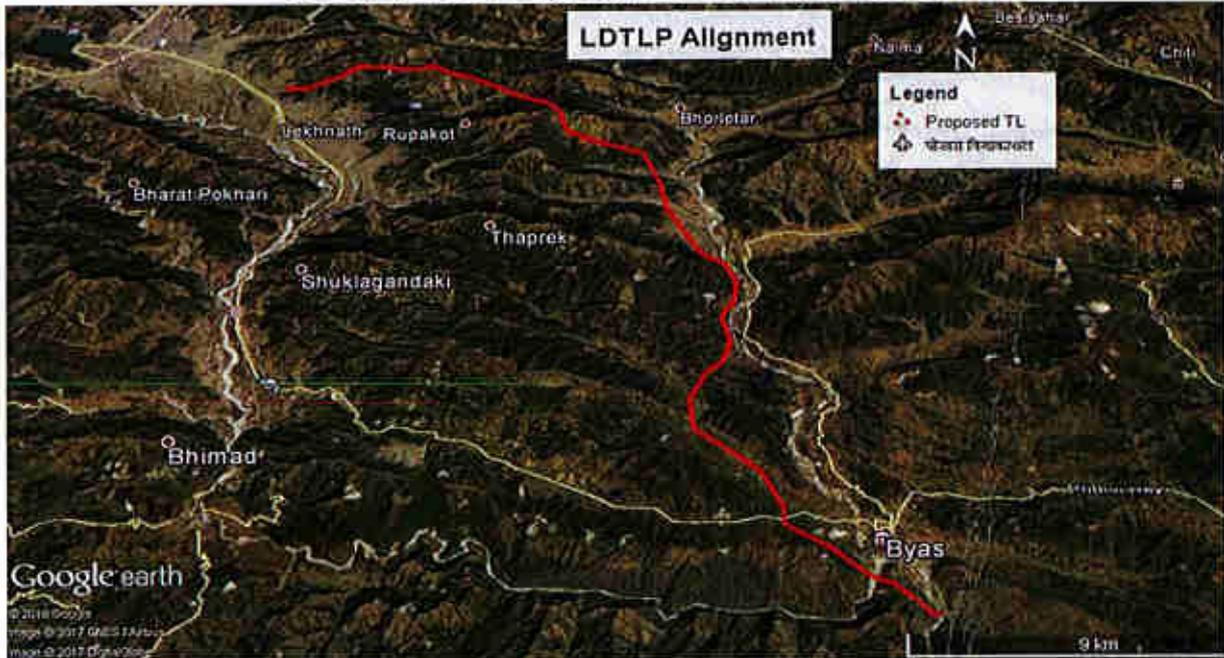


**UPDATED INITIAL ENVIRONMENTAL EXAMINATION
of
LEKHNATH-DAMAULI 220kV TRANSMISSION LINE PROJECT
(Double Circuit)**

Gandaki Province (Kaski and Tanahu Districts)



Submitted to:
**Ministry of Energy, Water resources and Irrigation
Through
Department of Electricity Development**

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कार्यकारी सारांश

१.० परिचय

प्रस्तावित लेखनाथ-दमौली २२० के.भी. प्रसारण लाईन आयोजनाको प्रस्तावक नेपाल विद्युत प्राधिकरण (ने.वि.प्रा.) हो । ने.वि.प्रा. नेपाल सरकारको पूर्ण स्वामित्वमा रहेको एक संगठित संस्था हो । यस संस्था अन्तर्गतको वातावरण तथा सामाजिक अध्ययन विभागले प्रस्तावित लाईन आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (IEE) प्रतिवेदन तयार गरेको हो । ४२.२५४ कि. मी. लम्बाई, २२० के. भी. र ब्यास नगरपालिकामा अवस्थित बेलवास सबस्टेसन सहितको यस आयोजनाको IEE प्रतिवेदन वातावरण तथा सामाजिक अध्ययन विभागद्वारा तयार गरी २०७४/१०/२८ मा तत्कालिन उर्जा मन्त्रालयबाट स्विकृत भएको थियो । यो अद्यावधिक प्रारम्भिक वातावरणीय परिक्षण (UPDATED IEE) विद्युत विकास विभागको मिति २०७५/०७/०६ को पत्रानुसार तयार गरिएको छ ।

२.० आयोजना सम्बन्धी विवरण

प्रस्तावित लेखनाथ-दमौली २२० के.भी. प्रसारण लाईन आयोजना (LDTLP) गण्डकी प्रदेशको कास्की र तनहुँ अवस्थित छ । यस आयोजनाबाट जिल्लाका एक महानगरपालिका, एक नगरपालिका र तीन गाउँपालिका - गा.पा) प्रभावित हुनेछन् । प्रस्तावित प्र.ला. लेखनाथ सबस्टेसनबाट प्रारम्भ भई आयोजना प्रभावित क्षेत्रहरु ; कास्की जिल्ला अन्तर्गतका पोखरा महानगरपालिका, रुपा गा. पा. र तनहुँ जिल्ला अन्तर्गतका म्याग्दे/रिशिङ्ग गाउँपालिका, ब्यास नगरपालिकाको बेलवास सबस्टेसनमा गएर टुङ्गिनेछ । प्रस्तावित प्रसारण लाईन आयोजनाको लम्बाई करिब ४४.४९२ कि.मी. छ । यस मध्ये AP ४४ देखि न्यू दमौली सबस्टेसन सम्मको भाग Multi Circuit र बाँकी भाग Double Circuit को हुनेछ । प्रसारण लाईन मार्गको केही भाग परिवर्तन भएको कारण आयोजनाबाट प्राप्त प्राविधिक संक्षिप्त विवरण (Salient Features) मा केही परिवर्तन भएको छ ।

