

Nam Ngiep 1 Hydropower Project

**Environmental and Social Management
and Monitoring Plan**

Operational Phase

Volume II Part 1

**Project Description and Summary of Related
Management Plans**

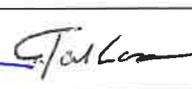
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Abbreviations and Acronyms

| | |
|----------|---|
| ADB | Asian Development Bank |
| BAC | Biodiversity Advisory Committee |
| CA | Concession Agreement |
| CVC | Conventional Vibrated Concrete |
| DESIA | Department of Environmental and Social Impact Assessment, MONRE |
| ECC | Environmental Compliance Certificate |
| EGATi | Electricity Generating Authority of Thailand International Ltd. |
| EHS | Environment, Health and Safety |
| EIA | Environmental Impact Assessment |
| EL | Elevation |
| EMP | Environmental Management Plan |
| EMO | Environmental Management Office |
| EMU | Environmental Monitoring Unit |
| EMS | Environmental Management System |
| ESD | Environmental and Social Division of NNP1PC |
| ESIA | Environmental and Social Impact Assessment |
| ESMMP-OP | Environmental and Social Management and Monitoring Plan – Operational Phase |
| FSL | Full Supply Level |
| GOL | Government of Lao PDR |
| GWh | Gigawatt hour |
| HSRA | Houay Soup Resettlement Area |
| IFC | International Financial Institution |
| IMA | Independent Monitoring Agency |
| ISO | International Organization for Standardization |
| JSC | Joint Steering Committee |
| KANSAI | The Kansai Electric Power Company Incorporated |
| kV | kilo-Volt |
| LHSE | Lao Holding State Enterprise |
| LTA | Lender’s Technical Advisor |
| MAF | Ministry of Agriculture and Forestry |
| MEM | Ministry of Energy and Mines |
| MONRE | Ministry of Natural Resource and Environment, Lao PDR |
| MPWT | Ministry of Public Works and Transport |
| MW | Megawatts |
| NNP1 | Nam Ngiep 1 Hydropower Project |
| NNP1PC | Nam Ngiep 1 Power Company Limited |
| PAFO | Provincial Agriculture and Forestry Office |
| PAP | Project Affected People |
| PONRE | Provincial Department of Natural Resource and Environment, MONRE |
| RCC | Roller Compacted Concrete |
| RMU | Resettlement Management Unit |

SMO Social Management Office

WRPC Watershed and Reservoir Protection Committee

1 INTRODUCTION

The Environmental and Social Management and Monitoring Plan for the Operational Phase (ESMMP-OP) of the Nam Ngiep 1 Hydropower Project is composed of three volumes:

Volume I: General Matters

Volume II: Part 1 Project Description and Summary of Related Management Plans
Part 2 Subplans

Volume III: Procedures

This Volume II of the ESMMP-OP is divided in two parts: Part 1 Project Description and Summary of Related Management Plans (this document), and Part 2 Subplans. The subplans describe in detail the specific environmental and social management and monitoring measures for the operational phase of the Nam Ngiep 1 Hydropower Project focusing on the first 5 years from September 2019 to August 2024 of operations. The subplans in Part 2 of the ESMMP-OP Volume II are listed in **Table 1-1**.

TABLE 1-1 LIST OF ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING SUBPLANS

- ESMMP-OP Volume II Part 2: Subplans:
 - SP01: Reservoir and River Health Management
 - SP02: Hazardous Materials Management
 - SP03: Project Waste Management
 - SP04: Wastewater Management
 - SP05: Community Waste Management
 - SP06: Community Water Supply Monitoring
 - SP07: 230-kV Transmission Line Management
 - SP08: 115-kV Transmission Line Management
 - SP09: Decommissioning and Rehabilitation

2 OVERALL OBJECTIVES

The Subplans provide a framework for the implementation of environmental and social measures related to project operations to ensure that the project at all times complies with all environmental and social obligations and requirements (Compliance Obligations) in a timely and cost-effective manner, and that opportunities for improvements are identified and considered continually.

The Subplans include monitoring programmes and the objectives of these programmes are twofold: (i) to monitor and document compliance with the Compliance Obligations and provide early warnings in case there is a risk that an obligation may be breached, and (ii) to monitor the impacts of project operations to ensure that the mitigation measures are effective and give early warning in case of unexpected impacts.

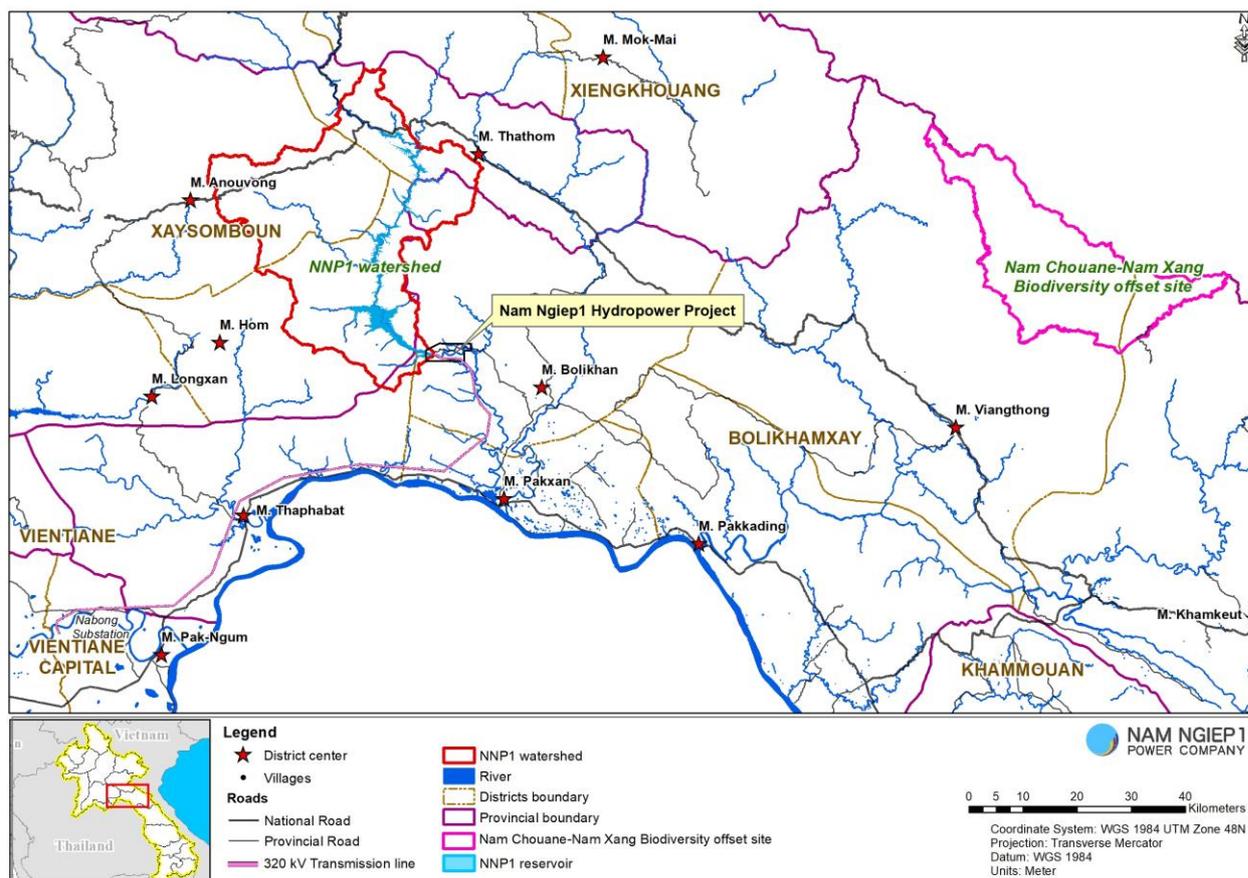
2.1 The Nam Ngiep 1 Hydropower Project

Nam Ngiep 1 Power Company (NNP1PC or the Company) was formed on 12 April 2013 to develop, finance, construct, own and operate the Nam Ngiep 1 Hydropower Project (NNP1). NNP1PC is a consortium between KANSAI (The Kansai Electric Power Company Incorporated Japan), Electricity Generating Authority of Thailand International Ltd. (EGATi) and Lao Holding State Enterprise (LHSE), established to produce and sell electric power.

The Company entered into a Concession Agreement with the Government of Lao PDR on 27 August 2013 and the main construction works started in October 2014. The Commercial Operation Date (COD) is planned to be achieved on 31 August 2019.

The NNP1 is located on the Nam Ngiep River, a left bank tributary of the Mekong River, with the confluence about 7 km upstream of the town of Pakxan in Bolikhamxay Province, Lao PDR (see **Figure 2-1**). At its confluence with the Mekong, the Nam Ngiep has a total catchment area of 4,494.7 km² and is composed of 33 tributaries (sub-catchments).

FIGURE 2-1 OVERVIEW MAP WITH THE LOCATION OF THE NAM NGIEP 1 HYDROPOWER PROJECT



The project consists of two dams. The main dam which is 167 m high and located 9.0 km upstream of Hat Gnuin Village in Bolikhan District, has created a 70-km-long, narrow reservoir that extends up the Ngiep Valley as far as Thathom District. The Power Station at this dam has an installed capacity of 272 MW generating electricity for export to Thailand. A second, smaller 20 m high labyrinth dam, is built about 6 km downstream of the main dam. This creates a re-regulating reservoir upstream of the dam in order to regulate water flows, thereby minimising disturbances to the river and people living further downstream along the Nam Ngiep. A small power station of 18 MW installed capacity located at the re-regulation dam supplies electricity for use in Laos.

At the end of the concession period, all plant facilities are expected to be transferred to the Government of Lao PDR. With a combined capacity of 290 MW, Nam Ngiep 1 Hydropower Project will generate around 1,620 GWh of electricity annually. Two transmission lines transport the electricity generated by the project. From the main power station, a 230-kV Transmission Line runs for 125 km to the Nabong Substation outside Vientiane Capital. A 115-kV Transmission Line constructed by EDL transmits electricity from the re-regulation power station to Pakxan Substation over a distance of 33 km.

3 PROJECT DESCRIPTION

The Nam Ngiep 1 Hydropower Project comprises a 167 m high concrete gravity dam and a main power station with an installed capacity of 272 MW. A re-regulation dam and 18 MW power station is located 6 km downstream of the main power station. The main power station is expected to generate 1,546 GWh annually and the re-regulation dam is expected to have an annual power generation of 105 GWh.

The main components of the Project include:

- The main reservoir
- The main dam and spillway
- The main dam powerhouse
- The re-regulation reservoir
- The re-regulation dam
- The re-regulation dam powerhouse
- The 230-kV transmission line
- The 115-kV transmission line (associated facility)
- Site infrastructure, offices and residences

The location of the dams and the reservoirs are displayed on the overview map in **Figure 3-2** and the layout of the main project facilities are shown in **Figure 3-1**. As indicated on the maps the dams and other project facilities are located in Bolikhamxay Province, and the main reservoir in Xaysomboun Province with the catchment extending into Xieng Khuang Province.

FIGURE 3-1 OVERVIEW MAP OF THE PROJECT LOCATION

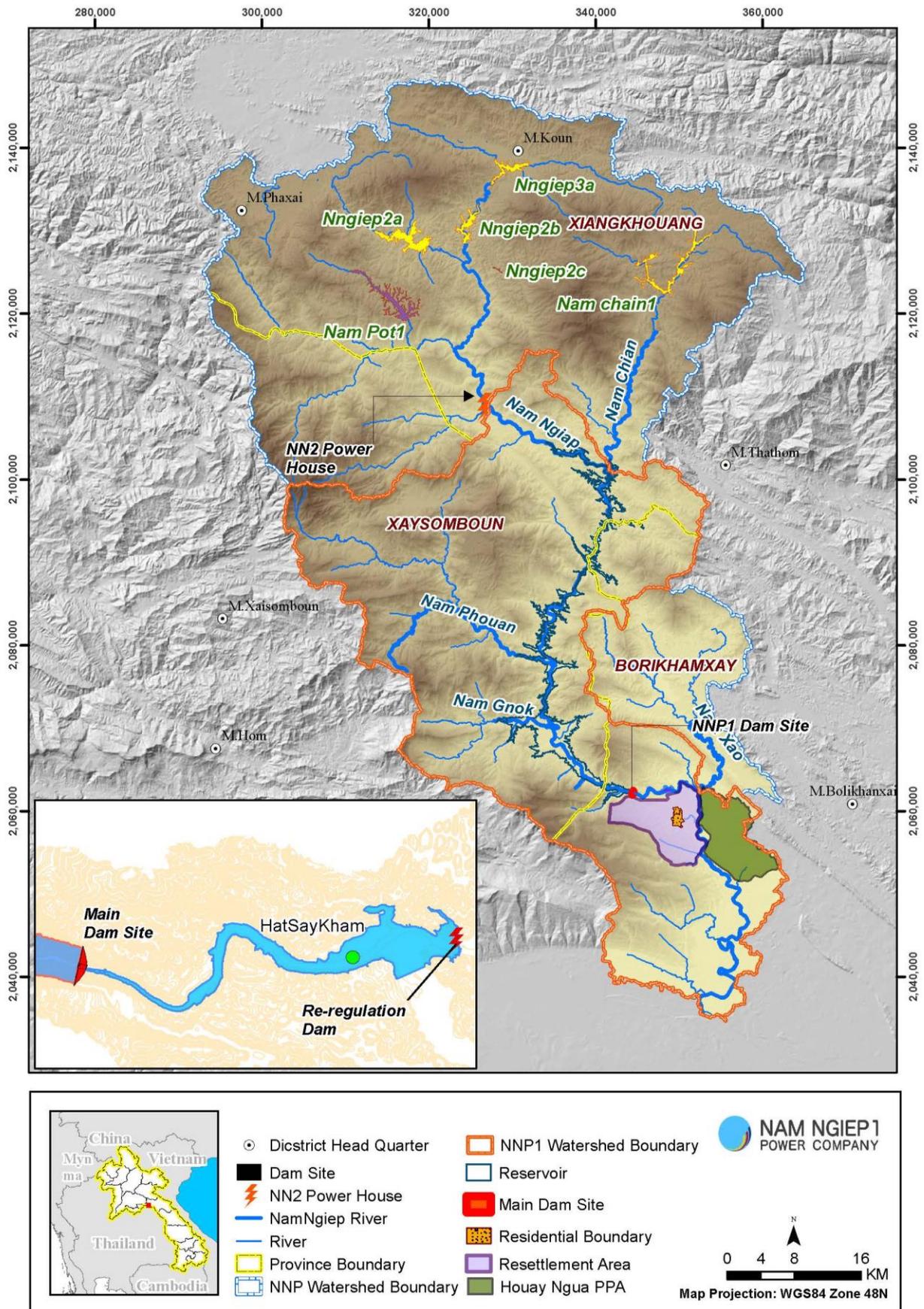


FIGURE 3-2 SATELLITE IMAGE OF SEPTEMBER 2018 WITH LOCATION THE MAIN PROJECT FACILITIES



3.1 Main reservoir

The main reservoir was impounded during May – August 2018 and stretches about 70 km from the main dam up to covers an area of 67 km² at full supply level 320 masl and has an effective storage capacity of 1,192 million m³. Key technical data are presented in **Table 3-1**.

TABLE 3-1: KEY TECHNICAL DATA

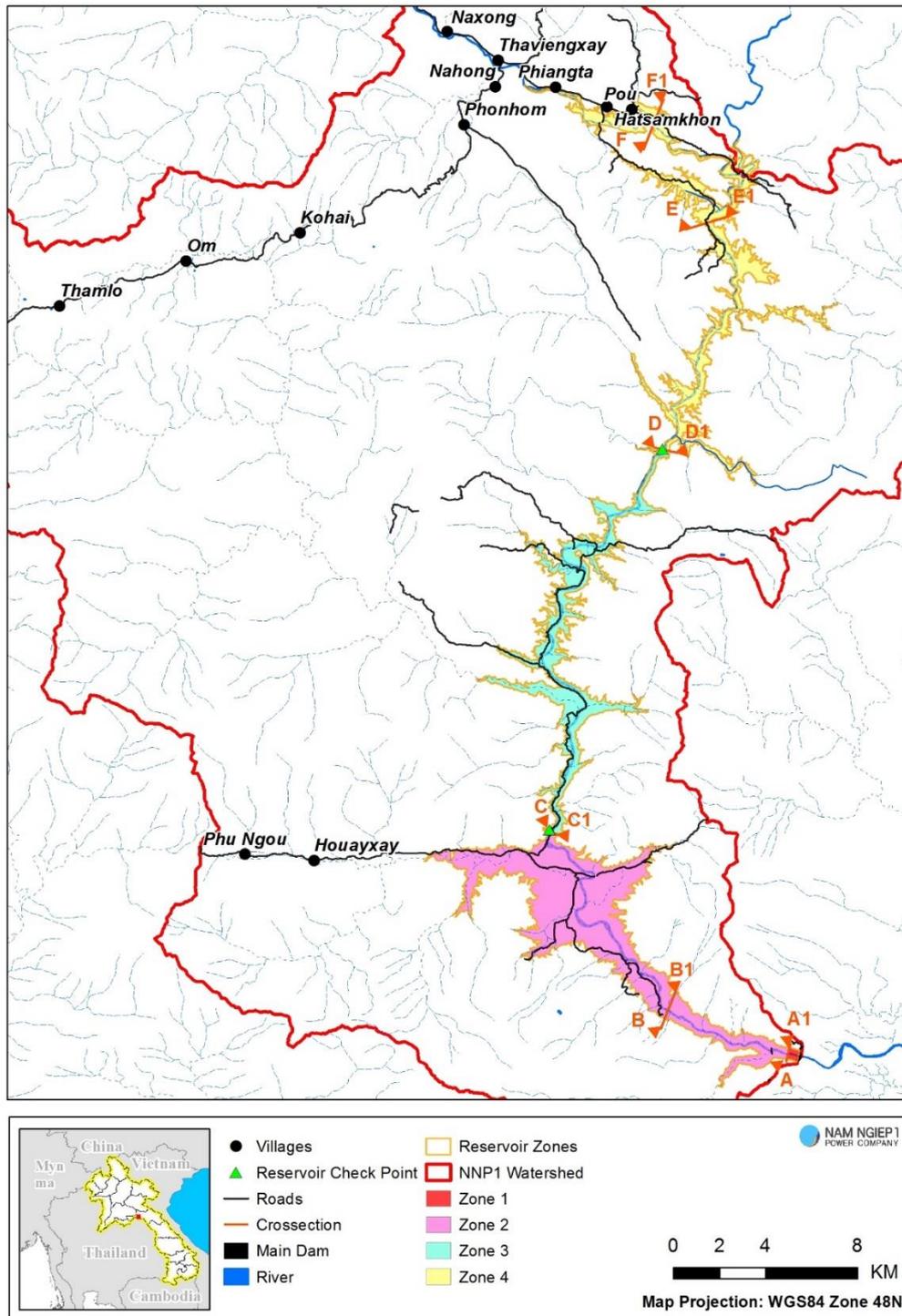
| Item | Specification |
|----------------------------|------------------------------|
| Full Supply Level | 320 masl |
| Minimum operating level | 296 masl |
| Reservoir surface area | 67 km ² |
| Effective storage capacity | 1,192 million m ³ |
| Catchment area | 3,700 km ² |

NNP1PC together with concerned government agencies have prepared a Reservoir Management Plan and this plan divides the reservoir into four zones (**Figure 3-3**) as follows:

- **Dam Safety Exclusion Area** – which is that part of the reservoir which is within 500 m of the main NNP1 dam wall.
- **Lower Reservoir Use Zone** – defined as that part of the reservoir between the Dam Safety Exclusion Area and the TPZ identified in the Watershed Management Plan (WMP);
- **Restricted Access Zone** – is the section of the reservoir that falls within the TPZ described within the WMP; and
- **Upper Reservoir Use Zone** – defined as the section of reservoir that is upstream of the Totally Protected Zone (TPZ) identified in the Watershed Management Plan (WMP).

Prior to start of impounding the reservoir, biomass was cut and burned for an area of 1640 ha.

FIGURE 3-3: MANAGEMENT ZONES OF THE NNP1 RESERVOIR



3.2 Main Dam and Spillway

The main dam is a 167 m high Roller Compacted Concrete (RCC) gravity dam, with a crest length of 530 m and crest elevation at 322 masl (see technical data in **Table 3-2**). Due to weak geological layers, the dam foundation required excavation of 20 % more materials than expected and construction of a ‘shear key’ structure. The dam foundations have been grouted to limit seepage.

FIGURE 3-4 THE MAIN DAM AND POWERHOUSE, DECEMBER 2018



A spillway consisting of 4 radial gates is mounted at the centre of the dam with a combined capacity of 5210 m³/s when fully opened equal to a flood with an average recurrence interval of 1,000 years. Each gate opens to a ski jump chute with flipped buckets which direct the jets past the main powerhouse to a plunge pool.

The water intake is provided through two bell-mouth type intakes with a sill level of 276 masl, which is 20 m below the MOL and well above the 50-year sedimentation level of 233 masl. Each intake is connected to a penstock that conducts the water to each of the two turbines in the main powerhouse.

