Chilime – Trishuli Transmission Line and Substations, Nepal

Non-Technical Summary

Report

May, 2015

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Chilime – Trishuli Project, Nepal

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May 26, 2015

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ABBREVIATIONS

AIS	Air Insulated Switchgear
AP	Angle Point
B.S.	Bikram Sambat (Nepali calender)
EHS	Environmental, Health and Safety
EIB	European Investment Bank
EMF	Electric and Magnetic Field
EPA	Environment Protection Act
EPR	Environment Protection Rules
ERM	Environmental Resources Management
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FPIC	Free, Prior and Informed Consent
GIS	Gas Insulated Switchgear
ha	Hectare
HPP	Hydropower Plant
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ILO	International Labour Organisation
IP	Indigenous People
IPP	Independent Power Producer
IUCN	International Union for Conservation of Nature
KfW	KfW Development Bank
km	Kilometre
kV	kiloVolt
LACP	Land Acquisition and Compensation Plan
NEA	Nepal Electricity Authority
NEA ESSD	Nepal Electricity Authority, Environment and Social Studies Department
NEC	Neighbourhood Electrification Component
NTS	Non-Technical Summary
MW	MegaWatt
m	Meter
PAH	Project Affected Household
PAP	Project Affected Person
PS	Performance Standard
RoW	Right-of-Way
SEP	Stakeholder Engagement Plan
TL	Transmission Line
VDC	Village Development Committee

1 INTRODUCTION

1.1 BACKGROUND

This document is the Non-Technical Summary (NTS) for the Chilime – Trishuli transmission line and substations Project (hereinafter referred to as "the Project"). The Project is being developed by the governmental organization Nepal Electricity Authority (hereinafter referred to as NEA or the Project Developer), and will be financed by the Government of Nepal, NEA, KfW Development Bank (KfW) and the European Investment Bank (EIB). The Project is located in Rasuwa and Nuwakot districts approximately 40 km northwest of Kathmandu. The TL will serve as a connection between hydropower plants in the Upper Trishuli Valley and Kathmandu Valley and runs along the Trishuli River.

This NTS has been compiled based on the following reports

- *IEE of Trishuli 3 B Hub Substation Project* (NEA ESSD, October 2014)
- *IEE Report of 132/220 kV Chilimie Substation Hub and Chilime – Trishuli 220 kV TL Project* (NEA ESSD, November 2014)
- I*EE Addendum. Chilime – Trishuli Project, Nepal* (ERM, April 2015).

1.2 NATIONAL AND INTERNATIONAL REQUIREMENTS

In Nepal, the Environment Protection Act (EPA), 1997 (B.S. 2053), and the Environment Protection Rules (EPR), 1997 (B.S. 2053), are the major legislations defining the requirements of environmental impacts and public engagement. According to national requirements, the Project parts only require Initial Environmental Examinations (IEEs) and not a full scope Environmental and Social Impact Assessment (ESIA). The amended EPR (Schedule 1)[1] specify that 132 kV lines and higher as well as substations connecting 220 kV lines only require an IEE. Concerning felled forest, the EPR amendments[2] state that an IEE is sufficient for TL projects regardless of the forest area cleared. Additional documents are nevertheless needed for this Project to meet international environmental and social requirements. To secure the funding by KfW and EIB, the Project has to comply with the International Finance Corporation (IFC)[3], including IFC EHS Guidelines,

[1] EPR, p. 29 of the Nepali version (the English version does not include the amendments)

[2] See National Gazette (dated 13-10-2066 B.S./January 27, 2010)

[3] http://www.ifc.org/performancestandards

Sector-Specific Guidelines (in this case "Electric Power and Distribution")[4], and EIB[5] Standards.

Therefore, in addition to the two IEEs (prepared by NEA ESSD) and this NTS the following documents have been prepared:

- an IEE Addendum,
- a Stakeholder Engagement Plan (SEP), and
- an Environmental and Social Management Plan (ESMP).

Furthermore, a Land Acquisition and Compensation Plan (LACP) is currently being prepared by NEA ESSD.

2 THE PROJECT

2.1 NEED FOR THE PROJECT

The Project is part of Nepal's strategy to overcome the continuing power shortages and satisfy the growing demand of electricity. Nepal has been facing chronic power shortages for decades suppressing economic and social development in the country. The demand and supply gap is widening every year with the demand for electricity increasing 10% annually, while the generation capacity has remained almost the same for the last 2 years. The growth in power consumption has led to severe imbalances in demand and supply of electricity which has resulted in load shedding.

Nepal is also well known for its significant hydropower potential and the development of new hydropower projects is among the government's top priorities to close the ever widening gap between electricity demand and supply. The Project is vital for connecting the electricity producing hydropower plants in the Upper Trishuli Valley with the demand centres in Kathmandu Valley.

