

資料－6 参考資料

- 資料－6 (1) ステークホルダーミーティング議事録
- 資料－6 (2) 環境遵守証明書
- 資料－6 (3) 初期環境影響評価書 (小水力)
- 資料－6 (4) 初期環境影響評価書 (配電線)
- 資料－6 (5) 住民移転計画書 (小水力)

Lao's People Democratic Republic

Peace Independence Democracy Unity Prosperity

Minutes of

1rst Stakeholders Meeting

The meeting was held on 11th September 2012 at Gnot Ou District, Phongsaly Province

The meeting was chaired by Mr. Kongkheo Khantaphom, Deputy District Party Secretary/ and Deputy District Governor and Acting Governor, officially opened at 8:30 am and attended by various Government departments, village representatives, community organization (see attachment for detail).

Mr Kongkeo, in his opening speech, welcome the JICA Study Team led by Mr Jun Tamakawa, and expressed his appreciation to JICA, that provides funding for this project. He also stressed the project will definitely make a great contribution to the government poverty reduction program. He informed

Following the opening speech, Jica Study Team made a presentation, by using power point slides to describe the project and what was proposed.

Meeting was divided into two Parts as follow:

Part I : Presentation of proposed project

The presentation covered the following:

- Objective of the project- that is to construct Mini Hydro of approx. 500Kw and to construct distribution lines in a remote villages in Gnot Ou district
- Project layout and project components, eg the location of diversion dam, penstock and powerhouse area
- The expected impact to surrounding environment, in particular impact to livelihood of the villagers as well as their assets.

Part II: Consultation & Discussion Session

Part two of the project covered, discussions of impact and how and if compensation would be implemented. Participant exchanged comment and advices.

Followings were issues and concern raised in this part the meeting:

- There will be high volume water during wet season, with large boulders and debris flowing down the river.
- Due to geology of the surrounding mountains, landslides occur during the wet season, along both road and river banks. This also contributes to the river sedimentation in Nam Ou and high turbidity.
- Fish stock, like everywhere else in Laos, are declining due mainly to over fishing , used illegal fishing equipment(dynamite, poison , electric etc..)
- Possible flooding of upstream towns that are along the river. This could impact rice and corn fields as well.

- With the end of the Sugar Cane Concession in 2013, the district objective is to change crop production to Tea and Coffee, to assist in the increase of the local economy and reducing the erosion, caused by sugar cane plantation

Other comments made by participants included:

- Need to have “watershed conservation program” as part of Mini Hydro project, it is to ensure long term viability of the project. (- **CaA**).
- Compensation should be carried out fairly (-**Ban Loum, Head of Village**).
- During construction phase of the project, turbidity of water will increase, mitigation measured should be carefully followed (**Publicwork Department**).
- At present, Electricite du Laos (EdL) is importing electricity from China at .58 Yuan per kw/ hour or roughly 7000kip kw/hour. On average, EdL buys power annually for 50million Kip per year, selling to the district at 20million kip per year, to a loss of 30million Kip per year.
EdL stated they would be very happy to incorporate electricity from this project into the grid to reduce expenditure (**EdL**).

The meeting closed 12:00 noon. All attended lunch at the invitation of Acting District Governor.

Minute of meeting recorded by Manomai

The pictures show meeting atmosphere.



List of Participants

(1st Stakeholders Meeting 11 Sep 2012, Outai, Gnot Ou district Phongsali Province)

No	Names	Organisation	Position	Tel
1	Mr Anousak Phongsavat	IREP-MEM	Deputy Director, IREP	55507714
2	Mr Somchit Sithivong	Provincial Energy & Mines	Director (Di)	55688081
3	Mr Kongkeo Chanthaphom	Gnod Ou district office	Acting Governor	56828209
4	Mr Bounthet Inchak	Gnod Ou district office	Deputy Governor	22398643
5	Mr Somvang Soumvilay	District-Ag.Forest dept	Party's permanent secretary	22845810
6	Mr Bounleuth Dongvan	District Publicwork	District head (Dh)	55537556
7	Mr Laykham Bounphaxai	District Office	Dh	59335666
8	Mr Peng Chanthaphom	District Natural Resource & Environment/ Lands (DNRE/L)	Dh	59766186
9	Mr Ouneua Sivanpheng	Provincial EDL	Division Head (Province)	55555514
10	Mr Oun Sosiliphom	Defense	Dh	22847603
11	Mr Soulayvane Kharthachak	E&M- work-Unit	Dh	23903635
12	Mr Phonsavane Sipaseut	IREP	Unit Head	55912796
13	Ms Boulay Phommalat	Phouxang Village	Village head	22028137
14	Mr Genshiro Kano	JICA- Study Team		2029946814
15	Mr Naoyuki Tsuda	JICA- Study Team		55028470
16	Mr Senchi Suzuki	JICA- Study Team		29946815
17	Mr Naoki Kosaka	JICA- Study Team		+818040849688
18	Mr Teru Miyazaki	JICA- Study Team		54146049
19	Mr Ko Kawano	JICA- Study Team		
20	Mr Shigeki Wada	JICA- Study Team		
21	Mr Chareun Sayakoummane	Chareun and Associates Ltd (CaA)	Di	55520990
22	Mr Jun Tamakawa	JICA- Study Team	Team leader	
23	Mr Phonxai Thiphasone	Provincial E & M	Admin Head	59620999
24	Mr Van Ali	Provincial EDL	Head supply unit -Gnod Ou	28800990
25	Mr Xaipaseut Dalavan	Provincial EDL	Head Technical unit -Gnod Ou	22846438
26	Mr Sonphet chanthala	Province E&M	Technical Officer	23887819
27	Mr Bounkthu Khenkham	Province E&M	Technical Officer	97899722
28	Mr Theng Choy	Loun Village	Secretariat	23902870
29	Mr Tom keonamvong	District Police	Head	22845919
30	Mr Manomai	CaA	Senior staff	22000650
31	Mr Santi Sayakoummane	CaA	Environmental Officer	

Lao's People Democratic Republic
Peace Independence Democracy Unity Prosperity

Minutes of Meeting

The meeting on 18th December 2012 at Gnot Ou District, Phongsaly Province was chaired by Mr. Kongkheo Khantaphom, Deputy District Party Secretary/ and Deputy District Governor, acting Governor.

The meeting was officially opened at 8:30 am and was attended by many government Department and organization officers (see attachment for detail).

- I.) Objective of this meeting.
 1. The proposal from the Japanese Expert regarding the outline of the project.
 2. The proposal from the Japanese Expert regarding the Initial Environment study.

- II.) Questions from different Departments and organizations.
 1. Institute of Renewable Energy Promotion - proposed that the Department of Public Work needs to consult with the Project Manager before any construction should take place.
 2. The Department of Public Work - proposed to consult with contractors first in order to reduce any environmental impact in the project area. They also asked for budget funding to build the Flood Way in the project area.
 3. Comrade Kong Lakeo and comrade Khamphoy Vannavong, whose corn fields will be affected by the project, asked for compensation for their 0.3 hectare of their land area.
 4. The Department of Energy and Mine - will consult with the concerned organizations to establish a Management Body to deal with any compensation that will occur. They proposed that separate housing should be built for the Dam site workers.
 5. The District Head - asked for one year compensation during the construction period. After the completion of the Project, there will be some more detail calculation on the actual affected area for compensation.
 6. Department of Environmental Conservation - will send technical officials to assess the actual corn fields, to protect and conserve water resources and to stop the sugar cane plantation in order to promote reforestation.
 7. Department of Agriculture and Forestry – proposed that after the completion of the Project, there should be budget funding to look after the catchment areas and to provide covers for open channels in order to prevent accidents.
 8. Proposed that JICA Project, according to their ability, should build access roads for some of the 3 Villages that have no access roads.

III.) According to the discussions, everyone in the meeting had come to the agreement and the meeting was concluded at 12:00pm

This recording of the meeting is valid from this date onward.

Signed and Sealed by Deputy District Party Secretary

Mr. KongKheo Khamtaphom

Gnot Ou District 18th December 2012

Recorded by Mr. Manomay Sengmany

List of Participants

(2nd Stakeholders Meeting 18 Dec 2012 Outai, Gnot Ou district Phongsali Province)

No	Names	Organisation	Position	Tel
1	Mr Kongkeo Chanthaphone	Gnod Ou DistrictOffice	Acting Governor	56828209
2	Mr Somchit Sitthivong	Provin Energy and Mines	Deputy Director (Dd)	556888081
3	Mr Boun Theth Inchack	Gnod Ou district office	Deputy Governor-Dg)	22998643
4	Mr Inpeng Sochayvong	Gnod Ou district Lao NationalConstruction Front	Director (Dir)	22845817
5	Mr Laykham Bounphaxaison	Provincial cabinet Office	Dir	59335666
6	Mr Sak Sipaseut	District EDL	Dd	95688454
7	Mr Bounthavy Sisoukhan	District Publicwork	Dd	82395075
8	Khamchanh Sithilat	District Natural Resource & Environment (DNRE)	Dd	55688101
9	Mr Bounxai Phommathet	District Planning & Finance	Dir	22845655
10	Mr Bounleut Khongsakeo	Province Planning Dept	Tehnical Officer (To)	22929955
11	Mr Chansamai Khouakham	District Youth Org	Dir	58006449
12	Mrs Senglot Chanda	District Lao Women Union	Dir	22845996
13	Mr Phonphet Vongsa	Province Cabinet	To	28760998
14	Mr Khamlay Xayadeth	District Agri & Forest Dept	Dd	22245529
15	MrBounleuth Dongvan	Province Publicwork	Dir	55537556
16	Mr Pheng Chanthaphone	Province Natural Resource & Environment (PNRE)	Dir	56481958
17	Mr Khamphoy Navong	Corn field Owner	Retired District Official	22849201
18	Mrs Boualay Phommalat	Phouxang Village	Village Head	56512362
19	MrVankeo Solaphom	Loum Village	Village Head	
20	Mr Akira Niwa	Jica – head Quater	Senior Adviser	
21	Mr Hidetaka Koseki	Jica – head Quater	Staff	
22	Naoyuki Tsuda	Jica Study Team	Deputy Team leader	55028470
23	Nabuo Hashimoto	Jica /MEM	Expert	55504411
24	Shigehi Wada	Jica Study Team	Staff	55028422
25	Manomai Sengmany	Chareun &Associate Ltd	Expert	22000650
26	Jun Tamakawa	Jica Study Team	Team Leader	28989803
27	Mr Khamphara Sisamontry	IREP/MEM	Dd	55601154
28	Mr Konthong Sommla	District /Mpt	Dd	55019942
29	Mr Masato Togawa	JICA	Chief officer	55512637
30	Mr Yuzurio Susumu	JICA	Senior staff	55517635
31	Mr Bounma	Province Dept Energy & Mine	To	97899283
32	Mr Chomuang	District dept Energy & Mine	To	28764040

Phongsaly Province

Certificate

No. 0113/NRE

Department of Natural Resources and environment

Date 20/02/2013

The environment of Gnod Ou mini hydropower Project, installation capacity 450 KW at Ban Phor ,
Gnod Ou district, Phonsaly Province.

- In reference to Decree of Environment Impact Assessment in Lao PDR No.112/PM, dated 16/02/2010
- In reference to Environmental Protection Law No.02/99 MONRE, dated 3/4/1999.

Gnod Ou mini hydropower Project, Installation capacity 450 KW at Ban Phor, Gnod Ou District. This area is not affected
By the project such as habitat, production area, no affect to forest and to other Protected areas. This project is a grant aid from
Japanese government (JICA) including Initial Environmental Examination(IEE) report.

Therefore, Department of Natural resources and Environment of Phongsaly Province issues this environmental
compliance certificate as evidence.

Note:

1/. This use of this certificate is prohibited for other project
and Do not copy

Director of Department of Natural resources and Environment

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ແຂວງຜົ້ງສາລີ
ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ

ເລກທີ 0113 /ພຊສ
ວັນທີ 10 / 02 / 2013

ໃບຢັ້ງຢືນ

ດ້ານສິ່ງແວດລ້ອມໂຄງການກໍ່ສ້າງເຂື່ອນໄຟຟ້ານ້ຳອູ, ຂະໜາດ 450 KV ຢູ່ເຂດບ້ານພີ, ເມືອງຍອດອູ, ແຂວງຜົ້ງສາລີ.

- ອີງຕາມຄຳລັດວ່າດ້ວຍການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມຢູ່ ສ ປປ ລາວ, ສະບັບເລກ ທີ 112/ນຍ, ລົງວັນທີ 16/02/2010.
- ອີງຕາມກົດໝາຍວ່າດ້ວຍການປົກປັກຮັກສາສິ່ງແວດລ້ອມ ສະບັບເລກທີ ເລກທີ 02/99/ສພຊ ວັນທີ 3/4/1999

ໂຄງການກໍ່ສ້າງເຂື່ອນໄຟຟ້ານ້ຳອູ, ຂະໜາດ 450 KW ຢູ່ເຂດບ້ານພີ, ເມືອງຍອດອູ ແມ່ນເປັນເຂດທີ່ມີຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ, ເຂດຜະລິດຂອງປະຊາຊົນ, ບໍ່ມີຜົນກະທົບຕໍ່ປ່າໄມ້ ແລະ ເຂດອະນຸລັກອື່ນໆ, ເປັນໂຄງການຊ່ວຍເຫຼືອຫຼ້າຂອງອົງການໄຈກາລັດຖະບານຍີ່ປຸ່ນ ພ້ອມທັງມີບົດປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ-ສັງຄົມ ດັ່ງນັ້ນ, ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງຜົ້ງສາລີ, ຈຶ່ງເຫັນດີອອກໃບຢັ້ງຢືນດ້ານສິ່ງແວດລ້ອມສະບັບນີ້ເພື່ອໄວ້ເປັນຫຼັກຖານຢັ້ງຢືນ.

ໝາຍເຫດ:
1/ ໃບຢັ້ງຢືນສະບັບນີ້ສຳມາດໃຫ້ອື່ນນຳໄປໃຊ້ ແລະ ສຳມາດປອມແບງຢ່າງເດັດຂາດ.

ສີ່ງຢືນ ຫົວໜ້າພະແນກ
ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ

ສີ່ງຢືນ ສີ່ງຢືນ

Gnod Ou Mini- Hydro Power Project

Initial Environmental Examination (IEE)



Prepared for:



Tokyo Electric Services Company, LTD (TEPSCO)

Prepared by:



Chareun and Associates Co. Ltd

28 December, 2012

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Vientiane, Laos P.D.R.

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Abbreviations

AP	Affected Persons
BCA	Biodiversity Conservation Area
CA	Concession Agreement
CaA	Chareun and Associates
DAFO	District Agriculture and Forestry Office
DEP	Department of Electricity Promotion
DESIA	Department of Environment and Social Impact Assessment
D-L	Distribution Line
DLUP	Department of Land Use and Planning
DNRE	District Natural Resources & Environment
DOF	Department of Forestry,
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMO	Environmental Management Office
ESMU	Environmental and Social Monitoring Unit
ESD	Environment and Social Division
ESIA	Environmental and Social Impact Assessment
GRC	Grievance Redress Committee
GoL	Government of Lao PDR
ha	Hectares
HC	Head Contractor
IEE	Initial Environmental Examination
IREP	Institute of Renewable Energy Promotion
JICA	Japan International Cooperation Agency
kWh	Kilowatt hour
kW	Kilowatt
LACP	Land Acquisition and Compensation Plan
MAF	Ministry of Agriculture and Forestry

masl	Meters above sea level
MHP	Mini-Hydropower Project
MEM	Ministry of Energy and Mines
MIC	Ministry of Information and Culture
MOF	Ministry of Finance
MONRE	Ministry of Natural Resources and Environment
MOU	Memorandum of Understanding
MPWT	Ministry of Public Works and Transport
MW	Megawatt
NBCA	National Biodiversity Conservation Area
NIREA	National Institute for Religious and Ethics Affairs
NLMA	National Land Management Authority
NPA	National Protected Area
NPAD	National Protected Area Division
NTFP	Non-timber Forest Product
PAP	Project Affected Persons
PCU	Project Compensation Unit
PDA	Project Development Agreement
PDR	Peoples Democratic Republic
PESMU	Project Environmental and Social Monitoring Unit
PNRE	Provincial Natural Resources and Environment
PSF	Professional Service Firm
RAP	Resettlement Action Plan
RoW	Right of Way
TOR	Terms of Reference
VDU	Village Development Unit
WA	Workplace Agreement

Chapter I

Introduction

1.1 Background of the Study

Power demand in Lao PDR has been increasing rapidly within the past ten years. During this time, the national electrification ratio of Laos has increased from 36% in 2000 to 48% in 2005 and to 73% in 2010. By region, the electrification ratio in the North is at 59%, with 96% in the Central area and 70% in the South. The Lao Capital Vientiane, in the central part of Laos, is at 99% electrification which particularly shows how well established urban areas are. However, if compared to other parts of the country electrification is still very under developed in rural and remote areas. A target by the Government of Lao (GoL) is to improve national electrification ratios to 80% by 2015 and to 90% by 2020. This will be achieved by reducing internal disparities between urban and rural areas, and poverty reduction in remote areas.

Phongsaly which is located in the northern part of Laos sits on the borders of China and Vietnam, and is one of the most under developed Provinces in comparison to the rest of the country. With electrification in Phongsaly at only 23% in June of 2011, the GoL has set a high priority on improving electricity in this Province.

In accordance with the above, in 2008 the GoL requested the Government of Japan (GoJ) for Grant Aid for rehabilitation of two Mini-hydropower Plants (MHP). After discussion between Japan International Cooperation Agency (JICA) and GoL, the development of Gnod Ou Mini-Hydropower Project was selected as Japan's Grant Aid Project.

1.2 Objectives of the Initial Environmental Examination (IEE)

The main objectives of this IEE are:

- To meet the requirements of the regulations concerning the Environmental Examination of the MHP for GoL approval to allow the construction to commence.
- To present the environmental and socio-economic baseline data of the study area.
- To determine possible environmental impacts related to the construction and operation of the MHP and provide a series of mitigation measures to address these impacts in an Environmental Management and Monitoring Plan (EMMP).

Any compensation and resettlement measures are dealt with in a compensation action plan.

- To inform the stakeholders and communities about the project via a series of public consultation meetings.

1.3 Scope of work

The precondition of the Project is to apply the scheme of “Japanese Program Grant Aid for Environment and Climate Change”. In this regard, the objectives of the preparatory survey are:

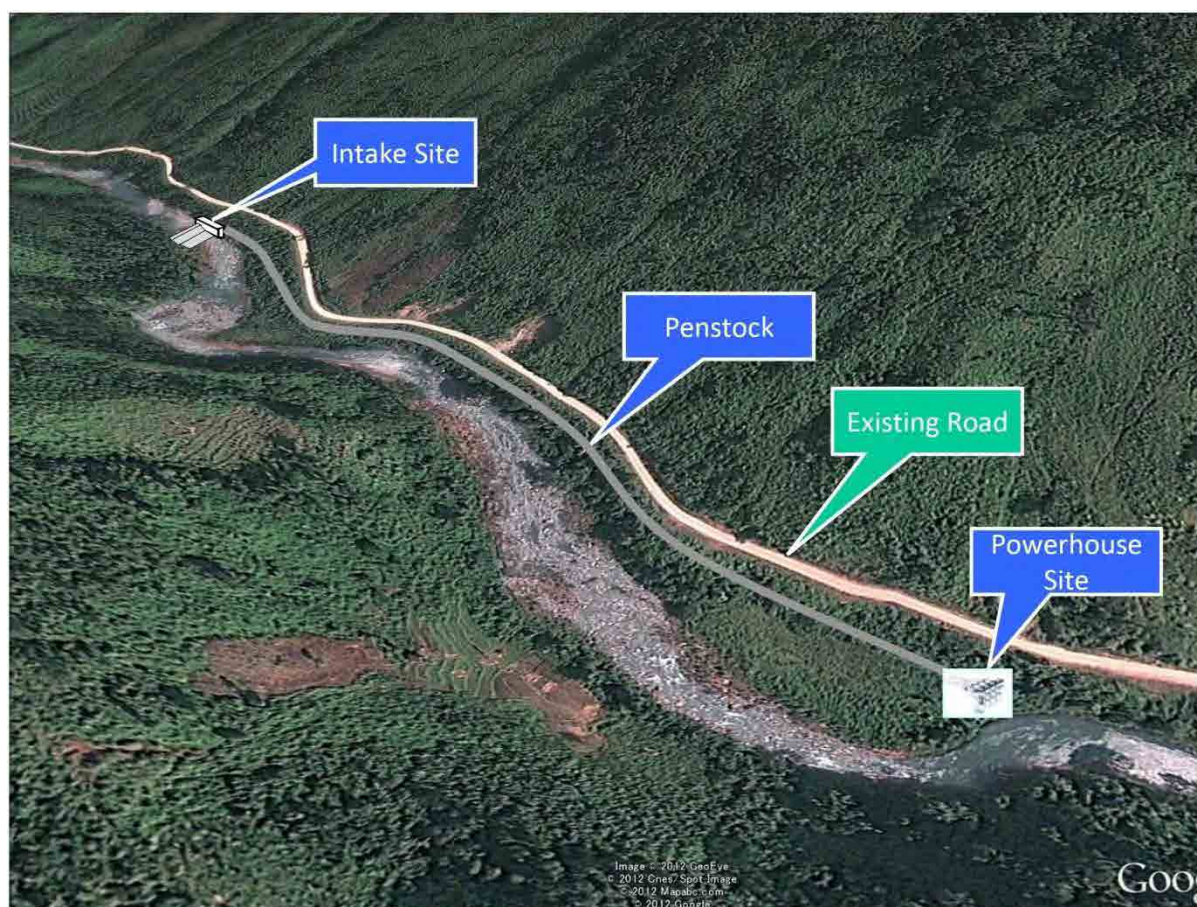
- To propose a Project implementation plan supported with outline design and cost estimation, which meets the scheme mentioned above, and
- To propose the scope of Project components for which GoL should be responsible, and those matters to be carefully followed up, such as implementation plan, formulation for operation and maintenance of the power plant.
- To obtain physical, biological, cultural, archaeological, socio-economic data, along the defined route as shown Figure 1-1.
- To identify impacts and recommend mitigation measures, including monitoring program to ensure mitigation activities are effectively carried out.

1.4 Study Area

The main study site for the MHP is located along the Nam Ou River approximately 5km from the main Township of Ou Tai.

Figure 1-1 shows the Project component layout. It illustrates intake site, alignment of penstock, power house site and location of existing road. The distance between intake and power house is approximately 700m.

Figure 1-1 Project component layout



1.5 Methodology

As this Project is expected to be implemented under Japan's Grant Aid Scheme, it is important for the GoL to fully understand their role and responsibilities as an Aid beneficiary. The survey team will assist GoL in prior preparation and procedures for smooth implementation of the Project.

The Japanese Cabinet meeting to obtain an approval for the Project as a Japanese Grant Aid Project is scheduled in February 2013. Time schedule of the preparatory survey will be duly controlled to avoid any delay in its progress.

A survey team was responsible for going into the field and collecting relevant environmental and socio-economic data, around the MHP site. This involved discussion meetings with villagers regarding the Project, as well as completion of questionnaires. The impacts and benefits of the Project were also discussed, to which the villagers supported. Socio-economic data was collected by interviews with affected persons (AP) with preset questionnaires.

1.5.1 Pre-survey

The pre-survey study involved compiling information on possible impacts from the Project such as; which villages would be affected, if any compensation would be needed and potential environmental impacts.

Prior to arrival of the survey team it was important to inform local District Authorities of the site visit and the time frame in which the work would take place.

1.5.2 Field survey

The field surveys then allowed for detailed data collection regarding the main impacts of the Project. This involved consultations with local villagers to introduce the Project to them, as well as determine if they had any concerns.

The field surveys and interviews were carried out with the Head of Village in every potentially affected village upstream and downstream from the MHP site. The survey team consisted of four personnel including a member from the local District Office.

At every village meeting, the locals were informed about the general objectives of the Project. This included benefits of the Project, as well as the potential impacts to the environment and socio-economic condition. Loss of asset and compensation requirements for the Project was specifically discussed with records of land ownership and type of productive land recorded.



Image 1-5a shows an interview/consultation with the head of Ban Phor village. Other villagers also gathered to provide input to the survey.

The interviews focused on the local attitudes of villagers, regarding the proposed Project and their views. It also focused on current land status, forest usage, income generation activities, wildlife condition and compensation.



Image 1-5b shows an interview with head of Ban Somxai, one of the villages downstream from the project site.

Other relevant data on general environment such as flora, fauna, other land use, water, cultural sites, health and education both in and around the Project site was also collected during the field and site visits. A list of fish species and local flora was also obtained from the local District Office. See Appendix 1 & 2.

1.6 Challenges of Study

Main challenges of study were to work around the raining season, from May to October, with August being the month with most rain.

It was also difficult to coordinate villagers for interviews, as most were tending to their seasonal crops. They were only able to participate with a limited amount of time. During the interviews, it was also observed that most socio-economic data, such as income statements, receipts for expenditure or any other forms of recorded documentation were simply unavailable. Villagers had to recall from memory such information that was required by the survey team.

Chapter II

Policy and Legislation

2.1 Overview

Policies of the GoL regarding environmental protection and impacts on communities have received support from international programs as well as through direct bilateral assistance aimed at improved resource management and biodiversity conservation. Many of these policies have been advanced by the GoL under a National Environment Action Plan, 2000 (NEAP). The key policy document for hydropower is *the National Policy for Environmental and Social Sustainability in the Hydropower Sector in Lao PDR*.

The intention of the NEAP is to highlight priorities for environmental protection, which are believed to be critical in establishing a framework for development and social equity, as well as the well being for citizens of the Lao PDR. The causes of resource degradation include the key environmental issues that include forestry, land and water management, flora and fauna biodiversity, energy (including hydropower) industrial and mining development, and transport infrastructure.

The following legislation now in force and supporting regulations in Lao PDR are relevant to ensuring environmental and socio-economic issues are addressed during design, construction, and operation of the Project.

- Decree on Environmental Impact Assessment 2010
- Regulation for the Agreement on Lao National Environmental Standards 2010
- Regulations for Compensation and Resettlement of Persons Affected by Development Projects 2010. These regulations implement Decree No192/MONRE 2005 on Compensation and Resettlement

The GoL is also a signatory in following international conventions or agreements affecting Hydropower Project Development:

- UN Convention on Biological Diversity 1996
- UN Convention for Protection of World Cultural and Natural Heritage (Ratified by GoL in 1987)
- Agreement on Co-operation for the Sustainable development of the Mekong River Basin 1995

The development of the Gnod Ou MHP in Laos PDR has to take place within a framework that covers:

- GoL policies aimed to promote hydropower Energy development, protection of National Protected Areas (NPA's) and endangered wildlife species in accordance with international treaties, protect the environment, and protect the interests of Lao persons and communities affected by development projects.
- Institutional responsibilities of GoL to control development and administration of hydroelectric power generation in the energy sector.
- The laws and regulations of the GoL approved to implement GoL Policies.

2.2 Procedure for Obtaining Initial Environmental Examination (IEE) Approval

2.2.1 Requirement for Initial Environmental Examination (IEE) Report

Under the Decree of Environmental Impact Assessment (112/MONRE), an IEE report is required to assess the environmental and social impact arising from the development of the Project. The report must include project description, social economic and environmental baseline information. It shall also include the listing of potential impact as well as form of mitigation, including budget for compensation and budget for monitoring.

2.2.2 Procedure

The Ministry of Natural Resources and Environment (MONRE) is in the process of drafting a regulation detailing procedure where the Provincial Natural Resources and Environment (PNRE) are authorized to grant approval for an IEE. This is expected to be adopted sometime in the middle of 2013.

Under current Decree Environmental Impact Assessment Division 3 article 9, PNRE can issue Environment Compliance Certificate (ECC) but subject to approval from MONRE first.

However, due to the nature of the Project (Mini Hydro Project, finance through aid program for community etc..) and according to discussion with PNRE as well as MONRE, approval at provincial level will be effective.

An IEE report will therefore be submitted to PNRE (instead of MONRE), via the Institute of Renewable Energy Promotion (IREP - Rural Electrification Division) under Ministry of Energy and Mines.

2.3 Organization Related with Enforcement of Environmental Standards

Organizations responsible for enforcement of Environmental Standards are the Ministry of Natural Resources and Environment (MONRE) and its subordinates (departmental) at Provincial and District levels. The District Natural Resources and Environment (DNRE) will be in charge of everyday responsibilities of enforcing the Environmental Standards.

The Institute of Renewable Energy Promotion (under Ministry of Energy and Mines), through its Rural Electrification Division being the “responsible” authority is also responsible to ensure parties involved (during construction & operation) observe such standards, e.g. by inclusion into contractual agreement.

2.4 Relevant Law and Acts Related with Environment.

2.4.1 Environmental Protection Law (1999) and the Decree on Environmental Impact Assessment (2010)

The increasing awareness of environmental protection and natural resource management in Lao PDR has led in the implementation of the Environmental Protection Law (EPL). The EPL specifies necessary principles, regulations and measures for managing, monitoring, restoring and protecting the environment in order to protect human health, including the protection of natural resources and the richness of nature, and to ensure the sustainable socio-economic development of the nation.

The Decrees on Environmental Impact Assessment (2010) objectives are:

- To disseminate and implement Article 8 of Law Environmental Protection, in relation to EIAs;
- To lay down principles and rules, and adopt measures on establishment, functions, management and monitoring of EIAs;
- To ensures that all investment projects of the State and private sector, both domestic and foreign, operating in Lao PDR (hereafter called „investment projects“) which create or will create adverse environmental and social impacts, are designed with the right and appropriate environmental and social impact prevention and mitigation measures or Environmental Management and Monitoring plans (EMMP);
- To effectively prevent, minimize and resolve adverse environmental and social impacts derived from investment projects;
- To contribute to the national socio-economic development, to make it sustainable.

Law on water and water Resources (1996)

It recognizes water as the principal natural resource and the need to regulate and manage exploitation, development and use of water resources in Lao PDR. The aim being to protect and sustain water resources and assure water quality is sufficient to satisfy the needs in terms of domestic, agriculture and in industrial uses.

The Lao Land Law (1997)

The Lao land law states that land within Lao PDR is the property of the national community, and individuals are assigned to effectively use the land, but not treat it as a tradable commodity. The GoL grants rights to individuals, families or organizations as either temporary right to use grants for up to five years or as thirty years “leases”. The Ministry of Finance, in conjunction with the National Land Management Authority (NLMA) in MONRE, has the responsibility for land titling, registration and leasing of land. The Ministry of Agriculture and Forestry (MAF) manages the use of the land.

An individual’s right to use land can be terminated if the State expropriates the land to uses in the public’s interest, but the State must pay appropriate compensation damages.

Decree on the Preservation of the Cultural, Historical and Natural Heritage (1997)

National heritage is classified as:

- Immovable (artifacts and ruins which due to their size cannot be moved)
- Movable (artifacts which due to their size can be removed).
- Natural national heritage (aesthetic landscapes, waterfalls, caves etc.)

Management of the National Heritage is vested with the Ministry of Information and Culture (MIC).

- Article 13 requires any removal of assets that belong to the national heritage can only be removed by approval of the MIC.
- Article 15 prohibits the destruction of national heritage assets.

Article 18 requires that any artifacts that may be discovered are to notify the district information and culture Service of the MIC within 3 days of any discovery.

This Decree must be brought to the attention of contractors during construction in case an accidental discovery is made.

2.4.2 Amended Lao Forestry Law (No.06/ Na - Dec. 2007)

It provides the framework for all implementing legislation in the forestry sector. The MAF has issued a number of regulations for the allocation, zoning and use of forestland within village boundaries and protected areas. Individuals and any organizations have the right to obtain the rights to utilized forestry resources in a sustainable manner.

2.4.3 Decree on Compensation and Resettlement of People Affected by Development Project (2006)

Decree No. 192/ MONRE 2005 define and sets out procedures, rules and measures to mitigate adverse social impacts. Implementation procedures of this Decree are detailed in Regulation 2432 (2005) and in *Technical Guidelines on Compensation and Resettlement (2010)*.

Even though this Project has no resettlement, this Decree is still relevant, because of its compensation requirement.

2.4.4 Electricity Law (2008)

It requires a license for the generation and transmission of electricity.

The principles concerning electricity projects and these are found in the Environment Management Standard for Electricity Project No. 585/MIH. DOE, dated October 4, 2001. The principles include:

All affected persons, housing, land and other assets registered at the time of population survey and asset inventories, and all who can demonstrate loss, have the right to adequate compensation for loss to income restoration in conformity with these principles. The placement of housing plots, housing and agricultural land shall be of acceptable standard, use and value to the satisfaction of the affected owner. Where relocation is required, the transition period shall be as short as possible.

2.4.5 Labor Law (1999)

The purpose of the labor law is to regulate the employment of labor and to secure harmonious working relationships and conditions for labor.

Article 6 states that:

- Priority is to be given to the employment of Lao citizens.
- A written employment contract is to be concluded between the employer and each worker and approved by both parties
- Article 7 states that :
 - Foreign workers may be employed if no qualified Lao workers are available.
 - Where foreign workers are employed a program for transferring skills to Lao workers is required.
- Article 8 shows that all employers are to have training programs to improve worker skills.
- Article 25 shows that labor can be employed for 6 days per week and 8 hours/day and not exceeding 48 hours/ week. Workers cannot be employed for more than 6 hours/ day or 36 hours/ day where hazardous workplace conditions occur, e.g. radiation, gas or smoke, dangerous chemicals and explosives, tunneling or underground, abnormally hot or cold environment and vibrating machinery.
- Article 49 requires employers to provide a safe work environment and to prepare a work place health and safety program which is to be accessible to workers. The employer is required to provide the following necessary measures for workers:
 - Good lighting, limit noise and provide adequate ventilation to remove dust and aerosols from the workplace environment.
 - Water for drinking and washing, showers, toilets, cafeteria and a changing room.
 - Proper storage of toxic and hazardous substances to reduce risk of leakage.
 - Provision of personal protective clothing.
 - Provision of guards on machines and barriers to keep workers away from dangerous machinery.
 - Provision of fire alarms and protection against electrocution.
 - Provision for training courses in worker health and safety.
- Article 50 shows that employers may request a medical certificate from the worker at the start of employment stating that they do not suffer from an occupational disease. If the worker is shown to have an occupational disease the employer may reject the worker.

- Article 25 where people work in hazardous conditions the employer is to provide an annual health check for workers. Any worker who contracts a work related illness shall be entitled to payment of all medical expenses by the employer.
All employers are to provide a first-aid kit; and when more than 50 persons are employed medical staff is to be provided.
- Article 51 deals with Occupational Injuries and employees who are injured at work are entitled to have all of their costs met by the employer. Should death result the employer will pay funeral expenses and at least 6 months" salary.
- Article 53 shows that any worker who suffers an occupational injury may receive their full salary for up to 6 months. After 6 months and up to 18 months 50% of the salary or wage is to be paid by the employer. After this period the worker will receive social security.

