



Nam Ngiep 1 Hydropower Project

Quarterly Environment Monitoring Report Second Quarter of 2024

April to June 2024

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ABBREVIATIONS / ACRONYMS

AIP	Annual Implementation Plan
ADB	Asian Development Bank
ADM	Administration Division
BAC	Biodiversity Advisory Committee
BOF	Biodiversity Offset Framework
BOMC	Biodiversity Offset Management Committee
BOMP	Biodiversity Offset Management Plan
BOMU	Biodiversity Offset Management Unit
BSP	Biodiversity Service Provider
CA	Concession Agreement between the NNP1PC and GOL
CAP	Corrective Action Plan
CCA	Community Conservation Agreement
CDP	Community Development Plan
COD	Commercial Operation Date
CVC	Conventional Vibrated Concrete
CWC	Civil Works Contract
DAFO	District Agriculture and Forestry Office
DCC	Document Control
DD	Data Deficient of IUCN conservation status
DEB	Department of Energy and Business of the Ministry of Energy and Mine
DEMO	District Energy and Mines Office
DOF	Department of Forestry of Ministry of Agriculture and Forestry
DWP	Detailed Work Program
EC	Electrolytic Conductivity
EIA	Environmental Impact Assessment
EMMR	Environmental Management and Monitoring Reports
EMO	Environmental Management Office of ESD within NNP1PC
EMU	Environmental Monitoring Unit
EMWC	Electrical-Mechanical Works Contract
EPF	Environmental Protection Fund
ESD	Environmental and Social Division of NNP1PC
ESMMP	Environmental and Social Monitoring and Management Plan

FMM	Financial Management Manual
FPF	Forest Protection Fund
GOL	Government of Lao PDR
GIS	Geographic Information Systems
HMWC	Hydraulic Metal Works Contract
HR	Human Resources
H&S	Health and Safety
IAP	Independent Advisory Panel
IEE	Initial Environmental Examination
IMA	Independent Monitoring Agency
INRMP	Integrated Natural Resources Management Plan
IUCN	International Union for Conservation of Nature
ISP	Intergraded Spatial Planning
KGS	Khammany General Service
KPI	Key performance Indicator
kV	kilo-Volt
LC	Least Concern of IUCN conservation status
LTA	Lender's Technical Advisor
MAF	Ministry of Agriculture and Forestry
MEM	Ministry of Energy and Mines, Lao PDR
MOM	Minutes of Meeting
MONRE	Ministry of Natural Resource and Environment, Lao PDR
MOU	Memorandum of Understanding
MPI	Ministry of Planning and Investment
NC-NX	Nam Chouane-Nam Xang
NCR	Non-Compliance Report
NNP1PC	Nam Ngiep 1 Power Company Limited
OAA	Other aquatic animals
OC	Obayashi Corporation
OFIs	Opportunity for Improvement
O&M	Operation & Maintenance
ONC	Observation of Non-Compliance
OSOV	Owners' Site Office and Village
PAFO	Provincial Department of Agriculture and Forestry

PCD	Procurement Division
PEMO	Province Energy and Mine Office
PONRE	Provincial Department of Natural Resource and Environment, MONRE
RCC	Roller Compacted Concrete
SIR	Site Inspection Report
SMO	Social Management Office of ESD within NNP1PC
SMART	Spatial Monitoring and Reporting Tool
SOP	Standard Operating Procedure
SS-ESMMP	Site Specific Environmental and Social Monitoring and Management Plan
TD	Technical Division
TOR	Terms of Reference
TPZ	Totally Protected Zone
TSS	Total Suspended Solids
UAE	United Analysis and Engineering Consultant Company Ltd.
UR	Upper Reservoir
VU	Vulnerable of IUCN conservation status
WCS	Wildlife Conservation Organization
WMF	Watershed Management Fund
WMP	Watershed Management Plan
WRPC	Watershed and Reservoir Protection Committee
WRPO	Watershed and Reservoir Protection Office
WWTS	Wastewater Treatment System

EXECUTIVE SUMMARY

The quarterly environment monitoring report of Nam Ngiep 1 Hydropower Project provides information and analysis of compliance with the environmental and social obligations of the Project stipulated in the Concession Agreement between the Nam Ngiep 1 Power Company (NNP1PC) and the Government of Lao PDR (GOL), and as required by environmental legislation of the Lao PDR, the ADB Safeguard Policy Statement and IFC Performance Standards. The Company ensures compliance with these requirements through implementation of project specific sub-plans, programmes and activities prepared as part of the Environmental and Social Management and Monitoring Plan for the Operation Phase (ESMMP-OP).

During Q2 2024, the implementation of the 2023 Environmental Management Plan (EMPs) under ISO14001:2015 was concluded. Three out of the four EMPs (**(EMP01, EMP03, and EMP04)** successfully met their targets, while one (**EMP02**) failed. Environment Management Office (EMO) finalised four Environmental Management Plans (EMPs) for implementation from August 2024 to July 2025. EMP 01, EMP02, and EMP04 from 2023 will continue with adjusted targets and additional KPIs. A new EMP 03, proposed by the Engineer Ratch Lao Contractor, will focus on recycling HDPE plastic waste into waste bins.

Three joint monthly site inspections were conducted by EMO, ADM and Technical Division (TD) to follow up on the progress of corrective actions from previous findings. Three Site Inspection Reports (SIRs) were submitted to TD and ADM. All pending issues were resolved including the provision of spill response kits for the Powerhouse, the Re-regulation Dam, and LILAMA10's Storage Facility, as well as the Opportunity for Improvement (OFI) identified in the ISO14001 Surveillance Audit of February 2024. However, one long pending issue, about delayed installation of a spare wastewater pump for OSOV2's Wastewater Treatment System (WWTS) was escalated to NCR Level 1 and was closed within this quarter.

In Q2 2024, a total of 18.14 m³ solid waste from NNP1 project sites and camps was disposed of at the NNP1 Project Landfill, a decrease of 2.15 m³ compared with Q1 2024.

The environmental flow requirements have been monitored in accordance with the ESMMP-OP and the results show that the rate of water level increase due to dam operations (ramping-up) in a few cases did not comply with the requirements.

The concentration of dissolved oxygen (DO) at the surface level in R05 (Main Reservoir immediately upstream of the main dam) ranged between 6.0 mg/L and 8.7 mg/L. The monthly mean DO concentration at the intake level decreased from 0.8 mg/L in April 2024 to 0.2 mg/L in May 2024 and then increased to 1.8 mg/L in June 2024. The DO concentrations in Nam Chiane and Nam Phouan were above 6 mg/L. The DO concentrations at the surface level in the Re-regulation Reservoir (R07) were between 2.1 and 5.8 mg/L. During turbine discharge, the DO levels in Nam Ngiep downstream the Re-regulation Dam were less than 6 mg/L.

The depth profile monitoring during the period indicates formation of oxyclines in the Main Reservoir at the monitored stations at varying depths.

Bolikhamxay Watershed and Reservoir Protection Office (WRPO) conducted the forest and reservoir patrol from April - May 2024 using the budget under the AIP2023. Bolikhamxay WRPO submitted the first six months fund disbursement request with the Forest Protection Fund (FPF) of the Department of Forestry (DOF) of the Ministry of Agriculture and Forestry (MAF).

In April and May 2024, the Xaysomboun WRPO resumed the forest, Totally Protected Zone (TPZ), and reservoir patrolling. The vice governor of Hom District assigned staff to the field sub-office. The head of Xaysomboun Provincial Vice Governor (head of WRPC) instructed XSB WRPO to further communicate with NNP1 EMO for the FCMP finalization. However, there is still no progress with the establishment and enforcement by a special task force to deal with the threats and the construction of the reservoir checkpoints as end of June 2024.

Bolikhamxay Biodiversity Offset Management Unit (BOMU) continued the patrolling, sub-stations safeguarding and snare removal efforts from April to June 2024. BOMU handed over vaccines to the livestock groups in Viengthong and Xaychamphone districts as part of the Nam Chouane-Nam Xang (NC-NX) Community Development Plan (CDP) activity. The first otter survey was conducted and the data are being analysed by the Biodiversity Service Provider-Wildlife Conservation Society (BSP-WCS). BOMU AIP2024 was approved by Bolikhamxay Provincial Agriculture and Forestry Office (BLX PAFO) on 9 May 2024 and the first six months budget was disbursed on 25 June 2024.

The fish species dominating the fish catch by weight in Q2 2024 include *Oreochromis niloticus* and four species group of *Barbonymus gonionotus* and *Hypsibarbus*, *Poropuntius*, *Hampala* and *Sikukia gudgeri* and *Amblyrhynchichthys truncatus* that are classified as Least Concern (LC) according to the IUCN Red List of Threatened Species, except *Sikukia gudgeri* which is classified as Data Deficient (DD) and *Oreochromis niloticus* is an exotic species. The recorded catch of threatened species includes three species which are classified as Vulnerable species (VU): *Cirrhinus cirrhosus*, *Scaphognathops bandanensis*, and *Tor sinensis*.

1 INTRODUCTION

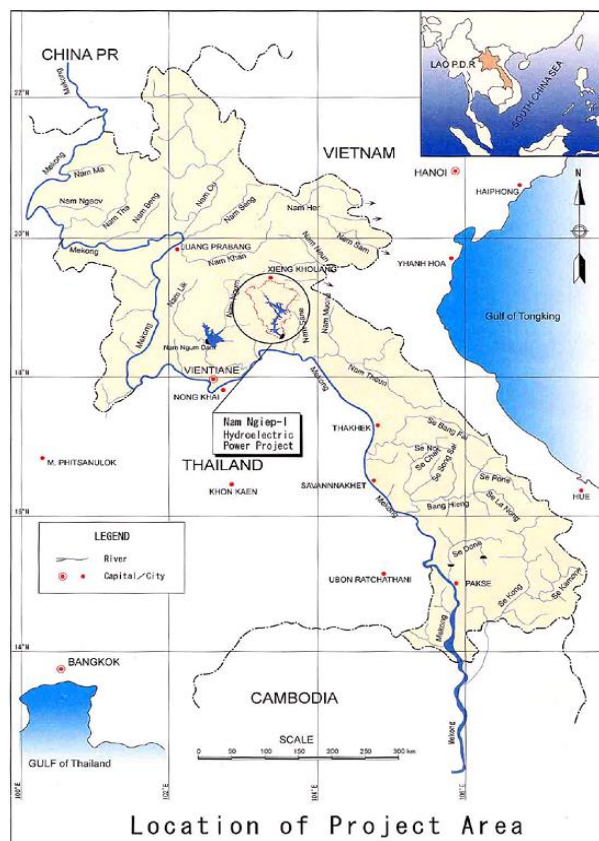
The Nam Ngiep originates in the mountains of Xiengkhouang Province, flowing through Khoun District into Thathom District of Xaysomboun Province, through Hom District and into Bolikhamxay District of Bolikhamxay Province. The Nam Ngiep meets the Mekong River just upstream from Pakxan in Bolikhamxay Province.

Two dams and power stations were constructed along the Ngiep River in Bolikhamxay. At the main dam site, a primary power station generated around 1,546 GWh of electricity for export to Thailand and release water to a regulating pond where a second dam and power station generate around 105 GWh of electricity for local use.

The Project Commercial Operation Date was achieved on 05 September 2019.

This Quarterly Environment Report provides a summary of environmental monitoring activities and mitigation actions during **Q1 2023**. The report is published on the Company website (<https://namngiep1.com/>).

Related construction Site Specific Environmental and Social Monitoring and Management Plans (SS-ESMMPs) are also publicly disclosed on the Company website as required under the Concession Agreement.



2 ENVIRONMENTAL MANAGEMENT AND MONITORING

The environmental management and monitoring activities reported in this section document the implementation of the relevant sub-plans and programmes of the Environmental and Social Management and Monitoring Plan for the Operation Phase during Q2 2024.

2.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

During Q2 2024, the implementation of the 2023 Environmental Management Plan (EMPs) under ISO14001:2015 was concluded. Three out of the four EMPs (EMP01, EMP03, and EMP04) successfully met their targets, while one (EMP02) failed. The details of EMPs 2023 implementation results are shown in **Table 2.1-1**.

TABLE 2.1-1: THE DETAILS OF EMPs 2023 IMPLEMENTATION

EMP No.	Activity Description	KPI	Evaluation Date	Implementation Progress
01/2023*	Providing HSE awareness training to NNP1PC staff and contractors	80% of NNP1PC staff and the Contractors are trained on Health, Safety and Environmental awareness during April 2023 to March 2024.	03 May 2024	Achieved 80 %
02/2023*	Reducing the paper consumption in NNP1 offices	Total use of A4 paper for printing in the NNP1PC's offices (VTE, OSOV1, OSOV2) is reduced by 10% during April 2023 to March 2024 compared with the previous 12 months.	03 May 2024	0 % Not achieved To be continued for 2024 by (i) conducting campaign of 'how to reduce paper consumption in your office' and (ii) creating the SharePoint system to support the paperless working process for document review and approval have not yet been implemented as planned.
03/2023*	Reducing the quantity of waste disposal at NNP1 Project Landfill	The quantity of waste disposed of in the NNP1 landfill is reduced by 5% within one year compared with the previous 12 months.	03 May 2024	Achieved 26.3 %
04/2023 [#]	Planting trees	50% plant survival, the plantation contributes to the sustainable environment objectives (refer to Tree Planting Plan).	03 May 2024	Achieved 82%

*EMP_s were implemented in 2022 and continued in 2023 for further success

[#] New EMP 2023 suggested by the external ISO Auditor (SGS)

In 2024, Environment Management Office (EMO) finalised four Environmental Management Plans (EMPs) for implementation from August 2024 to July 2025. EMP 01, EMP02, and EMP04 from 2023 will continue with adjusted targets and additional KPIs. A new EMP 03, proposed by the Engineer Ratch Lao Contractor, will focus on recycling HDPE plastic waste into waste bins.

The details of EMPs to be implemented from August 2024 to July 2025 are shown in **Table 2.1-2**

TABLE 2.1-2: THE DETAILS OF EMPs 2024 FOR THE IMPLEMENTATION FROM AUGUST 2024 TO JULY 2025

EMP No.	Activity Description	KPI	Evaluation Date	Implementation Progress
01/2024*	Providing HSE awareness training to NNP1PC staff and contractors	100% of new NNP1PC employees and contractors and 80% of existing NP1PC employees and contractors will be trained in health, safety, and environmental awareness August 2024 to July 2025	-	-
02/2024*	Reducing the paper consumption in NNP1 offices	Total use of A4 paper for printing in the NNP1PC's offices (VTE, OSOV1, OSOV2) is reduced by 5% during August 2024 to July 2025 compared with the previous 12 months.	-	-
03/2024 [#]	To make at least one new product (four HDPE waste bins) from the HDPE plastic waste within the implementation timeline from August 2024 to July 2025.	Collect and sort HDPE plastic waste to produce four waste bins from August 2024 to July 2025.	-	-
04/2024*	Planting at least 200 trees at selected rehabilitation areas.	At least 50% of planted trees survive by July 2025.	-	-

*EMP_s implemented in 2023, continued in 2024 for further success

[#] New EMP for implementation in 2024 and futures.

2.2 CONTRACTOR SS-ESMMPs

In Q2 2024, EMO reviewed and approved three DWP and SS-EMMP covering remedial measures on the main dam's right abutment, monitoring works of the industrial site, and maintenance and repairing works of the industrial sites.

2.3 RESULTS OF COMPLIANCE INSPECTIONS AT CONSTRUCTION SITES

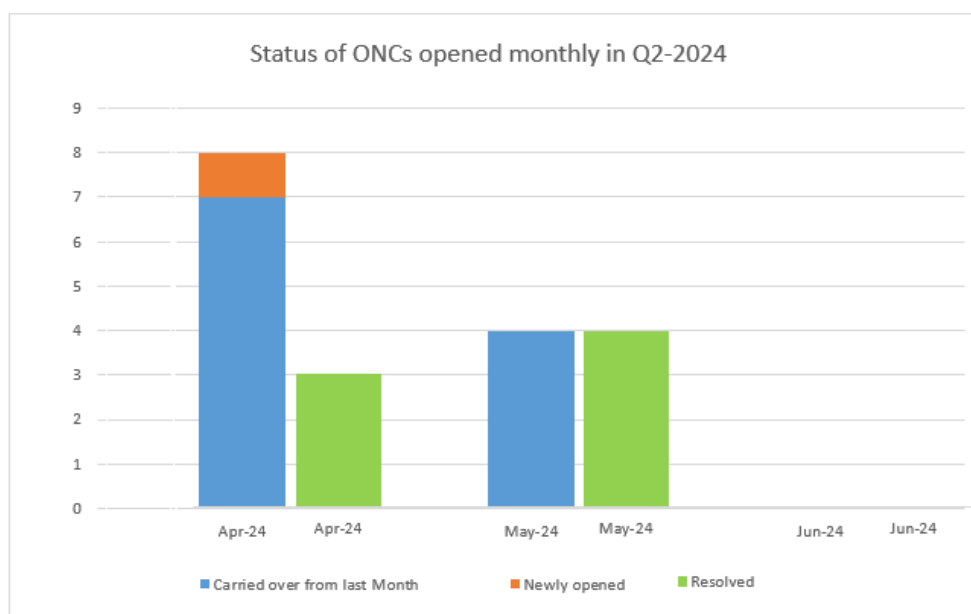
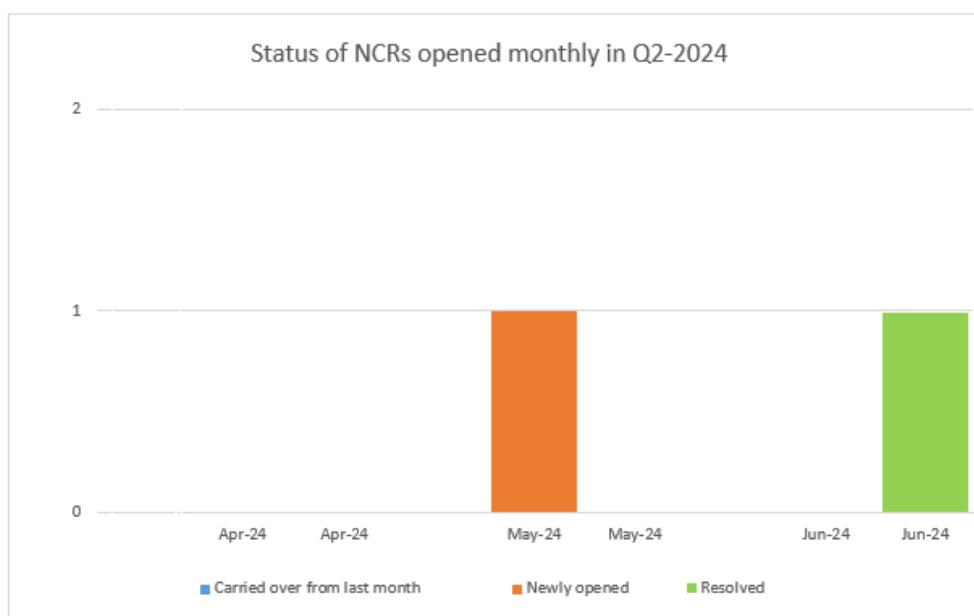
During Q2 2024, three joint monthly site inspections were conducted by EMO, ADM and Technical Division (TD) to follow up on the progress of corrective actions from previous findings. Three Site Inspection Reports (SIRs) were submitted to TD and ADM. All pending issues were resolved including the provision of spill response kits for the Powerhouse, the Re-regulation Dam, and LILAMA10's Storage Facility, as well as the Opportunity for Improvement (OFI) identified in the ISO14001 Surveillance Audit of February 2024. However, one long pending issue, about delayed installation of a spare wastewater pump for OSOV2's Wastewater Treatment System (WWTS) was escalated to NCR Level 1 and was closed within this quarter.

The status of ONC and NCR reports is summarized in **Table 2.3-1**, **Figure 2-1** and **Figure 2-2**. The Site Inspection Results During Q2 2024 is presented in **Appendix 1: The Site Inspection Results During Q2 2024**

TABLE 2.3-1: STATUS OF ONCs AND NCRs REPORT DURING Q2 2024

Status	ONC	NCR-Level 1	NCR-Level 2	NCR-Level 3	Incident Report
Carried over ONC/NCR from the previous quarter	7	0	0	0	0
Newly opened ONC/NCR	1	1	0	0	0
Total No. of ONC/NCR	8¹	1	0	0	0
Resolved ONC/NCR	8	1	0	0	0
Unresolved ONC/NCR carried forward to the next quarter	0	0	0	0	0

¹ One ONC (ON-ADM-0015) was escalated to NCR level 1 (NCR-01-ADM/2024). For a detailed description, please refer to Appendix 1: The site inspection results during Q2 2024.

FIGURE 2-1: STATUS OF ONCs DURING Q2 2024

FIGURE 2-2: STATUS OF NCRs DURING Q2 2024


2.4 SITE DECOMMISSIONING AND REHABILITATION

All 31 rehabilitated areas were inspected. No evidence of erosion or instability were observed at any of the inspected sites.

2.5 WASTE MANAGEMENT AT THE OPERATION SITES

2.5.1 Waste Management at NNP1 Project Sites

In Q2 2024, a total of 18.14 m³ solid waste from NNP1 project sites and camps was disposed of at the NNP1 Project Landfill, a decrease of 2.15 m³ compared with Q1 2024. The local contractor maintained routine waste collection and NNP1 landfill management throughout Q2 2024.

The amount of recyclable waste managed on site during Q2 2024 is shown in **Table 2.5-1**.

TABLE 2.5-1: AMOUNTS OF RECYCLABLE WASTE DURING Q2 2024

Source and Type of Recyclables		Unit	Carried Over from Q1 2024	Status in Q2 2024			
				Additions	Total (A)	Sold (B)	Remaining Amount (A - B)
Construction activity							
1	Scrap metal	kg			0	0	0
Sub-Total 1		kg			0	0	0
Operation camp							
2	Plastic bottle	kg	26	20	46	0	46
3	Aluminium Can	kg	N/A*	N/A	N/A*	N/A	N/A
4	Paper/Cardboard	kg	19	22	41	0	41
5	Glass	kg	24	81	105	0	105
6	Scrap metal	Kg	0	0	0	0	0
Sub-Total 2		kg	69	123	192	0	192
Grand Total (Sub-Total 1+2)		kg	69	123	192	0	192

*Please note that aluminium cans are collected and sold separately by housekeepers before storage so there is no accurate recorded quantity. The item is therefore marked Non-available (N/A).

2.5.2 Hazardous Waste Management

The amounts of hazardous waste and hazardous materials that were collected, stored and disposed of during Q2 2024 are shown in **TABLE 2.5-2**.

TABLE 2.5-2: HAZARDOUS MATERIAL AND HAZARDOUS WASTE RECORDED DURING Q2 2024

No.	Type of Hazardous Material	Unit	Total in Q2 2024	Used/ Disposed	Remaining
1	Diesel	Litre	19,704	17,850	1,854
2	Gasoline	Litre	3,661	2,705	956
3	Lubricant (Turbine oil)	Litre	36	2	34
4	Colour paint	Litre	39	0	39
5	Thinner	Litre	1	0	1
6	Grease oil	Litre	785	0	785
7	Gear Oil	Litre	35	2	33
8	Chlorine Liquid	Litre	175	75	100
9	HA Cut AF	Litre	3,925	0	3,925
10	HA Cut Cat AF	Litre	373	0	373
	Type of Hazardous Waste				
11	Used Oil (Hydraulic + Engine)	Litre	355	0	355
12	Used oil mixed with water	Litre	0	0	0

No.	Type of Hazardous Material	Unit	Total in Q2 2024	Used/ Disposed	Remaining
13	Empty used oil drum/container (drum 200L)	Unit	53	0	53
14	Use Oil Filter	Unit	31	0	31
15	Contaminated soil, sawdust and textile material	m ³	1.2	0	1.2
16	Used tyre	Unit	5	0	5
17	Empty used chemical drum/container (drum 20L)	Unit	108	0	108
18	Lead acid batteries	Unit	6	0	6
19	Empty paint and spray cans	Can	117	0	111
20	Halogen/fluorescent bulbs	Unit	459	0	459
21	Empty cartridge (Ink)	Piece	117	0	117
22	Clinic Waste	Kg	13.6	13.6	0
23	Expired Chlorine Powder	Kg	65	0	65

2.5.3 Animal Fodder (Pig Feed) Collection Programme

During Q2 2024, local villagers collected 644.9 kg of food waste from the Owner's Site Office and Village (OSOV1's canteen) for feeding their animals. Additionally, food waste management was conducted by Khammany General Service (KGS) routinely.

2.5.4 Community Solid Waste Management and Recycling Programme

Following a meeting on 26 April 2024 between the Bolikhan EMU and NNP1-EMO regarding the handover of community solid waste management and the Houay Soup landfill, the EMU sent an official response to NNP1-EMO on 2 May 2024, outlining two options for the handover.

- Option 1: proposed that NNP1PC repairs the HDPE lining of the Houay Soup landfill, after which the EMU would notify villagers to resume its use.
- Option 2: allow villagers from Thaheua, HatGnuin, and Phouhomxay to use NNP1PC's landfill, once filled up, NNP1PC will fix the Houay Soup landfill for shared use.

The EMU also requested that NNP1PC should maintain the access road to the landfill, handover the recycling waste bank in HatGnuin for use in village projects, and handover the waste compaction machine to the EMU to support waste management in the Bolikhan District.

On 7 May 2024, NNP1-EMO responded, accepting EMU's requests, including allowing villagers to use NNP1PC's landfill, maintaining the access road, transferring the recycling waste bank building to HatGnuin village and the waste compaction machine to Bolikhan EMU.

With no objections raised by NNP1PC, the EMU considers the handover conditions met and will inform the villagers accordingly.

The special task force in Phouhomxay village identified most of the individuals involved in the theft. They were fined and signed an acknowledgment letter. To prevent further incidents, the NNP1 landfill is currently managed by a local contractor who oversees daily operations. Additionally, the top HDPE liner is covered with soil, unlike the community landfill where the top HDPE liner is exposed and more vulnerable to be stolen.

Table 2.5-3: Theft of HDPE lining from Houay Soup Landfill

	
May 2023	May 2024

2.6 RESERVOIR OPERATIONS

2.6.1 Main Reservoir

The water level in the main reservoir, inflow to the reservoir and discharge from the reservoir since January 2020 are displayed in the graphs in **Figure 2-3** and **Figure 2-4**.

During Q2 2024, the mean daily inflow to the main reservoir was 78 m³/s. The minimum daily inflow was 23 m³/s, maximum daily inflow was recorded at 441 m³/s, and 25th percentile of 48 m³/s and 75th percentile of 77 m³/s. As indicated in **Figure 2-3**, the inflow during Q2 2024 was higher compared to the same period in 2023.

The water level in the main reservoir decreased with 8.58 m from El. 307.50 m asl (01 April 2024) to 298.92 m asl (23 June 2024) and then increased to 301.74 m by the end of Q2 2024.

FIGURE 2-3: INFLOW TO THE MAIN RESERVOIR

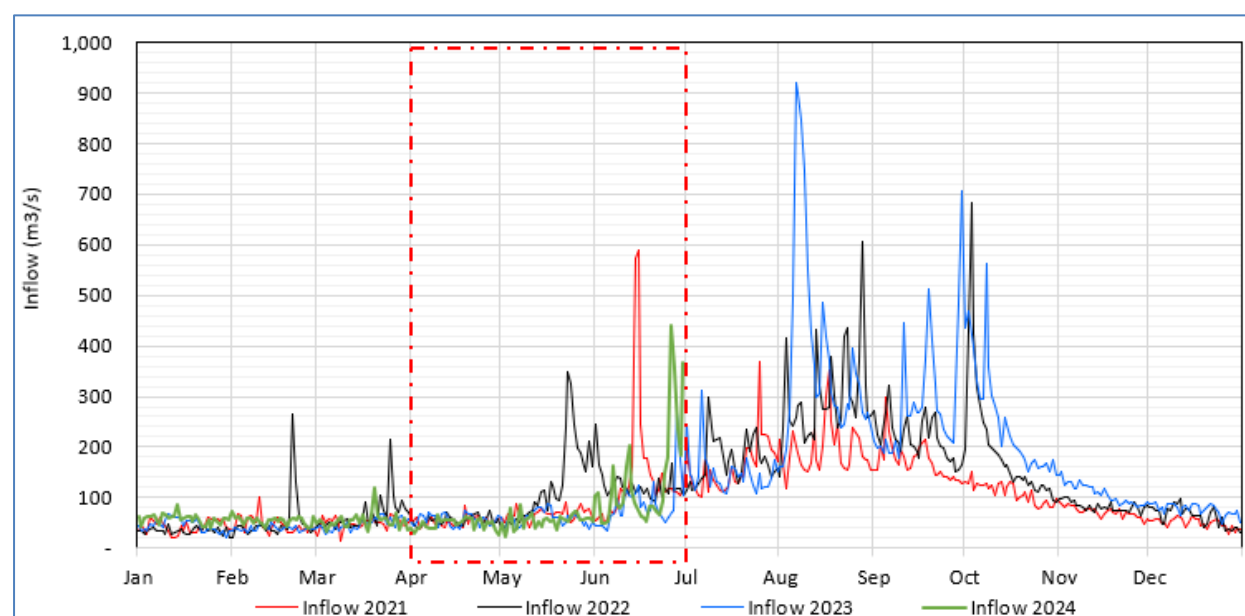
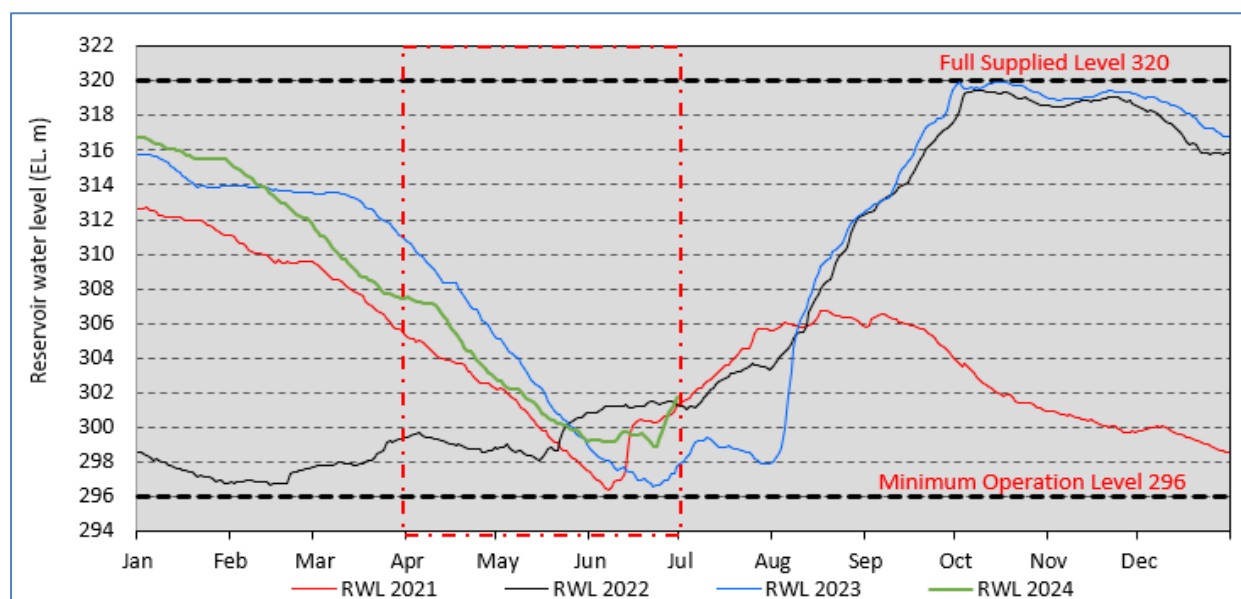


FIGURE 2-4: WATER LEVEL OF THE MAIN RESERVOIR

2.6.2 Environmental Flow Requirements for the Operation Phase

NNP1PC has monitored compliance with the Environmental Flow Requirements (EFRs) stipulated in the CA, Annex C, Clause 53 (g) and as further modified in the Environmental Flow Assessment Report of July 2014 approved by MONRE. The EFRs have been monitored in accordance with the monitoring programme outlined in the ESMMP-OP 2019 (Vol. II, Part 2 on Subplan 1 on Reservoir and River Health Management), except with respect to thalweg water depth monitoring.