क्र.स.	विवरण	आयोजनाको विवरण	
		स्वीकृत IEE	अद्यावधिक IEE
१	आयोजनाको नाम	लेखनाथ-दमौली २२० के.भी. प्रसारण लाईन आयोजना	लेखनाथ-दमौली २२० के.भी. प्रसारण लाईन आयोजना
२	प्रभावित क्षेत्र	पदेश नं. ४, कास्की (पोखरा लेखनाथ, रुपा) तनहुँ - म्याग्दे, ब्यास, रिशिङ्ग)	गण्डकी प्रदेश, कास्की (पोखरा,, रुपा) तनहुँ - (म्याग्दे, ब्यास, रिशिङ्ग)
३	प्रारम्भिक विन्दु	AP 1 खराने - पोखरा लेखनाथ महानगरपालिका	AP 1 खराने - पोखरा महानगरपालिका
४	अन्तिम विन्दु	AP 43 बेलवास -ब्यास न.पा.	न्यू दमौली सबस्टेसन -ब्यास न.पा.
५	राजमार्ग क्रसिड संख्या	१ (पृथ्वी राजमार्ग)	१ (पृथ्वी राजमार्ग)
६	मुख्य नदी क्रसिड	२७	२७
७	१३२ के.भी. प्रसारण लाईन क्रसिड	२	२
८	११ के.भी. प्रसारण लाईन क्रसिड	१२	१४
९	कुल लम्बाई	४२.२५४ कि.मी.	४४.४९२ कि.मी.
१०	सर्किटको प्रकार	डबल सर्किट ३७.४०१कि.मी चार सर्किट ४.८५३ कि.मी.	डबल सर्किट ४२.२९८कि.मी. मल्टी सर्किट २.१९४ कि.मी.
११	कन्डक्टर	Bundled	Bundled
१२	भोल्टेज	१३२ के.भी र २२० के.भी	२२० के.भी
१३	अधिकतम भोल्टेज	२४५ के.भी.	२४५ के.भी.
१४	क्षमता	६०० मे.वा.	६०० मे.वा.
१५	टावरको स्पान	३३० मी.	३३० मी.
१६	टावरको संख्या	१२३ (४४ AP, ७९ ST)	१३० (५१ AP, ७९ ST)
१७	टावरको उचाई	२९ मी. (डबल सर्किट) ४४ मी. (चार सर्किट)	२९ मी. (डबल सर्किट) ४४ मी. (मल्टी सर्किट)

क्र.स.	विवरण	आयोजनाको विवरण	
		स्वीकृत IEE	अद्यावधिक IEE
१८	कन्डक्टरको न्युनतम ग्राउण्ड क्लियरेन्स	<ul style="list-style-type: none"> न्युनतम ७.१ मि. राजमार्ग ९.८ मि. 	<ul style="list-style-type: none"> न्युनतम ७.१ मि. राजमार्ग ९.८ मि.
१९	क्षेत्राधिकार	३० मि. - २२० के.भी. १८ मि. - १३२ के.भी.	मात्र २२० के.भी. - ३० मि.
२०	जग्गाको क्षेत्रफल	१५ मी. x १५ मी.	१५ मी. x १५ मी.
२१	जग्गा आवश्यकता	१३४.६१२५ हे	१४२.८७९६२ हे
२२	सवस्टेशन संख्या	१	१
२३	सवस्टेशन स्थान	बेलवास - व्यास न.पा.	खयरबोटे, व्यास न.पा.
२४	सवस्टेशन क्षेत्रफल	६ हे.	७.१०१ हे.
२५	अनुमानित लागत	करिव ७ अर्ब ५० करोड ने.रु.	करिव ७ अर्ब ६० करोड ने.रु.

३.० अध्ययन विधि

वातावरण संरक्षण ऐन २०५३ (संशोधन सहित) र राष्ट्रिय वातावरणीय प्रभाव मूल्याङ्कन (EIA) निर्देशिका २०५० को अधिनमा रही यस आयोजनाको अद्यावधिक प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदन तयार गरिएको छ । नेपाल सरकारले विभिन्न समयमा लिएको कानूनी प्रक्रिया, स्थलगत अध्ययन, स्थानिय जनतासंगको अन्तरक्रिया आदि यस प्रतिवेदन तयारीको सन्दर्भमा लिइएका सामग्रीहरु हुन् ।

अध्ययनको क्रममा भौतिक वातावरण अध्ययन अन्तर्गत हावापानी, भौगोलिक अवस्था, भू-उपयोग सम्बन्धी तथ्याङ्कहरुको प्रयोग गरिएको छ जसमा हावापानी सम्बन्धि तथ्याङ्कहरु द्वितिय श्रोतबाट संकलन गरिएको छ । त्यसैगरी भौगोलिक तथ्याङ्कहरु जस्तै भू-बनोट माटोको प्रकार, टावरहरुको स्थिरता तथा अवस्थिती सम्बन्धि तथ्याङ्कहरु क्षेत्रिय भौगोलिक नक्शा तथा नेपालको अन्य भौगोलिक प्रतिवेदनहरु बाट संकलन गरियो भने प्रभावित जग्गाको प्रकार, क्षेत्रफल, आदि स्थलगत नक्शा, सर्वेक्षण प्रतिवेदन, समूहगत छलफल तथा स्थलगत भ्रमण आदिबाट संकलन गरिएको छ ।