The dam crest elevation is set at 322 masl adding a 2 m freeboard to the FSL at 320 masl sufficient to ensure that waves generated by wind and earthquake would not overtop the dam. The main dam height also ensures that a Probable Maximum Flood (8,980 m³/s) would not overflow the dam crest. Furthermore, if considering the malfunction of one of the spillway gates, the water level in case of the design flood (1,000-year ARI) would rise-up to 320.29 masl.

TABLE 3-2: KEY TECHNICAL DATA FOR THE MAIN DAM

| Facility | Items | Specifications |
|--------------------------|------------------|--|
| Main Dam | Type | Concrete gravity dam (Roller-Compacted Concrete) |
| | Dam height | 167.0 m |
| | Crest length | 530.0 m |
| | Dam volume | 2.3 million m ³ |
| | Crest level | 322.0 masl |
| Riparian Release Conduit | Elevation | 244.6 masl (sill level) |
| | Maximum Capacity | 9.3 m ³ /s at NWL (320 masl) |
| Spillway | Gate type | Radial gate |
| | Number of gates | 4 |

| Facility | Items | Specifications |
|----------|--------------------|--------------------------------------|
| | Design flood | 5,210 m ³ /s (1,000-year) |
| Intake | Type | Bell-mouth |
| | Number | 2 |
| | Discharge capacity | 230.0 m ³ /s |
| Penstock | Type | Embedded and concrete-lined |
| | Number | 2 |
| | Length | 185.81 m |
| | Diameter | 5.2 m |

A riparian release conduit has been installed in the main dam body with a sill elevation of 244.6 masl. The range of flow for the riparian conduit is 0.0-9.3 m³/s, depending on the water level. At NWL (EL 320 m) and MOL (EL 296 m), the conduit capacity is 9.3 m³/s and 5.5 m³/s, respectively.

The riparian release conduit has served its main purpose during the initial impounding. After normal operation starts, water can be released by the spillway gates or turbines, and the riparian conduit will only be used in extreme or emergency cases (e.g. if the spillway gates was or the turbines malfunctioned, or in extreme drought conditions when the turbines cannot operate).

FIGURE 3-5 THE SPILLWAY GATES AT THE MAIN DAM, APRIL 2019



3.3 Main Dam Powerhouse

The main dam powerhouse is a four-storey building constructed semi-underground close to the main dam. The powerhouse contains two Francis type turbines with an installed capacity of 272 MW and an estimated annual power generation of 1,546 GWh at the substation for delivery to EGAT.

The tailrace is 48.5 m long. The sill level at the end of the tailrace yard is EL. 174.0 m equivalent to the elevation of the reservoir bed.

TABLE 3-3 KEY TECHNICAL DATA FOR THE MAIN POWERHOUSE

| Item | Specification |
|--|-----------------------------|
| Type | Semi-underground |
| Length | 25.0 m |
| Width | 62.5 m |
| Height | 47.2 m |
| Maximum plant discharge | 230.0 m ³ /s |
| Maximum plant discharge (for simulation) | 34.5 m ³ /s |
| Gross head | 132.7 m |
| Effective head | 130.9 m |
| Type of turbine | Francis |
| Rated output | 272 MW (at Substation) |
| Annual power generation | 1,546 GWh (at Substation) |
| Peak operation hour | 16 hrs (Monday to Saturday) |

All generating units are isolated and protected from the pressurized water supply by inlet valves within the main power station. The draft tube gates of the Francis turbine units also permit the isolation of a unit for inspection and maintenance, allowing the other units to remain in service. Power supply to the main power station, including the power generating equipment, is tapped from each of the Francis unit's busbars through auxiliary transformers. The power transformers are arranged next to the power station building. The power transformers of the main power station are connected to the 230-kV substation by means of overhead lines. A Supervisory Control and Data Acquisition (SCADA) system enables monitoring, supervision and control of the power stations and substations. This system also enables analysis of power station conditions. The SCADA system will enable automatic operation of both the main power station and the re-regulation power station.

3.4 Re-regulation Reservoir

A re-regulation reservoir is created between the main dam and the re-regulation dam. The reservoir has a length of about 6 km. It has an effective storage capacity of 4.6 million m³ and covers an area of 1.27 km² at NWL.

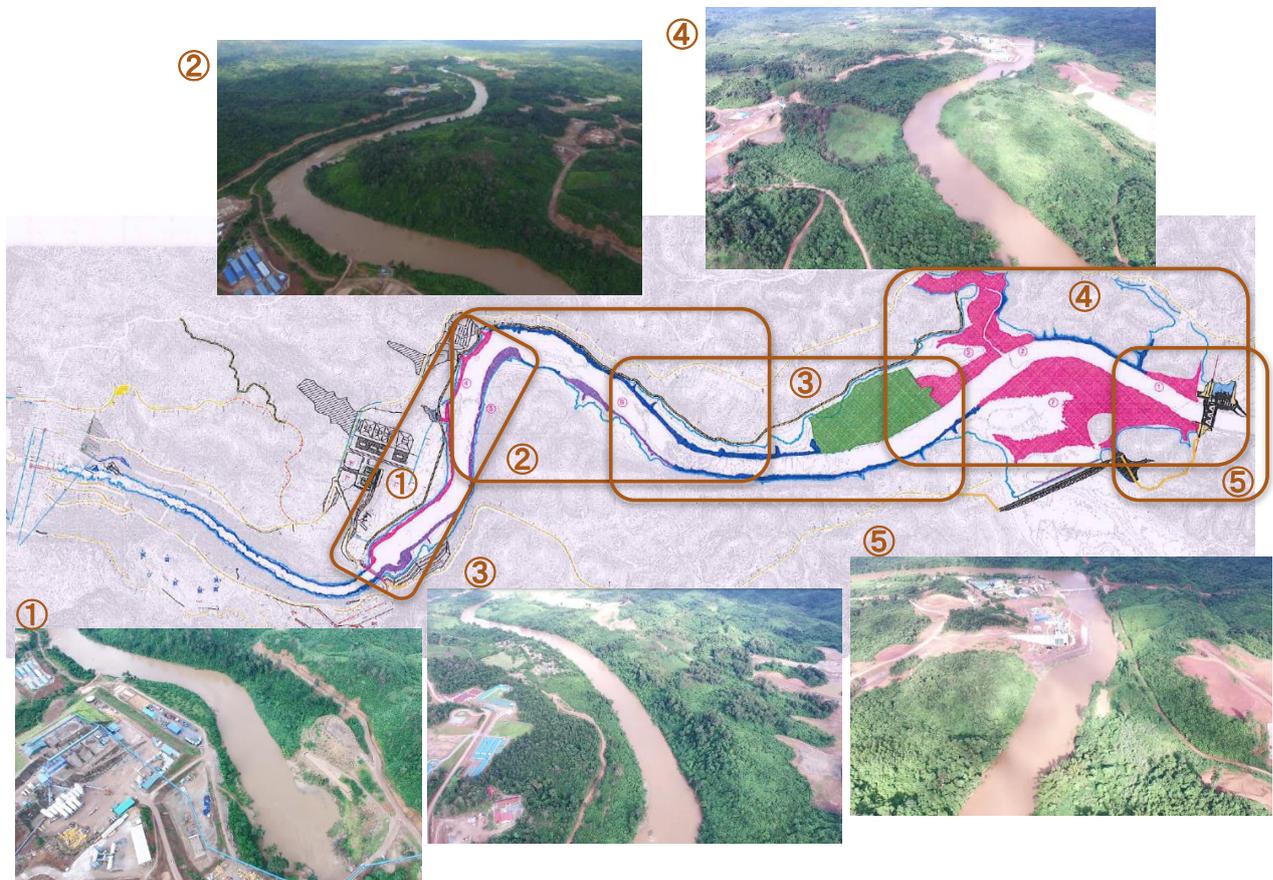
Key technical data are presented in **Table 3-4**.

TABLE 3-4: KEY TECHNICAL DATA FOR THE RE-REGULATION RESERVOIR

| Item | Specification |
|-------------------------------|-----------------------------|
| Flood water level | 185.9 masl |
| Normal water level (NWL) | 179.0 masl |
| Minimum operating level (MOL) | 174.0 masl |
| Reservoir surface area | 1.27 km ² at NWL |
| Effective storage capacity | 4.6 million m ³ |
| Catchment area | 3,725 km ² |

Prior to impounding the re-regulation reservoir, biomass was cleared from areas below 176 masl as indicated in **Figure 3-6**. The clearance was carried out from January to May 2017, and the initial impounding was undertaken from 15-24 May 2017.

FIGURE 3-6 BIOMASS CLEARANCE OF THE RE-REGULATION RESERVOIR



The re-regulation reservoir serves to provide sufficient storage capacity to control and even out the discharge to Nam Ngiep from the re-regulation dam.

The main dam powerhouse produces electricity based on peak operations discharging 230 m³/s 16 hours per day from 0600-2200 hours, Monday to Saturday. During the same period the re-regulation dam powerhouse will discharge about 160 m³/s through the turbine producing electricity continuously. From Saturday at 2200 hours to Sunday at 1800 hours the discharge from the re-regulation dam will be reduced to 27 m³/s, where after it will be increased to 48 m³/s until Monday morning at 0600 hours.

This operational scheme means that the water level in the re-regulation reservoir will fluctuate daily from about 174 masl to 179 masl as illustrated in **Figure 3-7**. The reservoir surface areas at water level 174 masl and 179 masl respectively are illustrated in **Figure 3-8**.

FIGURE 3-7 WATER LEVEL FLUCTUATIONS IN THE RE-REGULATION RESERVOIR DURING NORMAL OPERATIONS

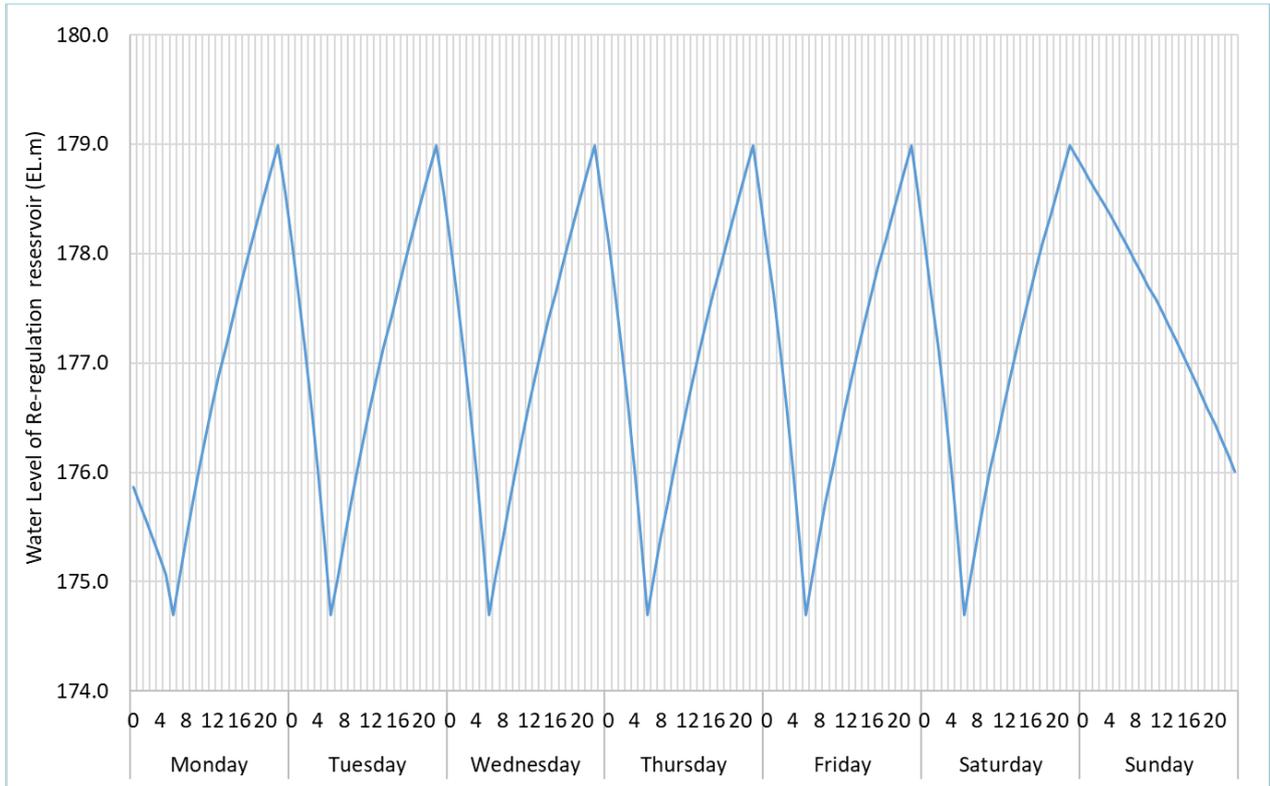
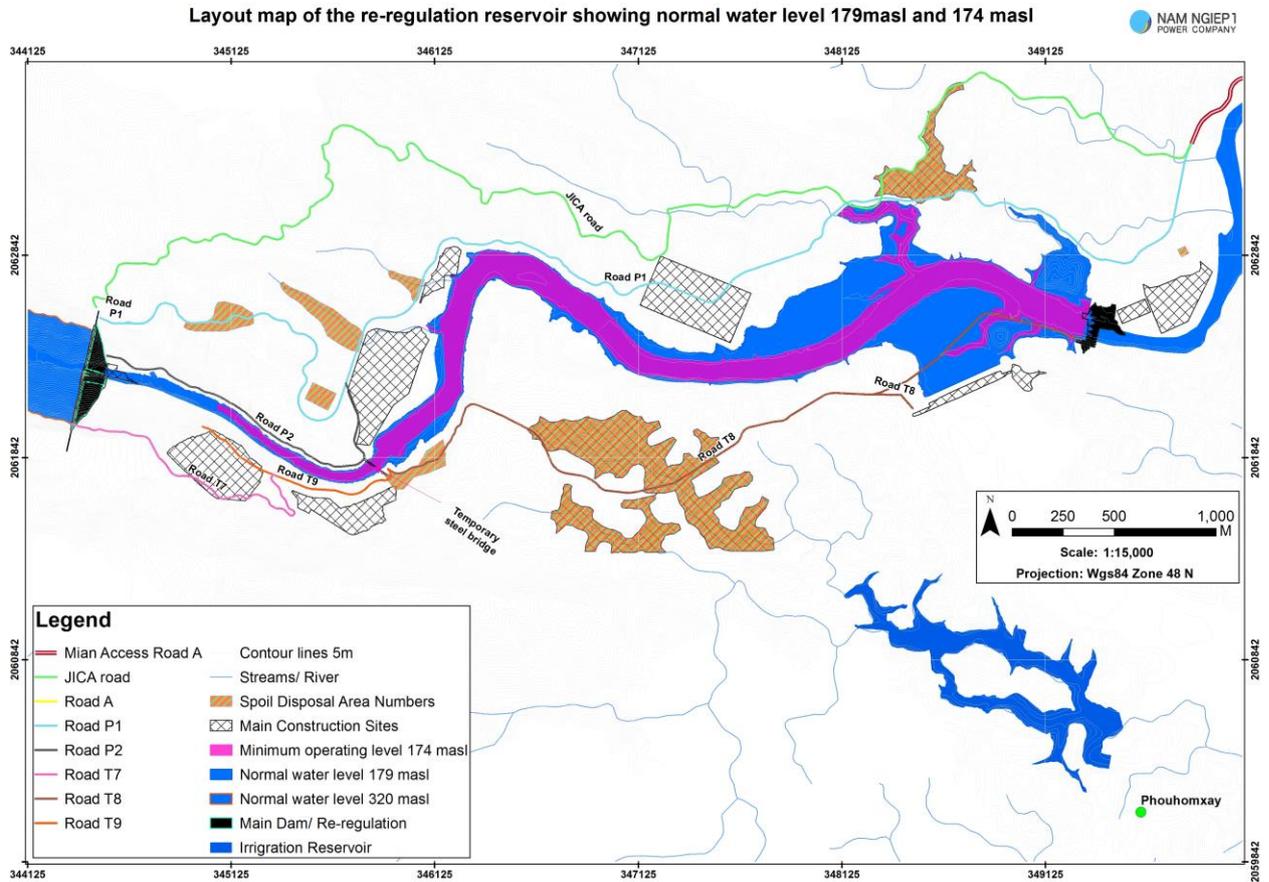
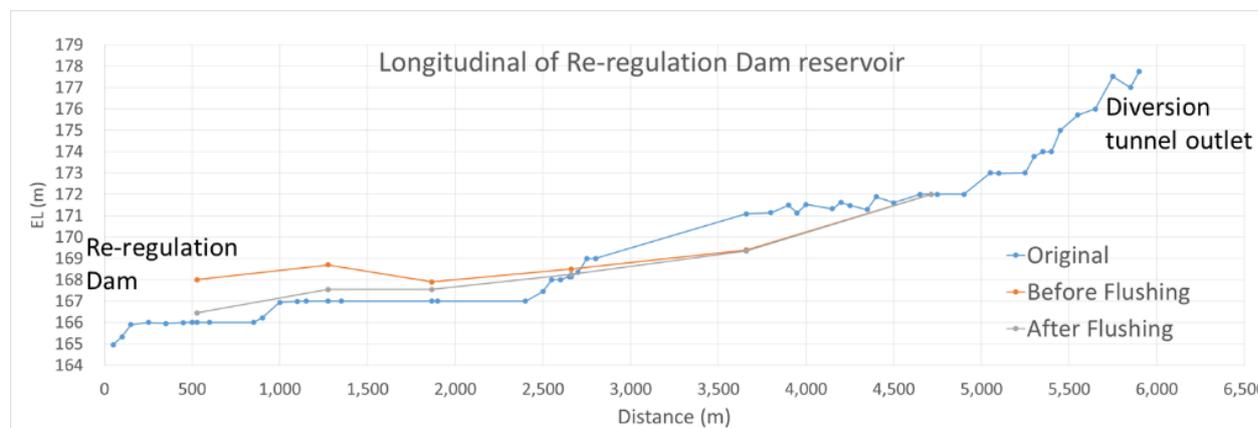


FIGURE 3-8 RE-REGULATION RESERVOIR SURFACE AREA AT 179 m AND 174 m



The longitudinal profile of the re-regulation reservoir is shown in **Figure 3-9**. The profile indicates a rather steep gradient of the river bed from the main dam and about 1 km downstream, followed by a gentle gradient for about 2 km, then a short steep section followed by a very gentle gradient

FIGURE 3-9 LONGITUDINAL PROFILE OF THE RE-REGULATION RESERVOIR



3.4.1 Dyke

An earth-filled embankment or dyke is constructed on the right bank of the re-regulation reservoir to retain the re-regulation reservoir and to secure an effective storage capacity of Normal Water Level 179.0 masl. The crest length of the dyke is approximately 507 m and it has a height of 14.6 m with the crest elevation at 189.4 masl. Key technical data are presented in **Table 3-5**.

TABLE 3-5: KEY TECHNICAL DATA FOR THE EMBANKMENT

| Facility | Item | Specification |
|-------------------|-----------------|-----------------------------------|
| Embankment (dyke) | Type | Earth-filled with rip-rap surface |
| | Dam height | 14.6 m |
| | Crest length | 507 m |
| | Dam volume | 327,900 m ³ |
| | Crest elevation | 189.4 masl |

3.5 Re-regulation Dam

The re-regulation dam is constructed as a concrete gravity dam (Roller Compacted Concrete and Conventional Concrete) for power generation and to store water discharged from the main dam during peak operations and release the water evenly over the week (Monday to Saturday). In addition, the re-regulation reservoir also provides water for irrigation at Phouhomxay Village during the dry season.

The re-regulation dam and powerhouse are shown on the picture in **Figure 3-10**.

