

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

October 2021




					
A	15 November 2021	Hendra WINASTU	Wanidaporn RODE	Khamlar PHONSAVAT	Final
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EXECUTIVE SUMMARY

The NNP1PC's Environmental and Social Policies were reviewed and approved by the new Managing Director thereby confirming implementation and continual improvement of the Environmental Management System (EMS). A letter to the Ministry of Natural Resource and Environment (MONRE) requesting the Government of Lao PDR (GOL) to consider a 1-year extension of time for NNP1PC to obtain the ISO14001 accreditation was prepared and is expected to be submitted to MONRE by early November 2021. The Stage 2 ISO14001:2015 Certification Audit by SGS was agreed and confirmed to be conducted on 21-24 February 2022.

During September 2021, EMO received no document for review and approval. EMO did not issue any Site Inspection Report (SIR) or Observation of Non-Compliance to the Contractor.

Due to the COVID-19 pandemic and the measures announced by the GOL, the regular joint site inspections were completely suspended at all restricted areas such as nearby villages and in Zone 2UR as well as NNP1PC's operation sites during the reporting period. However, the EMO undertook their own site inspections of the Dam sites, NNP1PC's operation sites and the 230 kV transmission line as normal.

The operation and adjustment of the newly constructed wastewater treatment systems are in progress. EMO has conducted six fortnightly samplings after the completion of the improvements. The results present a positive trend of improvements except for Ammonia-Nitrogen, Total Nitrogen and Total Phosphorus at OSOV2 and the Main Powerhouse.

In October 2021, water quality depth profile measurements at R01, R02 and R03 (main reservoir) and NPH01 were suspended due to security concerns. The water quality monitoring in the downstream stations were also suspended due to rapid increase in COVID-19 infection cases in the communities and NNP1PC could not access the villages and use the local boat service along Nam Ngiep Downstream for monitoring at the stations of NNG06, NNG07, NNG08, NXA01 and NHS01.

At R05, the average DO concentration was 7.3 mg/L in the upper 9.5 m varying between 6.5 mg/L and 8.1 mg/L, and the oxycline was generally found at a depth of 10.0 to 13.0 m with DO concentrations between about 2 mg/L and 5 mg/L – similar to September 2021. In the Re-regulation Reservoir, the mean DO concentration at water surface were 4.1 mg/L and 4.4 mg/L in R06 and R07 respectively.

The discharge from the Re-regulation Dam was mainly a combination of gate and turbine discharge. At the stations in Nam Ngiep immediately downstream of the Re-regulation Dam, the DO concentrations were less than 6 mg/L for all monitoring period. No dead fish was observed in Nam Ngiep downstream in this monitoring period. NNP1PC is still in the process of collecting information to assist in developing measures to improve the DO levels downstream.

In October 2021, the local waste collection contractors continued collecting waste from the NNP1PC's operation sites and the nearby villages, and operating the NNP1 Project Landfill and Houy Soup Landfill. The work included waste segregation and disposal, waste cover, grass cutting and repairing perimeter fences.

A total of 25.4 m³ of solid waste was disposed of at the NNP1 Project Landfill, an increase of 0.1 m³ compared with September 2021. A total of 27.2 m³ of solid waste from Phouhomxay, Thahuea and

Hat Gniun Villages was disposed of at Houay Soup Landfill, an increase of 9.3 m³ compared with September 2021. Due to the continuation of COVID-19 measures, many local recycling businesses and vendors have not yet resumed their recyclable waste trading. There was no trading of recyclable waste at the community recycle waste bank during the period of reporting.

There were no field activities carried out by Xaysomboun and Bolikhamxay Watershed and Reservoir Protection Office (WRPO) due to continuous enforcement of lockdown as part of the COVID-19 measures in October 2021. Bolikhamxay Nam Chouan-Nam Xang Biodiversity Offset Management Unit (NC-NX BOMU) carried out NC-NX patrolling and snare removal activity under the approval of District Task Force Committee for COVID-19 measures at the end of October 2021.

1. ENVIRONMENTAL MANAGEMENT MONITORING

1.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

The NNP1PC’s Environmental and Social Policies were reviewed and approved by the new Managing Director thereby confirming implementation and continual improvement of the EMS. A letter to MONRE requesting the GOL to consider a 1-year extension of time for NNP1PC to obtain the ISO14001 accreditation was prepared and is expected to be submitted to MONRE by early November 2021. The Stage 2 ISO14001:2015 Certification Audit by SGS was agreed and confirmed to be conducted on 21-24 February 2022.

TABLE 1-1: ENVIRONMENTAL MANAGEMENT SYSTEM WORK PLAN-REVISED IN OCTOBER 2021

Item	ISO14001:2015 Work Plan	Year 2020		Year 2021				Year 2022	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	Continue to prepare EMS documents (8 Standard Operating Procedures are completed)	■	■						
2	NNP1PC Environmental Policy announcement		■						
3	NNP1PC ISO Committee establishment		■						
4	Training relevant staff on: <ul style="list-style-type: none"> - Requirement and Interpretation of ISO14001:2015 - Organization Context and Risk Management for ISO14001 - ISO14001:2015 Document Information - ISO14001:2015 Internal Audit 		■		■				
5	Implement the EMS procedures and processes	■	■	■	■	■	■	■	■
6	ISO14001:2015 Internal Audit					■			
7	Implement the corrective actions and preventive actions according to the Internal Audit					■			
8	Management Review by NNP1PC Management					■			
9	ISO 14001:2015 Assessment and Certification Audit – Stage 1 (remote audit on the documentation review)					■			
10	Implement the corrective actions and preventive actions according to the Stage 1 Audit					■	■	■	
11	ISO 14001:2015 Assessment and Certification Audit – Stage 2 (remote audit, 4 man-days)							■	
12	Implement the corrective actions and preventive actions according to the Stage 2 Audit							■	
13	Certify of ISO14001:2015 upon successful completion of the audit							■	■

■	Completed activities per the plan
■	Plan to achieve the activities

1.2 COMPLIANCE MANAGEMENT

In October 2021, EMO received no documents for review and approval. No Site Inspection Report (SIR) or Observation Non-Compliance was issued to the Contractor during the month.

Due to the Corvid-19 situation, the GOL's lockdown measures continue to be in place in the area surrounding the project and its activities, and the suspension of the regular joint site inspections has continued at all areas such as at nearby villages, in Zone 2UR and the NNP1PC's operation sites during the reporting period. However, the Compliance team conducted their normal independent site inspections at the construction sites including at the new wastewater treatment systems at OSOV1, OSOV2, and at the Main Dam grouting work and the 230 kV Transmission Line.

The operation and adjustment of the newly constructed wastewater treatment systems (WWTS) are in progress. EMO has conducted six fortnightly samplings after the completion of the improvements. The results present a positive trend of improvement except for Ammonia-Nitrogen, Total Nitrogen, Total Phosphorus at OSOV2 and the Main Powerhouse. However, EMO requires more time to confirm the results and the sampling schedule will be adjusted from fortnightly to weekly basis to optimize the wastewater treatment conditions. In addition, the WWTS operation manual is under drafting with a support of the Contractor (SCC). It is expected that the first draft could be finalized by the end of November 2021.