जैविक वातावरणमा वन्यजन्तु र वनस्पती सम्बन्धि तथ्याङ्कहरु प्रयोग गरिएको छ । वनस्पती सम्बन्धि तथ्याङ्कहरु स्थलगत भ्रमण, वन स्रोत सर्वेक्षण तथा समूहगत छलफल आदि बाट संकलन गरिएको छ । त्यस्तै सामाजिक आर्थिक तथा सांस्कृतिक वातावरणको अध्ययनको लागि आयोजना प्रभावित क्षेत्रको जनसंख्या, धर्म, संस्कृति, जात/जाति, पूर्वाधार आदि तथ्याङ्कहरुको सहायता लिइएको छ भने यस्ता तथ्याङ्कहरु प्रभावित परिवारहरुको घरधुरी सर्वेक्षण, गाउँपालिका/नगरपालिका स्तरीय चेकलिष्ट, बजार सर्वेक्षण तथा समूहगत छलफल जस्ता विधिहरुको प्रयोग गरि संकलन गरिएको छ ।

४.० वातावरण सम्बन्धी ऐन, नियम तथा कानुनी प्रावधानहरु

आयोजना कार्यान्वयन गर्दा प्रस्तावकले वातावरण संरक्षणसंग सम्बन्धित विद्यमान नीति, नियम, ऐन, कानून तथा निर्देशिकाहरुमा तोकिएका मापदण्डहरुलाई विशेष रूपमा ध्यान दिनेछ । यस आयोजना अध्ययनको क्रममा विद्युत तथा जलश्रोतसंग सम्बन्धित महत्वपूर्ण ऐन, नियम, नियमावली, तथा निर्देशिकाहरु जस्तै वातावरण संरक्षण ऐन २०५३, वातावरण संरक्षण नियमावली २०५४ (हालसम्मको संशोधित), जग्गा प्राप्ति ऐन २०३४, वन ऐन २०४९, वन नियमावली २०५१, वातावरणीय प्रभाव मूल्याङ्कन सम्बन्धी राष्ट्रिय निर्देशिका २०५०, आदि को पुनरावलोकन गरिएको छ ।

५.० आयोजना क्षेत्रको विद्यमान वातावरणीय अवस्था

५.१ भौतिक वातावरण

यस प्रसारण लाईनको मार्ग विभिन्न भौगोलिक अवस्थाका स्थानहरु जस्तै; चट्टान युक्त पहाड, साधारण/अत्याधिक भिरालो र समतल जमीनमा रहेको छ । आयोजनाको स्वीकृत IEE प्रतिवेदन अनुसार यस क्षेत्रको उचाइगत फरक ११८४ मिटर पोखरा म.न.पा. को कोटबारी देखि ३२७ मिटर व्यास न.पा. सम्म रहेको छ । त्यसैगरी आयोजनाको Updated IEE अनुसार यो प्रसारण लाईन मार्ग विभिन्न भौगोलिक

अवस्थाका स्थानहरूमा रहेको छ र उचाइगत फरक ११८४ मि. पोखरा म.न.पा. को कोटबारी देखि ३०१ मि. ब्यास न.पा. सम्म रहेको छ।

आयोजनाको स्वीकृत IEE प्रतिवेदन अनुसार करीब ६८.८४% भाग खेतीयोग्य जमिन, २६.०१% वन क्षेत्र, २.६८% बाँझो क्षेत्र र २.४७% अन्य (बालुवा युक्त, पानीका श्रोत, सडक क्रसिङ्ग, नदी क्रसिङ्ग) किसिमका जमीन भएर गएको छ। त्यसैगरी आयोजनाको Updated IEE अनुसार ६८.२५% भाग खेतीयोग्य जमिन, ३८.१९% वन क्षेत्र, ३.७५% बाँझो क्षेत्र र ३.४% अन्य (बालुवा युक्त, पानीका श्रोत, सडक क्रसिङ्ग, नदी क्रसिङ्ग) किसिमका जमीन भएर गएको छ।

५.२ जैविक वातावरण

स्वीकृत IEE मा कूल आवश्यक जग्गामध्ये २५.९९% वन क्षेत्रमा पर्दछ। अद्यावधिक IEE मा कूल आवश्यक जग्गामध्ये २६.७% वन क्षेत्रमा पर्दछ। आयोजनाको स्वीकृत IEE प्रतिवेदन अनुसार प्रस्तावित आयोजनाद्वारा कास्की जिल्लाका १३ र तनहुँ जिल्लाका ५ वटा सामुदायिक वन प्रभावित हुनेछन्। आयोजनाद्वारा कास्की जिल्लाको एक सरकारी वन पनि प्रभावित हुनेछ। त्यसैगरी आयोजनाको Updated IEE अनुसार परिवर्तित भागको केही क्षेत्रले थप एक सामुदायिक वन र एक सरकारी वनका केही भागहरूमा समेत प्रभाव गर्नेछ। यसरी, Updated IEE अनुसार प्रस्तावित आयोजनाद्वारा कास्की जिल्लाका १३ र तनहुँ जिल्लाका ६ वटा सामुदायिक वन प्रभावित हुनेछन्।