FIGURE 3-10 RE-REGULATION DAM AND POWERHOUSE, AUGUST 2018



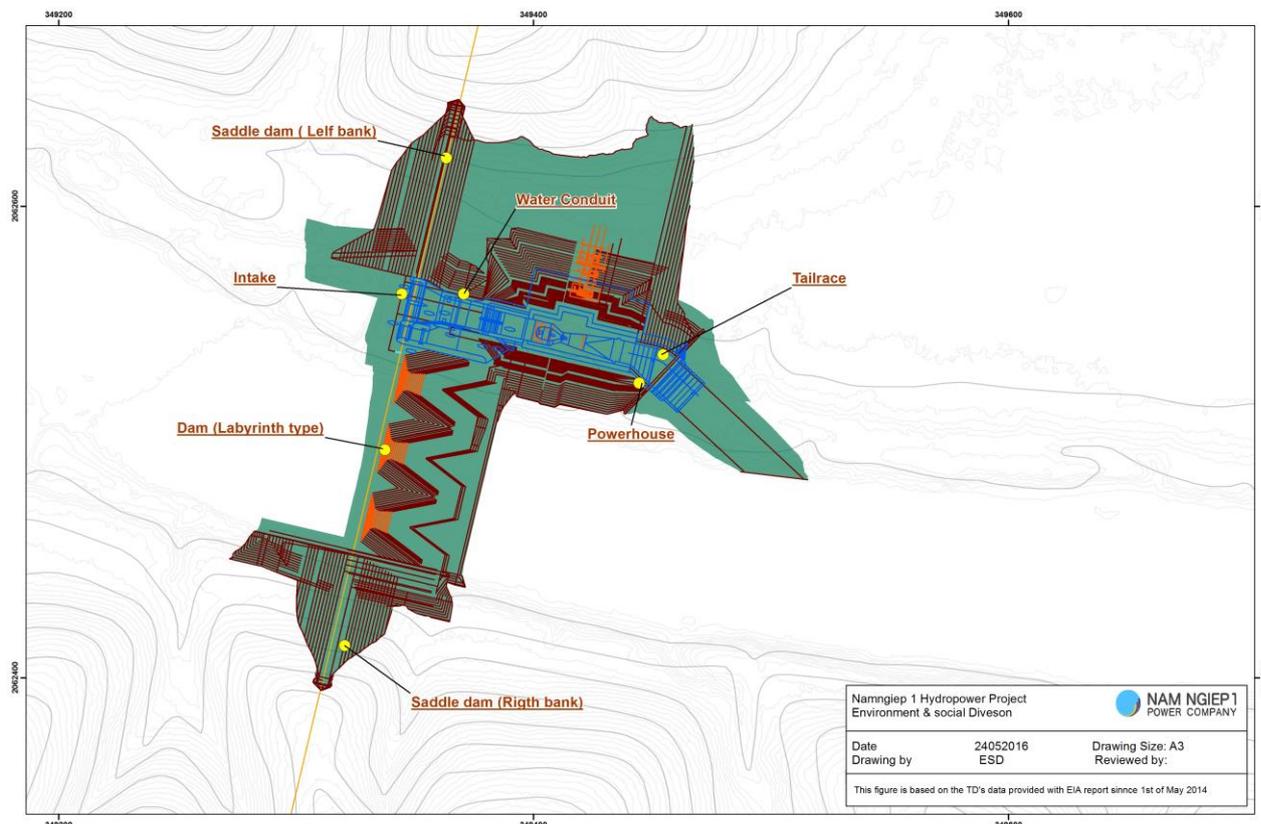
Key technical data are provided in **Table 3-6** and the layout is displayed in **Figure 3-11**.

The dam has a crest length of approximately 90.0 m and a crest height of 20.6 m. Dam crest elevation of the non-overflow section is 187.0 masl, and 179.0 masl for the labyrinth shaped overflow section. The labyrinth design allows discharge of a larger design flood than a normal straight dam design, with a lower head over the crest.

TABLE 3-6: KEY TECHNICAL DATA FOR THE RE-REGULATION DAM

| Facility | Item | Specification |
|--------------------|--------------------|--|
| Re-Regulation Dam | Type | Concrete Gravity dam |
| | Dam height | 20.6 m |
| | Crest length | 90.0 m |
| | Dam volume | 23,900 m ³ |
| | Crest elevation | 187.0 masl (non-overflow section) |
| Spillway | Type | Ungated labyrinth shaped |
| | Crest elevation | 179.0 masl |
| | Discharge capacity | 5,210 m ³ /s (1,000-year ARI) |
| Re-Regulation Gate | Type | Fixed wheel gate |
| | Number | 1 |
| | Discharge capacity | 160 m ³ /s |
| Intake | Number | 1 |
| | Discharge capacity | 160 m ³ /s |
| | Sill elevation | 168 masl |

FIGURE 3-11 LAYOUT OF THE RE-REGULATION DAM



The dam height and design are based on a design flood with a peak discharge of 5.210 m³/s equal to a flood with a 1000-year ARI. The water level of the design flood is calculated at 185.9 masl.

3.6 Re-regulation Dam Powerhouse

The re-regulation powerhouse is built in conjunction with the re-regulation dam. The re-regulation powerhouse has a length of 46.4 m, a width of 22.1 m and a height of 49.1 m. One unit of bulb type turbine and generator is installed at EL. 154.40 m with a maximum power output of 18 MW. The tailrace is an open channel type with length of 43.4 m, which has a cross section with concrete walls and slab. The flow velocity in the tailrace is controlled to be about 1.0 m/s. The end of the tailrace has the same elevation as the riverbed of EL. 157.5 m.

The bell-mouth shaped intake is designed to take the maximum plant discharge of 160 m³/s at any water level between NWL and MOL.

The key technical data are presented in **Table 3-7**.

TABLE 3-7 KEY TECHNICAL DATA FOR THE RE-REGULATION POWERHOUSE

| Facility | Item | Specification |
|-----------------------|-------------------------|-------------------------|
| Powerhouse | Type | Semi-underground |
| | Length | 46.4 m |
| | Width | 22.05 m |
| | Height | 49.1 m |
| | Tailrace Water Level | 165.9 m |
| Turbine and Generator | Maximum plant discharge | 160.0 m ³ /s |

| Facility | Item | Specification |
|----------|-------------------------|-------------------------|
| | Minimum plant discharge | 40.0 m ³ /s |
| | Gross head | 13.1 m |
| | Effective head | 12.7 m |
| | Type of water turbine | Bulb |
| | Rated output | 18 MW (at Substation) |
| | Annual power generation | 105 GWh (at Substation) |

3.7 230-kV Transmission Line

There are two transmission lines related to the Project, a 230-kV line from the main dam powerhouse to the Nabong Substation in Vientiane Capital and a 115-kV line from the re-regulation powerhouse to Pakxan Substation.

The 230-kV line has been constructed by the Project and will be operated by the Project, whereas the 115-kV line is an associated facility to the Project, constructed, owned and operated by EDL.

The 230-kV Transmission Line is a 3-phased, double circuit line using steel reinforced aluminium conductors that operates at a nominal frequency of 50 Hz.

The 230-kV line consists of 300 galvanized steel towers and has a total length of approximately 119 km. The normal span between towers is 430 m. The right-of-way (ROW) is 17.5 m on each side of the centreline. The towers are 46 – 46.8 m high with 27-30 m from ground to the lowest crossarm.

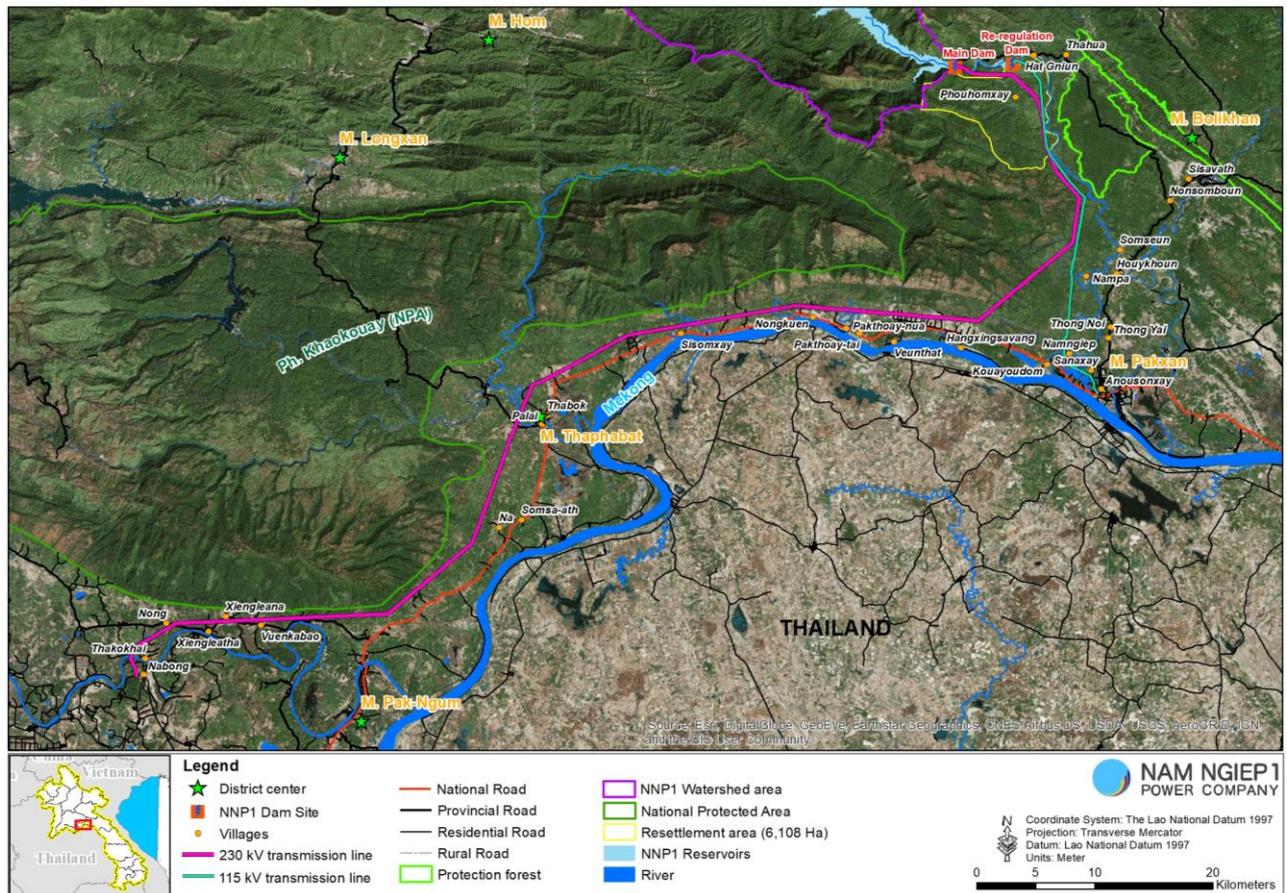
The minimum ground clearances taking into consideration the sag of the conductors under the maximum operating temperature of the conductors (75 °C) are listed in **Table 3-8**.

TABLE 3-8 MINIMUM GROUND CLEARANCE OF CONDUCTORS

| Area | Ground Clearance |
|--|------------------|
| Above Streets and Residential Areas | 10 m |
| Above Cultivated Areas, Rural Roads | 8.4 m |
| Above Areas only Accessible by Pedestrians | 8.4 m |
| Above Navigable Rivers (high water level) | 11.5 m |

The alignment of the 230-kV Transmission Line from the main dam powerhouse to Nabong Substation is indicated in **Figure 3-12**.

FIGURE 3-12 ALIGNMENT OF THE 230-kV TRANSMISSION LINE FROM THE MAIN DAM TO NABONG SUBSTATION



3.8 115-kV Transmission Line

EDL has built a 115-kV Transmission Line connecting the re-regulation powerhouse with Pakxian Substation. EDL owns and operates the line and the line is considered an associated facility to NNP1.

The alignment of the 115-kV Transmission Line is shown in **Figure 3-13**. The transmission line is 33 km long with 25 m wide right-of-way and 86 towers, of which 9.4 km with 24 towers are in Phouhomxay Village as indicated in **Figure 3-14**.

FIGURE 3-13 ALIGNMENT OF THE 115-kV TRANSMISSION LINE

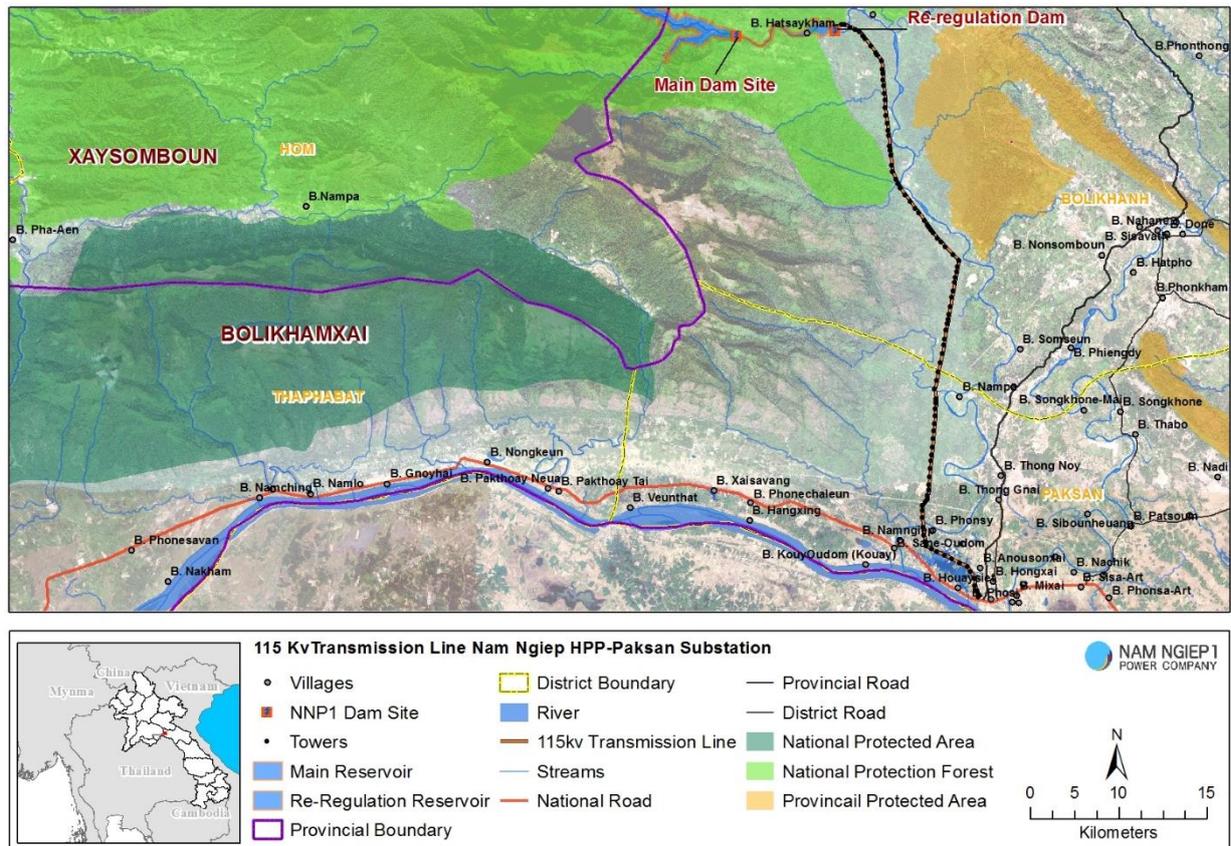
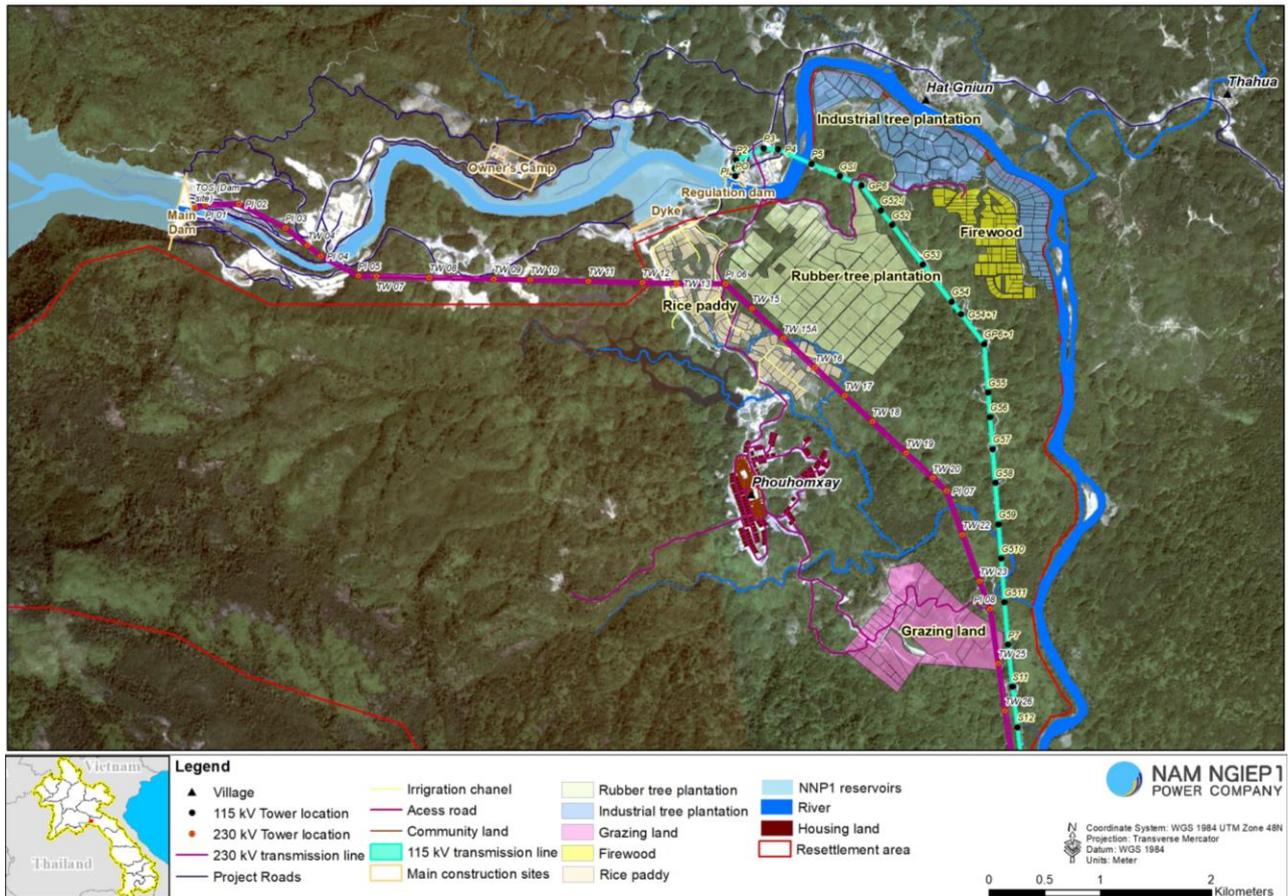


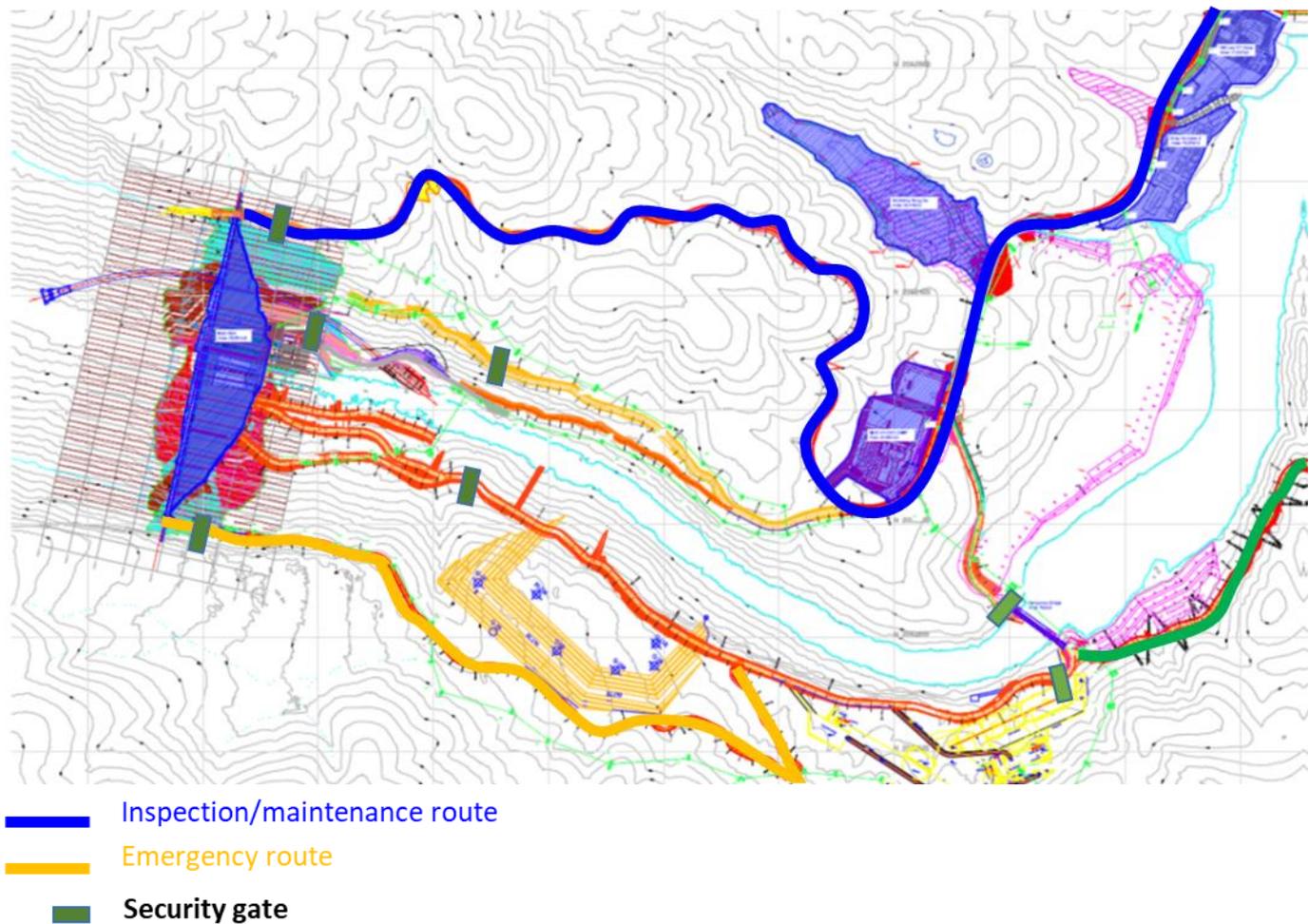
FIGURE 3-14 ALIGNMENT OF THE 230-kV TRANSMISSION LINE AND THE 115-kV TRANSMISSION LINE THROUGH PHOUHOMXAY VILLAGE



3.9 Access Control, Site Infrastructure, Offices and Residences

3.9.1 Access Control

All permanent project facilities, offices and residence areas will be fenced and gated. The gates will be staffed during working hours and will otherwise be locked. In addition, a security gate will be installed to prevent unauthorized access to the steel bridge across the re-regulation reservoir, and a security gate will be established to prevent unauthorized access to the roads on the right bank that lead to the main dam. The routes and access control to the Main Dam are indicated in **Figure 3-15**. As shown in **Figure 3-15** emergency access is provided to the right abutment of the main dam – both to the crest and to the middle part. The route to the middle part of the dam gives access to a drainage adit, monitoring wells and several instruments that have been installed to secure and monitor the dam stability. In case that abnormal behavior is observed unexpectedly and emergency measures are required to be implemented, it is necessary to secure access for construction vehicles. The route to the crest of the dam at the right abutment is necessary for the operation of spillway gates in case of an emergency where the normal access road is not passable.