[4] http://www.ifc.org/ehsguidelines
[5] http://www.eib.org/attachments/strategies/eib_statement_esps_en.pdf & http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf

2.2 *MAIN PROJECT FEATURES*

The Project is located in Rasuwa and Nuwakot districts approximately 40 km north-northwest of Kathmandu and consisting of the following elements:

- Chilime 220/132 kV GIS[6] Substation;
- Trishuli – Chilime 220 kV Transmission Line (TL);
- Trishuli 3B Hub 220/132 kV AIS[7] Substation;
- 33/11 kV Neighbourhood Electrification Component (NEC)

The TL will serve as a connection between hydropower plants (HPPs) in the Upper Trishuli Valley, which are at different stages of development, and Kathmandu Valley. The site location is presented in Figure 1.

2.2.1 *Substations*

Chilime Substation will be located at Thambuchet village (Goljung Village Development Committee (VDC) at the right hand side of the Chilime River, Rasuwa District). It will be realized as a GIS substation. The exact area required for a GIS substation at this site is not known yet.[8] It will connect Upper Sanjen (14.6 MW), Sanjen (42.5 MW) and Rasuwagadhi (111 MW) HPPs to the 220 kV TL, which connects to the Trishuli Substation. The electricity is further evacuated from Trishuli Substation via the 220 kV to Matatirtha substation in Kathmandu Valley.

Trishuli Substation will be located at Champani (Manakamana VDC, Nuwakot District), also at the right hand side of the Trishuli River. It will be realized as an AIS substation and will require an area of about 5.3 ha. Besides evacuating the electricity from the above mentioned hydropower plants it will also serve as a connection for the following hydropower plants currently under construction: Upper Trishuli 3A (60 MW), Upper Trishuli 3B (42 MW), Upper Trishuli-1 (216 MW), Ankhu Khola (42.9 MW), Upper Mailung (14.3 MW), Upper Mailung A (5 MW) and Samundratar (21 MW).

[6] GIS = Gas Insulated Switchgear

[7] AIS = Air Insulated Switchgear

[8] The IEE for Chilime Substation cites a required area of 4.64 ha. This area was needed for the AIS design which was later replaced by a GIS design, which has a smaller footprint. (The 4.6 ha include the resettlement areas from Sanjen and Chilime HPPs to the west of Chilime Substation, currently under construction). The updated numbers will be considered in the LACP.

Figure 1 *Site Location Map*

2.2.2 *Transmission Line*

The proposed TL will be a double circuit 220 kV system with galvanized steel lattice towers. The total number of angle towers is currently estimated to be 39 (AP-0 – AP-39). Since the detailed design is part of the next planning stage, the final number and exact locations of the suspension towers (in between the angle towers) is not known yet. The average angle tower will have a height of approx. 42.5 m. The tower bases will each have a size of around 15 m x 15 m. The TL will have a 15 m Right-of-Way (RoW) on each side. The 39 tower foundations for the angle towers will require an area of 0.9 ha

2.2.2.1 *Routing*

The proposed TL will have a length of 26.5 km. The alignment starts from Chilime Substation at Thambuchet (Goljung VDC[9], Rasuwa District). AP-0 is located south-west of the proposed substation. From there, the alignment climbs up to AP-5, the highest point (2,635 m) of the transmission line, in the southwest and passes over some forest area, cultivated land and small streams. From AP-5 the TL descends towards the southeast from the mountain range, crosses cultivated land and passes by the village of Gre (between AP-6 and AP-7).

From AP-8, the route heads southwest again, crossing a stream (Nasin Khola), which marks the border between Gatlang and Haku VDCs, and scattered forest area. From here the TL runs parallel to the Trishuli River until it reaches the proposed Trishuli Substation. From AP-9, located below the settlement of Nesin, the line passes mostly over cultivated land, crossing another stream between AP-11 and AP-12, located below the settlements Sano Haku and Thulo Hako. From here the TL continues across cultivated land and scrub. Starting from AP-16, the vegetation develops into forest. At AP-21, the TL reaches the cultivated land and scattered settlements of Gogane.

After AP-23, the land use again changes to forest. Between AP-25 and AP-26, the alignment crosses the Mailung River. In Dadagaun VDC, from AP-26, located near Siruchet, the TL goes south continuing to follow the course of the Trishuli River. The TL passes through areas of scrub and cultivated land and in-between the settlements of Khadku, Chipleti, Diyale, Dadagaun. From AP-33 onwards the tree density decreases, with cultivated land being the determining feature along the alignment. Passing Simle, Pairegaun and Thulogaun, the TL crosses the Adheri River, which marks the border between Rasuwa and Nuwakot Districts, and passes between Puranagaun and Archale (AP-36 and AP-37). From here the alignment turns towards the east and the

[9] VDC = Village District Committee

Trishuli River, crossing another stream and dense forest (AP-38), until it reaches the proposed substation site of Trishuli.