The results of the EFR compliance monitoring during Q2 2024 are summarized in **Table 2.6-1**.

TABLE 2.6-1: SUMMARY OF EFRs COMPLIANCE MONITORING IN Q2 2024

No	EFRs in the Downstream of the Re-regulation dam	EFRs compliance
1	Min flow 27 m ³ /s at all times	100% of observations comply
2	Thalweg water depth at least 0.5 m in the entire reach from immediately downstream of the Re-regulation dam until 4.3 km downstream the dam (measured at cross-sections where visual observations or boat navigation indicate shallow waters)	The Q2 2024 monthly thalweg monitoring missions only included monitoring of navigation difficulties and not water depth measurements, because the discharge from the re-regulation dam exceeded 50 m³/s at the time of the missions. The results of previous monitoring missions, as also confirmed by the LTA, have documented that when the discharge is 30 m³/s or greater, the water depth requirements are met and there are no problems with navigating the river. Furthermore, in Q4 2023, at the beginning of the dry season, NNP1PC conducted interviews with inhabitants

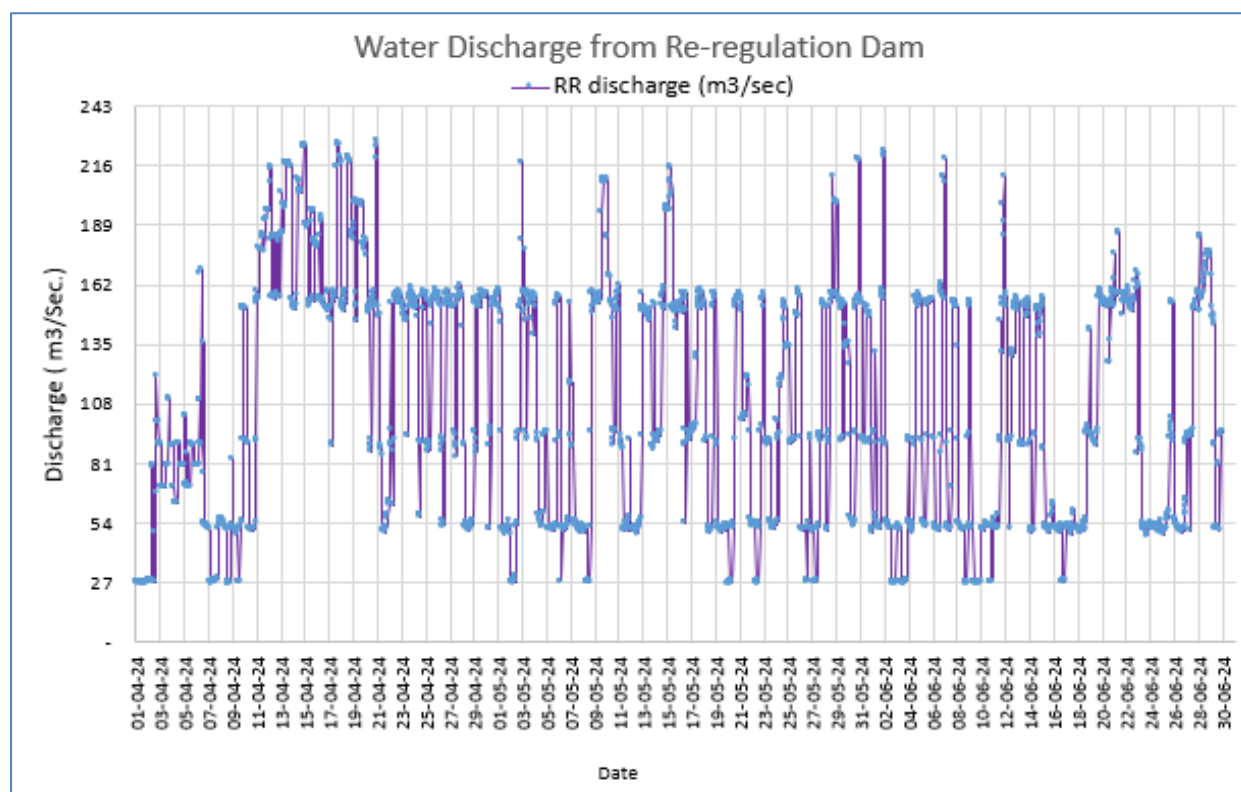
No	EFRs in the Downstream of the Re-regulation dam	EFRs compliance
		who use boats to gather and assess any complaints about boat navigation difficulties, there were no complaints from inhabitants and no damage observed. NNP1PC has consulted with the Environmental and social specialist who recommended that revisions to the monitoring programme should be made as part of ESMMP-OP update which will be commenced from Q4 2024 to Q1 2025
3	Maximum rate of change (both rise and fall, separately) in stage of 0.6 m per hour	100% of hourly fluctuations comply
4	Maximum fluctuation in stage of 1.7 m over 24-hour (this requirement is about range and determines the maximum difference in stage height over 24-hour periods)	100% of 24-hour fluctuations comply
5	Maximum fluctuation in stage of 1.7 m over 7-days (this requirement is about range and determines the maximum difference in stage height over 7-day periods)	100% of 7-day fluctuations comply

2.6.2.1 Minimum Flow Requirements

The discharge monitoring data for the re-regulation dam during Q2 2024 indicates that the minimum flow requirement of 27 m³/s has been met at all times. The Re-regulation Dam discharge graph can be found in **Figure 2-5**.

During Q2 2024, the mean discharge from the re-regulation dam was about 120 m³/s in April 2024 and about 104 m³/s and 95 m³/s in May and June 2024 respectively.

The changes in the discharge from the re-regulation dam were informed in advance to the RMU and to the heads of the downstream villages, who then announced the changes to the communities over the village speaker systems. There were no complaints related to the flow discharges or fluctuation levels downstream the Re-regulation dam during the reporting period.

FIGURE 2-5: DISCHARGE FROM THE RE-REGULATION DAM DURING Q2 2024

2.6.2.2 Minimum Water Depth

Since 18 July 2018, NNP1PC has carried out weekly monitoring of river depths at 19 locations downstream the re-regulation dam as shown on **Figure 2-6**. These locations represent cross-sections with possible shallow water depths at low discharge rates.

The monitoring is undertaken to confirm compliance with the water depth requirements in the Concession Agreement, Annex C, and the approved Environmental Flow Assessment (Thalweg water depth at least 0.5 m in the entire reach from immediately downstream of the Re-regulation dam until 4.3 km downstream the re-regulation dam).

Starting in December 2020, the water depths have been measured across the river channel where visual observations or boat navigation indicate shallow waters to ensure that the measurements represent the river thalweg.

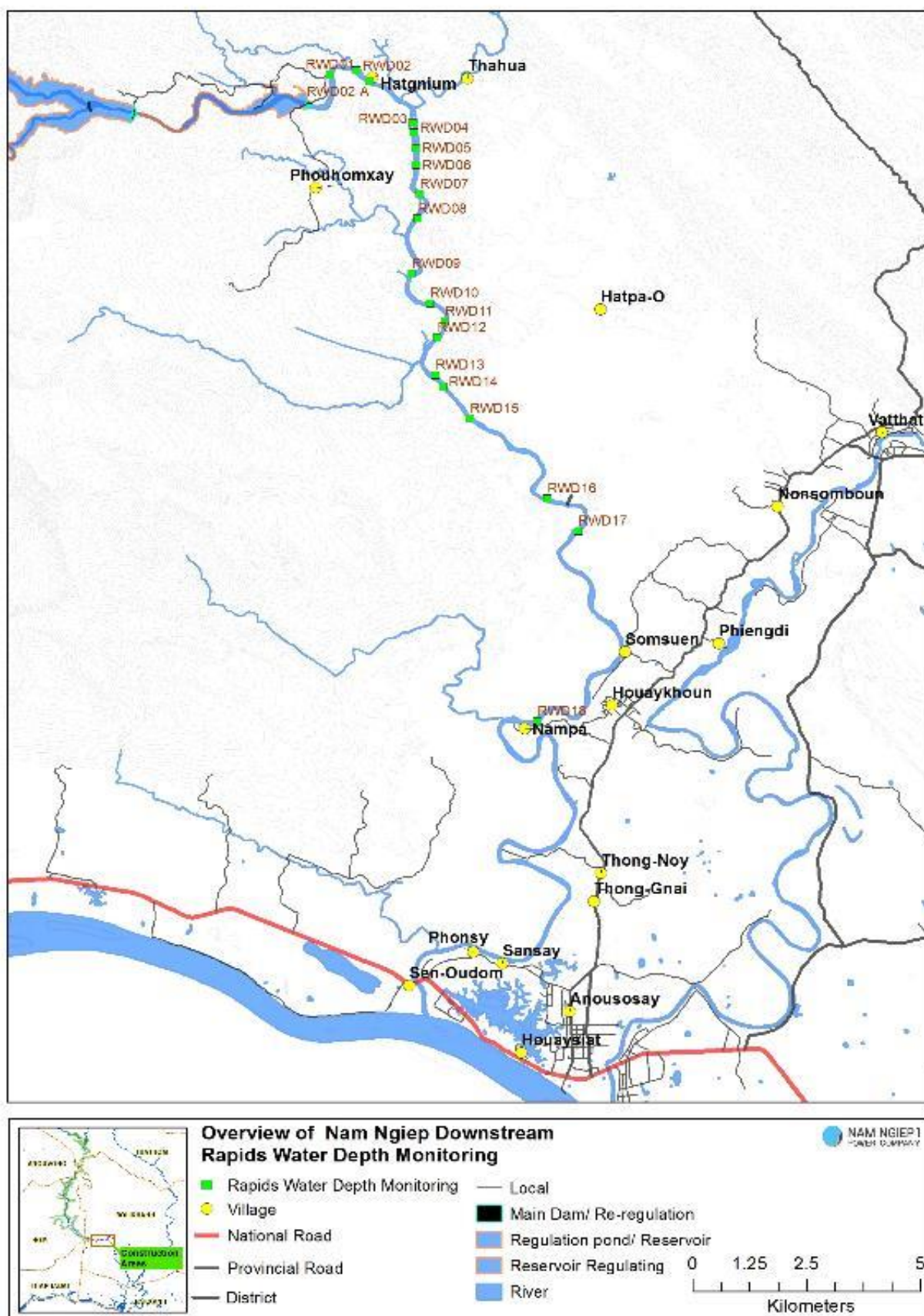
According to the recommendations by the Lenders' Technical Advisor (LTA) during the virtual site visit on 21 to 26 November 2021, NNP1PC has continued to monitor the situation at the critical sites under conditions with discharge of less than 30 m³/s for detecting any navigation problems and also monitor whether any complaints have been raised to consider how to solve the problems, if any. The results of these monitoring missions have documented that when the discharge is 30 m³/s or greater, the water depth requirements are met and there are no problems with navigating the river.

NNP1PC carried out three boat monitoring missions in Q2 2024. However, as the discharge exceeded 50 m³/s on all three missions, the thalweg water depths were not measured. There were no boat navigation difficulties during the missions.

In Q4 2023, at the beginning of the dry season, NNP1PC conducted interviews with inhabitants who use boats to gather and assess any complaints about boat navigation difficulties.

NNP1PC has consulted with the Environmental and social specialist who recommended that revisions to the monitoring programme should be made as part of ESMMP-OP update which will be commenced from Q4 2024 to Q1 2025. Additionally, NNP1PC -EMO will engage with the downstream villagers to promptly report to NNP1PC to further investigate if any future issues related to boat navigation difficulty in dry season.

FIGURE 2-6: LOCATION MAP OF RIVER DEPTH MONITORING POINTS



2.6.2.3 Stage Height Fluctuations

The requirements on stage height fluctuations constitute a rise or a fall in water elevation and include two aspects:

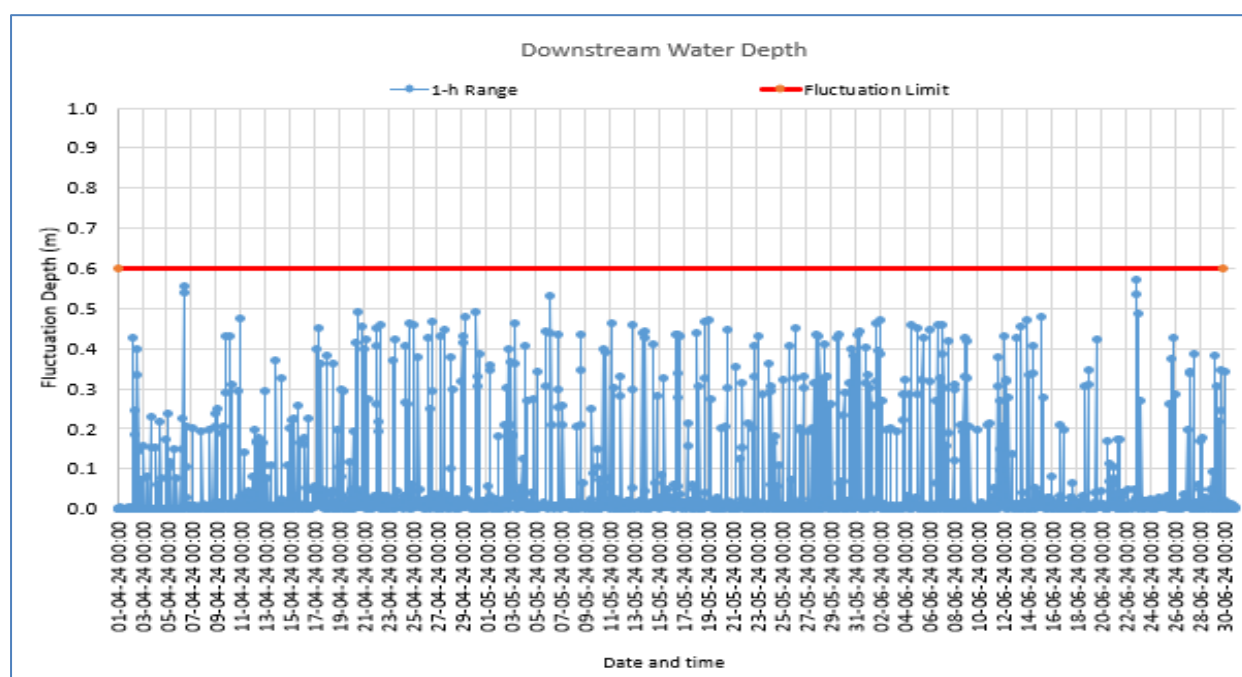
1. A requirement on the rate of change which is set at a maximum of 0.6 m per hour (calculated from the hourly water level recordings).
2. Requirements on the range in fluctuations over 24-hour periods and 7-day periods respectively, which is set at a maximum of 1.7 m for both periods. In other words, the range requirements determine the maximum difference in stage height over 24-hour periods and 7-day periods respectively.

Compliance with the 24-hour maximum fluctuation EFR is determined by calculating the difference between the maximum and the minimum stage height over each 24-hour period. In the same way, the 7-day maximum fluctuation EFR, is determined by calculating the difference between the maximum and the minimum stage height over each 7-day period. There is no compulsion for the Company to meet the stage height fluctuation requirements after a high flow event passes over the Re-regulation dam spillway.

In practice, meeting stage height fluctuation EFRs are managed through controlling the rate of change in discharge from the re-regulation dam/powerhouse. This is done using established rating relationships between stage height and discharge, as set out in the Re-regulation dam operation manual. These relationships are regularly checked and revised as necessary, as they would change whenever the channel morphology changes due to significant erosion or deposition.

During Q2 2024, the maximum allowed rate of change of 0.6 m over 1-hour was complied with for all hourly periods. It is important to note that NNP1PC has been conducting interviews with boat-using inhabitants since Q4 2023 to gather and assess any complaints about navigation difficulties. As of now, no complaints have been received, and no damage has been observed. The results are presented in **Figure 2-7**.

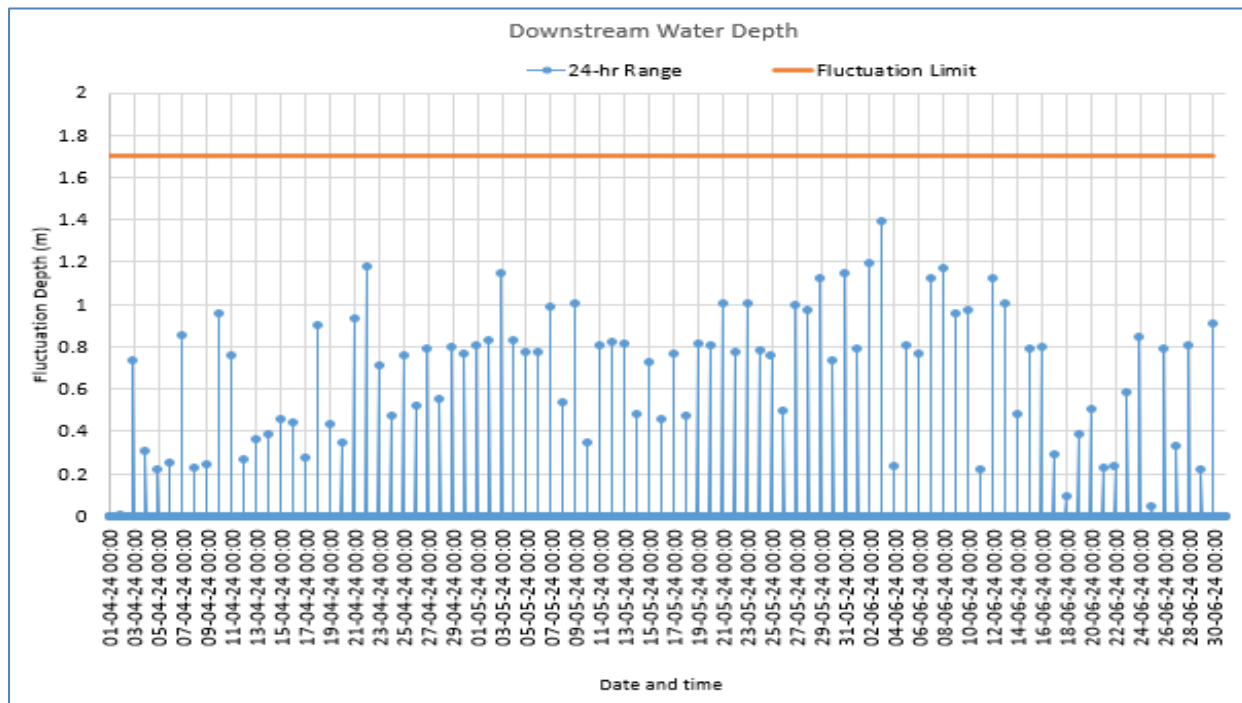
FIGURE 2-7: HOURLY STAGE HEIGHT FLUCTUATIONS DURING Q2 2024



During Q2 2024, the maximum allowed difference in stage height of 1.7 m over 24-hour was complied with for all 24-hour periods (00:00 – 23:59).

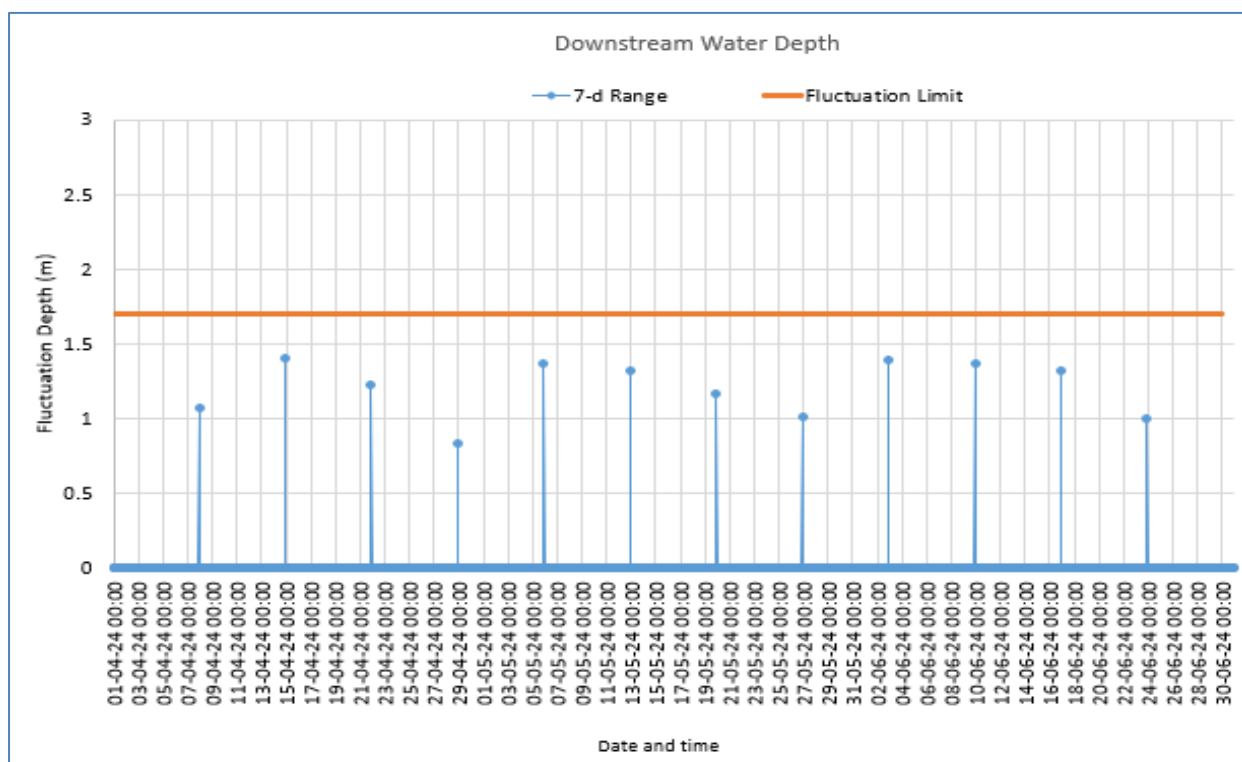
The results of the monitoring are presented in **Figure 2-8**.

FIGURE 2-8: 24-HOUR STAGE HEIGHT DIFFERENCE (M) DURING Q2 2024



During Q2 2024, the maximum difference in stage height of 1.7 m over 7-days was complied with for all 7-day periods. The results are presented in **Figure 2-9**.

FIGURE 2-9: 7-DAY STAGE HEIGHT DIFFERENCE (M) DURING Q2 2024



2.7 WATER QUALITY MONITORING

2.7.1 Surface Water (River) and Depth Profile Water Quality

Descriptions of each monitoring station, surface water and depth profile water quality monitoring parameters, and the location of sampling map can be found in **Appendix 3** and all surface water quality data for Q2 2024 are listed in **Appendix 5-1**.

Dissolved Oxygen (DO)

The results of DO measurements for the station immediately upstream of the main dam (R05 – intake at 276 m asl.) and immediately downstream of the re-regulation dam (NNG05) are presented in **Figure 2-10**, the DO long profile measurement as timeseries are presented in **Figure 2-11**, and the full set of DO surface water quality data are shown in **Table 2.7-1**.

The water temperature and DO depth profiles in the main reservoir at R05 during Q2 2023, Q1 2024 and Q2 2024 are presented in **Figure 2-13** to **Figure 2-15**.

FIGURE 2-10: DISSOLVED OXYGEN IMMEDIATELY UPSTREAM AND DOWNSTREAM OF THE MAIN DAM

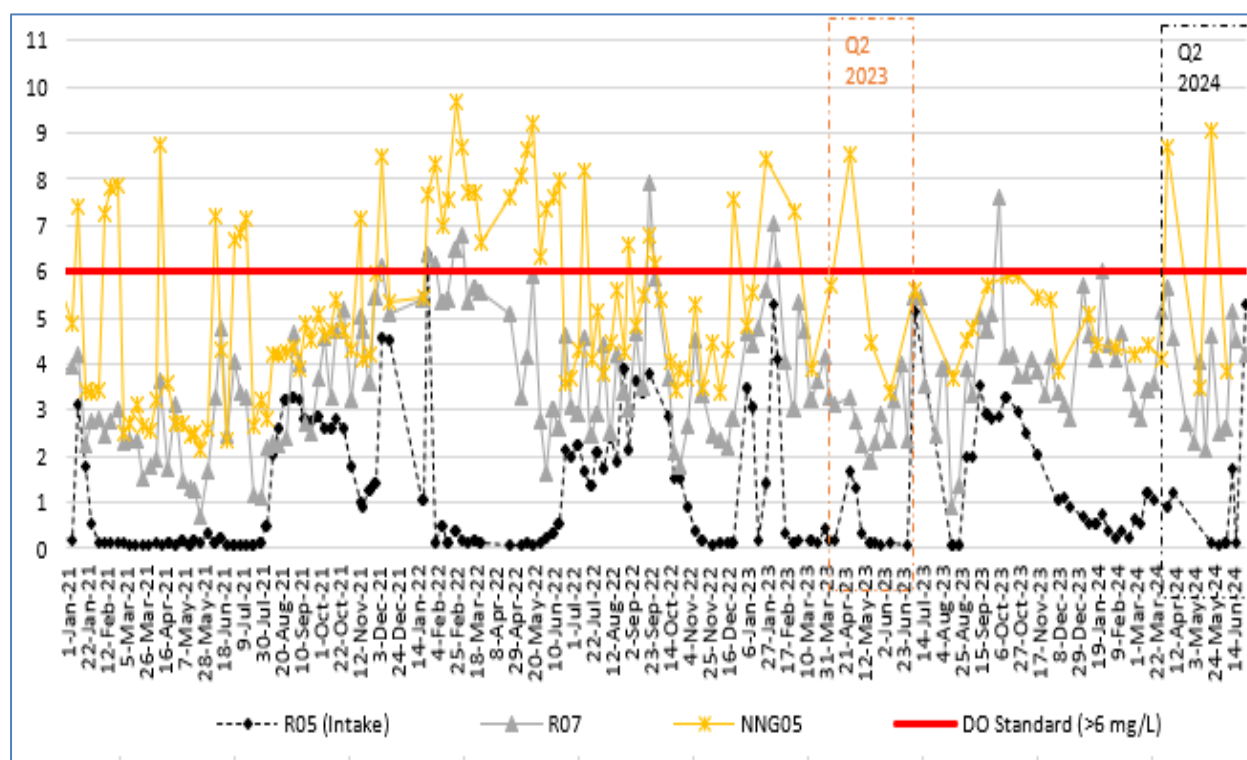
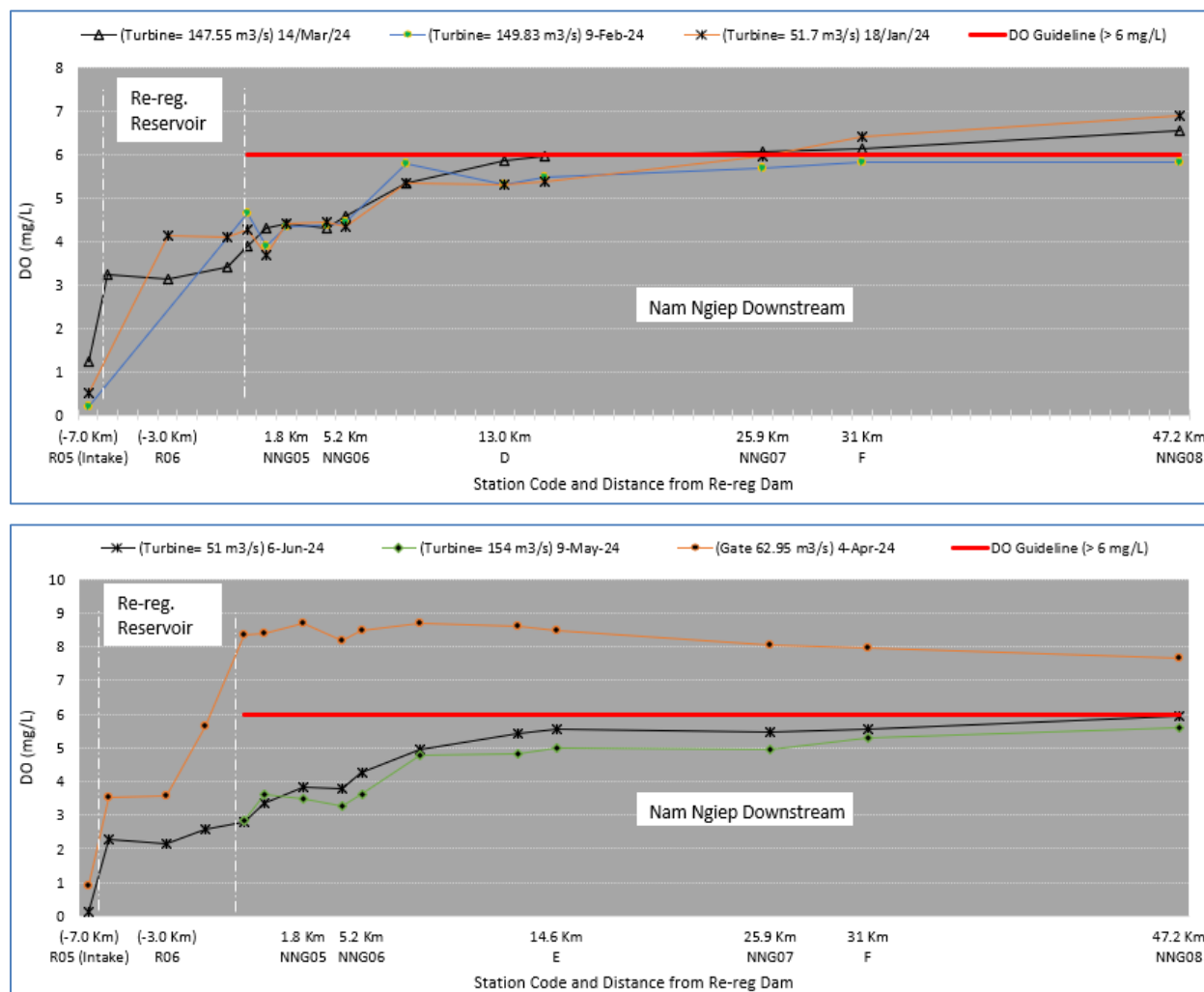


FIGURE 2-11: DISSOLVED OXYGEN LONG PROFILE MEASUREMENT FROM IMMEDIATELY UPSTREAM THE MAIN DAM TO LOWER NAM NGIEP (Q1 2024 AND Q2 2024)



Main Reservoir

Figure 2-15 and **Figure 2-16** present the DO and water temperature depth profile timeseries in the Main Reservoir (R04 and R05) from September 2018 to June 2024, the graphs clearly show seasonal variations in water temperatures and a deepening of the thermocline during periods with cooler water leading to a corresponding deepening of the oxycline.

The depth profile monitoring during Q2 2024 indicates formation of thermoclines and oxyclines in the main reservoir at the monitored stations at different depths.

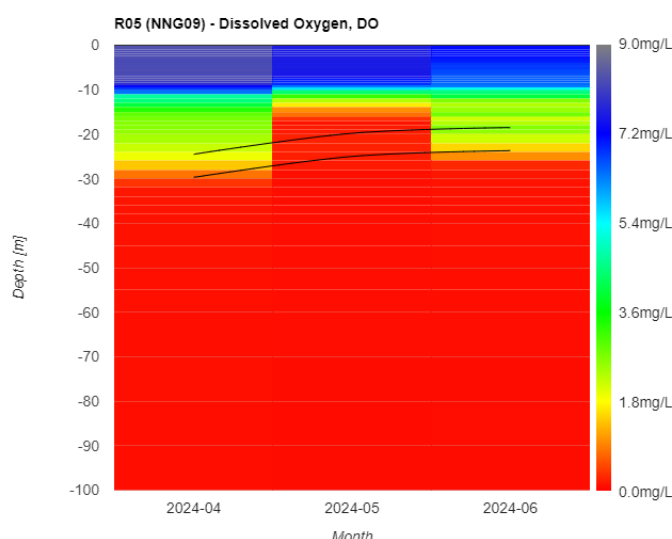
At R05, when comparing Q2 2024 with Q2 2023, overall, the thermocline and oxycline show similar patterns.