FIGURE 3-15 ACCESS CONTROL TO THE MAIN DAM

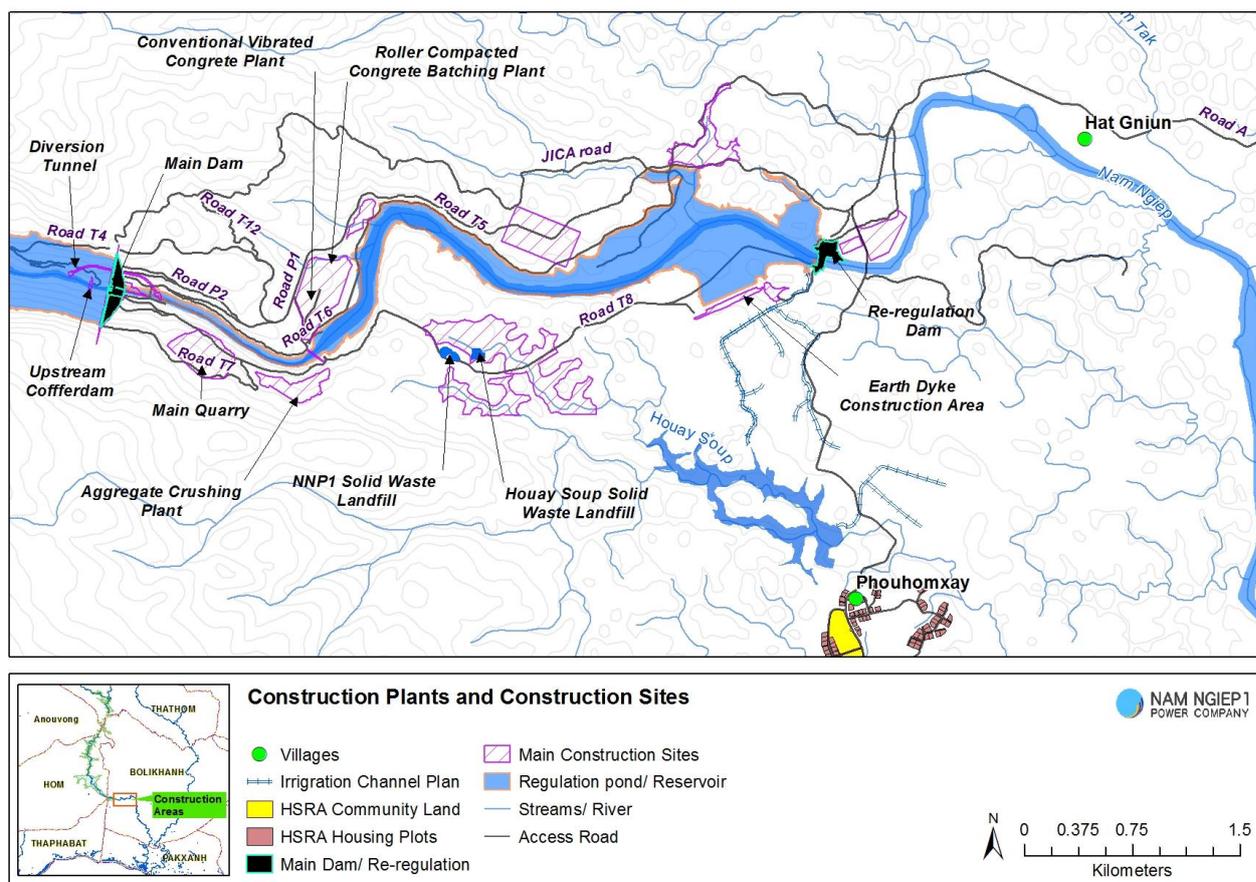
For safety reasons all unauthorized access and use of the re-regulation reservoir is prohibited. The Company will install signage at likely entry points to warn people not to enter, and the Company will raise awareness about the risks and the rule prohibiting access through regular community meetings and other means of communication.

3.9.2 NNP1 Project Landfill

The Project has constructed a sanitary landfill for disposal of non-hazardous waste generated by the Project. The landfill operations started in July 2016. The landfill consists of two pits lined with a HDPE membrane, leachate collection system and a series of four ponds for treatment of the leachate.

The location is indicated in **Figure 3-16**.

FIGURE 3-16 LOCATION OF NNP1 PROJECT LANDFILL AND PHOUHOMXAY LANDFILL



The landfill pit No 1 was filled-up and closed in November 2018 and the pit has been capped with a HDPE membrane and a 0.6 m layer of compacted soil and topsoil.

3.9.3 Phouhomxay Landfill

The Project has constructed a sanitary landfill for non-hazardous waste generated by the communities of Phouhomxay Village, Hat Gniun Village and Thaheua Village. The landfill is located next to the NNP1 Project Landfill as shown in **Figure 3-16**.

The landfill consists of three pits lined with a HDPE membrane and with a leachate collection system connected to a series of two ponds and a constructed wetland for treatment of the leachate.

NNP1PC has hired a contractor to collect waste and operate the landfill until the end of 2020 after which the communities will be responsible for the waste management.

3.9.4 Phouhomxay Village

Phouhomxay Village serves as the resettlement site for the Project. The village area covers 6000 ha located immediately south of the project construction area as indicated in **Figure 3-17**. The village is connected to the road to Pakxan via an all-weather road and concrete bridge across Nam Ngiep. The village currently houses 82 households and a population of 554 people and includes infrastructure and public facilities and services such as local roads, agricultural roads, a school, a health centre, a market, electricity supply, water supply, bus service, and a community hall with an ethnic museum.

The construction of the village started in February 2016 and was completed in May 2018 except for a section of the main irrigation canal, which will be completed before COD.

FIGURE 3-17: PHOUHOMXAY VILLAGE, MAY 2018



4 SUMMARY OF STANDALONE SOCIAL MANAGEMENT PLANS

4.1 Resettlement and Ethnic Development Plans

The resettlement and livelihood and income restoration measures are described in the approved Project Resettlement and Ethnic Development Plan (REDP) which were made public and uploaded onto NNP1PC's and ADB's websites in June 2014. This main REDP of June 2014 has been updated in the following zone specific REDPs, which are all available on NNP1PC's website <https://namngiep1.com/resources/environmental-and-social-management-plans/>:

- Resettlement and Ethnic Development Plan Updated Zone 3, December 2015
- Resettlement and Ethnic Development Plan Updated Zone 5, February 2016
- Resettlement and Ethnic Development Plan Update Graves and Cemeteries, May 2016
- Resettlement and Ethnic Development Plan Update Zone 2UR, October 2016
- Resettlement and Ethnic Development Plan Update Zone 2LR, October 2016
- Livelihood Impacts Management Plan – Update Zone 4 (LIMP-U4) June 2018

The REDP and its updates provide a comprehensive background description of the social safeguards policies and measures that are and will continue to be applied to ensure full compliance with the Company's social obligations. These safeguard documents present the social and livelihood restoration plans including the compensation policy, entitlements of PAPs, zone specific resettlement action plans, livelihood and income restoration plans, ethnic development plans, public consultation plans leading to Broad Community Support, and the documents describe the implementation and monitoring structures for these plans as well as a schedule and budget for their execution.

4.1.1 Project Impact Zones

The implementation of the resettlement and livelihood and income restoration measures is divided into geographical zones based on the assessment of the level and nature of the potential impacts from the Project construction and operations. The zones are indicated in **Figure 4-1**.

Zone 2UR (Upper Reservoir Area) covers the upper section of the immediate catchment area of the main reservoir below elevation 320 m asl. The three villages of Pou, Hatsamkhone, Piengtha, located alongside the Nam Ngiep River, will be directly affected. All of these villages belong to Thathom District, Xaysomboun Province.

Summary of progress:

- Asset registration, compensation agreements and payments have been completed for all 222 affected households.
- Additional compensation for land assets affected by the construction of agricultural roads restoring access to agricultural land has been completed for all 71 impacted households.
- 8 households have been relocated within their village.
- The construction of the Agricultural Access Roads is completed.
- The construction of the Suspension Bridge faced a setback in April 2018 with a partial collapse of the deck. The bridge is currently under repair, and the bridge is expected to be completed by December 2019.
- The construction of the market building and bus stops is completed.
- Completed the construction of the school buildings (3 villages) and village meeting hall (3 villages).

- Initiated a range of livelihood activities with the households in Zone 2UR and self-resettlers in Thaviengxay district

Zone 2LR (Lower Reservoir Area) covers the lower section of the reservoir, which inundates the four villages of Houaypamom, Sopphuane, Sopyouak, and Namyouak. All of these villages are located in Hom District, Xaysomboun Province. All households in these villages have been resettled and compensated for the loss of housing, residential land, productive lands, and other assets, and livelihood restoration programmes are being implemented.

Summary of progress:

- Asset registration, compensation agreements and payments have been completed for all 479 affected households in Zone 2LR
- The final choice survey has been completed for all affected households and 51 households (plus 7 split households) have resettled in Phouhomxay Village and 428 households have self-resettled at various locations.
- All households were relocated prior to the start of the impounding of the main reservoir on 15 May 2018.
- Livelihood restoration for 58 households resettled in Phouhomxay Village and 428 self-resettlement households is being implemented.

Zone 3 (Construction Area) covers the area where the main project components are being built and includes one community, Hatsaykham with 39 households located in the re-regulation reservoir. Hatsaykham belongs administratively Hat Gniun Village, one of the two host villages.

Summary of progress:

- Asset registration, compensation agreements and payments have been completed for all households in Zone 3.
- 20 households (plus 4 households that separated out from the original 20 households) have resettled in Phouhomxay Village and 19 households have self-resettled. All households had completed relocation before the start of impounding the re-regulation reservoir on 15 May 2017.
- Livelihood restoration activities are under implementation for the resettled households.

Zone 4 (Downstream) covers the villages downstream from the regulating dam, excluding Hat Gniun Village, which is considered a host village. Zone 4 includes the villages of Nampa, Somseun, Houaykhoun, Thong Noi, Thong Yai, Sanaxay, Phonsy, Pak Niep and Sene Oudom.

Summary of progress:

- The construction of water supply for 3 downstream communities started in December 2017 and is now completed.
- Asset registration and compensation is completed for 103 households who will be impacted on their river bank gardens during power generation.

Zone 5 (Host Villages) covers the villages nearest to the resettlement site being Ban Hat Gniun and Ban Thahuea.

Summary of progress

- Land acquisition and compensation have been completed for all 94 households that lost land due to the project.

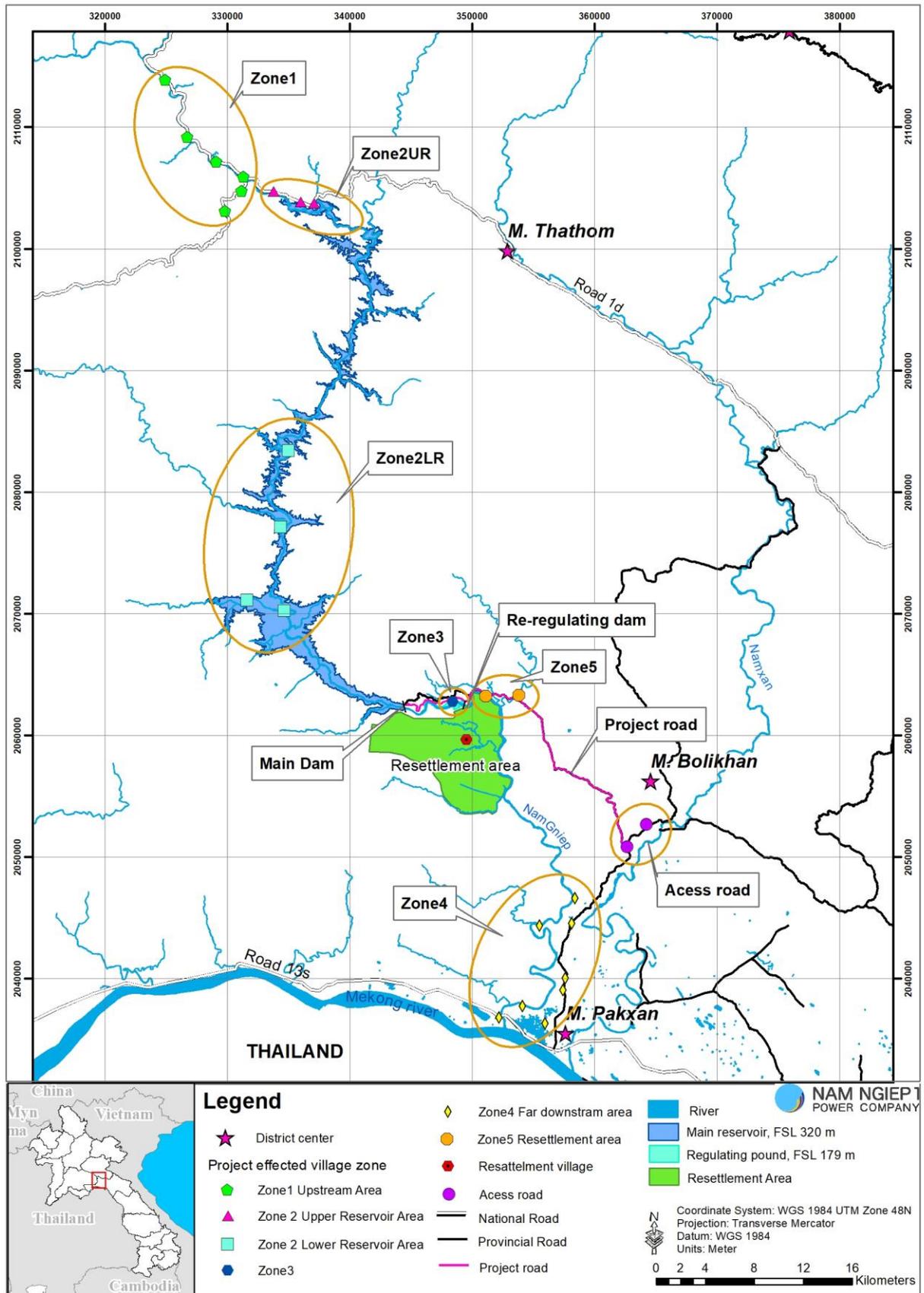
- Implementation of livelihood support activities is ongoing with 68 households from Hat Gniun Village and Thahuea Village and 28 households from Somseun Village.

230 kV Transmission Line corridor covers 24 villages located in one province and Vientiane municipality affected by the permanent acquisition of land for transmission tower bases and the temporary impact from construction and line stringing.

Summary of progress:

- Land acquisition and compensation have been completed for all 462 households that are affected by the project.

FIGURE 4-1 OVERVIEW MAP OF THE PROJECT IMPACT ZONES



4.1.2 Asset Registration and Compensation

Asset registration and compensation for land acquisition have been completed for all zones as presented in **Table 4-1**.

Note that for Zone 4, Downstream, NNP1PC prepared a Livelihood Impact Management Plan which describes the compensation policy for impacts on riverbank gardens resulting from an increase in dry season water level during operation of the power stations. The plan has been accepted by ADB and put on the Companies and ADB's websites. Following approval of the plan, NNP1PC completed the compensation in July 2018.

In terms of grievances, as of 31 December 2018 a total of 2,662 grievance cases had been filed throughout the project period, of these 2,648 cases have been closed and 14 cases are pending.

TABLE 4-1 STATUS OF LAND ACQUISITION AND COMPENSATION

| Impact Zone | Area, and Number of Households and People subject to Land Acquisition | | | Area, and Number of Households and People agreed to Land Acquisition | | | Area, and Number of Households and People completed Land Acquisition | | | Status |
|---------------------------|---|------------|--------|--|------------|--------|--|------------|--------|---|
| | Area (ha) | Households | People | Area (ha) | Households | People | Area (ha) | Households | People | |
| Zone 2UR | 543.6 | 229 | 1,439 | 543.6 | 229 | 1,439 | 543.6 | 229 | 1,439 | Compensation payments completed June 2018 |
| Zone 2LR | 5,585.8 | 479 | 3,277 | 5,585.8 | 479 | 3,277 | 5,585.8 | 479 | 3,277 | Compensation payments completed Q2 2018 |
| Zone 3 | 765.8 | 39 | 268 | 765.8 | 39 | 268 | 765.8 | 39 | 268 | Compensation payments completed in 2017 |
| Zone 4 | 1.6 | 103 | 713 | 1.6 | 103 | 713 | 1.6 | 103 | 713 | Compensation payments completed July 2018 |
| Zone 5 | 1,278.8 | 94 | 521 | 1,278.8 | 94 | 521 | 1,278.8 | 94 | 521 | Compensation payments completed in 2017 |
| Transmission Lines | 98.2 | 462 | 2,815 | 98.2 | 462 | 2,815 | 98.2 | 462 | 2,815 | Compensation payments completed in 2017 |
| Access road | 190.2 | 200 | 1,201 | 190.2 | 200 | 1,201 | 190.2 | 200 | 1,201 | Compensation payments completed in 2014 |

4.1.3 Infrastructure Development

Phouhomxay Village and Zone 5

Phase 1 of the infrastructure construction comprising infrastructure for the resettlers from Hatsaykham started in February 2016 and was completed in November 2016. This includes the construction of 24 houses, construction of pre-primary school and teachers' accommodation, installation of temporary domestic water supply system, installation of 22 kV and 0,4 kV distribution lines and construction of a solid waste disposal site. These facilities were required to be completed before relocation of the 24 households from Hatsaykham cluster. In October 2016, the Lenders Technical Adviser (LTA) inspected the housing and infrastructure development and confirmed that the construction work had been done in accordance with the approved Resettlement and Ethnic Development Plan (REDP). The physical relocation of the 24 households from Hatsaykham took place on 12 November 2016.

Phase 2 of the construction works started in December 2016. This phase includes construction of public infrastructure (health centre, primary and secondary school, market, bus station, village meeting hall, office and cultural area, water supply system, and irrigation pond with canal system), housing and development of agricultural lands for resettlers from Zone 2LR. All work has been completed except rock excavation and construction of the main irrigation canal which is expected to be completed by COD.

Zone 4

The improvements of the water supply systems in three downstream villages were completed in Q2 2018 and the extension of the water supply network in Somseun and Sonkhone village was completed in Q4 2018.

Zone 2UR

The infrastructure development in Zone 2UR comprises construction of a suspension bridge across the Nam Ngiep, improvement of water supply systems, improvement of community infrastructure including school buildings, a health centre, and other community buildings, and construction of agriculture roads restoring access to agricultural land for PAPs. All works except the construction of the suspension bridge are completed. The completion of the suspension bridge has been delayed due to a partial collapse of the structure in April 2018. A redesign and reconstruction of the suspension bridge is under way and is expected to be completed by December 2019.

4.1.4 Resettlement

Resettlement of all PAPs from Hatsaykham was completed before the start of the impounding of the re-regulation on 15 May 2017, and all PAPs from Zone 2LR were resettled prior to the start of the impounding of the main Reservoir in May 2018.

Table 4-2 to **Table 4-5** provide the number of resettlers who opted to resettle within the Project Zone of Influence. Due to households splitting, the total number of households after resettlement is larger than the number of households required to resettle from the original villages.

Significantly impacted people who are living in the Project Zone of Influence are entitled to participate in the Livelihood Programs initiated by NNP1PC. This includes Resettlers, Self-Resettlers, the host community as well as the significantly impacted people in the 3 communities in Zone 2UR.