2.2.2.2 Re-routing

In the course of planning, the alignment of the proposed TL has undergone two large scale re-routings. Between Chilime Substation and AP-8, the TL was initially planned to head directly east from the substation towards the Trishuli River. Due to the buffer zone of Langtang National Park being extending into this area, the TL was rerouted towards the west, bypassing the buffer zone. The second re-routing was undertaken between the village of Gogane and Trishuli Substation. Originally, the TL was supposed to run much closer to the Trishuli River, even crossing it at two points. But due to the planned TL for the Upper Trishuli-1 Hydropower Plant, the Chilime – Trishuli line was re-routed further uphill from the river.

2.2.3 Neighbourhood Electrification Component

The main aim of the Neighbourhood Electrification Component (NEC) is to have communities in the vicinity of the Project benefit from it by providing electricity to them. The NEC, a distribution project on the 33, 11 and 0.4 kV level, is still in the early planning stage (by NEA's department of "Distribution & Consumer Services"). Several different options are being considered at the moment with respect to specific project measures. The NEC and its measures will be designed by the implementation consultant in consultation with local stakeholders.

2.3 CONSTRUCTION

The overall construction period is estimated to last 2 years. Implementation will consist of 6 month pre-construction phase and 18 months construction and commissioning phase.

The construction work of the substations will be conducted throughout the year. The construction work for the transmission line will mainly be carried out during the dry season (October - May). Construction activities during the monsoon season will mostly be restricted to stringing of conductors.

The primary site access for the Project construction will be gained from the Pasang Lhyamu Highway, the Syapru Besi - Chilime HPP Road (for the northern part of the Project) and Betrawati - Mailung Road (for the southern part of the Project). Existing feeder roads and tracks will be used for construction and maintenance where available. No permanent access roads will be constructed to tower sites from an existing road. Some trails might be

upgraded where necessary. The construction material for the transmission line will be transported by vehicle as far as possible and where necessary by foot to the individual tower locations.

For Trishuli Substation a 350 m long and 10m high protection wall will be constructed along the river bank. Some elevating and / or levelling will also be necessary for the site. For Chilime Substation some erosion protection works along the river will be needed.

For Trishuli Substation approximately 50 people will be employed during the construction, consisting of 25 unskilled, 15 semi-skilled and 10 skilled workers. For Chilime Substation and the TL, altogether approximately 300 people will be employed during the construction. This includes 200 unskilled, 50 semi-skilled and 50 skilled workers. Three work camps will be set up. One camp will be established on the proposed Chilime Substation site and the other two will be mobile along the TL route. Part of the workforce, especially unskilled workers, will be recruited from the Project area.

3 PROJECT ALTERNATIVES

3.1 TRANSMISSION LINE

Initially, three line route options were proposed. One of the three line routes presented clear advantages in comparison with the other two alternatives, in terms of both better access to the corridor, less number of crossed settlement areas and l fewer forest crossings. For these reasons this option was chosen. The chosen line route was then optimized in order to avoid the Langtang National Park and its buffer zone.

3.2 CHILIME SUBSTATION

Three possible sites (A, B and C), all located southeast of Chilime Village, were considered for Chilime Substation. All three sites were located along the Chilime River. Option A and C are located on the right hand side of the river. Option B is located on the left hand side of the river and thus would require the building of a bridge for access. Option A provided the easiest access, making use of the access road for Chilime Hydropower Plant. All proposed locations would need flood protection. Options B and C would require some degree of heightening, compacting or levelling in order to retain enough space for the proposed substation. Directly west of the option A, there are about a dozen buildings under construction for the resettlement for the Sanjen Hydropower Plant.

Option A was chosen as the location for Chilime Substation as having advantages compared with the other options. Chilime Substation was

originally planned as an AIS substation. Due to the limited amount of land between the river and the steep valleys in this area and the resettlement houses to the west, the Substation will be realized as a GIS design, which requires less space than an AIS design.

3.3 TRISHULI SUBSTATION

The proposed Trishuli Substation has been selected due to its accessibility from Trishuli-Mailung Dobhan Road, the availability of sufficient space and its relatively plane terrain land. The proposed site is currently used for agriculture and does not contain any residential buildings. The substation is centrally located for evacuating the electricity from several hydropower projects in the area towards Kathmandu Valley.

