NAM NGIEP 1
POWER COMPANY

Nam Ngiep 1 Hydropower Project

Environmental Management Monthly Monitoring Report

July 2016

Rev	Date	Author	Checked	Approved	Modification Details
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Accessibility	
☑	Public
☐	Internal
☐	Confidential

Document No.

NNP1-C-J0904-RP-019-A

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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 July 2016, NNP1PC-EMO received seven SS-ESMMPs and one ESMMP. Out of these eight documents, three were approved and five are under review. A total of 14 Observations of Non-Compliances (ONCs) were issued in July 2016; this is an increase of six compared to eight ONCs issued in June 2016. The issued ONCs were mainly related to erosion and sediment controls at the construction sites and camps, which were influenced by the storms that occurred in July 2016. With a carry-over from June 2016, a total of 26 ONCs were active in July 2016. Out of these, 11 were resolved, five were not resolved and exceeding the deadlines[1] given and a total of 15 ONCs will be carried over into August 2016. NNP1PC is following up with the Contractors to resolve the remaining issues in August 2016.

A contractor has been selected to construct a small Site laboratory at the Owners' Site Office and Village. A Detailed Work Programme (DWP) and SS-ESMMP will be prepared by the contractor for NNP1PC review and approval prior to commencing the construction works. The purchase of the laboratory equipment from a supplier in Thailand was finalised and the Purchase Order was issued in July 2016.

Water quality monitoring data for the period of July 2016 indicated that at all construction camps had higher concentrations of total coliforms than the effluent standards. A joint assessment of the waste water treatment systems (WWTS) between a Thai Expert, NNP1PC (TD and EMO), and the Civil Contractor (OC) was undertaken during 29-30 June 2016, and the Thai Expert is currently preparing design recommendations. However, it was agreed during the assessment that chlorination in a one to two cubic metres Chlorine Contact Tank using sodium hypochlorite (NaOCl) is needed. Additional details on specifications and drawings of the WWTS for a few camps were requested by the expert before finalizing his report. The corrective actions proposed by the expert will be discussed and agreed upon including timing of implementation between NNP1PC and the Contractors.

The construction of the NNP1 Project landfill was completed in July 2016, except for some minor improvements. The total volume of waste removed from the temporary pits to the new pit was approximately 800 m^3. In July 2016, the faecal coliform count in the groundwater monitoring well MW1 at the western periphery of the landfill was 22 MPN/100 ml. No faecal coliforms were found in the three other monitoring wells. All four groundwater wells have low pH levels similar to the pH level in the wells at Hatsaykham Village.

There were no Environmental Monitoring Unit (EMU) visit in July 2016.

[1] Progress is slow with implementation of corrective actions

The development of NNP1 Watershed Management Plan (WMP) continues to progress with compilation and incorporation of data analysis, workshops, and management sub-plans on biodiversity and fisheries into an interim Watershed Management Plan. The draft report is currently under internal review by NNP1PC.

Most of the milestones under the biodiversity programme will be rescheduled. The key milestones that will be revised include preparation of offset option paper, boundary confirmation baseline survey, biodiversity offset baseline survey, Biodiversity Offset Management Plan, and provincial regulations on biodiversity offset.

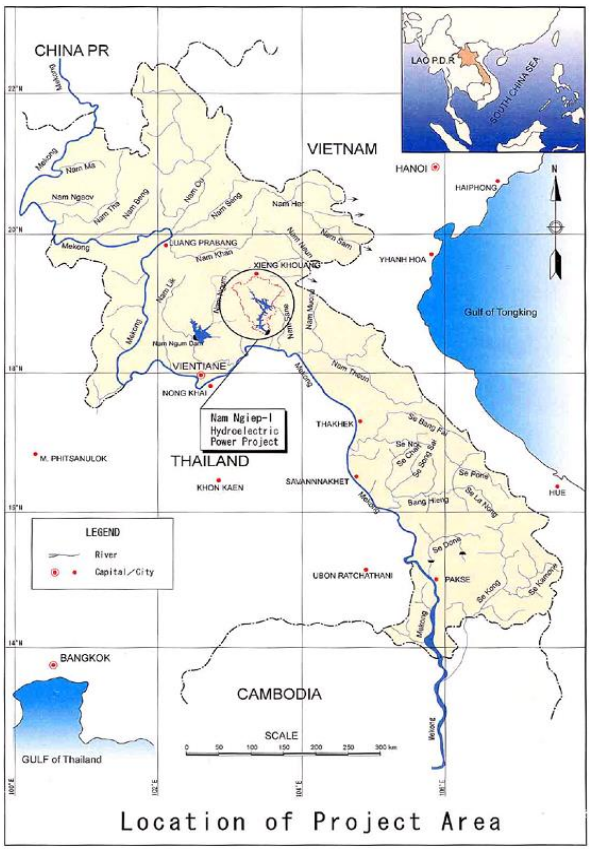
In relation to the biodiversity offset programme, a Biodiversity Offset Management Committee (BOMC) was established on 04 July 2016 with the primary responsibility to provide guidance and supervision for NNP1 Biodiversity Offsets.

During this wet season, there is no further progress on biomass clearance, mainly because of limited access to the area.

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 (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 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 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 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.

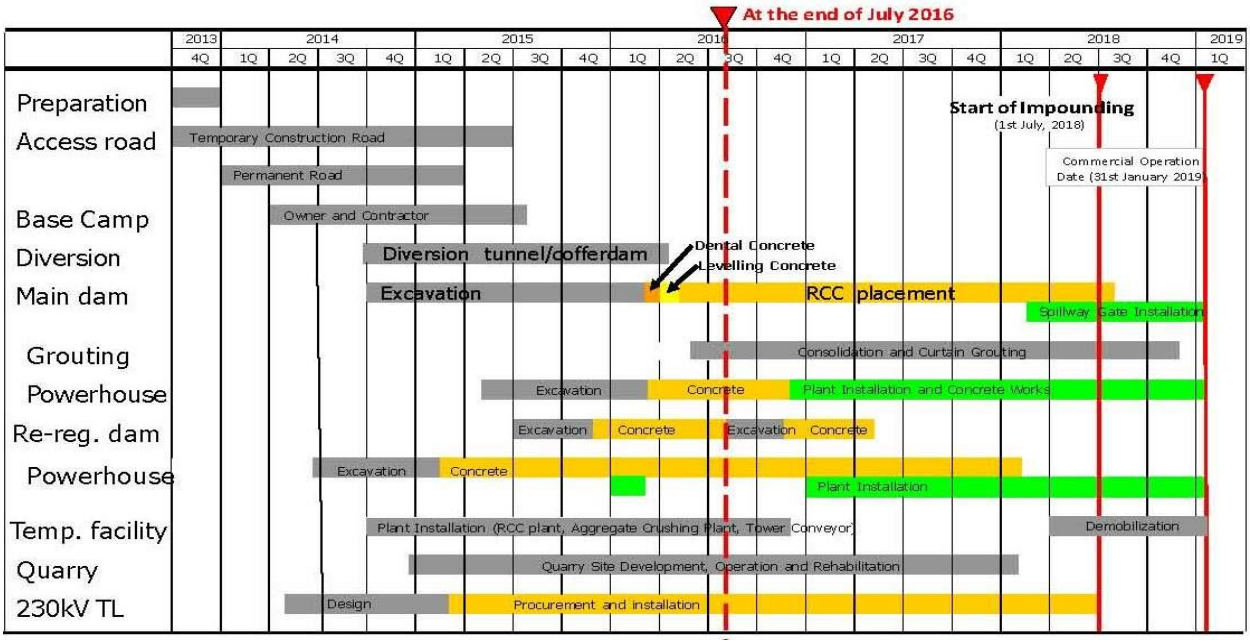
2 WORK PROGRESS OF PRINCIPAL CONTRACTORS

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 230kV Transmission Line Works. Actual overall cumulative work progress until the end of July 2016 was 44.1%[1] (compared to planned progress of 48.3%), 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 **Error! Reference source not found.** respectively.

Figure 2-1: Overall Construction Schedule



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 July2016 was 48.1% (compared to planned progress of 47.7%) 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. The cost of the additional excavation and RCC concrete placement necessitated expenditure of contingency amounts provided exactly for such eventualities. The dental concreting works were 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 was completed at the beginning of May. Consolidation grouting at the main dam area was commenced on 10 May 2016 and RCC concrete placement for the main dam body was commenced on 21 May 2016. Consolidation grouting covers the whole footprint of the main dam and RCC concrete placement and consolidation grouting are implemented in parallel, section by section. The progress of RCC concrete placement is shown in Table 2-1 below.

Table. 2.1-1: Progress of Main Dam RCC Works at 31 July 2016

Total Anticipated Volume (m^3)	Completed (m^3)	Progress (%)
2,310,000	158,560	6.9

The consolidation drilling and grouting for the main dam started in May 2016 and is ongoing. The progress is 31.6 % by achievement of total drilled length at the end of July 2016 as a proportion of the total expected drilling shown in *Table.2.1-2* below.

Table. 2.1-2: Progress of Consolidation drilling and grouting at 31 July 2016

Total Anticipated Drilling (m)	Completed (m)	Progress (%)
16,420	5,195	31.6

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 31 July 2016.

Total Anticipated Volume (m^3)	Completed (m^3)	Progress (%)
32,600	12,033	36.9

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 2-3 below

Table 2-3: Progress of Re-regulation Dam Left Bank Structural Concrete Works to 31 July 2016

	Concrete Volume (m^3) Placed by the End of July 2016						
Structure	Intake	Powerhouse	Tailrace	Retaining Wall	Spillway	Left Bank RCC Structure	Ove ral

Anticipated Quantity	26,549			508	23,500	13,200	63,757
Completed Quantity	11,643	11,169	1,681	508	3,758	13,228	41,987
Progress	**92%**			**100%**	**16%**	**100%**	**66%**

The concrete volume placed already for both powerhouse and dam is 40,980m^3 being 64% of the revised total estimate of 63,757 m^3 for all 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 re-designed as roller compacted concrete (RCC) and was completed on 18 March 2016. Following installation of guide frames for re-regulation waterway gate and stop log and re-regulation intake gate in April 2016, secondary concrete embedment of the guide frames was completed in May 2016 and structural concrete works for the retaining wall to support the substation yard was commenced in June 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 was completed in early April 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 until the end of June 2016 was 31.8% (compared to planned progress of 53.0%). This delay is due to the change of schedule of delivery of stator material for Unit 1 of the main powerhouse and receipt of runner material of re-regulation powerhouse at the Electrical and Mechanical Works Contractor's factory from April 2016 to August 2016 and from June 2016 to July 2016 respectively. However, the stator of Unit 1 of the main powerhouse and the runner of the re-regulation powerhouse will be shipped from the factory to the Site on schedule by coordination of the manufacturing schedule in the 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 diagram (Unit No.1), plant control flow diagram, diagram of connection with external equipment of LV distribution panel, list of spare parts for main transformer, and shop inspection and test procedures for turbine stationary parts assembly for hydro-turbine, guide vane servomotor, pit liner, rotor pole and overhead traveling crane.
- For the re-regulation power station, layout drawing of equipment of substation, sequence diagram of 145 kV disconnector, calculation documents of mechanical strength of foundation anchor bolts for equipment and trestle of substation, diagram of connection with external equipment of LV distribution panel, list of special tools and spare parts for generator circuit breaker panel, shop inspection and test procedures for stay cone, hatch cover and frame, front channel liner, overhead traveling crane, and detailed works, and detailed works program (DWP) and site-specific environmental and social monitoring and management plan (SSESMMP) for installation work of embedded parts of stay cone.

The installation work of embedded piping for the main powerhouse commenced on 17 February 2016 and continued in coordination with concrete casting work. The status of embedded pipe installation is shown in

b) Figure 2-2.

c) The grounding works for the main powerhouse and re-regulation power house are under way in coordination with concrete casting work.

Figure 2-2: 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 July 2016 was 25.1% (compared to planned progress of 25.1%). The main activities carried out during this month are described below:

a) Main dam

- Site witnessed inspections to confirm dimensional accuracy for the endpoint of Penstock Pipe No. P38 for Line 1 was approved by the Owner's Engineer on 12 July 2016.
- Site witnessed inspection before field welding at the joint between Penstock Pipe Nos. P38 and P39 for Line 1, was approved by the Owner's Engineer on 18 July 2016.
- Site witnessed inspection to confirm dimensional accuracy for the endpoint of Penstock Pipe No. P38 for Line 2 was approved by the Owner's Engineer on 26 July 2016.
- Site witnessed inspection after field welding at the joint between Penstock Pipe Nos. P38 and P39 for Line 1, was approved by the Owner's Engineer on 18 July 2016.

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

Table. 2-4: Progress of the penstock pipe fabrication at the IHI field shop as at the end of June 2016

Item No.	Work Activity	Fabrication Progress (%)	Remarks
1.1	Assembly & Welding	24 %	
1.1	Painting	18 %	
1.1	Delivery to Main Dam Laydown Area	3 %	
1.1	Site Erection at Main Dam	3 %	

b) Re-regulation dam

- Re-regulation Waterway Gate: The gate leaf installation was completed, except for the installation of rubber seal and lifting hoist. The dimensional accuracy and visual witness inspection (before painting) was completed on 06 July 2016. The painting witness inspection was approved by the Owner's Engineer on 13 July 2016.
- Re-regulation Waterway Stop Log: Rubber seal installation for the two segments of stop log was completed. Functional tests before initial filling of reservoir was carried-out and was witnessed and approved by the Owner's Engineer on 09 July 2016. This kind of test, which is also called a "dry test" has confirmed the normal function and operation of all rotation parts. A leakage test was checked by insertion of thickness gauge #05 (0.05mm) in between the rubber seal and seal plates, and it was confirmed visually as sealed. The 2 Nos. stop log gates, steel stand, lifting beam and rope were all temporary placed and protected at the storage area inside the IHI field shop.
- Re-regulation Intake Gate: The gate leaf installation was completed, except for the installation of rubber seal and lifting hoist. Dimensional accuracy and visual witness inspection before painting was completed on 30 June 2016. Painting witness inspection was approved by the Owner's Engineer on 11 July 2016.
- Re-regulation Intake Trash Rack: Installation of main beams and trash rack panels was completed. Dimensional accuracy and visual witness inspection for the left and right bank trash rack was approved by the Owner's Engineer on 29 June 2016 and 04 July 2016 respectively.
- Re-regulation Draft Gate: The removable guide frames / side roller rails at the left and right sides of the draft gate were completed. Dimensional accuracy, visual and

painting inspection for the guide rails was approved by the Owner's Engineer on 27 July 2016.

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

Table. 2-5: progress of steel gate installation for each work item at the end of July 2016

Item No.	Work Item Description	Gate Leaf Installation Progress (%)	Remarks
2.1	Re-regulation Waterway Gate	100 %	Gate leaf installation is completed, except rubber seal, lifting hoist & control panels.
2.2	Re-regulation Waterway Stop Log	100 %	Dry test/ Functional test before initial filling of reservoir was completed. Checking operation of rotation parts and leakage test by thickness gauge.
2.3.1	Re-regulation Intake Gate	100 %	Gate leaf installation is completed, except rubber seal, lifting hoist & control panels.
2.3.2	Re-regulation Intake Trash Rack	100 %	Installation of trash rack is completed
2.4	Re-regulation Draft Gate	30 %	Upper removable guide frame installation completed. Awaiting at site the gate leaf and lifting beam from HCM Vietnam factory.

