vietnam to the south, a border with Kham and Khoun District to the northwest. The general layout of core service area and the system's general layout is shown in the Figure 3-3.

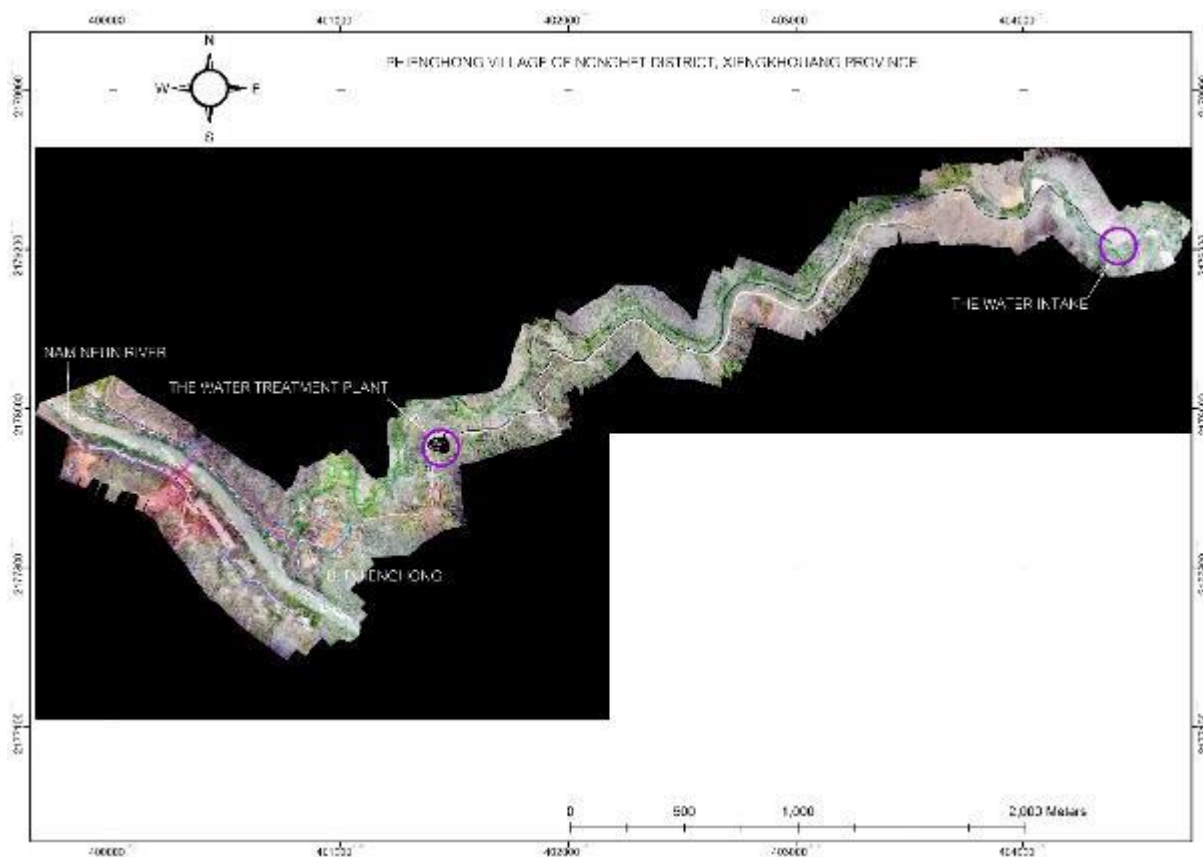


Figure 3-3 General layout of Phienghong WSS in Nonghet District

16. There are existing rural supply schemes (Nam Lin) in these villages. They are gravity fed water supply schemes without any water treatment. The existing water supply is insufficient to meet the water demand for the full year due to the small sizes of the existing pipeline system, leakages issues, and low water quantity at source during the dry season.

Connection Policy. Households that apply for a connection during the construction period will benefit from a policy that waives any up-front connection charges for metered water connections. This initiative is specifically designed to assist poor and low-income groups, ensuring they have access to the new piped water supply system without the financial burden that might otherwise prevent them from connecting. By removing these initial costs, the project aims to promote equitable access to clean water, thereby encouraging a higher number of new connections. To maximize awareness and uptake, comprehensive marketing and awareness campaigns will be conducted throughout the community. These campaigns will educate residents about the project's connection policies, highlighting the financial relief provided by the waiver of up-front charges and emphasizing the numerous benefits of connecting to a piped water supply. Benefits such as improved health outcomes, convenience, and reliability of a consistent water source will be key focal points of these informational drives. During the construction phase of the Water Supply System (WSS) in Namthae Cluster, Kham District, it is projected that there will be 539 new domestic service connections. Similarly, in the Phienghong Cluster, Nonghet District, an estimated 111 new connections are expected.

3.2 Descriptions of the WSSs and their Elements

17. Each WSS comprises of the following key elements:

- i. A Water intake, to be built on brook of water source.
- ii. Raw transmission pipelines to transmit raw water from the water intake to the water treatment plant.
- iii. A water treatment plant (WTP) with treatment units, storage and laboratory.
- iv. Water Supply Office.
- v. Distribution pipes, to transmit clean water from the WTP to the head points in the serviced villages.
- vi. Household connection pipes to connect households with the head points.
- vii. Ancillary work items such as access roads and power supply.

18. The key parameters of each system are listed and described below.

Table 3-1 Key parameter of the proposed WSS in Xiengkhouang Province

Element (from source to taps)	Namthae WSS, Kham District	Phienghong WSS, Nonghet District
1. Water Sources	Houay Kor Xor Brook	Namlan Stream
2. Water Intakes	Elevation: 1.313m X= 353474 Y = 2156638	Elevation: 440m X= 404397 Y = 2179232
3. The access road from the main road to WTP	L= 140 m Area= 2,800 m ²	L= 30 m Area= 390 m ²
4. Raw transmission pipes (HDPE) from intake to WTP	5.105km HDPE-DN160mm	4.420km HDPE-DN90mm
5. Water Treatment Plan (WTP)	Elevation: 949m X= 352689 Y = 2160416 Area= 4,900m ²	Elevation: 387m X= 401420 Y = 2178334 Area= 4,800 m ²
Capacity (m ³ /d)	650	150
Construction of the foundation for WTP	Yes, ground levelling required	Yes, ground levelling required
Treatment Units (static mixer, steel clarifier tank, steel filter tank, steel reservoir, valve, pipe, and fitting)	Yes	Yes
Chemical dosing system (tanks, dosing pumps, mixers, valves, check valves, pipes, and fittings)	Yes	Yes
clear water reservoir	220	50
a power supply system, and a control cabinet	Yes	Yes
Drainage system	Yes	Yes
Inlet and outlet pipes and fittings	Yes	Yes
Back wash water tank	No	No
6. Nampapa Service Office	Ban Nam Chaeng Village Elevation: 828m X= 348863 Y = 2161196	Nam Papa Service office of Phienghong cluster will be constructed at the WTP site adjoining to the WTP X= 401420

Element (from source to taps)	Namthae WSS, Kham District	Phienghong WSS, Nonghet District
		Y = 2178334
7. Distribution pipes (HDPE)	L= 28.085 km (It is longest clear water distribution pipeline because it will cover 6 villages) DN225 DN180 DN160 DN110 DN90 DN63 DN50	L= 5.716 km (It is shorter clear water distribution pipeline because it will cover only 1 village) DN110 DN90 DN63 DN50
8. Household Connection Pipes	539	111
9. Office with separate rooms for storage, chemicals and operators	Yes	Yes
10. Basic laboratory equipment	Yes	Yes
11. Ancillary Items		
Access Road	New access road, long: 140m and wide: 5m	New access road, long:30m and wide: 5m
Power Supply	Yes, 50kVA transformer	Yes, 50kVA transformer
Serviced Areas and Serviced Population	1. B. Phakok 2. B. Phahan 3. B. Phonchaeng 4. B. Namthoum 5. B. Phonhom 6. B. Phonkam Total Population: 3,604	1. B. Phienghong Total Population: 1,011

3.3 Water Sources

3.3.1 Namthae WSS in Kham District

19. Houay Korsor was selected as the raw water source for Namthae cluster WSS in Kham District. The stream originated from the natural spring on the high cliff at the elevation of 1,296mamsl and flows through the valleys, agriculture farms and finally discharges to Nam Khouang brook in B. Phakok Village. Houay Korxar has a catchment area of approximately 4.6 Km². The map showing the catchment of the Houay Korsor stream is shown in the **Error! Reference source not found.** below. The Houay Korsor stream location allows transmission of raw water to the WTP by gravity feed.

20. The flow rate in Houay Korsor stream of Namthae cluster is low during the dry season especially from November to April. The measurement of the flow rate was conducted 2 times, first time in dry season on 3rd November 2021 and second time in raining season on 8th June 2022. Measured flow rates were 8,743m³/day on 3rd November 2021 and 16,325m³/day on 8th June 2022. The amount of water withdrawn (designed capacity of the water supply system 650m³/day) is much lower than the amount of water available in this stream.



Figure 3-4 A View Catchment Area of Houay Korsor

3.3.2 Phienghong WSS in Nonghet District

21. Nam Lan Stream was selected as the raw water source for Phienghong Cluster WSS in Nonghet District. It originated from the mountain then it flows along the valleys through forestry, agriculture land and finally discharges to Nam Neun River at the middle of the Phienghong village. Nam Lan brook has a large catchment area which is about 163Km², and it is recharged from many channels from the mountain valley. This stream was selected because the water quantity and quality meet the demand for water supply in the Phienghong cluster and the proposed location of the water intake allows gravitational feed to the WTP.

22. The flow rate in Nam Lan stream of Phienghong cluster WSS is low during the dry season especially from November to April. The measurement of the flow rate was conducted 2 times, first time in dry season on 6th November 2021 and second time in raining season on 8th June 2022. Measured flow rates were 31,163m³/day on 6th November 2021 and

2,329,783m³/day on 8th June 2022. The amount of water withdrawn (designed capacity of the water supply system 150m³/day) is much lower than the amount of water available in this stream.

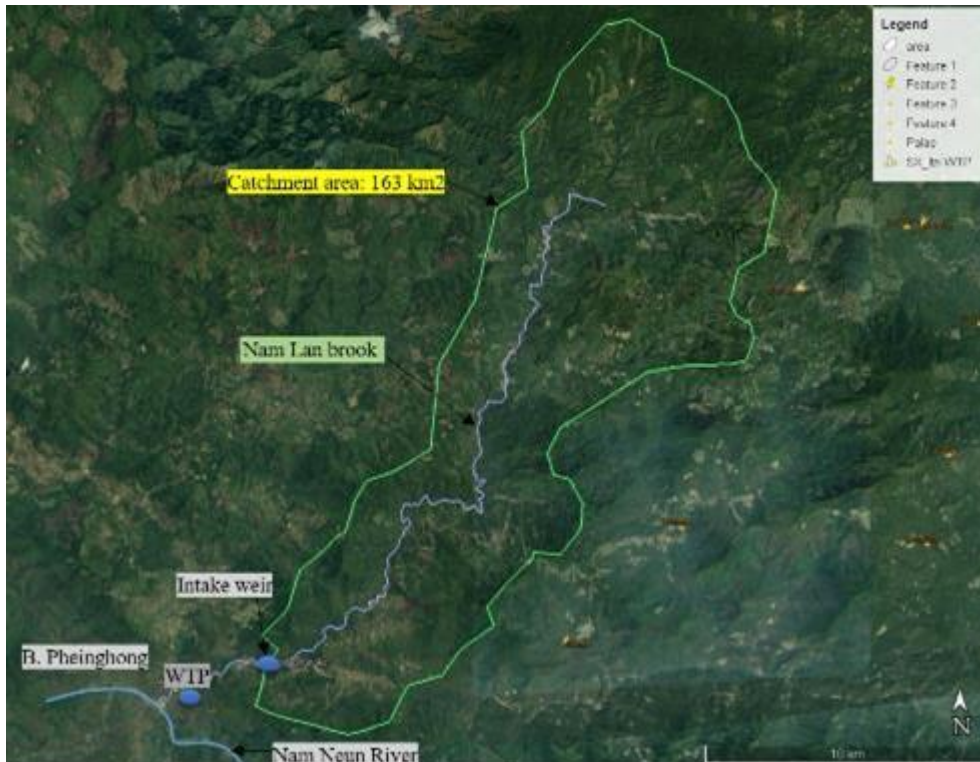


Figure 3-5 A View Catchment Area of NamLan Brook

3.4 Water Intakes

23. The locations of the proposed water intakes were selected taking into account their proximity to the proposed Water Treatment Plan (WTP) and most suitable location for weir construction.



Figure 3-6 Aerial Picture of Water Intake of Namthae WSS(a) and Phieinghong WSS (b)

24. Since the water intake site is located away from the inhabitation hence there are no activities around the proposed water intake site including no water use from the water source in surrounding area in the vicinity of the proposed water intake, ensuring a pristine and undisturbed environment around the area.

3.4.1 Site Selection, Intake Locations

25. **Namthae WSS** in Kham District. The proposed water intake is located near the spring water point of Houay Korsor on communal land and about 6.5Km of confluence to NamKouang River, at coordinate of X= 353433asml and Y=2156669mamsl. The estimated length of the raw water transmission pipeline from intake to proposed WTP location is 5.11Km. The ground elevation is 1313mamsl, 300 m above the WTP. The water intake of the Namthae Currently the WSS cluster is accessible via a walking trail. The photo below shows the location of the proposed water intake and the walking trails used to access it..



Figure 3-7 The proposed location of water intake of Namthae WSS and walking trail to access the water intake site

26. **Phienghong WSS in Nonghet District.** The water intake site is located on Nam Lan Stream in communal land at the east of the Phienghong village, about 5km downstream of stream's origin and 30Km upstream of the confluence to Nam Neun River at the coordinate X= 404531 and Y=2179309. It is 4.2km from the proposed WTP location. The ground elevation is 447mamsl, 60 m above the WTP. The photo below shows the location of the proposed water intake location and walking trails to access the proposed water intake.

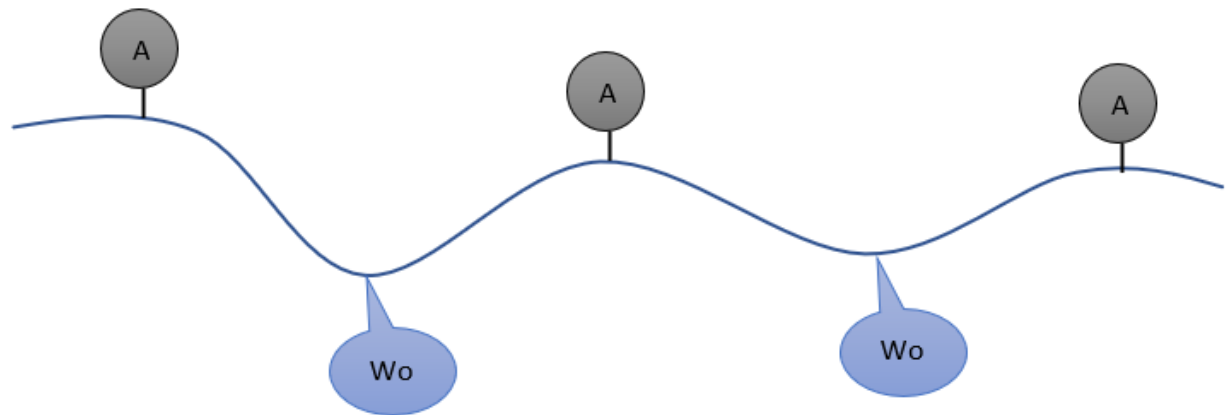


Figure 3-8 The Proposed Location of water intake of the Phienghong WSS and walking trail to access the water intake site

3.4.2 Intake Structures

27. The proposed intake systems for Namthae WSS will be constructed because the quantity of water in brook is less during the dry season. At the site of construction of weir, the stream is narrow. These reinforced concrete structures are designed to collect raw water from the stream with a capacity of 1,050 m³/day (43.75 m³/hr) for Namthae WSS. A spillway will be built to block the stream, allowing water to flow up and down as needed for the intake system. Level of the weir is 20 cms higher than the spill way which allow the water released by gravity to the spill way.

28. This will help control the water flow and ensure efficient direction into the intake structure. The spillway may also help regulate the water level in the stream, preventing flooding or other water management issues. The width of the collection wall is 1.0 m. During the rainy season, excess water will flow through the spillway located next to the water inlet. The width of the spillway will be determined by the width of the stream. To prevent garbage and floating materials from entering, both coarse and fine screens will be used. The coarse screen, made of stainless-steel bars, has a size of 25 mm with a spacing of 20 mm between the bars and dimensions of BxH=1.0x1.2 m. The fine screen, also made of stainless-steel bars, has a size of 2 mm with a spacing of 2 mm between the bars and dimensions of BxH=1.0x1.0 m. A DN80 pipe will be used to lead raw water to the WTP, with a velocity of 0.46 m/s and a head loss of 3.43 m/km. The intake will use a galvanized steel pipe connected to an HDPE raw water pipeline DN90. A stop valve DN80 will be installed for management and operation, and a DN50 pipe with a stop valve will be installed at the bottom of the water collection compartment to discharge sludge when necessary. The design of the weir is illustrated in Figures 3.7 and 3.8 below. Velocity of 0.46 m/s is appropriate. The design of the pipelines includes installing air release valves (A) at the highest level. Additionally, washouts (Wo) will be installed at the lowest level. These washouts serve the purpose of drainage and allow for cleaning out any sludge that may accumulate in the pipelines.



29. Typically, the Operations and Maintenance (O&M) team is responsible for monitoring the effluent flow rate to the Water Treatment Plant (WTP) every hour using a water meter. If the water quantity is lower than expected, it indicates a potential issue either at the intake or within the pipeline. In the case of pipeline-related issues, the O&M team must initiate cleaning procedures, starting from the intake and extending all the way to WTP.

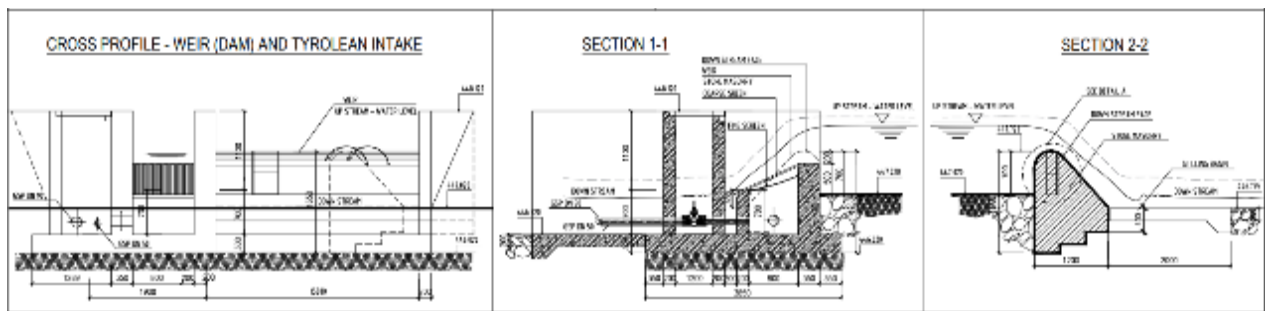
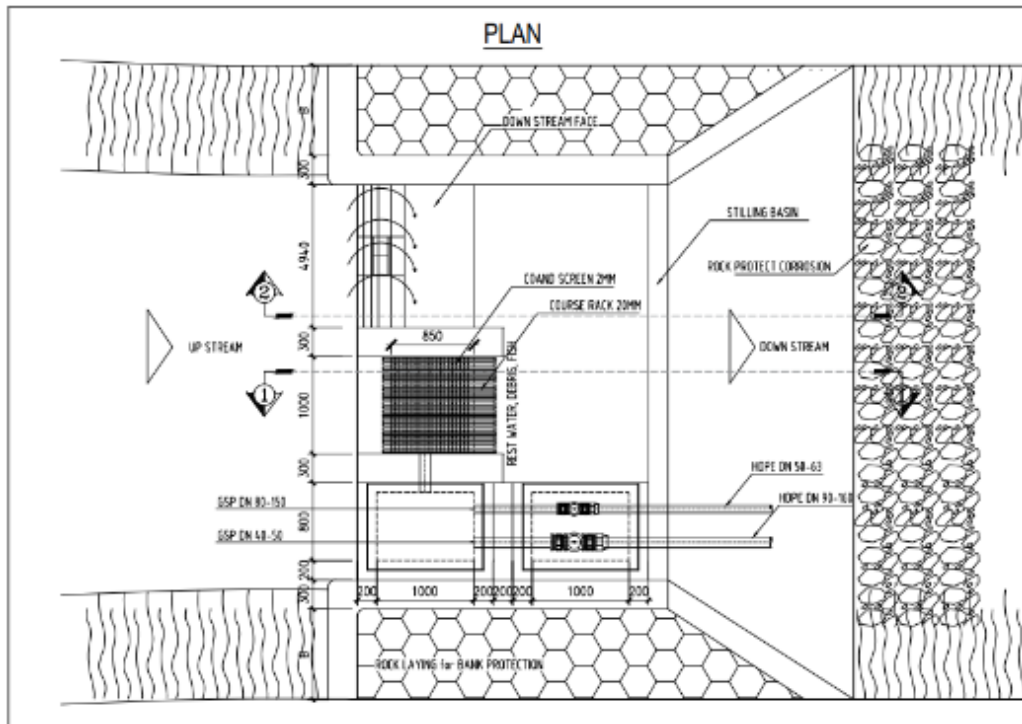


Figure 3-9 Plan of Weir Intake

Phienghong WSS Water Intakes

30. The Phienghong WSS water intake brook is substantial in size and features a natural sedimentation area, eliminating the need to construct a weir at the intake. An inlet chamber will be built to collect raw water from this sedimentation area. The inlet chamber measures 1.2 meters in width, 2.6 meters in length, and 1.6 meters in height, and is divided into three sections. The first chamber collects water from the sedimentation area, the second chamber houses the inlet pipe, and the third chamber contains the control valve. Additionally, a drainpipe is included to facilitate the cleaning of sludge and other sediments from the chambers. Details are provided in Table 3-10 below:

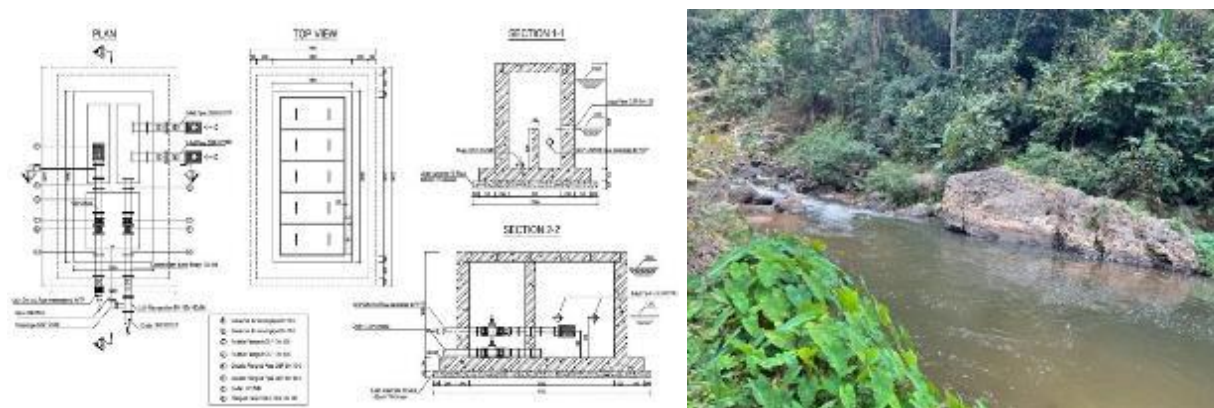


Figure 3-10 Cross Profile-Weir and Tyrolean Intake

3.5 Raw Water Transmission Pipelines

31. Raw water is led from the intake to the WTP by DN160-HDPE and DN90 gravity pipeline for Namthae and Phienghong WSS, respectively. The length of raw water transmission pipelines is 5,105 meters in Namthae and 4,200 meters in Phienghong. At the highest points will be installed air release valve DN25. On the raw water pipeline there are air release valve chambers. At the lowest points will be placed a blow-off valve. On the raw water pipeline, there are blow-off valves. Stop valve will be installed to manage the operation of the pipeline, on the route there are management valve chambers. The key parameters of transmission pipelines in each system are shown in the table below.

Table 3-2 Raw Water Transmission Pipelines

No	WSS	Length (m)	Air release valves	Blow-off valves	Management Valve Chambers
1	Namthae	5,105	8	4	5
2	Phienghong	4,200	2	2	4

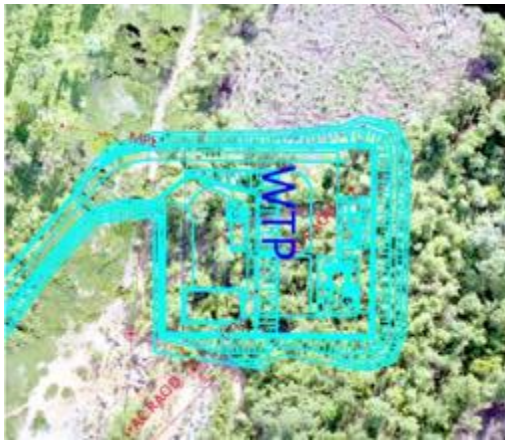
3.6 Water Treatment Plants

32. Water Treatment Plant (WTP, 4,900 m²) of Namthea WSS consists of: (i) a mixing/flocculation and vertical sedimentation tank; (ii) filtration tank; (iii) clean water reservoir/clean water tank, chemical house, laboratory and a sludge lagoon.

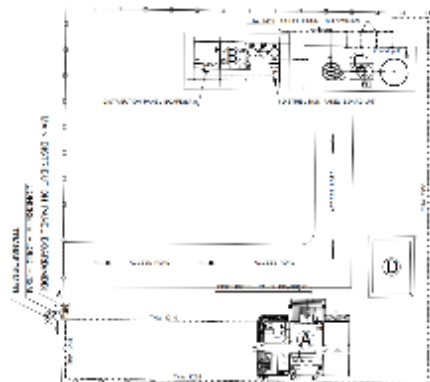
33. WTP of Phienghong WSS (4,800 m²) consist of: (i) a mixing/flocculation and vertical sedimentation tank; (ii) filtration tank; (iii) clean water reservoir/clean water tank, chemical house, laboratory and a sludge lagoon. The Water supply Office will also be located in the proposed WTPs area.

34. Water Treatment Plants (WTPs) will be situated atop hills, with the Namthae WSS positioned at an elevation of 942 meters above mean sea level (mamsl) and the PheingHong WSS at 387 meters mamsl. The two Water Treatment Plants (WTPs) are meticulously designed with the primary objective of meeting the drinking water demands of their respective areas. The Namthae Water Supply System (WSS) has a design capacity of 650

cubic meters per day, while the Phienghong WSS is designed to handle 150 cubic meters per day. This capacity ensures that both systems can adequately supply the necessary volume of treated water to meet the daily requirements of the communities they serve. The proposed site for the water intake is located on village communal land. Currently, this land is fallow, with some presence of bushes. However, all of this land is the communal land of the village and has been used temporarily by local farmers for crop cultivation during the wet season. During the village meeting with the community and authorities, the land for the WSS Namthae cluster (**Annex-11**) and Phienghong cluster (**Annex-21**) was officially assigned for these two Water Supply subprojects. The villagers unanimously agreed to the subproject, and the village authorities have transferred the land for the construction of the Water Treatment Plant (WTP). As depicted in the attached picture, portions of the land previously utilized temporarily by some individuals will no longer be used for that purpose in the future. All local people will be informed about the work plan prior construction by the contractor and PIU in order to avoid the grievance in the future. Any grievances from the community during the construction phase will be addressed through the Grievance Redress Mechanism (GRM). The selection of village communal land for the intake site aims to minimize disruption to existing land use and to ensure ease of access for construction and maintenance. This strategic choice helps to balance the need for essential infrastructure development with the preservation of local agricultural practices and community harmony. The layout of the proposed WTP and a photo showing the existing condition at the WTPs are presented in Figure 3-11 below.



WTP of Namthae WSS



WTP of Phienghong WSS

Figure 3-11 Layout of Water Treatment Plants

35. The two Water Treatment Plants (WTPs) are meticulously designed with the primary objective of meeting the drinking water demands of their respective areas. As mentioned above, the Namthae Water Supply System (WSS) has a design capacity of 650 cubic meters per day, while the Phienhlong WSS is designed to handle 150 cubic meters per day. This capacity ensures that both systems can adequately supply the necessary volume of treated water to meet the daily requirements of the communities they serve.

36. **Water Treatment Processes.** Raw water flows into the clarifier at the top of the mixing and sedimentation tank. Depending on the raw water quality, flocculants and/or coagulants (alum dosage $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$ 10 – 30 mg/l or 5 – 10 mg/l PAC) are added to help settle out the solids at the bottom of the tank. Clearer water flows up through the plates to the filtration tank where water will flow through sand or other granular substances. Turbidity will be removed at this step. Then chlorine is added to the filtered water for disinfection, bacteria and other harmful organisms will be removed. Clean water is stored in a reservoir. The solids settled at the bottom of the clarifier is drained into a sludge thickening tank for additional settling. Then the sludge typically gets thickened further in the sludge lagoon for final dewatering.

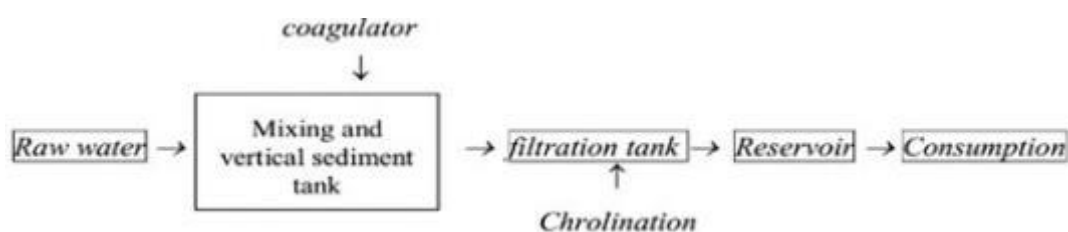


Figure 3-12 The process of water treatment plant.

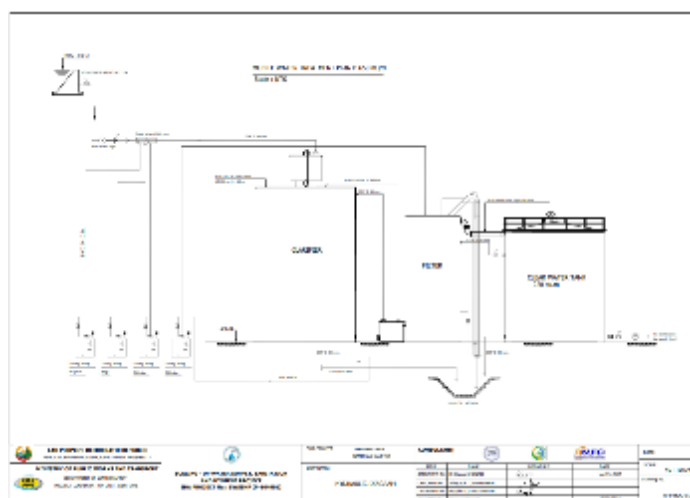


Figure 3-13 Hydraulic Diagram

37. The key technical features of water treatment process are summary in Table 3-3 below.

Table 3-3 Key Parameter of WTPs

Component	Functions	Design capacity
Alum mixing	Rapid alum mixing with raw water	<ul style="list-style-type: none"> Alum dosage $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$ 10 - 30 mg/l or 5 - 10 mg/l PAC Mixing method: Hydraulic Location: mixing equipment Mixing time: 1 - 2 minutes

Vertical sedimentation	<ul style="list-style-type: none"> Sedimentation of coagulant created in the flocculation tank. Turbidity < 30 NTU 	<ul style="list-style-type: none"> Gravity Filter tank size (DxH): 1,200x4,500 mm. Velocity 0.3 - 0.72 m/minute
Rapid filter	Filter water discharged from sedimentation tanks	<ul style="list-style-type: none"> Filter material: 1 layer, crystal sand, d = 0.7 mm - 1.6 mm Thickness: 0.8 -1.2 m Filter velocity: 6-9 m/h Backwash method: Water
Disinfection	Water disinfection	<ul style="list-style-type: none"> Dosage: Chlorine 1 - 2mg/l Contact time > 30 minutes

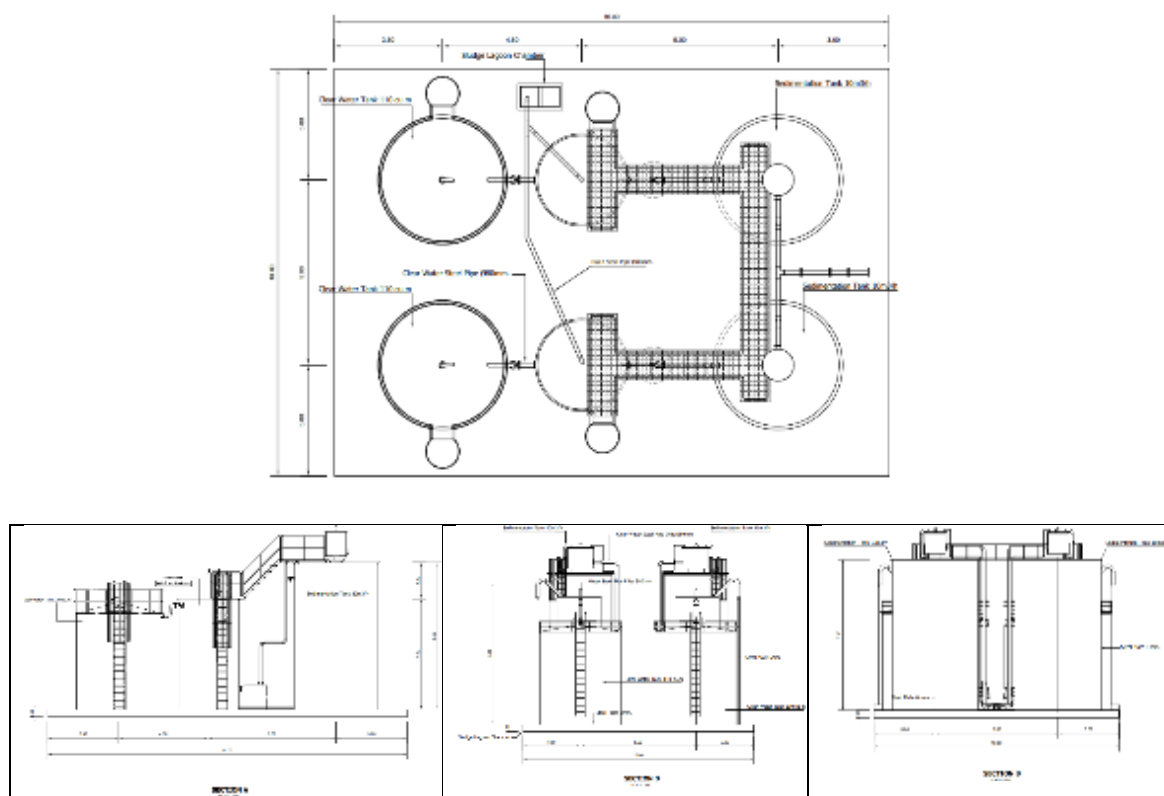


Figure 3-14 Water Treatment Plant Plan

38. **Clean Water Reservoir (Tanks).** The required total volumes of the clean water tank at each WTP are at 30% of the WTP capacity day. The clean water tank is pre-casted. On the ground clean water tank is setting on slope towards the drainage outlet minimum of 1%. The roof shall slope from the reservoir center towards the edges a minimum of 2%. The access manholes shall have a concrete up-stand 200 mm high to prevent rainwater from entering the reservoir. Access ladders or step irons of stainless steel to the reservoir wall shall be provided at each manhole. The diagram below shows the proposed design of the clean water tank.