For Trishuli Substation, besides the above mentioned location no alternative sites have been considered. The Substation will be realized as an AIS design, as suggested by the technical consultant.[10]

4 ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION

4.1 OVERVIEW

For each relevant topic, the IEEs and IEE Addendum provide a description of the environmental baseline and details of the Project's impacts on that environment, and identifies the measures that will be used to prevent, reduce, remedy or offset significant adverse environmental and social impacts (i.e. mitigation measures). Any impacts that may still remain after implementing the mitigation measures are then reported as the remaining "residual impacts" of the Project.

The mitigation measures are also separately elaborated in the Environmental and Social Management Plan (ESMP). As with the development of most major infrastructure projects, many of the adverse environmental and social impacts are likely to occur during the construction phase. However, such impacts are usually temporary and can be managed, controlled or mitigated to prevent, reduce or offset them.

[10] Lahmeyer International (2014): Feasibility Study 220 kV Trishuli Transmission System Project. Final Report.

4.2 IMPACT ASSESSMENT CONCLUSION

4.2.1 Water

The Project has its start point (Chilime Substation) at the Chilime River and its end point (Trishuli Substation) at the Trishuli River. The Upper Trishuli river system is already subject to many hydropower projects, some finished, but most of them under construction or at the planning stage.

The construction phase of this project presents more risks to the water environment than the operation phase. These include soil disturbances from foundation work, accidental spills, oil leakage or waste generated from work camps. This can lead to the contamination of surface water bodies (including impacts to freshwater ecosystems and fish) or pollution of groundwater.

The risk of impacts will be reduced through adoption of a range of controls, which are set out in the ESMP. The contractor will provide onsite sanitation facilities to control and treat wastes within the work camps. The substations will be designed to prevent oil leakages from transformers. During the detailed design stage secondary containment will be proposed to trap any oil leakage. An Emergency Preparedness and Response Plan will be implemented for spill containment and clean-up, engineering contingencies, collisions, natural hazards and other emergencies during construction and operation.

No significant impact on the watershed and natural drainage is expected during the construction and operation phases.

4.2.2 Waste

At the moment no proper waste management and operational landfills are in place in the Project area.

The improper disposal of solid waste like cement bags and other left -over construction materials, kitchen waste and waste generated by the work camps can cause adverse impacts to the environment.

Most of the excavated soil of tower pad (>90%) will be used for back filling and compaction. Garbage and solid wastes generated in the Project area will be either dumped in designed landfill areas or converted into compost. A sufficient amount of toilets will be installed in all construction camps. Waste oils and chemicals will be collected and stored in suitable storage tanks and disposed of by a certified company. A Waste Management Plan will be established to ensure that all waste (hazardous, non-hazardous, waste water) is disposed of in an environmentally sound manner. There will be training for the workers in order to ensure adequate waste management.

No significant impact is predicted to arise from waste disposal during construction or operation.

4.2.3 Biodiversity

The Project area is located within Nepal's Midhills zone (600-3500 m), which hosts the highest diversity of ecosystems and species in Central Nepal. The Project is located just west of Langtang National Park. There are two Endemic Bird Area (EBAs) within the vicinity of the Project area, the Western Himalayas and the Central Himalayas. 39 species were identified that could be present in the Project area that are Globally Threatened (CR, EN, VU), Near Threatened (NT) or listed as Data Deficient (DD). About 45 % of the area affected by the Project is Natural Habitat, the rest is Modified Habitat.

For biodiversity, the main significant impacts during construction relate to direct loss of Natural Habitat along the RoW and at the tower locations totalling 40.9 ha (for the current footprint, prior to mitigation[11]). Indirect loss of Natural Habitat (improved access to forest areas for locals, wind throw) will also occur during construction, although the exact extent likely to be affected is difficult to predict. With the implementation of mitigation such as the use of hand tools, spacing towers ridge to ridge and minimising forest clearance, the total area of Natural habitat to be lost will be significantly reduced. In addition, compensation planting will be implemented to achieve an overall 'no net loss' to biodiversity[12] for the loss of all Natural Habitat. The plantation sites in community forest areas will be finalized after discussion with the members of concerned forest users group. The compensation numbers will be adapted shortly before construction in cooperation with the District Forest Office. Following the above mitigation the residual impacts for forest loss and degradation during construction are considered to be of minor significance.

Direct loss of flora and fauna will also occur during construction, although mitigation measures including provision of conservation awareness training and employment of a dedicated Project Environment Officer will be implemented reducing the residual impacts to a level that is considered not significant.

During operation, impacts on habitats and species (other than those for birds and bats from collision with transmission lines) will largely be indirect, from

[11] The 40.9 ha is based on the assumption that the entire RoW will be cleared of forest. This is a conservative estimate though, as not all forest areas have to be cleared within the RoW due to the steep terrain.