Chapter III

Description of the Project

3.1 Project Category

Based on the *Environmental Impact Assessment Guideline, November 2011*, the Project falls under Category 1; considered small scale and producing approximately 500kW with no storage reservoir. According to these Guidelines, for any project with generation capacity of less than 15MW, only an Initial Environmental Examination (IEE) is necessary.

3.2 Project Location

The Gnod Ou Mini-Hydropower Project (MHP) will be situated right on the Nam Ou River located between Ban Phor and Ban Champhor in Gnod Ou District in Phongsaly Province. The Nam Ou River flows in a southerly direction from Ou Neua down to through Ou Tai Township.

Figure 3-1 Project location, Phongsaly Province in the north of Lao PDR



3.3 Features of the Mini- Hydro Power Plant

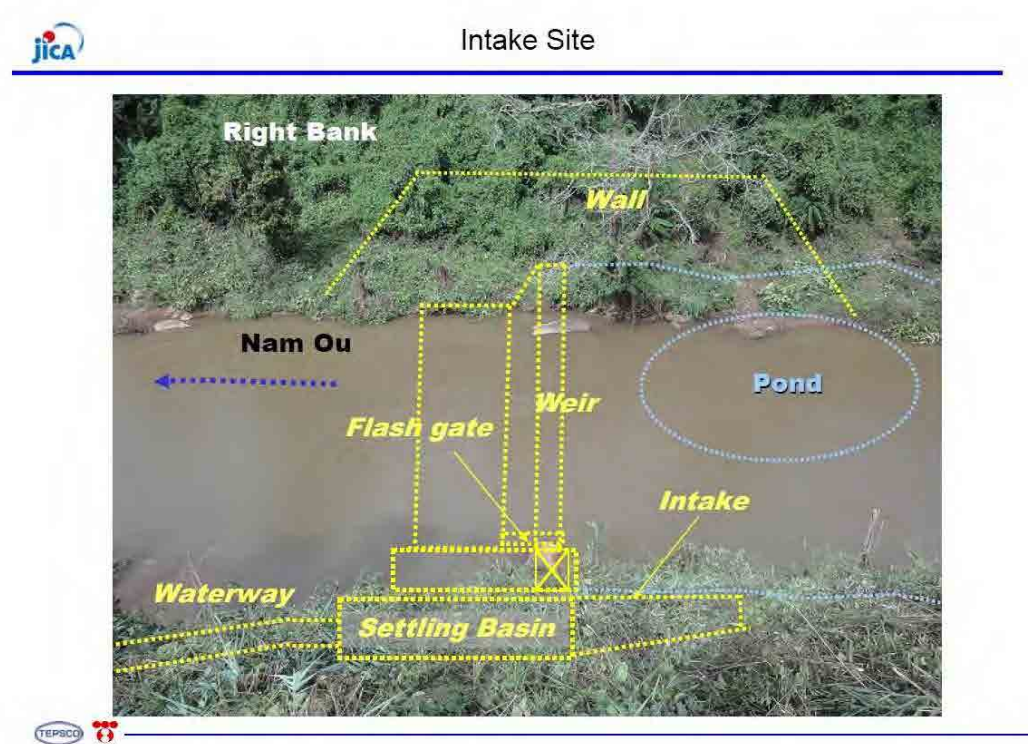
The diversion of water from the Nam Ou River through a 700m penstock and into the powerhouse, however this will be a “run of the river” type diversion with no storage reservoir.

Main Project features are:

- Weir height: 4m and length of 35m
- Gross head: 10.8m (including height of weir)

- Maximum discharge: 7.5 – 8 m³/s
- Penstock: Steel pipe 2m in diameter
- Submerged pump turbines generators, 3-4 units
- Installed capacity of approx 500kW

Figure 3-2 Alignment of intake weir



The intake site shown in Figure 3-2 above illustrates the features of the weir, including a fish gate and settling basin. It also has the ability to flush out sediment when required.

Figure 3-3 Alignment and positioning of penstock route

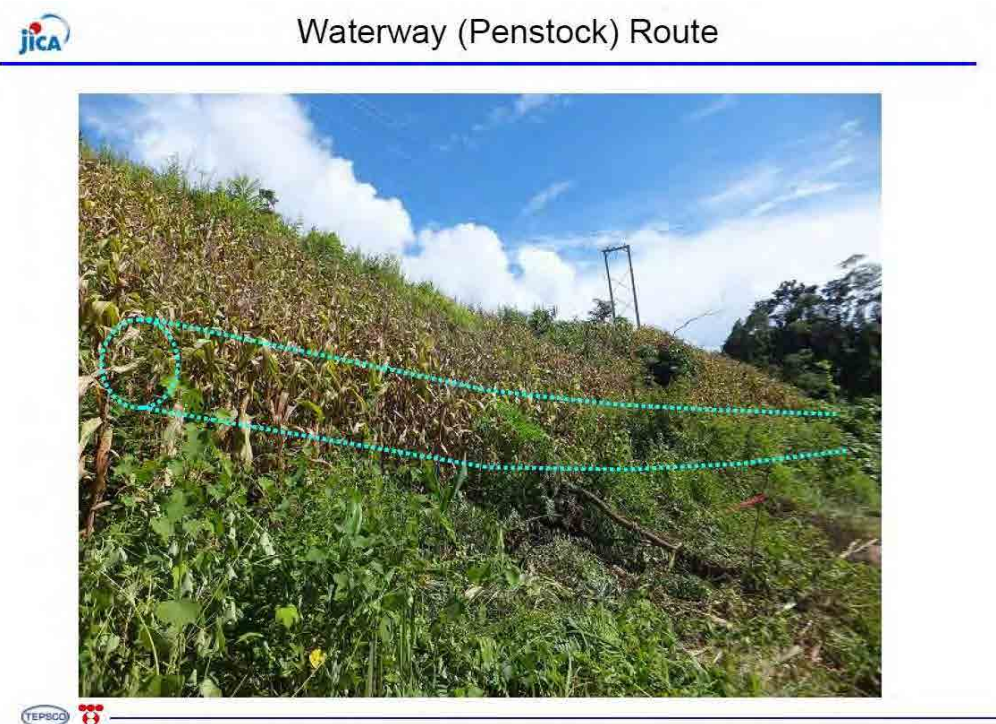
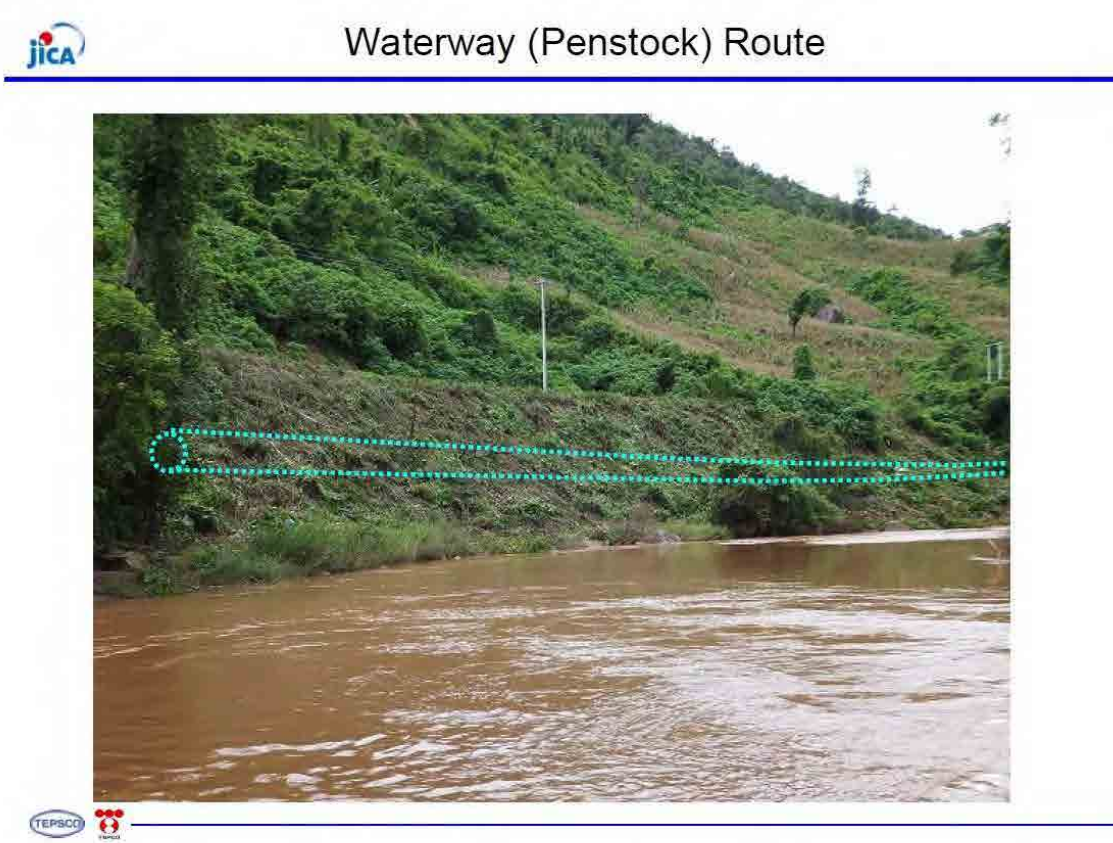
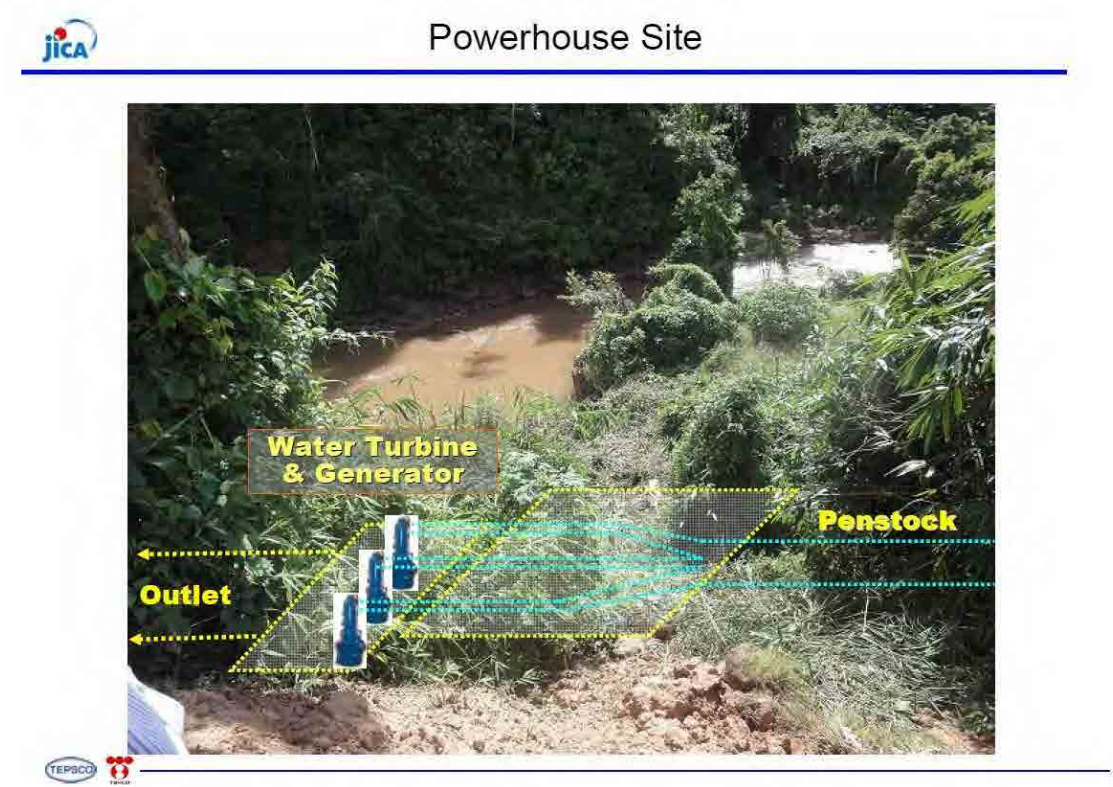


Figure 3-4 Penstock alignment in relation to Nam Ou



The penstock shown in Figure 3-3, 3-4 will be placed above ground along the side of the river bank, showing the terrain in which the pipe will be placed. The gross head from intake to powerhouse (Figure 3-5) will be 6.8m not including the weir.

Figure 3-5 Powerhouse site design layout



3.4 Site Development and Construction

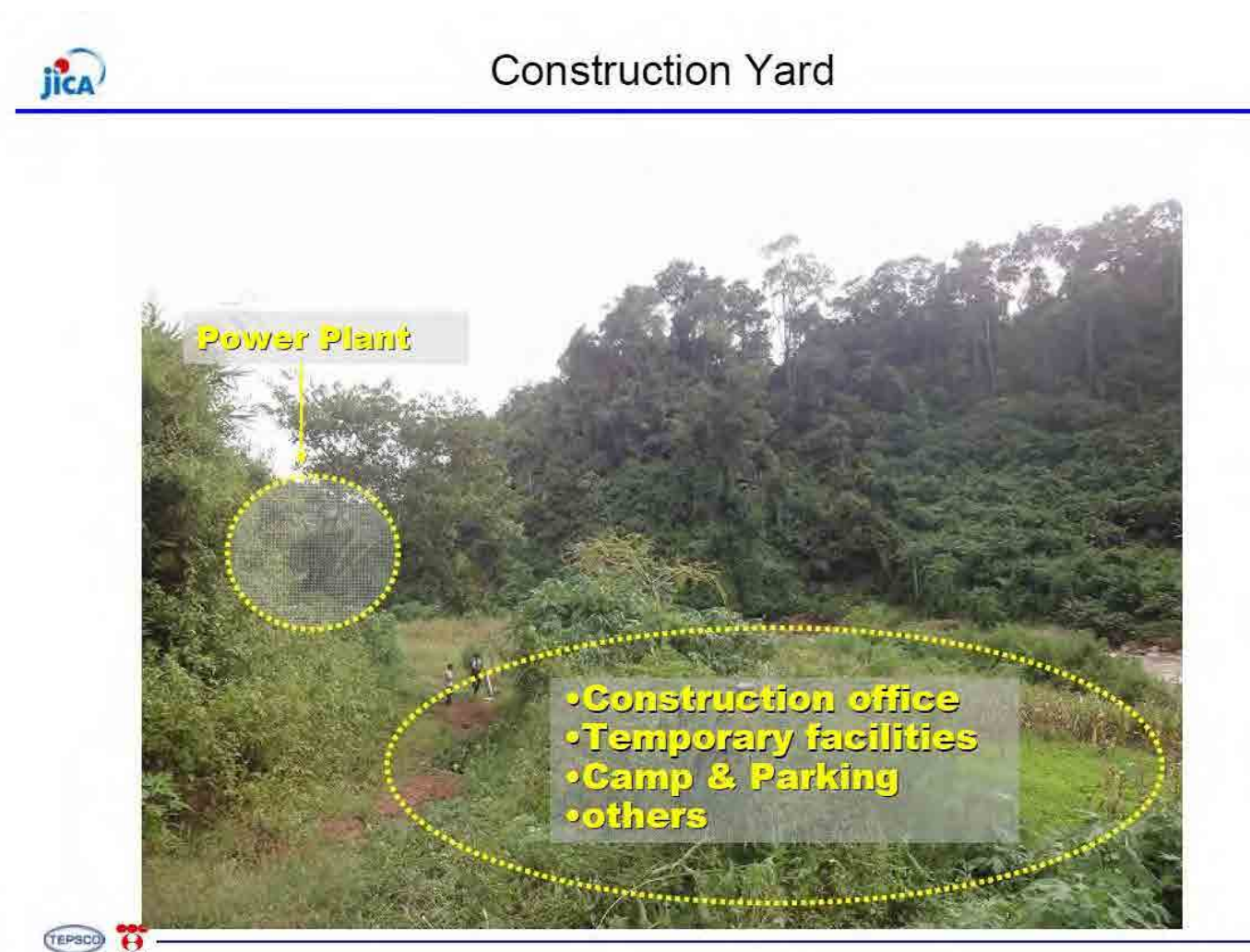
The Project will be implemented under the Japan's Grant Aid Scheme and will be required to comply with JICA's guidelines for the Grant Aid when conducting design and cost estimation (for both Distribution Line and Mini-hydro construction). Compensation measures will also be calculated to those who lose productive land during construction and operation phases.

On site facilities during construction and operation phases will include:

- Construction yards and offices (Figure 3-6)
- Temporary camps and toilets
- Parking facilities
- Quarry Sites

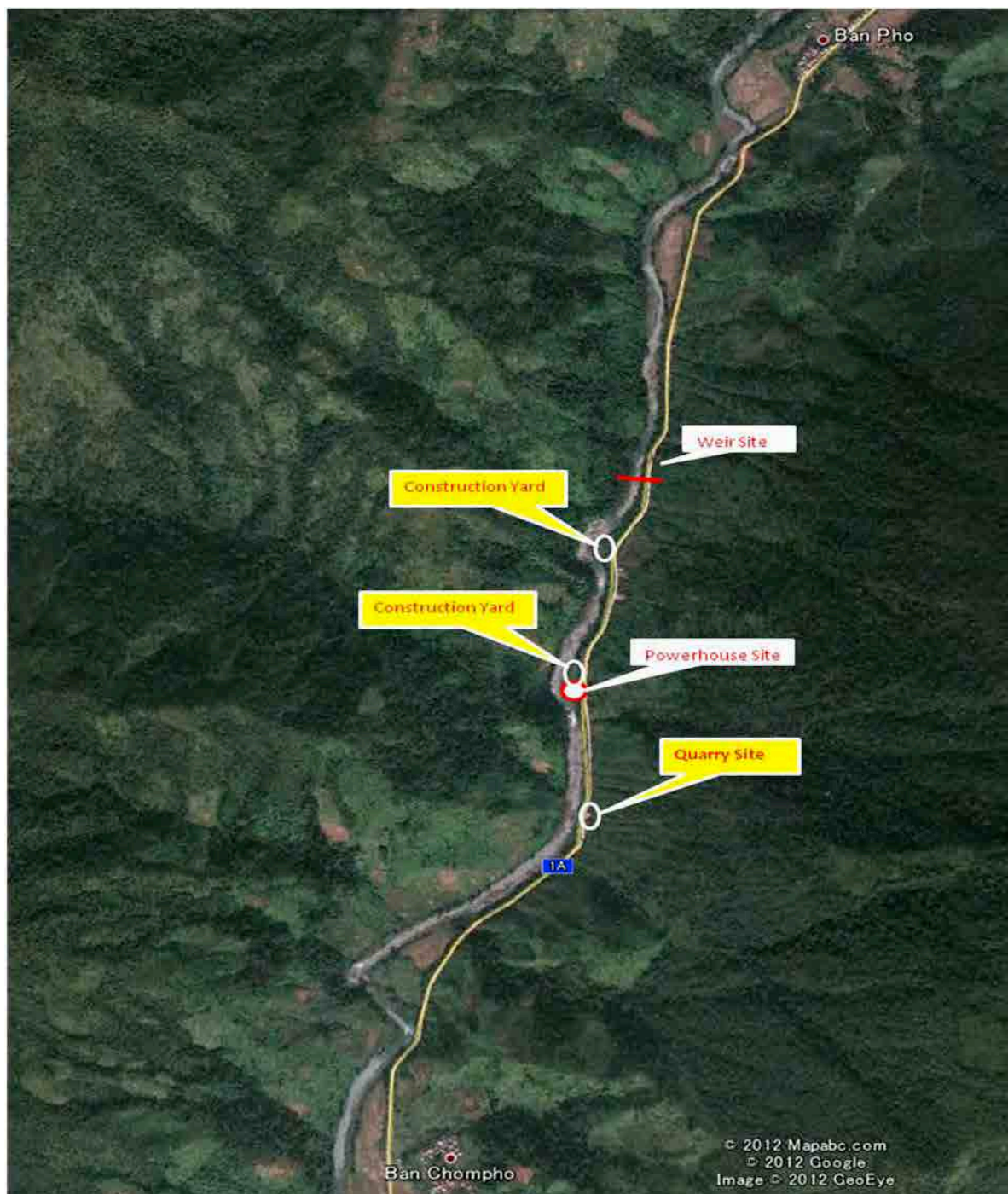
Locations of construction yard, powerhouse quarry and weir site are shown in Figure 3-7.

Figure 3-6 Location of construction yard in relation to powerhouse



It was proposed that sand and gravel be used from the river, however it was decided that they would not be suitable as aggregate material for concrete. Alternatively aggregates will be taken from a nearby quarry sites.

Figure 3-7 Locations of the various Project facilities



Chapter IV

Description of Environmental Baseline

4.1 Physical Environment

4.1.1 Topography

Like most of Laos, the Gnod Ou District is quite mountainous with deep valleys and rolling plains. With an average elevation of around 1300masl Ou Tai sits surrounded by a vast array of steep and rolling terrain. The Project area has retained a large amount of undisturbed forests and other natural vegetation mainly on top of mountain ridges, along with very deep valleys and highland relief, elevation reaches approximately 1950masl in the mountain ranges near the Vietnamese border.

The climate is mostly subtropical, but rather cool at higher elevations. From April to October there is appreciable rain: from mid-May to mid-September the South-West monsoon brings intense rainfall.

4.1.2 Geology and Landforms

The Geology of the area is entirely of Cretaceous age, and comprises mainly weathered sandstones and mudstones, but with more indurated and siliceous outcroppings visible in many places.

A minor amount of limestone is also seen, giving rise to the caves seen near Naten village; however this is well outside the Project area.

Some of the mudstone contains appreciable quantities of salt, and salt encrustation can be observed in several locations in this area.

4.1.3 Erosion

Erosion is high during the wet season (May to October) with the highest rainfall occurring in August. Landslides frequent the area, mainly along steep slopes and road cuttings and river banks.

The bank in which the proposed penstock will be constructed showed no sign of erosion during the site survey; this was attributed to large boulders and rocks that had been laid down as part of the road embankment. Thick scrub and bushes also covered the river bank along the roadside providing stability against minor landslides.

Along the bank directly opposite of the Project area, there were a few signs of landslides. This was due mainly to removal of vegetation; however the Project will not contribute to such soil instability.

4.2 Biological Environment

4.2.1 Forestry and Vegetative Cover in and Around of Mini- Hydro Power Plant

Mostly a mix of farm land and degraded forest surrounds the Project site, with most crops located right along Nam Ou. The forest cover is predominantly dry evergreen and semi-evergreen with a mosaic of swidden land and forest at various stages of regeneration. Large tracts of contiguous old-growth forest survive towards the Vietnamese border and along the Nam Ou, upstream from the Nam Khang confluence. A list of local tree species in the nearby protection forests is listed in Appendix 2.

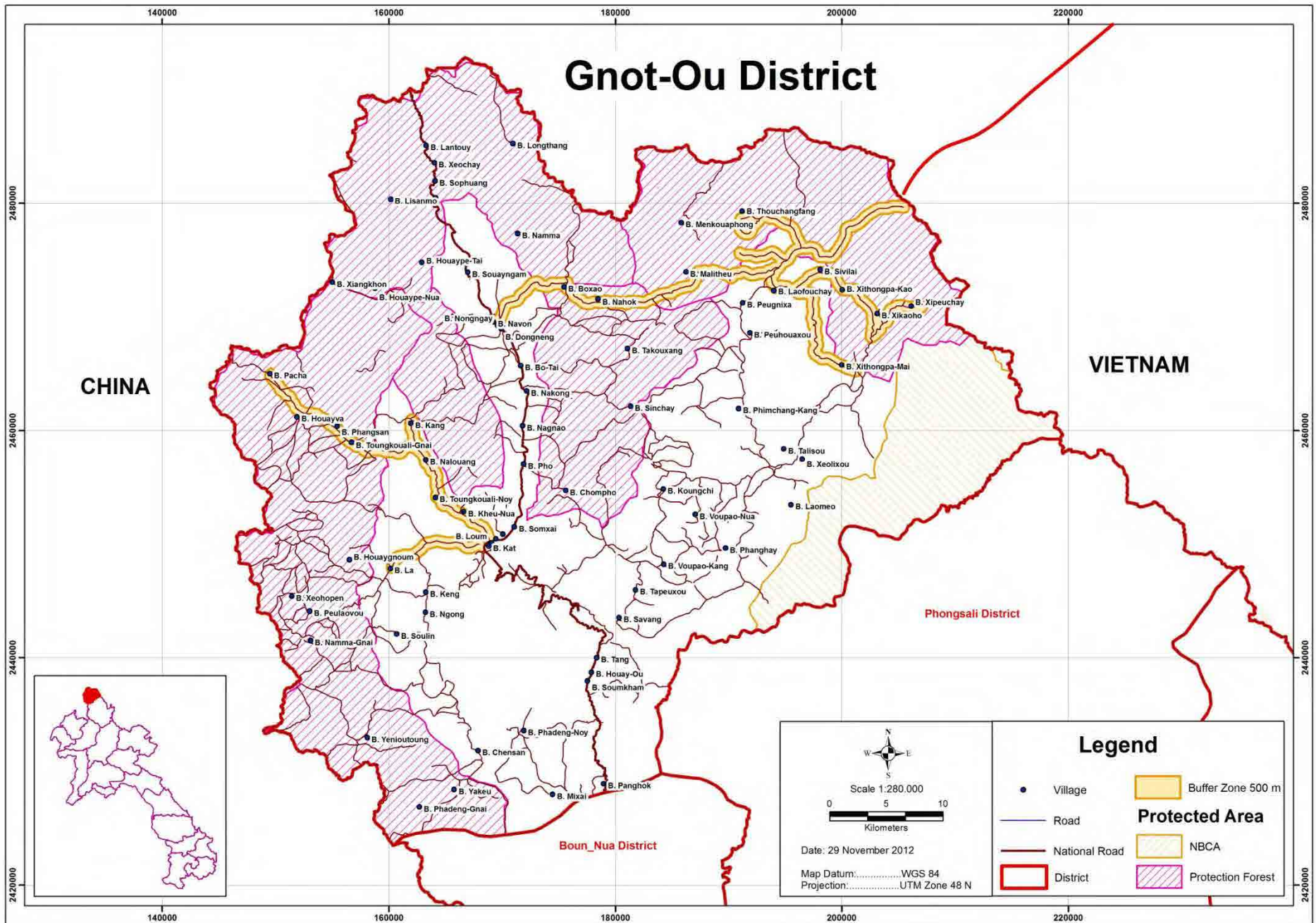
4.2.2 Locally- Managed Conservation Areas

There are local conservation areas also known as Provincial Biodiversity Conservation Areas (BCA). Figure 4-1 on the following page illustrates the extent of the Protected Forests. The map shows approximately 50% of the district is protected forest, this is only protected forest and not of National status. Below is a list of BCAs and total area (Table 4-1).

Table 4-1 List of National, Provincial and District BCAs in Gnod Ou District

No.	Name of BCA	Unit	Area	Location
National Biodiversity Conservation Area (NBCA)				
1.	Phou Denh Din Area	ha	222,000	Phongsaly, Gnod Ou and Samphanh District
2.	Gnod Ou District	ha	22,315	Gnod Ou District
Provincial BCA				
3.	Phou TaSan Area	ha	22,040	Gnod Ou District
District BCA				
4.	Phou Xang Area	ha	1,446	Gnod Ou District
	Total	ha	45,801	

Figure 4-1 Protected forest areas in Gnod Ou District



4.2.3 Wildlife and National Biodiversity Conservation Areas

There are two National Biodiversity Conservation Areas (NBCAs) in Phongsaly; Nam Lan Conservation Area, which is situated in the south west corner of Phongsaly Province and covers approximately 15,000ha and borders Yunnan Province, China. The other NBCA is Phou Denh Din National Protected Area; situated in the south east corner of Gnod Ou District, bordering Vietnam. Both these NBCAs are well outside of the Project area.

According to interviews with villagers wildlife is scarce around the Project area. A list of local wildlife that has been recorded in the local area was provided by the Local District Office and is provided in Appendix 1.

4.3 Economic, Social and Cultural Environment

4.3.1 Population and Communities

There are a total of 79 villages in the Gnod Ou District; out of these only 21 villages are currently receiving electricity from the national grid. A further 22 villages will be added to the grid after Project completion. Many ethnic groups are present in the Project area, main groups being Lao Leu, Yao, Kheu and Hor.

4.3.2 Land Use

Most land is used for farming and crops, mainly in the form of rice, corn, and sugar and banana plantations. However along penstock alignment, only a small patch of corn garden will be affected. It is estimated that occasional inundation of rice fields would occur, land ownership was recorded and compensation estimated were carried out, see Appendix 3.

4.3.3 Infrastructure/Facilities/Industries

The main industry in the Project area is corn and rice production. Livestock, poultry and rice are mainly produced for household consumption, while corn is usually exported.

There is a high school in Ou Tai which serves the surrounding villages; however, there is also a primary school in the small village of Ban Phor. There is one main Hospital in Ou Tai which provides medical treatment to residents in the entire District. For those residents located in the northern rural parts of the District that are too far away from Ou Tai, medical treatment is must often be sort in neighboring China.

4.3.4 Water Use and Water Supply

As there is no public water system for villages located around the Project site, residents rely on natural springs that have been tapped from the surrounding mountains. These springs run all year round, and are the only source of natural drinking water.

The District water supply is mainly sourced from Nam Ou or other rivers and pumped in smaller water tanks for domestic use. Ban Phor, for example, receives water from the Phor River which flows all year round out of natural mountain springs. There are no irrigation schemes downstream of the Project area.

4.3.5 Transportation

The main forms of transportation in rural areas are motor bikes or hand tractors (Tok-tok) for travel between villages. Public transport is available between Ou Tai and Boun Neua, and there is also a mini bus that transports passengers to and from the Chinese border daily. Overall transportation to and from the District is fair and requires a lot of improvement, if socio-economic conditions are to develop.

4.3.6 Energy Sources/Power Supply

At present, Electricite du Laos (EdL) is importing electricity from China at .58 Yuan per kWh or roughly 700kip kWh. On average EdL purchases power annually at 50 million Kip per year and resells to the District at 20 million Kip, therefore incurring a loss 30 million kip per year. Out of 79 villages in the District, 21 are currently receiving electricity from the national grid. However not all households within these villages have power. For those households not connected to the national grid, Pico Hydro setups are used. These units are setup along rivers and streams to supply households with between 500W to 1kW of energy, which are used for lighting and charging of household devices.

Below are examples of Pico Hydro usage along Nam Ou (Image 4-3a,b). These setups help to power homes in Ban Champhor and are located downstream from the proposed MHP site.



Image 4-3a Pico Hydro setups along Nam Ou at Ban. Chompor.



Image 4-3b, is a closer view of the main components of a Pico unit.

These typical Pico Hydro setups are used throughout the District, which have been modified by extending the drive shaft and attaching a propeller to enable functionality in shallow waters. These systems however, cannot be used during the peak of the wet season due to increased water levels and currents. These setups will not be needed after the completion of the Project.

4.3.7 Public Health/Public Safety/Occupational Health

There is only one hospital in Ou Tai that serves the entire District. However each village has a health volunteer to assist with any minor needs. It was also noted that for some villages that are too far from Ou Tai, travelling across to China for health related issues is more convenient.

4.3.8 Waste Management

Local garbage removal services collect household waste on a weekly basis. Recycling of plastics and cardboard is done where possible, with burning of other household waste still a common practice. In regards to sanitary waste approximately 40% of households do not have toilets, but for the households that do septic tanks are installed.

4.3.9 Archeology

The results of the field survey show that no temples, religious, spiritual sites, or cemeteries are located within the proposed Project area.

Some archeological features are present around Ban Phor, including old statues and stupas. These are located along the mountain side well out of range of construction and main Project sites.

4.3.10 Aesthetic/Recreation/Tourism/Culture

At present no major commercial form of tourism exists in the area, however there are an increasing number of people visiting Phongsaly Province and Phou Den Dinh National Protected Area. These limited numbers of tourists are beginning to explore more parts of the province, being drawn in by the remoteness and richness of the untouched environment.

4.3.11 Land Acquisition and Compensation

Table 6-3 and 6-4 in Chapter VI describes productive land lost, production capacity, price, compensation period and total amount.

Except for the rice paddy field listed in Table 6-3, under the Land Law Group 4- "Occupation of land within and around water body" and Group 6- "Occupation of Public Work (road reserve) Lands", the land occupied or impacted by project development (dam, penstock & powerhouse including temporally land used for construction camp) listed in Table 6-4, are considered "public land".

As such, acquisition of these lands is not necessary, however, compensation for loss of livelihood (loss of crop production/income) will be observed and put to effect, in accordance to Decree 192/MONRE.

Even though the paddy fields are considered “private land” or under the Land Law Group 2- “Occupation of Agriculture Land,” Article 18 “Authorized Right of Use,” the acquisition of such lands is not necessary, because the impact is considered minor (occasional flooding) and the “authorized right of use..” (or land entitlement) is still maintained, the land owner will be able continue to use the land during the Project life.

4.3.12 Economic Conditions

Interviews and surveys were conducted in all potentially affected villages along Nam Ou. It was determined that only three villages would be impacted by the Project; one upstream from the weir site (Ban Phor) and two further downstream of the powerhouse (Ban Chomphor and Ban Somxai).

There are three rice fields that are to be impacted by “occasional flooding” expected after the Project completion. The majority of the affected persons (AP) are from Ban Phor.

Ban Phor, based on District social economic classification is neither “poor” nor “rich”; it is in the “middle” ranking of socio-economic status.

Compared to the total income generating activities the “affected” rice fields represent approximately less than 10 % of the total income.

All APs have other rice fields as well as income generating activities which include rice productions (both wet & dry), corn plantations, livestock and supplementary income from occasional employment in Ou Tai Township. It must be noted that rice production during the dry season will not be affected by the Project. Irrigation water from Huay Phor is used, and flows naturally.

The remainders of the APs are from Ban Somxai & Ban Phane, which is situated in Ou Tai Township. Their primary incomes are mostly small business, e.g. retail shops and their affected rice fields in Ban Phor represent small portion of their overall incomes.

Corn field areas (0.8ha) affected by penstock (Image 4-3c), belong to a retired government employee. The income from corn production is secondary, estimated at less than 10% of his annual income; therefore he will be marginally impacted.



Image 4-3c, Location of construction yard indicating a small corn garden that will be impacted.

Above shows the proposed construction yard next to the powerhouse site with corn garden situated along the river bank. See compensation estimate in Appendix 3.

Chapter V

Environmental Impact and Mitigation Measures

5.1 Factors for Consideration in Assessing Mini-Hydro Power Plant Impacts

Mini-Hydropower, as the name suggests are very small scale projects, as such, anticipated impacts of the will be minimal. The following factors shall be essential for assessment of impacts, they are: physical, biological, economic, social and cultural environments.

Physical factors include: Soil and water quality.

Biological factors include: Wildlife, fish and native vegetation.

Socio-economic and cultural factors include: Income generating activities, education health, communication, transportation and energy supply, temples, cemeteries or places of cultural significance.

5.2 Major Impacts and Mitigation Measures During Project Construction Phase

The main impacts from construction of the MHP are expected to be:

Environmental – Soil erosion along river banks, partial loss of native vegetation and visual landscape impacted along penstock alignment route.