यस क्षेत्रका स्थानियले विभिन्न उद्देश्यको लागि यहाँको रुखविरुवाहरू प्रयोग गर्ने गर्दछन् जस्तै; काठ, घाँस, दाउरा, फलफूल र औषधि। यहाँको काष्ठ पैदावारमा साल, कटुस, चिलाउने, सल्लो र उतिस पर्दछन्। आयोजना क्षेत्रमा पाइने फलफूलमा आँप, केरा, मेवा, नासपाती, अम्बा, काफल, कटहर सुन्तला, निबुवा, भोगटे, कागती रहेका छन्। त्यसैगरी, चरी अमिलो, अविजालो, अदुवा, अमला, असुरो, घाडताप्रे, एंसेलु, लप्सी, चुत्रो, आँखे टिमुर र पानीअमला आयोजना क्षेत्रमा पाइने औषधी जन्य विरुवाहरू हुन्। आयोजना क्षेत्रमा देखिएका जंगली जनावरहरूमा दुम्सी, मलसाप्रो, लंगुर, रतुवा, चितुवा, खरायो, स्याल, ढेंडु, वन विरालो, बाँदर, आदी छन्। वन विरालो, ब्वाँसो, आदि रहेका छन्। त्यसैगरी यहाँ पाईने मुख्य चरा चुरुङ्गीमा काग, फिस्टो, ढुकुर, कोईली, भँगेरा, गौथली, कालिज, वाज, इत्यादी रहेका छन्।

५.३ सामाजिक, आर्थिक तथा सांस्कृतिक वातावरण

आयोजना प्रभावित जिल्ला

आयोजना प्रभावित जिल्लाको कुल क्षेत्रफल ३,५६३ वर्ग कि.मी. रहेको छ। नेपालको जनगणना २०६८ अनुसार जिल्लाको कुल जनसंख्या ८१५,३८६ रहेको छ जसमा पुरुष ३७९,७९५ (४६.६%) र महिला ४३५,५९१ (५३.४%) रहेका छन्। आयोजना प्रभावित जिल्लाको औषत घरधुरी संख्या ४.०३ सहित कूल घरधुरी संख्या २०३,९८२ रहेको छ।

आयोजना प्रभावित जिल्लाहरूको जनघनत्व २२६.४९ व्यक्ति प्रति वर्ग कि.मी. र विगत एक दशकको जनसंख्या वृद्धि दर १.४१% रहेको छ। यसैगरी साक्षरता दर (५ वर्ष तथा माथिका) ७९.४०% रहेको छ जसमध्ये पुरुष साक्षरता दर ८७.७०% र महिला साक्षरता दर ७२.३०% रहेका छन्। यस क्षेत्रको मुख्य पेशामा कृषि, पशुपालन, पर्यटन र बैदेशिक रोजगारी हुन्। पहाडी-ब्राह्मण, मगर, गुरुङ्ग, क्षेत्री र दलित यहाँका मुख्य जातजाती हुन् भने यिनिहको जनसंख्या क्रमश २१.४९%, १५.९०%, १४.५८%, १३.४४%, १४.६६% रहेको छ। यस क्षेत्रमा नेपाली भाषा बोल्नेको जनसंख्या सबैभन्दा बढि (७१.९१%) रहेको छ भने त्यसपछि गुरुङ्ग (१०.४८%), मगर (९.५७%), नेवारी (२.९२%) रहेका छन्।

आयोजना प्रभावित गाउँपालिका/नगरपालिका

प्रस्तावित आयोजना क्षेत्रमा रहेका गाउँपालिका/नगरपालिकाको कुल जनसंख्या ५३६,२२१ रहेको छ। जसमध्ये पुरुष २५१,५५२ (४६.९१%) र महिला २८४,६६९ (५३.०९%) छन्। त्यस्तै प्रभावित क्षेत्रको जनसंख्या जिल्लाको घरधुरी संख्या १३०,८९१ र औषत घरधुरी संख्या, महिला पुरुष अनुपात र जनघनत्व क्रमश ५५०.४ र ३१६ व्यक्ति प्रति वर्ग कि.मी रहेको छ। त्यसैगरी साक्षरता दर (५ वर्ष तथा माथिका) ८०.७९% रहेको छ जसमध्ये पुरुष साक्षरता दर ९०.४% र महिला साक्षरता दर ७६.१% रहेका छन्। आयोजना क्षेत्रमा मुख्य जातजातीमा

२०७४

ब्राह्मण (२४.३२%), क्षेत्री (१४.७२%), गररुङ्ग (१४.१५%), कामी/दमै/ढोली/सार्की (१२.९३%) मगर (१३.२७%), नेवार (६.१३%) आदि रहेका छन्। यस क्षेत्रमा बोलिने मुख्य भाषमा नेपाली (७६.६०%), गुरुङ्ग (९.७५%) आदि रहेका छन्।