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 June 2016 was 62.67% (compared to planned progress of 64.0%). 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 about a month behind 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 factory

production could be rescheduled after delayed design submission and approval and 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-adjustment of tower spotting and soil tests for the entire route is complete in the approved section (PI 14 – PI 24) other than the section near to 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 been issued and provided to NNP1 by DEPP for reference.
- Adjustment of tower design and calculation according to approved basic design;
- Fabrication drawings of Tower type LDC are not submitted yet, while foundation design for all Tower types have already been approved.
- The construction progress by the end of June 2016 is completion of 197 out of an expected total of 293 tower foundations, tower erection of 117 towers and the checking and tightening of bolts and nuts for 98 towers. The progress in July 2016 is on the revised schedule (refer to the Figure 2-2).

d) The bush clearance works were started in May 2015 and progress was made between Tower 54 and Tower 38, while others sections (PI 18 – PI 22) 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, while the access road has been prepared almost 80 km and work continues in the sections 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 in good time. Onset of daily rains has made access to all areas difficult but the Contractor follows its revised acceleration schedule, after the progress for the construction of tower foundations slowed after April, 2016 (See Figure 2-3 below)

Figure 2-3 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 July 2016, NNP1PC-EMO received seven SS-ESMMPs and one ESMMP. Out of these eight documents, three were reviewed and approved and five are under review. There was no SS-ESMMP carried over from previous month, the SS-ESMMP received in July 2016 are listed in Table 1-1 below.

Table 3-1 *SS-ESMMPs received and review status in July 2016*

Title	Date Received	Status	Comments

SS-ESMMP for the Construction of House Building, Lot 1 at HSRA	15 March 2016 (1st revision) and 1 July 2016 (2nd revision)	Approved with comments on 11 July 2016	Additional maps and drawings and diagram in A3 format were requested
SS-ESMMP for Construction of Houay Soup Resettlement Area Landfill	17 June 2016 (1st revision)	Approved with comments on 06 July 2016	Provide site condition map and revise mitigation in accordance with ESMMP-CP Sub-Plan SP01, SP02 and SP06
SS-ESMMP for the Construction of Consolidation Grouting Works at the Main Dam	28 April 2016 (1st revision) and 02 July 2016 (2nd revision)	Approved with no comments on 25 July	Not applicable
SS-ESMMP for the Construction of Tractor Road at HSRA	22nd July 2016 (1st revision)	Under review	
SS-ESMMP for the Construction of HM Subcontractor Labour Camp No.2 (LILAMA10)	22 July 2016 (1st revision)	Under review	
SS-ESMMP for the Installation of Embedded Part of Stay Cone (preliminary work) for Re-regulating Station	22 July 2016 (1st revision)	Under review	
HM Contractor's ESMMP	21 July 2016 (2nd revision)	Under review	
SS-ESMMP for the Operation and Maintenance Works of the RCC Plant	26 July 2016	Under review	

3.1.2 Compliance Report

In July 2016, a total of 30 construction areas and camps including temporary camps at Houay Soup Resettlement Area (HSRA) and the 230 kV Transmission Line were inspected through follow-up site inspections and joint bi-weekly inspections with the Contractors (

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: 19 July 2016	1 ONC (pending)	A joint WWTS assessment between a Thai external expert, Owner (TD & EMO) and Contractors was undertaken during 29-30 June 2016. TD continue to provide information for the external expert and agreed actions will be discussed in August 2016.
V&K Camp	Inadequate 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: 19 July 2016	1 ONC (pending)	The existing wetland ponds are not properly sealed with concrete; this resulted in seepage of grey water at the first wetland pond where treatment process has just started. A joint WWTS assessment between the Thai external experts, Owner (TD & EMO), Contractor (Obayashi Corporation) was undertaken during 29-30 June; agreed actions will be discussed in August 2016 in an internal meeting.
HM Worker Camp (LALIMA Camp 10	The Contractor has commenced the construction of the WWTS without submitting revised detailed designs and updated SS-ESMMP responding to the Owner's comments (ON_HM-0004). 1st inspection date: 25 May 2016 Latest follow up: 22 June 2016	1 ONC (pending)	The 3rd revision SS-ESMMP has been submitted to EMO. Review and clearance of this document is expected to be done by the beginning of August 2016. The Contractor informed that the black water tank, and wetland ponds have been improved as per the EMO's recommendation in the 2nd revision SS-ESMMP.
RCC Plant Yard (Song Da 5)	The Subcontractor has some continuous simple corrective actions as per ON-OC-0216 to improve the turbid water quality generated from the RCC material washing area. So far, no proper sedimentation device facilities were installed to improve the turbid water quality generated from this site (ONC_OC-0218)	1 ONCs (pending)	On 26 July 2016, the Contractor submitted a SS-ESMMP for the operation and maintenance the of RCC plant. The document has been under review; The Contractor is required to follow the agreed actions specified in earlier issued Site Inspection Requests which include the frequency adjustment of the sediment clean-up from the sedimentation ponds when observed

	1st inspection date: 28 June 2016 Latest follow up: 21 July 2016		that they are 60% full, regularly remove dried sediment from the drying yards to keep space for incoming sediment and cleaning-up of the ponds by 27 July 2016.
Borrow Pit for HSRA Irrigation Canal	A borrow pit was operated about 10 m from Houay Soup Noi (a small stream) for irrigation construction without environmental protection measures as per the approved SS-ESMMP dated 11 May 2016 (ON_VSP-0001). 1st inspection date: 25 May 2016 Latest follow up: 12 July 2016	1 ONC (pending)	During the joint bi-weekly inspection on 12 July 2016, it was observed that some actions have been implemented including the construction of 3 m x 3 m x 1 m sediment pond. However, the agreed corrective actions were not fully implemented as per the Owner's requirement including installing erosion and sediment control systems by 14 June 2016. A revised version of the SS-ESMMP was submitted for the SS-ESMMP for construction of irrigation canal dated 11 May 2016.
SECC Camp	- Oil spills from an electricity generator were not controlled and contained properly (ON_SECC-0033). - A temporary waste disposal pit was filled up by rain water without maintenance and/or provision of a new disposal pit (ON_SECC-0034). 1st inspection date: 12 July 2016 Latest follow up: Not available	2 ONCs (new)	Clean up the contaminated soil/sand and store in a designated hazardous storage area as well as install rainwater screen sheets to prevent stagnant water in the electricity generator storage area by 19 July 2016; Pump out stagnant rainwater; construct protective earth bund and install roofing material that can withstand at least one rainy season by 19 July 2016.
SECC Batching Plant Yard	Inadequate management electricity storage facility. Oil contaminated sand; stagnant rain water and blockage of sediment were not cleaned up from the facility. This has a potential risk of oil film overflowing outside the storage area (ON_SECC-0035).	1 ONC (new)	Improve the management of the facility including: cleaning up the contaminated sand and store in a designated hazardous waste storage area for final disposal by an authorized vendor; clean up the sediment and increase the storage bund, clean up the open ditch located in front of the generator storage area by 19 July 2016.

	1st inspection date: 12 July 2016 Latest follow up: Not available		
HSRA Irrigation Channel	The construction waste including plastic sheets and cement bags were disposed along the irrigation channel. This waste can be washed into the adjacent drainage lines during rain events (ON_VSP-0002). 1st inspection date: 12 July 2016 Latest follow up: Not available	1 ONC (new)	The Contractor is required to collect and bring back the waste to their worker camp for segregation and disposal properly by 20 July 2016.
Borrow Pit for HSRA Irrigation Canal	Topsoil was stockpiled on the embankment of Houay Soup Noi. Some parts of the stockpile collapsed and damaged the riparian vegetation that naturally protects the riverbank and cause more erosion (ON_VSP-0003). 1st inspection date: 12 July 2016	1 ONC (new)	Remove the topsoil where the crack /collapse occurred; push the topsoil back from the riverbank for about 3 metres to maintain the riparian vegetation, compact the existing topsoil stockpile and install silt fences to reduce soil erosion by 20 July 2016.
HSRA Main Road	Improper operation of a borrow pit. Topsoil and spoil were stockpiled at less than 10 meters away from the Houay Soup Noi . This has a potential risk of soil erosion and being washed into Houay Soup Noi (ON_VRC-0004). 1st inspection date: 12 July 2016	1 ONC (new)	Provide erosion and sediment control systems for the borrow pit including a silt fence and/ or similar device, adequate cut-off drains and sediment ponds at the lower downslope to prevent direct sediment run-off into the river by 21 July 2016.
VRC Camp	Mixed disposal of recyclable waste and non-recyclable waste. The Contractor was instructed to improve its waste management but there was no action implemented (ON_VRC-0005) 1st inspection date: 12 July 2016	1 ONC (new)	Recover recyclable waste from the pit and sell to the local villagers at the Recycle Bank located at Hat Gniun Village that operates every Wednesday from 9:30 am to 5:00 pm.

Figure 3-1 and **Error! Reference source not found.**). A total of 14 Observations of Non-Compliances (ONCs) were issued in July 2016, increased from 08 ONCs in June 2016. The issued ONCs were mainly related to the erosion and sediment controls at the construction sites and camp which was influenced by the storms that occurred in July 2016. With a carry-over from June 2016, a total of 26 ONCs were active in July 2016. Out of these, 11 ONCs were resolved, five ONCs were not resolved and exceeded the deadlines[2] and a total of 15 ONCs will be carried over into August 2016. NNP1PC is following up with the Contractors to resolve the remaining issues in August 2016.

The carry-over of ONCs from July into August 2016 is summarized in Table 3-2 below

Table 3-2 Carryover ONCs from July into August 2016

Site ID	Issues	Reporting	Actions

[2] Progress is slow with implementation of corrective 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: 19 July 2016	1 ONC (pending)	A joint WWTS assessment between a Thai external expert, Owner (TD & EMO) and Contractors was undertaken during 29-30 June 2016. TD continue to provide information for the external expert and agreed actions will be discussed in August 2016.
V&K Camp	Inadequate 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: 19 July 2016	1 ONC (pending)	The existing wetland ponds are not properly sealed with concrete; this resulted in seepage of grey water at the first wetland pond where treatment process has just started. A joint WWTS assessment between the Thai external experts, Owner (TD & EMO), Contractor (Obayashi Corporation) was undertaken during 29-30 June; agreed actions will be discussed in August 2016 in an internal meeting.
HM Worker Camp (LALIMA Camp 10	The Contractor has commenced the construction of the WWTS without submitting revised detailed designs and updated SS-ESMMP responding to the Owner's comments (ON_HM-0004). 1st inspection date: 25 May 2016 Latest follow up: 22 June 2016	1 ONC (pending)	The 3rd revision SS-ESMMP has been submitted to EMO. Review and clearance of this document is expected to be done by the beginning of August 2016. The Contractor informed that the black water tank, and wetland ponds have been improved as per the EMO's recommendation in the 2nd revision SS-ESMMP.
RCC Plant Yard (Song Da 5)	The Subcontractor has some continuous simple corrective actions as per ON-OC-0216 to improve the turbid water quality generated from the RCC material washing area. So far, no proper sedimentation device facilities were installed to improve the turbid water quality generated from this site (ONC_OC-0218)	1 ONCs (pending)	On 26 July 2016, the Contractor submitted a SS-ESMMP for the operation and maintenance the of RCC plant. The document has been under review; The Contractor is required to follow the agreed actions specified in earlier issued Site Inspection Requests which include the frequency adjustment of the sediment clean-up from the sedimentation ponds when observed

	1st inspection date: 28 June 2016 Latest follow up: 21 July 2016		that they are 60% full, regularly remove dried sediment from the drying yards to keep space for incoming sediment and cleaning-up of the ponds by 27 July 2016.
Borrow Pit for HSRA Irrigation Canal	A borrow pit was operated about 10 m from Houay Soup Noi (a small stream) for irrigation construction without environmental protection measures as per the approved SS-ESMMP dated 11 May 2016 (ON_VSP-0001). 1st inspection date: 25 May 2016 Latest follow up: 12 July 2016	1 ONC (pending)	During the joint bi-weekly inspection on 12 July 2016, it was observed that some actions have been implemented including the construction of 3 m x 3 m x 1 m sediment pond. However, the agreed corrective actions were not fully implemented as per the Owner's requirement including installing erosion and sediment control systems by 14 June 2016. A revised version of the SS-ESMMP was submitted for the SS-ESMMP for construction of irrigation canal dated 11 May 2016.
SECC Camp	- Oil spills from an electricity generator were not controlled and contained properly (ON_SECC-0033). - A temporary waste disposal pit was filled up by rain water without maintenance and/or provision of a new disposal pit (ON_SECC-0034). 1st inspection date: 12 July 2016 Latest follow up: Not available	2 ONCs (new)	Clean up the contaminated soil/sand and store in a designated hazardous storage area as well as install rainwater screen sheets to prevent stagnant water in the electricity generator storage area by 19 July 2016; Pump out stagnant rainwater; construct protective earth bund and install roofing material that can withstand at least one rainy season by 19 July 2016.
SECC Batching Plant Yard	Inadequate management electricity storage facility. Oil contaminated sand; stagnant rain water and blockage of sediment were not cleaned up from the facility. This has a potential risk of oil film overflowing outside the storage area (ON_SECC-0035).	1 ONC (new)	Improve the management of the facility including: cleaning up the contaminated sand and store in a designated hazardous waste storage area for final disposal by an authorized vendor; clean up the sediment and increase the storage bund, clean up the open ditch located in front of the generator storage area by 19 July 2016.

	1st inspection date: 12 July 2016 Latest follow up: Not available		
HSRA Irrigation Channel	The construction waste including plastic sheets and cement bags were disposed along the irrigation channel. This waste can be washed into the adjacent drainage lines during rain events (ON_VSP-0002). 1st inspection date: 12 July 2016 Latest follow up: Not available	1 ONC (new)	The Contractor is required to collect and bring back the waste to their worker camp for segregation and disposal properly by 20 July 2016.
Borrow Pit for HSRA Irrigation Canal	Topsoil was stockpiled on the embankment of Houay Soup Noi. Some parts of the stockpile collapsed and damaged the riparian vegetation that naturally protects the riverbank and cause more erosion (ON_VSP-0003). 1st inspection date: 12 July 2016	1 ONC (new)	Remove the topsoil where the crack /collapse occurred; push the topsoil back from the riverbank for about 3 metres to maintain the riparian vegetation, compact the existing topsoil stockpile and install silt fences to reduce soil erosion by 20 July 2016.
HSRA Main Road	Improper operation of a borrow pit. Topsoil and spoil were stockpiled at less than 10 meters away from the Houay Soup Noi . This has a potential risk of soil erosion and being washed into Houay Soup Noi (ON_VRC-0004). 1st inspection date: 12 July 2016	1 ONC (new)	Provide erosion and sediment control systems for the borrow pit including a silt fence and/ or similar device, adequate cut-off drains and sediment ponds at the lower downslope to prevent direct sediment run-off into the river by 21 July 2016.
VRC Camp	Mixed disposal of recyclable waste and non-recyclable waste. The Contractor was instructed to improve its waste management but there was no action implemented (ON_VRC-0005) 1st inspection date: 12 July 2016	1 ONC (new)	Recover recyclable waste from the pit and sell to the local villagers at the Recycle Bank located at Hat Gniun Village that operates every Wednesday from 9:30 am to 5:00 pm.