Table 3-4 Clean Water Reservoir Dimensions

No	WSS	Diameter (m)	Hight (m)	Volumes (m ³)
1	Namly	3.5	4.0	60
2	Sinxay	3.5	4.0	50
3	Sophun	4.0	4.0	55
4.	Longnai-Kao	4.5	4.0	70

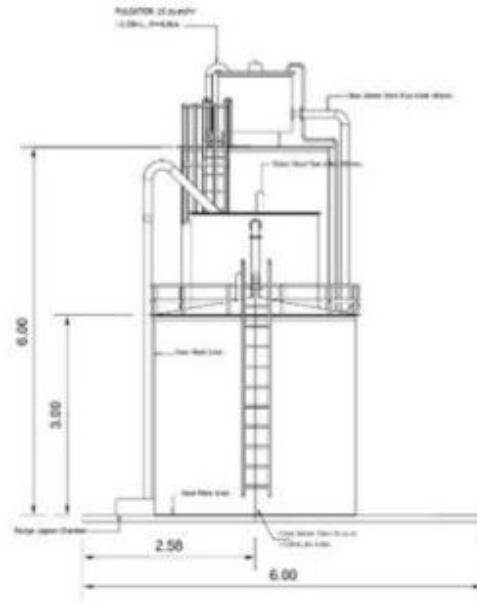


Figure 3-1 Clean water tank.

39. **Chemical and Operation Houses.** The Operation House at each, dimensions at 7.6 m x12.9 m x5.1m (BxLxH), is divided into 03 separate rooms (Chemical dispensing room; Chemical storage room and operation room). The diagram below shows the proposed design of the Operation House.

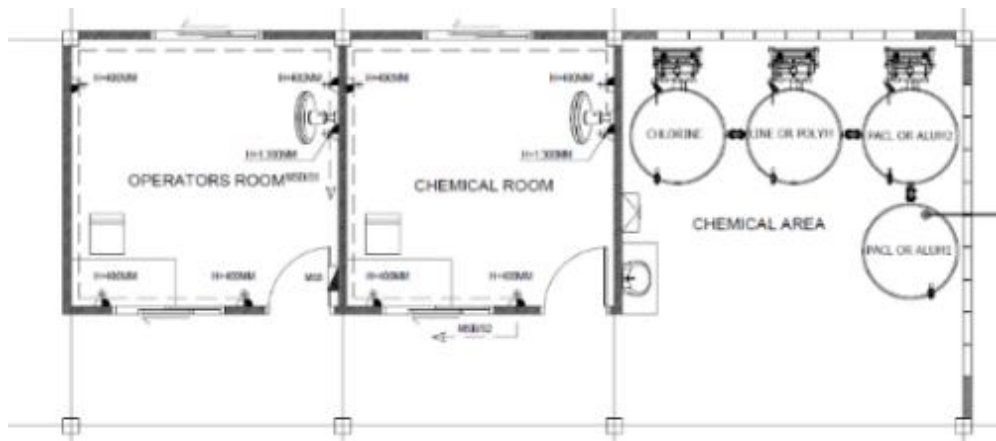


Figure 3-15 Figure of Chemical and Operation House

40. **Laboratory:** The basic laboratory will be setup in the operation house with basic water quality analysis equipment such as turbidity and residual chlorine meter; multiparameter water quality meter for measuring pH, EC, TDS and temperature, HI-96727 color of water portable Photometer, four station Portable Floc Tester, beaker 600ml, 1000ml and 2000ml, PP Cylinder 100, 250, 500, 1000ml, wash bottle LDPE LP 250ml and test tube brush. Consumables: pH combination buffer solution kit, pH Electrode storage solution, free Chlorine Reagent, DPD Method. There are 7 water quality parameters that will be monitored every 4 hours including Turbidity, Chlorine, pH, EC, TDS, temperature and Color. Refer to O&M Guidelines of Nam Papa, the O&M staff of PNP test 7 parameters every 4 hours. CMU conducts the 6 monthly water quality analysis of 23 parameters for Water Supply System (Nam papa) as per the MOH standard.

41. **Sludge lagoons:** The backwash water from the filtration and sedimentation tanks will be discharged under pressure to the sludge collection tank through a pipeline with a diameter of 150 mm (DN 150). For the Namthae cluster, the capacity of the sludge lagoon is 132 cubic meters, with dimensions of 8 X 15 X 1.1 meters. This lagoon is designed to store approximately 6,578 kilograms of sludge, which is sufficient for a period of three months. The sludge lagoon is conveniently located within the same area as the Water Treatment Plant (WTP), ensuring efficient management of sludge. Similarly, the Phienghong cluster WTP features a sludge lagoon with a total design capacity of 35 cubic meters, measuring 5 X 7 X 1 meter. This lagoon is designed to store approximately 1,752 kilograms of sludge, also sufficient for a three-month period.

42. Both sludge lagoons are designed to manage the sludge generated from the water treatment process over a quarterly period. The volume of sludge generated from the treatment of surface water in both proposed WTPs is relatively small, with the Namthae cluster producing 6,578 kilograms and the Phienghong cluster producing 1,752 kilograms over three months. Due to the manageable volume of sludge, the construction of a drying field within the WTP premises is not anticipated. Instead, the sludge will be retained in the sludge lagoons and will be periodically removed and transported to a designated disposal site every two to three months. This approach ensures that the sludge management process is efficient and does not require extensive additional infrastructure. Regular removal and proper disposal of sludge will help maintain the operational efficiency of the WTPs and minimize any potential environmental impact.

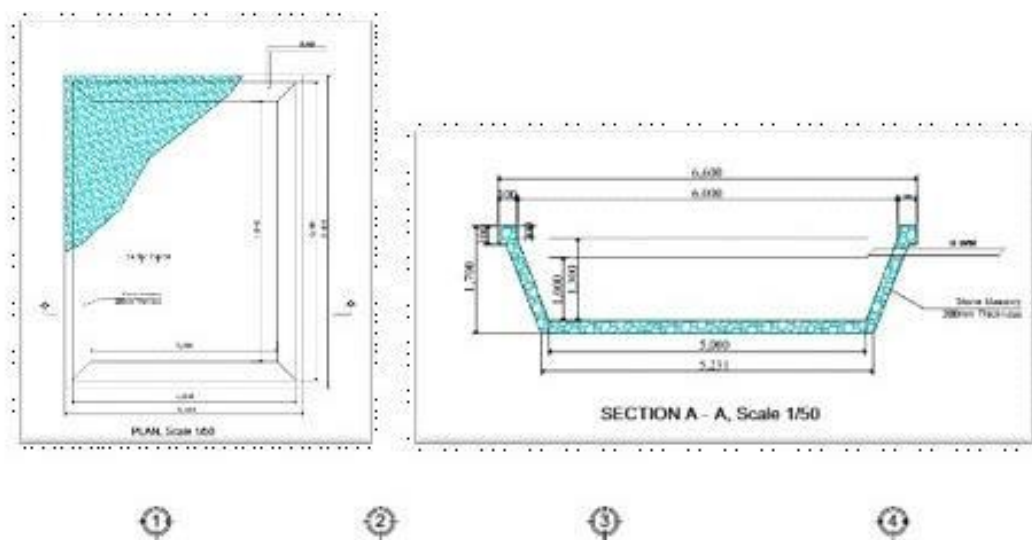


Figure 3-16 Sludge lagoon.

43. **Water Supply Office.** Both offices feature an identical design, with the same dimensions. The structure consists of a concrete frame and brick walls. The roof is constructed using sheet metal and is supported by a steel truss system. The water supply office measures 9 meters in width, 12 meters in length, and 7 meters in height. Its foundation comprises single reinforced concrete footings combined with reinforced concrete bracing beams.

44. **The water supply office for Namthae WSS will be situated separately from the WTP.** The Water Supply System (WSS) Service Office will be located on an empty plot of land near the village cluster office, which is owned by the village and classified as public land. This strategic selection of sites was guided by considerations of land availability and customer accessibility, ensuring the office can serve the community effectively. The designated plot has a total area of 800 square meters (20m x 40m), providing ample space for the office and associated infrastructure. The Nam Papa service office for the Namthae cluster will be conveniently situated near the head of the village office on this community land. This location enhances the operational efficiency and accessibility for residents. According to the Google Map view, the red-roofed building visible in the vicinity is identified as a health center, highlighting the proximity to essential community services. The village authority has shown substantial support for this project by generously donating the land for the WSS Service Office. The advantageous location of the donated plot, near both the village cluster office and the health center, underscores its suitability for the Namthae WSS Service Office.

45. In contrast, **the** Water Supply Service Office for the Phienghong WSS cluster will be located at the same site as the Water Treatment Plant. This land, too, is village communal land, ensuring that the project aligns with the community's collective resources and planning. By situating the service office within the WTP area, the project maximizes the efficient use of available land and centralizes the operations, simplifying management and oversight.



Figure 3-17 Namthae Water Supply office.



Figure 3-18 Phienghong Water Supply Office

3.7 Distribution Network

46. The distribution network (28 km in Namthae and 5.7 km in Phienghong) will supply the water by gravity flow from the proposed clean water reservoir located at WTP site to the serviced areas (B. Phakok, B. Phahan, B. Phonchaeng, B. Namthoum, B. Phonhom and B. Phonkam villages in Kham District WSS and B. Phienghong in Nonghet). Out of the 28 kilometers of pipeline for the Namthae cluster will run along the sides of the edges of walking trails, roads and unused public lands. Similarly, for the Phienghong cluster's 5.7-kilometer pipeline will traverse run along walking trails, roadsides, and public lands.

47. The capacity of the distribution network is designed to cater for the population of the service area up to year 2048. Service pipelines are calculated according to the volume distribution and the number of serviced households. The routing of service pipelines is based on the density of populations and distribution of residential areas.

48. The denoted diameters (DN) of the distribution pipelines are from 50 to 225mm. Most of the pipes will be installed at depth of 0.5m underground, along the sidewalk, approximately 0.5 – 1.5m from the houses avoiding affecting the existing infrastructure. Appurtenances such as gate valves, district metering area (DMA) water meters, air valves, wash-out valves, etc. will be provided to facilitate the efficient operation and maintenance of the system.

Table 3-5 type of and length of distribution pipes.

Type of pipes	Unit	Namthae	Phienghong
HDPE pipes	m	L= 28.085 km DN225 DN180 DN160 DN110 DN90 DN63 DN50	L= 5.716 km DN110 DN90 DN63 DN50
HDPE pipes HH Connections	m Nos	8.085 km DN25 539	1.665Km DN25 111

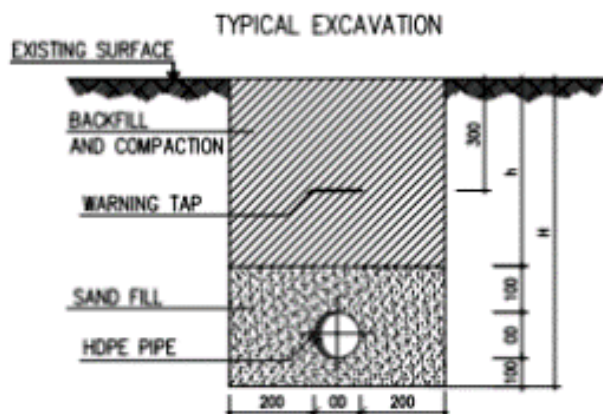


Figure 3-19 Typical of Excavation for water pipes network.

3.8 Access Roads, Power supply to the WTPs

49. Gravel access road (5m in width) to WTP will be constructed with necessary structures such as culverts, side drains, retaining walls etc. The estimated length of access road is approximately 140m in Namthae WSS and 30m in Phienhong WSS.

50. A Transformer of 50KVA from national grids electric will be installed to ensure the efficiency power supply to WTP and will not interfere with the existing power supply of the villagers. The length of power lines to connect the transformer with the main 22 kv power line in Namthae cluster is 100 meters and in Phienhong cluster is 20 meters. It will run along the side of the access road.

4 Environmental and Social Baseline Conditions

4.1 Topography

51. The topography of Laos is divided into four regions: the mountain range, the undulated plain, the plateau, and the low alluvial land along the Mekong River. Both of WSSs is on the mountain ranges and in the north-east, along the border of Houaphan Province and Vietnam. The mountain ranges from deep V-shaped valley, steep slope, and some of the flatlands. The ground elevation at Namthae WSS is 730mamsl and Phienhong WSS is 300mamsl.

4.2 Hydrology and Surface water quality

52. Kham district area is a part of the catchment area of Nam Neun River. Namthea stream is a tributary of Nam Neun River. The average annual rainfall of Xiengkhouang Province (average of 5 years) was 1,600mm. The highest average rainfall 318.28 mm recorded in month of August and the minimum rainfall 9.14 mm recorded in month of February as given in the graph below.

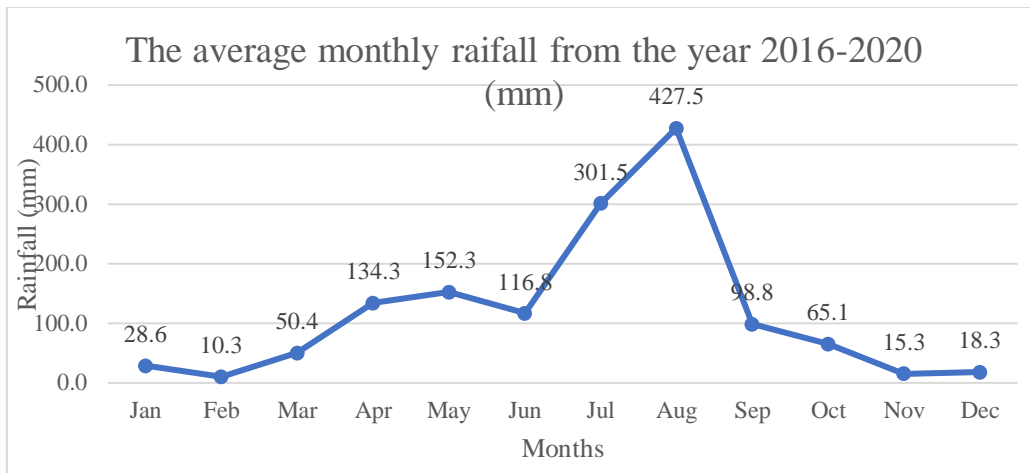


Figure 4-1 Average Monthly Rainfall from the Year 2016-2020 (mm)

53. Based on consultation with the villagers at Phakok, Phanhan, Phonchaeng, Namthoum, Phonkham, Phonhnom and Phienghong village in November 2021 and June 2022, it was confirmed that the brooks have water all year round in the brooks. Proposed water intake locations are also situated near water springs and the brooks have never dried up. There is no need to define the water sources.

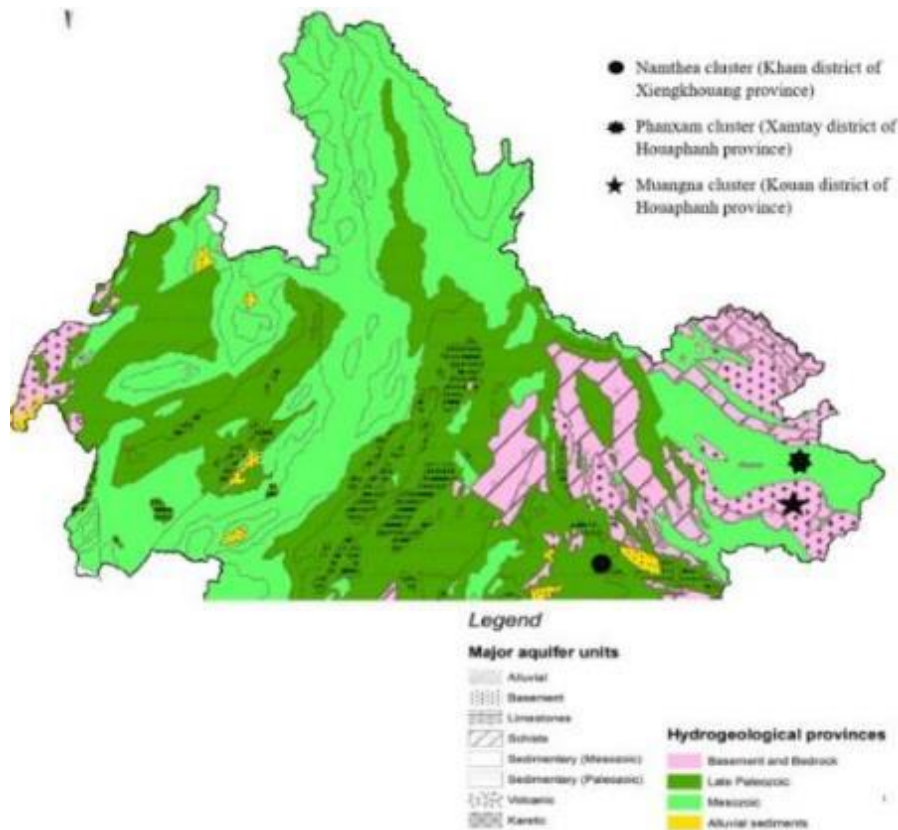


Figure 4-2 A synthetic map of hydrogeological groups and major of aquifer units (textures)

54. **Namthae WSS.** The flow rates of Huaye Korxor Brook of Namthae cluster measured on 8th June 2022 at two cross sections near the proposed intake sites, the distance of the cross-section A cross section B is approximately 900m. The average flow rates were 16,325m³/d, and 36,837m³/d respectively. The estimate of Huaye Korxor Brook flow rates was 26,581 m³/d

(Table 4-1 **Error! Reference source not found.**). It is much greater than the demand for the project area (650m³/d).

Table 4-1 Summary of the flow discharge in Houay Korsor Brook (8th June 2022)

#	Cross section	V(m/s)	A(m ²)	Q(m ³ /s)	Q(m ³ /d)
1	Cross section A	0.97	0.195	0.19	16,325.7
2	Cross section B	0.97	0.44	0.43	36,837.5
	Averages	0.97	0.32	0.31	26,581.6

55. **Phienghong WSS.** The flow discharges of Houay Lan were measured on 9th June 2022 at the two cross sections (Cross Section A and Cross Section B). The average flow rates at cross section A were 186,842m³/d and at cross section B were 105,015m³/d. The average flow rates of Houay Land were 147,429 m³/d (Table 4-2). It is much greater than the demand for the project area (150m³/day).

Table 4-2 Summary of the flow discharge in NamLan

No.	Cross section	Flow rate on 9 th Jun, 2022		
		(l/s)	(m ³ /s)	(m ³ /d)
1	Cross section A	2,197	2.197	189,842.6
2	Cross section A	1,215	1.215	105,015.8
	Average	1,706	1.706	147,429.2

56. Raw water quality samples were collected at the same date of the water flow rate on 8th and 9th June 2022 at the proposed intake location by Phanthamit Analytical Lab Co., Ltd. The results of water quality analysis are summarized in Table 4-3 below.

Table 4-3- Summary of Water Quality Analysis Result

#	Parameters	Unit	Standard	Houay Korsor 8 June 22	NamLan 9June2023
1	Chloride	mg/L as Cl ⁻	< 250	ND	ND
2	Color	Pt. Co	< 5	3.97	6.09
3	Fluoride	mg/L as F ⁻	< 1.5	0.20	<0.10
4	Hardness	mg/L as CaCO ₃	< 300	118.00	35.0
5	Iron	mg/L	< 0.3	0.17	0.25
6	M-Alkalinity	mg/L	-	134.00	44.0
7	Nitrate	mg/L as NO ₃	< 50	0.47	ND
8	pH		6.5-8.5	8.30	7.9
9	Sulfate	mg/L as SO ₄	<250	5.31	ND
10	Turbidity	NTU	<5	5.97	8.22
11	Arsenic	mg/L	<0.01	ND	<0.0020
12	Coliform Bacteria	MPN/100mL	-	700	1,300
13	E. coli	MPN/100mL	0	49	17
14	Total Bacteria	Colonies/cm	-	1,600	1,600
15	Taste		Acceptable	Non- Objectionable	Non-Objectionable
16	Odor		-	Odorless	Odorless

ND: not detected

57. Data in the table above shows that the quality of raw water is good with almost all parameters are within the allowable limits, except Turbidity, Coliform Bacteria and Total Bacteria were higher than standard. The amount of heavy metals found in analysis were much lower than the acceptance Ministry of Health of Lao PDR standard limits at both raw water sources. In the Houay Korsor area, the turbidity level was 5.97 NTU, slightly above the

standard limit of 5 NTU. Additionally, the Coliform bacteria count was 700 MPN/100mL, E. coli was 49 MPN/100mL, and the Total Bacteria count was 1600 colonies/cm. Similarly, in the Nam Lan, the turbidity level was 8.22 NTU, exceeding the standard. The Coliform bacteria count was 1300 MPN/100mL, E. coli was 17 MPN/100mL, and the Total Bacteria count was 1600 colonies/cm. These water quality parameters can be effectively addressed through standard treatment methods, including sedimentation, filtration, and disinfection.

4.3 Geology

58. Almost all the project area is in the Northern of the Lao PDR, the geological of this area is divided into four water-bearing systems: Basement, Mesozoic aged sedimentary, Paleozoic aged sedimentary and Karstic system.

12. **Namthea WSS** The geological map illustrates that Namthae cluster is on the Truongson fold belt mainly composed of middle to upper Paleozoic system and granitic rocks of the Late Paleozoic era. The geological map in Namthae cluster illustrates that Late Paleozoic aged rocks are the highest proportion than others group, the rocks are sandstones and siltstones, whilst granitic aged rocks account for a small proportion group in this area.

59. **Phienghong WSS.** The geological map illustrates that Phienghong Village is on the Truongson fold belt mainly composed of middle to upper Paleozoic system and granitic rocks of the Late Paleozoic era. The geological map in B. Phienghong illustrates that Mesozoic aged rocks are the highest proportion than others group, the rocks are sandstones and siltstones, whilst Basement and bedrock aged rocks account for a small proportion group in this area. The feature of this group is sandstone with different rock contents.

4.4 Air quality and Noise

60. There are no records on noise and air quality in the project area. Air quality in the project area is generally good since there are no industries producing discharges/emissions and emissions from vehicular exhaust are not significant (low traffic density). The main cause of air quality reduction is the dust from vehicles when passing 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.

61. The project sites are relatively far from activities generating noise. There are no industries within the proposed project sites so the existing ambient noise levels can be considered very low. There are no sensitive receptors in the proximity of the proposed site of the WTP and water intake and other components.

4.5 Biological Resources

62. According to IBAT (Integrated Biological Assessment Tool), there are 35 natural protected areas in Laos. The proposed WSSs are not located in any protected areas, the nearest protected areas, Nam Et-Phou Louey National Park in the north, are far from the project area.

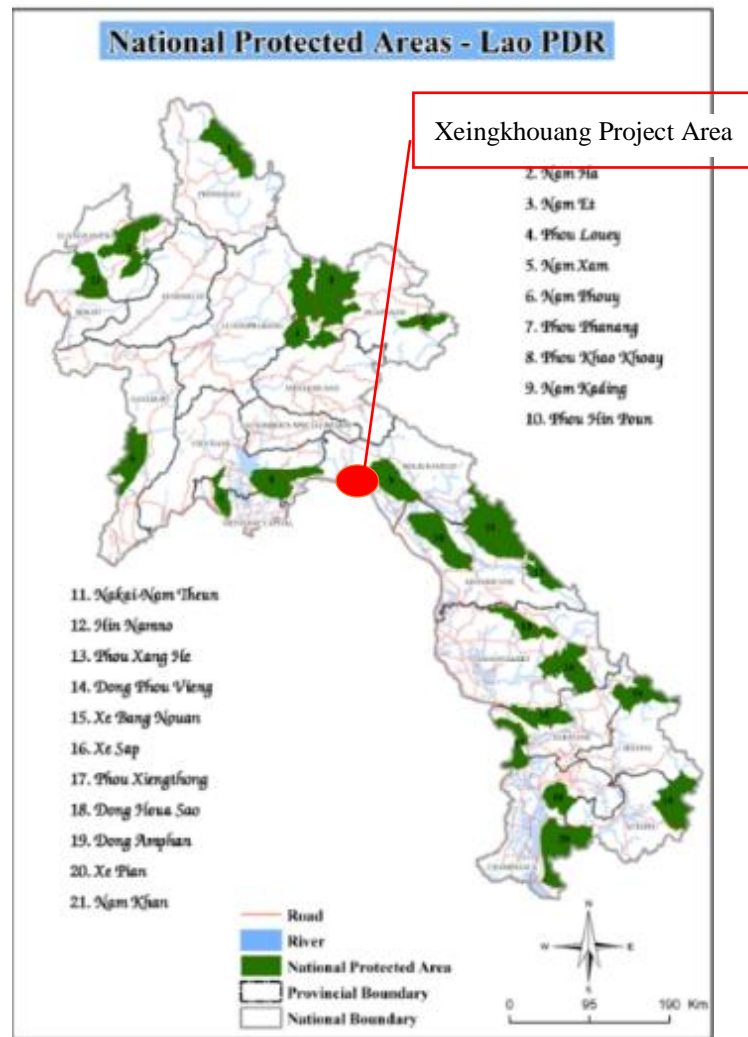


Figure 4-3 The project location in relation to the nearest protected area.

63. The forest at the upstream catchment area of the water sources (small stream) are naturally grown forest trees and community not conducting agricultural operations in the catchment areas with a view to ensure the availability of water. There are no known biologically important fauna species, such as rare, endangered, or vulnerable species, in the surrounding areas of these proposed sites. This absence of significant wildlife ensures that the development of the WTPs and intake areas will not negatively impact any critical or sensitive fauna populations. Moreover, there is no significant presence of any known biologically important fauna species within the immediate vicinity of the proposed intake areas and WTP sites. This comprehensive evaluation assures that the construction and operation of the WTPs will proceed without threatening local biodiversity or disrupting any habitats crucial for the survival of rare or endangered species. The existing vegetation covering these areas predominantly consists of *Castanopsis echinocarpa*, *Castanopsis hystrix*, bamboo, wild banana, and rattans. These plant species form the primary vegetative landscape in the vicinity of the proposed sites. The wildlife typically found in this area includes common species such as rats, snakes, various insects, butterflies, and birds. These species are indicative of a typical ecosystem without the presence of rare or endangered fauna. In the water sources near the proposed intake areas, a few aquatic species have been identified. These include the Dwarf snakehead (*Pa Kung*), Murrel snakehead, Asian sole

fish, frogs, crabs, and shrimp. These species are commonly found in local water bodies and do not fall under the category of biologically important or vulnerable species. T



Figure 4-4 The proposed location of Water Intake and WTP of Namthae WSS



Figure 4-5 The proposed location of Water Intake and WTP of Phienghong WSS.

64. The transmission and distribution pipelines will pass along the embankments of some agricultural land (mostly upland rice, casava and corn fields), and garden land/plantations with economical values rather than biological values. The main flora species in such land are mainly bushes including grasses, vines, bamboo, shrubs and small trees. Along the pipeline there are fauna species like insects, ants, wasps, rats and other small natural creatures.



Figure 4-6 The proposed alignment of the raw water pipe of Namthae and Phienghong WSS

4.6 Physical Culture Resource

65. These locations do not contain any historical artifacts or hold any historical significance. Furthermore, there are no known archaeologically significant sites within the project boundaries. This includes a thorough examination to ensure the absence of any graveyards or burial sites in the vicinity. This careful evaluation guarantees that the development of the Nam Papa sub-project will not disturb any locations that are culturally or spiritually important to the community. By ensuring that the project sites are free from historical or archaeological constraints, the project aligns with cultural preservation principles and respects the heritage and spiritual values of the local population. The assessment underscores the project's commitment to responsibly selecting sites that avoid any potential conflicts with cultural or historical resources.

66. The proposed project locations and lands for both the Namthae and Phienghong water supply clusters, encompassing areas designated for water intake, water treatment plants, WSS service offices, distribution pipelines, access roads, and power supply, have been confirmed to contain no historical artifacts or sites of historical significance, including temples, graveyards, or burial sites, within their vicinity. However, the “chance find” procedures shall be included in the contract with the civil work contractors (e.g. Letters of Agreement) in instances where the contracted party is assisting with project implementation and/or construction activities.

4.7 Infrastructure and Public Services

67. **Power Supply.** All households in two WSS core service areas are connected to the national electricity grid and sufficient for their power demand.

68. **Common Diseases and Health Care Service.** Common diseases in both the Namthae and Phienghong Water Supply System (WSS) subproject areas include seasonal flu and diarrhea, which frequently affect the local population. Additionally, there is a recurring issue of dengue fever during certain seasons, posing a significant health challenge to the residents in the target villages within both clusters. In the Namthae WSS area, healthcare services are centralized at the Namthae Health Care Center, which serves six target villages. This center is pivotal in providing essential medical services, addressing common health issues such as flu and diarrhea, and offering preventive measures against dengue fever. The Namthae Health Care Center plays a crucial role in maintaining the community's health and well-being by implementing disease prevention strategies and providing timely medical care. Similarly, the Phienghong cluster benefits from the presence of a dedicated healthcare facility located in Phienghong village. This healthcare center is committed to delivering comprehensive medical services to the local community. It ensures that residents have access to necessary healthcare resources to manage and mitigate common diseases and seasonal health challenges. The center's efforts in disease prevention and health promotion are vital in safeguarding the community's health, particularly during periods of heightened vulnerability to diseases like dengue fever. Both healthcare centers are integral to the success of the WSS subprojects, as they provide the medical support necessary to address the health needs of the population. Their proactive approach to disease prevention and management helps to ensure that the communities in the Namthae and Phienghong clusters remain healthy and resilient against common and seasonal diseases.

69. **Education Facilities/Schools**

Namthae cluster in Kham District

- Phakok village has a primary school for service for two villages Phakok and Phahan villages.
- Phahan village has no primary and secondary school. The children in this village go to primary school in Phakok village.
- Phoncheang village has a primary school building with 8 classrooms and 8 teachers.
- Namthoum village has a primary school with 5 classrooms and 8 teachers (3 female).
- Phonhome village has a nursery school with 2 classrooms with 2 teachers (2 female), primary school with 5 classrooms and 5 teachers (1 female)
- Phonkham village has a primary school building with 5 classrooms and 3 teachers and a secondary school with 20 classrooms and 28 teachers.
- In 6 villages of Namthe cluster sub-project area have small retail shops. These shops offer a variety of goods to meet the daily needs of the residents, including Groceries, Fresh Produce locally grown fruits and vegetables, Fresh meat products, eggs and household Items.

The Phienghong village of Nonghet District

- There is a primary school building with six classrooms and 3 teachers and a secondary school with 16 classrooms and 16 teachers.
- The WSS subproject area in Phienghong village, Nonghet District, has small retail shops that cater to the daily needs of the local residents. These shops offer a variety of essential goods and services, including groceries, fresh produce, locally grown fruits and vegetables, fresh meat products, eggs, household items, and other necessities.

70. ***Sanitation, Waste and Wastewater Management.***

In the WSS service areas service areas of the six villages within the Namthae cluster, 94% of households (HH) have toilets. Out of these six villages, four—Phahanh, Phonkham, Phakok, and Phoncheng—have been declared Open Defecation Free (ODF). However, in Phienghong village of Nonghet District, despite almost all households having toilets, the village has not yet been declared ODF. This is due to a lack of comprehensive sanitation facilities. There is no existing wastewater collection system. Waste is disposed in nearby areas of the villages. Rainwater and wastewater are discharged to backyard gardens before entering water bodies

4.8 ***Ethnic Groups***

71. The results of field data collection in Namthae cluster of Kham district found that all population of Phakok, Phahan, Phonecheng, and Namthoum villages is from Hmong ethnic group; 51.8% of population of Phonhome village is from Khmu ethnic group, and 49.2% is from Hmong ethnic group; and 89.9% of population of Phonkham village is from Tai ethnic group (Taidam), 9.2 % is from Hmong ethnic group, and other 0.9% is from Khmu ethnic group. In Phienghong cluster, Nonghet district, all people are Lao ethnic group.

4.9 ***Namthae WSS Specific Conditions***

4.9.1 ***Land Cover and Land use.***

72. The information about land use in this village was obtained by interviewing the village authority. However, only Ban Phonkham can provide the village land use information as show in Table 4-4.

