NAM NGIEP 1
POWER COMPANY

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

October 2016

A	29 Nov 2016	Viengkeo Phetnavongxay	Peter.G.Jensen	Prapard PanARam	
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BBREVIATIONS / ACRONYMS

AD	Administration Division of NNP1PC
AIP	Annual Implementation Plan
ADB	Asian Development Bank
ARCAP	Audit Report and Corrective Action Plan
BBS	Biodiversity Baseline Survey
BAC	Biodiversity Advisory Committee
BOF	Biodiversity Offset Framework
BODM	Board of Directors Meeting
BOMC	Biodiversity Offset Management Committee
CA	Concession Agreement between the NNP1PC and GOL,
CAP	Corrective Action Plan
COD	Commercial Operation Date
CVC	Conventional Vibrated Concrete
CWC	Civil Works Contract
CTA	Common Terms Agreement
DCC	District Coordination Committees
DEB	Department of Energy Business, MEM
DEPP	Department of Energy Policy and Planning, MEM
DEQP	Department of Environment and Quality Promotion, MONRE
DESIA	Department of Environmental and Social Impact Assessment, MONRE
DFRM	Department of Forest Resources Management, MONRE
DGC	District Grievance Committee
DLA	Department of Land Administration, MONRE
DSRP	Dam Safety Review Panel
EC	Electrolytic Conductivity
ECOCD	EGAT Construction Obligation Commencement Date
EDL	Electricite du Laos
EDL PPA	Power Purchase Agreement between NNP1PC and EDL
EGAT	Electricity Generating Authority of Thailand
EGATi	EGAT International Company Limited
EIA	Environmental Impact Assessment
EMO	Environmental Management Office of ESD within NNP1PC
EMU	Environmental Monitoring Unit

EMWC	Electrical-Mechanical Works Contract
EPF	Environmental Protection Fund
ERIC	Environmental Research Institute Chulalongkhorn University
ERM	Environmental Resource Management
ESD	Environmental and Social Division of NNP1PC
ESMMP	Environmental and Social Monitoring and Management Plan
FAD	Finance and Accounting Division
FC	Financial Close
FCD	Financial Close Date (as defined in the EGAT PPA)
FI	Fire Incident
FY	Fiscal Year
GOL	Government of Lao PDR
GIS	Geographic Information Systems
GRM	Grievance Redress Mechanism
HH	Household
HIV	Human Immunodeficiency Virus
HMWC	Hydraulic Metal Works Contract
HR	Human Resources
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IMA	Independent Monitoring Agency
INRMP	Integrated Natural Resources Management Plan
ISP	Intergraded Spatial Planning
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
KANSAI	The Kansai Electric Power Company Incorporated
km	kilometre
KPN	KPIC Netherlands B.V.
kV	kilo-Volt
LAK	Lao Kip
LEPTS	Lao Electric Power Technical Standard
LHSE	Lao Holding State Enterprise
LMP	Labour Management Plan
LNTP	Limited Notice to Proceed (under each construction Contract)
LTA	Lender's Technical Advisor

LTI	Lost Time Incident
M	million
m	metre
MEM	Ministry of Energy and Mines, Lao PDR
MOF	Ministry of Finance, Lao PDR
MOM	Minutes of Meeting
MONRE	Ministry of Natural Resource and Environment, Lao PDR
MOU	Memorandum of Understanding
MUSD	Millions of US Dollars
MVI	Motor Vehicle Incident
NA	National Assembly of the Lao PDR
NASC	Standing Committee of National Assembly
NBCA	National Biodiversity Conservation Area
NCI	Non-Compliance Issue
NCR	Non-Compliance Report
NM	Near Miss
NN2	Nam Ngum 2 Power Company Limited
NNP1PC	Nam Ngiep 1 Power Company Limited
NPA	Non-Profit Association
NPF	National Protection Forest
NTFP	Non-Timber Forest Products
NT2	Nam Theun 2 Hydropower Project
NTP	Notice to Proceed (under each construction contract)
OC	Obayashi Corporation
ONC	Observation of Non-Compliance
PAP	Project Affected People
PD	Property Damage
PO	Purchase Order
PONRE	Provincial Department of Natural Resource and Environment, MONRE
PPA	Power Purchase Agreement (between NNP1PC and EGAT)
PRLRC	Provincial Resettlement and Livelihood Restoration Committee
PvPA	Provincial Protection Area
RCC	Roller Compacted Concrete
REDP	Resettlement and Ethnic Development Plan
RFP	Request for Proposal

RI	Recordable Injury
RMU	Resettlement Management Unit
ROW	Right of Way
SBLC	Stand-by Letter of Credit
SCOD	Scheduled Commercial Operation Date (as defined in EGAT PPA)
SFCD	Scheduled Financial Close Date (as defined in EGAT PPA)
SHM	Shareholders Meeting
SIR	Site Inspection Report
SLBMP	Salvage Logging Biomass Management Plan
SMO	Social Management Office of ESD within NNP1PC
SS-ESMMP	Site Specific Environmental and Social Monitoring and Management Plan
STD	Sexually Transmitted Disease
TD	Technical Division of NNP1PC
THB	Thai Baht
TOR	Terms of Reference
TSS	Total Suspended Solids
USD	US Dollar
UXO	Unexploded Ordinance
VGC	Village Grievance Committee
WMF	Watershed Management Fund
WMP	Watershed Management Plan
WRPC	Watershed and Reservoir Protection Committee
WRPO	Watershed and Reservoir Protection Office
WWTS	Waste Water Treatment System

EXECUTIVE SUMMARY

NNP1PC received an official comment from the Department of Environmental and Social Impact Assessment (DESIA), Ministry of Natural Resources and Environment (MONRE) for the draft updated Environmental and Social Management and Monitoring Plan for the Construction Phase (ESMMP-CP) in October 2016. This document is being revised and will be resubmitted for MONRE's approval in December 2016.

During October 2016, Environmental Management Office (EMO) of NNP1PC received a total of four SS-ESMMP. Of these, two SS-ESMMP were accepted with conditions, and the other two are under review and will be carried over into November 2016. In October 2016, NNP1PC-EMO issued a total of six Observations of Non-Compliance (ONC), the same number as in September 2016. With the carry-over from September 2016, a total of 20 ONC and one NCR were active in October 2016. Out of these, eight ONC were resolved, 12 ONC and one NCR will be carried over into November 2016. All of the carried-over ONC and NCR had passed their deadline for action to be taken. NNP1PC-EMO will follow up with the Contractors and TD to resolve the remaining issues in November 2016.

From 04 to 06 October 2016, Provincial and District EMU conducted a joint environmental monitoring mission to the main construction sites and camps. A mission report, referenced 19-PONRE-EMU and dated 14 October 2016 was submitted to NNP1PC in October 2016 for corrective action to take place.

The EMO water testing laboratory construction was commenced in the third week of October 2016. The procurement of the laboratory equipment from a supplier in Thailand was ongoing.

During October 2016, all construction camps had higher concentrations of total coliforms than the effluent standard except the Owner's Village and Site Office. NNP1PC-TD issued an instruction to the Contractors with the required improvement plan for the Wastewater Treatment Systems (WWTS) in all the camps to be started by the end of November 2016 that to the Civil Works Contractor by letter referenced NNP1/0750-016/OBA/EPC-CE dated 12 October 2016. A proposed improvement plan was submitted by the Civil Contractor, focusing initially on the two most populated subcontractor Camps No. 1 and 2 of Song Da 5, on 19 October 2016 for NNP1PC review and comment.

The Solid Waste Landfill operation has continued to improve over the last month in drier weather with heavy compaction equipment appropriately reverting from medium sized crawler to rubber tyred excavator for bi-weekly spreading and compaction of waste and compaction of the soil cover. NNP1 continue to insist on proper segregation of the waste by the contractors and their subcontractors prior to delivery to the landfill, and bags are returned to camps if this has not been carried out. This practice has helped in reducing disposal of mixed waste in the landfill as verified during the daily spot checks and supervision. Approximately 127 m^3 of waste was disposed of at the NNP1 Project Landfill during October 2016, a decrease of 44 m^3 compared to September 2016. The landfill effluent quality has been monitored in all the leachate ponds, and the results indicate that all ponds complied with the standards. The first stage construction of the Houay Soup Landfill was completed. It consists principally of a Waste Pit (P1) with a capacity of 900 m^3, two anaerobic ponds and a wetland pond for leachate treatment, a groundwater monitoring borehole and a temporary fence.

The development of the NNP1 Watershed Management Plan (WMP) continues to progress. The revised interim plan was submitted to ADB in early October 2016. An ADB mission acknowledged the overall development progress and accepted the interim as confirmed on 27 October 2016 during the mission. NNP1PC has also continued the village consultations at the remaining villages in Xaysomboun Province within the NNP1 watershed area to obtain more information related to land-use practices and socio-economic activities that may affect NNP1 watershed area.

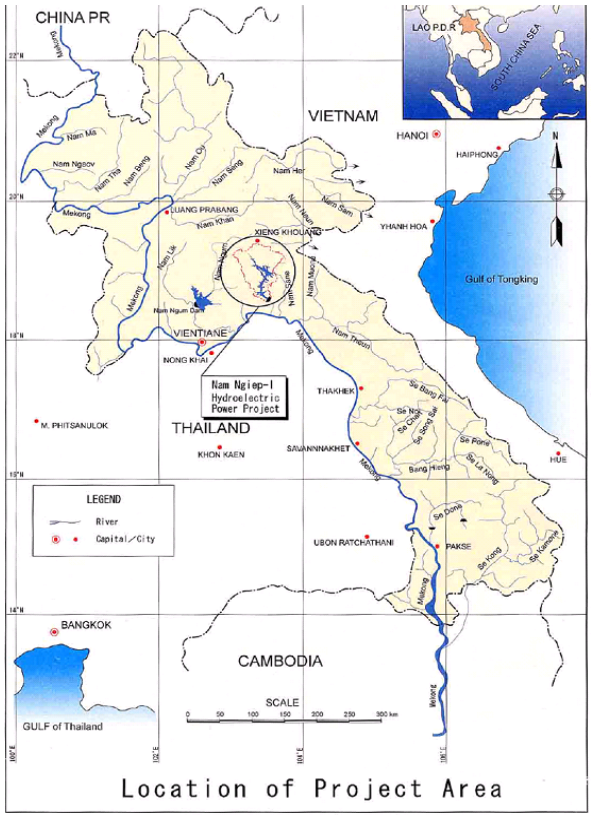
The Boundary Confirmation Baseline Survey of the Nam Chouane-Nam Sang Offset Site was completed on 23 October 2016. ADB Consultant presented the initial outcomes to NNP1 and Biodiversity Offset Management Committee (BOMC) on 26 October 2016 and noted that though the site has good biodiversity value it is still risky in meeting the offset target, if not properly managed. In addition, ADB Mission reiterated that GOL and NNP1 need to consider the need for additional sites within or outside NNP1 Project provinces in case this is recommended in the final survey report. The ADB Mission also reiterated that engagement of an international conservation organization of ADB preference as a condition for the preparation and implementation of BOMP as well as activities prior to BOMP. However, Bolikhamxay Province suggested that the activities at Nam Chouane-Nam Sang offset site have to be implemented and evaluated over a few years. If the results indicate that the offset targets are unlikely to be met, then the government will be open for a discussion about the adequacy of the site, the effectiveness of the management measures implemented so far and the need for an additional site. The Province also agrees on the need for technical assistance from an international expert to support the preparation and implementation of the offset management activities. However, the recruitment of this technical assistant should follow proper procurement procedures.

A meeting was conducted in Xaysomboun Province to discuss the issue related to biomass clearance in the NNP1 future reservoir. The contractor presented a detailed work plan for biomass clearance activities from November 2016 to December 2017, and the meeting also discussed the concern of Hom District regarding extraction of trees with diameter of more than 20 cm that remained in the biomass clearance priority areas for domestic use. The clearance activities are expected to be resumed by the middle of November 2016.

1. INTRODUCTION

The Nam Ngiep originates in the mountains of Xieng Khouang Province, flowing through Khoun District into Thathom District of Xaysomboun Province, through Hom District and into Bolikhan District of Bolikhamxay Province. The Nam Ngiep meets the Mekong River just upstream from Pakxan in Bolikhamxay Province (Figure1-1).

Figure 1-1 Location Map



The project will consist of two dams. The main dam which is located 9.0 km upstream of Hat Gnuin Village in Bolikhan District, will create a 70-km-long, narrow reservoir that extends up the Ngiep Valley as far as Thathom District. At almost 150 m high, the main dam will be the second largest in Lao PDR. The Power Station at this dam will generate up to 272 MW of electricity for export to Thailand. With a combined capacity of 290 MW, Nam Ngiep 1 will generate around 1,620 GWh of electricity annually. Two transmission lines will be required to transport the electricity generated by the project. From the main power station a 230-kV line will run for 125 km to the Nabong outside Vientiane Capital. A 115-kV transmission line will be constructed by EDL from the Re-regulation Power Station to Pakxan substation over a distance of 40 km.

This Environmental Monthly Monitoring Report (EMMR) provides a summary of environmental monitoring activities and mitigation actions in October 2016. The EMMR was prepared by the Project's Environmental Management Office (EMO). It has been internally reviewed and cleared by EMO senior technical staff and management prior to submitting the report to the Government of Lao PDR (GoL) related agencies.

The EMMR and other related reports including related construction Site Specific Environmental and Social Monitoring and Management Plans (SS-ESMMPs) are publically disclosed on the Project website in line with the ADB and GoL Public Disclosure Policies. Hard copies of the final reports will also be available upon requests at the Project's main office in Vientiane Capital and field office in Pakxan, Bolikhamxay Province.

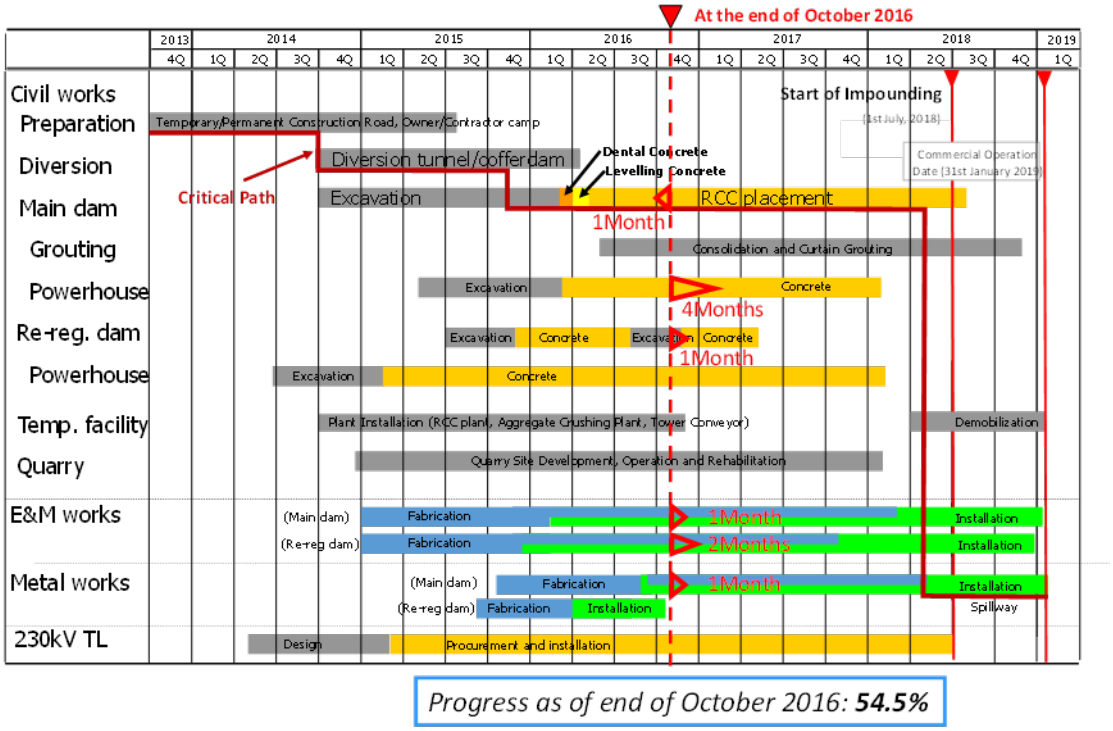
2. WORK PROGRESS OF PRINCIPAL CONTRACTORS

Construction Works for the Project are being carried out through four separate main construction contracts under the supervision of the Technical Division of NNP1PC. The four contracts are the Civil Works, the Electrical and Mechanical Works, the Hydraulic Metal or Hydro-mechanical Works and the 230 kV Transmission Line Works. Actual overall cumulative work progress until the end

of October 2016 was 54.5%[1] (compared to planned progress of 53.1%), based on achieved Interim Milestone Payments for all Contracts excluding the value of Advance Payments, varied works and other adjustments allowed under each Contract. In terms of the value of actual work done the percentage is slightly understated since work completed, but not paid, is not included.

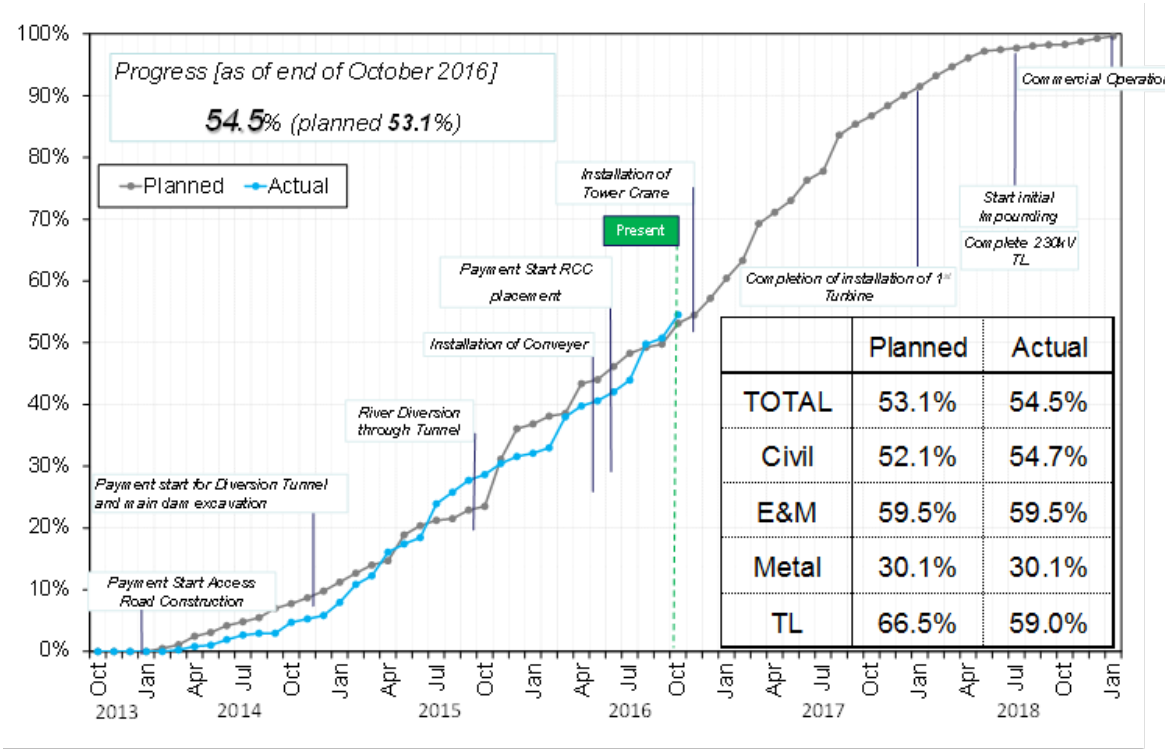
The overall construction schedule and progress curve (by achieved Milestone Payments) are shown in Figure 2-1 and Figure 2-2

Figure 2-1: Overall Construction Schedule



[1] The progress to-date is calculated as (Cumulative Amount of Achieved Interim Milestone Payments) / (Total Agreed Original Price of Construction Contracts) and expressed as a percentage. These totals exclude varied works and other adjustments allowed under each Contract.

Figure 2-2: Progress Curve (All construction Works



	Contractor	Planned	Actual	Ahead	Behind
Overall	-	53.1%	54.5%	1.4%	-
Civil	Obayashi Corporation	52.1%	54.7%	2.6%	-
E&M	Hitachi Mitsubishi Hydro Corporation	59.5%	59.5%	-	-
Hydro-Mechanical	IHI Infrastructure Systems Co., Ltd.	30.1%	30.1%	-	-
230 kV TL	Loxley and Sri Consortium	66.5%	59.0%	-	-7.5%

2.1 Civil Work

The Civil Works Contract was executed between Obayashi Corporation and the Nam Ngiep 1 Power Company on 30 September 2013 and the NTP was issued on 03 October 2014. Excavation works of the main dam, the diversion tunnel and the re-regulation dam were commenced in October 2014 and completed in February 2016, following which the concreting works were commenced.