आयोजना प्रभावित घरपरिवार

आयोजनाको Updated IEE अध्ययनको लागि जम्मा २७ परिवारको सामाजिक आर्थिक सर्वेक्षण गरिएको थियो। सर्वेक्षण अनुसार आयोजनाबाट प्रत्यक्ष प्रभावित हुने घर परिवारको कूल जनसंख्या १८० मध्ये १०२ (५६.६६%) पुरुष र ७८ (४३.३३%) महिला रहेका छन्। त्यस्तै लैङ्गीक अनुपात र औषत घरधुरी संख्या क्रमशः १.३१ र ६.७ रहेको छ। उमेरका आधारमा सर्वेक्षण गरिएका जनसंख्याको ७०% आर्थिक रूपले सक्रिय जनसंख्या रहेको पाईयो। सर्वेक्षण अनुसार यहाँ बोलिने मुख्य भाषमा नेपाली (६६.६७%) रहेको पाईयो भने नेपाली बाहेक दमै (२५.९३%) र मगर (७.४१%) रहेका छन्। सर्वेक्षण गरिएका जनसंख्यामा धेरैजसो विद्यार्थी रहेका छन्। त्यसैगरी सर्वेक्षण गरिएका घरपरिवारहरु मध्ये २३.८५% जनसंख्या कृषिमा आश्रित रहेको देखिन्छ। कृषिका अतिरिक्त व्यापार व्यवसाय, नोकरी २३.०८% विद्यार्थी २१.५४%, घरायसी काम ११.५४%, देशभित्र दैनिक ज्यालादारी ९.२३%, देशबाहिर दैनिक ज्यालादारी ८.४६% र भिन्न योग्यता भएका ०.७७% रहेका छन्।

६.० वातावणीय प्रभाव

६.१ भौतिक वातावरण

आयोजनाले पार्ने मुख्य भौतिक प्रभाव नै क्षेत्राधिकार (तार तान्न) र टावर निर्माणको लागि अधिग्रहण गरिने जमिन (स्थायी र अस्थायी) हो। यस चरणमा भू-बनोटमा अन्य कुनै पनि किसिमका परिवर्तन हुने देखिदैन। Updated IEE अध्ययनमा आयोजना निर्माणको लागि जम्मा १४२.८७९ हे. जमिन आवश्यक पर्ने देखिन्छ जबकी स्विकृत IEE अनुसार क्षेत्राधिकार, टावर निर्माण (AP र ST), सबस्टेसन र अस्थायी रूपमा आवश्यक पर्ने जम्माको लागि जम्मा १३४.६१२ हे. जमिन आवश्यक पर्ने देखिएको थियो। प्रसारण लाईनको लागि ५१ वटा AP र ७९ वटा ST चाहिने अनुमान गरिएको छ।

६.२ जैविक वातावरण

IEE अध्ययन अनुसार सम्पूर्ण प्रसारण लाइनको क्षेत्राधिकार र टावर निर्माणको लागि ३४.९८८४ हे. जग्गा वन क्षेत्रमा पर्दछ। यो क्षेत्र अन्तर्गत सरकारद्वारा व्यवस्थित वनमा प्र. ला. मार्गको ०.७ हे. र सामुदायिक वनमा क्षेत्राधिकार र टावर निर्माणको लागि २१.६९४७ हे. जमीन आवश्यक पर्दछ। थप १२.५९३७ हे. निजी घाँसे जमीन रहेको छ। Updated IEE अध्ययनमा देखिए अनुसार कूल वन क्षेत्र ३८.१९५७ हे. पर्दछ जसमध्ये ०.८८ हे. सरकारी वन, २१.९९४७ हे. सामुदायिक वन क्षेत्र आवश्यक पर्नेछ। स्विकृत IEE अनुसार जम्मा ४२ AP मध्ये ९ वटा AP वन क्षेत्र अन्तर्गत पर्ने देखिन्छ भने Updated IEE अध्ययनमा देखिए अनुसार ५१ AP मध्ये ९ वटा AP वन अन्तर्गत पर्ने देखिन्छ।

स्वीकृत IEE अनुसार १४,१६० रुखहरु वन क्षेत्रबाट हटाउनुपर्ने देखिन्छ। यसमध्ये पोल ७९.२४% हुनेछन् भने रुख साइजका २०.७६% हुनेछन्। थपिएको (२.६६ कि.मी.) भागको Updated IEE अध्ययन गर्दा रुखहरुको total enumeration गरिएको थियो जसमा जम्मा ७८ (रुख आकारका ४३, पोल आकारका ३५) वटा रुखहरु कटान गर्नु पर्ने देखिन्छ। यसरी, Updated IEE अध्ययन अनुसार जम्मा १४,२३८ रुखहरु मध्ये रुख आकारका ११,२६३ र पोल आकारका २,९७५ रहेका छन्। Approved IEE अध्ययनमा निजी जग्गामा रहेका ३२०० रुखहरु कटान गर्नुपर्ने हुन्छन् जसमध्ये साल, चिलाउने, कटुस, बोटधएरो, पड्के, उत्तिस र मौवा रहेका छन्। थपिएको २.६६ कि.मी. को भागमा जम्मा १३७८ निजी रुखहरु कटान गर्नु पर्ने देखिन्छ। यसरी Updated IEE अध्ययन अनुसार निजी जग्गाबाट ४७२३ रुखहरु कटान गर्नु पर्ने हुन्छ।