EMO issued no Observations of Non-Compliance (ONC) during October 2021. The status of compliance reports (Observation of Non-Compliance or ONC; and Non-Compliance Report or NCR) issued by NNP1PC is summarized in **Table 1-2**.

TABLE 1-2: SUMMARY OF ONCs AND NCRs

Items	ONC	NCR-1	NCR-2	NCR-3
Carried over from September 2021	4	0	0	0
Newly Opened in October 2021	0	0	0	0
Total in October 2021	4	0	0	0
Resolved in October 2021	4	0	0	0
Carried over to November 2021	0	0	0	0
Unsolved Exceeding Deadlines	0	0	0	0

1.2.1 Site Inspection by Environment Management Unit (EMU)

The monthly site visit by the EMU of Bolikhan District and the quarterly site visit by the EMU of Xaysomboun Province were not carried out in October 2021 due to the COVID-19 lockdown measures.

1.2.2 Site Decommissioning and Rehabilitation

During the reporting period of October 2021, EMO has continued to monitor the status and progress of site rehabilitation for the Phouhomxay Village's Irrigation canal rock and spoil disposal

area and the former LILAMA10 camp. The conditions are similar to last month. EMO has scheduled a joint site inspection with TD-O&M to evaluate the percentage of vegetation cover for the area of LILAMA10 camp in early November 2021. The joint site inspection and evaluation results will be updated in November 2021 Report.

FIGURE 1-1: PHOTOS STATUS OF VEGETATION COVER OF TWO SITES IN OCTOBER 2021.

FORMER LILAMA10 CAMP	PHOUHOMXAY VILLAGE’S IRRIGATION CANAL ROCK AND SPOIL DISPOSAL AREA
	

1.3 WATER QUALITY MONITORING

The analyses of Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD₅), Faecal Coliform Bacteria, Total Coliform Bacteria and *E. coli* have been carried out by NNP1PC’s environmental laboratory since August 2017.

All data are reported to the Ministry of Natural Resources and Environment (MONRE) monthly, and quarterly to the ADB. The reports are also published on the Company’s website at <https://namngiep1.com/resources/monitoring-reports/>

Due to the rapid increase in COVID-19 infection cases in the project related communities during September 2021, the GOL imposed additional COVID-19 preventative measures, which meant that the community water supply (groundwater and gravity fed) monitoring had to be suspended.

In addition, there is still no turbidity measurement data reported in October 2021 due to the Turbidity Meter was broken.

1.3.1 Effluent Discharge from Camps and Construction Sites

Detailed monitoring results are provided in the **Annex B** of this Report. The effluent camp monitoring results in October 2021 indicated non-compliances for some parameters in OSOV1 (EF01), OSOV2 (EF13) and the Main Powerhouse (EF19).

The status of implementation of the corrective actions addressing non-compliances at the camps and key project facilities are summarized in **Table 1-3**.

TABLE 1-3: STATUS OF CORRECTIVE ACTIONS FOR NON-COMPLIANCES AT WWTSs IN OCTOBER 2021

Site	Sampling ID	Status	Corrective Actions
OSO V1	EF01	Non-compliance for faecal coliform and total coliform in the second fortnightly sampling.	The wastewater treatment systems modification and improvements were completed. The efficacy of the treatment systems will be closely monitored until the end of December 2021 to ensure that there is sufficient data to draw conclusions and make appropriate adjustments to the operation.
OSO V2	EF13	Non-compliance for ammonia-nitrogen and total nitrogen in both fortnightly samples.	
Main Powerhouse	EF19	Non-compliance for total phosphorus in both fortnightly samples.	

1.3.2 Ambient Surface Water and Reservoir Water Quality Monitoring

The ambient surface water and reservoir water quality monitoring programme comprises five monitoring stations in the main reservoir (R01-R05), two stations in the Re-regulation Reservoir (R06 and R07), five stations in the mainstream Nam Ngiep (NNG01 and NNG05 to NNG08) and four stations in the main tributaries to Nam Ngiep (Nam Chiane [NCH01], Nam Phouan [NPH01], Nam Xao [NXA01] and Nam Houay Soup [NHS01]). However, water quality monitoring at three stations in the main reservoir (R01-R03) and Nam Phouan (NPH01) were suspended due to the security concerns, and water quality monitoring in downstream such as Nam Ngiep (NNG06, NNG07 & NNG08), Nam Xao (NXA01) and Nam Houaysoup (NHS01) were suspended due to rapidly COVID19 pandemic in the communities where boat service contractor located.

In addition, weekly depth profile monitoring (pH, DO, conductivity and temperature) has been undertaken since 18 September 2018 for stations located in the Re-regulation reservoir and the main reservoir. The locations of the monitoring stations are shown in **Figure 1-3**.

The monitoring results for key parameters (DO, TSS and BOD₅) during October 2021 are presented in **Table 1-4**, **Table 1-5** and **Table 1-6**. The full set of data for October 2021 is attached in **Annex A**. In addition, the results for DO are presented as line graphs in **Figure 1-4**.

Main Reservoir

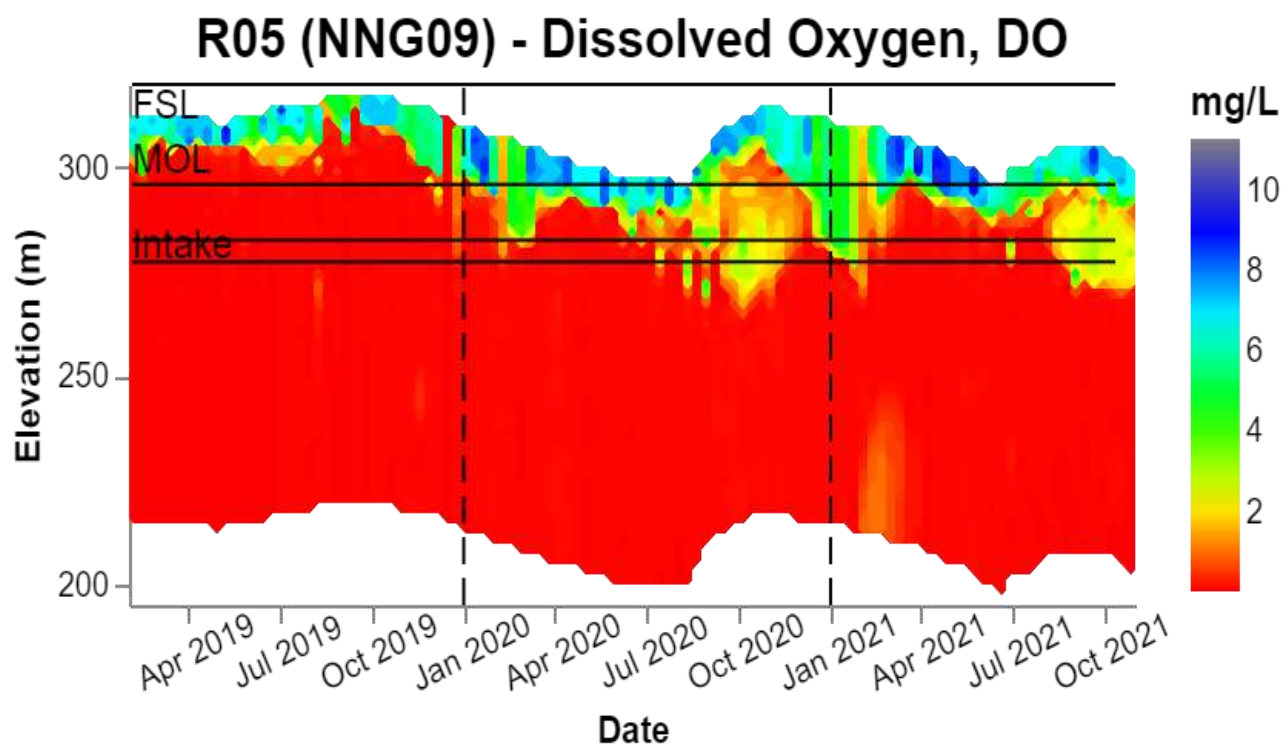
From 01 to 31 2021, the main reservoir water level decreased with 2.91 m from El. 303.88 m asl to El. 300.97 m.