Table 4-4 Land Use in Namthae WSS Core Service Area

Land Use type/ Village	Phakok	Phahan	Phonecheng	Namthoum	Phonhome	Phonkham
Total area of village(ha)	-	-	500	-	-	1000
Residential land (ha)	-	-	2	-	4	10
Rice paddy (ha)	-	-	50	-	50	125
Upland paddy(ha)	-	-	150	-	300	412
Agriculture land (ha)	-	-	-	-	0	400
Village protected forest (ha)	-	-	-	-	0	50
Village conservation forest (ha)	-	-	-	-	6	57
Production forest(ha)	-	-	-	-	6	0
Used forest of the village(ha)	-	-	-	-	6	5
Sacred forest	-	-	-	-	2	1
cemetery	-	-	3	-	2	5

4.9.2 Water Use

73. Currently, the villager access to the rural water supply system (Nam Lin/Nam Saat, 2007 by Christian Reformed World Relief Committees (CRWRC) which supplies water to the households directly by gravity system without any treatment. However, the water amount is insufficient to provide the service areas for the whole year. The cause is the sizes of the existing pipe system are less than the demand, leakage and the quantity of water is relatively low in the dry season.

4.9.3 Demographic and Socio-economic conditions¹


74. **Namthae Core Service Area** is covering of six villages with the total household of 594 HHs and 3693 people, 1773 female (Phakok village is 603 people (296 female); Phahan village's population is 532 people (227 female); Phonecheng village's population is 526 people (247 females); Namthoum village's population is 464 people (222 female); Phonhome village's population is 884 people (468 female); and Phonkham village's population is 684 people (313 female)), the sex ratio is 1.00:1.08 (M: F).



75. The local economy is based on agriculture and trade. The primary income is rice cropping, animal breeding (buffalo, cows, pigs, goat, and poultry), state employee, handcraft, and business/service. The survey indicated the occupation in the village: 2% of male and female heads of households are district government officials, commercial at 1% of total heads of households, 95% of heads of households are farmers, and the rest 2% are workers and others.



¹ Source: Field data collection by Social Safeguard Specialist



4.9.4 Site Specific Conditions –Namthae WSS

Table 4-5– Site Specific Conditions in Namthae WSS

Work Item	Existing Conditions	Photos
Water Source and Water Intake	<p>The water source is Houay Korsor brook located in commune land area of Phahan village. It is a small stream. There are small bushes, vines, shrubs, small trees with a diameter of about 3-20 cm, bamboo, some rocks in stream bed. There are also barren spots between the bush which contractor can use to put construction materials.</p> <p>Water intake is in Houay Korsor located downstream of a spring water. This area is village fallow land.</p> <p>The intake will be constructed in Houay Korxor Brook located in the communal land area of Phahan village, so it will not have any impact on the private land property of the people.</p> <p>Intake site can be accessed by walking trail. The water intake site is situated far from inhabited areas, ensuring that there are no activities or water usage from the source in the surrounding vicinity. This location maintains a pristine and undisturbed environment around the proposed water intake site.</p>	

Work Item	Existing Conditions	Photos
<p>Raw Water Pipeline</p>	<p>The length L = 5.105 Km, DPE-DN160mm. Raw water pipelines will be laid along the brook, through the valley, crossing fallow land, agriculture land or running along the roadside. Some sections are well covered with vines, bushes, banana and other trees etc. Raw Water Pipeline will pass through agriculture land of 21 HH (4 HH in Phakok village and 17 HH of Phahan village) There will be temporary impact on the land of these HHs and the raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters. The width of pipe trenches ranges from 0.5 to 0.8 meters. During the time of construction, the contractor will try to avoid the laying out of pipeline in the middle of the field. List of temporary affected HHs of Phahan and Phakok villages is given at the annexure-2.</p> <p>Alignment drawings of the Namthae cluster given at annexure-24</p>	
<p>Access road to WTP</p>	<p>The length L=140m, width B=5m</p> <p>The proposed new access road will be constructed along the existing path in Phakok Village. The existing path is unsealed and narrow, dusty in the dry season and muddy in the wet season. There are mostly shrubs along the roadside.</p> <p>Three houses and a primary school are situated approximately 20 meters to the right of the junction.</p> <p>The existing ground elevation is from 928 to 941mamsl. The slope gradient is 11.83%.</p>	

Work Item	Existing Conditions	Photos
<p>Water Treatment Plant site</p>	<p>Land area S = 4,900 square meters, dimensions: 65mx75m.</p> <p>The proposed Water Treatment Plant (WTP) site is situated on communal land, which is currently fallow and unused. This site, along with its surroundings, is well-covered with small trees, vines, and shrubs. A portion of this communal land has been cleared by some local residents for seasonal crop cultivation during the wet season, as depicted in the attached picture. However, at present, the land remains fallow and unused, making it a suitable location for WTP development without disrupting ongoing agricultural activities.</p> <p>Additionally, the existing vegetation, comprising small trees, vines, and shrubs, will be managed to ensure that the construction and operation of the WTP do not adversely affect the local ecosystem. The WTP is bordered by communal land in the north, private grassing land in the south, district education office land in the east and communal land in the west.</p> <p>The ground elevation is from 943 to 958mamsl. The slope gradient is 21.42%.</p>	
<p>Clean water distribution Pipes and Household Connections</p>	<p>The length L = 28.085 Km. There are houses along the roadside, the pipeline will be passing mostly in front of their houses. There are markets, businesses, temples near the water connection pipelines which may also be affected temporarily during construction phase. They will be connected to the WSS.</p> <p>The contractor will lay out the pipeline on the roadside without impacting the structure of the households. No concrete floor will be broken by laying out of the pipelines.</p> <p>Project has supported construction of WASH facilities for Schools in Namthae cluster. Water connections will be provided to all public facilities including schools and health center.</p> <p>Google maps showing sensitive receptors given below:</p>	

Work Item	Existing Conditions	Photos
		
<p>Powerlines for the WTP</p>	<p>The electrical poles will be located along the side way of the access road to the WTP on the communal land of Ban Phakok.</p>	

4.10 Phienghong WSS Specific Conditions

4.10.1 Land use.

76. The information of land use in Phienghong Village was obtained by interviewing village authorities. The village's total land area is 1905.75 ha, including residential land, industrial tree plantation, upland paddy land, village protection forest, village production forest, agriculture land, sacred forest and cemetery. The majority of the village area, approximately 798 hectares, is designated as an industrial plantation area. This is followed by upland paddy fields and agricultural land, each covering around 437 hectares. the Figure 4-7 is shown the distinct land use types in Phienghong Village.

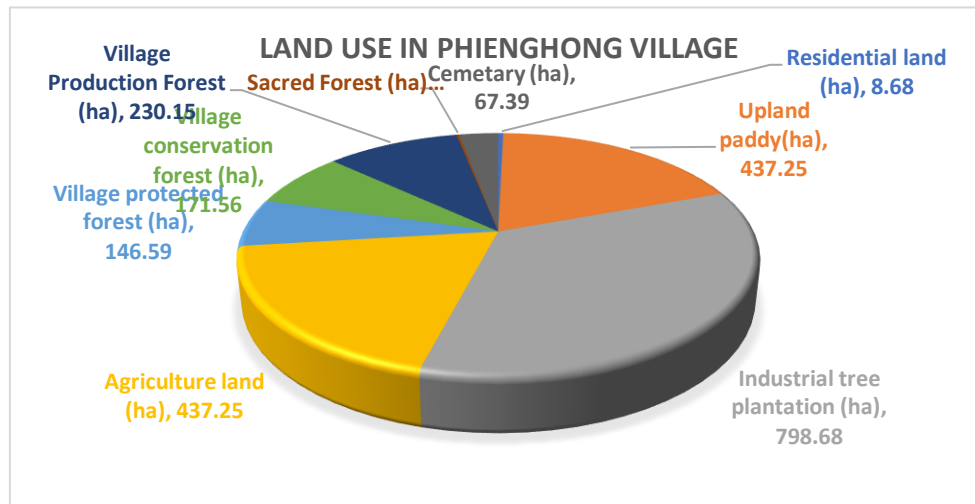


Figure 4-7 Land Cover and Land Use in Phienghong Village

4.10.2 Water Use

77. The residents of Phienghong village have been supplied with clean water since 2015 by the Integrated Upland Development Project in Nonghet District (UDIN). This system only included pipeline network and without treatment. Water is insufficient for all year round; supply does not meet water demand. There are agricultural activities on both sides of the brook embankments.

4.10.3 Demographic and Socioeconomic Conditions



78. Phienghong village has 111 households with a total population of 1011 people (recorded in Jan. 2021) and 1,416 people (estimated in 2038 - the Project's target year), corresponding to a population growth rate of 2%.



13. The main livelihoods identified through FGDS and local authorities were land-based i.e. engagement in agriculture activities including rice farm, corn and cassava cultivation, livestock and non-timber forest product (NTFP) collection, handicraft, trade/business/service and salary (worker and officer). The local economy is primarily based on agriculture and handicrafts. The main sources of income include rice cropping and livestock raising, which encompasses buffalo, cows, pigs, goats, and poultry. Some residents are government employees. In addition to agriculture, most households engage in handicrafts, particularly weaving, as a part-time job. The survey indicated that 21.5% of male and female heads of households are district government officials, and all households engage in farming.




4.10.4 Site Specific Conditions – Phienghong WSS in Nonghet District

79. The existing site-specific conditions at the Phienghong WSS system are described below.

Table 4-6 Site Specific Conditions in Phienghong WSS Cluster, Nonghet District

Work Item	Descriptions	Photos
Water source and water intake	<p>The water source of Phienghong WSS is Nam Lan Stream.</p> <p>The water intake for the project will be strategically located on the Nam Lan riverbank, situated on communal land. This careful selection ensures that the intake site does not impact the private property of any households, thereby avoiding any potential conflicts or displacement of residents.</p> <p>Currently the access to the intake site is facilitated by a walking trail, making it easily reachable without the need for extensive infrastructure development. The location of the water intake site is deliberately chosen to be far from inhabited areas, ensuring that there are no residential activities or water usage from the source in the surrounding vicinity. This isolation helps maintain a pristine and undisturbed environment around the proposed water intake site</p>	
Raw Water Pipelines	<p>The length L = 4.2Km</p> <p>The raw water transmission pipe from the intake to the water treatment plant will be laid downstream of Houay Lan stream which passes the fallow land and along the roadsides. Some sections of the roads run along hills on one side and valley at the other side.</p> <p>Raw Water Pipeline will pass through agriculture land of 11 HHs of (5 HHs of Keochia village and 6 HHs of PhienghongPhienghong village). There will be temporary impact on the land of these HH sand the raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters. The width of pipe trenches ranges from 0.5 to 0.8 meters. HHs have agreed to allow the passing of pipelines through their agriculture field. Laying out of pipeline will not be done in the middle of the field.</p>	

Work Item	Descriptions	Photos
Access road to WTP	<p>Alignment drawings of the Phienghong cluster given at annexure-25</p> <p>The length L=30m, width B=5m</p> <p>The new access road to WTP will be connected to the internal village road. Along the access road is covered by shrubs, grass and bamboo. Access road to safe site of the WTP is small and it is near to the Phienghong village at following location:</p> <p>The ground elevation is from 371 to 393mamsl. The slope gradient is approximately 14%.</p> <p>The access road to the Water Treatment Plant (WTP) site is relatively short, with a total length of only 30 meters, and it is situated within the same area as the WTP. At present, there is no established access road to the site. The location is currently accessible via a walking trail that is 2-3 meters wide and approximately 40 meters in length.</p> <p>This walking trail provides sufficient access for initial site visits and preliminary work. However, to facilitate construction and future operational needs, the development of a proper access road will be necessary. The short length of the proposed access road ensures that the impact on the surrounding environment will be minimal.</p>	
Water Treatment Plant site	<p>Land Area =4,200 square meter, dimensions: 60mx70m</p> <p>The proposed Water Treatment Plant (WTP) is located in communal fallow land of Phienghong Village which is bordered with communal land in the north, south and west and village road to the east.</p> <p>The existing land is covered by vines, shrubs, bamboo and small trees with a diameter of about 3-10 cm.</p> <p>There is no residential buildings surrounding of the WTP.</p>	

Work Item	Descriptions	Photos
	<p>The existing ground elevation is from 378 to 404mamsl. Slop gravity is approximately 24.48%.</p>	
<p>Distribution Pipes and Household Connections</p>	<p>The length L = 5.714Km. Alignment maps in Annex 25 The distribution network will be installed in Phienghong village, along the roadside to the houses. Water will be supplied to the households and school. Google map of the village showing school and health center given below:</p> 	
<p>Powerline for the WTP</p>	<p>Length: 200m The power supply will connect from the grid network about 200 m, the alignment of the power line will be installed along the access road</p>	

5 Potential Environmental and Social Impacts and Risks

5.1 Positive Impacts and Benefits

80. The subprojects will provide direct and indirect benefits for all people living and working in the beneficiary villages. Principal benefits include a secure and continuous supply of safe and clean water. The WSSs will also provide stable drinking water that could contribute to improve community health, water supply is more reliable in both quality and quantity would meet the demands for processing food, cleaning, washing etc.

5.2 Environmental Impact During the Construction Phase

81. Construction activities that may be undertaken for the proposed subprojects would include land clearing, setting up site offices and camps, mobilization of workers, machines and construction materials including the pipes to the sites, ground levelling, transportation of construction materials and wastes to and from the construction sites, excavation and grading, pipe installation and backfilling, disposal of excavated soil, road construction/rehabilitation, construction and installation, commissioning etc. During construction phase, there will be common construction impacts and risks, and specific impacts and risks related to existing baseline conditions at the construction site and typical construction activities.

5.2.1 Common Construction Impacts and Risks

82. Common construction impacts and risks are listed and discussed below.

A. Pre-Construction Impacts and Risks

- (i) Impacts on land and objects on land due to site clearance, some structures may need to be relocated.
- (ii) Safety risks for the workers and machines during site clearance and excavation if unexploded objects (UXO) remain at the sites.

B. Construction Impacts and Risks

- (i) Generations of dust, noise, solid waste and wastewater.
- (ii) Increased Erosion/landslide and sedimentation risks
- (iii) Biological impacts associated with reduced vegetation cover and trees due to ground disturbance.
- (iv) Traffic disturbance and increased traffic safety risks.
- (v) Damages to existing infrastructures, such as existing roads
- (vi) Social disturbance due to construction.
- (vii) Community health and safety risks.
- (viii) Occupational health and safety risks
- (ix) Chance Find
- (x) Site-specific impacts and risks

The above impacts and risks are discussed in more detail below:

A. Pre-Construction Impacts and Risks

- (i) *Impacts on land and existing objects on land.*

83. Land and existing objects on land affected are summary:

Namthae WSS in Kham District

- The intake: No impact on the private land or property.
- The raw water pipeline: The agricultural land of 21 households (4 in Phakok village, and 17 in Phahan village) will experience a temporary impact during the construction phase.
- Access Road to WPT and 22kV distribution line: No impact on private land or property.
- Water Treatment Plan (WTP): No impact on private land or property.
- Water Supply Office: No impact on private land or property.
- Clean water pipelines: No impact on private land or property.

Phienghong WSS in Nonghet District

- The intake: No impact on private land or property
- The raw water pipeline: the agricultural land area of 11 households (5 in Keochia village and 6 in Phienghong village) that considered a temporary impact during the construction phase only.
- Access Road to WPT and 22kV distribution line: No impact on the private land or property
- Water Treatment Plan (WTP): No impact on the private land or property
- Clean water pipelines: No impact on the private land or property

Table 5-1 Summary Impact on land and existing objects on land WSS

Facilities	Affected Households (HH)	Agricultural Land (m ²)	Residential Land (meters)	Communal land (m ²)	Others
<i>Namthae WSS</i>					
Intake	-	-	-	-	-
Raw Water Pipeline	21	4,620	-	Temporary	-
Water Treatment Plant	-	-	-	4,900	-
Access Road to WTP and 22kV Distribution Line	-	-	-	yes	-
Water Supply Office	-	-	-	800	-
Clean water distribution pipeline	-	-	-	-	-
<i>Phienghong WSS</i>					
Intake	-	-	-	-	-
Raw Water Pipeline	11	2,100	-	Temporary	-
Water Treatment Plant	-	-	-	4,800	-
Access Road to WTP and 22kV Distribution Line	-	-	-	yes	-
Clean water distribution pipeline	-	-	-	-	-
<i>Ancillary sites (access roads, dumping sites etc.) for all WSS</i>	Disposal sites will be selected based on consultation with local authorities				

Remark: There Resettlement plan has been prepared in separated document for project policy on minimizing the impacts and compensations/supports to the Project affected Households

(ii) Safety risks related to UXO

84. There will be safety risks for the workers and machines during site clearance and excavation if there are unexploded objects (UXO) remains at the sites. This risk is manageable. At the end of the detail design stage, the PMU recruited a contractor to carry out UXO clearance at project sites. UXO clearance will be completed before the start of construction work. The construction sites will be handed over to the contractors only after the completion of the UXO clearance.

B. Construction Impacts and Risks

(i) Impacts on Air Quality

85. The potential sources of air pollution during the construction stage include dust from earthworks, it is concentrated mostly in areas within a 50 meter in radius of the disturbed ground, mostly from excavation activities. Fugitive emissions will be generated from the operation of construction equipment and machinery, vehicles working in the area (mainly at the WTP site, along the access road and the pipeline alignments) and along the transport routes; Most of the emissions will be in the form of coarse particulate matter and will settle down in close vicinity of the work sites. Dust generation will be the most during ground levelling and excavations at the WTP sites and along their access roads, however, the potential impacts are expected to be localized, short-term, and reversible. The workers at the sites and the small number of residents living near construction sites or the access roads would be most affected by dust. This impact can be mitigated by the use of personal protective equipment (PPE) and the application of other measures, such as carrying out construction in stages and covering the materials as part construction practices. These are specified in the Environmental and Social Codes of Practices (ESCP) presented in the Environmental and Social Management Plan (ESMP) section of this report.

(ii) Increased level of Noise and Vibration.

86. Construction activities may cause noise and vibration impacts for a short duration. Noise and vibration are sourced from the operation of equipment such as jackhammer for the excavation of paved roads to create pipe trenches before installation, pile driving during for foundation construction at the water treatment plant sites. Ambient noise levels in these areas may reach 88dBA at about 15m away from the operating equipment. Along the haul roads, the average ambient noise level will also experience an acute increase because of increased vehicular traffic. The movement of vehicles also generate noise and vibrations along the road. Noise and vibrations mostly affect the workers. Noise and vibrations can be mitigated by the measures highlighted in ESCOP.

(iii) Generation of Solid wastes and Wastewater

Excavated Soil

87. Earth work will include clearing of vegetation, grading of the access road, ground levelling at the WTPs, and excavation at pipe trenches along the transmission and distribution pipelines and other facilities. It is estimated that the total volume of excavated materials is 26,500 m³ for Namthae WSS and is 31.200m³ for Phienghong WSS. It is anticipated that the topsoil, which will be stripped and removed, can be reused for garden land, and the subsoil could be utilized for backfilling or ground levelling. The disposal sites need to be identified after construction contract signing.

Construction Waste

88. Other than excavated materials, 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 mostly generated at the WTP construction site and some at the water intake, representing no direct health impacts. They can be disposed of approval site; the scrap metal and wood can be collected for recycling.

Domestic Waste and wastewater

89. Domestic waste will be mostly generated at the worker's camp. Domestic waste is not anticipated to be a significant volume as only small temporary camps will be established at the sites near the WTPs. There will not be camps for the worksites for the intake, transmission and distribution pipelines. It is projected that the temporary camps will generate an estimated 0.4 to 0.5 kg/person/day or about 8 to 10 Kg/day (Max. 20 workers) and would mainly of consist plastic/ glass/paper food containers or packaging materials, residues from food processing wastes. Wastewater also will be generated from workers camps and offices. The volume is anticipated to be small.

90. If not properly managed, domestic waste and wastewater may cause nuisance to the public, attract vermin thus affect public health, leachate may cause air/soil/water pollution. Therefore, domestic waste and wastewater need to be collected and properly disposed of.

91. ESCOP and Workers Codes of Conducts includes the measures for domestic waste and wastewater management.

Hazardous materials

92. Oil, gas, paints, and some chemicals will be used during construction phase for the operations of machines and vehicles or construction of the water intakes, the WTPs, administration office, chemical house, fences etc. Hazardous wastes generated at the construction sites may include containers of paint and solvents, used batteries, waste oil, rags and other materials contaminated with oil or chemicals. Although the volume is anticipated to be small, this type of waste is highly detrimental to the environment and public health. These materials must be segregated from the general solid waste, collected and disposed appropriately following ESCOP.

(iv) Increased Erosion/Landslide and Sedimentation Risks

93. Ground disturbance during the construction of facilities such as the intake, WTP, Office, access road, water pipelines, may result in erosion at disturbed ground areas. The causes of these risks include site clearance, excavation, earthworks and grading that turns covered surface to barren soil. Erosion potential is also enhanced by the heavy rains. Erosion would lead to the concentration of sediments and further siltation in rivers beds and water bodies. Erosion on slopes and steep areas may eventually lead to landslides, especially after durable rainfalls. Landslides may threaten the stability of existing infrastructure, they may collapse. Landslides may also lead to damage and even loss of properties and human lives down the slopes.

94. As the WTP site of the WSS in the Namthae cluster of Kham district is located near a creek to the north, there is a potential risk that excavated soil and granular construction materials could enter the stream, causing sedimentation. This sedimentation may narrow the wet cross-sections of these watercourses, potentially leading to blockages that could increase local water levels and even result in flooding. Additionally, the water in the stream could become more turbid, which may negatively impact aquatic species. However, these impacts are expected to be transient and short-term, and they are manageable with appropriate mitigation measures. To address these potential issues, the construction plan includes sediment control practices such as silt fences, sediment basins, and proper stockpiling of excavated

materials away from the watercourse. Regular monitoring of the water quality and the physical condition of the stream will be conducted to ensure that any sedimentation or turbidity is promptly managed. By implementing these measures, the project aims to minimize the environmental impact on the creek and preserve the local aquatic ecosystem while ensuring the successful construction and operation of the water treatment plant.

95. The construction of water intakes will take place on and near waterways. Given that the size of the water intake is small and the construction duration is short, it is expected that the incremental sediment risks will be minimal. Proper construction management practices, such as controlled excavation and sediment barriers, will be implemented to further mitigate any potential sedimentation. This approach ensures that the environmental impact on the waterways remains minimal, protecting the aquatic environment and maintaining water quality during the construction process.

96. Excavation will take place at the WTP and along with the pipeline's alignment. There are some houses downslopes of the WTP in the Phienghong cluster of Nonghet district. If a landslide occurs, it may cause damage to household properties. Therefore, construction must be carried out with care and strictly follow approved construction methods to prevent such hazards. Along the pipeline alignment, excavation will mostly be small-scale, typically 0.5 to 1.5 meters deep and 40 to 80 centimeters wide, depending on the size of the pipelines. Ground disturbance and loss of vegetation cover could lead to increased erosion potential at these sites. When construction is taking place close to existing structures such as houses or shops, which are about 70 meters away, the risk of soil subsidence causing damage to these structures is reduced. This risk can be further mitigated by employing proper construction methods, including supporting excavated areas and new slopes. Additionally, erosion control measures, such as temporary ground covers and silt fences, will be used to minimize soil displacement and protect nearby properties and the environment.

97. As the project areas have steep topography, landslide risk is high. Erosion and sedimentation risks can be mitigated by avoiding earthworks in the rainy season, carrying out excavation in stages, and ground levelling as soon as possible. Engineering design and cost estimation should cover the measures to protect slopes and adequate drainage on slope recover the disturbed vegetation cover, avoid siting the heavy load work items (such as clear water reservoir) right on top of any slope, and catchment management as well as other measures listed in the ESCOP.

(v) Traffic disturbance and Increased traffic safety risks

98. Pipe laying will cause temporary disturbances to access from roads to properties. Construction activities implemented at roadside such as excavation of pipe trench, temporary loading of the pipes, construction materials and wastes, would disturb local traffic and caused increased traffic safety risks. Particularly the installation of the pipes at road crossings or construction activities along narrow roads may lead to temporary blockage or closure of roads and hamper movement of vehicles and people in the community. Currently traffic along the transportation route is low, disturbance to traffic is expected to be low. However, traffic safety risks would be higher during peak traffic hours near schools, health care centers or other public centers. Similarly, there will also be increased traffic safter risks at the intersection between the main road and the access roads to the WTP. Traffic disturbance and safety risks would be temporary, in moderate terms and manageable by appropriate construction schedules, methods and site management measures.

(vi) Biological Impacts and Risks

99. *Tree cutting, vegetation clearance.* The water intake is located in the waterway near village production forest, the construction of the weir at the intake of two WSSs will not require

cutting of the trees. Shrubs in limited areas may be removed. However, land clearance including tree cutting may be required for opening temporary access to the intake at some sections. The vegetation cover in those areas are small trees with a diameter less than 10cm and bush. Tree cutting and vegetation removal may also be required for the construction of the access road to the WTP, at the WTP sites and number of sections along the transmission and distribution pipelines. This impact is unavoidable but can be minimized through the siting of the pipeline alignment and limiting the disturbed areas to a minimum.

100. *Risks to wildlife.* There may be some wildlife in the project areas where bushes exist. During the construction phase, the workers may hunt or catch the birds, the fish or other wildlife. They may also cut or cause damage to the trees outside the boundary of construction sites. The workers may also be engaged in illegal trade or consumption of wildlife. Careless behaviors of the workers when handling or using flammable materials such as fuels may pose forest fire risks. As the number of workers is very small and mostly are local laborers, it is expected that the risks to wildlife caused by construction activities are moderate.

101. *Bush fire risks.* As construction is likely to take place mostly in dry season meanwhile the project areas are quite well-vegetated, careless behaviors or workers or incidents from the use of fuels, gas, and electricity may lead to bush fire risks. This risk is manageable through ESCOP and the Codes of Conducts.

102. Impacts and risks to biological resources in general and wildlife in particular will be addressed through ESCOP, Workers Codes of Conducts and specific mitigation measures.

(vii) Social Disturbance

14. The proposed WSSs are of small size, the maximum number of labor force is 20 people. Therefore, the mobilization of the workers to the project site and their interactions with local communities are not expected to create competition for the local resources between the migrant labor force and local communities.

103. Pipe trench excavation, pipe laying, temporary loading of the pipes, construction materials and waste will cause temporary disturbance to daily activities of local communities and accessibility to their properties, and some schools. Particularly at pipe road crossings, construction activities along narrow roads may lead to temporary blockage or closure of roads and hamper movement of vehicles and people in the community.

104. On the other hand, dust, noise, pollution, traffic disturbance, safety risks caused by construction may lead to some tensions in communities at some levels.

105. The ESCOP and Workers Codes of Conducts will help to mitigate or address social disturbance. In addition, local labor will be given priority to be hired for manual work in the project during the construction phase. Since these are small construction projects, the workers will be hired locally except for the technical engineers and skilled workers. About 15-20 local labor will be hired for each site which can generate additional income for the local community.

(viii) Occupational Health and Safety

106. During the construction phase, the implementation of the works may result in hazards to the health and safety of workers, such as

- Tripping, falling from height or slippery surfaces, while carrying heavy loads or moving from lower to higher areas and vice versa.
- Workers are attacked by harmful insects such as bees, snakes, etc. when working near the bush or forested land.

- Accidents happen during the operation of machines and equipment (including welding machines), handling of bulky work items including the pipes and pre-cast objects of the WTP or caused by landslides.
- Electrical failures.
- Hazards caused by gas or oil spills lead to fires.
- Materials and equipment fall from high above.
- Exposure to extreme weather conditions for long duration: heat from sunlight, heavy rains etc.
- Working in risky conditions (narrow space, dark, near open space high above, etc.)
- Exposure to pollution (dusts) or hazardous materials (gas, oils, paints etc.)
- Lack of access to clean water, safe food or adequate sanitation facilities when living in project area.
- Contract water-borne diseases (dengue fever, diarrhea etc.) or Sexual transmitted diseases if the works engage in “social evils” such as prostitutions.
- Social disorder if the workers quarrel, fight, or engage in gambling, drug addicts, prostitution etc.

OHS risk is at moderate level and manageable through ESCOP, Codes of Conducts and site-management measures.

(ix) Community Health and Safety

107. During construction phase, local communities may be exposed to health and safety risks, such as

- Falls in open holes or pipe trenches, especially at sections passing along roads, in front of houses, shops or schools.
- Exposure to the operation of construction plants (trucks, cranes, etc.) or vehicular movements in the area or heavy equipment, the handlings of the bulky construction materials such as the HDPE pipes, the power poles, the pre-casted tanks or other parts of the WTP.
- Expose to unsafe electrical wires, gas, hazardous materials stored or spilled at and surrounding the construction sites.
- Pollution by dust, waste and wastewater.

(x) Chance Find

108. There are no known historical or archaeological sites within the proposed two-cluster water supply subprojects footprint. However, there is a risk that artifacts may be exposed during excavation. Chance Find Procedures specified in the ESCOP will be applied to address such circumstances.

5.2.2 Site-specific Construction Impacts and Risks

109. The construction impacts and risks would be higher at some locations, depending on the types of typical construction activities (such as pile driving or welding) to be carried out, and the sensitiveness of project locations (whether it is in bush land, near school/health care centers or other public accessible sites, on the road, etc.).

110. Type-specific impacts and risks may include disruption of water flow during intake construction, traffic disturbance or disruptions due to excavation of trenches for pipeline installation, occupational health and safety risks during the installations of power poles and

lines or bulky items at the WTPs, etc. These specific impacts and risks are listed in the ESMP (Section 6), together with the mitigation measures.

5.3 Environmental Impacts and Risks During the Operation Phase

5.3.1 Impacts on Hydrology and Water Usage

111. As mentioned in Section 3.3.1, the measured flow rates measured in dry season at the proposed intake on the Houay Korsor was at 26,581m³/day, much higher than the proposed capacity of the WPT, at 650m³/day (about 2.44%). The design capacity of the Phienghong WSS in Nonghet district is 150m³/day, accounts for 0.1% of the flow rate in water source measured in dry season of 2022, which was at 8,998 m³/day. Therefore, it is anticipated that the proposed WSSs would not cause any noticeable changes in stream hydrology or downstream water usage.

5.3.2 Generation of backwash water and sludges at water treatment plants.

112. WTP will produce inert silt and sediment as a by-product which may contain traces of water treatment chemicals (aluminum salt or alum). Sediments generated from the pre-sedimentation process are very small, average of 15.6kg/days at each WTP. While those from the filtration process are insignificant in volume. The WTP design included a sludge lagoon for temporary storage of sludge generated from the water treatment process. Sediment volumes will be large during the wet season due to high suspended solids content in the river water, but low during the dry season. Aluminum is suspected to be the cause of Alzheimer disease. Hence sludge will be disposed of in predetermined landfill sites to avoid health hazards and prevent it entering the food chain. Warning should be made not to allow dumping of WTP sludge to crop/agricultural land. Loading such materials on timber plantation is fine.

5.3.3 Occupational Health and Safety of Workers

113. Water treatment will involve the use of PAC alum, Polyacrylamide (PAA) coagulant auxiliary agent, disinfection solution and chlorine. Therefore, the work will expose to hazards risks during chemical handling. The risk is particularly present during chlorination because chlorine is a reactive chemical that is hazardous to skin and eyes in case of accidental spill or leak.

114. These risks are manageable through detailed design by the provision of wash basins in the operation house, and a separate room for chemical storage.

5.3.4 Community Health and Safety

115. Accidents may happen if unauthorized community members, especially children, enter the water treatment plant and walk around the treatment units or are in contact with water treatment chemicals. Therefore, detailed design of the WTPs should include warning and protection measures. The WTPs should be properly fenced off and secured to restrict access and intrusion of unauthorized personnel. Watchmen/security personnel will be hired to secure the facilities on a 24-hour basis. This would minimize the safety risks to the community.

5.3.5 Landslide Risks

116. As the proposed WTPs are built on steep topography, rainfall in the project area is relatively high and durable. Under the impacts of rain and socio-economic activities along these sites, land slide risks do exist along the access road to the WTP, at the WTP and the slopes surrounding above the WTPs. The layout design of the WTPs should take into account these

risks and apply necessary arrangements and measures to mitigate the risks. Monitoring land slide risks during the operation phase would also be necessary.

5.3.6 System Failure Risks

117. The operation of the WTP requires electrical usage thus it may cause overload in the existing power supply system and lead to power failure. To avoid this risk, the design of the WSS included a 50 KVA transformer to supply power for the WTP operations.

118. Pollution due to chemical spills may also happen during the transportation, handling of chemicals or during the operation of the treatment units. This risk will be considered during the detail design and mitigation measures such as safe storage area, and leakage detection systems should be proposed.

5.3.7 Raw Water Quality and Quantity Security

119. Water quality: Currently the water quality of both water sources is generally good (see section 4.2). The quality of the raw water may deteriorate if there are detrimental human activities such as farms, agricultural areas, use of pesticide/fertilizers/chemical substances in the upstream catchment area or upstream of intake locations. This may affect the efficiency of WTP and the resulting quality of the treated water. The PIU and PNP shall be continuously coordinate with the village authorities in the WSS service area regarding community activities in the catchment area to monitor catchment activities that may contribute to the contamination of raw water and advise them not to use any chemical which may potentially affect the water.

120. There is no proposed future development that could also have impacts on water quality in the area.

121. Water quantity: The water flow rate of Houay Korsor (Namthae WSS) and Houay Lan (Phienghong WSS) is 26,581m³/day and 147,429m³/day while the water demand for Namthae WSS and Phienghong WSS is 650m³/day or only 2.4% of water flow rate in Houay Korsor and 150 m³/day or 0.1% of stream water flow rate in Nam Lan River.

122. There are no other water usage activities around the Houay Korsor and Nam Lan that might have impacts on water usage. Note that the measurement of water supply shows that there is water supply is sufficient and water taken at water intake is only minor (based on above session).