The cumulative actual work progress of the Civil Works until the end of October 2016 was 54.7% (compared to planned progress of 52.1 %) calculated in the same manner as described above for the value of achieved Interim Milestone Payments excluding advance payment.

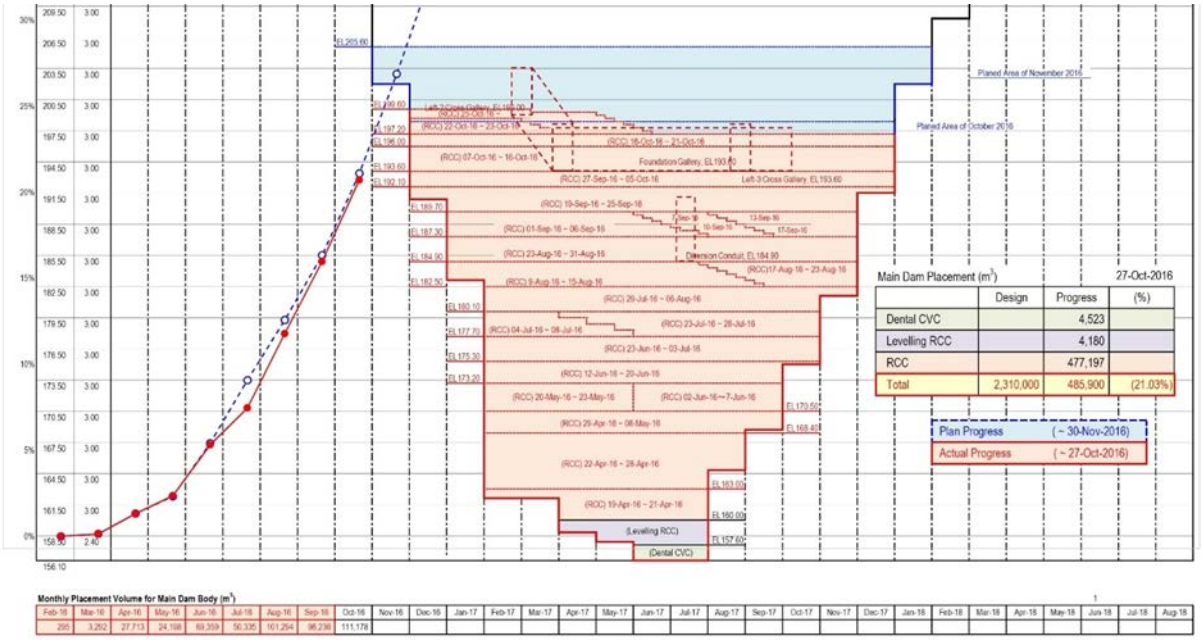
2.1.1 Main dam and power house

After starting the main dam excavation works in October 2014 on the left bank, the works were about one month advanced when diversion of the Nam Ngiep River was achieved at the end of October 2015. However, excavated volumes were 20% greater than expected and part of this additional work is necessary to construct a 'shear key' structure due to the weak layers of rock encountered in the

dam foundation. Following the efforts on Site, the additional excavation work was completed at the end of February 2016.

During October 2016, construction of the Foundation Gallery at El. 193.60 m commenced using a temporary steel frame and steel sheets as formwork for the sidewalls and precast concrete lintels spanning over the RCC placed in layers to create the crown of the Gallery. The progress of RCC concrete placement is shown in Figure 2-3

Figure 2-3 *Progress of Main Dam RCC Works as of 27 October 2016*



The consolidation drilling and grouting for the main dam started in May 2016 and is ongoing. The progress is 54.4 % by achievement of total drilled length at the end of October 2016 as a proportion of the total expected drilling shown in table 2-1 below

Table 2-1 Progress of Consolidation drilling and grouting at *28 October* 2016

Total Anticipated Drilling (m)	Completed (m)	Progress (%)
16,510	8,991	54.4

Main Powerhouse excavation works was completed in January 2016 and levelling concreting works was started in coordination with installation of the grounding system accordingly. Progress of the concreting works is proceeding well and is shown in Table 2-2 below

Table 2-2: Progress of Main Powerhouse Structural Concrete Works to 28 October 2016.

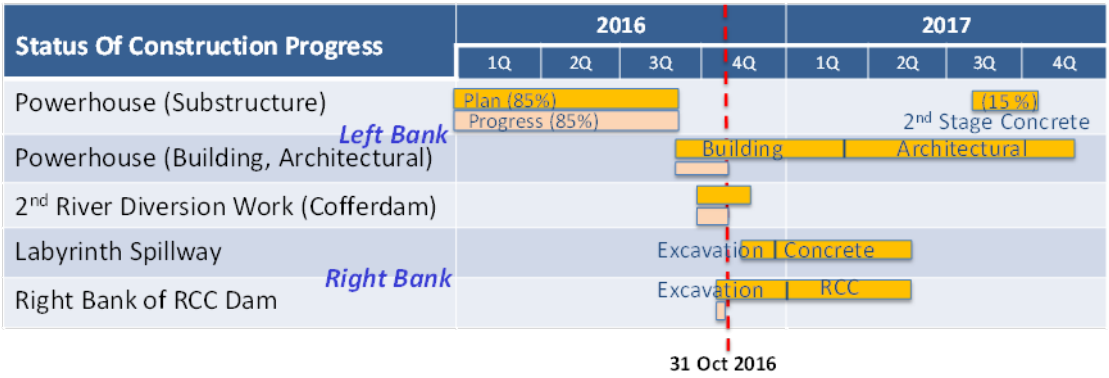
Total Anticipated Volume (m^3)	Completed (m^3)	Progress (%)
32,600	18,182	55.7

2.1.2 Re-regulation dam and powerhouse

The re-regulation powerhouse excavation and cofferdam works for river diversion were commenced in early October 2014. The excavation works for the powerhouse on the left bank were fully completed down to El. 146.7 m at the end of February 2015.

Structural concrete works were commenced in March 2015, in coordination with installation of the grounding system. The progress o of overall re-regulation dam and powerhouse works for the left bank section, diversion of the river commenced in October 2016 and currently on-going, and for the right bank section is shown in Figure 2-4 below

Figure 2-4: Progress of Re-regulation Dam Powerhouse Works to 31 October 2016



2.1.3 Temporary work facility

2.1.3.1 DIVERSION TUNNEL INLET AND OUTLET

The diversion tunnel works which is over 600 m in length and 10 m in diameter were commenced in October 2014 by drill and blast techniques and completed in late September 2015. The river diversion took place on 31 October 2015 together with construction of earth-fill cofferdams upstream and downstream.

2.1.3.2 SECONDARY UPSTREAM COFFERDAM

The concrete placement works in both conventional and roller compacted concrete (CVC and RCC respectively) for the secondary upstream cofferdam were started in November 2015 and completed ahead of construction schedule in the middle of February 2016. The grout curtain works were completed on 02 April 2016.

2.1.3.3 PLANT YARDS

These comprise the Aggregate Crushing Plant, the CVC Batching Plant and the RCC Batching Plant. Foundation work and installation of equipment were completed at all the plant yards and the belt conveyor system from the RCC plant to the main dam was completed in early April 2016.

2.1.3.4 QUARRY

After removal of overburden the excavation of raw materials for aggregate crushing were started in July 2015. The nature and type of the rock being exploited is acceptable though unsuitable soil layers are removed to spoil disposal areas, and good quarry management continues.

2.1.3.5 DISPOSAL AREAS

The disposal area on the right bank has been available for operation since January 2015, as was the adjacent waste disposal area. The Disposal Area No.9 along Road P1 near the entrance of Road T5 started operation in April 2015. Unsuitable material from the quarry continues to be hauled to Disposal area No.6 and Disposal Area No.9 is being developed by the E&M Contractor as stated above.

2.2 Electrical and Mechanical Works

The EMWC was executed between Hitachi-Mitsubishi Hydro Corporation and NNP1PC on 13 June 2014 and the NTP was issued on 03 October 2014. The cumulative work progress of the Electrical and Mechanical Works until the end of October 2016 was 59.5% (the same when compared to planned progress of 59.5%).

Figure 2-5: Embedded piping installation (Main powerhouse)

2.3 Hydro-Mechanical Works

The HMWC was executed between IHI Infrastructure Systems (IIS) and NNP1PC on 18 April 2014 and the NTP was issued to the Contractor on 03 October 2014. The cumulative work progress of the Hydraulic Metal Works until the October 2016 was 30.1% (compared to planned progress of 30.1%).

The latest progress of penstock pipes fabrication at IHI field shop as of the end of October 2016 is shown ***in Table 2-4*** below

Table 2-3: *Progress of the penstock pipe fabrication at the IHI field shop as at the end of October 2016*

Item No.	Work Activity	Fabrication Progress (%)	Remarks
1.1	Assembly & Welding	37.0 %	
1.1	Painting	31.7 %	
1.1	Delivery to Main Dam Laydown Area	12.6 %	
1.1	Site Erection at Main Dam	12.6 %	

Latest progress of steel gate installation for each work item at the end of September 2016 is shown ***in Table 2-5*** below.

Table 2-4: *progress of steel gate installation for each work item at the end of* **October** *2016*

No.	Item	Start Date	Actual Date Completed	Planned Completion Date	Overall Progress Including Inspection	QA/QC NCR Records	Safety Incident Record	Remaining Progress % “’Final Inspection’
2.1	Re-regulation Waterway Gate	15-Mar-16	16-Oct-16	31-Oct-16 (Milestone)	99 %	0	0	1 % ‘Wet Test’
2.2	Re-regulation Waterway Stoplog	15-Mar-16	09-Jul- 16	15-Aug-16 (Key Date)	99 %	0	0	1 % ’Wet Test’
2.3.1	Intake Gate	15-Mar-16	16-Oct-16	31-Oct-16 (Milestone)	99 %	NCR-HMW-2016-002 *(Closed)*	0	1 % ‘Wet Test’
2.3.2	Intake Trashrack	15-Jun-16	11-Jul- 16	15-Aug-16 (Key Date)	100 %	0	0	N.A.
2.4	Draft Gate	1-May-16	01-Oct-16	10-Oct-16 (Key Date)	99 %	0	0	1 % ‘Wet Test’

2.4 230kV Transmission Line Works

The TLW Contract was executed between Loxley-Sri Consortium and NNP1PC on 11 July 2014 and the NTP was issued to the 230 kV TL Contractor on 03 October 2014. The cumulative work progress of the Transmission Line Works until the end of October 2016 was 59.0% (compared to planned progress of 66.5%). The TL works is about 1 month ahead of planned by value as the procurement of material forms a large part of the payment to-date and this is ahead of schedule. Notwithstanding that the actual tower foundation work and erection is behind schedule, work is being undertaken to a programme of acceleration that have seen commencement of stringing in October 2016 and its completion 3 months before COD.

The delay to commencement of construction works was approximately 7 months while awaiting compensation matters to be resolved by NNP1PC. The Contractor agreed to accelerate its Works and is on target to get back onto the original schedule for tower foundation excavation and tower erection. During the rainy season and with further delays due to compensation virtually, full access to most sections of alignment was achieved in 2015 following resolution of remaining environmental and social matters. In the last month there has been progress with tower erection only, while the construction of foundation is now continue to prepare the access road and the location of towers and its will be conducted the construction by November 2016 (See Figure 2-4 below)

Figure 2-4 Cumulative Work Progress of Tower Foundation (Original Planned and Actual)

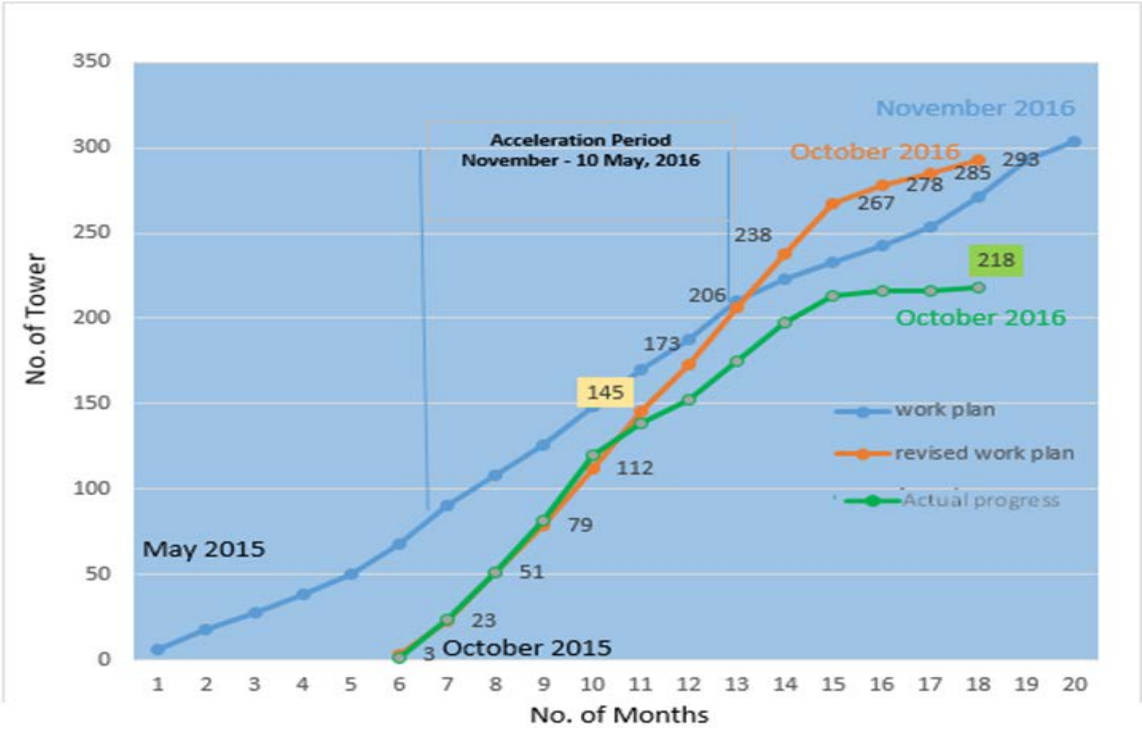
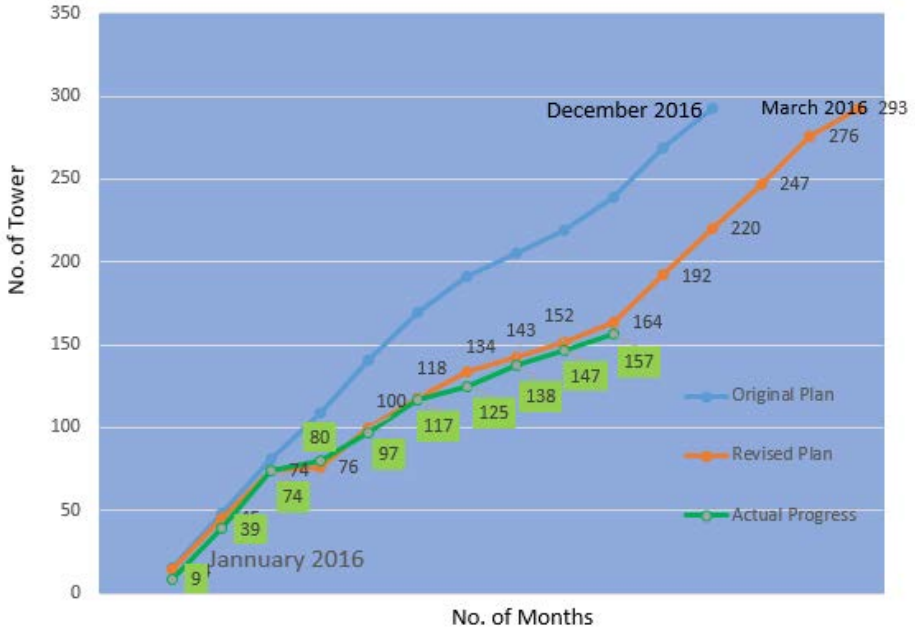


Figure 2-5: Cumulative Works Progress (Revised Planned & Actual

Figure 2-6 Revised Cumulative Works Progress of Tower Erection (Planned and Actual)



3. ENVIRONMENTAL MANAGEMENT MONITORING

3.1 Compliance Management

3.1.1 ESMMP-CP Update 2016

NNP1PC received an official comment from the Department of Environmental and Social Impact Assessment (DESIA), Ministry of Natural Resources and Environment (MONRE) for the draft updated Environmental and Social Management and Monitoring Plan for the Construction Phase (ESMMP-CP) in October 2016. This document is being revised and finalised in accordance with the received comments, and will be resubmitted for the approval of MONRE in December 2016.

3.1.2 Site Specific Environmental and Social Management and Monitoring Plans

During October 2016, Environmental Management Office (EMO) of NNP1PC received a total of four SS-ESMMP. Out of these, two SS-ESMMP were accepted with conditions, the other two are under review and will be carried over into November 2016.

Table 3-1: SS-ESMMPs received and review status in October 2016

Title	Date Received	Status	Comments
SS-ESMMP for Second River Diversion and Excavation of Right Bank	28 September 2016 (1st revision)	No objections with conditions on 13 October 2016	Provide detail layouts of the vegetation clearance, spoil disposal area and erosion and sediment control systems
SS-ESMMP for Construction of Houay Soup Landfill	20 October 2016 (2nd submission)	Under review	
SS-ESMMP for Re-regulation Pond Biomass Clearance	28 October2016 (1st submission)	Under review	

Title	Date Received	Status	Comments
SS-ESMMP (2nd submission) and 3rd submission of DWP supplemental information for Curtain Grouting Works at the Main Dam	26 September 2016 and 22 October 2016	No objection with conditions on 07 October 2016	Prepare and submit a separate DWP & SS-ESMMP for Kenber Camp with a drainage layout and full detailed drawings of the Waste Water Treatment System (WWTS)

3.1.3 Compliance Report

In October 2016, NNP1PC- EMO issued a total of six Observations of Non-Compliances (ONC) which was the same number as in September 2016. With a carry-over from September 2016, a total of 20 ONC and 01 NCR were active in October 2016. Out of these, eight ONC were resolved, 12 ONC and one NCR will be carried over into November 2016. All of the ONC and NCR carried over had passed their deadline by when action was expected to be taken. NNP1PC-EMO will follow up with TD and the Contractors to resolve the remaining issues in November 2016.

The carried-over ONC and NCR from October 2016 into November 2016 are summarized in Table 3-2 below.

Table 3-2 Carryover ONCs from October 2016 to November 2016

Site ID	Issues	Reporting	Actions
Song Da 5 Camp No.2	The WWTS construction was not consistent with the proposed design (ON_OC-0085). 1st inspection date: 02 June 2015 Latest follow up: 26 October 2016	1 ONC (Pending)	NNP1PC-TD sent a letter Ref. No.: NNP1/0750-016/OBA/EPC-CE dated 12 October 2016 to the Civil Contractor to instruct improvements of the WWTS by the end of November 2016. The priority and most populated camps are Song Da 5 Camp No. 1 and Camp No. 2 followed by the remaining camps with improvements in line with the required improvement plan recommended by an external Thai Expert (Mr. Pipat).
V&K Camp	Insufficient capacity of waste water treatment ponds to handle the operation of the V&K camp (ON_OC-0087). 1st inspection date: 02 June 2015 Latest follow up: 26 October 2016	1 ONC (Pending)	The existing wetland ponds should be properly lined and sealed with concrete; the seepage of grey water at the first wetland pond where the treatment process starts should be stopped. The improvement should follow the Thai expert's recommendations.

Site ID	Issues	Reporting	Actions
HM Hydro Subcontract Worker Camp (LALIMA 10 Camp)	The Contractor commenced the construction of the camp's WWTS without submitting revised detailed designs and updated SS-ESMMP responding the NNP1P-EMO's comments (ON_HM-0004). 1st inspection date: 25 May 2016 Latest follow up: 01 November 2016	1 ONC (Pending)	Submit the revised detailed designs and updated SS-ESMMP, improvement requirements should be incorporated in the 3rd revision of SS-ESMMP according to Owner's Comment Sheet.
	3. The LILAMA10 Camp has been accommodated with 11 workers, but the construction of the Waste Water Treatment System (WWTS) remained incomplete (NCR_HM-0001) 1st inspection date: 28 September 2016 Latest follow up: 26 October 2016	1 NCR (New)	The WWTS improvement will be discussed during the Monthly Meeting scheduled on 09 November 2016 to ensure that improvement actions are in full compliance with the NNP1's instruction letter Ref. No.: NNP1/0750-016/OBA/EPC-CE dated 12 October 2016.
RCC Plant Yard	Lack of proper sedimentation facilities to improve the turbid water quality generated from the site (ONC_OC-0217) 1st inspection date: 28 June 2016 Latest follow up: 25 October 2016	1 ONC (Pending)	- The information on the turbid water generation from RCC production and the capacity of existing sediment ponds should be provided as required by EMO it the conditions issued to the 2nd submission of the SS-ESMMP for Operation and Maintenance of the RCC Plant. The Contractor is required to: - Follow the agreed actions specified in previous issued Site Inspection Report. The contractor is required to frequently clean-up the sediment ponds when observed at 60% full, and regularly remove the dried sediment from drying yards to keep space for incoming sediment from the clean-up of the ponds. - Submit a record sheet which documents the frequency of sediment clean –up by the Contractor for NNP1PC (TD and EMO) record and verification by 17/10/2016.