Figure 3-1: Site Inspection Locations

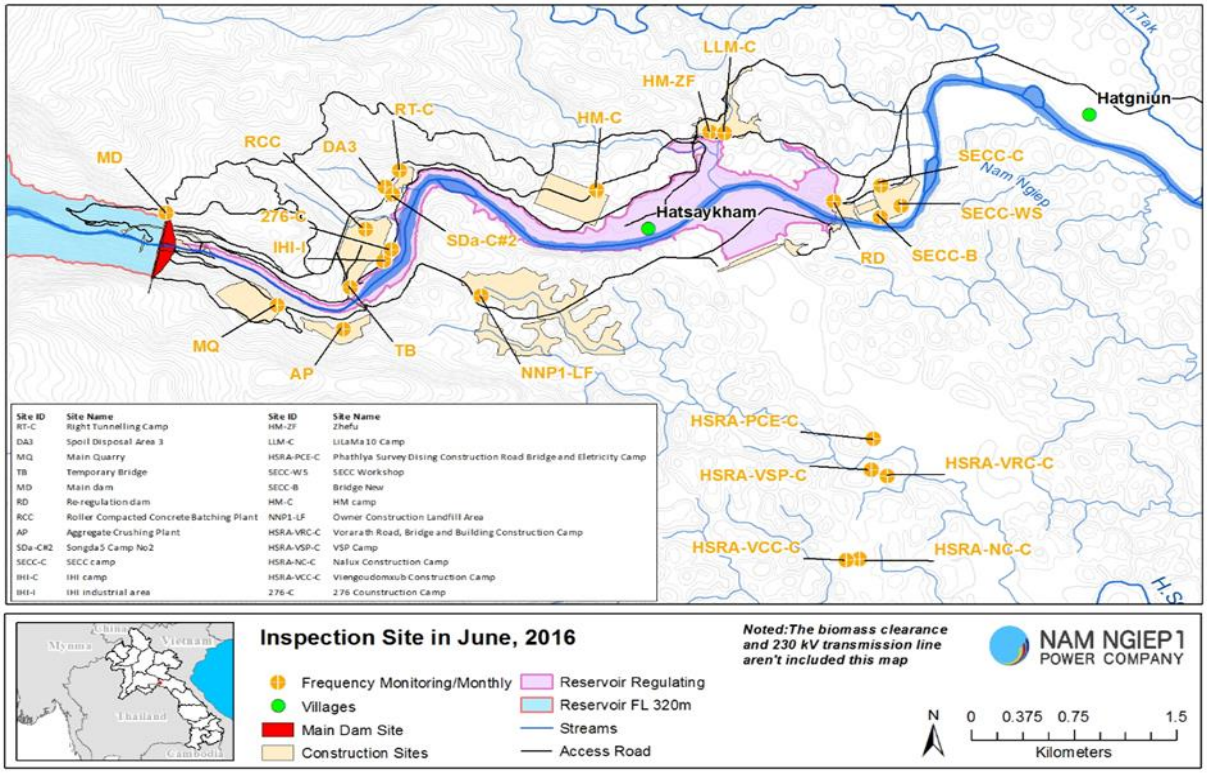


Figure 3-2: 230 kV Transmission Line Construction Monitoring

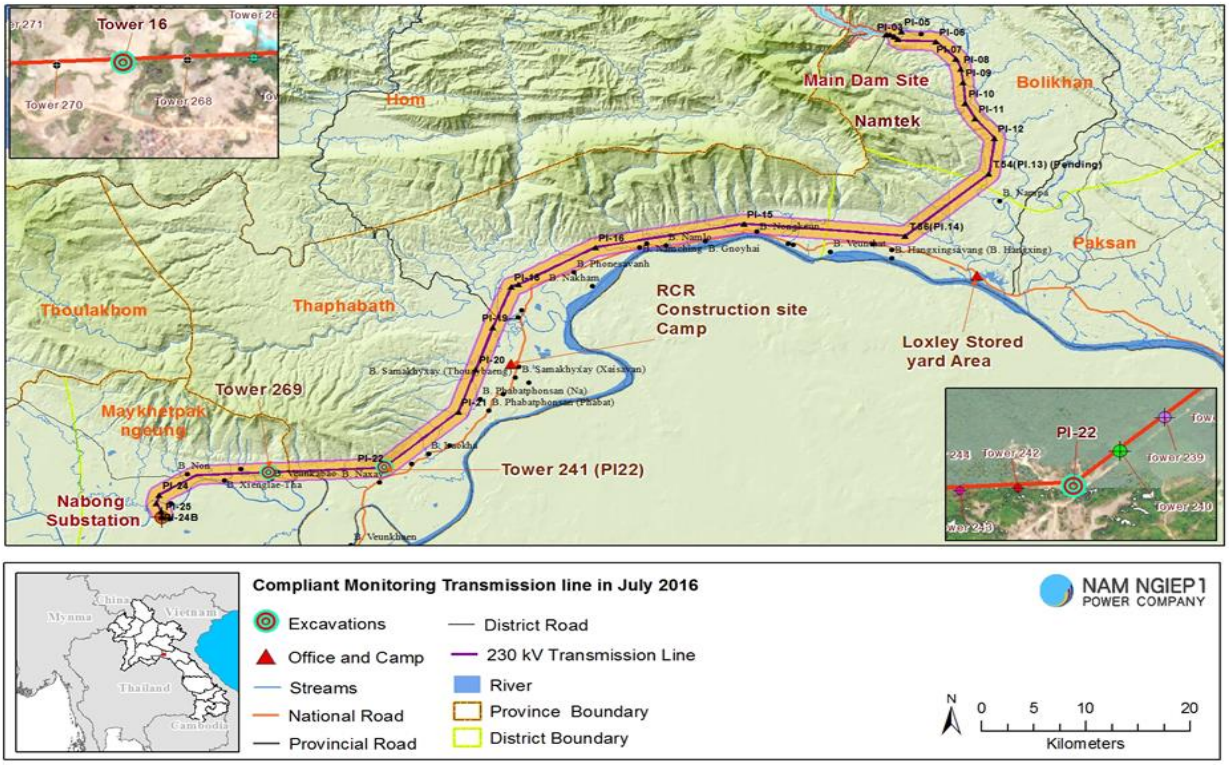
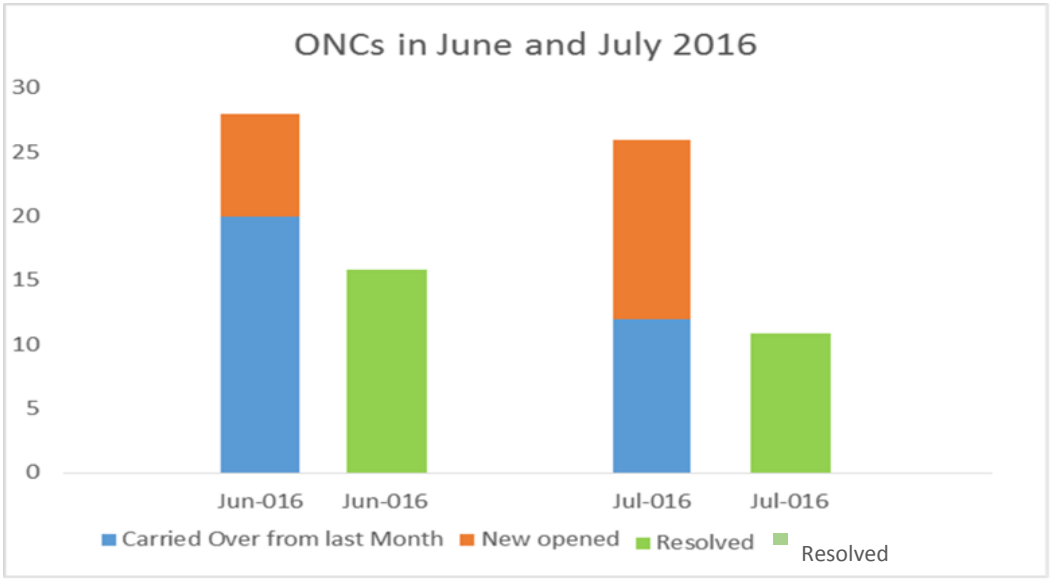


Table 3-3: Summary of ONCs and NCRs

Reporting Period (1-30 June 2016)	ONC	NCR-1	NCR-2	NCR-3
Carried over from May 2016	12	0	0	0
New issues this month	14	0	0	0
Resolved this month	11	0	0	0
Carried forward into July 2016	15	0	0	0
Unresolved exceeding deadline	5	0	0	0

Figure 3-3: Observations of non-compliance (ONCs) this month compared with previous month



3.1.3 Monitoring by the Environmental Monitoring Unit of the Government

There was no Environmental Monitoring Unit (EMU) visit during July 2016.

3.2 Environmental Quality Monitoring

A contractor has been selected to construct a small laboratory at the Owners' Site Office and Village. A Detailed Work Programme (DWP) and SS-ESMMP is to be prepared by the contractor for NNP1PC review and approval prior to commencing the construction works. The purchase of the laboratory equipment from a supplier in Thailand was finalised and the Purchase Order was issued in July 2016.

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

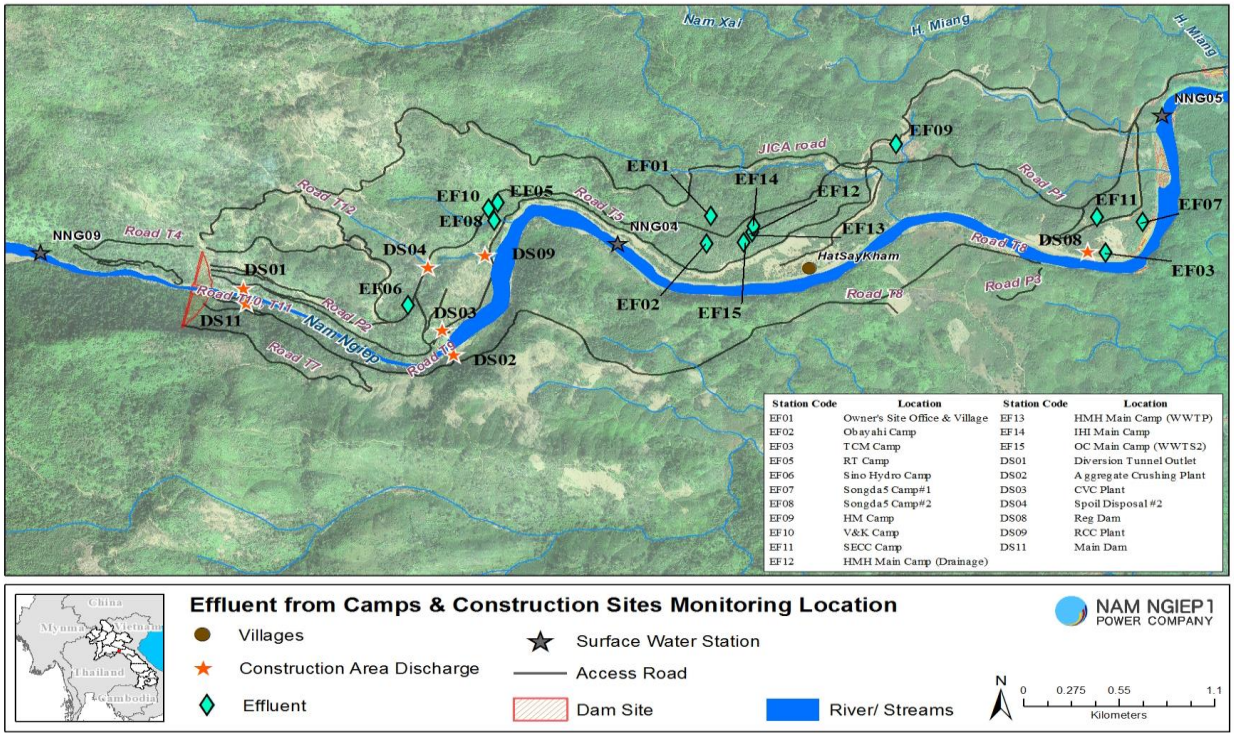
a) Effluent discharge from camps and construction sites;
b) Ambient surface water quality monitoring;
c) Ambient air quality monitoring (particulate matter of less than 10 microns);
d) Ambient noise and noise emission monitoring.

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 the Asian Development Bank (ADB) in the Quarterly Monitoring Reports

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 Clause 1.13. During June 2016, all construction camps, except the Owner's Site Office and Village and the V&K Camp, had significantly higher concentrations of total coliforms than the effluent standards. The results of the monitoring are included in Annex 1 and the assessment of compliance and corrective actions are summarized in Table 3-4.

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	The total coliform decreased from 160,000 MPN/100ml in June 2016	A site engineer from NNP1PC carried out a system check and repair of the leaked grey water was completed on 16 June 2016. EMO

Site	Sampling ID	Non-Compliance	Corrective Actions
		to 3,300 MPN/100ml in July 2016.	will continue to monitor the effluent quality during the month of August 2016.
OC Camp	EF02	Biochemical Oxygen Demand (BOD_5), Ammonia nitrogen (NH_3-N), and total coliforms exceeded the Standards (measured at 41.4 and 25 mg/l and more than 160,000 MPN/100 ml respectively).	A joint inspection for the waste water treatment system (WWTS) assessment between the Thai external specialist, the Owner (TD and EMO), and Contractor (OC) was undertaken during 29-30 June 2016 at all the camps. It was agreed by NNP1PC that chlorination in a one to two cubic metres capacity Chlorine Contact Tank using sodium hypochlorite (NaOCl) is needed. The corrective actions will be provided in the consultant report and will be discussed and agreed between NNP1PC and the Contractors
TCM Camp	EF03	Total coliforms were higher than the Standard at 1,700 MPN/100 ml.	As above
Right Tunnelling (RT) Camp	EF05	The total coliforms exceeded the Effluent Standards with a measured value of 7,900 MPN/100 ml.	This camp was completely and satisfactorily decommissioned in July 2016
Sino Hydro Camp	EF06	Total coliforms were measured 54,000 MPN/100 ml.	A joint waste water treatment system (WWTS) between the Thai external specialist, the Owner (TD and EMO), and Contractor (OC) was undertaken during 29-30 June 2016 at all of the camps including the TCM camp. It was agreed that chlorination in a one to two cubic metres capacity Chlorine Contact Tank using sodium hypochlorite (NaOCl) was needed. Proposed

Site	Sampling ID	Non-Compliance	Corrective Actions
			corrective actions will be discussed with the Contractors in August 2016
Song Da 5 Camp No. 1	EF07	Total coliforms did not comply with the Standard with a recorded value of 54,000 MPN/100 ml.	In addition to the above, separation the grey water from the surface water around the camp (through additional grey water pipes) was completed
Song Da 5 Camp No. 2	EF08	BOD_5, NH_3-N and total coliforms did not comply with the Standard with measured values of 37.7 and 20 mg/l and, more than 160,000 MPN/100 ml respectively.	As above
Hitachi-Mitsubishi Hydro (HM) Worker Camp No.1	EF09	BOD_5, NH_3-N and total coliforms were higher than the Standard with values recorded of 44.6 and 14 mg/l, and 160,000 MPN/100 ml respectively.	As above
V&K Camp	EF10	Total coliforms, TSS and pH did not comply with the Standards (measured values of 4,000 MPN/100 ml, 91.8 mg/l and 9.58 respectively). However, the second monitoring on 26 July 2016 showed that all parameters complied with the Standard.	As above
SECC Camp	EF11	TSS and total coliforms did not comply with the Standards (measured values of 104 mg/l and	As above

Site	Sampling ID	Non-Compliance	Corrective Actions
		160,000 MPN/100 ml respectively).	
HM Main Camp Drainage	EF12	Total coliform results was not complied with the standard as values recorded of 7,900 MPN/100 ml.	As above
HMH Main Camp (WWTS)	EF13	NH_3-N and Total coliform results were not complied with the Standard with values recorded as 13 mg/l and 54,000 MPN/100 ml.	As above
IHI Main Camp	EF14	BOD_5, COD, NH_3-N, and total coliforms exceeded the Standards (measured at 81.4, 128 and 26 mg/l and, more than 160,000 MPN/100 ml respectively).	As above
OC Camp (WWTS2)	EF15	Total coliforms were higher than the Standards at 160,000 MPN/100 ml.	See above comments
Main Dam Construction Area	DS11	The TSS measured on 06/07/2016 slightly above the standard at 56.1 mg/l. The second measurement conducted on 21/07/2016 complied with the Standard.	EMO will continue to monitor the effluent water quality being discharged from this turbid water treatment system
Re-regulation Dam	DS08	The TSS measured on 21 July 2016 exceeded the Standard at 754 mg/l.	The Contractor was advised to monitor the treatment of effluents using the Turbid Water Treatment Plant. EMO will continue to monitor the effluent water quality

Site	Sampling ID	Non-Compliance	Corrective Actions
			being discharged from this turbid water treatment system
Spoil Disposal Area No.2 (Song Da 5 Workshop)	DS04	The TSS result on 21 July 2016 was slightly higher than the Standard with a recorded value of 72.6 mg/l compared to the Standards of less than 50 mg/l.	EMO will continue to monitor the TSS level at this site and notify the Contractor for any results that are higher than the Standards
RCC Plant	DS09	The TSS results in July 2016 were higher than the Standard (<50 mg/l) with recorded values of 873 mg/l and 674 mg/l respectively.	A Site Specific Environmental and Social Management Plan (SS-ESMMP) for the operation stage of the RCC plant was submitted to NNP1PC for review and approval.
CVC Plant	DS03	The TSS results in July 2016 were higher than the Standard (<50 mg/l) with recorded values of 508 mg/l and 300 mg/l respectively. In addition, the pH measured on 28/7/2016 was 9.1 which was slightly higher than the standard.	EMO will continue to monitor the TSS level at this site and notify the Contractor for any results that are higher than the Standards.

