

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

April 2016

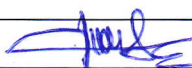

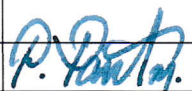
					
A	23 May 2016	Viengkeo Phetnavongxay	Peter G. Jensen	Prapard PanARam	
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BBREVIATIONS / ACRONYMS

ADB	Asian Development Bank
BBS	Biodiversity Baseline Survey
BOD	Biochemical Oxygen Demand
BOF	Biodiversity Offset Framework
BODM	Board of Directors Meeting
BRP	Biomass Removal Plan
CA	Concession Agreement between the NNP1PC and GOL,
CAP	Corrective Action Plan
COD	Commercial Operation Date
CVC	Conventional Concrete
CWC	Civil Works Contract
DAS	Document Approval Sheet
DCC	District Coordination Committees
DEQP	Department of Environmental Quality Promotion, MONRE
DESIA	Department of Environmental and Social Impact Assessment, MONRE
DFRM	Department of Forest Resources Management, MONRE
ECZ	Elephant Conservation Zone
EdL	Electricite du Laos
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 of Chulalongkhorn University
ERM	Environmental Resource Management
ESD	Environmental and Social Division of NNP1PC
ESMMP	Environmental and Social Monitoring and Management Plan
GOL	Government of Lao PDR
GIS	Geographic Information Systems
IEE	Initial Environmental Examination
IMA	Independent Monitoring Agency

INRMP	Integrated Natural Resources Management Plan
ISP	Integrated Spatial Planning
LTA	Lender's Technical Advisor
MoM	Minutes of Meeting
MoNRE	Ministry of Natural Resource and Environment, Lao PDR
NCR	Non-Compliance Report
NNP1PC	Nam Ngiep 1 Power Company Limited
NPF	National Protection Forest
NTFP	Non-Timber Forest Products
NTP	Notice to Proceed (under each construction contract)
NVDI	Normalised Difference Vegetation Index
OC	Obayashi Corporation
ONC	Observation of Non-Compliances
PONRE	Provincial Department of Natural Resource and Environment, MONRE
PRLRC	Provincial Resettlement and Livelihood Restoration Committee
PvPA	Provincial Protection Area
RCC	Roller Compacted Concrete
ROW	Right of Way
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
TL	Transmission Line(s)
TLWC	Transmission Line Works Contract
ToR	Terms of Reference
TSS	Total Suspended Solids
USD	US Dollar
UXO	Unexploded Ordinance
WMC	Watershed Management Committee
WMF	Watershed Management Fund
WMP	Watershed Management Plan
WWTS	Waste Water Treatment System

EXECUTIVE SUMMARY

In April 2016, NNP1PC-EMO received and approved six SS-ESMMPs. The number of new ONCs reduced from twenty one (21) in the previous month to ten (10) in April 2016. With the carry-over from March 2016, a total of twenty two (22) ONCs were active. Out of these, only one (01) ONC was resolved, seven (07) were unresolved after exceeding the deadlines and a total of twenty one (21) ONCs will be carried over into May 2016. The highest number of issued ONCs was at the Batching Plant of the HSRA Bridge Contractor, SECC (3 ONCs).

The procurement process to appoint a contractor to construct a small laboratory at the Owners' Site Office and Village was ongoing. The technical bids that were received, were opened and under evaluation. It is expected that the financial evaluation will be concluded and an appointment made in May 2016. Additional requests for quotations to supply the laboratory equipment were sent to key suppliers in Thailand in April 2016 to compare prices with the quotations provided by the Lao suppliers.

In April 2016, the results of all the effluent readings taken at workers' camps were higher than the Effluent Standards specified in the CA Annex C. A meeting was held between EMO and TD to agree on the corrective actions for selected camps including the OC, Sino-hydro, V&K, Right Tunnelling and Song Da 5 Camp No.2 that have consistently high bacteria levels (BOD, COD and total coliforms). It was agreed during the meeting that the Contractor would be asked to carry out a self-assessment of the claimed improvement against the external consultant's recommendations before being verified by the Owner for further improvement in May 2016.

The effluents from the construction areas were, for the most part, in compliance with the Effluent Standards except at the Spoil Disposal Area No.2 where the TSS was higher than the Standard with a value recorded of 13,240 mg/l compared to the Standard requirement of less than 50 mg/l. All water quality parameters monitored in April 2016 in the Nam Ngiep, both upstream and downstream of the Construction Site were within the National Surface Water Quality Standards except with respect to the faecal coliforms with values recorded at 1,300 MPN/100 ml which were slightly higher than the Standards in two samples taken at Nam Ngiep upstream of Ban Phiengta (NNG01 which is located about 73 km upstream of the Project construction site) and Nam Ngiep at Ban Somsuen (NNG07 which is located about 27 km downstream of the Project construction site). Thus, these were unrelated to the Project.

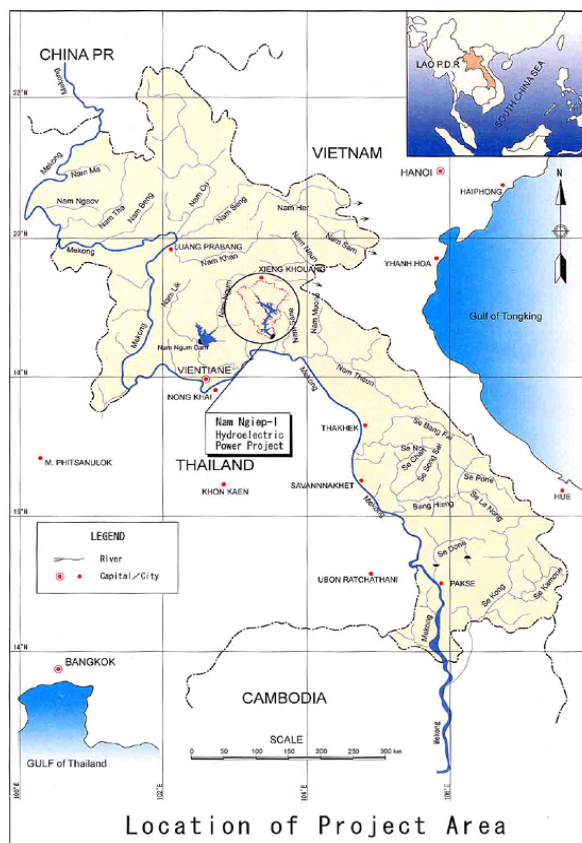
In April 2016, a Detailed Works Program (DWP) and Site Specific Environmental and Social Management and Monitoring Plan (SS-ESMMP) for the Construction of the NNP1 Landfill was reviewed and approved by the EMO. It is expected that the landfill construction will start by May 2016. The bids for the construction of the Houay Soup Resettlement Area landfill were evaluated and finalised. It is expected that the contract will be awarded in May 2016.

1 INTRODUCTION

The Nam Ngiep originates in the mountains of Xieng Khouang Province, flowing through Khoum District into Thathom District of Xaysomboun Province, through Hom District and into Bolikhamxay Province. The Nam Ngiep meets the Mekong River just upstream from Pakxan in Bolikhamxay Province (Fig. 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 Bolikham 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 February 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 publicly 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.

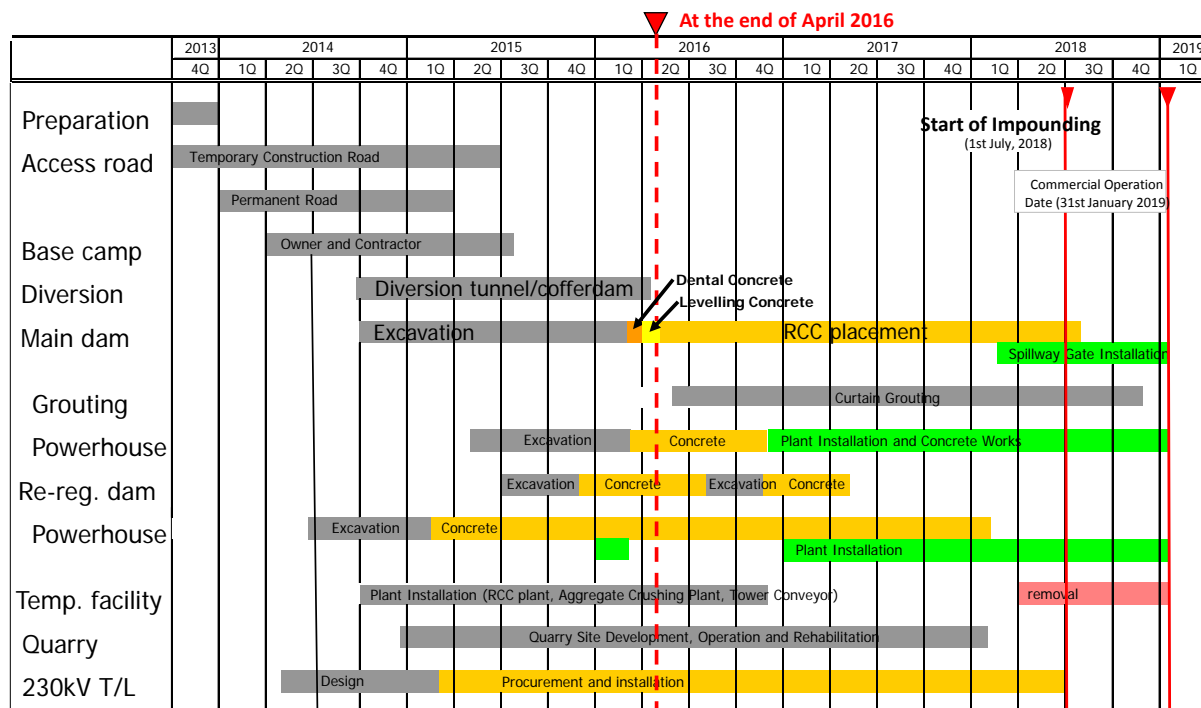
2 WORK PROGRESS OF PRINCIPAL CONTRACTORS

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 230kV Transmission Line Works. Actual overall cumulative work

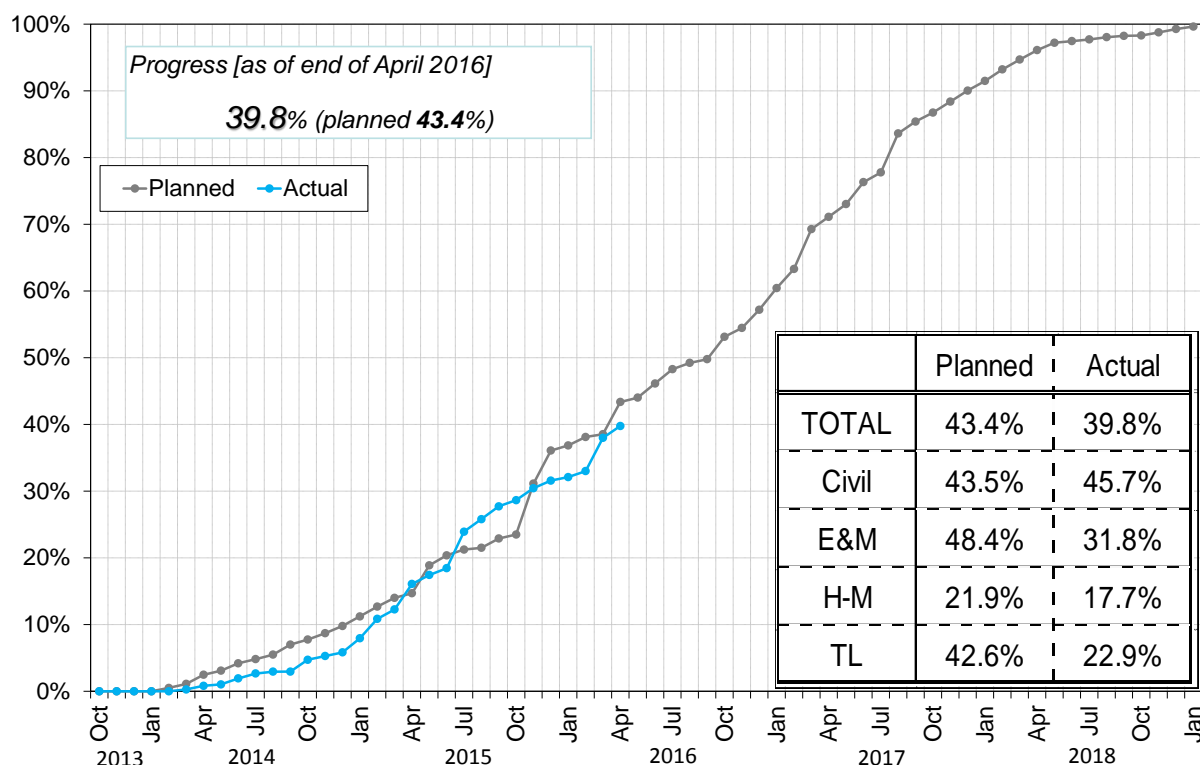
progress until the end of April 2016 was 39.8%¹ (compared to planned progress of 43.4%), based on achieved Interim Milestone Payments for all Contracts excluding the value of Advance Payments. In terms of the value of actual work done the percentage is slightly understated since work completed, but not 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 respectively.

Figure 2-1: Overall Construction Schedule



¹ The progress to-date is calculated as (Cumulative Amount of Achieved Interim Milestone Payments) / (Total Agreed Price of Construction Contracts) and expressed as a percentage.

Figure 2-2: Progress Curve (All Construction Works)

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. Accordingly, the concreting work was mainly commenced.

The cumulative work progress of the Civil Works until the end of April 2016 was 45.7% (compared to planned progress of 43.5%) 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 well advanced until diversion of the Nam Ngiep River was achieved at the end of October 2015. However, excavated volumes are now known to be 20% greater than expected and part of this additional work is needed 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. The cost of the additional excavation and RCC concrete will necessitate use of contingency amounts provided for such eventualities. The dental concreting works was commenced in March 2016, and conventional RCC levelling concrete placement for the main dam in the 'shear key' structure up to El. 170.5 m is expected to be commenced in early May 2016.

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 2-1 below

Table 2-1: Progress of Main Powerhouse structural Concrete Works to 31 April 2016.

Total Anticipated Volume (m3)	Completed (m3)	Progress (%)
32,600	5,487	16.8

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 of structural concrete works is shown in Table 2-2 below

Table 2-2: Progress of Re-regulation Dam Structural Concrete Works to 31 March 2016

	Concrete (m ³) placed as at the end of April 2016					
Structure	Intake	Powerhouse	Tailrace	Spillway	Left Bank RCC	Total
Anticipated Qty.	24,000			23,500	13,200	60,700
Completed Qty.	11,295	8,775	1,676	3,758	13,228	38,732
Progress	91%			16%	100%	64%

The concrete volume placed already for both powerhouse and dam is 38,732m³ being 64% of the revised total estimate of 60,700m³ for both structures. The powerhouse concreting has advanced well and secondary concrete embedment for the draft tube liner was completed at the end of April 2016. The left bank structure was redesigned as roller compacted concrete (RCC) and was completed on 18 March 2016. Following installation of guide frames for re-regulation gate, re-regulation stop log and re-regulation intake gate in April 2016, secondary concrete at embedment of the guide frames will be commenced in early May 2016.

The Dyke (saddle dam) embankment works on the right bank near the Houay Soup Resettlement Area were also started in November 2015 and was completed on 30 April 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 TEMPORARY BRIDGE

The temporary bridge works for the main river crossing close to the RCC plant were completed and the bridge opened for traffic from 16 January 2015.

2.1.3.4 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 is virtually complete at 31 March 2016. Accordingly, through the RCC trial mix and trial embankment in October and November 2015, RCC placement in the permanent structure at the re-regulation dam followed on, starting in November 2015 and finishing during March 2016.

2.1.3.5 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.

2.1.3.6 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 progress until the end of April 2016 was 31.8% (compared to planned progress of 48.4%). This delay is due to the change of the schedule regarding the receipt of stator material for 1st Unit of the Main Power Station at the Electrical and Mechanical Works Contractor's factory, from April 2016 to August 2016. However, the stator will be shipped from the factory to the site on schedule by coordination of the manufacturing schedule in their factory. Accordingly, it has no impact on the overall construction schedule.

The main activities carried out during this month are described below:

- a) The following documents were submitted:
 - For the main power station, schematic diagrams of the generator circuit breaker, the system logic diagram of water spray extinguishing system for main transformer, and calculation documents of the capacity of the battery bank system.

- For the re-regulation power station, the system logic diagram of water spray extinguishing system for the main transformer and the calculation documents of the capacity of the guide vane servo motor and the mechanical strength of the main shaft.
- b) The installation work of embedded piping for the main powerhouse commenced on 17 February 2016 and it continued in coordination with concrete casting work. The status of embedded pipe installation is shown in Figure 2-3.
- c) The grounding works for the main powerhouse and re-regulation power house are under way in coordination with concrete casting work.

Figure 2-3: 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 end of April 2016 was 17.7% (compared to planned progress of 21.9%). The main activities carried out during this month are described below:

- a) Main dam
 - Welding work for lower penstock pipes P1-38 for Line 1 and P2-38 for Line 2 was completed. The NDT examination results that passed the in-house inspection result for dimensional and visual was accepted by the Owner's Engineer on 22 April 2016.
 - Witness inspection to check DFT/ painting for lower penstock pipes P1-38 for Line1 and P2-38 for Line2 was scheduled on 03 May 2016.
- b) Re-regulation dam

- Setting of a new bench marks for the re-regulation draft tube gate was completed in accordance with agreement between the Civil & HMW Contractors. Witnessed inspection results were approved by the Owner's Engineer on 20 April 2016.
- Installation of the air release pipe for the re-regulation gate was completed and was handed over to the Civil Contractor on 30 April 2016 for secondary concreting.
- Installation of the re-regulation gate guide frames (embedded and removable guide) was completed and was handed over to the Civil Contractor on 30 April 2016 for secondary concreting.
- Installation of the re-regulation stop log guide frames (embedded and removable guide) was completed and was handed over to the Civil Contractor on 30 April 2016 for secondary concreting.
- Installation of the re-regulation intake gate guide frames (embedded and removable guide) was completed and was handover to the Civil Contractor on 30 April 2016 for secondary concreting.
- The HMW Contractor is ongoing with preparation work for the installation of the bottom guide frame for the re-regulation draft gate.

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 April 2016 was 22.9% (compared to planned progress of 42.6%). The difference is chiefly as a result of delay to commencement of construction works by 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 by May 2016, within 8 months from starting. 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 little progress with tower erection due to late confirmation of steel orders due to design review, and tower excavation also slowed down as stub angles became unavailable until steel deliveries were received.