Site ID	Issues	Reporting	Actions
SECC Camp (Access Bridge Contractor)	SECC Contractor would finish its construction activities by the end of November 2016. To ensure that SECC's site demolition is done properly, the Contractor was instructed to prepare and submit a Site Decommissioning Plan to EMO for review and approval at least 7 days prior to the commencement of decommissioning work (ONC_SECC-0039) 1st inspection date: 06 September 2016 Latest follow up: 01 November 2016	1 ONC (Pending)	The Contractor shall prepare and submit a Site Decommissioning Plan covering all SECC's sites (SECC Camp, Temporary Waste Pit, SECC's Workshop and SECC Batching Plant) at least 2 months prior to site decommissioning for NNP1PC-EMO review and approval.
Re-Regulation Dam (Borrow Pit Area)	The Contractor started operating a borrow pit with inadequate environmental management practices as indicated below: - Topsoil was stockpiled at sensitive erosion area; - The cut slope area had no berm and cut-off drains; - Spoil was disposed and stockpiled on the access road to the SECC waste disposal pit. No information and management measures on the excavation of this borrow pit was included in the two (02) approved SS-ESMMPs for the Re-Regulation Dam (i.e. the Re-Regulation Dam Left Bank Excavation and Re-Regulation Dam Power Station (ON_OC-0232). 1st inspection date: 30 August 2016 Latest follow up: 25 October2016	1 ONC (Pending)	The Contractor needs to take the following immediate actions: - Designate topsoil stockpile to minimise soil erosion and to preserve for borrow pit recovery; - Install borrow pit berms, cut-off drains and sediment pond where feasible to prevent landslide and retain sediment. Submit a revised SS-ESMMP to include this borrow pit and provide the following information by 11 October 2016: - Estimated quantity of materials to be used; - Biomass clearing and topsoil management; - Spoil management and disposal (stockpiling, excavation, etc.); - Detailed design of slope stabilisation including cut-off drains and berms; - Site environmental rehabilitation and site closure plan. On 18 October 2016, the contractor has done temporary works while waiting for larger machinery to become available from the regulation dam including installation of open ditch to divert water away from the roadside. The Contractor informed NNP1PC-EMO that the full improvement works will commence in early November 2016, after

Site ID	Issues	Reporting	Actions
			machinery becomes available from the second river diversion.
Re-regulation dam (spoil disposal area)	There was a land levelling activity for permanent spoil disposal from the excavation of left bank coffer dam behind the SECC camp (ON_OC-0236). 1st inspection date: 11 October 2016 Latest follow up: 25 October 2016	1 ONC (New)	Include this spoil disposal management plan in the revised SS-ESMMP for the Re-regulation Dam which will be submitted by 11/10/2016 to EMO for review and approval. The spoil disposal management plan needs to follow ESMMP-CP 2014 and Draft Updated ESMMP-CP 2016 Vol. III and IV, SP10 Spoil Disposal.
Aggregate Plant Yard	Lack of proper sedimentation control to improve the turbid water discharge from the Aggregate washing plant and sediment pond at Spoil disposal No.: 7 (ON_OC-0235). 1st inspection date: 03 October 2016 Latest follow up: 25 October 2016	1 ONC (New)	Immediately fix the sediment pond's embankment to stop turbid water leakage and install at least 4 baffles in the sediment pond by early November 2016.
Aggregate Plant Yard	No regular sediment clean-up along open ditches, it is very likely that the turbid water is overflowing to the road T11 and subsequently Nam Ngiep River (ON_OC-0237). 1st inspection date: 11 October 2016 Latest follow up: 25 October 2016	1 ONC (New)	Clean up sediment from open ditches and remove sediment stockpiles more frequently. Otherwise, sufficient sandbags along the roadside shall be provided to prevent the overflowing of turbid water.
Access Road P1	Solid waste scattered around at cement truck parking area/assembly point along P1 road side (ON_OC-0238). 1st inspection date: 26 October 2016	1 ONC (New)	The Contractor is required to: - Regularly clean up solid waste at these areas and transport to NNP1 landfill for disposal; - Instruct cement truck drivers to understand the waste management at NNP1PC Project sites.
IHI Worker Camp & Industrial Area (276 camp's toilet)	There was an evidence of black water leaked from the underground septic tank of the toilet and released to the open ditch from the RCC plant yard. This may be resulted from either broken or full septic tanks (ON_IHI-0004). 1st inspection date: 12 October 2016 Latest follow up: 26 October 2016	1 ONC (New)	The Contractor is required to: - Fix/repair the source of leakage immediately; - Inform and consult with NNP1PC for guidance and approval (if the leakage was from the full septic tanks and necessary to be emptied).

Site ID	Issues	Reporting	Actions
SECC-PC Bridge	It was observed that some garbage has been disposed on the ground within the SECC's construction area for a couple of months. EMO has raised a number of environmental concerns about this improper waste disposal by the Contractor. So far, no corrective action was undertaken by the Contractor (ON_SECC-0040) 1st inspection date: 19 October 2016	1 ONC (New)	Collect the garbage and arrange proper disposal at the Houay Soup Landfill.

Figure 3-1: Site Inspection Locations

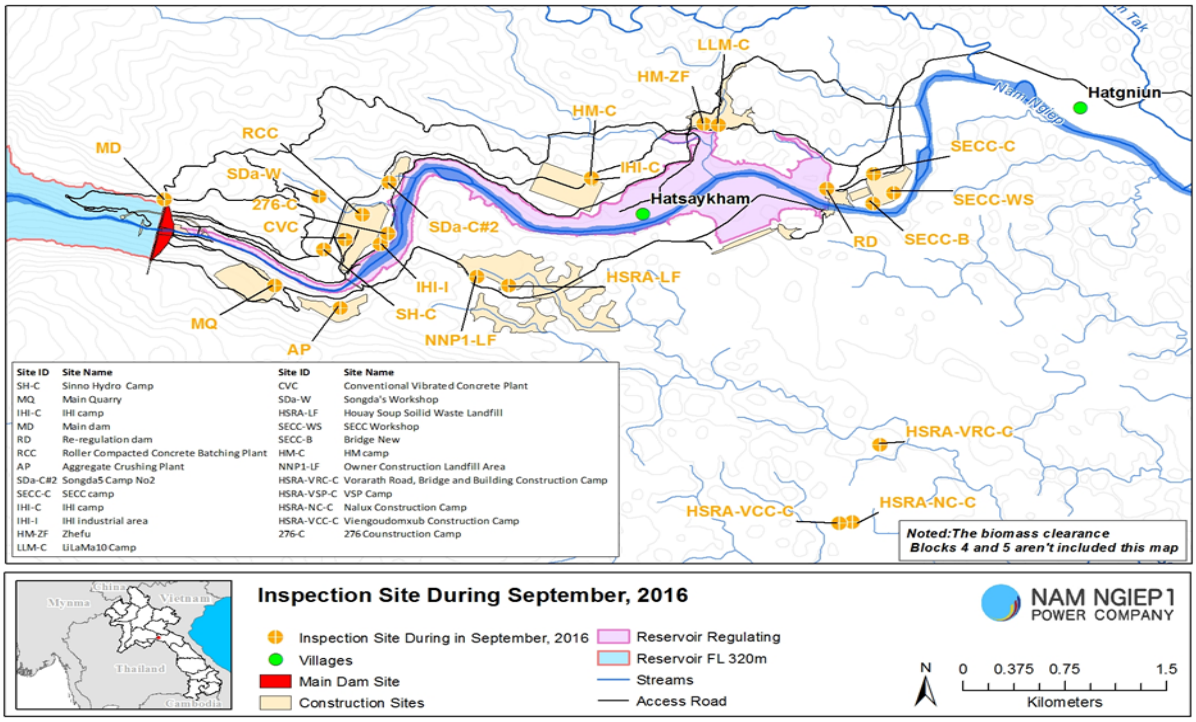


Figure 3-2: 230 kV Transmission Line Construction Monitoring

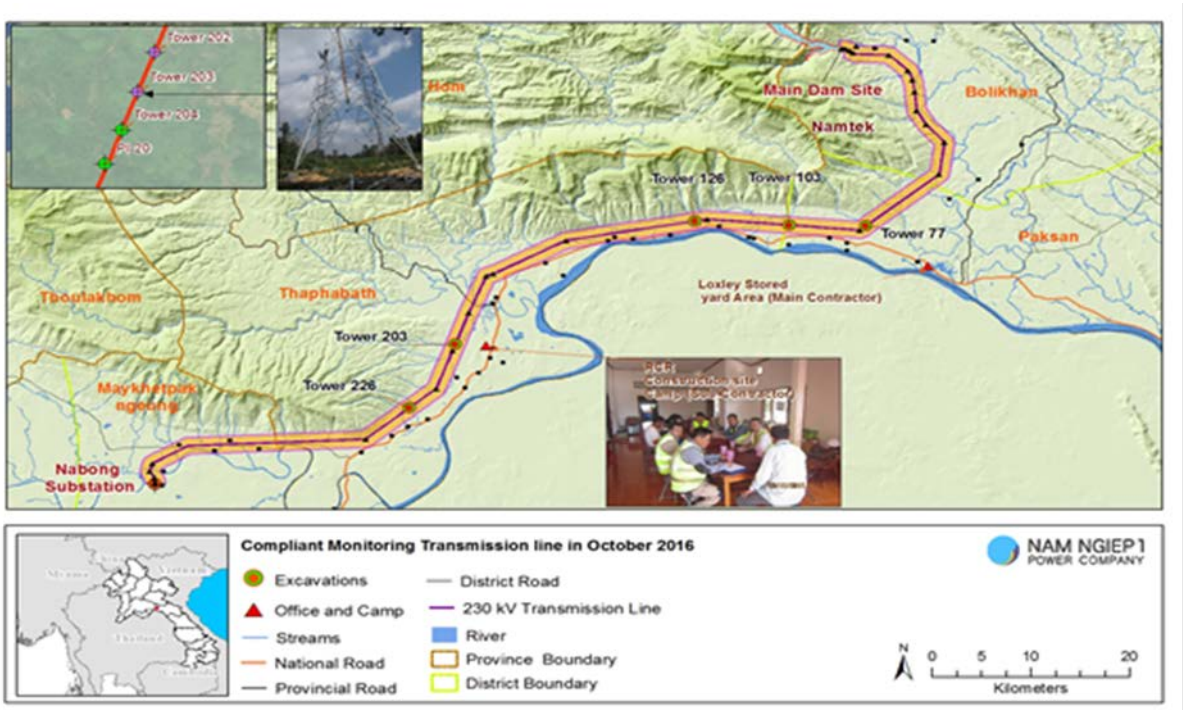
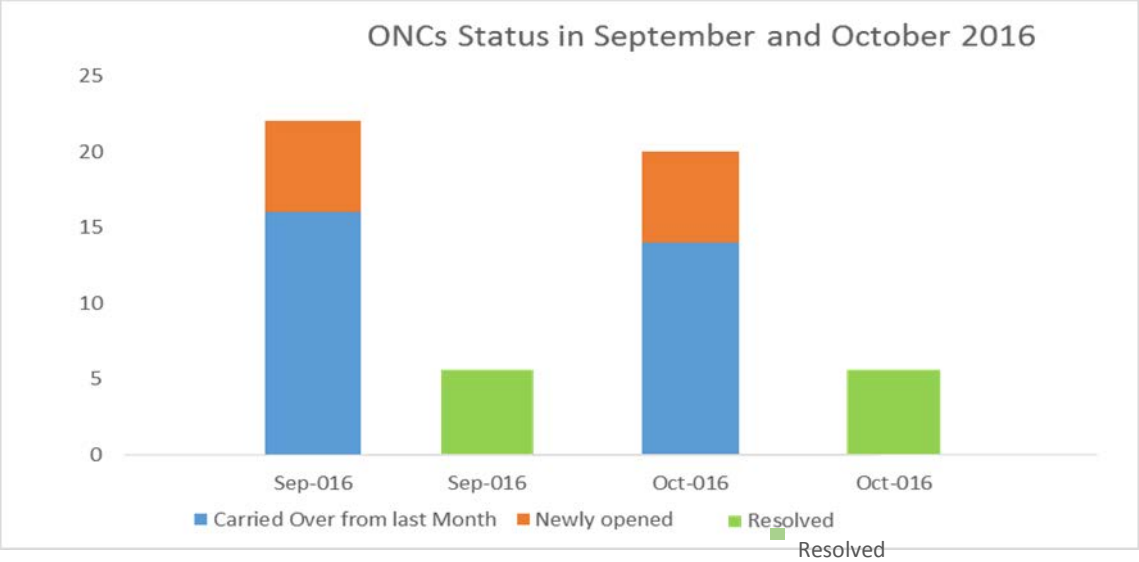


Table 3-3 Summary of ONCs and NCRs

Reporting Period (01-30 October 2016)	ONC	NCR-1	NCR-2	NCR-3
Carried over from September 2016	14	1	0	0
New issues this month	6	0	0	0
Resolved this month	8	0	0	0
Carried forward into October 2016	12	1	0	0
Unresolved exceeding deadline	8	1	0	0

Figure 3-3: Observations of non-compliance (ONCs) this October 2016 Compared with September 2016



3.1.4 Monitoring by the Environmental Monitoring Unit of the Government

During 04 to 06 October 2016, Provincial and District EMUs conducted a joint environmental monitoring mission to the main construction sites and camps. A mission report reference No.: 19-PONRE-EMU dated 14 October 2016 was submitted to NNP1PC in October 2016 for corrective action. The main environmental issues identified by the EMU are the following:

a) Inadequate wastewater management at SECC camp, Song Da 5 Camp No. 1 and Camp No. 2, and V&K Camp;
b) Improper sedimentation control from RCC plant and aggregate plant yard;
c) No dust suppression from Ban Nonsomboun to the NNP1 Project's construction sites;
d) No site recovery plan for the main quarry.

3.2 Environmental Quality Monitoring

The EMO laboratory construction was commenced in the third week of October 2016. The procurement of the laboratory equipment with a supplier in Thailand was ongoing.

The environmental quality monitoring undertaken has followed the recommended environmental quality monitoring programme presented in the ESMMP-CP Volume III. The recommended programme consists of the following components:

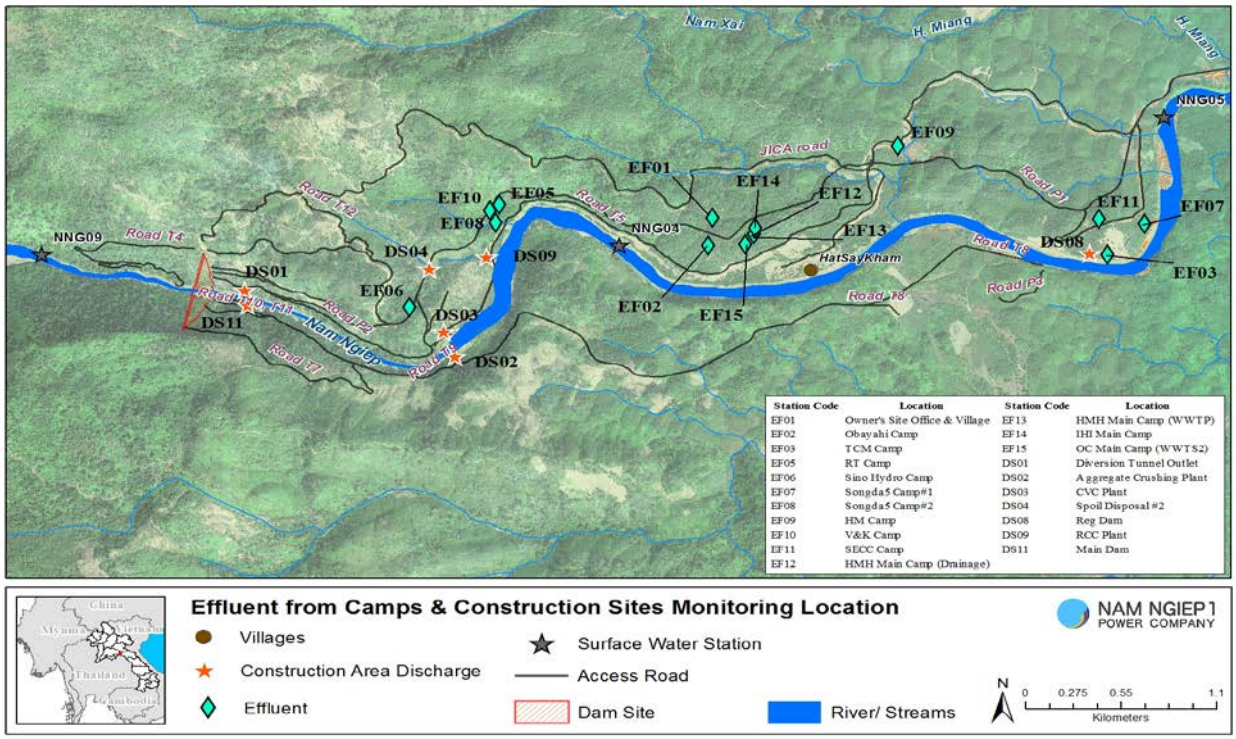
a) Effluent discharge from camps and construction sites;
b) Ambient surface water quality monitoring;
c) Groundwater and community water supply;
d) Landfill leachate;
e) Ambient noise and noise emission monitoring.

All Environmental Quality Monitoring data are routinely reported to the Ministry of Natural Resources and Environment (MONRE) in the Monthly Environmental Management and Monitoring Reports (EMMR) and to ADB in the Quarterly Environment Monitoring Reports

3.2.1 Effluent Discharge from Camps and Construction Sites

Since July 2016, the frequency of effluent monitoring has increased from monthly to fortnightly at all the camps, and from fortnightly to weekly at the construction sites. Results of the monitoring of effluents from the camps and construction sites.

Figure 3-4: Map of Effluent Discharge Monitoring Locations



All parameters were assessed with reference to the Effluent Standards specified in the Project's Concession Agreement Annex C, Appendix 2 Clause 1.13. During October 2016, all construction camps had higher concentrations of total coliforms than the effluent standard except the Owner's Village and Site Office. NNP1PC issued an instruction to the Contractors with required improvement plans for the Wastewater Treatment Systems (WWTS) in all the camps by the end of November 2016 (reference no. NNP1/0750-016/OBA/EPC-CE dated 12 October 2016. On 19 October 2016, the Contractor submitted an improvement plan focusing on 2 main camps of Song Da 5 No. 1 and Song Da 5 No. 2 for review and comments by NNP1PC.

Detailed monitoring results are included in the Annex and the assessment of compliance and corrective actions are summarized below.

Table 3-4: Compliance assessment of the effluent discharge from the camps and construction sites

Site	Sampling ID	Non-Compliance	Corrective Actions
Owner's Site Office and Village	EF01	All parameters complied with the standards.	No required.
OC Camp (WWTP1)	EF02	Biochemical Oxygen Demand (BOD_5), Ammonia nitrogen (NH_3-N), and total coliforms exceeded the Standard for both missions.	NNP1PC issued an instruction to the Contractors with required improvement plans for the Wastewater Treatment Systems (WWTS) in all the camps by the end of November 2016 (reference no.

Site	Sampling ID	Non-Compliance	Corrective Actions
			NNP1/0750-016/OBA/EPC-CE dated 12 October 2016.
Sino Hydro Camp	EF06	Total coliforms were higher than the Standard at 160,000 MPN/100 ml for both missions. In addition, Ammonia-nitrogen were 12 and 15 mg/l for the first and the second missions respectively, exceeded the Standard.	As above.
Song Da 5 Camp No. 1	EF07	BOD slightly exceeded the standard with value recorded of 30.9 mg/l during the second fortnight. In addition, total coliforms were 160,000 MPN/100 ml, exceeded the standard for both mission.	As above. In addition, a proposed improvement plan was submitted by the Civil Contractor focusing on 2 main camps of Song Da 5 No.1 and Song Da 5 No.2 on 19 October 2016 for review and comments by NNP1PC.
Song Da 5 Camp No. 2	EF08	NH_3-N and total coliforms did not comply with the Standard for both missions. In addition, BOD was 31.4 mg/l, exceed the standard for the first mission.	As above.
Hitachi-Mitsubishi Hydro(H-MH) Worker Camp No.1	EF09	Total coliforms were 160,000 and 1,700 MPN/100 ml for the first and second missions respectively.	As above.
V&K Camp	EF10	Total coliforms were 92,000 and 1,100 MPN/100 ml for the first and second missions respectively, and did not comply with the Standard for both missions. In addition, TSS was 194 mg/l, exceeding the standard during the first fortnight.	As above.
SECC Camp	EF11	Total coliforms were 54,000 and 1,100 MPN/100 ml for the first and second missions respectively.	As above.