At the time of sampling, no discharge was observed at the Obayashi Camp WWTS 1 (EF02), Obayashi Camp WWTS 2 (EF15), TCM Camp (EF03), Sino Hydro Camp (EF06), Song Da 5 Camp No.1 (EF07), Song Da 5 Camp No. 2 (EF08), SECC Camp (EF11), HMH Main Camp WWTP (EF13) and IHI Main Camp (EF14). Thus, the samples were collected from the final sediment pond at these camps. Also, no sampling collection was conducted in July 2016 at the Aggregate Crushing Plant (DS02) as there was no waste water discharged from the sediment ponds.

3.2.2 Surface (Ambient) Water Quality Monitoring

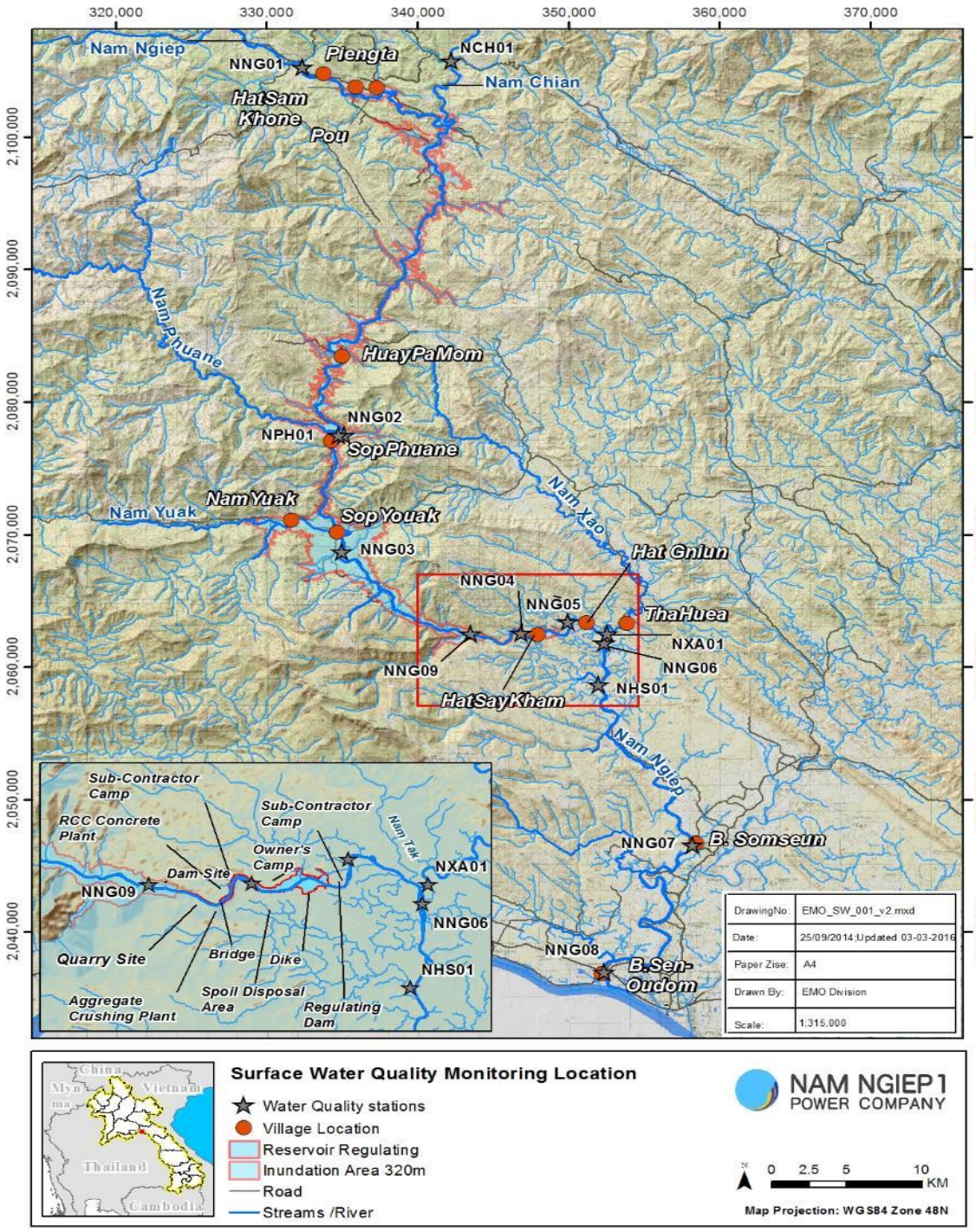
Surface water samples are collected and analysed twice a month[3] from nine stations in Nam Ngiep and four stations in the main tributaries including the lower Nam Chian, Nam Phouane, Nam Xao and Houay Soup (total 13 stations). The weekly surface water quality monitoring (physical parameters only) has commenced in July 2016 and included the stations located upstream of construction sites (NNG09), within Construction Sites (NNG04) and downstream of construction sites (NNG05). During the LTA missions in early July 2016, the water quality monitoring for NNG02, NNG03 and NPH01 stations were cancelled due to an access issue.

The location of surface water monitoring stations are indicated on the maps in

Figure 3-5

[3] 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 3-8 and Table 3-9.

Nam Ngiep

The Biochemical Oxygen Demand (BOD5), COD, faecal coliform and total coliform exceeded the Standard for the most stations of Nam Ngiep River. The highest amount of COD recorded was at Nam Ngiep Upstream Main Dam (NNG09 – Upstream of Construction Sites) at 31.6 mg/l. In

addition, the peak of BOD and faecal coliforms were recorded at the Nam Ngiep at Ban Somsuen (NNG07 –Downstream of Construction Sites) with values of 2.3 mg/l and 4,900 MPN/100 ml respectively. Moreover, the peak of total coliform was found at Nam Ngiep Upstream Main Dam (NNG09 – Upstream Construction Site) and Nam Ngiep at Ban Somsuen (NNG07 – Downstream of Construction Sites). Thus, the elevated levels of BOD, COD, faecal coliform and total coliform are not likely to be influenced by the Project activities.

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	04/07/16	-	-	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16	06/07/16
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	6.6	No Monitoring Conducted	No Monitoring Conducted	6.94	7.17	7.87	7.82	6.99	6.95
DO (%)		93.9			102.6	104.4	91.6	89.5	98.3	98.7
DO (mg/L)	>6.0	7.51			8.23	8.11	7.35	7.09	7.55	7.62
Conductivity (µs/cm)		87.3			66.1	61.5	80	111	51.8	54.1
TDS (mg/l)		43			33	30	40	55	26	27
Temperature (°C)		24.3			24.8	26.6	25.06	25.69	26.8	27.3
Turbidity (NTU)		81.8			47	60.6	61	109.1	45	46.3
TSS (mg/l)		225			282	191	315	215	225	150
BOD_5 (mg/l)	<1.5	1.7			2.2	1.4	1.9	2	2.3	2.1
COD (mg/l)	<5.0	14.8			31.6	17.5	20.6	17.3	19.4	11.4
NH_3-N (mg/l)	<0.2	ND[12]			ND[12]	ND[12]	ND[12]	ND[12]	ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.28			0.4	0.22	0.22	0.36	0.18	0.6
Manganese (mg/L)	<1	0.2			0.218	0.176	0.226	0.25	0.162	0.116
Total Iron (mg/L)		10.6			8.65	3.67	5.74	4.78	7.98	6.1
Total coliform (MPN/100ml)	<5,000	3,500			13,000	7,900	3,300	7,900	13,000	2,400
Faecal coliform (MPN/100ml)	<1,000	1,200			3,300	7,900	1,300	1,700	4,900	2,200

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	19/07/16	20/07/16	20/07/16	21/07/16	21/07/16	21/07/16	21/07/16	21/07/16	21/07/16
Parameters (Unit)	**Guideline**									
pH	5.0 – 9.0	7.36	6.68	7.49	7.34	7.36	7.25	7.45	7.2	7.42
DO (%)		94	96.9	97.9	102	103.5	76	78.5	97.1	94.6
DO (mg/L)	>6.0	7.38	7.68	7.7	8.26	8.09	6.18	6.31	7.63	7.41
Conductivity (µs/cm)		74.8	107.5	58.3	55.9	59.6	55	58	42.2	36.7
TDS (mg/l)		37.4	53	29	28	29.8	27.5	29	21.1	18.35
Temperature (°C)		25.3	25.4	25.6	24.7	26.6	24.59	25.6	26.4	26.5
Turbidity (NTU)		1,691	106	92.3	115	82.6	90	63	91.9	58.9

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	12/07/2016	12/07/2016	12/07/2016
Parameters (Unit)	Guideline			
pH	5.0 – 9.0	7.68	7.04	7.18
DO (%)		101.8	101.1	100.9
DO (mg/L)	>6.0	7.91	7.78	7.69
Conductivity (µs/cm)		66.1	68.7	70.4
TDS (mg/l)		33	34	35
Temperature (°C)		26.5	27	27.5
Turbidity (NTU)		57.3	46.3	41.6

	River Name	Nam Ngiep		
	Zone	Upstream of Construction Sites	Within Construction Site	Downstream of Construction Sites
	Station Code	NNG09	NNG04	NNG05
	Date	27/07/2016	27/07/2016	27/07/2016
Parameters (Unit)	Guideline			
pH	5.0 – 9.0	7.27	7.28	7.11
DO (%)		101.9	102.7	99.9
DO (mg/L)	>6.0	7.95	7.9	7.54
Conductivity (µs/cm)		64.7	66.7	68
TDS (mg/l)		32.5	34	34
Temperature (°C)		26.5	27.3	27.8
Turbidity (NTU)		31.2	34.8	37

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 BOD, COD and faecal coliform exceeded the National Surface Water Quality Standard with recorded values of 1.5 mg/l, 11.5 mg/l and 2,400 MPN/100 ml respectively.

Nam Phouan is located about 24 km upstream of NNP1 Project construction site. The station of Nam Phouan was cancelled for monthly sampling due to the slippery access road as a result of heavy rain during the scheduled mission. However, all physical parameters for the fortnightly monitoring complied with the standard.

Tributaries downstream 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 The BOD, COD and total coliform exceeded the National Surface Water Quality Standard with recorded values of 2.0 mg/l, 16 mg/l and 13,000 MPN/100ml respectively.

Houay Soup Nyai has a confluence with the Nam Ngiep River downstream of NNP1 Project construction site. The COD was found to slightly exceed the National Surface Water Quality Standard (less than 5.0 mg/l) with a recorded value of 9.9 mg/l and the results of faecal and total coliforms exceeded the Standard with values recorded at 1,700 and 13,000 MPN/100 ml respectively.

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	04/07/2016		06/07/2016	06/07/2016
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	7.51	No Monitoring Conducted	7.52	6.3
DO (%)		102		85	77.6
DO (mg/L)	>6.0	8.22		6.64	6.41
Conductivity(µs/cm)		30.1		121	25
TDS (mg/L)		15		60	12
Temperature (°C)		23.7		26.52	24.02
Turbidity (NTU)		118		88.9	67.3
TSS (mg/l)		476		194	55.7
BOD_5 (mg/l)	<1.5	1.5		2	1.4
COD (mg/l)	<5.0	11.5		16	9.9
NH_3-N (mg/l)	<0.2	ND[12]		ND[12]	ND[12]
NO_3-N (mg/l)	<5.0	0.33		0.22	0.18
Manganese (mg/L)	<1	0.258		0.39	0.033
Total Iron (mg/L)		11.8		4.56	1.61
Total coliform (MPN/100mL)	<5,000	4,900		13,000	13,000
Faecal coliform (MPN/100mL)	<1,000	2,400		790	1,700

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 (fortnightly measured)

	Site Name	Nam Chain	Nam Phouan	Nam Xao	Nam Houaysoup
	Zone	Tributaries Upstream		Tributaries Downstream	
	Station Code	NCH01	NPH01	NXA01	NHS01
	Date	19/07/2016	20/07/2016	21/07/2016	21/07/2016
Parameters (Unit)	Guideline				
pH	5.0 - 9.0	7.48	7.4	7.82	7.23
DO (%)		101.1	100.4	74.8	70
DO (mg/L)	>6.0	7.96	8.08	6.01	5.88
Conductivity(µs/cm)		30.1	43.4	146	36
TDS (mg/L)		15	21.7	73	18
Temperature (°C)		25	24.6	26.45	24.37
Turbidity (NTU)		19	764	53.5	28.4

3.2.3 Groundwater Quality Monitoring

NNP1PC sampled and analysed the groundwater quality in 4 boreholes. Three boreholes are community boreholes at Ban Hatsaykham and one is a private well at Ban Hat Gniun (see NNP1 Solid **Waste Landfill**

The faecal coliforms were 22 MPN/100 ml in the groundwater monitoring well at the western periphery of the landfill (MW1). No faecal coliforms were found in the other monitoring wells.

All four groundwater wells have low pH levels similar to the wells in Hatsaykham.

Figure 3-6).

The results are presented in Table 3-10. 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 village authorities and the local health centres as part of the Project's health programme.

In addition, a baseline groundwater monitoring in four wells (MW1-MW4) installed at the NNP1 Solid Waste Landfill Site was carried out during July 2016.

Ban Hatsaykham

Most of the monitored parameters for three boreholes (GHSK01, GHSK02 and GHSK03) complied with the standards, except pH, faecal coliform and total coliform in the first sampling batch. However, the additional samples were taken to confirm these and the results showed that faecal coliform and total coliform contamination in two out of three boreholes (i.e. GHSK01 and GHSK03) were less than the first results. A second sample from the other borehole (GHSK02) was not taken due to the broken hand pump. The water is not safe for drinking directly and villagers were advised to boil water before drinking.

Ban Hat Gnuin

The faecal coliforms and E.coli bacteria contamination were 2,400 MPN/100 ml which exceeded the National Groundwater Standards. In addition, the pH level was measured at 6.01 which was slightly lower than the Standard range of between 6.50 and 9.20. Other monitored parameters were found to comply with the Standard.

NNP1 Solid Waste Landfill

The faecal coliforms were 22 MPN/100 ml in the groundwater monitoring well at the western periphery of the landfill (MW1). No faecal coliforms were found in the other monitoring wells.

All four groundwater wells have low pH levels similar to the wells in Hatsaykham.