TABLE 4-2: SUMMARY OF RESETTLERS TO PHOUHOMXAY

| Zone | Origin Village Name | Number of Resettling Households | Number of Split Households | Total Number of Households | Total Number of People | Number of Female Re-settlers | Age of Resettlers in years | | | |
|--------------|---------------------|---------------------------------|----------------------------|----------------------------|------------------------|------------------------------|----------------------------|-----------|-----------|-------------|
| | | | | | | | 0-5 | 5-10 | 10-15 | 15 and more |
| Zone 3 | Hatsaykham | 20 | 4 | 24 | 167 | 84 | 31 | 30 | 16 | 90 |
| Zone 2LR | Houaypamom | 11 | 1 | 12 | 93 | 43 | 22 | 13 | 15 | 43 |
| | Namyouak | 5 | 0 | 5 | 27 | 15 | 5 | 7 | 1 | 14 |
| | Sopphuane | 12 | 4 | 16 | 94 | 46 | 19 | 7 | 11 | 58 |
| | Sopyouak | 23 | 2 | 25 | 152 | 80 | 22 | 22 | 26 | 82 |
| Total | | 71 | 11 | 82 | 534 | 268 | 99 | 79 | 69 | 287 |

TABLE 4-3: NUMBER OF SELF-RESETTLER HOUSEHOLDS IN BOLIKHAN DISTRICT

| No. | Village Name | Number of Self-Resettler Households in the village |
|--------------|---------------|--|
| 1 | Nonsomboun | 15 |
| 2 | Wa | 39 |
| 3 | Nakoun | 5 |
| 4 | Bor | 18 |
| 5 | Phameuang | 24 |
| 6 | Sisavath | 4 |
| 7 | Nahun | 38 |
| 8 | Phadai | 1 |
| 9 | Thongphankham | 1 |
| 10 | Nalong | 1 |
| Total | | 146 |

TABLE 4-4: NUMBER OF SELF-RESETTLER HOUSEHOLDS IN HOM DISTRICT

| No. | Village Name | Number of Self-Resettler Households in the village |
|--------------|--------------|--|
| 1 | Houayxay | 80 |
| 2 | PhouNgou | 10 |
| 3 | Homthat | 20 |
| 4 | Phalavak | 28 |
| 5 | Phoukatha | 1 |
| 6 | Namkhaine | 54 |
| Total | | 193 |

TABLE 4-5: NUMBER OF SELF-RESETTLER HOUSEHOLDS IN THATHOM DISTRICT

| Village name | Number of Self-Resettler Households in the village |
|---------------------------|--|
| Thaviengxay and Phonhom | 35 |
| Vanghai, Paknyong cluster | 99 |
| Total | 134 |

4.1.5 Livelihood Development

The Concession Agreement Annex C, Clause 87 requires NNP1PC to: *compensate PAPs and assist them to regain, maintain and improve their net incomes and living standards beyond the pre-Project levels (always taking into consideration the impact of increased number, type and amount of expenses incurred by such PAPs which would not have been incurred but for the Project), and ensure that PAPs are in no significant aspect of their lives and livelihoods worse off than they would have been without the Project.* This clause also includes targets on:

- i. Poverty Elimination: raising households above the national poverty line;
- ii. Maintaining Economic Parity: a living standard of at least pre-project level for every household;
- iii. Net Income Improvement: increase of average community net income by 200% within ten years from COD from what will be measured in the baseline socioeconomic survey, to be carried out after cut-off-date close to the effective date

Following the completion of the resettlement, NNP1PC has updated the Livelihood Development Plan for the PAPs based on the actual number of households who have resettled to Phouhomxay Village (the resettlement area) or to self-selected locations (self-resettlement).

The Livelihood Development Plan will be implemented over a period of 5 years after COD (corresponding to the Resettlement Implementation Period specified in the Concession Agreement). The plan describes the support that the Project will provide to restore the livelihoods of the PAPs who are living in the 3 target districts of Thathom, Bolikhan and Hom.

The Livelihood Development Plan is in alignment with the national livelihood approaches and strategies, and it establishes key principles, best practices and standards with special consideration on access to market and investment support for those who do not have enough capital such as vulnerable, elderly and disabled people.

The basis of the livelihood programme is the concept of self-determination by the affected people to decide in what way they will provide for their family.

The plan builds on the experience of implementing the NNP1PC Livelihood Programme since 2014 including trials conducted at the resource centre. In 2018, NNP1PC arranged a series of workshops for the PAPs involved in the livelihood programmes to evaluate the programmes and identify areas of improvements for the next phase in livelihood development. The results of the evaluations indicated that access to knowledge and practical experience with best practises are some of the main factors that would contribute to increasing production and productivity, which are fundamental factors to meet the required increase in income. Therefore, the Livelihood Development Plan focuses on measures to increase productivity and to do that training and other forms of support have been designed and are being provided to build expertise in the specific income generating activities or professions selected by each individual PAP.

The selection of profession by the PAPs went through a process of consultations and household by household interviews in order to obtain the personal preference of PAPs on their profession. This has enabled the professional development programmes to be tailored to the choices made by the individual PAPs. There is close attention to the choice made by women for their selected profession. Support and necessary trainings will be provided to the person who selected a specific profession, ensuring that women have equal access to training and support for development of their selected profession.

The main professions selected by the PAPs include:

- Cattle rancher
- Cash crop farmer
- Rice farmer
- Vegetable farmer
- Fisherman
- Chicken production
- Rubber plantation farmer
- Cassava farmer
- Weaving
- Shop manager

Special attention will continue to be provided to vulnerable households. This includes a focus on producing food at the home plot with more intense training and follow-up. This food production can include both vegetables, fruit and meat through raising chicken or fish. The programme will also seek to establish community or kinship support for cultivation of agricultural land during periods of high labour input, such as ploughing, planting and harvesting. Key to the support is an individual approach, taking into consideration the abilities of each person, their family and kinship support for long term sustainability. Through timely addressing small issues, including health issues and other concerns not directly related to income generation, a gradual improvement will be achieved for the vulnerable households over time.

An important part of the programme is building the capacity of PAPs, producer groups, model farmers and district staff to continue to build professions after the end of the Resettlement Implementation Period.

The goal is to ensure food security for resettled households, to generate cash surplus for savings and purchase of consumables, and to ensure that the PAPs are secure enough in their post-resettlement livelihoods that any unforeseen future events (natural and family) do not present long term threats.

The Livelihood Development Plan sets the framework for the activities and detailed annual plans will be prepared to match and deal with changing circumstances taking into consideration the actual progress of professional development as well as overall changes in local, national and international markets which all influence the economy.

4.2 Social Development Plan

The Social Development Plan (SDP), updated in October 2016 covers those social, economic, labour and cultural mitigation issues that are not covered in the Resettlement and Ethnic Development Plans. The SDP elaborates on the issues of public health, labour and social management linked to construction and community development.

The SDP is available on NNP1PC’s website <https://namngiep1.com/resources/environmental-and-social-management-plans/>

The main components of the SDP related to the operational phase include:

1. Public Health Action Plan (PHAP). The PHAP covers four programmes:
 - a. Community Health in Phouhomxay Village (the Resettlement Area)
 - b. Community Health in project impact zones
 - c. Capacity Building for GOL staff in project area
 - d. Integrated WASH and Nutrition programme
2. Education Programme
3. Community Development Plan (CDP). The CDP focuses on aspects to help improve the community as a whole, to lift up the quality of life, standard of living, and income of affected people. The CDP contains three plans/programmes:
 - a. Gender Action Plan;
 - b. Programme for Youth and Children;
 - c. Cultural Awareness/Heritage Preservation Programme.
4. Vulnerable Households Programme

4.2.1 Public Health Action Plan

The objectives of the PHAP are twofold: (i) to prevent project-generated adverse health effects on the communities at the village and district levels and minimize and mitigate these if these are not preventable; and (ii) to improve the health conditions of local people with special attention in residents in the resettlement villages.

The strategies to achieve these objectives are the following: (i) strengthening the skills of health care providers and village health; (ii) promote Behavioural Change Communication (BCC) for health-related programs and prevention strategies, focusing on improved knowledge and awareness of endemic causes of morbidity and mortality, as well as on maternal and child health care

During the construction phase, the focus was on health activities to prevent, minimise and mitigate the health effects at the village and district levels. The Project together with the Health Department have implemented health packages to improve the health status of the population in the target areas.

The activities planned for the first 4 years after COD are summarized in **Table 4-6**.

TABLE 4-6 SUMMARY OF THE PUBLIC HEALTH ACTION PLAN FOR THE FIRST 4 YEARS AFTER COD

| Programme | Activities | Expected Results |
|--|---|---|
| Community Health in Phouhomxay Village (the Resettlement Area) | <ul style="list-style-type: none"> - Provide curative, preventative, promotive and rehabilitative services to villagers in Phouhomxay Village and gradually merge the service provision to the District Health Office. - Support ‘Healthy Model Village’ attainment including CLTS and SLTS. - Integrate the Nutrition Programs with the WASH activities (Program 4) - Monitor the health status of the villagers | <ul style="list-style-type: none"> - Health conditions of the villagers in Phouhomxay Village improved. - 100% of resettlers participate in health activities - Nutrition status improved among women in |

| Programme | Activities | Expected Results |
|---|--|--|
| | <ul style="list-style-type: none"> - Conduct health survey on Year 4 after COD - Continue to support the Phouhomxay health centre by planning with the District Health Office to increase operation budget 30 percent per annum until 2014 | <ul style="list-style-type: none"> - reproductive and children under 5 years old. |
| Community Health in project impact zones | <ul style="list-style-type: none"> - Identify and facilitate appropriate health measures for Mother-and-Child Health Programs using integrated community outreach model including parasite treatments, monitoring of the nutritional status of women of reproductive age and children under 5 - Monitoring the health status of the villagers. | <ul style="list-style-type: none"> - Health conditions of the villagers in the impacted villages improved. - 100% of villagers participate in health activities - Nutrition status improved among women in reproductive and children under 5 years old. |
| Capacity Building for GOL staff in project area | <ul style="list-style-type: none"> - Conduct training, awareness raising and dissemination the key messages on health to target population. - Conduct training of the different subjects according to the Ministry of Health’s plan. - Facilitate the health authorities to supervise the health centre on a quarterly basis. - Plan with the local health and Administrative authorities to handover the technical and managerial responsibilities of the PHX health centre to the Bolikhan District Health Office. | <ul style="list-style-type: none"> - Maintain ‘Healthy Model Village status’ - Medical staff trained to be able to manage the health services plan. - By 2023, 4 health staff should be employed by the District Health Office. |
| Integrated WASH and Nutrition programme | <p>(Phouhomxay, Zone 2UR and Zone 5):</p> <ul style="list-style-type: none"> - Support local health authorities to implement water safety plan together with hygiene and sanitation program - Extend nutrition program by working closely with Livelihood Program. - From baseline nutrition data identify households at risk and increase | <ul style="list-style-type: none"> - Water Safety Plans in place for all new and upgraded water supply systems (total 8 systems) - All at risk households identified and monitored |

| Programme | Activities | Expected Results |
|-----------|--|---|
| | monitoring and education to those households as a priority Phouhomxay Village: - Monitoring of anaemia prevalence in women of reproductive age (PHX) | - Prevalence of anaemia to remain less than 30% |

4.2.2 Education Programme

The Education Programme includes a comprehensive scholarship programme and support to formal education. The education programme, especially the scholarship programme, is a key component in social development and therefore also in for the Company to achieve its targets.

The ADB Facility Agreement requires the Company to provide a minimum of 12 scholarships per annum for secondary and tertiary education and vocational training provided to female students from inundated areas and host communities from 2015.

NNP1PC launched the scholarship programme at the start of the construction phase in 2014. The status of implementing the scholarship programme is summarized in **Table 4-7**.

TABLE 4-7 SUMMARY OF THE SCHOLARSHIP PROGRAMME

| Academic Year | Total Number of Scholarships Awarded | Hmong Students | % Hmong Students | Female Students | % Female Students | Hmong Female Students |
|--------------------------|--------------------------------------|----------------|------------------|-----------------|-------------------|-----------------------|
| September 2014-June 2015 | 19 | 14 | 74% | 6 | 32% | 3 |
| September 2015-June 2016 | 32 | 18 | 56% | 7 | 22% | 3 |
| September 2016-June 2017 | 30 | 18 | 60% | 14 | 47% | 8 |
| September 2017-June 2018 | 30 | 21 | 70 % | 12 | 40 % | 9 |
| September 2018-June 2019 | 27 | 7 | 26 | 11 | 41 | 2 |
| Total | 138 | 78 | 57 % | 50 | 36 % | 25 |

The Education Programme after COD is summarized in **Table 4-8**.

A total of 30 scholarships will be allocated each year to the best performing students, with a minimum of 12 scholarships (40%) reserved for female students. Scholarships will target two main project areas, the 3 villages in the upper reservoir area (Zone 2UR) and the resettlers and the host communities. The scholarships will target 3 levels of education: Technical College, College and University.

The scholarship programme in Zone 2UR is scheduled to operate until 5 years after COD (the end of the stabilization phase of the Project), and for the resettlers the programme is expected to operate until 10 years after COD (the end of the income monitoring period).

TABLE 4-8 SUMMARY OF THE EDUCATION PROGRAMME AFTER COD

| Programme | Activities | Expected Results |
|-----------------------|--|---|
| Scholarship Programme | <ul style="list-style-type: none"> - Select the students who pass the national examination of the secondary education level | Scholarships provided to 30 students of the PAP |
| Formal Education | <ul style="list-style-type: none"> - Support the education activities in both schools by focusing on students who face learning and speaking issues. - Plan with the local education and administrative authorities to handover the technical and managerial responsibilities of the Phouhomxay schools to the Bolikhan District Education. - Plan and agree with the school teachers and District Education and Sport Office to increase the budget from the government sites-30 percent each year until 2024. | <ul style="list-style-type: none"> - The kindergarten, primary and secondary schools are functional according to the national education agenda. - No drop-out - Students pass the examination - Net enrolment increased - By 2023, all Phoumxy school teachers are employed by the District Education and Sport Office |

4.2.3 Community Development Plan

The Community Development Plan focuses on the key cross-cutting issues of health, gender, youth and children, and cultural heritage.

The Gender Action Plan includes two programmes. The Gender Mainstreaming programme supports women and girls’ schooling, and focus on increasing income opportunities for women in the resettlement site and supporting women’s engagement in the Project. The second programme addresses capacity building to promote women’s leadership and decision-making power by village level workshops on gender roles and women management trainings.

The Youth and Children programme focuses on the youth who have just finished school but are not continuing into further education. The programme is centred around scholarships to develop occupational skills that will improve the chance of diverse livelihood options and greater opportunity. Other educational support linked to improvements of school buildings are contained with the relevant REDPs.

The Cultural Preservation Programme with support and training from the Bolikhamxay Provincial Department of Information, Culture and Tourism focuses on promoting and raising awareness among local people about their cultural heritage and to preserve and transfer their culture to the next generation.

4.2.4 Gender Action Plan

The main objective of the Gender Action Plan is to promote the realization of gender equity, basic human rights and women rights according to the laws of Lao PDR.

The strategy is to implement a gender equity policy that will involve the leadership of the Lao Women’s Union at village and district levels. Activities will be facilities by the Project 2 years after the COD then it will be incorporate into the District Lao Women’s Union Plan.

The planned activities for the first 4 years after COD are summarized in **Table 4-9**.

TABLE 4-9 SUMMARY OF THE GENDER PROGRAMME FOR THE FIRST 4 YEARS AFTER COD

| Sub-Programme | Activities | Expected Results |
|-----------------------|---|---|
| Gender mainstreaming | - Support girl education and health condition in particular those who live in vulnerable households | - Increased girls' levels of education and literacy |
| | - Implement occupation training for women groups such as food processing, using innovative technologies | - Health status of women improved in target areas |
| Community empowerment | - Skills training for women in target zones to increase their skills in different social and livelihood issues | - Skills of women increased in target areas |
| | - Training on gender roles to be carried out for all adults in the community in key project zones - Monitor women participation in decision making | - Achieve the government targets for women’s involvement in community |
| | - Promote women participation in activities of their villages | - Women participation increased in village activities |
| | - Implement women group activities as well as support the celebration of women days and women of 3 goods | - Participation of women in village activities increased |

4.2.5 Youth and Cultural Preservation Programmes

The Youth and Cultural Preservation Programmes are summarized in **Table 4-10**.

TABLE 4-10 SUMMARY OF THE YOUTH AND CULTURAL PRESERVATION PROGRAMMES

| Programme | Activities | Targets |
|-----------------------|--|--|
| Community Development | - Develop and implement public assets operation and maintenance plan | - Public facilities provided by the Project are well maintained |
| | - Organize training on different legal subjects by focusing on the youth and working age population. This should lead by the District Youth Organization and Social Development team | - Increased knowledge about laws and regulations among the youth |

| Programme | Activities | Targets |
|-----------------------|--|---|
| Youth Programme | <ul style="list-style-type: none"> - Raise awareness among the youth about drug addiction - Implement 'Drug Free Village' | <ul style="list-style-type: none"> - Number of drug addicted persons reduced |
| Cultural Preservation | <ul style="list-style-type: none"> - Maintain the village museum according to village plan - Support cultural activities such as Hmong New Year, music playing and dancing | <ul style="list-style-type: none"> - Culture is preserved |

4.2.6 Vulnerable Households Programme

The Vulnerable Household Programme is a cross-cutting assistance programme covering health, nutrition, education and gender and youth aspects. The programme is tailored to the PAPs that need special assistance and attention. The programme is summarized in **Table 4-11**.

TABLE 4-11 SUMMARY OF THE VULNERABLE HOUSEHOLDS PROGRAMME

| Program | Activities | Expected Results |
|----------------|---|---|
| Kinship | <ul style="list-style-type: none"> - Continue to work with the local authorities to implement the kinship programme | <ul style="list-style-type: none"> - Vulnerable household improved their living conditions |
| Social support | <ul style="list-style-type: none"> - This activity is based on case by case basis. A VDF should be allocated to purchase food for them. | <ul style="list-style-type: none"> - The health condition of the vulnerable member meet national and international standards including a daily nutrition of at least 2100 Kcal/day |
| | <ul style="list-style-type: none"> - Implement and facilitate the access to the national insurance scheme, which is free of charge | <ul style="list-style-type: none"> - Vulnerable households are signed-up for the national insurance scheme |
| | <ul style="list-style-type: none"> - Implement the education plan of the vulnerable households and support activity under village development fund | <ul style="list-style-type: none"> - |

4.3 Evaluation of Implementation of the Social Measures

NNP1PC continually evaluates the progress of implementing the Social Measures. The evaluation is done on a day-to-day basis through weekly reporting to the Project Management by the various implementing teams, on a monthly and quarterly basis through progress reviews and reports and roughly every 6 months in connection with missions by the Independent Advisory Panel, the Independent Monitoring Agency, the Lenders' Technical Adviser and ADB.

In addition, NNP1PC undertakes comprehensive socioeconomic surveys:

- Biennial Socioeconomic Survey: This involves a large questionnaire with multiple indicators including income and is conducted every 2 years from Effective Date (2014);
- Ongoing Socioeconomic Survey: This is a short survey focusing on simple indicators, which is undertaken every 6 months between the biennial surveys to provide trends and assess wellbeing;
- Self-Resettler Monitoring: A specific survey to follow up on Self-Resettlers.

Table 4-12 is a short evaluation of compliance with key Social Compliance Obligations the implementation of Social Measures, and **Table 4-13** contains key lessons learned from the implementation of Social Measures during the Construction Phase.