Site	Sampling ID	Non-Compliance	Corrective Actions
H-MH Main Camp (WWTS)	EF13	Total coliforms and COD did not comply with the Standard for both missions. In addition, TSS and BOD were 67.8 and 48.6 mg/l respectively, exceeded the Standard during the second fortnight.	As above.
IHI Main Camp	EF14	Biochemical Oxygen Demand (BOD_5), COD, ammonia nitrogen and total coliforms exceeded the Standard for both missions.	As above.
OC Camp (WWTS2)	EF15	Total coliforms were higher than the Standard at 160,000 MPN/100 ml during the first fortnight and 35,000 MPN/100 ml in the second fortnight.	As above.
Main Dam Construction Area	DS11	All parameters complied with the Standard.	No corrective actions are required. NNP1PC-EMO will continue to monitor the effluent quality.
Re-regulation Dam	DS08	The TSS (sampled on 11 October 2016) slightly exceeded the Standard (less than 50 mg/l) with a value recorded of 74.5 mg/l.	
Spoil Disposal Area No.2 (Song Da 5 Workshop)	DS04	The pH value (on 11 October) was lower than Standard range.	This low pH indicated the nature water quality condition of the creek which passes this sampling site. Similar cases happened in the last dry season (2015).
RCC Plant	DS09	All TSS results in October 2016 were higher than the Standard (<50 mg/l) with recorded values of 28,170 mg/l, 48,420 mg/l, 47,693 mg/l and 212 mg/l respectively.	The Contractor was instructed to clean-up the sediment ponds daily and included in a 3rd revision of the submitted SS-ESMMP. A record sheet of maintenance schedule would be submitted to NNP1PC for record and verification.
CVC Plant	DS03	Wastewater was contained in the ponds and no discharge to the environment was observed.	
Aggregate Crushing Plant	DS02	All TSS values (sampled on 05, 11 and 20 October 2016) exceeded the Standard with values	The Contractor was instructed to immediately fix the sediment pond's embankment to stop turbid water leakage and install at least 4 baffles

Site	Sampling ID	Non-Compliance	Corrective Actions
		recorded of 2,000 mg/l, 10,027 mg/l and 3,322 mg/l respectively.	in the sediment pond by early November 2016. An NCR2 will be raised if no progress is observed.

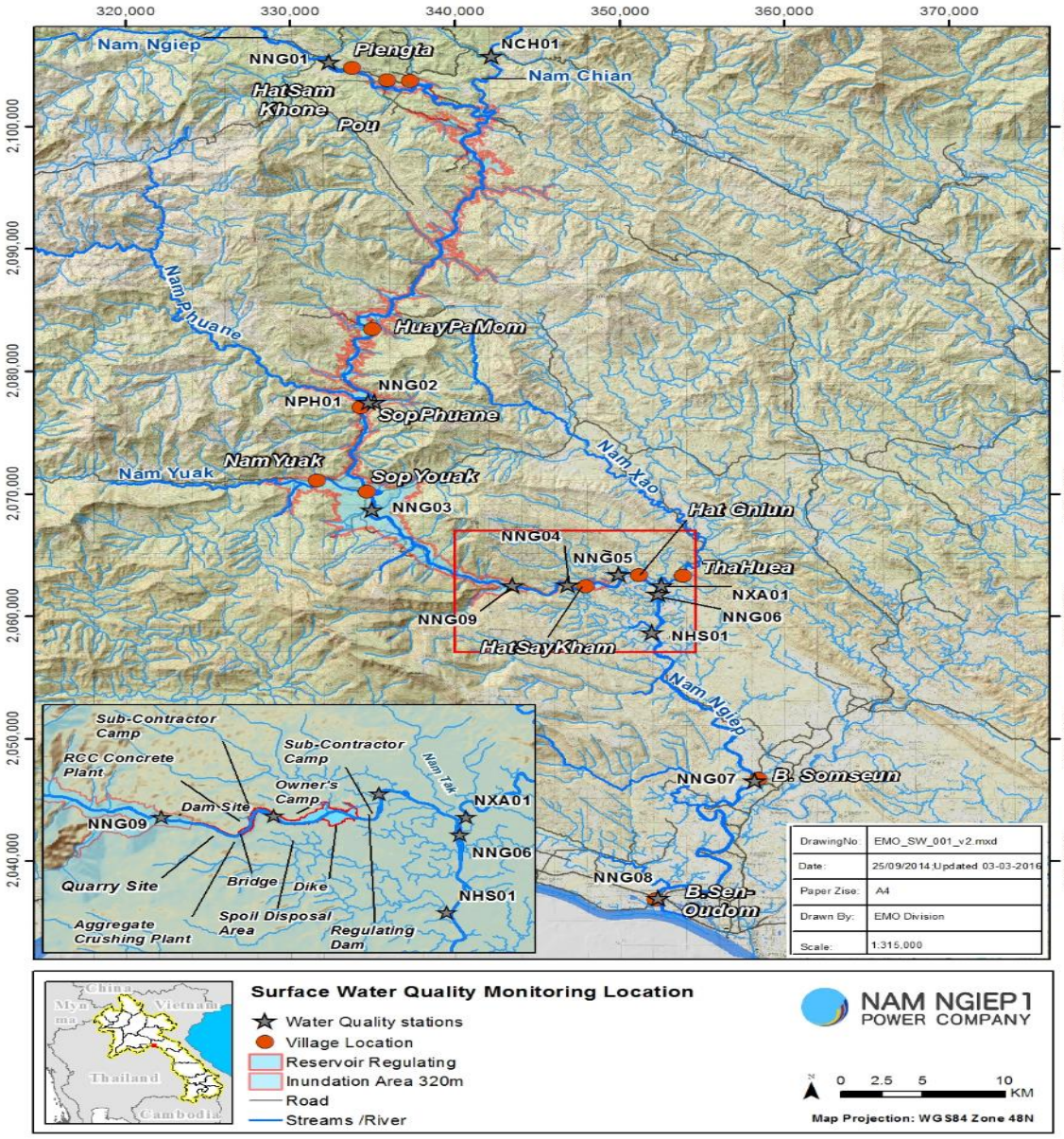
At the time of sampling, no waste water discharge was observed at the Obayashi Corporation (OC) Camps (EF02 and EF15), TCM Camp (EF03), Sino Hydro Camp (EF06), Song Da 5 Camp No.1 (EF07), Song Da 5 Camp No. 2 (EF08), HMH Worker's Camp No.1 (EF09), V&K Camp (EF10), SECC Camp (EF11), HMH Main Camp (EF13) and IHI Main Camp (EF14). Thus, the samples were collected from the final sediment ponds. Also, no sampling was conducted during 16-26 September 2016 at the CVC Plant (DS03) as there was no waste water discharge from the sediment ponds.

3.2.2 Surface (Ambient) Water Quality Monitoring

Surface water samples are collected and analysed twice a month[2] from nine stations in Nam Ngiep and four stations in the main tributaries including the lower Nam Chian, Nam Phouane, Nam Xao and Houay Soup, a total thirteen stations. From August 2016, weekly surface water quality monitoring (physical parameters only) has been undertaken with respect to Station NNG09 located upstream of construction sites, NNG04 located within the Construction Site and NNG05 downstream of construction sites.

2 Monthly for chemical parameters and fortnightly for physical parameters

Figure 3-5: Surface Water Quality Monitoring Stations



Key findings for surface water quality monitoring in September 2016 are shown below.

Nam Ngiep

The Chemical Oxygen Demand (COD) exceeded the Standard for the all stations of Nam Ngiep River. The highest amount of COD recorded was in Nam Ngiep at Ban Somseun (NNG07 – Downstream of Construction Sites) at 19.6 mg/l. In addition, total coliforms exceeded the standard at the station of Nam Ngiep Upstream Main Dam (NNG01 – Upstream of Construction Sites) with values recorded at 5,400 MPN/100 ml. Moreover, the BOD exceeded the standard at the stations of Nam Ngiep Upstream Ban Hat Gniun (NNG05 – Downstream of Construction Sites), Nam Ngiep Downstream of Nam Xao Confluence (NNG06 – Downstream of Construction Sites) and Nam Ngiep at the Bridge of Road 13 (NNG08 – Downstream of Construction Sites) with recorded values of 3.3 mg/l, 1.9 mg/l and 1.9 mg/l respectively. Furthermore, the confirmed Arsenic result was 0.0044 mg/l, complied with the standard (<0.01 mg/l).

Since Nam Ngiep surface water quality monitoring programme commenced in September 2014, EMO has frequently found elevated levels of COD and bacteria with concentrations exceeding the

surface water quality standards with considerable spatial and temporal variations. Thus, there is not likely that the COD and total coliform are caused by Project activities.

It should also be noted that with respect to Total Suspended Solids (TSS) and turbidity which are parameters that potentially could be affected by Project activities, the monitoring results do not indicate any effect from the Project.

Table 3-5: Results of the Physical and Chemical Parameters of Nam Ngiep Surface Water Quality Monitoring

	River Name	Nam Ngiep								
	Zone	Upstream of Construction Sites				Within Construction Site	Downstream of Construction Sites			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	03/10/16	04/10/16	04/10/16	05/10/16	05/10/16	05/10/16	05/10/16	05/10/16	05/10/16
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	7.67	7.18	7.85	7.61	7.74	7.88	7.98	8.34	8.44
DO (%)		92.8	99.7	97.3	99.4	100.8	85.7	102.8	97.6	93
DO (mg/L)	>6.0	7.59	7.65	7.58	7.92	7.66	6.8	8.18	7.35	6.98
Conductivity (µs/cm)		102.3	70.5	71.6	69.8	74	275	119	67.9	89.6
TDS (mg/l)		51.15	35	36	35	37	138	59	34	44.25
Temperature (°C)		23	26.5	26.3	25.4	26.1	26.27	26.42	28.7	27.7
Turbidity (NTU)		80	86	84.9	45.2	41.5	61.8	54.1	73.3	71.4
TSS (mg/l)		304	405	634	120	97.3	99.6	89	112	153
BOD_5 (mg/l)	<1.5	ND[13]	ND[13]	ND[13]	1	ND[13]	3.3	1.9	1.5	1.9
COD (mg/l)	<5.0	15.2	13.6	12.4	7.3	7.5	8.4	7.8	19.6	8.6
NH_3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	0.2	ND[12]
NO_3-N (mg/l)	<5.0	0.77	2.85	0.17	0.16	0.15	0.13	0.16	0.5	0.1
Manganese (mg/L)	<1	0.183	0.229	0.134	0.089	0.083	0.09	0.087	0.092	0.103
Total Iron (mg/l)		13.4	40.6	21.2	7.34	7.19	6.91	6.41	7.68	12.5
Total coliform (MPN/100ml)	<5,000	790	350	700	5,400	280	2,400	4,900	3,100	220
Faecal coliform (MPN/100ml)	<1,000	170	350	460	700	31	920	490	330	220

ND[1] (<0.0005 mg/L)	ND[2] (<0.0003 mg/L)	ND[3] (<0.0002 mg/L)	ND[4] (<0.005 mg/L)	ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L)	ND[7] (<0.07 mg/L)	ND[8] (<0.04 mg/L)	ND[9] (<0.02 mg/L)	ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L)	ND[12] (<0.2 mg/L)	ND[13] (<1.0 mg/L)	ND[14] (<1.5 mg/L)	ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L)	ND[17] (<2.7 mg/L)			

Table 3-6: Monitoring results of Nam Ngiep Surface Water Quality (Measured Fortnightly)

	River Name	Nam Ngiep								
	Zone	Upstream of Construction Sites				Within Construction Site	Downstream of Construction Sites			
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	18/10/16	19/10/16	19/10/16	20/10/16	20/10/16	20/10/16	20/10/16	20/10/16	20/10/16
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	7.07	7.58	7.45	7.68	7.42	7.74	7.59	7.12	7.6
DO (%)		95	97.8	97.7	99.7	99.9	90.9	82.7	94.4	92.8
DO (mg/L)	>6.0	7.21	7.56	7.54	7.89	7.71	7.99	6.58	7.01	6.95
Conductivity (µs/cm)		185.1	73.6	82.3	73.5	70.7	131	136	110	116
TDS (mg/l)		92	37	41	36	35	66	68	55	58
Temperature (°C)		26.9	26.3	26.4	25	26.7	25.2	25.64	26.59	28.6
Turbidity (NTU)		764	603	102	55.8	56.6	70.7	84.1	99.4	77.3

Table 3-7: Monitoring results of Nam Ngiep Surface Water Quality at the Upstream, within and Downstream of Construction Sites (Measured Weekly)

	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	11/10/16	11/10/16	11/10/16
Parameters (Unit)	Guideline			
pH	5.0 – 9.0	7.7	6.99	7.33
DO (%)		100.7	99.2	99.8
DO (mg/L)	>6.0	7.83	7.51	7.62
Conductivity (µs/cm)		95.4	75.7	86.7
TDS (mg/l)		47.7	37.85	43.35
Temperature (°C)		26.7	28.2	27.7
Turbidity (NTU)		39.5	50.7	41.8

	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	24/10/16	24/10/16	24/10/16
Parameters (Unit)	Guideline			
pH	5.0 – 9.0	6.81	7.11	7.37
DO (%)		101.2	101.6	101.3
DO (mg/L)	>6.0	7.88	7.84	7.57
Conductivity (µs/cm)		70.5	69.8	75
TDS (mg/l)		35.25	35	37.5
Temperature (°C)		26.7	27.2	28.9
Turbidity (NTU)		36.8	36.8	38.4

Tributaries upstream the main dam: Nam Chiane (NCH01), Nam Phouan (NPH01)

Nam Chiane (NCH01) is located about 66 km upstream of the NNP1 Project construction site. The Chemical Oxygen Demand (COD) exceeded the National Surface Water Quality Standard with recorded values of 5.9 mg/l. In addition, faecal coliform exceeded the standard with values recorded of 1,300 MPN/100 ml.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site. The COD exceeded the National Surface Water Quality Standard with recorded values of 6.2 mg/l.

Tributaries downstream of the main dam: Nam Xao (NXA01), Nam Houay Soup (NHS01)

Nam Xao has confluence with the Nam Ngiep downstream of the NNP1 Project construction site. All parameters monitored complied with the surface water quality standard.

Houay Soup Nyai has a confluence with the Nam Ngiep River downstream of NNP1 Project construction site. The COD exceeded the National Surface Water Quality Standard with recorded values of 7.5 mg/l.

Table 3-8: Results of Physical and Chemical Parameters of Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	03/10/16	04/10/16	05/10/16	05/10/16
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	7.83	7.52	8.01	7.37
DO (%)		97.9	98.9	92.7	83.1
DO (mg/L)	>6.0	8.04	8.01	7.09	6.62
Conductivity(µs/cm)		36.5	48.6	137	60
TDS (mg/L)		18.45	24.3	69	30
Temperature (°C)		22.8	24.2	27.9	26.4
Turbidity (NTU)		12	7.18	9.1	16.2
TSS (mg/l)		23.4	15.1	12.7	5.2
BOD_5 (mg/l)	<1.5	1	ND[13]	1.2	ND[13]
COD (mg/l)	<5.0	5.9	9.8	ND[5]	7.5
NH_3-N (mg/l)	<0.2	ND[12]	ND[12]	ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.13	0.16	0.12	0.16
Manganese (mg/L)	<1	0.042	0.046	0.071	0.057
Total Iron (mg/L)		1.16	0.484	0.949	0.886
Total coliform (MPN/100mL)	<5,000	1,300	540	460	350
Faecal coliform (MPN/100mL)	<1,000	1,300	140	110	350

ND[1] (<0.0005 mg/L) ND[2] (<0.0003 mg/L) ND[3] (<0.0002 mg/L) ND[4] (<0.005 mg/L) ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L) ND[7] (<0.07 mg/L) ND[8] (<0.04 mg/L) ND[9] (<0.02 mg/L) ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L) ND[12] (<0.2 mg/L) ND[13] (<1.0 mg/L) ND[14] (<1.5 mg/L) ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L)

Table 3-9: Physical Parameters Results of Surface Water Quality – Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup (measured fortnightly)

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	18/10/16	19/10/16	20/10/16	20/10/16
Parameters (Unit)	**Guideline**				
pH	5.0 - 9.0	7.68	7.6	7.05	6.64
DO (%)		97	103.2	80.1	72.7
DO (mg/L)	>6.0	7.68	8.06	6.06	6.04
Conductivity(µs/cm)		40.9	63.5	156	60
TDS (mg/L)		20	31	78	30
Temperature (°C)		24.4	25.7	27.32	25.78
Turbidity (NTU)		12	4.26	5.13	5.1

3.2.3 Groundwater Quality Monitoring

During October 2016, NNP1PC sampled and analysed the groundwater quality in 14 boreholes. Out of these, two boreholes are community owned boreholes at Hatsaykham Village, one borehole is a private well at Hat Gniun Village, five boreholes are built by the Project for re-settlers at Houay Soup Resettlement Area, and four boreholes are built by NNP1PC at NNP1 Project Landfill.

All groundwater quality data are routinely reported to the Social Management Office of NNP1PC which then communicates the results to the village authorities and the local health centres as part of the Project's public health programme. The results are shown below.

Ban Hatsaykham

Most of the monitored parameters complied with the Standards, except pH which was lower than the Standard range between 6.50 and 9.20 with recorded values of 5.68 and 5.78 for the borehole number GHSK01 and GHSK03 respectively.

Ban Hat Gnuin

The faecal coliforms and E.coli bacteria contamination were 170 MPN/100 ml which was much lower than the previous month, but still exceeded the National Groundwater Standard. Other remaining parameters monitored complied with the groundwater quality Standard.

Houay Soup Resettlement Area (HSRA)

All parameters monitored complied with the Standard.

NNP1 Solid Waste Landfill

The monitoring of the groundwater monitoring borehole located at Houay Soup Landfill (MW5) commenced in October 2016 after the completion of first landfill pit. The monitoring results in all groundwater monitoring boreholes at both landfills show that the concentration of lead is slightly higher than the Standard. The level of faecal and total coliforms was also found to be high in one of the boreholes at NNP1 Project landfill (MW3) and Houay Soup landfill (MW5).