६.३ सामाजिक, आर्थिक तथा सांस्कृतिक वातावरण

IEE अध्ययन अनुसार सम्पूर्ण प्रसारण लाईनको क्षेत्राधिकार र टावर (AP र SP) निर्माण, सबस्टेसन, प्रवेश मार्ग, घुम्ती क्याम्प, क्षेत्राधिकार को लागि १०६.६० हे. जमीन जग्गा आवश्यक पर्ने देखिएको थियो। Updated

IEE अध्ययन अनुसार जम्मा ११४.३१३५ हे. निजि जग्गा आयोजनाको लागि आवश्यक पर्नेछ। यसरी, आयोजनाको लागि आवश्यक पर्ने निजि जग्गा ७.७०८९ हे. बृद्धि भएको छ। IEE अध्ययन अनुसार सम्पूर्ण प्रसारण लाइनले ८४ घरधुरीहरूलाई (यी घरधुरीहरूमा सहायक टावरको निर्माणबाट प्रभाव पर्ने घरधुरी समेटिएको छैन) प्रत्यक्ष रूपमा प्रभाव पर्ने देखिएको थियो। Updated IEE अध्ययन अनुसार जग्गा अधिग्रहण र क्षेत्राधिकार भित्र घर पर्ने गरी जम्मा ९१ घरधुरीहरूलाई प्रभाव पर्ने देखिन्छ। IEE अध्ययन अनुसार सम्पूर्ण आयोजना निर्माणबाट जम्मा २२ वटा संरचना (१२ घर, ९ गोठ र एक शौचालय) प्रभावित थिए। त्यसैगरी, Updated IEE अध्ययन अनुसार पनि २२ वटै संरचनाहरू (१३ घर, ८ गोठ र एक शौचालय) प्रभावित हुनेछन्।

तीन घरधुरीको चार वटा संरचनाहरू प्रत्यक्ष प्रभावित हुनेछन्। आयोजनाको निर्माणबाट प्रभावित परिवारहरूको वार्षिक करिव ३८.८८ मे.टन स्थायी र १६८.२७ मे.टन अस्थायी अन्नवाली क्षति हुने देखिन्छ। आयोजनाको निर्माण चरणमा स्थानियहरूको स्वास्थ्य तथा सरसफाईमा विशेष असर पर्ने देखिन्छ। आयोजनाको निर्माण क्षेत्र तथा क्याम्प क्षेत्रबाट फालेका विभिन्न प्रकारका फोहोर तथा सडेगलेका सामानहरूले वरिपरिको क्षेत्र तथा कामदारहरू स्वयंको स्वास्थ्यमा असर पर्ने देखिन्छ। त्यसैगरी निर्माण कार्य सम्बन्धि चोटपटकहरू तथा यातायात दुर्घटनाहरू पनि आयोजना निर्माणको चरणमा देखिने प्रभावहरू हुन्। त्यसैगरी आयोजनाले पार्ने प्रत्यक्ष प्रभावमा आयोजनाको क्षेत्राधिकार भित्र पर्ने नजिकका घर तथा बस्तीहरूको जग्गा जमिनको मूल्यमा हुन जाने गिरावट नै प्रमुख रूपमा रहेको छ।

७.० प्रभाव न्यूनीकरणका उपायहरू

७.१ भौतिक वातावरण

भौतिक वातावरणमा पर्ने प्रभावलाई न्यूनीकरण गर्नको लागि टावर तथा सबस्टेशन निर्माणको क्रममा निस्किएको माटोलाई उचित व्यवस्थापन गर्नको लागि निर्माण पश्चात पूर्ववत रूपमा राखिने छ। टावर निर्माणपूर्व सो स्थानको स्थिरताको अध्ययन गरिनेछ र अति संवेदनशिल स्थानहरूमा छुट्टै बनावट को टावरहरूको निर्माण गरिनेछ। अस्थिर जमिनमा टावर निर्माण प्रतिबन्ध गरिनेछ। भौतिक वातावरणमा पर्ने प्रभाव न्यूनीकरण अन्तर्गत; नदी सम्बन्धि तालिम, छाब्दी खोलामा रिटेनिङ्ग संरचना निर्माण र कल्भर्ट निर्माण गर्नको लागि जम्मा रु. ६,६२५,०००/- लाग्ने अनुमान गरीएको छ।

७.२ जैविक वातावरण

आयोजना निर्माणको क्रममा क्षति भएका रुखहरूको क्षतिपूर्ति स्वरूप बृक्षारोपण गरिने छ। बृक्षारोपण गरिने क्षेत्र छनेटको लागि डिभिजन वन र सामुदायिक वनहरूसंग छलफल गरिनेछ। वन्यजन्तु संरक्षण कार्यको लागि आयोजनाका क्षेत्रका स्थानिय, कामदारहरू लाई लक्षित गरी सचेतना मूलक कार्यक्रमहरू सञ्चालन गरिनेछ। आयोजनाका कामदारहरूलाई खाना पकाउनको लागि काठ दाउराको प्रयोगमा बन्देज लगाईने छ। आयोजनाको ठेकेदारले आवश्यक एल. पि. ग्याँस उपलब्ध गराएर दाउराको प्रयोग निरुत्साहित गरिनेछ। आयोजनाका कामदारहरूलाई अवैध शिकार, वन अतिक्रमण तथा अन्य गैरकानुनी क्रियाकलापहरू गर्न कडा प्रतिबन्ध लगाईने छ। जैविक क्षेत्रको प्रभाव न्यूनीकरण र क्षमता अभिवृद्धिको (जग्गाको मूल्य समेत) लागि जम्मा रु. ७०,५३१,४६०/- (प्रभाव न्यूनीकरण लागत रु. ६७,६३१,४६०/- र क्षमता अभिवृद्धि लागत रु. २९,०००,०००/-) लाग्ने अनुमान गरिएको छ।