Depth profile measurements and sampling at R01, R02 and R03 continue to be suspended due to security concerns during October 2021.

At R05, the average DO concentration was 7.3 mg/L in the upper 9.5 m varying between 6.5 mg/L and 8.1 mg/L, and the oxycline was generally found at a depth of 10.0 – 13.0 m with DO concentrations between about 2 mg/L and 5 mg/L – similar to September 2021. As shown in *Figure 1-2*, at the intake level (approximately 24 m below surface), the mean DO concentration was 2 mg/L during October 2021. DO concentrations below 0.5 mg/L (anoxic condition) were recorded at depths below 34 m corresponding to 7.5 m below the Intake in early October 2021 to 7.4 m below the Intake by the end of the month, taking into consideration the decreased water level in the reservoir over the period.

As also indicated in *Figure 1-2*, the slightly elevated DO concentrations at the intake level appeared around August 2021 and has continued at least until the end of October 2021. A somewhat similar picture is seen in August-October 2020.

FIGURE 1-2 DO DEPTH PROFILES IN R05 (INDIVIDUAL MEASUREMENT DATA)



At R04, the DO levels in the upper 7.5 m varied between 6.5 mg/L and 8.0 mg/L and the DO concentrations then varied between 1.5 mg/L and 3 mg/L down to a depth of about 34 m whereafter the concentrations dropped to below 0.5 mg/L.

As expected, the TSS concentrations in the main reservoir have been consistently low since the start of impounding with a mean of 5 mg/L compared with the high flow season means of about 100 – 250 mg/L and low flow season means of 20 mg/L - 50 mg/L.

The BOD₅ measurements at R04 and R05 in both epilimnion and hypolimnion were less than 1.0 mg/L.

Re-regulation Reservoir

In October 2021, the turbine discharges from the main powerhouse varied between 25 and 289 m³/s usually interrupted by night-time periods with no discharge.

The mean DO concentration at the water surface were 4.1 mg/L and 4.4 mg/L in R06 and R07 respectively during October 2021.

The BOD₅ concentrations in both R06 and R07 were less than 1.0 mg/L.

Nam Ngiep Downstream

During October 2021, the discharge from the Re-regulation Dam was mainly a combination of gate and turbine discharge.

Due to the rapid increase in COVID-19 infection cases in the communities, the GOL imposed additional COVID-19 measures, which meant that NNP1PC could not access the villages and use local boat service along Nam Ngiep Downstream for water quality monitoring for the stations of NNG06, NNG07, NNG08, NXA01 and NHS01.

During periods with turbine discharge, the DO concentrations at NNG05 about 1.8 km downstream of the Re-regulation Dam varied between 4.6 mg/L and 5.4 mg/L with an average of 4.8 mg/L.

No dead fish was observed in Nam Ngiep downstream during this monitoring period. NNP1PC is still in the process of collecting information to assist in developing measures to improve the DO levels downstream.

The BOD₅ in the downstream station (NNG05) was less than 1 mg/L and complied with the national surface water quality standard.

Main Tributaries to Nam Ngiep

No water quality monitoring for Nam Phouan (NPH01), Nam Chiane (NCH01), Nam Xao (NXA01) and Nam Houaysoup (NHS01) during October 2021.