TABLE 4-12 SHORT EVALUATION OF COMPLIANCE WITH KEY SOCIAL COMPLIANCE OBLIGATIONS

| ID | Description | Obligation Source Reference | Progress / Evaluation |
|----|---|--|--|
| | FUNDING | | |
| 1. | Funding of the PRLRC, RMU, Working Groups, Grievance Redress Committee | CA Annex C, Clause 83 and Appendix 3 | NNP1PC has provided sufficient funding for the operation of the PRLRC, RMU, Working Groups, Grievance Redress Committee in accordance with the CA Annex C |
| | MONITORING | | |
| 2. | Design and implement a comprehensive, accurate and effective self-monitoring system | CA Annex C, Clause 94 | Comprehensive Socioeconomic Surveys have been carried out in 2014 (baseline), 2017 and 2019. Short and focused Ongoing Socioeconomic Surveys have been undertaken |
| | COMPENSATION | | |
| 3. | Compensation for all impacts due to land acquisition either in cash or kind in accordance with the Project’s Detailed Entitlement Matrices OR placement of respective values in Escrow Accounts in case of grievances | CA Annex C, Clause 89, Appendix 7, LACP Safeguards and Social Compliance in ADB Facility Agreement | <ul style="list-style-type: none"> • Compensation for all eligible impacts has been completed. • A total of 2,667 grievance cases were files and as of 01-Jul-19 of these 2,662 have been resolved. All remaining grievances will be investigated and resolved in a timely manner and not later than by the end of 2019. • Additional compensation for impacts in Zone 2UR when the reservoir reached full supply level will be determined and paid |
| | RESETTLEMENT | | |
| 4. | Issuance of land titles to PAPs | CA Annex C Appendix 7 | In cooperation with GOL, NNP1PC has ensured that land titles have been issued to PAPs in Phouhomxay Village and in Zone 2UR for partially impacted land |
| 5. | Ongoing 5-year supplement rice support programme | CA Annex C, Appendix 7, REDP | The rice supplement programme is ongoing and has been implemented as required |

| ID | Description | Obligation Source Reference | Progress / Evaluation |
|--|--|--|--|
| 6. | Completion of provision of special transitional assistance to vulnerable households | CA Annex C, Appendix 7, REDP | Completed |
| PHOUHOMXAY DEVELOPMENT | | | |
| 7. | Completion of construction of all private houses and utilities resettling to the Project's designated resettlement site | CA Annex C Clause 65 to 69, 89, Appendix 7, REDP ADB FA Social Milestones | Completed. Private houses have been handed over to the relevant PAPs |
| 8. | Provision of irrigation system in Phouhomxay | CA Annex C Appendix 7, REDP | 90% completed. Full completion is expected in Oct 2019 |
| 9. | Completion of construction of water supply to all resettlement houses in Phouhomxay | CA Annex C Appendix 7, REDP ADB FA Social Milestones | Completed. However, to ensure acceptable water quality, improvements to the water treatment system is being designed |
| 10. | Complete agricultural roads in Phouhomxay | As above | Completed |
| 11. | Handover of public infrastructure and facilities | REDP | Public infrastructure has been handed over to Phouhomxay Village, but the official handover to GOL will be done after establishing the Village Development Fund and its procedures |
| 12. | Initial methodology of long-term maintenance and upkeep for community land and property in Houay Soup agreed and structures for its implementation available | ADB FA Social Milestones | Procedures for the management of the Village Development Fund is under discussion with GOL and will be ready before the first annual payment due by the end of 2019 |
| ZONE 2UR INFRASTRUCTURE DEVELOPMENT | | | |
| 13. | Suspension bridge in Zone 2UR | CA Annex C Appendix 7, REDP | Ongoing with expectation to complete in May 2020 |
| 14. | Agricultural access roads | As above | Completed |
| 15. | Fish landing | As above | To be constructed by Dec 2019 |
| 16. | Irrigation systems | As above | To be completed in Q4 2019 |

| ID | Description | Obligation Source Reference | Progress / Evaluation |
|-----|---|--|---|
| 17. | Handover of public infrastructure and facilities | REDP | Official handover of all community infrastructure to the community and relevant GOL department has been completed |
| | LIVELIHOOD RESTORATION | | |
| 18. | Poverty Elimination Test: Ensure that no PAP shall by the date which is two (2) years after the Effective Date, be at a level below the applicable National Poverty Line then in effect for similarly located and situated PAPs | CA Annex C, Clause 87 (a), 94 (a) | Implementation of livelihood programmes for PAPs in Phouhomxay Village, Zone 2UR, Zone 5 and for self-resettlers is ongoing with strong promotion of occupation development for each PAP including self-resettlers |
| 19. | Maintaining Economic Parity Test: Ensure that within two (2) years after the physical relocation of the PAPs, the net household income of all PAPs is not below the net household income for such household on the Effective Date | CA Annex C, Clause 87 (a), 94 (a) | Implementation of livelihood programmes for professional development of PAPs in Phouhomxay Village, Zone 2UR, Zone 5 and for self-resettlers in Hom, Bolikhan and Thathom district is ongoing with strong promotion of occupation development of each PAP including self-resettlers |
| 20. | Net Income Test: That within 2 years after physical relocation the average net income of physical and/or economically displaced persons is 120% of the average baseline net income, adjusted for CPI | CA Annex C Clause 87 (a), 94 (a) ADB FA Social Milestones | Implementation of livelihood programmes for PAPs in Phouhomxay Village, Zone 2UR, Zone 5 and for self-resettlers is ongoing with strong promotion of occupation development of each PAP including self-resettler |
| | LABOUR AND CAMP FOLLOWERS PROGRAMME | | |
| 21. | Compliance with the Lao Labour Law | CA, annex C, Clause 70 SDP Chapter 4 Part 4.1 to 4.8, Chapter 5 | With support from NNP1PC, the Labour and Trade Union has conducted monthly inspections of labour camps throughout the Construction Phase. There are no pending non-compliances. |
| 22. | Protect the health of communities as described in the SDP; | As above | In cooperation with the health authorities, NNP1PC has conducted regular training on STD, HIV/AIDS for camp followers |
| 23. | Law enforcement for social stability and control of social misbehaviour | CA, Annex C, SDP | NNP1PC has supported the operation of a police post with 6 officers in Hat Gniun Village. Moved to Phouhomxay Village in 2019 |

| ID | Description | Obligation Source Reference | Progress / Evaluation |
|---|--|---|--|
| EDUCATION PROGRAMME | | | |
| 24. | Implement the scholarship programme | CA Annex C, REDP | Ongoing with 30 student scholarship provided each year |
| 25. | Vocational training | As above | Vocational training of PAPs is ongoing in conjunction with the occupation development programme |
| 26. | School operations in Phouhomxay Village | | NNP1PC has supported the operation of the schools in Phouhomxay through payment of teacher salary and operation expenses |
| HEALTH, GENDER, VULNERABLE GROUPS PROGRAMMES | | | |
| 27. | Implement the Health Action Plan as described in the SDP | CA Annex C, 57, 87 (a), Appendix 7, SDP | <p>NNP1PC has supported the operations of the health centre in Phouhomxay, funded three health staff and conducted capacity building of the health staff.</p> <p>It is the policy of the Government to reduce the number of public staff for the whole country. This may also affect the staffing of the health centre in Phouhomxay Village and it is likely that it will take more time for the local health authorities to be able to manage all staffing and funding needs</p> |
| 28. | Implement Gender Action Plan | As above | The implementation of the Gender Action Plan is ongoing with training and other related activities at community level |
| 29. | Vulnerable households programme | As above | Special support including health check-ups, food, livelihood support, and consultations are ongoing |
| 30. | Cultural awareness | As above | Ongoing in conjunction with community development program |
| 31. | Establish procedures for the Community Development Programme Make annual payments to a community development program in the amount of USD 195,000 following COD | CA Clause 4.33 Annex C 97 | Under GOL management. NNP1 has drafted the procedures for management of the Village Development Fund and submitted to GOL. The first payment to the Village Development Fund will be made immediately after the procedures have been completed |

TABLE 4-13 KEY LESSONS LEARNED FROM IMPLEMENTATION OF THE SOCIAL MEASURES DURING THE CONSTRUCTION PHASE

| Issues / Challenges | Lessons Learned |
|---|--|
| <p>Long, time consuming and resource demanding process to complete asset registration, PAPs’ selection of resettlement options, and reaching agreement on the compensation payments</p> | <p>The Project applied a meticulous procedure which ensured full compliance with obligations. However, the implementation schedules and plans underestimated the time and resources needed to implement the procedures, and plans therefore had to be revised several times and more resources had to be deployed.</p> <p>To match the construction of resettlement infrastructure and housing with the actual number of resettlers, the Project carefully phased and implemented the construction work in step with the decisions of the resettlers. However, this was not always possible, and the Project had to build temporary accommodation for several households at the resettlement site, while their permanent houses were being constructed.</p> |
| <p>A small group of affected households in Zone 2LR refused to cooperate with the Project until very close to the scheduled start of impounding the main reservoir</p> | <p>With the concerted efforts of NNP1PC and GOL including high level officials from central level, field asset registration was finally completed for all households prior to impounding. It also proved important to have a procedure in place and agreed upon among the Project, GOL and the Lenders about how to deal with such situations.</p> |
| <p>447 or 86% of the resettlers choose self-resettlement. This is a very large and unexpected number and proportion of the resettlers. NNP1 is the first project in Lao PDR with such a high number and percentage of self-resettlers, and because the choice process took quite long time to complete, it was difficult for the Project to plan and implement appropriate measures</p> | <p>As the scale of self-resettlement was unexpected and unprecedented, the project developed special procedures for the self-resettlement process involving intensive consultations, training, visits to potential locations and acceptance from the host communities. The Project also established a dedicated team to assist the self-resettlers on livelihood restoration.</p> <p>In many cases, the self-resettlers resettled as a group (20-100 households) putting pressure on public services and infrastructure in the host villages. All things considered for the Project, it is more resource demanding and more difficult to provide adequate and timely assistance to self-resettlers. The self-resettlers are located in many different places and many aspects of their livelihood restoration are beyond the influence of the Project. However, the integration of the self-resettlers into the host communities has been frictionless and harmonious,</p> |

| Issues / Challenges | Lessons Learned |
|---|--|
| | and the self-resettlers have a high rate of participation in the livelihood programmes. |
| <p>Identifying and supporting sustainable and promising livelihood options for the PAPs have been a major challenge for the Project. Today, the participation of PAPs in the Livelihood Programmes is high. Most of the households have decided to take up at least one profession/occupation such as cattle raising, local wine production, rubber tree planting, cash crop production, vegetable production or fish production.</p> | <p>The project developed and started implementing livelihood programmes in 2014 to build capacity of PAPs in their old village location before relocation. Thus, the updated livelihood restoration plans build on the experience of implementing the Livelihood Programme since 2014. In 2018, NNP1PC arranged a series of workshops for the PAPs involved in the livelihood programmes to evaluate the programmes and identify areas of improvements for the next phase in livelihood development. The results of the evaluations indicated that access to knowledge and practical experience with best practises are some of the main factors that would contribute to increasing production and productivity, which are fundamental factors to meet the required increase in income. Therefore, the Livelihood Development Plan focuses on measures to increase productivity and to do that training and other forms of support have been designed and are being provided to build expertise in the specific income generating activities or professions selected by each individual PAP</p> |
| <p>Confrontation between resettlers and previous occupants of land in Phouhomxay Village has created tensions, lack of confidence in land allocated, and has potential for conflicts.</p> | <p>Land acquisition becomes particularly complex when it involves loss of land for households in host villages, and as in this case although the Project compensated for such losses, tensions may still arise. Working closely with the local authorities, the Project completed the PLUP process for Phouhomxay Village and Hat Gniun Village. The granting of replacement land for land expropriated in Phouhomxay Village is expected to resolve many outstanding land issues.</p> |
| <p>Some resettlers continue to use land bordering the main reservoir which has been fully compensated. These activities pose a threat to protection of biodiversity and may lead to further encroachment and unsustainable exploitation of natural resources</p> | <p>The watershed management plan and associated regulations include measures to stop illegal land use or illegal exploitation of biodiversity or other natural resources. The Watershed and Reservoir Protection Office will carry out intensive patrolling and law enforcement actions to stop such illegal activities.</p> |
| <p>Importance of development and implementation of a Social Development Plan</p> | <p>Key indicators of the social development were attainable in particular on education, gender and disease prevention, improved hygiene and sanitation conditions. There were no outbreaks of diseases during the construction phase. This was a result of active participation and close cooperation with the</p> |

| Issues / Challenges | Lessons Learned |
|---|---|
| | villagers and local authorities in the social development intervention |
| Improvement of nutritional status of children | Despite achieving all targets under the Social Development Plan and the Concession Agreement, it has been difficult to improve the nutritional status of children and pregnant mothers. The causes of poor nutritional status are not only due to the food security or access to health care services but are also related to the caring practices at the family level including breast feeding and food supplementation. Dealing with these causes requires sustained and long-term interventions. |
| - | The health authorities are facing the problems of staff as the central government policy intends to reduce public staff for the whole country, so it would take more time for the local health authorities to take over all responsibilities from the NNP1PC support in particular on staff and its operating cost |

5 SUMMARY OF STANDALONE WATERSHED AND BIODIVERSITY MANAGEMENT PLANS

5.1 NNP1 Watershed Management Plan

Under the Concession Agreement between NNP1PC and GOL, the Company has agreed to provide funding and technical support for watershed management activities in the basin to address project impacts on the retention, quality and availability of water, biodiversity and related environmental values, and on the livelihoods of people utilising the natural resources in the watershed. NNP1PC also has commitments under the ADB safeguard policy to achieve conservation and “no net loss” in biodiversity. The Watershed Management Plan of The Nam Ngiep 1 Hydropower Project in Xaysomboun and Bolikhamxay Province (WMP) sets out the framework to achieve both commitments.

The WMP has been developed to analyse watershed management issues and plan appropriate actions to support the sustainable use of natural resources and maintenance of ecological services within the NNP1 watershed. The WMP covers part of the administrative areas of Xaysomboun Province and a small area of Bolikhamxay province.

The WMP is a long-term management plan covering the period from 2019 through to the end of the project concession period, which ends 27 years after the Commercial Operation Date (COD) of NNP1.

The WMP has been developed to be consistent with the 8th National Socio-economic Development Plan 2015-2020, the Government Vision and Strategy on natural resources protection, the five-year Socio-economic Development Plans of Xaysomboun and Bolikhamxay Provinces, the draft Xaysomboun Integrated Spatial Plan (ISP), and the NNP1 Biodiversity Impact Mitigation and Offset Framework.

The WMP contains a detailed initial Five-Year Action Plan that spans the period immediately prior to COD and after COD until 2024. This detailed plan will be supplemented with an outline of activities to be included in subsequent Annual Implementation Plans. The budget for the first Five Year Action Plan is provided and contains an indicative budget for subsequent years of the WMP.

The vision of NNP1 watershed management is:

“The NNP1 watershed is well-managed contributing to protecting, maintaining, and enhancing its forests, water, wildlife, and the livelihood of the people”

The vision provides all stakeholders with a clear ideal state for the watershed and guides the development of the WMP toward this outcome.

The spatial scope of the WMP covers three distinct areas within the Nam Ngiep basin (**Figure 5-1**), each requiring specific watershed management measures and activities, aimed at achieving the vision and the specific objectives of the NNP1 Watershed Management Plan:

- **Reservoir watershed** – defined as the section of watershed that drains directly from side slopes and tributaries into the reservoir. This sub-watershed is the primary focus of the WMP, where most project-supported activities will be undertaken to protect, improve and manage the watershed sustainably, including management that aims to directly benefit project functioning;

- **Downstream riparian zone** – the riparian zone below the dam until the confluence with the Mekong River, defined as the bed and banks of the Nam Ngiep River and within 50 m of the crest of the banks and full supply level (FSL) of the re-regulating pond. This zone will be monitored for damage from project-altered river flows and mitigation measures will be undertaken if needed (e.g. erosion protection);
- **Upper watershed** - defined as the drainage area above the NNP1 reservoir watershed and located within Xaysomboun and Xiang Khuang Provinces, contains six existing and proposed hydropower projects consisting of: (i) operational, Nam Ngiep 2 and Nam Ngiep 3A commissioned in 2015 and 2014 respectively; (ii) under construction, Nam Chiane and Nam Ao (the latter under reconstruction following the dam break in September 2017); and (iii) proposed, Nam Thong 1 and Nam Thong 2. The NNP upper watershed will be managed under collaboration of different project's developers and supervision of National Level Watershed Management Committee.
- **Lower watersheds** – defined as the Nam Ngiep river drainage area below the NNP1 dam, covering approximately 83,996 ha. The focus of the WMP is limited to land within the NNP riverbed, on the banks and within 50 m of the crest of the riverbank.

FIGURE 5-1 NAM NGIEP 1 WATERSHED



The NNP1 Watershed Management Plan provides a comprehensive description and analysis of the baseline physical, biological and socio-economic conditions within the watershed including

recent trends to identify the changes that have occurred and the causes of these trends, thus enabling changes over the next few decades to be predicted. Based on this analysis, the Watershed Management Plan has identified high priority issues/risks.

To deal with these issues or risks, the NNP1 Watershed Management Plan is divided into six Components. The Components are arranged and designed around interconnected groups or strings of cause and effect relationships - which when resolved will lead to the realization of the Vision. Each Component is logically structured starting with a Specific Objective expressing the future situation to be achieved through a set of results that will be delivered by the implementation of a package of activities. The combined effect of implementing the components and substantially achieving their Specific Objectives is designed and expected to significantly contribute to the realization of the Vision. The six Components and associated objectives, results and activities of the Watershed Management Plan are summarized in **Table 5-1**.

With respect to biodiversity, NNP1PC is obligated and committed to achieve no net loss of biodiversity caused by the Project. This obligation is derived from the ADB Safeguard Policy Statement (Safeguard Requirements 1: Environment), which the Company according to both the Concession Agreement and the ADB Facility Agreement (the loan agreement between NNP1PC and ADB) is required to comply with.

To ensure compliance with this obligation (to achieve No Net Loss (NNL) of biodiversity), NNP1PC and ADB assisted by international and national biodiversity conservation experts have developed a so-called Biodiversity Impact Mitigation and Offset Framework, which outlines a range of actions to achieve NNL, including intensive mitigation in the NNP1 Watershed as well as offsetting residual impacts at the Nam Chouane Nam Xang Biodiversity Offset Site. The NNP1 Watershed Management Plan has adopted, further developed and incorporated these measures in the applicable components (particularly Components No. 3 and No. 4). With respect to offsetting the residual impacts of the NNP1 hydropower project, NNP1PC in collaboration with the Government has developed a Biodiversity Offset Management Plan which will be implemented in the designated offset site called Nam Chouane Nam Xang (NCNX) in Viengthong and Xaychaphone districts, Bolikhamxay Province.

The main methods to effectively control wildlife hunting and collection and loss of habitats are restriction of access to biodiversity sensitive areas and enforcement of regulations by intensive patrolling.

The project will create two Total Protection Zones (TPZ-1 and TPZ-2) covering 580 km². As shown in **Figure 5-2**, TPZ-1 extends on both sides of the reservoir and covers a roughly 20 km long stretch of the central part of the reservoir with an area of 20 km². TPZ-2 borders the right shoreline of the lower part of the reservoir.

To support enforcement of regulations in the TPZs, ranger stations will be established in the TPZs, and access to the reservoir and the shorelines of TPZ-1 will be controlled by establishing and operating two reservoir checkpoints (see **Figure 5-2**)

FIGURE 5-2 TOTAL PROTECTION ZONES

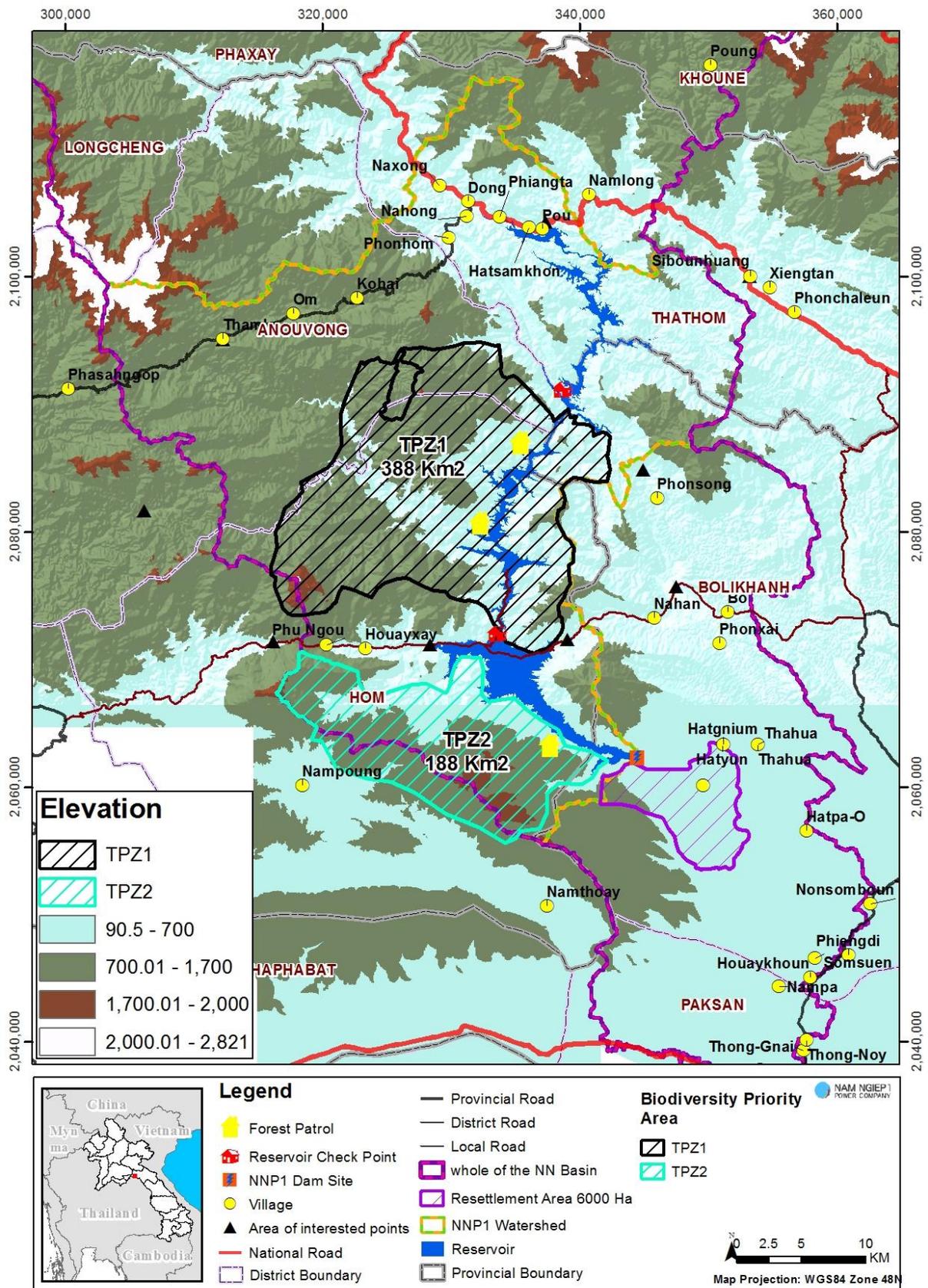


TABLE 5-1 COMPOSITION OF THE NNP1 WATERSHED MANAGEMENT PLAN

| Component | Specific Objectives | Expected Results | Activities ¹ |
|---|---|---|--|
| <p>1. Forest Cover Maintenance</p> | <p>The quality and spatial distribution of forests and other important wildlife habitats within the watershed is at 100% or greater than baseline levels by the end of the NNP1 concession period</p> | <ul style="list-style-type: none"> • Encroachment into forest is reduced • Illegal logging is reduced • Forest fire is reduced | <ol style="list-style-type: none"> 1.1. Completion of participatory land use mapping in three remaining villages within the watershed and ensure that there are no land use conflicts among the villages in the NNP1 watershed 1.2. Undertake forest patrols to monitor land use and other watershed regulations 1.3. Survey of external villages with a recent history of using NNP1 watershed forest resources about their resource uses in the watershed 1.4. Strengthening of institutional capacity of village authorities, WRPO and relevant government agencies related to land use and natural resource management. 1.5. Develop and implement agreements on forest fire control with target villages. 1.6. Establish a WRPO sub-office at Meuang Hom to protect the TPZ area and facilitate reservoir management related activities that have multiple purposes 1.7. Establish a near real-time reporting tool for villagers to report illegal activities that are linked to the systems used by the Department of Forest Inspection |
| <p>2. Land Improvement</p> | <p>The area of land degradation caused by direct human activity in the watershed is reduced to below the baseline level</p> | <ul style="list-style-type: none"> • Effective project approval procedures are implemented to protect riparian zones, control land degradation and soil erosion, and reduce land use impacts on river or | <ol style="list-style-type: none"> 2.1. Conduct training, awareness raising and dissemination of the regulation on land use, soil conservation and riparian protection to watershed residents. 2.2. Conduct monitoring and mapping of severe soil erosion with the participation of local villagers to identify locations of concern and propose mitigation measures to appropriate agencies where infrastructure is threatened |

¹ To be reviewed and refined each year in Annual Implementation Plans.