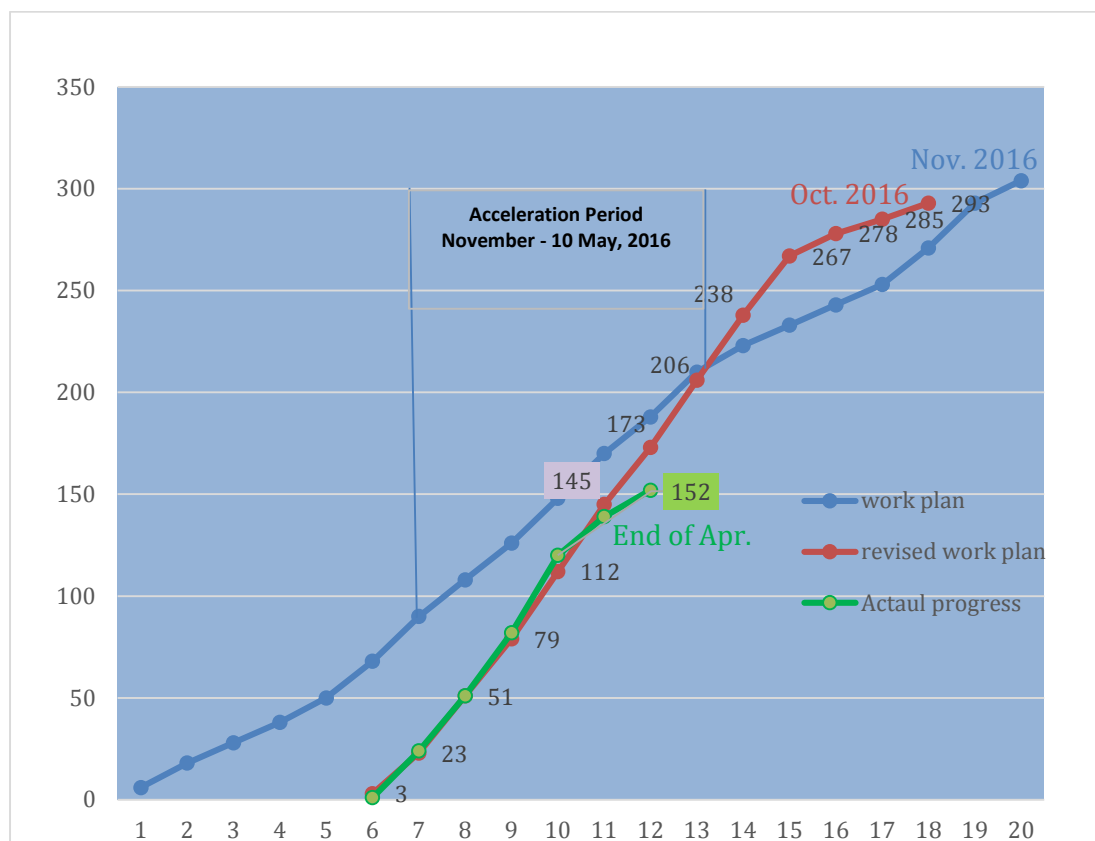
The main activities already completed or carried out during this month are described below:

- a) All the line route survey works from the main power station to Nabong Substation have been substantially completed and the final alignment of the 230 kV Transmission Line route is now confirmed. The route survey for the final change of alignment, a straight-line offset of the TL over a 2.8 km distance from Tower 31 to Tower 38 to avoid encroachment into the protected forest is finished, while the revision plan and profile design of this section is approved by the Owner's Engineer.
- b) Plan and profile drawings, re-adjust of tower spotting and soil tests in the approved section (PI 14 – PI 22) other than the section near a private plantation area (Tower 54 to Tower 86) and between T31 and T38 are completed.
- c) Preparation and revision of the design documents have been progressed including:

- Basic design of the 230 kV transmission line was approved by the Department of Energy Management in accordance with LEPTS on 22 January 2015, while the approval certificate of the 230 kV transmission line route had already issued and provided to NNP1 by DEPP for reference.
 - Adjustment of tower design and calculation according to approved basic design;
 - Remaining sections of revised plan and profile drawings;
 - Fabrication drawings of Tower type LDC are not submitted yet, while foundation design for all Tower types have already been approved, except for Tower Types LDC.
 - The first 75 Towers (Lot 1) of steel for Tower Type DA has already been delivered to Site, while the construction of tower foundations has reached 152 out of an expected total of 293 and the tower erection is 74 towers completed by the end of April, 2016. The progress in this month is behind schedule due to the delay of importation of some construction materials such as the stub angle of the tension towers and because preparatory work for construction in the mountainous areas is a more protracted process.
 - The first delivery of Conductor and OHGW (Overhead Ground Wire) for 30km or 25% of the line has already been imported on 28 March 2016 after the test report has already approved by the TLW Owner's Engineer.
 - The first 50 % of insulator has already delivered to site on 28 April, while the steel tower 20 % lot 2 has also been delivered to site since 25 April.
- d) The bush clearance works were started in May 2015 and progress was made between Tower 54 and Tower 38, while others sections (PI18 – PI22) were started in September 2015 after the compensation works has been completed. Almost 62 km out of a total of approximately 120 km for 139 No. towers has been finished by the end of March, 2016 and the work continues in the section between PI 1 and PI 18, PI 22 and PI 24 currently.

In respect of the delay to commencement of most works the Contractor is studying its programme to ensure that sufficient resources are committed as the works progress to ensure that completion is achieved on time (See Figure 2-4 below)

Figure 2-4 Cumulative Work Progress of Tower Installation (Plan and Actual)



3 ENVIRONMENTAL MANAGEMENT MONITORING

3.1 Compliance Management

3.1.1 Site Specific Environmental and Social Management and Monitoring Plans

In April 2016, NNP1PC-EMO reviewed and approved six (06) SS-ESMMPs as listed below.

Table 3-1 SS-ESMMPs reviewed in March 2016

Title/Contractor	Date Received	Status	Comments
SS-ESMMP for the construction of houses, pre-school and accommodation buildings Lot3 at the HSRA	15 March 2016 (1 st revision) and 18 April 2016 (2 nd revision)	Approved with comments the 2 nd revision on 21 April 2016	Some information was missing such as the total size of the construction area, a layout and drawings of the buildings and facilities of the temporary camps.
SS-ESMMP for the Improvement of the Internal Road in 2UR (Upper Reservoir)	18 March 2016 (1 st revision)	Approved with comments on 06 April 2016	More information was needed about the design of the improved road, whether a borrow pit was needed and proposed mitigation measures addressing possible

			environmental and social risks identified in the sub-plans.
SS-ESMMP for the construction of NNP1 Project solid waste landfill	30 March 2016 (1 st revision)	Approved with comments on 20 April 2016	More details and drawings were needed for bunds, berms, water supply system and monitoring boreholes which would be constructed around the landfill. More information was needed on the hazardous material storage, workshop and proposed mitigation measures for the worker camp construction as well as a site decommissioning plan for the temporary worker camp.
SS-ESMMP for the Construction of the Main Road on HSRA	31 March 2016 (1 st revision)	Approved with comments on 21 April 2016	The Contractor was asked to provide mitigation measures to address erosion problem including giving more details about temporary topsoil stockpiles, proposed measures for the camp decommissioning as well as providing maps and drawings of the erosion and sediment control, vegetation clearance, borrow pit, top soil and waste vegetation stockpiles.
SS-ESMMP for Biomass Clearance in the Reservoir	04 April 2016 (3 rd revision)	Approved with no comment on 06 April 2016	The submitted document was complete and addressed key environmental and social mitigation measures. The Contractor was permitted to proceed with their proposed activities.
SS-ESMMP for 22kV electrical installation at the Houay Soup Resettlement Area (HSRA)	05 April 2016 (1 st revision)	Approved with no comment on 6 April 2016	The submitted document was complete and addressed key environmental and social mitigation measures. The Contractor was permitted to proceed with their proposed activities

3.1.2 Compliance Report

The results of the environmental compliance inspections undertaken in April 2016 are summarized in Table 3-2 and the inspected sites are indicated on the maps in *Figure 3-1* and *Figure 3-2*.

Table 3-2 Results of environmental compliance inspections in April 2016

Site ID	Findings	Reporting	Actions
RT Camp	<p>Grey water seepage from existing sediment/retaining ponds.</p> <p>ONC Number : ON_OC-0028</p> <p>1st inspection date: 17 February 2015</p> <p>Latest follow up: 26 April 2016</p> <p>Water seepage testing results from January 2015 to present indicated a fluctuation of total coliforms from 450 to more than 160,000 MPN /100ml.</p>	1 ONC (pending)	The Contractor has stopped grey water seepage. However, for the long term operation and maintenance of the wastewater treatment ponds, the Contractor is required to submit details of the waste water treatment ponds including the operation and maintenance information. The EMO held an internal meeting with TD on 20 April 2016 to agree on the next steps and actions to fix the issues.
Song Da 5 Camp No.2	<p>The wastewater treatment system is not consistent with the proposed design.</p> <p>ONC number: ON_OC-0085</p> <p>1st inspection date: 02 June 2015</p> <p>Latest follow up: 26 April 2016</p>	1 ONC (pending)	The contractor needs to follow the proposed design submitted on 31 March 2015 to minimise Separate the drainage system between rain water and waste water from bathroom and kitchen by 16 June 2015.
V&K Camp	<p>Inadequate capacity of waste water treatment ponds to handle the operation of V&K camp</p> <p>ONC number: ON_OC-0087</p> <p>1st inspection date: 02 June 2015</p> <p>Latest follow up: 26 April 2016</p>	1 ONC (pending)	Reduce the depth of the outlet and ensure that the pond has sufficient capacity to retain and treat the waste water prior to discharging to the environment.

CVC Batching Plant	<p>Concrete waste water treatment and management</p> <p>Water testing detected high pH level which exceeded the effluent discharge standard.</p> <p>Concrete wastewater has been used to spray on the roads and expose areas to prevent direct discharge into the environment.</p> <p>ONC number: ON_OC-0200 1st inspection date: 23 Feb 2016 Latest follow up: 26 April 2016</p>	1 ONC	<p>This issue was followed-up and closed under the following conditions:</p> <p>The Contractor followed the EMO's recommendations on the maintenance of the concrete waste water retention pond including making an attempt to improve the water discharge quality (for examples, the pipeline was connected from the concrete waste water retention pond to the RCC dewatering treatment ponds). However, the waste water discharge quality is still an outstanding issue where the pH and TSS level were found to be higher than the Standard in January 2016. pH was 11.33 and TSS was measured as 1,828 mg/l. EMO will continue to monitor and follow up on a routine basis</p>
SECC Camp	<p>The septic tank was full and over-flowed into the environment</p> <p>ONC number: ON_SECC-0020 1st inspection date: 15 March 2016 Latest follow up: 29 March 2016</p>	1 ONC	<p>Empty and dispose of the septic waste at an authorized area. The Contractor also needed to have started regularly checking of the septic tank since 18/3/16 after this issue was closed in late April 2016.</p>
SECC batching plant yard	<p>The new generator storage area does not have a roof, concrete floor, bunding area (ON_SECC-0023)</p> <p>Inadequate erosion and sediment control mitigation measures for sensitive erosion area (sediment pond embankment closed to Nam Ngiep left bank; ON_SECC-0024)</p> <p>Poor maintenance of concrete waste retention pond (ON_SECC-0025)</p> <p>1st inspection date: 29 March 2016 Latest follow up: 12 April 2016</p>	3 ONCs	<p>Install appropriate roof and bunding area by 12 April 2016.</p> <p>Appropriate actions, as per SP01: erosion and sediment control, are needed to control and protect sensitive erosion or site casting at left embankment of sediment pond.</p> <p>Clean up concrete waste when the sediment pond is nearly 80% full.</p>

230 kV Transmission Line	<p>Improper concrete waste disposal of about 0.5 m³ next to the Tower No.157 and other nearby areas.</p> <p>ONC number: ON_LS-0012</p> <p>1st inspection date: 24 March 2016</p> <p>Latest follow up: 07 April 2016</p>	1 ONC	<p>The concrete waste is to be cleaned up by 07 April 2016 and disposed of in a sediment pond. When the work is completed, the pond shall be backfilled with clay.</p> <p>More bins/plastic bags shall be provided to separate recyclable from non-recyclables wastes</p>
Spoil Disposal Area No.3	<p>This spoil disposal area is situated on the seasonal stream and receives a large volume of water from the upper catchment area. Inadequate erosion and sediment control was installed.</p> <p>ONC number: ON_OC-0208</p> <p>1st inspection date: 22 March 2016</p> <p>Latest follow up: 26 April 2016</p>	1 ONC	<p>Install earth andstone dyke along the side of the open channel by 11 April 2016 in order to minimise the washout of the stockpile area for the incoming wet season. The EMO will make follow-up on the corrective action implementation before issuing a Non-Compliance Report (NCR)</p>
Earth Dyke	<p>There was no significant environmental issue identified during the inspection. However, EMO was informed that the earth dyke works will be completed by 30 April 2016 and the camp site facilities will be decommissioned soon thereafter.</p> <p>ONC number: ON_OC-0209</p> <p>1st inspection date: 05 April 2016</p> <p>Latest follow up: 26 April 2016</p>	1 ONC	<p>EMO instructed that three main tasks detailed below are necessary to be implemented before equipmentdemobilization:</p> <ul style="list-style-type: none"> i. Temporary camp and supporting facilities structures decommissioning. ii. Hazardous materials (used oil and contaminated soil removal/ elimination). iii. Borrow pits landscaping and/ or site closure/site restoration.
Main Quarry	<p>No erosion and sediment control for the dirty rock stockpiling.</p> <p>ONC number: ON_OC-0210</p> <p>1st inspection date: 05 April 2016</p> <p>Latest follow up: 29 April 2016</p>	1 ONC	<p>Provide proper control devices for dirty rock stockpile by 27 April 2016 to ensure no sediment transport into the adjacent Nam Ngiep River</p>
Song Da 5 Camp No.1	<p>Inadequate operation of general waste incinerator on site without consultation with the EMO.</p>	1 ONC	<p>By 10 May 2016:</p> <p>provide waste management induction/ training for related</p>

	<p>ONC number: ON_OC-0211</p> <p>1st inspection date: 26 April 2016</p> <p>Latest follow up: n/a</p>		<p>workers on general waste management and burning procedures (simple steps shall be developed by the Contractor).</p> <p>Only non-plastic and non-hazardous waste is allowed to be burned</p>
Main dam	<p>High turbid cement wastewater from the conveyor belt and washing activities was connected to an existing sediment pond. This potentially reduces the treatment capacity of the on-site waste water treatment systems or leads to higher consumption of chemicals (such as the Poly-Aluminium Chloride) for waste water treatment.</p> <p>ONC number: ON_OC-0212</p> <p>1st inspection date: 26 April 2016</p> <p>Latest follow up: n/a</p>	1 ONC	<p>Install additional sedimentation ponds and/or erosion control devices to settle high turbid waste water prior to being treated by the waste water treatment facility.</p> <p>Note: Practical solutions will be discussed via email and during next bi-weekly inspection.</p>
Song Da 5 Temporary Batching Plant	<p>Inadequate management of construction waste behind the temporary batching plant (located below CVC plant).</p> <p>ONC number: ON_OC-0213</p> <p>1st inspection date: 26 April 2016</p> <p>Latest follow up: n/a</p>	1 ONC	<p>Though this plant has been dismantled, the Contractor is to manage the construction waste properly as per the SP05.8 regarding the Waste Management. This construction waste shall be removed and disposed of at the designated area.</p>
IHI Worker Camp	<p>Inadequate storage was built for a 100 litre electricity generator</p> <p>ONC number: ON_IHI-0001</p> <p>1st inspection date: 27 April 2016</p> <p>Latest follow up: n/a</p>	1 ONC	<p>The Contractor is required to provide a drip tray or bund area with a concrete floor to prevent oil spills during the operation of the power generator and fuel handling; ii) install appropriate roofing materials to prevent stagnant rain water in the generator storage area and iii) store some dry sand in a drum (a spill response kit) within the storage area for absorbing spills.</p>

HM Worker Camp No.2	<p>The camp was not designed to withstand the 2016 rainy season and strong winds. There was also no provision of mobile toilet, no adequate cooking and washing facility.</p> <p>ONC number: ON_HM-0002</p> <p>1st inspection date: 27 April 2016</p> <p>Latest follow up: n/a</p>	1 ONC	<p>Workers and staff are not allowed to use the adjacent forest areas as toilets. All workers and staff should be instructed on the use of HM's toilet at the main camp; Otherwise, a temporary toilet shall be provided by the Contractor for these workers and closed by using lime and back-filling after the permanent camp and facilities are completed.</p> <p>Once built, temporary toilet facilities shall be maintained by the Contractor to ensure hygienic and sanitised environment.</p>
VCR Camp	<p>1. A 20,000 litres fuel tank was installed and operated inappropriately within the VRC work camp boundary (ON_VCR-001)</p> <p>2. No provision of steel tray and roofing for electricity generator at VRC work camp boundary (ON_VCR-002)</p> <p>1st inspection date: 19 April 2016</p> <p>Latest follow up: 29 April 2016</p>	2 ONCs	<p>Design and construct a 120% containment storage SP-06 of the ESMMP; install oil traps with control valve; install roofing facility to prevent stagnant rain water; equip spill responder material such as dry sand within the storage for oil spill absorption by 03 May 2016.</p> <p>Provide steel trays and roofing for electricity generator by 3 May 2016.</p>
HSRA Land Levelling Area	<p>A 12,000 litre fuel tank was observed storing on the bare ground at Huay Soup Resettlement Area development site. This fuel container was also not equipped with any spill response kits.</p> <p>ONC number: ON_CS.RB-0001</p> <p>1st inspection date: 19 April 2016</p> <p>Latest follow up: 29 April 2016</p>	1 ONC	<p>Providing steel tray to protect oil spillage during operation of the fuel tank and during fuel handling; install roofing to prevent stagnant rain water within the fuel storage; store dry sand drum within the storage for absorbing spilled oil by 03 May 2016.</p>

Figure 3-1: Dam and Common Facilities Construction Area

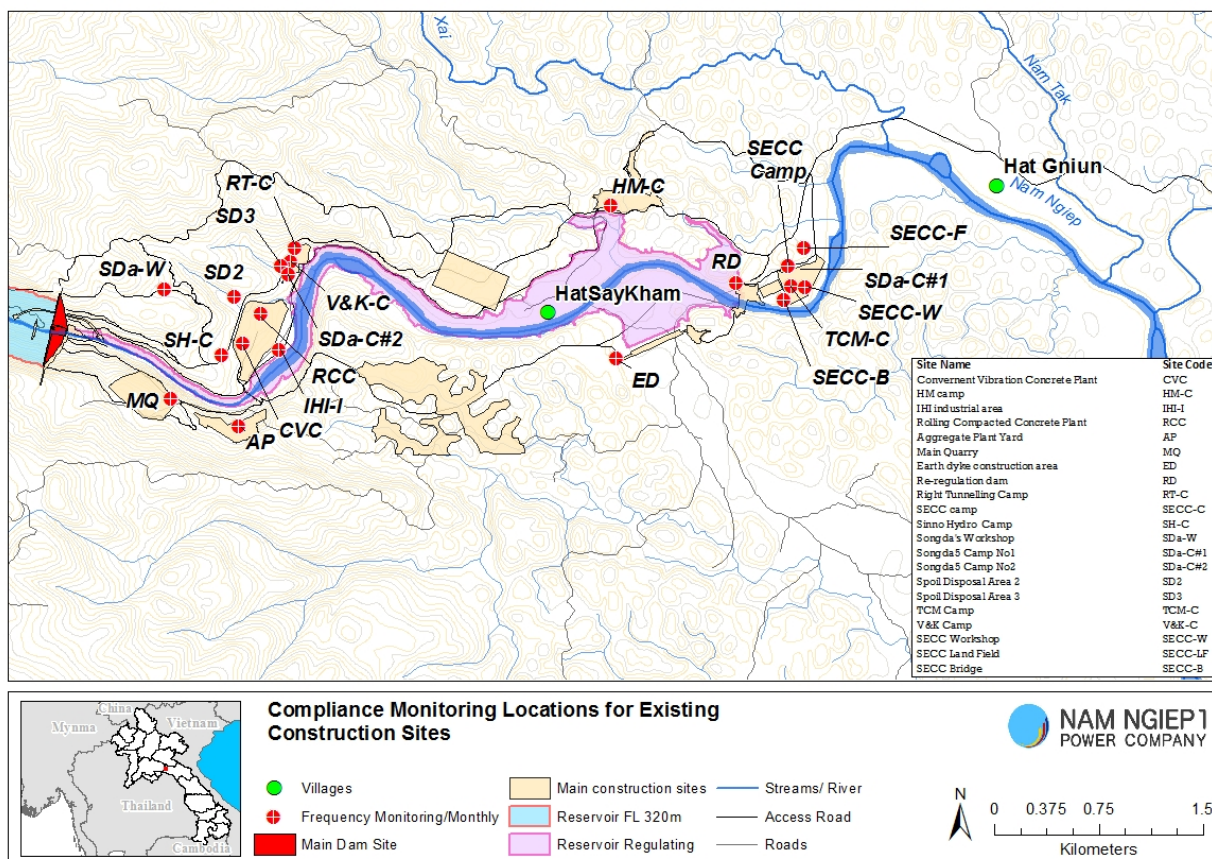
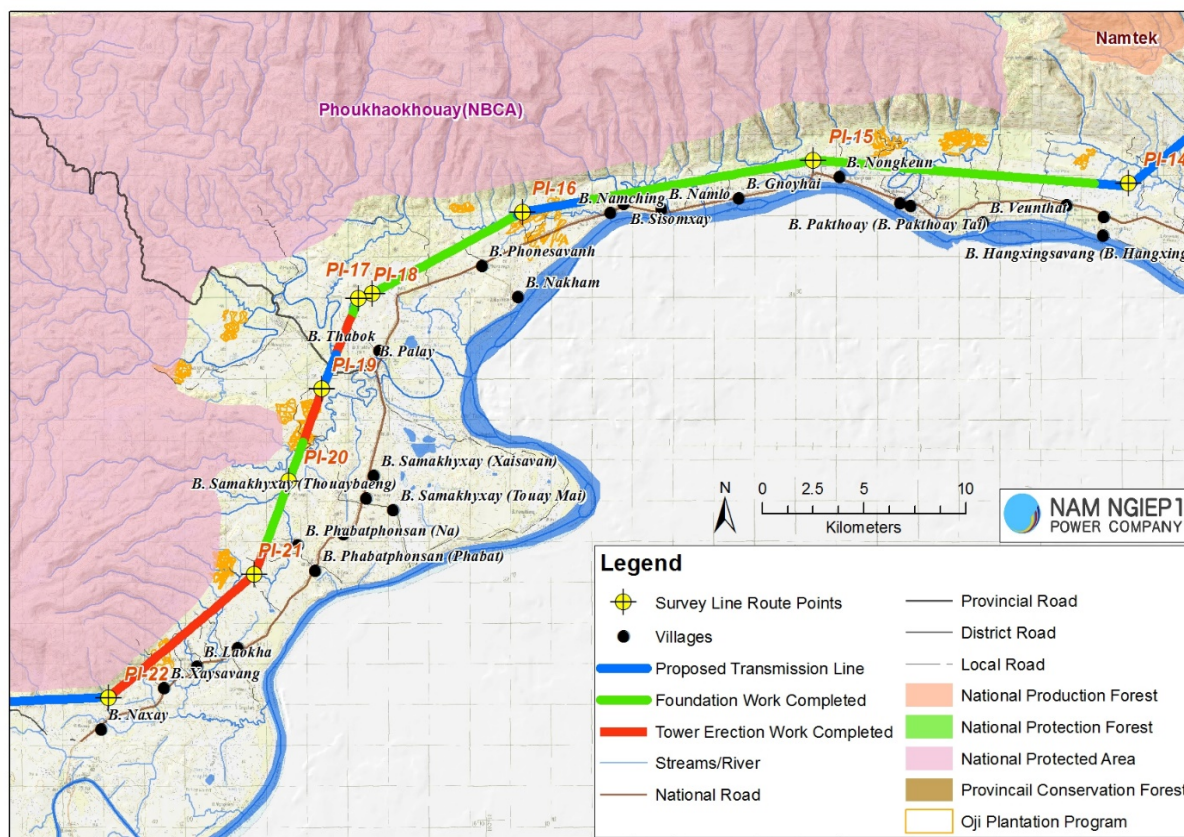