FIGURE 1-3: SURFACE WATER AND RE-REGULATION RESERVOIR WATER QUALITY MONITORING STATIONS

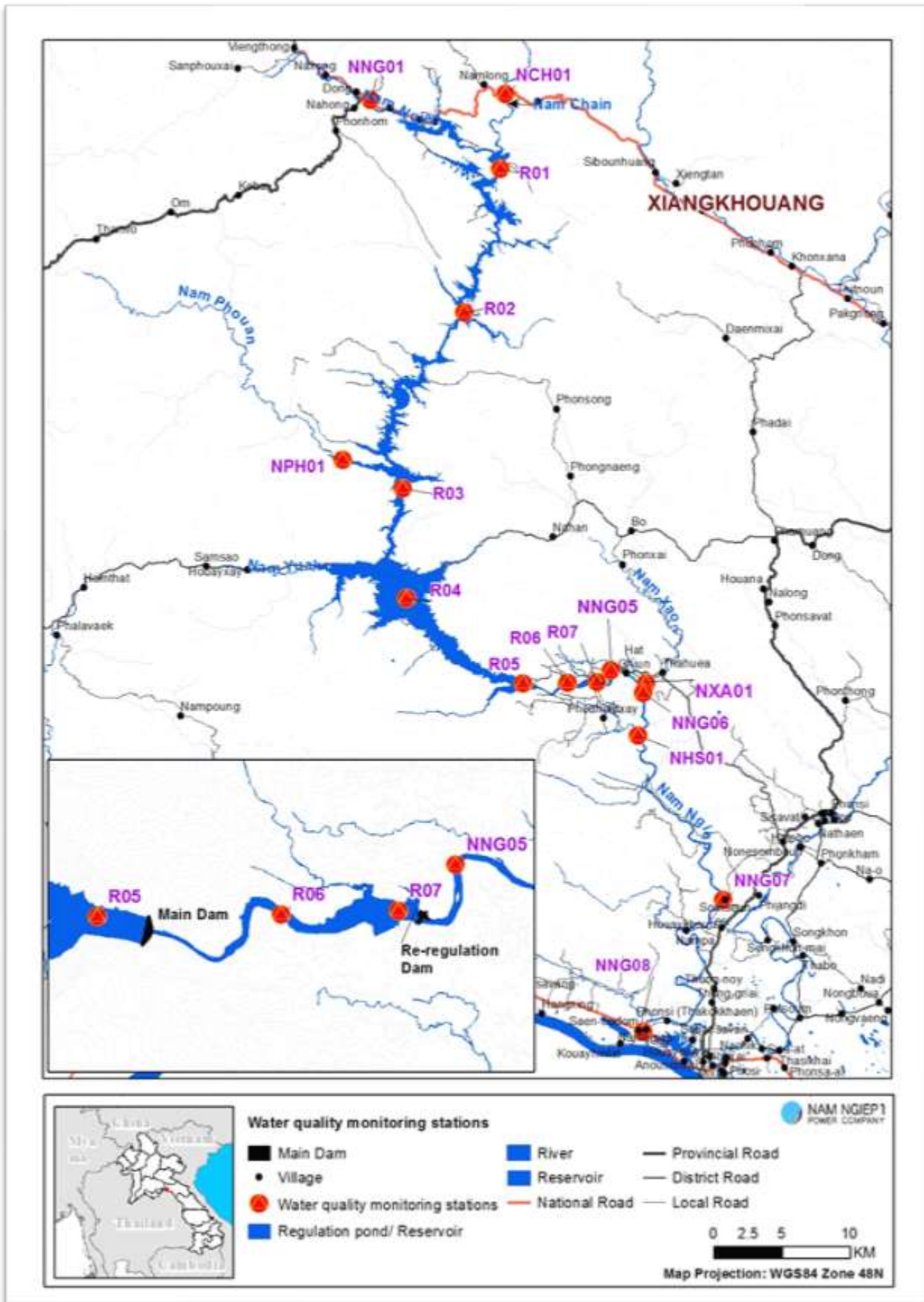


FIGURE 1-4: CONCENTRATION OF DISSOLVED OXYGEN (MG/L) IN THE UPPER 0.2 M SINCE SEPTEMBER 2019 TO OCTOBER 2021

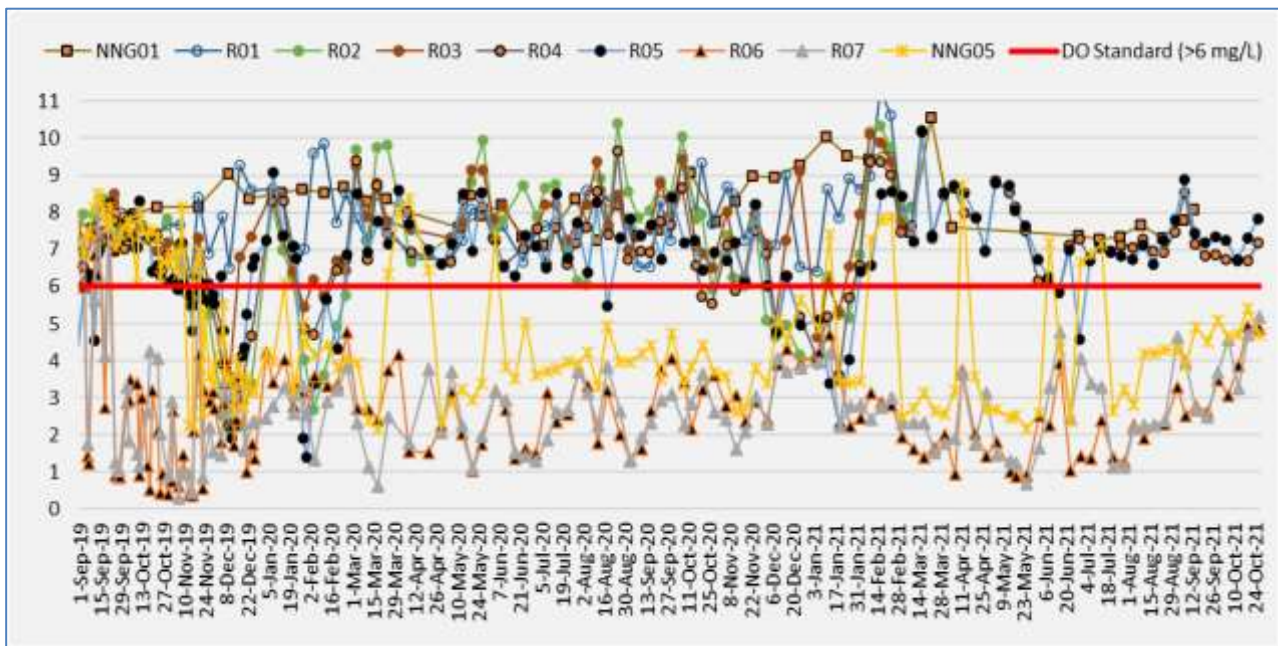


TABLE 1-4: RESULTS OF SURFACE WATER QUALITY MONITORING FOR DISSOLVED OXYGEN (MG/L) IN THE UPPER 0.2 M, NATIONAL WATER QUALITY STANDARD: >6.0 MG/L

DO (mg/L)	NNG01	R01	R02	R03	R04	R05	R06	R07	NNG05	NNG06	NNG07	NNG08	NCH01	NPH01	NXA01	NHS01
5-Oct-21					6.75	7.26										
6-Oct-21							3.07	4.58	4.63							
12-Oct-21					6.73	6.71										
13-Oct-21							3.87	3.27	4.71							
19-Oct-21					6.69	7.32	4.92	4.7	5.41							
26-Oct-21					7.19	7.84										
27-Oct-21							4.88	5.2	4.72							

TABLE 1-5: RESULTS OF SURFACE WATER QUALITY MONITORING FOR TOTAL SUSPENDED SOLIDS (MG/L)

Total Suspended Solids (mg/L)	NING01	R01	R02	R03	R04	R05	R06	R07	NING05	NING06	NING07	NING08	NCH01	NPH01	NXA01	NHS01
19-Oct-21					<5	<5	<5	<5	<5							
19-Oct-21 Bottom					16.5	<5										

TABLE 1-6: RESULTS OF SURFACE WATER QUALITY MONITORING FOR BOD₅ (MG/L) - WATER QUALITY STANDARD: < 1.5 MG/L

BOD ₅ (mg/L)	NING01	R01	R02	R03	R04	R05	R06	R07	NING05	NING06	NING07	NING08	NCH01	NPH01	NXA01	NHS01
19-Oct-21					<1	<1	<1	<1	<1							
19-Oct-21 Bottom					<1	2.5										

1.3.3 Groundwater Quality Monitoring

During October 2021, the groundwater quality monitoring in the communities were also suspended due to rapid increase in COVID-19 infection cases in the communities and NNP1PC could not access the villages, therefore no water quality monitoring results for the five wells located in Phouhomxay Village, Somseun Village, Nam Pa Village, Thong Noy Village and Pou Village to be reported in this month.

1.3.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

Due to the rapid increase in COVID-19 infection cases in the communities, NNP1PC suspended the water quality monitoring of the community gravity fed water supply systems in Phouhomxay, Hat Gniun and Thahuea Villages in October 2021.

1.3.5 Landfill Leachate Monitoring

During October 2021, the landfill leachate monitoring was conducted at NNP1 Project Landfill (Last pond - LL4) and at Houay Soup Solid Waste Landfill (Last pond - LL6).

The results indicate that NNP1 Project Landfill leachate fully complied with the standards. However, the Houay Soup Landfill leachate did not comply with the standard for faecal coliform and total coliform. The leachate was still contained in the leachate ponds without discharging to the environment. EMO will continue to monitor the leachate and report the results in the next monthly progress report.