6 Environmental and Social Management Plan

123. The Environmental and Social Management Plan (ESMP) includes the following key contents.

- Mitigation measures
- Monitoring requirements
- Monitoring program and reporting requirements
- Institutional Arrangements

6.1 Mitigation Measures

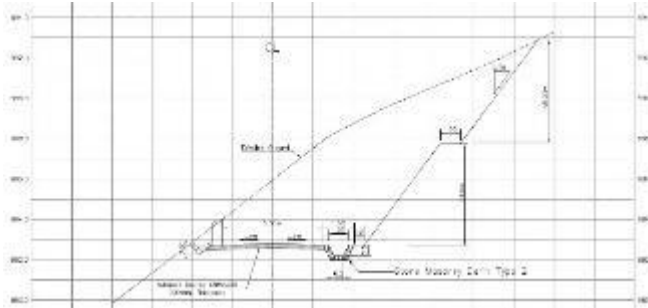
6.1.1 Detailed Design Checklist and Applications

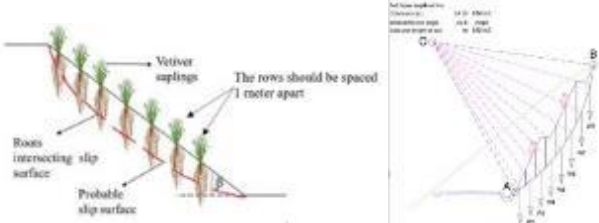
124. Environmental check list has been developed for the Project for the detail design consultants to use during detail design stage in order to avoid or minimize some impacts and risks of construction and operational phases.


125. The roads affected by excavation of pipe trenches will be reinstated by the contractors. The construction bidding document/contract covers the costs for the reinstatements of the affected roads.

126. Environmental check list has been developed for the Project for the detail design consultants to use during detail design stage in order to avoid or minimize some impacts and risks of construction and operational phases. The application of that check list during engineering design and the preparation of cost estimations of the four WSSs are explained in Table 6-1 and **Error! Reference source not found.** below.

Table 6-1– Application of Environmental Checklist for WSS Detail Design

Risks, Impacts	Detail Design Mitigation Measures/Check Lists	Detail Design
Water Treatment Plants (WTP)		
Traffic Safety Risks along access road during construction and operation phases	<ul style="list-style-type: none"> • Design of the access roads to the proposed WTP includes measures to ensure traffic safety along the road, especially at the curves, along steep slopes and at the junction between the existing main road and the access road to the WTP; • Side drainage along the road to ensure sufficient drainage capacity and avoid slope failure. • Inform local residents about construction activities and safety precautions; • Install road signage and lighting to improve visibility and safety, especially during night-time and adverse weather conditions. 	<ul style="list-style-type: none"> • The design: Class 5 of the STD of the road design, 5 m of wide and 140m long in Namthae cluster and 5 m of wide and 30m long in Phienghong cluster, and a side of the road have the drainage system. the radius of the curve is 20m, and the radius of junction curves is 5 m. • The drainage system has sufficient capacity to drain the water out of the water shade area, the section of canal (0.5 x 1 x 0.6m) As the figure below. 
Land slide, erosion risks that affect the safety and stability of the treatment units and down slope communities	<ul style="list-style-type: none"> • WTP plant lay out taking into consideration the land areas to be disturbed, areas loss of vegetation cover and trees, the volume of earth works/ground disturbance and stability of structures with high loads such as clean water storage reservoirs; • Plant lay out include greening and landscaping to minimize barren ground surface and erosion risks. • Design considers slopes stabilization measures at, surrounding the WTP and along the access roads; 	<ul style="list-style-type: none"> • The slope at access road and water treatment plant are as given below: <ul style="list-style-type: none"> ○ Namthae: Average 11.83% ○ Phienghong: Average 10.35% • The design, cutting a hill and creating a slope to protect against landslides for the construction of the road, according to the geotechnical survey team is conducted to assess the soil type, slope stability, and potential risks of landslides. Based on the survey results, the slope design is created to ensure stability

Risks, Impacts	Detail Design Mitigation Measures/Check Lists	Detail Design
	<ul style="list-style-type: none"> Foundation design considers the static and dynamic loads (water required treatment, operational substance and etc.) to avoid failures from operation. 	<p>and safety. The site is then cleared of vegetation, rocks, and debris before excavation begins. Heavy machinery and proper excavation techniques are used to excavate the hill, the slope will plant the vetiver grass along the roadway to stabilize the hillside. Drainage systems such as culverts or ditches will be installed to divert water away from the road and prevent erosion. After the slope is constructed, it is regularly monitored to ensure stability and safety.</p>  <ul style="list-style-type: none"> The cutting slope are safety and stability, the bearing capacity of soil is 3.3 kg/cm² (the average of 3 Drilling holes) <ol style="list-style-type: none"> Analyze the stability of soil for the access road, No potential of the land slide Analyze the stability of soil for WTP, No potential of the land slide
Safety for the workers	<ul style="list-style-type: none"> Ensure deep and high locations are protected with hand rails; Ensure the design of working bridges, ladders, handrails are convenience and safe for the workers. 	<ul style="list-style-type: none"> The structures design is considered on occupation health and safety. The design of ladders should be safe for the users especially for the workers during the construction phase.

Risks, Impacts	Detail Design Mitigation Measures/Check Lists	Detail Design
Occupational Health and Safety	<ul style="list-style-type: none"> • Chemical storage area is separated from other operations, in roofed areas and with warning signs; • There are wash basins and septic tank toilets for the operators; • The chlorine storage area/disinfection unit Include leakage detection equipment and auto spray; • OM include evacuation plan • Plan to manage/store/dispose the excavated soils during the site preparation and construction phase. 	<ul style="list-style-type: none"> • Chemical storage area is separated from other operations, have sign boards for warning and a sink for washing of the hand when contact with the chemicals 
Safety during operation	<ul style="list-style-type: none"> • Fences, warnings to restrict access to the WTP sites during both construction and operation phases 	<ul style="list-style-type: none"> • Fence and warning signs are designed for installing during the construction and operation for community health and safety purpose.
Pollution Control	<ul style="list-style-type: none"> • The size of sludge Lagoon is adequate to prevent spills downslopes. Allocate drying yard/designated areas for sludge drying before transportation out of the WTP; • Implement a regular monitoring of sludge lagoons to detect and address any potential leaks or spills promptly during that 4 months periods. • Do not allow reuse of sludge for filling food crop land (as it contains Al – a heavy metal that was considered to cause Alzheimer’s disease). • Contractors must implement robust waste management practices to handle and safely dispose of both hazardous and non-hazardous waste generated during the construction phase. 	<ul style="list-style-type: none"> • Size of sludge lagoon is 35m³ (5mx7mx1m), it is designed to store sludge approx. 1752Kg or for a period of four months. • The sludge will be transported and disposed of at the approval site. • The spoil disposal area could not be identified during the design. The selected contractor shall be work with the PMU/PIA and relevant local authorities to identify disposal sites for the topsoil and unused excavated materials

Risks, Impacts	Detail Design Mitigation Measures/Check Lists	Detail Design
	<ul style="list-style-type: none">Contractors must regularly monitor sludge lagoons to promptly detect and address any potential leaks or spills throughout the four-month period.	
Pipelines, Power systems	<ul style="list-style-type: none">Refine, optimize alignments to avoid, minimize impacts and risks on residential land, disturbance to existing housing structures and private properties as much as possible	

6.1.2 Environmental and Social Codes of Practices (ESCOP) and construction requirements

127. The mitigation measures specified in this section are applicable to construction phase and included in the construction bidding documents.
128. The construction contractors are required to implement or comply with all mitigation measures presented in this subsection during the execution of the contract. After contract signing, the successful bidder (the contractor) is required to prepare a Contractor's Environmental Management Plan (C-ESMP) to submit to PMU for review and clearance prior to construction commencement. The C-ESMP shall.
- Include statements to comply with the Project's safeguard requirements.
 - Detail the ESCOP and Codes of Conduct.
 - Detail other mitigation measures (including the preparation of site-specific mitigation measures such as camp and site office arrangements, drainage, erosion control and land slide prevention measures, vegetation management, fire preventions, safety for the workers and the publics etc.) to ensure that all construction impacts and risks are managed or addressed properly during construction phase.
 - include a copy on the license of the equipment and construction plants that the contractors plan to use during contract execution.
 - be updated to address the issues arisen during construction phase, if any
129. After signing the contract, the contractors would be required to coordinate with the construction supervisors and the PMUs to conduct additional consultation with local authorities, get their advice on the disposal sites of topsoil and excavated materials from earth works. Application of appropriate mitigation measures at the disposal sites and along the access would also be required. These need to be specified in the Contractor's Environmental and Social Management Plans (C-ESMP). Draft Template for Monthly Environmental, Health and Safety (ESHS) Monitoring Report given at annex-26.

Table 6-2 Environmental and Social Code of Practice (ESCOP)

Impacts/Risks	Mitigation Measures	Responsibility	
		Implementation	Supervisor/approval
1. Soil Erosion and Sedimentation	<ul style="list-style-type: none"> Excavation works shall be scheduled during the dry season to the extent practical to avoid carrying out excavation works during heavy rainfall periods. Construction activities should be carefully planned to minimize disturbed areas and to preserve existing vegetation, which minimizes the potential of removing existing trees that protect soil from erosion. Diversion structures, such as earth dikes and drainage swales, shall be installed along paved surfaces, the top of slopes and below areas where runoff starts to concentrate, to divert off-site water runoff during construction and limit the exposure of disturbed sediments to moving water. Silt traps/sedimentation basins/settlement pond to capture and detain construction site runoff shall be installed. Slope failure protection should be considered during construction and after construction (operation). All works at or near the river must be rehabilitated immediately, to minimize the risk of bank erosion and soil being washed into the river. The contractor will be prohibited from quarrying materials directly from any river. Construction materials will be procured from Government-permitted sources/ suppliers only. Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. 	Contractor	Environment and Social Specialist; PMU and PIU
2. Air Quality reduction, dust generation	<ul style="list-style-type: none"> Spray water on access roads and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area. Impose speed limits on construction vehicles. Excavation work will be avoided in periods of high wind. The contractor will comply with a 10 km/h speed limit when in the community area. The transportation of materials that may generate dust shall be covered with canvass or similar. Install temporary fens or barriers around the subproject facility construction site. The burning of site clearance debris (trees, undergrowth) or construction waste material is prohibited. Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. Regularly maintain the construction machines to ensure they are in good condition. 	Contractor	Environment and Social Specialist; PMU and PIU
3. Noise and Vibration	<ul style="list-style-type: none"> Limit construction activities, particularly operation of noise/vibration generating equipment at night. 	Contractor	Environment and Social Specialist; PMU and PIU

Impacts/Risks	Mitigation Measures	Responsibility	
		Implementation	Supervisor/approval
	<ul style="list-style-type: none"> Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors. Install temporary fences or barriers around the subproject facility construction site especially near schools, healthcare stations and houses. Require drivers to minimize honking and to comply with speed limits of 10 km/h when driving in community areas. Provide information to community on schedule of construction activities through billboard/signs. Avoid using equipment that may result in high levels of vibrations 		
4. Impacts and risks to biodiversity	<ul style="list-style-type: none"> The contractors will prohibit activities such as cutting wood for cooking, harvesting and hunting, or wildlife trade. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid the cutting of trees as much as possible and minimize damage to native vegetation. The width of roads and paths to the intakes and the WTPs will be kept to a minimum, only to accommodate the construction. The use of vehicles/equipment will be kept to a minimum to reduce the land acquisition required. 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, using native plant species for greening at the WTP site 	Contractor	Environment and Social Specialist; PMU and PIU
		Contractor	Environment and Social Specialist; PMU and PIU
5. Impact and Risks on Private and community assets	<ul style="list-style-type: none"> Build access roads to minimum necessary width. installation of pipelines within the Right-of-Way when feasible. Protect slopes where excavation potentially affect existing housing/shop structures 	Contractor	Environment and Social Specialist; PMU and PIU
6. Disruption to traffic and pedestrians' access to properties	<ul style="list-style-type: none"> Conduct a trees survey within the subproject area. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid the cutting of trees as much as possible and minimize damage to native vegetation. For trees that need to be cut on private land, the owner will be compensated in cash by the PIU in accordance with the approved Land Acquisition and Compensation Plan. The width of roads and paths to the intakes and the WTPs will be kept to a minimum, only to accommodate the construction. The use of vehicles/equipment will be kept to a minimum to reduce the land acquisition required. Manual labor will be utilized in sloping terrain where use of heavy equipment would cause 	Contractor	Environment and Social Specialist; PMU and PIU

Impacts/Risks	Mitigation Measures	Responsibility	
		Implementation	Supervisor/approval
	<p>unnecessary damage. Steep exposed slopes will be graded and covered with bush and grass to minimize erosion.</p> <ul style="list-style-type: none"> Implement landscaping and planting of trees/vegetation, using local or endemic tree and plant species at WTP site 		
<p>7. Risks on Relics and artifacts exposure</p> <p>Chance Find Procedures</p>	<ul style="list-style-type: none"> The Contractor will ensure that the workforce is 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. If the contractor discovers archeological sites, historical site, remains and objects, including graveyards, and/or individual graves during excavation or construction, the Contractor will carry out the following steps²: <ul style="list-style-type: none"> Stop the construction activities in the area of the chance find. Delineate the discovered site or area. Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities, or the National Culture Administration take over. Notify the project engineer, supervisor (CSC), and/or PSC who in turn will notify the responsible local authorities and the provincial Culture Department immediately (within 24 hours or less). Responsible local authorities and the provincial Culture Department would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of National Culture Administration. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values. Decisions on how to handle the finding shall be taken by the responsible authorities and the provincial Culture Department. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage. Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and Construction work could resume only after permission is given from the responsible local authorities or the provincial Culture Department concerning safeguard of the heritage. 	Contractor	Environment and Social Specialist; PMU and PIU

² Refer to the Table 6-3 Environmental and Social Codes of Practices is based on ESMP

Impacts/Risks	Mitigation Measures	Responsibility	
		Implementation	Supervisor/approval
8. Generation Solid Waste	<ul style="list-style-type: none"> Excavated material will be utilized to backfill the trench and/or ground leveling at the construction sites such as the WTP, access roads and pipe trenches. The contractor is required to properly reinstate the excavated trench after completion of pipe laying. Surplus excavated material/cut soil from construction of the WTP will be used as backfill material for low-lying areas that have been identified by the village authority.³ Non-hazardous construction waste shall be disposed of at a designated disposal site with the necessary environmental compliance certificate, as agreed with the District Authorities. The contractor will segregate solid waste into hazardous and non-hazardous waste on a daily basis, and then further segregate into recyclable and non-recyclable waste. Recyclable waste includes plastic bottles, cans, and metal. Non-recyclable waste is likely to include wrappings, packaging, and construction waste. The waste fractions will be stored temporarily in bins or in fenced-off and covered enclosures. The contractor will bring recyclable waste to the local recycling dealer or shop - if there is one. If there is no local recycling dealer, the recyclables (still segregated) shall be brought to the waste disposal site as specified by the District Authorities for possible recycling by dealers operating there or disposed together with non-recyclable waste at that site. Disposal of waste (that is not recycled) is only allowed at the solid waste disposal site specified by the District Authorities. Open burning or burial of any form of waste or materials is strictly prohibited both onsite and offsite. Littering of waste is strictly prohibited 	Contractor	Environment and Social Specialist; PMU and PIU
9. Occupational Health and Safety	<p>The Contractor will appoint a Site Manager or his/her representative with the appropriate qualifications in environmental and occupational health and safety associated with the implementation of the ECOP, the Labor Management Plan and Environmental, Health and Safety of IFC (http://www.ifc.org/ehsguidelines).</p> <p>Site sanitation</p> <ul style="list-style-type: none"> The contractor will install the Worker Camp in an area far enough from water sources, houses and sensitive areas and in consultation with the community. The contractor will be responsible for reinstatements of temporary disturbed areas by camp and site offices work completion. Provide an adequate number of latrines and other sanitary arrangements at the site and work areas and ensure that they are cleaned and maintained to a hygienic standard. 	Contractor	Environment and Social Specialist; PMU and PIU

³ Refer to table 6-2 Environmental and Social Codes of Practices is based on ESMP

Impacts/Risks	Mitigation Measures	Responsibility	
		Implementation	Supervisor/approval
	<ul style="list-style-type: none"> The contractor should make separate arrangements for men and women workers. Provide garbage receptacles at the construction site and camps, which will be periodically cleared to prevent the outbreak of diseases and maintain hygiene; and Collect and treat camp wastewater before discharge into the environment. There is no existing wastewater treatment in this area, but it is proposed to make the septic tank system at worker camp to collect, treat camp wastewater before discharge. <p>Occupational Safety</p> <ul style="list-style-type: none"> Provision of first-aid facilities readily accessible by workers. Contractors should include an emergency management plan in case of an accident, and safety drills. Workers must be made aware of the emergency management plan. Provisions of personal protection equipment (PPE), such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations for workers. All workers must be trained in the use of the required equipment. Wearing PPEs while working on-site 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. Contractors should provide training to the workers for awareness and measures to prevent sexually transmitted diseases (STD). <p>Food Safety</p> <ul style="list-style-type: none"> Provide a clean and sufficient supply of fresh water. Inspect and supervise food hygiene in canteens on site regularly. Canteen workers must have valid health permits. If food poisoning is discovered, implement effective control measures immediately to prevent it from spreading. <p>Disease prevention and safety awareness</p> <ul style="list-style-type: none"> Construction workers must have a physical examination before starting work on site. If an infectious disease is found, the patient must be isolated for treatment to prevent the disease from spreading. Provide induction and training by local health departments on the prevention and management of communicable diseases. Implement STIs/HIV/AIDS and other communicable diseases awareness and prevention programs. 		

Impacts/Risks	Mitigation Measures	Responsibility	
		Implementation	Supervisor/approval
	<ul style="list-style-type: none"> Provide training on the specific hazards associated with the work, as well as training on basic sanitation and health care issues, and general health and safety. <p>Security:</p> <ul style="list-style-type: none"> Regular attendance and controlled timekeeping of all employees. Restriction of un-authorized persons to the residential and work areas. Restriction of carrying weapons and control hunting by employees; and Provision of boundary walls/fence with proper exits to the camp 		
10. Community Health and Safety	<ul style="list-style-type: none"> Install barricades/barriers and sturdy plate covers in open excavations during non-working time. The contractor must install the physical barrier to limit access to the construction site. Install signs at construction sites warning people of potential dangers. Erect construction billboards, which include construction contents, schedule, responsible person and complaint phone number, at the entry to each construction site and construction staging area. Construction works with noise and dust will be prohibited during the nighttime. Liaise with PIU to inform the community about the upcoming construction work and important precautions to protect the community. Coordinate with the Village Authority Committee and share the work plans and number of workers who will stay in the camp. 	Contractors	Environment and Social Specialist; PMU and PIU
11. Disposal of Sludge generated from sludge lagoon	<ul style="list-style-type: none"> The selected contractor shall work with the PMU/PIA and relevant local authorities to identify disposal sites for the sludges and get approval/agreement with landowner before dumping. The disposal site should be empty and lower land that needs to fill up and it shall be located far enough from water sources, residential area and sensitive areas. Do not located in forest areas, cultivation area and other sensitive area. Do not allow reuse of sludge for filling food crop land. Do not dump the sludge in the natural water sources/natural drainage courses. Do not located within the Install barrier and safety warning signs around the disposal area. Land levelling shall be completed before handover to landowner. 	PNP staff	DPWT
12. Unintended impact during the construction	<ul style="list-style-type: none"> The contractor's Environmental and Social Management Plan (ESMP) must include detailed guidance on constructing the pipe layout to ensure minimal disruption and avoid damage to assets, such as crops and structures belonging to affected households (AHs) and the community, along the pipeline route. Additionally, the ESMP should outline measures to prevent restrictions on access to homes, which is a primary concern for AHs and villagers. This is particularly critical for the Namthae Water Supply System (WSS) project due to the pipeline's considerable length of approximately 28 km. 	Contractors	Environment and Social Specialist; PMU and PIU

Impacts/Risks	Mitigation Measures	Responsibility	
		Implementation	Supervisor/approval
	<ul style="list-style-type: none"> The contractor's ESMP must also incorporate the establishment and implementation of the Grievance Redress Mechanism (GRM) as stipulated in the project ESMP. 		

130. In addition to the ESCOP above, the Contractors will be required to follow strictly the EHS rules below:

Site EHS Rules:

- EHS orientation session before starting work.
- Wearing personal protective equipment (gloves, helmets, safety shoes, dungarees, goggles, etc.).
- Follow the message and instructions displayed on EHS notice boards installed on site.
- Promptly report all accidents to the concerned authority.
- Maintain appropriate barricades as required.
- Vehicles must be driven at a safe speed, observing speed limits of 30km/h and designated routes as mentioned in Contractor's Mobility Map.
- Drivers must have a valid driving license for the class of vehicle they are operating.
- Vehicles shall only be parked in designated parking area; and
- Mine clearance of the project investment area.

Health and Hygiene:

- Provision of adequate medical facilities for the staff.
- Provision of cooling and heating facilities to the staff; and
- Provision of drainage, sewerage and septic tanks in camp area.

Security:

- Regular attendance and controlled timekeeping of all employees.
- Restriction of un-authorized persons to the residential and work areas.
- Restriction of carrying weapons and control hunting by employees; and
- Provision of boundary walls/fence with proper exits to the camp.

WORKERS CODES OF CONDUCTS

131. Each employee shall be informed of the Code of Conduct and bound by it while in the employment of the Client or its Contractors. The Code of Conduct shall be available to local communities at the project information centers or other places easily accessible to the communities.

132. The Contractor is responsible for providing appropriate training to all staff according to their level of responsibility for environmental, health and safety matters.

The Code of Conduct shall address the following measures (but not limited to them):

- All of the workforces shall abide by the laws and regulations of the Lao PDR.
- Illegal substances, weapons and firearms shall be prohibited.
- Pornographic material and gambling shall be prohibited.
- Fighting (physical or verbal) shall be prohibited.
- Creating nuisances and disturbances in or near communities shall be prohibited.
- Disrespecting local customs and traditions shall be prohibited.
- Smoking shall only be allowed in designated areas.
- Maintenance of appropriate standards of dress and personal hygiene.
- Maintenance of appropriate standards of hygiene in their accommodation quarters.
- Residing camp workforce visiting the local communities shall behave in a manner consistent with the Code of Conduct; and

- Failure to comply with the Code of Conduct, or the rules, regulations, and procedures implemented at the construction camp will result in disciplinary actions.

Security. Some security measures shall be put into place to ensure the safe and secure running of the camp and its residents. Some of these security measures include:

- The list of workers must be registered to local authorities in accordance with existing regulations of Lao PDR.
- Children under 14 years of age will not be hired under the Project.
- Adequate, day-time night-time lighting shall be provided.
- Control of camp access. Access to the camp shall be limited to the residing workforce, construction camp employees, and those visiting personnel on business purposes.
- Prior approval from the construction camp manager for visitor's access to the construction camp.
- A perimeter security fence at least 2m in height constructed from appropriate materials.
- Provision and installation in all buildings of firefighting equipment and portable fires extinguishers.

WORKERS CODES OF CONDUCTS

133. Any construction worker, office staff, Contractor's employees or any other person related to the project found violating these prohibitions will be subject to disciplinary actions that can range from a simple reprimand to termination of his/her employment depending on the seriousness of the violation.

Prohibitions:

The following activities are prohibited on or near the subproject sites:

- Cutting of trees for any reason outside the approved construction area.
- Hunting, fishing, wildlife capture, or plant collection.
- Buying of wild animals for food.
- Having caged wild animals (especially birds) in camps.
- Poaching of any description.
- Explosive and chemical fishing.
- Disturbance to anything with architectural or historical values.
- Building of fires.
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.; Use of firearms (except authorized security guards).
- Use of alcohol by workers in office hours.
- Driving in an unsafe manner on local roads.
- Washing cars or machinery in streams or creeks.
- Maintenance (change of oils and filters) of cars and equipment outside authorized areas.
- Creating nuisances and disturbances in or near communities.
- Disposing of garbage in unauthorized places.
- Indiscriminate disposal of rubbish or construction wastes; Littering the site.
- Spillage of potential pollutants, such as petroleum products.
- Collection of firewood.
- Urinating or defecating outside the designated facilities; and

- Burning of waste and/or cleared vegetation.

MANAGEMENT OF REQUIREMENTS OF CONSTRUCTION SITES AND WORKERS CAMPS

134. The contractor will be responsible to comply with, but not limited to the following:

- Temporary workers' camps will be required to accommodate 5-6 engineers and skilled workers at each site.
- Camp will be installed at the site of allocated land for the WTP.
- After the construction is completed, the temporary camp will be unfabricated and the sites will be cleaned.
- The contractor shall install the Worker Camp in an area far enough from water points, house and sensitive areas in consultation with the community. Good quality sanitary equipment should be installed in the Worker Camp.
- The contractor shall manage all activities in compliance with laws, rules and other permits related to site construction regulations and will protect public properties. Degradation and demolition of private properties will be avoided. Paying compensation for damage to the public facilities and/or private property will be required.
- The contractor is responsible for the protection of the local environment against dust, air, noise, vibration, exhaust fuels and oils and other solid residues generated from the work site. The contractor shall manage waste properly and do not burn it on site and will also provide proper storage for construction materials, organize parking and displacement of the machines in the site. Used oil and construction waste materials must be appropriately disposed and adequate waste disposal and sanitation services will be provided at the construction site next to the generated area. In order to protect soil, surface and ground water the Contractor must avoid any wastewater discharge, oil spill and discharge of any type of pollutants on soils, in surface or ground water, in sewers and drainage ditches.
- The contractor shall be responsible for maintaining good hygiene, safety, and security of the work sites, including protection of health and safety of staff and workers. The contractor will prevent standing water in open construction pits to avoid potential contamination of the water table and the development of a habitat for disease-carrying vectors and insects.
- The contractor shall be prohibited from quarrying material directly from the river.
- The contractors shall procure construction materials from government-permitted sources/suppliers only.
- During construction, the contractor must be taking serious action to control dust by using water or through other means and the construction site will be cleaned on a daily basis.
- The Contractor will work with local authority and management local traffic effectively and ensure traffic access of road safety of local residents and road users during the works. Speed limits at work sites and community areas will be applied to all vehicles and cars. All vehicles and their drivers must be identified and registered, and the drivers are properly trained.
- Install barriers and safety warning signs on road sections and if necessary, deploy traffic aids/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.

- The contractor should install signaling of work, ensure no blockage of access to households during construction and/or provide alternative access.
- The contractor must immediately rehabilitate the excavated areas and any damaged road and path sections.

House Keeping

135. The Contractor will follow a ‘good housekeeping’ policy at all times. This will include, but not necessarily be limited to the following:

- Ensure considerate site behavior of the Contractor’s staff.
- Open fires will be prohibited at all times.
- Ensure that appropriate provisions for dust control and road cleanliness are implemented.
- All site areas will be kept in clean and tidy condition, rubbish and food waste will be removed frequently.
- Wheel washing facilities will be brushed or sprayed clean frequently.
- Storage sites, fixed plants and machinery, equipment and temporary buildings will be located to limit adverse environmental effects.
- Frequently inspect, repair and re-paint as necessary all site hoardings to comply with the local conditions and local regulations, all flying post/board is to be removed as soon as reasonably practicable and within 24 hours of notice.
- Adequate toilet facilities will be provided for all site staff.

Working Hours

136. Core working hours will be from 08:00 to 16:00 on weekdays and 0800 to 1300 on weekends. Individual site requirements which differ from the above will be considered on a site-by-site basis. Noisy operations shall not take place outside these hours without prior approval from delegated agencies and local authorities.

137. In the case of work required in response to an emergency (or which if not completed would be damaging and unsafe), the relevant local authority will be advised as soon as is reasonably practicable of the reasons for and likely duration of such works.

Workers Camps

138. *Workers’ Camp and Site Installation Requirement.* Potential sites of workers’ camps must be discussed with and proposed by local communities and authorities during consultations and prior to their establishment. If additional camps and ancillary construction sites are selected, for following criteria must be used:

- minimize the land occupation.
- Site offices shall be located at least 200 meters from any existing residential settlements.
- Camp facilities should not be located in steep slopes.
- Site offices and camps be located at least 100 meters from any watercourses and be operated so that no pollutants enter watercourses. Camp areas shall be located to allow effective natural drainage.
- The workforce shall be provided with safe, suitable and comfortable accommodation. They have to be maintained in clean and sanitary conditions.

- In every site adequate and suitable facilities for washing clothes and utensils shall be provided and maintained for the use of contract labor employed therein.
- Potable water for human consumption shall be provided for at camps, site offices.
- Adequate sanitation facilities (toilets and washing areas) shall be provided for workers to use. The toilet should be provided with adequate supplies running water, soap, and toilet paper. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions.
- At every construction camp, there must be at least one septic tank. The wastewater from the tank shall not be discharged into any watercourses. The wastewater shall be periodically transported away by a water tank to the nearest treatment plant.
- *Medical Facilities.* A medical and first aid kit shall be provided at each camp area. All consumables in the first aid kit should be checked and recharged regularly.

Concrete mixing

- Concrete mixing stations will minimize the land occupation.
- Concrete mixing must be done on impermeable ground, waste and wastewater containing cement must be collected through drains with slurry sump on-site before being discharged into the receiving source.
- The concrete mixing station must be at least 200 meters away from residential houses or other sensitive buildings such as Buddhist pagodas, churches, temples, school gates, medical facilities and public agencies.

Earthworks, Cuts and Fill Slopes Management

139. Earthworks, cuts and fill slopes shall be carefully managed to minimize negative impacts on the environment.

- All earthworks shall be properly controlled, especially during the rainy season.
- The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the works.
- The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
- In order to protect any cut or fill slopes from erosion, in accordance with the drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.
- The Contractor shall use the excavated material from for filling unless the CSC considers the material unsuitable for filling.
- Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as agreed to by the CSC.

SITE-SPECIFIC MITIGATION MEASURES

Spoil Disposal Sites

140. If the Contractor proposes any disposal site during the construction phase, they have to be approved by PIA and relevant local authorities. The contractor should ensure that these sites are:

- a) not located within designated forest or cultivated areas, or any other properties.
- b) do not impact natural drainage courses.
- c) where there is no future landslide,
- d) do not impact endangered/rare flora.

141. Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas. The final use of the disposal site shall be approved by the local government.

142. Besides the requirements for the location of spoil disposal sites, the following actions shall be put into place.

- Post a speed limit sign at the entrance of the disposal site.
- Provide a notice stating, “Only authorized persons are allowed”, limiting access by unauthorized persons to the disposal site.
- Topsoil will be reserved and loaded in separate areas for reuse at the end of the disposal operation as cover material for the rehabilitation of the disposal site.
- If the disposal site is located near a river or water course, a retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities. The surface runoff shall be retained and settled first before allowed discharge into the receiving water.
- A drainage ditch shall be built around the disposal site to control surface runoff to ensure that no localized flooding would happen in the areas surrounding the disposal sites; Sediments in runoff passing the excavated materials will be trapped before the flow enter any water bodies.
- After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks.
- Disposal sites close to patches of agricultural land will be limited in size to avoid damage to crops.

143. Minimize potential impacts along pipelines.

144. ESCOP will be applied to pipeline installation contracts. Additional measures will be applicable at specific locations are listed in the table below.

Table 6-3: Site-specific mitigation measures for Pipe Installation

No.	Site Characters	Issues/Risks	Mitigation measures
1	<ul style="list-style-type: none"> ▪ Construction takes place near an existing house 	<ul style="list-style-type: none"> ▪ Block or disrupt access to house. ▪ Damages to the house structure (land slide at foundation) 	<ul style="list-style-type: none"> ▪ Provide temporary access to the house. ▪ Install support in the pipe trenches at sections near the house foundation. ▪ Back fill the pipe trenches as soon as possible

2	<ul style="list-style-type: none"> ▪ Construction takes place within 50 m from a school or health care centers 	<ul style="list-style-type: none"> ▪ Safety for the school students, patients and medical staff ▪ Health impacts due to dust and noise 	<ul style="list-style-type: none"> ▪ Avoid loading construction materials and waste within 20m from school gates and health centers. ▪ Remove the waste from the site in parallel with excavation/pipe installation. ▪ Place warning signs and speed limit at 10 km/h at this section. ▪ Create a safe temporary path if access is disrupted. ▪ Backfill as soon as the pipe installation is completed. ▪ Clean up the road at the end of working shifts. ▪ water the road section passing the school and health care center if the weather is hot and dry, windy. ▪ Avoid parking trucks, loading and unloading materials and wastes during peak traffic hours
3	<ul style="list-style-type: none"> ▪ Construction at road crossing 	<ul style="list-style-type: none"> ▪ Traffic disruptions, traffic safety risks 	<ul style="list-style-type: none"> ▪ Carry out construction at night time, if possible, ensure adequate lighting ▪ Coordinate with local authorities to divert traffic flow if necessary. ▪ Inform the public in advance if construction takes place at night-time. ▪ Backfill, reinstate the affected roads fully before traffic is resumed in daytime
4	<ul style="list-style-type: none"> ▪ Construction takes place along roadside 	<ul style="list-style-type: none"> ▪ Traffic disruptions, traffic safety risks 	<ul style="list-style-type: none"> ▪ Avoid construction activities at peak hours. ▪ Install speed limit signs at 10km/h at the two ends of construction section. ▪ Minimize the volumes of materials and waste loaded along roadside at each time. ▪ Backfill, reinstate the affected roads fully as soon as possible (related costs have been included in the BOQ) ▪ Contractor must install speed limit sign, provision all safety insures before start of construction by the contractor as per the provision of the ESMP.
5	<ul style="list-style-type: none"> ▪ Construction take place on or passing private land 	<ul style="list-style-type: none"> ▪ Disturbance to owner's daily activities ▪ Safety risks ▪ Dust, nuisance. ▪ Damages to private properties and crops 	<ul style="list-style-type: none"> ▪ Inform landowner and get agreement on construction schedule in advance. ▪ Treat landowner with respects ▪ No construction at lunch and nighttime ▪ Minimize disturbed areas. ▪ Do not load materials and wastes on vegetated areas, load on barren land. ▪ Create a safe temporary path if access is disrupted.