Figure 3-2: 230 kV Transmission Line Construction Monitoring

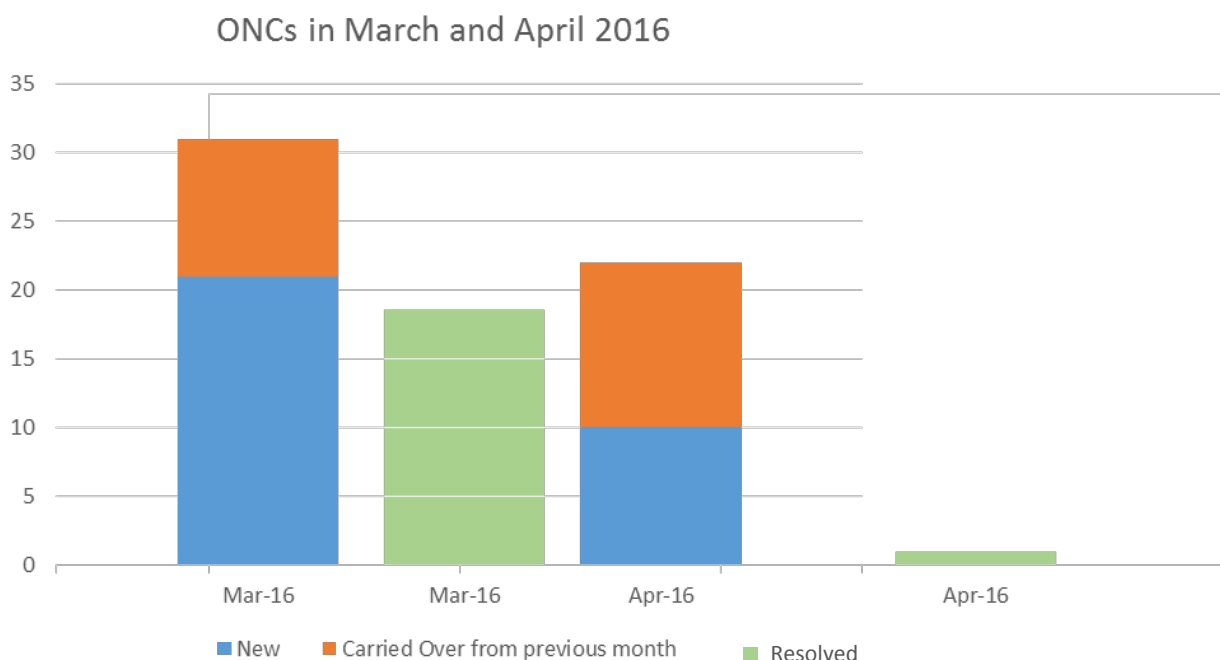


The number and status of observations of non-compliances (ONCs) and non-compliance reports (NCRs) are summarized in Table 3-3.

Table 3-3: Summary of ONCs and NCRs

Reporting Period (01-30 April 2016)	ONC	NCR-1	NCR-2	NCR-3
Carried over from March 2016	12	0	0	0
New issues in this month	10	0	0	0
Resolved this month	1	0	0	0
Carried forward into May 2016	21	0	0	0
Unresolved exceeding deadline	7	0	0	0

Figure 3-3: ONCs this month compared with previous month



As shown in Table 3-3 and Figure 3-3, the number of new ONCs reduced from 21 in March to 10 in April 2016. With a carry-over from March 2016, a total of 22 ONCs were active. Out of these, only 1 ONCs was resolved, 7 was unresolved exceeding the deadlines and a total of 21 ONCs will be carried over into May 2016. The highest number of issued ONCs was at the SECC Batching Plant (3 ONCs).

3.1.3 Monitoring by the Environmental Monitoring Unit of the Government

No Environmental Monitoring Unit (EMU) visits were scheduled in April 2016.

3.2 Environmental Quality Monitoring

The procurement of a contractor to construct a small laboratory at the Owners' Site Office and Village was ongoing. The technical evaluation of the submitted bids was undertaken. It is expected that the

financial evaluation will be concluded in May 2016. Additional requests for quotations to supply the laboratory equipment were sent to key suppliers in Thailand in April 2016D.

The environmental quality monitoring undertaken during April 2016 has followed the recommended environmental quality monitoring programme presented in the ESMMP-CP Volume III. The recommended programme consists of the following components:

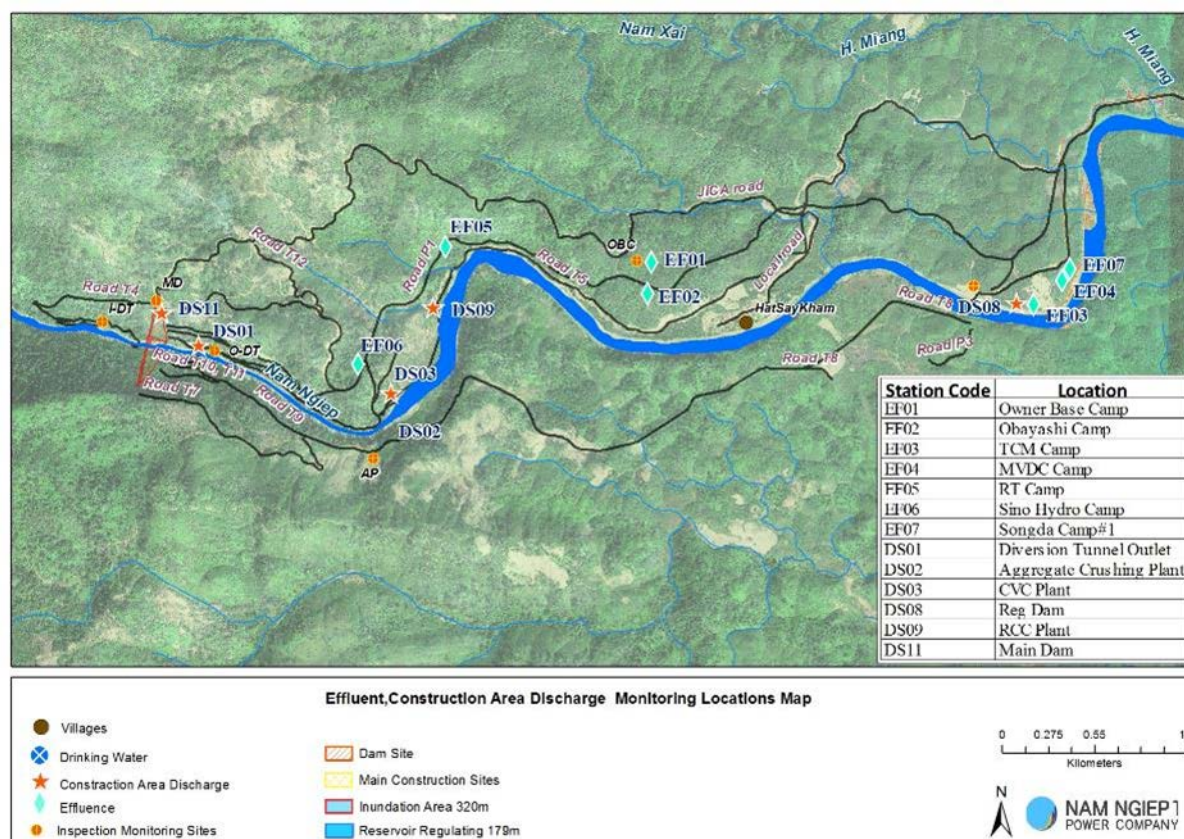
- a) Effluent discharge from camps and construction sites;
- b) Ambient surface water quality monitoring;
- c) Ambient air quality monitoring (particulate matter of less than 10 PM);
- d) Ambient noise and noise emission monitoring.

The monitoring of groundwater and gravity fed water supplies in villages commenced in 2015 at the impacted villages of Ban Hat Guin, Ban Hatsaykham and Ban Thaheau. It is aimed at ensuring that these water supplies meet the National Standards for village use.

3.2.1 Effluent Discharge from Camps and Construction Sites

The monitoring of the effluents from the camps and construction sites is presented in *Table 3-4* and the monitoring points and the related sites are displayed on the map in Figure 3-4.

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, and Clause 1.13. The assessment of compliance is presented in Table 3-4 and the data is included in Annex A.

Table 3-4: Compliance assessment of the effluent discharge from the camps and construction sites in April 2016

Site	Sampling ID	Non-Compliance	Corrective Actions
Owner's Site Office and Village	EF01	Total coliforms were at 490 MPN/100 ml and Ammonia nitrogen (NH ₃ -N) was at 12 mg/l, slightly above the Standards	The EMO will continue to monitor the results of the bacteria levels at this camp and will issue an ONC if it continues to exceed the Standards.
OC Camp	EF02	Biochemical Oxygen Demand (BOD ₅), Chemical Oxygen Demand (COD), Ammonia nitrogen (NH ₃ -N), and total coliforms were higher than the Standards (measured at 88.5, 169 and 32 mg/l and, more than 160,000 MPN/100 ml respectively)	A meeting was held between EMO and TD to agree on the corrective actions for selected camps including the OC Camp that have consistently high bacteria level (BOD, COD and total coliforms). It was agreed during the meeting that the Contractor would be asked to carry out a self-assessment of the claimed improvement against the external consultant's recommendations before May 2016 and the determination by the Owner of any further improvement necessary.
TCM Camp	EF03	Total coliforms were higher than the Standards at 13,000 MPN/100 ml	The grey water treatment ponds at this camp are subject to a review by the EMO against the approved SS-ESMMP and the independent consultant's recommendations. Proposed measures and corrective actions will be discussed with TD for Contractor's implementation before issuing an ONC or NCR
Right Tunnelling Camp (RT Camp)	EF05	The total coliforms were slightly above the Standards with a measured value of 4,900 MPN/100 ml	A meeting was held between EMO and TD to agree on the corrective actions for selected camps including the Right Tunnelling camp that have consistently high bacteria level (BOD, COD and total coliforms). It was agreed during the meeting that the Contractor would carry out a self-assessment of the claimed improvement against the external consultant's recommendations before being verified by the Owner for further improvement by 30 April 2016.
Sino Hydro Camp	EF06	Total coliforms were slightly above the Standards at 13,000 MPN/100 ml	A meeting was held between EMO and TD to agree on the corrective actions for selected camps including the Sino Hydro camp that has consistently high bacteria level (BOD,

Site	Sampling ID	Non-Compliance	Corrective Actions
			COD and total coliforms). It was agreed during the meeting that the Contractor would be asked to carry out a self-assessment of the claimed improvement against the external consultant's recommendations before being verified by the Owner for further improvement by 30 April 2016.
Song Da 5 Camp No. 1	EF07	BOD5, NH ₃ -N, and total coliforms did not comply with the Standards with recorded values of 55.2 mg/l, 13 mg/l and >160,000 MPN/l respectively	The grey water treatment ponds at this camp are subject to a review by the EMO against the approved SS-ESMMP and the independent consultant's recommendations. Proposed measures and corrective actions will be discussed with the Contractor through TD by May 2016 before issuing an ONC or NCR
Song Da 5 Camp No. 2	EF08	BOD5, NH ₃ -N, and total coliforms did not comply with the Standards. Total coliforms were >160,000 MPN/100ml	A meeting was held between EMO and TD to agree on the corrective actions for selected camps including the Song Da 5 Camp No.2 that has consistently high bacteria level (BOD, COD and total coliforms). It was agreed during the meeting that the Contractor would be asked to carry out a self-assessment of the claimed improvement against the external consultant's recommendations before being verified by the Owner for further improvement by 30 April 2016.
H-MH Camp	EF09	No sampling was undertaken as there was no resident living in the camp in April 2016	
V&K Camp	EF10	TSS and total coliform were not complied with the Standards (measured 194 mg/l and 92,000 MPN/100 ml respectively)	A meeting was held between EMO and TD to agree on the corrective actions for selected camps including the V&K camp. It was agreed during the meeting that the Contractor would be asked to carry out a self-assessment of the claimed improvement against the external consultant's recommendations before being verified by the Owner for further improvement by 30 April 2016.
SECC Camp	EF11	COD, NH ₃ -N, TSS, and total coliforms were not	The septic tank overflow into the nearby sediment ponds for grey water

Site	Sampling ID	Non-Compliance	Corrective Actions
		compliant with the Standards. Total coliforms were >160,000 MPN/100ml	leading to a high bacteria and TSS levels at this camp. An ONC was issued on 15 March 2016 (ONC_SECC-0020) asking the Contractor to separate the septic tank from the sediment ponds for grey water. The latest follow-up inspection conducted on 29 March 2016 and end of April 2016 found that the Contractor has implemented the suggested measures. The EMO will continue to monitor the effluent quality at this camp in May 2016.
Main Dam Construction Area	DS11	The first TSS was slightly higher than the Standards with a value recorded of 177 mg/l compared to a Standard of less than 50 mg/l	No action is needed by the Contractor. The EMO team will continue to monitor the construction areas' turbid water treatment systems installed at various places
Re-regulation Dam	DS08	All parameters complied with the Standards	
Spoil Disposal Area #2 (Song Dd 5 Workshop)	DS04	The TSS was higher than the Standard with a value recorded of 13,240 mg/l compared to the Standards of less than 50 mg/l	The EMO will continue to monitor the TSS levels at this workshop. A written warning with actions will be issued and followed up during the next month's inspection. An ONC will be issued if no improvement of the effluent quality is found.
RCC Plant	DS09	All parameters complied with the Standards	

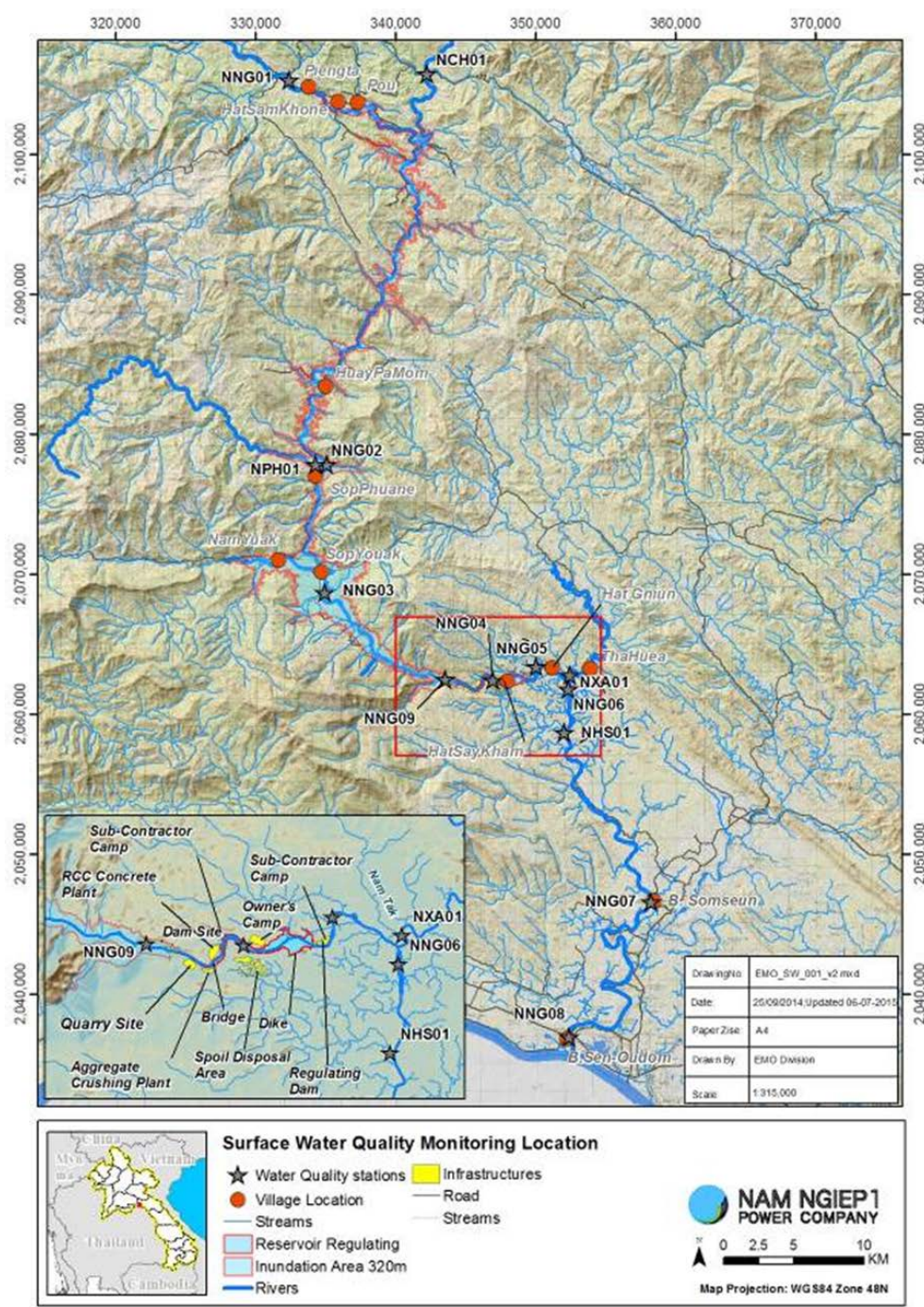
At the time of sampling, no discharge was observed at the Obayashi Camp (EF02), TCM Camp (EF03), Sino Hydro Camp (EF06), Song Da 5 Camp No.1 (EF07), Song Da 5 Camp No.2 (EF08), V&K Camp (EF10) and SECC Camp (EF11). Thus, the samples were collected from the last sediment pond. Also, no samplings were conducted in April 2016 at the aggregate crushing plant (DS02), CVC plant (DS03) and RCC plant (DS09) since no waste water was discharged from their sediment ponds.