The landfill leachate monitoring results for October 2021 can be found in **Table 1-7**.

TABLE 1-7: RESULTS OF THE LANDFILL LEACHATE MONITORING

		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								
15-Oct-21	pH	6.0-9.0				8.32		8.27		
15-Oct-21	Sat. DO (%)					116.6		116		
15-Oct-21	DO (mg/L)					9.3		9.23		
15-Oct-21	Conductivity (µS/cm)					76		150		
15-Oct-21	Temperature (°C)					26.82		26.96		
15-Oct-21	BOD ₅ (mg/L)	<30				7.77		6.63		
15-Oct-21	COD (mg/L)	<125				48.4		54.4		
15-Oct-21	Faecal Coliform (MPN/100mL)	<400				70		540		
15-Oct-21	Total Coliform (MPN/100mL)	<400				70		920		
15-Oct-21	Total Nitrogen (mg/L)	<10				1.83		1.78		
15-Oct-21	Ammonia nitrogen (mg/L)	<10				<2		<2		
15-Oct-21	Oil & Grease (mg/L)	<10				<1		1.3		

1.4 DISCHARGE MONITORING

1.4.1 Main Reservoir – Water Level, Inflow and Discharge

The water level in the main reservoir, inflow to the reservoir and discharge from the reservoir have been monitored since the start of the impounding on 15 May 2018. The graph in **Figure 1-5** and **Figure 1-6** presents the values recorded since May 2018.

During October 2021, the mean inflow to the main reservoir was 110 m³/s. The minimum and maximum inflows were 77 m³/s (on 25 October 2021) and 152 m³/s (on 03 October 2021) respectively.

From 01 to 31 October 2021, the water level in the main reservoir decreased from El. 303.88 m asl to El. 300.97 m.

In October 2021, the hourly turbine discharges from the Main Powerhouse varied between 25 and 289 m³/s usually interrupted by night-time periods with no discharge.

FIGURE 1-5: INFLOW TO THE MAIN RESERVOIR

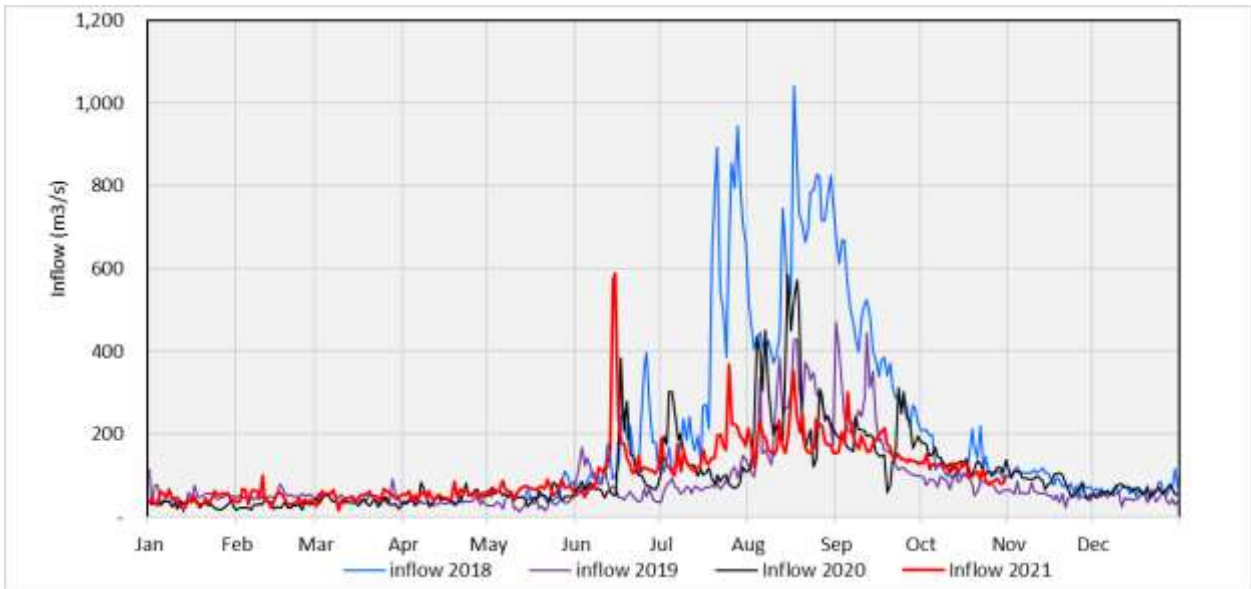
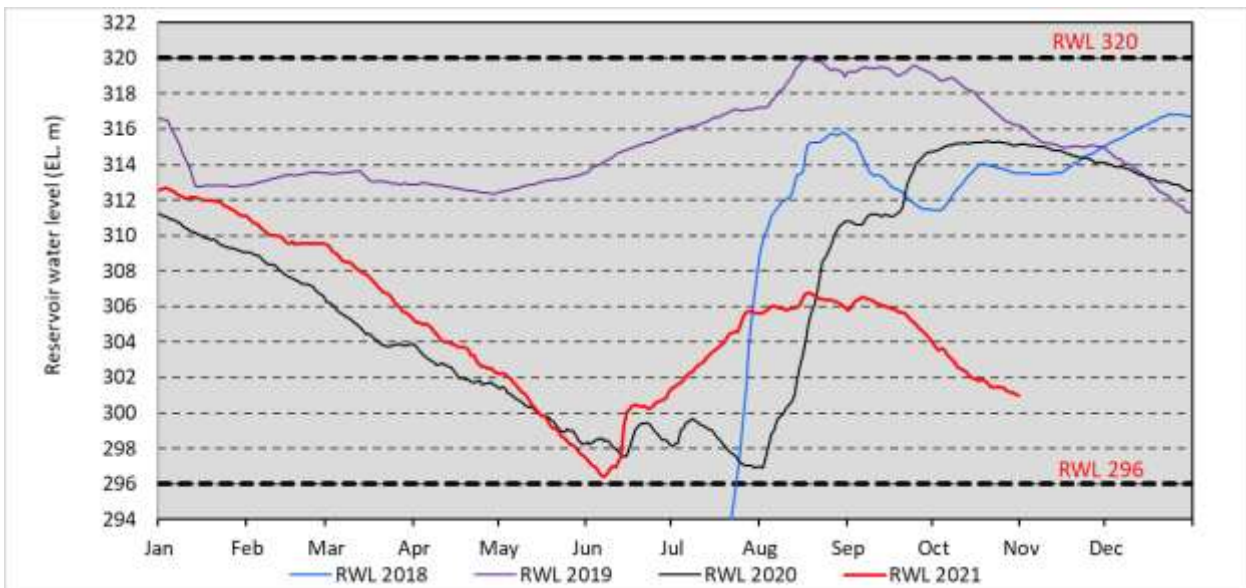


FIGURE 1-6: WATER LEVEL FOR THE MAIN RESERVOIR



Note: The 2018 and 2019 Reservoir Water Level represent the reservoir before the COD (05 September 2019)