Figure 2-14 shows the DO and water temperature depth profiles for Q2 2023, Q1 2024 and Q2 2024 at R05. The profiles for Q1 2024 and Q2 2024 show rising water temperatures moving into the hot months of April and May, formation of a distinct thermocline at about 8.0 m - 14 m depths and formation of an oxycline at roughly the same depths. The profiles for Q2 2024 indicate that oxygen depletion (about 2 mg/L DO) is found at about 25 m below surface in early April 2024 gradually decreasing to a depth of about 13 m in late June 2024. Compared to Q2 2023, there are no obvious improvements in the DO levels.

The monthly mean DO concentration at the intake level varied from 0.8 mg/L in April 2024, 0.2 mg/L in May 2024 and 1.8 mg/L in June 2024. Anoxic levels were found at decreasing depths from about 32 m in April 2024 (about 2 m below the intake sill) to 17 m in May 2024 (about 10 m above the intake sill) and to a depth of about 15 m in June 2024 (about 3 m above the intake sill), however with a peak in DO of 5 mg/L to 6 mg/L at about 22 m depth followed by a drop in DO down to anoxic levels at 28 m depth (about 6 m below the intake sill) (see **Figure 2-12**).

The DO concentrations at R03 and R04 showed a similar pattern to R05.

FIGURE 2-12 MONTHLY MEAN CONCENTRATIONS OF DISSOLVED OXYGEN IN R05



At R02, during Q2 2024, DO concentrations varied between 5.8 mg/L and 9.7 mg/L with an average of 7.7 mg/L in the upper 3.0 m and at depths from 4 m to about 15 m below surface the DO varied between 3 mg/L and 5 mg/L. Anoxic conditions were found at decreasing depths from about 26 m in early April 2024 to about 15 m in early May 2024. From early May 2024 to end of June 2024, DO measurements were not carried out at depths below 15 m.

At R01, the mean DO concentration throughout the quarter was about 7.6 mg/L over the entire water column with no measurements below 6.3 mg/L.

Re-regulation Reservoir (R06 and R07)

The depth profiles at R06 and R07 in the Re-regulation Reservoir showed no indications of a thermocline, because the Re-regulation Reservoir behaves more like a river than a lake.

The mean monthly DO concentrations at R06 over the entire water column varied from 2.9 mg/L in April, 2.1 mg/L in May to 3.3 mg/L in June 2024. A similar pattern was found at R07. The DO concentrations in R06 and R07 are likely linked to the DO concentrations at the intake level in the main reservoir. However, it should be noted that the actual flow patterns and movements of water from R05 to the intake is not known and is likely rather complex with circulation patterns or other complex water movements near the intake, which adds uncertainties to correlating water quality data at or near the intake depth at R05 in the main reservoir with water quality data in the Re-regulation Reservoir.

Nam Ngiep Upstream and Tributaries

The Nam Ngiep Upstream station, NNG01, and the station in Nam Chian (NCH01) a left bank tributary at the upper part of the reservoir had DO concentrations above 6 mg/L during Q2 2024.

Downstream Stations

During Q2 2024, a total of three monitoring missions were conducted. All three monitoring missions were undertaken during discharges greater than 50 m³/s (greater than minimum environmental flow requirement).

As indicated in **Figure 2-11**, periods with turbine discharge (May and June 2024) resulted in DO concentrations of about 4 mg/L over the first 5 km downstream the re-regulation dam and then gradually increasing to close to 6 mg/L (the National Surface Water Quality Standard) near the confluence with the Mekong River. However, during gate discharge in April 2024, the DO concentration in all Nam Ngiep downstream stations were about 8 mg/L and complied with the Standard.

No dead fish was observed in Nam Ngiep downstream during Q2 2024.

NNP1PC continues to carefully compile and assess all monitoring data to determine if any additional water aeration measures may be necessary to improve the DO levels in Nam Ngiep River downstream the Re-regulation Dam.

FIGURE 2-13: MAIN RESERVOIR DISSOLVED OXYGEN AT THE END OF Q2 2024

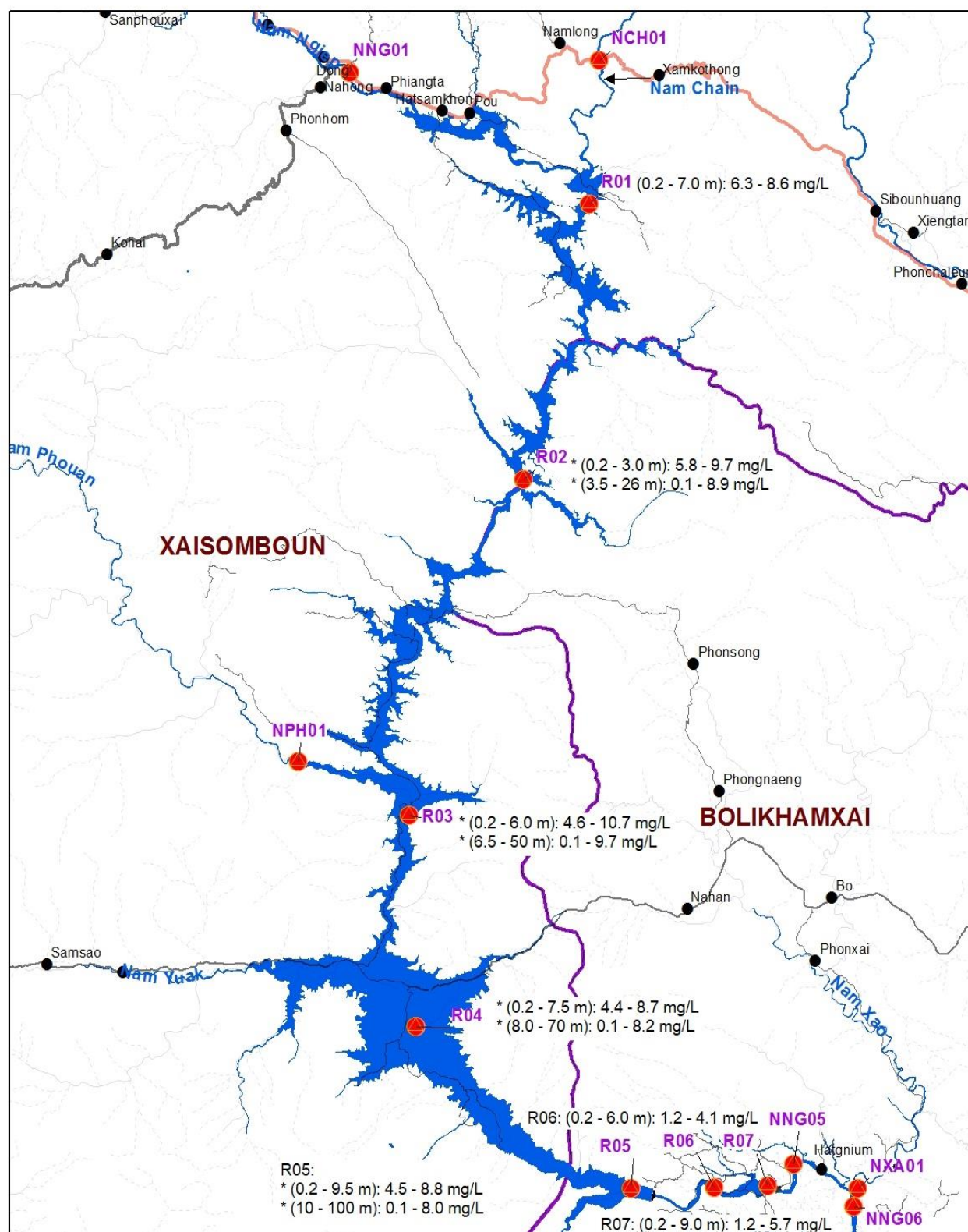


FIGURE 2-14: WATER TEMPERATURE AND DISSOLVED OXYGEN – DEPTH PROFILES IN THE MAIN RESERVOIR IMMEDIATELY UPSTREAM OF THE MAIN DAM (R05)

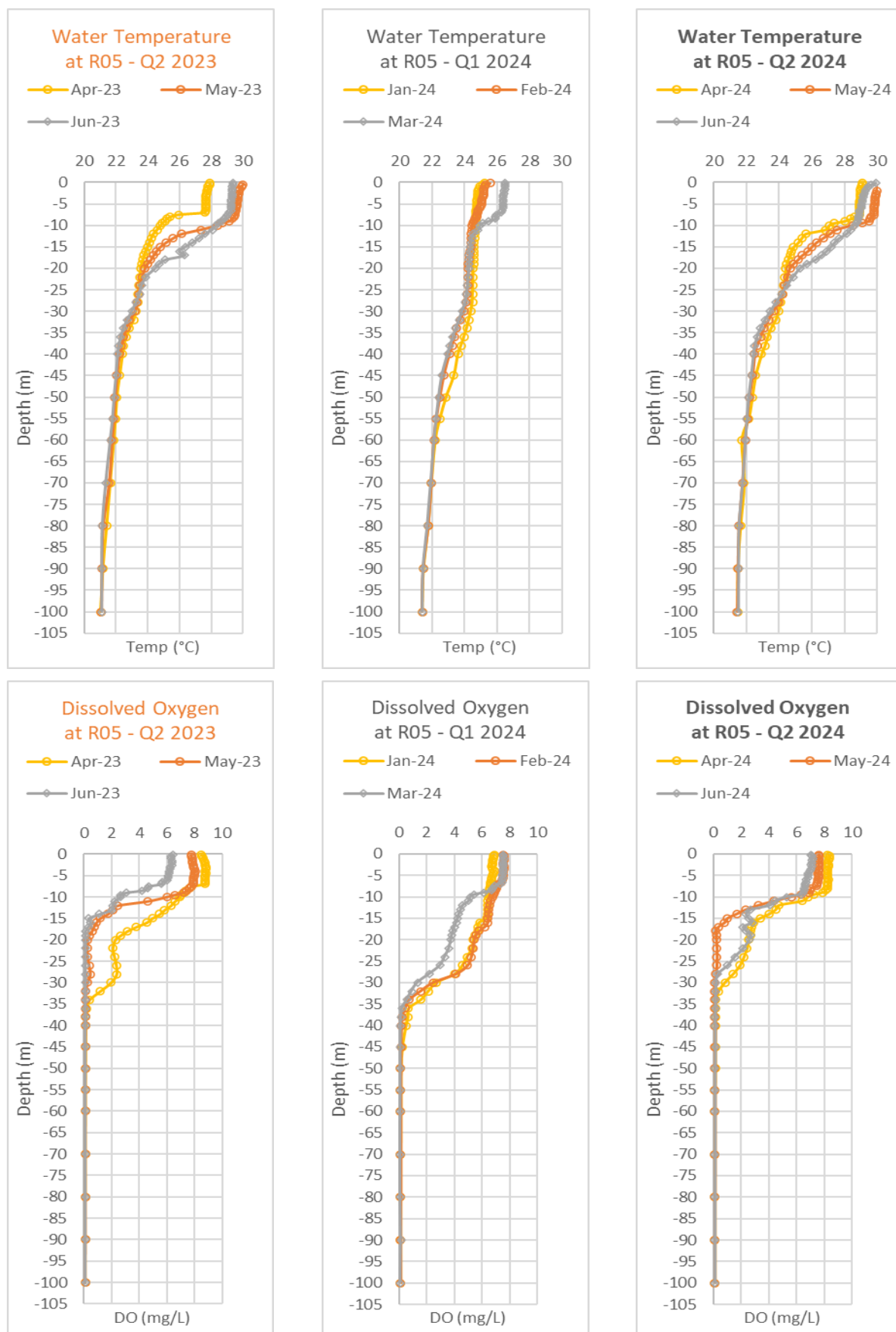


FIGURE 2-15: WATER TEMPERATURE AND DO DEPTH PROFILES IN THE MAIN RESERVOIR (R04 - R05), WITH POSITION OF INTAKE AT THE ACTUAL WATER LEVEL DURING SEPTEMBER 2018 – JUNE 2024

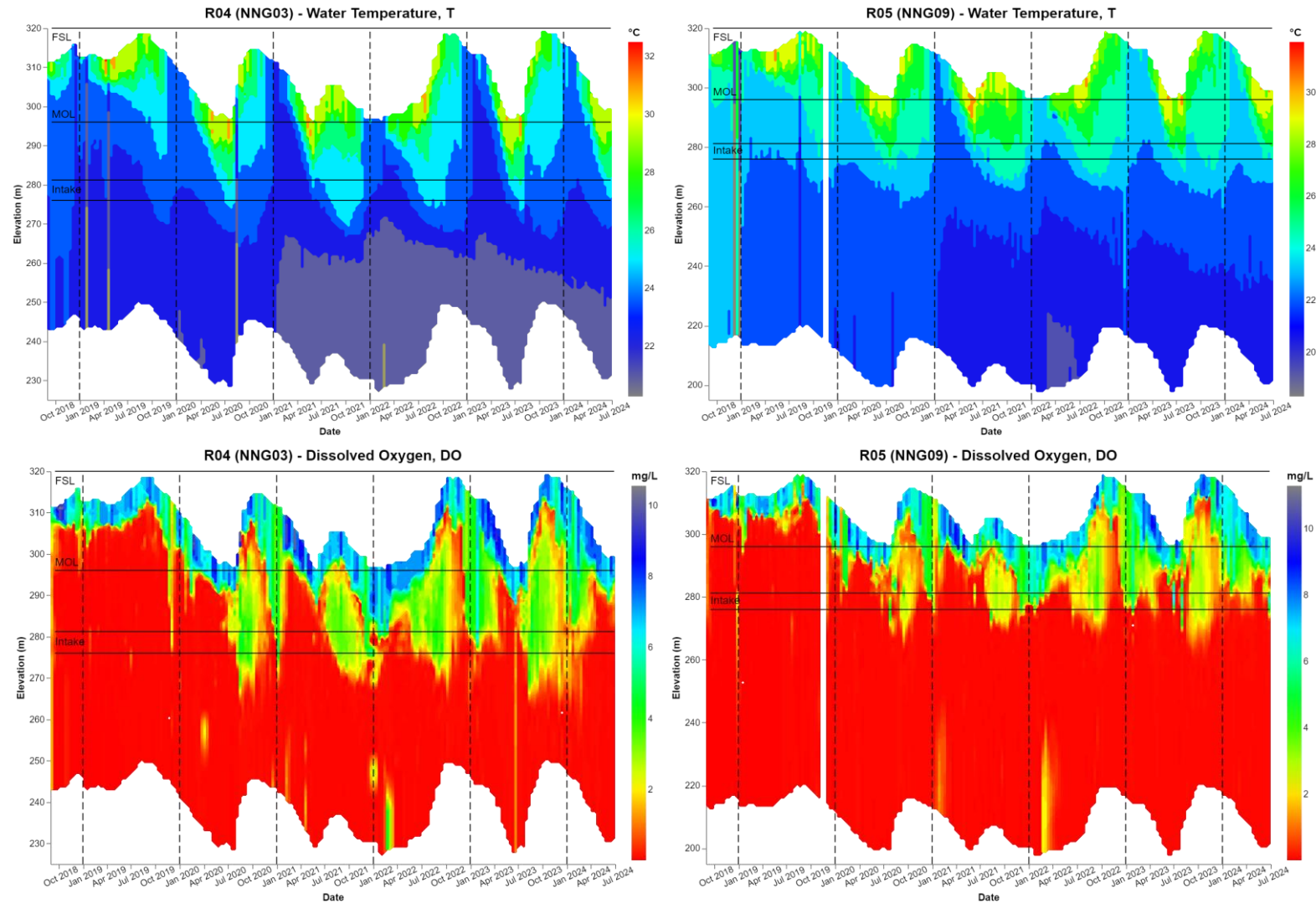


FIGURE 2-16: THE STRAIGHT-LINE GRAPH OF MONTHLY AVERAGED DO AND WATER TEMPERATURE AT R04 AND R05

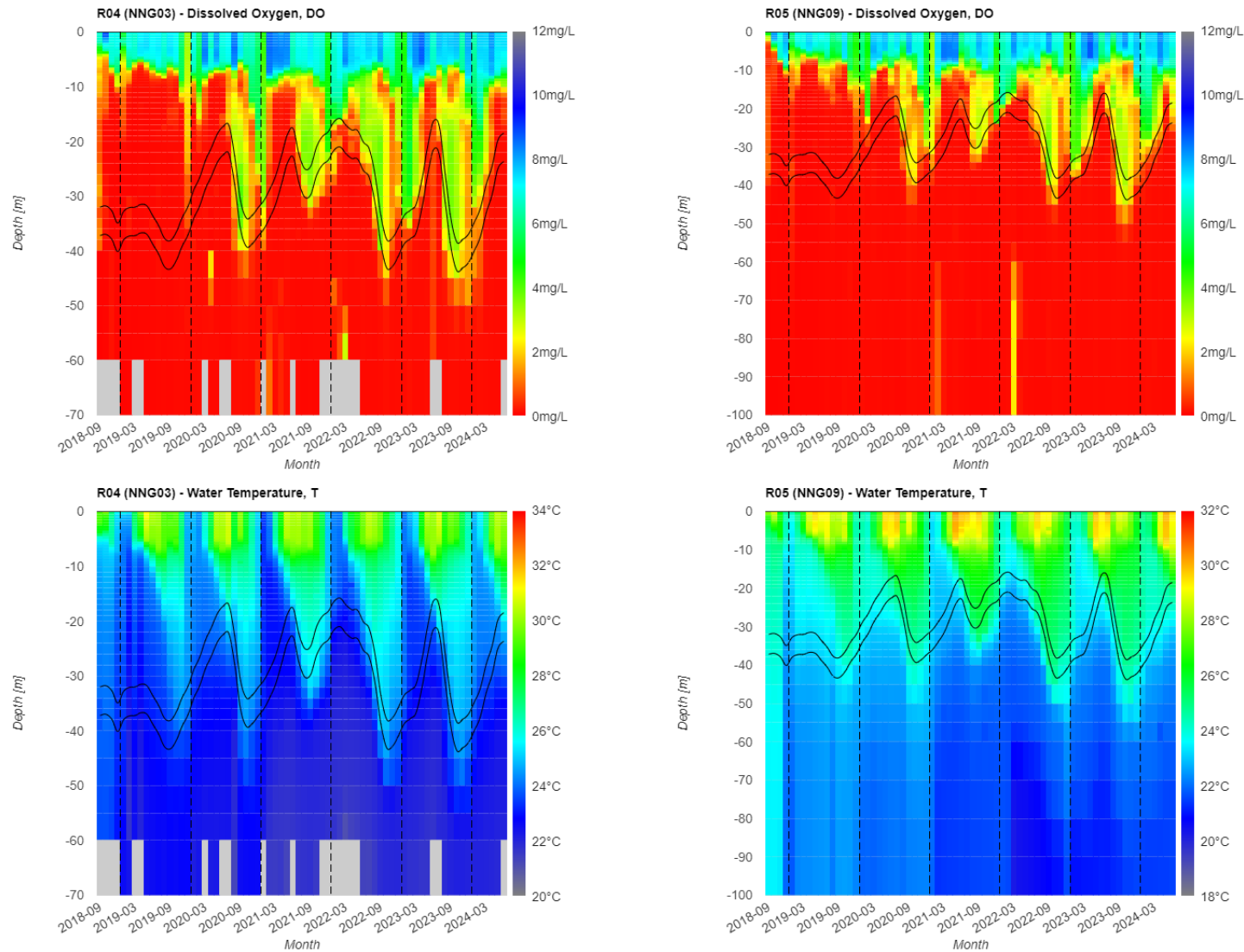


TABLE 2.7-1: DO (MG/L) RESULTS OF SURFACE WATER IN MAIN RESERVOIR, DO (MG/L) RESULTS OF R05 AT INTAKE DEPTH, RE-REGULATION RESERVOIR, NAM NGIEP AND ITS MAIN TRIBUTARIES MONITORED IN Q2 2024**(NATIONAL SURFACE WATER QUALITY STANDARD FOR DISSOLVED OXYGEN: ≥ 6 MG/L)**

Station Code	NNG01	R01	R02	R03	R04	R05 Intake	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
2-Apr-24		7.41	8.32	10.11											8.9		
3-Apr-24					8.48	0.9	8.72	3.59	5.65								
4-Apr-24										8.68	8.46	8.03	7.66			6.06	6.54
5-Apr-24	7.48													8.15			
9-Apr-24		7.45	8.35	8.05													
10-Apr-24					8.26	1.23	8.1	3.24	4.59								
23-Apr-24		7.83	8.18	8.1													
24-Apr-24					7.72	0.31	7.88	2.34	2.69								
2-May-24		8.52	9.66	9.09													
3-May-24					8.35	0.5	8.32	1.69	2.27								
6-May-24	6.97													8.04			
7-May-24		7.2	7.46	7.79											7.72		
8-May-24					7.55	0.22	7.8	3.05	4.06								
9-May-24										3.5	3.6	4.93	5.6			6.19	6.03
14-May-24		6.3	7.22	6.93													
15-May-24					6.85	0.1	7.23	1.32	2.14								
21-May-24		7.35	7.46	7.86													
22-May-24					7.76	0.11	7.85	3.45	4.61							6.48	7.62
28-May-24		6.8	7.49	7.41													

Station Code	NNG01	R01	R02	R03	R04	R05 Intake	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
29-May-24					6.98	0.09	6.78	2.53	2.5								
3-Jun-24	6.62													7.36			
4-Jun-24		7.44	7.5	7.55											8.31		
5-Jun-24					6.45	0.14	6.03	2.13	2.6								
6-Jun-24										3.84	4.24	5.47	5.93			6.28	6.44
12-Jun-24		7.41	6.6	6.87													
13-Jun-24					7.82	1.73	7.29	3.89	5.11								
17-Jun-24					8.43	0.13	8.27	3.9	4.51								
18-Jun-24		8.45	9.28	8.62													
26-Jun-24		7.2	6.76	7.72													
27-Jun-24					7.22	5.29	6.61	4.12	4.22							7.29	7.34

Ammonia Nitrogen

In Q2 2024, Ammonia Nitrogen complied with the National Surface Water Quality Standard (<0.2 mg/L) in all monitored stations.

TABLE 2.7-2: AMMONIA NITROGEN (MG/L) RESULTS FOR THE SURFACE WATER IN NAM NGIEP AND ITS MAIN TRIBUTARIES MONITORED IN Q2 2024

(NATIONAL SURFACE WATER QUALITY STANDARD FOR AMMONIA NITROGEN: <0.2 MG/L)

Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG 06	NNG 07	NNG 08	NCH 01	NPH 01	NXA 01	NHS 01
2-Apr-24		<0.2		<0.2										<0.2		
3-Apr-24					<0.2	<0.2										
5-Apr-24	<0.2												<0.2			
6-May-24	<0.2												<0.2			
7-May-24		<0.2		<0.2										<0.2		
8-May-24					<0.2	<0.2										
3-Jun-24	<0.2												<0.2			
4-Jun-24		<0.2		<0.2										<0.2		
5-Jun-24					<0.2	<0.2										

Biochemical Oxygen Demand (BOD₅)

Since 2014, the Biochemical Oxygen Demand (BOD₅) values in the Nam Ngiep River and its tributaries have generally been below the detection limit (< 1 mg/L). The results for Q2 2024 indicate that the BOD₅ levels are in compliance with the standard at all stations, except NNG01 (Nam Ngiep River upstream of the main reservoir during May 2024).

In addition, NNP1PC continues to carefully compile and assess all monitoring data to determine if any additional water aeration measures may be necessary to improve the DO levels in Nam Ngiep River downstream the Re-regulation Dam.

TABLE 2.7-3: BOD_5 (MG/L) RESULTS FOR THE SURFACE WATER IN NAM NGIEP AND ITS MAIN TRIBUTARIES MONITORED IN Q2 2024**(NATIONAL SURFACE WATER QUALITY STANDARD FOR BOD_5 : <1.5 MG/L)**

Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG 06	NNG 07	NNG 08	NCH 01	NPH 01	NXA 01	NHS 01
2-Apr-24		<1		<1										<1		
2-Apr-24 Bottom				<1												
3-Apr-24					<1	<1	<1	<1								
3-Apr-24 Bottom					<1	<1										
4-Apr-24									<1	<1	<1	<1				
5-Apr-24	<1												<1			
6-May-24	1.52												1.12			
7-May-24		<1		<1										1.05		
7-May-24 Bottom				<1												
8-May-24					<1	<1	<1	<1								
8-May-24 Bottom					<1	<1										
9-May-24									<1	<1	<1	<1			<1	<1
3-Jun-24	<1												<1			
4-Jun-24		<1		<1										<1		
4-Jun-24 Bottom				<1												
5-Jun-24					<1	1.38	<1	<1								
5-Jun-24 Bottom					<1	<1										
6-Jun-24									<1	<1	<1	<1			<1	<1

Chemical Oxygen Demand (COD)

The COD measurements in Q2 2024 are presented in **Table 2.7-4**.

TABLE 2.7-4: COD (MG/L) RESULTS FOR THE SURFACE WATER IN NAM NGIEP AND ITS MAIN TRIBUTARIES IN Q2 2024**(NATIONAL SURFACE WATER QUALITY STANDARD FOR COD: < 5 MG/L)**

Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG0 6	NNG 07	NNG 08	NCH 01	NPH 01	NXA 01	NHS 01
2-Apr-24	7.0												6.6	12.8		
3-Apr-24							9.6	16								
4-Apr-24									9.6	6.4	12.8	9.6			9.6	12.8
6-May-24	25.6												16			
7-May-24														12.8		
9-May-24							6.4	12.8	16	6.4	19.2	9.6			19.2	16
3-Jun-24	<5												<5			
4-Jun-24														6.4		
5-Jun-24							9.6	<5								
6-Jun-24									<5	<5	6.8	10			<5	13.6

Faecal Coliform Bacteria

The results of the faecal coliform analyses in Q2 2024 are presented in **Table 2.7-5**.

The standard for Faecal coliform was complied with in all stations in April 2024, and on 7 and 9 May 2024. Non compliances were found in NNG01 on 6 May and 3 June 2024, in NNG08 and NNG07 on 6 June 2024 and in NCH01 on 3 June 2024.

TABLE 2.7-5: FAECAL COLIFORMS (MPN/100 ML) RESULTS IN NAM NGIEP AND ITS MAIN TRIBUTARIES IN Q2 2024**(NATIONAL SURFACE WATER QUALITY STANDARD FOR TOTAL COLIFORMS: <1,000 MPN/100 ML)**

Station Code	NNG0 1	R0 1	R0 2	R0 3	R0 4	R0 5	R0 6	R0 7	NN G05	NNG 06	NNG07	NNG0 8	NCH0 1	NPH 01	NXA 01	NHS 01
2-Apr-24														240		
4-Apr-24									240	130	79	79			350	130
5-Apr-24	920												540			
6-May-24	1,600												350			
7-May-24														920		
9-May-24									22	26	350	280			280	220
3-Jun-24	1,600												1,600			
4-Jun-24														920		
6-Jun-24									79	110	1,600	1,600			920	540

Total Coliform Bacteria

The results of measurements for total coliform bacteria are presented in **Table 2.7-6**. The results indicate a similar pattern and same tendency as for faecal coliform bacteria. There were no exceedances of the National Surface Water Quality Standard (<5,000 MPN/100 mL) for total coliform bacteria.

TABLE 2.7-6: TOTAL COLIFORM (MPN/100 ML) RESULTS IN NAM NGIEP AND ITS MAIN TRIBUTARIES IN Q2 2024
(NATIONAL SURFACE WATER QUALITY STANDARD FOR TOTAL COLIFORMS: <5,000 MPN/100 ML)

Station Code	NNG 01	R0 1	R0 2	R0 3	R0 4	R0 5	R0 6	R0 7	NNG 05	NNG 06	NNG0 7	NNG0 8	NCH0 1	NPH0 1	NXA0 1	NHS 01
2-Apr-24														540		
4-Apr-24									350	220	350	170			540	240
5-Apr-24	1,600												920			
6-May-24	1,600												350			
7-May-24														1,600		
9-May-24									70	110	1,600	1,600			1,600	1,600
3-Jun-24	1,600												1,600			
4-Jun-24														1,600		
6-Jun-24									350	540	1,600	1,600			1,600	1,600

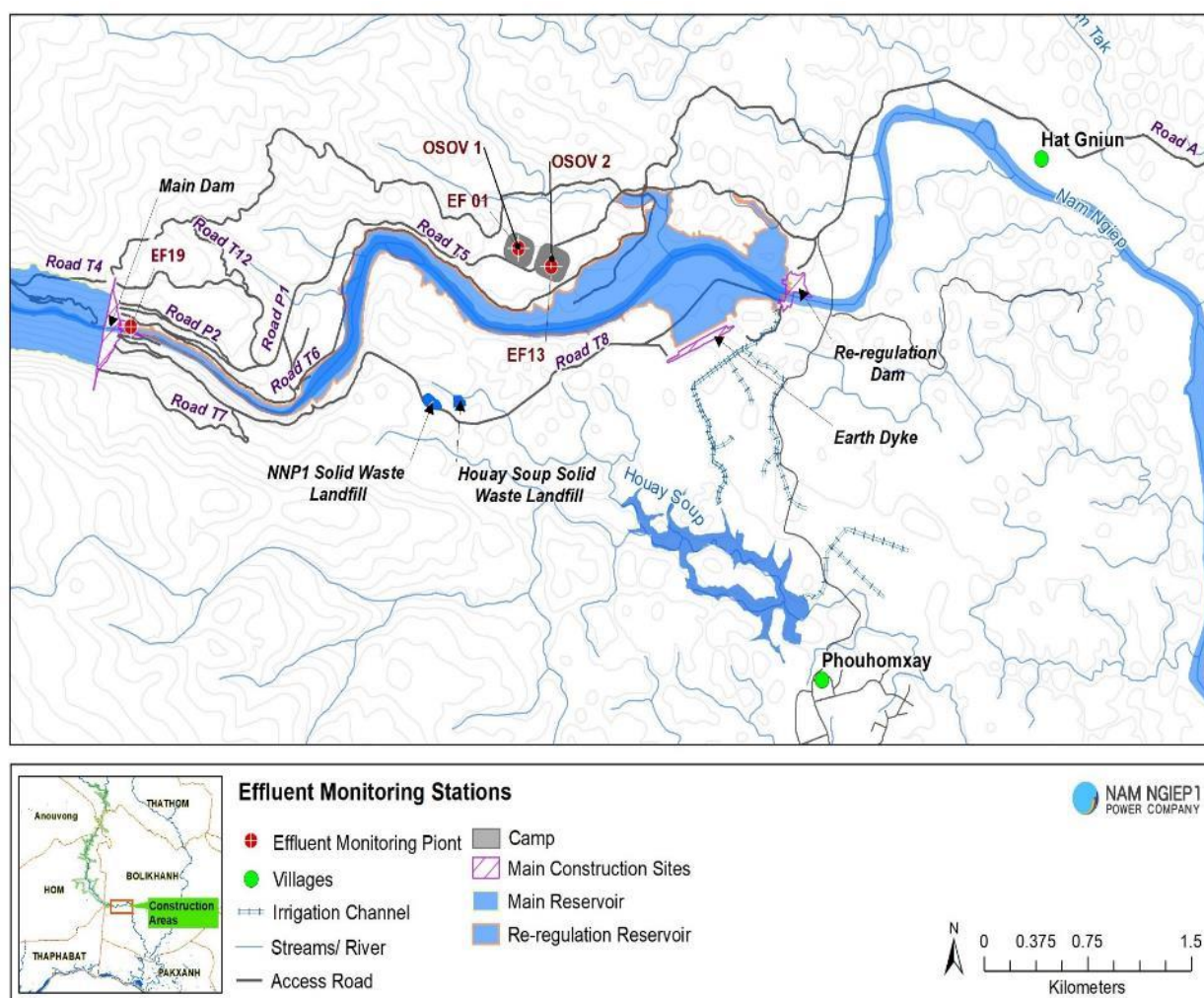
2.7.2 Compliance Monitoring of Effluents from Camps

A total of 03 sites discharged effluents in Q2 2024, including 02 camps (OSOV1 and OSOV2) and at the Wastewater Treatment System of the Main Powerhouse. The effluent monitoring location sites can be found in **Figure 2-17**.