3.2.2 Surface (Ambient) Water Quality Monitoring

Surface water samples are collected and analysed twice a month² 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 (total 13 stations). The stations are indicated on the maps in Figure 3-5 and Figure 3-6.

All ambient water quality data are routinely reported to the Ministry of Natural Resources and Environment (MONRE) through the monthly Environmental Management and Monitoring Reports (EMMR) and to the Asian Development Bank in Quarterly Reports.

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 March 2016 are shown in Table 3-5, Table 3-6, Table 3-7 and Table 3-8.

Nam Ngiep

All parameters monitored in April 2016 for Nam Ngiep both upstream and downstream of the Project construction site were within the National Surface Water Quality Standards except the faecal coliforms which was slightly higher than the Standard for the station of Nam Ngiep upstream of Ban Phientga (NNG01 – located about 73 Km upstream of Project construction site) and Nam Ngiep at Ban Somsuen (NNG07 – located about 27 Km downstream of Project construction site) with values recorded at 1,300 MPN/100 ml. Thus, these exceedances are not related to the Project activities.

Table 3-5: Physical and Chemical Parameters of Nam Ngiep Surface Water Quality Monitoring in April 2016

	Site Name	Nam Ngiep								
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	01/04/16	02/04/16	02/04/16	03/04/16	03/04/16	03/04/16	03/04/16	03/04/16	03/04/16
Parameters (Unit)	Guideline									
pH	5.0 – 9.0	7.15	7.29	8.07	7.97	7.99	7.9	8.12	7.64	7.7
DO (%)		99.8	100	105	102.8	107.4	112.4	112.9	106.9	105.1
DO (mg/L)	>6.0	8.36	8.08	8.2	8.4	8.47	8.88	8.78	7.9	7.88
Conductivity (µs/cm)		105.2	103.5	108.6	110	131.5	100.6	101.9	106.4	103.8
TDS (mg/l)		53	52	54	55	66	50	50	53.2	52
Temperature (°C)		22.2	24.5	26.5	24.4	26.3	26.3	26.9	29.8	29
Turbidity (NTU)		11.39	12.68	9.01	10.48	10.68	13.27	12	16.6	30.8
BOD ₅ (mg/l)	<1.5	1.1	ND ¹³	ND ¹³	ND ¹³	ND ¹³	1.2	ND ¹³	ND ¹³	ND ¹³
COD (mg/l)	<5.0	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶
TSS (mg/l)		17.7	19	13.8	13.9	13.4	18.5	19.4	24.6	40.8
NH ₃ -N (mg/l)	<0.2	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²	ND ¹²
NO ₃ -N (mg/l)	<5.0	0.07	0.06	0.05	0.07	0.07	0.06	0.06	0.07	0.08
Manganese (mg/L)	<1	0.056	0.047	0.04	0.05	0.051	0.049	0.052	0.054	0.055
Total Iron (mg/L)		0.882	1.11	0.62	0.825	0.842	0.862	0.73	1.06	1.89
Total coliform (MPN/100ml)	<5,000	1,300	490	230	1,300	280	170	790	2,400	330
Faecal coliform (MPN/100ml)	<1,000	1,300	490	230	490	170	170	490	1,300	130

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: Physical Parameter Results of Nam Ngiep Surface Water Quality (Fortnightly Measured) in April 2016

	Site Name	Nam Ngiep								
	Station Code	NNG01	NNG02	NNG03	NNG09	NNG04	NNG05	NNG06	NNG07	NNG08
	Date	19/04/16	20/04/16	20/04/16	21/04/16	21/04/16	21/04/16	21/04/16	21/04/16	21/04/16
Parameters (Unit)	Guideline									
pH	5.0 – 9.0	7.18	7.17	7.25	7.48	7.38	7.37	7.4	7.25	7.67
DO (%)		96.1	97.4	101.2	105.2	105.7	105.7	107.9	109.3	102.1
DO (mg/L)	>6.0	8.01	7.83	8.14	7.56	7.76	8.28	8.38	8.12	7.7
Conductivity (µs/cm)		94.9	99.5	96.5	109.6	103.9	96.6	98.5	99.8	103.2
TDS (mg/l)		47	49.5	48	54	52	48.3	49.25	49	51
Temperature (°C)		22.5	24.9	25	25.9	26	26.1	26.9	27.3	27.5
Turbidity (NTU)		35.3	13.45	14.5	25.5	23.9	13.9	11.4	9.46	12.4

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 COD slightly exceeded the National Surface Water Quality Standard set at less than 5.0 mg/l with a value recorded as 6.5 mg/l.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site.

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

Nam Xao has a confluence with Nam Ngiep River downstream of the NNP1 Project construction footprint. The COD exceeded the National Surface Water Quality Standard set at less than 5.0 mg/l with a value recorded as 11.7 mg/l. In addition, the last DO was slightly lower than the standard set at greater than 6.0 mg/l with a value recorded of 5.52 mg/l.

Nam Houay Soup has a confluence with Nam Ngiep River downstream of NNP1 Project construction footprint. The COD exceeded the National Surface Water Quality Standard set at less than 5.0 mg/l with

a value recorded as 11.1 mg/l. In addition, the last DO was slightly lower than the standard set at greater than 6.0 mg/l with a value recorded of 5.90 mg/l.

Table 3-7: Results of Physical and Chemical Parameters of Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup in April 2016

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	01/04/16	02/04/16	03/04/16	03/04/16
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	7.24	8.05	8	7.49
DO (%)		104.1	104.9	86.9	101.3
DO (mg/L)	>6.0	8.79	8.53	6.49	7.84
Conductivity(μs/cm)		52.6	79.6	161	84.9
TDS (mg/L)		26.3	39	80	42
Temperature (°C)		21.6	24.2	29.3	27.2
Turbidity (NTU)		21.1	1.87	17.9	6.64
BOD ₅ (mg/l)	<1.5	ND ¹³	ND ¹³	1	1.2
COD (mg/l)	<5.0	6.5	ND ¹⁶	11.7	11.1
TSS (mg/l)		49.4	ND ¹⁶	15	7
NH ₃ -N (mg/l)	<0.2	ND ¹²	ND ¹²	ND ¹²	ND ¹²
NO ₃ -N (mg/l)	<5.0	0.12	0.04	0.08	0.08
Manganese (mg/L)	<1	0.071	ND ⁴	0.094	0.048
Total Iron (mg/L)		1.48	0.183	0.815	0.715
Total coliform (MPN/100mL)	<5,000	490	490	490	790
Fecal coliform (MPN/100mL)	<1,000	490	490	330	490

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 3-8: Physical Parameters Results of Surface Water Quality – Nam Chian, Nam Phouan, Nam Xao and Nam Houay Soup (fortnightly measured) for April 2016

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	19/04/16	20/04/16	21/04/16	21/04/16
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	7.26	6.6	7.12	6.8
DO (%)		101.3	98.2	74.4	76.4
DO (mg/L)	>6.0	8.31	7.89	5.52	5.9
Conductivity(μs/cm)		54.5	93.6	169.9	103
TDS (mg/L)		27	47	84.95	51.5
Temperature (°C)		23.1	24.9	29.7	26.8
Turbidity (NTU)		20.1	2.01	3.23	11.31

3.2.3 Groundwater Quality Monitoring

In April 2016, NNP1PC sampled and analysed the groundwater quality in 4 boreholes. Three are community boreholes at Ban Hatsaykham and one is a private well at Ban Hat Gniun (see Figure 3-6).

The results are presented in Table 3-9. The water from the boreholes in Ban Hatsaykham is used by 42 households for drinking, bathing, washing and domestic use purposes. The water from the well in Ban Hat Gnuin is used by 6 households for bathing and washing purposes.

All groundwater quality data are routinely reported to the Social Management Office who regularly communicate the results to the key NNP1 Project Villages' authorities and the local health centres as part of the Project's health programme.

Ban Hatsaykham

The pH levels for all three boreholes (GHSK01, GHSK02 & GHSK03) were 5.81, 5.69 and 5.84 respectively which were slightly lower than the National Groundwater Standard range of between 6.50 and 9.2. The instance of low pH will continue to be monitored. However, the levels recorded do not pose any risks to health. All of other parameters monitored complied with the standards.

Ban Hat Gnuin

The faecal coliforms and E.coli bacteria contamination were 49 MPN/100ml which exceeded the standards. In addition, the pH level was measured 5.15 which was slightly lower than the National Standard range of between 6.50 and 9.20. These do not pose any risks to health. All of other parameters monitored complied with the standards.

Figure 3-6: Groundwater Quality Monitoring Locations

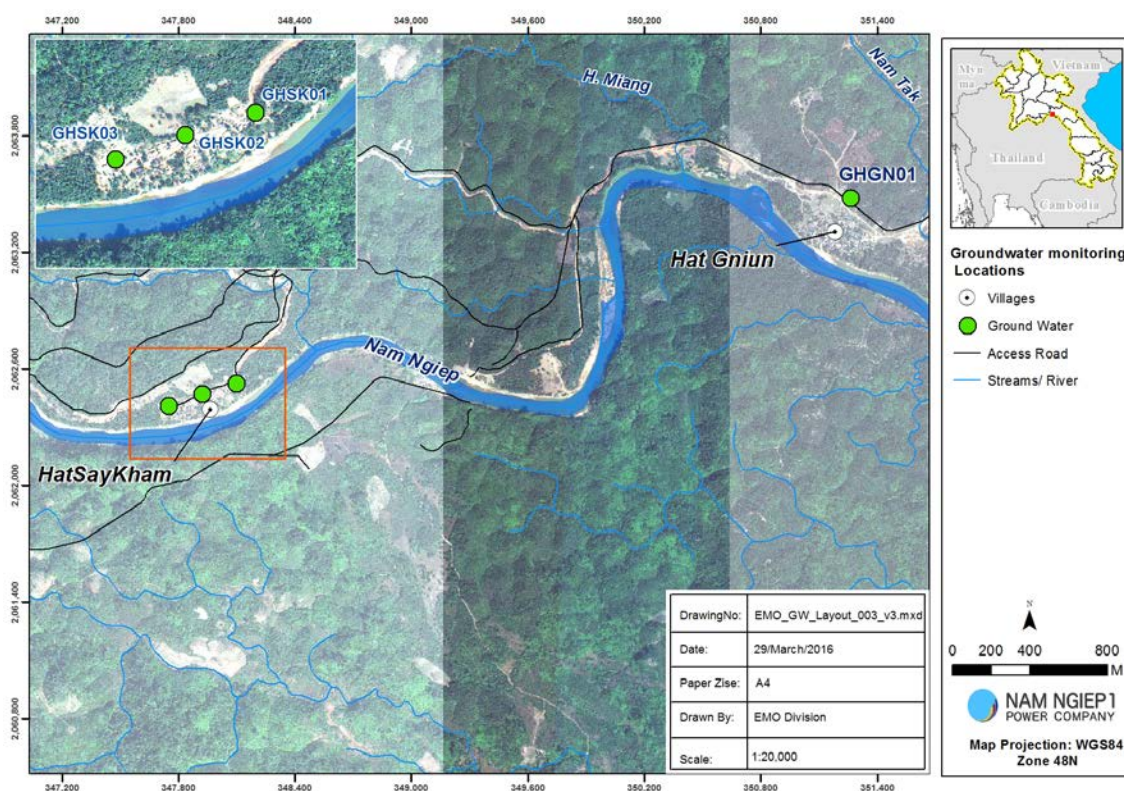


Table 3-9: Groundwater Quality Monitoring Results in April 2016

	Site Name	Ban Hatsaykham			Ban Hat Gnuin
	Station Code	GHSK01	GHSK02	GHSK03	GHGN01
	Date	02/04/16	02/04/16	02/04/16	02/04/16
Parameter (Unit)	Guideline				
pH	6.5-9.2	5.81	5.69	5.84	5.15
Sat. DO (%)		39.9	42.7	86.5	27.1
DO (mg/L)		3.13	3.29	6.73	2.16
Conductivity (µs/cm)		148	81	104	55
TDS (mg/L)	<1,200	74	40	52	28
Temperature (°C)		26.7	27.85	27.34	26.06
Turbidity (NTU)	<20	0.02	0.03	0.02	1.27
Faecal coliform (MPN/100ml)	0	0	0	0	49
Ecoli Bacteria (MPN/100ml)	0	0	0	0	49

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)			

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 provide necessary recommendations to the users of possible impacts caused by bathing and washing. During April 2016, water samples were taken from water taps at Ban Hat Gnuin and Ban Thaheua.

Results of the assessment for GFWS of Ban Hat Gnuin and Ban Thaheua are shown in Table 3-8 and summarised as follows:

Ban Thahuea (WTHH02): All parameters complied with the National Drinking Water Standards.

Ban Hat Gnuin (WHGN02): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E.coli which were found to be 6.9 MPN/100ml for both parameters.

Table 3-10: Results of the Gravity Fed Water Supply Quality Monitoring in April 2016

	Site Name	Ban Thaheua	Ban Hat Gnuin
	Station Code	WTHH02	WHGN02
	Date	02/04/16	02/04/16
Parameter (Unit)	Guideline		
pH	6.5-8.5	7.1	7.37
Sat. DO (%)		70.2	79.5
DO (mg/L)		5.46	6.14
Conductivity (µs/cm)	<1,000	124	116
TDS (mg/L)	<600	62	58
Temperature (°C)	<35	27.24	27.75
Turbidity (NTU)	<10	0.37	1.38
Faecal coliform (MPN/100ml)	0	0	6.9
Ecoli Bacteria (MPN/100mL)	0	0	6.9

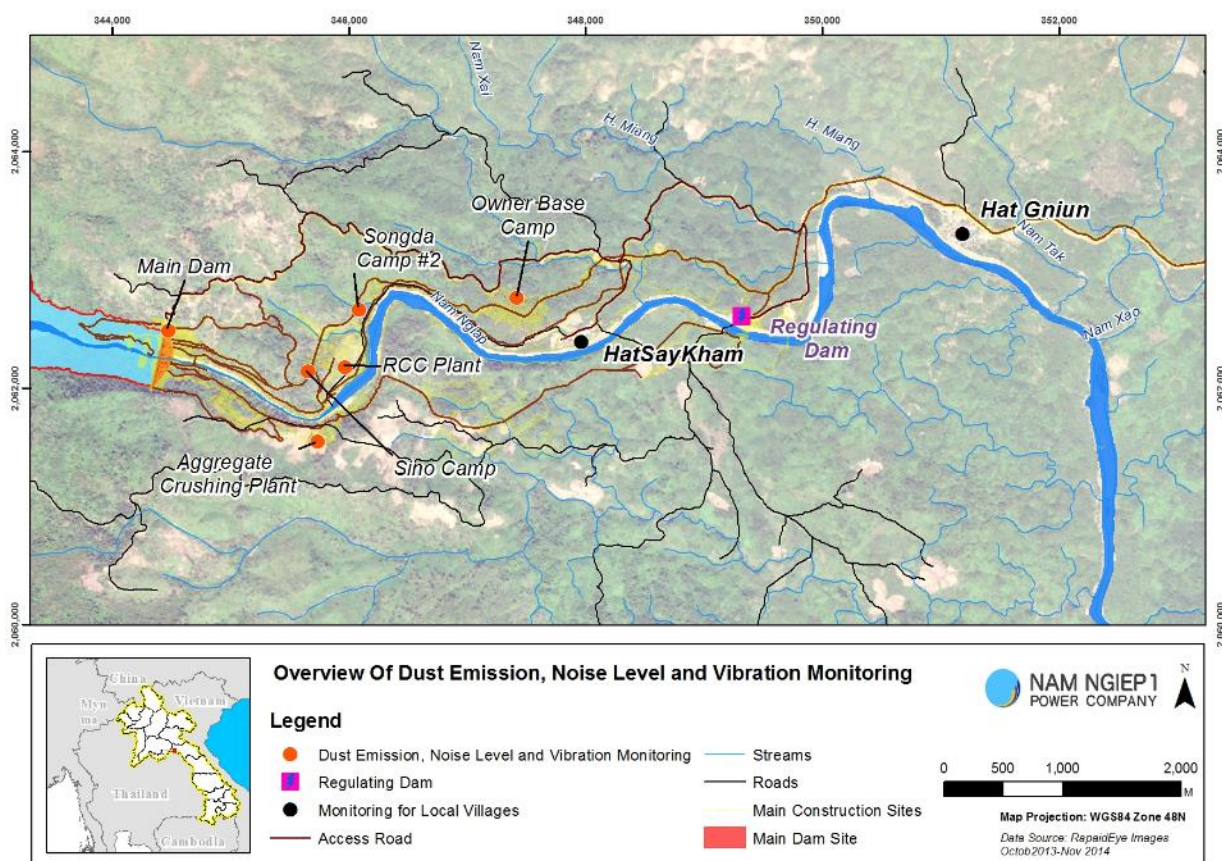
ND ¹ (<0.0005 mg/L)	ND ² (<0.0003 mg/L)	ND ³ (<0.0002 mg/L)	ND ⁴ (<0.005 mg/L)	ND ⁵ (<0.003 mg/L)
ND ⁶ (<0.09 mg/L)	ND ⁷ (<0.07 mg/L)	ND ⁸ (<0.04 mg/L)	ND ⁹ (<0.02 mg/L)	ND ¹⁰ (<0.01 mg/L)
ND ¹¹ (<0.3 mg/L)	ND ¹² (<0.2 mg/L)	ND ¹³ (<1.0 mg/L)	ND ¹⁴ (<1.5 mg/L)	ND ¹⁵ (<4.0 mg/L)
ND ¹⁶ (<5.0 mg/L)	ND ¹⁷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

3.2.5 Dust Monitoring

During April 2016, the monitoring of particulate matter (PM10) was conducted over a period of 72 consecutive hours in Ban Hat Gnuin and Ban Hatsaykham. In addition, dust monitoring was conducted for 24 consecutive hours at the Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No.2 (to assess possible impact on worker's health) and Owner's Site Office and Village.

The monitoring points are indicated on the map in Figure 3-7. All average dust emission results during the monitored period complied with the National Standard. These results are presented in Annex B.

Figure 3-7: Noise and Dust Emission Monitoring Locations



3.2.6 Noise Monitoring

During April 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, Son Da 5 Camp No.2 (to assess possible impact on worker's health) and Owner's Site Office and Village (to monitor the ambient noise levels) for 24 of consecutive hours.

The recorded noise level data indicates full compliance with the National Standard for the period of 06:01-22:00 for all stations monitored. However, the noise level recorded during the period of 22:01-06:00 at Ban Hat Gnuin, Ban Hatsaykham, the RCC Plant, the Owner's Site Office, Songda5 Camp#2, Sino

Hydro Camp and the Main Dam were slightly higher than the National Standard. With reference to the investigation on this matter conducted in February 2016, the key causes of high noise level is most likely the windy conditions.

Results of the noise monitoring for April 2016 are shown in Annex C.

3.3 Construction Site Waste Management

3.3.1 Solid Waste Management at the Construction Site

In April 2016, a Detailed Works Program (DWP) and Site Specific Environmental and Social Management and Monitoring Plan (SS-ESMMP) for the Construction of Landfill was reviewed and approved by the EMO. It is expected that the landfill construction will start by May 2016.