Social – Impacts from loss of livelihood from gardens along river banks; disruption to other farming activities.

No replacement or removal of permanent structures or resettlement of affected persons is expected to be required.

5.2.1 Construction Activities

Major construction activities that are considered to be significant with respect to environmental impacts include:

- Land clearing for site preparation; construction of office /camp areas, diversion weir, penstock and powerhouse.
- Construction of diversion weir, penstock and powerhouse.
- Transportation of construction materials, equipment and machinery to construction sites.

The expected impacts, mitigation measures and budget estimates during the Project Construction Phase are summarized in Table 5-1.

Table 5-1 Impacts and Mitigation Measures

Item	Potential Impact	Mitigation Measures	Responsibility	Duration	Budget (Kip)
Environmental					
Water Quality	Contamination to local waterways from construction sites	Not to discharge domestic waste water directly into waterways. Heavy machinery should not be washed near waterways.	Developer/Contractor	During construction and operation phases	-
Dust	Increased dust from construction vehicles	Use water trucks during dry season on access or public roads where construction vehicles will travel.	Developer	Twice daily during construction phase	15,000,000
Noise	Increased noise from construction vehicles	Ensure loud vehicles or any earthmoving is conducted during the daytime at acceptable hours, e.g. 8am-5pm.	Developer	During construction phase	-
Aquatic Life	Loss or deterioration of aquatic life	Ensure no contaminants or toxic waste is disposed of in or near waterways.	Developer	Pre Construction Construction 3years/Operation	-
Wildlife	Loss or deterioration of local wildlife	Ensure no sale or purchase of wildlife, by employing ranger.	Developer	Construction 2years/Operation	-
Flora	Loss or deterioration of local flora species	Avoid unnecessary removal of any vegetation.	Developer	Construction 2years/Operation	-
Hazardous Waste	Disposal of hazardous waste into waterways or surrounding environment	Ensure hazardous waste is stored and disposed of by qualified contractors.	Developer/ Contractor	During construction and operation phases	1,000,000
Solid and Domestic Waste	Disposal of solid or domestic waste into waterways or surrounding environment	The use of septic tanks for toilets and bathrooms. Employ certified garbage removalists and recycle paper and plastics. Solid waste should be taken to appropriate land fill sites.	Developer/ Contractor	During construction and operation phases	1,000,000

Item	Potential Impact	Countermeasure to be taken	Responsibility	Duration	Budget (Kip)
Soil Erosion	Erosion of riverbanks or road sides	Ensure major construction is undertaken during the dry season. Conduct bank stability and re-vegetation and silt trapping.	Developer	Construction 2years/Operation	15,000,000
Social					
Road Safety	Road accidents due to increased traffic	Correct road safety signage including speed limits around Project site.	Developer	During construction phase	15,000,000
Worker Health & Safety	Risk of worker health and safety from poor sanitation and disease	Regular health checks for all workers, and education programs.	Developer	During construction and operation phases	5,000,000
Village Health & Safety	Risk of village health & safety due to Project	Ensure adequate education about the Project and construction of fencing around high risk areas, such as the dam site to powerhouse.	Developer	During construction and operation phases	10,000,000

Total expected budget for implementation of mitigation measures is 62,000,000Kip.

5.2.2 Physical Environment

Impacts to physical environment include increase dust and traffic during construction periods as well as possible erosion. During dry periods when dust caused from construction vehicles occurs, roads should be watered at least twice a day.

Increased sediment flows in local waterways from soil disturbance during weir construction, at construction/camp sites. Vegetation clearance from long/short term accommodation, administration and maintenance facilities will also contribute to increased sediment flow. Run-off should be carefully monitored especially with any camp or construction sites that are close to waterways.

5.2.3 Biological Environment

Aquatic life could be affected by fluctuations in water levels and water quality from powerhouse discharge. Fish populations may also be affected by the construction of the weir. A fish ladder will be incorporated into the weir to allow fish to pass during the wet season.

Main waste expected from the Project will be mainly construction debris, along with general garbage from camp and construction sites. Improper disposal of construction debris, vegetation and other materials can cause visual pollution and diminish ecological values. Inorganic waste will be removed and disposed of in a safe manner, with packaging from electrical and other construction materials recycled, or disposed of in approved landfills. Villagers shall also be given the opportunity to collect and recycle where possible.

5.2.4 Economic, Social and Cultural Environments

There will be minor impacts from occasional flooding to three rice fields totaling an area of 2.66ha and construction of penstock and powerhouse affecting 0.8ha of a corn garden. However this is not considered significant as these rice fields and corn garden are not part of the villagers primary source of income. No social or culturally significant areas such as cemeteries or temples are found within the Project area.

5.3 Impacts During Project Operation

5.3.1 Mini – Hydro Power Plant Operation and Maintenance

Being a run of the river scheme (ROR) Project, impacts during operation phase are considered far less than other conventional hydro-power schemes, where water is stored and released. In larger projects where a storage reservoir is created, a main problem can be stratification of water which can lead to anaerobic conditions, leading to deterioration in

water quality and aquatic life. ROR schemes do not store any water, so a majority of the rivers natural flow is not disturbed.

5.3.2 Physical and Biological Environments

The main impact will be loss of water between the intake weir and powerhouse discharge site (700m). At present, project engineers have decided to divert 100% of flow during the dry season and allow for overflow during wet seasons. A minimum environmental flow would not be required due to the short distance of the diversion.

Some loss of productive land due to occasional inundation is likely to occur upstream from the Project site. Three low laying rice fields were surveys totaling 2.66ha. For more details on compensation please refer to section 6.3 Land Acquisition and Compensation Plan (LACP). A flood analysis of the potentially affected areas describes occasional flooding that will occur; this was the basis used for the compensation. See Appendix 4.

5.3.3 Economic, Social and Cultural Environments

24 hour electricity generation from the Project will significantly increase quality of village life. It will also help to improve the development of regional industries and commercial activities in the area.

Vulnerability

The survey indicated that no vulnerable groups are among the impacted persons in the Project area. According to District Government Office they are considered to belong to the “middle income family group”.

Education Level

The majority of the villagers in the Project affected areas achieved primary level education and therefore are able to read and write. All the affected villages have primary schools.

There is only one secondary school in Ou Tai, to which secondary students from affected villages (Ban Phor, Ban Somxai and Ban Phane) all attend.

Income

Data regarding incomes and expenditures were obtained by interviews with APs. Data collected was based on personal recollection and memory. Written record of sales or receipts of payment were none existence, therefore all the statistical data presented must not be viewed as absolute, but an estimate of socio-economic status. Data on incomes and expenditure was not presented in this report for confidential reasons.

The primary sources of income are farming of rice, corn. All APs have other sources of income generating activities which include growing vegetable crops, sugar cane, bananas and peanuts. Livestock and poultry also supplement income. Contracting labor and occasional employment in nearby Ou Tai Township is also common, but only when agricultural activities are in low season. Compared to the total income generating activities the income from the “affected” rice fields and corn garden represents less than 10%.

Rice production is sufficient for family consumption and only in a good year some surpluses are sold for extra income. Due to increasing demand from China, corn production has been a significant economic activity in this region. Rubber plantations are still in early stages and are yet to produce any income.

There are three villages whose rice fields will be affected by the project. Ban Somxai, Ban Phane and Ban Phor. Based on District social economic classification, Ban Phor is in the “middle” ranking of socio-economic status. The remainders of the APs are from Ban Somxai & Ban Phane, which are situated in Ou Tai Township. Their primary incomes are mostly small business, e.g. retail shops and their affected rice fields represent a small portion of their overall incomes.

Expenditure

Main expenditure items considered in this analysis include:

- Food
- Clothing
- Healthcare/medication
- Electricity
- Transportation
- Schooling
- Farm Activities and
- Others (traditional functions, and community donation etc.)

Affected villagers on average spent almost 30% of their total income for living necessities and saved the remaining. Farm activities attracted the most expenditure; secondly was spent on other means (traditional functions, and community donation etc) and the third priority was on children’s schooling. Fourthly was health and medicine, and the last of the spending items was electricity.

5.4 Termination and Abandonment Phase

The expected operative life of the Project is approximately 30 years. At the abandonment or termination phase, the Project owner in this case; the Institute of Renewable Energy Promotion (IREP), shall inform the District Authority and in turn inform relevant Provincial departments, three months prior to the termination date.

The parties shall explore and discuss options which include (i) reutilization and (ii) demolition.

- i. Reutilization is very a common practice for MHP. Sites are retained for either recreational and or agricultural purpose, including aquaculture or fishery development areas. The parties shall together workout specific plans, including adequate budgetary provision as well as setting up organizational bodies to be responsible. Community or villages in the Project area must be encouraged to participate.
- ii. Demolition is not a common practice and only implemented as a last resort. Similar to reutilization, the parties must work out a detailed demolition plan; assess the impact to the immediate environment, social or otherwise in particular the downstream impact. The plan shall include mitigation measures with adequate budgetary provision for such activities. Like reutilization the organizational body must be set up to be responsible for all activities associated with the demolition process.

Chapter VI

Environmental Management & Monitoring Plan

This chapter presents the Environmental Management and Monitoring Plans (EMMP) which should be applied to mitigate adverse environmental impacts during construction, operation and termination phases of the Project.

The mitigation measures and monitoring plans are proposed in accordance with the major impacts that are expected as a result of the Project.

6.1 Environmental Management Plan

The Project owner is to ensure a contractual obligation that will require the contractor to prepare and submit a monthly environmental management report to the Environmental and Social Monitoring Unit (ESMU). This monthly report will identify the work undertaken and document any environmental problems encountered during the reporting period. This report should also include environmental protection or mitigation measures adopted to resolve such problems and any follow-up actions required.

6.1.1 Design and Construction Phase

Design of location of powerhouse, penstock and weir have taken into account environmental impacts and will comply with the following environmental and social principles:

- Avoiding existing residential areas, particularly areas with many houses and other large buildings, this will ensure no relocation or resettlement.
- Avoid any unnecessary exploitation of valuable land, culturally or socially significant sites, religious areas, conservation areas, village cemeteries and agricultural land.
- Avoid mature forests and other environmentally sensitive areas, including National and Provincial/District Biodiversity Conservation Areas.

6.2 Environmental Monitoring Plan

The Project Owner and ESMU will be responsible for implementing the proposed mitigation and monitoring measures. The ESMU, established by Project Owner will also be on a daily basis responsible for ensuring environmental mitigation measures and monitoring activities identified in this EMMP are properly implemented. Table 6-1 describes the items that will be addressed in the monitoring plan, followed by the implementation schedule of these activities in Table 6-2.

The ESMU will:

- Conduct temporary and routine monitoring plans of the Projects construction activities to ensure that work is compliant with environmental specifications and provisions set out in the construction contract.
- Ensure on a weekly basis that the social mitigation measures, including compensation, are properly implemented.
- Carry out regular consultations with people living in the vicinity of the MHP site, to inform them of the plans for the Project, seek their input in detailed design and plans in order to minimize adverse social and environmental impacts.
- Ensure that people are continually informed of all aspects of the Project during its implementation.
- Inform people in affected areas of the grievance procedure and address all issues related to any complaints.

The following Table 6-1 describes a list of monitoring items during construction and operation phases, with frequency and responsible authorities. Water quality monitoring is considered of most importance and should be conducted by a qualified contractor.

A monitoring form is also provided in Appendix 6, which is to be filled out by persons responsible for conducting monitoring tasks. It will also be required that this form be completed and submitted to JICAs Lao office quarterly, for the duration of the monitoring period.

Budget for monitoring by DNRE or PNRE is shown in Table 6-6.

Table 6-1 Monitoring Program

Ev.	Item	Details	Area	Times	Authority in Charge
-Construction Phase-					
Environment (Pollution, Natural)					
-1	Air Quality	Dust	Near Project site, Near Villages	1/0.5M	Contractor
-1	Air Quality	Noise	Near Project site, Near Villages	1/0.5M	Contractor
-2	Water Quality	Ph,SS,DO	Downstream	1/0.5M	Contractor
-1	Aquatic	Fish	Downstream, Upstream	1/1M	Contractor
-1	Wild Life	Valuable species	Near Project site	1/6M	Contractor
-1	Wild Plant	Valuable species	Near Project site	1/6M	Contractor
-2	Hazardous Waste	Heavy metal	Project site	1/0.5M	Contractor
-1	Domestic Waste	Domestic Waste	Near Project site	1/0.5M	Contractor
-2	Erosion	Soil Erosion	Slope of nearby river	1/0.5M	Contractor
Social					
-2	Road Condition	Road facilities	Near Villages(2)	1/0.5M	Contractor
-2	Worker's Condition	Worker's working Condition	Project site	1/1M	Contractor
-2	Public Health	Public Health	Near Villages(2)	1/0.5M	Contractor

-Operation Phase-					
Ev.	Item	Details	Area	Times	Authority in Charge
Environment (Pollution, Natural)					
-1	Water Quality	Ph,SS,DO	Downstream	1/0.5M, 4-years	ESMU
-1	Aquatic	Fish	Downstream, Upstream	1/1M, 3-years	ESMU
-1	Wild Life	Valuable species	Near Project site	1/6M, 2-years	ESMU
-1	Wild Plant	Valuable species	Near Project site	1/6M, 2-years	ESMU
-1	Hazardous Waste	Heavy metal	Near Project site	1/0.5M, 4-years	ESMU
-1	Domestic Waste	Domestic Waste	Near Project site	1/0.5M, 4-years	ESMU
-2	Erosion	Soil Erosion	Slope of nearby river	1/0.5M, 2-years	ESMU
Social					
-1	Workers' Condition	Workers' working Condition	Near Project site	1/1D, 4-years	ESMU
-1	Public Health	Public Health	Near Villages(2)	1/0.5M	ESMU
-2	Grievance	Grievance Redress	Concerned people	5 times (all)	ESMU

Table 6-2 Implementation schedule of the monitoring activities

Activities	Mini-Hydro: Implementation of Monitoring Schedule						Remarks
	Pre Construction	Construction	Operation Years				
Environmental			1st	2nd	3rd	4th	
Water Quality*							
Dust							
Noise							
Aquatic Life*							
Wildlife							
Flora							
Hazardous Waste							
Solid & Domestic Waste							
Soil Erosion							
Social							
Road Safety							
Worker Health & Safety							
Villager Health & Safety							

* Activities that should be carried out by a qualified contractor

6.3 Land Acquisition and Compensation Plan (LACP)

6.3.1 Land Acquisition

As previously stated in section 4.3.11 there will be no land acquisition, the construction sites will occupy „public land“. As such acquisition of these lands is not necessary, compensation for loss of livelihood (loss of crop production/income) will still be observed and effected, in accordance to Decree 192/MONRE.

6.3.2 Cost Estimate for Permanent Loss of Land

As indicated in section 6.3.1, even though the entitlement of rice fields will still be retained by the owners, the compensation estimates were considered as if the loss was of a permanent nature.

The compensation cost calculation was based on section 8.5.3 of the “Technical Guideline on Compensation and Resettlement of People Affected by Development Projects”.

Six to ten years is a common period for compensation adopted for rice fields (with most hydro projects, if total inundation & considered permanent loss, based on The Ministry Agriculture Guideline). A three year period is considered appropriate in this case because owners are still tending to their gardens.

More details are presented in the full compensation estimate given in Appendix 3.

Table 6-3 Compensation estimate for loss of rice production affected by “occasional” flooding

Name affected Rice field	Areas (ha)	Production capacity (kg/ha)	Price Kip/kg	Compensation Period (yr)	Total Amount (kip)
“Thong Na Phor”	1.70	2,500	3,000	3	38,250,000
“Thong Na Phat”	0.25	2,500	3,000	3	5,625,000
“Thong Na Kham”	0.71	2,500	3,000	3	15,975,000
Total	2.66				59,850,000

Table 6-4 Compensation estimate for loss of corn production affected by penstock construction

Name affected corn field	Areas (ha)	Production capacity (kg/ha)	Price Kip/kg	Period of compensation (yr)	Total Amount (Kip)
Penstock & Powerhouse Site	0.8	4,000	2,500	3	24,000,000
Total	0.8				24,000,000

Total compensation budget estimates for Hydro Plant impacts are **83,850,000Kip**

6.3.3 Cost Estimate for Temporary Loss of Fruit Trees and Other Commercial Trees

There will be no fruit trees or other commercial trees affected by the Project.

6.3.4 Cost Estimate for Temporary Loss of Agricultural Production

There will be no loss of agricultural land that is considered temporary. The only temporary loss will be from construction camps, office facilities or parking spaces that will be needed during construction phases. These facilities will occupy „public“ vacant and non agricultural land. After construction has been completed, it is the Project Owner’s responsibility to carry out any appropriate rehabilitation e.g. re-vegetation with native species.

6.3.5 Entitlement Matrix of Mini- Hydro Power Plant

The entitlement matrix shown in Table 6-5 was based on estimates of the total size of each rice field. However these entitlements must be accurately determined and approved by the Compensation Committee. The Committee will be set up before commencement of any work, as stipulated in “Technical Guideline on Compensation and Resettlement of People Affected by Development Projects”. According to these guidelines compensation in this case will be paid for in cash.

Table 6-5 Entitlement Matrix

Name of the affected Rice field	Item	Names of Owners	Villages of residence	Areas (ha)	Entitlement Amount (kip)
“Thong Na Phor” (x-sec No.14)	1	Mr Khamseng	Phor	-	-
	2	Mr Khampeng	Phor	-	-
	3	Mr Khamping	Phor	-	-
	4	Mr Nokeo	Phor	-	-
	5	Mr Somchit	Phor	-	-
	6	Mr Teuntakeng	Somxai	-	-
	7	Mr Dilavou	Somxai	-	-
	8	Mr Daopha	Pharne	-	-
	9	Mr Khamla	Phor	-	-
					1.70
“Thong Na Phat” (x-sec No.13)	1	Mr Bounthan	Phor	-	-
				0.25	1,875,000
“Thong Na Kham” (x-sec No.11&12)	1	Mr Chomseng	Phor	-	-
	2	Mr Phouvieng	Phor	-	-
	3	Mr Tanang	Somxai	-	-
				0.71	5,325,000
Corn Garden	1	Mr Khamphoy	Phane	0.8	8,000,000
Total				3.46	27,950,000

6.4 Environmental Monitoring Program

6.4.1 Environmental Management and Monitoring Plans

The objective of an EMMP is to describe action plans that ensure effective implementation of mitigation, management and monitoring measures for all identified environmental impacts during construction and operation.

a. Sectors Involved in Monitoring

Under Decree 112/MONRE section III Article 22 identifies and sets out sectors and authorities responsible for the monitoring of the implementation of the EMMP, for each development category which in this case is Category 1.

These include:

- i. Monitoring carried out by Project Developer (internal monitoring)
 - ii. Monitoring carried out by Governmental Departments
 - iii. Monitoring carried out by independent organizations (external monitoring, associated with complex development- not application for Gnod Ou MHP development)
- i. Monitoring carried out by the Project Developer is affected by setting up of an ESMU. Their tasks are to carry out the daily monitoring of the implementation of the proposed EMMP, reviewing and updating if necessary. The ESMU shall liaise, inform and report to Natural Resources and Environment (NRE – at District & Provincial levels). The ESMU shall also inform provincial departments responsible for investment and relevant authorities. In this case the Institute of Renewable Energy Promotion (IREP) and the Ministry of Energy and Mines, as well as Gnod Ou District and Phongsaly Provincial administrative office.
- ii. Monitoring carried out by Governmental Departments, as stipulated, is the responsibility of the Government department which will assess and review the IEE. In this respect the monitoring shall be carried out by District NRE and Provincial NRE. Provincial & District NRE shall on regular basis inform and report to MONRE, including the local administrative office. MONRE has the responsibility to assess and review the monitoring and the implementation of the EMMP.

In case of environmental accidents, MONRE will provide immediate response to address the situation including site inspection and assessment of degree of impact.

- iii. Monitoring carried out by independent organizations, external monitoring is only necessary when a complexity level of project is high in this case not applicable for the MHP.

b. Monitoring Budget Estimate

Monitoring budgets were estimated based on the Project's degree of complexity which in turn determines the frequency of monitoring activities.

Number of sectors or authorities responsible for the monitoring; as stated previously, are also related to the complexity of the Project. For instance, Gnod Ou MHP is a small and relatively simple project, therefore it is not expected that external monitoring be required, and hence budget provision is excluded.

It must be noted that internal monitoring costs carried out by ESMU, are considered as project development cost, and therefore were not included in the monitoring budget.

Total Implementation Cost for Monitoring Plan is: US\$30,000 or 240,000,000 Kip. See Table 6-6 and Table 6-7.

Table 6-6 Budget Estimation for Monitoring Activities & Monitoring Schedule (Assume completion period-2 years)

Responsible Party	Frequency	Construction Period (month)													Total Amount (\$USD)
		1	2	3	4	5	6	7	8	9	10	11	12	13..	
District- NRE	47	8	8	4	4	2	2	2	1	1	1	1	1	12	5,170
Provincial -NRE	12	2	2	1	1	0	0	1	0	0	1	0	0	4	7,320
MONRE	2	1	0	0	0	0	0	0	0	0	0	0	0	1	4,500
Contingency provision (10%)															1,699
External monitoring (accidental provision)															5000
Grand Total															20,000

Table 6-7 Budget Support for Compensation & Grievance Committee

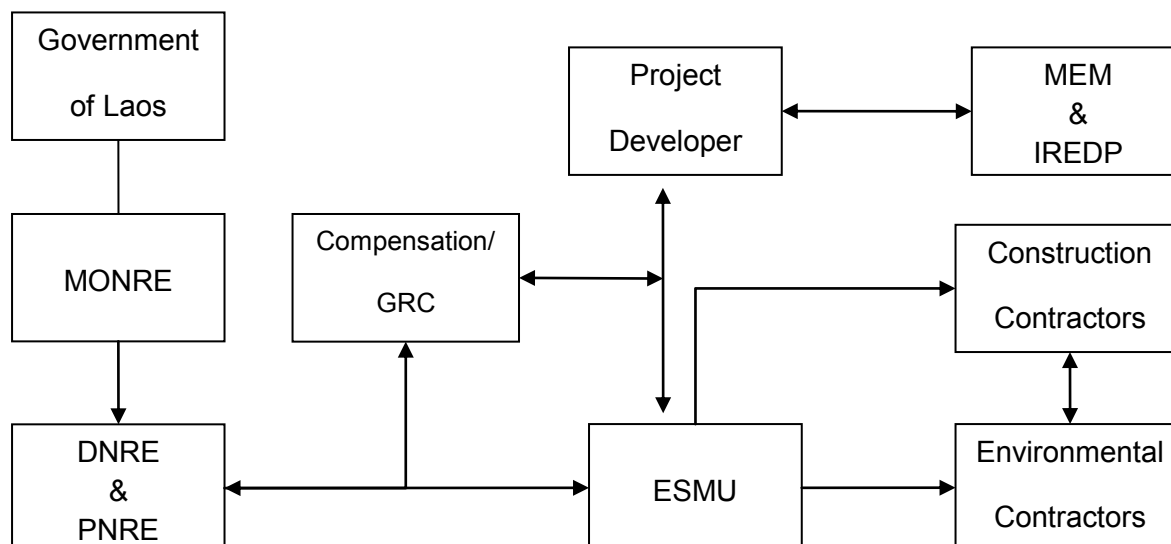
Compensation & Grievance Committee (members)	Expense for each visit					Transportation		Total Amount (\$USD)
	No Days/time	Frequency	Daily Allowance	No. of Personnel	Amount	\$/day	Amount	
Provincial Governor	1	15	100	1	1,500	200	200	1,700
District Governor	1	15	60	1	900	70	70	970
Concern Authorities	1	15	50	3	2,250	150	150	2,400
Provincial Lao National for Construction Front	1	15	40	3	1,800	150	150	1,950
Community Representatives	1	15	30	5	2,250	50	50	2,300
Contingency (10%)					465		93	558
Grand Total								10,000

As shown in the tables above, the total monitoring budgets, including budgetary support for compensation and grievance committee is \$30,000.

6.5 Institutional Arrangements

For implementation of the Project, several parties will be involved with different duties and responsibilities. The main parties involved and their working relationships are shown below.

Figure 6-1 Working Relationships of Concerned Parties



The ESMU will be responsible for all social and environmental impact activities. The ESMU will work in close cooperation with GoL organizations and agencies. The ESMU will:

- Carry out environmental monitoring and supervision during the construction phase in cooperation with DNRE or PNRE.
- Improve environmental awareness among workers and populations near Project sites.
- Report to Government agencies, e.g. DNRE, PNRE and IREP.
- Carry out in association with DNRE and PNRE and other Government agencies listed in Table 6-6, social and environmental monitoring program to ensure that all mitigation measures specified are carried out by a responsible authority or contractor.

6.5.1 Government Institutional Arrangements for the Project

The GoL will establish the national level organizations responsible for setting policy and directions for supervising and monitoring of the Gnod Ou MHP and its components.

The Project will provide additional resources so that these organizations can provide efficient support to the implementation and monitoring of the mitigation measures and the development of the Project.

6.5.2 Project Institutional Arrangements

The ESMU will also ensure the Project meets all of its social obligations, including, compensation, livelihood restoration, and other social development works. These are all to be carried out in close cooperation and in coordination with the relevant government organizations set up to implement environmental and social aspects of the project.

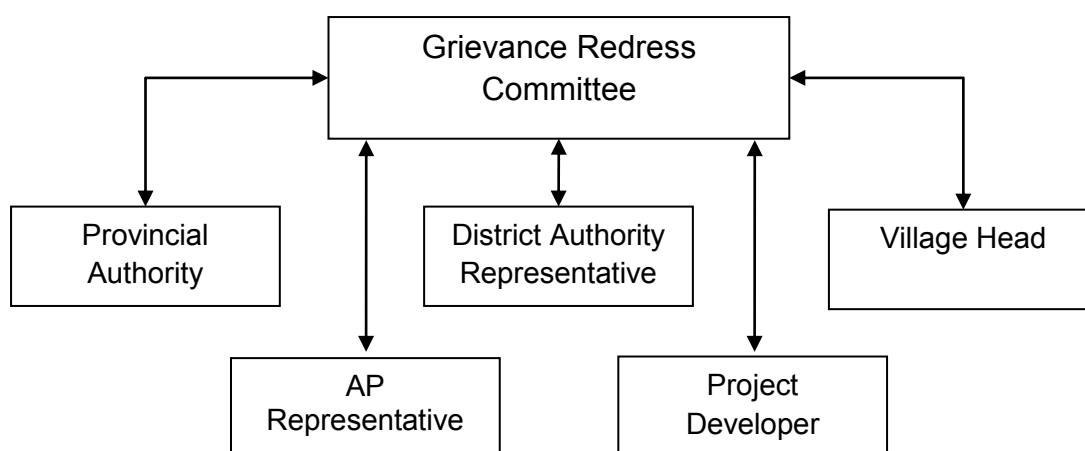
The ESMUs responsibilities will be:

- Manage the environmental, social, economic and compensation components, using consultant inputs as required,
- Monitor and report to the developer and concerned authority on the effectiveness of implementation of the mitigation measures, social development activities, and resettlement program, and
- Coordinate activities during pre and post construction with relevant government agencies, with the aim of improving the environmental performance of the Project during construction and operating phase.

6.5.3 Grievance Redress Committees

A Grievance Redress Committee (GRC) will be established at District and Provincial levels to address any complaints and grievances related to land acquisition and compensation that may be raised by affected persons.

The GRC will be comprised of the following members, among other:



The purpose of the grievance procedure is to ensure that APs have the means to assure they are satisfied and have been adequately protected from adverse impacts. If impacts cannot be avoided ensure that the APs are satisfied they have obtained adequate compensation and that their entitlements are delivered sufficiently and on schedule. If an AP or group or community feels they have not been adequately protected or compensated, have not received their entitlements, or otherwise believe there have been unfairly affected by the Project, they have the right to make a claim. The grievance procedure will cover both social and environmental issues, since most of the environmental impacts are those that affect people.

The GoL recognizes that the best way to avoid conflicts or grievances is through the process of consultations, disclosures, and participatory planning and decision-making. Thus, the first stage is conflict avoidance. If disagreements do arise, but have not yet become severe conflicts, then the issue may still be solved through informal negotiations and other means. It is only when problems have become more intractable that they need to be taken to the more formal grievance process.

6.6 Timing and Budgets

According to the construction schedule of the Gnod Ou MHP, the total construction period of the main dam and power house will be 14 months (Table 6-8). The main budget will be subject to final design.

Table 6-8 Assumed Project Implementation Schedule



Year	2012			2013					2014					'15		
Month	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2
Preparatory Survey	█															
Approval by Japanese Gov..				▲												
E/N, G/A (Agreement)				▲												
Detailed Design and Tender Document Preparation					█											
Procurement of Contractor						█										
Construction									█							
Commissioning																▲
Operation & Maintenance																█

Chapter VII

Public Involvement

7.1 Stakeholders

This section of the IEE report provides a brief overview of information regarding public consultation for the proposed MHP. This public consultation information has been collected through consultations and discussions with the following groups and individuals:

- Representatives from the Ministry of Natural Resources and Environment (MONRE);
- Provincial Governor;
- Officials from District office;
- First Stakeholders Meeting; *11th September 2012* – Appendix 5
- Village leaders and residents in the surrounding villages of the MHP,
- Second Stakeholders Meeting; *18th December, 2012* – Appendix 5
- Other potential Project beneficiaries.

During this initial field survey, the responses of local residents were noted, especially their perception of the proposed Project. More detailed discussions were held in addition to the survey. During the consultation and discussion sessions, particular effort was made so the villagers were aware that the Project, is in no way an imposition on them, and that they have every right in determining the outcome of the Project.

Prior to the arrival of the field survey units, local District Authorities in the Project area were officially notified of the objectives and the timing of the fieldwork that was to be conducted.

7.2 Major Comments and Opinions

Three villages are considered to be impacted by the proposed Project. APs and village authorities were interviewed and consulted. Main comments and concerns raised during consultations were:

- Village officials and residents expressed generally positive reactions to the proposed Project, welcomed it and were looking forward to a reliable electricity supply.
- Residents were concerned about flooding that may occur, damaging crops and rice fields upstream from the Project site.
- Fish stocks have been in decline since 1998 due to the increase of more sophisticated fishing techniques and illegal fishing activities.

- Deterioration of water quality caused by construction activities will aggravate the decline of fish stocks.
- The Project will interfere with the breeding cycle of aquatic plant and animal life.

Public consultation for the proposed Project is valuable and should continue during the detailed design phase, construction phase and operation phase.

Public participation through consultation will also be encouraged as part of the monitoring of activities for this Project, and will be part of the overall monitoring and evaluation component.

Chapter VIII

Conclusion

The proposed Mini-Hydropower Project will consist of a weir that will divert water from Nam Ou through a 700m penstock and into a powerhouse with 3-4 “Submerged Pump Turbine Generators”. The proposed installation capacity will be approximately 500kW, with a maximum discharge of 7.5 – 8 m³/s. The weir height will be 4m and will span 35m across Nam Ou.

The purpose of this Project is to provide electrification to remote villages in Gnod Ou District by extension of distribution lines to targeted villages.

The MHP site will be located approximately 5km from Ou Tai Township, between Ban Chomphor and Ban Phor. It will be constructed along Nam Ou with an existing road running alongside, eliminating the need for construction of access roads.

Direct impact by loss of riverside crops and occasional flooding of rice fields from installation of Project components and facilities will be compensated accordingly. Upon approval of the IEE and prior to commencement of the Project, the Compensation/Grievance Committee will be set up to oversee the compensation process and ratification of quantities and value of the affected assets.

Estimation of entitlement values for riverside crops and rice fields have been calculated and presented (Appendix 3).

Land acquisition; under Land Law group 4 & 6, which states “*Occupation of Public work (road reserve) lands*”, “*Occupation of land within and around water body*”, will not be necessary. The land occupied or impacted by Project development (Dam, penstock & powerhouse including temporarily land used for construction camp), are considered “*public land*”. However compensation for loss of livelihood (loss of crop production/income) will be given in accordance to Decree 192/MONRE.

From consultations with local residents during the IEE field survey no cultural, historical or religious site of importance was found within the Project area.

Mitigation measures for the design and construction and operation phases have been proposed and if implemented effectively, will ensure the adverse impacts resulting from the Project (however small) are satisfactorily addressed.

A proposed monitoring plan is to be carried out by ESMU, District NRE & Provincial NRE to ensure that environmental mitigation and monitoring is effectively undertaken.

It is strongly recommended that during construction and or maintenance, first priority be given to hiring workers from affected and surrounding villages, so local residents can also benefit from the additional income.

This IEE, including and an EMMP, is considered sufficient to meet the Environmental Impact Assessment Requirements (Decree 112/MONRE 2010 Group 1) of the proposed Gnod Ou Min-Hydropower Project.

Under Decree 112/MONRE, the Project falls under Category 1 and from assessment of the impact through field survey, consultations and during stakeholder meetings (Appendix 5), it was concluded that adverse impacts to physical, biological, social, cultural environment would not be insignificant and further study such as an EIA shall not be necessary.

References

Technical Guidelines on Compensation and Resettlement of Project Affected by Development Project, by The Water Resources and Environment Administration (WREA) Vientiane capital, June 2011.

Environmental Impact Assessment Guidelines, by The Environmental Management Support Programme (EMSP) & Water Resources and Environment Administration (WREA), 2011.

Lao Electric Power Technical Standards, Ministry of Industry & Handicrafts, Vientiane 2004.

Biodiversity in Phongsaly Province, Guide book, by Phongsaly Forest Conservation and Rural Development Project, April 2005.

National Biodiversity Conservation Areas (NBCA's) in Lao PDR, Lao Swedish Forestry Program June 2001.

Appendix 1

List of Wildlife and Fish in the protected forest and Conservation areas in Gnod Ou District.