The results are described in **Table 2.7-7** and the full data set is in **Appendix 5-2**.

The status of compliance as of 30 June 2024 can be summarized as follows:

- Non-compliance with Ammonia-Nitrogen, Total Nitrogen, Total Phosphorus for Wastewater Treatment Systems in the Main Powerhouse (EF19) and OSOV2 Camp (EF13);
- Non-compliance with Faecal Coliform and Total Coliform at OSOV1 (EF01) and OSOV2 (EF13).

FIGURE 2-17: LOCATION OF EFFLUENT MONITORING POINTS**TABLE 2.7-7: RESULTS OF THE EFFLUENT WATER QUALITY MONITORING OF THE CAMPS IN Q2 2024 (NON-COMPLIANCE PARAMETERS ONLY)**

Date	Parameter (Unit)	Guideline in the CA	Site Name	OSO V1	OSO V 2	Main Powerhouse
			Station Code	EF01	EF13	EF19
01-Apr-24	NH ₃ -N (mg/L)	<10.0		<2	9.4	11.7
22-Apr-24	NH ₃ -N (mg/L)	<10.0		<2	<2	<2
13-May-24	NH ₃ -N (mg/L)	<10.0		<2	<2	7.4
27-May-24	NH ₃ -N (mg/L)	<10.0		<2	7.3	<2
10-Jun-24	NH ₃ -N (mg/L)	<10.0		<2	11.8	<2
21-Jun-24	NH ₃ -N (mg/L)	<10.0		<2	11.2	6.8
01-Apr-24	Total Nitrogen (mg/L)	<10.0		4.4	12.8	13.2
22-Apr-24	Total Nitrogen (mg/L)	<10.0		3.2	2.4	3.5
13-May-24	Total Nitrogen (mg/L)	<10.0		1.8	3.8	7.6
27-May-24	Total Nitrogen (mg/L)	<10.0		0.1	11.3	4.2
10-Jun-24	Total Nitrogen (mg/L)	<10.0		1.9	13.0	3.4
21-Jun-24	Total Nitrogen (mg/L)	<10.0		3.2	11.9	7.2

		Site Name	OSOV1	OSOV 2	Main Powerhouse
		Station Code	EF01	EF13	EF19
Date	Parameter (Unit)	Guideline in the CA			
01-Apr-24	Total Phosphorus (mg/L)	<2	2.18	1.0	1.8
22-Apr-24	Total Phosphorus (mg/L)	<2	2.36	0.4	8.2
13-May-24	Total Phosphorus (mg/L)	<2	2.06	0.4	7.9
27-May-24	Total Phosphorus (mg/L)	<2	2.81	0.8	8.5
10-Jun-24	Total Phosphorus (mg/L)	<2	0.92	1.2	6.3
21-Jun-24	Total Phosphorus (mg/L)	<2	1.71	1.1	7.1
01-Apr-24	Faecal Coliform (MPN/100 mL)	<400	1,600	0	0
22-Apr-24	Faecal Coliform (MPN/100 mL)	<400	540	0	240
13-May-24	Faecal Coliform (MPN/100 mL)	<400	220	70	0
27-May-24	Faecal Coliform (MPN/100 mL)	<400	540	22	0
10-Jun-24	Faecal Coliform (MPN/100 mL)	<400	350	0	0
21-Jun-24	Faecal Coliform (MPN/100 mL)	<400	45	2	0
01-Apr-24	Total coliform (MPN/100 mL)	<400	1,600	0	0
22-Apr-24	Total coliform (MPN/100 mL)	<400	1,600	0	540
13-May-24	Total coliform (MPN/100 mL)	<400	1,600	170	0
27-May-24	Total coliform (MPN/100 mL)	<400	1,600	130	0
10-Jun-24	Total coliform (MPN/100 mL)	<400	1,600	0	0
21-Jun-24	Total coliform (MPN/100 mL)	<400	1,600	170	0

TABLE 2.7-8: COMPLIANCE STATUS OF EFFLUENT DISCHARGE FROM THE CAMPS IN Q2-2024

Site	ID	WWTS	Key Non-Compliance Issues ² in Q2-2024	Corrective Actions
OSOV 1 (Owner's Site Office and Village)	EF01	- Septic tanks (kitchen and black water) and wetland (grey water), discharge: 70 m³/day. - The effluent from this site flows into the Re-regulation Reservoir.	- Faecal coliform (<400 MPN/100 mL): Non-compliance in 3 out of 6 samplings. Q2 mean 549 MPN/100 mL. - Total coliform (<400 MPN/100 mL): Non-compliance in all 6 samplings. Q2 mean 1,600 MPN/100 mL. - Total Phosphorus (<2 mg/L): Non-compliance in 4 out of 6 samplings. Q2 mean 2.0 mg/L.	Carried out routine maintenance of the Wastewater Treatment System including cleaning all 17 septic tanks, inspecting the air blowers to ensure they are functioning properly and maintaining wetland system.
OSOV 2 (ESD Camp)	EF13	- Septic tanks (kitchen and black water) and SBR with chlorination system. - The effluent from this site is led into a ditch connected to the Re-regulation	- Total nitrogen (<10 mg/L): Non-compliance in 4 out of 6 samplings. Q2 mean 9.2 mg/L. - Ammonia-nitrogen (<10 mg/L): Non-compliance in 2 out of 6 samplings. Q2 mean 7.0 mg/L.	The installed WWTS does not eliminate nitrogen or phosphorus. However, there is no concern given the low discharge effluent quantity, which is completely absorbed in the soil within a distance of less

² The values in brackets indicate the applicable standard

Site	ID	WWTS	Key Non-Compliance Issues ² in Q2-2024	Corrective Actions
		reservoir, however, due to low quantities of effluent, the liquid is absorbed in the soil before reaching the reservoir.		than 300 m before reaching the re-regulation pond. Cleaning all 17 septic tanks and inspecting the air blowers and closely monitoring the residual chlorine content and chlorination dosage adjustment to ensure they are functioning properly
Main Powerhouse	EF19	- Septic tanks (grey and black water), biofilm tank and chlorination tank. - The effluent from this site flows into the tailrace of the Main Powerhouse and then into the Re-regulation Reservoir.	- Ammonia-nitrogen (<10 mg/L): Non-compliance in 1 out of 6 samplings. Q2 mean 4.8 mg/L. - Total nitrogen (<10 mg/L): Non-compliance in 1 out of 6 samplings. Q2 mean 6.5 mg/L. - Total Phosphorus (<2 mg/L): Non-compliance in 5 out of 6 samplings. Q2 mean 6.6 mg/L.	As above

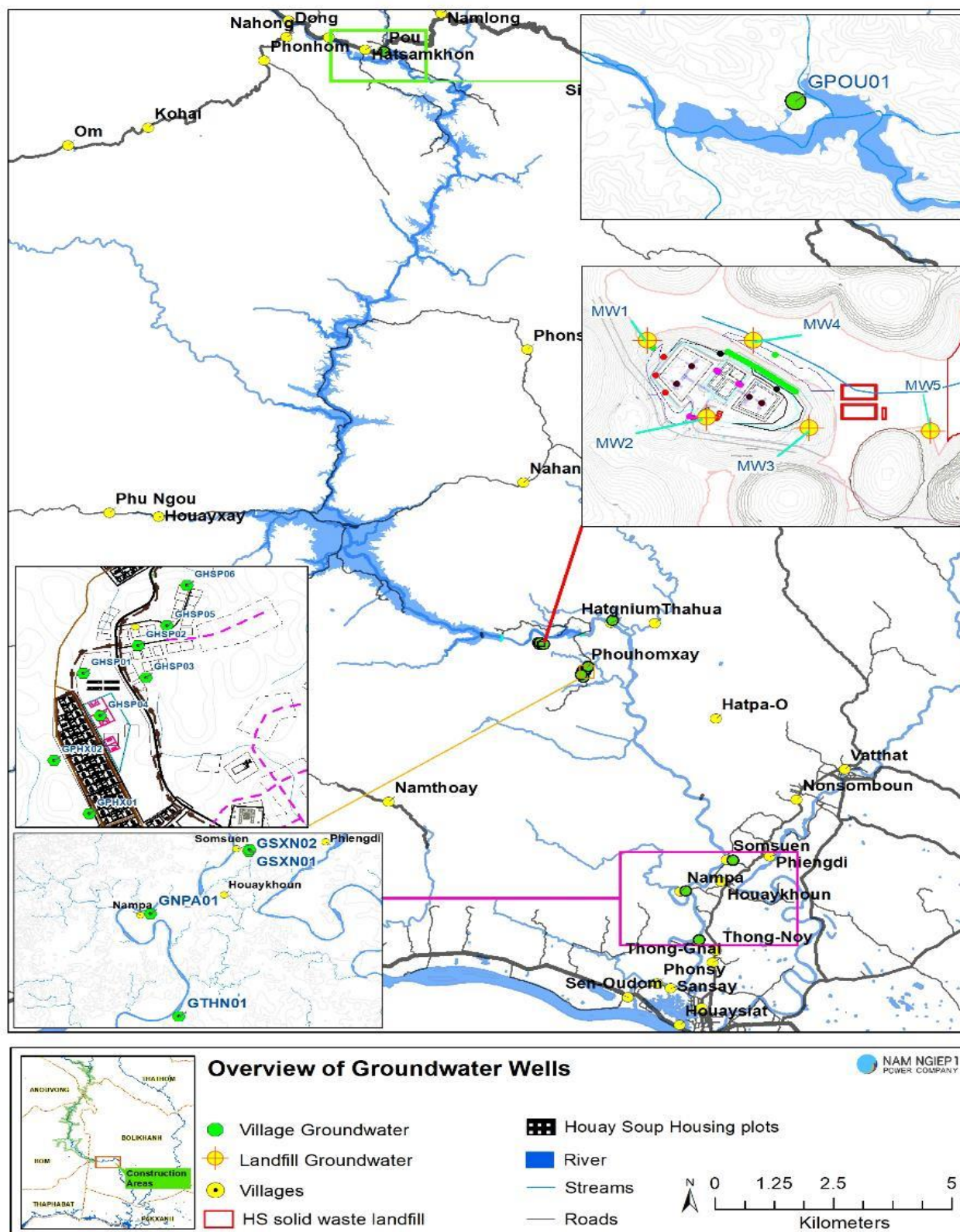
2.7.3 Groundwater Quality Monitoring

During Q2 2024, six of seven boreholes at Somseun, Nam Pa, Thong Noy and Phouhomxay (one borehole in each village) and Pou Villages (two boreholes) have been monitored for the following parameters:

- a. *Monthly*: pH, DO (%), DO (mg/L), Conductivity ($\mu\text{S}/\text{cm}$), Temperature ($^{\circ}\text{C}$), Turbidity (NTU), Faecal Coliform (MPN/100 mL) and *E. coli* (MPN/100 mL);
- b. *Annually (This Quarter)*: Arsenic (mg/L), Total Iron (mg/L), Magnesium (mg/L), Fluoride (mg/L), Total Hardness (mg/L), Nitrate (mg/L), Nitrite (mg/L) and Lead (mg/L).

Note that during Q2 2024, the water pump of borehole (GPHX01) at Phouhomxay Village was broken. Therefore, no water sampling taken. The groundwater sampling locations are displayed in **Figure 2-18** and the groundwater monitoring data is presented in **Appendix 5-3**.

FIGURE 2-18: GROUNDWATER SAMPLING LOCATIONS



Key findings from the groundwater quality monitoring are summarized as the follows:

Phouhomxay Village: all monitored parameters complied with the standard, except pH in May 2024.

Thong Noy Village: all monitored parameters complied with the standard, except pH, faecal coliform and *E. coli* bacteria.

Somseun Village: all monitored parameters complied with the standard, except faecal coliform in June 2024.

Nampa Village: all monitored parameters complied with the standard, except pH, faecal coliform and *E. coli* bacteria in June 2024.

Pou Village: all monitored parameters complied with the standard, except pH and faecal coliform in May 2024.

The villagers were advised to boil water before drinking. This advice is in accordance with the Law on Hygiene, Disease Prevention and Health Promotion No 01/NA of 10 April 2001, which states that domestic water supply for daily use is not required to be readily drinkable but would normally have to be boiled or otherwise treated before it would be suitable for drinking.

There are two types of water supply systems in Lao PDR:

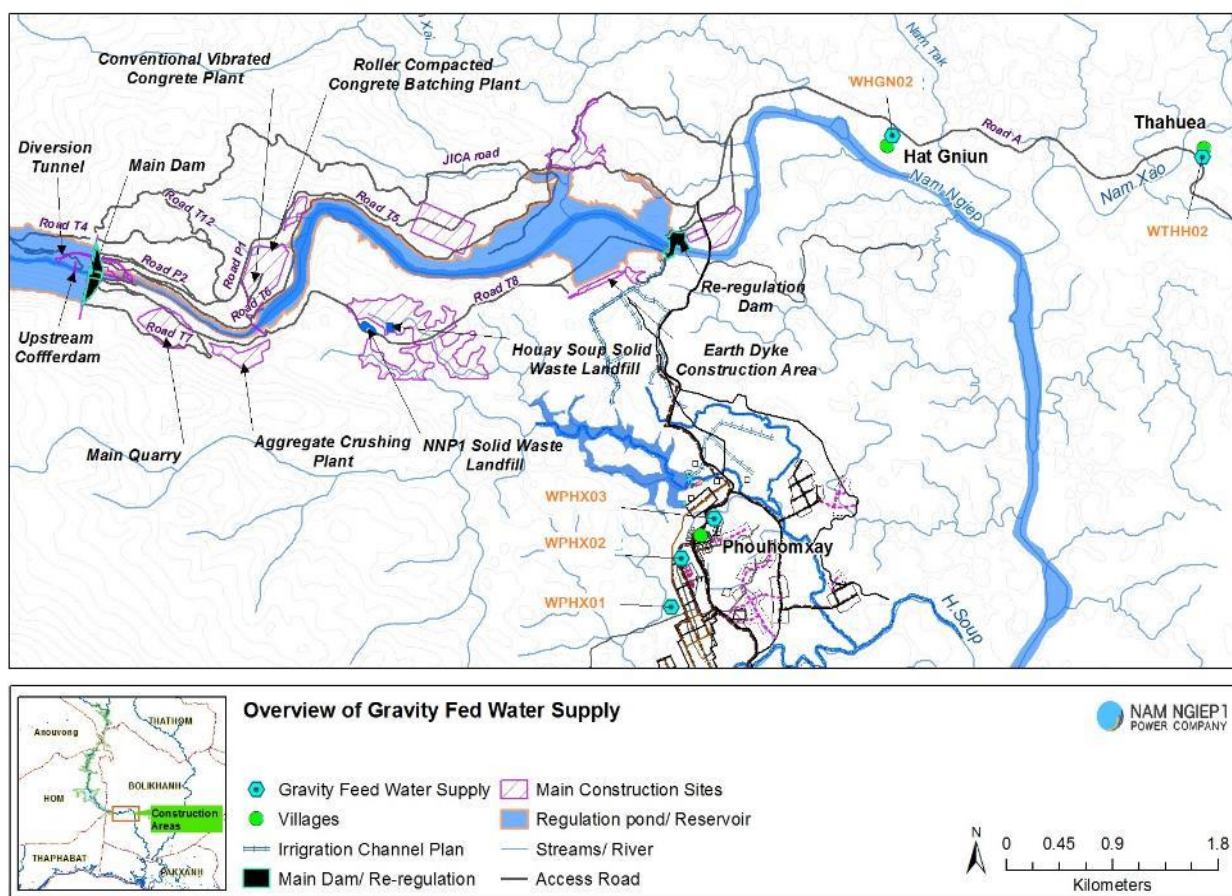
- (A) Nam Papa systems (water supply)** – water from natural water sources that has gone through a treatment process to become clean and safe water in compliance with the drinking water quality standards. These systems are managed by the Department of Water Supply, Ministry of Public Works and Transport; and
- (B) Nam Sa-at Systems (domestic water supply)** – provide water to rural areas that are not connected to Nam Papa systems. Nam Sa-at systems include gravity fed systems and boreholes with motorised pumps or hand pumps. These systems are managed by the Centre for Environmental Health and Water Supply (Nam Sa-at) under the Department of Hygiene and Health Promotion, Ministry of Health.

The community water supply systems related to the NNP1 hydropower project are under Nam Sa-at system with the monitoring requirements identify in the Minister's Decision on the Water Quality Standard Management for Drinking and Domestic Use, No. 561/MoH dated 27 February 2014.

The issue of bacterial contamination in the communities' water supply have been investigated by ESD team together with the respective local authorities and the villagers to find the likely root causes. A series of actions have been taken to prevent the contamination according to the Water Safety Plans (WSP); however, the Project, Nam Sa-at (GOL) and the villagers considered that disinfection treatment processes (e.g., chlorination, ceramic filtration) would not be sustainable and cost effective in a long run. It is well understood and agreed with the villagers that the water shall be boiled before drinking as mentioned above. It is also noted that boiling of water from domestic water supply (Nam Sa-at) systems before drinking is a general practice in the rural areas of Lao PDR.

2.7.4 Gravity Fed Water Supply (GFWS) Monitoring

The monitoring of the GFWS aims to assess the quality of water that is being used for bathing and washing by villagers at Hat Gniun, Thaheua and Phouhomxay villages. The gravity fed water supply system at Phouhomxay Village has been in use since December 2017.

FIGURE 2-19: OVERVIEW OF GRAVITY FED WATER SUPPLY

Water samples were taken from the taps for analysis during the reported period and selected results are shown in **Table 2.7-9**. Note that the water supply system in Thaheua Village was under maintenance in June 2024 during the water sampling schedule, therefore, no water samples were taken at this site. The full set of data is presented in **Appendix 5-4**.

TABLE 2.7-9: THE GFWS MONITORING RESULT IN Q2 2024

Date	Parameter (Unit)	Site Name	Tha Heua Village	Hat Gnuin Village	Phouhomxay Village	
		Station	WTHH02	WHGN02	WPHX02	WPHX03
		Guideline				
08-Apr-24	Faecal Coliform (MPN/100 mL)	0	70	130	33	17
16-May-24		0	22	350	22	22
11-Jun-24		0		170	170	280
08-Apr-24	E.Coli Bacteria (MPN/100 mL)	0	33	49	17	11
16-May-24		0	11	33	7.8	11
11-Jun-24		0		31	79	130

Thaheua Village (WTHH02): all parameters complied with the standard, except for faecal coliform and *E.coli*.

Hat Gniun Village (WHGN02): all parameters complied with the standard, except for faecal coliform and *E.coli*.

Phouhomxay Village (WPHX02-tap water at primary school; and **WPHX03**-tap water at a villager's house): all parameters complied with the standard, except faecal coliform and *E.coli* in the Q2 2024 samples. Note here that during sampling of tap water in Phouhomxay Village, surface water from Houay Soup Stream was still supplied into the system.

As observed in the field during water sample collection, livestock is roaming around in the water intake areas which may have contributed to the presence of Faecal Coliform Bacteria and *E.coli* in GFWS samples. According to the 2019 site condition survey, it is not feasible to fence off the upstream water course due to cattle having access from all directions along the stream. The villagers generally use tap water for washing and cleaning. They were informed about the monitoring results and were advised to prevent the bacterial contamination by removing livestock from the intake areas and boil water before drinking. The advice to boil the water is in accordance with the Law on Hygiene, Disease Prevention and Health Promotion No 01/NA of 10 April 2001, which states that domestic water supply for daily use is not required to be readily drinkable but would normally have to be boiled or otherwise treated before it would be suitable for drinking.

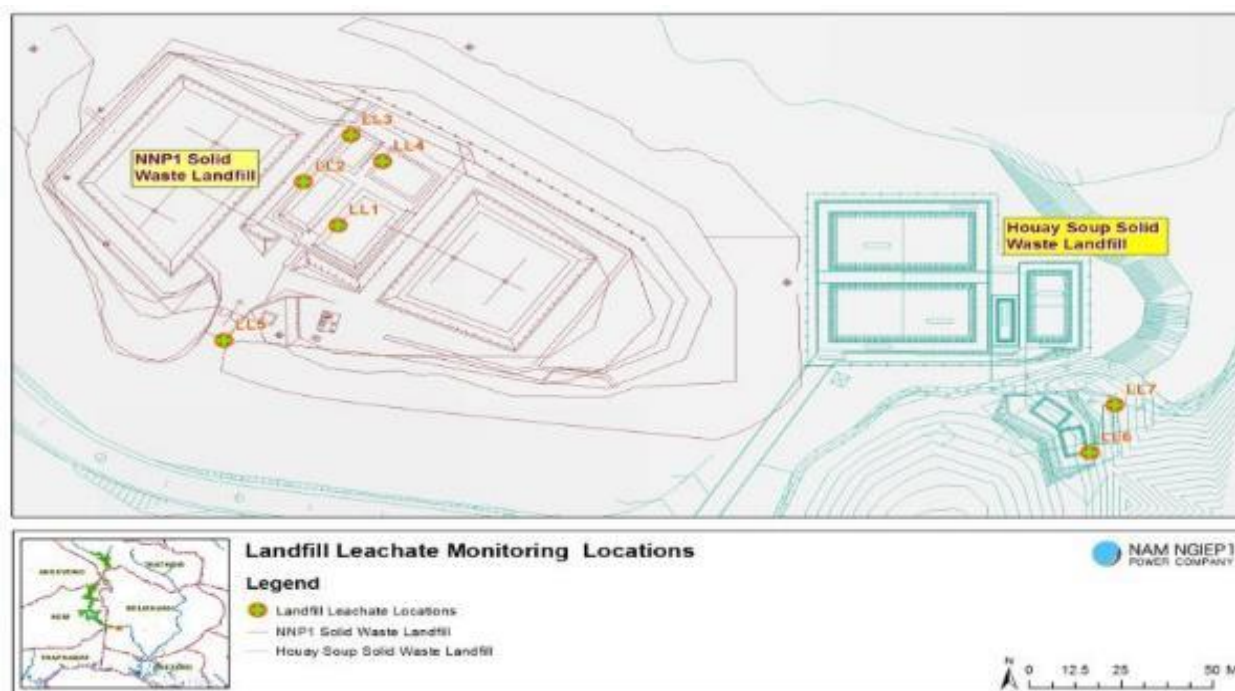
As mentioned in **section 2.7.3**, the gravity fed system is a domestic water supply managed by the Centre for Environmental Health and Water Supply (Nam Sa-at) under the Department of Hygiene and Health Promotion, Ministry of Health. It is well understood and agreed with the villagers that the water shall be boiled before drinking.

For Phouhomxay Village, the villagers requested NNP1PC and the District Water Supply Office during a meeting in March 2022 to reuse the Gravity Fed System (GFS) as a main supply and reserve the existing ground water supply system for times when the GFS would have to be repaired. The water from the gravity fed system needs to be boiled before drinking, but may be used directly for other purposes such as washing, feeding animals, watering the garden, and other households' activities.

In addition, to ensure sufficient water quantity, the ESD will work with the District Water Supply Office to improve the water intake of the GFS under NNP1PC's Corporate Social Responsibility (CSR). For the presence of bacteria, the community confirmed that they will boil water before drinking. It is also noted that boiling domestic water supply (Nam Sa-at) before drinking is a general practice in the rural areas of Lao PDR.

2.7.5 Landfill Leachate Monitoring

The landfill leachate treatment systems at NNP1 Project landfill and Houay Soup landfill are monitored to control the functioning of the treatment process and ensure compliance with effluent standards. Due to low rainfall during Q2 2024, the sampling of effluent could only be carried out in June 2024. The monitoring locations are presented in the **Figure 2-20**.

FIGURE 2-20: LANDFILL LEACHATE MONITORING LOCATION

The monitoring results in June 2024 indicate compliance with the applicable standards for all monitored parameters, except for faecal coliform and total coliform for both NNP1 Landfill Leachate (last leachate pond) and Houay Soup Landfill Leachate (last leachate pond). However, there has not been any discharge to the environment from the leachate systems during this reporting period. The monitoring data can be found in **Appendix 5-5**.

2.7.6 Water Quality Compliance Monitoring

The water quality non-compliance issues in Q2 2024 are summarized in **Table 2.7-10**.

TABLE 2.7-10: NON-COMPLIANCES RELATING TO WATER QUALITY MONITORING IN Q2 2024

No	Non-compliance Issues	Corrective Actions	Status
1	During turbine discharge (May and June 2024), Dissolved Oxygen (DO) in the Nam Ngiep River downstream the Re-regulation Dam was lower than the National Surface Water Quality Standard (6 mg/L)	- NNP1PC has continued implementing the water quality monitoring program and discussed the results with the LTA during the May 2023 visit; - LTA recommended to maintain the monitoring program, and concluded that other measures aiming at an improvement, like e.g. the possibility of artificial re-aeration of the water in the re-regulation pond for increasing oxygen content, are not required.	- Closely monitoring

No	Non-compliance Issues	Corrective Actions	Status
2	Effluents discharged from the Wastewater Treatment Systems (WWTS) at OSOV1, OSOV2 and the Main Dam exceeded the National Effluent Standard Guideline for some parameters	In April, May and June 2024, EMO, ADM and TD conducted a monthly joint inspection for the operation and maintenance of the WWTS: - All 17 septic tanks and air blowers at OSOV1 were randomly checked by the ADM staff and they are functioning properly. - Wetland maintenance at OSOV1 including weeding and replacing dead reeds and fixing the fence have been completed. - Closely monitor the residual chlorine content and chlorination dosage adjustment for the effluents of OSOV2 and the Main Powerhouse WWTS.	- Closely monitoring the system operation and maintenance.
3	Groundwater quality monitored for the communities (Phouhomxay, Thong Noy and Som Seun Villages) were not in compliance with the National Groundwater Quality Standard for drinking purpose on Faecal Coliform and <i>E.coli</i> parameters	- A full inspection of the water supply systems in Som Seun, Nam Pa and Thong Noy Village was conducted in September 2020 by NNP1PC team including consultations with the Village Water Use Committee (VWUC) and also interviews with some consumers (detailed in Q4 2020 Report). - Potential contamination sources of coliform were identified and recommendations on operation and maintenance of the water supply system were provided to the involved parties. - The villagers were informed about the monitoring results and were advised to boil water before drinking in accordance with the Law on Hygiene, Disease Prevention and Health Promotion No 01/NA of 10 April 2001, which states that domestic water supply for daily use is not required to be readily drinkable but would normally have to be boiled or otherwise treated before it would be suitable for drinking.	- The villagers were advised/encouraged to boil water before drinking. - Continue to monitor.
4	Gravity Fed Water Supply monitored for the communities (Thaheua, Hat Gniun, and Phouhomxay Village) were not complied with the	- Site observations were conducted during the routine water sampling, it was observed that livestock was roaming around the water intake areas and faeces from livestock and birds may contribute to the presence of bacterial contamination. It is not feasible to fence off the upstream water course due to	- The villagers generally use tap water for washing and cleaning, and were encouraged to

No	Non-compliance Issues	Corrective Actions	Status
	National Drinking Water Quality Standard on Faecal Coliform and <i>E.coli</i> parameters.	cattle having access from all directions along the stream. The villagers were informed about the monitoring results and were advised to boil water before drinking.	boil water before drinking. - Continue monitoring.
5	Landfill Leachate Monitoring for both NNP1 and Houay Soup Landfills were not complied with the Effluent Standard for faecal coliform and total coliform.	- The leachate is still contained in the leachate ponds without being discharged to the environment. - Continue monitoring.	- Continue monitoring.

3 WATERSHED AND BIODIVERSITY MANAGEMENT

3.1 WATERSHED MANAGEMENT

3.1.1 Implementation of Watershed Management Plan

3.1.1.1 Xaysomboun Watershed and Reservoir Protection Office (WRPO)

Approval of the Fishery Co-Management Plan (FCMP):

On 23 April 2024, NNP1 EMO submitted a request letter to the Xaysomboun Provincial Vice Governor to seek his support for the approval of the fishery co-management plan. On 30 April 2024, Xaysomboun WRPO provided the revised draft fishery regulation to NNP1 EMO. After reviewing, it was observed that this draft differed from the previously discussed and agreed upon version by the both WRPOs of XSB and BLX, and NNP1 EMO. In responses, on 10 May 2024, NNP1 EMO sent an official letter recommending that XSB WRPO proceed with the originally agreed draft.

On 25 June 2024, the EMO was informed that the Xaysomboun Provincial Vice Governor had instructed XSB WRPO to communicate with NNP1 EMO. The head of XSB WRPO also noted that, due to the ongoing patrolling activities, the CFMP approval meeting has been scheduled for mid-September 2024.

a) Construction of Reservoir Checkpoints:

On 10 June 2024, the head of XSB WRPO informed NNP1 EMO that the current local contractor has cancelled the construction, and a new local contractor would continue the work. A joint site visit to the location of 2 reservoir checkpoints among NNP1 EMO, XSB WRPO and the new contractor is tentatively scheduled for early of July 2024.

b) Patrolling:

On 14 June 2024, XSB WRPO held a monthly meeting to present the results of patrolling work conducted from March to May 2024. The meeting, attended by representatives from XSB WRPO, NNP1 EMO and BSP-WCS, noted the absence of the head of XSB WRPO and other

patrol team leaders as well. NNP1 EMO and BSP-WCS observed that XSB WRPO patrol team has not followed up on the discussion from March 2024, and the patrolling report has not been submitted to the head of XSB WRPC and PAFO.

XSB WRPO informed NNP1 EMO that the Vice Governor of Hom District has assigned five staff members to the field sub-office on 30 April 2024 including 2 Hom DAFO, 2 militaries and 1 police. However, there was no representative from the XSB provincial level. By the end of June 2024, the solar panel to be used for the field sub-office has yet to be installed.

3.1.1.2 Bolikhamxay Watershed and Reservoir Protection Office (WRPO)

Bolikhamxay WRPO continued patrols from April to May 2024. The results of the April patrol were discussed on 17 May 2024. However, a discussion meeting on the May patrol results, that needs involvement from relevant district and provincial offices, was paused due to budget shortfall. The next patrol plan are on hold and will resume once funding is received from the FPF-DoF-MEM under the approved AIP 2024.

3.1.1.3 NNP1PC EMO

a) ADB, IAP and LTA Social Mission:

On 22 May 2024, NNP1 EMO, ADB, LTA and LHSE visited a representative handicraft production group in Nahong village and representative households engaged in greenhouse vegetable production in Phonhom village. The purpose of the visit was to monitor the livelihood program activities for 12 villages in the watershed area. During the wrap-up session, several key points were raised for further action, including a request to review the livelihood plan to target people directly dependent on watershed resources.



ADB and LTA visited a representative household of the rattan production group at Nahong village



ADB and LTA visited a representative household of greenhouse vegetable production at Phonhom village

b) Livelihood Program Activities:

NNP1 EMO in collaboration with the Hom DAFO organized a meeting with village authorities and villagers on the development of producer group regulation of cattle, pineapple and oranges from 4-6 June 2024 respectively. On 18 June 2024, the head of Hom DAFO approved the production group regulations of cattle, pineapple and oranges as well as the issuance of group establishment license.

On 25-26 June 2024, NNP1 EMO and Thathom DAFO organized a meeting with village authority and villagers on the development of kai Noy Rice and Handicraft group regulations at Nahong and Phonhom village. It is expected that the regulation and license of group establishment will be approved and issued in July 2024.



Producer group establishment meeting at Houayxay Village on 4-6 June 2024



Producer group establishment meeting at Nahong and Phonhom villages on 25-26 June 2024

c) No Net Loss (NNL) within the NNP1 Watershed:

On 25 June 2024, NNP1 EMO submitted an official letter to the Department of Energy Business, Ministry of Energy and Mines (DEB-MEM) proposing a joint site monitoring in the NNP1 watershed. This objective is to address the unresolved issues and seek directives and discuss counter measures for the challenges in achieving No Net Loss (NNL) of biodiversity within the NNP1 watershed. The joint site monitoring is expected to be conducted in July 2024.

3.1.2 Preparation of Annual Implementation Plan (AIP)

The following table provides an overview of the progress in preparing the Annual Implementation Plans (AIP) for 2023 and 2024 by Xaysomboun WRPO and Bolikhamxay WRPO. Detailed highlights of fund preparation, approvals, and transfer statuses are shown in **TABLE 3.1-1**.