3.3.2 Hazardous Materials and Waste Management

On 21 April 2016, a hazardous waste and materials inventory was jointly undertaken at the main construction sites and sub-contractor camps including the TCM Camp, Song Da 5 No.2 Camp, Right Tunnelling Workshop, V&K Camp, CVC Plant, Sino Hydro fuel station, new Song Da 5 workshop at the Disposal Area No.2 and SECC workshop. The hazardous waste and materials at Song Da 5 temporary workshop and Song Da 5 temporary batching plant were not registered this month because these two sites were dismantled.

The types and amounts of hazardous materials stored at the different construction sites and camps are indicated in Table 3-11.

Table 3-11 Hazardous material inventory during April 2016

Type of Hazardous Materials	Site Name							Total
	TCM Camp	Songda Camp	RT Camp	V&K camp	CVC Plant	Sino hydro fuel station	SECC Camp	
Used oil/hydraulic fluids	11co	1d	7d	2d	0	1sd	1d	11d,1sd,11co
Used oil mixed with	0	0	2d	0	0	0	0	2d
Other petroleum	0	0	0	0	0	0	0	0
Empty used oil drum/container	5sd	3sd	2d	3d,5sd	1sd	6d	5sd	12d, 19sd
Used oil filters	0	0	18u	6u	0	0	7u	31u
Contaminated soil, sawdust and concrete	0	0	17b	1b	0	0	1b	19b
Contaminated textile and material	0	0	4b	1b	0	0	1b	6b
Contaminated used rubber (hydraulic) hose	0	0	2d	0	0	0	0	2d
Contaminated grease	0	0	0	0	0	0	0	0
Empty contaminated grease drum/container	0	0	0	0	0	1sd	1sd	2sd
Empty contaminated bitumen	80d	0	0	0	0	0	0	80d
Used tyres	10u	0	7u	11u	0	4u	11u	43u
Chemical mixed with water and chemical	0	0	0	0	0	0	0	0

Type of Hazardous Materials	Site Name							Total
	TCM Camp	Songda Camp	RT Camp	V&K camp	CVC Plant	Sino hydro fuel station	SECC Camp	
Empty used chemical drum/container	0	0	0	27d	3d	0	0	30d
Solvent residues and containers	0	0	0	0	0	0	0	0
Acid and caustic	0	0	285bo	0	0	0	0	285bo
Empty paint and spray	4ca	0	0	0	1ca	0	1ca	6ca
Used battery	0	0	0	0	0	0	1u	1u
Ink cartridge	0	0	0	0	0	0	0	0
Halogen/ fluorescent	0	0	0	0	0	0	0	0
Electrical and electrical	0	0	0	0	0	0	0	0
Pesticide waste	0	0	0	0	0	0	0	0
Infectious and medical	0	0	0	0	0	0	0	0
Other (cement bags)	0	0	50 kg	0	0	0	100	150 kg

3.4 Community Waste Management Support

3.4.1 Community Recycling Programme

By the end of April 2016, a total of 6,508.2 kg of recyclables were received by the Community Recycle Bank, an increase of 230 kg from last month (see Table 3-10 below). The number of villagers participating in this programme continued to increase. By the end of April 2016, a total of 182 people (129 adults and 53 students) 120 households held accounts at the Recycle Bank. The percentage of participation in the programme for each village are: Ban Hat Gniun 80%, Ban Hatsaykham 66.66% and Ban Thahuea 63%.

The types and amounts of waste recycled in April 2016 and in total are presented in Table 3-12.

Table 3-12: Types and amounts of waste traded in April 2016 and in total

Types of Waste	Unit	Amount Recycled In April 2016	Accumulated Amount Recycled (July 2015 – April 2016)
Recyclable waste			
Glass	Kg	46	1,874
Scrap metal	Kg	46	2,022
Plastic bottle	Kg	20	1,068.5
Paper/cardboard	Kg	103	1,075
Aluminium cans	Kg	15.5	468.7
Tin cans	Kg	5	
Total	Kg	235.5	6,508.2
Hazardous waste			
Hydraulic/oil containers	Kg	0	11.5
Used batteries	Am	0	9



On 23 April 2016, the EMO conducted a trial operation of a recyclable pressing machine. This trial operation was done in collaboration with the NNP1PC Technical Division's Safety Team and included an environmental assessment (noise testing) as summarised and shown in *Table 3-13* below.

The results of the noise assessment during the trial operational period (10:05-10:36) are the following:

The maximum noise level was 99.8 dB(A) during the machine operation;

- The mean noise level during the machine operation was between 57.97 – 87.04 dB (A) which were higher than the National Guidelines for noise level in the community area between 06:00-22:00.

Table 3-13 Summarised noise level during a trial operation of the recyclable pressing machine located in Ban Hat Gnuin (next to the main road)

Noise Level (dB)	23/04/2016						
	10:05 – 10:11	10:12 – 10:24	10:24-10:29	10:29-10:31	10:31-10:32	10:32-10:35	10:35-10:36
Data Record Max	59.1	97.5	65.4	99.8	58.8	62	55.5
Guideline Max	115	115	115	115	115	115	115
Data Record Average	54.07	87.04	54.64	75.05	52.73	57.97	53.43
Guideline Averaged	55	55	55	55	55	55	55
Remark	Equipment Off	Equipment Operating	Equipment Off	Equipment Operating	Equipment Off	Equipment On	Equipment Off

According to these results, the machine operation can be carried out provided the conditions below are followed:

- When the maximum noise level is greater than 80 dB(A), all operators are required to have appropriate ear protection and the working duration should not be longer than 8 hours.
- In order to avoid a noise disturbance to the students in the nearby school the recyclable pressing machine should only be operated during the weekend and the duration of operation should be minimized.
- Regular maintenance of the machine can reduce the operational noise level.

Photograph 3: Safety labels attached to the pressing machine storage area



Photograph 4: An operator wears PPE during the machine operation



3.4.2 Waste Management Training

Waste management training for the shop owners (camp followers) along the Road A at Ban Hat Gniun, was held on 18 April 2016. The main purpose of this training was to explain about waste separation, the Community Recycle Bank Operation, how to reduce the quantity of waste (reduce, reuse and recycle) and how to dispose of waste, types of waste that the community waste bank programme purchase and how to clean waste prior to selling it to the Community Recycle Bank. Staff from 34 shops received training including the owners from 6 local shops owned by villagers, 10 shops with owners who have settled in Ban Hat Gniun, and 18 shops whose owners are Vietnamese.

The amount of participants are presented in Table 3-14

Table 3-14 Summary of the participants during the Waste Management Training

Date	Description	No. of Participants
18 April 2016	Local villagers (Ban Hat Gniun)	6
	Lao people immigrating to Ban Hat Gniun	10
	Foreigners (Vietnamese) immigrating to Ban Hat Gniun	18
	Total	34

Photograph 5: Waste management training for camp followers at Ban Hat Gnuin



Photograph 4: Waste management training for camp followers at Ban Hat Gnuin



3.4.3 Houay Soup Waste Management

In April 2016, the bids for the construction of Houay Soup Resettlement Area landfill were evaluated and finalised. It is expected that the contract will be awarded in May 2016.

3.5 Watershed Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligations	Status by April 2016
Prepare a draft Watershed Management Plan by 31 July 2016	40% completed Progress was continued on data and information collection and analysis, particularly for baseline profiling including GIS layers and maps, and displays of socio economic and environmental data. Progress was made for working draft based on preliminary results of information collection and data analysis.
Prepare draft Watershed Management Regulations by 31 July 2016	
Final Watershed Management Plan by 31 October 2016	
Final Watershed Management Regulations by 31 January 2017	

Activities in April 2016	Results
Data and information collection and analysis for WMP	<ul style="list-style-type: none"> Continue progressing with baseline profiling based on the existing information including GIS layers and maps,

	<p>and displays of socioeconomic and environmental data.</p> <ul style="list-style-type: none"> The preliminary results were elaborated into WMP working draft which will be further discussed in planning workshop scheduled in the first week of May 2016.
GOL consultant procurement	<ul style="list-style-type: none"> MONRE DFRM still could not find any suitable candidates till end of April 2016. WMC-WMO agreed to progress with WMP planning in parallel with settling the consultant procurement issue. The matter will also be discussed during the planning workshop scheduled in the first week of May 2016.
Watershed boundary survey	<ul style="list-style-type: none"> Bolikhamxay and Xaysomboun WMO completed the field activity and its reporting including the documentation of GPS marking and agreement with concerned villages (close to the boundary). Xaysomboun WMO reported the results of the overall activities to the vice-Governor of Xaysomboun Province in late April 2016
Land use planning activity	<ul style="list-style-type: none"> Xaysomboun WMO completed the land use planning in 2 villages of Thathom District and Bolikhamxay WMO completed the same exercise in the 3 villages of Bolikhan District. Land zoning map was produced and concerns on the current land use and proposed area for future management were discussed and agreed with villages.
WMO Office Construction <ul style="list-style-type: none"> 1 WMO Office in XSB with the dimension of 12.20 m x 25 m 1 WMO Office in BLX with the dimension of 15 m x 20 m and repair of the coordination office in Pakxan District with the dimension of 8 m x 38.5 m 	<ul style="list-style-type: none"> Building construction in Xaysomboun was estimated for 100% completion. The WMO staff is scheduled to use the new office in the late May 2016. Bolikhamxay WMO office construction is estimated to be 85% complete while the repair of the coordination office is 100% complete.
Xaysomboun ISP	<ul style="list-style-type: none"> Hom, Anouvong, Longxane and Longcheng District provided good contribution in progressing with District ISP report. Each district plans to present the results to District Governor prior further finalization with ISP Technical Committee and MoNRE DEQP. - The overall Provincial ISP draft report elaborating the results from district ISP exercise is expected in May 2016

3.5.2 Biodiversity Offset Management

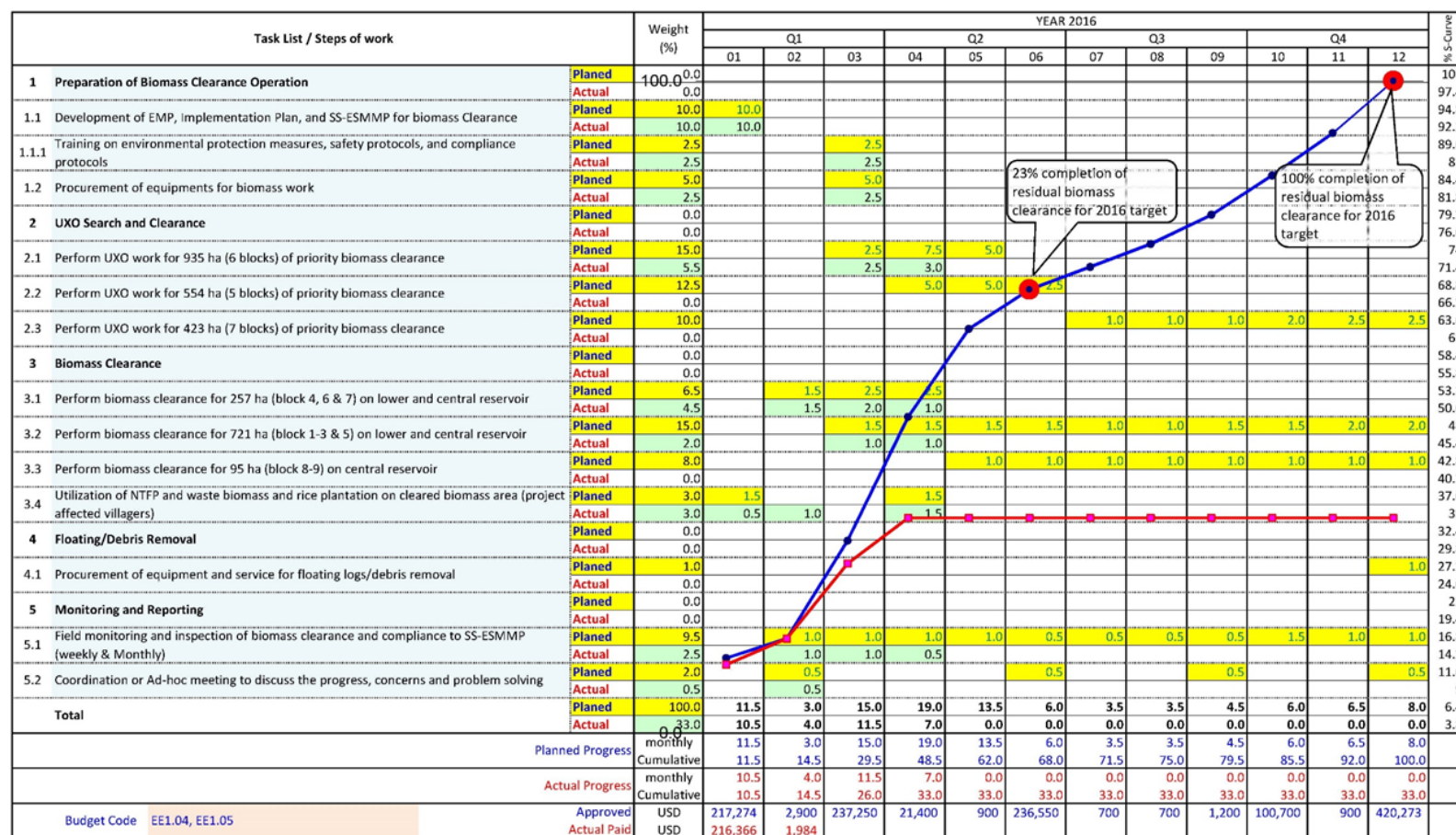
Obligations	Status by April 2016
Final Biodiversity Offset Survey Report by 30 June 2016	80% completed First draft of ground truth survey report by Consultant submitted on 28 April 2016 to NNP1 EMO.
Draft Offset Options Paper for the Biodiversity Offset Sites by 31 July 2016	
Consensus building and workshops among stakeholders for the offset site selection by 15 September 2016	
Final Offset Options Paper for the Biodiversity Offset Sites by 31 October 2016	

Activities in April 2016	Results
Ground truth survey	<ul style="list-style-type: none"> The camera-trap data retrieval was completed on 07 April 2016. NNP1PC continue to extend camera-trap data recording in the area for another month. The data was further analysed to be incorporated into ground truth survey report. The preliminary analysis shows the present of critically endangered and endangered species at risk and/or potentially at risk in Lao PDR such as White-cheeked Gibbon <i>N. leucogenys</i>, Phayre's Leaf Monkey <i>Trachypithecus phayrei</i>, Douc Langur <i>Pygathrix nemaeus</i>, Sunda Pangolin <i>Manis javanica</i>, Big-headed turtle <i>Platysternon megacephalum</i>. The current analysis of camera-trap data also shows the record of some wildlife of 28 mammals and 6 bird species range from least threatened to vulnerable category.
BAC site visitation	<ul style="list-style-type: none"> The 3rd BAC mission took place from 29 March to 10 April 2016 with the key activity of site visitation to Nam Mouane Watershed to provide independent initial assessment of the site's potentiality as suitable offset site. Based on the findings and observations as preliminary assessment prior to the final results of the ground-truth survey), BAC strongly suggests that the site would offer, at the very least a 'No Net Loss', but more likely a 'Net Gain'.

3.5.3 Biomass Clearance

The overall progress of biomass clearance programme is demonstrated in Figure 3-8 below.

Figure 3-8: Gantt Chart of Biomass Clearance Programme in 2016



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

Activities in Apr 2016	Results
Labour recruitment	<ul style="list-style-type: none"> To date, the Contractor has completed a signed contract with 48 individuals (daily contract) and 138 households (lump sum contract) in Ban Sopyouak, 5 households (lump sum contract) in Ban Nam Youak for the biomass clearance work in Block 1 and Block 4-6 In addition, Contractor has completed a signed contract with 33 individuals (daily contract) and 13 households (lump sum contract) in Ban Sop Phouan for the biomass clearance work in Block 7-9.
Ground survey and demarcation of priority biomass clearance area	<ul style="list-style-type: none"> Updated land use of priority biomass clearance areas (18 Blocks) are shown in Table 3-15 and updated priority biomass clearance map is shown in the below <i>Figure 3-9</i>.
Perform UXO work for 9 blocks of priority biomass clearance	<ul style="list-style-type: none"> Information of UXO accidents & survivors, found UXO and history of war in the priority blocks were collected. The Contractor conducted both non-technical and technical field survey for UXO in Block 1 and Block 4. The F3 & F1A4 Minelab detector were used randomly throughout the area for shallow search and discovered no evidence and/or UXO present.
Perform biomass clearance of block 1-9 on lower and central reservoir	<ul style="list-style-type: none"> Vegetation clearing (cut and burn) was completed for around 30 ha in Block 1; 120 ha in Block 4; 40 ha in Block 5 and 10 ha in Block 6. The vegetation clearing did not encounter with any commercial tree or even the tree with diameter of more than >50 cm. The vegetation clearing in Block 7-9 is starting.
Utilization of NTFP and waste biomass	<ul style="list-style-type: none"> Contractor has made contact with potential customers for the sale of cut biomass to local wood processing entrepreneurs but there was no concrete discussion and agreement yet. Local villagers have collected cut biomass for firewood and to build the huts.
Opportunity of short-term crop plantation on cleared biomass area (project affected villagers)	<ul style="list-style-type: none"> Around 138 households are interested in crops plantation on cleared biomass area. The list of interested households is being finalised.
Coordination or Ad-hoc meeting to discuss the progress, concerns and problem solving	<ul style="list-style-type: none"> Village Coordination Meeting on biomass clearance progress took place at NNP1-SMO Based Office in Ban Sop Youak, Hom District on 08 April 2016. The meeting was attended by 29 participants (no female) including representatives from Ban Nam Youak, Ban Sop Phouan Ban Nong (Sop Youak), Contractor-LAUNC, and NNP1-EMO-Biomass team.