No.	Local name	English name	Scientific name	Remarks
1	ເໝືອຍ	Sun Bear	<i>Ursus malayanus</i>	
2	ເສືອແມວກິນປາ	Fishing Cat	<i>Prionailurus viverrinus</i>	
3	ເຍືອງ	Southern Serow	<i>Naemohedus sumatraensis</i>	
4	ຄ່າງ	Crested Langur	<i>Semnopithecus cristatus</i>	
5	ກວາງ	Sambar Deer	<i>Cervus unicolor</i>	
6	ຟານ	Muntjac	<i>Muntiacus rooseveltorum</i>	
7	ບາງ	Giant Flying Squirrel	<i>Petaurista philippensis</i>	
8	ລິ້ນງົວ	Sunda Pangolin	<i>Manis javanica</i>	
9	ເຫັງນຫາງກ່ານ	Large Spotted Civet	<i>Viverra megaspila</i>	
10	ຈອນຟອນ	Back Striped Weasel	<i>Mustela strigidorsa</i>	
11	ໄກ້	Java Mouse-deer	<i>Tragulus javanicus</i>	
12	ຫອນ	Burmese Ferret Badger	<i>Melogale personata</i>	
13	ເພັ້ນ	East Asian Porcupine	<i>Hystrix brachyura</i>	
14	ລິງ	Monkey	<i>Macaca (Genus)</i>	
15	ກະຮອກ	Black Giant Squirrel	<i>Ratufa bicolor</i>	
16	ອິ້ນ	Large Bamboo Rat	<i>Rhizomys sumatrensis</i>	
17	ແລນ	Indian Monitor	<i>Varanus bengalensis</i>	
18	ເຕົາ	Amboina Box Turtle	<i>Cuora amboinensis</i>	
19	ປາຝາອອງ	Asiatic Soft Shell Turtle	<i>Amyda (Genus)</i>	
20	ນົກແກງ	Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>	
21	ນົກເຂົາທອງ	Red Turtle Dove	<i>Streptopelia tranquebarica</i>	
22	ນົກເລົ້າ	Owl	<i>Tytonidae and Strigidae (Family)</i>	
23	ນົກເຕັນຊິວ	Kingfisher	<i>Alcedo atthis</i>	
24	ນົກຕັງລໍ	Great Barbet (Asian)	<i>Megalaima virens</i>	
25	ນົກເປົ້າ	Pigeon	<i>Treron (Genus)</i>	
26	ງູສິງດົງ	Snake	<i>Zamenis (Genus)</i>	
27	ງູຂຽວ	Pit-Viper	<i>Trimeresurus (Genus)</i>	
28	ງູຈິງອາງ	King Cobra	<i>Ophiophagus hannah</i>	
29	ງູຫຼາມ	Large Burmese Python	<i>Python molurus</i>	
30	ງູເຫຼືອມ	Asiatic Reticulated Python	<i>Python reticulatus</i>	

List of Fish in Nam Ou, Gnod Ou District

No.	Local name	English	Scientific name	Remarks
1	ປາເຄງ	Pa Keng/Cat-Fish	<i>Mystus microphthalmus</i>	
2	ປາແດງ	Pa Deng	<i>Tor???</i>	
3	ປາແຂ້	Pa Khae/Giant Devil Cat-Fish	<i>Bagarius Yarrelli</i>	
4	ປາຕອງ	Pa Tong/Asian Knife-Fish	<i>Notopterus (Genus)</i>	
5	ປາຈາດ	Pa Chad/Cyprinid Fish	<i>Poropuntius (Genus)</i>	
6	ປາກົດ	Pa Kot/Crystal eyes cat-fish	<i>Hermibagrus wycki</i>	

Appendix 2

The list of trees in the protected forests

No.	Local name	English name	Scientific name	Remarks
1	ໄມ້ແດງນ້ຳ	Mai Deng Nam	<i>Xylia dolariformis</i>	
2	ໄມ້ກໍ່ແດງ	Mai Kor Deng	<i>Castanopsis hystrix</i>	
3	ໄມ້ຍົມຫອມ	Mai Yom Hom	<i>Toona febrifuga</i>	
4	ໄມ້ຍົມຫິນ	Mai Yom Hinh	<i>Chukrasla tabularis</i>	
5	ໄມ້ເປື້ອຍຂາວ	Mai Peuy Khao	<i>Lagerstroemia florribunda</i>	
6	ໄມ້ຈິກໂຄກ	Mai Chik Khok	<i>Shorea obtusa</i>	
7	ໄມ້ກາກະເລົາ	Mai KakaLao	<i>Lagorstroemia macrocarpa</i>	
8	ໄມ້ຈຳປາ	Mai Champa	<i>Michetia champaca</i>	
9	ໄມ້ຫຼຽນ	Mai Hienh	<i>Mella azedarach</i>	
10	ໄມ້ລອງທໍ	Mai Long hor	No Scientific name	
11	ໄມ້ຊາຍ	Mai Xai	No Scientific name	
12	ໄມ້ໂຫຼ	Mai Lo	No Scientific name	

Appendix 3

Compensation Estimate for Gnod Ou Mini-Hydropower Project

According to the technical design of the Mini Hydro Project, after construction of weir, the water level will increase which may cause “occasional” flooding to three rice fields at a frequency ranging once every 10, 20 and 50 years.

In addition to flooding of the rice fields mentioned above, a villager’s corn garden will also be affected, not by flooding but by the construction of penstock along the left bank which starts from the proposed weir to the powerhouse. The garden has approximate total area of 0.8 ha, where crops such as corn and peanuts are cultivated. The garden belongs to one family that lives in Ban Phane.

Village consultation

A meeting took place in Ban Phor at 8.30am on 08/11/12; representatives from the District (Mr Soudaiwan – Dept of Energy & Mine Gnod Ou District) and Village Head of Ban Phor (Mr Khamkha, co-chaired the meeting.

The participants were mainly the Project Affected Persons (PAPs). Refer to Table A-1 & A-2 below “List of affected persons”.

Mr Manomai (consultant from CaA) introduced the Project.

I-The topics discussed were as follows:

1. Project objective:
 - Electrification in the remote area to enhance the standard living
 - Response to the government policy on “poverty reduction program”
 - Reduction of the imported electricity
2. The impact during construction
 - Upstream- no impact
 - Downstream – water quality, land use and social impacts
3. The impact during operation
 - Occasional flooding of rice fields upstream
 - Little change to aquatic life both up and down stream

4. The compensation policy

- Establishment of compensation committee, to oversee the compensation process including valuation of AP assets
- Compensation procedure
- Compensation must be taken place before the construction

II-Discussion and recommendation on the Project

1. The villagers agreed with the project objective because they will have proper and reliable electricity. Presently they rely on pico-hydro that cannot be used during the heavy rain and dry season.
2. Villagers are satisfied with the compensation policy- that is crop compensation only, villagers are allowed to own and use their rice fields as usual.
3. At the end of meeting, everyone agreed and satisfied with this project and the villagers fully support the proposal and wish the construction begins as soon as possible. The meeting was closed at 12.00noon.

Table A-1: List of rice field owners affected by “occasional” flooding

Name of the affected Rice field	Item	Names of owners	Village of residence	Areas (ha)
“Thong Na Phor” (x-sec No.14)	1	Mr Khamsen	Phor	-
	2	Mr Khampeng	Phor	-
	3	Mr Khamping	Phor	-
	4	Mr Nokeo	Phor	-
	5	Mr Somchit	Phor	-
	6	Mr Teuntakeng	Somxai	-
	7	Mr Dilavou	Somxai	-
	8	Mr Daopha	Pharne	-
	9	Mr Khamla	Phor	-
				1.70
“Thong Na Phat” (x-sec No.13)	1	Mr Bounthan	Phor	-
				0.25
“Thong Na Kham” (x-sec No.11&12)	1	Mr Chomseng	Phor	-
	2	Mr Phouvieng	Phor	-
	3	Mr Tanang	Somxai	-
				0.71
Total				2.66

Table A-2: List of owner affected by “Penstock Construction”

Name of the affected Cropping area	Item	Names of owner	Village of residence	Areas (ha)
“Cropping Area”	1	Mr Khamphoy	Phane	0.8
Total				0.8

Compensation Estimates

Production capacities and crop market values:

Statistical Information about local crop (rice, corn etc..) production capacity and their market values were obtained from *Gnod Ou District Office*, with a survey of local market prices along with prices from local farmers.

Rice:

Average production capacity- 2,500kg/ha- wet rice– Oct-2012

Average local market price@3,000kip/kg (un-husk)-Oct 2012

Corn:

Average production capacity – 4,000kg/ha- Oct2012

Average local market price @ 2,500kip/kg - Oct 2012

Compensation Estimates

Table A-3: Compensation estimate for rice production affected by “occasional” flooding

Name affected Rice field	Areas (ha)	Production capacity (kg/ha)	Price Kip/kg	Compensation Period (yr)*	Total Amount (Kip)
“Thong Na Phor”	1.70	2,500	3,000	3	38,250,000
“Thong Na Phat”	0.25	2,500	3,000	3	5,625,000
“Thong Na Kham”	0.71	2,500	3,000	3	15,975,000
Total	2.66				59,850,000

* Period of compensation were based on loss of perennial crop, affected person retains the land

Table A-4: Compensation estimate for corn production affected by penstock construction

Name affected corn field	Areas (ha)	Production capacity (kg/ha)	Price Kip/kg	Period of compensation (yr)*	Total Amount (Kip)
“Cropping area”	0.8	4,000	2,500	3	24,000,000
Total	0.8				24,000,000

* Period of compensation were based on loss of perennial crop, affected person retains the land

Total compensation budget estimates for Hydro Plant impacts are 83,850,000Kip

Appendix 4

Flood Analysis

Figure 1: River cross section and Paddy Fields

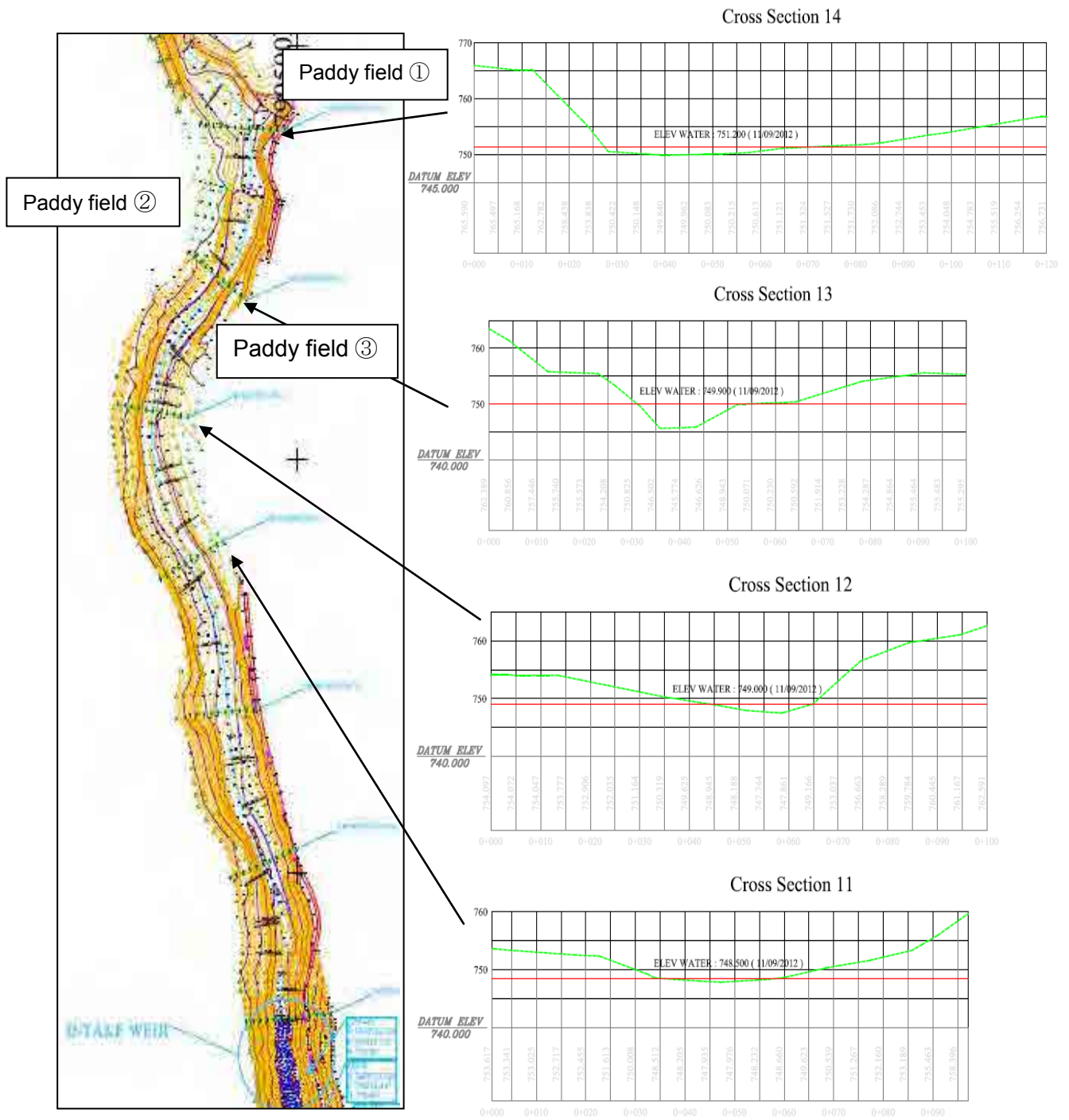




Figure 2: Paddy field ①



Figure 3: Paddy field ②



Figure 4: Paddy field ②



Figure 5: Paddy field ③

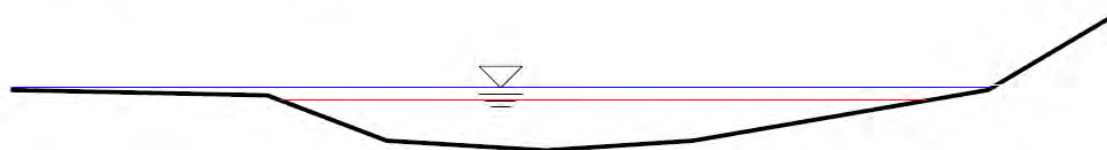


Figure 6: Paddy field ③

< Section 11 > (Upper figure: With weir / Lower figure: Without weir)

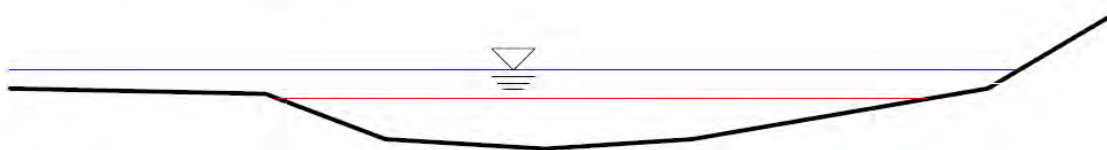
断面名称 : Setion 11
 河床高 : 47.700(m)
 限界水位 : 52.065(m)
 水位 : 53.117(m)

—— 水位 — — — 限界水位



断面名称 : Setion 11
 河床高 : 47.700(m)
 限界水位 : 52.065(m)
 水位 : 54.560(m)

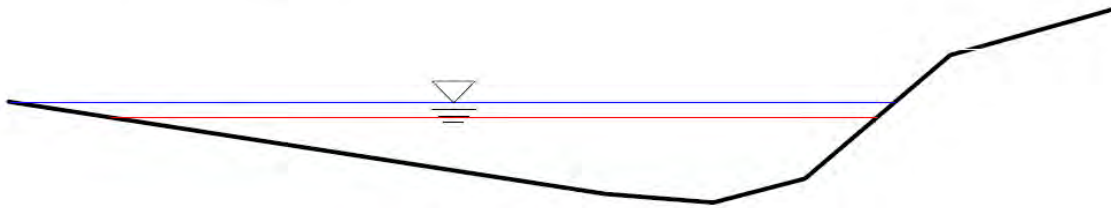
—— 水位 — — — 限界水位



<Section 12> (Upper figure: With weir / Lower figure: Without weir)

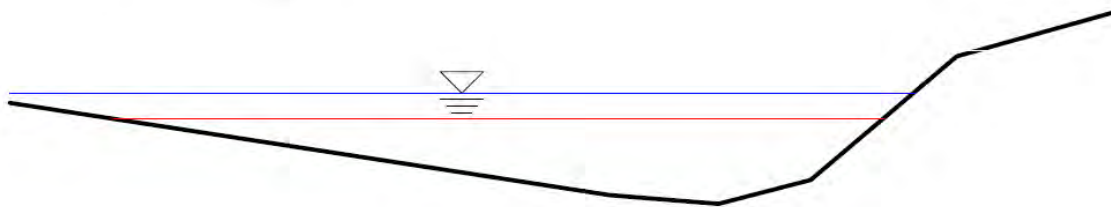
断面名称： Section 12
河床高： 47.500(m)
限界水位： 52.967(m)
水位： 53.962(m)

—— 水位 - - - 限界水位



断面名称： Section 12
河床高： 47.500(m)
限界水位： 52.967(m)
水位： 54.663(m)

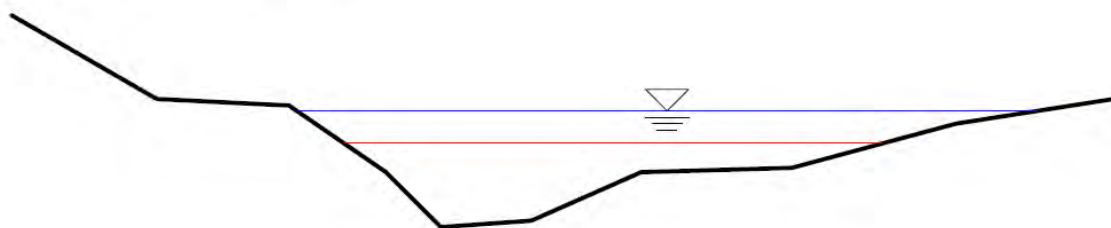
—— 水位 - - - 限界水位



<Section 13> (Upper figure: With weir / Lower figure: Without weir)

断面名称： Section 13
河床高： 45.500(m)
限界水位： 52.347(m)
水位： 55.020(m)

—— 水位 - - - 限界水位



断面名称： Section 13
河床高： 45.500(m)
限界水位： 52.347(m)
水位： 55.288(m)

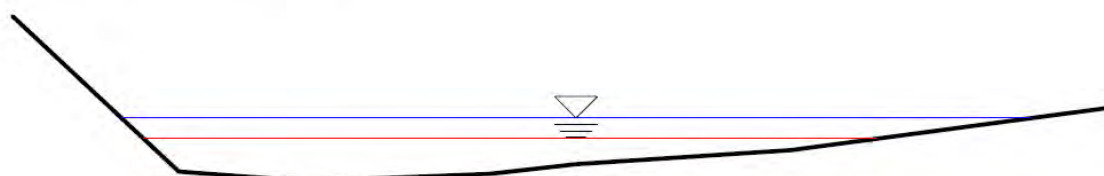
—— 水位 - - - 限界水位



< Section 14 > (Upper figure: With weir / Lower figure: Without weir)

断面名称： Section 14
河床高： 49.600(m)
限界水位： 53.576(m)
水位： 55.474(m)

—— 水位 - - - 限界水位



断面名称： Section 14
河床高： 49.600(m)
限界水位： 53.576(m)
水位： 55.681(m)

—— 水位 - - - 限界水位

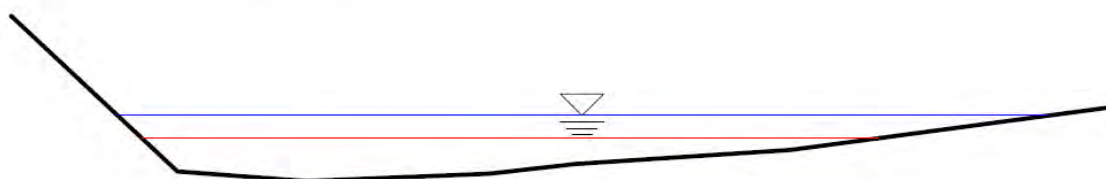


Table 1 Comparison of Flood Water Level (FWL)

Flood Return Period (Years)		100	50	20	10	5	2	Location of Paddy Field
Flood(m ³ /s)		847	710	547	429	322	186	
A. Without Weir (Flood Water Level(m))	Section 11	753.117	752.458	751.869	751.409	750.958	750.350	Paddy field Area①: Left bank and upstream (EL.752.091)
	Section 12	753.962	753.443	752.900	752.444	751.954	751.144	Paddy field Area①: Left bank and upstream (EL.753.838)
	Section 13	755.020	754.525	753.874	753.325	752.736	751.768	Paddy field Area②: Right bank and upstream (EL.754.263)
	Section 14	755.474	754.941	754.239	753.664	753.068	752.149	Paddy field Area③: Left bank and upstream (EL.753.739)
B. With Weir (Flood Water Level(m))	Section 11	754.560	753.994	753.267	752.635	752.018	751.122	Paddy field Area①: Left bank and upstream (EL.752.091)
	Section 12	754.663	754.167	753.535	752.941	752.327	751.423	Paddy field Area①: Left bank and upstream (EL.753.838)
	Section 13	755.288	754.781	754.110	753.507	752.872	751.876	Paddy field Area②: Right bank and upstream (EL.754.263)
	Section 14	755.681	755.140	754.423	753.802	753.165	752.215	Paddy field Area③: Left bank and upstream (EL.753.739)
C. (=B-A) Differentials (m)	Section 11	1.443	1.536	1.398	1.226	1.060	0.772	—
	Section 12	0.701	0.724	0.635	0.497	0.373	0.279	—
	Section 13	0.268	0.256	0.236	0.182	0.136	0.108	—
	Section 14	0.207	0.199	0.184	0.138	0.097	0.066	—

Blue figures: Flooded before the Project

Red figures: Newly flooded after the Project

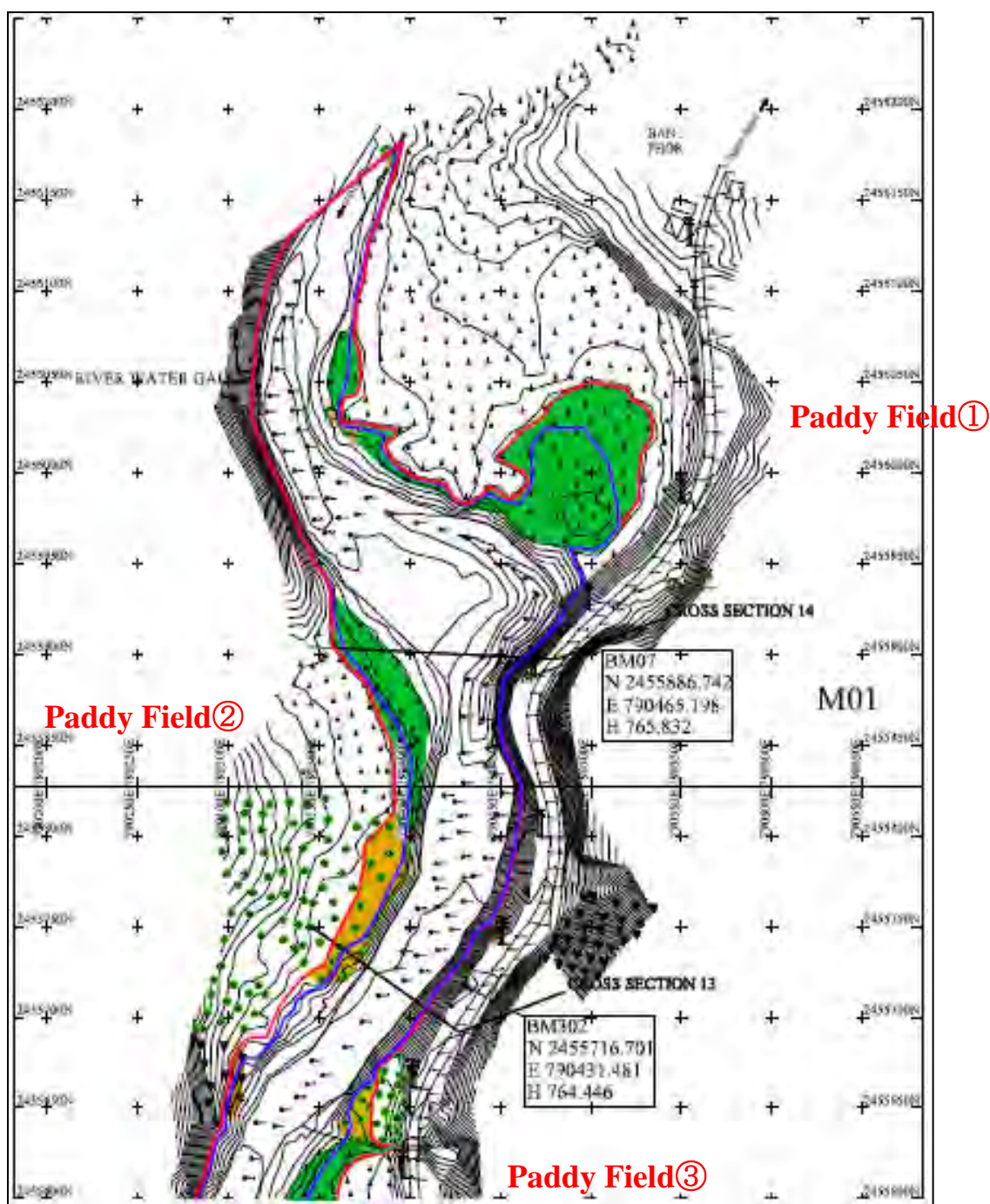


Figure 7 F.W.L (100 Year-Return-Period)/Upper stream

Legend

Red line : F.W.L (100 Year-Return-Period) with the Weir

Blue Line : F.W.L (100 Year-Return-Period) without the Weir

Green Area : Flood Area (Paddy field) with the Weir

Brown Area : Flood Area (Garden) with the Weir

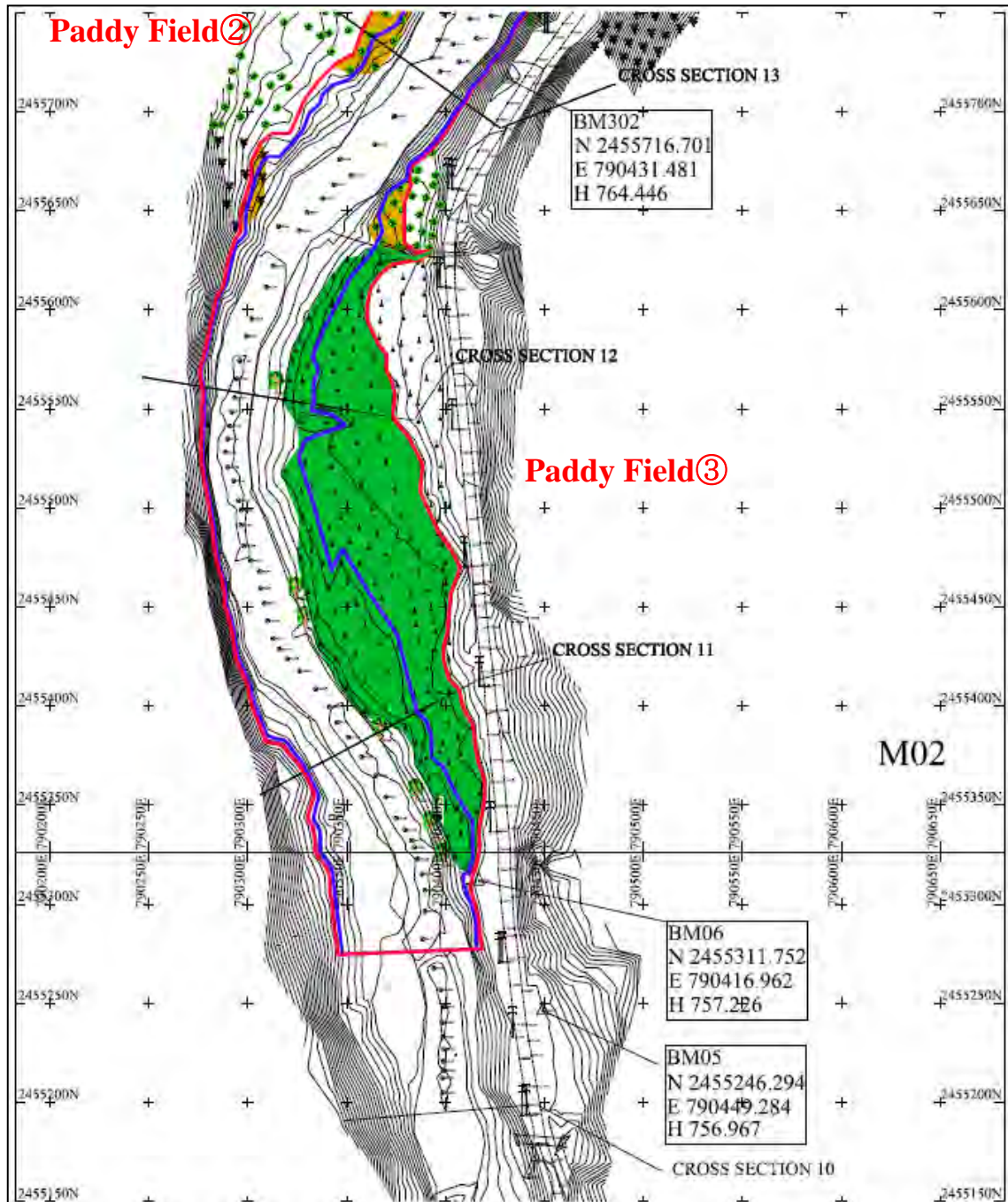


Figure 8 F.W.L(100 Year-Return-Period)/Lower stream

Legend

- Red line : F.W.L (100 Year-Return-Period) with the Weir
- Blue Line : F.W.L (100 Year-Return-Period) without the Weir
- Green Area : Flood Area (Paddy field) with the Weir
- Brown Area : Flood Area (Garden) with the Weir

Table 2 Paddy Field and Garden under the FWL (100 Year-Return-Period) with the Weir

Items	Paddy Field Area ①	Paddy Field Area ②	Paddy Field Area ③	Total
Paddy Field (ha) · · · Green Area in figure 7&8	1.50	0.24	0.66	2.40
Garden (ha) · · · Brown Area in figure 7&8	0.05	0.21	0.00	0.26

(Total) 2.66

Appendix 5

First Stake Holders Meeting

The first stake holders meeting was held at Gnod Ou District Administration office on the 11th of September, 2012. Below are the comments made by all parties involved.

This meeting was chaired by Deputy District Party Secretary and Deputy District Governor, Mr. Khongkheo Khantaphom. He raised the following issues and concerns throughout the meeting.

1. There will be high volume water during wet season, with large boulders and debris flowing down the river.
2. Due to geology of the surrounding mountains, landslides occur during the wet season, along both road and river banks. This also contributes to the river sedimentation in Nam Ou and high turbidity.
3. Possible flooding of upstream towns that are along the river. This could impact rice and corn fields as well.
4. With the end of the Sugar Cane Concession in 2013, the district objective is to change crop production to Tea and Coffee, to assist in the increase of the local economy and reducing the affects of erosion.

The pictures below were taken during the First Stake Holders Meeting.



Comments made by other parties during the meeting were:

1. The proposed watershed conservation of Gnod Ou District (**CaA**).
2. Compensation should be carried out fairly (**Ban Loum, Head of Village**).
3. During construction phase of the Project, turbidity of water will increase, mitigation measured should be followed (**Communications Department**).
4. At present, Electricite du Laos (EdL) is importing electricity from China at .58 Yuan per kWh or roughly 700kip kWh. On average, EdL buys power annually for 50million Kip per year, selling to the district at 20million kip per year, to a loss of 30million Kip per year. EdL said they would be very happy to incorporate electricity from this Project into the grid to reduce expenditure (**EdL**).

List of Participants

(1nd Stakeholders Meeting 11 Sep 2012, Ou Tai, Gnod Ou District, Phongsaly Province)

No	Names	Organisation	Position	Tel
1	Mr Anousak Phongsavat	IREP-MEM	Deputy Director, IREP	55507714
2	Mr Somchit Sithivong	Provincial Energy &	Director (Di)	55688081
3	Mr Kongkeo	GnodOu district office	Acting Governor	56828209
4	Mr Bounthet Inchak	GnodOu district office	Deputy Governor	22398643
5	Mr Somvang Soumvilay	District-Ag.Forestdept	Party's permanent secretary	22845810
6	Mr Bounleuth Dongvan	District Publicwork	District head (Dh)	55537556
7	Mr Laykham Bounphaxai	District Office	Dh	59335666
8	Mr Peng Chanthaphom	District Natural	Dh	59766186
9	Mr Ouneua Sivanpheng	Provincial EDL	Division Head (Province)	55555514
10	Mr Oun Sosiliphom	Defense	Dh	22847603
11	Mr Soulayvane	E&M- work-Unit	Dh	23903635
12	Mr Phonsavane S ipaseut	IREP	Unit Head	55912796
13	Ms Boulay Phommalat	Phouxang Village	Village head	22028137
14	Mr Genshiro Kano	JICA- Study Team		2029946814
15	Mr Naoyuki Tsuda	JICA- Study Team		55028470
16	Mr Senchi Suzuki	JICA- Study Team		29946815
17	Mr Naoki Kosaka	JICA- Study Team		+818040849688
18	Mr Teru Miyazaki	JICA- Study Team		54146049
19	Mr Ko Kawano	JICA- Study Team		
20	Mr Shigeki Wada	JICA- Study Team		
21	Mr Chareun	Chareun and	Di	55520990
22	Mr Jun Tamakawa	JICA- Study Team	Team leader	
23	Mr Phonxai Thiphasone	Provincial E & M	Admin Head	59620999
24	Mr Van Ali	Provincial EDL	Head supply unit –Gnod Ou	28800990
25	Mr Xaipaseu tDalavan	Provincial EDL	Head Technical unit –Gnod	22846438
26	Mr Sonphet Chanthala	Province E&M	Technical Officer	23887819
27	Mr Bounkthu Khenkham	Province E&M	Technical Officer	97899722
28	Mr Theng Choy	Loun Village	Secretariat	23902870
29	Mr Tom Keonamvong	District Police	Head	22845919
30	Mr Manomai Sengmany	CaA	Senior staff	22000650
31	Mr Santi Sayakoummane	CaA	Environmental Officer	

Village and District Consultation

In addition to 1st Stakeholders meeting held on 11th Sept 2012, Project affected villagers and district officials were consulted and discussed with regarding, the Project design, and implementation, including type of assets that may be affected as well as benefit that should be expected from the proposed Project.

Villagers, including government at the district levels were also consulted, with regard to history of natural resources and surrounding environment.

Following is a summary of issues discussed:

1. The largest flood that had occurred in Ou Tai was in 2001, which inundated most of the rice crops downstream and covered the bridge coming into Ou Tai. The last major flood before 2001 was in 1970 which saw similar devastation to the township and agricultural land.
2. Prior to 1975 fish stocks were high; reportedly, villagers could even catch fish by hand. 1997-98 fish stocks began to decline. With the increase of more sophisticated fishing techniques and equipment, such as electro-fishing and dynamite.
3. A Mekong River Cat-Fish has been known to move up into the higher parts of Nam Ou, during periods of increased water flow.
4. Population increase since 1975 has seen an increase in the clearing of land for agriculture purposes.

Results from Local Village Interviews:

1. Three Villages were interviewed along Nam Ou, one upstream (Ban Phor) and two downstream (Ban Chomphor and Ban Somxai) from the proposed Project site.
2. All three villages were involved in corn, rice or sugar cane production.
3. Sugar Cane is being produced by Chinese Companies for export.
4. Corn is grown by each household at Ban Chomphor, this is also exported.
5. Rice is seen to be grown by all villages, and is for the local market.
6. The Head of all Villages had no major objection to the development of the Hydro-Project, and welcomed the fact that it may increase electrification in the region and that they did not have to rely so much on imported power.
7. Their only slight concern was with flooding of upper river areas after the Project was completed.



Photos taken during two of the Village interviews with the Head of Village at Ban Phor and Ban Chomphor.



Pico-Hydro units' places along Nam Ou at Ban Chomphor, the picture on the right shows the amount of lines feeding into the village. In Ban Chomphor; out of 56 houses, only six houses in the village have their electricity from the national grid with 13 using Pico-hydro setups.