[12] 'No net loss' is a requirement for Natural Habitats addressed in IFC PS 6 Biodiversity

improved access to forest which could then cause further exploitation of these resources. Mitigation, including provision of awareness training and management of the compensation planting area, will be implemented reducing the residual impacts to a level considered to be of minor significance for habitats and not Significant for species.

During the field survey (April 5-9, 2015), 12 raptor species were recorded, including one protected species (Peregrine Falcon). Direct loss of bats and birds as a result of collisions with transmission lines may be significant, particularly for all bat species and bird species that are susceptible to transmission line collisions (such as raptors, geese, cranes, storks and some waders). Mitigation measures in the form of incorporating nest boxes into tower designs for raptors and the use of deflectors along the earth wire will significantly reduce impacts and for low risk species, the residual impacts will be not significant. However, for species which are of high sensitivity (Protected / IUCN Red Listed species, e.g. Peregrine Falcon) residual impacts will remain of moderate significance. Monitoring is essential for identifying any blackspot areas where bird collisions or electrocutions occur. Additional mitigation measures can then be applied if necessary.

A Biodiversity Action Plan will be developed covering all phases of the Project.

4.2.4 Landscape

The landscape of the Project area is characterized by steep valleys. Visibility is varies with the seasons (low visibility before the monsoon season, high visibility after the monsoon season). To the east of the Project, there is Langtang National Park, which is very popular with trekking tourists.

The impact of the substations, transmission line and towers on the landscape value can only be mitigated to a limited extent. The stringing of the 220 kV transmission line with 42.5 m high towers on average will cause visual change to the existing landscape and scenery. In order to minimize visual impacts near the two substations, trees and bushes should be planted. For this measure the availability of space, especially around Chilime Substation, has to be checked during the detailed design phase.

4.2.5 Ambient Air & Noise

The Project area is located in rural settings, therefore air and noise quality are generally quite high. Only along the few access roads and tracks some dust particles and traffic noise can be observed.

Impacts due to air emissions from the construction sites will only be short term at each tower location. The overall vehicular movement and frequency is low and will not differ much from the prevailing conditions. The emission of noise and vibrations are inevitable during construction. Most tower locations are relatively far from the settlements as about half of the TL route passes through areas without any settlements. Only the settlements close to the towers and access roads will be impacted by noise during construction. The nearest residential buildings will be 15 m from the TL (outside the Row).

The substations will emit a humming sound. The transmission line also emits some noise, especially during wet weather conditions, due to the so-called corona effect. As the transmission line will not cross residential areas this is not deemed to be significant. Furthermore, the corona effect can be reduced through design and this should be applied in the detailed design.

Air and noise pollution during construction will be temporary. In sensitive areas (e.g. near settlements) working hours will be limited to daytime work. Water spraying will be done to control dust pollution. During the detailed design phase, measures will be considered to reduce the noise levels from the TL and the substations to insure that national limits and international best practice thresholds are met. Furthermore, the detailed design phase will account for preventing greenhouse gas leakage from the GIS Substation.

The impacts are expected to be insignificant.

4.2.6 Electric and Magnetic Fields

Transmission lines create electric and magnetic fields (EMFs). EMFs are strongest beneath the lines and diminish rapidly with distance. Scientific research on the effects of EMFs on public health has neither demonstrated the existence of a significant risk, nor has it proven the complete absence of risk.

During the detailed design phase, measures will be considered to reduce the EMF effect and it will be insured that international best practice[13,14] thresholds are met. The impacts are expected to be insignificant.

[13] ICNIRP (International Commission on Non-Ionizing Radiation Protection) (1998): Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). http://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf

[14] EU: http://ec.europa.eu/health/electromagnetic_fields/eu_actions/index_en.htm

4.2.7 Social Issues

Approximately 83 of the population in the six Project affected VDCs belong to Indigenous Peoples (IPs), in this case Tamang, Gurung and Newar, and ca. 3% to Dalit ("untouchables") groups (Kami, Damai and Sarki). Besides IPs and Dalit groups, the following vulnerable groups have been identified within the Project context: women, disabled, the elderly, displaced persons and landless farmers. Vulnerable groups require particular attention and assistance (e.g. focus group discussions) when it comes to stakeholder engagement. Furthermore, the process of Free, Prior and Informed Consent (FPIC) has to be applied to the Project since IPs are significantly affected due to the loss of land. FPIC is established through good faith negotiation between the Project Developer and the Affected Communities. FPIC requires the documentation of the negotiation process and of the outcome between the parties. This does not necessarily mean that all affected individuals or groups within the community need to be in agreement.

A Stakeholder Engagement Plan (SEP) has been prepared. Its overall aim is to ensure that a timely, consistent, comprehensive, coordinated and culturally appropriate approach is applied for stakeholder consultation and Project disclosure.