Figure 3-9: Map of Priority biomass clearance areas (updated in April 2016)

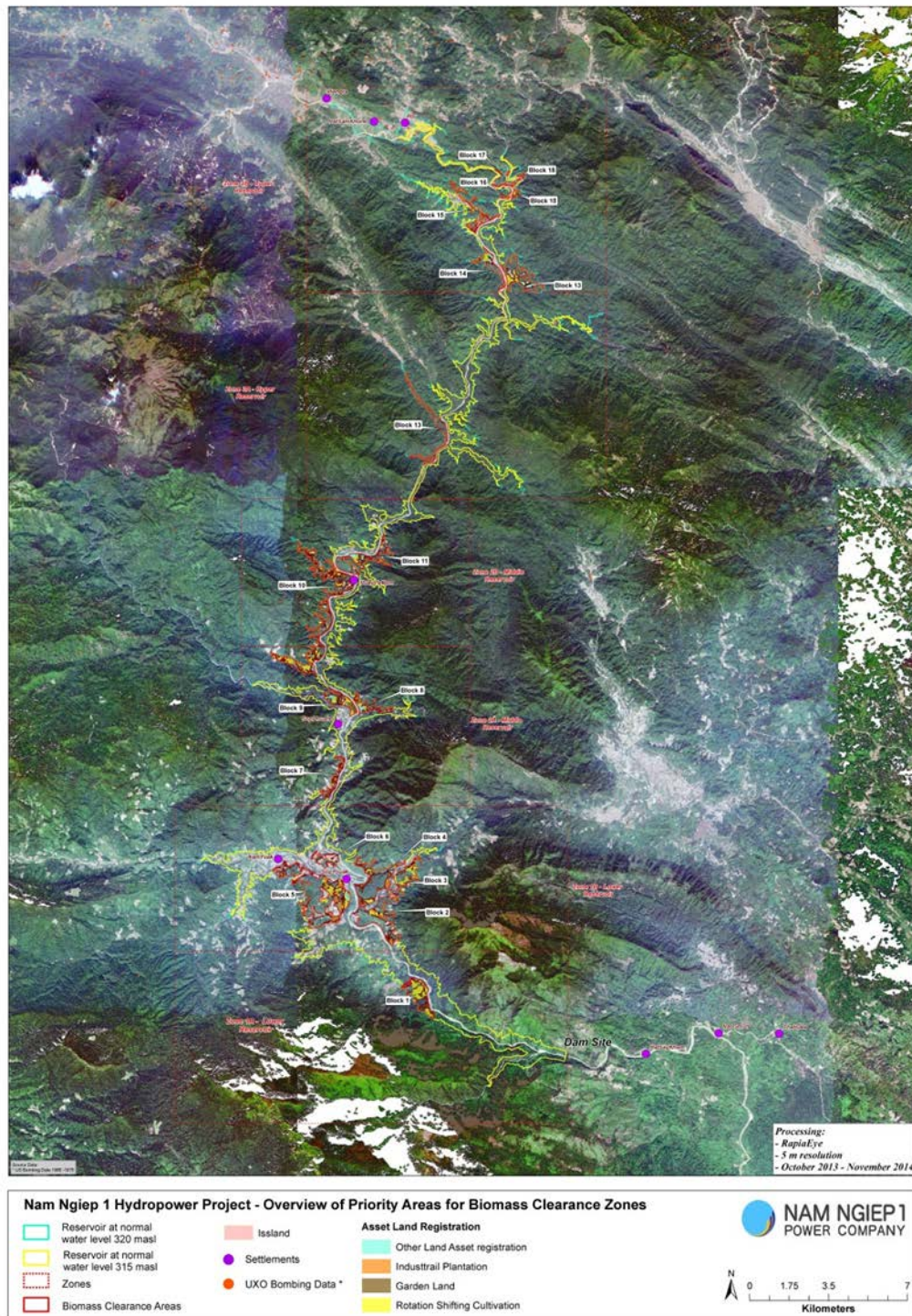
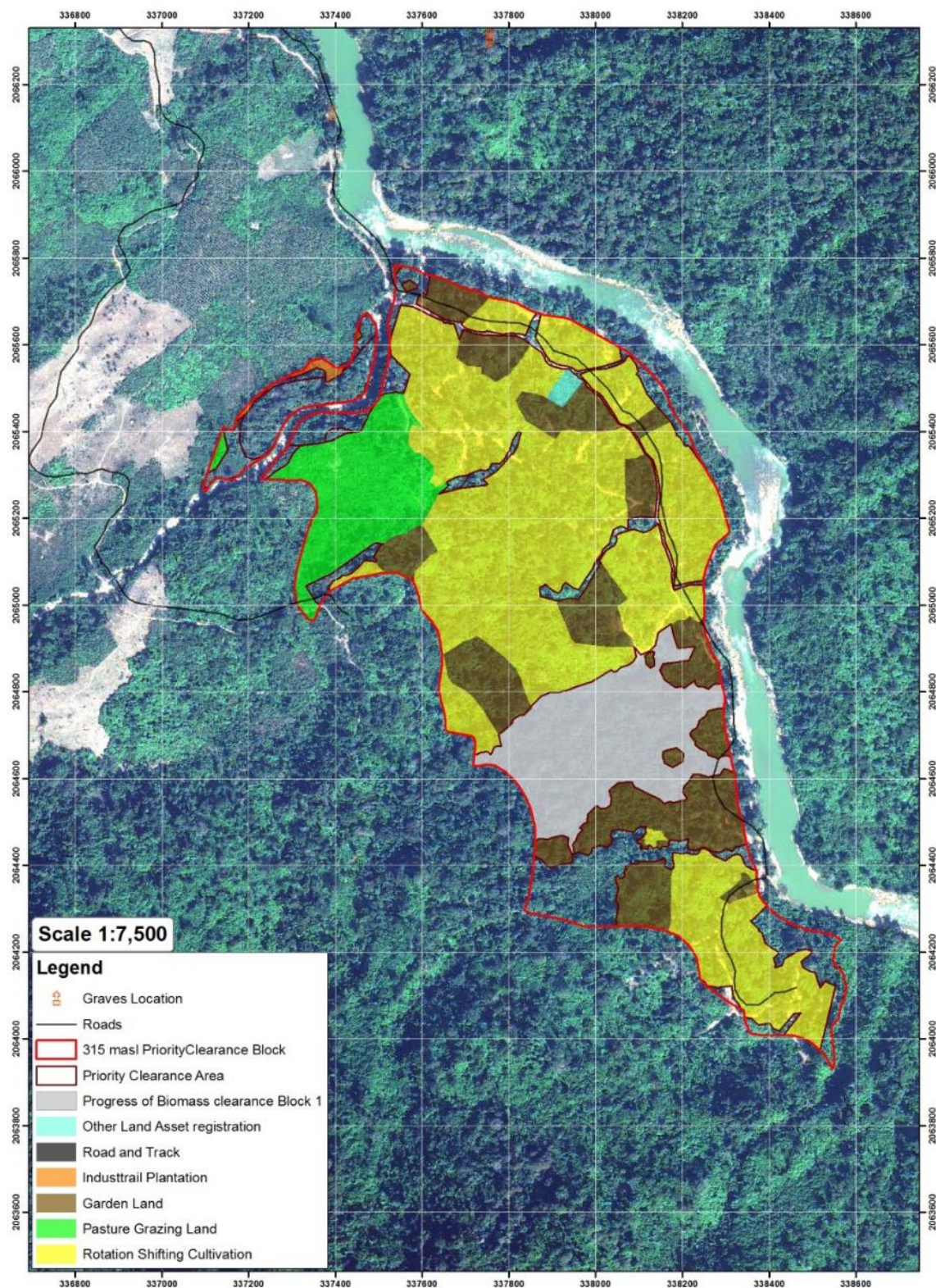
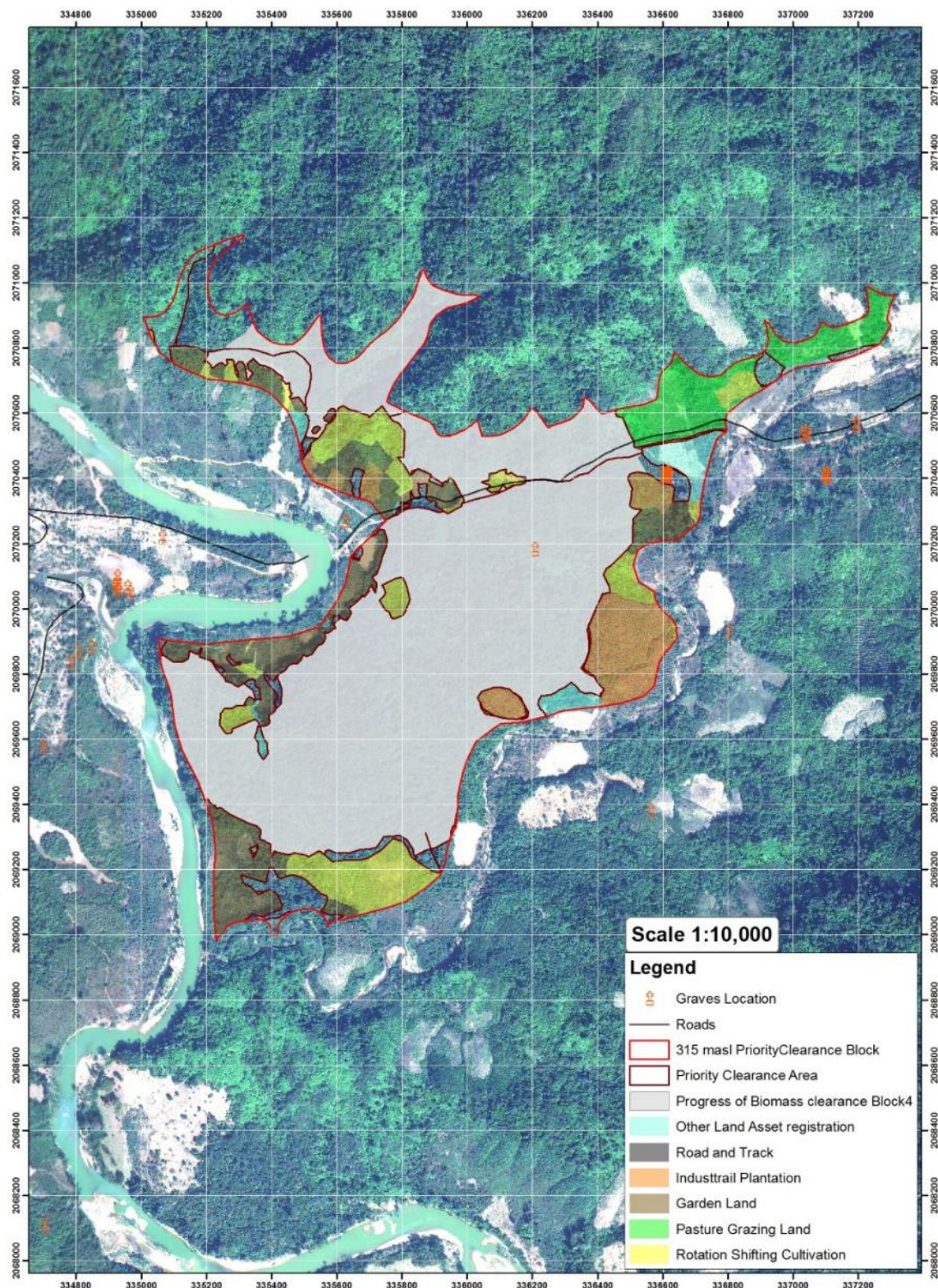


Table 3-15 Priority area for biomass clearance (updated April 2016)

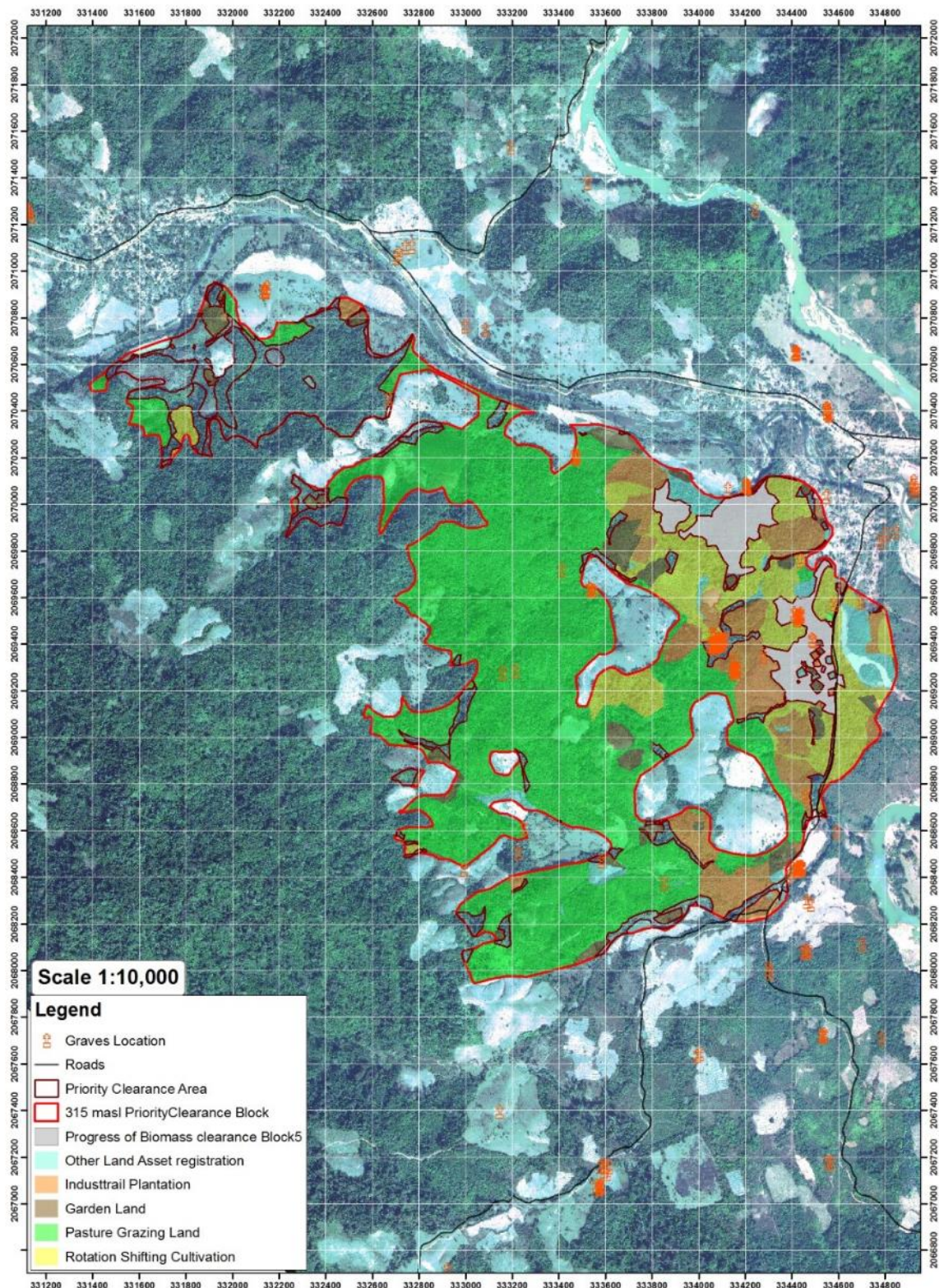
Block	Zone	Land Use Classification in Priority Biomass Clearance Area						Total area (ha)	Status of clearance as of Apr 2016 (ha)
		Rotational Shifting Cultivation	Garden Land	Industrial Plantation	Other Communities Land Asset	Maintained Vegetation (315-320 masl)	Forests		
1	1	50.53	20.18	0.31	10.29	6.11	27.96	115.38	30
2	1	10.79	5.68	7.86	108.82	7.30	25.47	165.92	
3	1	24.44	9.20	5.82	32.84	8.51	8.06	88.86	
4	1	14.76	20.86	10.21	13.95	3.94	103.96	167.68	120
5	1	41.62	17.51	38.25	215.14	8.79	29.40	350.72	40
6	1	-	2.15	0.56	11.90	0.00	32.09	46.71	10
7	2	5.51	9.38	0.25	0.18	3.39	24.32	43.03	
8	2	9.88	3.93	-	7.12	3.40	16.68	41.00	
9	2	15.95	19.73	-	7.63	1.38	9.44	54.13	
10	2	71.09	26.74	1.72	60.10	39.09	118.64	317.39	
11	2	16.29	-	-	71.41	8.07	2.28	98.05	
12	3					20.13	64.11	84.23	
13	3	15.45	-	-	-	27.10	88.79	131.35	
14	3	8.88	0.71	-	29.43	9.66	4.32	53.00	
15	3	15.53	0.24	-	21.60	49.53	6.38	93.27	
16	3	2.02	-	-	-	6.53	1.30	9.86	
17	3	-	-	-	6.64	36.22	1.40	44.25	
18	3					3.23	3.95	7.18	
Total								1,912.01	200

Figure 3-10: Map showing the progress of biomass clearance in priority Block 1

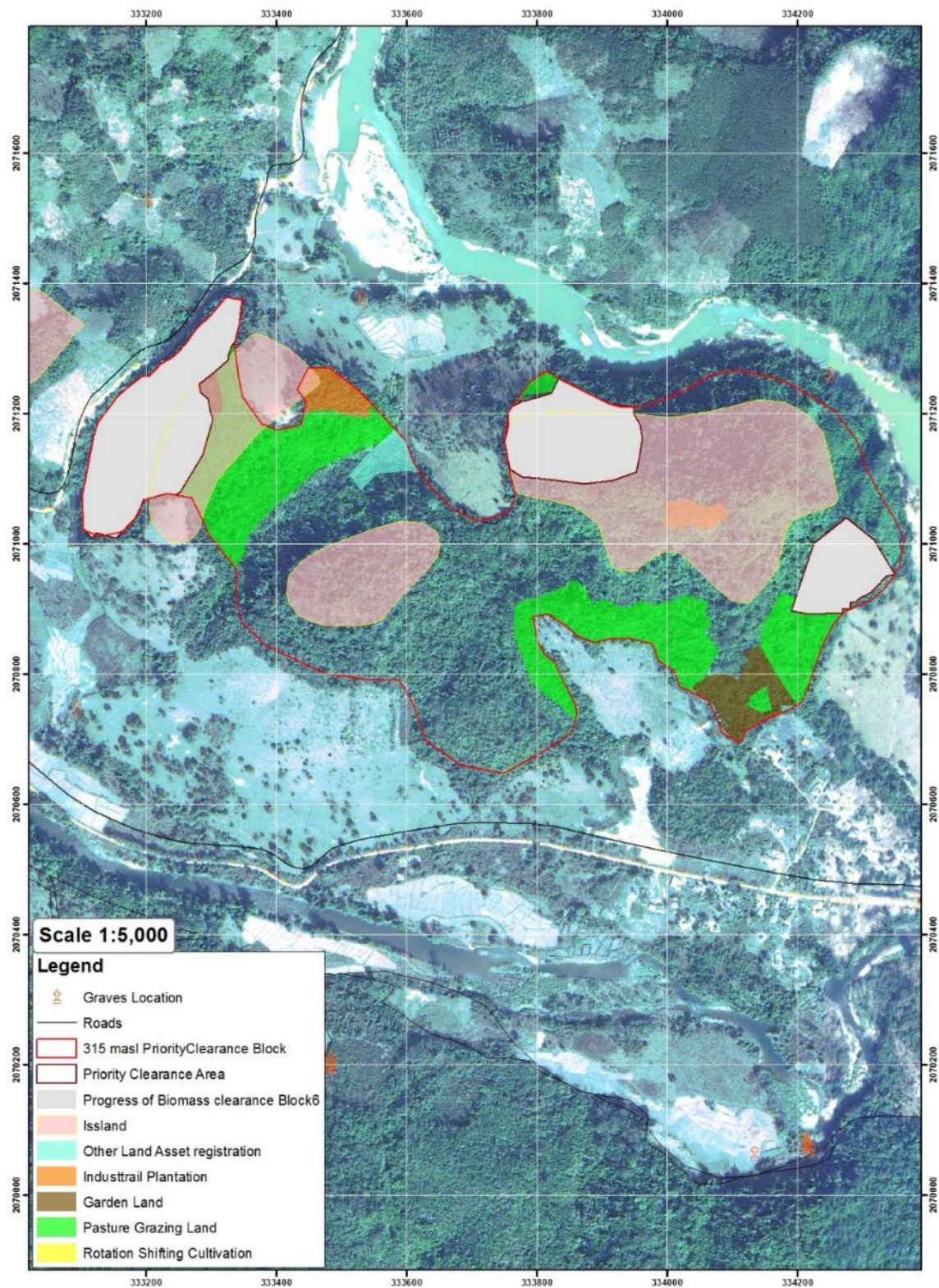
As of April 2016, the cleared area in this block is around 30 ha out of target clearing of 115 ha.

Figure 3-11: Map showing the progress of biomass clearance in priority Block 4

As of March 2016, the cleared area in this block is around 120 ha out of target clearing of 168 ha.

Figure 3-12 Map Showing the progress of biomass clearance in priority block 5

As of April 2016, the cleared area in this block is around 40 ha out of target clearing of 351 ha.

Figure 3-13 Map showing the progress of biomass clearance in priority block 6

As of April 2016, the cleared area in this block is around 10 ha out of target clearing of 47 ha.

3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

The first sub-project proposal of Bolikhamxay Province on Houay Ngoua PPA management for EPF/NNP1 financing was being submitted to the Board of Directors of the EPF for a final decision on the fund disbursement. Regarding a Xaysomboun Province's proposal on the Longleng Forest Protection, the responsible officer under the Xaysomboun PoNRE was invited to further improve the proposal in the upcoming workshop scheduled on the first week of May 2016.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

A completed IEE in Lao version will be provided to NNP1PC in May 2016. The DDA will be commenced once NNP1PC receives a copy of the IEE.

3.6.3 Nabong Substation Upgrade Due Diligence Assessment

The Nabong sub-station DDA report was finalized and will be submitted to ADB by the end of April 2016.

3.7 External Monitoring

3.7.1 Independent Monitoring Agency

A meeting was held with the Independent Monitoring Agency (IMA) in mid-April 2016 to discuss the overall roles and responsibilities of the IMA, proposed work plan and reporting requirements. The IMA was invited to participate in the kick-off meeting during the ADB/LTA/IAP mission in May 2016.