Figure 3-6: Groundwater Quality Monitoring Locations

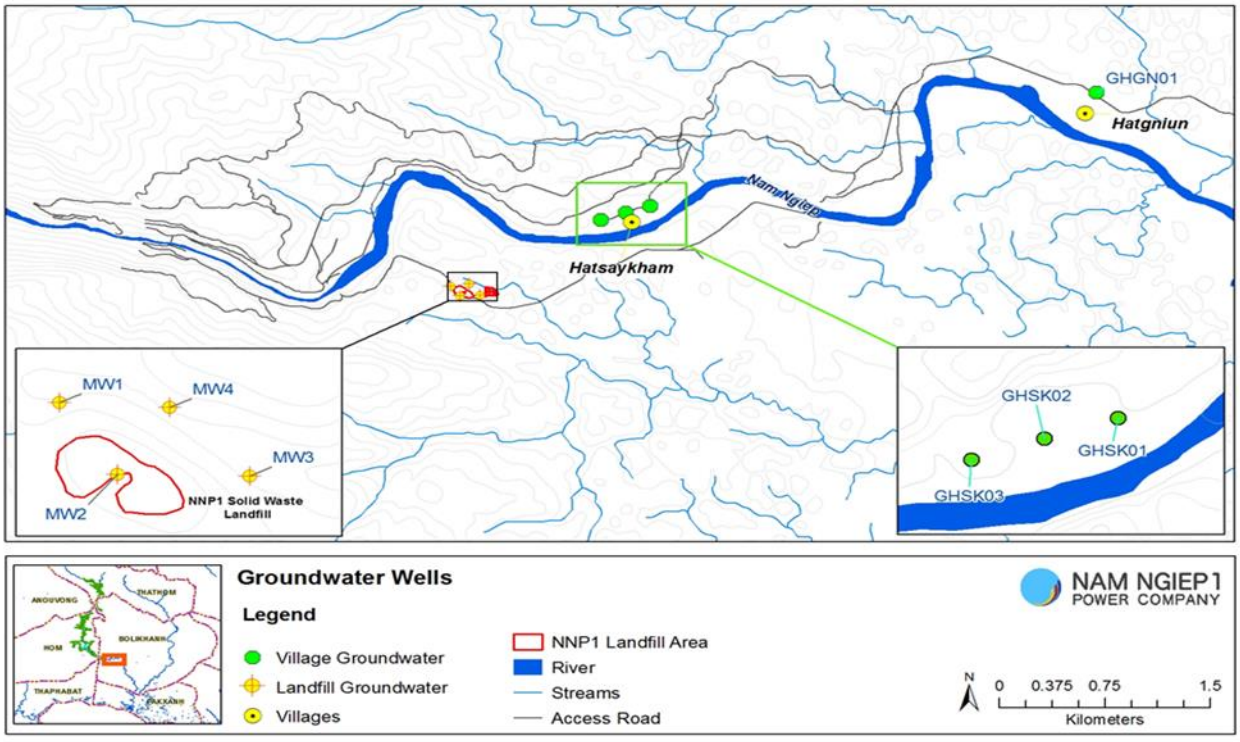


Table 3-10: Groundwater Quality Monitoring Results during the first and second mission (Hatsaykham village only)

	Site Name	Ban Hatsaykham			Ban Hat Gniun
	Station Code	GHSK01	GHSK02	GHSK03	GHGN01
	Date	01/07/2016	01/07/2016	01/07/2016	01/07/2016
Parameter (Unit)	**Guideline**				
pH	6.5-9.2	5.75	6.13	5.91	6.01
Sat. DO (%)		38.8	51	50.6	102.6
DO (mg/L)		3.03	3.94	3.93	7.72
Conductivity (µs/cm)		56.1	56.2	42	71.3
TDS (mg/L)	<1,200	28	28	21	35
Temperature (°C)		26.6	27.1	26.8	28.7
Turbidity (NTU)	<20	0.24	0.17	4.11	26.9
Faecal coliform (MPN/100ml)	0	330	7,900	700	2,400
Ecoli Bacteria (MPN/100ml)	0	330	7,900	700	2,400

	Site Name	Ban Hatsaykham		
	Station Code	GHSK01	GHSK02	GHSK03
	Date	22/07/2016	22/07/2016	22/07/2016
Parameter (Unit)	**Guideline**			
pH	6.5-9.2	7.3	The Hand Pump Broken	7.21
Sat. DO (%)		27.6		29.29
DO (mg/L)		2.13		2.29
Conductivity (µs/cm)		166		62
TDS (mg/L)	<1,200	83		31
Temperature (°C)		26.19		26.79
Turbidity (NTU)	<20	1.71		7.74
Faecal coliform (MPN/100ml)	0	49		79
Ecoli Bacteria (MPN/100ml)	0	49		79

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: NNP1 Project Landfill's Baseline Groundwater Monitoring Results

	Site Name	NNP1 Solid Waste Landfill			
	Station Code	LGW01	LGW02	LGW03	LGW04
	Date	23/07/2016	22/07/2016	23/07/2016	23/07/2016
Parameters (Unit)	**Guideline**				
pH		5.88	5.82	6.09	5.77
Sat. DO (%)		45.4	33.1	34.6	43.2
DO (mg/L)		3.58	2.58	2.61	3.3
Conductivity (µs/cm)		51.6	41.6	89.6	39.2
TDS (mg/L)		26	20.8	45	19.5
Temperature (°C)		26.3	28.3	26.4	27.6
Turbidity (NTU)		40.5	0.4	13	20.8
BOD (mg/L)		ND[13]	ND[13]	ND[13]	ND[13]
COD (mg/L)		7.8	7.3	6.1	7.8
NO_3-N (mg/l)		0.27	0.12	0.15	6.76
NO2-N (mg/l)		ND[7]	ND[7]	ND[7]	ND[7]
Arsenic (mg/l)	<0.01	0.0006	ND[2]	0.0017	ND[2]
Manganese (mg/l)		0.237	0.028	0.838	0.11
Mercury (mg/l)	<0.001	0.0005	ND[3]	ND[3]	ND[3]
Iron (mg/l)		2.77	0.08	6.88	1.53

Faecal Coliform (MPN/100 ml)		22	0	0	0

3.2.4 Gravity Fed Water Supply (GFWS) Quality Monitoring

Water quality monitoring of the GFWS systems in Ban Hat Gnuin and Ban Thaheua is conducted on a monthly basis with the aim of alerting users to potential impacts when bathing and washing.

Results of the assessment for GFWS of Ban Hat Gnuin and Ban Thaheua are shown in Table 3-12 and summarised as follows:

Ban Thahuea (WTHH02): All parameters complied with the National Drinking Water Standards except for faecal coliforms and E.coli which were found to be 700 MPN/100 ml for both parameters.

Ban Hat Gnuin (WHGN02): All parameters complied with the National Drinking Water Standards except turbidity which was recorded at 14.2 NTU, and both faecal coliforms and E.coli which were found to be 490 MPN/100 ml.

Table 3-12: Results of the Gravity Fed Water Supply Quality Monitoring

	Site Name	Ban Thaheua	Ban Hat Gnuin
	Station Code	WTHH02	WHGN02
	Date	01/07/2016	01/07/2016
Parameter (Unit)	**Guideline**		
pH	6.5-8.5	6.89	7.05
Sat. DO (%)		97.5	106
DO (mg/L)		7.43	7.94
Conductivity (µs/cm)	<1,000	52.1	65.6
TDS (mg/L)	<600	26	32
Temperature (°C)	<35	27.9	29
Turbidity (NTU)	<10	5.11	14.2
Faecal coliform (MPN/100ml)	0	700	490
Ecoli Bacteria (MPN/100mL)	0	700	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)	ND[17] (<2.7 mg/L)			

3.2.5 Dust Monitoring

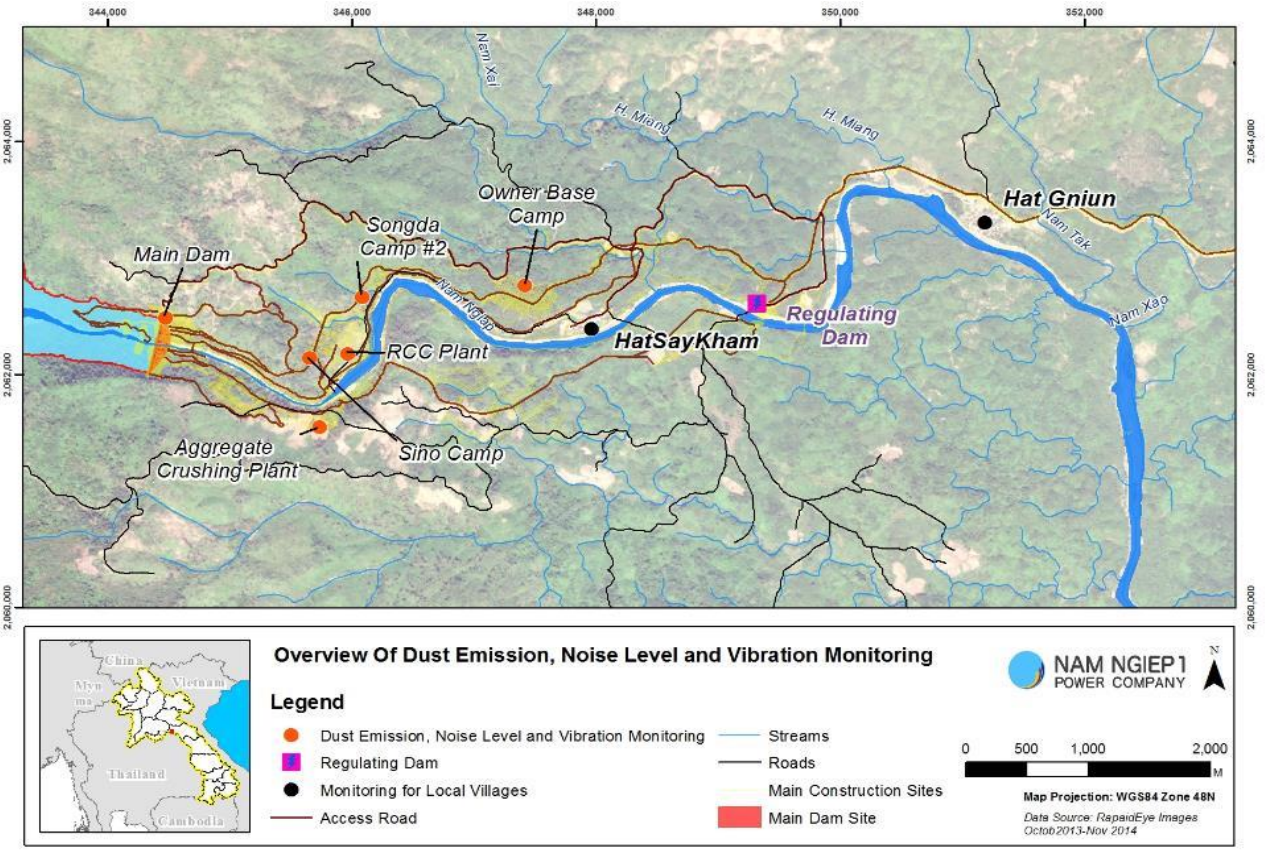
Dust monitoring for Ban Hat Gnuin, Ban Hatsaykham, Aggregate Crushing Plant, RCC Plant, Sino Hydro Camp, Song Da 5 Camp No. 2 and Owner's Site Office and Village was cancelled because of malfunctioning equipment. The dust aerosol monitoring equipment will be sent to the supplier in the United States for maintenance and spare part replacement which will take approximately 2 months. This is not likely to cause major issues with scheduled dust monitoring during the rainy season.

3.2.6 Noise Monitoring

During July 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 (to assess possible impact on workers' health) and Owner's Site Office and Village (to monitor the ambient noise levels) for 24 of consecutive hours

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

Figure 3-7: Noise and Dust Emission Monitoring Locations



The noise levels recorded indicate full compliance with the National Standard for the period of 06:01-22:00 for all stations monitored, except Ban Hatsaykham [06 July 2016 – 54.73 dB(A) compared to the standard of 55 dB(A)] and Aggregate Crushing Plant [25 July 2016 – 79.85 dB(A) compared to the standard of 70 dB(A)]. For the period of 22:01-06:00, slightly higher levels than the Standard were recorded at Ban Hat Gnuin and Ban Hatsaykham [between 48.74 – 64.01 dB(A) compared to the Standard of 45 dB(A)]; the RCC, Aggregate Crushing Plant, Sino Hydro Camp and the Main Dam [between 50.09 – 82.42 dB(A) compared to the Standard of 50 dB(A)].

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

3.3 Construction Site Waste Management

3.3.1 Solid Waste Management at the Construction Site

The construction of the NNP1 Project landfill was substantially completed in July 2016 with some minor activities to be completed such as improving the landfill road surface with sub-base course, concrete lining of the open ditch and removing waste from temporary pits to the new waste pit. The total volume of all waste removed from the temporary pits to the new pit was approximately 800 m^3 including soil layers that could not be separated (see Photograph 1 and Photograph 2).

Photograph 1: Construction of the NNP1 landfill waste pit	*Photograph 2: Waste was moved from temporary pits to the new pit*
	

3.3.2 Hazardous Materials and Waste Management

During 13 and 14 July 2016, joint hazardous materials and waste inventories were undertaken at the main construction sites and sub-contractors' camps including Loxley's stock yard (for 230 kV transmission line materials), Loxley subcontractor's site office (RCR) and workshop in Thaphabat District (Bolikhamxay Province), TCM Camp, Right Tunnelling Workshop, V&K Camp, CVC Plant, Sino Hydro fuel station located at their camp area, new Song Da 5 Workshop at Spoil Disposal Area No. 2, HM Hydro Workers' Camp, IHI Workers' Camp and SECC Workshop.

The types and amounts of hazardous materials stored at the different construction sites and camps are indicated in Table 3-13.

Table 3-13 Hazardous material inventory

NO.	HAZARDOUSE WASTE TYPE	UNIT	TOTAL IN JULY (A)	DISPOSED (B)	REMAINING (A - B)
1	Used hydraulic and engine oil	litre (l)	2,900	1,500	1,400
2	Empty used chemical drum/container	Drum (20 l)	700	0	700
3	Used oil mixed with water	l	600	600	0
4	Acid and caustic cleaners	Bottle	285	285	0
5	Used tyres	Piece	113	7	106
6	Used oil filters	Piece	99	46	53
7	Empty contaminated bitumen drum/container	Drum (200 l)	82	0	82
8	Empty used chemical drum/container	Drum (200 l)	45	1	44
9	Empty used oil drum/container	Drum (20 l)	42	0	42
10	Empty paint and spray cans	Can	42	9	33

NO.	HAZARDOUSE WASTE TYPE	UNIT	TOTAL IN JULY (A)	DISPOSED (B)	REMAINING (A - B)
11	Contaminated soil, sawdust and concrete	Bag	33	25	8
12	Empty used oil drum/container	Drum (200 l)	22	4	18
13	Car battery	Unit	11	0	11
14	Ink cartridge	Unit	11	0	11
15	Halogen/fluorescent bulbs	Unit	8	0	8
16	Contaminated textile and material	Bag	8	5	3
17	Clinical waste	kg	4	0	4
18	Cement bag	Bag	1,500	1,500	0

A significant increase of hazardous waste sold this month came from the RT Camp decommissioning (see Photograph *1*3 and Photograph *2*4). In addition, a total of 72 m^3 of black water from the RT Camp and Song Da 5 Camp No. 2 were disposed of at the designated Spoil Disposal Area No. 6 following NNP1PC's Standard Operating Procedure (SOP) for Sewage/Black Water Disposal

The amount of recycled waste recorded at the NNP1 Project construction sites, camps, offices including ESD office and the contractors' camps at Houay Soup Resettlement Area (HSRA) is summarised in **Error! Reference source not found.**13 below

Table 1- 13: Amounts of recycle waste sold

	RECYCLE WASTE TYPE	UNIT	SOLD	TOTAL
1	Iron and metal scrap	kg	155	19,300
2	Aluminium	kg	315	41
3	Glass	kg	11	177
4	Plastic bottles	kg	20	61
5	Paper/cardboard	kg	0	63

The food waste generated from the Owner's Site Office and Village, camps of the Contractors and sub-contractors was collected by Hatsaykham villagers for use as animal feeds (pig and poultry). The amount collected in July 2016 was 4,178 kg as summarised in **Error! Reference source not found.**14 below

Table 3-14: Amount of food waste collected by villagers

NO.	SITE LOCATION NAME	UNIT	TOTAL
2	Song Da 5 Camp No. 1	kg	1,484
3	TCM Camp	kg	61

NO.	SITE LOCATION NAME	UNIT	TOTAL
5	IHI's 276 Subcontractor Camp	kg	0
6	OC Camp	kg	502
7	Owner's Camp	Kg	169
8	Song Da 5 Camp No. 2	Kg	1,962
Total			**4,178**

3.4 Community Waste Management Support

3.4.1 Community Recycling Programme

From July 2015 to present a total of 7,405 kg of recyclables were received by the Community Recycle Bank. The Bank received 418 kg recycled waste in July 2016. This is an increase of 116 kg when compared to June 2016 (see Table 3-144). By the end of July 2016, a total of 185 people (131 adults and 54 students) or 121 households held accounts at the Community Recycle Bank. The percentage participation in the programme for each village is:

Ban Hat Gniun 87%
Ban Hatsaykham 64%
Ban Thahuea 64%

Only one new member signed-up for the programme in July 2016. Therefore, the participation percentage does not change significantly.