TABLE 3.1-1 ANNUAL IMPLEMENTATION PLAN PREPARATION STATUS

Watershed and Reservoir Protection Office (WRPO)	Preparation of Annual Implementation Plan (AIP) 2023	Preparation of Annual Implementation Plan (AIP) 2024
Xaysomboun WRPO	- On 25 January 2024, NNP1PC transferred funds to the FPF-DoF-MAF; - On 25 March 2024, Xaysomboun WRPO received 2,648,370,000 LAK from the fund under the approved AIP 2023. Status: Complete	- The Xaysomboun WRPO did not confirm the AIP2024 preparation during the joint ADB-IAP-LTA mission on 24 January 2024. - During the monthly meeting with Xaysomboun WRPO on 12 March 2024, NNP1 EMO proposed to postpone the discussion on the AIP 2024 preparation until the Xaysomboun WRPO has a clear plan to address outstanding issues. Note: NNP1 EMO also pointed out the risk in fund utilization because more than 3 billion LAK remain in the budget from the AIP 2020, 2022, and 2023. The Head of Xaysomboun WRPO agreed with the proposal. Status: No Progress
Bolikhamxay WRPO	On 20 October 2023, Bolikhamxay WRPO received the last two-quarter funds under the approved AIP 2023 from the FPF DOF-MAF with a total of 583,688,000 LAK, of which 163,490,000 LAK is from the NNP1 NNL source and 420,198,000 is from the GOL CA source. Status: Complete	- On 4 January 2024, the Bolikhamxay WRPO finalized their AIP2024, NNP1 EMO submitted it to ADB and IAP on the same day. - On 4 February and 5 March 2024, the IAP and ADB approved Bolikhamxay WRPO AIP2024 respectively. - On 28 March 2024, BLX WRPO submitted the fund disbursement request letter to FPF-DOF-MAF. NNP1 EMO expected to receive the fund request letter from FPF-DoF-MAF by the early of July 2024. Status: Pending

3.2 BIODIVERSITY OFFSET MANAGEMENT

3.2.1 ADB, IAP and LTA Social Mission

From 21 and 22 May 2024, ADB and LTA social team members and one observer from LHSE visited the NC-NX Biodiversity Offset Area monitored the progress of conservation-linked livelihood activities under BOMP in six villages within the NC-NX Biodiversity Offset Area. During the visit, the team consulted with villagers from Na Gngang and Vangphieng in Viengthong district to discuss the progress of the Community Development Plan (CDP) within BOMP. During the wrap-up session, several key points were raised for further action including a request for WCS to prepare TOR to identify alternative sustainable economic activities and conduct market chain analysis. EMO and SMO to work together and continue to intensify patrolling and deepen awareness through outreach.

3.2.2 Implementation of Biodiversity Offset Management Plan

Progresses on the implementation of activities by Component are described below:

a. Component 1 - Spatial Planning and Regulation

The Biodiversity Service Provider-Wildlife Conservation Society (BSP-WCS) shared the revised Participatory Land Use Plan (PLUP) of Vangphieng, Na Gngang and Natan villages to BOMU and NNP1-EMO on 8 April 2024. The plans were reviewed and finalized on 7 May 2024 and signed by the three village authorities and Viengthong District Agriculture and Forestry Office (DAFO) in the second and third week of June 2024, respectively. The plans were further submitted to Viengthong District Administration Office in the last week of June 2024. The plans are expected to be approved by the District Governor in early July 2024.

BSP-WCS has reviewed the PLUP data of Sopkhone, Meungcham, and Phonmeuang villages of Xaychamphone district which were obtained by the Lao Landscape and Livelihood Project (LLL). It was noted that the PLUP of these villages requires further review and updates due to insufficient data. However, accessing to the villages and conducting field surveys are challenging in rainy season. Consequently, the activity is further postponed to October or November 2024.

b. Component 2 – Enforcement

The April 2024 patrolling was conducted by two patrol teams from 3-12 April and 18-27 April 2024. There was no field patrolling in May and June 2024 because the law enforcement budget under BOMU AIP2023 had run out and BOMU has not received the fund under the AIP2024. However, safeguarding of the sub-stations was carried out in April, May and June 2024.

The results of patrolling in April 2024 are as follows:

Team	Patrolling Area/Distance	Observations/Actions Taken
1	TPZ highest priority area covering Nam Xi, Houay Pong, Houay Xay Gnai, Houay Xay Noy, Nam Sone and Nam Chang. (13 days covering 135 km on forest patrolling).	The team observed two recently used camps for NTFP collection at Houay Xay Noy and Nam Xi. The team also noticed improvements to the old road from Houay Xay Noy to Nam Sone by the 251 Border Military for military mobilization purposes.
2	TPZ highest priority area covering Houay Phai, Nam San, Nam Chouan, Houay Payang.	The team observed the improvement of the old road from TPZ boundary to Houay Payang and also joined Bolikhamxay PAFO and Viengthong DAFO in halting a forest fire

	(13 days covering a distance of 67 Km on forest patrolling).	at the western mountain ridge of Nam Kapong.
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FIGURE 3.2-1 MAP OF PATROLLING TRACK IN THE SECOND QUARTER 2024

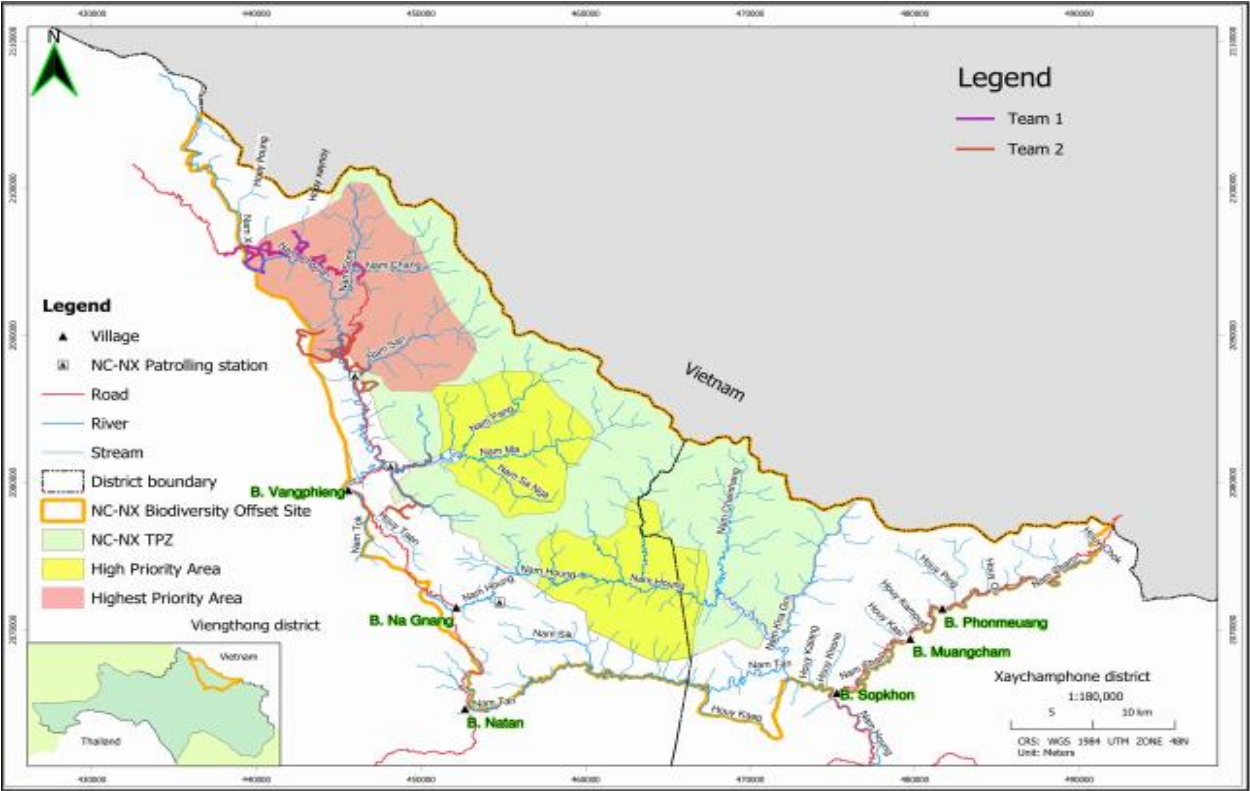


Figure 3.2-2: Map of threats in the Second Quarter 2024

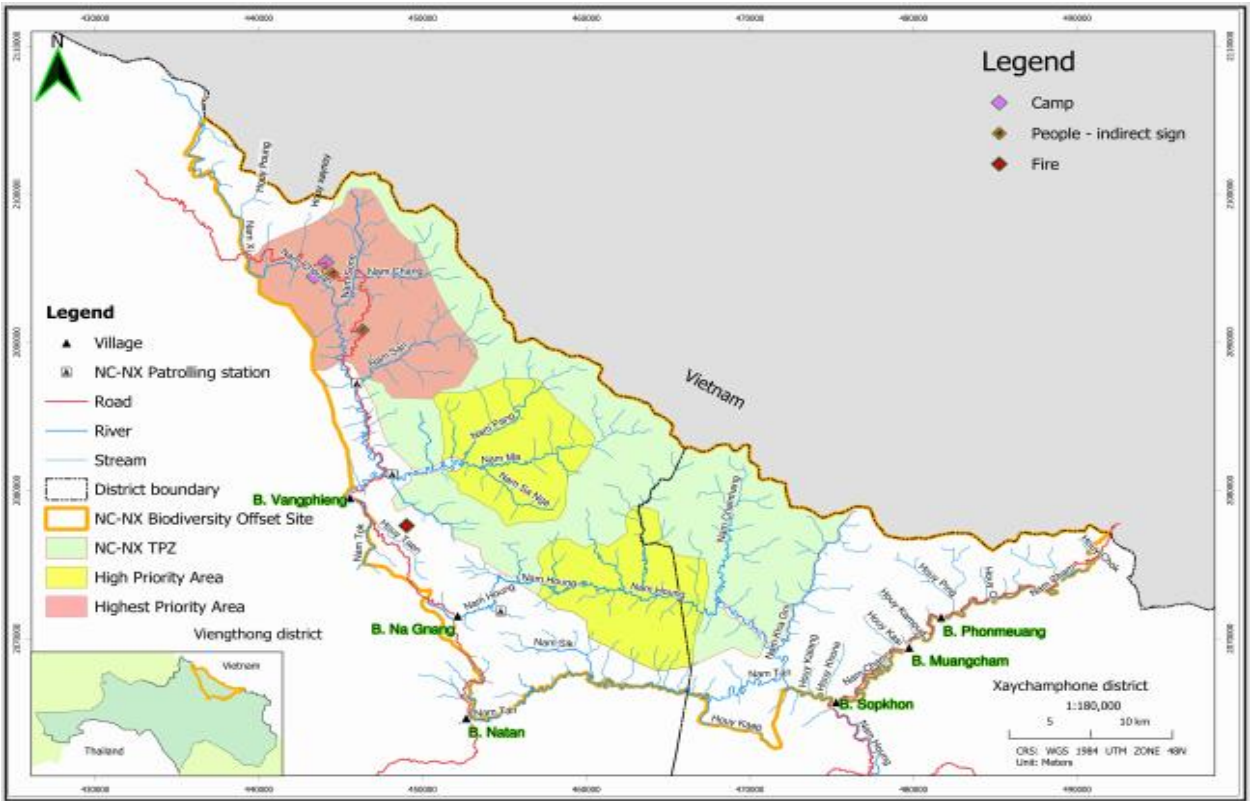


FIGURE 3.2-3 REPRESENTATIVE PHOTOS FOR MONTHLY PATROLLING IN THE SECOND QUARTER 2024

 A photograph showing a dirt path in a forest. A person is visible in the distance on the path. The ground is covered with dry leaves and branches. A timestamp '2024. 4.23. 10:18' is visible in the bottom right corner.	 A photograph showing a dirt path in a forest. A person is visible in the distance on the path. The ground is covered with dry leaves and branches. A timestamp '2024. 4.23. 10:19' is visible in the bottom right corner.
Camp and road access for NTFP collection at Houay Xay Noy and Nam Xi observed by Team 1	
 A photograph showing a dirt path in a forest. A person is visible in the distance on the path. The ground is covered with dry leaves and branches. A timestamp '2024. 4.25. 8:39' is visible in the bottom right corner.	 A photograph showing a dirt path in a forest. A person is visible in the distance on the path. The ground is covered with dry leaves and branches. A timestamp '2024. 4.19. 14:12' is visible in the bottom right corner.
Camp for NTFP collection at Houay Xay Noy observed by Team 1	Improvement of the old road from Houay Xay Noy to Nam Sone recorded by Team 1
 A photograph showing a dirt path in a forest. A person is visible in the distance on the path. The ground is covered with dry leaves and branches. A timestamp '2024. 4.25. 8:39' is visible in the bottom right corner.	 A photograph showing a dirt path in a forest. A person is visible in the distance on the path. The ground is covered with dry leaves and branches. A timestamp '2024. 4.25. 8:39' is visible in the bottom right corner.
Improvement of the old road from TPZ boundary to Houay Payang observed by Team 2	

The construction of the Nam San permanent substation was completed in April 2024 **Figure 3.2-4.**

FIGURE 3.2-4 PHOTOS OF NAM SAN PERMANENT SUBSTATION**c. Component 3 – Conservation Outreach**

BSP-WCS is still preparing the content and materials for the school outreach program during April to June 2024.

d. Component 4 – Conservation linked livelihood

BOMU handed over vaccines and treatment medicines to the livestock groups in Viengthong and Xaychamphone districts from 5-11 June 2024. The vaccines were given as a free contribution, while the treatment medicines were provided using a revolving fund for the livestock groups. The list of the handed over vaccines and treatment medicines is presented in the **Table 3.2-1** below.

TABLE 3.2-1 LIST OF VACCINES AND TREATMENT MEDICINES PROVIDED FOR THE LIVESTOCK GROUPS

No.	Items	Unit	Vangphieng	Na Ghang	Natan	Sopkhone	Meuangcham	Phonmeuang	Total
I	Vaccines								
1	Vaccine for avian cholera	bottle	5	6	3	4	24	30	72
2	Vaccine for hog cholera	bottle	9	10		4	12	19	54
3	Vaccine for Anthrax (cattle)	bottle	30	40					70
4	TERRAMYCIN (cattle)	bottle	17	30					47
5	BLACKLEG VACCINE 20 cc (goat)	bottle	2	2			9	2	15
6	Syringe No. 5 cc	box	1	1	1	1	1	1	6
7	Syringe No. 10 cc	box	1	1	1	1	1	1	6
8	Short needle No. 18	box	1	1			1	1	4
9	Long needle No. 18	box	1	1			1	1	4
10	Cooler box	box	3	3	1	2	3	2	14
II	Treatment medicines								
1	NOVACILAN	bottle	2	2		2	2	2	10
2	OXYCLINE (50 ml)	bottle	2	2		2	2	2	10
3	NEGASUNT K1 (Powder)	bottle	2	2		2	2	2	10
4	TRETRAVET-AEROSOL	bottle	2	2		2	2	2	10
5	PENDISTREP-LA 100 ml	bottle	2	2		2	2	2	10
6	OXYTETRACYCLINE 20% 100 ml	bottle	2	2		2	2	2	10
7	DEXON-A	bottle	2	2		2	2	2	10
8	IVERMECTIN 100 ml	bottle	2	2		2	2	2	10
9	DICOFINAC PLUS	bottle	2	2		2	2	2	10
10	ENRO-150	bottle	2	2		2	2	2	10
11	BIO-OXYTOXIN	bottle	2	2		2	2	2	10
12	VITAMIN B CLOMPLEX 100 ml	bottle	2	2		2	2	2	10
13	ENROVITA	pack	2	2	2	2	2	2	12

FIGURE 3.2-5 PHOTOS OF HANDING OVER THE VACCINES AND TREATMENT MEDICINES TO THE LIVESTOCK GROUPS



There was no snare removal in April 2024 due to the unavailability of the village team members and the Lao New Year celebrations. The monthly snare removal was carried out from 11-25 May

2024 at Nam Sone, Nam Chang and Nam Chouan, and from 12-26 June 2024 at Nam Xi, Houay Pong and Houay Xay Gnai.

e. Component 6 – Monitoring and reporting

The otter survey (camera trap retrieval) was carried out from 28 May - 4 June 2024. Nine camera traps, one battery tray and five SD memory cards out of the total 80 camera traps installed were stolen from the survey sites **Figure 3.2-6**. Per NNP1-EMO initial checking of the photos, otter photos were recorded at 15 camera trap locations at 9 out of 13 rivers **Figure 3.2-7**. Many of the camera traps also recorded individual and groups of fishermen, hunters and domestic animals along many rivers **Figure 3.2-8**.

FIGURE 3.2-6 MAP OF CAMERA TRAP DEPLOYMENT LOCATIONS AND LOSS

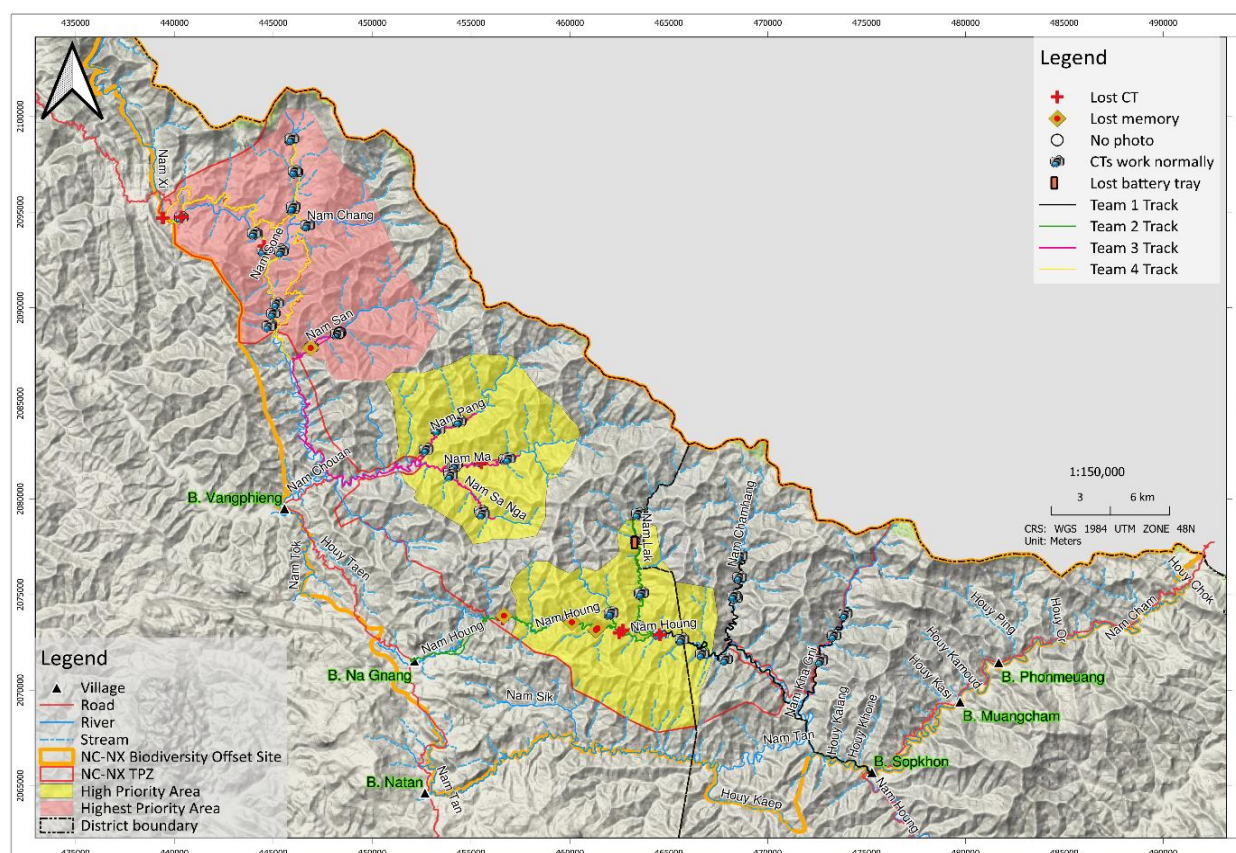


FIGURE 3.2-7 MAP OF CAMERA TRAP LOCATIONS RECORDED OF OTTER

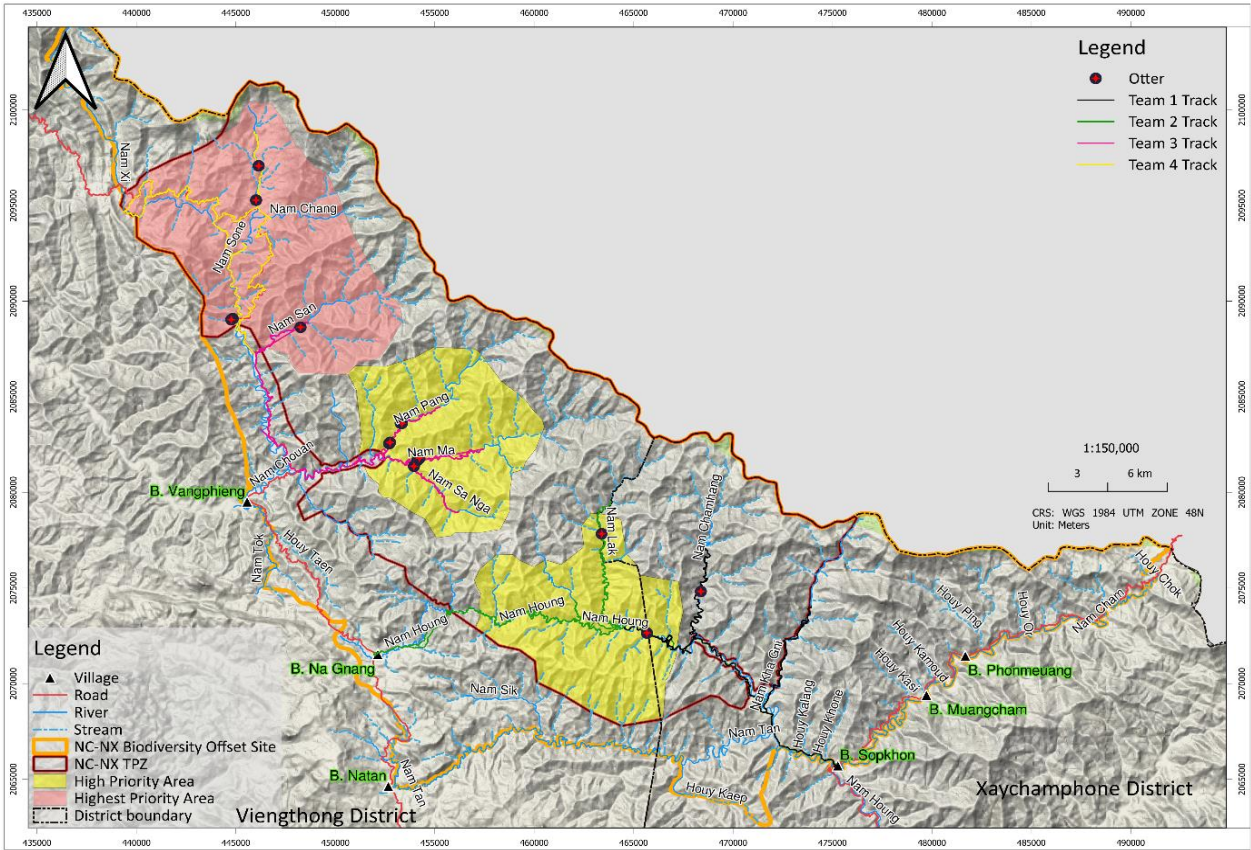
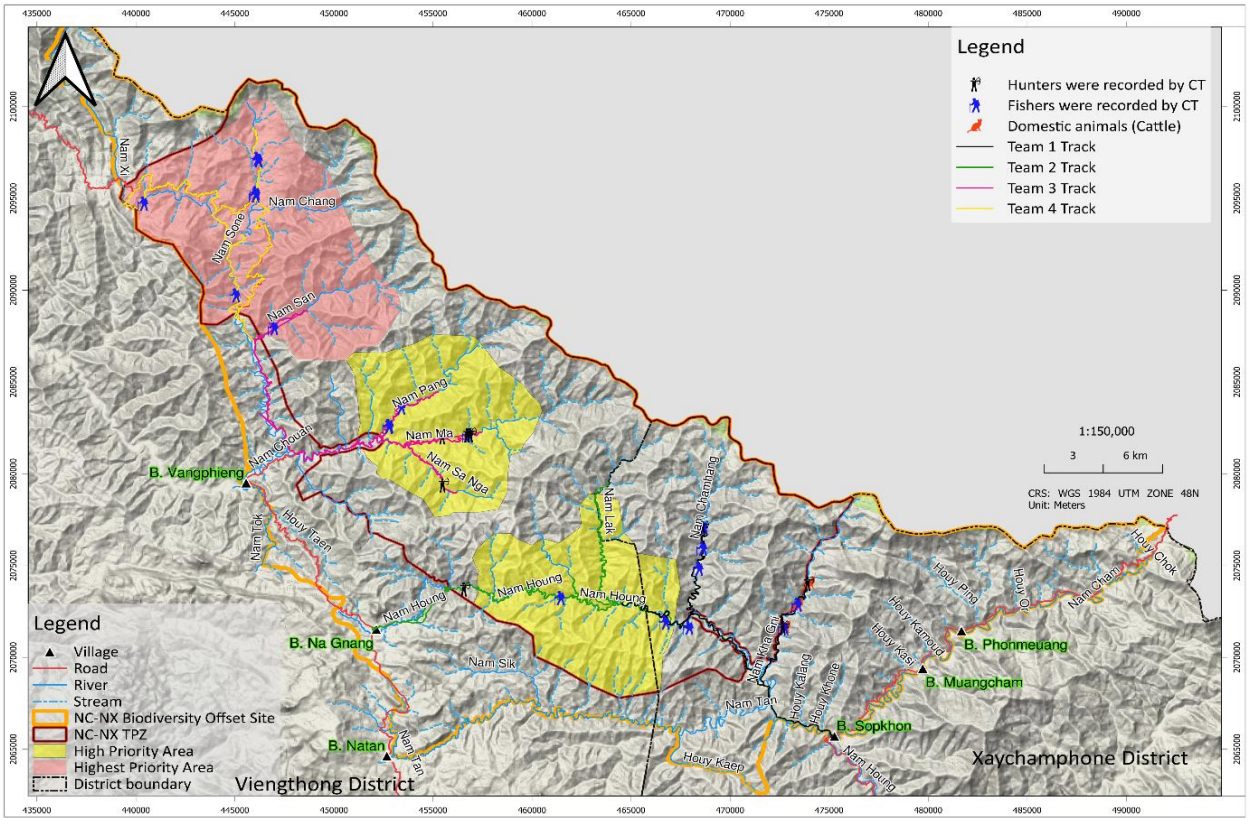


FIGURE 3.2-8 MAP OF CAMERA TRAP LOCATIONS RECORDED THREATS



The data and report for the camera trap survey which was carried out from November 2023 to February 2024, the gibbon survey from December 2023 to January 2024 and the otter survey from April to June 2024 are being analysed and prepared by BSP-WCS as of the end of Q2 2024.

3.2.3 Preparation of Annual Implementation Plan (AIP) 2024

The AIP was approved by IAP and ADB on 5 April and 23 April 2024, respectively. It was approved by BLX PAFO on 9 May 2024 and submitted to DoF-MAF on 12 May 2024. NNP1-EMO received the first six months fund request letter from DoF-MAF on 13 June 2024, comprising: 1). CA budget of LAK 1,644,013,000 and 2). No Net Loss (NNL) of LAK 948,587,000. NNP1 PC disbursed the fund to FPF DoF-MAF's bank account on 25 June 2024.

4 FISHERY MONITORING

Four species groups and one species dominated the fish catch by weight in Q2 2024 as listed in **Table 4-1**. All species are classified as Least Concern (LC) according to the IUCN Red List of Threatened Species¹, except *Sikukia gudgeri* is classified as Data Deficient (DD) and *Oreochromis niloticus* is an exotic species.

TABLE 4-1: FISH SPECIES DOMINATING THE FISH CATCH IN Q2 2024

Species	Lao Name	Fish Catch (kg)	IUCN Red List Classification
<i>Oreochromis niloticus</i>	ປານິນ	278.8	LC (exotic)
<i>Barbonymus gonionotus</i> , <i>Hypsibarbus malcolmi</i> , <i>Hypsibarbus vernayi</i> , <i>Hypsibarbus wetmorei</i>	ປາປາກ	261.9	LC
<i>Poropuntius normani</i> , <i>Poropuntius laoensis</i> , <i>Poropuntius carinatus</i>	ປາຈາດ	234.6	LC
<i>Hampala dispar</i> , <i>Hampala macrolepidota</i>	ປາສຸດ	189.9	LC
<i>Sikukia gudgeri</i> , <i>Amblyrhynchichthys truncatus</i>	ປາຂາວຊາຍ	179.5	DD, LC

The recorded catch of Threatened species (IUCN Red List classification) in Q2 20224 are presented in **Table 4-2**. The list includes three species are classified as Vulnerable species (VU).

TABLE 4-2: THREATENED SPECIES OF Q1 2024 FISH CATCH

Species	Lao Name	Fish Catch (kg)	IUCN Red List Classification
<i>Cirrhinus cirrhosus</i>	ປາແກງ/ປານວນຈັນ	3.5	VU
<i>Scaphognathops bandanensis</i>	ປາປ້ຽນ/ປາວຽນໄຟ	70	VU
<i>Tor sinensis</i>	ປາແດງ	14.7	VU

The occurrence of Threatened species in the fish catch by quarter since the start of species

Species abundance and occurrence is based on the 7-day reported catch from the DCL survey in Q2 2024. The catch is divided in 3 areas including above the main dam, below the main dam and Mekong area. Main biodiversity indicators in Q2 2024 for above dam, below dam and Mekong area are presented in **Table 4-3** and the Shannon biodiversity index has been calculated (the higher the value, the higher the diversity of species).

TABLE 4-3: MAIN BIODIVERSITY INDICATORS FOR Q2 2024

Biodiversity Indicators	Mekong	Below dam	Above dam
Total species and groups	36	47	39
Single species	28	34	24
Species groups	8	13	15
Top 15 species (% total catch weight)	88.01%	84.27%	85.65%
Proportion for species groups	26.63%	59.57%	41.26%
Diversity index (Shannon)	2.8499	2.9103	2.8193

FIGURE 4-1 shows fish diversity index (Shannon) for above dam, below dam and Mekong area from July 2015 to June 2024.

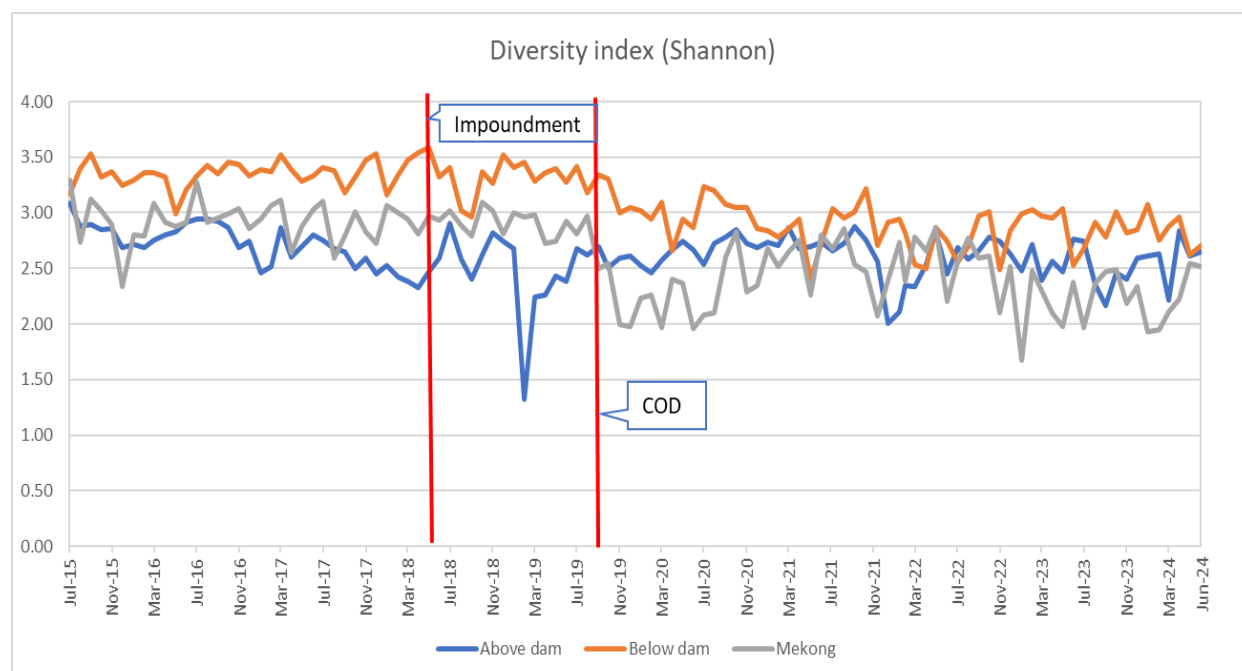


FIGURE 4-1: FISH DIVERSITY INDEX (SHANNON) BY FISHING ZONE FROM JULY 2015 TO JUNE 2024

The mean daily fish catch per household from July 2015 to June 2024 is displayed in **Figure 4-2** and the mean fish catch per household per fishing day for Q2 from 2016 to 2024 are shown in **Table 4-4**.