3.7.2 Biodiversity Advisory Committee

BAC planned to conduct their third visit to proposed biodiversity offset area. The visit will be conducted during the first week of April to confirm and finding and report of ground-truth survey.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

Table A- 1: Results of Camp Effluent in April 2016

	Site Name	Owner Site Office and Village	Obayashi Camp	TCM Camp	RT Camp	Sino Hydro Camp	Songda5 Camp#1	Songda5 Camp#2	V & K Camp	SECC Camp
	Station code	EF01	EF02	EF03	EF05	EF06	EF07	EF08	EF10	EF11
	Date	03/04/16	03/04/16	03/04/16	03/04/16	03/04/16	03/04/16	03/04/16	03/04/16	03/04/16
Parameters (Unit)	Guideline									
pH	6.0 - 9.0	6.99	8.23	7.64	6.88	7.65	7.24	7.54	7.74	8.64
Sat. DO (%)	-	23.7	49.4	116	80.6	25.5	31	26	37.4	145.2
DO (mg/L)	-	1.84	3.79	8.37	6.05	2	2.45	2.08	2.85	10.17
Conductivity (µs/cm)	-	607	921	194	216	501	669	852	376	507
TDS (mg/L)	-	304	460	97	108	250	335	426	188	253
Temperature (°C)	-	27.17	27.84	31.61	29.07	26.3	26.72	25.5	28.47	33.4
Turbidity (NTU)	-	0.52	38.1	6.71	58.8	56.3	13.9	0.11	171	68
BOD (mg/L)	<30	1.9	88.5	4.5	3.1	19	55.2	53.8	10.4	29.8
COD (mg/L)	<125	14.3	169	27.5	19.6	49.8	119	113	31.8	206
TSS (mg/L)	<50	ND ¹⁶	31.4	23.6	6.3	35.9	16.7	10.4	164	83.3
NH ₃ -N (mg/L)	<10.0	12	32	ND ¹²	ND ¹²	8	13	36	6	10
Oil & Grease (mg/L)	<10.0	ND ¹³	3	ND ¹³	ND ¹³	1	2	2	ND ¹³	1
Total coliform (MPN/100ml)	<400	490	>160,000	13,000	4,900	13,000	160,000	>160,000	92,000	>160,000
Faecal Coliform (MPN/100ml)		490	>160,000	13,000	1,300	7,900	92,000	>160,000	22,000	160,000
Discharge Volume (m ³ /day)		15	0	0	15	0	0	0	0	0

Table A- 2: Results of Construction Area Discharge in April 2016

	Site Name	Spoil Disposal #2	RCC Plant	Regulating Dam		Main Dam	
	Station Code	DS04	DS09	DS08		DS11	
	Date	03/04/16	21/04/16	03/04/16	21/04/16	03/04/16	21/04/16
Parameter (Unit)	Guideline						
pH	6.0 - 9.0	6.15	8.12	7.53	7.23	7.73	8.69
Sat. DO (%)		42.7	106	80.3	118.7	104	106.3
DO (mg/L)		3.4	7.8	6.22	8.43	8.3	7.83
Conductivity (µs/cm)		193	355	325	170.9	439	403
TDS (mg/L)		96	177	162	89	219	202
Temperature (°C)		25.9	26.9	27.73	30.9	25.7	25.6
Turbidity (NTU)		13,000	31.7	2.58	12.3	74.2	4.66
TSS (mg/L)	<50	13,240	28	ND ¹⁶	13	177	48.8
Oil & Grease (mg/L)	<10	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶	ND ¹⁶
Discharge Volume (m ³ /day)		800	10	100	100	6,000	6,000

ANNEX B: AMBIENT AIR QUALITY DATA

Table B- 1: 24 hour average dust concentrations measured in Ban Hat Gnuin

Ban Hat Gnuin - 24 Hour Average Particulate Matter (PM10) Concentration			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	24/04/2016 15:52	25/04/2016 15:52	26/04/2016 15:52
End Time	25/04/2016 15:52	26/04/2016 15:52	27/04/2016 14:51
Average Data Recorded in 24h (mg/m ³)	0.07	0.04	0.08
Guideline Average in 24h (mg/m ³)	0.12	0.12	0.12

Figure B- 1: Dust Monitoring Results at Ban Hat Gnuin in April 2016

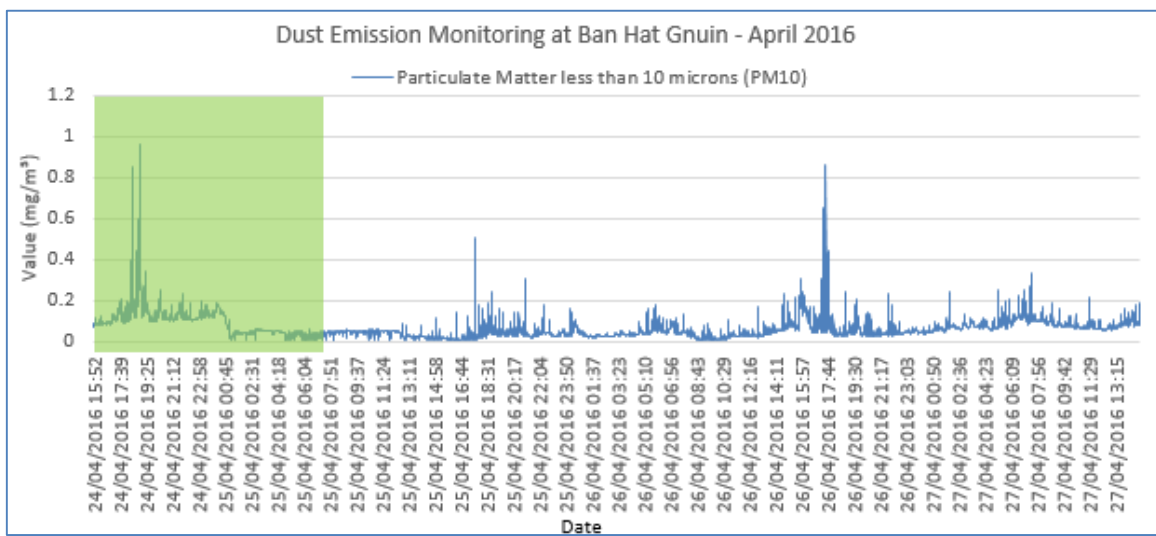


Table B- 2: 24 hour average dust concentration measured in Ban Hatsaykham

Ban Hatsaykham - 24 Hour Average Particulate Matter (PM10) Concentration			
Period	00 to 24 Hours	24 to 48 Hours	48 to 72 Hours
Start Time	21/04/2016 13:23	22/04/2016 13:23	23/04/2016 13:23
End Time	22/04/2016 13:23	23/04/2016 13:23	24/04/2016 13:23
Average Data Recorded in 24h (mg/m ³)	0.06	0.06	0.11
Guideline Average in 24h (mg/m ³)	0.12	0.12	0.12

Figure B- 2: Dust Monitoring Results at Ban Hatsaykham April 2016

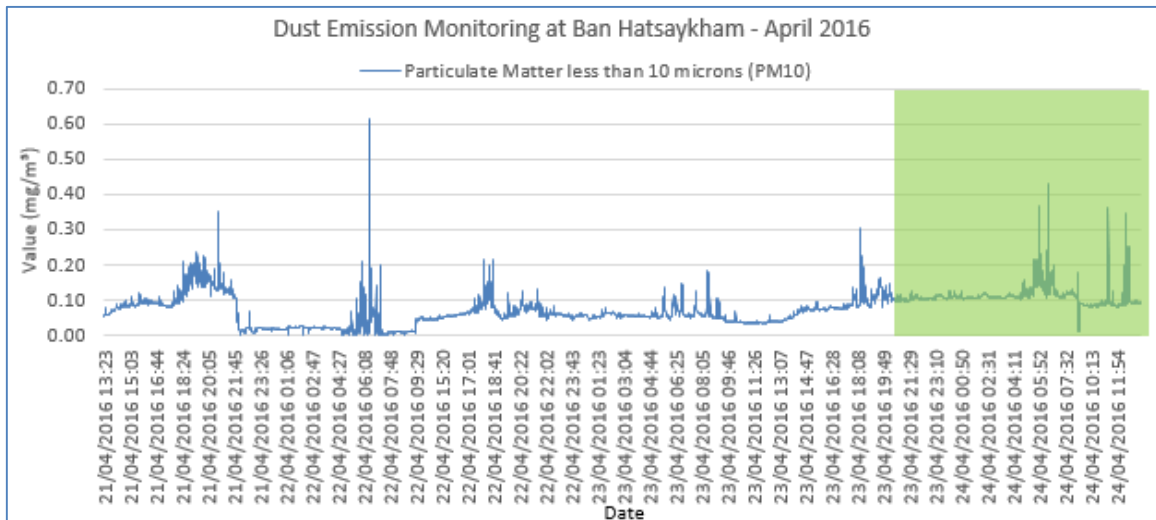


Figure B- 3: Dust Monitoring Results at Aggregate Crushing Plant in April 2016

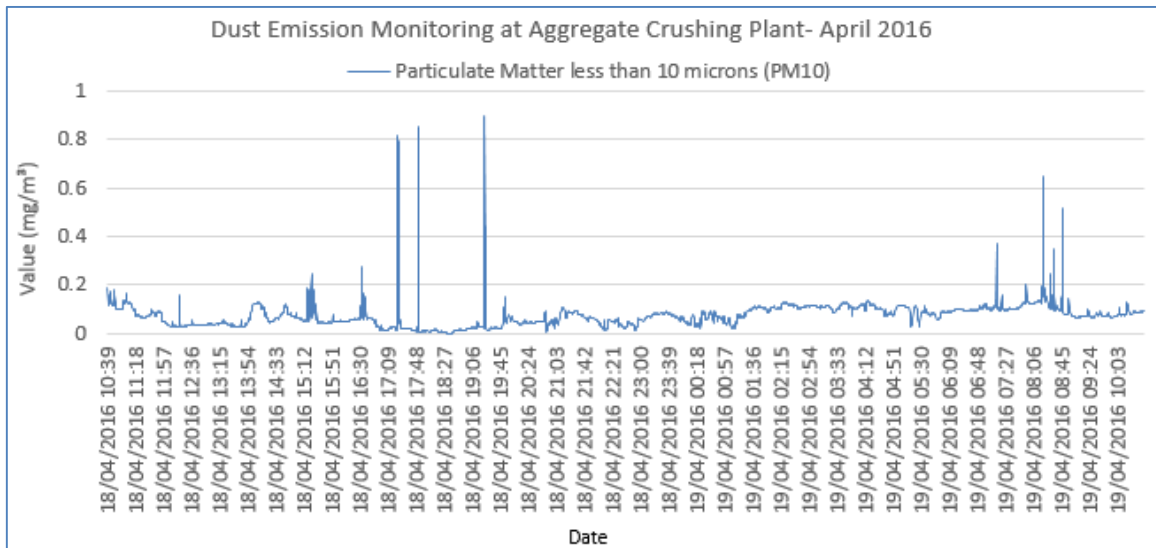


Figure B- 4: Dust Monitoring Results at RCC Plant in April 2016

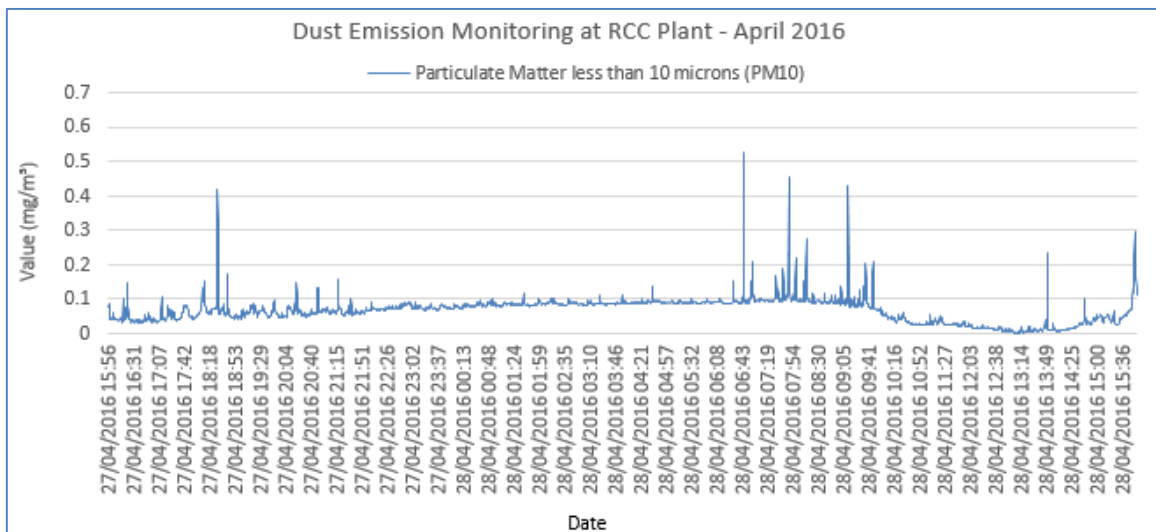


Figure B- 5: Dust Monitoring Results at Songda 5 Camp#2 in April 2016

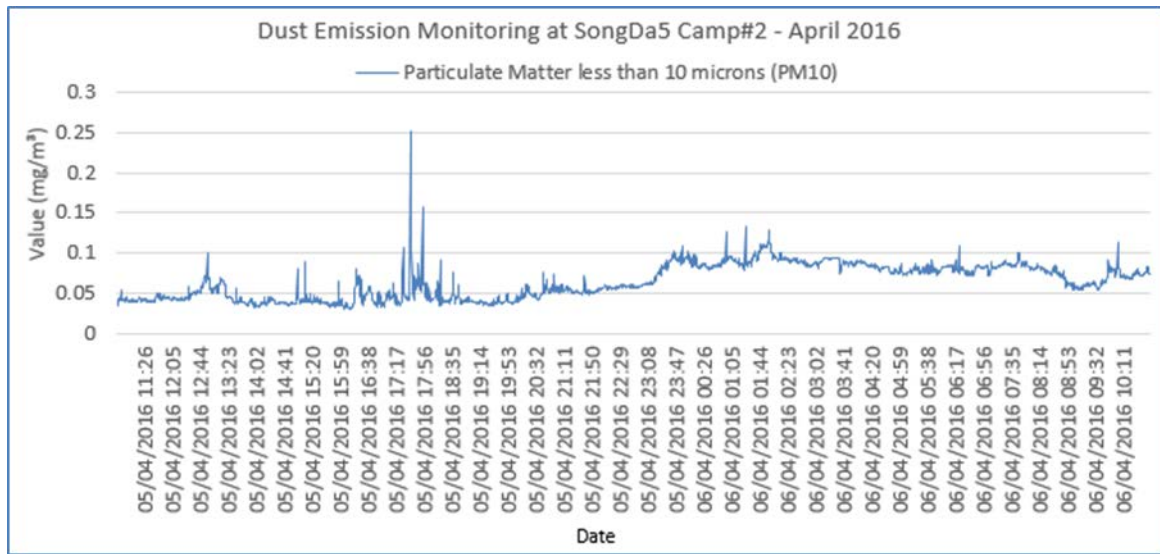


Figure B- 6: Dust Monitoring Results at Sino Hydro Camp in April 2016

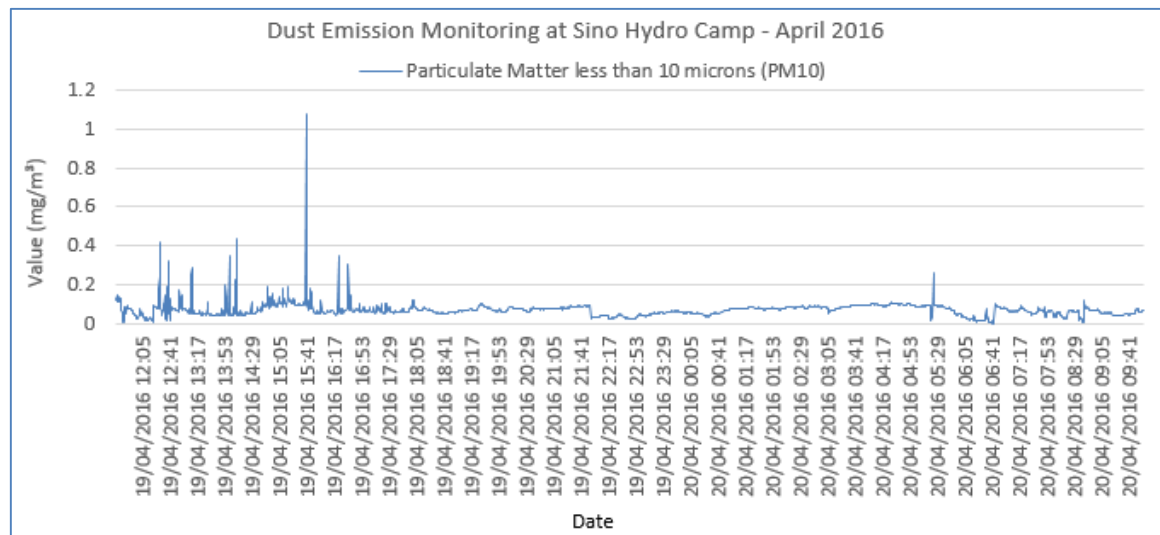


Figure B- 7: Dust Monitoring Results at Owner's Site Office and Village in April 2016

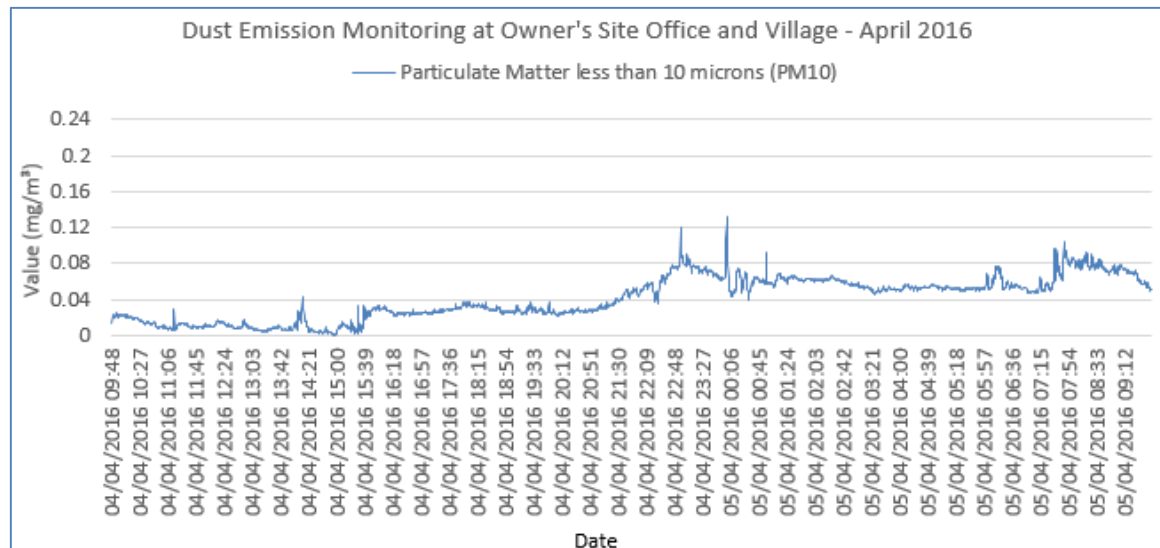
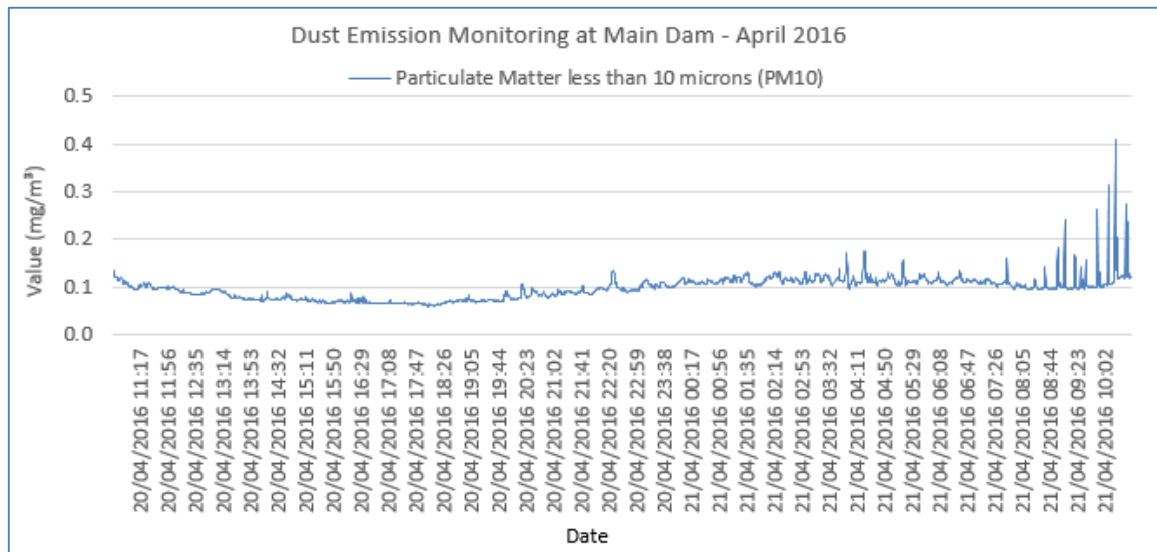