The Project will offer employment opportunities during the construction phase (approx. 350 jobs, with ca. 60 skilled, 65 semi-skilled and 225 unskilled labourers). Unskilled worker will be recruited from local communities. Several training programs will be implemented to benefit local communities, such as an Improved Agricultural Farming Program, a Skill Development Program, an Education Support Program and a Health and Sanitation.

NEA considers providing some of the local communities with electricity through the NEC, which will improve livelihood.

Impacts to affected communities from construction and land take are discussed in Chapters 4.2.5 (air and noise), 4.2.6 (EMFs) and 4.2.8 (land acquisition) and 4.2.9 (health & safety).

4.2.8 Land Use, Land Take and Land Acquisition

Permanent land take can result in (i) *physical displacement* if existing residential buildings must be demolished to make room for the Project and people must move into new homes; and in (ii) *economic displacement* of land owners and users through the loss of agricultural land or other income-producing lands, or access to those lands – in other words, people lose all or part of their ability to earn their livelihood from the land. There will be no physical resettlement

due to this Project. Temporary land take will occur during construction along the transmission line and the work camps.

The majority of Project Affected Persons (PAPs) are working in the agricultural sector, which consists mainly of subsistence farming. The main crops cultivated are maize, millet, paddy and wheat.

Due to the permanent land take for Trishuli Substation, 28 households (161 people) will be affected. Of the 5.3 ha (equivalent to 104 ropani) land required for the construction of the substation, 3.7 ha (equivalent to 72 ropani) is privately owned cultivated land. The rest (1.6 ha = 32 ropani) is flood plain (government land), which has been used for cultivation and is the main source of income for Tribhuvan Secondary School. Out of the 28 affected households 4 will lose < 10% of their land, 5 will lose land between 10-25%, 6 will lose 25-50% and 13 of the households will lose > 50% of their land. One household will lose a non-residential building.

There are 4 (Project Affected Households) PAHs at Chilime Substation and 26[15] along the TL who will lose part of their land permanently. Altogether, the 26 PAHs along the TL will lose 3.080 ha of land. One PAH will lose ca. 11 % of their land and one PAH will lose ca. 18 %. 4 PAHs will lose between 5 % and 10 % of their land, the rest (20 PAHs) will lose <5 %.

At Chilime Substation, 4 PAHs are affected by the Project. The exact extend of the loss of land will be evaluated in the LACP[16]. Directly west of Chilime Substation, there are resettlement houses for PAPs displaced by the Sanjen HPP under construction[17].

For the TL, the temporary land take amounts to approx. 78.6 ha for the RoW (excluding angle towers) and 0.5 ha for the two temporary work camps. The land under the RoW will be prohibited from the construction of houses, sheds and plantation of big trees etc. However, there will be no restriction on agricultural activities after the construction work is finished.

The loss due to permanent land take, any agricultural production losses and the loss of buildings will be compensated in cash. According to the household

[15] The Project will affect 32 households at Chilime Substation and along the TL. Two of these households were not found during the field survey as they live outside the village. Therefore, only 30 households have been surveyed so far. The LACP will account for all Project affected households.

[16] The IEE for Chilime Substation cites land loss numbers that were due to the AIS design, which has been replaced by GIS design. The GIS substation has a smaller footprint. The updated numbers will be given in the LACP.

[17] At the time of the site visit, April 2015, the resettlement houses were not occupied. The IEE for Chilime Substation considers the relocation of these resettled households, as would have been necessary with the AIS design. This is no longer necessary with the GIS design.

survey, 80 % prefer cash compensation while 20 % prefer land for land compensation. There will be no land for land compensation. Additional measures (i.e. alternative income earning opportunities) will have to be implemented for PAPs whose livelihoods are land-based as per PS 5[18]. This includes Tribhuvan Secondary School, which will lose its main source of income due to the Project.

Compensation for temporary land use (RoW, work camps) will be paid at 20% of the total land value. And all required land will be reinstated after usage to the conditions prior to the construction activities.

A Land Acquisition and Compensation Plan (LACP) is currently being prepared by NEA. The LACP will reflect national as well as international standards and outline support measures to bridge possible gaps between national and international standards.

4.2.9 Community Health & Safety

The Project is located in a rural area, which is difficult to access. Public infrastructure is limited. The nearest hospital and health posts are located in Dhunche, Rasuwa, Bidur Nuwakot and Betrawati Baazar. Piped water, spout water, uncovered well and river water are the major sources of drinking water. Open defecation is still very common in the Project area.