			<ul style="list-style-type: none"> ▪ Clean up, reinstate the site completely before departure
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145. Safety during Power System Construction (poles, wires and transformers)

The following ESH guidelines for power distribution construction will be followed:

- Testing structures for integrity prior to undertaking work.
- Safety belts and Rope shall be used.
- Implement fall protection measures in climbing protection measures.
- Provide adequate work-positioning device system for workers.
- When operating power tools at height, workers should use a backup safety strap.
- Signs and other obstructions should be removed from poles or structures prior to undertaking work.
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

146. Minimize potential impacts and risks on vegetated land.

- Contractors work with the PIA and supervising consultants as well as local authority to refine and confirm the pipeline alignment to avoid cutting trees when possible.
- Disturbance to the ground will be kept minimal. Establish the boundary of construction materials.
- Use suitable size transportation means and apply manual excavation method to avoid or minimize mass cutting of big trees along alignment during pipeline installation.
- Carry out manual excavation and pipe installation, if necessary, in order to avoid cutting or damage to the trees.
- The biomass to be cleared are collected and loaded tidily at or near the construction sites in ways that they can be of beneficial usage for community later on if appropriate.

The following activities are prohibited on or near the subproject sites:

- Cutting of trees for any reason outside the approved construction area.
- loadings of machines and materials on vegetated areas, causing damages to the trees
- Hunting, fishing, wildlife capture, or plant collection.
- Buying of wild animals for food.
- Having caged wild animals (especially birds) in camps.
- Poaching of any description.
- Explosive and chemical fishing.
- Building of fires if not authorized.
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.
- Collection of firewood.
- Urinating or defecating outside the designated facilities; and
- Burning of waste and/or cleared vegetation.
- Workers will be fully protected from harmful insects by the provision of adequate PPEs.



The contractor shall ensure that:


- Workers wear adequate protective clothing during vegetation clearance, trained to use equipment safely before executions.
- Reinstatement of vegetation cover according to the design as soon as possible.

Encourage community monitoring of contractor's compliance.



Table 6-4 Site-specific Mitigation Measures


Namthae Water Supply System in Kham District

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
1. Access Road to the WTP from main road	 	<p>L = 140 m; W = 5m.</p> <p>The existing pathway in Phakok Village is unsealed and narrow. It becomes dusty during the dry season and muddy in the wet season. Along both sides of this pathway lies empty land, which is communal.</p> <p>The existing ground elevation is from 928 to 941mamsl. The slope gradients are 11.83%</p>	Erosion and landslide risk on slopes	<ul style="list-style-type: none"> Minimize disturbed areas to minimize erosion risks, avoiding overcutting of trees or over-removal of vegetation cover. Shape the cut and fills to reduce land slide risks. Establish vegetation cover on slopes according to design as soon as possible. Excavating the hillside to the engineered slope to minimize the potential for slope failure during road construction. Install temporary barriers
		<p>Grasses, vines, bushes, plants, trees, ants, butterflies, birds, and mosquitoes are observed along the pathway.</p>	<p>Safety risks for the workers due to harmful insects</p> <p>Bush fire risk</p>	<ul style="list-style-type: none"> Provide adequate PPEs to the workers, advise them to be observant to harmful insects. Educate worker to wear the long sleeves, long pants, and insect repellent to minimize exposure Educate workers about insect hazards, prevention measures, and emergency procedures. Provide anti-mosquito/insect spray to workers and advise them to use it No wildlife catching/hunting allowed.
		<p>At the junction with the village road, traffic density is very low. Traffic count in a day: 1 truck, 5 bicycles and motorcycles, 2 tractors.</p>	<p>Traffic safety risks at junction with the village road</p>	<ul style="list-style-type: none"> Place signs about Construction Site, speed limit and warning signs at the junction with village road. Arrange flag man to guide traffic when project vehicle density is high or trucks carrying bulky items enter the project sites. Provide lighting at night at this spot. Impose speed limits at 20km/h on construction vehicles along this section.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> • Provide information to community on schedule of construction activities through billboard/signs •
		<p>Three houses and a primary school are situated approximately 20 meters to the right of the junction.</p> <p>No electricity and water networks along the road</p> <p>Total 26,500 M³ land will be excavated of which 18,400M³ excavated materials will be g transported to the disposal sites</p> <p>8,036 filling materials and granular materials will be transported to the WTP sites.</p>	<p>Disturbance the access to the house along the roadsides</p> <p>Dust, noise and vibration impact households.</p> <p>Truck trips will cause dusts and traffic safety risks</p> <p>Traffic disturbance safety risk along the roadside</p>	<ul style="list-style-type: none"> • Inform households and school about the construction schedule at least two weeks in advance. • Install fences or barriers around the subproject facility construction site. • Create safe connection between the access road and roadside house access paths; • Install temporary dust barriers in front of the three houses and schools during ground levelling. • Spray water along this section during dry weather. • Impose speed limits at 20km/h on construction vehicles along this section. • Excavation work will be avoided in periods of high wind. • Avoid using equipment that may result in high levels of vibrations during the class hours. • Cover trucks carrying granular materials with canvass or similar. • Require drivers to minimize honking when driving in community area • Provide information to community on schedule of construction activities through billboard/signs. • Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials placed along the access road.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
			Traffic and safety risks along the road, especially during class opening and school over times	<ul style="list-style-type: none"> • Provide adequate PPEs to the workers, advise them to be observant to harmful insects. • • Measures to control traffic during construction: <ul style="list-style-type: none"> - Place warning signs on the main road and road access to the Water Treatment Plant (WTP). - Scheduling Truck Movement to avoid truck movement during school opening and closing times to ensure the safety of children. - Set and enforce speed limits on the access road to control vehicle speed. - Provide training for truck drivers to ensure they are aware of safety protocols and road regulations. - Arrange for flag men to direct traffic when trucks are coming in and out of the construction site. - Water the roads regularly to minimize dust. - Install flashing lights so that truck drivers can observe houses during dark hours, ensuring better visibility and safety. • Measures for and safety risks reduction during construction: <ul style="list-style-type: none"> - Restrict access to the construction site to authorized personnel only. - Ensure all workers wear appropriate personal protective equipment (PPE), such as helmets, gloves, safety boots, and reflective vests. - Provide comprehensive safety training for all workers, including hazard recognition and emergency procedures. - Conduct regular refresher courses to - Place clear and visible safety signs around the construction site to warn of potential hazards. - Use barrier tape or fencing to mark off dangerous areas.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> - Install guardrails, safety nets, and personal fall arrest systems where there is a risk of falling from heights. - Ensure that ladders and scaffolding are secure and meet safety standards. - Keep the construction site clean and free of debris to prevent tripping hazards. - Equip the site with first aid kits and ensure that trained first aid personnel are always available.
2. Power Supply for the WTP		120m 22KV power lines will be built along the access road to connect to the grid network. A 50 KVA hanging transformer will be installed.	Safety risks for the workers	<ul style="list-style-type: none"> • Testing structures for integrity prior to undertaking work. • Safety belts and Rope shall be used. • Implement fall protection measures in climbing protection measures. • Provide adequate work-positioning device system for workers. • When operating power tools at height, workers should use a backup safety strap. • Signs and other obstructions should be removed from poles or structures prior to undertaking work. • An approved tool bag should be used for raising or lowering tools or materials to workers on structures
3. At the WTP site		<p>Land area = 4,900m² (65mx75m).</p> <p>The WTP site is on communal land of Phakok Village. The WTP is bordered with village land in the south and with the private land of three households in the north, east and west.</p>	Damage to existing trees and crop land surrounding the WTP site.	<ul style="list-style-type: none"> • Provide information to community on schedule of construction activities through billboard/signs. • Conduct a tree survey and inventory of trees and submit the results to the PIU/PMU for approval before cutting. • Pegging/Fencing the construction area before starting construction work. Minimize disturbed areas, avoid damaging trees and vegetation cover. • Minimize disturbed areas, avoid damaging trees and vegetation cover.


Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
		<p>only bush and small trees, no big trees, there may be some snakes, bees, ants, insects, small birds etc.). No invasive plant species identified.</p>	<p>Dust, noise and vibration impact households.</p> <p>Safety risks for the workers if harmful insects attack them</p>	<ul style="list-style-type: none"> • Clearance outside of the approved construction area is prohibited. • . • Install barricades/barriers and sturdy plate covers in open excavations during non-working time. • Install barriers and signs to limit access to the construction site. • Limit construction activities, particularly operation of noise/vibration generating equipment at night. • Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors. • Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. • Load materials and waste within the WTP boundary, prevent spills to garden land or nearby water sources. • Topsoil will be reserved and loaded in separate areas for reuse at the end of the disposal operation as cover material for the rehabilitation of the disposal site. • Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. • Provide adequate PPEs to the workers, advise them to be observant to harmful insects. • Educate worker to wear the long sleeves, long pants, and insect repellent to minimize exposure • Educate workers about insect hazards, prevention measures, and emergency procedures. • Provide anti-mosquito/insect spray to workers and advise them to use it


Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> • Monitor compliance to Codes of Conduct, especially with regards to fuel handling and fire setting
			Fire Risks	<ul style="list-style-type: none"> • Monitor compliance to Codes of conducts, especially the use of fuels, to prevent fire risks. • To prevent bush fires, unauthorized fire setting is strictly prohibited according to the code of conduct. • The burning of site clearance debris (trees, undergrowth) or construction waste material, unauthorized fire setting is prohibited
		Ground elevation is from 943 msl to 958mamsl the slope gradient is approximately 21.42%.	Erosion and landslide risk due to steep topography	<ul style="list-style-type: none"> • Create and maintain temporary drainage channels and sedimentation traps within and surrounding the WTP boundaries. • Monitor erosion risks daily. • Take appropriate actions with additional mitigation measures to prevent erosion/land slide when risks are identified. • Establish vegetation cover on slopes according to design as soon as possible. • Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals.


Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
			<p>Dust is generated from earth works and during transportation of large volumes of granular materials.</p>	<ul style="list-style-type: none"> • Excavation work will be avoided in periods of high wind and rainy weather. • Trucks must be covered during transportation of excavated soil. • Workers must wear masks at the site. • Drivers are requested to follow regulations on speed limits. • Spray water on access roads and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area. • The burning of site clearance debris (trees, undergrowth) or construction waste material, unauthorized fire setting is prohibited. • Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. • Apply the measures specified for disposal sites
			<p>Safety risks if locals enter the construction sites;</p>	<ul style="list-style-type: none"> • Fence off the boundary of the Water Treatment Plant (WTP) sites to prevent unauthorized access and enhance security.


Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
			<p>Large volumes of excavation and granular materials will be brought to the sites and cause dusts to the workers and the surroundings, materials and wastes may spill down the slopes;</p> <p>Rainwater with muds may spill from construction sites and cause flooding/muddy conditions to the surrounding lands).</p>	<ul style="list-style-type: none"> • Build and maintain proper drainage ditches within and surrounding the WTP sites to manage water runoff and prevent flooding. • Cover and contain excavated and filling materials to prevent them from spreading and causing safety hazards. • Arrange for truck wheel spraying at the exit of the WTP site to minimize dust spreading and maintain air quality. • Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals.
			<p>Objects may “fly” or fall from the construction site, especially from high elevations, posing risks to workers, crop lands, and houses down the slopes.</p>	<ul style="list-style-type: none"> • Install safety netting and barriers around elevated work areas to catch any falling objects and prevent them from reaching the ground or nearby areas. • Use tool lanyards to secure tools and equipment used at heights, ensuring they remain attached to workers or structures. • Set up debris chutes for safe and controlled removal of waste materials from higher levels to ground level. • Establish and enforce exclusion zones around the base of elevated work areas where unauthorized personnel and activities are prohibited. • Place warning signs around the construction site to alert workers and nearby residents about the risk of falling objects. • Conduct regular inspections of scaffolding, cranes, and other elevated platforms to ensure they are secure and free of loose materials. • Ensure all workers wear appropriate PPE, including hard hats, to protect against head injuries from falling objects.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
			Traffic safety risks during transportation	<ul style="list-style-type: none"> • Store materials and equipment securely when not in use to prevent them from being dislodged by wind or other factors. <ul style="list-style-type: none"> • Measures to control traffic during construction: <ul style="list-style-type: none"> - Place warning signs on the main road and road access to the Water Treatment Plant (WTP). - Scheduling Truck Movement to avoid truck movement during school opening and closing times to ensure the safety of children. - Set and enforce speed limits on the access road to control vehicle speed. - Provide training for truck drivers to ensure they are aware of safety protocols and road regulations. - Arrange for flag men to direct traffic when trucks are coming in and out of the construction site. - Water the roads regularly to minimize dust. - Install flashing lights so that truck drivers can observe houses during dark hours, ensuring better visibility and safety. • Measures for and safety risks reduction during construction: <ul style="list-style-type: none"> - Restrict access to the construction site to authorized personnel only. - Ensure all workers wear appropriate personal protective equipment (PPE), such as helmets, gloves, safety boots, and reflective vests. - Provide comprehensive safety training for all workers, including hazard recognition and emergency procedures. - Conduct regular refresher courses to - Place clear and visible safety signs around the construction site to warn of potential hazards.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> - Use barrier tape or fencing to mark off dangerous areas. - Install guardrails, safety nets, and personal fall arrest systems where there is a risk of falling from heights. - Ensure that ladders and scaffolding are secure and meet safety standards. - Keep the construction site clean and free of debris to prevent tripping hazards. - Equip the site with first aid kits and ensure that trained first aid personnel are always available.
		Water for construction will be taken from the nearby stream, drinking water will be purchased from local suppliers	Safety risks for the workers	Follow safety rules for construction of power system specified in this ESMP.
4. Nampapa Water Supply Office		The proposed location is an empty plot of land in Namthae Village. It is bordered by village land to the north, the Phonkai Health Care center to the east, the village road to the south, and the Namthae Village Office to the west.	Safety risks for the workers and community	<ul style="list-style-type: none"> • Provide information to community on schedule of construction activities through billboard/signs. • Fence off the construction site with gate. • Install barricades/barriers and sturdy plate covers in open excavations during non-working time. • Install barriers and signs to limit access to the construction site. • Provide adequate PPEs to the workers, advise them to be observant to harmful insects.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
			<p>Dust during excavation</p> <p>Vibrations from pile driving (if any) for foundation construction</p>	<ul style="list-style-type: none"> • Limit construction activities, particularly operation of noise/vibration generating equipment at night. • Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. • Load materials and waste within the construction site boundary, prevent spills to garden land or nearby water sources. • . • Regularly spray water on excavation sites and roads to keep dust levels down. • Erect dust barriers or screens around the excavation area to contain and reduce dust spread. • Schedule and limit dust-generating activities during times when wind speeds are lower to reduce dust dispersion. <ul style="list-style-type: none"> • Conduct a pre-construction survey of nearby structures to document their condition and identify any pre-existing vulnerabilities. • Utilize modern pile driving equipment designed to minimize vibrations. • Establish buffer zones around sensitive areas and limit pile driving activities within these zones. • Schedule pile driving activities during times that will minimize disruption to nearby residents and businesses. • Monitor compliance to Codes of Conduct, especially with regards to fuel handling and fire setting.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
5.Raw Water Pipelines		<p>Length=5.105Km</p> <p>The pipeline lays along the stream where people do cultivation activities, some of part are through the fallow land.</p> <p>The raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters and a width of 0.5-1meters.</p>	<p>Damage to existing trees and crop land along the pipeline alignment sites.</p> <p>Obstructions to cultivation activities.</p> <p>Safety risks for the workers and the farmers.</p> <ul style="list-style-type: none"> - Construction activities may damage existing crops and disrupt planting schedules. - Soil erosion due to excavation can lead to loss of fertile topsoil. - Encountering rocks, roots, or existing underground utilities can cause delays and require additional excavation. - Improper installation or soil conditions can lead to pipeline damage or leaks. - Risk: Heavy machinery - Construction activities - Open trenches and heavy machinery pose safety risks to farm workers and livestock. 	<ul style="list-style-type: none"> • Avoid and minimize ground disturbance during peak cultivation period. • Support farmers to transport materials and products if construction affects accessibility to agricultural land. • Disturbance to the ground will be kept minimal. Establish the boundary of construction materials. Carry out manual excavation and pipe installation, if necessary, in order to avoid or minimize cutting or damage to the trees. <ul style="list-style-type: none"> • Workers will be fully protected from harmful insects by the provision of adequate PPEs • Coordinate with farmers to schedule pipeline work during off-peak agricultural seasons and compensate for crop damage. • Use erosion control measures such as silt fences, temporary vegetation, and mulching. • Conduct thorough subsurface investigations and plan routes to avoid obstacles. • Ensure proper installation techniques as mentioned in the particular technical specifications • Implement safety protocols, use appropriate signage, and restrict access to construction areas.


Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
6.Distribution Pipelines		<p>L=28.085km</p> <p>The main pipeline will be laid along roadsides. The depth of the pipe trench is 0.7-1.2m and the width is 0.5-1.0m.</p> <p>The households who have a house along the roadsides have been consulted, all of them agreed to allow the pipeline passing in front of their houses</p>	<p>Block or disrupt access to house.</p> <p>Safety risks for the workers and villagers.</p> <p>Traffic disruptions, traffic safety risks.</p>	<ul style="list-style-type: none"> • Reinform community about construction schedules two days in advance; • Create a safe temporary path if access is disrupted. • Back fill the pipe trenches as soon as possible • Provide safe, temporary walkways for pedestrians around the construction site, particularly near markets and populated areas. • Backfill as soon as the pipe installation is completed. • Avoid loading construction materials and waste within 20m from school gate and health centers, markets or any popular publicly accessible locations. Fully reinstate the excavated road as soon as possible. • Do not park vehicles or temporarily load materials in front of the market and shops unless construction is on-going at these sites. <ul style="list-style-type: none"> • Request families to keep their children away from construction sites. • Carry out construction in stages to minimize community exposure to open pipe trenches. • Provide temporary access to roadside houses where access is disturbed. • Install support in the pipe trenches at sections near the house foundation. • Requires the workers strictly follow the Codes of Conducts. • Place safety signage around the construction site with instructions and contact information for reporting issues. • Erect clear and visible warning signs around the construction site. • Restrict construction activities to daytime hours to minimize disturbance to residents and businesses.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> • Use barriers and fencing to secure the area and prevent unauthorized access, especially around residential houses, health care centers, and markets. • Implement traffic control measures to manage vehicle and pedestrian flow around the construction site. • Use barriers and fencing to secure the area and prevent unauthorized access, especially around residential houses, health care centers, and markets. • Ensure that emergency access routes to health care centers and residential areas are maintained at all times. • Place warning signs and speed limit at 10 km/h along road sections where construction is on-going.
			Health impacts due to dust and noise.	<ul style="list-style-type: none"> • Use dust suppression methods such as water spraying and covering stockpiles to reduce air pollution. Clean up the road, watering dusty areas during working shifts. • water the road section passing the school and health care center if the weather is hot and dry, windy. • Avoid parking trucks, loading and unloading materials and waste during peak traffic hours. • Inform the public in advance if construction takes place at night-time. • Implement a waste management plan to ensure that construction debris is promptly and safely removed. • Remove the waste from the site in parallel with excavation/pipe installation; • Topsoil will be reserved and loaded in separate areas for reuse at the end of the disposal operation


Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
				<p>as cover material for the rehabilitation of the disposal site.</p> <ul style="list-style-type: none"> • place warning signs and reflective bands to restrict unauthorized access to construction areas. • Transport the excavated materials away within 24 hours since excavation • Protect temporary materials and waste loads to prevent spills.
			<p>Damage to private properties.</p> <p>Damage to the front concrete yard of the people</p>	<ul style="list-style-type: none"> • Avoid laying out of the pipeline in the front yard. Contractor should layout the pipeline in Right of Way (ROW) between the road and front year. If there any damage to the front yard, contractor should repair it to original condition • Inform residents, health care centers, markets, and other stakeholders about the construction schedule and potential disruptions.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures

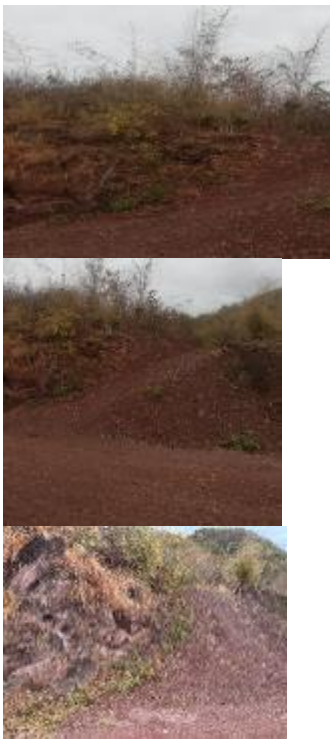
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Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
7. The proposed disposal Sites		<p>The proposed disposal site will be located about 1500m from the WTP, this is the village waste disposal site with total area available of 1600m². However, the contractor has to get approval from the village authority. It is border with village land and road.</p>	Local safety risks.	<ul style="list-style-type: none"> Post a speed limit sign at the entrance of the disposal site. <p>Provide a notice stating, “Only authorized persons are allowed”, limiting access by unauthorized persons to the disposal site.</p>
			Erosion and spills of disposal materials into the creek or the houses nearby the construction site	<ul style="list-style-type: none"> Topsoil from the digging should be reserved and loaded in separate areas for reuse at the end of the disposal operation as cover material for the rehabilitation of the disposal site. A retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities. The surface runoff shall be retained and settled first before allowed discharge into the receiving water. A drainage ditch shall be built around the disposal site to control surface runoff to ensure that no localized flooding would happen in the areas surrounding the disposal sites; Sediments in runoff passing the excavated materials will be trapped before the flow enter any water bodies. After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks.
			Dust and noise	<ul style="list-style-type: none"> Use appropriate containers and covers for transporting waste to the disposal site to prevent spillage and scattering. After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks.

Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
			Traffic safety risks along the access to the disposal sites	<ul style="list-style-type: none"> • Measures to control traffic during construction: <ul style="list-style-type: none"> - Place warning signs on the main road and road access to the Water Treatment Plant (WTP). - Scheduling Truck Movement to avoid truck movement during school opening and closing times to ensure the safety of children. - Set and enforce speed limits on the access road to control vehicle speed. - Provide training for truck drivers to ensure they are aware of safety protocols and road regulations. - Arrange for flag men to direct traffic when trucks are coming in and out of the construction site. - Water the roads regularly to minimize dust. - Install flashing lights so that truck drivers can observe houses during dark hours, ensuring better visibility and safety. • Measures for and safety risks reduction during construction: <ul style="list-style-type: none"> - Restrict access to the construction site to authorized personnel only. - Ensure all workers wear appropriate personal protective equipment (PPE), such as helmets, gloves, safety boots, and reflective vests. - Provide comprehensive safety training for all workers, including hazard recognition and emergency procedures. - Conduct regular refresher courses to - Place clear and visible safety signs around the construction site to warn of potential hazards. - Use barrier tape or fencing to mark off dangerous areas. - Install guardrails, safety nets, and personal fall arrest systems where there is a risk of falling from heights.



Element	Photos, maps	Existing Conditions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> - Ensure that ladders and scaffolding are secure and meet safety standards. - Keep the construction site clean and free of debris to prevent tripping hazards. - Equip the site with first aid kits and ensure that trained first aid personnel are always available.
8. Water Intake site		<p>There is gravel along the intake sites.</p> <p>Shrubs along the stream</p> <p>Water fairly clear</p> <p>Shrubs and barren soil along the stream</p>	Temporary disrupt stream flow.	<ul style="list-style-type: none"> • install a temporary culvert to maintain stream flow during intake construction.
			Over disturbance to stream bed	<ul style="list-style-type: none"> • Do not exploit construction materials (gravels from stream bed) on-site.
			Water pollution risks	<ul style="list-style-type: none"> • Carry out construction with care to minimize dropping of mortars into the stream. • positioned waste stores, training of site staff on the importance of maintaining a tidy site, and ensuring that everyone does their bit to comply with all applicable site rules and legislation. • Fuel storage tanks should be positioned far from any watercourse or surface water drains, and from access points and traffic routes.
			Unnecessary disturbance to stream side vegetation.	Load materials and equipment on barren soil, not on vegetated areas
			Fish, wildlife caught by the workers	<ul style="list-style-type: none"> • No fish/wildlife catching, keeping allowed


Phienghong Water Supply System in Nonghet District

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
1. Access Road to the WTP from main road		<p>L = 30m; W = 5m.</p> <p>The existing ground elevation is from 371 to 393amls. The slope's gradient is 14%.</p> <p>The access road to WTP will be constructed from the village road. This is the empty land of the village.</p>	<p>Safety risk for workers and villagers.</p>	<ul style="list-style-type: none"> ▪ Inform households about the construction schedule in advance. ▪ Place Construction Site, speed limit signs before the entrance to the access road. ▪ Minimize disturbed areas to minimize erosion risks, tree cutting and removal of vegetation cover. ▪ Shape the cut and fills to reduce land slide risks. ▪ Establish vegetation cover on slopes according to design as soon as possible. ▪ Proper drainage facility for the runoff water to prevent erosion ▪ Provide information to community on schedule of construction activities through billboard/signs. ▪ Avoid using equipment that may result in high levels of vibrations. ▪ Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. ▪ Install temporary dust barriers in front of the three houses and schools during ground levelling at the WTP. ▪ Minimize disturbed area to minimize erosion risks, tree cutting and removal of vegetation cover.
		<p>There are grasses, vines, bushes, plants, trees, ant, butterflies, birds, mosquito observed along the alignment</p>	<p>Tree cutting, removal of vegetation cover.</p>	<ul style="list-style-type: none"> ▪ Minimize disturbed areas, avoid damaging trees and vegetation cover ▪ Conduct a tree survey and inventory of trees and submit the results to the PIU/PMU for approval before cutting. ▪ Pegging/Fencing the construction area before starting construction work. ▪ Clearance outside of the approved construction area is prohibited. ▪ No wildlife catching/hunting allowed

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
		<p>At the junction with the main road, traffic density is low. Traffic count in a day: 1 pickup, 8 bicycles and motorcycles, 2 tractors.</p> <p>Total 31,200 M³ land will be excavated of which 27,490M³ excavated materials will be g transported to the disposal sites</p> <p>3,200 filling materials and granular materials will be transported to the WTP sites.</p>	<p>Safety risks for the workers due to harmful insects</p> <p>Fire Risk</p> <p>Traffic safety risks at junction with the main road</p> <p>Dust from movement of trucks</p>	<ul style="list-style-type: none"> ▪ Provide adequate PPEs to the workers, advise them to be observant to harmful insects. ▪ Educate worker to wear the long sleeves, long pants, and insect repellent to minimize exposure ▪ Educate workers about insect hazards, prevention measures, and emergency procedures. ▪ Provide anti-mosquito/insect spray to workers and advise them to use it. ▪ No wildlife catching/hunting allowed. <ul style="list-style-type: none"> ▪ The burning of site clearance debris (trees, undergrowth) or construction waste material, unauthorize fire setting is prohibited. ▪ Monitor compliance to Codes of conducts, especially the use of fuels, to prevent fire risks. ▪ To prevent bush fires, unauthorized fire setting is strictly prohibited according to the code of conduct. <ul style="list-style-type: none"> ▪ Place warning signs at the junction with the village road, provide lighting at night at this spot. <ul style="list-style-type: none"> ▪ Spray water on access roads and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area. ▪ Impose speed limits on construction vehicles. ▪ Excavation work will be avoided in periods of high wind. ▪ The contractor will comply with a 10 km/h speed limit when in the community area. ▪ Transport of materials that may generate dust shall be covered with canvass or similar. ▪ Install temporary fens or barriers around the subproject facility construction site. ▪ Require drivers to minimize honking and to comply with speed limits of 10 km/h when driving in community areas

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> ▪ . ▪ . ▪ .

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
2. Power Supply for the WTP		30 m 22KV power lines will be built along the access road to connect to the grid network. A 50 KVA hanging transformer will be installed.	Safety risks for the workers	<ul style="list-style-type: none"> ▪ Testing structures for integrity prior to undertaking work. ▪ Safety belts and Rope shall be used. ▪ Implement fall protection measures in climbing protection measures. ▪ Provide adequate work-positioning device system for workers. ▪ When operating power tools at height, workers should use a backup safety strap. ▪ Signs and other obstructions should be removed from poles or structures prior to undertaking work. ▪ An approved tool bag should be used for raising or lowering tools or materials to workers on structures.
3. At the WTP site		Land area = 4,200m ² (60mx70m). The Water Treatment Plant (WTP) will be located in fallow land of communal land which is surrounded by private agriculture land.	Damage to existing trees and crop land surrounding the WTP site.	<ul style="list-style-type: none"> ▪ Conduct a tree survey and inventory of trees and submit the results to the PIU/PMU for approval before cutting. ▪ Pegging/Fencing the construction area before starting construction work. ▪ Clearance outside of the approved construction area is prohibited. ▪ Provide compensation for damaged crops and trees.
		only bush and small trees, no big trees, there may be some snakes, bees, ants, insects, small birds etc.). No invasive plant species identified. Soil excavation volumes: 31,200m ³	Dust, noise and vibration impact households.	<ul style="list-style-type: none"> ▪ Fence off the construction site with gates. ▪ Install barricades/barriers and sturdy plate covers in open excavations during non-working time. ▪ Install the physical barrier to limit access to the construction site.

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
			<p data-bbox="1088 695 1388 783">Safety risks for the workers if harmful insects attack them.</p> <p data-bbox="1182 970 1346 994">Bush fire risks</p>	<ul style="list-style-type: none"> <li data-bbox="1411 233 2040 288">▪ Limit construction activities, particularly operation of noise/vibration generating equipment at night. <li data-bbox="1411 296 2040 376">▪ Position any stationary equipment that produces high noise levels such as diesel generators as far as practical from sensitive receptors. <li data-bbox="1411 384 2040 464">▪ Install temporary fences or barriers around the subproject facility construction site especially near schools, healthcare stations and houses. <li data-bbox="1411 472 2040 560">▪ Require drivers to minimize honking and to comply with speed limits of 10 km/h when driving in community areas. <ul style="list-style-type: none"> <li data-bbox="1411 695 2040 751">▪ Provide adequate PPEs to the workers, advise them to be observant to harmful insects. <li data-bbox="1411 759 2040 807">▪ Educate worker to wear the long sleeves, long pants, and insect repellent to minimize exposure <li data-bbox="1411 815 2040 871">▪ Educate workers about insect hazards, prevention measures, and emergency procedures. <li data-bbox="1411 879 2040 935">▪ Provide anti-mosquito/insect spray to workers and advise them to use it <ul style="list-style-type: none"> <li data-bbox="1411 970 2040 1026">To prevent bush fires, unauthorized fire setting is strictly prohibited according to the code of conduct. <li data-bbox="1411 1034 2040 1121">▪ The burning of site clearance debris (trees, undergrowth) or construction waste material, unauthorized fire setting is prohibited <li data-bbox="1411 1129 1839 1153">▪ Fire safety to prevent fire in bushes <li data-bbox="1411 1161 2040 1217">▪ Monitor compliance to Codes of conducts, especially the use of fuels, to prevent fire risks <li data-bbox="1411 1225 2040 1313">▪ The burning of site clearance debris (trees, undergrowth) or construction waste material is prohibited.


Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
		<p>The existing ground elevation is from 387mamsl to 404mamsl. The slope gradient is approximately 24.28%.</p>	<p>Erosion and landslide risk due to steep topography Rainwater with muds may spill from construction sites and cause flooding/muddy conditions to the surrounding lands</p>	<ul style="list-style-type: none"> ▪ Provide information to community on schedule of construction activities through billboard/signs. ▪ Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. ▪ Load materials and wastes within the WTP boundary, prevent spills to garden land. ▪ Establish vegetation cover on slopes according to design as soon as possible.
			<p>Dust is generated from earth works and during transportation of large volumes of granular materials.</p>	<ul style="list-style-type: none"> ▪ Excavation work will be avoided in periods of high wind. ▪ Trucks must be covered during transportation of excavated soil. ▪ Workers must wear masks at the site. ▪ Drivers are requested to follow regulations on speed limits. ▪ Spray water on access roads and construction sites during dry weather conditions to control dust emission, particularly roads near residences and through the town core area. ▪ Keep the stockpile of aggregate material covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. ▪ Apply the measures specified for disposal sites.
			<p>Safety risks if locals enter the construction sites ;</p>	<ul style="list-style-type: none"> ▪ Provide a notice stating, “Only authorized persons are allowed”, limiting access by unauthorized persons to the construction site. ▪ Install signs at construction sites warning people of potential dangers.


Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
			<p>Traffic safety risks during transportation</p> <p>Large volumes of excavation and granular materials will be brought to the sites and cause dusts to the workers and the surroundings, materials and wastes may spill down the slopes;</p> <p>).</p>	<ul style="list-style-type: none"> • Measures to control traffic during construction: <ul style="list-style-type: none"> - Place warning signs on the main road and road access to the Water Treatment Plant (WTP). - Scheduling Truck Movement to avoid truck movement during school opening and closing times to ensure the safety of children. - Set and enforce speed limits on the access road to control vehicle speed. - Provide training for truck drivers to ensure they are aware of safety protocols and road regulations. - Arrange for flag men to direct traffic when trucks are coming in and out of the construction site. - Water the roads regularly to minimize dust. - Install flashing lights so that truck drivers can observe houses during dark hours, ensuring better visibility and safety. • Measures for and safety risks reduction during construction: <ul style="list-style-type: none"> - Restrict access to the construction site to authorized personnel only. - Ensure all workers wear appropriate personal protective equipment (PPE), such as helmets, gloves, safety boots, and reflective vests. - Provide comprehensive safety training for all workers, including hazard recognition and emergency procedures. - Conduct regular refresher courses to - Place clear and visible safety signs around the construction site to warn of potential hazards. - Use barrier tape or fencing to mark off dangerous areas. - Install guardrails, safety nets, and personal fall arrest systems where there is a risk of falling from heights. - Ensure that ladders and scaffolding are secure and meet safety standards.


Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> - Keep the construction site clean and free of debris to prevent tripping hazards. - Equip the site with first aid kits and ensure that trained first aid personnel are always available
			<p>Objects may “fly” or fall from the construction site, especially from high elevations, posing risks to workers, crop lands, and houses down the slopes.</p>	<ul style="list-style-type: none"> • Install safety netting and barriers around elevated work areas to catch any falling objects and prevent them from reaching the ground or nearby areas. • Use tool lanyards to secure tools and equipment used at heights, ensuring they remain attached to workers or structures. • Set up debris chutes for safe and controlled removal of waste materials from higher levels to ground level. • Establish and enforce exclusion zones around the base of elevated work areas where unauthorized personnel and activities are prohibited. • Place warning signs around the construction site to alert workers and nearby residents about the risk of falling objects. • Conduct regular inspections of scaffolding, cranes, and other elevated platforms to ensure they are secure and free of loose materials.