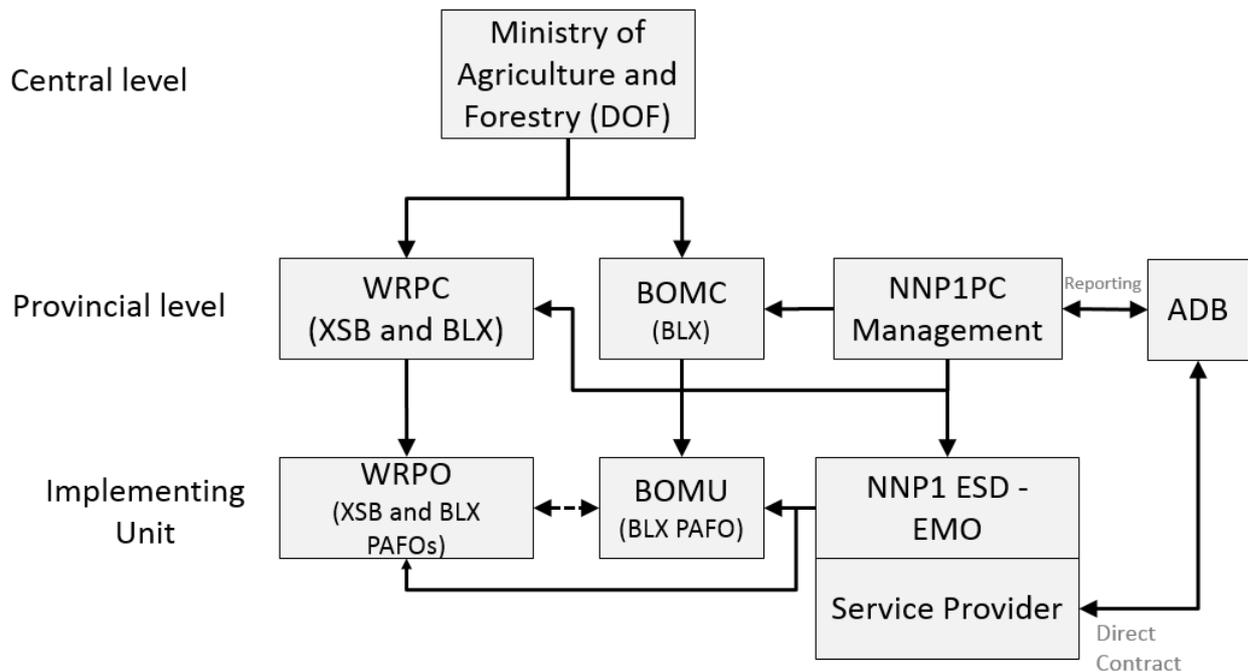
| Component | Specific Objectives | Expected Results | Activities ¹ |
|--|--|---|---|
| | | <p>stream turbidity and reservoir sedimentation.</p> <ul style="list-style-type: none"> • Effective enforcement of riparian zone regulations. • All provinces and districts in the Nam Ngiep River Basin have agreed on joint collaboration and efforts to protect the river basin. | <p>2.3. Pursue collaboration on coordinated management for the entire Nam Ngiep river basin</p> <p>2.4. Enforce riparian zone conservation in accordance with the Forestry Law and identify areas for natural regeneration within these zones</p> <p>2.5. Develop, introduce, and enforce regulations</p> |
| <p>3. Controlled Use Zone (CUZ) Biodiversity Protection</p> | <p>The abundance of high conservation value species in the CUZ is maintained</p> | <ul style="list-style-type: none"> • Biodiversity management regulations are strictly enforced in the CUZ • The threats to biodiversity in the CUZ are reduced | <p>3.1. Specific rules and penalties for violation of wildlife and aquatic animals related laws and regulations are incorporated into the relevant watershed and reservoir management regulations</p> <p>3.2. The WRPO, PAFO and POFI work across all districts in the watershed to develop an effective law enforcement strategy to reduce illegal activities such as illegal logging, hunting and the sale of wildlife</p> <p>3.3. Awareness raising in villages within and adjacent to the watershed on: the importance of biodiversity within the watershed; the benefits to watershed residents of precluding illegal hunting and snaring from the watershed; and related laws and regulations</p> <p>3.4. SMART program established to support patrolling and monitoring of performance, and to train WRPO and village working group</p> <p>3.5. Liaison with the Watershed Management and Protection Authority (WMPA) at Nam Theun 2 Hydropower Project of Nam Theun Power Company (NTPC) to understand any conservation efforts for <i>Luciocyprinus striolatus</i> implemented in Nakai-Nam Theun National Protected Area, to inform actions that could be implemented for <i>Luciocyprinus striolatus</i> conservation within the Nam Ngiep 1 watershed</p> <p>3.6. Development, implementation and compliance monitoring with regulations to protect waterways and aquatic habitats within the watershed</p> |

| Component | Specific Objectives | Expected Results | Activities ¹ |
|--|---|--|--|
| <p>4. Total Protection Zone (TPZ) Biodiversity Protection</p> | <p>The abundance of high conservation value species inside the TPZs has increased in accordance with the No-Net-Loss requirements for the NNP1 Watershed as detailed in the Biodiversity Impact Mitigation and Offset Framework</p> | <ul style="list-style-type: none"> • Biodiversity management regulations are strictly enforced in the TPZs • The threats to biodiversity in the TPZs are reduced | <ol style="list-style-type: none"> 4.1. Develop forums to bring the importance of biodiversity to the forefront of GOL agendas 4.2. Work with GOL to legally recognise and establish two inviolate TPZs and convert parts of the existing National Production Forest area that overlap with TPZs to form part of the adjacent National Protection Forest area. 4.3. Awareness raising on the importance of biodiversity within the watershed; the benefits to watershed residents; and the related laws and regulations 4.4. Undertake TPZ patrol and develop and implement a comprehensive law enforcement and patrolling strategy for the newly created TPZs with clear roles and responsibilities among the competent agencies 4.5. Establish a SMART programme to support patrolling and monitoring of threats, and train WRPO and village working group 4.6. Create a biodiversity monitoring programme to better understand the priority species and habitats within the TPZs 4.7. Establish a threat assessment protocol as a check on the efficacy of the patrolling program in the TPZs at eliminating threats to biodiversity 4.8. Undertake studies to better understand the population of priority species in the watershed, particularly in the newly created TPZs 4.9. Identify partners to help develop conservation linked tourism 4.10. Undertake species specific studies in the TPZs to better understand their status and ecology of the TPZs. 4.11. Undertake independent monitoring of the TPZ implementation 4.12. Undertake studies incorporating recommendations on the mitigation of impacts on the six endemic fish species |
| <p>5. Reservoir Management</p> | <p>The reservoir is a healthy habitat for aquatic biodiversity and a valuable source of food and income for</p> | <ul style="list-style-type: none"> • Reservoir users comply with applicable reservoir management regulations and agreements • Reservoir and reservoir shoreline users do not cause | <ol style="list-style-type: none"> 5.1. Establish and operate 2 Reservoir Checkpoints and undertake reservoir patrols for a minimum of 100 patrol days per year in zones 2, 3, and 4 5.2. Develop and implement Fisheries Co-management 5.3. Establish Fish Conservation Zones in the reservoir and watershed to provide protected areas for fish species |

| Component | Specific Objectives | Expected Results | Activities ¹ |
|----------------------------------|--|---|--|
| | inhabitants of the watershed | any significant impacts on biodiversity or water quality • No pest fish species introduced | 5.4. Prepare specific regulations covering: Tourism, navigation, allocation of fishing rights; issuing of fishing licenses and licensing fees; restrictions on fishing gear/methods, and boat licensing rules and restrictions 5.5. Reservoir navigation and general safety controls and restrictions included in the specific regulations 5.6. Develop WRPO capacity in reservoir management through study tour of two existing reservoirs in Lao to enhance knowledge and techniques on reservoir management and fisheries co-management |
| 6. Livelihood Improvement | Interested households practice Good Agricultural Practices and exploit ways to improve their livelihoods | • Farmers are trained and skilled in Good Agricultural Practices • Villagers capacity to exploit livelihood alternatives is strengthened | 6.1. Identify the needs and opportunities in terms of natural resources-based livelihoods and alternative livelihoods 6.2. Assist in the development of a sustainable zoning and land use plan for use of common resources including village forests, Fishery Co-Management, etc. 6.3. Provide technical assistance to villagers on improving land productivity 6.4. Support the sustainable management of NTFPs |

The institutional arrangements for the NNP1 watershed management are presented in **Figure 5-3**.

FIGURE 5-3 INSTITUTIONAL ARRANGEMENTS



As illustrated in **Figure 5-3**, the Ministry of Agriculture and Forestry, MAF is the national authority on management of forests, biodiversity and fisheries, and as such MAF is the overall supervisory and decision-making body on forest resources, wildlife, fisheries and biodiversity related issues in the watershed areas of all HPPs in the country according to Minister of MAF Agreement No. 1371 dated 11 June 2018. The Watershed and Reservoir Protection Committees (WRPC), one for Xaysomboun province and one for Bolikhamxay province, are headed by their respective Provincial Governor, and MAF is represented through the Department of Forestry, DOF. The WRPCs provide an oversight role, approving plans and budgets, supervising the implementation and ensuring coordination with concerned government bodies. The Watershed and Reservoir Protection Offices, WRPOs (one for each province) are headed by the Provincial Agriculture and Forestry Office of each province, and they are the implementing bodies working hand-in-hand with NNP1PC’s technical team and the biodiversity conservation service provider. The service provider will be contracted by ADB under a Technical Assistant grant to the company, but will on technical and practical matters be managed by NNP1PC and function as a technical arm of the Company.

The Department of Forestry is responsible for financial management of the funds that NNP1PC will provide in accordance with its Concession Agreement obligations. DOF will also provide technical advice and oversight support to PAFOs and NNP1PC for the implementation of the WMP. NNP1PC will directly manage all other funds to ensure implementation of the WMP.

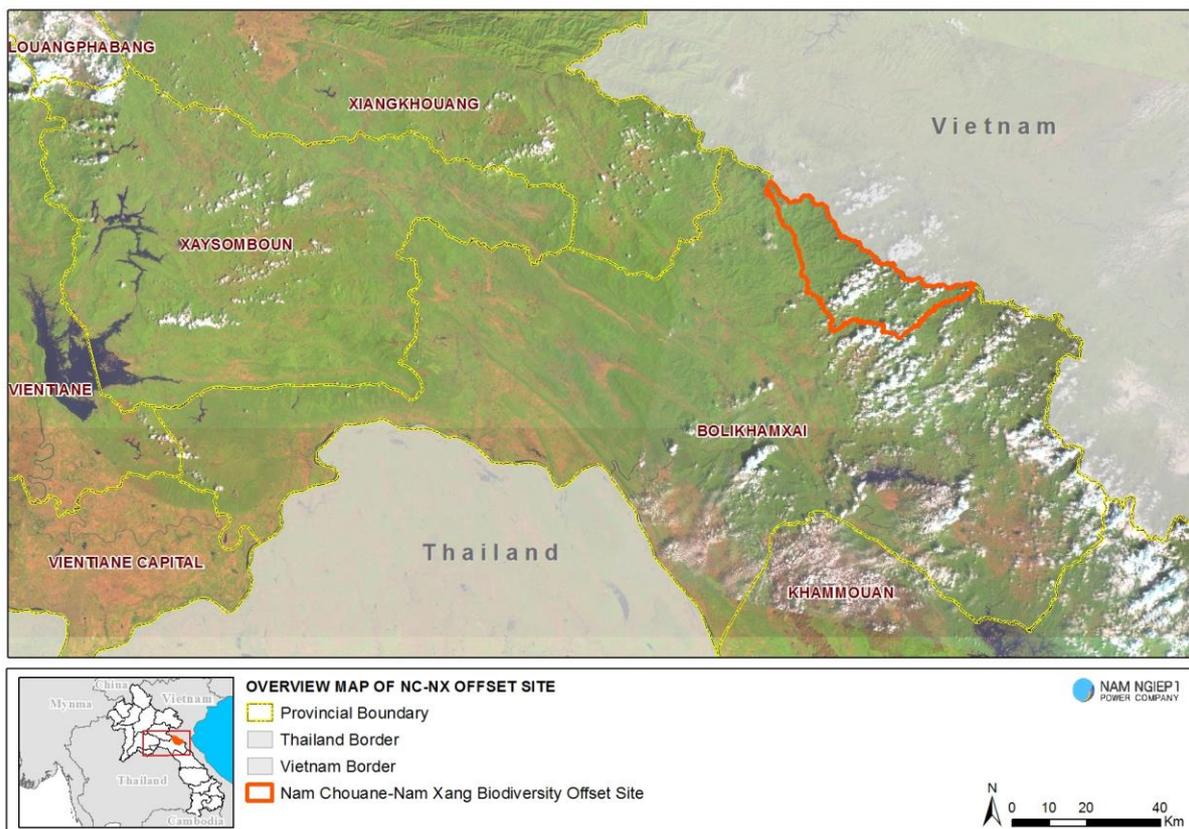
The budget that NNP1PC will provide for implementation of GOL responsibilities and activities under the NNP1 Watershed Management Plan is detailed in the plan and is not repeated here.

5.2 Biodiversity Offset Management Plan

The Nam Chouane-Nam Xang Biodiversity Offset Management Plan of the Nam Ngiep 1 Hydropower Project was completed and approved by ADB and GOL in 2019.

Biodiversity baseline assessments prepared under the ADB Safeguard Policy Statement revealed that the project area supported several Critically Endangered and Endangered or Vulnerable species. NNP1PC working closely with ADB determined an offset site was necessary to offset residual impacts to biodiversity to meet *No Net Loss to Biodiversity* (NNL) following the ADB Safeguard Policy Statement, as further described in the Biodiversity Impact Mitigation and Offset Framework. In cooperation among the Company, ADB and GOL, the Nam Chouane-Nam Xang (NC-NX) was selected as the offset site for the residual impacts from the NNP1 Hydropower Project. Offsetting at NC-NX requires the effective protection of two large rivers (Nam Xang and Nam San), their tributaries, adjacent riparian vegetation, and all associated fauna. The NC-NX is located within the Nam Chouane and the Nam Gnouang National Protection Forest along the Lao-Vietnamese border adjacent to Pu Mat National Park. It lies within the Viengthong and Xaychomphone District administrative boundaries (see **Figure 5-4**).

FIGURE 5-4 OVERVIEW MAP OF THE NAM CHOUANE-NAM XANG (NC-NX) BIODIVERSITY OFFSET SITE



Under the Concession Agreement between NNP1PC and GOL, the Company has agreed to provide funding and technical support for mitigating impacts on biodiversity in the sub

catchment of the Nam Ngiep River Basin and the management activities in NC-NX to ensure the company meets NNL to Biodiversity.

The NC-NX Biodiversity Offset Management Plan (BOMP) has been developed to provide the long-term vision for the NC-NX (2019 -2046) with a focus on implementation for the first 10 years. The Plan is part of an adaptive and iterative management process, ultimately leading to the NC-NX meeting NNL. It is based on multiple consultations and rigorous biological and social surveys in and around the NC-NX. Annual Implementation Plans (AIP) will be created jointly by the NC-NX and NNP1PC providing details on “how” conservation is delivered year by year. The monitoring program included in the Plan is designed to provide the framework for evaluating the effectiveness of the management actions allowing for adaptation of strategies throughout the plan period. While the vision, goal, conservation objectives and institutional arrangements for the implementation of the BOMP are unlikely to change significantly over the course of the implementation period, it is expected that the BOMP will be revised based on successes and lessons learned reflecting changes in the Government’s 5-year socio-economic planning cycle.

The vision of the BOMP is:

“Creating an exemplary conservation area by protecting and enhancing the forests, rivers, wildlife and working in partnership with local communities to reduce threats to biodiversity in NC-NX.”

This vision provides stakeholders a clear ideal state for the biodiversity within NC-NX and harmonious relationship among communities living closest to the area, while guiding the management of NC-NX toward this outcome.

The BOMP provides a comprehensive description and analysis of the conservation targets² and the conservation objectives³ for these targets (**Table 5-2**), direct and indirect threats affecting these conservation targets (**Table 5-3**), and strategies for resolving these direct and indirect threats allowing for positive change in our conservation targets and achievement of the Conservation Objectives. To address the direct and indirect threats affecting the conservation targets, the BOMP has five components with corresponding activities designed around the causal relationship between the conservation objectives, direct and indirect threats (**Table 5-4**). The assumption being that if the condition or status of the conservation targets are maintained, or increase over time, then the overarching goal of NNL to Biodiversity through is met.

One of the essential interventions in the BOMP for achieving no net loss to Biodiversity is the establishment of a Total Protection Zone (TPZ) with areas of high biodiversity value as well as 2.5 km on either side of rivers and tributaries within NC-NX. The area of NC-NX outside the TPZ will be managed as a Controlled Use Zone (CUZ). The zoning considers community use of the area following land use plans and village consultations. The NC-NX regulations further clarify what uses are permissible in the different zones, including collection of NTFPs, hunting and fishing.

The TPZ and the CUZ are indicated in **Figure 5-5**.

² Conservation Targets here means the species or habitats that have been selected to represent the biodiversity that needs to be conserved and which are the focus of the planning and management measures

³ Conservation Objectives express the future condition of the Conservation Targets that needs to be achieved

After the boundary and zones are clearly marked and the villagers know the limits of their legal shifting cultivation areas, law enforcement in the TPZ and the CUZ will be enhanced; land grabbing or expansion of agriculture areas into the TPZ will decrease; and land conversion will decrease in the TPZ and CUZ.