Figure 3-6: Groundwater Quality Monitoring Locations

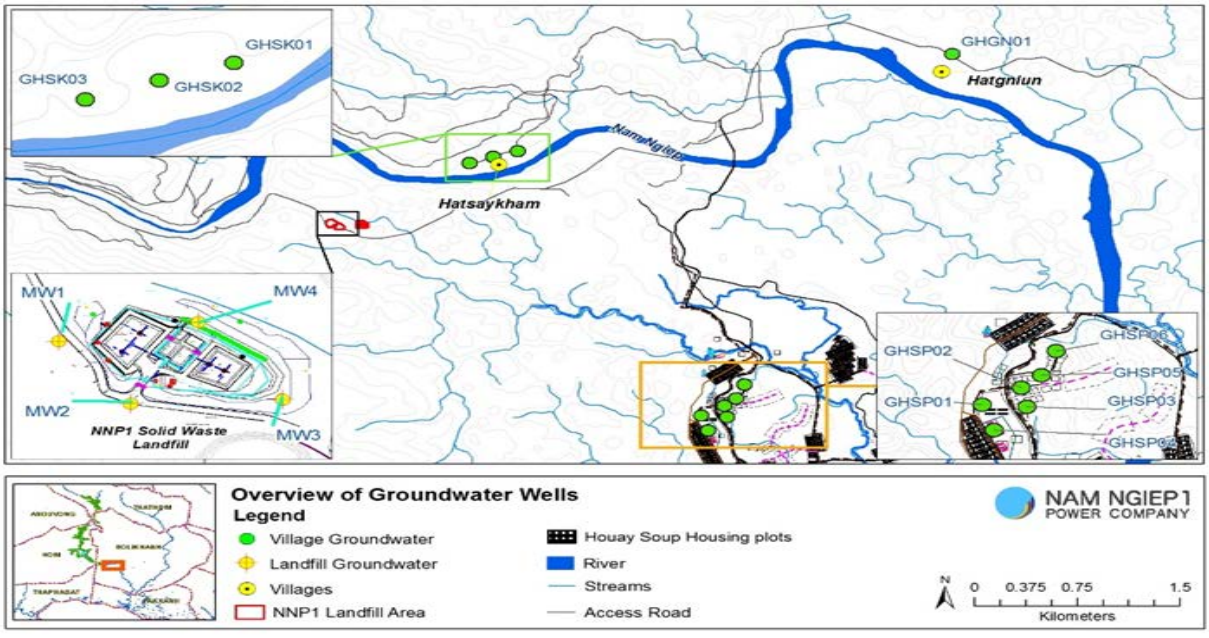


Table 3-10: Groundwater Quality Monitoring Results Hatsaykham and Hat Gniun Villages in October 2016

	Site Name	Ban Hatsaykham			Ban Hat Gniun
	Station Code	GHSK01	GHSK02	GHSK03	GHGN01
	Date	07/10/2016		07/10/2016	07/10/2016
Parameter (Unit)	Guideline				
pH	6.5-9.2	5.68	Hand Pump Broken	5.78	7.4
Sat. DO (%)		55.7		40.8	45.3
DO (mg/L)		4.33		3.15	3.49
Conductivity (µs/cm)		63.9		21.14	25
TDS (mg/L)	<1,200	32		10.52	12.5
Temperature (°C)		26.9		27.3	27.5
Turbidity (NTU)	<20	0.86		0.58	8.7
Faecal coliform (MPN/100ml)	0	0		0	170
Ecoli Bacteria (MPN/100ml)	0	0		0	170

ND[1] (<0.0005 mg/L)	ND[2] (<0.0003 mg/L)	ND[3] (<0.0002 mg/L)	ND[4] (<0.005 mg/L)	ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L)	ND[7] (<0.07 mg/L)	ND[8] (<0.04 mg/L)	ND[9] (<0.02 mg/L)	ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L)	ND[12] (<0.2 mg/L)	ND[13] (<1.0 mg/L)	ND[14] (<1.5 mg/L)	ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L)	ND[17] (<2.7 mg/L)			

Table 3-11: *Groundwater Quality Monitoring Results for Houay Soup Resettlement Area in October 2016*

	Site Name	Houay Soup Resettlement					
	Station Code	GHSP01	GHSP02	GHSP03	GHSP04	GHSP05	GHSP06
	Date	07/10/2016	07/10/2016	07/10/2016	07/10/2016	07/10/2016	07/10/2016
Parameter (Unit)	Guideline						
pH	6.5-9.2	7.24	7.62	7.87	7.78	6.9	6.76
Sat. DO (%)		87.1	93.8	96.9	49.1	30.8	96.6
DO (mg/L)		6.57	6.92	7.2	3.91	7.02	7.06
Conductivity (µs/cm)		345	174	52	82.1	116.9	58.8
TDS (mg/L)	<1,200	172.5	87	26	41.05	58.45	29.4
Temperature (°C)		28.5	29.7	29.5	26.8	28.8	30.3
Turbidity (NTU)	<20	0.8	0.62	1.06	0.47	0.66	0.69
Faecal coliform (MPN/100ml)	0	0	0	0	0	0	0
Ecoli Bacteria (MPN/100ml)	0	0	0	0	0	0	0

ND[1] (<0.0005 mg/L)	ND[2] (<0.0003 mg/L)	ND[3] (<0.0002 mg/L)	ND[4] (<0.005 mg/L)	ND[5] (<0.003 mg/L)
ND[6] (<0.09 mg/L)	ND[7] (<0.07 mg/L)	ND[8] (<0.04 mg/L)	ND[9] (<0.02 mg/L)	ND[10] (<0.01 mg/L)
ND[11] (<0.3 mg/L)	ND[12] (<0.2 mg/L)	ND[13] (<1.0 mg/L)	ND[14] (<1.5 mg/L)	ND[15] (<4.0 mg/L)
ND[16] (<5.0 mg/L)	ND[17] (<2.7 mg/L)			

Table 3-12: NNP1 Project Landfill's Groundwater Monitoring Results

	Site Name	NNP1 Landfill				Houay Soup Landfill
	Station Code	MW1	MW2	MW3	MW4	MW5
	Date	25/10/2016	25/10/2016	25/10/2016	25/10/2016	25/10/2016
Parameters (Unit)	Guideline					
pH		6.96	5.79	7.43	6.25	7.68
Sat. DO (%)		30.1	24.4	51.7	27.2	44.1
DO (mg/L)		2.24	1.8	3.81	2.07	3.35
Conductivity (µs/cm)		187.3	40.8	243	28.6	88.5
TDS (mg/L)		93.65	20.4	121	14.3	44.25
Temperature (°C)		29.1	29.5	29.7	28.9	28
Turbidity (NTU)		4.19	12.8	3.6	29.2	26.1

	Site Name	NNP1 Landfill				Houay Soup Landfill
	Station Code	MW1	MW2	MW3	MW4	MW5
	Date	25/10/2016	25/10/2016	25/10/2016	25/10/2016	25/10/2016
Parameters (Unit)	**Guideline**					
BOD (mg/l)		ND[13]	ND[13]	ND[13]	ND[13]	ND[13]
NH_3-N (mg/l)		ND[12]	ND[12]	ND[12]	ND[12]	ND[12]
Total Nitrogen (mg/l)		0.77	0.6	0.9	3.24	0.89
Copper (mg/l)		ND[18]	ND[18]	ND[18]	ND[18]	ND[18]
Lead (mg/l)	<0.01	0.126	0.038	0.404	0.12	0.022
Total Phosphorus (mg/l)		0.06	0.14	0.16	0.24	0.08
Faecal Coliform (MPN/100ml)		0	0	2,400	0	3,300
E. Coli Bacteria (MPN/100ml)		0	0	31	0	130
Total Petroleum (mg/l)		ND[13]	ND[13]	ND[13]	ND[13]	ND[13]

3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

Water quality monitoring for GFWS system is conducted on a monthly basis with the aim to alert the users in case of health risks when using the water for bathing or washing. During October 2016, water samples were taken from the taps at Thaheua and Hat Gniun Villages.

Results of the assessment for GFWS of both Thaheua and Hat Gniun Villages are shown and summarised as below:

Thahuea Village (WTHH02): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E.coli which were found to be 12 MPN/100 ml for both parameters.

Ban Hat Gnuin (WHGN2): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E.coli which were found to be 17 MPN/100 ml for both parameters.

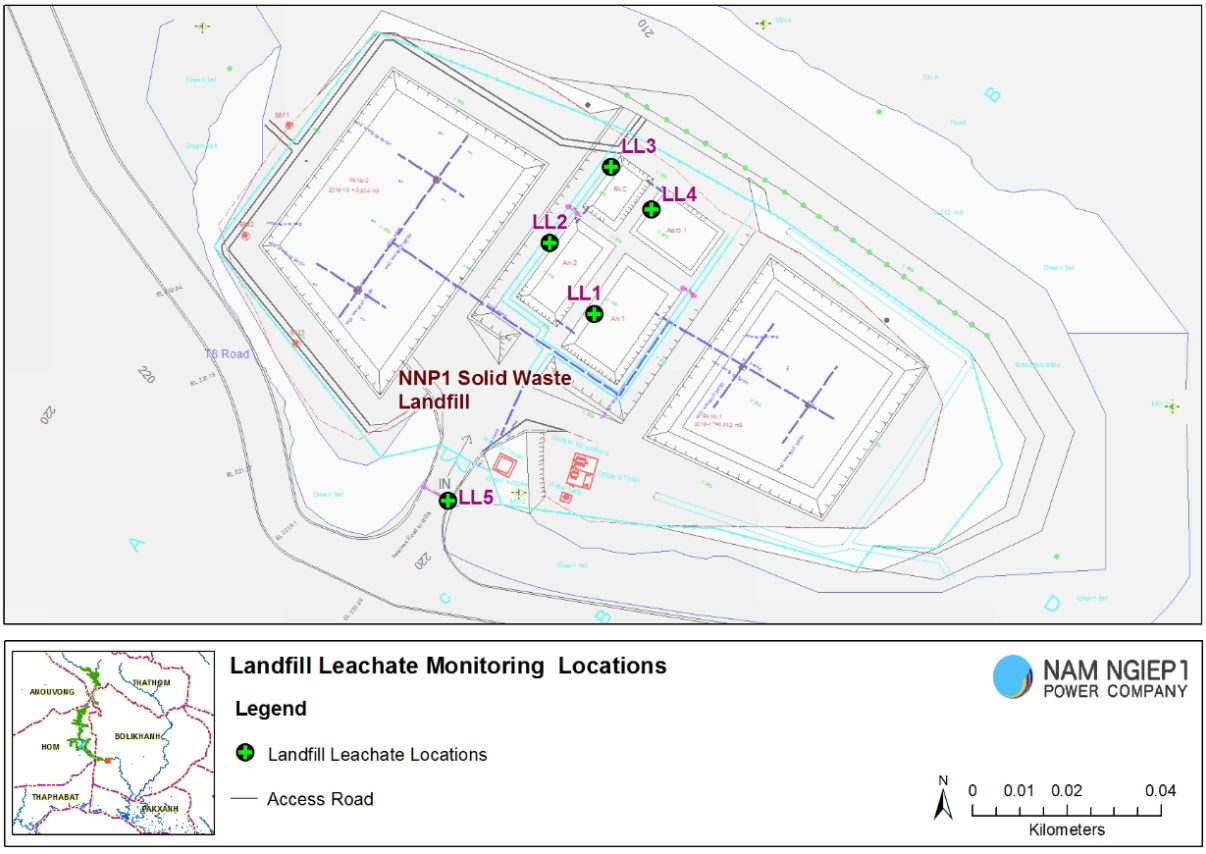
Table 3-13: Results of the Gravity Fed Water Supply Quality Monitoring

	Site Name	Ban Thaheua	Ban Hat Gnuin
	Station Code	WTHH02	WHGN02
	Date	07/10/2016	07/10/2016
Parameter (Unit)	**Guideline**		
pH	6.5-8.5	6.97	7.38
Sat. DO (%)		96.4	95.2
DO (mg/L)		7.31	7.14
Conductivity (µs/cm)	<1,000	36.3	69.5
TDS (mg/L)	<600	18.1	35
Temperature (°C)	<35	28.3	29
Turbidity (NTU)	<10	1.77	1.27
Faecal coliform (MPN/100ml)	0	12	17
Ecoli Bacteria (MPN/100mL)	0	12	17

3.2.5 Landfill Leachate Monitoring

During October 2016, water samples were taken from all four landfill leachate ponds. The location of landfill leachate monitoring is displayed in Figure 3-7

Figure 3-7: Landfill Leachate Monitoring Location



All results of the analyses of leachate from all four landfill leachate ponds (LL1, LL2, LL3 and LL4) complied with the Effluent Standard. Detailed results are presented below.

Table 3-14: Landfill Leachate Monitoring Results

	Site Name	NNP1 Solids Waste Landfill (Leachate Ponds)			
	Station Code	LL1	LL2	LL3	LL4
	Date	10/10/2016	10/10/2016	10/10/2016	10/10/2016
Parameters (Unit)	**Guideline**				
pH	6.0 - 9.0	7.24	6.96	7.67	7.17
Sat. DO (%)		133.8	79.9	124.2	132.5
DO (mg/L)		9.23	5.56	8.69	9.39
Conductivity (µs/cm)		246	213.5	221	163.1
TDS (mg/L)		123	106.75	110.5	81.55
Temperature (°C)		33.3	32.9	32.5	31.9
Turbidity (NTU)		15	13.4	18.4	9.81
BOD (mg/L)	<30	5.1	3.9	3.2	4.9
COD (mg/L)	<125	39.6	34.3	35.7	43.5
NH_3-N (mg/L)	<10.0	5	4	3	ND[13]
Total nitrogen (mg/l)	<10.0	8.59	8.75	5.81	3.61
Oil & Grease (mg/l)	<10	1	ND[13]	1	ND[13]
Copper (mg/l)	<0.3	ND[18]	ND[18]	ND[18]	ND[18]
Lead (mg/l)	<0.2	ND[10]	ND[10]	ND[10]	ND[10]
Total phoshorus (mg/l)	<2	ND[10]	0.01	0.02	0.05
Total coliform (MPN/100ml)	<400	11	13	79	330
Faecal Coliform (MPN/100ml)		7	8	0	0
Total petroleum hydrocarbons (mg/l)		ND[13]	ND[13]	ND[13]	ND[13]

3.2.6 Dust Monitoring

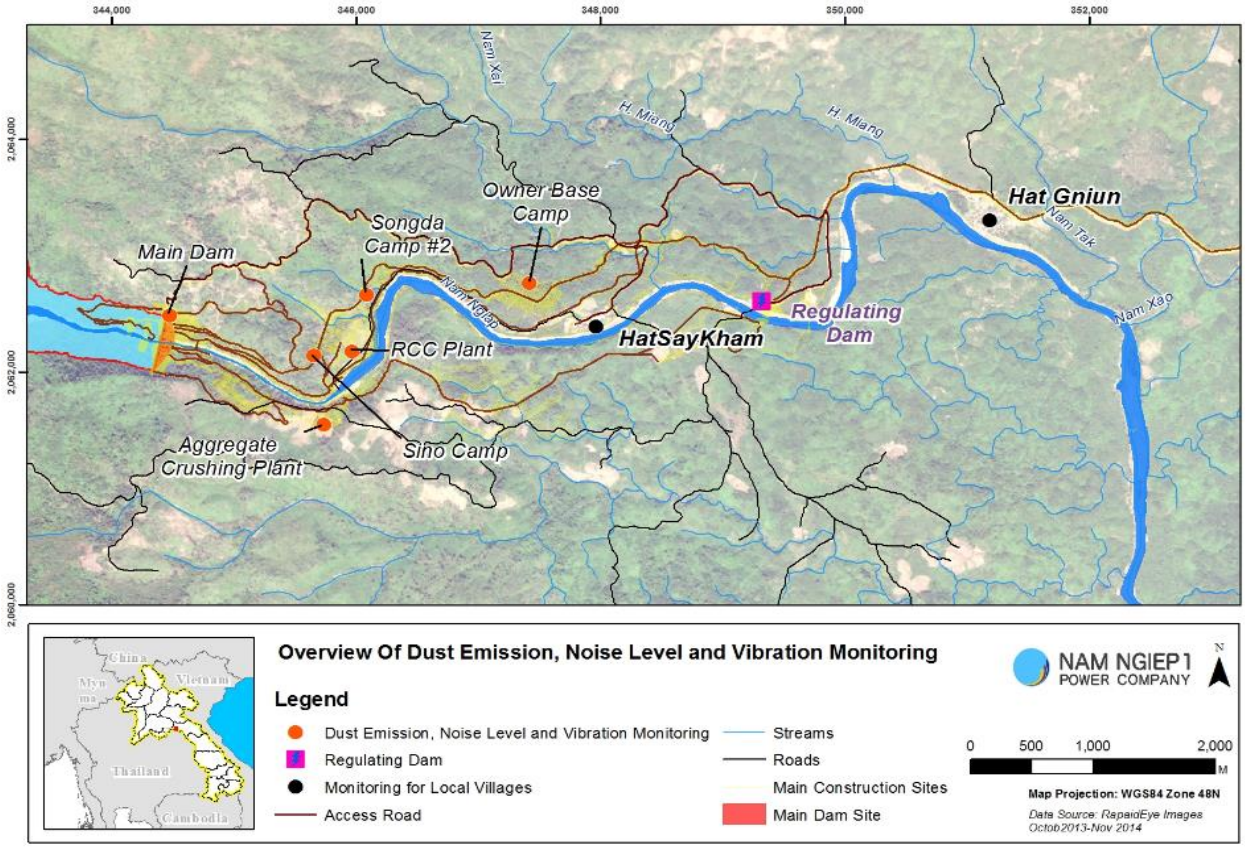
Dust monitoring for Hat Gnuin and Hatsaykham Villages, Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No. 2 and Owner's Site Office and Village was cancelled because of malfunctioning equipment. The dust aerosol monitoring equipment was sent back to the supplier in the United States for maintenance and spare part replacement, dust monitoring activity will resume again once the equipment is returned to the NNP1.

3.2.7 Noise Monitoring

During October 2016, noise monitoring was conducted in Ban Hatsaykham and Ban Hat Gnuin for at least 72 consecutive hours in each village. Noise monitoring was also conducted at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No. 2 and Sino Hydro Temporary Worker Camp (new) to assess possible impact on workers' health and Owner's Site Office and Village (to monitor the ambient noise levels) for 24 consecutive hours

The noise monitoring location are described in the Figure 3-7 below

Figure 3-8: Noise and Dust Emission Monitoring Locations



The recorded noise levels indicate full compliance with the National Standard for the period of 06:01-22:00 in all stations monitored. For the period of 22:01-06:00, slightly higher levels than the Standard were recorded at Ban Hat Gnuin and Ban Hatsaykham [between 46.85 – 51.74 dB(A) compared to the Standard of 45 dB(A)]; the RCC, Aggregate Crushing Plant, Sino Hydro Camp, Sino Hydro Temporary Worker Camp and the Main Dam [between 50.11 – 74.66 dB(A) compared to the Standard of 50 dB(A)].

The noise levels recorded at all Project Construction Site's stations indicated full compliance with the National Standard for the period of 06:01-22:00. However, for the period of 22:01-06:00, slightly higher noise levels than the Standard were recorded at the RCC, Aggregate Crushing Plant, Sino Hydro Camp, Sino Hydro Temporary Workers' Camp, Song Da 5 Camp No. 2, the Main Dam and

Owner's Site Office and Village [between 51.09 – 75.32 dB(A) compared to the Standard of 50 dB(A)]. The key causes of high noise levels were most likely to be the conditions of wind and rain during the night except at the Aggregate Crushing Plant where the crushing machine operated during the night time period.

Results of the noise monitoring for October 2016 are shown in Annex 2.

3.3 PROJECT WASTE MANAGEMENT

3.3.1 Solid Waste Management

In October 2016, NNP1PC closely supervised the landfill operation including waste disposal, waste compaction and soil cover activities. The Landfill operation has generally improved when compared to the last month. With dry weather a rubber-tyred excavator replaced a crawler based excavaorfor spreading and compaction of waste and soil cover. The Contractors were instructed to properly segregate the waste prior to disposal. This practice helped reducing disposal of mixed waste in the landfill, as verified during the daily spot checking and supervision. Approximately 127 m^3 of waste was disposed of at the NNP1 Project Landfill during October 2016, a decrease of 44 m^3 compared to September 2016 (see Photograph 1 and Photograph 2).

Photograph 1: Waste compaction and soil cover at the NNP1 Project landfill	Photograph 2: Waste disposal spot checking by supervision at NNP1 Project Landfill
	

3.3.2 Hazardous Materials and Waste Management

During October 2016, joint hazardous materials and waste inventories were carried out at the main construction sites and subcontractors' camps including Loxley's Stockyard (230 kV Transmission Line), the Site Office and Workshop of RCR, the Loxley-SRI Contractor, TCM Camp, V&K Camp, RCC plant, CVC Plant, Sino Hydro fuel station, Sino Hydro's worker camp, Song Da5 Industrial Area, HM Hydro contractor camp, HM Hydro Workers' Camp, IHI Contractor Camp, IHI Workers' Camp and SECC Workshop.

Compared to September 2016, it was observed that the amount of some waste types had increased to almost double the quantity, for such as used hydraulic and engine oil, empty and used chemical drums and used tyres. This is because the authorised vendor (Khounmixay Processing Factory in Pakxan) did not come to the site as frequently as the last month to purchase recyclables and wastes from the Project possibly due to limited staff available during the rice harvesting season, though commercial reasons may be more likely. Most of recyclables and contaminated materials have been stockpiled on site as shown in Table 3-15 below.