Above are the types of crops farmed by the locals, the left photos shows rice, which is the larger wild type variety and on the right is some corn being dried at Ban Chomphor.

Second Stakeholders Meeting

The second stakeholder meeting was held on the 18th of December 2012 at Gnod Ou District, Phongsaly Province and was chaired by Mr. Kongkheo Khantaphom, Deputy District Party Secretary and Deputy District Governor. The meeting was officially opened at 8:30 am and was attended by many government Department and organization officers.

I.) Objective of this meeting was:

1. A proposal from the Japanese Expert regarding the outline of the Project.
2. A proposal from the Japanese Expert regarding the Initial Environment study.

II.) Questions from different Departments and organizations.

1. Institute of Renewable Energy Promotion - proposed that the Department of Public Work needs to consult with the Project Manager before any construction should take place.
 2. The Department of Public Work - proposed to consult with contractors first in order to reduce any environmental impact in the Project area. They also asked for budget funding to build a Flood Way in the Project area.
 3. Comrade Kong Lakeo and comrade Khamphoy Vannavong, whose corn fields will be affected by the Project, asked for compensation for their 0.3 hectare of their land area.
 4. The Department of Energy and Mine - will consult with the concerned organizations to establish a Management Body to deal with any compensation that will occur. They proposed that separate housing should be built for the Dam site workers.
 5. The District Head - asked for one year compensation during the construction period. After the completion of the Project, there will be some more detail calculation on the actual affected area for compensation.
 6. Department of Environmental Conservation - will send technical officials to assess the actual corn fields, to protect and conserve water resources and to stop the sugar cane plantation in order to promote reforestation.
 7. Department of Agriculture and Forestry – proposed that after the completion of the Project, there should be budget funding to look after the catchment areas and to provide covers for open channels in order to prevent accidents.
 8. Proposed that JICA Project, according to their ability, should build access roads for some of the 3 Villages that have no access roads.
- iii) According to the discussions, everyone in the meeting had come to the agreement and the meeting was concluded at 12:00pm

List of Participants
(2nd Stakeholders Meeting 18 Dec 2012 Ou Tai, Gnod Ou District Phongsaly Province)

No	Names	Organisation	Position	Tel
1	Mr Kongkeo Chanthaphone	Gnod Ou District Office	Acting Governor	56828209
2	Mr Somchit Sitthivong	Provin Energy and Mines	Deputy Director (Dd)	556888081
3	Mr Boun ThethInchack	Gnod Ou district office	Deputy Governor-Dg)	22998643
4	Mr Inpeng Sochayvong	Gnod Ou district Lao National Construction Front	Director (Dir)	22845817
5	Mr Laykham Bounphaxaison	Provincial cabinet Office	Dir	59335666
6	Mr Sak Sipaseut	District EDL	Dd	95688454
7	Mr Bounthavy Sisoukhan	District Publicwork	Dd	82395075
8	Khamchanh Sithilat	District Natural Resource & Environment (DNRE)	Dd	55688101
9	Mr Bounxai Phommathet	District Planning & Finance	Dir	22845655
10	Mr Bounleut Khongsakeo	Province Planning Dept	Technical Officer (To)	22929955
11	Mr Chansamai Khouakham	District Youth Org	Dir	58006449
12	Mrs Senglot Chanda	District Lao Women Union	Dir	22845996
13	Mr Phonphet Vongsa	Province Cabinet	To	28760998
14	Mr Khamlay Xayadeth	District Agri& Forest Dept	Dd	22245529
15	Mr Bounleuth Dongvan	Province Publicwork	Dir	55537556
16	Mr Pheng Chanthaphone	Province Natural Resource & Environment (PNRE)	Dir	56481958
17	Mr Khamphoy Navong	Corn field Owner	Retired District Official	22849201
18	Mrs Boualay Phommalat	Phouxang Village	Village Head	56512362
19	Mr Vankeo Solaphom	Loum Village	Village Head	
20	Mr Akira Niwa	Jica – head Quater	Senior Adviser	
21	Mr Hidetaka Koseki	Jica – head Quater	Staff	
22	Naoyuki Tsuda	Jica Study Team	Deputy Team leader	55028470
23	Nabuo Hashimoto	Jica/MEM	Expert	55504411
24	Shigehi Wada	Jica Study Team	Staff	55028422
25	Manomai Sengmany	Chareun & Associate Ltd	Expert	22000650
26	Jun Tamakawa	Jica Study Team	Team Leader	28989803
27	Mr Khamphara Sisamontry	IREP/MEM	Dd	55601154
28	MrKonthong Sommala	District /Mpt	Dd	55019942
29	Mr Masato Togawa	JICA	Chief officer	55512637
30	MrYuzurio Susumu	JICA	Senior staff	55517635
31	Mr Bounma	Province Dept Energy & Mine	To	97899283
32	Mr Chomuang	District dept Energy & Mine	To	28764040

Appendix 6

MONITORING FORM

(Mini-Hydro Power Plant)

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during Report Period
e.g. Responses/Actions to Comments and Guidance from Government Authorities	

2. Mitigation Measures

- Air Quality (Ambient Air Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, Term of investigation, etc.)
Dust (PM10)	mg/m ³				0.02(Annual) 0.05(24 hours)	

- Water Quality (Effluent/ Wastewater/ Ambient Water Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH					No	
SS (Suspended Solid)					No	
DO					No	

- Waste

Monitoring Item	Monitoring Results during Report Period
Domestic Waste	
Industrial Waste	

- Noise / Vibration

Item	Unit	Measured Value (Mean)	Measured Value (Max)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level	dB				70dB	

3. Natural Environment

- Ecosystem

Monitoring Item	Monitoring Results during Report Period (Method of survey)
Impacts to Valuable species (Big mammals)	
Impacts to Wild Valuable Plants	
Impact to Aquatic Valuable Plants	

4. Social Environment

- Living / Livelihood

Monitoring Item	Monitoring Results during Report Period (Method of survey)
Level of livelihood	

Gnod Ou Mini-Hydropower Project
Initial Environmental Examination (IEE)
For
Distribution Lines



Prepared for:



Tokyo Electric Services Company, LTD (TEPSCO)

Prepared by:



Chareun and Associates Co. Ltd

28 December, 2012

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Vientiane, Laos P.D.R.

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Abbreviations

AP	Affected Persons
BCA	Biodiversity Conservation Area
CA	Concession Agreement
CaA	Chareun and Associates
DAFO	District Agriculture and Forestry Office
DEP	Department of Electricity Promotion
DESIA	Department of Environment and Social Impact Assessment
D-L	Distribution Line
DLUP	Department of Land Use and Planning
DNRE	District Natural Resources & Environment
DOF	Department of Forestry,
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMO	Environmental Management Office
ESMU	Environmental and Social Monitoring Unit
ESD	Environment and Social Division
ESIA	Environmental and Social Impact Assessment
GRC	Grievance Redress Committee
GoL	Government of Lao PDR
ha	Hectares
HC	Head Contractor
IEE	Initial Environmental Examination
IREP	Institute of Renewable Energy Promotion
JICA	Japan International Cooperation Agency
kWh	Kilowatt hour
kW	Kilowatt
LACP	Land Acquisition and Compensation Plan
MAF	Ministry of Agriculture and Forestry

masl	Meters above sea level
MHP	Mini-Hydropower Project
MEM	Ministry of Energy and Mines
MIC	Ministry of Information and Culture
MOF	Ministry of Finance
MONRE	Ministry of Natural Resources and Environment
MOU	Memorandum of Understanding
MPWT	Ministry of Public Works and Transport
MW	Megawatt
NBCA	National Biodiversity Conservation Area
NIREA	National Institute for Religious and Ethics Affairs
NLMA	National Land Management Authority
NPA	National Protected Area
NPAD	National Protected Area Division
NTFP	Non-timber Forest Product
PAP	Project Affected Persons
PCU	Project Compensation Unit
PDA	Project Development Agreement
PDR	Peoples Democratic Republic
PESMU	Project Environmental and Social Monitoring Unit
PNRE	Provincial Natural Resources and Environment
PSF	Professional Service Firm
RAP	Resettlement Action Plan
RoW	Right of Way
TOR	Terms of Reference
VDU	Village Development Unit
WA	Workplace Agreement

Chapter I

Introduction

1.1 Background of the Study

Power demand in Lao PDR has been increasing rapidly within the past ten years. During this time, the national electrification ratio of Laos has increased from 36% in 2000 to 48% in 2005 and to 73% in 2010. By region, the electrification ratio in the North is at 59%, with 96% in the Central area and 70% in the South. The Lao Capital Vientiane, in the central part of Laos, is at 99% electrification which particularly shows how well established urban areas are. However, if compared to other parts of the country electrification is still very under developed in rural and remote areas. A target by the Government of Lao (GoL) is to improve national electrification ratios to 80% by 2015 and to 90% by 2020. This will be achieved by reducing internal disparities between urban and rural areas, and poverty reduction in remote areas.

Phongsaly which is located in the northern part of Laos sits on the borders of China and Vietnam, and is one of the most under developed Provinces in comparison to the rest of the country. With electrification in Phongsaly at only 23% in June of 2011, the GoL has set a high priority on improving electricity in this Province.

In accordance with the above, in 2008 the GoL requested the Government of Japan (GoJ) for Grant Aid for rehabilitation of two Mini-hydropower Plants (MHP). After discussion between Japan International Cooperation Agency (JICA) and GoL, the development of Gnod Ou Mini-Hydropower Project was selected as Japan's Grant Aid Project.

1.2 Objectives of the Initial Environmental Examination (IEE)

The main objectives of this IEE are:

- To meet the requirements of the regulations concerning the Environmental Examination of the Distribution Line component of the MHP for GoL approval to allow the construction to commence.
- To present the environmental and socio- economic baseline data of the study area.
- To determine possible environmental impacts related to the construction and operation of the MHP and provide a series of mitigation measures to address these impacts in an Environmental Management and Monitoring Plan (EMMP). Any compensation and resettlement measures are dealt with in a compensation action plan.

This map describes the grid extension targets, with a total of 22 villages planned to receive electrification. The two study sites are separated into Priorities 1 and 2, the map also indicates D-L that have recently been completed in February and September of 2012.

Priority targets 1 and 2 show the number of households and population in each of the target villages to receive electrification (Table 1-1).

Priority 1 covers an approximate distance of 42km and will follow the existing road to B. Xipeuchay. Priority 2 is approximately 34km in distance and will also follow existing road from B. Kheu Nua to Ban Pacha.

Table 1-1 Targeted villages to receive electrification

Priority 1 (North East)				Priority 2 (West)			
No	Name	HH	Population	No	Name	HH	Population
I-1	Bosao	72	475	II-1	Kang	57	311
I-2	Nahok	109	712	II-2	Nalouang	167	876
I-3	Malitheu	82	521	II-3	Toungkouali Gnai	33	210
I-4	Menkuaphong	37	227	II-4	Phangsan	55	278
I-5	Thouchangfang	47	296	II-5	Houayva	28	157
I-6	Phugnixe	31	223	II-6	Phouneusan	50	296
I-7	Peuhouaxou	24	140	II-7	Pacha	47	248
I-8	Sivilai	41	267	III-1	La	100	514
I-9	Laofouchay	37	249	IV-1	Kheu Nua	44	206
I-10	Xithongpa Gao	31	225				
I-11	Xikaoho	57	389				
I-12	Xithongpa Mai	36	266				
I-13	Xipeuchay	37	246				
	Total	641	4,236		Total	581	3,096

1.5 Methodology

Since this Project is expected to be implemented under Japan's Grant Aid Scheme, it is important for the GoL to fully understand their role and responsibilities as an Aid beneficiary. The survey team will assist GoL in prior preparation and procedures for smooth implementation of the Project.

The Japanese Cabinet meeting to obtain an approval of the Project as a Japanese Grant Aid Project is scheduled in February 2013. Time schedule of the preparatory survey will be duly controlled to avoid any delay in its progress.

A survey team was responsible carrying out field surveys and collecting relative environmental and socio-economic data, along both D-L routes. This involved meeting with villagers to discuss the Projects impacts; benefits to the environment and community, as well as grievance mechanisms that will be available and accessible if required.

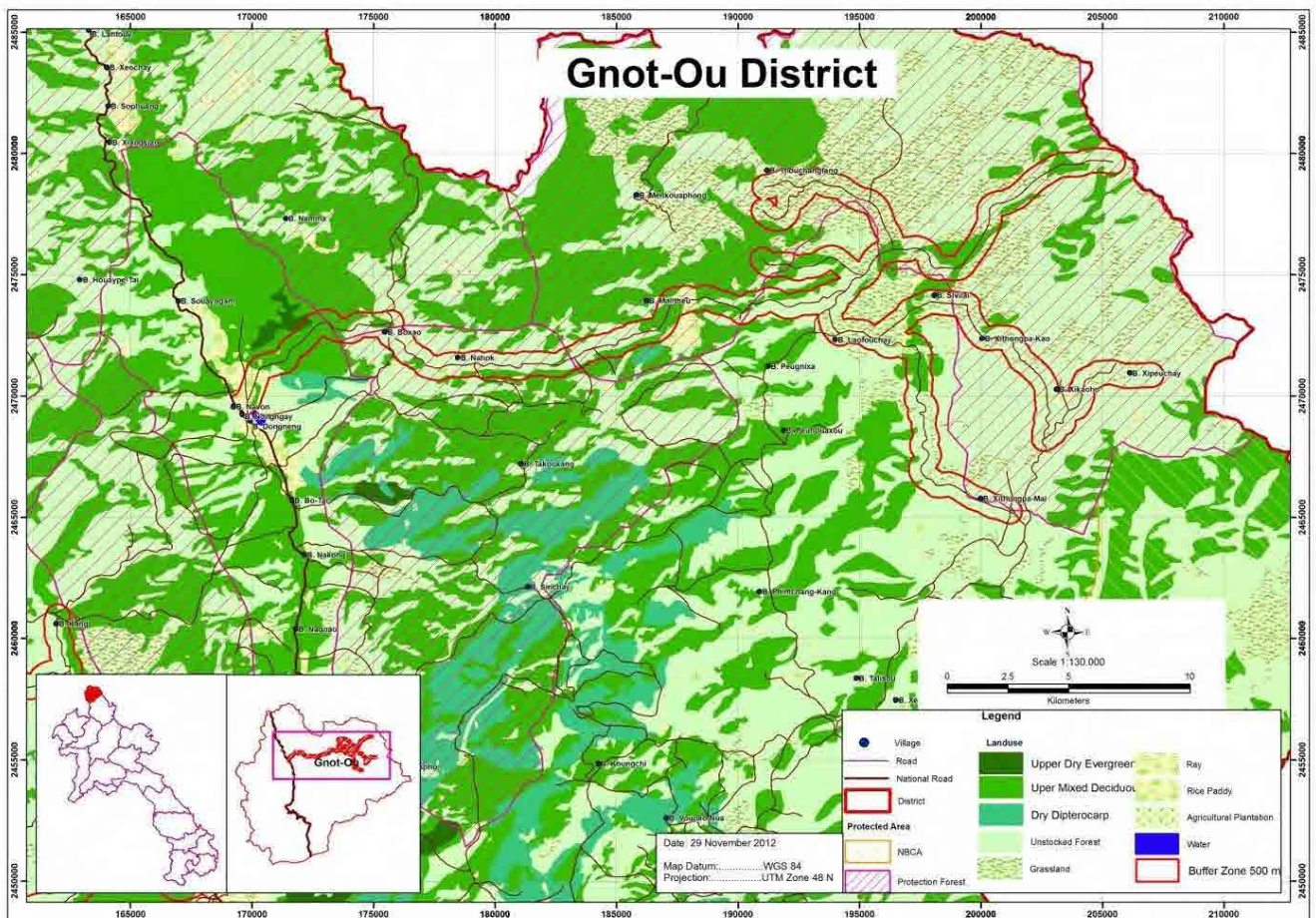
1.5.1 Pre-survey

The pre-survey study involved collecting lists of villages to receive electrification and D-L routes. See Table 1-1. Prior to arrival of the survey team it was important to inform local District Authorities of the site visit and the time frame in which the work would take place.

1.5.2 Field survey

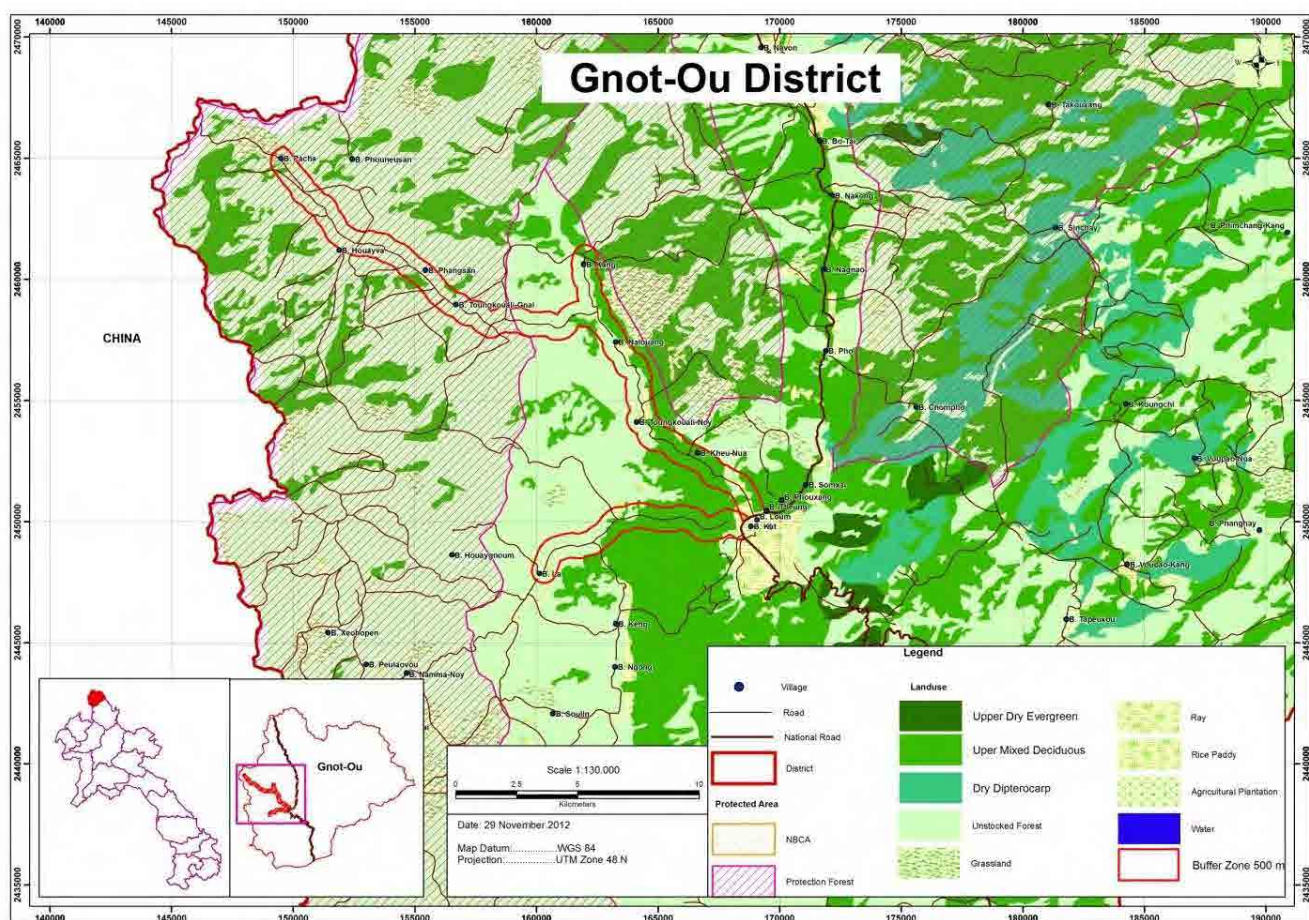
The field survey allowed detailed data collection regarding socio-economic condition and land use along proposed routes, which follow existing un-paved public roads. D-L Priority 1 as shown in Figure 1-2, covers an approximate distance of 42km and will follow the existing road to B. Xipeuchay from B. Navon. D-L Priority 2 in Figure 1-3, is approximately 34km long and will also follow existing road to from Ou Tai to Kheu Nua. The field survey was also to collect primary data on vegetation and/or productive land that may be impacted and any compensation or resettlement that may be required.

Figure 1-2 Land use in “Priority 1” area



A 500m buffer zone was used for the D-L study of 42km of existing road from B. Navon to B. Xipeuchay.

Figure 1-3 Land use in “Priority 2”



Priority 2 uses the same size buffer zone and covers an approximate 34km in length and will also follow existing road from Ou Tai to B. Kheu Nua and a small extension across to B. La.

The field surveys and interviews were carried out with the Head of Village in every potentially affected village along the D-L route. The survey team consisted of four personnel including a member from the local District Office.

At every village meeting, the locals were informed about the general objectives of the project. This included benefits as well as the potential impacts to the environment and socio-economic condition.

The interviews focused on the local attitudes of villagers regarding the proposed project and their views. It also focused on current land status, forest usage, income generation activities and wildlife conditions.

Other relevant data on the general environment such as flora, fauna, other land use, water, cultural sites, health and education both in and around the project site was also collected during the field and site visits.



Image 1-5a B.Khue Nua



Image 1-5b Route to B.Nalouang

Some examples of the types of conditions that were surveyed; Image 1-5a illustrates a small village (B. Kheu Nua) in which the proposed D-L will be extended through, details of land ownership were collected and recorded. Image 1-5b shows another route extending on to B. Nalouang, it was recorded that the land was scrub land of non-agricultural value.

1.6 Challenges of Study

Main challenges of study will be to work around the raining season; from May to October, with August being the month with most rain. No resettlement or compensation will occur along D-L RoWs.



Image 1-6a, road just outside of Ou Tai Township

The above, Image 1-6a, shows the condition of one of the roads heading north-east out of Ou Tai during the site visit in September. Even towards the end of the rainy season, accessibility was very difficult, and a second site visit was necessary to complete the field survey.



Image 1-6b, section of road towards Ban Nalouang

This photo illustrates road conditions to Ban Nalouang and shows how steep some sections of the road can be.

Chapter II

Policy and Legislations

2.1 Overview

Policies of the GoL regarding environmental protection and impacts on communities have been developed with support from international donor programs as well as through direct bilateral assistance aimed at improved resource management and biodiversity conservation. Many of these policies have been advanced by the GoL under a National Environment Action Plan, 2000 (NEAP). The key policy document for hydropower is *the National Policy for Environmental and Social Sustainability in the Hydropower Sector in Lao PDR*.

The intention of the NEAP is to highlight priorities for environmental protection, which are believed to be critical in establishing a framework for development and social equity, as well as the well-being for citizens of the Lao PDR. The causes of resource degradation include the key environmental issues such as forestry, land and water management, flora and fauna biodiversity, energy (including hydropower) industrial and mining development, and transport infrastructure.

The following legislation currently in force and supporting regulations in Lao PDR are relevant to ensuring environmental and socio-economic issues are addressed during design, construction, and operation of the project.

- Decree on Environmental Impact Assessment 2010
- Regulation for the Agreement on Lao National Environmental Standards 2010
- Regulations for Compensation and Resettlement of Persons Affected by Development Projects 2010. These regulations implement Decree No192/ MONRE 2005 on Compensation and Resettlement

The development of the Gnod Ou Hydropower Project in Laos PDR has to take place within a framework that covers:

- GoL policies aimed to promote hydropower Energy development, protection of National Protected Areas (NPA's) and endangered wildlife species in accordance with international treaties, protect the environment, and protect the interests of Lao persons and communities affected by development projects.
- Institutional responsibilities of GoL to control development and administration of hydroelectric power generation in the energy sector.
- The laws and regulations of the GoL approved to implement GoL policies.

2.2 Procedure for Obtaining Initial Environmental Examination (IEE) Approval

2.2.1 Requirement for Initial Environmental Examination (IEE) Report

Under the Decree of Environmental Impact Assessment, an IEE report is required to assess the environmental and social impact arising from the development of the Project. The report must include project description, social economic and environmental baseline information. It shall also include the listing of potential impact as well as form of mitigation, including budget for monitoring.

Category list states that installation of 22kV distribution line will only require an IEE, unless it passes through a National Protected Area.

In this case, the proposed distribution alignment will be within the “Public Works Land” or within the road RoW, and away from any National Protected Areas.

2.2.2 Procedure

The Ministry of Natural Resources and Environment is in the process of drafting a regulation detailing procedure where the Provincial Natural Resources and Environment (PNRE) are authorized to grant approval for an IEE. This is expected to be adopted by mid 2013.

Under the current Decree Environmental Impact Assessment Division 3 article 9, PNRE can issue an Environment Compliance Certificate (ECC) but subject to approval from MONRE first.

However, due to the nature of the project (Mini Hydro Project, finance through aid program for community etc..) and according to discussion with PNRE as well as MONRE, approval at provincial level will be effective.

An IEE report will therefore be submitted to PNRE (instead of MONRE), via the Institute of Energy Promotion (Rural Electrification Division) under Ministry of Energy and Mines.

2.3 Organization Related with Enforcement of Environmental Standards

Organizations responsible for the enforcement of Environmental Standards are the Ministry of Natural Resources and Environment (MONRE) and its subordinates (departmental) at provincial and district levels. The District Natural Resources and Environment (DNRE) will be in charge of everyday responsibilities of enforcing the Environmental Standards.

The Institute of Energy Promotion (under Ministry of Energy and Mines), through its Rural Electrification Division being the “responsible” authority is also responsible to ensure parties involved (during construction & operation) observe such standards, e.g. by inclusion into contractual agreement.

2.4 Relevant Law and Acts Related with Environment

The GoL has developed policy, strategy and legal frameworks for the protection of the environment and conservation of natural resources. The legislations relevant to construction of D-L are mentioned below.

2.4.1 Environmental Protection Law (1999) and the Decree on Environmental Impact Assessment (2010).

The Environmental Protection Law (1999) specifies necessary principles, regulations and measures for managing, monitoring, restoring and protecting the environment in order to protect human health, including the protection of natural resources and the richness of nature, and to ensure the sustainable socio-economic development of the nation.

The Decrees on Environmental Impact Assessment (2010) objectives are:

- To disseminate and implement Article 8 of Law Environmental Protection, in relation to EIAs;
- To lay down principles and rules, and adopt measures on establishment, functions, management and monitoring of EIAs;
- To ensures that all investment projects of the State and private sector, both domestic and foreign, operating in Lao PDR (hereafter called „investment projects“) which create or will create adverse environmental and social impacts, are designed with the right and appropriate environmental and social impact prevention and mitigation measures or Environmental Management and Monitoring Plans (EMMP);
- To effectively prevent, minimize and resolve adverse environmental and social impacts derived from investment projects;
- To contribute to the national socio-economic development and to make it sustainable.

2.4.2 Amended LAO Forestry Law (No.06/Na-Dec.2007)

This Forestry Law determines the basic principles, regulations and measures on sustainable management. These principles also include preservation, development, and utilization, inspection of forest resources, regeneration and tree planting. It also increases forest resources in the Lao People’s Democratic Republic aiming at maintaining a balance of nature, making forest and forestland stable sources of living and use for the people. It is to ensure a sustainable condition and protection of the environment, water resources with protection from soil erosion and maintenance of soil quality, while protecting plants, tree species wildlife and aquatic life, as well as contributing gradually to national socio-economic development.

The Ministry of Agriculture and Forestry (MAF) administers the Forestry Law. The Forestry Law encompasses the protection of water sources, flora, aquatic animals and wildlife. Forestry resources consist of soil, flora, water, aquatic animals, and wildlife. Forestry and forest lands are the property of the State.

- Article 9 of the Forestry Law categorizes forest in Lao P.D.R. into three categories
 - Protection Forests
 - Conservation Forests
 - Production Forests

This Project falls under „*Protection Forests*“ and in Article 10 is classified for the function of protecting water resources, riverbanks, roadsides, preventing soil erosion and soil quality.

- Article 70 states that conversion of forestland under the management of the State to another land type is possible if it brings a high level of benefits to the nation and to livelihoods of the people and it is included in the national socio-economic development plan, and able to be undertaken only in the designated areas.
 - Entities that have been approved to convert land shall be responsible for paying fees for technical services, royalties and conversion fees. In the case of temporary conversion such as mining exploitation and other production activities, the land must be restored and replanted.
 - In the case that the State needs to convert forestland, which is allocated to an individual or organization for use, the target purpose for land use must have a higher level of national benefit. The State shall then compensate the individual or organization according to laws and regulations.

2.4.3 Decree on Compensation and Resettlement of People Affected by Development Project (2005)

This regulation concerns the implementation of the Decree No.192\MONRE 2005. Implementation is detailed in *Technical Guidelines on Compensation and Resettlement (2010)*. The basis for compensation is that affected persons will not be worse off due to the Project. The Project owner must also ensure that vulnerable groups and livelihoods are not worse off than before the Project commencement.

Part III of the Decree compensation principles include:

- Project owners are to compensate project affected people for their loss of rights to land use and assets (structures, crops, trees and other fixed assets) at replacement cost.
- Where a large part of the land (agriculture, residential or commercial), (more than 20%) is taken, the basis for the compensation shall be through provision of replacement land and restoration of livelihoods to pre-project levels or better.
- House and/or structures shall be compensated at full replacement cost.
- Where land is temporarily occupied by the project e.g. during construction the owners shall be compensated for loss of income and damage. The Project owner shall arrange to restore temporarily occupied areas to their pre-project state.
- Tenants who have leased a house\structure shall be entitled to 3 months rental allowance and assisted in finding alternative rental accommodation.
- A compensation and resettlement is to be basically completed before construction commences.

Other parts of the Decree include requirements for assistance during relocation and transition, economic rehabilitation of affected persons with loss of more than 20% of their income or land. New sites selected for resettlement are to be provided with basic social infrastructure and services so that the new site is provided with equivalent or better facilities than the affected persons previously enjoyed.

- Article 11 states that local culture and practices are to be respected.
- Article 12 requires participatory public consultation so that PAP's and other stakeholders are fully informed and consulted.
- Article 13 establishes a grievance redress mechanism.
- Article 14 requires a detailed budget to be prepared that includes all compensation and resettlement and monitoring costs.

The Regulations for implementing the Decree on Compensation and Resettlement of People Affected by Development Projects (2006) provides procedures (updated in 2010) for implementing resettlement and compensation plans that include D-L projects.

2.4.4 Electricity Law (2011)

The Law on Electricity No.03/NA Dec 2011 determines the principles, rules and measures on the organization, operation, management and inspection of electrical activities for the high effectiveness of electricity generation and business operation with the aims to use the natural resource potentials in an economical and sustainable manner. The Law also encourages the implementation of the national socio-economic development plan and improvement of living conditions of the multi-ethnic people.

Relevant articles include:

- Article 6 Principle of Electricity Activities:
Operation of electricity activities and business shall comply with the following principles:
 1. Conformity with the national economic and social development;
 2. Productiveness, economization and endurance;
 3. Protection of environment, society and nature (community, forest and water source);
 4. Safety.
- Article 18 Electricity Distribution and Principles of Distribution:
Electricity distribution is the distribution of electricity from distribution system or from the electricity generating equipment to various types of user's sites which are referred to as the electrical network by means of medium and low voltages.
Electricity distribution shall be carried out based on the following principles:
 1. Continuous and regular electricity distribution;
 2. Broad-based, sufficient and economical distribution of electricity;
 3. Safe distribution of electricity;
 4. Distribution of electricity to ensure socio-economic development;
 5. Distribution of electricity to ensure national defense and public security protection activities.
- Article 21 Installation of Electrical Facilities:
Individuals, legal entities or organizations undertaking the construction, installation, expansion, repair and maintenance of the electrical facilities shall strictly comply with the Lao Electric Power Technical Standards.

- Article 31 (Amended from 2008) Social, Environmental and Natural Assessment:
The social, environmental and natural assessment consists of the following main contents:
 1. Assessment of environmental impact in each case, together with proposals of methods and measures for solving or mitigating any adverse impacts on the environment, water sources, land surface or underground, ecology, biodiversity and aquatic and wildlife animals habitats;
 2. An estimate of the damage and resettlement of peoples affected by the electricity project;
 3. Means to mitigate the impacts to water volume, including the accumulate impacts in the downstream reservoir of the dam;
 4. Expenses for restoration of the impacts provided for in paragraphs 1, 2 and 3 of this Article shall be incorporated into the project cost.

Beside of expenses as stipulated in above, the project developer shall be paid for environment tax in compliance with the Laws.

2.4.5 Decree on the Preservation of Cultural, Historical and Natural Heritage (2007)

National heritage is classified as:

- Immovable (artifacts and ruins which due to their size cannot be moved)
- Moveable (artifacts which due to their size can be moved)
- Natural national heritage (aesthetic landscapes, waterfalls, caves etc.)

Management of the National Heritage is vested with the Ministry of Information and Culture (MIC).

- Article 13 requires any removal of assets that belong to the national heritage only be removed by approval of the MIC.
- Article 15 prohibits the destruction of national heritage assets.

Chapter IV relates to the discovery of artifacts. Article 18 requires that any artifacts that may be discovered are to notify the District Information and Culture Service of the MIC within 3 days of any discovery.

This Decree must be brought to the attention of contractors during construction in case an accidental discovery is made. All D-L will need to avoid cultural sites.

Chapter III

Description of the project

3.1 Project Category

Based on the *Environmental Impact Assessment Guideline, November 2011*, the Project falls under Category 1; considered small scale and less than 230kV, only an Initial Environmental Examination (IEE) is necessary. However, when D-L passes through a National Protected Area (NPA) or exceed 230kV then, an Environmental Impact Assessment (EIA) would be required.

3.2 Project Location

The project is located in Ou Tai, the largest town in Gnod Ou District, Phongsaly Province and is the northern most point of Lao PDR, bordering China and Vietnam.

At present, Ou Tai, which is located near the proposed Gnod Ou MHP site is receiving electricity by a 22kV D-L, which has been extended from Yunnan Province, China, since February 2012. The Gnod Ou Mini-hydro will be responsible for electrifying isolated villages (other than those between China to Boun Neua) by extension of the 22kV D-L and installation of 22kV/400V transformers.

Figure 3-1 Project Location Phongsaly Province in the North of Lao PDR



3.3 Features of the Distribution Line

The D-L will include:

- Approximately 76km of newly constructed D-L, to un-electrified parts of the District
- 22kV capacity line, with
- 400v transformers.
- A right-of-way (RoW) will be cleared under the D-L 5m both ways from centre.
- A 10m height clearance will also be accounted for.

Priority 1 is approximately 42km and will follow the existing road RoW. Priority 2 is approximately 34km in length.

3.4 Site Development and Construction

The Project will be implemented under the Japan's Grant Aid Scheme and will be required to comply with JICA's guidelines for the Grant Aid when conducting design and cost estimation (for both D-L and Mini-hydro construction).



Image 3-4a, D-L outside of B.Somxai



Image 3-4b, D-L passing through B.Chomphor

Images 3-4a and 3-4b show existing 22kV D-L between Ou Tai and Ou Neua. These lines follow the existing GoL roads, and will be similar to the newly proposed. Minimal impact would be expected in terms of impacting wildlife and existing vegetation, from existing RoWs.