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> • Ensure all workers wear appropriate PPE, including hard hats, to protect against head injuries from falling objects. • Store materials and equipment securely when not in use to prevent them from being dislodged by wind or other factors.
		Water for construction will be taken from the nearby stream, drinking water will be purchased from local suppliers	Safety risks for the workers	Follow safety rules for construction of power system specified in this ESMP.
4. Nampapa Water Supply Office		The proposed location is at the same place with WTP.	<p>Safety risks for the workers and community</p> <p>Dust during excavation</p> <p>Vibrations from pile driving (if any) for foundation construction</p>	<ul style="list-style-type: none"> • Provide information to community on schedule of construction activities through billboard/signs. • Fence off the construction site with gate. • Install barricades/barriers and sturdy plate covers in open excavations during non-working time. • Install barriers and signs to limit access to the construction site. • Limit construction activities, particularly operation of noise/vibration generating equipment at night. • Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. • Load materials and waste within the construction site boundary, prevent spills to garden land or nearby water sources. • Provide adequate PPEs to the workers, advise them to be observant to harmful insects. • Regularly spray water on excavation sites and roads to keep dust levels down. • Erect dust barriers or screens around the excavation area to contain and reduce dust spread. • Schedule and limit dust-generating activities during times when wind speeds are lower to reduce dust dispersion. • Conduct a pre-construction survey of nearby structures to document their condition and identify any pre-existing vulnerabilities.

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> Utilize modern pile driving equipment designed to minimize vibrations. Establish buffer zones around sensitive areas and limit pile driving activities within these zones. Schedule pile driving activities during times that will minimize disruption to nearby residents and businesses. Monitor compliance to Codes of Conduct, especially with regards to fuel handling and fire setting.
5.Raw Water Pipelines		<p>The length L =4.42Km of HDPE DN 90mm.</p> <p>Raw water transmission pipes from the intake to the water treatment plant will be laid along the downstream of Houay</p>	<p>Damage to existing trees and crop land along the pipeline alignment sites.</p> <p>Obstructions to cultivation activities</p>	<ul style="list-style-type: none"> Avoid and minimize ground disturbance during peak cultivation period. Support farmers to transport materials and products if construction affects accessibility to agricultural land. Disturbance to the ground will be kept minimal.

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
		<p>Lan which passes the fallow land and along the roadsides.</p> <p>The raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters and a width of 0.5-1meters.</p>	<p>Safety risks for the workers and the farmers</p> <ul style="list-style-type: none"> • Construction activities may damage existing crops and disrupt planting schedules. • Soil erosion due to excavation can lead to loss of fertile topsoil. • Encountering rocks, roots, or existing underground utilities can cause delays and require additional excavation. • Improper installation or soil conditions can lead to pipeline damage or leaks. • Risk: Heavy machinery • Construction activities • Open trenches and heavy machinery pose safety risks to farm workers and livestock. 	<ul style="list-style-type: none"> • Establish the boundary of construction materials. • Carry out manual excavation and pipe installation, if necessary, in order to avoid or minimize cutting or damage to the trees. • Workers will be fully protected from harmful insects by the provision of adequate PPEs • Coordinate with farmers to schedule pipeline work during off-peak agricultural seasons and compensate for crop damage. • Use erosion control measures such as silt fences, temporary vegetation, and mulching. • Conduct thorough subsurface investigations and plan routes to avoid obstacles. • Ensure proper installation techniques as mentioned in the particular technical specifications <ul style="list-style-type: none"> ▪ Implement safety protocols, use appropriate signage, and restrict access to construction areas.

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
6. Distribution Pipelines		<p>The length L = 5,716 meters.</p> <p>The main pipeline will be laid along roadsides. The depth of the pipe trench is 0.7-1.2m and the width is 0.5-1.0m.</p> <p>The households who have a house along the roadsides have been consulted, all of them agreed to allow the pipeline passing in front of their houses. Pipelines will be laydown along the roadside.</p>	<ul style="list-style-type: none"> • Block or disrupt access to house. • Health impacts due to dust and noise. 	<ul style="list-style-type: none"> ▪ Inform landowner and get agreement on construction schedule in advance. ▪ Ensure that emergency access routes to health care centers and residential areas are maintained at all times. ▪ Provide safe, temporary walkways for pedestrians around the construction site, particularly near markets and populated areas. ▪ Create a safe temporary path if access is disrupted. ▪ Backfill as soon as the pipe installation is completed. ▪ Clean up the road at the end of working shifts. ▪ Provide temporary access to the house. ▪ Back fill the pipe trenches as soon as possible <ul style="list-style-type: none"> ▪ Place warning signs and speed limit at 10 km/h at this section. ▪ Avoid loading construction materials and waste within 20m from school gates and health centers. ▪ Remove the waste from the site in parallel with excavation/pipe installation. ▪ Use barriers and fencing to secure the area and prevent unauthorized access, especially around residential houses, health care centers, and markets Install support in the pipe trenches at sections near the house foundation. ▪ Use dust suppression methods such as water spraying and covering stockpiles to reduce air pollution. ▪ water the road section passing the school and health care center if the weather is hot and dry, windy. ▪ Inform the public in advance if construction takes place at nighttime.

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
			<ul style="list-style-type: none"> • Safety risks for the workers and villagers • Traffic disruptions, traffic safety risks 	<ul style="list-style-type: none"> ▪ Place safety signage around the construction site with instructions and contact information for reporting issues. ▪ Implement a waste management plan to ensure that construction debris is promptly and safely removed. ▪ Implement traffic control measures to manage vehicle and pedestrian flow around the construction site. ▪ Inform residents, health care centers, markets, and other stakeholders about the construction schedule and potential disruptions. ▪ Erect clear and visible warning signs around the construction site. ▪ Restrict construction activities to daytime hours to minimize disturbance to residents and businesses. ▪ Avoid parking trucks, loading and unloading materials and waste during peak traffic hours.

			<ul style="list-style-type: none"> • Damages to private properties and crops • Damage to the front concrete yard of the people 	<ul style="list-style-type: none"> ▪ Avoid laying out of the pipeline in the front yard. Contractor should layout the pipeline in Right of Way (ROW) between the road and front year. If there any damage to the front yard, contractor should repair it to original condition. ▪ Back fill the pipe trenches as soon as possible ▪ . ▪ . ▪ . ▪ .
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Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
7. The proposed disposal Site		<p>The proposed disposal site will be located about 40m of the WTP, this is the private garden land of Mr. Som</p> <p>The contractor should consult and agree with the landowner before dumping.</p> <p>It is border with the private gardens and village road</p>	Local risks.	<ul style="list-style-type: none"> ▪ Provide a notice stating, “Only authorized persons are allowed”, limiting access by unauthorized persons to the disposal site. ▪ Post a speed limit sign at the entrance of the disposal site.
			Erosion	<ul style="list-style-type: none"> ▪ Topsoil from digging will be reserved and loaded in separate areas for reuse at the end of the disposal operation. ▪ If the disposal site is located near a river or water course, a retaining wall and/or interception ditch or settling ponds shall be built prior to the initiation of the construction activities. The surface runoff shall be retained and settled first before allowed discharge into the receiving water. ▪ A drainage ditch shall be built around the disposal site to control surface runoff to prevent flooding surrounding the disposal sites; Sediments in runoff passing the excavated materials will be trapped before the flow enters any water bodies.
			dust, noise	<ul style="list-style-type: none"> ▪ Use appropriate containers and covers for transporting waste to the disposal site to prevent spillage and scattering. ▪ After being tipped down, disposal waste piles must be levelled and rolled out to mitigate dust emission, erosion, and washing off by wind and water as well as to limit safety risks.
			Traffic safety risks along the access to the disposal sites	<ul style="list-style-type: none"> • Measures to control traffic during construction: <ul style="list-style-type: none"> - Place warning signs on the main road and road access to the disposal site - Scheduling Truck Movement to avoid truck movement during school opening and closing times to ensure the safety of children. - Set and enforce speed limits on the access road to control vehicle speed.

Element	Photos, maps	Descriptions	Impacts, Risks	Specific Mitigation Measures
				<ul style="list-style-type: none"> - Provide training for truck drivers to ensure they are aware of safety protocols and road regulations. - Arrange for flag men to direct traffic when trucks are coming in and out of the construction site. - Water the roads regularly to minimize dust. - Install flashing lights so that truck drivers can observe houses during dark hours, ensuring better visibility and safety. • Measures for and safety risks reduction during construction: <ul style="list-style-type: none"> - Restrict access to the construction site to authorized personnel only. - Ensure all workers wear appropriate personal protective equipment (PPE), such as helmets, gloves, safety boots, and reflective vests. - Provide comprehensive safety training for all workers, including hazard recognition and emergency procedures. - Conduct regular refresher courses to - Place clear and visible safety signs around the construction site to warn of potential hazards. - Use barrier tape or fencing to mark off dangerous areas. - Install guardrails, safety nets, and personal fall arrest systems where there is a risk of falling from heights. - Ensure that ladders and scaffolding are secure and meet safety standards. - Keep the construction site clean and free of debris to prevent tripping hazards. - Equip the site with first aid kits and ensure that trained first aid personnel are always available
8. Water Intake site			Over disturbance to stream bed.	<ul style="list-style-type: none"> • Do not exploit construction materials (gravels from stream bed) on-site.

6.1.3 Mitigation Measures required During Operation Phase

The mitigation measures below will be implemented by the WTP operators.

Table 6-5 the mitigation measure for the operation phase

Operation Phase				
Item	Issues	Mitigation measure	Implement	Supervisor
Generation of backwash water and sediments at water treatment plants	The moisture content of the sludge in sludge lagoon is about 95%, the amount of sludge is:15.95 kg/day	1. The sludge amount produced during the treatment of surface water in the WTP in this cluster is small. Therefore, a drying field is not anticipated within the WTP, instead, the sludge amount will be kept in the sludge lagoon and sucked up and transported to a disposal site every 2-3 months. Sucking up and transporting the sludge by special vehicles need to be stipulated in a contract with a local sanitation company. The sludge shall be disposed of at a special area assigned for sludge in an allocated and agreed disposal site.	PNP	
Flooding	Flooding around the WTP area and access roads from rainfalls	2. Side drainage along the road to ensure sufficient drainage capacity and avoid flooding. Side drainage should be sufficient to drain generated surface runoff from rainfall to avoid flooding around the WTP area.		
Occupational Health and Safety		3. Training of staff and allocation of responsibility to ensure that materials are properly handled. 4. The dose of chemicals applied to the water for treatment will be adjusted according to the actual operation of the water treatment plant	PNP	
Community health and safety		5. The facilities that will be constructed will be properly fenced off and secured to restrict access and intrusion of unauthorized personnel. Watchmen/security personnel will be hired to secure the facilities on a 24-hour basis. This would minimize the safety risks to the community	PNP	

Raw Water Quality		<ol style="list-style-type: none">6. The PIU and PNP shall continuously coordinate with the village authorities regarding community activities in the catchment area to monitor watershed activities that may contribute to the contamination of raw water.7. The PIU and PNP shall be continuously coordinate with the village authorities conduct and maintain communication campaigns on watershed protection, land use planning.8. Laboratory testing equipment and training will also be provided to allow the PNP to conduct regular monitoring of raw and treated water quality parameters.		
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6.2 Institutional Arrangements

6.2.1 PMU Roles and Responsibilities

147. PMU will be responsible for monitoring the overall subproject implementation, including environmental compliance of the subproject. Specifically, the PMU will:

- closely coordinate with local authorities in the participation of the community during subproject preparation and implementation.
- monitor and supervise ESMP implementation including incorporation of ESMP into the detailed technical designs and bidding and contractual documents.
- ensure that an environmental management system is set up and functions properly; and
- be in charge of reporting on ESMP implementation to the relevant authorities.

6.2.2 Construction Supervisors (CSC) Roles and Responsibilities

- On behalf of the PMU, the CSC will review and approve safeguard documents and reports submitted by the contractors.
- Be responsible for the regular supervision and monitoring of all construction activities and to ensure that the Contractor complies with the requirements of the contract and ESCOP. Prepare monthly ESHS monitoring reports and submit them to the PMU.

6.2.3 Contractors' Safeguard Responsibilities

148. The contractor shall comply with and implement the mitigation measures proposed in the Project's Social and Environmental Management Plan to prevent damage and nuisance to the environment and local communities. In particular, the Contractor is responsible for implementing or complying with the measures and requirements stated in the Environmental and Codes of Practices (ESCOP) and specific mitigation measures. The contractor is responsible for self-monitoring the implementation of these mitigation measures.

149. The contractor's responsibilities include but are not limited to the following.

- After contract signing, the successful bidder (the contractor) is required to prepare a Contractor's Environmental Management Plan (C-ESMP) to submit to PMU for review and clearance prior to construction commencement. The contents of C-ESMP should cover: (i) general information about the contractors and commitments on complying with safeguard requirements; (ii) ESCOP, Codes of conducts, other ESHS requirements, detail about specific measures and actions (including detail maps, diagrams) that the contractor plan to implement or comply with; (iii) proposals about ESHS training for their workers; (iv) Proposed staff assigned to ESHS responsibility. The C-ESMP will be updated to address the issues arisen during construction phase, if any.
- Throughout the construction period, the contractor of each package will submit monthly environmental, social, health, safety (ESHS) compliance progress reports to the PIU, copy furnished to the PMU. The contractor should highlight the summary of the progress of construction, ESHS activities undertaken within the reporting period to implement the

measures outlined in the ESMP, record any community complaints received and how the complaint was resolved.

- Assign staff to be responsible for ESHS aspects at construction sites and facilitate inspection missions.
- Conduct ESHS briefings for the workers including ESCOPs, Codes of Conducts, specific mitigation measures.
- Coordinate with PMU/PIA to inform local authorities and communities about construction schedules and impact mitigation requirements.
- Implement or comply with ESCOP, specific mitigation measures, Codes of Conducts and other relevant requirements on environmental, social, health and safety (ESHS) specified in the ESMP.
- Prepare monthly ESHS compliance monitoring report and submit it to construction supervisors.
- Implement additional mitigation or corrective measures as guided by the Construction Supervisors or PMU.
- Prepare Incident Report, if applicable

6.3 Monitoring and Reporting Requirements

150. Contractors' ESHS performance at construction sites will be directly monitored and supervised by the Site Construction Supervision Engineer who will prepare monthly ESHS monitoring report for submission to PIU (Draft template provided in Annex 3 of this ESMP).

151. At subproject/provincial level, PIU/DPWT staff, together with district and village authorities will be responsible for monitoring the implementation of mitigation measures as approved in the ESMP. Monitoring information together with other information collected from various stakeholders together with observations of project activities will be reported monthly to the DPWT using standard reporting forms. Monthly monitoring reports from PIU/DPWT will be included.

- List of consultations held, including locations and dates, name of participants and occupations.
- Main points arising from consultations include any agreements reached.
- A record of grievance applications and grievance redress dealt with.
- Number of construction supervision reports that include assessment of contractor's compliance with safeguards in accordance with ECOP.
- A number of training courses for community groups in environmental and social issues (if any) shall be provided in the contractor's monitoring and reporting responsibilities.

152. The PIU will consolidate the results of the monthly environmental monitoring through a quarterly progress report that will be submitted to the PMU which is based at the Department of Water Supply of the MPWT. 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. Copies of the relevant progress and ESHS reports will be shared with relevant authorities and the World Bank.

7 Information Disclosure, Consultation and Participation

153. Public Consultation were held many times during the project feasibility study. The objectives of consultation are to generate public awareness by providing information about a sub-project to all stakeholders, particularly the sub-projects affected persons (PAPs); cut-off-date; entitlements and provide opportunity to the stakeholders to voice their opinions and concerns on different aspects of the project.
154. Village meetings for public consultations were organized in August 2023 and in October 2024 in six villages. For the August meeting and with a total of 91, of whom 27 were the women. The attendance in each village was as follows:
155. Participants in August consultation meeting:
- Phakok village: 15 participants (0 females)
 - Phahan village: 16 participants (4 females)
 - Phoncheng village: 26 participants (12 females)
 - Namthoum village: 16 participants (9 females)
 - Phonkham village: 11 participants (2 females)
 - Phonhome village: 7 participants (0 females)
156. For the October meeting and with a total of 81, of whom 21 were the women. Participants in October 2024 consultation meeting:
- Phakok village: 6 participants (1 females)
 - Phahan village: 21 participants (0 females)
 - Phoncheng village: 15 participants (3 females)
 - Namthoum village: 13 participants (6 females)
 - Phonkham village: 13 participants (5 females)
 - Phonhome village: 13 participants (6 females)
157. The objectives of these village meetings were to gather the villagers' opinions on the planned project, discuss potential impacts, and propose solutions. The community was informed that in order to minimize the impact on agricultural land, the contractor will be required to avoid laying the pipelines through the middle of the fields and will instead lay them along the edges of the agricultural land. Overall, during the village meetings, the villagers have expressed strong support for the construction of the water supply system sub-project and have agreed to allow the passage of raw water pipelines through their agricultural fields and community land. They have actively participated in the planning discussions and have voiced their commitment to cooperating with the construction teams. The pipelines will be laid during the off-season, specifically scheduled to avoid any agricultural activities, ensuring that their crops and livelihoods are not disrupted. Additionally, measures will be taken to restore any affected areas to their original condition after the pipeline installation is complete, demonstrating the project's commitment to minimizing any negative impact on the community. During construction, the contractor will avoid passing the pipeline through the middle of their agricultural land, laying the pipelines along the boundaries of the agricultural land to the extent possible. The raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters, with the width of pipe

trenches ranging from 0.5 to 0.8 meters. The contractor will lay out the pipelines along the border of the field and avoid laying them in the middle of the field to the extent possible.

158. These households have been consulted during the village meeting to discuss the WSS subproject. The potentially affected households in Phahan and Phakok villages have given their consent for the pipeline to pass through their agricultural land. Documentation of the village consultation meeting is provided in Annexure -4 to 9 (List of participants in the meeting).

- i. Annex 4.1 & 4.2: List of participants in village meeting Phakok village
- ii. Annex 5.1 & 5.2: List of participants in village meeting Phahan village
- iii. Annex 6.1 & 6.2: List of participants in village Phoncheng village
- iv. Annex 7.1 & 7.2: List of participants in village meeting Phonhome village
- v. Annex 8.1 & 8.2: List of participants in village meeting Namthoum village
- vi. Annex 9.1 & 9.2: List of participants in village meeting Phonkham village

159. Copies of Record of Meetings of all of the 6 villages are in Annexure-10 to 15

- i. Annex 10: Record of the village meeting of Phakok village
- ii. Annex 11: Record of the village meeting of Phahan village
- iii. Annex 12: Record of the village meeting of Phoncheng village
- iv. Annex 13: Record of the village meeting of Phonhome village
- v. Annex 14: Record of the village meeting of Namthoum village
- vi. Annex 15: Record of the village meeting of Phonkham village
- vii. Annex-16: Signed copy of the List of Affected Households in Phahan village
- viii. Annex-17: Signed copy of the List of Affected Households in Phakok village

160. The village meetings for public consultations have been organized between 14 to 20 August 2023, in which total 32 participants (15 female) in Phienghong village. Overall, the villagers have supported the construction of water supply system sub-project and expressed to pass of land with minor impacts that do not affect their livelihood. The objectives of the meetings were to discuss the opinion of the villagers on the project planned, the potential impacts and proposed solutions. Additional consultation meetings were also organized in October in Phienghong and Keochia villages with the total participants of 11, of whom 5 were the women in Phienghong village and 10 participants in Keochia of whom 4 were the women. At the October meetings the objectives of the project as well as the potentials impacts have been refreshed and the grievance procedure has been disseminated to the participants and in addition, posters and manuals on grievance procedures have been distributed in each village. In these meetings, temporary affected people agreed to allow the passing of the pipelines.

- i. List of temporary affected HH by Phienghong WSS cluster is given at the annex-2
- ii. List of temporary affected HH by Namthae WSS cluster is given at the annex-3.
- iii. List of participants in Phienghong village meeting of Phienghong cluster given at the Annex- 18.1 & 18.2.
- iv. List of participants in Keochia village meeting of Phienghong cluster given at the Annex- 19.
- v. Record of the village meeting of PhienghongPhienghong village given at Annex 20

- vi. Record of the village meeting of Keochia village given at Annex 21
- vii. Signed copy of the List of Affected Households in Phienghong village given at annex-22
- viii. Signed copy of the List of Affected Households in Keochia village given at annex-23

161. The objectives of these village meetings were to gather the villagers' opinions on the planned project, discuss potential impacts, and propose solutions. To minimize the impact on agricultural land, the contractor will pay special attention to avoiding passing the pipelines through the middle of the fields and will instead lay them along the edges of the agricultural land.

162. Overall, the villagers have expressed strong support for the construction of the water supply system sub-project and have shown willingness to allow the passage of raw water pipelines through their agricultural fields and community land. They have actively participated in the planning discussions and have voiced their commitment to cooperating with the construction teams. The pipelines will be laid during the off-season, specifically scheduled to avoid any agricultural activities, ensuring that their crops and livelihoods are not disrupted. Additionally, measures will be taken to restore any affected areas to their original condition after the pipeline installation is complete, demonstrating the project's commitment to minimizing any negative impact on the community. During construction, the contractor will avoid passing the pipeline through the middle of their agricultural land, laying the pipelines along the boundaries of the agricultural land to the extent possible. The raw water pipeline will be laid underground at a depth of 0.7 to 1.2 meters, with the width of pipe trenches ranging from 0.5 to 0.8 meters. The contractor will lay out the pipelines along the border of the field and avoid laying them in the middle of the field to the extent possible.

163. Public consultations were carried out between 14-20/8/2023 in 6 villages in which total 91 people (27 female) have participated in the meetings. Subsequent consultations were carried out in October 2024 with the total participants of 120 people, of whom 32 were the women, to refresh the information on the project, its impacts and grievance procedures, posters and booklet on grievance have also been distributed in each village. Number of participants in the village meetings are summarized in the following Table. Overall, the villagers have supported the construction of a water supply system sub-project and expressed willingness to voluntary contribution of land with minor impacts that do not affect their livelihood. The objectives of the meetings were to discuss the opinion of the villagers on the project planned, the potential impacts and proposed solutions.

Table 7-1 Summary of the Public Consultations by village

Date	Location	Participants			
		Agency	Total	Female	Ethnic
14/8/2023	Phakok	Village Authority, villager, PIU, PMISC staff	15	0	Hmong
16/8/2023	Phahan	Village Authority, villager, PIU, PMISC staff	16	4	Hmong

Date	Location	Participants			
		Agency	Total	Female	Ethnic
18/8/2023	Phoncheng	Village Authority, villager, PIU, PMISC staff	26	12	Hmong
17/8/2023	Namtoum	Village Authority, villager, PIU, PMISC staff	16	9	Hmong
19/8/2023	Phonkham	Village Authority, villager, PIU, PMISC staff	11	2	Lao
20/8/2023	Phonhome	Village Authority, villager, PIU, PMISC staff	7	0	Hmong
20/8/2023	Phienghong	Village Authority, villager, PIU, PMISC staff	32	42	Lao
Total in 2023			123	42	
15/10/2024	Phonkham	Village Authority, villager, PIU, PMISC staff	13	5	Lao
15/10/2024	Phonhome	Village Authority, villager, PIU, PMISC staff	14	6	Khmu\Lao
16/10/2024	Phoncheang	Village Authority, villager, PIU, PMISC staff	16	3	Hmong\Lao
16/10/2024	Namthoum	Village Authority, villager, PIU, PMISC staff	13	6	Hmong\Lao
17/10/2024	Phahan	Village Authority, villager, PIU, PMISC staff	22	0	Hmong\Yang\Lao
17/10/2024	Phakok	Village Authority, villager, PIU, PMISC staff	10	2	Hmong
19/10/2024	PhiengHong	Village Authority, villager, PIU, PMISC staff	17	5	Khmu\Lao\Phorng
19/10/2024	KeoChiew	Village Authority, villager, PIU, PMISC staff	15	5	Lao
Total in 2024			120	32	

164. After public consultations, separate meetings have been carried out with the individual heads of the potential temporary affected households to inform them about the preliminary result of the detailed measurement survey, their affected structures and their entitlements.

165. In addition, after the completion of the conceptual design, meeting was carried out with the provincial and district grievance committee as well as technical staff of the provincial PIU and central PMU to review the preliminary Inventory of Loss (IoL),

collected in May 2023 and the updated IoL resulting from final conceptual design prior to carrying out the second DMS in August 2023 and in October 2024, prior the start of the civil works. Table 7-2 summarizes the main comments that were raised during the village consultation meetings.

Table 7-2 Summary of Main Components raised during the Public Consultation

Comments	Response
Water system design and Civil work	
The design should avoid the impact on existing structures	<p>The water supply system design has been prepared to avoid adverse impact as much as possible on the existing structures in the village.</p> <p>The pipeline laying design should be depth enough underground to pass the agricultural or resettlement land area to avoid any adverse impact.</p> <p>The sensitive section along the residential area will be closely monitored during the civil works.</p>
There must be close monitoring of civil works during the construction phase in order to avoid impacts on the structures especially the houses along the main water pipeline	<p>Construction Supervision Consultants have been hired under the PIA to monitor environmental and social impacts and inspect the quality of the civil works.</p> <p>In addition, grievance committees have been set up at the village, district and provincial and central level to help with grievance redress procedures during the pre and construction phases.</p>
Training must be provided to the villagers on safety issues and signs	ESMP has been developed and it will cover occupational health and community health and road safety. The Contractor will be responsible in ensuring trainings/workshops to the workers as well as community members are being organized.
II. Construction Phase	
The villagers want the project to be started as soon as possible for the improvement of the water supply system in their communities	The construction will begin ASAP after the acceptance of the ESMP by the financier
Villagers requested to organize ritual ceremony before the start of the construction	The contractor will be informed to organize the ritual ceremony before the start of the construction.
Additional impacts on the structures during the construction period	The Contractor will be asked to use manual work in the sensitive areas and if there are additional impacts the APs will receive repair costs according to their entitlements, especially house, shop and porches.
Civil works may destroy their crops along the alignment	The contractor will be instructed to avoid impacts on their crops as much as possible during pipe lay out along the agricultural land
Access constraints to houses during the civil works	The AHs will be provided with temporary access during the civil works and access to the house will be restored after its completion.
The villagers are willing to contribute minor resettlement impacts because they want to	Willingness in the voluntary contribution is highly appreciated but the project has a compensation approach that agreed by the government in the resettlement policy framework.

have better access to clean water in their villages	This issue will be reported to the provincial and district grievance committees and consulted with relevant legal frameworks and the relevant standard of WB.
III. Operation phase	
The tariff should not be high and affordable	The tariff will be calculated to cover the operation and maintenance cost of the system and the villagers will be informed after the construction phase.
Concern about water availability for their cattle farm if use the same source of water for the improved water supply system	The design of the system has done the survey on water sources and it would not affect water supply for cattle raising
Concern about chemical contamination at the water treatment plant	Chlorine will be use but it will be controlled and its application will follow the requirement of the Lao government

Moreover, the Grievance Redress Mechanism (GRM) will be applied and disclosed to villagers and contractor prior construction with clearly inform that the contractor is responsible for the compensation of these damages and restoration to pre-construction levels.

8 Grievance Redress Mechanism

166. Part VI of Decree 84/GoL requires the Project to establish an effective mechanism for grievance resolution. A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. The objective of the grievance redress mechanism is to resolve complaints as quickly as possible and 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 detailed grievance redress procedures will be publicized through effective public information.

167. The grievance mechanism is based on key principles that will protect the rights and interest of project participants; ensure that their concerns are addressed in a prompt and timely manner, and that entitlements are provided in accordance with GoL and Bank safeguard policies. PIU/DPWT will ensure that communities directly affected by the Project have a full understanding of the GRM and ways to access it especially on (i) the concept of compensation for any involuntary acquisition of land and/or assets and (ii) ensuring environmental and social mitigation measures in the ESMP's are implemented as planned. APs are entitled to lodge complaints regarding any aspect of the environmental and social impacts associated with the Project. The AP's complaints can be made verbally or in written form to the GRC or, alternatively, raise his/her voice in a public or individual meeting with project staff.

8.1 Type of GRM

168. 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 are included.

- 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, disruption 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 land acquisition, resettlement, compensation, relocation and unaddressed losses.
- Complaints related to gender issues.

8.2 Grievance Resolution Process

169. 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 disputes do occur and all the details have been recorded accurately enabling all parties to be treated fairly. 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. The procedures for the grievance resolution process for the subproject are detailed below:

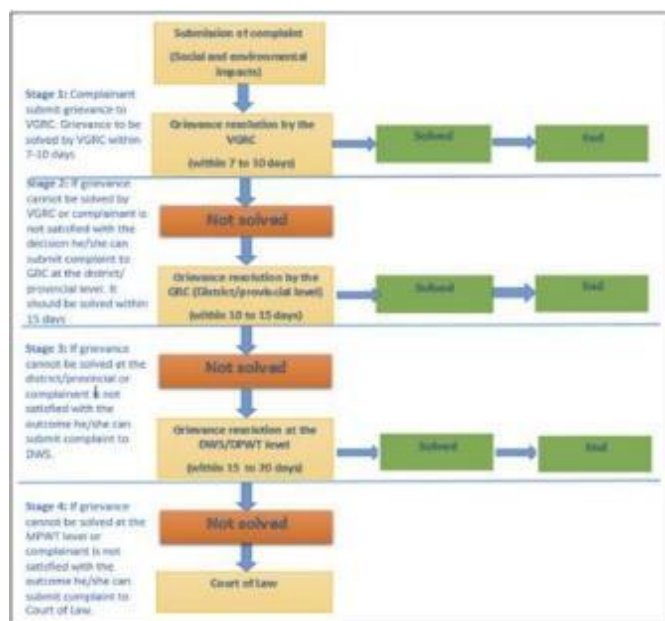
Stage 1: In the first instance, Aps will address complaints on any aspect of compensation, relocation or unaddressed losses to the Village Grievance Redress Committee (VGRC) or other designated village grievance officers. The VGRC will organize a meeting with the complainants to resolve the issue using its traditional methods of conciliation and negotiation; the meeting will be held in a public place and will be opened to other Aps and villagers to ensure transparency. The VGRC aims at clarification and amicable solution agreed with the subproject.

Stage 2: If after 10 days of lodging the complaint, no understanding or amicable solution can be reached or no response is received from the Village Grievance Redress Committee, the complainant can bring the complaint to the District/Provincial GRC. The District/Provincial GRC will be involved in meeting with the complainant and VGRC to discuss the complaint and provide a decision at mutual arrangement within 15 days of receiving the appeal.

Stage 3: If the AP is still not satisfied with the decision of the PGRC, or in the absence of any response within the stipulated time, the complainant can submit his/her grievance to the Department of Water Supply. DWS will act on behalf of the MPWT. It may consider seeking external opinion on this matter and the appeal must be solved within 20 days of receiving the appeal.

Stage 4: As a last resort, the AP may submit his/her case to the Court of Law. The complaint will be lodged with the Court of Law; the decision of the Court will be final.

Figure 8-1 GRM Procedure



170. The list of contact person for grievance procedures is summarized in the following Table.

Table 8-1 List of contact persons at the provincial and district levels

No.	Name	Position	Phone
1	Mr. Khambai Thongsavath	Xiengkhuang DPWT	02023998999
2	Mr. Bounty	Kham district, PWT Office	02055380933
3	Mr. Syphoned Phanthavong	Nonghet district Office	02056262226

171. People can also submit their grievances directly to the centralized GRM hotline of the project at 020 5836 8779.

172. The communities and individuals who believe that they are adversely affected by a WB supported project may submit complaints to existing project level grievance redress mechanism or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project related concerns. Project affected communities and individuals may submit their complaints to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the WB's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit www.worldbank.org/grs. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org

9 Annexures

Annex –1 Screening for Eligibility based on Negative List

Screening for Eligibility based on the Project’s Negative list.

The project’s negative list—meaning activities that are prohibited from receiving financing—

- i. Water treatment, water supply, sewage treatment or other works with serious adverse effects on wetlands or natural waterways, through pollution or hydrological changes.
- ii. Significant conversion or degradation of natural habitat or where the conservation and/or environmental gains do not clearly outweigh any potential losses.
- iii. Use of pesticides on the World Health Organization's Hazardous Pesticides List.
- iv. Works which would adversely affect significant cultural property, including archaeological and historical sites.
- v. Purchase or lease of land which has unclear titles.
- vi. Trade in wildlife and wildlife products is prohibited under the CITES convention.
- vii. Release of genetically altered organisms into the natural environment.
- viii. Radioactive products
- ix. Purchase of asbestos-containing products.
- x. Purchase and or trade in weapons.
- xi. Activities are likely to create adverse impacts on ethnic groups within the village and/or in neighboring villages or unacceptable to ethnic groups communities living in a village of mixed ethnic composition.