Figure B- 8: Dust Monitoring Results at Main Dam in April 2016



ANNEX C: AMBIENT NOISE DATA

Table C- 1: Average Results of Noise Monitoring at Ban Hat Gnuin in April 2016

Noise Level (dB)	24-25/04/2016			25-26/04/2016			26-27/04/2016			27/04/2016
	13:40-18:00	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	06:01-13:40
Maximum Value Recorded	73	73.4	94.4	73.7	70.9	73.7	76.5	69.6	74.1	72.6
Guideline Max	115	115	115	115	115	115	115	115	115	115
Average Data Recorded	49.99	54.11	55.97	48.65	55.47	51.71	49.86	51.00	50.63	51.21
Guideline Averaged	55	55	45	55	55	45	55	55	45	55

Figure C- 1: Results of Noise Level Monitoring at Ban Gnuin in April 2016

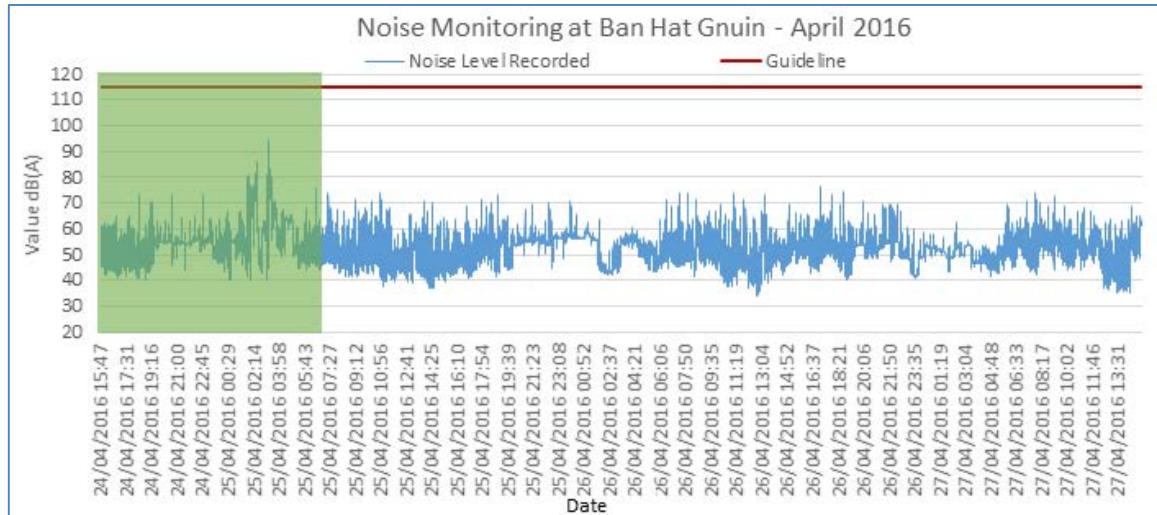


Table C- 2: Noise Monitoring Average Results at Ban Hatsaykham in April 2016

Noise Level (dB)	21-22/04/2016			22-23/04/2016			23-24/04/2016			24/04/2016
	13:40-18:00	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	06:01-13:40
Maximum Value Recorded	67	74.9	102.9	80.9	81.2	87.4	65.9	60.1	61.6	66.2
Guideline Max	115	115	115	115	115	115	115	115	115	115
Average Data Recorded	44.66	46.19	47.33	46.48	48.71	49.78	45.22	46.84	47.74	46.91
Guideline Averaged	55	55	45	55	55	45	55	55	45	55

Figure C- 2: Results of Noise Level Monitoring at Ban Hatsaykham in April 2016

Table C- 3 and Table C- 4: Average Results of Noise Monitoring at Aggregate Crushing Plant and RCC Plant in April 2016

Aggregate Crushing Plant

Noise Level (dB)	18-19/04/2016		19/04/2016
	10:50-22:00	22:01-06:00	06:01-10:50
Maximum Value Recorded	84.3	66.1	82.5
Guideline Max	115	115	115
Average Data Recorded	48.32	46.26	51.38
Guideline Averaged	70	50	70

RCC Plant

Noise Level (dB)	27-28/04/2016		28/04/2016
	16:04-22:00	22:01-06:00	06:01-16:04
Maximum Value Recorded	73.4	60.5	76.8
Guideline Max	115	115	115
Average Data Recorded	64.52	54.23	64.01
Guideline Averaged	70	50	70

Figure C- 3: Results of Noise Level Monitoring at Aggregate Crushing Plant in April 2016

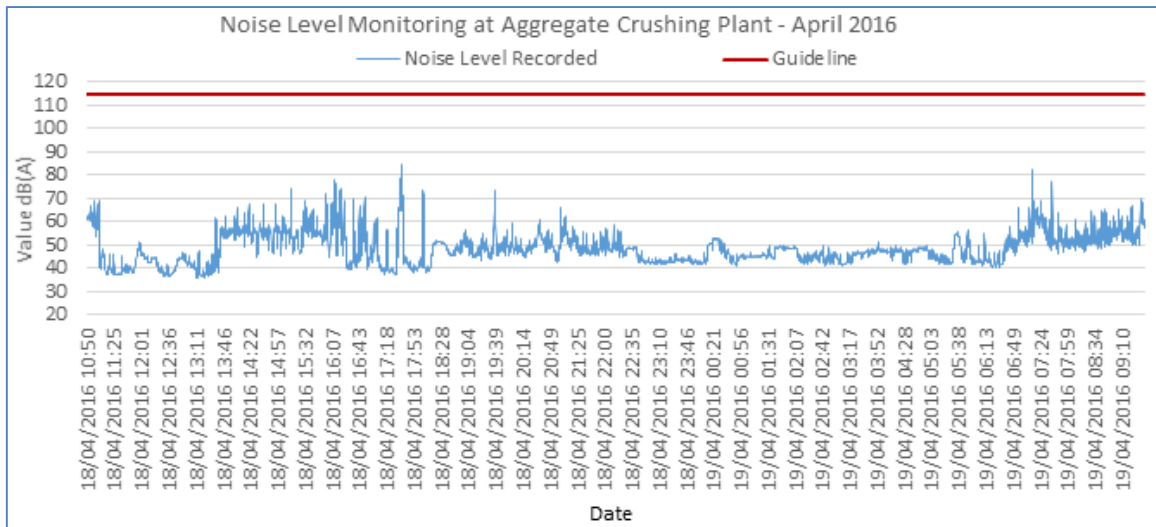


Figure C- 4: Results of Noise Level Monitoring at RCC Plant in April 2016

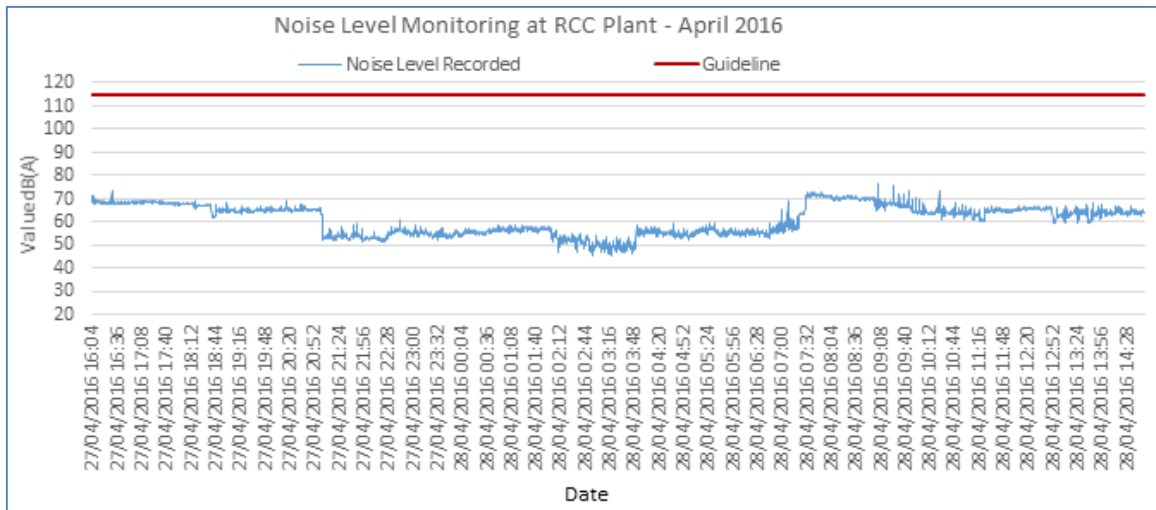


Table C- 5 and Table C- 6: Average Results of Noise Monitoring at Songda Camp#2 and Sino Hydro Camp in April 2016

Song Da 5 Camp No.2

Noise Level (dB)	05-06/04/2016		06/04/2016
	10:55 – 22:00	22:01 – 06:00	06:01-10:55
Maximum Value Recorded	73.7	70.2	75.2
Guideline Max	115	115	115
Average Data Recorded	49.31	54.07	52.56
Guideline Averaged	70	50	70

Sino Hydro Camp

Noise Level (dB)	19-20/04/2016		20/04/2016
	11:42 – 22:00	22:01 – 06:00	06:01-10:16
Maximum Value Recorded	66.9	86.3	83.7
Guideline Max	115	115	115
Average Data Recorded	53.47	54.46	58.81
Guideline Averaged	70	50	70

Figure C- 5: Results of Noise Level Monitoring at Song Da 5 Camp No.2 in April 2016

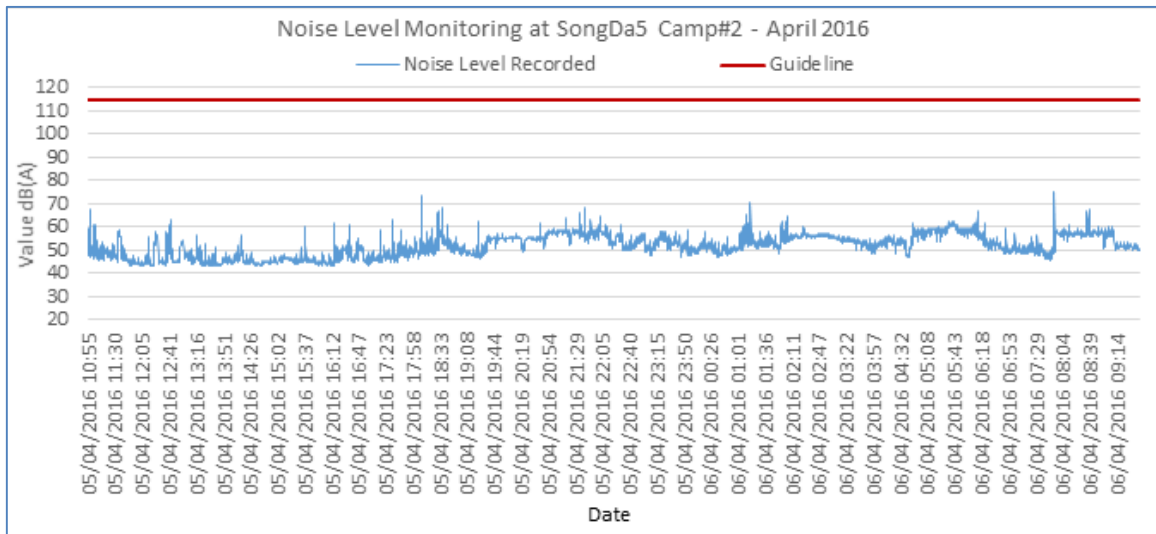


Figure C- 6: Results of Noise Level Monitoring at Sino Hydro Camp in April 2016

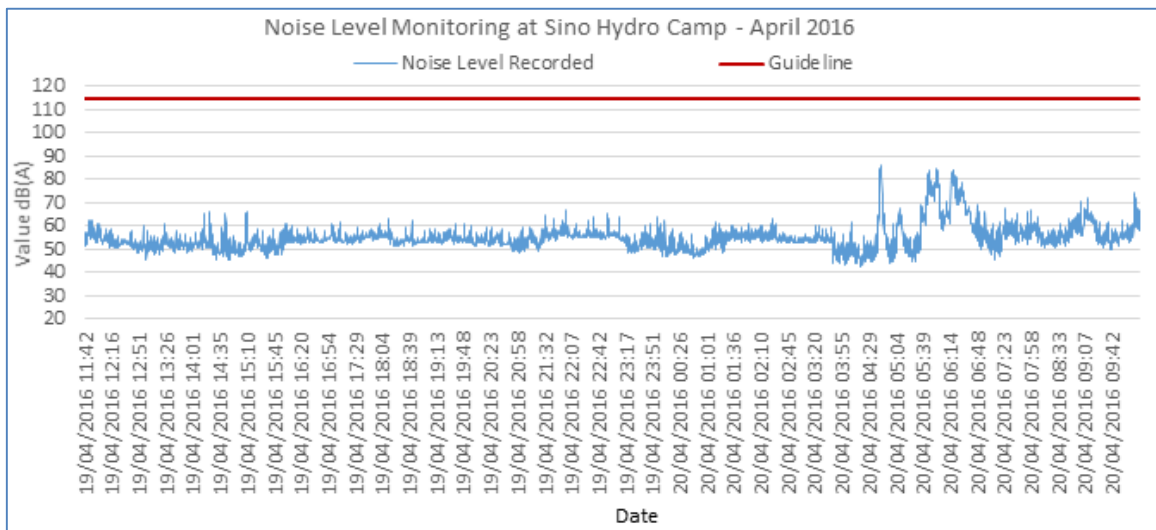


Table C- 7 and Table C- 8: Average Results of Noise Monitoring at the Owner's Site Office and Village and, the Main Dam in April 2016

Owner's Site Office and Village

Noise Level (dB)	04-05/04/2016		05/04/2016
	10:02 – 22:00	22:01 – 06:00	06:01-10:02
Max Value Recorded	64.4	57.4	54.1
Guideline Max	115	115	115
Average Data Recorded	43.54	52.09	42.15
Guideline Averaged	70	50	70

Main Dam

Noise Level (dB)	20-21/04/2016		21/04/2016
	10:55 – 22:00	22:01 – 06:00	06:01-10:55
Max Value Recorded	67.1	68.7	65.7
Guideline Max	115	115	115
Average Data Recorded	48.73	51.67	50.43
Guideline Averaged	70	50	70

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

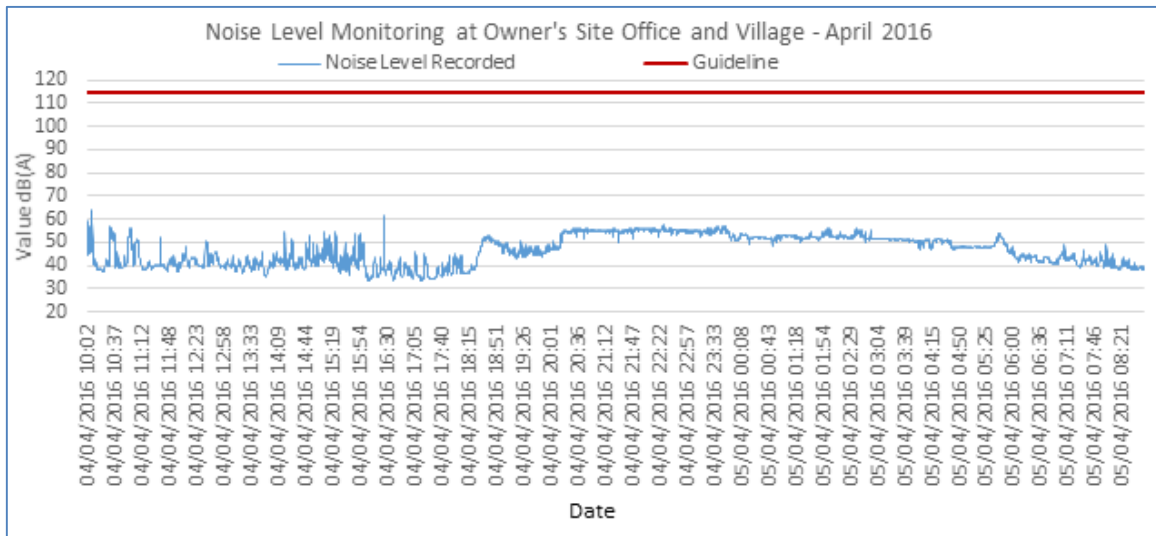
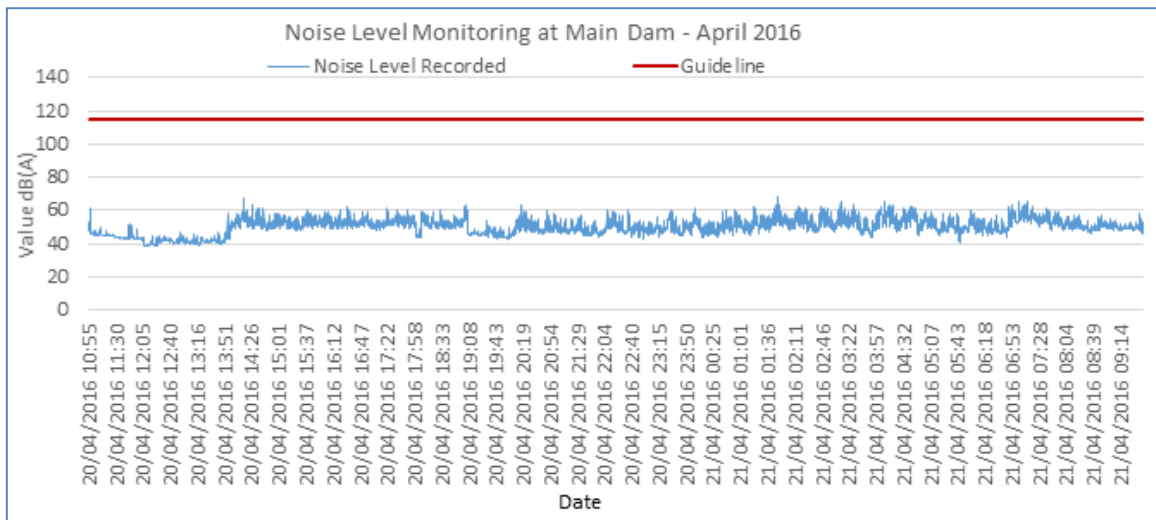


Figure C- 8: Results of Noise Level Monitoring at Main Dam in April 2016



ANNEX D: MAPS FOR WATERSHED BOUNDARY DEMARCATION ACTIVITY IN XAYSOMBOUN PROVINCE

Figure D- 1: Maps showing the surveyed villages (in circle) and target location for watershed boundary demarcation in Hom District, Xaysomboun Province



Figure D- 2: Map showing the surveyed villages (in circle) and target location for watershed boundary demarcation at Anouvong District, Xaysomboun



Province

Figure D- 3: Map showing the surveyed villages (in circle) and target location for watershed boundary demarcation at Thathom District, Xaysomboun Province