Based on the Lao Electricity Power Technical Standard 2012, regulations for installation;
Article 10 Clearance between plants and overhead transmission conductors.

- The clearance between any overhead transmission conductor and any plant shall be no less than the value specified in the table below. The clearance shall be secured to provide for the occurrence of such case that the electrical conductor dips at the maximum design operating temperature or swaying due to wind.

Table 3-1 Clearance between plants and overhead transmission conductors

Nominal Voltage	Clearance Above	Clearance Width
No higher than 35 kV	2m	10m
Higher than 35 kV	The value obtained by adding 6cm for every 10kV and fraction thereof over 35kV to 2m	The value obtained by adding 6cm for every 10kV and fraction thereof over 35kV to 2m

This shall not apply when overhead distribution lines are installed according to the following requirements.

1. Overhead transmission conductors with a voltage no higher than 35kV, for which insulated *conductors* are used, shall be installed so that there is no contact with vegetation.
2. Overhead transmission conductors with a voltage higher than 35kV, for which *cables* are used, shall be installed so that there is no contact with vegetation.

The topography along each of the proposed alignments does not vary considerably. The D-L will originate from the Mini-hydro dam site, and connect with existing D-L and travel north of the project site where it will reach Ban Navon. From this point, newly constructed D-L will then run east along existing unpaved roads (Priority 1) approximately 42km to Ban Xipeuchay.

Priority 2 will also follow existing unpaved roads; then travel in a north-west direction from Gnod Ou Township, approximately 34km to Ban Pacha.

According to Lao Electric Power Technical the length of span of overhead D-L shall conform to the table below.

Table 3-2 Length of Span

Classification of supporting structure	Length of span
Class A reinforced concrete pole or class A iron pole	No longer than 75m
Class B reinforced concrete pole or class B iron pole	No longer than 150m
Steel tower	No longer than 400m (or no longer than 250m when two or more electrical conductors are arranged horizontally and the distance between the electrical conductors is less than 4m)

Chapter IV

Description of Existing Environment

4.1 Physical Environment

4.1.1 Topography

Gnod Ou is the northern most District of Phongsaly Province which sits on the Lao-China border. Nam Ou, one of the largest tributaries of the Mekong River flows through Gnod Ou District.

Like most of Laos the Gnod Ou District is quite mountainous with deep valleys and rolling plains. With an average elevation of around 1300masl, Ou Tai Township sits surrounded by a vast array of steep and rolling terrain.

Along the Priority 1 & 2 routes, the area is surrounded by a large amount of undisturbed forests and other natural vegetation (Phou Tasan Table 4-1); along with very deep valleys and highland relief, elevation reaches approximately 1950masl in the mountain ranges near the Vietnamese border.

The climate is mostly subtropical, but rather cool at higher elevations, from April to October there is appreciable rain: from mid-May to mid-September the South-West monsoon brings intense rainfall.

4.1.2 Geology and Landforms

The Geology of the area is entirely of Cretaceous age, and comprises mainly of weathered sandstones and mudstones, but with more indurated and siliceous outcroppings visible in many places. A minor amount of limestone is also seen, giving rise to the caves seen near Naten village; however this is well outside the project area.

Some of the mudstone contains appreciable quantities of salt, with salt encrustation observed in several locations in this area.

4.1.3 Erosion

Erosion is high during the wet season (May to October) with the highest rainfall occurring in August. Landslides are frequent in the area, mainly along steep slopes and river banks.

4.2 Biological Environment

4.2.1 Forestry and Vegetative Cover Around Project Area

Mostly a mix of farm land and degraded forest surrounds the Project site, with most crops located right along Nam Ou. The forest cover is predominantly dry evergreen and semi-evergreen with a mosaic of swidden land and forest at various stages of regeneration. Large tracts of contiguous old-growth forest survive towards the Vietnamese border and along the Nam Ou, upstream from the Nam Khang confluence. A list of local tree species is listed in Appendix 3. Refer to Figure 4-1 for land use and vegetation cover across the project area.

4.2.2 Locally-Managed Conservation Areas

There are local conservation areas also known as Provincial Biodiversity Conservation Areas (BCA), which are illustrated in Table 4-1.

Table 4-1 List of National, Provincial and District BCAs in Gnod Ou District

No.	Name of BCA	Unit	Area	Location
National Biodiversity Conservation Area (NBCA)				
1.	Phou Denh Din Area	ha	222,000	Phongsaly, Gnod Ou and Samphanh District
2.	Gnod Ou District	ha	22,315	Gnod Ou District
Provincial BCA				
3.	Phou Tasan Area	ha	22,040	Gnod Ou District
District BCA				
4.	Phou Xang Area	ha	1,446	Gnod Ou District
	Total	ha	45,801	

Priority 1: Ban Boxao to Ban Xipeuchay is in a potential protected forest zone, Phou Tasan BCA. Article 70 in the Lao Forestry Law 2007 states that:

- *Conversion of forestland under the management of the State to another land type is possible if it brings a high level of benefits to the nation and to livelihoods of the people and it is included in the national socio-economic development plan, and able to be undertaken only in the designated areas.*
- *Entities that have been approved to convert land shall be responsible for paying fees for technical services, royalties and conversion fees. In the case of temporary conversion such as mining exploitation and other production activities, the land must be restored and replanted.*
- *In the case that the State needs to convert forestland, which is allocated to an individual or organization for use, the target purpose for land use must have a higher*

level of national benefit. The State shall then compensate the individual or organization according to laws and regulations.

4.2.3 Wildlife and National Biodiversity Conservation Areas

There are two National Biodiversity Conservation Areas (NBCAs) around the project area; Nam Lan Conservation Area is situated in the south west of Phongsaly Province and covers approximately 15,000ha and borders Yunnan Province, China. The other NBCA is Phou Denh Din National Protected Area, situated in the south east corner of Gnod Ou District, bordering Vietnam. Both these NBCAs are well outside of the Project area.

According to interviews with villagers wildlife is scarce around the project area. A list of local wildlife that has been recorded in the local area was provided by the Local District Office and is provided in Appendix 2.

4.3 Economic, Social and Cultural Environment

4.3.1 Population and Communities

There are a total of 79 villages in the Gnod Ou District; out of these only 21 villages are currently receiving electricity from the national grid. A further 22 villages will be added to the grid after project completion (Table 1-1). Many ethnic groups are present in the project area and along D-L routes, main groups being Lao Leu, Yao, Kheu and Hor.

4.3.2 Land Use

Most land is used for farming and crops, mainly in the form of corn, rice and sugar plantations. However along penstock alignment, only a small patch of corn plantation will be affected. Land use along D-L alignment will follow an existing road, impacting mainly re-growth vegetation. Some small rubber and bamboo plantations were also recorded along the proposed route but will not be significantly affected by the D-L.

The RoW is calculated for medium voltage (22kV) D-L, with 5m from the centre line on either side, totaling 10m of land/vegetation to be cleared. A height of 10m is also allowed for clearance above ground.

Figure 4-1 Land Use in Gnod Ou District

Figure 4-1 Land Use in Gnod Ou District

CHINA

Gnot-Ou District

VIETNAM

Phongsali District

Boun_Nua District

Date: 29 November 2012

Map Datum:WGS 84

Projection:UTM Zone 48 N

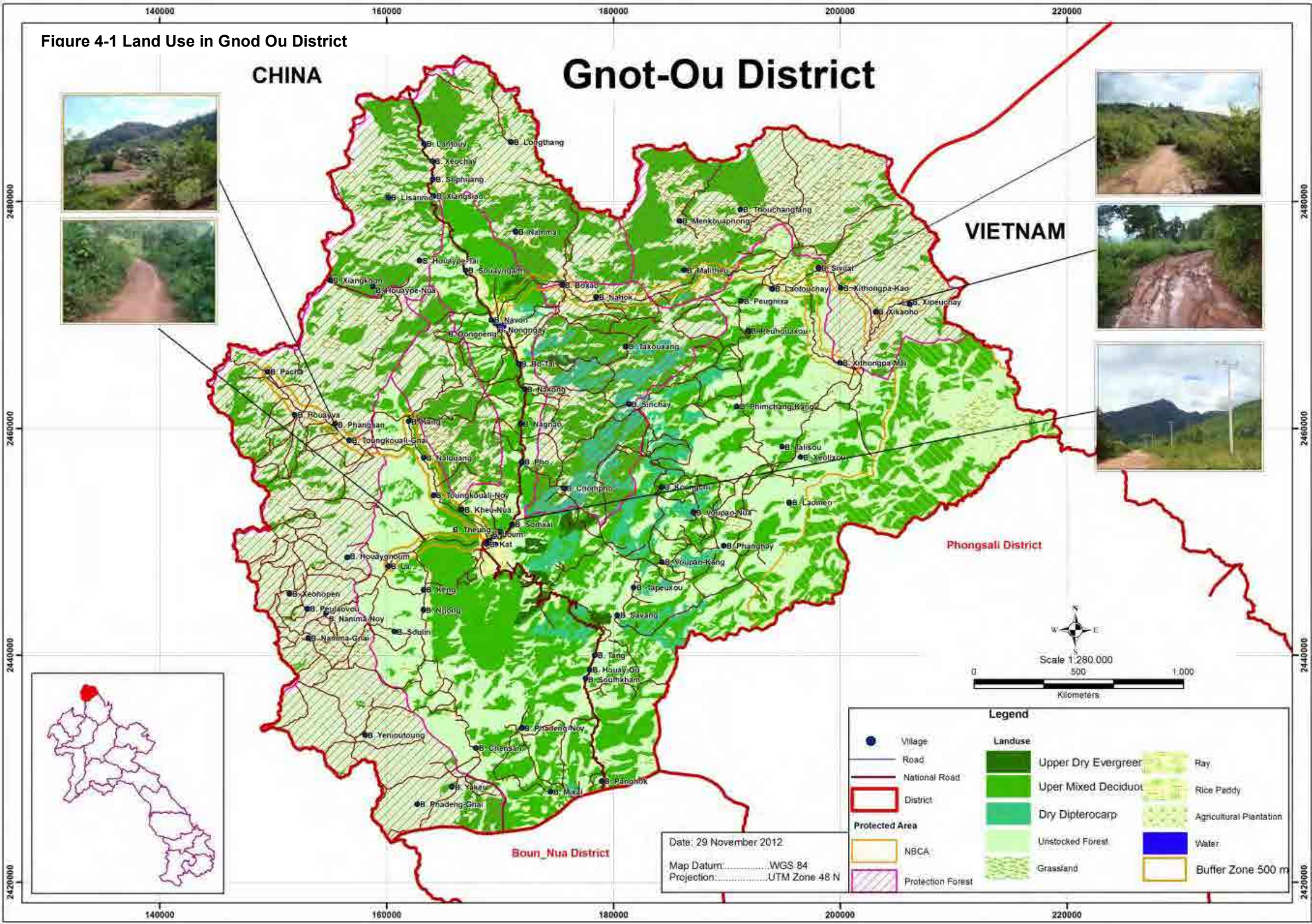
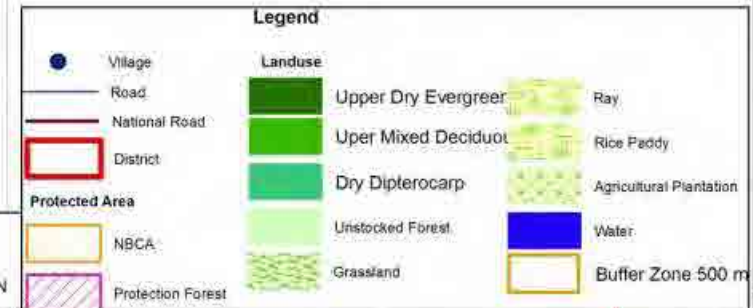
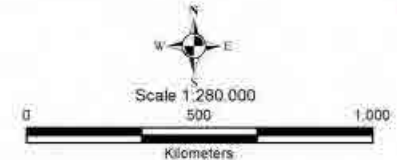


Figure 4-1 provides details of the location of proposed routes and the types of conditions along various sections of road. For the purpose of this study, a buffer zone of 500m was used for the vegetation analysis.

Major forest types described are: upper dry evergreen, upper mixed deciduous, dry dipterocarp, un-stocked forest and grass land.

4.3.3 Infrastructure/Facilities/Industries

The main industry in the Project area is corn and rice production. Livestock, poultry and rice are mainly produced for household consumption, while corn is usually exported.

There is a high school in Ou Tai which serves the surrounding villages; unlike villagers affected by the MHP the villagers of the D-L are quite far from the only high school.

There is one main Hospital in Ou Tai which provides medical treatment to residents in the entire District. For those residents located in the northern rural parts of the District that are too far away from Ou Tai, medical treatment is must often be sort in neighboring China.

4.3.4 Water Use and Water Supply

There is no public water system for remote villages along proposed D-L routes, therefore residents rely on natural springs that have been tapped from the surrounding mountains. These springs run all year round, and are the main source of their water supply. All villagers along the proposed routes access this clean running water.

4.3.5 Transportation

The main forms of transportation in rural areas are motor bikes or hand tractors (Tok-tok) for travel between villages. Public transport is available between Ou Tai and Boun Neua, and there is also a mini bus that transports passengers to and from the Chinese border daily. Overall transportation to and from the District is fair and requires a lot of improvement, if socio-economic conditions are to develop.

Along the proposed D-L no public transport is available; the main mode of transport being motorbike and hand tractor, with only a limited number of people having access to vehicles.

4.3.6 Energy Sources/Power Supply

At present, Electricite du Laos (EdL) is importing electricity from China at .58 Yuan per kWh or roughly 700kip kWh. On average EdL purchases power annually at 50 million Kip per year and resells to the District at 20 million Kip, therefore incurring a loss 30 million kip per year. Out of 79 villages in the District, 21 are currently receiving electricity from the national grid. However not all households within these villages have power. For those households not connected to the national grid, Pico Hydro setups are used. These units are setup along rivers and streams to supply households with between 500W to 1kW of energy, which are used for lighting and charging of household devices.



Image 4-3a Pico Hydro setups along Nam Ou at Ban Chombor

These typical Pico Hydro setups (Image 4-3a) are used throughout the District, which have been modified by extending the drive shaft and attaching a propeller to enable functionality in shallow waters. These systems however, cannot be used during the peak of the wet season due to increased water levels and currents. These setups will not be needed after the completion of the project.

4.3.7 Public Health/Public Safety/Occupational Health

There is only one hospital in Ou Tai that serves the entire District. No villages have dispensaries; however each village has a health volunteer to assist with any local needs. For some villagers that live too far away from Ou Tai, travelling across the border to China for health related needs is more convenient.

4.3.8 Waste Management

Garbage removal services are not available along project routes. Recycling of plastics and cardboard is done where possible at the local level; however burning of other household waste is still a common practice. Sanitary waste management is quite poor, with approximately only 10% of households having a toilet and septic tanks installed.

4.3.9 Archeology

There were no archeological artifacts reported along the proposed routes, considering that the construction of D-L will be along an existing road, any significant artifacts would have already been uncovered from previous excavation works.

4.3.10 Aesthetic/Recreation/Tourism/Culture

At present no major commercial form of tourism exists in the area, however there are an increasing number of people visiting Phongsaly Province and Phou Den Dinh National Protected Area. These limited numbers of tourists are beginning to explore more parts of the province, being drawn in by the remoteness and richness of the untouched environment.

In the Priority areas that are to receive electrification, only a small number of Buddhist temples are located in the larger villages. The results of the field survey show that no temples, religious sites, spiritual sites, or cemeteries are located within or along any of the proposed D-L RoWs.

4.3.11 Land Acquisition and Compensation

As D-L will be on Government land under the Land Law, Group 6- "*Occupation of Public work (road reserve) lands*", the land occupied or impacted by project development are considered "public land" and as such, acquisition of these lands is not necessary. Approval would also not be necessary for the use of RoWs.

4.3.12 Economic Conditions

Main economic activities are from corn export and domestic rice consumption, with small amounts of retail and service shops throughout. There are three home industry rice mills throughout the affected project area. There are small motorcycle service shops that sell fuel from barrels but no large retail petrol stations. For detailed socio-economic data, please refer to Appendix 3.

Chapter V

Environmental Impact and Mitigation Measures

5.1 Factors for Consideration in Assessing Distribution Line Impacts

Assessment of D-L impacts should take into account land use along the route of the line, and the vegetation types needed to be cleared for right of way (RoW).

The following factors shall be essential for assessment of impacts, they are: physical, biological, economic, social and cultural environments.

Physical factors include: Soil and water quality

Biological factors include: Wildlife, fish and native vegetation.

Socio-economic and cultural factors include: Loss of livelihood, damage to temples or cemeteries.

The RoW is calculated for medium voltage (22kV) D-L with 5m from the centre line on either side, totaling 10m of land/vegetation to be cleared.

5.2 Major Impacts and Mitigation Measures During Project Construction Phase

5.2.1 Construction Activities

The impacts from construction of D-L are expected to be not significant.

Physical impacts: Impacts to soil and water quality will not be significant.

Biological impacts: Will have no impacts to local habitat or local wildlife. The RoW has already been cleared when road was constructed and is subjected to routine maintenance.

Socio-economic and cultural impacts: Loss of livelihood, damage to temples or cemeteries will not be anticipated.

The expected impacts, mitigation measures and budget estimates during the Project Construction Phase are summarized in Table 5-1.

Total expected budget for implementation of mitigation measures is 22,000,000Kip.

Table 5-1 Impacts and Mitigation Measures

Item	Potential Impact	Mitigation Measures	Responsibility	Duration	Budget (Kip)
Environmental					
Dust	Increased dust from construction vehicles	Use water trucks during dry season on access or public roads where construction vehicles will travel.	Developer	Twice daily during construction phase.	5,000,000
Noise	Increased noise from construction vehicles	Ensure loud vehicles or any earthmoving is conducted during the daytime at acceptable hours, e.g. 8am-5pm.	Developer	During construction phase	-
Wildlife	Loss or deterioration of local wildlife	Ensure no sale or purchase of wildlife, by employing a ranger.	Developer	Construction 2years/Operation	-
Flora	Loss or deterioration of local flora species	Avoid unnecessary removal of any vegetation.	Developer	Construction 2years/Operation	-
Hazardous Waste	Disposal of hazardous waste into waterways or surrounding environment	Ensure hazardous waste is stored and disposed of by qualified contractors.	Developer/ Contractor	During construction and operation phases.	1,000,000
Solid and Domestic Waste	Disposal of solid or domestic waste into waterways or surrounding environment	The use of septic tanks for toilets and bathrooms. Employ certified garbage persons and recycle paper and plastics. Solid waste should be taken to appropriate land fill sites.	Developer/ Contractor	During construction and operation phases.	1,000,000
Social					
Worker Health & Safety	Risk of worker health and safety from poor sanitation and disease	Regular health checks for all workers, and education programs.	Developer	During construction and operation phases.	5,000,000
Village Health & Safety	Risk of village health & safety due to project	Ensure adequate education about the project and construction of fencing around high risk areas, i.e. around penstock and powerhouse.	Developer	During construction and operation phases.	10,000,000

Construction activities will not have any significant impacts during D-L construction. Clearing of RoWs will be the extent of the impact with removal of vegetation necessary as a safety measure. Construction activities of the D-L will include:

- Clearance of vegetation for distribution posts, and pruning of vegetation for vertical clearance along the length of lines. This may include felling trees, shrubs, and bamboo which will be expected to be very minor.
- Correct disposal of waste from cleared sites.
- Transportation of cement posts to each of the sites for erection.
- Transportation of cement and aggregates to each of the posts footings.
- After posts are in place, installation of insulator and pulling wheels will be hung from each post.
- Placement of drums of conductor wire at strategic locations along D-L routes.
- Installation of grounding rods as required.
- Construction of a temporary equipment stockyard and work camps along various routes if needed.

There will be no replacement or removal of permanent structures or resettlement of affected persons is expected to be required.

5.2.2 Physical Environment

There will be no impacts to physical environment from dust and traffic during construction periods will be expected. This is due to the nature of the construction process, in which only a small team is responsible for construction of D-L.

5.2.3 Biological Environment

The D-L construction will not have a significant to wildlife or natural habitat; it will follow existing GoL roads with existing secondary re-growth vegetation.

Main waste expected from the project will be vegetative debris from clearance of RoWs. Improper disposal of construction debris, vegetation and other construction materials can cause visual pollution and diminish ecological values.

Villagers will be permitted to remove vegetative matter such as bamboo or smaller trees that have economic or practical value. The remaining vegetative waste will be removed and disposed of in a safe way, with packaging from electrical and other construction materials recycled where possible, or disposed of in approved landfills.

5.2.4 Economic, Social and Cultural Environments

There will be no expected impacts to social and cultural environments. The D-L will not impair natural views, damage environmental beauty or reduce values of recreational resources. As the alignment is to follow existing roads, no recreation, tourism or cultural sites exist along RoWs. However, given the scale of the project (22kV) there is a lot of flexibility in determining alignment along routes to avoid such impacts.

5.3 Impacts During Project Operation

5.3.1 Distribution Line Operation and Maintenance

EdL will carry out maintenance along D-L, including; checking conditions of posts, conductors and insulators, as well as clearing or trimming vegetation around RoWs. The use of herbicide or other chemicals are not permitted as these can contaminate watercourses which in turn may harm aquatic life as well as terrestrial wildlife, not to mention threaten peoples' health. Burning to control vegetation along D-L is also prohibited.

5.3.2 Physical and Biological Environments

As D-Ls will be suspended above ground and alignment will follow existing roads, impacts to the physical and biological environment will be minor. Topography and seasonal changes may affect maintenance during operation of the project.

5.3.3 Economic, Social and Cultural Environments

There will be no negative impact to economic, social and cultural environments; only improvement. The electrification of 22 villages on a 24hour basis will significantly contribute to an increase in quality of life for the area. As well as help to improve the development of regional industries and commercial activities.

5.4 Termination and Abandonment Phase

Similar to the MHP, termination is not expected, however if needed the Project Owner (EdL) should inform all parties involved e.g. Village and District Authorities three months prior to termination. These parties will then work through appropriate plans of implementation accepted by all concerned.

Chapter VI

Environmental Management and Monitoring Plan

This chapter presents the Environmental Management and Monitoring Plans (EMMP) which should be applied to mitigate adverse environmental impacts during construction, operation and termination phases of the Project.

The mitigation measures and monitoring plans are proposed in accordance with the major impacts that are expected as a result from the Project.

6.1 Environmental Management Plan

The Contractor will also be required to prepare and submit a monthly environmental management report to the Environmental and Social Monitoring Unit (ESMU). This monthly report will identify the work undertaken and document any environmental problems encountered during the reporting period, the environmental protection or mitigation measures adopted to resolve such problems and any follow-up actions required to correct such problems.

As there will be no significant impacts as in Table 5-1, monitoring of the mitigation measure will be minimal. Table 6-2 illustrates the schedule in which the minor monitoring activities will be carried out. This will be conducted by ESMU from the MHP.

6.1.1 Design and Construction Phase

For maximum efficiency and minimal environmental impact the alignment will follow existing unpaved roads to the designated target villages. The alignments will also be created as straight as possible, to minimize construction and material costs.

Aside from these fundamental engineering principles, selection of the proposed D-L routes will comply with the following environmental and social principles:

- Avoid existing residential areas, particularly areas with many houses and other large buildings, this will ensure no relocation or resettlement.
- Avoid any unnecessary exploitation of valuable land, culturally or socially significant sites, religious areas, conservation areas, village cemeteries and agricultural land.
- Avoid mature forests and other environmentally sensitive areas, including National and Provincial/District Biodiversity Conservation Areas.

6.2 Environmental Monitoring Plan

The Project Owner and ESMU will be responsible for implementing the proposed monitoring and mitigation measures for the D-L. The ESMU established by Project Owner of the MHP will also be responsible for ensuring on a daily basis that the environmental mitigation measures and environmental monitoring activities identified in the EMMP are properly implemented. Table 6-1 describes the items that will be addressed in the monitoring plan, followed by the implementation schedule of these activities in Table 6-2.

The ESMU will:

- Conduct temporary and routine monitoring plans of the projects construction activities to ensure that work is compliant with environmental specifications and provisions set out in the construction contract.
- Ensure on a weekly basis that the social mitigation measures, including social monitoring activities in this IEE report are properly implemented.
- The ESMU will be assisted by Environmental Management Office (EMO) of the Project.
- Implement and monitor social aspects associated with the project, including any compensation if applicable.
- Carry out regular consultations with people living in the vicinity of the D-L to inform them of the plans for the project, seek their input in detailed design and plans in order to minimize adverse social and environmental impacts.
- Ensure the people are continually informed of all aspects of the project during its implementation.

During construction of the D-L, the ESMU will hold monthly meetings with the Project Owner to:

- Evaluate their work performance in relation to environmental and social objectives of the Project;
- Identify areas of satisfaction and shortcomings in the contractor's work and provide guidance to resolve areas where the work is deficient.

A monitoring form is also provided in Appendix 4, which is to be filled out by persons responsible for conducting monitoring tasks. It will also be required that this form be completed and submitted to JICAs Lao office quarterly for the duration of monitoring period.

Table 6-1 Monitoring Items

Ev.	Item	Detailed	Area	Times	Authority in Charge
-Construction-					
Environment (Pollution, Natural)					
-1	Air Quality	Dust	Near Project site	1/0.5M	Contractor
-1	Air Quality	Noise	Near Project site Near Villages (2V)	1/0.5M	Contractor
-2	Wild Life	Valuable species	Near Project site	1/3M	Contractor
-1	Wild Plant	Valuable species	Near Project site	1/6M	Contractor
-1	Hazardous Waste	Heavy metal	Near Project site	1/0.5M	Contractor
-1	Domestic Waste	Domestic Waste	Near Project site	1/0.5M	Contractor
-Operation-					
Social					
-2	Wild Life	Valuable species	Near Project site	1/6M 2-years	ESMU
-1	Public Health	Public Health	Near Village	1/6M 2-years	ESMU
-2	Grievance	Grievance Redress	Concerned people	5 times (all)	ESMU

Table 6-2 Implementation schedule of the monitoring activities

Activities	Distribution Line: Implementation of Monitoring Schedule						
	Pre Construction	Construction	Operation Years				Remarks
Environmental			1st	2nd	3rd	4th	
Water Quality*							N/A
Dust		—————					
Noise		—————					
Aquatic Life*							N/A
Wildlife		—————	—————				
Flora		—————					
Hazardous Waste		—————					
Solid & Domestic Waste		—————					
Soil Erosion		—————					
Social							
Road Safety		—————					
Worker Health & Safety		—————					
Villager Health & Safety		—————	—————				

* Should be carried out by qualified contractor

6.3 Land Acquisition and Compensation Plan (LACP)

6.3.1 Land Acquisition

Distribution lines are considered to be on “public land”, therefore acquisition of these lands is not necessary. Under the Land Law Section II, Division 5 and Article 30 defines this land as “Public Work Land” and is authorized to be used for the purpose of road, drainage, telephone and telecommunication towers including power lines.

Precedence has shown throughout the entire country that EdL has adopted the “standard of practice” by installing 22kV distribution line along the road RoWs, without any need for land acquisition.

6.3.2 Cost Estimate for Permanent Loss of Land

There will be no permanent loss of privately owned land as D-L will occupy public land.

6.3.3 Cost Estimate for Temporary Loss of Fruit Trees and other Commercial Trees

Fruit trees and commercial trees are not present along D-L routes or RoWs.

6.3.4 Cost Estimate for Temporary Loss of Agricultural Production

There will be no agricultural land occupied with the D-L or Rows.

6.3.5 Entitlement Matrix of Distribution Line

As no compensation will be necessary, loss of entitlement was not calculated.

6.4 Environmental Monitoring Program

6.4.1 Environmental Management and Monitoring Plans

Impacts are only expected to be minimal, however there will still be a monitoring plan required. These are mentioned in Table 6-1.

A budget estimate to implement monitoring programs is provided at the end of this section (Table 6-3)

a. Sectors Involved in Monitoring

Under Decree 112/MONRE section III Article 22 identifies and sets out sectors and authorities responsible for the monitoring of the implementation of EMMP, for each development category, in this case it is Category 1.

These include:

- (i) Monitoring carried out by Project developer (internal monitoring).

- (ii) Monitoring carried out by Governmental Departments.
 - (iii) Monitoring carried out by independent organizations (external monitoring associated with complex development- not applicable for 22kV Distribution line development).
- i. Monitoring carried out by the Project Developer is affected by setting up of an ESMU. Their tasks are to carry out the daily monitoring of the implementation of the proposed EMMP, as well as reviewing and updating.
- The ESMU shall liaise, inform and report to Natural Resources and Environment (NRE – at District & Provincial levels). The ESMU shall also inform provincial departments responsible for investment and relevant authorities. In this case the Institute of Renewable Energy Promotion (IREP) and the Ministry of Energy and Mines, as well as Gnod Ou District and Phongsaly Provincial administrative office.
- ii. Monitoring carried out by Governmental Departments, as stipulated, is the responsibility of the Government department which will assess and review the IEE.
- In this respect the monitoring shall be carried out by District NRE and Provincial NRE. Provincial & District NRE shall on regular basis inform and report to MONRE, including the local administrative office. MONRE has the responsibility to assess and review the monitoring and the implementation of the EMMP. In the case of any environmental accidents MONRE will also provide immediate response to address the situation including site inspection and assessment of degree of impact.
- iii. Monitoring carried out by independent organizations, external monitoring is only necessary when complexity levels of project are high in this case not applicable for the D-L component.

b. Monitoring Budget Estimate

Monitoring budgets were estimated based on the Project degree of complexity which in turn determines the frequency of monitoring activities.

Number of sectors or authorities responsible for the monitoring, (as listed in section a.) is also related to such complexity of the project.

For instance, Gnod Ou D-L project is a very small and simple project, therefore it is not expected to require external monitoring, and hence budget provision is excluded.

It must be noted that internal monitoring costs carried out by ESMU, are considered as project development cost, and therefore were not included in Monitoring budget.

Table 6-3 Budget estimation for monitoring activities & monitoring schedule (Assume completion period-1 years)

Responsible Party	Frequency	Construction Period (month)													Total Amount (\$USD)
		1	2	3	4	5	6	7	8	9	10	11	12	13...	
District- NRE	24	2	2	2	2	2	2	2	2	2	2	2	2		2,640
Provincial -NRE	6	1	1	1	0	0	1	0	0	1	0	0	1	0	3,660
MONRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contingency provision (10%)															630
Environmental accident -provision															3000
Grand Total															7,000

Table 6-4 Budget support for compensation & grievance committee- assume to occur five times

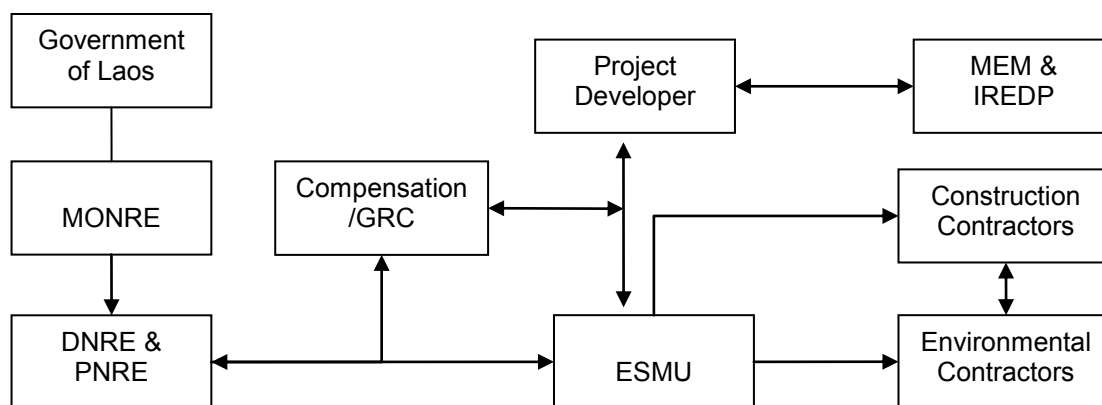
Compensation & Grievance Committee (members)	Exp for each visit					Transportation		Total Amount (\$USD)
	No Days/time	Frequency	Daily Allowance	No. of Personnel	Amount	\$/day	Amount	
Provincial Governor	1	5	100	1	500	200	200	700
District Governor	1	5	60	1	300	70	70	370
Concern authorities	1	5	50	3	750	150	150	900
Provincial Lao National for Construction Front	1	5	40	3	600	150	150	750
Community Representatives	1	5	30	5	750	50	50	800
Contingency (10%)					155		93	248
Grand Total								4,000

Total Implementation cost for monitoring plan is US\$11,000 or 88,000,000 Kip

6.5 Institutional Arrangements

The institutional arrangements for the construction and operation phases of the D-L will follow the MHP component of the project.

Figure 6-1 Working relationships of concerned parties



For the implementation of the environmental program it is necessary to have institutional responsibilities defined and qualified personnel engaged.

The ESMU will be responsible for all social and environmental impact activities. The ESMU will work in close cooperation with GoL organizations and agencies. The ESMU will:

- Carry out environmental monitoring and supervision during the construction phase in cooperation with DNRE or PNRE.
- Improve environmental awareness among workers and populations near Project sites.
- Report to Government agencies, e.g. DNRE, PNRE and IREP.
- Carry out in association with DNRE and PNRE and other Government agencies, listed in Table 6-3, social and environmental monitoring program to ensure that all mitigation measures specified are carried out by a responsible authority or contractor.

6.5.1 Government Institutional Arrangements for the Project

The GoL will establish the national level organizations responsible for setting policy and directions for supervising and monitoring the D-L construction and operation. The project will provide additional resources so that these organizations can offer efficient and effective support for the implementation and monitoring of the mitigation measures and the development of the project.

6.5.2 Project Institutional Arrangements

The ESMU will also ensure the Project meets all of its social and environmental obligations. These are all to be carried out in close cooperation and in coordination with the relevant government organizations set up to implement environmental and social aspects of the project.

The ESMUs responsibilities will be to:

- Manage the environmental, social and economic components, using consultant inputs as required,
- Monitor and report to the developer on the effectiveness of implementation of the mitigation measures, and
- Coordinate activities during construction and after construction with relevant government agencies, with the aim of improving the environmental performance of the project during its operating phase.

6.5.3 Grievance Redress Committee (GRC)

This will mainly be used for the MHP component part of the Project, as the D-L component will not have any resettlement or compensation. However the same GRC can be used if any issues arise.

6.6 Timing and Budgets

The total construction period of the 22kV D-L component will be 13 months; budget will be subject to final design.

Chapter VII

Public Involvement

7.1 Stakeholders

This section of the IEE report provides a brief overview of information regarding public consultation for the proposed D-L project. This public consultation information has been collected through consultations and discussions with the following groups and individuals:

- Representatives from the Ministry of Natural Resources and Environment. (MONRE);
- Provincial Governors;
- Officials from District Offices;
- Village leaders and residents in the 22 villages along the proposed route of the D-L; and,
- Other potential Project beneficiaries.
- First stakeholders" meeting- 11 Sept 2012
- Second stakeholders" meeting- 18 Dec 2012

During this initial field survey, the responses of local residents were noted, especially their perception of the proposed project. More detailed discussions were held in addition to the survey. During the consultation and discussion sessions, particular effort was made to make the villagers aware that the Project is in no way an imposition on them, and that they have every right in determining the outcome of the Project.