FIGURE 5-5 MAP OF NC-NX AND THE TPZ

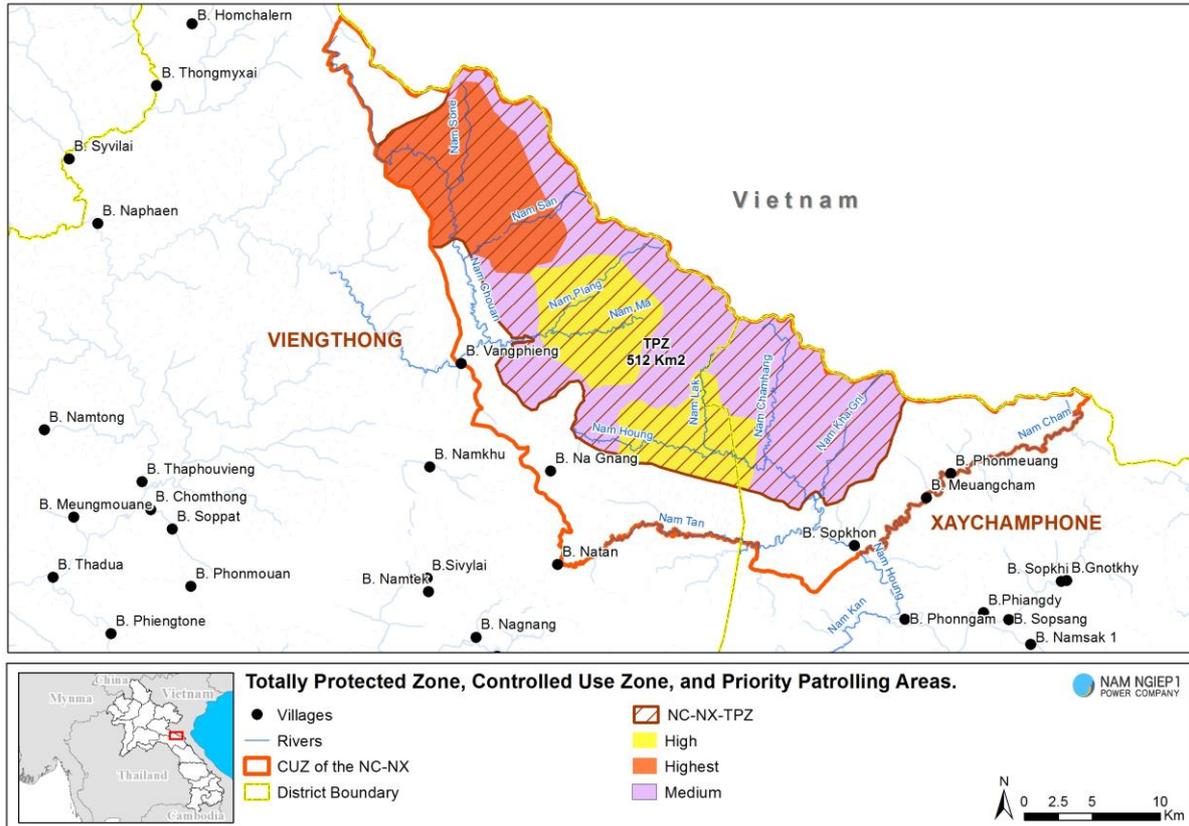


TABLE 5-2 CONSERVATION OBJECTIVES AND TARGETS

| Conservation Targets | Conservation Objectives | Indicators |
|---|--|--|
| 7. Riverine habitat | By 2024 there will be no further direct anthropogenic loss of mature trees, no further clearance, no exploitation of other biotic dead or alive features in the TPZ . | Quantity and quality of forest area cover in CUZ and TPZ |
| 8. Fish Communities | By 2024 harvest sensitive stenotopic fish populations in select habitats along the Nam San and Nam Xang Rivers will be maintained or increase compared to 2019-20 fish surveys. | Number of species at selected habitat types |
| 9. Riverine mammals | By 2024 NC-NX will see an increase in otter occupancy by 20% in the high biodiversity portion of the TPZ as compared with 2019-20 data. | Otter sign occupancy of 100m river sections & instances of human fishing activity |
| 10. Riverine birds | By 2024 NC-NX will see at least three resident pairs fish eagles or not less than 20% of increase in Blyth’s Kingfisher along the river corridors in the high and highest priority patrolling areas of the TPZ, as compared with 2019-20 data. | Number of resident pairs of fish eagles, Blyth’s Kingfisher counts & instances of human fishing activity along the river corridors in the TPZ. |
| 11. Arboreal mammals | By 2024 NC-NX will see a 10% increase in gibbon populations indicated by a 10% increase in groups recorded from listening posts in the TPZ. | Number of gibbons heard in listening post trend analysis |
| 12. Avian ground-dwelling snare-sensitive species | By 2024 the NC-NX high biodiversity areas of the TPZ will show a 20% increase occupancy of Coral-billed Ground Cuckoo at Camera Trap (CT) stations | Coral-billed Ground Cuckoo occupancy at CT stations |
| 13. Mammalian ground-dwelling snare-sensitive species | By 2024 the NC-NX high biodiversity areas of the TPZ will show a 20% increase occupancy of Large Indian Civet at CT stations | Large Indian Civet occupancy at CT stations |
| 14. Conifer forests | There will be no exploitation of cypress trees in NC-NX as compared to 2018 baseline data. | Number of individual trees in baseline polygon |

TABLE 5-3 THREAT REDUCTION TARGETS

| Direct Threats | Threat Reduction Objectives |
|---|--|
| 1. Illegal Commercial Hunting – Snaring | a. Illegal Commercial Hunting (Industrial Snaring) by Vietnamese and Lao local villagers in the highest priority area will have no snares by January 2021 and will be maintained with no snares. b. Illegal Commercial Hunting (Industrial Snaring) by Vietnamese and Lao local villagers in the high priority area will have no snares by December 2021 and maintained with no snares. c. Once the snares have been sufficiently removed from the highest and high priority areas patrol teams will move to remove snares from the remainder of the TPZ (the medium priority areas), where snares will be reduced by 85% from 2018-19 levels by December 2022 and by 95% by 2022. |
| 2. Illegal Hunting Non-snaring | a. By December 2021 no local people will be hunting in the highest and high priority patrol areas and by December 2022 there will be no local people hunting in the medium priority areas of the TPZ. b. By December 2024 Illegal hunting in the CUZ will be reduced by 60% and by December 2026 reduced further to 80% from 2018 levels. |
| 3. Illegal Land Conversion | a. The TPZ of NC-NX will be legally recognized by 2020 allowing for full implementation of the NC-NX Law Enforcement Strategy. b. By 2020 and onwards there will be no (since dry season 2019) shifting cultivation and permanent agriculture in the TPZ. All agriculture will be confined and restricted to the area agreed upon within the land use plans of the CUZ. |
| 4. Illegal Logging | a. No illegal timber and non-timber extractive activities will be detected in TPZ by 2021. b. All illegal logging will decrease by 85% in the CUZ by 2021 compared to 2018. And no illegal extractive activities will be detected in the CUZ by 2030. |

TABLE 5-4 MANAGEMENT COMPONENTS, THREAT REDUCTION OBJECTIVES, EXPECTED RESULTS, AND ACTIVITIES

| Components | Threat Reduction Objectives | Expected Results | Activities |
|-------------------------------------|---|--|---|
| 1. Spatial Planning and Regulations | The TPZ of NC-NX will be legally recognized by June 2020 allowing for full implementation of the NC-NX Law Enforcement Strategy. By 2020 and onwards there will be no (since dry season 2019) shifting cultivation and permanent agriculture in the TPZ. All agriculture will be confined and restricted to the area | <ul style="list-style-type: none"> • NC-NX boundary within the existing Nam Mouan- Nam Gnouang Provincial Protected Forest Area is confirmed, CUZ and TPZ delineated on maps and endorsed by the village and district. • Land use plans for the 6 target villages updated consistent with the BOMP and agreed by villagers, and endorsed by district, and LUP signs installed • The implementation of the village land use plans is enforced. | 1.1. Prepare updated village land use plans for the 6 target villages taking into consideration the NC-NX boundaries and the proposed TPZ and CUZ. 1.2. Undertake consultations and obtain official endorsement of the updated village land use plans and the proposed TPZ and CUZ by the village and district authorities. 1.3. Disseminate the endorsed village land use plans, NC-NX boundaries and the TPZ and CUZ. |

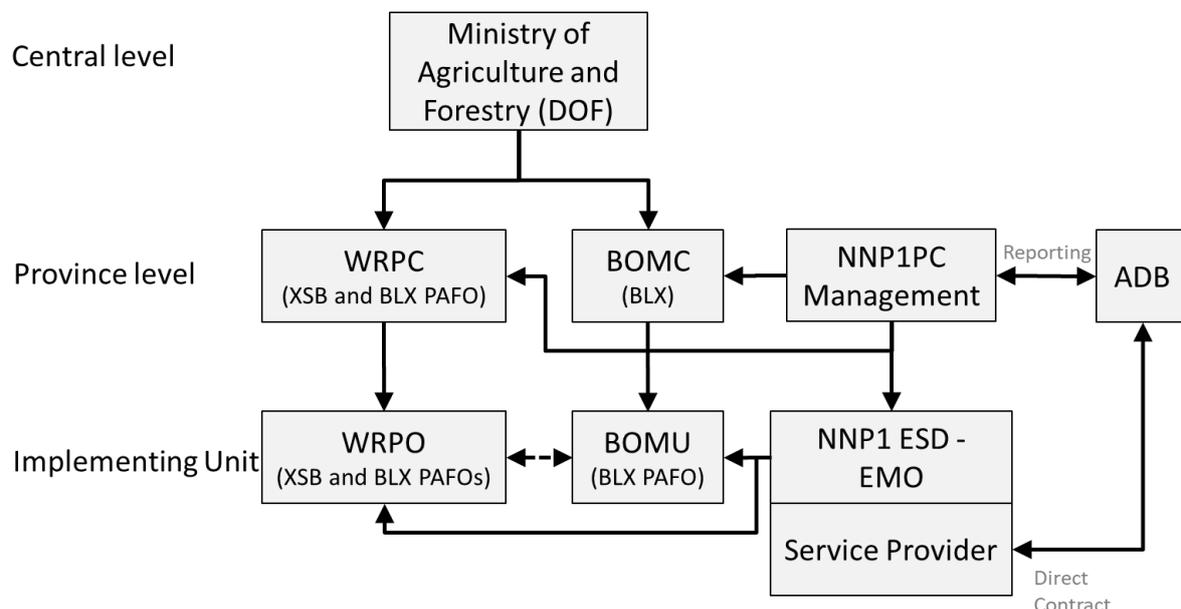
| Components | Threat Reduction Objectives | Expected Results | Activities |
|---------------------------------|---|---|---|
| | <p>agreed upon within the land use plans of the CUZ..</p> | <ul style="list-style-type: none"> 100% of households receive the NC-NX regulation and 85% of recipients who receive the regulation understand the contents as measured by a pre and post-test by the outreach team as part of the outreach campaigns. | <p>1.4. Demarcate NC-NX, TPZ and CUZ on maps and on the ground.</p> <p>1.5. Monitor (mobile patrol teams) the implementation of the updated village land use plans and the BOMU advises the village and district authorities about any inconsistencies.</p> <p>1.6. Explore the opportunity for elevating the NC-NX to be a National Protected Area.</p> <p>1.7. Evaluation of the NC-NX regulation’s effectiveness and recommend updates, if needed.</p> |
| <p>2. Enforcement</p> | <p>Illegal Commercial Hunting (Industrial Snaring) by Vietnamese and Lao local villagers in the highest priority area will have no snares by January 2021 and will be maintained with no snares.</p> <p>Illegal Commercial Hunting (Industrial Snaring) by Vietnamese and Lao local villagers in the high priority area will have no snares by December 2021 and maintained with no snares. Once the snares have been sufficiently removed from the highest and high priority areas patrol teams will move to remove snares from the remainder of the TPZ (the medium priority areas), where snares will be reduced by 85% from 2018-19 levels by December 2022 and by 95% by 2022.</p> | <ul style="list-style-type: none"> Snares in priority patrol areas of the TPZ are detected, destroyed and removed. Offenders of NC-NX regulations in the TPZs are apprehended and brought before the justice system for prosecution. Illegal sale of wildlife and equipment for hunting, snaring, fishing and logging is detected and offenders brought before the justice system for prosecution The Viengthong and Xaychomphone District Judiciary process illegal hunting cases both from within the NC-NX Boundary and the Districts, and levy penalties sufficiently to deter further such offences. | <p>2.1. Develop the NC-NX Law Enforcement Strategy.</p> <p>2.2. Select and establish, train, and operate four TPZ patrol teams.</p> <p>2.3. Conduct performance-based evaluation.</p> <p>2.4. Develop mechanisms for regular feedback and tracking Trends.</p> <p>2.5. Adapt and refine the system iteratively.</p> <p>2.6. Create one mobile response team for each district.</p> <p>2.7. Develop joint workplans to reduce the direct and indirect threats.</p> <p>2.8. Develop informant networks.</p> |
| <p>3. Conservation Outreach</p> | <p>By December 2021 no local people will be hunting in the highest and high priority patrol areas and by December</p> | <ul style="list-style-type: none"> Increasing knowledge and respect of the NC-NX boundary, zones and biodiversity values, | <p>3.1. Develop a culturally sensitive Outreach Strategy in partnership with NNP1PC to enhance the local villagers and general public awareness on the zoning and importance of</p> |

| Components | Threat Reduction Objectives | Expected Results | Activities |
|--|---|--|--|
| | <p>2022 there will be no local people hunting in the medium priority areas of the TPZ.</p> <p>By December 2024 Illegal hunting in the CUZ will be reduced by 60% and by December 2026 reduced further to 80% from 2018 levels</p> | <p>while changing behaviours to stop illegal activities.</p> <ul style="list-style-type: none"> • GOL staff change attitudes, thinking, and belief regarding conservation impact including the way of and attitude change about the conservation of NC-NX. • Local villagers have access to a grievance mechanism and their concerns investigated and resolved. | <p>biodiversity conservation in NC-NX that promotes sustainable use of the lands and resources inside the CUZ for the six communities around the NC-NX and explains the regulation that governs the NC-NX as a whole.</p> <p>3.2. Outreach plans for annual workplan from 2019 – 2028 will be created following proven steps in developing effective conservation outreach programs (Annex 13).</p> <p>3.3. Conduct annual collaborative meetings with outreach stakeholders to seek synergies and areas where support can be sought from other GOL agencies.</p> |
| <p>4. Conservation Linked Livelihood Support</p> | <p>No illegal timber and non-timber extractive activities will be detected in TPZ by 2021</p> <p>All illegal logging will decrease by 85% in the CUZ by 2021 compared to 2018. And no illegal extractive activities will be detected in the CUZ by 2030</p> | <ul style="list-style-type: none"> • Opportunities for agriculture improvement in the CUZ of NC-NX are identified and coordinated with NC-NX livelihood support activities to ensure complementarity and sharing of lessons learned. • Conservation contracts are created with community members who use land and forests inside the CUZ of NC-NX. • Increased tenure and access to sustainable harvest of NTFPs in the CUZ. • Villagers have greater respect for and involvement in managing the CUZ within the NC-NX. • Improve the communities’ income through sustainable management including harvesting and sale of NTFPs • Increased but sustainable harvest of native fish, while the FCZ contributes to the protein security. • Contracted villagers detect and remove snares in the TPZs and earn a living. | <p>4.1. Develop conservation agreements with the target communities living next to and around the NC-NX for conservation linked livelihood activities that will be provided using the free, prior, informed consultation (FPIC) that leads to broad community support before signing.</p> <p>4.2 BOMU will identify agriculture extension partners (e.g. World Bank and Lux Dev) that work on natural resource-based livelihood support activities in the target NC-NX village to share information and ensure complementarity.</p> <p>4.3. The BOMU in partnership with Department of Technical Extension and Agro-Processing (DTEAP), Ministry of Agriculture and Forestry (MAF) will conduct a socio-economic assessment to investigate the current agricultural and agroforestry production, production methods, current yields, marketability and returns.</p> <p>4.4. Agricultural and agroforestry staff from DTEAP, MAF will work with PAFO and BOMU to identify how to achieve significant improvements that could be recommended and supported, regarding their current production methods, that would improve the yields from the inputs being made, or whether there are different crops or products that would be</p> |

| Components | Threat Reduction Objectives | Expected Results | Activities |
|------------|-----------------------------|--|--|
| | | <ul style="list-style-type: none"> The number of snares encountered in the NC-NX by patrol teams and threats monitoring teams decrease in high, highest and medium patrolling areas of the NC-NX TPZ. | <p>better in the village situation. They also need to help villagers testing the new methods, techniques or implementing existing proven techniques, proposing recommendations on how communities can improve production and marketability without increasing existing land use in the CUZ.</p> <p>4.5. Review NTFP status and harvest regime assessment in the six communities around NC-NX to identify which NTFPs are important to the communities and which NTFPs appear to be harvested sustainably and which are under threat and declining.</p> <p>4.6. Based assessment villagers will consider objectives from an NTFP management plan, and which of the NTFP is a priority for support in management planning.</p> <p>4.7. Select a subset of NTFPs to develop management protocols for sustainable management in the CUZ.</p> <p>4.8. The BOMU and NNP1PC will design and discuss the strategy in developing FCZ as part of the NC-NX fisheries management and fish conservation.</p> <p>4.9. The BOMU Outreach Team will work with other GOL counterparts to deliver community outreach that promotes FCZ in all six communities around the NC-NX.</p> <p>4.10. Develop a mechanism that links snare collection with village livelihoods, poachers and impoverished families in Vang Phieng village.</p> <p>4.11. In Vang Phieng village, Identify the village forestry volunteers and the disadvantaged villagers who know the areas of highest biodiversity in the TPZ.</p> <p>4.12. Develop a benefit sharing mechanism based on the lessons learned and existing mechanisms established in Lao PDR that links snare collection with village livelihoods and poachers in Vang Phieng village.</p> |

| Components | Threat Reduction Objectives | Expected Results | Activities |
|-----------------------------------|---|---|---|
| | | | 4.13. Conduct snare removal trips into the highest priority biodiversity area within the TPZ at regular intervals. |
| 5. Coordination and collaboration | Leverage the Project’s resources and impacts through partnerships and cooperation with other development partners and research institutions | <ul style="list-style-type: none"> • Increased likelihood of successful collaboration on enforcement of biodiversity regulation between relevant parties. • Increased likelihood that local communities will improve their living standards, use the local natural resources in a sustainable manner and not engage in illegal hunting or trading in wildlife. • Improved knowledge and understanding about the species diversity and abundance in NC-NX. • Increased likelihood of obtaining additional funding to support biodiversity management in NC-NX. | <p>4.13. Conduct snare removal trips into the highest priority biodiversity area within the TPZ at regular intervals.</p> <p>5.1. Conduct interagency consultations.</p> <p>5.2. Conduct training and awareness raising of village and district officers as well as the Lao Military officers on relevant law enforcement in the NC-NX with a focus on TPZ.</p> <p>5.3. Collaborate with the Lao Border Military and Vietnamese Counterpart on key biodiversity species identification, border security, enforcement of illegal logging and wildlife trade, reporting to the relevant GOL agencies.</p> <p>5.4. Collaborate with Pu Mat National Park.</p> <p>5.5. Collaborate with other development partners working in the same or adjacent area on biodiversity conservation and livelihood development.</p> <p>5.6. Cooperate with the research and academic institutions in the country and regions.</p> <p>5.9. Coordinate and cooperate with other project developers in the areas.</p> |

FIGURE 5-6 THE OVERALL INSTITUTIONAL ARRANGEMENTS FOR THE NNP1 WATERSHED MANAGEMENT AND NC-NX BIODIVERSITY OFFSET MANAGEMENT



As illustrated in **Figure 5-6**, the Ministry of Agriculture and Forestry, MAF is the national authority on management of forests, biodiversity and fisheries, and as such MAF is the overall supervisory and decision-making body on forest resources, wildlife, fisheries and biodiversity related issues in the protected areas, such as: NC-NX, throughout the country. The Biodiversity Offset Management Committee (BOMC), is chaired by the Bolikhamxay Provincial Governor, and MAF is represented through the Department of Forestry, DOF. The BOMC provide an oversight role, approving plans and budgets, supervising the implementation and ensuring coordination with concerned government bodies. The BOMU is directed by an appointed staff from the Provincial Agriculture and Forestry Office it is the implementing bodies working hand-in-hand with NNP1PC’s technical team and the biodiversity conservation service provider. The service provider will be contracted by ADB under a Technical Assistant grant to the company but will on technical and practical matters be managed by NNP1PC and function as a technical arm of the Company.

The Department of Forestry (DOF) is responsible for financial management of the funds that NNP1PC will provide in accordance with the Concession Agreement. DOF will also provide technical advice and oversight support to Bolikhamxay PAFO and NNP1PC for the implementation of the BOMP. NNP1PC will directly manage all other funds to ensure implementation of the BOMP.

The budget that NNP1PC will provide for implementation of GOL responsibilities and activities under the BOMP is detailed in the plan and is not repeated here.

The six components of this management plan and the corresponding activities will only be effective at addressing threats if the plan is kept alive through ownership by NNP1PC, villagers, GOL partners, and effective implementation with adaptive management as change begins to happen. The threats to the conservation targets in the NC-NX ecosystem, particularly industrial snaring and land conversion, are severe and require quick and effective action to reverse the current downward health trends of the NC-NX, its riverine forests and wildlife. Regular meetings to forge close government collaboration and ownership at the provincial and district levels, community engagement, and effective TPZ patrolling, along with the other actions outlined in this plan should

reverse these trends. This collaboration is necessary to ensure that the policies of the Lao Government are implemented to the fullest extent to protect the biodiversity in the NC-NX.