In addition to buying recyclable waste from villagers and students, some recycled waste was also transported from IHI, HM Hydro and other Contractors to the Recycle Waste Bank. Recyclables will continue to be stockpiled at the Community Recycle Bank, the Owner's Site Office and Village and the Contractors/Subcontractors with the intention of arranging a routine collection by the Khunmixay Processing Factory who are authorised buyers.

The types and amounts of waste recycled in April 2016 and in total are presented in Table 3-14.

Table 3-14: Types and amounts of waste traded

Types of Waste	Unit	Amount Recycled In July 2016	Accumulated Amount Recycled (July 2015 – July 2016)
Recyclable Waste			
Glass	kg	158	2,180
Scrap metal	kg	178	2,404
Plastic bottle	kg	17	1,130
Paper/cardboard	kg	48	1,164
Aluminium cans	kg	18	527
Tin cans	kg	0	
Total	kg	418	7,405
Hazardous Waste			
Hydraulic oil containers	kg	0	12

Photograph 3: Buying recyclable waste at the waste bank

Photograph 4: Recyclable waste transportation from HM Hydro Contractor to the Community Recycle Bank

On 07 July 2016, the EMO Waste Management Team joined the SMO Camp Followers Team, Village Chief and district authorities in conducting waste management consultations for the camp followers/shops at Hat Gniun Village. The purpose of this consultation was to raise their awareness on the good waste management practices which include waste segregation, waste generation reduction based on the principle of 3 R's (Reduce, Reuse and Recycle), waste disposal and types of waste that the Community Recycle Bank purchase (see Photograph *1*5 and Photograph *2*6). The number of participants was summarized in Table 3-145 below.

Photograph 5: Waste management consultation for Laos camp

followers/shops

Photograph 6: Waste management consultation for Vietnamese camp

followers/shops

Table 3-15 Number of camp follower/shop owners participating in Waste Management Consultation at Hat Gniun Village

No.	Camp Follower/Shop Owner	Total No. of Camp Follower/Shop Owners	No. of Women
1	Laos camp followers/shops	14	11
2	Vietnamese camp followers/shops	11	4
Total		**25**	**15**

3.4.2 Houay Soup Resettlement Area Waste Management

In July 2016, the first submission of the DWP & SS-ESMMP for the Houay Soup Landfill construction was approved. The progress made in July 2016 included boundary demarcation, site clearance and a temporary pit excavation to manage waste from the host villages and Contractors in the Houay Soup Resettlement Area.

3.5 Watershed Management

3.5.1 Preparation of the Nam Ngiep 1 Watershed Management Plan

Obligations	Status by July 2016
Prepare a draft Watershed Management Plan by 31 July 2016 ***The deadline shifted to:*** ***1) Interim progress report by 1 September 2016 and*** ***2) First complete draft by 15 November 2016***	Continue with WMP development focussing on compiling the outcomes of current data analysis, the proposed activity package, and management sub-plans developed by Biodiversity and Fishery Consultants. The progress writing is currently under internal review by NNP1 EMO.
Prepare draft Watershed Management Regulations by 31 July 2016 ***The deadline shifted to submission of draft provincial regulation to ADB by 15 November 2016***	There was internal meeting among WRPC secretariats (WRPO DFRM, WRPO Xaysomboun and WRPO Bolikhamxay) on 15 July 2015 to further discuss and update the initial draft of provincial watershed regulation.
Final Watershed Management Plan by 31 October 2016 ***The deadline shifted to 23 December 2016***	-

Obligations	Status by July 2016
Final Watershed Management Regulations by 31 January 2017 ***The deadline shifted in:*** ***1) draft provincial regulation submitted to Provincial Justice Department by 23 December 2016*** ***2) start the public hearing process from 10 January 2017***	-
Activities in July 2016	Results
Data and information collection and analysis for WMP development	• Elaborating the current outcomes of data/information analysis of the specific thematic area into the working draft. Further works are still needed to fill up the information gap particularly for Land Use, Fishery, and Livelihood. • The proposed activity package was further discussed within WRPO for verification and the completion of budget estimation and management arrangement of the relevant stakeholders.
Procurement of Consultants to support the WMP development	• The GOL National Consultant has signed a contract with MONRE DFRM on 15 July 2016. The consultant conducted a first visit in the period 18-26 July to: • 1) understand the overall progress as per discussion with WRPO Xaysomboun, WRPO Bolikhamxay and NNP1 EMO; • 2) discuss activity plan for further engagement in supporting the plan development; • 3) obtain relevant information including the latest development of WMP working draft with its activity package, and • 4) commence the site visitation in NNP1 watershed area particularly in Xaysomboun Province. • NNP1 Procurement and EMO have completed further discussion with 3 candidates in the middle of July 2016. NNP1 Procurement concluding the final review

Obligations	Status by July 2016
	at the end of July for acknowledgement and approval of NNP1 management prior for contract settlement.
WRPO activity	• WRPO Xaysomboun: o Conduct forest inspection in 2 priority areas: 1) Phou Katha at Hom District and 2) Xiengkhong to Danmixay Village along Nam Ngiep River in Thathom District for the legal and illegal logging practice by local or private companies. • WRPO Bolikhamxay: o Coordinate with Bolikhamxay Provincial Governor Office, Planning and Investment Office of Paksan and Bolikhan District to collect Social Economic data of the total 27 villages within and surrounding NNP1 watershed area that will be elaborated into livelihood theme under WMP baseline profiling progress. • WRPO DFRM, WRPO Xaysomboun, and WRPO Bolikhamxay: o Conduct internal workshop to review the overall progress of activities in last 6 months (January to June 2016)
Xaysomboun ISP	• MONRE DEQP issued the official instruction letter in the middle of July 2016 to Province and District ISP team to further collaborate with NNP1PC team in finalizing the ISP report. • The team is working on update and verification of some socio-economic profile that will be further elaborated for the livelihood theme of NNP1 WMP working draft.

3.5.2 Biodiversity Offset Management

Obligations	Status by July 2016
Final Biodiversity Offset Survey Report by 30 June 2016	• ADB, IAP, BAC and LTA provided their comments on the final draft report to be further addressed in the final version which is expected to be ready on 1 September 2016.
Draft Offset Options Paper for the Biodiversity Offset Sites by 31 July 2016 ***The deadline is shifted to 23 December 2016***	-
Consensus building and workshops among stakeholders for the offset site selection by 15 September 2016 ***It is shifted into Conference on the methodology of biodiversity loss and gain value assessment, among ADB, NNP1, IAP, BAC, and biodiversity experts planned on 13-15 September 2016***	-
Final Offset Options Paper for the Biodiversity Offset Sites by 31 October 2016 ***The deadline is shifted to 15 February 2017***	-

Activities in July 2016	Results
Ground truth survey report	• ADB, IAP, BAC and LTA provided their comments on the final draft report to NNP1PC on 25 July 2016. • The final version is expected to be ready on 1 September 2016.
Milestones related to NNP1 Biodiversity Program	• Most of the milestones under the biodiversity programme will be rescheduled.

Activities in July 2016	Results
	• The key milestones that will be revised for the deadline includes: o Preparation of offset option paper o Biodiversity offset baseline survey will be designed and scheduled in consultation with the Biodiversity Advisory Committee, ADB and BOMC o Preparation of Biodiversity Offset Management Plan o Preparation of Provincial Regulation for biodiversity offset • In this regard, the current preparation of biodiversity baseline survey put in holds until the first wet season baseline by ADB Consultant is completed.
BOMC establishment	• Biodiversity Offset Management Committee (BOMC) was established on 04 July 2016. This committee is primary responsible to provide guidance and supervision related to NNP1 Biodiversity Offset works. • The first BOMC internal workshop conducted on 29 July 2016 with the primary objectives: o To brief all BOMC members and relevant provincial offices on the overall progress / status of NNP1 biodiversity offset program. o To further discuss on the sequence of activities with the time frame prior to BOMP development.

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 July 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													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	47.5	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
		Planned 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 July 2016	Results
Labour recruitment	• The field work during this wet season was carried out intermittently by employing day labourers in weekly rotational schedule.
Perform UXO work for 9 blocks of priority biomass clearance	• UXO work (scrub cutting and UXO detection) was carried out intermittently on Parcel No. B5-1 (26 ha) in Block 5 and Parcel No. B6-1 (13 ha) in Block 6. By the end of July 2016, the UXO search and clearance completed another 13 ha. Parcel No. B5-1 and B6-1 & 2 can be seen from Fig 1-14. • Non-technical UXO survey was carried out for Block 10-18 in middle and upper reservoir area.
Perform biomass clearance of block 1-9 on lower and central reservoir	• During the reporting period, there is no further progress for biomass clearance.
Utilization of NTFP, waste biomass and lesser value tree	• The Xaysomboun GoL issued an official letter on the utilization of cut trees with diameter between 20 cm-80 cm in priority biomass clearance areas. The relevant authorities are making the follow up for the Block 1, 4-5, and 8-9 for further action. • It was unofficially informed by Hom District Authorities that a salvage logging company, Chanthalai Company, was contracted by Xaysomboun Province to remove the cut trees.
Opportunity of short-term crop plantation on cleared biomass area (project affected villagers)	• Conducted monitoring on villagers' crop plantation (more than 110 families) in the cleared biomass area, Block 4-5. Villagers' crop plantation database (Excel) is being updated. Pictures of crop plantation are showed in Fig 1-10-1-11.

Figure 3-9: Biomass Clearance and UXO work Progress to date

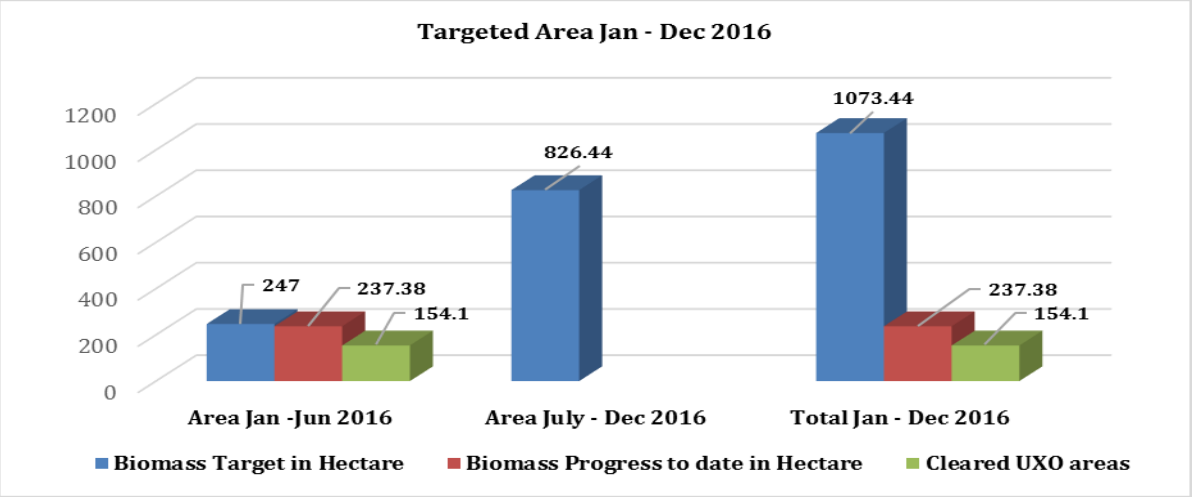


Figure 3-10: Upland rice on cleared biomass area in Block 4 by affected villagers

Figure 3-11: Peanut and maize plantations on cleared biomass area in Block 5 by affected villagers

Figure 3-12: Black ginger plantation on cleared biomass area in Block 6 by affected villagers

Figure 3-10 Map showing the progress UXO work in priority block 5

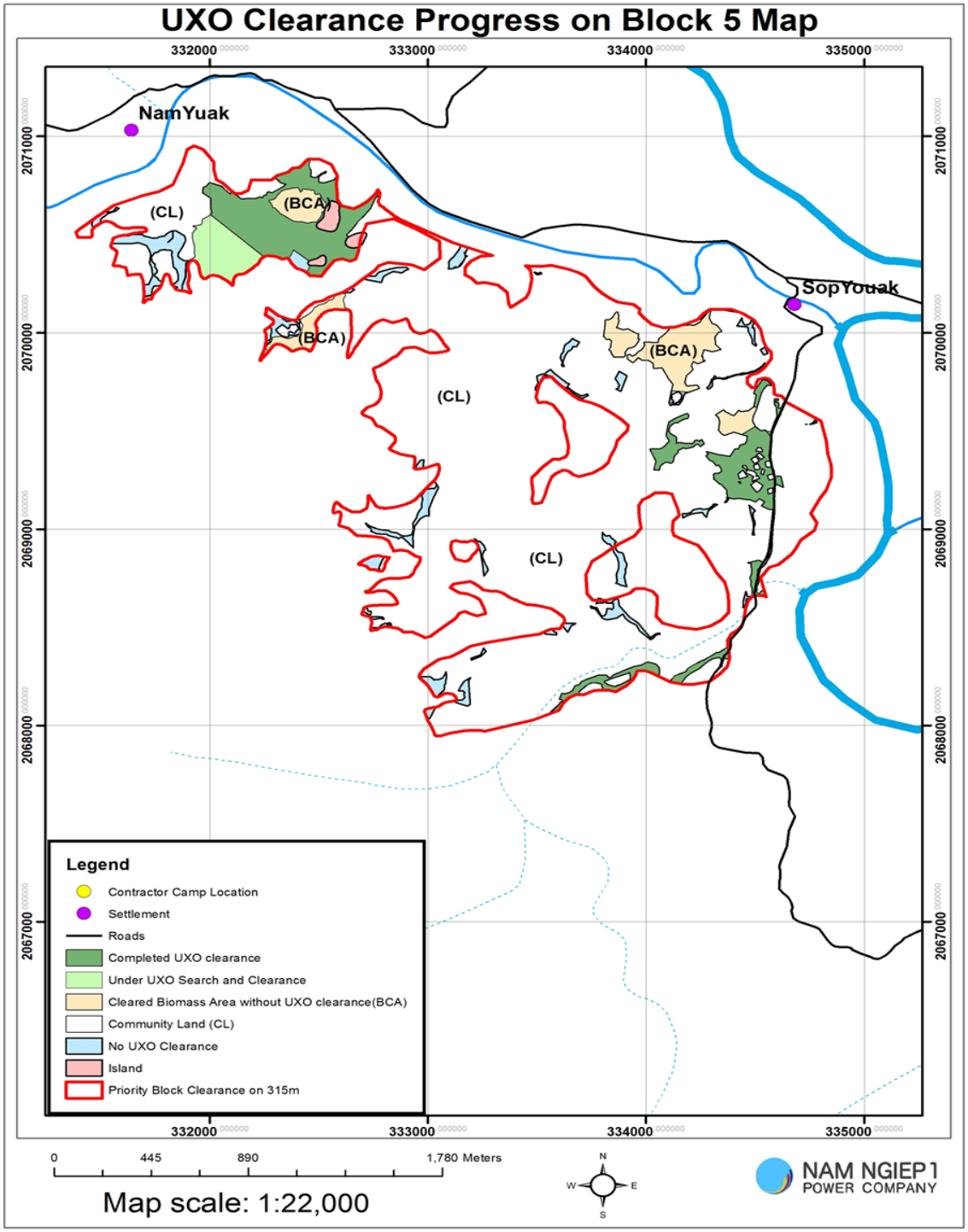
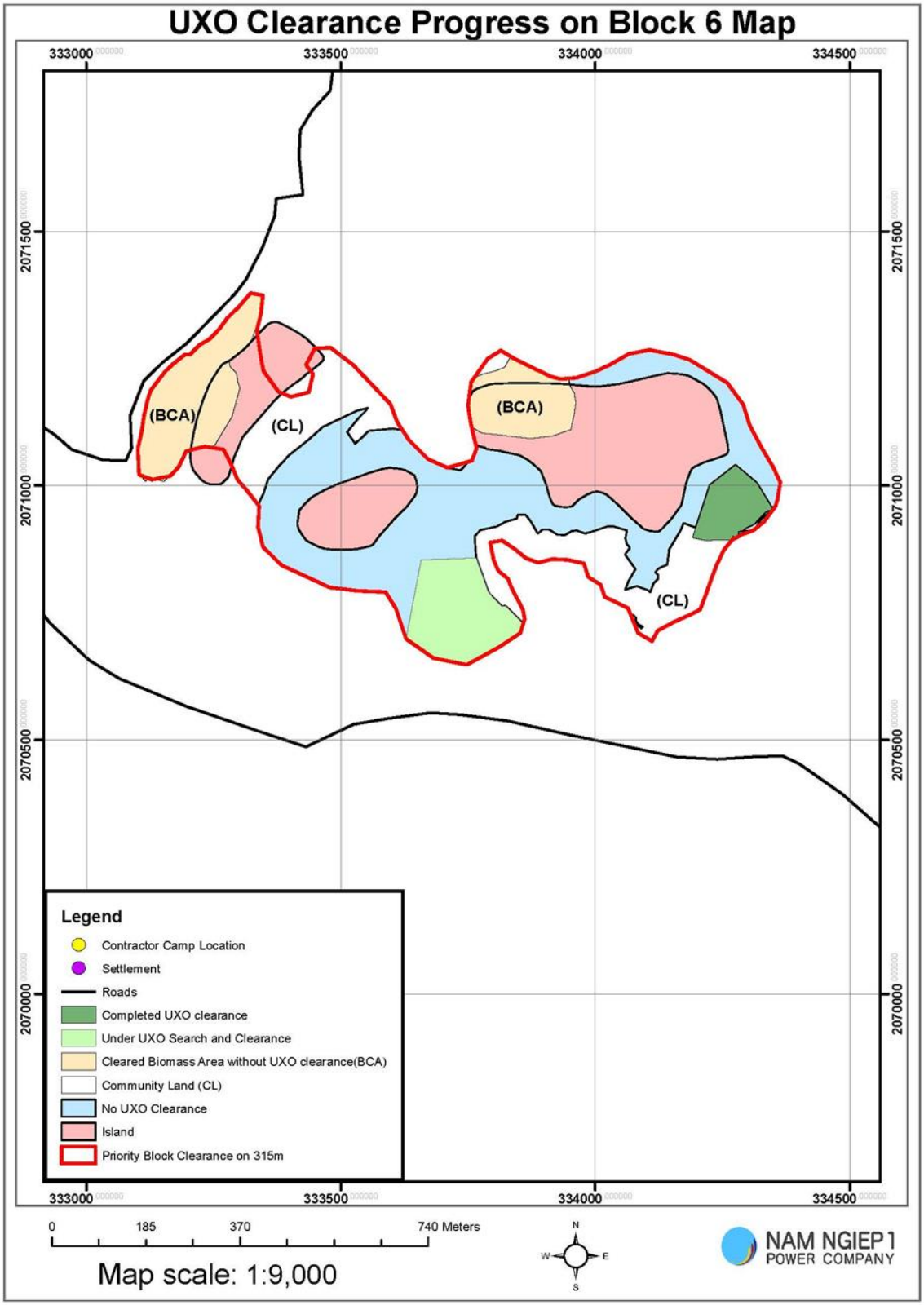