Prior to the arrival of the field survey units, local District Authorities in the project areas were officially notified of the objectives and the timing of the fieldwork that was to be conducted.

7.2 Major Comments and Opinions

The villages in the proposed project area cover a range of sizes, ethnic mixes, and income levels.

Main comments during these consultations were:

- Village officials and residents expressed generally positive reactions to the proposed project, and welcomed the project.
- Residents were happy and eager to receive electrification to their part of the district.

Public consultation for the proposed is valuable and should continue during the detailed design phase before construction begins. At this stage, affected people, others living near the D-L, and stakeholders should be informed of Project plans and be welcomed to make contributions.

Public participation through consultation will also be encouraged as part of the monitoring of activities for this project, and will be a feature of the overall monitoring and evaluation component.

Chapter VIII

Conclusion

The proposed project consists of two distribution lines transferring electricity from the Gnod Ou Mini-Hydro Power Project to remote villages in the northern and western parts of the District.

The proposed distribution lines will connect to existing 22kV distribution lines that run north-south from the Chinese border into Ou Tai Village.

Distribution line Priority 1 will branch off from Ban Navon and continue east 42 km to Ban Xipeuchay. Distribution line Priority 2 will traverse west for 34km from Ban Loum to Ban Pacha including a small stretch to Ban La.

All distribution lines will be installed within existing RoWs, no land acquisition is required and therefore will have no significant impact to physical, social or biological environments. The road RoW is within the Provincial Gnod Ou protected forests however installation of distribution lines will not impact the protected areas.

No spiritual, cultural, religious, and archaeological or tourist sites would be impacted by the Project.

Construction activities include minor vegetative clearance along road RoWs (approx 76km long) for distribution line posts and vegetative pruning for vertical clearance of conductors along the length of alignment.

No extra access tracks would be needed for transporting distribution line components, cement, aggregates and other construction materials.

Temporary stockyards, work camps and field office are small and mobile in nature, and no impact on the surrounding environment will be expected.

Operation and maintenance will follow the safety operation and maintenance plans as well as Lao Electric Power Technical Standards.

The construction and operation phase will result in minor impacts on existing secondary forests and vegetative resources. The impacts will not be significant, despite the length of the lines, because the existing road side vegetation along the road RoWs is already degraded.

The study indicated that 22 villages would receive electrification with no relocation or resettlement as a result of this project. However, social impacts and compensation can be avoided by careful consideration of alignments position during the design phase.

During the detailed ground survey and investigation, residents along the route should be consulted again regarding their attitudes and opinions, as well as obtaining information about the value of their properties and resources.

Mitigation measures for the construction and operation phase have been proposed that could, if implemented effectively, ensure the adverse impacts resulting from the project would be satisfactorily addressed.

A proposed monitoring plan, with evaluation and monitoring carried out by ESMU, District NRE & Provincial NRE ensure that environmental mitigation and monitoring is effectively undertaken.

This IEE, including and any environmental management and monitoring plan as presented in previous chapters is considered sufficient to meet the environmental assessment requirements of the proposed D-L associated with the Gnod Ou Min-hydro Power Project.

It falls under Category 1, considered small scale and less than 230kV, only an Initial Environmental Examination is necessary.

Therefore, a more detailed assessment by way of an Environmental Impact Assessment is not required for this project.

References

Technical Guidelines on Compensation and Resettlement of Project Affected by Development Project, by The Water Resources and Environment Administration (WREA) Vientiane capital, June 2011.

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Lao Electric Power Technical Standards, Ministry of Industry & Handicrafts, Vientiane 2004.

Biodiversity in Phongsaly Province, Guide book, by Phongsaly Forest Conservation and Rural Development Project, April 2005.

National Biodiversity Conservation Areas (NBCA's) in Lao PDR, Lao Swedish Forestry Program, June 2001.

Appendix 1:

Socio-Economic Data - Distribution Lines

The survey has been carried out for the three distribution line routes, with socio economic information collected, based on both “survey sample” as well as data from district office. Due to time constraint and road conditions only some villagers and village authorities were interviewed.

Due to steep terrain along the existing tract (public road right of way is 20m) within which distribution line will be constructed, no permanent agriculture activity were present. The track (route) is mainly along steep mountain sides where most vegetation has been subject to subsequent shifting cultivation over many generations. Vegetation along the route were mainly secondary re-growth (from slash & burn cultivation), with some pocket of older re-growth forest.

Three distribution lines were studied, they were:

- (i) Ban Kheu Neua to Ban Pacha; (ii) Ou Tai to Ban La; (iii) Boxao to Xipeuchay; details of socio-economic data are shown below.

(I). Distribution Line-Ban Kheu Neua to Ban Pacha (General socio-economic data)

No.	Village name	Ethnic group	Population	HH	School	Dispensary	Water supplies No. tap	Agriculture production	Pico (units)	HH Increase in 5 Years	Power use
1	Kheu Nua	Kheu	206	44	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai hospital	2	30t rice	15	60-70	-light -TV -battery charge -cooking
2	Tongkouali Noy	Yao	210	33	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai hospital	3	18t rice 20t corn	10	50	-light -TV -battery charge -cooking

Gnod Ou Mini-Hydro Project – Distribution Line - IEE

3	Nalouang	Leu	876	167	Primary Grade 1-5 Secondary Grade1-3	- N/A -village health volunteer -to Ou tai hospital	13	250t rice 50t corn	70	190	-light -TV -battery charge -cooking - rice milling -welding
4	Kang	Keu	311	57	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai hospital	2	61t rice 30t corn	10	70	-light -TV -battery charge -cooking - rice milling -welding
5	Phangsan	Yao	278	55	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	1	35t rice 56t corn	8	70	-light -TV -battery charge -cooking
6	Houyva	Hor	157	28	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	1	50t rice 50t corn	10	40	-light -TV -battery charge -cooking
7	Phouneusan	Yao	296	50	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	2	60 t rice 15t corn	15	70	-light -TV -battery charge -cooking
8	Pacha	Yao	248	47	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	1	25 t rice	5	55	-light -TV -battery charge -cooking

(II). Distribution Line-from Ou Tai to Ban La (General socio-economic data)

No.	Village name	Ethnic group	Population	HH	School	Dispensary	Water supplies No. water tap)	Agriculture Production (tonne)	Pico (unit)	HH Increase in 5 Years	Power use
1	La	Leu	514	100	Primary Grade 1-5	- N/A -Village health Volunteer -to Ou Tai hospital	10	200 t of rice 40 t of corn	60	120	-light -cooking -battery charge -welding -TV -rice milling

Distribution Line - from Ou Tai to Ban La does not pass any other villages so no potential impact to village asset is expected.

(III). Distribution Line - Boxaoto Xipeuchay (General socio-economic data)

No.	Village name	Ethnic group	Population	HH	School	Dispensary	Water supplies (No. water tap)	Agriculture Production (tonne)	Pico (unit)	HH Increase in 5 Years	Power use for
1	Boxao	Leu	475	72	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai hospital	5	200 t of rice 50 t of corn	72	90	-light -TV -battery charge -cooking
2	Nahok	Lao theung	712	109	Primary Grade 1-5	- N/A -village health volunteer to Ou tai hospital	7	80 t of rice	20	130	-light -TV -Battery charge -cooking
3	Malitheu	Hor	521	82	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	5	150 t of rice	13	110	-light -TV -battery charge -cooking

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4	Menkuaphong	Hor	227	37	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	3	50t of rice	10	50	-light -TV -battery charge -cooking
5	Thouchangfang	Hor	296	47	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	4	70 t of rice	12	55	-light -TV -battery charge -cooking
6	Phugnixe	Hor	223	31	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	3	50 t of rice	8	50	-light -TV -battery charge -cooking
7	Peuhouaxou	Hor	140	24	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	2	60 t of rice	7	40	-light -TV -battery charge -cooking
8	Sivilai	Hor	267	41	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	3	50 t of rice	10	60	-light -TV -battery charge -cooking
9	Laofouchay	Hor	249	37	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	2	30 t of rice	5	50	-light -TV -battery charge -cooking

Gnod Ou Mini-Hydro Project – Distribution Line - IEE

10	XithongpaGao	Hor	225	31	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	2	60 t of rice	5	50	-light -TV -battery charge -cooking
11	Xikaoho	Hor	389	57	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	2	100 t of rice	8	65	-light -TV -battery charge -cooking
12	Xithongpa Mai	Hor	266	36	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	2	40 t of rice	10	50	-light -TV -battery charge -cooking
13	Xipeuchay	Hor	246	37	Primary Grade 1-5	- N/A -village health volunteer -to Ou tai and Chinese hospital	2	110 t of rice	10	45	-light -TV -battery charge -cooking

Appendix 2

List of Wildlife and Fish in the Protected Forest and Conservation Areas in Gnod Ou District

No.	Local name	English name	Scientific name	Remarks
1	ເໝີອຍ	Sun Bear	<i>Ursus malayanus</i>	
2	ເສືອແມວກີ ນປາ	Fishing Cat	<i>Prionailurus viverrinus</i>	
3	ເຍືອງ	Southern Serow	<i>Naemorhedus sumatraensis</i>	
4	ຄ່າງ	Crested Langur	<i>Semnopithecus cristatus</i>	
5	ກວາງ	Sambar Deer	<i>Cervus unicolor</i>	
6	ຟານ	Muntjac	<i>Muntiacus rooseveltorum</i>	
7	ບາງ	Giant Flying Squirrel	<i>Petaurista philippensis</i>	
8	ລິ່ນງົວ	Sunda Pangolin	<i>Manis javanica</i>	
9	ເຫັງນຫາງ ກ່ານ	Large Spotted Civet	<i>Viverra megaspila</i>	
10	ຈອນຟອນ	Back Striped Weasel	<i>Mustela strigidorsa</i>	
11	ໄກ້	Java Mouse-deer	<i>Tragulus javanicus</i>	
12	ຫອນ	Burmese Ferret Badger	<i>Melogale personata</i>	
13	ເພັ້ນ	East Asian Porcupine	<i>Hystrix brachyura</i>	
14	ລິງ	Monkey	<i>Macaca (Genus)</i>	
15	ກະຮອກ	Black Giant Squirrel	<i>Ratufa bicolor</i>	
16	ອີ່ນ	Large Bamboo Rat	<i>Rhizomys sumatrensis</i>	
17	ແລນ	Indian Monitor	<i>Varanus bengalensis</i>	
18	ເຕົາ	Amboina Box Turtle	<i>Cuora amboinensis</i>	
19	ປາຝາອອງ	Asiatic Soft Shell Turtle	<i>Amyda (Genus)</i>	
20	ນົກແກງ	Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>	
21	ນົກເຂົ້າທອງ	Red Turtle Dove	<i>Streptopelia tranquebarica</i>	

22	ນົກເຄົ້າ	Owl	<i>Tytonidae and Strigidae (Family)</i>	
23	ນົກເຕ້ນຊິວ	Kingfisher	<i>Alcedo atthis</i>	
24	ນົກຕັງລໍ	Great Barbet (Asian)	<i>Megalaima virens</i>	
25	ນົກເປົ້າ	Pigeon	<i>Treron (Genus)</i>	
26	ງູສິງດົງ	Snake	<i>Zamenis (Genus)</i>	
27	ງູຂຽວ	Pit-Viper	<i>Trimeresurus (Genus)</i>	
28	ງູຈົງອາງ	King Cobra	<i>Ophiophagus hannah</i>	
29	ງູຫຼາມ	Large Burmese Python	<i>Python molurus</i>	
30	ງູເຫຼືອມ	Asiatic Reticulated Python	<i>Python reticulatus</i>	

List of Fish in Nam Ou, Gnod Ou District

No.	Local name	English	Scientific name	Remarks
1	ປາເຄງ	Pa Keng/Cat-Fish	<i>Mystus microphthalmus</i>	
2	ປາແດງ	Pa Deng	<i>Tor???</i>	
3	ປາແຂ້	Pa Khae/Giant Devil Cat-Fish	<i>Bagarius Yarrelli</i>	
4	ປາຕອງ	Pa Tong/Asian Knife-Fish	<i>Notopterus (Genus)</i>	
5	ປາຈາດ	Pa Chad/Cyprinid Fish	<i>Poropuntius (Genus)</i>	
6	ປາກົດ	Pa Kot/Crystal eyes cat-fish	<i>Hermibagrus wycki</i>	

Appendix 3**List of Trees in the Protected Forests**

No.	Local name	English name	Scientific name	Remarks
1	ໄມ້ແດງນ້ຳ	Mai Deng Nam	<i>Xylia dalariformis</i>	
2	ໄມ້ກໍ່ແດງ	Mai Kor Deng	<i>Castanopsis hystrix</i>	
3	ໄມ້ຍົມຫອມ	Mai Yom Hom	<i>Toona febrifuga</i>	
4	ໄມ້ຍົມຫິນ	Mai Yom Hinh	<i>Chukrasla tabularis</i>	
5	ໄມ້ເປື້ອຍຂາວ	Mai Peuy Khao	<i>Lagerstroemia florribunda</i>	
6	ໄມ້ຈິກໂຄກ	Mai Chik Khok	<i>Shorea obtusa</i>	
7	ໄມ້ກາກະເລົາ	Mai KakaLao	<i>Lagorstroemia macrocarpa</i>	
8	ໄມ້ຈຳປາ	Mai Champa	<i>Michetia champaca</i>	
9	ໄມ້ຫຼຽນ	Mai Hienh	<i>Mella azedarach</i>	
10	ໄມ້ລອງທໍ	Mai Long hor	No Scientific name	
11	ໄມ້ຊາຍ	Mai Xai	No Scientific name	
12	ໄມ້ໂຫຼ	Mai Lo	No Scientific name	

Appendix 4

MONITORING FORM (Distribution Line)

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during Report Period
Responses/Actions to Comments and Guidance from Government Authorities	

2. Mitigation Measures

- Air Quality (Ambient Air Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, Term of investigation, etc.)
Dust (PM10)	mg/m ³				0.02(Annual) 0.05(24 hours).	

- Waste

Monitoring Item	Monitoring Results during Report Period
Domestic Waste	
Industrial Waste	

- Noise / Vibration

Item	Unit	Measured Value (Mean)	Measured Value (Max)	Country's Standards	Referred International Standards WHO	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level	dB				70dB	

3. Natural Environment

- Ecosystem

Monitoring Item	Monitoring Results during Report Period (Method of survey)
Impacts to Valuable species (Big mammals)	
Impacts to Wild Valuable Plants	

4. Social Environment

- Living / Livelihood

Monitoring Item	Monitoring Results during Report Period (Method of survey)
Level of livelihood	

Resettlement Action Plan (RAP)
of
Gnod Ou Mini-Hydropower Project



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Abbreviations

AP	Affected Persons
BCA	Biodiversity Conservation Area
CA	Concession Agreement
CaA	Chareun and Associates
DAFO	District Agriculture and Forestry Office
DEP	Department of Electricity Promotion
D-L	Distribution Line
DNRE	District Natural Resources & Environment
DOF	Department of Forestry,
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMO	Environmental Management Office
ESMU	Environmental and Social Monitoring Unit
ESD	Environment and Social Division
ESIA	Environmental and Social Impact Assessment
GRC	Grievance Redress Committee
GoL	Government of Lao PDR
ha	Hectares
IEE	Initial Environmental Examination
IREP	Institute of Renewable Energy Promotion
JICA	Japan International Cooperation Agency
kWh	Kilowatt hour
kW	Kilowatt
LACP	Land Acquisition and Compensation Plan
MAF	Ministry of Agriculture and Forestry
masl	Meters above sea level
MHP	Mini-Hydropower Project
MEM	Ministry of Energy and Mines
MIC	Ministry of Information and Culture
MOF	Ministry of Finance
MONRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
MW	Megawatt
NBCA	National Biodiversity Conservation Area
NIREA	National Institute for Religious and Ethics Affairs
NLMA	National Land Management Authority
NPA	National Protected Area
NPAD	National Protected Area Division
NTFP	Non-timber Forest Product
PAP	Project Affected Persons
PCU	Project Compensation Unit
PDA	Project Development Agreement
PDR	Peoples Democratic Republic
PESMU	Project Environmental and Social Monitoring Unit
PNRE	Provincial Natural Resources and Environment
RAP	Resettlement Action Plan
RoW	Right of Way
TOR	Terms of Reference
WA	Workplace Agreement

Chapter I

Project Description

1.1 Introduction

Power demand in Lao PDR has been increasing rapidly within the past ten years. At the same time, the national electrification ratio of Laos has increased from 36% in 2000 to 48% in 2005 and to 73% in 2010. By region, the electrification ratio in the north is at 59%, with 96% in the central part and 70% in the south.

Particularly, the Lao Capital, Vientiane within the central part of Laos is at 99% electrification, showing that urban areas have achieved high electrification ratio. However, in comparison to rural/remote areas in other parts of the country, electrification is still very under developed. The Government of Lao (GoL) has goals of improving national electrification ratios to 80% by 2015 and to 90% by 2020. This aims to reduce internal disparities between urban and rural areas, and poverty reduction in remote areas.

Phongsaly Province, located in the northern part of Laos, sits on the border next to China and Vietnam, and is one of the Provinces which are considered under developed in comparison to the rest of the country. With electrification in Phongsaly at only 23% in June of 2011, the GoL has set a high priority on improving electricity in the Province. In line with the national target, in 2008, the GoL requested the Government of Japan (GoJ) for Grant Aid on rehabilitation of two micro-hydropower plants. After discussion between (Japan International Cooperation agency (JICA) and GoL, the development of Gnod Ou Mini-Hydropower Project (MHP) has been selected as Japans Grant Aid Project.

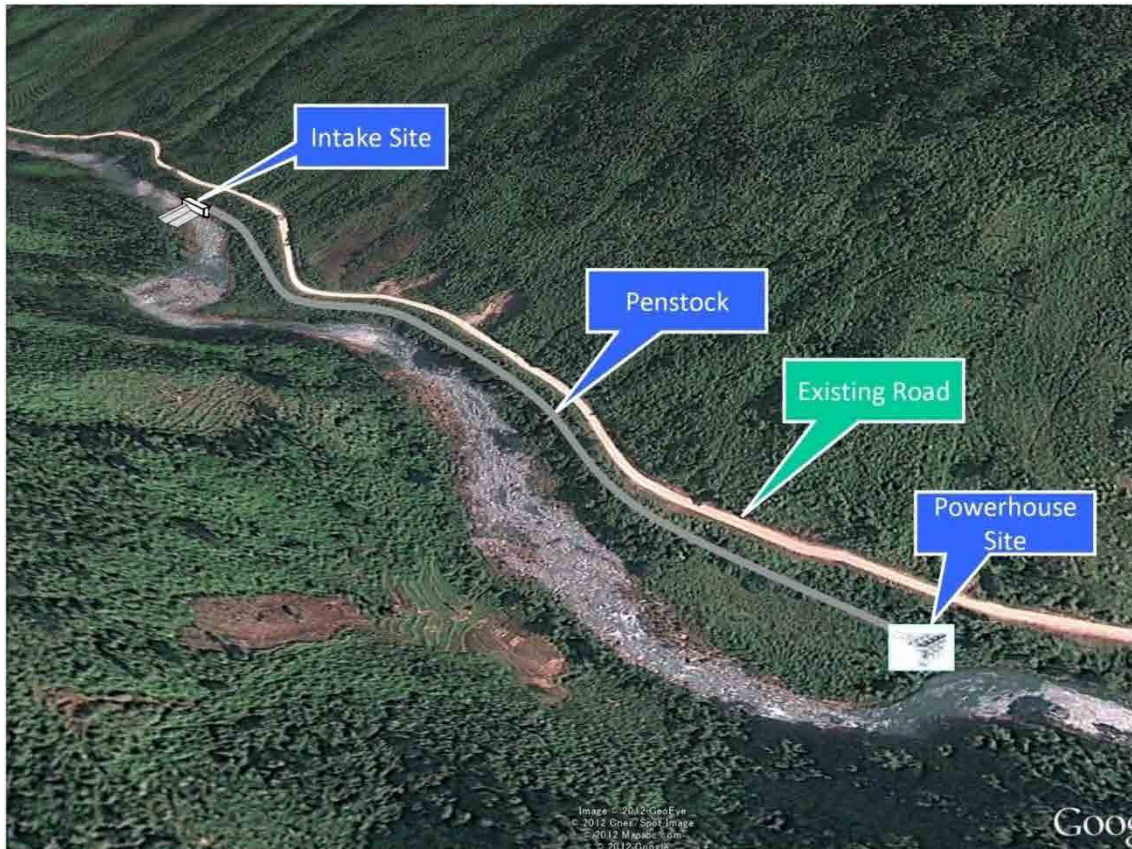
The main objectives of this “RAP” are:

- To meet the requirements of the regulations concerning the Environmental Examination of the Mini-Hydropower Project (MHP) for GoL approval to allow the construction to commence.
- To present the socio- economic baseline data of the project area.
- To determine any compensation or resettlement impacts by the construction and operation of the MHP are dealt with in a compensation action plan.*(It must be noted, no resettlement will be caused by this project)*
- To inform the stakeholders and communities about the project via a series of public consultation (stake holders meetings).

1.2 Project Component

Below is an image of the project component layout. It illustrates intake site, alignment of penstock, power house site and location of existing road. The distance between intake and power house is approximately 700m.

Figure 1-1 Project Component Layout



The diversion of water from the Nam Ou, through a 700m penstock and into the powerhouse is the fundamental feature of the project. This will be a “run of the river” type diversion therefore require no storage reservoir.

Main Project features are:

- Weir: height of 4m and length of 35m.
- Gross head: 10.8m (including height of weir)
- Maximum discharge: 7.5 – 8 m³/s
- Penstock: Steel pipe 2m in diameter.
- Submerged pump turbines generators, 3-4 units
- Installed capacity of approx 500kw.

1.3 Impacts of the Project

Assessment of Project impacts took into account land use along upstream and downstream riverside areas of the powerhouse and weir. The project has two main impact areas (i) Rice fields and (ii) corn garden.

Minor impacts to water quality during construction may occur. However impact to flora and fauna will not be an issue. Local fauna is almost none existent, let alone is there a presence of endangered species.

Local flora was in the same state as fauna, lacking any original forest and only degraded or un-stocked forests were present.

1.3.1 Rice Fields

Rice fields situated upstream of the diversion weir will be affected by “occasional” flooding from expected increased of water levels. The Affected Persons (AP) will be compensated for loss of rice production for the first 3 years of the Project.

1.3.2 Corn Garden

A corn garden located along the left side of the river bank will be affected by construction of penstock and powerhouse. It is government land and the owner has been allowed to use the area for seasonal cropping. The AP will be compensated for the loss of opportunity to earn an income from this land.

1.3.3 Water Quality

The construction of the dam (approx. 14 month period) including the diversion weir, powerhouse and penstock, will slightly increase the turbidity of the water, which will have minor impacts to aquatic life and villagers downstream. Ou Tai Township is situated approximately five kilometers downstream of the powerhouse; this would only be temporary and occur during main construction phase.

1.4 Measures to Minimize Impacts

Various options regarding site selection of the weir, penstock and powerhouse had been considered in order to minimize the impact.

Compared to various options considered, the proposed site was found to have the least impact to the surrounding environment. It is located a considerable distance from any major town or villages and major productive land.

Construction of the diversion weir or any component shall be carried out during dry seasons. A Cofferdam should be constructed to divert water away from diversion weir constructions area, to minimize turbidity of the water.

1.5 Project Benefits & Impacts

1.5.1 Benefits

Main benefits from the project development will include:

- i. Provision of reliable and affordable power supply to the local communities in Gnod Ou District.
- ii. Form a vital economic growth factor by promoting small or home industries eg, metal works, garage workshops, small manufacturing plants, ice factories, rice mills or flourmills and other small enterprise and home industry which require constant and reliable supply of the electricity.
- iii. A major contribution to the government poverty reduction program by increased local economic activities.

1.5.2 Impacts

Main impacts, as stated in section 1.3 above, will be the occasional (once in every ten year) loss of rice production. Water quality may be affected from slight increase in turbidity of water from construction sites. Provisions should be made to ensure minimal run-off from construction activities.

1.6 Potential Impacts of the Project

Potential impacts anticipated are the loss of rice production due to occasional inundation from construction of diversion weir; the loss of corn production arising from the construction of penstock and the powerhouse.

A section of Nam Ou between the weir and the powerhouse will cease flowing during the dry season; this will be due to the 100% diversion of water into penstock and powerhouse. No major impact to fish populations is expected, as most migration occurs during the height of the rainy season

Disturbance to flora and fauna are not anticipated, as the site is situated on the main road surrounded by farm land and degraded forest.

1.7 Objectives of the Resettlement Action Plan (RAP)

The main objective of the RAP is to provide a comprehensive action plan in order to bring about effective compensation and livelihood restoration and community development programs.

However, as stated above, the project development has minor impacts to rice fields and corn garden, and will not impact villages or residential houses. Hence, no resettlement only compensation will be necessary.

Chapter II

Project Location

2.1 Project Location

The Gnod Ou MHP will be situated right on the Nam Ou River located between Ban Phor and Ban Champhor (Figure 1-1) in Gnod Ou District in Phonsaly Province. Figure 2-1 shows Gnod Ou District in the Northern most part of Laos, Bordering Vietnam and China. The Nam Ou River flows in a southerly direction from Ou Neua down to through Ou Thai. Figure 2-2 illustrates the location of the project site in relation to Ou Tai Township.

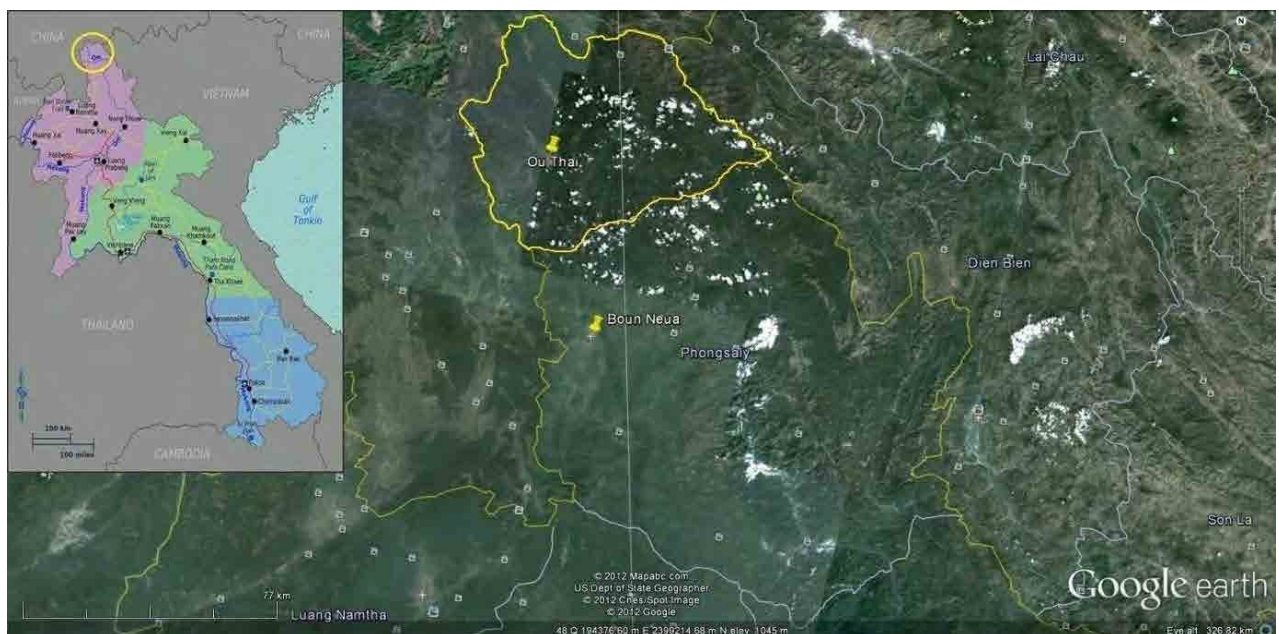
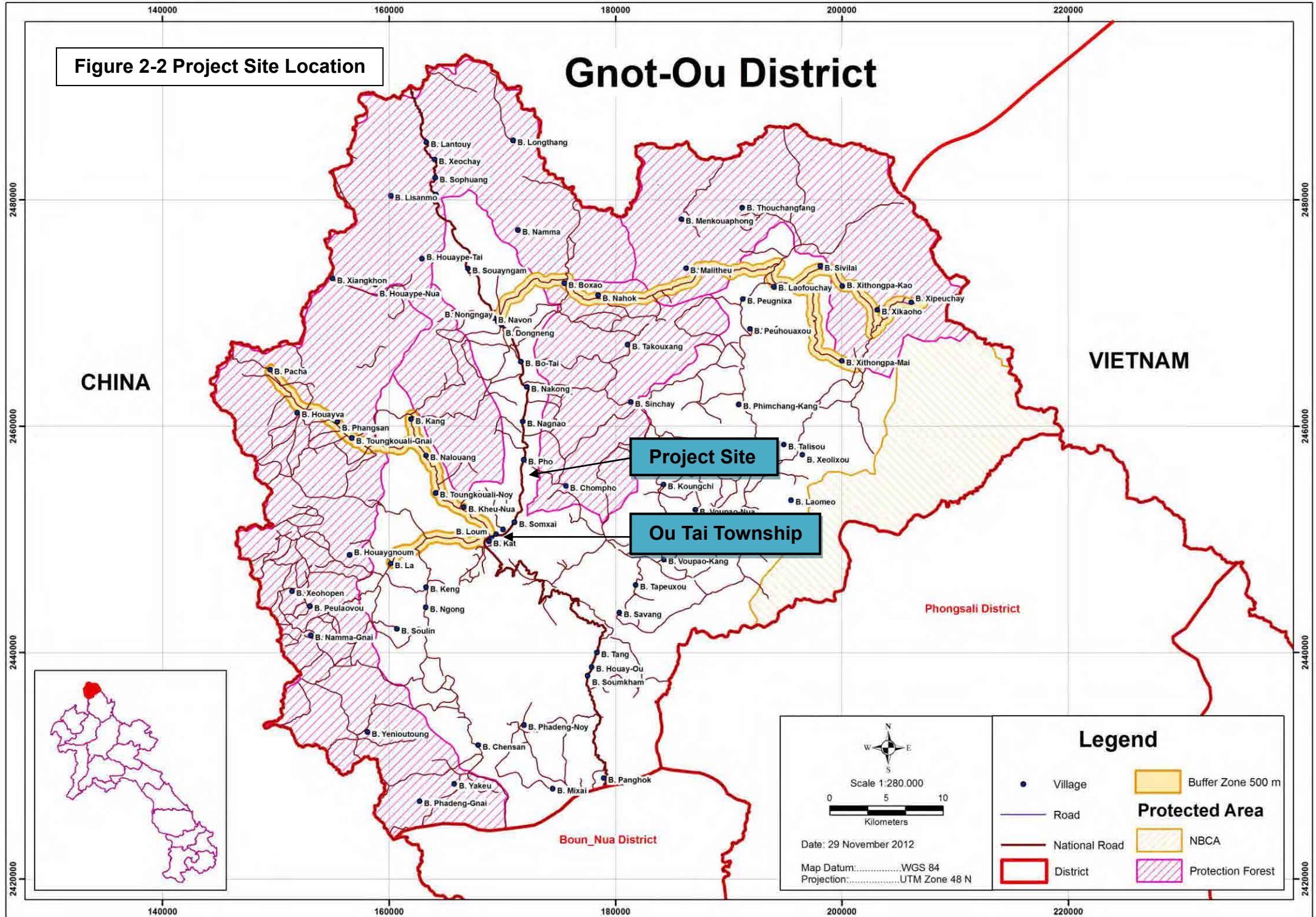


Figure 2-1 Project Location

Figure 2-2 Project Site Location

Gnot-Ou District



Chapter III

Socio-Economic Information and Profile

3.1 Vulnerability

The survey revealed that no vulnerable groups are among the affected persons in the project area. According to the District Government office they are considered to belong to the “middle income family group”.

3.2 Educational Level

The majority of the villagers in the impacted areas achieved a primary school level of education, therefore are able to read and write. All the affected villages have primary schools.

There is only one secondary school in Ou Tai. Secondary students from affected villages (Ban Pho, Ban Somxai and Ban Phane) and surrounding District all attend secondary school in Ou Tai.

3.3 Sources of Income

Main and primary sources of incomes are from farming-rice, corn, peanuts, vegetables, sugar cane, bananas, cardamom, rubber plantation and supplemented with livestock (buffalo, cattle pigs and goats) as well as poultry, such as chicken and ducks. When agricultural activities are in low season, contracting labor and occasional employment is also common. Rice production is mainly enough for family consumption, during when fruitful season surpluses are sold for extra income. Due to increase in demand from China, corn production has been a significant economic activity in this region. Rubber plantations are still in early stages and are yet to produce any income.

3.4 Income and Expenditure

Data about incomes and expenditures as shown in the Tables 3-1 & 3-2 were obtained by interviews of impacted persons. Data given were based on personal recollection and memory; written record of sales or receipts of payment were none existence, therefore all the statistical data presented must not be viewed as absolute values, but a picture of overall socio-economic condition.

3.4.1 Incomes

Ban Phor, based on district social economic classification, is in the “middle” ranking of socio-economic status.

Compared to the *total income generating activities* the income from the “affected” rice fields represent less than 10% of total income. All AP have other rice fields as well as other sources of income generating activities which include rice productions (both wet & dry), corn, vegetable crops, sugar cane, banana and rubber plantations, livestock and supplementary income from occasional employment in Ou Tai Township or nearby projects.

The remainders of the APs are from Ban Somxai & Ban Phan, which situate in Ou Tai Township. Their primary incomes are mostly small business, e.g. retail shops and their affected rice fields in Ban Phor represent small portion of their overall incomes, Table 3-1.

Corn garden areas (0.8ha) affected by penstock, belong to Mr Khamphoy, a retired government employee and his wife, who live and is taken care of by his eldest daughter. The corn production is more his time passing activity or “hobby” therefore he will be marginally impacted. Compared to the total income generating activities the income from affected corn garden represents a small proportion of total income, less than 10%.

Table 3-1 Income proportion -Rice Fields

Name of the affected Rice field	Item	Names of owners	Village of residence	Areas (Ha)	Estimate annual income/HH from affected rice fields
“Thong Na Phor” (x-sec No.14).	1	Mr Khamseng	Phor		
	2	Mr Khampeng	Phor		
	3	Mr Khamping	Phor		
	4	Mr Nokeo	Phor		
	5	Mr Somchit	Phor		
	6	MrTeuntakeng	Somxai		
	7	Mr Dilavou	Somxai		
	8	Mr Daopha	Pharne		
	9	Mr Khamla	Phor		
					<u>1.70</u>
“Thong Na Phat” (x-sec No.13).	1	MrBounthan	Phor		
				<u>0.25</u>	1,875,000
“Thong Na Kham” (x-sec No.11&12)	1	Mr Chomseng	Phor		
	2	Mr Phouvieng	Phor		
	3	Mr Tanang	Somxai		
				<u>0.71</u>	5,325,000
				<u>2.66</u>	19,950,000

Table 3-2 Income proportion- Corn Garden

Item	Names of owners	Village of residence	Areas (Ha)	Estimate annual income/HH from affected corn garden
1	Mr Khamphoy	Phane	<u>0.80</u>	8,000,000

3.4.2 Expenditures

Main expenditure items considered in this analysis include:

1. Foods,
2. Clothing,
3. Healthcare/medications,
4. Electricity,
5. Transportation,
6. Schooling,
7. Farm and
8. Others (traditional functions, and community donation etc...)