Annex –2 List of households temporarily affected by Raw Water Pipeline in Namthae clusters

No	Name	Ethnic	Land types	Village	Length meter	Agree to pass	Type of impact (P/T)
1	Mr. Payea	Hmong	Grass land	Phahan	300	Yes	T
2	Mr. Chongneng	Hmong	Grass land	Phahan	150	Yes	T
3	Community	Hmong	Grass land	Phahan	-	Yes	T
4	Mr. Yiachor	Hmong	Fallow	Phahan	200	Yes	T
5	Mr. Chorthai	Hmong	Fallow	Phahan	200	Yes	T
6	Mr. Vaxuathor	Hmong	Fallow	Phahan	200	Yes	T
7	Mr. Cherxaiya	Hmong	Fallow	Phahan	300	Yes	T
8	Mr. Xiaxengya	Hmong	Fallow	Phahan	150	Yes	T
9	Mr. Yiaxeng	Hmong	Fallow	Phahan	200	Yes	T
10	Mr. Xaochi	Hmong	Fallow	Phahan	200	Yes	T
11	Mr. Thorporthor	Hmong	Fallow	Phahan	150	Yes	T
12	Mr. Chongchua	Hmong	Fallow	Phahan	300	Yes	T
13	Mr. Tongkouthor	Hmong	Fallow	Phahan	100	Yes	T
14	Mr. Chaleeya	Hmong	Fallow	Phahan	120	Yes	T
15	Mr. Valorxiong	Hmong	Fallow	Phahan	150	Yes	T
16	Mr. Yerthor	Hmong	Fallow	Phahan	300	Yes	T
17	Mr. Chongvueya	Hmong	Fallow	Phahan	200	Yes	T
18	Mr. Vaxiong+ Cherthorya	Hmong	Fallow+ cassava	Phahan	200	Yes	T
19	Mr. Chiaxuathor	Hmong	Fallow+ Cassava	Phakok	200	Yes	T

20	Mr. Yongsalao	Hmong	Fallow+ Cassava	Phakok	500	Yes	T
21	Mr. Vangthaolor+ Vayengya	Hmong	Fallow+ Cassava	Phakok	300	Yes	T
22	Mr. Laothor	Hmong	Fallow+ Cassava	Phakok	200	Yes	T
23	Community land		Fallow	Phakok	-	Yes	T
Total (Meters)					4,620		

Annex –3 List of households temporarily affected by Raw Water Pipeline in Phienghong clusters

No.	Name	Ethnic	Land types	Length meter	Village	Type of impact (P/T)
1	Mr. Vieng	Lao	Maize field	200	Keochia	T
2	Mr. Phuone	Lao	Maize field	200	Keochia	T
3	Mrs. Choy	Lao	Maize field	200	Keochia	T
4	Mr. Sone	Lao	Maize field	150	Keochia	T
5	Mr. Khamxay	Lao	Maize field	150	Keochia	T
6	Mr. Kong	Lao	Maize field	300	Phienghong	T
7	Mr. Lamphone	Lao	Maize field	300	Phienghong	T
8	Mr. Phorpanoy	Lao	Maize field	200	Phienghong	T
9	Mr. Chanpheng	Lao	Maize field	150	Phienghong	T
10	Mr. Chanh	Lao	Maize field	150	Phienghong	T
11	Mr. Lar	Pong	Front of house	100	Phienghong	T


[Project name]

C-ESMP

Contract Package [number and Name of WSS System]

Total (meters)	2100		
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Annex-6.1 List of participants in village Phoncheng village in August 2023


Project: Scaling-Up Water Supply, Sanitation and Hygiene Project / **Credit Number:** 6375-LA / **Project Number:** P164901
Contract Name: Technical Assistance for Project Management and Implementation Support / **Contract Ref. No.:** C1/C5/07
Implementing Agency: Department of Water Supply, Ministry of Public Works and Transport

ກາລະລາງສົງຄະມະນຸນ

ຫຼັກຖານ: 19-8-2023, **ຫຼັກຖານ:** ສູນປະຊາກອນ ສາມາດ ສ້າງ ສາມາດ ສ້າງ ສາມາດ ສ້າງ ສາມາດ ສ້າງ ສາມາດ
ຊື່ບ້ານ/ບ້ານ: ບ. ສາມາດ

No	ຊື່ ນາມ ທາງສາມາດ (Name and Surname)		ເພດ (Sex)		ຕຳແໜ່ນ/ອົງການ/ອົງການ	ເບີໂທລະສັບ	ສັນຍາ
	ລາວ (Lao)	ອັງກິດ (English)	ຍິງ (F)	ຊາຍ (M)			
1	ນ. ສາມາດ			✓	ປົວ ສາມາດ	09530799	[Signature]
2	ນ. ສາມາດ			✓	ນາຍ ສາມາດ	090990098	[Signature]
3	ນ. ສາມາດ			✓		0309455105	[Signature]
4	ນ. ສາມາດ			✓			
5	ນ. ສາມາດ			✓		0904580145	[Signature]
6	ນ. ສາມາດ			✓	ນາຍ ສາມາດ	0954106251	[Signature]
7	ນ. ສາມາດ			✓		09702837	[Signature]

No	ຊື່ ນາມ ທາງສາມາດ (Name and Surname)		ເພດ (Sex)		ຕຳແໜ່ນ/ອົງການ/ອົງການ	ເບີໂທລະສັບ	ສັນຍາ
	ລາວ (Lao)	ອັງກິດ (English)	ຍິງ (F)	ຊາຍ (M)			
8	ນ. ສາມາດ			✓		090576	
9	ນ. ສາມາດ			✓		0954008	
10	ນ. ສາມາດ			✓			
11	ນ. ສາມາດ			✓			
12	ນ. ສາມາດ			✓		09018035	[Signature]
13	ນ. ສາມາດ			✓		090400100	[Signature]
14	ນ. ສາມາດ			✓			
15	ນ. ສາມາດ			✓			
16	ນ. ສາມາດ			✓			
17	ນ. ສາມາດ			✓			
18	ນ. ສາມາດ			✓			[Signature]
19	ນ. ສາມາດ			✓			[Signature]
20	ນ. ສາມາດ			✓			[Signature]

ຊື່ ພວກ ທາງພາສາລາວ (Name and Surname)		ເພດ (Sex)		ຕຳແໜ່ນ/ອົງການ/ອົງການ	ເບີໂທລະສັບ	ຮຽນສັນຍາ
ເພດ (Lao)	ຊື່/ຕຳແໜ່ນ (English)	ຜູ້ (F)	ຊາຍ (M)	Role/Organization	Telephone	Signature
21	ທ່ານ ສິມສິມ	✓			95	<i>[Signature]</i>
22	ທ່ານ ວິໄນ ສິມສິມ		✓		0101773456	<i>[Signature]</i>
23	ທ່ານ ສິມສິມ ສິມສິມ					
24	ທ່ານ ສິມສິມ ສິມສິມ				0101773456	<i>[Signature]</i>
25	ທ່ານ ສິມສິມ ສິມສິມ		✓			
26	ທ່ານ ສິມສິມ		✓		950965789	
27	ທ່ານ ສິມສິມ		✓			
28	ທ່ານ ສິມສິມ ສິມສິມ	✓		ຜູ້ແຈ້ງ ດູນ/ໂຄງ	23456789	<i>[Signature]</i>
29	ທ່ານ ສິມສິມ ສິມສິມ	✓		ຜູ້ແຈ້ງ ດູນ/ໂຄງ	56789012	<i>[Signature]</i>
30	ທ່ານ ສິມສິມ ສິມສິມ	✓		ຜູ້ແຈ້ງ	23456789	<i>[Signature]</i>

Annex-7.1 List of participants in village meeting Phonhome village in August 2023

Project: Scaling-Up Water Supply, Sanitation and Hygiene Project / Credit Number: 6375-LA / Project Number: P164901
 Contract Name: Technical Assistance for Project Management and Implementation Support / Contract Ref. No.: C1/C6/07
 Implementing Agency: Department of Water Supply, Ministry of Public Works and Transport

ຄາລະລາງສົງຄະມຽນ

ວັນທີ/Date: 10/08/2023 ທີ່/Topic: ສົງຄະມຽນກ່ຽວກັບການຈັດຕັ້ງປະຕິບັດໂຄງການນໍ້າປະປາ ໃນບ້ານໂພນໂຮມ

ບ່ອນກາງກອງ: ບ້ານໂພນໂຮມ ບໍລິເວນໂພນໂຮມ

ສະຖານທີ່/Venue: ບ້ານໂພນໂຮມ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ (Name and Surname)		ເພດ (Sex)		ຕຳແໜ່ງ/ພາກສ່ວນ	ເບີໂທລະສັບ	ລາຍເຊັນ
No	ລາວ (Lao)	ອັງກິດ (English)	ຜູ້ (F)	ຍິງ (M)	Role/Organization	Telephone	Signature
1	ທ. ສິມສິດ			✓	ສະມາຊິກ	0905557675	
2	ທ. ສິມສິດ			✓	ສະມາຊິກ	0905557675	
3	ທ. ສິມສິດ			✓	ສະມາຊິກ	0905557675	
4	ທ. ສິມສິດ			✓	ສະມາຊິກ	0905557675	
5	ທ. ສິມສິດ			✓	ສະມາຊິກ	0905557675	
6	ທ. ສິມສິດ			✓	ສະມາຊິກ	0905557675	

i. Annex-7.2 List of participants in village meeting Phonhome village in October 2024

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມໃນກອງປະຊຸມ

ວັນທີ : 15/10/2024. ສະຖານທີ່: ບ້ານ ໂພນໂຮມ, ຈຸດປະສົງຂອງກອງປະຊຸມ: ເພື່ອປຶກສາຫາລືກ່ຽວກັບການຈັດຕັ້ງປະຕິບັດໂຄງການນໍ້າປະປາ.

A. ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ (ອົງການປົກຄອງບ້ານ, ໜ່ວຍງານຈັດຕັ້ງປະຕິບັດໂຄງການ (PIU) ແລະ ອື່ນໆ) ໃນບ້ານ ໂພນໂຮມ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ຊາຍ/ຍິງ	ຊົນເຜົ່າ	ຕຳແໜ່ງ/ພາກສ່ວນ	ເບີໂທລະສັບ (ຖ້າມີ)	ລາຍເຊັນ (ຖ້າບໍ່ສາມາດເຊັນໃຫ້ຈຳໄປມີ ແລະ ຊຽນຊີໂສ)
1	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
2	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
3	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
4	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
5	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
6	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
7	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
8	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
9	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
10	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
11	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
12	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
13	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
14	ທ. ສິມສິດ	✓	ລາວ	ສະມາຊິກ	0905557675	
15						

Annex-8.1 List of participants in village meeting Namthoum village in August 2023


 Project: Scaling Up Water Supply, Sanitation and Hygiene Project / Credit Number: 479-LE / Project Number: P14001
 Contract Name: Technical Assistance for Project Management and Implementation Support / Contract Ref. No. C17/009
 Implementing Agency: Department of Water Supply, Ministry of Public Works and Transport

ឈ្មោះអ្នកចូលរួម (Participant Names)

Date: ០៧/០៨/២០២៣
 Village Name: ភូមិណាំថូម

No	ឈ្មោះ (Name)	ភេទ (English)	ប្រុស	ស្រី	អាសយដ្ឋាន (Sub-Organization)	ទូរស័ព្ទ (Telephone)	ហត្ថលេខា (Signature)
1	ឈ្មោះ ឈន់			✓	ភូមិ		
2	ឈ្មោះ ឈន់		✓		ភូមិ		
3	ឈ្មោះ ឈន់		✓		ភូមិ		
4	ឈ្មោះ ឈន់			✓	ភូមិ	030293381	
5	ឈ្មោះ ឈន់		✓		ភូមិ		
6	ឈ្មោះ ឈន់			✓	ភូមិ		
7	ឈ្មោះ ឈន់		✓		ភូមិ		
8	ឈ្មោះ ឈន់		✓		ភូមិ		
9	ឈ្មោះ ឈន់		✓		ភូមិ		
10	ឈ្មោះ ឈន់		✓		ភូមិ		
11	ឈ្មោះ ឈន់			✓	ភូមិ		

No	ឈ្មោះ (Name)	ភេទ (English)	ប្រុស	ស្រី	អាសយដ្ឋាន (Sub-Organization)	ទូរស័ព្ទ (Telephone)	ហត្ថលេខា (Signature)
12	ឈ្មោះ ឈន់		✓		ភូមិ		
13	ឈ្មោះ ឈន់			✓	ភូមិ		
14	ឈ្មោះ ឈន់		✓		ភូមិ		
15	ឈ្មោះ ឈន់			✓	ភូមិ		
16	ឈ្មោះ ឈន់		✓		ភូមិ		

Annex-8.2 List of participants in village meeting Namthoum village in October 2024

ចំនួន : ១៥នាក់
 ឈ្មោះ : ភូមិណាំថូម

A. ឈ្មោះអ្នកចូលរួម (ឈ្មោះអ្នកចូលរួម, ឈ្មោះសមាជិកក្រុមប្រឹក្សាភិបាល (PIU) និង ភូមិ) ក្នុង ភូមិណាំថូម

ល.រ	ឈ្មោះ អ្នកចូលរួម	ភេទ	ស្រី	អាសយដ្ឋាន	ទូរស័ព្ទ (លេខ)	ហត្ថលេខា (ហត្ថលេខា និង ឈ្មោះ)
1	ឈ្មោះ ឈន់	ប្រុស		ភូមិ	030293381	
2	ឈ្មោះ ឈន់	ស្រី		ភូមិ		
3	ឈ្មោះ ឈន់	ប្រុស		ភូមិ	030293381	
4	ឈ្មោះ ឈន់	ស្រី		ភូមិ		
5	ឈ្មោះ ឈន់	ប្រុស		ភូមិ		
6	ឈ្មោះ ឈន់	ស្រី		ភូមិ		
7	ឈ្មោះ ឈន់	ប្រុស		ភូមិ		
8	ឈ្មោះ ឈន់	ស្រី		ភូមិ		
9	ឈ្មោះ ឈន់	ប្រុស		ភូមិ		
10	ឈ្មោះ ឈន់	ស្រី		ភូមិ		
11	ឈ្មោះ ឈន់	ប្រុស		ភូមិ		
12	ឈ្មោះ ឈន់	ស្រី		ភូមិ		
13	ឈ្មោះ ឈន់	ប្រុស		ភូមិ		

Annex-9.1 List of participants in village meeting Phonkham village in August 2023

No	ຊື່ ແລະ ນາມສະກຸນ (Name and Surname)	ສັນຕິ (Sex)	ສາມາດ (Age)	ໜ້າທີ່/ອົງການ/ພາກສ່ວນ (Job/Organization)	ເບີໂທລະສັບ (Phone)	ຊາຍ/ຍິງ (Gender)
1	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
2	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
3	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
4	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
5	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
6	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
7	ທ່ານ ສິມສິມ			ນັກປະສານງານ		

No	ຊື່ ແລະ ນາມສະກຸນ (Name and Surname)	ສັນຕິ (Sex)	ສາມາດ (Age)	ໜ້າທີ່/ອົງການ/ພາກສ່ວນ (Job/Organization)	ເບີໂທລະສັບ (Phone)	ຊາຍ/ຍິງ (Gender)
8	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
9	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
10	ທ່ານ ສິມສິມ			ນັກປະສານງານ		
11	ທ່ານ ສິມສິມ			ນັກປະສານງານ		

Annex-9.2 List of participants in village meeting Phonkham village in October 2024

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມໃນກອງປະຊຸມ

ວັນທີ : 15/10/2024... ສະຖານທີ່: ບ້ານ ໂພນຂາມ, ຈຸດປະສົງຂອງກອງປະຊຸມ: ເພື່ອປຶກສາຫາລືກ່ຽວກັບການຈັດຕັ້ງປະຕິບັດໂຄງການນໍ້າປະປາ.

A. ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ (ອົງການປົກຄອງບ້ານ, ໜ່ວຍງານຈັດຕັ້ງປະຕິບັດໂຄງການ (PIU) ແລະ ອື່ນໆ) ໃນບ້ານ ໂພນຂາມ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ຊາຍ/ຍິງ	ຊົນເຜົ່າ	ຕໍາແໜ່ງ/ພາກສ່ວນ	ເບີໂທລະສັບ (ຖ້າມີ)	ລາຍເຊັນ (ຖ້າບໍ່ສາມາດເຊັນໃຫ້ສໍາເລັດ) ແລະ ຊາຍ/ຍິງ
1	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	0309446050	
2	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	20998 224	
3	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	22003123	
4	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	55988999	
5	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	0205991310	
6	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	020812976	
7	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	020286096	
8	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ	982727	
9	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ		
10	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ		
11	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ		
12	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ		
13	ທ່ານ ສິມສິມ	ຊາຍ	ລາວ	ນັກປະສານງານ		



Annex-16: Signed copy of the List of Affected Households in Phahan village

B. ລາຍຊື່ຄູ່ເຂົ້າຮ່ວມ (ຄົວເຮືອນທີ່ໄດ້ສັບຜົນກະທົບຊົ່ວຄາວ) ຕູ້ທີ່ໄດ້ນຳມາສື່ກຳຂອງຕົນເອງໄດ້ໄດ້ສັບຜົນກະທົບຈາກການວາງແລະສຳນຳດິນຂອງນ້ຳປະປາຄຸນນຳນ ນ້ຳເຂົ້າ ຂອງບ້ານ ຕາຫານ.

ລ/ດ	ຊື່ຄົວ	ຊື່ ແມ່	ສົມເທົ່າ	ອາໄສບ້ານທີ່ ຂອງ ຄອບຄົວ	ເບີໂທລະ ສັບ (ບໍ່ ມີ)	ບ່ອນອາໄສ ໄດ້ສັບຜົນ ກະທົບ	ລວມ ຄາວ (ເມັດ)	ເສັ້ນໄຟ ຕາມ ຕາມ	ນາມເຮືອ ຄອບ ຄຳ ນາມໄດ້ມີຂອງຄູ່ເຂົ້າ ສັບຜົນກະທົບ
1.	ສຳນວນ ປາເປີ(ກຸນແຈ້ງງຽງ)	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	01558 01	ບ່ອນອາໄສ	300	1000	ບ່ອນອາໄສ
2.	ສຳນວນ ປາເປີ(ກຸນແຈ້ງງຽງ)	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	250	1000	ບ່ອນອາໄສ
3.	ສຳນວນ ແບຍຈີ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	00000 000	ບ່ອນອາໄສ	200	1000	ບ່ອນອາໄສ
4.	ສຳນວນ ຈິນ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	200	1000	ບ່ອນອາໄສ
5.	ສຳນວນ ວາຊິວສີ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	200	1000	ບ່ອນອາໄສ
6.	ສຳນວນ ເຈີເຊຍາ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	200	1000	ບ່ອນອາໄສ

7.	ສຳນວນ ເສຍເຊີງຢາ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	00000 000	ບ່ອນອາໄສ	150m	1000	ບ່ອນອາໄສ
8.	ສຳນວນ ແບຍເຊີງ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	00000 000	ບ່ອນອາໄສ	150m	1000	ບ່ອນອາໄສ
9.	ສຳນວນ ເສີຍາ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	00000 000	ບ່ອນອາໄສ	200m	1000	ບ່ອນອາໄສ
10.	ສຳນວນ ວິທີ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	00000 000	ບ່ອນອາໄສ	200m	1000	ບ່ອນອາໄສ
11.	ສຳນວນ ປາເປີ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	200 m	1000	ບ່ອນອາໄສ
12.	ສຳນວນ ຕາວິນ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	03000 01865	ບ່ອນອາໄສ	300m	1000	ບ່ອນອາໄສ
13.	ສຳນວນ ຈາຊິຍາ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	700 m	1000	ບ່ອນອາໄສ
14.	ສຳນວນ ຫວາວິນ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ	03000 01865	ບ່ອນອາໄສ	100	1000	ບ່ອນອາໄສ
15.	ສຳນວນ ເສີຍາ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	150	1000	ບ່ອນອາໄສ
16.	ສຳນວນ ຈາຊິຍາ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	300 m	1000	ບ່ອນອາໄສ
17.	ສຳນວນ ວາຊິວສີ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	200	1000	ບ່ອນອາໄສ
18.	ສຳນວນ ເຈີເຊຍາ	ນາງ ສິງ	ຍີ	ບ່ອນອາໄສ		ບ່ອນອາໄສ	200	1000	ບ່ອນອາໄສ

Annex-17: Signed copy of the List of Affected Households in Phakok village Oct 2024

B. ឧបត្ថម្ភដោះស្រាយ (កិច្ចសន្យាស្តីពីការសាងសង់ប្រព័ន្ធបង្គោលស្រោចទឹក) ក្នុងតំបន់ភ្នំកែវខេត្តកែប ដែលបានប៉ះពាល់ដោយការសាងសង់ប្រព័ន្ធបង្គោលស្រោចទឹក ក្នុងតំបន់ភ្នំកែវខេត្តកែប ខេត្តកែប កម្ពុជា

ល.រ	ឈ្មោះ	ស្រុក	ភេទ	ថ្ងៃខែឆ្នាំ	លិខិតសម្រេច (លេខ)	ស្ថានភាព	លេខ ទូរស័ព្ទ	ស្នាក់នៅ	ស្នាក់នៅ
1	គាត់ ឃុនស៊ីង	ភ្នំកែវ	♂	៧/១	១២៧/២១២	ស្រេចស្រេច	200	ភ្នំកែវ	✓
2	គាត់ ហ៊ុនស៊ីង	ភ្នំកែវ	♂	២៩	០៣៥៤៦ ៤៣៩៩	ស្រេចស្រេច	500	ភ្នំកែវ	✓
3	គាត់ ឈុនស៊ីង	ភ្នំកែវ	♂	២/១២	០៣០៩៦ ០៣០៩៨	ស្រេចស្រេច	3000	ភ្នំកែវ	✓
4	គាត់ ឃុនស៊ីង	ភ្នំកែវ	♂	៧/១	០៣០២១៣១	ស្រេចស្រេច	200	ភ្នំកែវ	✓

Annex-18.1 List of participants in Phienghong village meeting of Phienghong cluster in August 2023

កម្រិត ៤៧៧



Project: Sealing Up Water Supply, Sanitation and Hygiene Project / Credit Number: 6375-LA / Project Number: P164901
 Contract Name: Technical Assistance for Project Management and Implementation Support / Contract Ref. No.: C/CS/W
 Implementing Agency: Department of Water Supply, Ministry of Public Works and Transport

ឈ្មោះអ្នកចូលរួម (Participant Names)

ស្ថិតិ/Date: កិច្ចសន្យា/Topic:

ល.រ	ឈ្មោះ (Name)		ភេទ (Sex)		តំបន់/ស្ថានភាព/ស្ថាប័ន	លេខទូរស័ព្ទ	ហត្ថលេខា
	ខ្មែរ (Khmer)	អង់គ្លេស (English)	ប្រុស (M)	ស្រី (F)			
1	ឈុន ស៊ីង		✓		ស. ឈុន ស៊ីង	០១០២៤៥៦៧៨	✓
2	ឈុន ស៊ីង		✓		ឈុន ស៊ីង		✓
3	ឈុន ស៊ីង		✓		ឈុន ស៊ីង		✓
4	ឈុន ស៊ីង		✓		ឈុន ស៊ីង		✓
5	ឈុន ស៊ីង		✓		ឈុន ស៊ីង		✓
6	ឈុន ស៊ីង		✓		ឈុន ស៊ីង	០៣០៤៥៦៧៨	✓
7	ឈុន ស៊ីង		✓		ឈុន ស៊ីង	០៣០៥៦៧៨៩	✓
8	ឈុន ស៊ីង		✓		ឈុន ស៊ីង		✓
9	ឈុន ស៊ីង		✓		ឈុន ស៊ីង	០៣០៤៥៦៧៨	✓
10	ឈុន ស៊ីង		✓		ឈុន ស៊ីង		✓
11	ឈុន ស៊ីង		✓		ឈុន ស៊ីង		✓

កម្រិត ៤៧៧

ល.រ	ឈ្មោះ (Name)		ភេទ (Sex)		តំបន់/ស្ថានភាព/ស្ថាប័ន	លេខទូរស័ព្ទ	ហត្ថលេខា
	ខ្មែរ (Khmer)	អង់គ្លេស (English)	ប្រុស (M)	ស្រី (F)			
12	ឈុន ស៊ីង		✓		ឈុន ស៊ីង	០៤៥៦៧៨៩	✓
13	ឈុន ស៊ីង		✓		ឈុន ស៊ីង	០៥៦៧៨៩០	✓
14	ឈុន ស៊ីង		✓		ឈុន ស៊ីង	០៦៧៨៩០១	✓
15	ឈុន ស៊ីង		✓		ឈុន ស៊ីង	០៧៨៩០១២	✓




 Project: Scaling-Up Water Supply, Sanitation and Hygiene Project / Credit Number: 6375-LA / Project Number: P164901
 Contract Name: Technical Assistance for Project Management and Implementation Support / Contract Ref. No.: C/CS/07
 Implementing Agency: Department of Water Supply, Ministry of Public Works and Transport

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກະຊວງ (Participant Names)

Date: 20/07/2023 - Topic: ສົ່ງຮັບແຜນວຽກວິໄນ: ທີ່ບໍລິເວນກະຊວງ ສະໜອງນ້ຳສະຫງວນນ້ຳສະໜອງນ້ຳປະຈຳປະເພດ

Venue: ບັນດາພູມສັນ

No	Name		Sex		Role/Organization	Telephone	Signature
	(Lao)	(English)	Male	Female			
1	ທ. ສິມາ			✓		30 9246867	
2	ທ. ສິມາ		✓				
3	ທ. ສິມາ		✓				
4	ທ. ສິມາ		✓				
5	ທ. ສິມາ		✓				
6	ທ. ສິມາ		✓				
7	ທ. ສິມາ		✓				
8	ທ. ສິມາ		✓				
9	ທ. ສິມາ		✓				
10	ທ. ສິມາ		✓				











 Project: Scaling-Up Water Supply, Sanitation and Hygiene Project / Credit Number: 6375-LA / Project Number: P164901
 Contract Name: Technical Assistance for Project Management and Implementation Support / Contract Ref. No.: C/CS/07
 Implementing Agency: Department of Water Supply, Ministry of Public Works and Transport

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກະຊວງ (Participant Names)

Date: - Topic:

Venue:

No	Name		Sex		Role/Organization	Telephone	Signature
	(Lao)	(English)	Male	Female			
11	ທ. ສິມາ			✓	ສະໜອງນ້ຳສະຫງວນນ້ຳສະໜອງນ້ຳປະຈຳປະເພດ	0304441692	
12	ທ. ສິມາ		✓		ສະໜອງນ້ຳສະຫງວນນ້ຳສະໜອງນ້ຳປະຈຳປະເພດ		
13	ທ. ສິມາ		✓		ສະໜອງນ້ຳສະຫງວນນ້ຳສະໜອງນ້ຳປະຈຳປະເພດ	0304441692	
14	ທ. ສິມາ		✓		ສະໜອງນ້ຳສະຫງວນນ້ຳສະໜອງນ້ຳປະຈຳປະເພດ	93 8759180	
15	ທ. ສິມາ		✓				
16	ທ. ສິມາ		✓				
17	ທ. ສິມາ		✓				
18	ທ. ສິມາ		✓				

Annex-18.2 List of participants in Phienghong village meeting of Phienghong cluster in October 2024

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມໃນກອງປະຊຸມ

ວັນທີ : 19/10/2024... ສະຖານທີ່: ຫ້ອງການກຸ່ມບ້ານບໍ່ເຍຍ, ຈຸດປະສົງຂອງກອງປະຊຸມ: ເລືອກສາຂາສື່ງ່ວກັບການຈັດຕັ້ງປະຕິບັດໂຄງການນ້ຳປະປາ.

A. ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ (ອົງການປົກຄອງບ້ານ, ຫ້ວຍງານຈັດຕັ້ງປະຕິບັດໂຄງການ (PIU) ແລະ ອື່ນໆ) ໃນບ້ານ ພຽງຫີງ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ຊາຍ/ຍິງ	ຊົນເຜົ່າ	ຕຳແໜ່ງ/ພາກສ່ວນ	ເບີໂທລະສັບ (ຖ້າມີ)	ລາຍເຊັນ (ຖ້າບໍ່ສາມາດເຊັນໃຫ້ຈຳໄປດີ ແລະ ຊຽນສີໃສ)
1	ທ. ຫຼ້າ ບົວ ພັນ	ຊາຍ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0309984784	
2	ນ. ສິມພອນ ສິດທິ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	99322132	
3	ສິມພັນ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0901100050	
4	ທ. ສິມພອນ	ຊາຍ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0901528827	
5	ນ. ສິມພອນ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	09095667113	
6	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0902495992	
7	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0909591429	
8	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0909591429	
9	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0909591429	
10	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	03021409870	
11	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0908757155	
12						
13						

Annex-19 List of participants in Keochia village meeting of Phienghong cluster in October 2024

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມໃນກອງປະຊຸມ

ວັນທີ : 19/10/2024 ສະຖານທີ່: ຫ້ອງການກຸ່ມບ້ານແກ່ວເຈີຍ, ຈຸດປະສົງຂອງກອງປະຊຸມ: ເລືອກສາຂາສື່ງ່ວກັບການຈັດຕັ້ງປະຕິບັດໂຄງການນ້ຳປະປາ.

A. ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ (ອົງການປົກຄອງບ້ານ, ຫ້ວຍງານຈັດຕັ້ງປະຕິບັດໂຄງການ (PIU) ແລະ ອື່ນໆ) ໃນບ້ານ ແກ່ວເຈີຍ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ຊາຍ/ຍິງ	ຊົນເຜົ່າ	ຕຳແໜ່ງ/ພາກສ່ວນ	ເບີໂທລະສັບ (ຖ້າມີ)	ລາຍເຊັນ (ຖ້າບໍ່ສາມາດເຊັນໃຫ້ຈຳໄປດີ ແລະ ຊຽນສີໃສ)
1	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ		
2	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ		
3	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ		
4	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ		
5	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ		
6	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0902888970	
7	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0909102132	
8	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ		
9	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0909059100	
10	ນ. ສິມ	ຍິງ	ລາວ ລຸ່ມ	ປະທານ ບ້ານ	0909102132	
11						
12						
13						

Annex-22 Signed copy of the List of Affected Households in Phienghong village Oct 2024

B. ມາຍຊື່ຜູ້ເຮົາຂວມ (ຄົວເຮືອນທີ່ໄດ້ຮັບຜົນກະທົບຊົ່ວຄາວ) ຜູ້ທີ່ຜົນກະທົບກໍ່ຂອງຕົນເອງໄດ້ໄດ້ຮັບຜົນກະທົບຈາກການວາງແລວສໍາຜັດຂອງນໍ້າປະປາກຸ່ມບ້ານ ໃບຊຽງສ້າງ ຂອງບ້ານ ຊຽງສ້າງ.