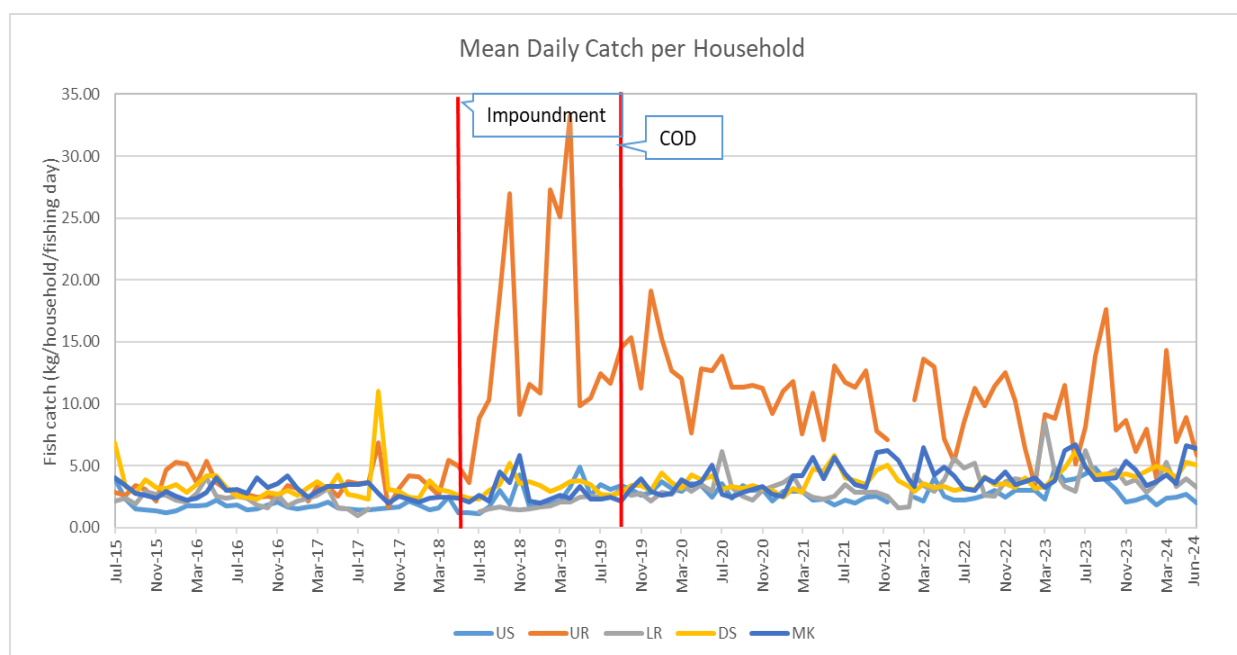


FIGURE 4-2: MEAN DAILY FISH CATCH PER HOUSEHOLD FROM JULY 2015 TO JUNE 2024

TABLE 4-4: MEAN DAILY FISH CATCH PER HOUSEHOLD FOR Q2 FROM 2016 TO 2024

Fishing Zone	Q2 2016 (kg)	Q2 2017 (kg)	Q2 2018 (kg)	Q2 2019 (kg)	Q2 2020 (kg)	Q2 2021 (kg)	Q2 2022 (kg)	Q2 2023 (kg)	Q2 2024 (kg)
Upstream	1.92	1.73	1.61	3.59	3.13	2.14	2.93	4.20	2.40
Upper reservoir	4.05	3.21	4.66	17.85	11.06	10.34	8.55	8.49	7.23
Lower reservoir	2.98	2.09	NA	2.37	3.08	2.41	4.13	3.60	3.51
Downstream	3.85	3.35	2.65	3.67	4.10	5.06	3.19	5.01	4.78
Mekong	3.31	3.39	2.30	2.65	4.06	5.13	4.44	5.59	5.51

The survey results in Q2 2024 indicate that Nam Ngiep is the main fishing habitat for the upstream and downstream zones, while the main fishing habitat for the upper reservoir, lower reservoir and Mekong zones are the reservoir, tributaries and streams, and Mekong respectively. The proportion of fishing habitats in Q22024 are displayed in **Table 4-5**.

TABLE 4-5: PROPORTION OF THE CATCH REPORTED BY MAIN HABITATS (%) IN Q2 2024

Habitats	US	UR	LR	DS	MK
Mekong	0.0%	0.0%	0.0%	8.3%	94.2%
Nam Ngiep	54.1%	28.1%	0.0%	45.9%	1.2%
Nam Xan	0.0%	0.0%	0.0%	0.0%	0.0%
Reservoir	21.7%	64.4%	15.0%	0.0%	0.0%
Tributary and stream	24.1%	7.5%	84.0%	43.5%	0.0%
Wetland	0.0%	0.0%	0.9%	0.9%	4.7%
Others	0.0%	0.0%	0.0%	1.3%	0.0%

Total reported fish and other aquatic animal (OAA) catch (proportion of OAA) for the same 7-day period in Q2 from 2016 to 2024 are shown in **Figure 4-3**.

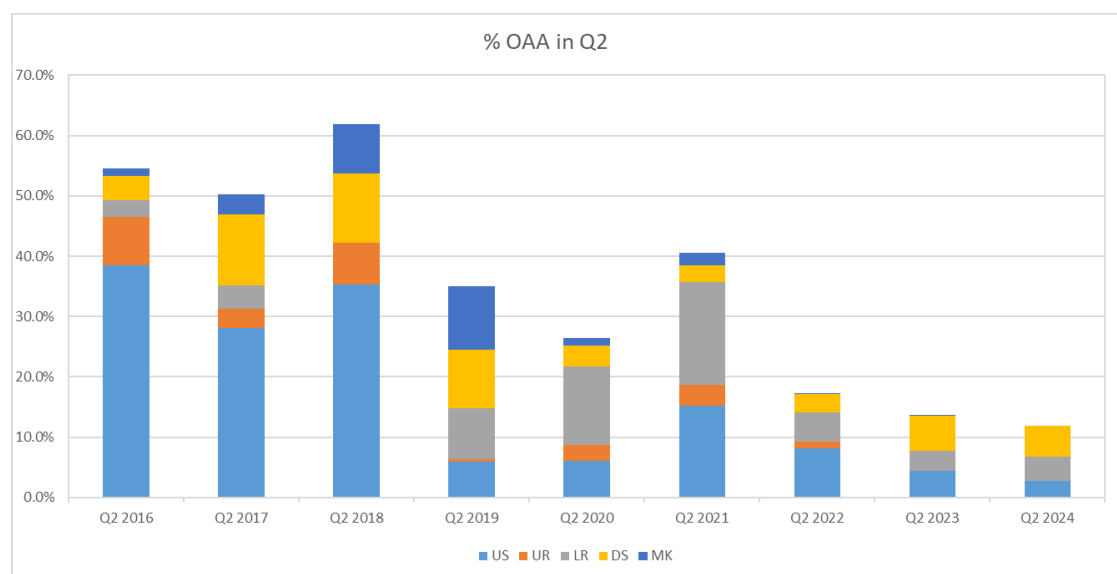


FIGURE 4-3: PROPORTION OF OAA TO THE TOTAL REPORTED KILOGRAM (KG) OF FISH AND OAA FOR A 7-DAY PERIOD BY FISHING ZONE IN Q2 FROM 2016 TO 2024

5 Health and Safety

5.1 RELATED TO NNP1PC HEALTH AND SAFETY

A summary of the safety incidents reported during the Construction Phase (up to the end of August 2019) are provided in the *Q4 2020 Environmental Monitoring Report (October to December 2020)*.

A summary of the safety incidents reported during the Operation Phase (September 2019 to June 2024) are provided in **TABLE 5.1-1**.

TABLE 5.1-1: SAFETY INCIDENTS REPORTED DURING THE OPERATION PHASE (SEPTEMBER 2019 TO JUNE 2024)

Type of Incidents	LTI	RI	NM	PD	FI	MVI	Total
No. of Incidents in Q2, 2024	0	0	0	0	0	0	0
Cumulative Total Incidents to 30 June 2024	0	3	0	0	0	1	4

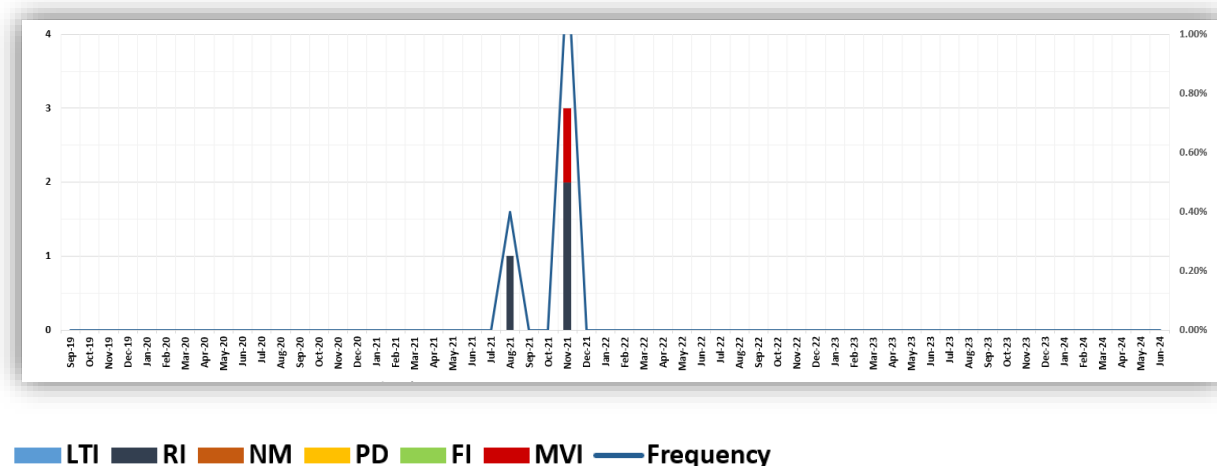
LTI: Lost Time Incident; RI: Recordable Injury; NM: Near Miss; PD: Property Damage; FI: Fire Incident; MVI: Motor Vehicle Incident

There were no incidents or accident reported in Q2 2024.

The histogram below in **Figure 5-1** shows the number of reported incidents in each month since the start of the Operation Phase (September 2019) with the colour indicating the type of incident including near misses. The graph superimposed on the histogram shows the frequency of incidents, including reported near misses, with the number of incidents occurring each month

expressed as a percentage of the total number of Project workers employed in each month being the total man-months.

All reported incidents that have involved the Owner and its Contractors and Subcontractors are included in the histogram and shown graphically below.



LTI: Lost Time Incident; RI: Recordable Injury; NM: Near Miss; PD: Property Damage; FI: Fire Incident; MVI: Motor Vehicle Incident

FIGURE 5-1: NUMBER, TYPE AND FREQUENCY OF SAFETY INCIDENTS FROM SEPTEMBER 2019 TO 30 JUNE 2024

The second histogram in **Figure 5-1** shows the number of persons who were injured, or lost their lives in the reported Lost Time Incidents.

Since Q4 of 2021, two cases of Recordable Injury (RI) and one case of Motor Vehicle Incident (MVI) have been recorded.

There were no health and safety incidents in Q2 2024.

5.1.1 Health and Safety Training and Emergency Drills in the Project site

Safety inductions were conducted in Q2 2024 for newcomer staffs and contractors. The main objectives of the safety induction are to let staffs, contractors and local labours understand the general measures for safety and assistance, including awareness of high slopes, sharp bamboo or trees, dangers from snakes, bees and wasps, dehydration while working in heat weather, safe condition of hand tools, communication each other while working in difference level of ground while doing the work.

No emergency drill was conducted in Q2 2024.



FIGURE 5-2: REPRESENTATIVE PHOTOS OF THE SAFETY INDUCTION DURING Q2 2024

5.2 RELATED TO COVID-19

The country officially opened in September 2022. However, NNP1PC still encourages COVID-19 countermeasures which include basic precautions of personal hygiene practices by frequent washing hands with alcohol-based gel, mask wearing in the workplace as well as avoiding mass gathering.

5.2.1 NNP1PC COVID-19 Measures

General Instructions:

- All staff are requested to strictly follow preventative measures against COVID-19 such as:
 - keeping physical distance of at least 1 meter from others, even if they do not appear to be sick;
 - avoiding the 3Cs, spaces that are closed, crowded or involve close contact;
 - wearing a properly fitted mask when physical distancing is not possible and in poorly ventilated settings;
 - cleaning the hands frequently with alcohol-based hand rub or soap and water;
 - covering the mouth and nose with a bent elbow or tissue when you cough or sneeze. Dispose of used tissues immediately and clean hands regularly; and
 - self-isolating until recovery in case of any symptoms or tested positive for COVID-19.
- A disposable medical face mask will be provided for each staff every day and more as appropriate upon agreement by the supervisor for high-risk staff who need to be working

with local communities/contact with external stakeholders. Appropriate disposal in the bin is required to avoid possible infection.

Specific Instructions:

Contractors inside and outside the Project areas are required to implement the followings at all times:

- (A) All contractors' personnel are required to strictly follow preventative measures against COVID-19 such as:
 - getting vaccinated as soon as possible following Governmental guidance on vaccination;
 - keeping physical distance of at least 1 meter from others, even if they do not appear to be sick;
 - avoiding the 3Cs, spaces that are closed, crowded or involve close contact;
 - wearing a properly fitted mask when physical distancing is not possible and in poorly ventilated settings;
 - cleaning your hands frequently with alcohol-based hand rub or soap and water;
 - covering your mouth and nose with a bent elbow or tissue when you cough or sneeze. Dispose of used tissues immediately and clean hands regularly; and
 - self-isolating until recovery in case of any symptoms or tested positive for COVID-19.
- (B) Relevant Division shall ensure that all contractors' personnel working for the NNP1 Project are regularly checked for body temperatures and use of face masks/hand gel in their camps and working places.
- (C) Contractors' personnel in OSOV1 or OSOV2 have to continuously check their body temperature using a thermometer provided at the entrance of OSOV1 and OSOV2 at least once a day.
- (D) If a contractors' personnel is found to have any symptoms of COVID-19 (i.e. dry cough, high fever, difficult breathing, sweats, chills, headaches), high temperature or flulike symptoms, the contractor shall inform NNP1PC of relevant information immediately.

5.2.2 General situation of COVID-19 in NNP1PC

There was no case COVID-19 infection in the second quarter 2024.

6 External missions and visits

On 21 and 22 May 2024, NNP1 EMO participated in the ADB-IAP-TA social mission, visiting 1). the NC-NX Biodiversity Offset Area to monitor the progress of conservation-linked livelihood activities under BOMP in six villages within the NC-NX Biodiversity Offset Area, 2). a representative handicraft production group in Nahong village and representative households engaged in greenhouse vegetable production in Phonhom village.

During the wrap-up session, several key points were raised for further action including:

- A request for WCS to prepare TOR to identify alternative sustainable economic activities and conduct market chain analysis. EMO and SMO to work together and continue to intensify patrolling and deepen awareness through outreach.
- A request to review the livelihood plan to target people directly dependent on watershed resources.

APPENDICES

APPENDIX 1: THE SITE INSPECTION RESULTS DURING Q2 2024

No	Issue ID	Inspection Date	Site Name	Issue/Description	Action Required/Recommendation	Deadline	Latest Follow- up Date	Status
1	ON-TD-0007	21/02/2024	Main Dam Powerhouse	During the joint inspection it was observed that the hazardous waste bin has been emptied with no known disposal record. Additionally, the recommendation from the previous joint inspection for TD to provide the spill response kits is still pending.	- TD and ADM were instructed to investigate the disappeared hazardous waste. It is important to note that unknown disposal of hazardous waste may trigger the issuance of NCR ; -TD was instructed to provide the spill response kits for the hazardous waste storage area.	Immediately and 29/2/2024	22/05/2024	Resolved (The corrective action was verified and accepted)
2	ON-TD-0008	21/02/2024	Re-regulation Powerhouse	Pending removal of hazardous waste to the LILAMA10's hazardous storage facility and pending provision of spill response kits.	TD was instructed to remove hazardous waste to the LILAMA10's hazardous storage facility and provide spill response Kits at Regulation Dam Powerhouse Area.	29/2/2024	22/05/2024	Resolved (The corrective action was verified and accepted)
3	ON-TD-0009	21/02/2024	LILAMA10's Storage Facility	Pending provision of spill response kits at the hazardous material and waste storage facility.	TD was instructed to provide the spill response kits at the Lilama10's hazardous material and waste storage facility to ensure effective control in the event of oil spill.	29/2/2024	22/05/2024	Resolved (The corrective action was verified and accepted)

No	Issue ID	Inspection Date	Site Name	Issue/Description	Action Required/Recommendation	Deadline	Latest Follow-up Date	Status
4	ON-TD-0011	21/03/2024	OSOV1's Fuel Station	The inspection of the grounding system of the fuel station to mitigate the risk of fire emergencies could be clearly recorded.	TD and ADM were instructed to conduct the grounding system testing and recording. TD confirmed that the testing equipment is under purchasing	Within April 2024	24/04/2024	Resolved (The corrective action was verified and accepted)
5	ON-ADM-0012	21/03/2024	OSOV1's Canteen	Inspection of the LPG gas pipeline at the canteen to examine for leaks, particularly at the joints, could be clearly recorded.	ADM were instructed to conduct the Inspection of the LPG gas pipeline at the canteen to examine for leaks, particularly at the joints. ADM confirmed that they will be conducting by early of April 2024.	Early of April 2024	22/05/2024	Resolved (The corrective action was verified and accepted)
6	ON-ADM-0013	21/03/2024	Camp OSOV 1&2	Monitoring the generator inspection at OSOV1 and OSOV2 could be considered.	ADM were instructed to conduct the generator inspection at OSOV1 and OSOV2. ADM confirmed that they will be conducting by early of April 2024 and providing the record.	Early of April 2024	24/04/2024	Resolved (The corrective action was verified and accepted)
7	ON-ADM-0014	21/03/2024	OSOV2 & Main Dam Powerhouse	Clear posting of the hazard symbol on the chlorine tank could be considered.	TD and ADM were instructed to providing and posting of the relevant hazard symbol and MSDS on the chlorine tanks at OSOV2 and Main Dam	Within April 2024	24/04/2024	Resolved (The corrective action was

No	Issue ID	Inspection Date	Site Name	Issue/Description	Action Required/Recommendation	Deadline	Latest Follow- up Date	Status
					Powerhouse. TD and ADM confirmed that they will be providing and posting the posters within March 2024 and providing the record.			verified and accepted)
8	ON-ADM-0015	24/04/2024	OSOV2's WWTs	Purchase a spare pump for the OSOV2 Wastewater Treatment System (WWTS) to ensure immediate replacement during pump malfunctions or breakdowns. (ISO Internal Audit 2023's OFI)	ADM was instructed to purchase a spare pump for the OSOV2 Wastewater Treatment System (WWTS) to ensure immediate replacement during pump malfunctions or breakdowns. Failure to take the corrective action by the deadline may result in the issuance of an NCR.	Within May 2024	28/06/2024	Escalated (This ONC was escalated to NCR level 1. Ref: NCR-01-ADM/2024)
9	NCR-01-ADM/2024	30/05/2024	OSOV2's WWTs	Delayed arrangement/purchase of a spare pump for the OSOV2 Wastewater Treatment System (WWTS) to ensure immediate replacement during pump malfunctions or breakdowns. (ISO Internal Audit 2023's OFI)	ADM was instructed to purchase a spare pump for the OSOV2 Wastewater Treatment System (WWTS) to ensure immediate replacement during pump malfunctions or breakdowns within the deadline.	Within June 2024	28/06/2024	Resolved (The corrective action was verified and accepted)

APPENDIX 2: ENVIRONMENTAL MONITORING CORRECTIVE ACTIONS Q2 2024

No	Aspect	Issue Description	Corrective Action Requests	Requested Timeline	Corrective Actions by NNP1PC (As of June 2024)
1	EAP	Hat Gniun: Muster point cannot be reached (private property), too far from village, access road flood-prone, may not be passable during rainy season: no realistic EAP for this village.	Identify realistic muster point (check suitability of two hills identified during May 2023 site visit). Conditions: sufficient elevation, as close as possible to village, accessible. Make muster point accessible (clear vegetation if required, no fences).	Q2 2024	<u>In progress:</u> - In June 2024, the muster point for Hat Gniun village, planned for emergency drills, is still unresolved due to access issues with private landowners and offices concerns were not available. The Bolikhan District Disaster Management Committee, local Hat Gniun authorities, and private landowners were re-scheduled to meet on July 1, 2024, to renegotiate access rights for the muster point. The outcome of this meeting is critical for the 2024 drill. - Additionally, the elevation of the hill where the muster point is located must be checked to ensure it can reach level 4 safety requirements during emergencies. - In Q3-2024, the HGN Muster point was in process to sign contract with local tractor to improve the access road to reach the point and make MoM with the private land owner to use their lands as a muster point in cases of emergency flooded.
		Thaheua: suitable muster point	Make accessible (clear overgrown path, keep open by regular cutting).	Q2 2024	<u>In progress:</u>

No	Aspect	Issue Description	Corrective Action Requests	Requested Timeline	Corrective Actions by NNP1PC (As of June 2024)
		identified, but not accessible due to dense vegetation.			- The paths were cleared during December 2023 to make it accessible. The villagers are also persuaded to carry out routine clearing of overgrown paths and maintain convenient access at least two times per annum. In particular before and after the rainy season. The drill was carried out in Thaheua on 26 September 2023. In April 2024, SMO surveyed the muster point conditions and planned to clear the vegetation by using a tractor or an excavator. In June 2024, PCD is procuring a local contractor to improve the muster points and its access. - For the TH Muster point, it is in process to sign the contract with local tractor to clear the weeds inside the point and improve the access to be able to use in both rainy and dry seasons. -
			Both villages: carry out drill under realistic conditions (i.e., people actually reaching identified muster point. Situation Jan. 2024 Both villages: try to increase participation in drills (ideally: minimum of one person from each household).	Ongoing	<u>In progress:</u> - The drill was carried out in Phouhomxay on 28 September 2023. - During Q3-2024, the drill for PHX, HGN and TH were completed and the participant is more interested to participate compare to the last year.

No	Aspect	Issue Description	Corrective Action Requests	Requested Timeline	Corrective Actions by NNP1PC (As of June 2024)
		Houay Soup Noy dam (irrigation reservoir): spillway sufficient for evacuating even exceptional flood. Village not threatened in case of a dam break, however, people in the demonstration farm or working in the fields would be at risk.	Confirm statements about spillway and exposure of village; check with Technical LTA. Include warning system and evacuation plan for farm and fields in EAP. Situation Jan.2024 Muster point identified. Maps of flood risk indicate that the village is not directly at risk from floods related to dam break. Opinion of Technical LTA on dimension and sufficiency of spillway not received yet.	Next Site Visit of Techn. LTA	<u>In progress:</u> - The inundation map in case of the irrigation dam break was created and is being studied. - The statement of evacuation plan in the EAP in case of the Dyke Break will be confirmed as the potential flood is in the same area in case of the irrigation dam break. - In March 2024, the Social Management Office (SMO) began preparing the drill plan for 2024, aiming to initiate drills in June. By April, the SMO had drafted the drill plan and shared it with the Technical Division (TD). After receiving feedback, the plan was scheduled to be communicated to the Department of Energy Security and Management (DESM) under the Ministry of Energy and Mines (MEM). - In May and June, the SMO, in coordination with the Environment and Social Division (ESD), conducted a survey on early warning systems, particularly focusing on the functionality of loudspeakers. They also consulted with the Labor and Social Welfare Office in Paksan and Bolikhan Districts to update the contact lists of downstream village authorities and Village Disaster Management Committees (VDMCs), ensuring that all necessary parties were prepared for the upcoming drills. -

No	Aspect	Issue Description	Corrective Action Requests	Requested Timeline	Corrective Actions by NNP1PC (As of June 2024)
					Following a discussion with LTA on their visit in January 2024. The LTA observed that: • Muster point identified. Maps of flood risk indicate that the village is not directly at risk from floods related to dam break. • Opinion of Technical LTA on dimension and sufficiency of spillway not received yet. • The Agriculture Extension and Demonstration Centre staff and visitors will be integrated into the flood risk preparedness measures. They will receive flood warnings through WhatsApp notifications and loudspeakers, ensuring timely communication during emergencies. Additionally, the Centre will be included in the next emergency drill conducted in Phouhomxay to enhance readiness and response capabilities in case of flood risks.
2	Critical water depth	In Nam Ngiep downstream of the dam minimum water depth of 0.5 m cannot be kept during conditions of minimum flow. Identified as “not a problem”.	Confirm: if users of respective sites agree that there is no such problem, make official statement and stop monitoring. If there is a problem, take measures (deepening of passage, removal of barrier) and confirm effectiveness.	End of dry season 2024	<u>In progress:</u> In accordance with the LTA’ recommendation, NNP1PC (EMO and TD) has closely monitored water depth in the thalweg of the Nam Ngiep River downstream the reregulation dam when the discharge is approx. 27 m³/s to: - Monthly interviews were conducted with the downstream residents, who use boats.

No	Aspect	Issue Description	Corrective Action Requests	Requested Timeline	Corrective Actions by NNP1PC (As of June 2024)
					- During the interviews in this quarter there were no concerns about boat navigation. - NNP1PC has consulted with the Environmental and social specialist who recommended that revisions to the monitoring programme should be made as part of ESMMP-OP update which will be commenced from Q4 2024 to Q1 2025.
3	Fisheries Management Plan	Still no Fisheries Management Plan. Main issue seems to be lack of commitment from Xaysomboun Province	Undertake every effort required for solving this issue.	Q2 2024	<u>Follow-up:</u> See 3.1.1, point a) for the progress of the FCMP approval.
4	Watershed Management Plan	Excessive slash-and-burn activity around reservoir. Critical issue for biodiversity (NNL), but also leading to massive sheet erosion.	Reinforce activities for protecting the watershed area (land use, fishing) according to contractual requirements.	Q2 2024	<u>Follow-up:</u> On 25 June 2024, NNP1 EMO submitted the official letter to the Department of Energy and Business, Ministry of Energy and Mines (DEB-MEM) proposing a joint site monitoring in the NNP1 watershed. This objective is to address the unresolved issues and seek directives and discuss counter measures for the challenges and working towards achieving the No Net Loss (NNL) within the NNP1 watershed. The joint site monitoring is expected to be conducted in July 2024.
5	Irrigation system	Section with Category A damage.	Make reinforcement as soon as possible, before collapse of the section.	Issue solved	<u>Completed:</u> - The observed damages were repaired in April 2024.

No	Aspect	Issue Description	Corrective Action Requests	Requested Timeline	Corrective Actions by NNP1PC (As of June 2024)
		Pump for providing irrigation water; installation work started.	Confirm operation of pump	Issue solved	<u>In progress:</u> - NNP1PC planned to hand over the irrigation system to local authorities or the water user group was initially set for June 2024. - However, the handover was postponed to October 2024 to allow for the completion of the refurbishment of 79 individual sliding gates. - In addition, the District Agriculture and Forestry Office must fully inspect and confirm satisfaction with the system's quality before the final handover takes place.
6	Community landfill	New issue in January 2024 Landfill pits severely damaged by removal of large segments of the impervious membrane. Landfill can no longer be used as it is. Seek alternative solution.	Transfer the waste material from the community landfill pit to the company landfill due to its small quantity, while also considering alternatives such as closing the community landfill gate, replacing the membrane if reused, and building new landfills closer to the villages, but ensuring that there are clear agreements on ownership and responsibility with future users before construction.	Q2 2024	<u>Completed:</u> See 2.5.4 for the progress of Community Solid waste Management Section 2.5.4 as revised and updated with more information and measures. NNP1PC will continue to monitor the issue closely. If there are any problems arise, those will be further discussed with GOL-EMU.