1.4.2 Re-regulation Reservoir – Discharge

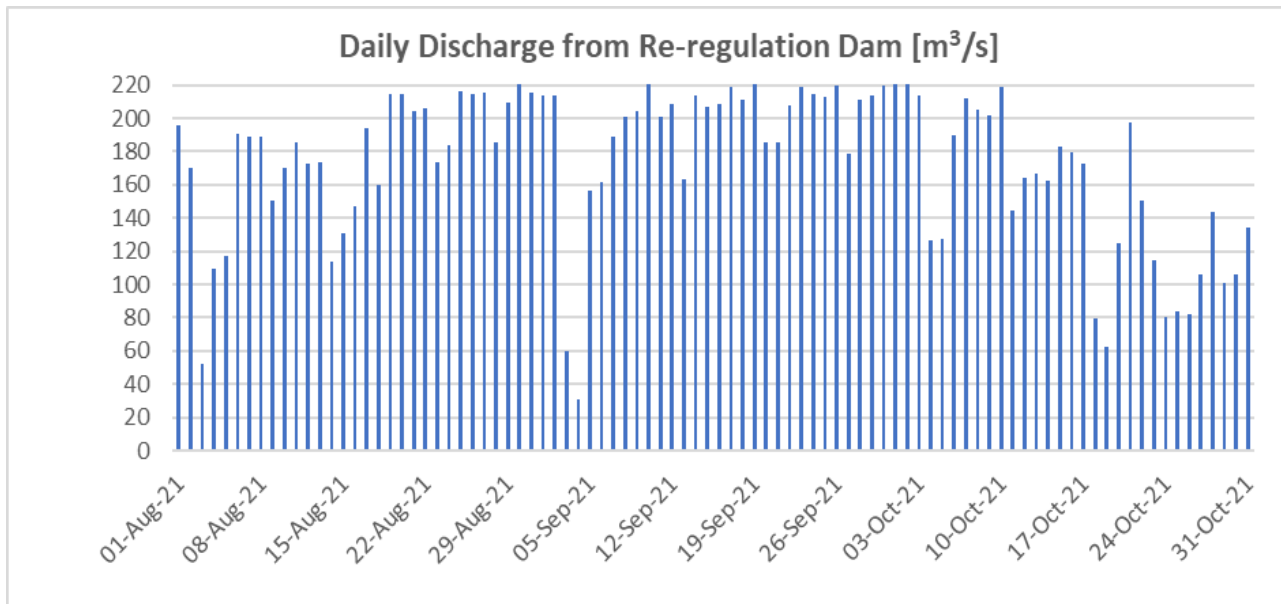
The daily discharge monitoring data for the Re-regulation Dam during August to October 2021 is presented in **Figure 1-7**.

During October 2021, the mean daily discharge from the Re-regulation Dam was about 176 m³/s with hourly turbine discharges varying between 149 m³/s and 164 m³/s, hourly gate discharge

varied between 27 m³/s and 216 m³/s, and hourly total discharge varying between 27 m³/s and 235 m³/s. The hourly discharge was kept above the minimum flow requirement of 27 m³/s at all times.

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.

FIGURE 1-7: DAILY DISCHARGE MONITORING AT THE RE-REGULATION DAM IN AUGUST TO OCTOBER 2021



1.4.3 Nam Ngiep Downstream Water Depth Monitoring

During October 2021, due to the rapid increase in COVID-19 infection cases in the communities, the GOL imposed additional COVID-19 measures which meant that NNP1PC could not access the villages and use local boat services along Nam Ngiep Downstream for water depth monitoring.

1.5 PROJECT WASTE MANAGEMENT

1.5.1 Solid Waste Management

In October 2021, a total of 25.4 m³ of solid waste was disposed of at the NNP1 Project Landfill, an increase of 0.1 m³ compared with September 2021.

During this reporting period, the contractor continued the regular waste collection from the NNP1PC’s operation sites and operated the project landfill for three days per week. The work included waste segregation and disposal, waste cover, grass cutting and repairing of perimeter fences.

FIGURE 1-8: WASTE MANAGEMENT ACTIVITIES AT NNP1 LANDFILL DURING OCTOBER 2021

WASTE COLLECTION WASTE SEGREGATION	WEEKLY LANDFILL MAINTENANCE (GRASS CUTTING)
 	
DAILY WASTE DUMP AND WASTE COVER AT LANDFILL	
	

The total amount of recyclable waste selling and collection this month is summarized in **Table 1-8**.

TABLE 1-8: AMOUNTS OF RECYCLABLE WASTE SOLD AND COLLECTION

Source and Type of Recycled Waste		Unit	Sold	Cumulative Total by October 2021
1	Plastic bottles	kg	0	25
2	Aluminium	kg	0	25
3	Paper/Cardboard	kg	0	28
4	Glass	kg	0	15
5	Scrap Metal	Kg	0	0
Total		kg	0	93

In October 2021, the villagers from Phouhomxay Village and host villages collected 125 kg of food waste from the OSOV1 canteen for feeding their animals. There was still a restriction of site access for the villagers due to the OSOV1 lockdown during 04-21 October 2021.

1.5.2 Hazardous Materials and Waste Management

The types and amounts of hazardous materials and hazardous waste stored on site in September 2021 are shown in **Table 1-9** And **Table 1-10**.

TABLE 1-9: RECORD OF HAZARDOUS MATERIAL INVENTORY

No.	Type of Hazardous Material	Unit	Total in October 2021 (A)	Used (B)	Remaining at the end of October 2021 (A – B)
1	Diesel	Litre	6,998	1,524	5,474
2	Gasoline	Litre	1,345	435	910
3	Lubricant (Turbine oil)	Litre	17,727	2,200	15,527
4	Colour Paint	Litre	242	0	242
5	Thinner	Litre	8	0	8
6	Grease Oil	Litre	220	0	220
7	Gear Oil	Litre	468	0	468
8	Chlorine Liquid	Litre	140	0	140
9	Chlorine Powder	kg	65	0	65
10	SIKA	Litre	7		7

TABLE 1-10: RECORD OF HAZARDOUS WASTE INVENTORY

No.	Hazardous Waste Type	Unit	Total in October 2021 (A)	Disposed (B)	Remaining at the end of October 2021 (A - B)
1	Used Oil (Hydraulic and Engine)	Litre	270	0	270
2	Used oil mixed with water	Litre	6,000	0	6,000
3	Empty 200L drum of used oil	Unit	14	0	14
4	Contaminated soil, sawdust and textile material	m ³	0.73	0	0.73
5	Empty 20L chemical drum	Drum	18	0	18
6	Lead battery	Unit	7	0	7
7	Halogen/fluorescent bulbs	Unit	382	0	382
8	Empty cartridge (Ink)	Unit	18	0	18
9	Clinic Waste	kg	3.7	0	3.7

1.6 COMMUNITY WASTE MANAGEMENT

1.6.1 Community Recycling Programme




Due to the continuation of COVID-19 measures, many local recycling businesses and vendors have not yet resumed their recyclable waste trading. No recycle waste trade activities in the community recycle waste bank in October 2021.