७.३ सामाजिक, आर्थिक तथा सांस्कृतिक वातावरण

जग्गाको क्षतिपूर्ति

स्थायी र अस्थायी रूपमा अधिग्रहण गरिने जग्गाको क्षतिपूर्ति क्षतिपूर्ति निर्धारण समितीद्वारा निर्धारण गरे बमोजिम हुनेछ। आवश्यक जग्गा 'जग्गा प्राप्ती ऐन २०३४' अनुसार प्रभावित परिवार र प्रस्तावकको आपसी समन्वयमा अधिग्रहण गरिनेछ।

उत्पादन क्षतिपूर्ति

आयोजना निर्माणको क्रममा स्थायी रूपमा क्षति पुग्ने ३८.८८ मे. टन र अस्थायी रूपमा क्षति पुग्ने १६८.२७ मे. टन खाद्यान्नको क्षतिपूर्ति गरिनेछ।



संरचना क्षतिपूर्ति

प्रस्तावित आयोजना कार्यन्वयन गर्दा हटाउनु पर्ने १३ वटा घर, ८ गोठ, एक शौचालय र Kahare Agriculture and Livestock Co-operative Limited (ब्यापारीक संरचना)हरूको लागि क्षतिपूर्ति प्रदान गरिनेछ। प्रभाव न्यूनीकरणको लागि सिमित समयकोलागि स्थानियहरूलाई रोजगारी प्रदान गरिनेछ।

स्वास्थ्य, सरसफाई तथा सुरक्षा

आयोजनाबाट प्रभावित क्षेत्रको स्वास्थ्य, सरसफाई तथा सुरक्षा अवस्थामा पर्ने प्रभावको बारेमा सर्वसाधारणहरूलाई जानकारी दिनको लागि सचेतनामूलक कार्यक्रमहरू संचालन गरिनेछ।

व्यवसायिक जोखिम तथा सुरक्षा

निर्माण क्षेत्रलाई सफा र खुला राख्नुका साथै आवश्यक चेतावनीपूर्ण चिन्हहरू विभिन्न स्थानमा राखिने छ। त्यसैगरी आयोजना क्षेत्रमा अनधिकृत व्यक्तिहरूको आवतजावतलाई पूर्णरूपमा निषेध गरिनेछ। आयोजना प्रस्तावकले कामदारहरूलाई आवश्यक सुरक्षा हेल्मेट, चशमा, सुरक्षा बुट, सुरक्षा बेल्ट, आगोबाट बच्ने सामग्रीहरू, सावधानीका चिन्हहरू तथा अन्य आवश्यक सामग्रीहरू प्रदान गर्नेछ।

कृषि खेती तालिम

आयोजना प्रभावित परिवार र vulnerable परिवारहरूको लागि च्याउ र फलफूल खेतीका तालिमहरू दिइनेछ।

विद्यालय सहयोगका कार्यक्रम

कमजोर अवस्थाका आयोजना प्रभावित वडामा स्थित विद्यालयका लागि वित्तिय सहयोग सहयोग प्रदान गरिनेछ। यस्तो सहयोग कम्प्युटर खरिद, पुस्तकालय स्थापना, खानेपानी सुविधा, विद्यालय खेलकूद मैदान स्तरोन्नती जस्ता कार्यहरूमा प्रदान गरिनेछ।

८.० वातावरणीय व्यवस्थापन योजना

आयोजनाको प्रभावकारी निर्माण गर्नको लागि वातावरण न्यूनीकरणका कार्यक्रमहरू, अनुगमन योजना, सरोकारवालाले उठाएका विभिन्न समस्याहरू आदि समाधान गर्नको लागि वातावरणीय अनुगमन गरिने छ। यस अनुगमन योजना अन्तर्गत दैनिक रूपमा अनुगमन गर्न एउटा इकाई कार्यालय गठन गरिनेछ जुन इकाईमा वातावरण तथा सामाजिक अध्ययन विभागका विभिन्न क्षेत्रका विशेषज्ञहरूको साथै स्थानीय स्तरमा रहेका विज्ञहरूलाई समेत संलग्न गरिने छ।

९.० निष्कर्ष

यस आयोजनाको कार्यान्वयनको लागि करीब १४२.८७९हे. जमिन टावर निर्माण, सबस्टेसन निर्माण, घुम्ती क्याम्प, स्विचिङ्ग स्टेसन र क्षेत्राधिकारको लागि आवश्यकता पर्नेछ। कुल जमीन मध्ये ९७.५२५हे. खेतीयोग्य जमीन, ३८.१९५७हे. वनको जग्गा, ३.७५७४हे. बाँझो जग्गा र ३.४०१५हे. अन्य जग्गा रहेका छन्। आयोजना निर्माणको चरणमा सामुदायिक र सरकारी वन गरी जम्मा १४,२३८ रुखहरू कटान गर्नु पर्नेछ भने क्षेत्राधिकारको लागि ४,७२३ वटा निजि रुखहरू पनि कटान गर्नु पर्नेछ। कुल वातावरणीय र सामाजिक लागत (प्रभाव न्यूनीकरण, क्षमता अभिवृद्धि, सामुदायिक सहयोगका कार्यक्रम तथा अनुगमन लागत सहित) रु ३५७,१३२,३७४-लाने अनुमान गरिएको छ जुन कूल आयोजनाको निर्माण लागतको ४.७% प्रतिशत हो।