Table 3-15: Results of hazardous material inventory

No.	Hazardous Waste Type	Unit	Total in October 2016 (A)	Disposal by Selling (B)	Remaining Amount (A - B)
1	Used hydraulic and engine oil	litre (l)	5110	0	5,110
2	Cement bag	Bag	2,500	0	2,500
3	Empty used chemical drum/container	Drum (20 l)	2000	0	2,000
4	Used oil filters	Piece	374	0	374
5	Used tyre	Piece	214	0	214
6	Used oil mixed with water	L	200	0	200
7	Ink cartridge	Unit	132	0	132
8	Empty contaminated bitumen drum/container	Drum (200 l)	82	0	82
9	Empty used oil drum/container	Drum (20 l)	47	3	44
10	Empty used oil drum/container	Drum (200 l)	27	6	21
11	Empty paint and spray cans	Can	82	21	61
12	Empty used chemical drum/container	Drum (200 l)	31	0	31
13	Contaminated soil, sawdust and concrete	Bag	22	0	22
14	Halogen/fluorescent bulbs	Unit	14	0	14
15	Contaminated textile and material	Bag	12	0	12
16	Car battery	Unit	10	0	10
17	Acid and caustic cleaners	Bottle	0	0	0
18	Clinical waste	kg	0	0	0

The amount of recyclable waste was recorded at each NNP1 Project construction site and offices including ESD Office, Loxley Office and Stockyard in Paksan, RCR's Site Office and workshop at Thaphabath District, Song Da 5 Camp No. 1, TCM Camp, Re-regulation dam, V&K Camp, Song Da 5 Camp No. 2, Song Da 5 Workshop at the Spoil Disposal area No. 2, RCC Plant, Sino Hydro Camp, Sino Hydro Worker's Camp, SECC Camp and each Contractor's Camp at Houay Soup Resettlement Area (HSRA). The amount of sold recyclable waste is summarised in ***Table 3-16*** below:

Table 3-16: Amounts of recycle waste sold

No.	Recycled Waste Type	Unit	Sold	Cumulative Total at October 2016
1	Scrap metal	kg	0	22,123
2	Glass	kg	8	487
3	Plastic bottles	kg	99	129
4	Aluminium	kg	32	125
5	Paper/cardboard	kg	112	53

The food waste generated from the Owner's Site Office and Village, selected camps of the contractors and subcontractors was collected by Hatsaykham villagers for use as animal feed (pig and poultry). A total of 4,139 kg was collected in October 2016 as shown in ***Table 1-17*** below.

Table 3-17: Amount of Food Waste Collected by Villagers

NO.	SITE LOCATION NAME	UNIT	TOTAL
1	Song Da 5 Camp No. 2	kg	1,805
2	Song Da 5 Camp No. 1	kg	1,522
3	Obayashi Corporation Camp	kg	611
4	Owner's Village and Site Office	kg	201
Total		**kg**	4,139

3.4 Community Waste Management Support

3.4.1 Community Recycling Programme

Since July 2015, a total of 8,977 kg of recyclables were received by the Community Recycle Bank. During October 2016, a total of 658 kg of recyclable waste was recorded, a reduction of 290 kg comparing to September 2016. A total of 121 households hold accounts at the Community Recycle Bank (no increase in membership in October 2016). The percentages of participation in the programme for each village remain to be 87% for Hat Gniun Village, 64% for Hatsaykham Village and 64% for Thahuea Village.

The types and amounts of waste recycled in O 2016 are presented below

Table 3-18: **Types and amounts of waste traded**

Types of Waste	Unit	Amount Recycled In October 2016	Accumulated Amount Recycled (July 2015 – October 2016)
Scrap metal	kg	202	2,991
Glass	kg	248	2,542
Plastic bottle	kg	116	1,394
Paper/cardboard	kg	72	1,360
Aluminium cans	kg	20	691
Total	kg	**658**	**8,977**

In October 2016, the purchase of recyclables from villagers and students continued. Some recyclables were transported from Contractors' camps to the Recycle Waste Bank at Hat Gniun Village (see ***Table 1-17***). Recyclables will continue to be stockpiled at the Community Recycle Waste Bank, the Owner's Site Office and Village and the Contractors/subcontractors with the intention of arranging a routine collection by the Khounmixay Processing Factory (see ***Photograph 3*** and ***Photograph 4*** below:

Photograph 3: Recyclable Waste Were Sold to the Community Recycle Waste Bank

Photograph 4: Recyclables Received from the Contractor

In addition, a total of 385 kg of glass bottles from the Community Recycle Waste Bank at Hat Gniun village was transported and sold to the Keo Lao Factory in Vientiane (see ***Photograph 5*** and ***Photograph 6*** below)

Photograph 5: Recyclable waste from Recycle Waste Bank was sold to Keo Lao Factory

Photograph 6: Recyclable Waste from Recycle Waste Bank was sold to Keo Lao Factory

3.4.2 Houay Soup Resettlement Area Waste Management

In October 2016, a joint final inspection of the 1st stage construction of the Houay Soup Landfill was conducted by NNP1PC and a Contractor which consisted of a waste pit (P1) with a capacity of 900 m^3, 2 anaerobic ponds and a wetland pond for leachate treatment, a groundwater monitoring borehole and a temporary fence. The Houay Soup Landfill was operated every Tuesday and Thursday from 09:30 to 10:30 am through individual arrangement with NNP1PC-EMO staff for waste disposal from host villages, residents and Contractors who work in the Houay Soup Resettlement Area. A total of 10 m^3 of solid waste from HSRA's Contractors was disposed at the permanent waste pit. This amount is likely to increase once Hatsaykham villagers move to the HSRA and new groups of Contractors start the construction activities for villagers in 2LR (lower Reservoir) at HSRA in December 2016 (see ***Photograph 7*** and ***Photograph 8*** below).

Photograph 7: A final inspection on the 1st stage Houay Soup Landfill construction	Photograph 8: Construction of the ground water monitoring borehole was completed
	

3.5 Watershed and Biodiversity Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligations[3]	Status by October 2016
Prepare: **1) Interim Nam Ngiep 1 Watershed Management Plan by 01 September 2016; and** **2) Full draft Nam Ngiep 1Watershed Management Plan by 15 November 2016**	ADB mission accepted the interim plan as confirmed during the mission on 27 October 2016
Prepare draft Watershed Management Regulations by 15 November 2016	The draft regulation was reviewed by WRPO DFRM and WRPO Bolikhamxay. The updated version will be shared to NNP1 in the first week of November 2016.
Final Watershed Management Plan by 23 December 2016	Not relevant at this time
1) Draft provincial regulation submitted to Provincial Justice Department by 23 December 2016. **2) Start of public hearing process by 10 January 2017**	Not relevant at this time
Activities in October 2016	**Results**

[3] All previous deadlines on preparation of the Nam Ngiep 1 Watershed Management Plan and watershed management regulations were revised and agreed with ADB in August 2016. The Table only shows the current required submissions and their respective target dates

Obligations[3]	Status by October 2016
Data and Information Collection and Analysis for WMP Development	• Continue with village consultation meetings that aims to provide some additional information for data and problem analysis such as: family setting, land use, forest use and its trend, food and income activities, and the preference of villagers on the land use, population, food, and rice sufficiency. • The meeting was conducted at seven villages within Xaysomboun Province from 19-21 October 2016. These seven villages include Tamlo, Om, and Korhai at Anouvong District and Thaviengxay, Naxong, Nahong, and Phonehom at Tathom District. • The overall progress of plan development and the revised interim plan was discussed during ADB mission on 27 October 2016. The mission acknowledged the progress and accepted the interim plan.
Prepare draft Watershed Management Regulations by 15 November 2016	• The revised draft was further reviewed by WRPO DFRM and WRPO Bolikhamxay in October. The plans to discuss the regulation in October was postponed to November 2016.
WRPO Activities	• The revised proposal of pre-WMP was discussed during ADB Mission on 27 October 2016. In conclusion, ADB only agreed to disburse the fund for the payment of office construction in Xaysomboun and Bolikhamxay Provinces. The mission considered other request are not necessary as inputs to WMP development.
Xaysomboun ISP	• MONRE DEQP provided the feedbacks on the ISP reports prepared by the Province and relevant districts. The workshop to finalize the report was postponed to 4 November 2016.

3.5.2 Biodiversity Offset Management

Obligations[4]	Status by October 2016
Start of the Boundary Confirmation Baseline Survey by 20 September 2016	• Completed
Consultant acceptable to ADB is engaged as technical consultant for preparation of biodiversity	• ADB Consultant provided the first comment on TOR on 14 October. The final comments of the TOR will be provided in the first week of November 2016.

[4] The biodiversity offset obligations were revised and agreed with ADB in August 2016. The Table only shows the current near term obligations up to end of January 2017

Obligations[4]	Status by October 2016
offset management plan by 30 November 2016	
Issuance of the Boundary Confirmation Baseline Survey preliminary report by 30 November 2016	Not relevant at this time
Issuance of the Boundary Confirmation Baseline Survey draft final report by 31 January 2017	Not relevant at this time

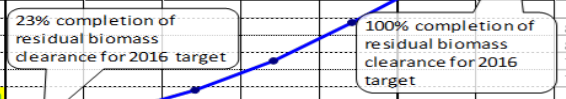
Activities in October 2016	Results
Boundary Confirmation Baseline Survey led by ADB Consultant	• The field work was completed on 23 October 2016. • ADB Consultant presented the initial outcomes of the survey to NNP1 and Biodiversity Offset Management Committee (BOMC) on 26 October 2016. • It was noted through the discussion that though the site hold good biodiversity value, it is still risky in meeting the offset target. Therefore, ADB Mission recommended NNP1 and GOL to consider the need for additional sites within or outside NNP1 Project provinces in case this is recommended in the final survey report
Consultant acceptable to ADB is engaged as technical consultant for preparation of biodiversity offset management plan by 30 November 2016	• ADB consultant provided the first comment on 14 October 2016 recommending that the scope of service to also include studying an incorporating the lesson-learned from NT2 experiences. • In addition, ADB Mission also reiterated that engagement of international conservation organization in ADB preference is a condition for the proper preparation and implementation of the Biodiversity Offset Management Plan (BOMP) as well as with respect to offset management activities prior to the completion of the BOMP
Activities pre-BOMP period of 1 October 2016 – 31 September 2017	• The proposed of pre-BOMP activities with BAC comments was submitted to ADB on 6 October 2016. The proposal was initially discussed during the ADB mission on 26 October and ADB final review will be provided in the first week of November.

3.5.3 Biomass Clearance

The overall progress of biomass clearance programme is demonstrated in Figure 0-9 below.

Figure 3-9: Gantt Chart of Biomass Clearance Programme in 31 October 2016

	Task List / Steps of work		Weight (%)	YEAR 2016 Q1 01	02	03	Q2 04	05	06	Q3 07	08	09	Q4 10	11	12	% S-Curve
1	**Preparation of Biomass Clearance Operation**	Planed	100.0	0.0												100
		Actual	0.0													97.4
1.1	Development of EMP, Implementation Plan, and SS-ESMMP for biomass Clearance	Planed	10.0	10.0												94.8
		Actual	10.0	10.0												92.2
1.1.1	Training on environmental protection measures, safety protocols, and compliance protocols	Planed	2.5			2.5										89.6
		Actual	2.5			2.5										87
1.2	Procurement of equipments for biomass work	Planed	5.0			5.0										84.4
		Actual	2.5			2.5										81.8
2	**UXO Search and Clearance**	Planed	0.0													79.2
		Actual	0.0													76.6
2.1	Perform UXO work for 935 ha (6 blocks) of priority biomass clearance	Planed	15.0			2.5	7.5	5.0								74
		Actual	10.5			2.5	3.0	1.0	4.0							71.4
2.2	Perform UXO work for 554 ha (5 blocks) of priority biomass clearance	Planed	12.5				5.0	5.0	2.5							68.8
		Actual	4.0						4.0							66.2
2.3	Perform UXO work for 423 ha (7 blocks) of priority biomass clearance	Planed	10.0							1.0	1.0	1.0	2.0	2.5	2.5	63.6
		Actual	0.0													61
3	**Biomass Clearance**	Planed	0.0													58.4
		Actual	0.0													55.8
3.1	Perform biomass clearance for 257 ha (block 4, 6 & 7) on lower and central reservoir	Planed	6.5		1.5	2.5	1.5									53.2
		Actual	5.5		1.5	2.0	1.0	1.0								50.6
3.2	Perform biomass clearance for 721 ha (block 1-3 & 5) on lower and central reservoir	Planed	15.0			1.5	1.5	1.5	1.5	1.0	1.0	1.5	1.5	2.0	2.0	48
		Actual	4.0			1.0	1.0	1.0	1.0							45.4
3.3	Perform biomass clearance for 95 ha (block 8-9) on central reservoir	Planed	8.0					1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	42.8
		Actual	0.0													40.2
3.4	Utilization of NTFP and waste biomass and rice plantation on cleared biomass area (project affected villagers)	Planed	3.0	1.5			1.5									37.6
		Actual	3.0	0.5	1.0		1.5									35
4	**Floating/Debris Removal**	Planed	0.0													32.4
		Actual	0.0													29.8
4.1	Procurement of equipment and service for floating logs/debris removal	Planed	1.0												1.0	27.2
		Actual	0.0													24.6
5	**Monitoring and Reporting**	Planed	0.0													22
		Actual	0.0													19.4
5.1	Field monitoring and inspection of biomass clearance and compliance to SS-ESMMP (weekly & Monthly)	Planed	9.5		1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	1.5	1.0	1.0	16.8
		Actual	4.5		1.0	1.0	1.0	0.5	1.0							14.2
5.2	Coordination or Ad-hoc meeting to discuss the progress, concerns and problem solving	Planed	2.0		0.5				0.5			0.5			0.5	11.6
		Actual	1.0		0.5		0.3	0.3								9
	Total	Planed	100.0	**11.5**	**3.0**	**15.0**	**19.0**	**13.5**	**6.0**	**3.5**	**3.5**	**4.5**	**6.0**	**6.5**	**8.0**	6.4
		Actual	67.5	**10.5**	**4.0**	**11.5**	**7.8**	**3.8**	**10.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	3.8
		Planed Progress	monthly	11.5	3.0	15.0	19.0	13.5	6.0	3.5	3.5	4.5	6.0	6.5	8.0	
			Cumulative	11.5	14.5	29.5	48.5	62.0	68.0	71.5	75.0	79.5	85.5	92.0	100.0	
		Actual Progress	monthly	10.5	4.0	11.5	7.8	3.8	10.0	0.0	0.0	0.0	0.0	0.0	0.0	
			Cumulative	10.5	14.5	26.0	33.8	37.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	
	Budget Code EE1.04, EE1.05	Approved	USD	217,274	2,900	237,250	21,400	900	236,550	700	700	1,200	100,700	900	420,273	
		Actual Paid	USD	216,366	1,383	- 677	610	277	77							



The blue graph and yellow highlight represent the planned activity, the red graph and green highlight represent the actual progress.

Activities in October 2016	Results
Labour recruitment	• 10 labourers from Ban Som Phouan are employed to support UXO work in Block 8 and Block 9.
Perform UXO work for 9 blocks of priority biomass clearance	• UXO survey was completed on 17.07 ha in Block 8 and 11.23 ha in Block 9. There was no UXO encountered during the survey. • Progress in Block 8 and 9 can be seen in Figure 3-10 and Figure 3-11 The overall UXO progress can be seen in Table 3-19.
Perform biomass clearance of block 1-9 on lower and central reservoir	• The Contractor provided an updated work plan from November 2016 – December 2017, which was discussed during the meeting with Xaysomboun Provincial Authority on 19 October 2016. • The meeting with Xaysomboun Provincial Authority was held as follow-up on the coordination meeting on 28 September 2016 in Hom District. The meeting was chaired by Provincial Governor and attended by 10 high ranking officers from relevant offices including Provincial Agriculture and Forestry Office (PAFO), Department of Natural Resource Environment (DoNRE), Department of Energy and Mine (PDEM), Department of Industry and Commerce (DIC), Xaysomboun Provincial Military Headquarters, and Provincial Governor Office. • The key highlights from the meeting: o NNP1 to review the Concession Agreement (CA) and the Contract of Biomass Contractor to address the issue on cutting and stockpiling the trees with diameter more than 20 cm o The progress should be continuously monitored and the report to be submitted on a weekly and monthly basis to WRPO and concerned authorities o The biomass clearance shall continue according to the Concession Agreement because it is not against the PM Instruction Letter, No. 15/PM, dated 13 May 2016.

Figure 3-10: UXO Search and Clearance in Block 8

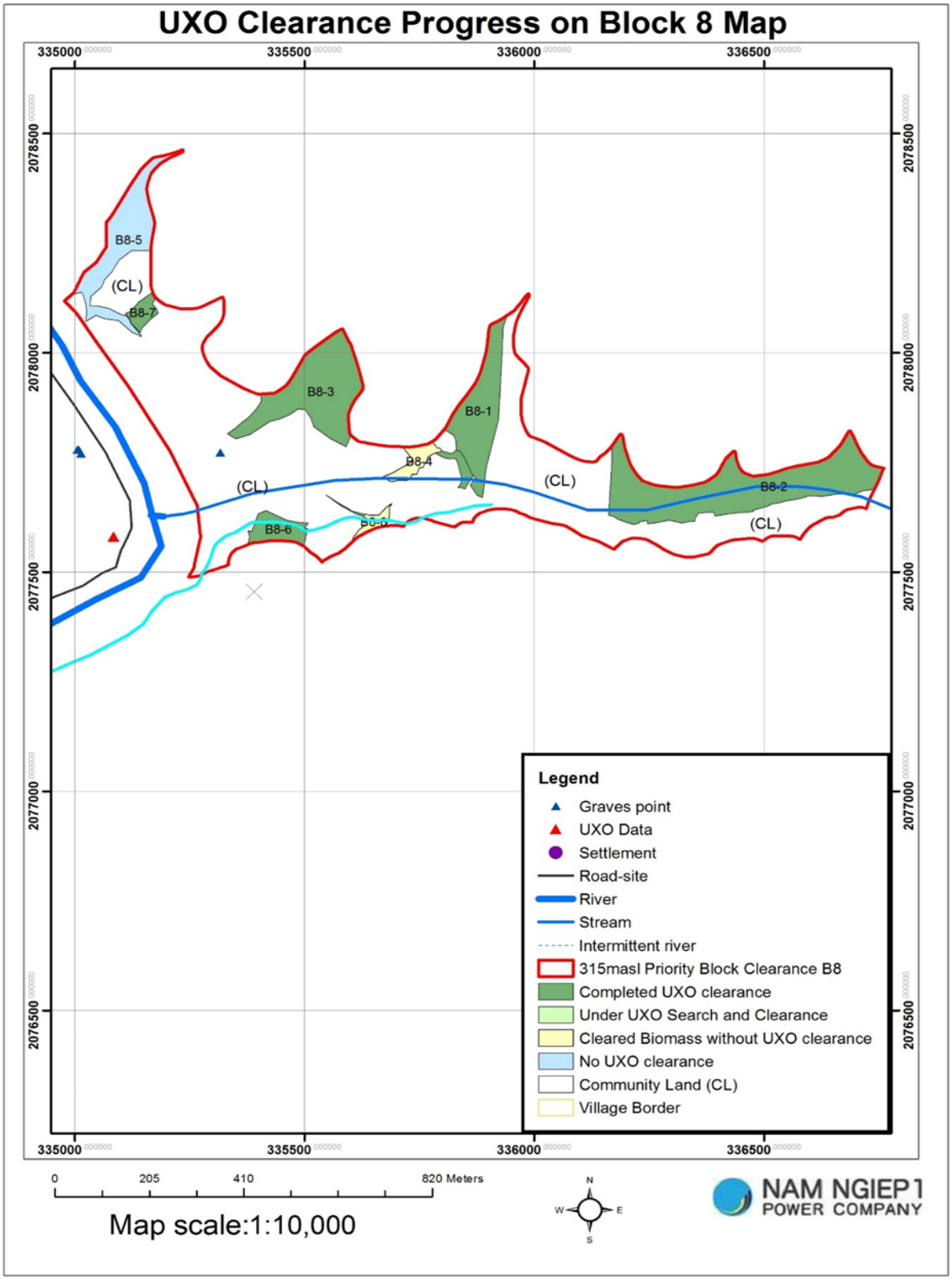


Figure 3-11: UXO Search and Clearance in Block 9

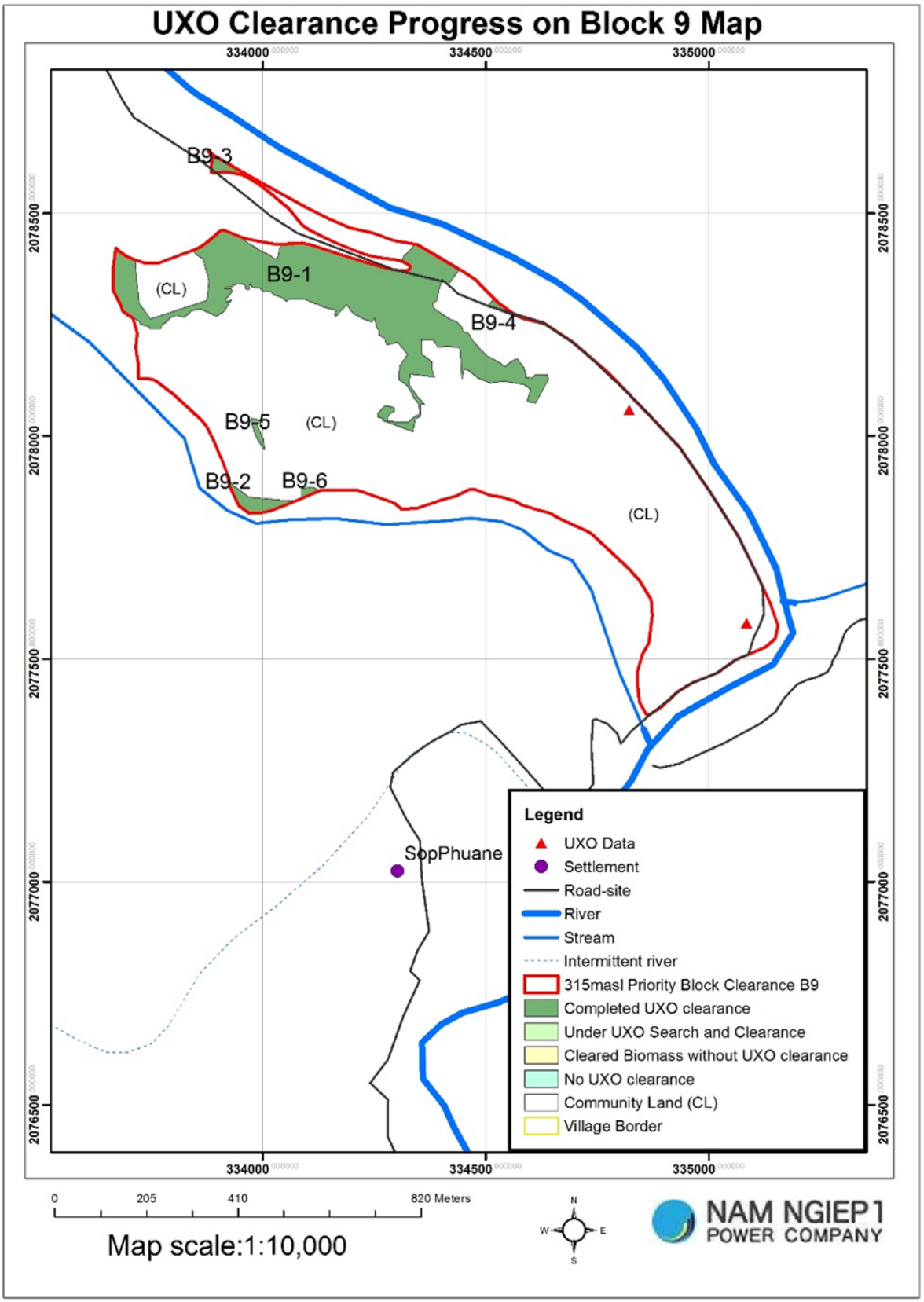


Table 3-19: Progress of UXO Search and Biomass Clearance by block as October 2016