APPENDIX 3: SITE CODES, LOCATIONS AND MONITORING PARAMETERS OF THE SURFACE WATER QUALITY MONITORING

SITE CODES AND LOCATION STATION FOR SURFACE WATER QUALITY MONITORING

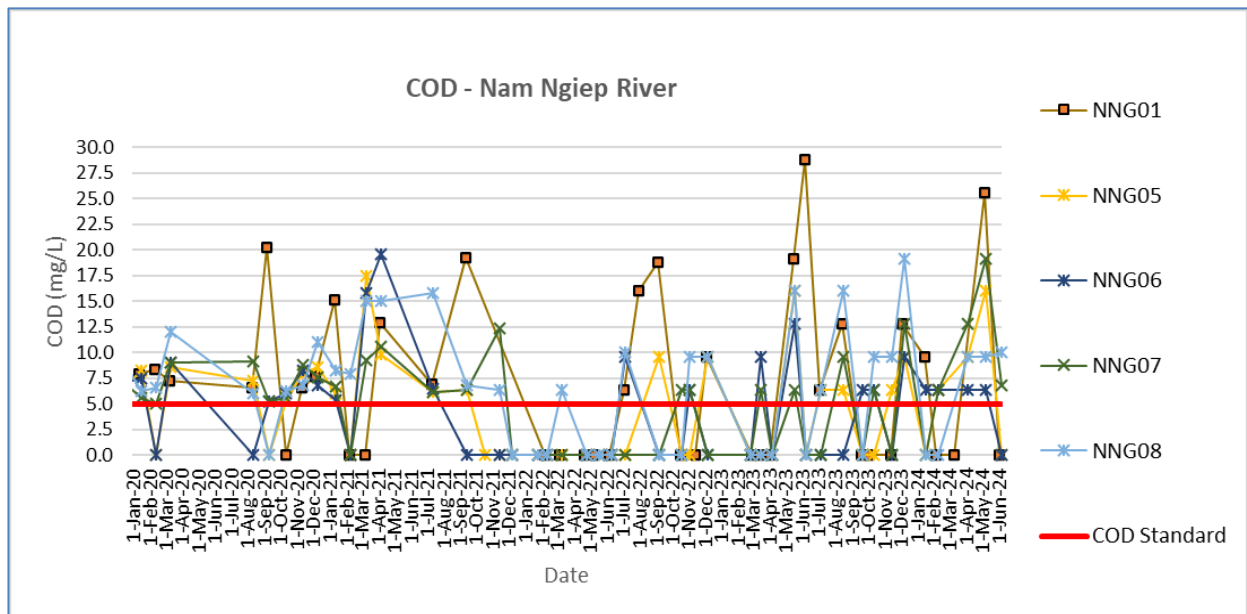
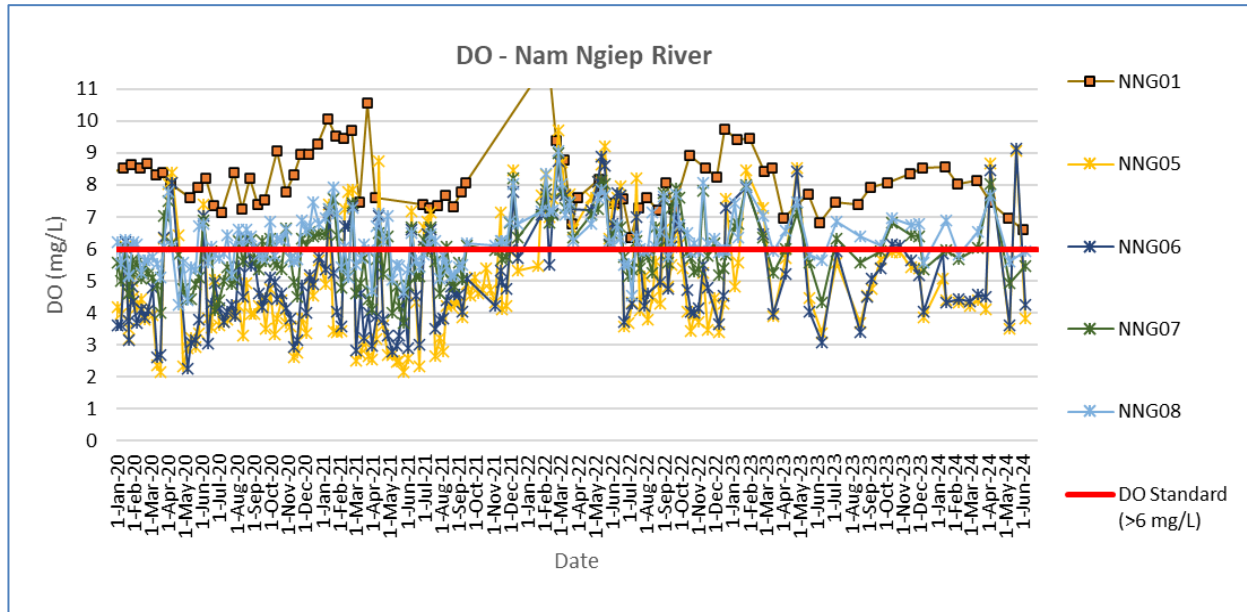
Site Code	Location station	Zone
NNG01	Nam Ngiep Upstream of Phiengta Village	Upstream Project Construction Site
R01	Main reservoir upstream main dam approx. 50 Km.	
R02	Main reservoir upstream main dam approx. 35 Km.	
NNG02/R03	Nam Ngiep Upstream of Nam Phouan Confluence / Main reservoir upstream main dam approx. 21 Km.	
NNG03/R04	Nam Ngiep Downstream of Sopyouak Village/ Main reservoir upstream main dam approx. 13 Km.	
NNG09/R05	Nam Ngiep Upstream Main Dam / Main reservoir upstream main dam approx. 0.5 Km	
NNG04 / R06	Nam Ngiep Downstream RT Camp (Middle Re-regulation Reservoir)	Within Project Construction Site
R07	Reservoir Upstream Re-Regulation Dam	
NNG05	Nam Ngiep Upstream of Hat Gniun Village	Downstream Project Construction Site
NNG06	Nam Ngiep Downstream of Nam Xao Confluence	
NNG07	Nam Ngiep at Somsuen Village	
NNG08	Nam Ngiep at the Bridge of Road 13	
NCH01	Nam Chiane at the Bridge of Road 1D	Tributaries Upstream of Project Construction Site
NPH01	Nam Phouan Upstream of Nam Ngiep Confluence	
NXA01	Nam Xao Upstream of Nam Ngiep Confluence	Tributaries Downstream of Project Construction Site
NSH01	Nam Houay Soup Upstream Nam Ngiep Confluence	

MONITORING FREQUENCY FOR SURFACE WATER QUALITY PARAMETERS

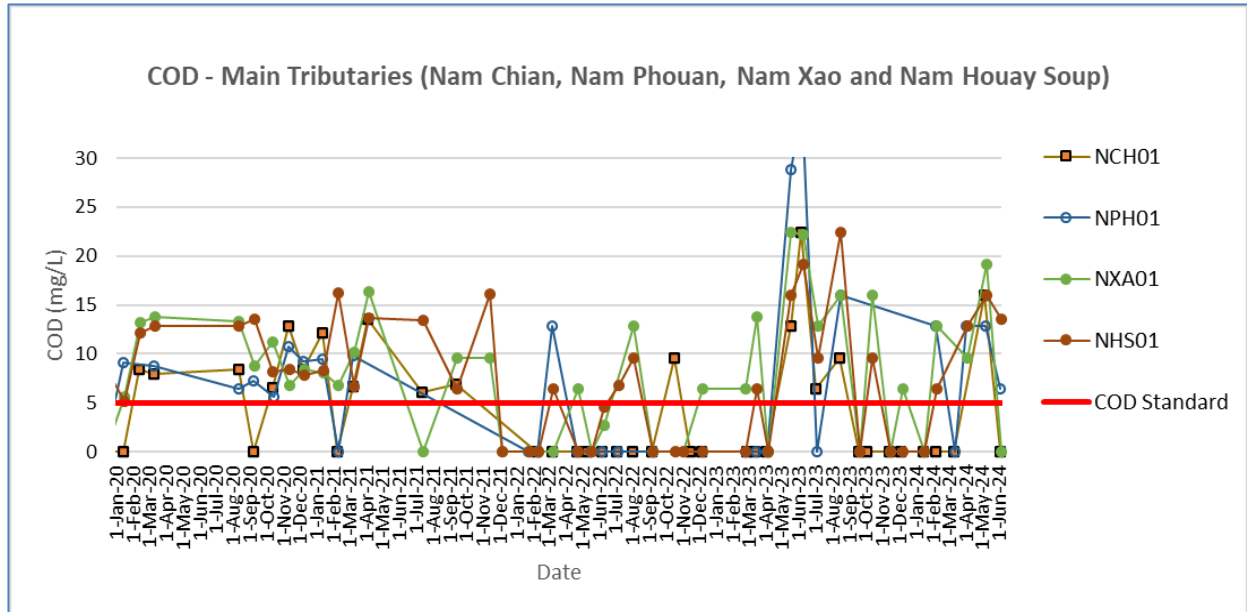
Frequency of Monitoring	Parameters (Unit)	Monitoring Sites
Weekly	pH, DO (%), DO (mg/L), Conductivity ($\mu\text{S}/\text{cm}$), Temperature ($^{\circ}\text{C}$), Turbidity (NTU).	- Main Reservoir: R01, R02, R03, R04, R05; - Re-regulation Reservoir: R06 and R07.
Monthly	pH, DO (%), DO (mg/L), Conductivity ($\mu\text{S}/\text{cm}$), Temperature ($^{\circ}\text{C}$), Turbidity (NTU).	- NNG01, NCH01, NPH01, NNG05, NNG06, NNG07, NNG08, NXA01 and NHS01
Monthly	TSS (mg/L), BOD ₅ (mg/L), COD (mg/L), NH ₃ -N (mg/L), NO ₃ -N (mg/L), total coliform (MPN/100 mL), faecal coliform (MPN/100 mL), Chlorophyll a, TOC and TKN.	As per ESMMP-OP. Noted: Hydrogen sulphide and Phytoplankton biomass remained in the analysis program for Q1 2023, but they were no longer monitored starting from Q2 2023.

APPENDIX 4: KEY TRENDS OF WATER QUALITY MONITORING FROM JANUARY 2020 TO END OF JUNE 2024 (ONLY PARAMETERS THAT EXCEEDED THE STANDARDS)

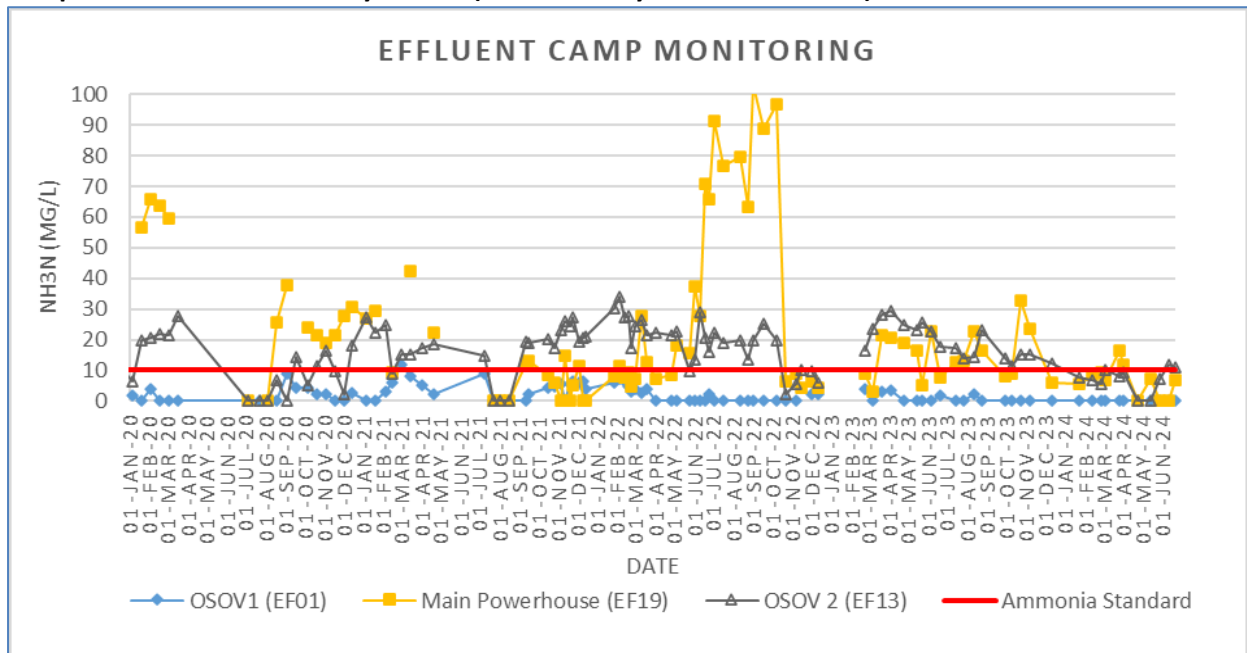
Nam Ngiep Surface Water

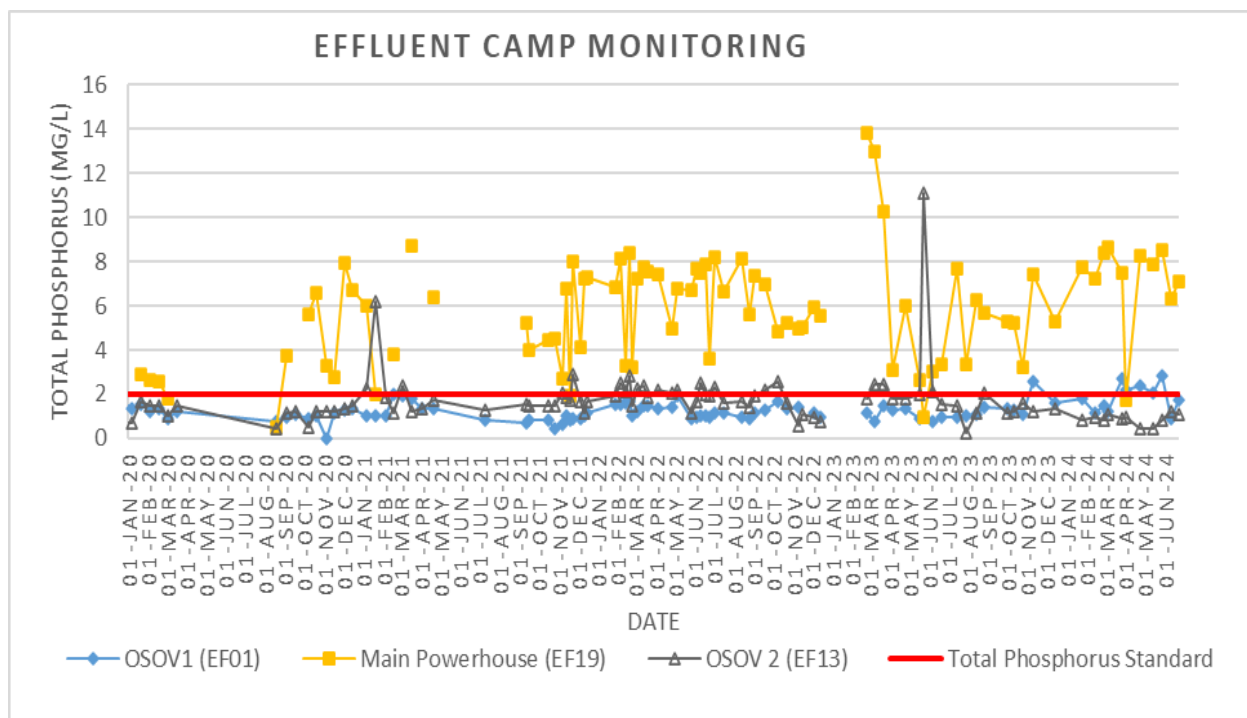
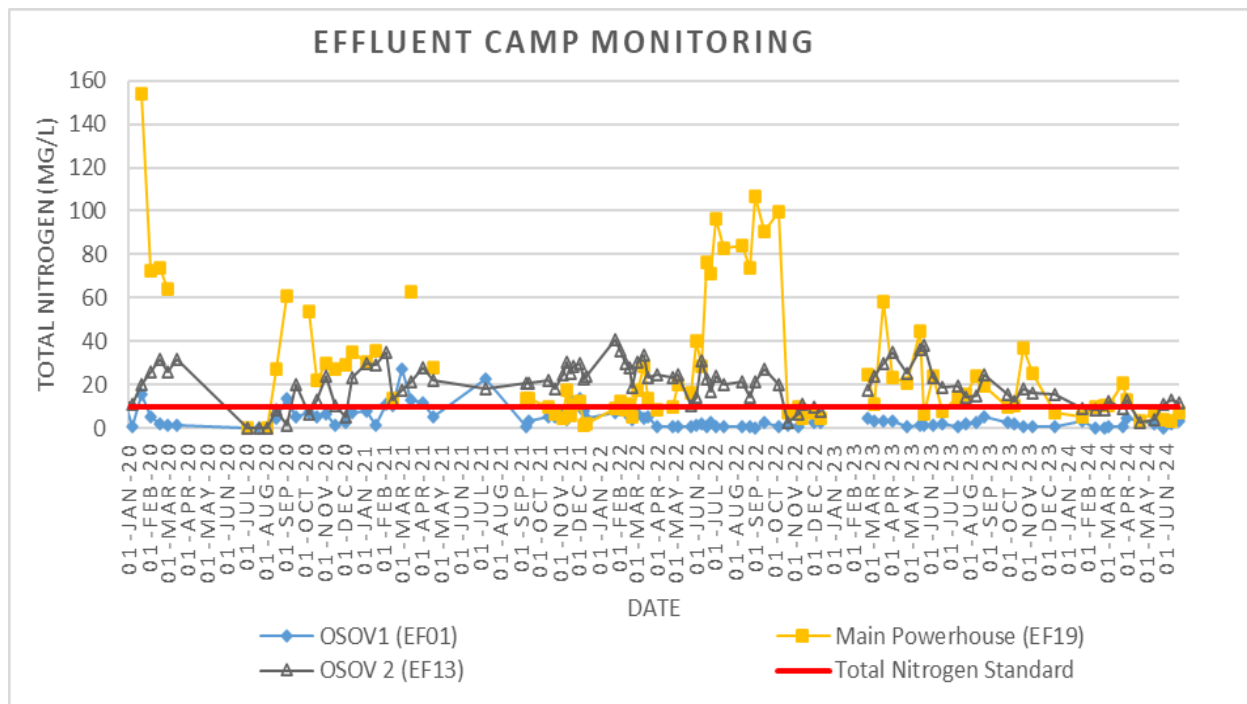


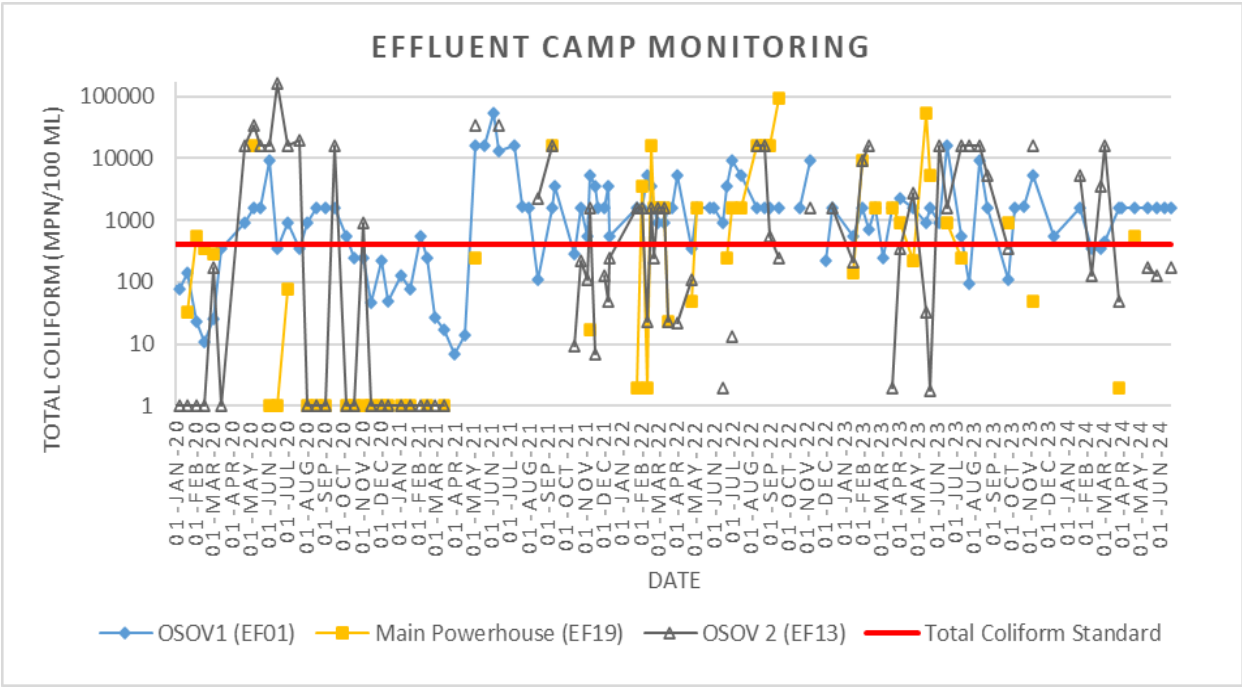
Key Water Quality Parameters for the Nam Ngiep Tributaries: Nam Chian, Nam Phouan, Nam Xao, Nam Houay Soup



Camps' Effluent Water Quality Trends (Since January 2020 – June 2024)







APPENDIX 5: WATER QUALITY MONITORING DATA
APPENDIX 5-1: SURFACE WATER QUALITY MONITORING – Q2 2024

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
2-Apr-24	pH	5.0 - 9.0		6.83	6.68	6.6									6.91			
3-Apr-24	pH	5.0 - 9.0					6.47	6.5	6.71	6.83								
4-Apr-24	pH	5.0 - 9.0									6.58	6.7	6.86	8.95		7.11	7.02	
5-Apr-24	pH	5.0 - 9.0	6.43											6.86				
9-Apr-24	pH	5.0 - 9.0		6.6	6.52	6.76												
10-Apr-24	pH	5.0 - 9.0					6.56	6.48	6.72	6.79								
23-Apr-24	pH	5.0 - 9.0		6.81	6.6	6.68												
24-Apr-24	pH	5.0 - 9.0					6.72	6.77	6.84	6.79								
2-May-24	pH	5.0 - 9.0		7.1	6.87	6.78												
3-May-24	pH	5.0 - 9.0					6.68	6.72	6.74	6.78								
6-May-24	pH	5.0 - 9.0	6.5											6.81				
7-May-24	pH	5.0 - 9.0		6.79	6.65	6.7									6.89			
8-May-24	pH	5.0 - 9.0					6.56	6.66	6.81	6.84								
9-May-24	pH	5.0 - 9.0									6.63	6.8	6.97	7.02		7.05	6.97	
14-May-24	pH	5.0 - 9.0		6.81	6.53	6.47												
15-May-24	pH	5.0 - 9.0					6.76	6.72	6.73	6.7								
21-May-24	pH	5.0 - 9.0		6.76	6.68	6.61												
22-May-24	pH	5.0 - 9.0					6.48	6.55	6.64	6.71	6.89	6.92				7.1	7.01	
28-May-24	pH	5.0 - 9.0		6.69	6.58	6.48												
29-May-24	pH	5.0 - 9.0					6.68	6.64	6.61	6.64								
3-Jun-24	pH	5.0 - 9.0	6.71											6.4				
4-Jun-24	pH	5.0 - 9.0		6.63	6.5	6.58									6.92			
5-Jun-24	pH	5.0 - 9.0					6.68	6.71	6.55	6.59								
6-Jun-24	pH	5.0 - 9.0									6.6	6.84	6.89	7.03		6.98	6.9	
12-Jun-24	pH	5.0 - 9.0		6.93	6.69	6.6												
13-Jun-24	pH	5.0 - 9.0					6.72	6.79	6.9	6.95								

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
17-Jun-24	pH	5.0 - 9.0					6.44	6.5	6.68	6.71								
18-Jun-24	pH	5.0 - 9.0		6.85	6.77	6.74												
2-Apr-24	Sat. DO (%)			94.7	109.8	131.3									108.7			
3-Apr-24	Sat. DO (%)						110.3	111.5	43.2	73.8								
4-Apr-24	Sat. DO (%)										104.3	101.9	97.8	86.6		79.1	84.4	
5-Apr-24	Sat. DO (%)		88											94.6				
9-Apr-24	Sat. DO (%)			93.5	112.8	107.5												
10-Apr-24	Sat. DO (%)						107.6	105	39	56.6								
23-Apr-24	Sat. DO (%)			96.4	110.3	109.6												
24-Apr-24	Sat. DO (%)						103.5	105.3	28.2	33.3								
2-May-24	Sat. DO (%)			106.4	131	125.4												
3-May-24	Sat. DO (%)						111.4	111	20.4	27.8								
6-May-24	Sat. DO (%)		89.3											104.3				
7-May-24	Sat. DO (%)			91.2	100.7	106.7									97.3			
8-May-24	Sat. DO (%)						100.6	103.4	36.5	53.3								
9-May-24	Sat. DO (%)										42.3	43.6	60	68.5		79.4	77.8	
14-May-24	Sat. DO (%)			79.5	96.7	92.8												
15-May-24	Sat. DO (%)						91.8	96.8	16.1	26.3								
21-May-24	Sat. DO (%)			91.2	99.6	105.1												
22-May-24	Sat. DO (%)						103.5	104.5	42.5	60.8	114.4	116.4				88.5	42	
28-May-24	Sat. DO (%)			85.3	100.5	99.2												
29-May-24	Sat. DO (%)						94.2	89.6	31.1	31.1								
3-Jun-24	Sat. DO (%)		84											89.6				
4-Jun-24	Sat. DO (%)			95.1	99.2	99.8									103.1			
5-Jun-24	Sat. DO (%)						85.2	78.5	26.3	32.3								
6-Jun-24	Sat. DO (%)										46.9	52.1	67.5	73.3		80.6	79.9	
12-Jun-24	Sat. DO (%)			90.3	86.1	90.3												
13-Jun-24	Sat. DO (%)						103.3	97	48	64.9								
17-Jun-24	Sat. DO (%)						112.7	111.6	47.8	57.3								

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
18-Jun-24	Sat. DO (%)			106.2	123.8	115.3												
2-Apr-24	DO (mg/L)	>6.0		7.41	8.32	10.11									8.9			
3-Apr-24	DO (mg/L)	>6.0					8.48	8.72	3.59	5.65								
4-Apr-24	DO (mg/L)	>6.0									8.68	8.46	8.03	7.66			6.06	6.54
5-Apr-24	DO (mg/L)	>6.0	7.48												8.15			
9-Apr-24	DO (mg/L)	>6.0		7.45	8.35	8.05												
10-Apr-24	DO (mg/L)	>6.0					8.26	8.1	3.24	4.59								
23-Apr-24	DO (mg/L)	>6.0		7.83	8.18	8.1												
24-Apr-24	DO (mg/L)	>6.0					7.72	7.88	2.34	2.69								
2-May-24	DO (mg/L)	>6.0		8.52	9.66	9.09												
3-May-24	DO (mg/L)	>6.0					8.35	8.32	1.69	2.27								
6-May-24	DO (mg/L)	>6.0	6.97												8.04			
7-May-24	DO (mg/L)	>6.0		7.2	7.46	7.79										7.72		
8-May-24	DO (mg/L)	>6.0					7.55	7.8	3.05	4.06								
9-May-24	DO (mg/L)	>6.0									3.5	3.6	4.93	5.6			6.19	6.03
14-May-24	DO (mg/L)	>6.0		6.3	7.22	6.93												
15-May-24	DO (mg/L)	>6.0					6.85	7.23	1.32	2.14								
21-May-24	DO (mg/L)	>6.0		7.35	7.46	7.86												
22-May-24	DO (mg/L)	>6.0					7.76	7.85	3.45	4.61							6.48	7.62
28-May-24	DO (mg/L)	>6.0		6.8	7.49	7.41												
29-May-24	DO (mg/L)	>6.0					6.98	6.78	2.53	2.5								
3-Jun-24	DO (mg/L)	>6.0	6.62												7.36			
4-Jun-24	DO (mg/L)	>6.0		7.44	7.5	7.55										8.31		
5-Jun-24	DO (mg/L)	>6.0					6.45	6.03	2.13	2.6								
6-Jun-24	DO (mg/L)	>6.0									3.84	4.24	5.47	5.93			6.28	6.44
12-Jun-24	DO (mg/L)	>6.0		7.41	6.6	6.87												
13-Jun-24	DO (mg/L)	>6.0					7.82	7.29	3.89	5.11								
17-Jun-24	DO (mg/L)	>6.0					8.43	8.27	3.9	4.51								
18-Jun-24	DO (mg/L)	>6.0		8.45	9.28	8.62												

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
26-Jun-24	DO (mg/L)	>6.0		7.2	6.76	7.72												
27-Jun-24	DO (mg/L)	>6.0					7.22	6.61	4.12	4.22						7.29	7.34	
2-Apr-24	Conductivity (µs/cm)			112	88	80									85			
3-Apr-24	Conductivity (µs/cm)						78	78	82	83								
4-Apr-24	Conductivity (µs/cm)										84	86	86	89		277	54	
5-Apr-24	Conductivity (µs/cm)		113											39				
9-Apr-24	Conductivity (µs/cm)			111	91	82												
10-Apr-24	Conductivity (µs/cm)						78	78	83	84								
23-Apr-24	Conductivity (µs/cm)			89	82	96												
24-Apr-24	Conductivity (µs/cm)						79	78	84	84								
2-May-24	Conductivity (µs/cm)			114	97	83												
3-May-24	Conductivity (µs/cm)						79	78	85	85								
6-May-24	Conductivity (µs/cm)		121											180				
7-May-24	Conductivity (µs/cm)			96	96	81									80			
8-May-24	Conductivity (µs/cm)						78	79	84	85								
9-May-24	Conductivity (µs/cm)										88	88	87	87		254	50	
14-May-24	Conductivity (µs/cm)			121	96	85												
15-May-24	Conductivity (µs/cm)						79	78	85	86								
21-May-24	Conductivity (µs/cm)			93	98	85												
22-May-24	Conductivity (µs/cm)						78	76	88	86	88	93				329	42	
28-May-24	Conductivity (µs/cm)			94	97	85												
29-May-24	Conductivity (µs/cm)						79	76	87	86								
3-Jun-24	Conductivity (µs/cm)		154											44				
4-Jun-24	Conductivity (µs/cm)			105	98	82									95			
5-Jun-24	Conductivity (µs/cm)						79	77	87	85								
6-Jun-24	Conductivity (µs/cm)										86	128	94	82		641	35	
12-Jun-24	Conductivity (µs/cm)			89	99	83												
13-Jun-24	Conductivity (µs/cm)						79	79	76	72								
17-Jun-24	Conductivity (µs/cm)						79	78	84	78								

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
18-Jun-24	Conductivity (µs/cm)			103	98	83												
2-Apr-24	Temperature (°C)			28.81	29.74	29.01									25.66			
3-Apr-24	Temperature (°C)						28.87	28.13	24.69	29.27								
4-Apr-24	Temperature (°C)										24.57	24.68	25.32	25.76		29.2	27.85	
5-Apr-24	Temperature (°C)		23.48											22.62				
9-Apr-24	Temperature (°C)			27.13	31.34	30.53												
10-Apr-24	Temperature (°C)						29.12	28.77	24.78	25.54								
23-Apr-24	Temperature (°C)			25.83	30.98	31.22												
24-Apr-24	Temperature (°C)						30.78	30.49	24.72	26.3								
2-May-24	Temperature (°C)			26.74	31.29	32.49												
3-May-24	Temperature (°C)						30.53	30.19	24.83	25.66								
6-May-24	Temperature (°C)		28.09											28.84				
7-May-24	Temperature (°C)			27.56	31.22	32.24									27.24			
8-May-24	Temperature (°C)						30.51	30.24	25.02	28.85								
9-May-24	Temperature (°C)										25.04	25.14	25.45	25.69		29.88	28.78	
14-May-24	Temperature (°C)			27.52	30.69	30.62												
15-May-24	Temperature (°C)						30.68	30.72	25.27	26.29								
21-May-24	Temperature (°C)			26.36	30.29	30.43												
22-May-24	Temperature (°C)						30.52	30.2	25.96	30.26	27.51	27.7				31.83	28.87	
22-May-24	Temperature (°C)			27.03	30.67	30.44												
22-May-24	Temperature (°C)						31.13	30.03	25.93	26.66								
3-Jun-24	Temperature (°C)		27.65											25.55				
4-Jun-24	Temperature (°C)			27.96	30.29	30.03									26.43			
5-Jun-24	Temperature (°C)						29.8	29.04	26.08	26.65								
6-Jun-24	Temperature (°C)										25.78	25.96	26.06	26.15		28.19	26.58	
12-Jun-24	Temperature (°C)			25.39	29.17	29.6												
13-Jun-24	Temperature (°C)						30.08	30.41	26.07	27.77								
17-Jun-24	Temperature (°C)						30.6	31.15	25.9	27.57								
18-Jun-24	Temperature (°C)			27.07	30.47	30.58												

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
2-Apr-24	Turbidity (NTU)			31.2	2.13	1.68									7.2			
3-Apr-24	Turbidity (NTU)						1.72	1.83	0.97	1.3								
4-Apr-24	Turbidity (NTU)										1.13	1.14	2.2	3.36			5.7	
5-Apr-24	Turbidity (NTU)		20.6												6.45			
9-Apr-24	Turbidity (NTU)			24.6	2.38	1.62												
10-Apr-24	Turbidity (NTU)						1.81	1.94	1.12	2.11								
23-Apr-24	Turbidity (NTU)			86.9	1.82	3.22												
24-Apr-24	Turbidity (NTU)						3.04	1.59	1.88	1.41								
2-May-24	Turbidity (NTU)			194	3.02	2.39												
3-May-24	Turbidity (NTU)						3.11	1.83	1.58	1.46								
6-May-24	Turbidity (NTU)		571											4.92				
7-May-24	Turbidity (NTU)			411	3.88	2.22									66.2			
8-May-24	Turbidity (NTU)						2.31	1.95	1.84	6.39								
9-May-24	Turbidity (NTU)										1.92	2.16	7.1	8.21		25.8	9.12	
14-May-24	Turbidity (NTU)			295	3.43	2.02												
15-May-24	Turbidity (NTU)						3.65	2.17	1.98	1.72								
21-May-24	Turbidity (NTU)			810	4.5	2.88												
22-May-24	Turbidity (NTU)						3.44	2.24	2.7	3.5	3.28	3.79				28.9	9.43	
28-May-24	Turbidity (NTU)			205	2.88	2.19												
29-May-24	Turbidity (NTU)						3.36	1.95	2.41	2.76								
3-Jun-24	Turbidity (NTU)		119											23.9				
4-Jun-24	Turbidity (NTU)			211	3.49	2.1									29.6			
5-Jun-24	Turbidity (NTU)						3.43	2.03	2	2.33								
6-Jun-24	Turbidity (NTU)										2.31	3.77	16	41.6		20.9	28.4	
12-Jun-24	Turbidity (NTU)			140	3.92	2.05												
13-Jun-24	Turbidity (NTU)						3.86	3.97	12.4	11.9								
17-Jun-24	Turbidity (NTU)						2.93	1.94	8.49	5.17								
18-Jun-24	Turbidity (NTU)			83.3	2.31	1.94												
2-Apr-24	TSS (mg/L)			5.83		<5									5.22			