The Project may potentially change the community's exposure to risks to their health and safety arising from accidents involving construction equipment traffic, structural failures, releases of hazardous materials, exposure to diseases and the activities of workers. Especially the influx of workers from outside of the Project area during the construction phase may add stress to the local health and sanitation situation. Also, a potential decline in the access to the drinking water and existing sanitation condition might occur in the project area, especially considering the HPPS currently under construction in the area. During the operation phase, communities in the vicinity of the transmission line will be vulnerable to electrical hazards such as fire, electrical shocks or even electrocution.

These risks will be minimized by instructing and training the workers on how to act in a responsible manner during and after working hours. The Project developer will communicate and implement a strict code of conduct. Also, a Health, Sanitation and Safety Program will be conducted to alert local communities to construction related safety issues and electrocution and educate them about health and sanitation issues. NEA is responsible for the

[18] Specific measures and PAPs will be outlined in the LACP.

overall implementation, as set out in the ESMP. The water supply of the Project area will be strengthened by installing new pipelines and by improving the storage of water at the source. The necessary precaution and warning signs will be placed at major construction sites and dangerous areas to make local people aware of the construction activities and the associated risks. Access to construction areas and the substations will be restricted to authorized people only.

4.2.10 Labour and Working Conditions

The Project will comply with all relevant national employment and labour laws and international standards (e.g. IFC PS 2, International Labour Organisation (ILO) conventions, IFC & EBRD "Worker's accommodation: processes and standard"[19]).

NEA will contractually stipulate that contractors apply good international practice as per PS 2 and the General and Sector-Specific EHS Guidelines (see Chapter 1.2). Safety for workers will be secured by setting standards for equipment and machinery and having appropriate operating procedures. Safety training will be conducted prior to construction work. Safety equipment (e.g. helmets, eye glasses, safety boots etc.) will be provided. The workers will also be trained and informed about health and occupational measures. An overall Occupational Health & Safety Plan will be implemented. These measures will minimize the risks for the workforce.

4.2.11 Cultural Heritage

There are several small stone stupas ("Mahne") scattered across the Project area.

Based on present knowledge, no archaeological, historical or cultural important sites are affected by the Project. Nevertheless, a so-called Chance Finds Procedure will be implemented across the entire Project in accordance with good international practice, which spells out which steps are to be undertaken to properly manage any unexpected findings during the construction works.

[19] http://www.ifc.org/wps/wcm/connect/9839db00488557d1bdfcff6a6515bb18/workers_accomodation.pdf?MOD=AJPERES

4.2.12 Rapid Cumulative Impact Assessment

The Upper Trishuli River Basin is currently subject to the planning of several Run-of-River HPPs. They are either in planning phase, under construction or in operation. Chilime and Trishuli Substations will serve as a connection for several HPPs in the Upper Trishuli Valley to the national grid and especially Kathmandu area. Trishuli Substation will connect Trishuli 3A, Upper Trishuli-1, Trishuli 3B, Ankhu Khola, Upper Mailiung, Upper Mailung A, and Samundratar. To evacuate the energy, several new TLs will be required. Figure 2 shows the location of the known developments in the area[20].

Little information is available on the other activities planned in the area. Under Nepali legislation, all HPPs with more than 1 MW capacity require an EIA. Cumulative impacts may arise due to construction activities of the Project, of other HPPs and of transmission lines in the area. Altogether, a significant amount of agricultural and forestry land was and will be converted due to the planned projects in the Upper Trishuli Valley. Visual impacts will be reduced to the hilly nature of the terrain. In order to minimize the potential impacts, best practice approaches should be applied to all projects in the area. It should be checked by NEA if PAPs are also affected by other projects and if they require additional assistance.This requires NEA to liaise with the Independent Power Producers (IPPs) that are developing the majority of the HPPs along the Upper Trishuli River.

[20] The blue and green lines connect the HPPs' water intake (upstream) and the powerhouse (downstream) locations, following the course of the rivers. The map only shows the approximate locations of the HPPs and is only intended to give an overview of the ongoing development in the area, not accurate locations for the projects.