1.6.2 Community Solid Waste Management

In October 2021, a total of 27.2 m³ of solid waste from Phouhomxay, Thahuea and Hat Gniun Villages was disposed of at Houay Soup Landfill, a decrease of 9.3 m³ compared with September 2021.

During this reporting period, the local waste collection contractor conducted regular waste collection from the three villages and operated the Houy Soup landfill for two days per week. The work included waste collection, segregation and disposal, waste cover, grass cutting and repairing the perimeter fences.

FIGURE 1-9: WASTE MANAGEMENT ACTIVITIES DURING OCTOBER 2021

WASTE COLLECTION FROM VILLAGE	WASTE DUMP AT HSL
	
DAILY WASTE COVER	DAILY LANDFILL MAINTENANCE (GRASS CUTTING)
	

2. WATERSHED AND BIODIVERSITY MANAGEMENT

2.1 WATERSHED MANAGEMENT

2.1.1 Implementation of Annual Implementation Plan (AIP) 2020

There were no activities during the reporting period due to increase of COVID-19 cases and continued enforcement of lockdown as part as the COVID-19 measures in Xaysomboun and Bolikhamxay Province.

The meeting between NNP1 Environment and Social Division (ESD) management with the Xaysomboun Provincial Governor and Bolikhamxay Vice Provincial Governor who is also the Chairman of Bolikhamxay Watershed and Reservoir Protection Committee (WRPC) related with the annual implementation activities will be organized after the ease of the COVID-19 lockdown in Xaysomboun and Bolikhamxay Province.

2.1.2 Preparation of Annual Implementation Plan (AIP) 2021

DOF-MAF completed the fund transfer under the approved Bolikhamxay Watershed Management (WM) AIP2021 for the period of July-September 2021 to Bolikhamxay Watershed and Reservoir Protection Office (WRPO) Account on 14 October 2021.

Xaysomboun WRPO provided comments on the revised final plan to NNP1 Environmental Management Office (EMO) on 28 October 2021 and proposed to have discussion with the EMO team for clarification subject to their availability in early November 2021.

2.1.3 Preparation of the Annual Implementation Plan (AIP) 2022

NNP1 EMO and BSP-WCS organized an online discussion about the AIP2022 preparation process on 08 October 2021. Further discussion with DOF-MAF was also organized on 18 October 2021. It was agreed that the BSP will closely work with WRPOs and NC-NX BOMU for the AIP2022 preparation. DOF-MAF also issued an official notification letter to WRPOs and NC-NX BOMU on 21 October 2021 for the cooperation from the WRPOs and NC-NX BOMU on the AIP2022 preparation with the deadlines for the plan preparation and approval. The letter also requested Xaysomboun WRPO to provide official confirmation on the establishment of full patrolling teams to undertake the land-based and reservoir patrolling in 2022.

2.2 BIODIVERSITY OFFSET MANAGEMENT

2.2.1 Implementation of BOMP Annual Implementation Plan (AIP) 2021

The progress on the implementation of key activities by Component in October 2021 are described below:

a. Component 1 - Spatial Planning and Regulation

Nam Chouane-Nam Xang Biodiversity Offset Management Unit (BOMU) shared the report and official minutes of meeting (MOM) with Vangphieng Village from the site visit to settle the issue on the Totally Protection Zone (TPZ) boundary demarcation on 30 September 2021. It is noted that Vangphieng Village has no objection on the agreed TPZ boundary that was discussed, consulted, and agreed in September 2019. This means that the boundary demarcation and sign installation can be continued accordingly. The activity will be commenced after the COVID-19 lockdown measure in Bolikhamxay Province is eased.

The plan for reviewing and updating the land use plans of three NC-NX villages (Natan, Na Gngang, Vangphieng Villages) in Viengthong District under the AIP2021 is still being reviewed by NC-NX BOMU in October 2021.

b. Component 2 – Law Enforcement

DOF-MAF completed the fund transfer under the approved NC-NX Biodiversity Offset Management (BOM) AIP2021 for the period July-September 2021 to Bolikhamxay NC-NX BOMU on 06 October 2021. After discussion with the District Task Force Committee for the COVID-19 measures, the patrolling teams are allowed to continue the work from 22 October 2021.

c. Component 3 – Conservation Outreach

Biodiversity Service Provider-Wildlife Conservation Society (BSP-WCS) shared the draft outreach strategy document to NNP1 EMO on 11 October 2021 and the comments were provided back on 12 October 2021 for further revision.

NNP1 EMO, NC-NX BOMU, and BSP-WCS organized an online discussion on 19 October 2021 to discuss about the outreach activity in the remaining quarter of 2021. BSP-WCS briefed the alternative plan related with the continuous enforcement of lockdown as part of the COVID-19 measures in Bolikhamxay Province. It was agreed that the outreach activity will be conducted as per the original plan if the COVID-19 measures are eased soon but otherwise then most of the activities will be postponed to 2022 and only the radio-based outreach campaign and school program will be implemented in 2021. NC-NX BOMU and BSP-WCS were working with provincial and district Information, Culture and Tourism offices for preparing the scripts for radio-based campaign.

d. Component 4 – Conservation linked livelihood development

The NC-NX Community Development Plan (CDP) was officially signed by Bolikhamxay Province Agriculture and Forestry Office (PAFO) on 26 October 2021.

After consulting with the District Task Force Committee for the COVID-19 preventive measures, the snare removal activity was implemented during 15-27 October 2021.

e. Component 6 – Biological Monitoring

BSP-WCS shared the NC-NX camera trap report to NNP1 EMO on 12 October 2021 and it is being reviewed by NNP1 EMO. NNP1 is processing the procurement of consultancy service for conducting Lao Newt and Bent-toed gecko survey in the NNP1 watershed. The field work is expected to be carried out subject to the COVID-19 situation and enforcement of lockdown in Xaysomboun Province.

2.2.2 Preparation of Annual Implementation Plan (AIP) 2022

NNP1 EMO, NC-NX BOMU, and BSP-WCS organized an online discussion on 19 October 2021 on the implementation of AIP2021 in the remaining quarter of 2021 as well as the preparation of AIP2022. NC-NX BOMU agreed to start the plan preparation with BSP-WCS support after receiving the official notification from DOF-MAF.

3. FISHERY MONITORING

The fishery monitoring survey could not be completed according to the schedule because of the enforcement of lockdown as part as the COVID-19 measures in Xaysomboun and Bolikhamxay Province between September to October 2021. The results will be presented in the next monthly report.

4. EXTERNAL MISSIONS AND VISITS

There was no external mission and visit during the month.