Figure 3-11 Map showing the progress UXO work in priority Block 6



3.6 Other Obligations and Support Programmes

3.6.1 Environmental Protection Fund (EPF)

There was no update during the month of July on the Houay Ngoua PPA sub-project implementation and the development of Xaysomboun and Xieng Khuang sub-project proposals. NNP1PC will follow up and provide an update in the August 2016 report.

3.6.2 115 kV Transmission Line IEE Due Diligence Assessment

Several discussions between NNP1PC, GOL and EDL were conducted during July 2016 to discuss the change of 115 kV transmission line alignment. EDL will carry out a survey of the required area for the transmission line before proposing to the Department of Land Administration (DOLA/MONRE) and NNP1PC for the a permit to use. An IEE will be concluded after the permission and then following up with the DDA.

3.6.3 Nabong Substation Upgrade Due Diligence Assessment

The due diligence report was sent to ADB in May 2016 and a follow-up call has been made with ADB but there was no comment received to-date.

3.7 External Monitoring

3.7.1 Independent Monitoring Agency

An initial IMA mission debriefing with the key GOL representatives and NNP1PC will be organised in early August 2016.

3.7.2 Biodiversity Advisory Committee

The recruitment process for the third BAC candidate is ongoing. NNP1PC has decided to recruit Dr. William Duckworth as a sole source selection for this position as he was recommended by the ADB. The candidate is expected to be engaged by the middle of August 2016, and NNP1PC will inform GOL accordingly.

ANNEXES

ANNEX A: RESULTS OF EFFLUENT ANALYSES

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

	Site Name	Owner Site Office and Village	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	RT Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF05	EF06	EF10
	Date	06/07/16	07/07/16	07/07/16	07/07/16	06/07/16	07/07/16	06/07/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	7.22	8.49	7.54	7.25	6.65	7.21	9.58
Sat. DO (%)	-	29.2	19.3	82.3	82	86.9	13.1	76
DO (mg/L)	-	2.24	1.43	6.2	5.86	6.57	0.99	5.68
Conductivity (µs/cm)	-	351	635	346	58.3	78.2	264	158.9
TDS (mg/L)	-	176	317	173	29	39	132	79
Temperature (°C)	-	27.4	29.2	28.2	30.4	28	27.9	28.7
Turbidity (NTU)	-	11.3	15.1	7.79	33.4	20.7	13.1	55.6
TSS (mg/L)	<50	ND[16]	26.4	6.9	23.4	20.2	16.4	91.8
BOD (mg/L)	<30	3.5	41.4	17.2	3.9	3	21.2	10.2
COD (mg/L)	<125	11.1	89.1	48.6	21.6	8.6	50.6	26.5
NH_3-N (mg/L)	<10.0	3	25	4	ND[12]	ND[12]	5	2
Oil & Grease (mg/L)	<10.0	ND[13]	3	ND[13]	ND[13]	ND[13]	ND[13]	ND[13]
Total coliform (MPN/100ml)	<400	3,300	160,000	160,000	1,700	7,900	54,000	4,000
Faecal Coliform (MPN/100ml)		3,300	160,000	13,000	1,100	7,900	13,000	1700
Discharge Volume (m3/day)		***40***	***0***	***0***	***0***	***80***	***0***	***17***

	Site Name	Songda5 Camp#1	Songda5 Camp#2	HMH worker Camp #1	SECC Camp	HMH Main Camp	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF12	EF13	EF14
	Date	07/07/16	07/07/16	07/07/16	07/07/16	07/07/16	07/07/16	07/07/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	7.47	7.99	7.62	7.14	7.67	8.22	7.31
Sat. DO (%)	-	160.5	4.7	28.8	18.9	126	154.1	1.1
DO (mg/L)	-	10.76	0.37	1.76	1.45	9.39	11.34	0.09
Conductivity (µs/cm)	-	329	441	286	174.5	183.7	368	536
TDS (mg/L)	-	164	220	143	90	92	184	268
Temperature (°C)	-	28.8	28.1	23.5	29	28.9	29.6	29.2
Turbidity (NTU)	-	12.21	18.9	23.7	77.6	10.56	7.01	11.8
TSS (mg/L)	<50	27.8	27.4	27.7	104	12.8	31.9	34.7
BOD (mg/L)	<30	21.8	37.7	44.6	21.6	4.8	12.2	81.4
COD (mg/L)	<125	66.8	54.6	67.8	52.6	20.2	60.7	128
NH_3-N (mg/L)	<10.0	3	20	14	3	ND[12]	13	26
Oil & Grease (mg/L)	<10.0	2	ND[13]	2	ND[13]	ND[13]	1	3
Total coliform (MPN/100ml)	<400	54,000	160,000	160,000	160,000	7,900	54,000	160,000
Faecal Coliform (MPN/100ml)		22,000	160,000	160,000	54,000	330	11,000	160,000
Discharge Volume (m3/day)		***0***	***0***	***17***	***0***	***8***	***0***	0

Table A- 2: Results of Camp Effluents in July 2016 (Cont.) – Physical Parameters Only

	Site Name	Owner Site Office and	Obayashi Camp WWT1	Obayashi Camp WWT2	TCM Camp	RT Camp	Sino Hydro Camp	V & K Camp
	Station Code	EF01	EF02	EF15	EF03	EF05	EF06	EF10
	Date	21/07/16	26/07/16	26/07/16	26/07/16	26/07/16	26/07/16	26/07/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	6.8	7.83	8.14	6.75		7.25	8.26
Sat. DO (%)		18.3	21.4	85.2	34.8		4.4	107.5
DO (mg/L)		1.38	1.51	6.11	2.41		0.32	7.4
Conductivity (µs/cm)		382	755	617	111.7	No monitoring	412	232
TDS (mg/L)		191	377	308	55	due to this camp	206	116
Temperature (°C)		27.88	31.3	31	33.3	was	31	33.6
Turbidity (NTU)		1.28	18.1	18.8	2.68	decommisioned	12.37	24.2

	Site Name	Songda5 Camp#1	Songda5 Camp#2	HMH worker Camp #1	SECC Camp	HMH Main Camp	HMH Main Camp WWTP	IHI Camp
	Station Code	EF07	EF08	EF09	EF11	EF12	EF13	EF14
	Date	26/07/16	26/07/16	26/07/16	26/07/16	26/07/16	26/07/16	26/07/16
Parameters (Unit)	Guideline							
pH	6.0 - 9.0	7.45	7.23	7.11	6.83	8.6	10.63	7.39
Sat. DO (%)		100.8	25.7	5.6	28.4	122.2	over range	7.2
DO (mg/L)		10.73	1.86	0.4	1.96	8.76	>20	0.53
Conductivity (µs/cm)		533	420	377	251	186.6	380	672
TDS (mg/L)		266	210	188	125	93	190	336
Temperature (°C)		34.3	30.6	30.6	33.4	31.2	30.8	30.2
Turbidity (NTU)		8.35	9.82	9.96	16.4	16.8	12.4	17.1

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

	Regulating Dam				Main Dam			
	DS08				DS11			
	06/07/16	12/07/16	21/07/16	28/07/16	06/07/16	12/07/16	21/07/16	28/07/16
Parameter (Unit)								
pH	7.01	7.42	7.59	7.31	7.08	7.53	7.23	8.12
Sat. DO (%)	100.1	98.2	99.1	97.3	98.9	100.9	60.3	98.5
DO (mg/L)	7.25	7.33	7.59	7.62	7.78	7.51	4.76	7.87
Conductivity (µs/cm)	232	191.7	133.3	103.5	269	264	386	374
TDS (mg/L)	116	95	66.65	52	134	132	192	157
Temperature (°C)	30.5	28.8	27.7	26.3	25.9	28.9	25.96	25.2
Turbidity (NTU)	11.7	3,053	1,970	730	19.2	4.78	8.93	12.7
TSS (mg/L)	19.5	N/A	754	N/A	56.1	N/A	12	N/A
Oil & Grease (mg/L)	ND[13]	N/A	ND[13]	N/A	ND[13]	N/A	ND[13]	N/A
Discharge Volume (m^3/day)	***80***	***80***	***650***	***432***	***6,000***	***6,000***	***6,000***	***6,000***

	Site Name	CVC Plant				Spoil Disposal No.2			RCC Plant			
	Station Code	DS03				DS04			DS09			
	Date	06/07/16	12/07/16	21/07/16	28/07/16	06/07/16	12/07/16	21/07/16	06/07/16	12/07/16	21/07/16	28/07/16
Parameter (Unit)	Guideline											
pH	6.0 - 9.0	8.79	8.82	8.29	9.1	6.41	6.38	6.69	8.87	8.53	8.4	7.29
Sat. DO (%)		101.1	99.1	59.3	96	72.6	79	73.7	64.1	100.7	53.4	97
DO (mg/L)		7.49	6.97	4.61	7.62	5.64	6.06	5.85	5.01	6.93	4.21	7.73
Conductivity (µs/cm)		119.6	152.6	273	118.8	17.33	17.14	18.43	328	357	205	160.2
TDS (mg/L)		59	76.3	136	59.4	8	8	9.21	164	178	102	80
Temperature (°C)		29.2	32	26.89	25.6	26.4	27	25.7	25.89	33.4	26.19	25.4
Turbidity (NTU)		1,164	23,450	757	138	46.2	39.8	42.7	2,199	33	1,591	11,180
TSS (mg/L)	<50	508	N/A	300	N/A	46.5	N/A	72.6	873	N/A	674	N/A
Oil & Grease (mg/L)	<10	ND[13]	N/A	ND[13]	N/A	ND[13]	N/A	ND[13]	ND[13]	N/A	ND[13]	N/A
Discharge Volume (m^3/day)		***80***	***80***	***150***	***172.8***	***2,500***	***2,500***	***810***	***600***	***600***	***320***	***864***

ANNEX B: AMBIENT AIR QUALITY DATA

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

Noise Level (dB)	28-29/07/2016			29-30/07/2016			30-31/07/2016			31/07/2016
	10:53-18:00	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 - 10:53
Maximum Value Recorded	75.6	73.4	90.5	84.7	72.8	80.4	77.7	79.6	64	77.2
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	49.42	51.18	58.88	50.17	54.86	56.39	47.67	51.41	52.03	47.99
Guideline Averaged	***55***	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

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

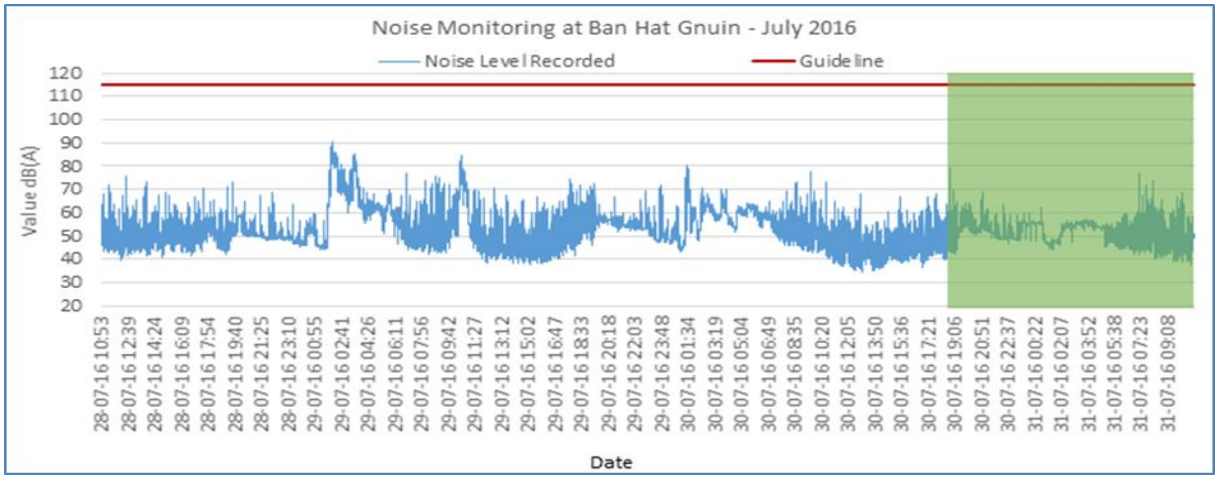


Table B- 2: Noise Monitoring Average Results at Ban Hatsaykham

Ban Hatsaykham-Noise Monitoring 72 consecutive hours-July 2016										
Noise Level (dB)	03-04/07/2016			04-05/07/2016			05-06/07/2016			06/07/2016
	10:39-18:00	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 -10:39
Maximum Value Recorded	83.30	63.40	61.50	74.90	69.40	69.30	69.30	69.20	82.00	65.70
Guideline Max	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***	***115***
Average Data Recorded	47.11	48.26	49.90	51.05	48.95	48.74	50.88	53.21	64.01	54.73
Guideline Averaged	***55***	***55***	***45***	***55***	***55***	***45***	***55***	***55***	***45***	***55***