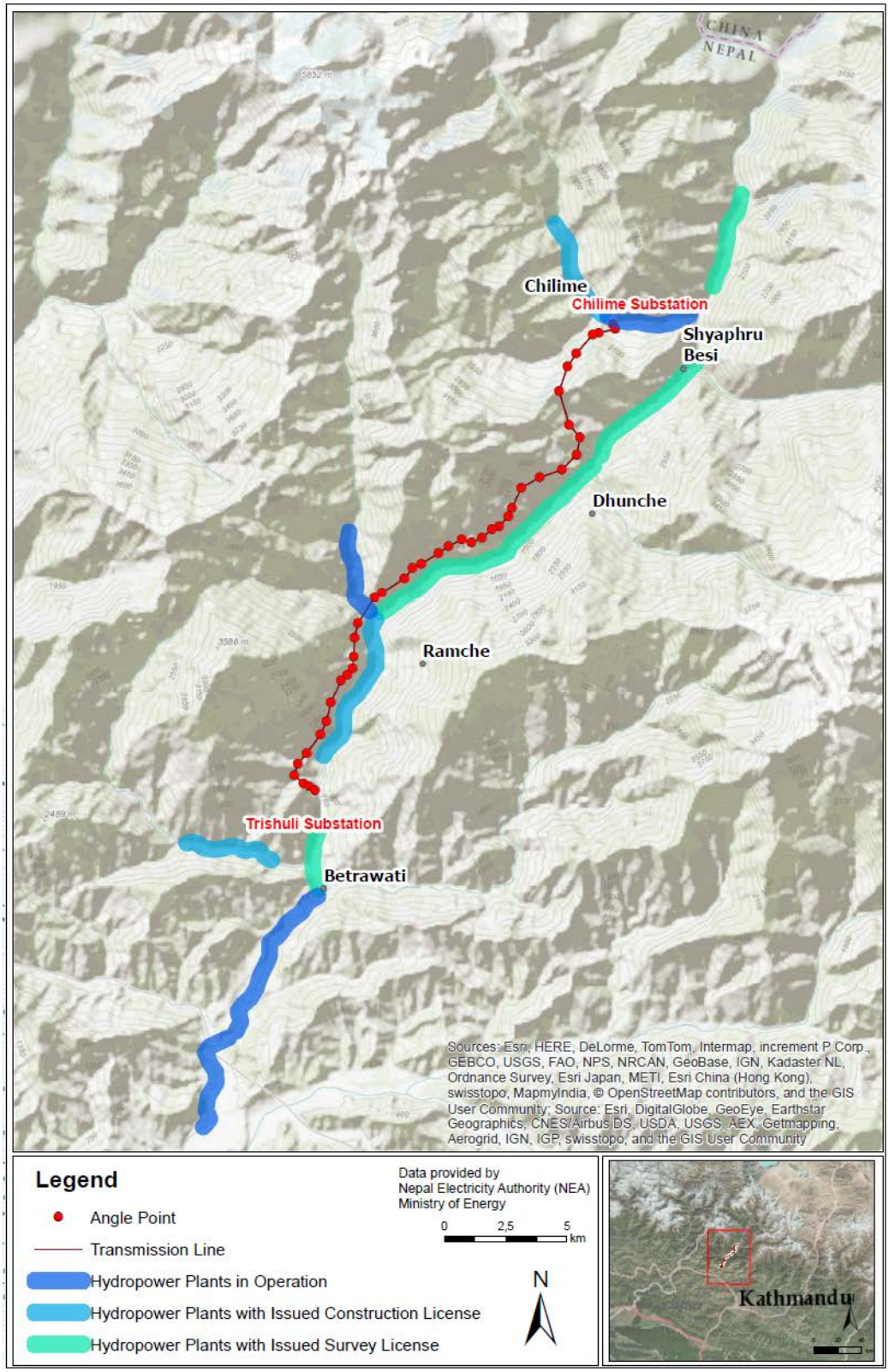

Figure 2 *HPP developments in the Project's vicinity*

5 ENVIRONMENTAL AND SOCIAL MANAGEMENT

5.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

An Environmental Management and Monitoring Unit (EMMU) will be formed, which will be responsible for managing and implementing mitigation measures and monitoring on behalf of the Project. The Unit will prepare and disseminate monthly reports containing information on the implementation status of the measures and monitoring results.

A formal Environmental and Social Management System fulfilling IFC PS 1 still needs to be implemented.

5.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) is a standalone document as a result of the environmental and social studies. The ESMP spells out exactly which further actions must be taken by NEA (and the contractors) for avoidance and mitigation of potential impacts of Project construction and operations. The purpose of the ESMP is to specify the important impacts and risks of the Project along with the responsible entities for implementation, the required timing by which the measure must be implemented, the monitoring and indicators by which the completion of the measures can be verified.

The ESMP addresses the full life-cycle of the Project will be kept up to date as the Project develops to incorporate any new requirements resulting from changes during detailed design (for example specification of noise mitigation, protection of archaeological sites discovered) or changes in Nepali legislation or international standards.

6 GRIEVANCE MECHANISM

A grievance is considered to be any complaint about the way a project is being implemented NEA will establish an Environmental Management and Grievances Redress Unit under the Project organizational setup before the beginning of any construction work.

The Grievance Procedure will be free, open and accessible to all and comments and grievances will be addressed in a fair and transparent manner. Information about the procedures, who to contact and how, will be made easily accessible (e.g. on community bulletin boards). Also, all workers will be informed of the grievance process and new workers will be informed when they join the Project. Information on contact points will be posted on staff information boards and on site information boards.