ANNEXES

ANNEX A: RESULTS OF WATER QUALITY MONITORING

TABLE A-1: RESULTS OF MAIN RESERVOIR, RE-REGULATION RESERVOIR AND SURFACE WATER (NAM NGIEP RIVER) QUALITY MONITORING

		River Name	Nam Ngiep											
		Zone	Location Refer to Construction Sites											
			Upstream/Main Reservoir					Within / Re-regulation Reservoir		Downstream				
		Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG 06	NNG 07	NNG 08
Date	Parameters (Unit)	Guideline												
5-Oct-21	pH	5.0 - 9.0					7.02	6.89						
6-Oct-21	pH	5.0 - 9.0							6.8	6.87	6.87			
12-Oct-21	pH	5.0 - 9.0					6.69	6.9						
13-Oct-21	pH	5.0 - 9.0							6.64	6.75	6.69			
19-Oct-21	pH	5.0 - 9.0					7.35	7.1	6.98	6.99	6.75			
26-Oct-21	pH	5.0 - 9.0					6.53	6.67						
27-Oct-21	pH	5.0 - 9.0							6.16	6.11	6.2			
5-Oct-21	Sat. DO (%)						88.9	95.6						
6-Oct-21	Sat. DO (%)								37.8	57.3	56.9			
12-Oct-21	Sat. DO (%)						88.5	88.3						
13-Oct-21	Sat. DO (%)								47.9	40.9	58.2			
19-Oct-21	Sat. DO (%)						85.9	93.5	62.2	60.9	68.1			
26-Oct-21	Sat. DO (%)						92.3	100.6						
27-Oct-21	Sat. DO (%)								59.8	64.1	58.2			
5-Oct-21	DO (mg/L)	>6.0					6.75	7.26						
6-Oct-21	DO (mg/L)	>6.0							3.07	4.58	4.63			
12-Oct-21	DO (mg/L)	>6.0					6.73	6.71						
13-Oct-21	DO (mg/L)	>6.0							3.87	3.27	4.71			
19-Oct-21	DO (mg/L)	>6.0					6.69	7.32	4.92	4.7	5.41			
26-Oct-21	DO (mg/L)	>6.0					7.19	7.84						
27-Oct-21	DO (mg/L)	>6.0							4.88	5.2	4.72			
5-Oct-21	Conductivity (µs/cm)						67	65						
6-Oct-21	Conductivity (µs/cm)								72	73	73			
12-Oct-21	Conductivity (µs/cm)						67	64						
13-Oct-21	Conductivity (µs/cm)								73	73	73			
19-Oct-21	Conductivity (µs/cm)						67	64	72	73	72			
26-Oct-21	Conductivity (µs/cm)						60	59						
27-Oct-21	Conductivity (µs/cm)								66	65	65			
5-Oct-21	Temperature (°C)						29.75	29.57						
6-Oct-21	Temperature (°C)								26.67	27.02	26.24			
12-Oct-21	Temperature (°C)						29.64	29.6						
13-Oct-21	Temperature (°C)								26.36	26.96	26.31			
19-Oct-21	Temperature (°C)						28.13	28.15	26.4	27.81	27.11			
26-Oct-21	Temperature (°C)						28.24	28.13						
27-Oct-21	Temperature (°C)								25.81	26.1	26.04			

		River Name	Nam Ngiep											
		Zone	Location Refer to Construction Sites											
			Upstream/Main Reservoir					Within / Re-regulation Reservoir		Downstream				
		Station Code	NNG 01	R01	R02	R03	R04	R05	R06	R07	NNG 05	NNG 06	NNG 07	NNG 08
Date	Parameters (Unit)	Guideline												
19-Oct-21	TSS (mg/L)						1.62	1.43	2	0.84	1.43			
19-Oct-21	BOD ₅ (mg/L)	<1.5					<1	<1	<1	<1	<1			
19-Oct-21	COD (mg/L)	<5.0							<5	6.4	<5			
19-Oct-21	NH ₃ -N (mg/L)	<0.2					<0.2	<2						
19-Oct-21	Faecal coliform (MPN/100 mL)	<1,000					0	0	5	14	14			
19-Oct-21	Total Coliform (MPN/100 mL)	<5,000					0	5	220	140	110			
19-Oct-21	TKN						<1.5	<1.5						
5-Oct-21	Secchi Disk (m)						3	2.7						
12-Oct-21	Secchi Disk (m)						3.4	3.5						
19-Oct-21	Secchi Disk (m)						3	2.9						
26-Oct-21	Secchi Disk (m)						4	4.2						
19-Oct-21	TOC (mg/L)								2.11	1.38	1.6			
19-Oct-21	Phytoplankton Biomass (g dry wt/m ³)						8	1						
19-Oct-21	Total Phosphorus (mg/L)						<0.01	<0.01						
19-Oct-21	Total Dissolved Phosphorus (mg/L)						<0.01	<0.01						
19-Oct-21	Hydrogen Sulfide (mg/L)						<0.02	<0.02						
19-Oct-21	TSS (mg/L)-bottom						16.53	<5						
19-Oct-21	BOD ₅ (mg/L)-bottom						<1	2.5						
19-Oct-21	Total Coliform (MPN/100 mL)-bottom						0	7.8						
19-Oct-21	Faecal coliform (MPN/100 mL)-bottom						0	0						
19-Oct-21	NH ₃ -N (mg/L)-bottom						0.56	0.21						
19-Oct-21	NO ₃ -N (mg/L)-bottom													
19-Oct-21	TKN-bottom						6.2	5.3						
19-Oct-21	Total Dissolved Phosphorus (mg/L)-bottom						<0.01	<0.01						
19-Oct-21	Total Phosphorus (mg/L)-bottom						<0.01	0.01						
19-Oct-21	Hydrogen Sulfide (mg/L)-bottom						<0.02	<0.02						
19-Oct-21	Phytoplankton Biomass (g dry wt/m ³)-bottom						8	2.4						

TABLE A-2: RESULTS OF CAMP EFFLUENTS IN OCTOBER 2021

	Site Name	OSOV1 (Owner's Site Office and Village)		OSOV2 (ESD Camp)		Main Powerhouse	
	Station Code	EF01		EF13		EF19	
	Date	15-Oct-21	25-Oct-21	15-Oct-21	25-Oct-21	15-Oct-21	25-Oct-21
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	6.78	6.37	7.53	7.28	7.84	7.04
Sat. DO (%)		58.4	70.8	90.2	87.7	95	80.2
DO (mg/L)		4.65	5.53	7.15	6.83	7.27	6.14
Conductivity (µs/cm)		365	358	463	400	764	1126
TDS (mg/L)		182.5	179	231.5	200	382	563
Temperature (°C)		27.13	27.78	27.22	28.14	29.14	29.01
TSS (mg/L)	<50	<5	<5	9.9	7.9	6.2	<5
BOD ₅ (mg/L)	<30	<6	<6	<6	<6	<6	<6
COD (mg/L)	<125	<25	<25	26	39	28.5	<25
NH ₃ -N (mg/L)	<10.0	4.3	4.8	20.3	17.2	8.3	6.1
Total Nitrogen (mg/L)	<10.0	5.13	5.37	22.1	18.1	9.72	6.32
Total Phosphorus (mg/L)	<2	0.82	0.47	1.51	1.50	4.46	4.49
Oil & Grease (mg/L)	<10.0	<1		2		<1	
Total coliform (MPN/100 mL)	<400	280	1,600	9	220	0	0
Faecal Coliform (MPN/100 mL)	<400	220	1,600	5	220	0	0
Residual Chlorine (mg/L)	<1.0			0.44	0.34	0.50	0.47