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
3-Apr-24	TSS (mg/L)						<5	<5	<5	<5								
4-Apr-24	TSS (mg/L)										<5	<5	<5	<5			<5	<5
5-Apr-24	TSS (mg/L)		12.85												<5			
6-May-24	TSS (mg/L)		383.63												<5			
7-May-24	TSS (mg/L)			482.19		33.2										87.2		
8-May-24	TSS (mg/L)						<5	<5	<5	<5								
9-May-24	TSS (mg/L)										<5	<5	5.5	8.8			20.83	<5
3-Jun-24	TSS (mg/L)		88.6												12.17			
4-Jun-24	TSS (mg/L)			327.6		12.6										138.15		
5-Jun-24	TSS (mg/L)						<5	<5	<5	<5								
6-Jun-24	TSS (mg/L)										<5	<5	11.74	40			16.8	16.88
2-Apr-24	BOD ₅ (mg/L)	<1.5		<1		<1										<1		
3-Apr-24	BOD ₅ (mg/L)	<1.5					<1	<1	<1	<1								
4-Apr-24	BOD ₅ (mg/L)	<1.5									<1	<1	<1	<1				
5-Apr-24	BOD ₅ (mg/L)	<1.5	<1												<1			
6-May-24	BOD ₅ (mg/L)	<1.5	1.52												1.12			
7-May-24	BOD ₅ (mg/L)	<1.5		<1		<1										1.05		
8-May-24	BOD ₅ (mg/L)	<1.5					<1	<1	<1	<1								
9-May-24	BOD ₅ (mg/L)	<1.5									<1	<1	<1	<1			<1	<1
3-Jun-24	BOD ₅ (mg/L)	<1.5	<1												<1			
4-Jun-24	BOD ₅ (mg/L)	<1.5		<1	<1	<1										<1		
5-Jun-24	BOD ₅ (mg/L)	<1.5					<1	1.38	<1	<1								
6-Jun-24	BOD ₅ (mg/L)	<1.5									<1	<1	<1	<1			<1	<1
2-Apr-24	COD (mg/L)	<5.0	7.0												6.6	12.8		
3-Apr-24	COD (mg/L)	<5.0							9.6	16								
4-Apr-24	COD (mg/L)	<5.0									9.6	6.4	12.8	9.6			9.6	12.8
6-May-24	COD (mg/L)	<5.0	25.6												16			
7-May-24	COD (mg/L)	<5.0														12.8		
9-May-24	COD (mg/L)	<5.0							6.4	12.8	16	6.4	19.2	9.6			19.2	16

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
3-Jun-24	COD (mg/L)	<5.0	<5											<5				
4-Jun-24	COD (mg/L)	<5.0													6.4			
5-Jun-24	COD (mg/L)	<5.0						9.6	<5									
6-Jun-24	COD (mg/L)	<5.0								<5	<5	6.8	10			<5	13.6	
2-Apr-24	NH ₃ -N (mg/L)	<0.2		<0.2		<0.2									<0.2			
3-Apr-24	NH ₃ -N (mg/L)	<0.2					<0.2	<0.2										
5-Apr-24	NH ₃ -N (mg/L)	<0.2	<0.2											<0.2				
6-May-24	NH ₃ -N (mg/L)	<0.2	<0.2											<0.2				
7-May-24	NH ₃ -N (mg/L)	<0.2		<0.2		<0.2									<0.2			
8-May-24	NH ₃ -N (mg/L)	<0.2					<0.2	<0.2										
3-Jun-24	NH ₃ -N (mg/L)	<0.2	<0.2											<0.2				
4-Jun-24	NH ₃ -N (mg/L)	<0.2		<0.2		<0.2									<0.2			
5-Jun-24	NH ₃ -N (mg/L)	<0.2					<0.2	<0.2										
2-Apr-24	NO ₃ -N (mg/L)	<5.0		0.18		0.06									0.06			
3-Apr-24	NO ₃ -N (mg/L)	<5.0					0.07	0.08										
5-Apr-24	NO ₃ -N (mg/L)	<5.0	0.1											0.06				
6-May-24	NO ₃ -N (mg/L)	<5.0	0.2											0.1				
7-May-24	NO ₃ -N (mg/L)	<5.0		0.2		0.09									0.11			
8-May-24	NO ₃ -N (mg/L)	<5.0					0.09	0.08										
3-Jun-24	NO ₃ -N (mg/L)	<5.0	0.41											0.11				
4-Jun-24	NO ₃ -N (mg/L)	<5.0		0.82		0.08									0.08			
5-Jun-24	NO ₃ -N (mg/L)	<5.0					0.13	0.09										
2-Apr-24	Faecal coliform (MPN/100 mL)	<1,000													240			
4-Apr-24	Faecal coliform (MPN/100 mL)	<1,000								240	130	79	79			350	130	
5-Apr-24	Faecal coliform (MPN/100 mL)	<1,000	920											540				
6-May-24	Faecal coliform (MPN/100 mL)	<1,000	1,600											350				
7-May-24	Faecal coliform (MPN/100 mL)	<1,000													920			
9-May-24	Faecal coliform (MPN/100 mL)	<1,000								22	26	350	280			280	220	
3-Jun-24	Faecal coliform (MPN/100 mL)	<1,000	1,600											1,600				

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
4-Jun-24	Faecal coliform (MPN/100 mL)	<1,000													920			
6-Jun-24	Faecal coliform (MPN/100 mL)	<1,000								79	110	1,600	1,600			920	540	
2-Apr-24	Total Coliform (MPN/100 mL)	<5,000													540			
4-Apr-24	Total Coliform (MPN/100 mL)	<5,000								350	220	350	170			540	240	
5-Apr-24	Total Coliform (MPN/100 mL)	<5,000	1,600											920				
6-May-24	Total Coliform (MPN/100 mL)	<5,000	1,600											350				
7-May-24	Total Coliform (MPN/100 mL)	<5,000													1,600			
9-May-24	Total Coliform (MPN/100 mL)	<5,000								70	110	1,600	1,600			1,600	1,600	
3-Jun-24	Total Coliform (MPN/100 mL)	<5,000	1,600											1,600				
4-Jun-24	Total Coliform (MPN/100 mL)	<5,000													1,600			
6-Jun-24	Total Coliform (MPN/100 mL)	<5,000								350	540	1,600	1,600			1,600	1,600	
2-Apr-24	TKN (mg/L)			<1.5		<1.5									<1.5			
3-Apr-24	TKN (mg/L)						<1.5	<1.5										
5-Apr-24	TKN (mg/L)		<1.5											<1.5				
6-May-24	TKN (mg/L)		<1.5											<1.5				
7-May-24	TKN (mg/L)			<1.5		<1.5									<1.5			
8-May-24	TKN (mg/L)						<1.5	<1.5										
3-Jun-24	TKN (mg/L)		<1.5											<1.5				
4-Jun-24	TKN (mg/L)			<1.5		<1.5									<1.5			
5-Jun-24	TKN (mg/L)						<1.5	<1.5										
23-Apr-24	Secchi Disk (m)			0.2	3	1.9												
24-Apr-24	Secchi Disk (m)						2.5	3.6	3.5	4								
4-Jun-24	Secchi Disk (m)				2	2.8												
5-Jun-24	Secchi Disk (m)						2.7	3.2	4.2	2.8								
12-Jun-24	Secchi Disk (m)				2	3.5												
13-Jun-24	Secchi Disk (m)						3.5	3.7	1	1.5								
17-Jun-24	Secchi Disk (m)						2.7	3.2	1.5	2								
18-Jun-24	Secchi Disk (m)				2.5	3.3												
2-Apr-24	TOC (mg/L)														1.98			

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
3-Apr-24	TOC (mg/L)							1.52	1.61									
4-Apr-24	TOC (mg/L)									1.33	1.25	1.36	1.68			4.71	2.79	
5-Apr-24	TOC (mg/L)		1.87											2.06				
6-May-24	TOC (mg/L)		7.72											1.1				
7-May-24	TOC (mg/L)														5.32			
9-May-24	TOC (mg/L)							1.03	1.39	1.18	0.87	1	1.05			4.41	4.54	
3-Jun-24	TOC (mg/L)		3.09											3.02				
4-Jun-24	TOC (mg/L)														3.02			
6-Jun-24	TOC (mg/L)							1.89	1.61	1.7	1.77	2.57	3.16			4.64	6.25	
2-Apr-24	Total Phosphorus (mg/L)			0.05		<0.01									0.01			
3-Apr-24	Total Phosphorus (mg/L)					<0.01	<0.01											
5-Apr-24	Total Phosphorus (mg/L)		0.01											<0.01				
6-May-24	Total Phosphorus (mg/L)		0.02											0.01				
7-May-24	Total Phosphorus (mg/L)			0.02		<0.01									0.03			
8-May-24	Total Phosphorus (mg/L)					<0.01	<0.01											
2-Apr-24	Total Dissolved Phosphorus (mg/L)			0.02		<0.01									<0.01			
3-Apr-24	Total Dissolved Phosphorus (mg/L)					<0.01	<0.01											
5-Apr-24	Total Dissolved Phosphorus (mg/L)		<0.01											<0.01				
6-May-24	Total Dissolved Phosphorus (mg/L)		0.01											<0.01				
7-May-24	Total Dissolved Phosphorus (mg/L)			0.01		<0.01									0.01			
8-May-24	Total Dissolved Phosphorus (mg/L)					<0.01	<0.01											
3-Jun-24	Total Dissolved Phosphorus (mg/L)		0.01											0.01				
4-Jun-24	Total Dissolved Phosphorus (mg/L)			0.01		<0.01									<0.01			

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
5-Jun-24	Total Dissolved Phosphorus (mg/L)					<0.01	<0.01											
4-Jun-24	Turbidity (NTU)-bottom				2.24													
5-Jun-24	Turbidity (NTU)-bottom					2.67	4.02											
2-Apr-24	TSS (mg/L)-bottom				21.07													
3-Apr-24	TSS (mg/L)-bottom					26.31	<5											
7-May-24	TSS (mg/L)-bottom				33.2													
8-May-24	TSS (mg/L)-bottom					31.07	11.13											
4-Jun-24	TSS (mg/L)-bottom				23.18													
5-Jun-24	TSS (mg/L)-bottom					33.22	15											
2-Apr-24	BOD ₅ (mg/L)-bottom				<1													
3-Apr-24	BOD ₅ (mg/L)-bottom					<1	<1											
7-May-24	BOD ₅ (mg/L)-bottom				<1													
8-May-24	BOD ₅ (mg/L)-bottom					<1	<1											
4-Jun-24	BOD ₅ (mg/L)-bottom				<1													
5-Jun-24	BOD ₅ (mg/L)-bottom					<1	<1											
2-Apr-24	NH ₃ -N (mg/L)-bottom				0.86													
3-Apr-24	NH ₃ -N (mg/L)-bottom					1.24	0.82											
7-May-24	NH ₃ -N (mg/L)-bottom				0.74													
8-May-24	NH ₃ -N (mg/L)-bottom					0.91	0.57											
4-Jun-24	NH ₃ -N (mg/L)-bottom				0.9													
5-Jun-24	NH ₃ -N (mg/L)-bottom					1.49	0.73											
2-Apr-24	NO ₃ -N (mg/L)-bottom				0.08													
3-Apr-24	NO ₃ -N (mg/L)-bottom					0.08	0.08											
7-May-24	NO ₃ -N (mg/L)-bottom				0.08													
8-May-24	NO ₃ -N (mg/L)-bottom					0.08	0.13											
4-Jun-24	NO ₃ -N (mg/L)-bottom				0.1													
5-Jun-24	NO ₃ -N (mg/L)-bottom					0.11	0.09											
2-Apr-24	TKN-bottom				<1.5													

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
3-Apr-24	TKN-bottom					<1.5	<1.5											
7-May-24	TKN-bottom				<1.5													
8-May-24	TKN-bottom					<1.5	<1.5											
4-Jun-24	TKN-bottom				<1.5													
5-Jun-24	TKN-bottom					<1.5	<1.5											
2-Apr-24	Total Dissolved Phosphorus (mg/L)-bottom				0.01													
3-Apr-24	Total Dissolved Phosphorus (mg/L)-bottom					<0.01	<0.01											
7-May-24	Total Dissolved Phosphorus (mg/L)-bottom				<0.01													
8-May-24	Total Dissolved Phosphorus (mg/L)-bottom					<0.01	<0.01											
4-Jun-24	Total Dissolved Phosphorus (mg/L)-bottom				0.01													
5-Jun-24	Total Dissolved Phosphorus (mg/L)-bottom					<0.01	<0.01											
2-Apr-24	Total Phosphorus (mg/L)-bottom				0.02													
3-Apr-24	Total Phosphorus (mg/L)-bottom					<0.01	0.01											
7-May-24	Total Phosphorus (mg/L)-bottom				<0.01													
8-May-24	Total Phosphorus (mg/L)-bottom					<0.01	0.01											
4-Jun-24	Total Phosphorus (mg/L)-bottom				0.03													
5-Jun-24	Total Phosphorus (mg/L)-bottom					0.02	0.01											
2-Apr-24	Chlorophyll-A-bottom				1.71													
3-Apr-24	Chlorophyll-A-bottom					1.7	1.77											
7-May-24	Chlorophyll-A-bottom				2.12													
8-May-24	Chlorophyll-A-bottom					4.36	1.29											

		River Name	Nam Ngiep												Nam Chain	Nam Phouan	Nam Xao	Nam Houay Soup
		Zone	Location Refer to Construction Sites												Location Refer to Construction Sites			
			Upstream/Main Reservoir						Re-Regulation Reservoir/Within		Downstream				Tributaries Upstream		Tributaries Downstream	
		Station Code	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
Date	Parameters (Unit)	Guideline																
4-Jun-24	Chlorophyll-A-bottom					2.12												
5-Jun-24	Chlorophyll-A-bottom						1.77	1.64										
2-Apr-24	Chlorophyll-A			2.18		3.13												
3-Apr-24	Chlorophyll-A						1.83	2.18										
7-May-24	Chlorophyll-A			4.23		2.65												
8-May-24	Chlorophyll-A						1.77	1.23										
4-Jun-24	Chlorophyll-A			0.82		1.77												
5-Jun-24	Chlorophyll-A						0.82	1.76										

APPENDIX 5-2: EFFLUENT CAMP MONITORING RESULTS – Q2 2024

		Site Name	OSOV1	OSOV 2	Main Powerhouse
		Station Code	EF01	EF13	EF19
Date	Parameter (Unit)	Guideline in the CA			
01-Apr-24	pH	6.0 - 9.0	6.58	6.94	6.64
22-Apr-24	pH	6.0 - 9.0	6.44	6.82	6.62
13-May-24	pH	6.0 - 9.0	6.94	6.8	6.57
27-May-24	pH	6.0 - 9.0	6.71	6.89	6.99
10-Jun-24	pH	6.0 - 9.0	6.52	6.75	6.97
21-Jun-24	pH	6.0 - 9.0	6.71	6.9	6.98
01-Apr-24	Sat. DO (%)		283	100.3	56.1
22-Apr-24	Sat. DO (%)		39.8	116.1	81.1
13-May-24	Sat. DO (%)		30	89.4	25.3
27-May-24	Sat. DO (%)		30.1	104.3	47.8
10-Jun-24	Sat. DO (%)		28.5	74.8	52.8
21-Jun-24	Sat. DO (%)		34.7	79.6	35.1
01-Apr-24	DO (mg/L)		2.16	7.82	4.2
22-Apr-24	DO (mg/L)		3.01	8.72	5.91
13-May-24	DO (mg/L)		2.31	6.93	1.87
27-May-24	DO (mg/L)		2.33	8.06	3.55
10-Jun-24	DO (mg/L)		2.24	5.89	4.06
21-Jun-24	DO (mg/L)		2.67	6.09	2.59
01-Apr-24	Conductivity (µs/cm)		433	370	1224
22-Apr-24	Conductivity (µs/cm)		405	265	1012
13-May-24	Conductivity (µs/cm)		403	264	1036
27-May-24	Conductivity (µs/cm)		383	390	1045
10-Jun-24	Conductivity (µs/cm)		171	374	770
21-Jun-24	Conductivity (µs/cm)		336	479	1078
01-Apr-24	Temperature (°C)		29.64	28.19	30.35
22-Apr-24	Temperature (°C)		29.69	29.86	32.06
13-May-24	Temperature (°C)		28.75	28.57	31.19
27-May-24	Temperature (°C)		28.44	28.7	30.61
10-Jun-24	Temperature (°C)		27.74	27.61	28.89
21-Jun-24	Temperature (°C)		29.14	29.71	30.9
01-Apr-24	Turbidity (NTU)		1.5	6.44	20.1
22-Apr-24	Turbidity (NTU)		3.92	3.3	4.66
13-May-24	Turbidity (NTU)		2.79	3.69	6.81
27-May-24	Turbidity (NTU)		1.86	7.6	5.04
10-Jun-24	Turbidity (NTU)		3.29	10.7	4.66
21-Jun-24	Turbidity (NTU)		1.96	10.7	5.13
01-Apr-24	TSS (mg/L)	<50	8	<5	5.55
22-Apr-24	TSS (mg/L)	<50	12.6	<5	<5
13-May-24	TSS (mg/L)	<50	11.4	<5	10
27-May-24	TSS (mg/L)	<50	15.2	<5	5.51
10-Jun-24	TSS (mg/L)	<50	5	7.35	<5
21-Jun-24	TSS (mg/L)	<50	11.4	10.92	7.85

		Site Name	OSOV1	OSOV 2	Main Powerhouse
		Station Code	EF01	EF13	EF19
Date	Parameter (Unit)	Guideline in the CA			
01-Apr-24	BOD ₅ (mg/L)	<30	12.48	9.63	<6
22-Apr-24	BOD ₅ (mg/L)	<30	10.08	8.01	10.7
13-May-24	BOD ₅ (mg/L)	<30	<6	<6	<6
27-May-24	BOD ₅ (mg/L)	<30	<6	<5	<6
10-Jun-24	BOD ₅ (mg/L)	<30	<6	<6	<6
21-Jun-24	BOD ₅ (mg/L)	<30	<6	<6	<6
01-Apr-24	COD (mg/L)	<125	<25	<25	38
22-Apr-24	COD (mg/L)	<125	<25	<25	26
13-May-24	COD (mg/L)	<125	<25	<25	25
27-May-24	COD (mg/L)	<125	<25	<25	<25
10-Jun-24	COD (mg/L)	<125	<25	<25	<25
21-Jun-24	COD (mg/L)	<125	<25	38.4	29
01-Apr-24	NH ₃ -N (mg/L)	<10.0	<2	9.4	11.7
22-Apr-24	NH ₃ -N (mg/L)	<10.0	<2	<2	<2
13-May-24	NH ₃ -N (mg/L)	<10.0	<2	<2	7.4
27-May-24	NH ₃ -N (mg/L)	<10.0	<10	7.3	<2
10-Jun-24	NH ₃ -N (mg/L)	<10.0	<2	11.8	<2
21-Jun-24	NH ₃ -N (mg/L)	<10.0	<2	11.2	6.8
01-Apr-24	Total Nitrogen (mg/L)	<10.0	4.4	12.8	13.2
22-Apr-24	Total Nitrogen (mg/L)	<10.0	3.2	2.4	3.5
13-May-24	Total Nitrogen (mg/L)	<10.0	1.8	3.8	7.6
27-May-24	Total Nitrogen (mg/L)	<10.0	0.1	11.3	4.2
10-Jun-24	Total Nitrogen (mg/L)	<10.0	1.9	13.0	3.4
21-Jun-24	Total Nitrogen (mg/L)	<10.0	3.2	11.9	7.2
01-Apr-24	Total Phosphorus (mg/L)	<2	2.18	1.0	1.8
22-Apr-24	Total Phosphorus (mg/L)	<2	2.36	0.4	8.2
13-May-24	Total Phosphorus (mg/L)	<2	2.06	0.4	7.9
27-May-24	Total Phosphorus (mg/L)	<2	2.81	0.8	8.5
10-Jun-24	Total Phosphorus (mg/L)	<2	0.92	1.2	6.3
21-Jun-24	Total Phosphorus (mg/L)	<2	1.71	1.1	7.1
01-Apr-24	Faecal Coliform (MPN/100 mL)	<400	1,600	0	0
22-Apr-24	Faecal Coliform (MPN/100 mL)	<400	540	0	240
13-May-24	Faecal Coliform (MPN/100 mL)	<400	220	70	0
27-May-24	Faecal Coliform (MPN/100 mL)	<400	540	22	0
10-Jun-24	Faecal Coliform (MPN/100 mL)	<400	350	0	0
21-Jun-24	Faecal Coliform (MPN/100 mL)	<400	45	2	0
01-Apr-24	Total coliform (MPN/100 mL)	<400	1,600	0	0
22-Apr-24	Total coliform (MPN/100 mL)	<400	1,600	0	540
13-May-24	Total coliform (MPN/100 mL)	<400	1,600	170	0
27-May-24	Total coliform (MPN/100 mL)	<400	1,600	130	0
10-Jun-24	Total coliform (MPN/100 mL)	<400	1,600	0	0
21-Jun-24	Total coliform (MPN/100 mL)	<400	1,600	170	0
01-Apr-24	Oil & Grease (mg/L)	<10.0	<1	<1	<1
13-May-24	Oil & Grease (mg/L)	<10.0	<1	<1	<1

		Site Name	OSOV1	OSOV 2	Main Powerhouse
		Station Code	EF01	EF13	EF19
Date	Parameter (Unit)	Guideline in the CA			
10-Jun-24	Oil & Grease (mg/L)	<10.0	<1	<1	<1
01-Apr-24	Residual Chlorine (mg/L)	<1.0	N/A	0.13	1.41
22-Apr-24	Residual Chlorine (mg/L)	<1.0	N/A	0.25	0.52
13-May-24	Residual Chlorine (mg/L)	<1.0	N/A	0.42	0.92
27-May-24	Residual Chlorine (mg/L)	<1.0	N/A	0.29	0.85
10-Jun-24	Residual Chlorine (mg/L)	<1.0	N/A	0.16	0.58
21-Jun-24	Residual Chlorine (mg/L)	<1.0	N/A	0.41	0.47

APPENDIX 5-3: COMMUNITY GROUNDWATER QUALITY MONITORING RESULTS – Q2 2024

Month Year	Parameter (Unit)	Site Name	Phouhomxay Village		Somseun Village	NamPa Village	ThongNoy Village	Pou Village	
		Station	GPHX01	GPHX02	GSXN01	GNPA01	GTHN01	GPOU01	GPOU02
		Guideline							
05-Apr-24	pH	6.5 - 9.2						6.6	6.76
08-Apr-24	pH	6.5 - 9.2		6.89	6.65	6.6	6.48		
06-May-24	pH	6.5 - 9.2						6.56	6.4
16-May-24	pH	6.5 - 9.2		6.48	6.7	6.35	6.57		
03-Jun-24	pH	6.5 - 9.2						6.6	6.52
11-Jun-24	pH	6.5 - 9.2		6.68	6.51	6.53	6.44		
05-Apr-24	Sat. DO (%)							87.7	75.3
08-Apr-24	Sat. DO (%)			65.3	71.8	83.9	72.6		
06-May-24	Sat. DO (%)							85.7	85.1
16-May-24	Sat. DO (%)			78.9	85.3	92.9	76.1		
03-Jun-24	Sat. DO (%)							78.8	60
11-Jun-24	Sat. DO (%)			24.1	90.2	100.1	83.6		
05-Apr-24	DO (mg/l)							7.15	6.12
08-Apr-24	DO (mg/l)			5.1	5.41	6.46	5.47		
06-May-24	DO (mg/l)							6.82	6.73
16-May-24	DO (mg/l)			6.21	6.46	7.14	5.75		
03-Jun-24	DO (mg/l)							6.27	4.76
05-Apr-24	Conductivity (µS/cm)							22	320
08-Apr-24	Conductivity (µS/cm)			520	445	466	482		
06-May-24	Conductivity (µS/cm)							27	305
16-May-24	Conductivity (µS/cm)			514	459	457	464		
03-Jun-24	Conductivity (µS/cm)							30	340
11-Jun-24	Conductivity (µS/cm)			524	437	442	370		

Month Year	Parameter (Unit)	Site Name	Phouhomxay Village		Somseun Village	NamPa Village	ThongNoy Village	Pou Village	
		Station	GPHX01	GPHX02	GSXN01	GNPA01	GTHN01	GPOU01	GPOU02
		Guideline							
05-Apr-24	Temperature (°C)							25.67	25.97
08-Apr-24	Temperature (°C)			28	30.08	28.9	30.14		
06-May-24	Temperature (°C)							27.12	27.5
16-May-24	Temperature (°C)			27.28	29.83	28.94	29.76		
05-Apr-24	Turbidity (NTU)	<20						5.3	1.65
08-Apr-24	Turbidity (NTU)	<20		3.89	1.83	1.43	3.26		
06-May-24	Turbidity (NTU)	<20						2.46	3.62
16-May-24	Turbidity (NTU)	<20		3.59	1.2	1.46	2.09		
05-Apr-24	Fecal coliform (MPN/100ml)	0						0	0
08-Apr-24	Fecal coliform (MPN/100ml)	0		0	0	0	22		
06-May-24	Fecal coliform (MPN/100ml)	0						0	6.8
16-May-24	Fecal coliform (MPN/100ml)	0		0	0	0	33		
03-Jun-24	Fecal coliform (MPN/100ml)	0						0	0
11-Jun-24	Fecal coliform (MPN/100ml)	0		0	4.5	7.8	22		
05-Apr-24	E.coli Bacteria (MPN/100ml)	0						0	0
08-Apr-24	E.coli Bacteria (MPN/100ml)	0		0	0	0	14		
06-May-24	E.coli Bacteria (MPN/100ml)	0						0	0
16-May-24	E.coli Bacteria (MPN/100ml)	0		0	0	0	14		
03-Jun-24	E.coli Bacteria (MPN/100ml)	0						0	0
11-Jun-24	E.coli Bacteria (MPN/100ml)	0		0	0	2	4.5		
05-Apr-24	Arsenic (mg/l)	<0.05						<0.0003	0.0013
08-Apr-24	Arsenic (mg/l)	<0.05		0.0028	0.0024	0.001	0.003		
05-Apr-24	Cadmium (mg/l)	<0.01						<0.003	<0.003
08-Apr-24	Cadmium (mg/l)	<0.01		<0.003	<0.003	<0.003	<0.003		
05-Apr-24	Total Iron (mg/l)	<1						0.035	0.086
08-Apr-24	Total Iron (mg/l)	<1		1.09	0.011	0.05	0.023		
05-Apr-24	Total hardness (mg/l)	<500						4.3	136
08-Apr-24	Total hardness (mg/l)	<500		227	186	184	199		

Month Year	Parameter (Unit)	Site Name	Phouhomxay Village		Somseun Village	NamPa Village	ThongNoy Village	Pou Village	
		Station	GPHX01	GPHX02	GSXN01	GNPA01	GTHN01	GPOU01	GPOU02
		Guideline							
05-Apr-24	Mercury (mg/l)	<0.01						<0.0002	<0.0002
08-Apr-24	Mercury (mg/l)	<0.01		<0.0002	<0.0002	<0.0002	<0.0002		
05-Apr-24	Lead (mg/l)	<0.05						<0.003	<0.003
08-Apr-24	Lead (mg/l)	<0.05		0.003	<0.003			<0.003	<0.003

APPENDIX 5-4: GRAVITY FED WATER SUPPLY QUALITY MONITORING RESULTS – Q2 2024

Date	Parameter (Unit)	Site Name	Thaheau Village	Hat Gnuin Village	Phouhomxay Village	
		Station	WTHH02	WHGN02	WPHX02	WPHX03
		Guideline				
08-Apr-24	pH	6.5 - 8.5	6.9	6.94	7.24	7.2
16-May-24	pH	6.5 - 8.5	6.89	6.8	6.69	6.74
11-Jun-24	pH	6.5 - 8.5		6.6	6.75	6.73
08-Apr-24	Sat. DO (%)		82.7	89.9	75.6	70.9
16-May-24	Sat. DO (%)		83.4	96.6	99.4	92.7
11-Jun-24	Sat. DO (%)			99.4	99.1	96.4
08-Apr-24	DO (mg/L)		6.38	6.83	5.98	5.5
16-May-24	DO (mg/L)		6.34	7.24	7.7	7.15
11-Jun-24	DO (mg/L)			7.89	7.92	7.71
08-Apr-24	Conductivity (µS/cm)	<1,000	79	129	23	25
16-May-24	Conductivity (µS/cm)	<1,000	82	127	20	18
11-Jun-24	Conductivity (µS/cm)	<1,000		88	15	15
08-Apr-24	Temperature (°C)	<35	28.87	29.71	27.29	28.6
16-May-24	Temperature (°C)	<35	29.57	30.34	28.5	28.86
08-Apr-24	Turbidity (NTU)	<10	6.09	6.19	2.26	3.17
16-May-24	Turbidity (NTU)	<10	3.85	1.7	1.73	1.13
11-Jun-24	Turbidity (NTU)	<10		5.04	8.24	9.66
08-Apr-24	Faecal Coliform (MPN/100 mL)	0	70	130	33	17
16-May-24	Faecal Coliform (MPN/100 mL)	0	22	350	22	22
11-Jun-24	Faecal Coliform (MPN/100 mL)	0		170	170	280
08-Apr-24	E.coli Bacteria (MPN/100 mL)	0	33	49	17	11
16-May-24	E.coli Bacteria (MPN/100 mL)	0	11	33	7.8	11
11-Jun-24	E.coli Bacteria (MPN/100 mL)	0		31	79	130

		Site Name	Thaheau Village	Hat Gnuin Village	Phouhomxay Village	
		Station	WTHH02	WHGN02	WPHX02	WPHX03
Date	Parameter (Unit)	Guideline				
08-Apr-24	Arsenic (mg/L)	<0.05	<0.0003	<0.0003	<0.0003	<0.0003
08-Apr-24	Cadmium (mg/L)	<0.003	<0.002	<0.002	<0.002	<0.002
08-Apr-24	Iron (mg/L)		0.263	0.122	0.168	0.183
08-Apr-24	Lead (mg/L)	<0.10	<0.01	0.016	<0.01	<0.01
08-Apr-24	Total hardness (mg/L)	<300	33.5	57.2	7.3	8.2
08-Apr-24	Mercury (mg/L)	<0.001	<0.0002	<0.0002	<0.0002	<0.0002

APPENDIX 5-5: LANDFILL LEACHATE MONITORING RESULTS – Q2 2024

		Site Name	NNP1 Landfill Leachate					Houay Soup Landfill	
		Location	Pond No.01	Pond No.02	Pond No.03	Pond No.04	Discharge Point	Last pond	Discharged Point
		Station	LL1	LL2	LL3	LL4	LL5	LL6	LL7
Date	Parameter (Unit)	Guideline							
10-Jun-24	pH	6.0-9.0				7.2		7.1	
10-Jun-24	Sat. DO (%)					135.2		70.1	
10-Jun-24	DO (mg/L)					10.22		5.52	
10-Jun-24	Conductivity (µS/cm)					95		109	
10-Jun-24	Turbidity (NTU)					60.2		456	
10-Jun-24	BOD5 (mg/L)	<30				9.91		11.44	
10-Jun-24	COD (mg/L)	<125				50.5		<25	
10-Jun-24	Faecal Coliform (MPN/100mL)	<400				1600		1,600	
10-Jun-24	Total Coliform (MPN/100mL)	<400				1,600		1,600	
10-Jun-24	Total Nitrogen (mg/L)	<10				1		1.59	
10-Jun-24	Ammonia nitrogen (mg/L)	<10				<2		<2	
10-Jun-24	Oil & Grease (mg/L)	<10				<1		<1	