ລ/ດ	ຊື່ ຜົນ	ຊື່ເພຍ	ຊົນເຜົ່າ	ອາໄສບ້ານໃນສ່ວນໃດຂອງ ກອບຄົວ	ຜູ້ໂທລະສັບ (ຖ້າມີ)	ປະເພດດິນ ໄດ້ຮັບຜົນ ກະທົບ	ລອງ ຍາວ (ເມັດ)	ເຜົາໂສ້ ສາມ	ມາຍເຮືອນ ຂະໜາດ ຂອງຜູ້ໄດ້ຮັບຜົນ ກະທົບ
1	ອ້າວ ກອງ	ມ. ງຸ້ງ	ລາວ	ປະຊາຊົນ		ໄຂ່ສາມີ	150	ເບີໂທລະສັບ	
2	ອ້າວ ຜ່າຍອນ	ມ. ງຸ້ງ	ລາວ	ປະຊາຊົນ		ໄຂ່ສາມີ	150	ເບີໂທລະສັບ	
3	ອ້າວ ຜ່າຍອນ	ມ. ສາກເກັ້ວ	ລາວ	ປະຊາຊົນ		ໄຂ່ສາມີ	200	ເບີໂທລະສັບ	
4	ອ້າວ ຈົນເຮັງ	ມ. ໂພ້ນ	ລາວ	ປະຊາຊົນ		ໄຂ່ສາມີ	200	ເບີໂທລະສັບ	
5	ອ້າວ ຈົນ	ມ. ໂພ້ນ	ລາວ	ປະຊາຊົນ		ໄຂ່ສາມີ	250	ເບີໂທລະສັບ	
6	ອາ. ຫຼັງ	ມ. ວັນນະ	ໄທ	ອາ. ຈາກຊຸມ		ໄຂ່ສາມີ	200	ເບີໂທລະສັບ	

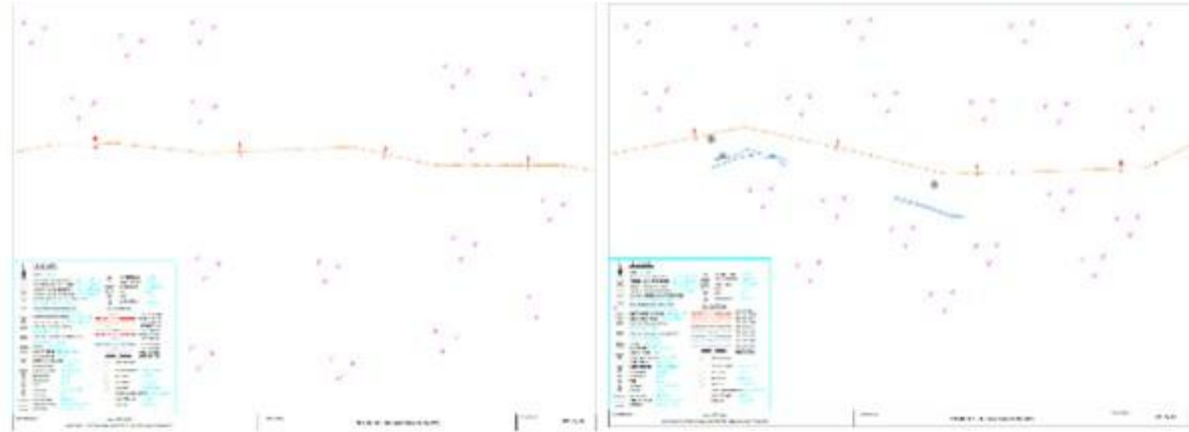
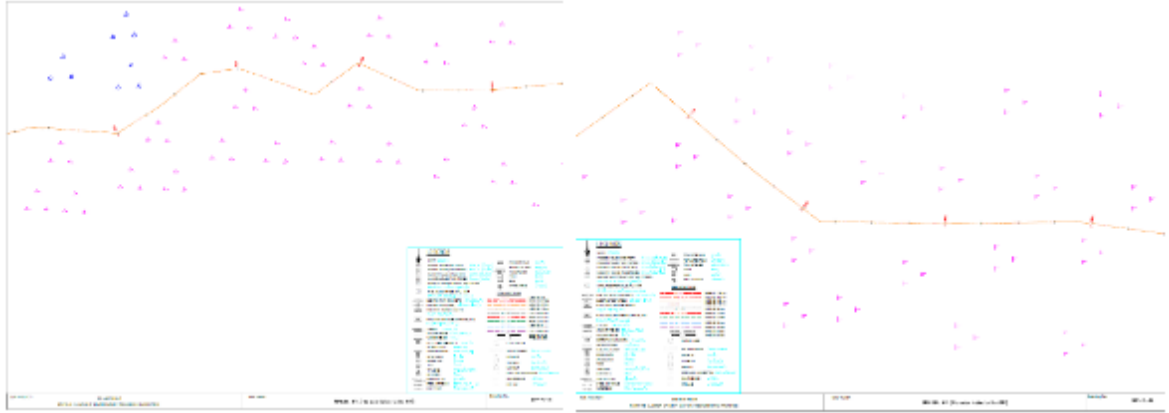
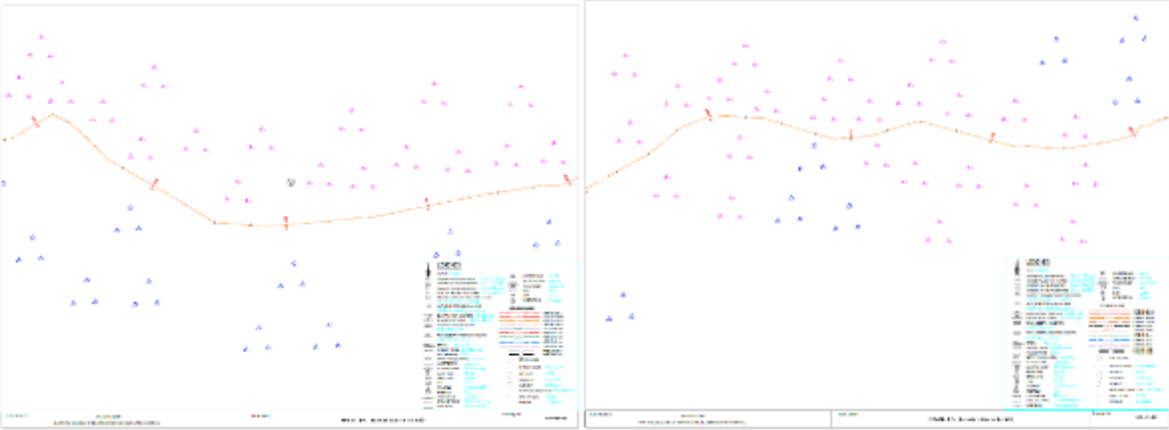
Annex-23 Signed copy of the List of Affected Households in Keochia village Oct 2024

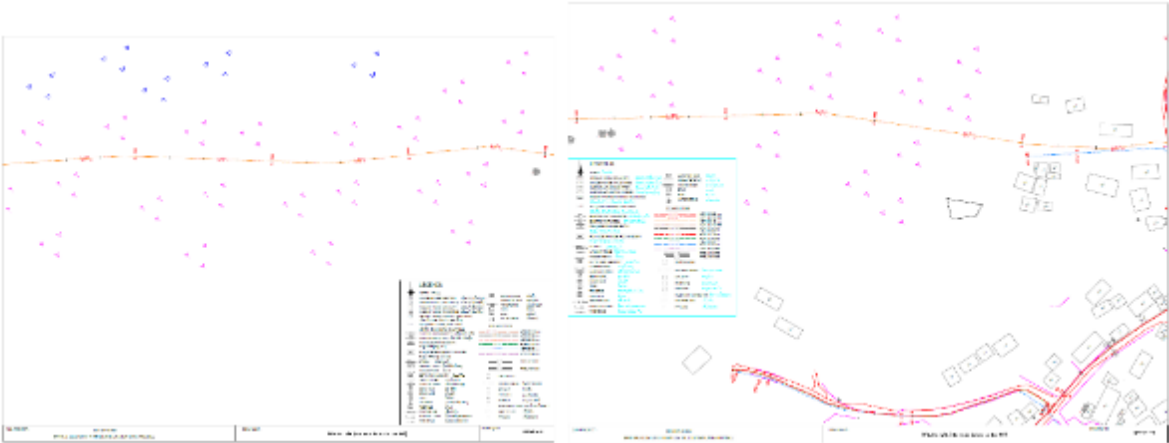
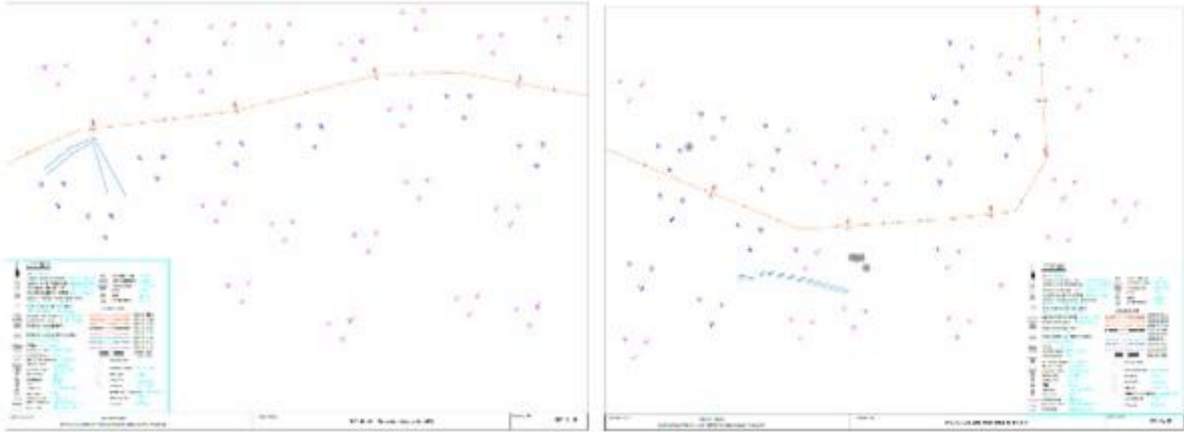
B. ມາຍຊື່ຜູ້ເຮົາຂວມ (ຄົວເຮືອນທີ່ໄດ້ຮັບຜົນກະທົບຊົ່ວຄາວ) ຜູ້ທີ່ຜົນກະທົບກໍ່ຂອງຕົນເອງໄດ້ໄດ້ຮັບຜົນກະທົບຈາກການວາງແລວສໍາຜັດຂອງນໍ້າປະປາກຸ່ມບ້ານ ຊຽງສ້າງ ຂອງບ້ານ ຫາວເຈີຍ.

ລ/ດ	ຊື່ ຜົນ	ຊື່ເພຍ	ຊົນເຜົ່າ	ອາໄສບ້ານໃນສ່ວນໃດຂອງ ກອບຄົວ	ຜູ້ໂທລະສັບ (ຖ້າມີ)	ປະເພດດິນ ໄດ້ຮັບຜົນ ກະທົບ	ລອງ ຍາວ (ເມັດ)	ເຜົາໂສ້ ສາມ	ມາຍເຮືອນ ຂະໜາດ ຂອງຜູ້ໄດ້ຮັບຜົນ ກະທົບ
1	ອ້າວ ດຽງ	ມ. ງຸ້ງ	ລາວ	ອາ. ຈາກຊຸມ ສັດ		ໄຂ່ສາມີ	200	ເບີໂທລະສັບ	
2	ອ້າວ ສອນ	ມ. ງຸ້ງ	ລາວ	ອາ. ຈາກຊຸມ ສັດ		ໄຂ່ສາມີ	150	ເບີໂທລະສັບ	
3	ນາງ ຈ່ອນ	ອາ. ໂພ້ນ	ລາວ	ອາ. ຈາກຊຸມ ສັດ		ໄຂ່ສາມີ	200	ເບີໂທລະສັບ	
4	ອ້າວ ສອນ	ມ. ງຸ້ງ	ລາວ	ອາ. ຈາກຊຸມ ສັດ		ໄຂ່ສາມີ	200	ເບີໂທລະສັບ	
5	ອາ. ສິນທິ	ມ. ງຸ້ງ	ໄທ	ອາ. ຈາກຊຸມ ສັດ		ໄຂ່ສາມີ	200	ເບີໂທລະສັບ	

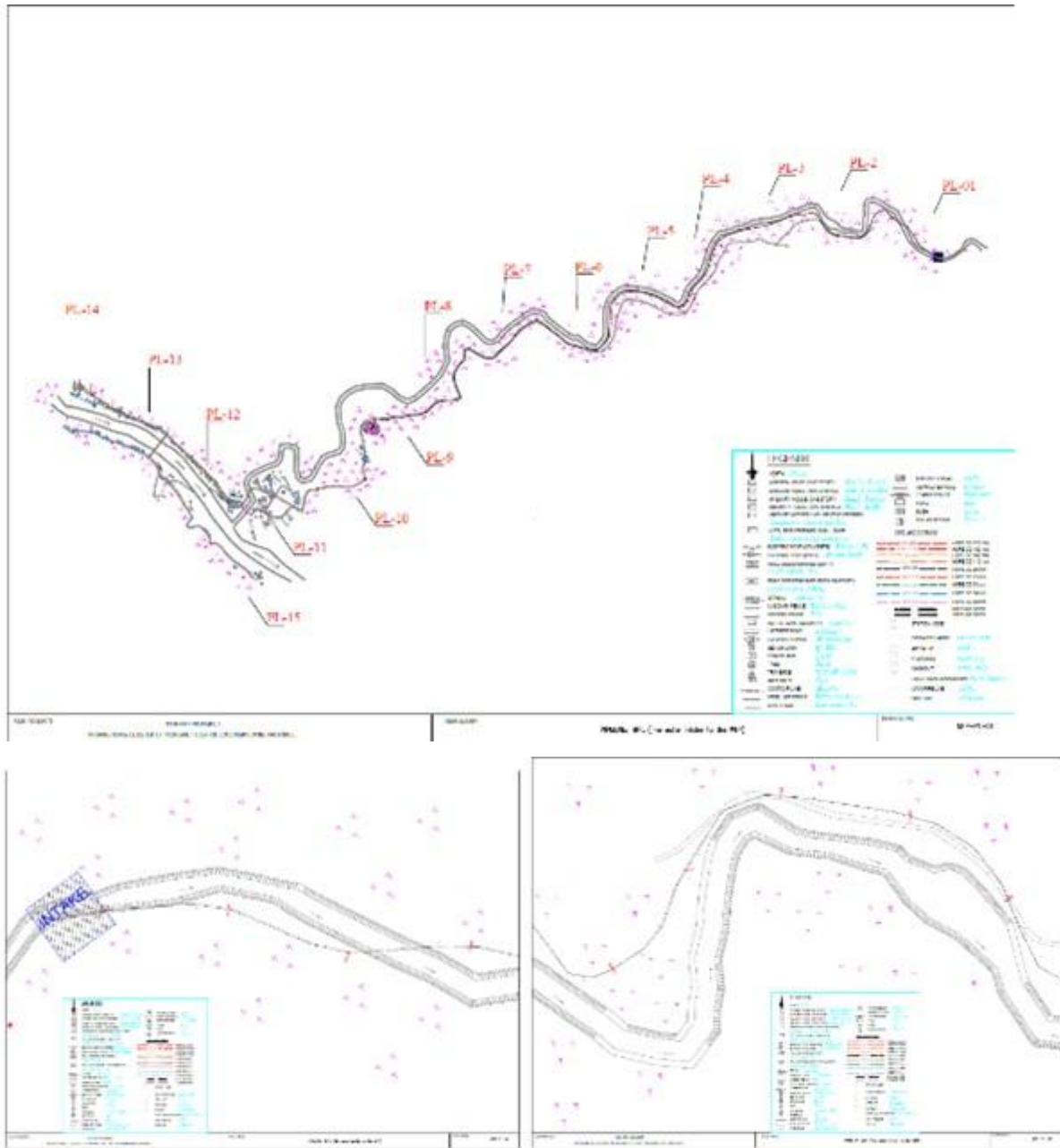
Annex-24 – Pipeline Alignment Namthae WSS Cluster of Kham District

LEGENDS		
	NORTH	ທິດເໜືອ
	WOODEN HOUSE (ONE STORY)	ເຮືອນໄມ້ (ຊັ້ນດຽວ)
	WOODEN HOUSE (TWO STORIES)	ເຮືອນໄມ້ (ສອງຊັ້ນ)
	MASONRY HOUSE (ONE STORY)	ເຮືອນກີ່ (ຊັ້ນດຽວ)
	MASONRY HOUSE (TWO STORIES)	ເຮືອນກີ່ (ສອງຊັ້ນ)
	MASONRY+WOODEN HOUSE (TWO STORIES)	ເຮືອນວິນລາ + ເຮືອນໄມ້ (ສອງຊັ້ນ)
	HUTS, RICE STORAGE, SMALL SHOP	ເລົ້າເຂົ້າ, ຮ້ານຂາຍເຄື່ອງ ຂະໜາດນ້ອຍ
	ELECTRIC POST (CONCRETE)	ເສົາໄຟຟ້າ ເປຕົງ
	ELECTRIC POST (STEEL)	ເສົາໄຟຟ້າ ເສົາເຫຼັກ
	ROAD SIDE DRAINAGE (EARTH)	ຮ່ອງນ້ຳ ຂ້າງທາງ (ດິນ)
	ROAD SIDE DRAINAGE (ROCK MASONRY)	ຮ່ອງນ້ຳ ຂ້າງທາງ (ກີ່ຫີນຜຸ)
	STREAM	ຫ້ວຍ/ແມ່ນ້ຳ
	MASONRY FENCE	ຮົ່ວກີ່ເປັນກີ່ແຜງ
	WOODEN FENCE	ຮົ່ວໄມ້
	LATERITE ROAD	ທາງດິນແດງ
	ELECTRIC TOWER	ເສົາໄຟຟ້າແຮງສູງ
	BENCHMARK	ຫຼັກ BM
	BUSH	ຝຸມໄມ້
	GRASS LAND	ທີ່ງຫຍ້າ
	TREE	ຕົ້ນໄມ້
	RICE FIELD	ທີ່ງນາ
	CONCRETE SLAB	ຢູ່ເບຕົງ
	ASPHALTED ROAD	ທາງຢູ່ຢາງ
	TRANSFORMER	ຫໍແປງໄຟຟ້າ
	POND	ໜອງ
	WATER SPRING	ນ້ຳອອກບໍ່
	TRAVERSE	ຈຸດວາງເຄົ້າ (ຝັກັດ)
PIPE AND FITTINGS		
	HDPE OD 225	HDPE OD 225 mm
	HDPE OD 180	HDPE OD 180 mm
	HDPE Ø150	HDPE OD 150 mm
	HDPE Ø110	HDPE OD 110 mm
	HDPE Ø90	HDPE OD 90 mm
	HDPE DN75	HDPE OD 75 mm
	HDPE Ø63	HDPE OD 63 mm
	HDPE Ø50	HDPE OD 50 mm
	HDPE Ø40	HDPE OD 40 mm
	PIPELINE NODE	PIPELINE NODE
	O1	STATION NODE
	0+000	DISTANCE MARKS ໄລຍະການໝາຍ
	A	AIR VALVE ປະຕູລົມ
	H	HYDRANTS ກ້ອກດັບເຜິງ
	W	WASHOUT ປະຕູລະບາຍນ້ຳ
	C1	RIDER MAIN CONNECTION ຫໍ່ແຈກນ້ຳສະອາດ
	MPL	MAIN PIPE LINE ຫໍ່ນ້ຳຕົບ
	PL	PIPE LINE ຫໍ່ນ້ຳສະອາດ

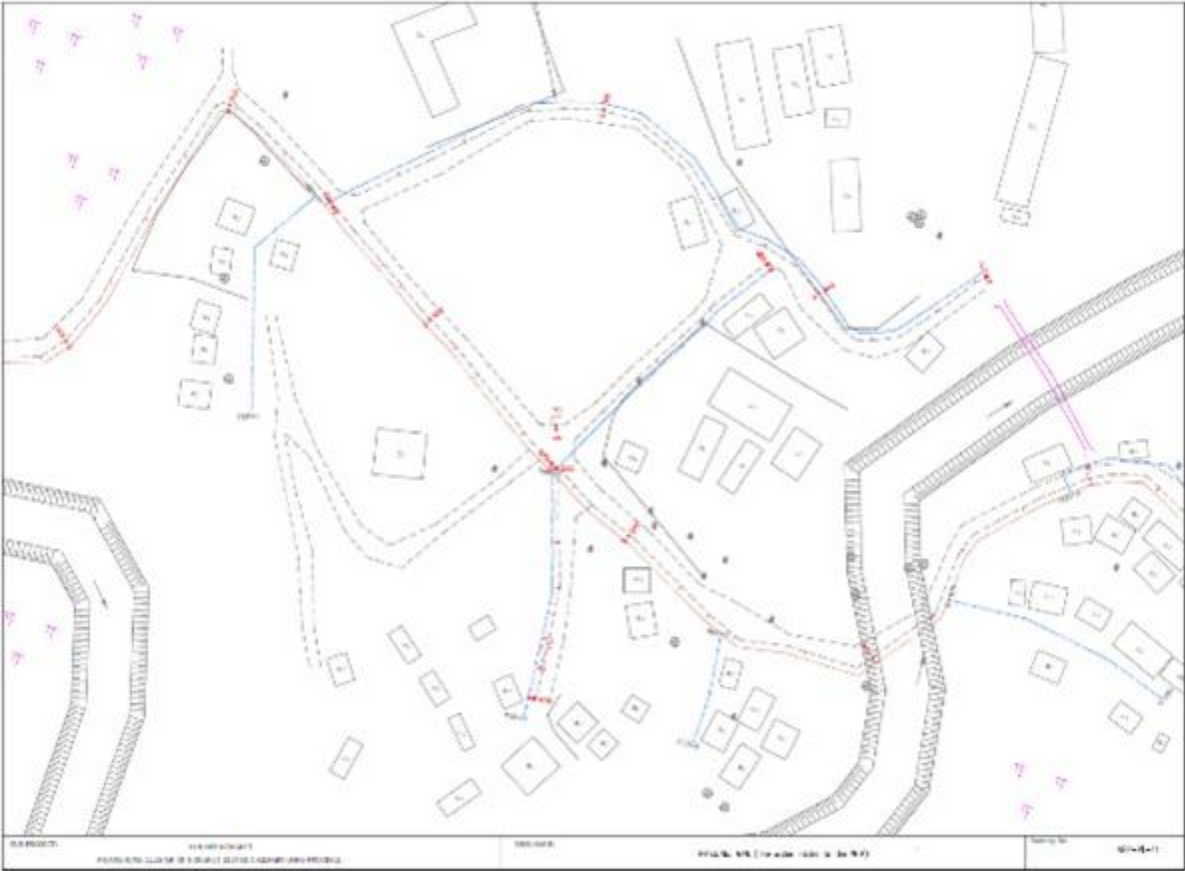




Annex-25 Pipeline Alignment Phienghong WSS Cluster of Nonghet District







Annex-26 Draft Template for Contractor’s Environmental and Social Management Plan (C-ESMP)

(to be used by Construction Supervisors)

Scaling-Up Water Supply, Sanitation, and Hygiene Project

IDA Project No.: SWSSHP (P-164901)

Subproject: Construction of Water Supply Systems (Nam Papa) in

CONTRACTOR'S ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (C-ESMP)

for

Water Supply Systems (Nam Papa) inCluster ofdistrict

Contract Package: C1/W/.....

District/Villages: Village, district

Name of Contractor:

Month [] Year []

GENERAL INFORMATION

1. Contract Package	[contract code] [Scope of work]
2. Contractor	Contractor [name] Address: [] Representative: [name] Position: [] Mobile Phone: Email:
3. Contract Duration	Contract signing date: Start Date [] End Date [] (Total days:)
4. Contractor's reviewer	
5. Issuance Date	
6. PMU/CSC Reviewer)	
7. Date of Approval	
8. Distributed to	

CONTRACTOR'S COMMITMENT

We are [name of contractor], the entity that will execute the [code and name of contract package, work content] of the [name of Project].

At required by the Project, herewith we submit the **Contractor's Environmental and Social Management Plan (C-ESMP)** for the above-mentioned contract package for consideration and approval by the CSC/PMU.

We know that there are potential environmental, health and safety risks and negative impacts at the constructions sites and at places disturbed by the construction activities. There are also the risks of social impacts and disturbances to the local communitites and the public caused by construction activiteis and the labour influx. We are committed to comply with the Project's ESMP requirements, the Environmental, Social, Health and Safety provisions stated in the bidding documents and construction contract. We also commit to fully implement measures to mitigate impacts and manage environmental, social, health and safety risks as highlighted in this C-ESMP throughout the implementation of this package.

CONTRACTOR'S REPRESENTATIVE

[sign]

I LEGAL BASIS

The Contractor's Environmental and Social Management Plan (C-ESMP) of the Contract package [Code] has been prepared based on Lao's laws and legal regulations as listed in the Project's Environmental and Social Management Framework and the approved Environmental and Social Management Plan (ESMP) prepared for [name] Province. This plan will also comply with the Environmental, Social, Health and Safety (ESHS) requirements specified in the bidding document.

[specify if there is any updated legislations. Delete this paragraph is there is no update]

II CONTRACTOR'S POLICIES ON ESHS

[Describe and list the objectives and policies on ESHS the contractor has been applying to the works the contractor is performing and/or will perform when implementing the contract]

III WORK CONTENTS OF THE CONTRACT PACKAGE

Contents of work **Package** [name and scope of work under the contract]

3.1 Construction Location:

Contract Package [Code and name] will be constructed in the area of [name the province, district, communes and villages]. The location map of the project area are shown in **Figure 1**.

[add maps showing the location of all work and ancillary work items, including the water intake, water treatment plants and access roads, transmission and distribution pipelines, worker's camps and accommodation, parking and storage areas, disposal sites etc.]

Figure 1 – Project Locations

3.2 Basic Technical Information

[Provide key technical parameters and diagrams of EACH work item as relevant].

3.2.1 Resources Mobilised and Emissions

Table 1 - Machinery and equipment

Item	Quantity	Status
Excavator		
Crane		
....		

Table 2 – Workers Mobilised

Site	Total	Male	Female	Local Labors
Intake				
WTP and Ancillary Works				
Pipelines				
Office				

Table 3 – Workers Accommodations

Site	Rent/Install	Descriptions and photos
Intake		[provide information about locations, size, arrangements for electricity/ water supply/ drainage/sanitation, safety instruments such as first aid kits, portable fire prevention bottles etc.]
WTP and Ancillary Works		
Pipelines		
Office		

Table 4 – Earthworks

	Location	Filling	Excavation	Reuse	Disposal
1	Intake				
2	WTP sites				
3	Pipelines				
4	Office				

Table 5 -Source of Filling Materials

	Location	Licensed/Agreements	Descriptions
1	Intake		
2	WTP sites		
3	Pipelines		
4	Office		

Table 6 - Disposal Option

	Location	Licensed/Agreements	Descriptions
1	Intake		
2	WTP sites		
3	Pipelines		

Transportation Routes

Ancillary work items and arrangements as relevant:

- Electricity and Water Supply at the construction site
 - Workers's accommodation
- Disposal Sites

3.2.2 Water Intake

[Drawing showing the structure, the layout showing the construction site, camps, parking and storage areas, flow diversion, etc. and photos showing the locations and existing conditions with layout)

Location:

Construction duration: [from dd/mm/yy.... To dd/mm/yy]

Accessibility from the main road

[describe how to access to the water intake site from the main road]

3.2.3 Water Treatment Plant and Access Road, Power lines and Substation

[Drawing showing the structure, the layout showing the construction site, camps, parking and storage areas, flow diversion, etc. and photos showing the locations and existing conditions with layout)

Location:

Construction duration: [from dd/mm/yy.... To dd/mm/yy]

Accessibility from the main road

[describe how to access to the water intake site from the main road]

Ancillary work items and arrangements as relevant:

- Electricity and Water Supply at the construction site

3.2.4 WTP Office

[Drawing showing the structure, the layout showing the construction site, camps, parking and storage areas, flow diversion, etc. and photos showing the locations and existing conditions with layout]

Location:

Construction duration: [from dd/mm/yy.... To dd/mm/yy]

Ancillary work items and arrangements as relevant:

- Electricity and Water Supply at the construction site

3.2.5 Pipelines System (Transmissions and Distribution)

[Drawing showing the pipeline alignment, camps, parking and storage areas, flow diversion, etc. and photos showing the locations and existing conditions with layout]

Location:

Construction duration: [from dd/mm/yy.... To dd/mm/yy]

[Map, photos of the dumping area and transportation route]

3.2.6 Licenses and Agreements

[List the types of licenses and agreements contractors required to obtain]

III ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS, MITIGATION MEASURES

4.1. Main Physical Activities

Table 7 – Physical Interventions

	Location	Main Physical Activities (in sequence and duration)
1	Intake	
2	WTP sites	
3	Pipelines	
4	Office	

4.2 Common Construction Activities

[List the main construction activities the contractor will perform (e.g. site clearing, camping, temporary warehouses, mobilizing machinery workers and supplies, earthworks, casting piles, drilling, piling, piling, piling, beaming, etc., finishing, returning, cleaning] depending on the characteristics of each package. Such activities will help clarify/guide the source of impact and the types of possible impacts]

The main construction activities that will take place during the construction phase include [below are just examples, let's update]:

- Vegetation clearing, clearing of premises
- Build camps, construction site offices, pile casting yards, ...
- Mobilize machinery and workers to the construction site
- Earthworks
- Blocking the flow of construction, Construction and installation of works
- Crane loading and unloading temporary gathering of materials (rainwater drainage pipes, earthworks, stones, sand ...)
- Transporting waste to landfills...

4.2 General Impact and mitigation measures

Referring to the ESMP, the Contractor has identified the socio-environmental impacts and risks of the package as below [the contractor reviews and re-examines the general impact list, below is just a suggestion]:

- Generation of dust, exhaust gases, odors, noise, vibration
- Generation of solid waste from excavated soil, dredged sludge, construction waste and domestic waste from camps
- Risks of w pollution due to increased turbidity, grease, ecoli from stormwater runoff and wastewater emission
- Sedimentation and local waterlogging
- Impacts and risks at quarries and borrowed land mines such as loss of vegetation and vegetation cover, soil slippage, erosion, safety risks, etc.
- Disturbance, damage to vegetation and greenery cover
- Disturbances and increased traffic safety risks
- Damage existing infrastructure and/or disrupt related services
- Social disturbances, local insecurity and order related to worker concentration
- Risks to community and workers
- There may be cultural, historical, archaeological artifacts revealed during earthworks.

For the general impacts of construction activities listed above, the construction unit will organize the implementation of measures to reduce MXSA impacts and risks in accordance with the Environmental Codes of Practice (ECOPs) and require workers to comply with the Code of Conduct presented in Table 4 below.

4.3. Site specific and Type specific Mitigation Measures

[prepare with reference to ESMP and construction progress]

Table 9 – Site/Type Specific Mitigation Measures at Intake

	Location	Photos	Existing Conditions and Risks	Mitigation Measures
1				

Table 10 – Site/Type Specific Mitigation Measures at WTP

	Location, main construction activity	Photos	Existing Conditions and Risks	Mitigation Measures
1				

Table 11 – Site/Type Specific Mitigation Measures along Access Road

	Location, main construction activity	Photos	Existing Conditions and Risks	Mitigation Measures
1				

Table 12 – Site/Type Specific Mitigation Measures at Office

	Location, main construction activity	Photos	Existing Conditions and Risks	Mitigation Measures
1				

Table 13 – Site/Type Specific Mitigation Measures along Transmission Pipelines

	Location, main construction activity	Photos	Existing Conditions and Risks	Mitigation Measures
1				

	Location, main construction activity	Photos	Existing Conditions and Risks	Mitigation Measures

Table 14 – Site/Type Specific Mitagation Measures along Distribution Pipelines

	Location, main construction activity	Photos	Existing Conditions and Risks	Mitigation Measures
1				

Others

Camps

ESHS issues that may arise in relation to workers include (hereinafter are only suggestions);

- Generation of solid waste and domestic wastewater from camps. If waste and wastewater are not managed well, it can cause odors, water pollution, soil pollution, affect aesthetics in the area, and cause health risks for workers and local people.
- Risks of accidents and fires related to the use of electricity and fuel for daily life and cooking.
- Risk of social disturbance, insecurity and order in the locality if workers behave inappropriately
- Health risks for workers if conditions at the accommodation are not satisfactory (due to pollution, water quality, insects/viruses/bacteria; workers are at risk of contracting infectious diseases if they lead unhealthy lifestyles or participate in social evils such as gambling, prostitution, etc drug....

To manage and minimize the above impacts and risks, the contractor will arrange accommodation for workers as follows.

Camp Layout

[include photos of camp locations and show shack locations on maps and diagrams of the layout of ancillary items to ensure MXSA

Describe how sleeping spaces, kitchens, toilets, showers, water and electricity are arranged, drainage, sanitation, temporary storage and solid waste collection in encampment areas, fire extinguishers, medicine cabinets/first aid bags - focusing on ESHS assurance criteria

Training for workers on ESH (in living and construction)

- Describe a training plan for workers on ESHS that the contractor will implement

Temporary material gathering yard

Here are just suggestions

The main impacts and risks in the temporary gathering area include safety risks to the community during loading and unloading and temporarily gathering bulky components, risks of leakage and explosion of fuels such as gasoline ... The following mitigation measures will be applied: (description and inclusion in photographs, diagrams, etc.)

List, include in diagrams and describe the layout of mitigation measures such as barriers, warnings, signs, assignments of people on duty ... (description and inclusion in photos, diagrams...)

Pile Casting Yard

Here are suggestions, contractors see for finalization

The main impacts and risks at the pile casting site include safety risks to the community while loading and unloading piles, rainwater runoff carrying sand and grease, risks of leakage and explosion of fuels such as gasoline, etc. The Contractor shall apply the following mitigation measures:

List, include in diagrams and describe the layout of mitigation measures such as barriers, warnings, signs, assignments of people on duty ...

Transportation Route

List the names of the main routes that the transport vehicles will pass through during the construction of the package, describe the current condition of the road and the traffic situation on those routes, clearly state whether there are any sensitive locations on the route (schools, markets, dispensaries...).

Location of transport routes and sensitive structures on the route

Then assess the impact and propose mitigation measures

Suggest:

If transported by road: Increased traffic density will increase dust content and emissions. If the vehicle load is greater than the road load, it will cause damage to existing bridges and roads. The risk of traffic accidents, the impact of dust and noise from transport vehicles will also be higher in areas passing through markets, schools and medical facilities. The contractor may therefore undertake to limit the speed when passing through these sections, and to avoid rush hour traffic through those sections

If transported by road, the main impacts will include disturbances and increased risks to water traffic safety, especially at night;

Annex 27. Draft Template for Monthly Environmental, Health and Safety (ESHS) Monitoring Report

(to be used by Construction Supervisors)

Project Name

Province

**ENVIRONMENTAL, SOCIAL, HEALTH AND
SAFETY (ESHS)
MONTHLY MONITORING REPORT**

Reporting Period: Month... Year...

Prepared by:

Date of Submission to PMU/PIA:

Reviewed/Approved by:

	Involuntary Resettlement	
Status of C-ESMP	<i>{Read and delete: State if the C-ESMP has been drafted/ approved or updated etc.) and date}</i>	
Reporting period:		
Last report date:		
Contract Sign and End date		
Construction Start Date		
Key sub-project activities since last report:	<p><i>{Read and delete: This section should include, among others, the following:}</i></p> <ul style="list-style-type: none"> • Contract awarding • Progress of Work (% physical completion) • Status of Safeguard Approvals / Permits / Consents* • Note if a CAP is currently being implemented or not 	
Report prepared by:		

3. C-ESMP Implementation Monitoring

3.1 Training on ESHS

{Read and delete: Provide brief on training on ESHSs have been conducted during this report period}

Table 9-2 Summary Training Activities

Date	Contents/Topics covered	Delivered by	Number of Participants, organization

3.2 Status of C-ESMP Implementation and Compliance

Read and delete: Summarize main mitigation/protection measures implemented in the reporting period.

7. xxx

8. xxx

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

Compliance with EMP Requirements (Environmental Performance

Table 9-3 Compliance with ESMP Requirements (Environmental Permeance)

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 ESMP list as basis for rating/evaluating compliance (see example below)		
Pollution Control Measures			

Table 9-4 Issue for Further Action

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

3.4 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.}

- 9. xxx
- 10. xxx

Table 9-5 Health and Safety Issue

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

New Issues from This Report			

3.5 Inspection, Meeting with Stakeholder

{Read and delete: List the inspects, meetings with various stake holders, their feedbacks and follow up actions}

- 11. xxx
- 12. xxx

4. Public Consultation and Information Disclosure

{Read and delete: Describe public consultation activities during the reporting period. Confirm compliance with consultation plan defined in the ESMP 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)
- Press/Media Releases
- Material development/production (e.g., brochure, leaflet, posters)
- Information disclosure

- 13. xxx
- 14. xxx

5. 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. Provide evidence of functional/operational GRM:

1. letter that states that the GRM has been established and is operational, included as an attachment- the list of GRM members at each level, the PMU focal person for GRM and an implementation budget has been allocated.
2. Statements and supporting documents that GRM focal points have been mobilized and functioning in their role.
3. Pamphlet/Leaflet and Project Information Booklet that has the GRM steps explained and GRM focal point contact numbers handed out to all AHs and available at village halls. Evidence includes photos, distribution/attendance list and handout.

4. Evidence of consultation/verbal dissemination of the GRM to AHs and public consultation. Attach presentation materials, minutes of meetings, photos and attendance sheets.
 5. Photos of signage within the community and near construction sites with clear indication of first point of contact.
 6. Photos/scan of record keeping system is established and functioning such as grievance ledgers with entries.
- Number of new grievances, if any, since last monitoring period: ____
 - Number of grievances resolved: ____
 - Number of outstanding grievances: ____

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

6. Conclusion

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

15. xxx

16. xxx

7. Appendix

7.1 Construction Site Photos

{Read and delete: add the photos of the construction site at all typical locations of each package with comments on the measures that have been implemented well and measures to be overcome. These photos must be returned to .jpeg and limited in capacity}

7.2 Incident Reports

{Read and delete: must be prepared as soon as possible after an incident has happened and attach to the monthly reports. Provide details about:

- *Affirming any violation to current legislation or international treaties.*

- *Any fatal accident or serious accident.*
- *Serious impacts or damage to personal property such as traffic accidents, damage to people's houses, roads and other incidents.*
- *Seriously polluting surface or groundwater.*
- *Any allegations related to sexual harassment or sexual misconduct, child abuse, child labor, or other violations involving children*

7.3 Consent/permits

7.4 Others