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

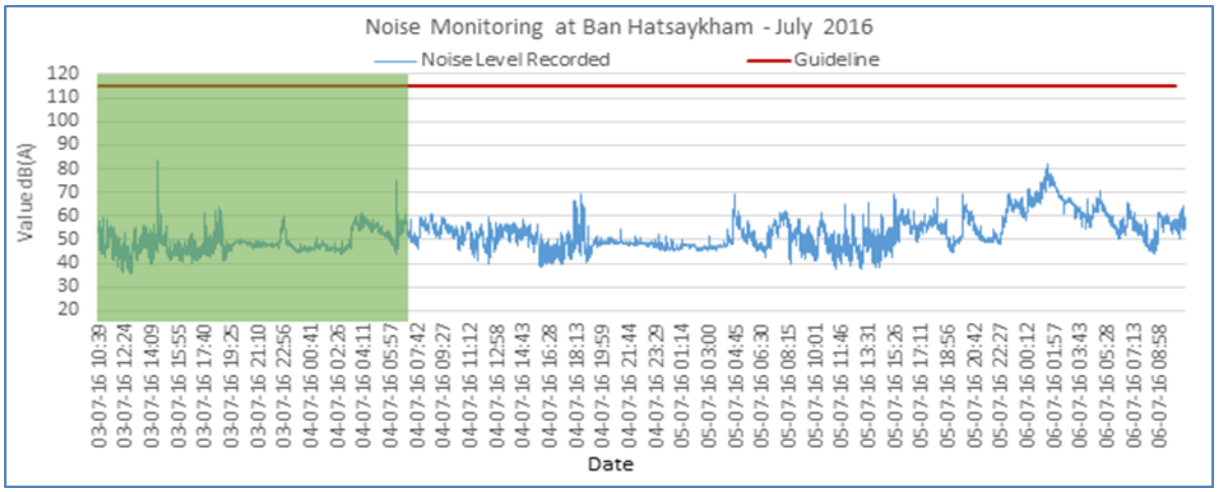


Table B- 3 and Table B- 4: Average Results Noise Monitoring at Aggregate Crushing Plant and RCC Plant in July 2016

Aggregate Crushing Plant

Noise Level (dB)	25-26/07/2016		26/07/2016
	10:55 – 22:00	22:01 – 06:00	06:01-10:55
Maximum Value Recorded	86.1	87.4	85
Guideline Max	***115***	***115***	***115***
Average Data Recorded	79.85	82.42	54.11
Guideline Averaged	***70***	***50***	***70***

RCC Plant

Noise Level (dB)	14-15/07/2016		15/07/2016
	11:14 – 22:00	22:01 – 06:00	06:01-11:14
Maximum Value Recorded	77.4	83.9	71.8
Guideline Max	***115***	***115***	***115***
Average Data Recorded	55.82	61.22	55.05
Guideline Averaged	***70***	***50***	***70***

Figure B- 3: Results of Noise Lavel Monitoring at Aggregate Crushing Plant in July 2016

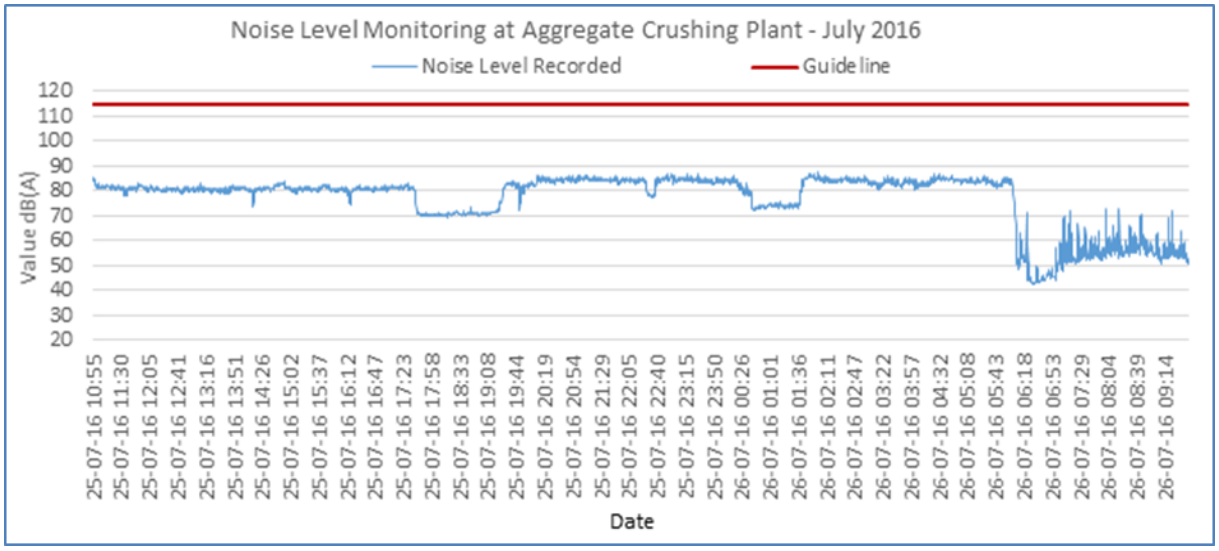


Figure B- 4: Dust Monitoring Results at RCC Plant in June 2016

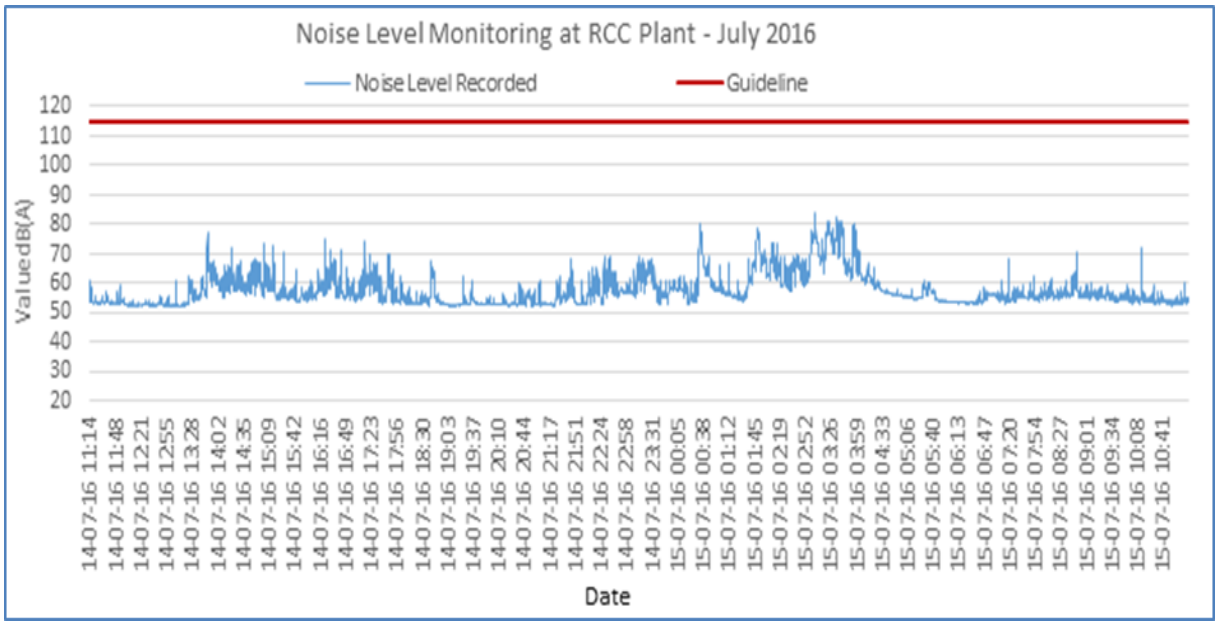


Table B- 5 and Table B- 6: ***Average Results of Noise Monitoring at Songda Camp#2 and Sino Hydro Camp in July 2016***

Songda Camp#2

Noise Level (dB)	15-16/07/2016		16/07/2016
	11:46 – 22:00	22:01 – 06:00	06:01-11:46
Maximum Value Recorded	78.4	61.9	73.6
Guideline Max	***115***	***115***	***115***
Average Data Recorded	58.98	58.49	57.76
Guideline Averaged	***70***	***50***	***70***

Sino Hydro Camp

Noise Level (dB)	13-14/07/2016		14/07/2016
	10:52 – 22:00	22:01 – 06:00	06:01-10:40
Maximum Value Recorded	72	90.7	69.2
Guideline Max	***115***	***115***	***115***
Average Data Recorded	52.06	68.14	58.64
Guideline Averaged	***70***	***50***	***70***

Figure B- 5: Dust Monitoring Results at Songd Da 5 Camp#2 in July 2016

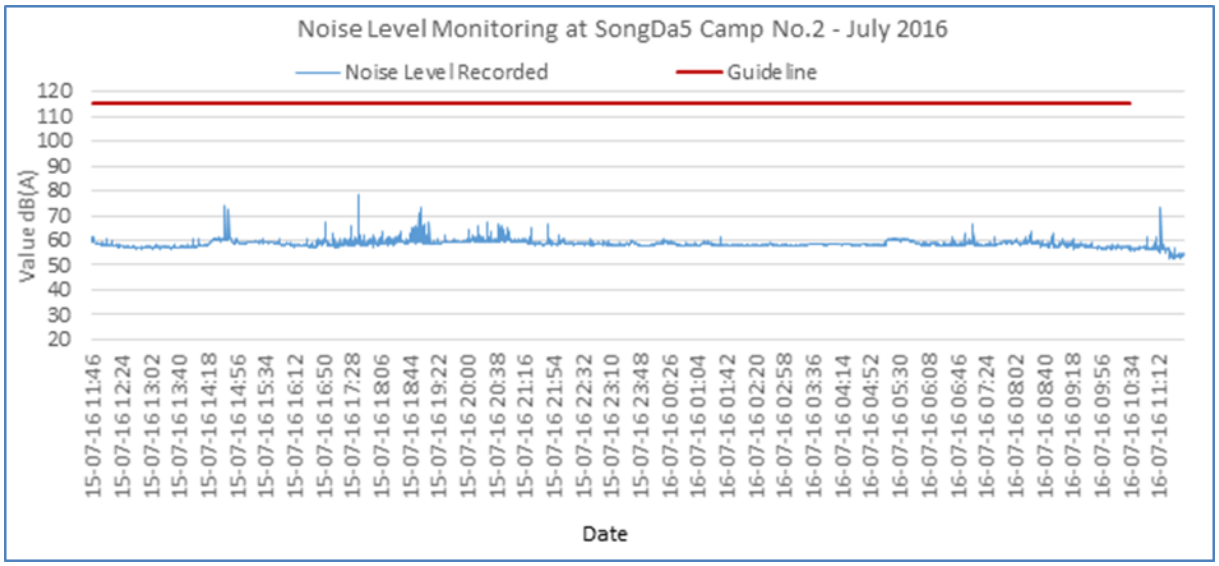


Figure B- 6: Dust Monitoring Results at Sino Hydro Camp in July 2016

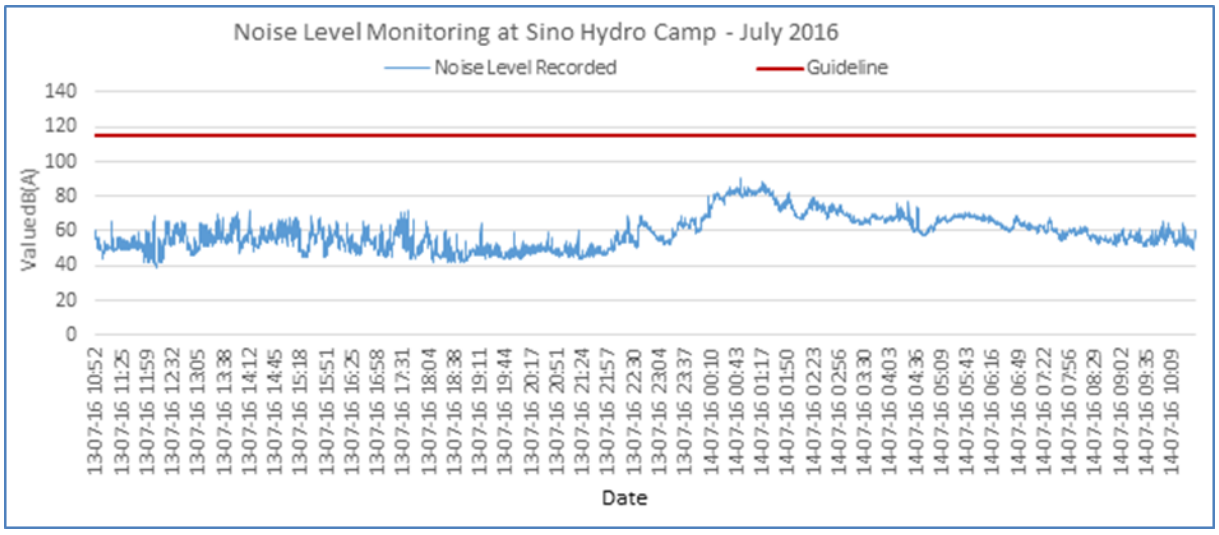


Table B- 6 and Table B- 7: ***Average Results of Noise Monitoring at the Owner's Site Office and Village and, the Main Dam in July 2016***

Owner's Site Office and Village

Noise Level (dB)	11-12/07/2016		12/07/2016
	10:10 – 22:00	22:01 – 06:00	06:01-10:10
Maximum Value Recorded	74.9	67.8	63.2
Guideline Max	***115***	***115***	***115***
Average Data Recorded	48.89	50.09	52.25
Guideline Averaged	***70***	***50***	***70***

Main Dam

Noise Level (dB)	26-27/07/2016		27/07/2016
	12:10 – 22:00	22:01 – 06:00	06:01-12:10
Data Record Max	61.2	88.2	60.1
Guideline Max	***115***	***115***	***115***
Data Record Average	49.06	54.57	51.97
Guideline Averaged	***70***	***50***	***70***

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

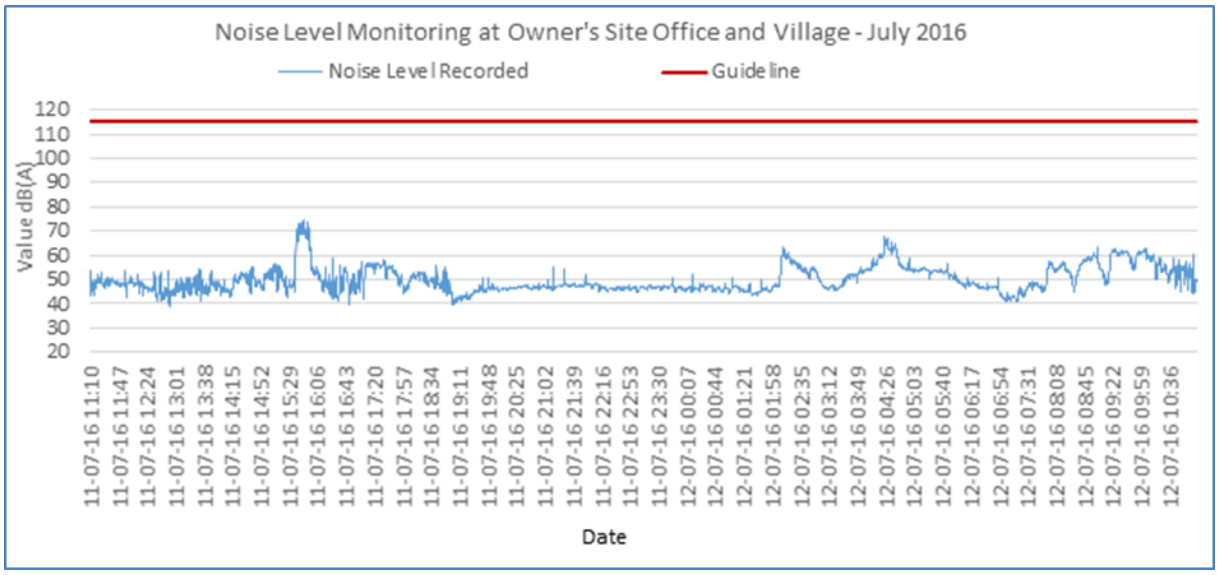


Figure B- 8: Results of Noise Level Monitoring at Main Dam in July 2016