Block	Parcel Code	Area_ha	UXO Clearance Progress		Remark
			Completed	Certificate	
Block8	B8-1	2.260	2.260		Completed UXO clearance
	B8-2	5.500	5.500		Completed UXO clearance
	B8-3	3.300	3.300		Completed UXO clearance
	B8-4	0.630	0.630		Completed UXO clearance
	B8-5	1.710	1.710		Completed UXO clearance
	B8-6	1.710	1.710		Completed UXO clearance
	B8-7	1.710	1.710		Completed UXO clearance
	B8-8	0.250	0.250		Completed UXO clearance
	Total B8	**17.070**	**17.070**		
Block9	B9-1	10.44	10.44		Completed UXO clearance
	B9-2	0.370	0.370		Completed UXO clearance
	B9-3	0.170	0.170		Completed UXO clearance
	B9-4	0.100	0.100		Completed UXO clearance
	B9-5	0.090	0.090		Completed UXO clearance
	B9-6	0.060	0.060		Completed UXO clearance
	Total B9	**11.230**	**11.230**		
Grand Total		**328.991**	**255.614**	**129.18**	

3.5.4 Fishery Monitoring

The overall progress of fish monitoring programme is illustrated in ***Figure 1-12*** below.

Figure 3-12: Gantt Chart of Fish Monitoring Programme as of 31 October 2016

	Task List / Steps of work		Weight (%)	YEAR 2016												% S-Curve	Assigned to
				Q1			Q2			Q3			Q4				
				01	02	03	04	05	06	07	08	09	10	11	12		
1	**Daily catch logbook and Verification Survey**		100.0														
			-														
1.1	Daily catch logbook data collection on 162 HHs in 25 villages	Planed	24.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	100	FM Team
		Actual	18.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				97	
1.2	Survey design, interview form design, test and development for verification survey	Planed	4.0		4.0											93	Consultant and FM team
		Actual	4.0		4.0											90	
1.3	Daily catch logbook verification survey for 2-4 on 144 HHs	Planed	10.0			2.0		2.0		2.0		2.0		2.0		87	FM Team
		Actual	7.5			2.0		2.0		2.0		1.5				83	
2	**Household Catch Assessment Survey**															80	
			-													77	
2.1	Data collection and validation on 121 HHs	Planed	10.0		2.0		2.0		2.0		2.0		2.0			73	FM team
		Actual	10.0		2.0		2.0		2.0		2.0		2.0			70	
3	**Fish Spawning Survey**															67	
			-													63	
3.1	Survey design, interview form design, test and development	Planed	2.0						2.0							60	Consultant and FM team
		Actual	2.0						2.0							57	
3.2	Data collection and validation on 16 villages	Planed	2.0						2.0							53	FM team
		Actual	2.0						2.0							50	
4	**Village Community Interview**															47	
			-													43	
4.1	Survey design, interview form design, test and development	Planed	7.0								4.0	3.0				40	Consultant and FM team
		Actual	7.0								4.0	3.0				37	
4.2	Data collection and validation on 34 villages	Planed	9.0										3.0	3.0	3.0		FM team
		Actual	4.0									1.0	3.0				
5	**Data management and report**															33	
																30	
5.1	Data input to database system	Planed	21.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	27	FM team/ Database team
		Actual	14.0	1.0	0.5	1.0	2.0	2.0	2.0	2.0	2.0	1.0				23	
5.2	Annual Data analysis and draft annual report for 2015-2016	Planed	5.0							5.0						20	Consultant
		Actual	5.0							5.0						17	
5.3	Disemination/presentation the report for 2015-2016	Planed	3.0								3.0					13	Consultant
		Actual	3.0							3.0						10	
5.4	Final Annual Report for 2015-2016	Planed	3.0									3.0				7	Consultant
		Actual	3.0								3.0					3	
	Total	Planed	100.0														
		Actual	79.5														
		Planned Progress	monthly	3.0	9.0	5.0	6.0	6.0	10.0	11.0	13.0	12.0	6.0	6.0	4.0		
			Cumulative	3.0	12.0	17.0	23.0	29.0	39.0	50.0	63.0	75.0	81.0	87.0	91.0		
		Actual Progress	monthly	-	8.5	5.5	6.0	6.0	10.0	14.0	13.0	7.5	2.0	-	-		
			Cumulative	-	8.5	14.0	20.0	26.0	36.0	50.0	63.0	70.5	72.5	72.5	72.5		
	Budget Code EL4.03	Approved	USD	3,000	2,450	1,850	3,000	1,850	1,850	3,000	1,850	1,850	5,600	1,850	1,850		30,000
		Actual Paid	USD														-

Activities in October 2016	Results
Daily Catch Logbook and Verification Survey	• Completed the daily catch logbook survey in 152 HH out of the total target of 162 HH. There were around 4,845 forms used for the survey • Database is being developed on the collected information
Household Catch Assessment Survey	• Completed households catch assessment including the exit survey in 121 HH
Village Community Interview	• Completed village community interview at 18 villages out of the total target of 34 villages. • Database is being developed on the collected information.
Gillnet Sampling Survey	• The Consultant (FishBio) submitted the draft annual gillnet survey report to NNP1 and currently being reviewed by NNP1 EMO. • The Consultant planned to have technical presentation in the middle of November 2016.

3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

There is no further feedback from EPF to Xaysomboun Proposal since May 2016. The proposal might be dropped if it will be continued by PAFO instead of PONRE.

The MOU was signed between EPF and the Bolikhamxay Province. There is on-going discussion on the establishment of Committee and Project team. The fund will be transferred to the Province upon submission of official letter of establishment of Committee and Project team.

The Xieng Khuang Proposal is under finalization. A working session to finalize the proposal between EPF and Xieng Khuang Province team is scheduled in November 2016.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

There was no update from EDL on the revision of the 115 kV Transmission Line IEE.

3.6.3 Nabong Substation Upgrade Due Diligence Assessment

NNP1PC continues to try to obtain the approval letters from government counterparts for the upgrading works at the Nabong Substation. The EMO and ESD management have followed up with EDL, but such reference was not available at EDL. The EMO and ESD management will follow up with Sub-Station's owner, and the result will be reported in November 2016 report.

3.7 External Monitoring

A report on LTA and ADB Environment Specialist visit during 18 to 23 September 2016 was provided for NNP1PC's comments. The ADB Principal Safeguard Specialist and Biodiversity Consultant have visited the project from 24 October to 02 November 2016 to discuss some issues related to the biodiversity offset and the watershed management programmes. The mission team attended the presentation on the results of the boundary confirmation baseline survey carried out by ADB consultant. The survey was confirmed once again that the Nam Chouane-Nam Sang is suitable for an Offset Site

3.7.1 Independent Monitoring Agency

There was no IMA mission and activity update during the month of October 2016.

3.7.2 Biodiversity Advisory Committee

The recruitment of Dr. William Duckworth as BAC chairperson was completed.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

Table A- 1: Results of camp effluents in October 2016 – the first fortnight sampling

	Site Name	Owner Site Office and Village	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF06	EF10
	Date	05/10/16	06/10/16	06/10/16		06/10/16	06/10/16
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	6.72	8.88	8.77	No sampling due to no water	8.42	8.89
Sat. DO (%)		35.6	1.1	87.9		10.1	96.8
DO (mg/L)		2.6	0.08	6.58		0.72	6.79
Conductivity (µs/cm)		415	647	573		458	275
TDS (mg/L)		207	324	287		229	142.75
Temperature (°C)		29.8	30.4	28.7		30	32.6
Turbidity (NTU)		2.79	13.5	6.96		10.07	60
TSS (mg/l)	<50	ND[5]	41.6	8.5		25.1	194
BOD (mg/l)	<30	ND[15]	45.4	13.9		22.1	15.5
COD (mg/l)	<125	10.7	171	77.5		69.6	75.5
NH_3-N (mg/l)	<10.0	3	31	ND[12]		12	4
Oil & Grease (mg/l)	<10.0	ND[15]	8	ND[15]		1	ND[15]
Total coliform (MPN/100ml)	<400	330	160,000	160,000		160,000	92,000
Faecal Coliform (MPN/100ml)		330	160,000	92,000		160,000	35,000
Discharge Volume (m3/day)		*21.6*	*0*	*0*		*0*	*0.5*

	Site Name	Songda5 Camp#1	Songda5 Camp#2	HMH Worker Camp #1	SECC Camp	HMH Main Camp - Drainage	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF12	EF13	EF14
	Date	06/10/16	06/10/16	06/10/16	06/10/16		06/10/16	06/10/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	7.01	8.69	7.64	6.53	No sampling due to no water	8.78	6.97
Sat. DO (%)		263.3	1.7	96.9	64.2		163.9	1.5
DO (mg/L)		19.01	0.12	6.75	4.69		11.83	0.11
Conductivity (µs/cm)		537	542	205.4	175.4		354	589
TDS (mg/L)		269	272	102.77	84.44		177	245
Temperature (°C)		31.1	30.9	31.2	30.3		30.9	30.1
Turbidity (NTU)		8.11	12.1	17.3	5.69		11.3	19
TSS (mg/l)	<50	11.6	9.8	24.5	35.2		42.1	27.8
BOD (mg/l)	<30	9.4	26.4	5.1	20.2		17	51.8
COD (mg/l)	<125	75.5	85.5	22	29.2		137	211
NH_3-N (mg/l)	<10.0	13	28	ND[12]	4		5	27
Oil & Grease (mg/l)	<10.0	ND[12]	ND[12]	ND[12]	ND[12]		1	3
Total coliform (MPN/100ml)	<400	160,000	160,000	160,000	54,000		4,600	160,000
Faecal Coliform (MPN/100ml)		160,000	160,000	54,000	2,300		680	160,000
Discharge Volume (m3/day)		*0*	*0*	*0*	*0.5*		*0*	0

Table A- 2: Results of camp effluents in October 2016 –second fortnight sampling

	Site Name	Owner Site Office and Village	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF06	EF10
	Date	20/10/16	21/10/16	21/10/16		21/10/16	21/10/16
Parameters (Unit)	Guideline						
pH	6.0 - 9.0	7.17	8.75	8.97	No sampling due to no water	8.71	8.78
Sat. DO (%)		17.4	1.5	81.7		9.4	207.1
DO (mg/L)		1.3	0.11	6.13		0.72	14.75
Conductivity (µs/cm)		786	655	611		484	265
TDS (mg/L)		396	327	305.5		242	132
Temperature (°C)		28.65	31.1	28.4		29.8	31.5
Turbidity (NTU)		1.4	15.9	11.2		19.9	9.6
TSS (mg/l)	<50	ND[5]	22	13.5		19.2	19.6
BOD (mg/l)	<30	1.1	61.8	17.5		23.4	8.8
COD (mg/l)	<125	12.8	140	93.5		54.6	48.6
NH_3-N (mg/l)	<10.0	5	25	3		15	5
Oil & Grease (mg/l)	<10.0	ND[13]	5	ND[13]		2	1
Total coliform (MPN/100ml)	<400	220	160,000	35,000		160,000	1,100
Faecal Coliform (MPN/100ml)		79	160,000	7,000		160,000	49
Discharge Volume (m3/day)		*259.2*	*0*	*0*		*0*	*0*

	Site Name	Songda5 Camp#1	Songda5 Camp#2	HMH Worker Camp #1	SECC Camp	HMH Main Camp - Drainage	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF12	EF13	EF14
	Date	21/10/16	21/10/16	21/10/16	21/10/16		21/10/16	21/10/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	8.06	8.72	8.66	7.17	No sampling due to no water	8.98	8.94
Sat. DO (%)		20.8	29.6	97.5	31.6		116.9	1.7
DO (mg/L)		1.56	2.15	6.72	2.47		11.98	0.12
Conductivity (µs/cm)		545	668	294	208.8		435	789
TDS (mg/L)		272.5	334	197	104.4		267.5	393
Temperature (°C)		28.9	30.2	33.7	26.4		31.3	29.8
Turbidity (NTU)		12.6	51.8	7.07	5.56		21.2	24.6
TSS (mg/l)	<50	21	15.3	6.3	5.5		67.8	24.4
BOD (mg/l)	<30	30.6	31.4	ND[12]	ND[12]		48.6	118
COD (mg/l)	<125	99.9	91.9	14.3	14.7		181	240
NH_3-N (mg/l)	<10.0	8	35	ND[12]	ND[12]		5	37
Oil & Grease (mg/l)	<10.0	ND[12]	2	ND[12]	ND[12]		1	3
Total coliform (MPN/100ml)	<400	160,000	160,000	1,700	1,100		92,000	160,000
Faecal Coliform (MPN/100ml)		160,000	92,000	1,700	130		7,000	28,000
Discharge Volume (m3/day)		*0*	*0*	*0*	*1.4*		*0*	*0*

Table A- 3: Results of the Construction Area Discharge in October 2016

	Site Name	Aggregate Crushing Plant				CVC Plant			
	Station Code	DS02				DS03			
	Date	05/10/16	11/10/16	20/10/16	24/10/16	05/10/16	11/10/16	20/10/16	24/10/16
Parameter (Unit)	**Guideline**								
pH	6.0 - 9.0	8.66	8.98	7.37	No Discharge	No Discharge	No Discharge	No Discharge	No Discharge
Sat. DO (%)		98.4	95.8	95.9					
DO (mg/L)		7.05	6.97	7.14					
Conductivity (us/cm)		81.2	82	33.1					
TDS (mg/L)		40.5	41	26					
Temperature (°C)		31.1	30.3	28.9					
Turbidity (NTU)		2,067	17,970	1,170					
TSS (mg/L)	<50	2,000	10,027	3,322					
Oil & Grease (mg/L)	<10	N/A	ND[13]	ND[13]					
Discharge Volume (m^3/day)		*172.8*	*259*	*85*					

	Site Name	Spoil Disposal #2				RCC Plant			
	Station Code	DS04				DS09			
	Date	05/10/16	11/10/16	20/10/16	24/10/16	05/10/16	11/10/16	20/10/16	24/10/16
Parameter (Unit)	**Guideline**								
pH	6.0 - 9.0	6.89	5.87	6.61	7.02	7.38	7.13	8.34	8.88
Sat. DO (%)		40.1	89.9	70.1	52.1	98.3	97.8	98.1	99.1
DO (mg/L)		3.14	6.73	6.02	3.96	7.5	7.37	7.03	7.25
Conductivity (us/cm)		481	17.26	37	23.9	102.9	96.8	70.7	226
TDS (mg/L)		241	8.63	19	12	51.89	48.4	35	113
Temperature (°C)		25.88	28.9	27.9	27.8	28	28.5	30	30.2
Turbidity (NTU)		12.2	7.36	7.34	12.07	12,800	44,000	84,000	84
TSS (mg/L)	<50	8.6	3.6	ND[5]	11.7	28,170	48,420	47,693	212
Oil & Grease (mg/L)	<10	N/A	ND[13]	ND[13]	N/A	N/A	ND[13]	ND[13]	N/A
Discharge Volume (m^3/day)		*691*	*864*	*432*	*346*	*259*	*605*	*432*	*259.2*

	Site Name	Regulating Dam				Main Dam			
	Station Code	DS08				DS11			
	Date	05/10/16	11/10/16	20/10/16	24/10/16	05/10/16	11/10/16	20/10/16	24/10/16
Parameter (Unit)	**Guideline**								
pH	6.0 - 9.0	7.46	8.68	No Discharge	No Discharge	8.88	7.82	7.89	7.96
Sat. DO (%)		101.7	99			100.4	97.4	97	100
DO (mg/L)		7.67	6.92			7.38	7.39	7.33	7.68
Conductivity (us/cm)		180.8	136.1			466	1313	705	337
TDS (mg/L)		90.4	68			233	656.5	352	168.5
Temperature (°C)		28.5	33.7			29.8	28.2	28.2	27.5
Turbidity (NTU)		30	62.7			6.26	6.38	5.44	7.42
TSS (mg/L)	<50	23.5	74.5			10.7	31.9	16.8	27.4
Oil & Grease (mg/L)	<10	N/A	ND[13]			N/A	ND[13]	16.8	N/A
Discharge Volume (m^3/day)		*8.6*	*8.6*			*6,000*	*6,000*	*6,000*	*6,000*

ANNEX B: AMBIENT NOISE DATA

Table B- 1: Average of Noise Monitoring at Ban Hat Gniun in October 2016

Noise Level (dB)	02-03/10/2016			03-04/10/2016			04-05/10/2016			05/10/2016
	09:46-18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 - 09:46
Maximum Value Recorded	70.40	73.40	61.20	70.80	62.20	70.10	75.70	68.10	72.10	74.90
Guideline Max	*115*	*115*	*115*	*115*	*115*	*115*	*115*	*115*	*115*	*115*
Average Data Recorded	49.43	51.45	50.15	48.11	50.80	49.35	46.78	50.75	50.76	50.01
Guideline Averaged	*55*	*55*	***45***	*55*	*55*	***45***	*55*	*55*	***45***	*55*