Table 3-3 & Table 3-4 illustrate and estimate expenditure of affected villagers. Farm activities attracted the most expenditure; secondly was spent on other means (traditional functions, and community donation etc) and the third priority was on children's schooling. Fourthly was health and medicine, and the last of the spending items was electricity.

It must be noted that all average total expenditures are simply estimates.

Table 3-3 Expenditure proportion – Rice fields

Name of the affected Rice field	Item	Names of owners	Village of residence	Average Annual Expenditure
“Thong Na Phor” (x-sec No.14). Total area 1.70Ha	1	Mr Khamseng	Phor	7,600,000
	2	Mr Khampeng	Phor	8,100,000
	3	Mr Khamping	Phor	7,200,000
	4	Mr Nokeo	Phor	6,900,000
	5	Mr Somchit	Phor	6,200,000
	6	MrTeuntakeng	Somxai	5,000,000
	7	Mr Dilavou	Somxai	5,900,000
	8	Mr Daopha	Pharne	5,000,000
	9	Mr Khamla	Phor	4,300,000
		Total		56,200,000
“Thong Na Phat” (x-sec No.13). Total area 0.25Ha	1	Mr Bounthan	Phor	8,500,000
		Total		8,500,000
“Thong Na Kham” (x-sec No.11&12) Total area 0.71Ha	1	Mr Chomseng	Phor	11,500,000
	2	Mr Phouvieng	Phor	5,800,000
	3	Mr Tanang	Somxai	4,100,000
		Total		21,400,000

Table 3-4 Expenditure proportion- Corn Garden

Item	Names of owners	Village of residence	Average Annual Expenditure
1	Mr Khamphoy	Phane	2,800,000

3.5 Land Ownership and Landholding size

A survey and interviews were conducted in all potentially affected villages along Nam Ou. It was determined that only three villages would be impacted by the project; one upstream from the weir site (Ban Phor) and two further downstream of the powerhouse (Ban Chomphor and Ban Somxai). Affected lands are “rice fields” and “corn garden”

3.5.1 Rice Fields

There are three rice fields (See Table 3-3) that are to be impacted by “occasional flooding” expected after the project completion. All of the APs are from Ban Pho. They are the legal and traditional owners of the properties.

Table 3-5 List of owner affected by “occasional flooding”

Name of the affected Rice field	Item	Names of owners	Village of residence	Areas (Ha) (estimate)
“Thong Na Phor” (x-sec No.14).	1	Mr Khamsen	Phor	
	2	Mr Khampeng	Phor	
	3	Mr Khamping	Phor	
	4	Mr Nokeo	Phor	
	5	Mr Somchit	Phor	
	6	Mr Teuntakeng	Somxai	
	7	Mr Dilavou	Somxai	
	8	Mr Daopha	Pharne	
	9	Mr Khamla	Phor	1.70
“Thong Na Phat” (x-sec No.13).	1	Mr Bounthan	Phor	0.25
“Thong Na Kham” (x-sec No.11&12)	1	Mr Chomseng	Phor	
	2	Mr Phouvieng	Phor	
	3	Mr Tanang	Somxai	0.71
	Total			2.66

3.5.2 Corn Garden

The corn garden area (0.8ha) affected by penstock and powerhouse belongs to Mr Khamphoy, a retired government employee and his wife. Unlike the rice fields, the corn garden is on public land and he has no entitlement of ownership (traditional or legal), only temporary right use. In strict legal terms he would be considered a “squatter”.

Table 3-6 Owner affected by “Penstock &Powerhouse”

Name of the affected Cropping area	Item	Names of owner	Village of residence	Areas (Ha)
Corn Garden	1	Mr Khamphoy	Phane	0.8

3.6 Water and Sanitation

As there is no public water system for villages located around the project site, residents rely on natural springs that have been tapped from the surrounding mountains. These springs run all year round, and are the only source of natural drinking water.

Ban Phor, for example, receives water from the Phor River which flows all year round out of natural mountain springs.

As there is no public water supply in the entire District water is mainly sourced from Nam Ou or its tributaries and pumped into smaller water tanks for domestic use.

3.7 Types of Loss

Types of loss are confined to minor loss of production capacity for the rice fields upstream from diversion weir; and corn garden situated between diversion weir and the powerhouse. A small section of the River between the weir and powerhouse will be dry for certain months of the year, mainly during drier months. This will have no significant impact on aquatic life as migration of fish will occur during the wetter months when the River will have sufficient volume; the installation of the fish ladder will also be of benefit for fish to pass the weir.

An existing quarry site will be used to extract aggregates for construction materials no impact is expected in this area.

3.8 Loss of Agriculture Land

3.8.1 Rice fields

Main loss of agricultural land will be three rice fields located at various sections upstream of the diversion weir. These will be subject to occasional flooding (refer to table below- list of affected rice field owners): See Table 3-3.

1. "Thong Na" Phor (Phor rice field) with total area of 1.70 ha, occupied by 9 families, living in Phor, Phan and Somxai villages.
2. "Thong Na" Phat (Phat rice field) with total area of 0.25 ha, occupied by one family living in Phor village.
3. "Thong Na" Kha (Kha rice field) total area of 0.71 ha, occupied by three families living in Pho and Somxai villages.

3.8.2 Corn Garden

In addition to flooding of the rice fields mentioned above, a villager's garden will also be affected, not from flooding but by the construction of the penstock along the left bank which starts from the proposed weir to the powerhouse.

The garden has an approximate total area of 0.8 ha, where some corn and peanuts are cultivated. The garden belongs to one family that lives in B.Phane village. See table 3-4.

3.9 Impact on Residential Assets

No impacts on residential assets will occur from the project.

3.10 Loss of Commercial Structure

No loss of any commercial structure will occur from the project. The site is in a non populated area.

3.11 Loss of Trees

No loss of trees will occur from the project. The site area is mostly scrub-land.

3.12 Loss of Irrigation Units

No loss of irrigation units will occur from the project.

Chapter IV

Information Disclosure, Consultation and Participation

4.1 Information Disclosure

As required under Decree 192/MONRE article 12, the project proponent through the feasibility study have consulted and interacted with various government authorities at Provincial and District level. Including concerned authorities in particular, the Institute of Renewable Energy and Promotion (IREP) of the Ministry of Energy and Mines (MEM). Stake holders meetings were set up twice, both in Gnod Ou District. All concerned parties attended, including the affected persons. Information such as project objectives, project layout, potential impact and benefits were discussed. Institutional arrangement, compensation entitlement, roles and responsibilities of Compensation/Grievance Committee were also disclosed.

4.2 Purpose of Consultation and Participation

The main purpose of consultation and participation was to inform: mainly (i) the purpose of the project, (ii) how and where the project will be constructed, (iii) how will it impact and benefit the communities, (iii) what are the rights and responsibilities under the laws and regulation, including grievance mechanism.

Consultation record and minutes of meetings were explained in section 7.2 of the IEE.

4.3 Consultation Process

As stated above, consultation process and records of consultation and minutes of meeting has been discussed, and can be found in Chapter 7.2 of the IEE.

4.4 Consultation Scope and Issues

Apart from consultations with Governmental department MEM, Provincial and District offices, consultation scope involved mainly with affected communities of the three affected villages such as Ban Phor, Ban Somxai and Ban Phane. The main issues discussed included the degree of impacts and benefits, compensation policy, mechanism of compensation and the legal frame work by which the compensation process is carried out.

4.5 Feedback from the Stakeholder Consultations

Feedbacks from Stakeholder consultation are important to both socio and environmental aspect of the project. One very important feedback was “confirmation” of the need for the project, and that it is vital for the socio-and economic future of the country. This is important in particular for boosting Gnod Ou District up from being one of the poorest Districts in Phonsaly Province.

4.6 Mechanism of Addressing the Views Emerging from Consultation

Views immersed from the consultation processes which provided crucial information for the most suitable project site selection design, with respect to lessening adverse impacts optimize power generation; hence optimize profit for the communities.

4.7 Consultation with the Community in Past

Various consultations with the communities, especially affected communities were carried out on site, in early September 2012 (including 1st Stakeholder meeting) & early December 2012 (with 2nd Stakeholders meeting).

4.8 Plan for Future Consultation and Community Participation

After the approval of the IEE and this “RAP”, the Compensation/Grievance Committee will be set up. Only then, the consultation and community participation will take place. The main aim of this will be to verify, negotiate and ratify compensation details for affected asset (rice fields & corn garden) so that compensation payment can be allocated prior to commencement of project construction (expected to start by mid April 2013).

Chapter V

Grievance Redress Mechanism

5.1 Grievance Redress

A Grievance Redress Committee (GRC) will be established at District and Provincial levels to address any complaints and grievances related to land acquisition, along with compensation and resettlement issues that may be raised by project affected persons.

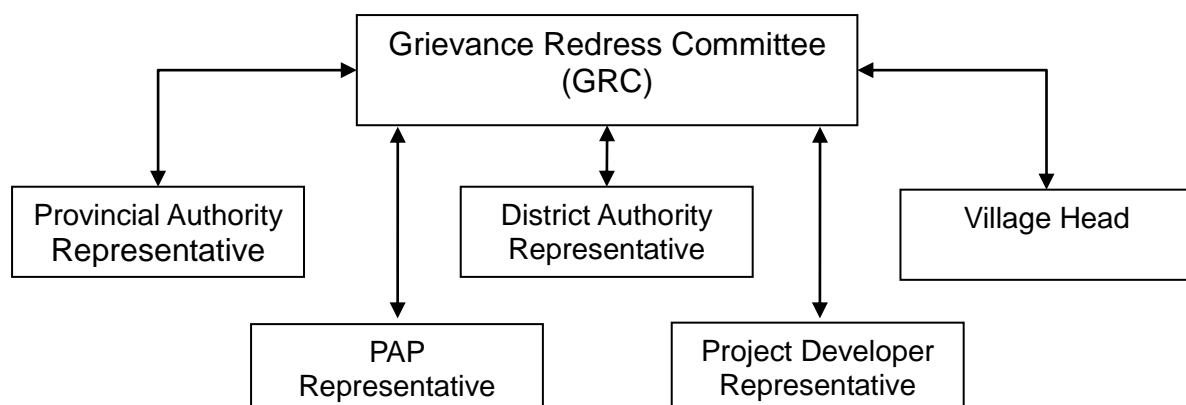
This project requires no resettlement, and the GRC's main function will be to oversee the compensation and address grievance matters from compensation or any other issues.

5.2 Grievance Redress Committees

The GRC will be comprised of the following members, among other:

1. Representatives of the Provincial Authority and agencies (only for the Provincial Grievance Redress Committees);
2. Representatives of District the Authority and agencies (only for the District Grievance Redress Committees and Provincial Grievance Redress Committees);
3. Village head;
4. A representative of Project Affected Persons (PAP)
5. A representative from the Project (ESMU)

Figure 5-1 Grievance Redress Committee



5.3 Purpose and Scope of Grievance Redress Committees

The purpose of the grievance procedure is to ensure that project affected persons have the means to assure they are satisfied they have been adequately protected from adverse impacts of the project. If impacts cannot be avoided, ensure that they are satisfied they have obtained adequate compensation and that entitlements are delivered sufficiently and on schedule. If an affected person or group or community feels they have not been adequately protected or compensated, have not received their entitlements, or otherwise believe there have been unfairly affected by the project, that person or group or community has the right to make a claim.

5.4 Grievance Redress Mechanism

The Grievance Procedure will cover both social and environmental issues, since most of the environmental impacts are those that affect people.

The GoL recognizes that the best way to avoid conflicts or grievances is through the process of consultations, disclosures, and participatory planning and decision-making. Thus, the first stage is Conflict Avoidance. This should be done through consultations and disclosures, as well as participation in planning and decision making. If disagreements do arise, but have not yet become firm conflicts, then the issue may still be solved through informal negotiations and other informal means. It is only when problems have become more intractable that they need to be taken to a more formal grievance process.

5.5 Time Frame of Grievance Redress

The GRC will make a final decision within two weeks. If land owners do not agree with the decision they could go to court to settle the matter. There have been cases of issues being settled in parliament, however, the majority of cases are easily settled at the committee level.

5.6 Documentation of the Complaints Received

The ESMU and District NRE, being the “front line” representative for Project owner and Government respectively, are responsible for not only environmental issues, but also responsible to receive and document any complaints arising from the implementation of the project. If the problem cannot be solved, the complaint must be discussed at the Compensation/Grievance level.

Chapter VI

Legal Framework

6.1 National Resettlement and Rehabilitation Policy

The Resettlement policy is addressed by Decree 192/MONRE and Technical Guidelines on Compensation and Resettlement of People Affected by Development Projects (June 2011). Table 6-1 compares these policies with JICA guidelines and it was found that there were no gaps between the two.

6.2 Legal and Policy Commitments of the Executing Agency

As stated earlier the Government of Lao (GoL) has set a goal and commitment to improving national electrification ratios to 80% by 2015 and to 90% by 2020. This would reduce internal disparities between urban and rural areas, and achieved poverty reduction in remote areas. In comparison to the rest of the country, Phongsaly Province and Gnod Ou District are among one of the poorest.

Government of Japan (GoJ) will provide Grant Aid and after discussion between (Japan International Cooperation agency (JICA) and GoL, the development of Gnod Ou Mini-Hydropower Project (MHP) was chosen. This will also include extension of distribution lines to the most remote villages in the District.

Through its departmental, the Institute of Renewable Energy Promotion (IREP) under the Ministry of Energy & Mine (MEM) is the legal Executing Agency for the project. The IREP under its Rural Electrification Division (RED) and in cooperation with Provincial (Phongsaly) and District (Gnod Ou) authorities and relevant governmental departments shall have overall responsibility to oversee the legal compliance, including implementation and operation of the project.

6.3 Principle and Methodology for Determining Valuations and Compensation Rates

The methodology for compensation calculation was based on a formula given in the technical guidelines, which specifies parameters that must be included in the calculation of the compensation. That is type of asset crops, trees, building etc....

However the final asset quantity and value must be consulted and discussed and agreed upon by Resettlement or in this case Compensation Committee, who will also be responsible for grievances arising from the compensation process.

Refer to Chapter 9-1 of Resettlement and Compensation Budget. Tables 9-1 and 9-2 illustrate compensation rates.

6.4 Land Acquisition Process

The affected lands such as rice fields and corn garden are of different land category, therefore land acquisition approach are different.

6.4.1 Land Acquisition Process, Rice Fields

Even though the paddy fields are considered “private land” or under the Land **Law Group 2-** “Occupation of Agriculture Land,” Article 18 “Authorized Right of Use”

The acquisition of such lands will not be necessary, because the impact is considered minor (occasional flooding) and the “authorized right of use..” (or land entitlement) is still maintained, the land owners continue to use the land beyond the project life.

6.4.2 Land Acquisition Process, Corn Garden

Under the **Land Law Group 4** “Occupation of land within and around water body” and **Group 6-** “Occupation of Public work (road reserve) lands”, the land occupied or impacted by project development (dam, penstock & powerhouse including temporally land used for construction camp), are considered “public land”. As such acquisition of this land is not necessary; however compensation for loss of livelihood (loss of crop production/income) will be observed and effected, in accordance to Decree 192/ MONRE.

Table 6-1 Comparison between JICA Guidelines and Lao Law

No.	JICA Guidelines	Laws of Lao	Gap between JICA Guidelines and Laws of Lao
1.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.	Decree 192, “Technical Guidelines On Compensation & Resettlement” (TGCR) Impact assessment method (under Decree 112) required developer to explore viable options (starting at design stage) in order to avoid impact. Chapter 2.2 Resettlement in the project process describes how planning and implementation activities are an integral part of a development project planning and implantation activities.	No Gap
2.	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken.	Decree 192, “TGCR” - Chapter 5.1 Objectives and scope state three basic principles for resettlement: a) Enhance the quality of life for the project affected people. b) To the extent possible, prevent or minimize adverse social impacts. c) Mitigate possible adverse social impacts.	No Gap
3.	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.	Decree 192, “TGCR” - Chapter deals with Involuntary resettlement, compensation & mitigation measures to ensure that affected persons are not worse off and adequately compensated. (See also Chapter 5.1)	No Gap

No.	JICA Guidelines	Laws of Lao	Gap between JICA Guidelines and Laws of Lao
4.	Compensation must be based on the full replacement cost as much as possible.	Decree 192 "TGCR" - Chapter 8.3.1 Compensation replacement land should have locational characteristics better or at least similar to the land lost. This is particularly important for residential and commercial land.	No Gap
5.	Compensation and other kinds of assistance must be provided prior to displacement.	Decree 192, "TGCR" - Chapter 15.3 Resettlement implementation activities. According to these activities relocation occurs after payment of compensation and allowances.	No Gap
6.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public.	Decree 192, "TGCR" - Chapter 5.2.2 A Resettlement Plan is required to be built around a development strategy, compensation, resettlement and rehabilitation packages designed to improve or restore the social and economic base of those severely affected. Chapter 11.2 Information dissemination takes place in all stages of the project cycle, insuring a continuous feedback process through which the communities learn about potential activities in the area.	No Gap
7.	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance.	Decree 192, "TGCR" - Chapter 11.5. Through respective local governments and civil society, APs are regularly provided with information on the project and the resettlement process prior to and during the preparation and implementation stage.	No Gap
8.	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.	Decree 192, "TGCR"- Chapter 6.3 Public participation and consultation should be developed in culturally appropriate ways familiar to ethnic groups. Where possible, staff with previous experience should be hired as part of the social impact assessment team.	No Gap
9.	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans.	Decree 192, "TGCR" - Chapter 11.5 Public participation in project cycle states that: Project owners are required to ensure that local authorities as well as representatives of Affected Persons (APs) are included in the implementation and decision making process.	No Gap
10.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.	Decree 192, & "TGCR"- Chapter 12 Grievance Redress. All complaints and grievances of project related to inventory, entitlements and compensation rates for assets must have a good degree of transparency and diligence by project authorities during resettlement preparation; this can eliminate or minimize many problems and issues.	No gap

No.	JICA Guidelines	Laws of Lao	Gap between JICA Guidelines and Laws of Lao
11.	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP4.12 Para.6)	Decree 192, & "TGCR" - Chapter 7.2.1 Census to establish cut-off-date and eligibility for entitlements. The importance of a census is not limited to collecting detailed information on APs, but is also practical for establishing the cut-off date for entitlement eligibility.	No gap
12.	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para.15)	Decree 192, & "TGCR" - Chapter 8.3.1 Entitlements to AP without tenure security, states that compensation entitlements to illegal occupiers of the state land are generally not recognized. However, it is good practice to provide these APs with an alternative location with secured tenure.	No gap
13.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	Decree 192, & "TGCR" - Chapter 8.3.1 Land for land is a preferred option especially when the productive asset, agricultural and commercial land are affected in a project.	No gap
14.	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	Decree 192, & "TGCR" - Chapter 15.3 Resettlement Implementation Activities, arrangements for planning and delivery of rehabilitation assistance to severely affected APs and vulnerable groups will start as soon as the payment and compensation to the APs is completed.	No gap
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8)	Decree 192 in "TGCR" - Chapter 20 places great emphasis on the need for providing special assistance to affected vulnerable groups in a development project. Vulnerable groups include; households below the poverty line, elderly with no means of support, Ethnic groups, households with weak tenure status and women headed households.	No gap
16.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	Decree 192, & "TGCR" - 5.2.1 Land acquisition compensation report states that in cases where impacts of the sub-project are marginal such that less than 200 persons (about 40-50 families) are severely affected and/or displaced, or where the impacts are minor, a simple Land Acquisition and Compensation Report should be prepared. It should provide same type of information as the full report; however, level of detail will differ.	No gap

Chapter VII

Entitlement, Assistance and Benefits

7.1 Eligibility and Entitlements of Displaced Persons, Rice Field

The entitlement matrix shown in the Table 7-1 below was based on the estimate of total area of each rice field. Individual owners in each rice field were known as shown in Table 3-5, but individual rice field area was not yet determined, therefore individual entitlement amount could not be calculated. However, these entitlements must be determined and approved by Compensation/grievance Committee to be set up, before commencement of any work, as stipulated in “Technical Guideline on Compensation and Resettlement of People Affected by Development Projects”

Table 7-1 Entitlement Matrix Rice Fields

No.	Type of Loss	Application	Definition of entitled person	Compensation Policy	Entitlement Amount (Kip)
1	Rice Field	Occasional Inundation	Thong Na Phor	Land Law Group 4	38,250,000
2	Rice Field	Occasional Inundation	Thong Na Phat	Land Law Group 4	5,625,000
3	Rice Field	Occasional Inundation	Thong Na Kham	Land Law Group 4	15,975,000
Total					59,850,000

According to *the Resettlement Technical Guidelines 2011*, compensation policy in this case is cash compensation for crops based on a market price.

Under the **Land Law Group 4** “Occupation of land within and around water body” and **Group 6**- “Occupation of Public work (road reserve) lands”, the land occupied or impacted by project development (dam, penstock & powerhouse including temporarily land used for construction camp), are considered “public land”. As such, acquisition of these lands is not necessary; however compensation for loss of livelihood (loss of crop production/income) will be observed and effected in accordance to Decree 192/ MONRE.

Even though the paddy fields are considered “private land” or under the **Land Law Group 2**- “Occupation of Agriculture Land,” Article 18 “Authorized Right of Use”, the acquisition of such lands is not necessary, because the impact is considered minor(occasional flooding) and the “authorized right of use..” (or land entitlement) is still maintained, the land owners continue to use the land beyond the project life.

7.2 Eligibility and Entitlements of Displaced Persons, Corn Garden

The entitlement matrix in Table 7-2 was based on the estimate of total amount of corn on the affected area of land. However, these entitlements must be determined and approved by the Compensation Committee, before commencement of any work, as stipulated in “Technical Guideline on Compensation and Resettlement of People Affected by Development Projects”

Table 7-2 Entitlement Matrix Corn Garden

No.	Type of Loss	Application	Definition of entitled person	Compensation Policy	Entitlement Amount (Kip)
1	Corn	Construction	Ban Phor	Land Law Group 4	24,000,000
Total					24,000,000

According to *the Resettlement Technical Guidelines 2011*, compensation policy in this case is cash compensation for crops based on a market price.

Under the **Land Law Group 4** “Occupation of land within and around water body” and **Group 6-** “Occupation of Public work (road reserve) lands”, the land occupied or impacted by project development (Dam, penstock & powerhouse including temporally land used for construction camp), are considered “public land”. As such acquisition of these lands is not necessary; however compensation for loss of livelihood (loss of crop production/income) will be observed and effected, in accordance to Decree 192/ MONRE.

However, even though the paddy fields are considered “private land” or under the **Land Law Group 2-** “Occupation of Agriculture Land,” Article 18 “Authorized Right of Use”, the acquisition of such lands is not necessary, because the impact is considered minor (occasional flooding) and the “authorized right of use..” (or land entitlement) is still maintained. The land owners will be able to continue to use the land beyond the project life.

Chapter VIII

Relocation, Income Restoration and Rehabilitation

8.1 Options for Relocating Housing and Other Structures

The Project has no impact to housing or any structure.

8.2 Replacement of Agricultural Land

Impact to rice fields is minimal (less than 10%) therefore land replacement will not be necessary.

8.3 Vulnerability Assessment of the Households to be rehabilitated

Based on our survey and according to Decree 192 article 3 (i), all affected persons do not fall into the category of “Vulnerable Group”.

8.4 Livelihood Risks

Since the impact to income generating assets is considered less than 10% of the total incomes, and the impacted rice fields will be impacted once every 10 years (only during the wet season). The project will have no impact to dry seasonal production; therefore the project development would have insignificant risk to the livelihood of the affected persons. The diversion dam is not considered large and will not retain a large quantity of water (run-of-river scheme), in the case of dam failure, the impact would not threaten any lives downstream; the main Township is over five kilometers downstream. Risks to livelihood will be if at all, very small.

8.5 Support to Vulnerable Groups

All affected persons do not fall in the category of “Vulnerable Group” hence no special support will be required.

8.6 Income Restoration Programs

The project impacts to income generating assets, namely rice fields and corn garden are established to be less than 10% of the total assets, under article 8 (1) income restoration program will not be required.

8.7 Alternative Relocation Sites

Compared to various sites (Diversion dam location, in order to maximize generation capacity and lesson the socio-environment impact) that were considered, the selected site is the most favorable with respect to technical, environmental and social requirement.

8.8 Timetable for Site Preparation and Transfer

Not yet determined at this IEE stage. This can be determined when all the detailed design is completed. It is anticipate being in place by April 2013.

8.9 Plans to Provide Civic Infrastructure

The location of the project site is accessible by good existing national road, improvement and maintenance to such infrastructure will be required, especially during construction period.

Chapter IX

Resettlement /Compensation Budget and Financing Plan

9.1 Resettlement/ Compensation Budget

Since the impacts are confined to compensation and not resettlement, the budget calculation highlighted loss of production opportunity. Two properties will be impacted; they are rice fields and corn garden.

Following sections show the methodology and result of compensation estimates.

9.1.1 Rice Fields

Production capacities and crop market values:

Statistical Information about local crop (rice, corn etc..) production capacity and their market values were obtained from *Gnod Ou District Office*, with a survey of local market prices along with prices from local farmers.

Average production capacity was, 2,500kg/ha- wet rice– Oct-2012

Average local market price was, 3,000kip/kg (un-husk)-Oct 2012

Table 9-1 Compensation estimate for rice production affected by “occasional” flooding

Name affected Rice field	Areas (Ha)	Production capacity (kg/ha)	Price Kip/kg	Compensation Period (yr)*	Total amount
“Thong Na Phor”	1.70	2,500	3,000	3	38,250,000
“Thong Na Phat”	0.25	2,500	3,000	3	5,625,000
“Thong Na Kham”	0.71	2,500	3,000	3	15,975,000
Total	2.66				<u>59,850,000</u>

* Compensation for three years is considered “appropriate”; the lands are subject to flooding once for every 10, 20 50 years; owners continue to own and use the lands; dry seasonal production will continue uninterrupted.

9.1.2 Corn Garden

Production capacities and crop market values:

Statistical Information about local crop (rice, corn etc..) production capacity and their market values were obtained from Gnod Ou District Office, with a survey of local market prices along with prices from local farmers.

Average production capacity was, 4,000kg/ha- Oct2012

Average local market price was, 2,500kip/kg - Oct 2012

Table 9-2 Compensation estimate for corn production affected by penstock and powerhouse construction

Name affected corn field	Areas (Ha)	Production capacity (kg/ha)	Price Kip/kg	Period of compensation (yr)*	Total amount
Cropping area	0.8	4,000	2,500	3	24,000,000
Total	<u>0.8</u>				<u>24,000,000</u>

* Period of compensation was based on loss of perennial crop. Crop cultivation is done manually, it is unlikely to interfere with penstock or powerhouse, and therefore affected person can resume the cultivation after completion of the construction

9.1.3 Total Compensation Budget

Total compensation budget estimates for Hydro Plant impacts are **83,850,000Kip**. However this total amount needs to be finalized by the Compensation Committee before payments are to take place.

9.2 Financing Plan

Financial requirement for the compensation is the responsibility of the project developer, it is important that the compensation payment shall be completed well before the project commencement. It must also be noted that final values and quantities will need to be verified and approved by Compensation/Grievance Committee.

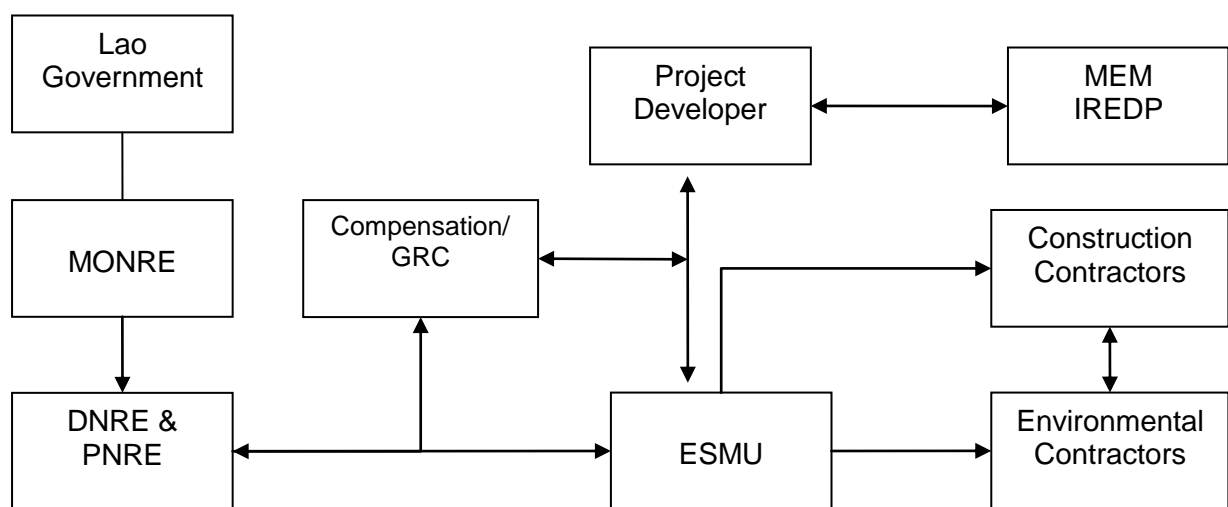
Chapter X

Institutional Arrangements and Implementation Schedule

10.1 Introduction

For implementation of the Project, several parties will be involved with different duties and responsibilities. The main parties involved and their working relationships are shown below.

Figure 10-1 Working relationships of concerned parties



Project owner will establish an ESMU to be responsible for all social and environmental impact activities. The ESMU will work in close cooperation with GoL organizations and agencies, especially District NRE and provincial NRE. The ESMU will:

- Employ skilled and experienced international and national persons, short and long term to carry out all the mitigation and monitoring measures.
- Carry out environmental monitoring and supervision during the construction phase in cooperation with the contractor.
- Implement preventative measure to protect the environment as a result of the project, such as biomass clearance, impacts to fisheries, water quality and environmental engineering measures, etc.

- Implement mitigation measures to avoid, reduce or compensate for environmental impacts on fisheries, downstream river bed erosion, and water quality and biodiversity threat/loss due to the project.
- Improve environmental awareness among workers and populations near the protected forest or conservation areas.

10.2 The Executing Agency

The executing agency for this project will be Provincial/District Administrative Office, Phongsaly & Gnod Ou. The IREP will also form part of the agency.

10.3 Resettlement Implementation Officer

As stated earlier, the project has no impact to village or individuals which require resettlement. However impacted persons would only need to be compensated. This task will be implemented by ESMU and Compensation/Grievance committee.

10.4 Non Government Organization

There are various donors working in the District, mainly: The European Union (EU), providing water supply for various villages, but none in the project affected area. Comite de Cooperation avec le Laos (CCL) involved in food supplementation program, water supply as well as livestock and agriculture. District Development Program (DDP) is also involved in construction of school buildings. The proposed development of MHP is well within the framework of these donors.

10.5 RAP Implementation Schedule

Since the impacts of this project are not significant, this procedure will take approximately one month.

Table 10-1 Implementation Schedule

Activity/Week	1	2	3	4
Detailed Asset Registration				
Consultation with Affected Persons				
Review & Approval by Compensation Committee				
Disclosure of Compensation Entitlement with AP				
Payment				

10.6 Institutional Responsibilities

The Project Developers will establish an ESMU the Project. The ESMU will also ensure the Project meets all of its social obligations, including resettlement (not applicable for this project), compensation, livelihood restoration, and other social development works. These are all to be carried out in close cooperation and in coordination with the relevant government organizations. There will also be a Compensation/Grievance Committee set up to implement social aspects of the project.

The ESMU's responsibilities will be:

- Manage the environmental, social, economic and compensation components, using consultant inputs as required,
- Monitor and report to the developer on the effectiveness of implementation of the mitigation measures, social development activities, and resettlement program, and
- Coordinate activities during construction and operation phase with relevant government agencies, with the aim of improving the environmental performance of the project during its operating phase.

Chapter XI

Monitoring and Reporting

11.1 Scope of Monitoring and Reporting

Under Decree 112/MONRE section III article 22 identifies and sets out sectors and authorities responsible for the monitoring of the implementation of “Environmental Management and Monitoring Plan” (EMMP), for each development category (in this case-category 1).

These include:

- i. Monitoring carried out by Project Developer (internal monitoring)
- ii. Monitoring carried out by Governmental department
- iii. Monitoring carried out by independent organization (external monitoring, associated with complex development- not application for Gnod Ou MHP development)

11.2 Mechanism of Internal Monitoring

11.2.1 Monitoring carrying out by project developer

This task is affected by setting up of an ESMU. Their tasks are to carry out the daily monitoring of the implementation of the proposed EMMP, including reviewing and updating if necessary.

The ESMU shall liaise, inform and report to Natural Resources and Environment (NRE-Gnod Ou District & Phongsaly Province). The ESMU shall also inform Provincial Department responsible for investment, relevant authorities (in this case IREP - Ministry of Energy and Mines), as well as Gnod Ou District and Phongsaly provincial administrative office.

11.2.2 Monitoring carrying out by Governmental department,

As stipulated, this task is the responsibility of the government department which is responsible for assessing and or reviewing of the IEE.

In this respect, the monitoring shall be carried out by District NRE and Provincial NRE. Provincial & District NRE shall on regular basis inform and report to MONRE, including local administrative office. MONRE has the responsibility to assess and review the monitoring and the implementation of the EMMP. In case of environmental accidents, provides immediate response to address the situation – site inspection and assessment of degree of impact.

11.3 Mechanism of External Monitoring and Evaluation

Decree 112/MONRE stipulates that external monitoring will be required only for very complex projects, the Gnod Ou Min Hydro is a very simple project, and therefore there will not be any need for external monitoring.

11.4 Compliance Monitoring

Compliance monitoring stipulates, under Decree 112/MONRE section III article 22 which identifies sectors, set out their responsibilities and roles in carryout the compliance monitoring. Under this Decree, MONRE and its subordinates at provincial and at district levels are the responsible authorities for such monitoring.

11.5 Social Impact Evaluation

Social impact evaluation was carried out through interviews with affected villagers and random discussions with general public of Ou Tai Township resident's as well official consultation meetings (First Stakeholders Meeting, Sept 2012, Second Stakeholders Meeting, December 2012).

Despite some minor impacts to rice field and a corn garden, the benefits that the project will bring to the communities of Gnod Ou District will outweighed the impact. Sufficient and reliable power supply will definitely improve the socio-economic situation of the communities and provide vital contribution to government poverty reduction program.