Figure B- 1: Result of Noise Level Monitoring at Ban Hat Gnuin in October 2016

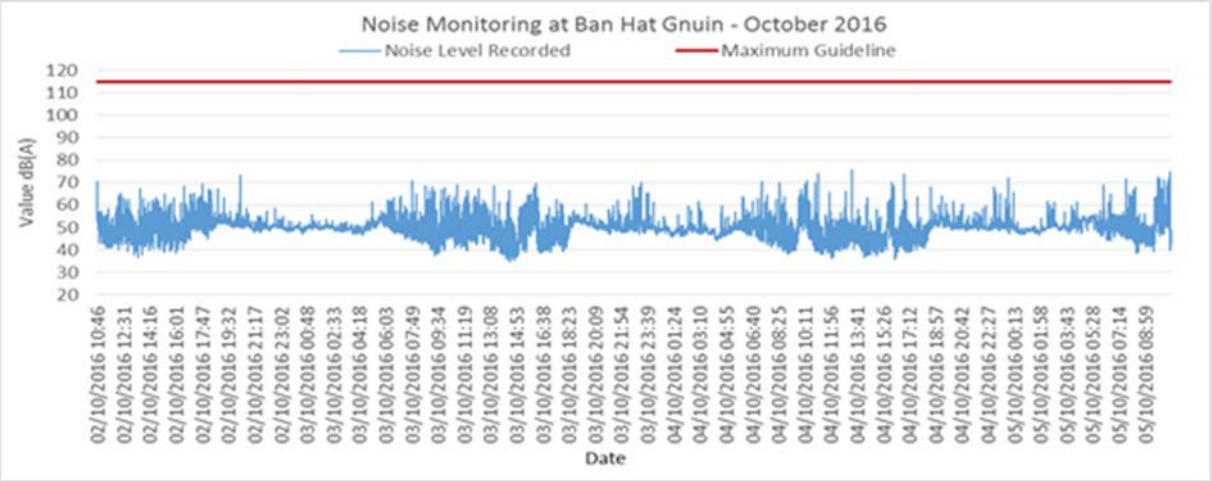


Table B- 2: Noise Monitoring Average Results at Ban Hatsaykham

Noise Level (dB)	06-07/10/2016			07-08/10/2016			08-09/10/2016			09/10/2016
	15:51-18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 – 18:00	18:01 – 22:00	22:01 – 06:00	06:01 - 15:51
Maximum Value Recorded	65.30	63.10	59.20	74.60	69.20	82.90	86.40	60.40	66.40	62.20
Guideline Max	*115*	*115*	*115*	*115*	*115*	*115*	*115*	*115*	*115*	*115*
Average Data Recorded	41.48	52.41	46.85	50.74	53.69	51.74	53.12	52.73	50.98	51.91
Guideline Averaged	*55*	*55*	***45***	*55*	*55*	***45***	*55*	*55*	***45***	*55*

Figure B- 2: Results of Noise Level Monitoring at Ban Hatsaykham October 2016

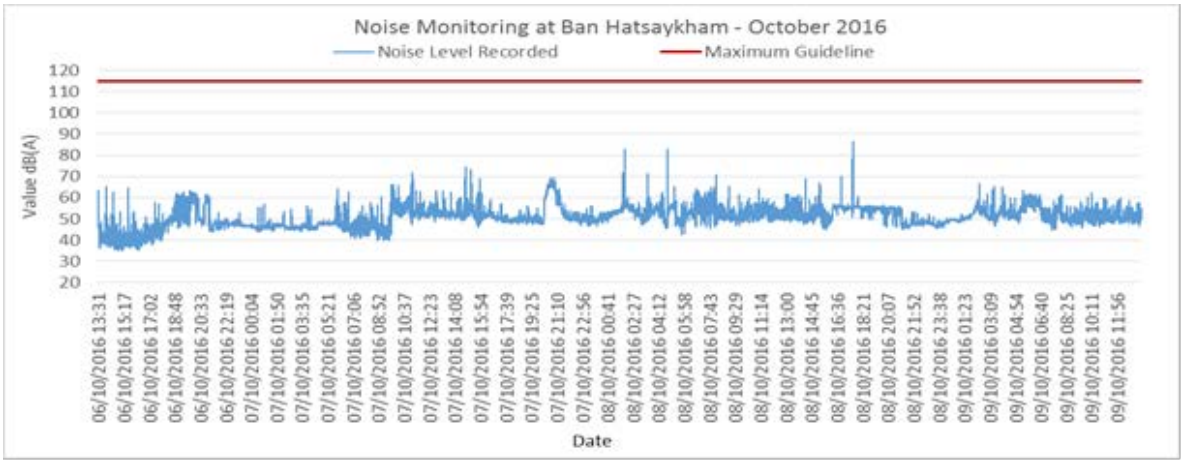


Table B- 3 and Table B- 4: Average Results Noise Monitoring at Aggregate Crushing Plant and RCC Plant in October 2016

Aggregate Crushing Plant

Noise Level (dB)	26-27/10/2016		27/10/2016
	10:04 – 22:00	22:01 – 06:00	06:01-10:04
Maximum Value Recorded	82.9	83.7	75.3
Guideline Max	***115***	***115***	***115***
Average Data Recorded	68.84	74.66	60.56
Guideline Averaged	***70***	***50***	***70***

RCC Plant

Noise Level (dB)	24-25/10/2016		25/10/2016
	10:22 – 22:00	22:01 – 06:00	06:01-10:22
Maximum Value Recorded	84.3	73.4	61.2
Guideline Max	***115***	***115***	***115***
Average Data Recorded	55.71	55.54	51.76
Guideline Averaged	***70***	***50***	***70***

Figure B- 3: Results of Noise Level Monitoring at Aggregate Crushing Plant in October 2016

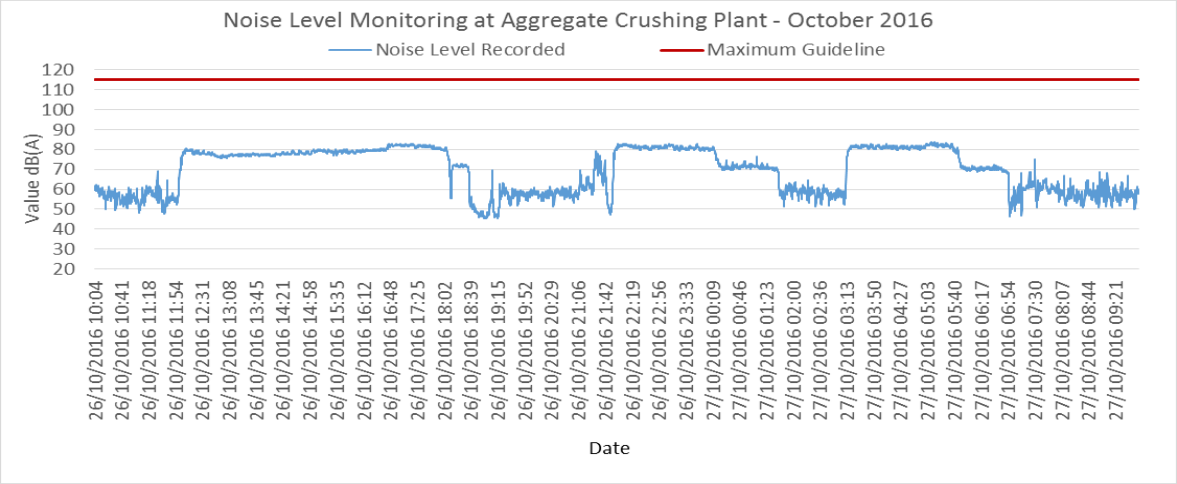


Figure B- 4: Dust Monitoring Results at RCC Plant in October 2016

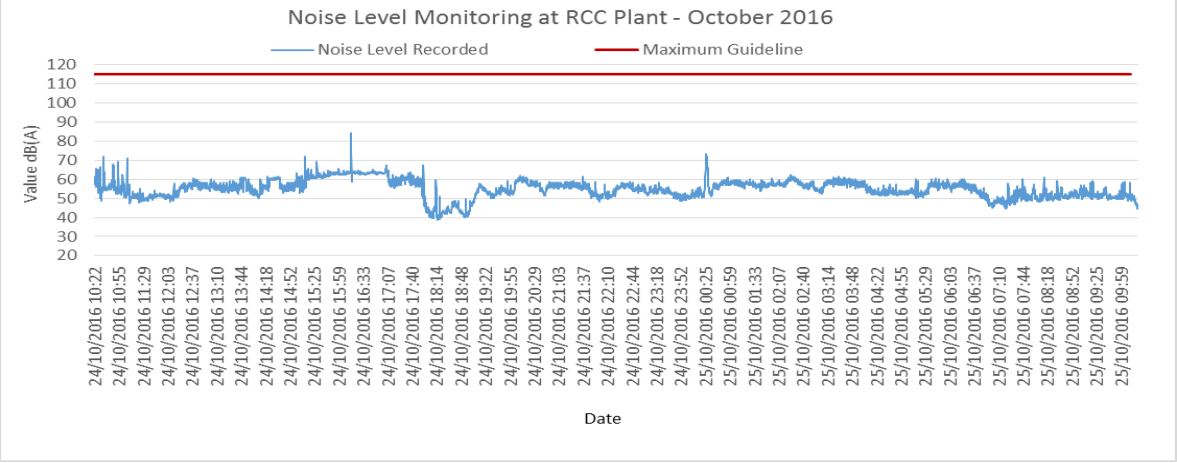


Table B- 5 and Table B- 6: ***Average Results of Noise Monitoring at Songda Camp#2 and Sino Hydro Camp in October 2016***

Songda 5 Camp No. 2

Noise Level (dB)	12-13/10/2016		13/10/2016
	13:37 – 22:00	22:01 – 06:00	06:01-13:37
Maximum Value Recorded	75.5	63.7	76.5
Guideline Max	***115***	***115***	***115***
Average Data Recorded	52.51	54.16	51.71
Guideline Averaged	***70***	***50***	***70***

Sino Hydro Camp

Noise Level (dB)	22-23/10/2016		23/10/2016
	11:12 – 22:00	22:01 – 06:00	06:01-11:12
Maximum Value Recorded	73.3	62.8	64.7
Guideline Max	***115***	***115***	***115***
Average Data Recorded	53.09	54.22	51.10
Guideline Averaged	***70***	***50***	***70***

Figure B- 5: Results of Noise Level Monitoring at Songda5 Camp#2 in October 2016

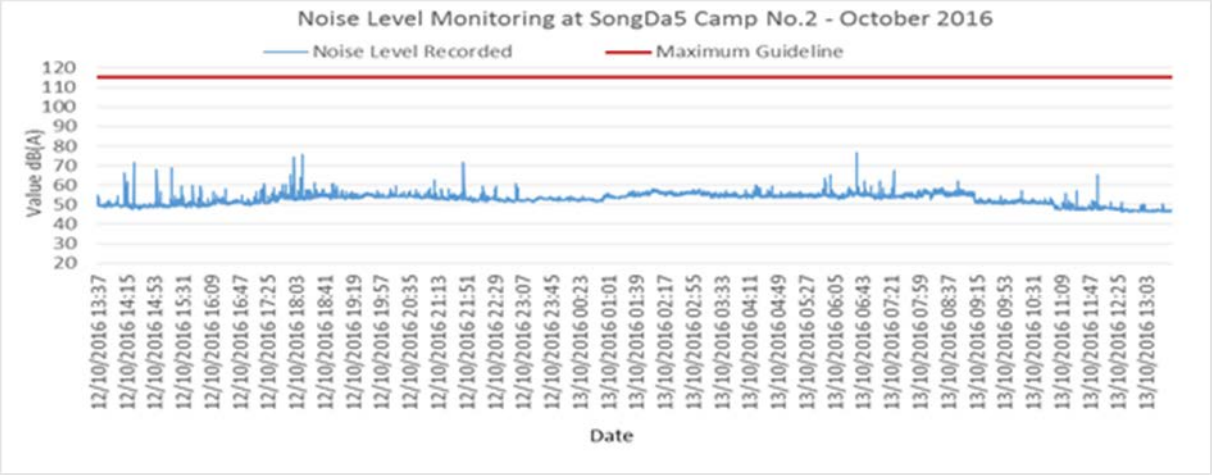


Figure B- 6: Results of Noise Level Monitoring at Sino Hydro Camp in October 2016

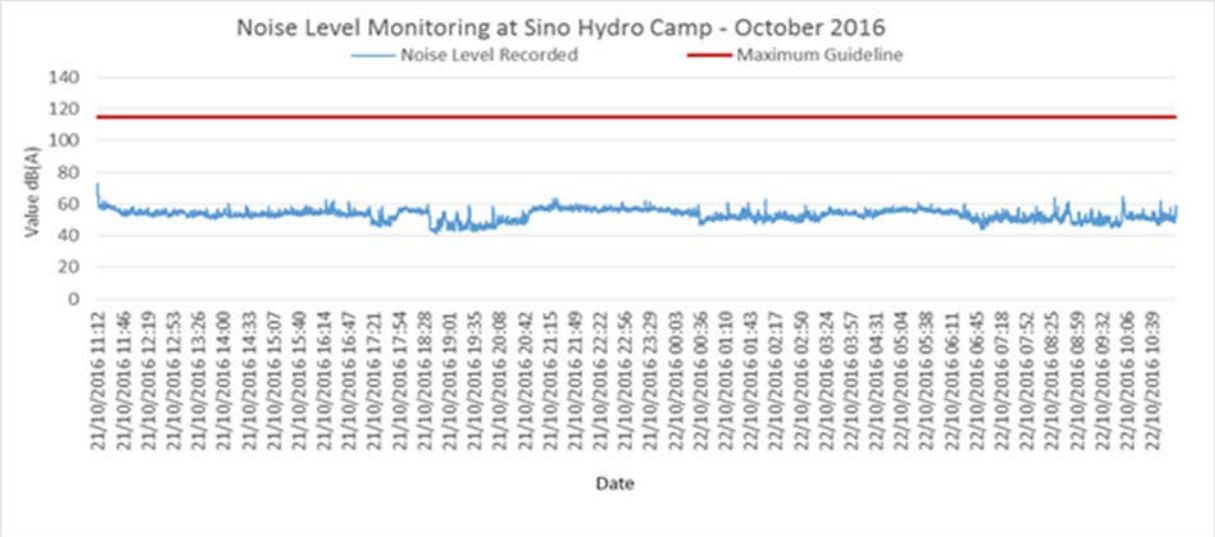


Table B- 6 and Table B- 7: ***Average Results of Noise Monitoring at the Owner's Site Office and Village and, the Main Dam in October 2016***

Owner's Site Office and Village

Noise Level (dB)	10-11/10/2016		11/10/2016
	11:58 – 22:00	22:01 – 06:00	06:01-11:17
Maximum Value Recorded	63.1	58.3	56.9
Guideline Max	***115***	***115***	***115***
Average Data Recorded	42.93	50.11	37.89
Guideline Averaged	***70***	***50***	***70***

Main Dam

Noise Level (dB)	28-29/10/2016		29/10/2016
	10:52 – 22:00	22:01 – 06:00	06:01-10:52
Data Record Max	63	59.3	61.5
Guideline Max	***115***	***115***	***115***
Data Record Average	51.02	52.41	54.58
Guideline Averaged	***70***	***50***	***70***

Figure B- 7: Results of Noise Level Monitoring at Owner's Site Office and Village in October 2016

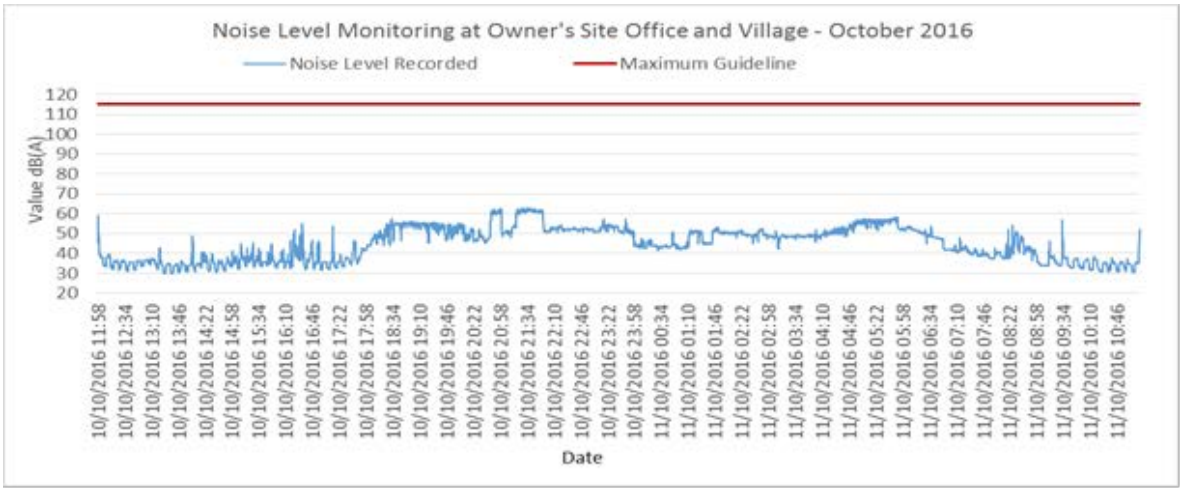


Figure B- 8: Results of Noise Level Monitoring at Main Dam in October 2016

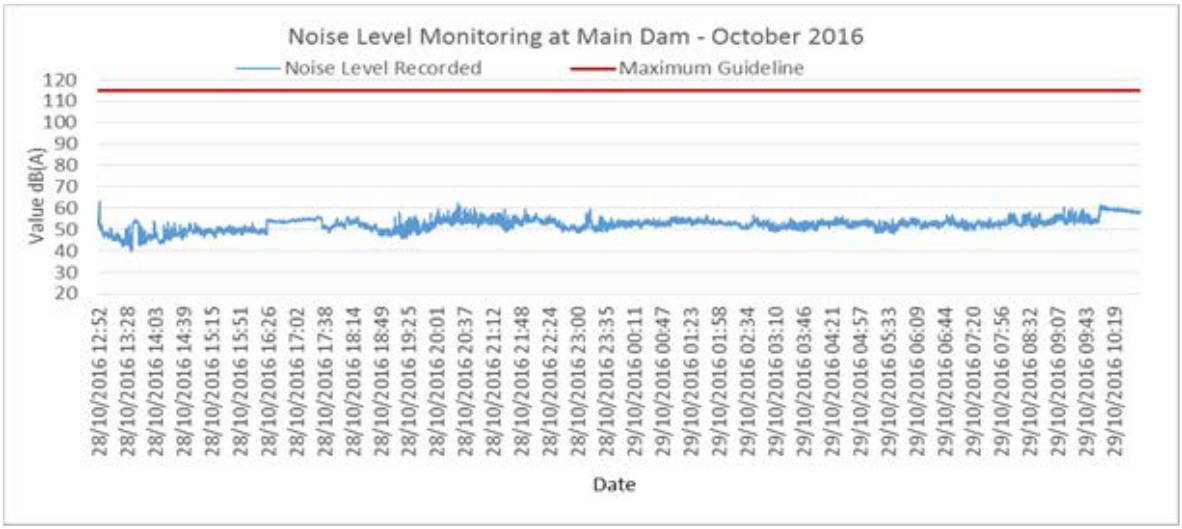


Figure B-9: Average Results of Noise Monitoring at the Sino Hydro Temporary Worker Camp in October 2016

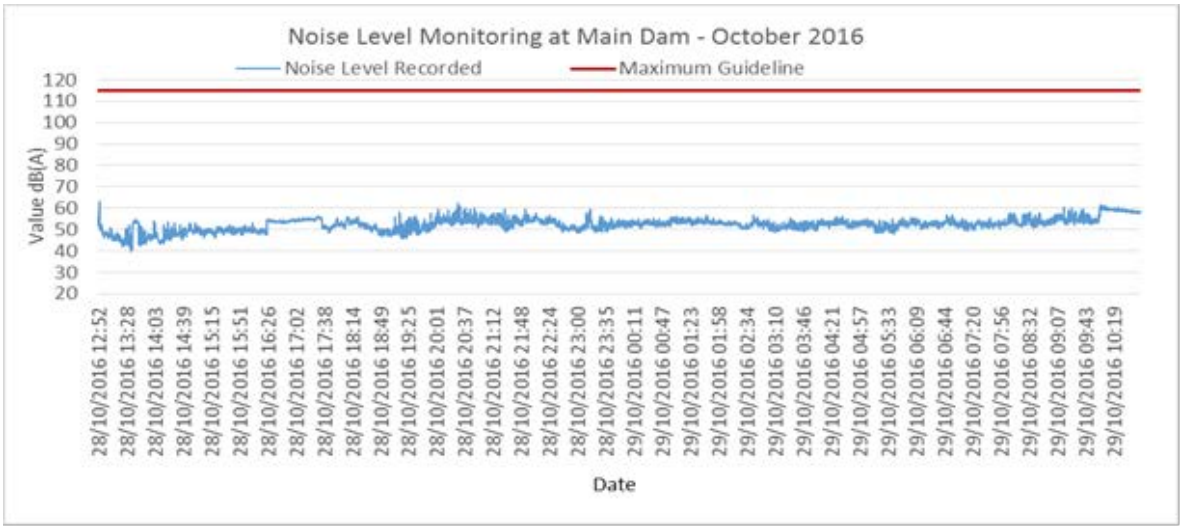


Table B- 10: Average Results of Noise Monitoring at the Sino Hydro Temporary Worker Camp in October 2016

Sino Hydro Temporary Worker Camp

Noise Level (dB)	27-28/10/2016		28/10/2016
	11:32 – 22:00	22:01 – 06:00	06:01-11:32
Maximum Value Recorded	70.2	66.7	64.4
Guideline Max	***115***	***115***	***115***
Average Data Recorded	56.06	56.56	54.55
Guideline Averaged	***70***	***50***	***70***

Figure B- *10:* Results of Noise Level Monitoring at Sino Hydro Temporary Worker Camp