EXECUTIVE SUMMARY

E.1 Introduction

Nepal Electricity Authority (NEA) is the project proponent of the proposed Lekhnath-Damauli 220kV Transmission Line Project (LDTLP). NEA is an organized institution undertaking of Government of Nepal and was established in August 16, 1985 (Bhadra 1, 2042 BS). Environmental and Social Studies Department (ESSD) is responsible for conducting the IEE of this project. The IEE of 42.254km 220kV line with proposed substation at Belbas of Byas Municipality was carried out by Environment and Social Studies Department (ESSD) of NEA and approved by the then MoEn on 2074/10/28. This Updated Initial Environmental Examination (Updated IEE) has been carried out as per the consent letter (2075/06/21B.S.) of Department of Electricity Development (DoED).

E.2 Project Description

The proposed LDTLP is located in Kaski and Tanahun Districts of Gandaki Province. It traverses through one metropolitan city (MC), one municipality and three rural municipalities (RMs) as its affected area. It starts from existing substation at Lekhnath and traverses through project area viz., Pokhara MC, Rupa RM in Kaski District and Myagde RM, Byas Municipality, Rising RM and ends at proposed New Damauli substation, Byas Municipality in Tanahun District. The total length of the proposed TL is about approximately 44.492km. Out of which 2.194km from AP 44 to New Damauli Substation is multi circuit. Remaining 42.298km is double circuit of 220kV. The voltage level will be 220kV. There is slight change in salient features of Updated IEE due to shift in alignment and technical reports provided by the project.

Table: Comparative Salient Features of LDTLP

SN	Particulars	As per Previous Approved IEE	Present Context
1	Name of the Project	Lekhnath-Damauli 220kV Transmission Line	Lekhnath-Damauli 220kV Transmission Line
2	Impact Area	4 Kaski (Pokhara Lekhnath MC, Rupa RM) Tanahun (Myagde RM, Byas Municipality, Rishing RM)	Gandaki Province, Kaski (Pokhara MC, Rupa RM) Tanahun (Myagde RM, Byas Municipality, Rishing RM)
3	Initial Point	AP 1 lies at existing Substation at Kharene of Pokhara MC, Kaski District	AP 1 lies at existing Substation at Kharene of Pokhara MC, Kaski District
4	Terminal Point	AP 43 lies at Belbas of Byas Municipality, Tanahun District	Proposed New Damauli Substation at Khairbote of Byas Municipality of Tanahun District
5	Highway crossings	1 (Prithvi highway)	1 (Prithvi highway)
6	River crossings	27	27
7	132kV line crossings	2	2
8	11kV line crossings	12	14
9	Line Length	42.254km	44.492Km
10	Conductor Configuration	Double circuit of 37.401km length; Four circuit of 4.853km length	Double circuit of 42.298Km and Multi circuit of 2.194Km
11	Conductor bundling	Bundled	Bundled
12	Nominal System Voltage	220kV and 132kV	220kV

SN	Particulars	As per Previous Approved IEE	Present Context
13	Voltage at maximum condition	245kV	245kV
14	Capacity	600MW	600MW
15	Tower average nominal Span	330m	-
16	No. of Tower	123 (44 APs and 79 STs)	130 (51 APs and 79 STs)
17	Tower Height	Around 29m for double circuit and 44m for four circuit	Around 29m for double circuit and 44m for four circuit
18	Ground Clearance	<ul style="list-style-type: none"> Minimum 7.1m at the maximum sag condition National highway 9.8m 	<ul style="list-style-type: none"> Minimum 7.1m at the maximum sag condition National highway 9.8m
19	Right of Way (RoW)	30m - 220kV TL 18m - 132kV TL	Only 220 kV, 30m
20	Foundation Area	15mx15m	15mx15m
21	Land Requirement	134.6125ha	142.87962ha
22	No. of Substation	1	1
23	Location of Substation	Belbas of Byas Municipality	Khairbote of Byas Municipality
24	Area of Substation	6ha	7.101ha
25	Cost of the Project	NRs 7,500,000,000	NRs 7,600,000,000

E.3 Study Methodology

The Updated IEE process follows the Environment Protection Rules (EPR), 1997 and National EIA Guidelines, 1993. This U-IEE is prepared in accordance with the legal requirements of GoN, based on field studies and consultation with local people and officials. For the physical environment, data on climate, geology and land were taken. The data on climate (temperature and rainfall) was collected through secondary source; Geographic and geological data, such as topography, rock type and soil type, stability of the project components locations, soil erosion and other key environmental features were investigated and obtained from the geological maps and previous geological reports of the Nepal and by general observation. Likewise, in biological environment, data on vegetation/forest, fauna were taken. For accessing the vegetation, walk-through survey, quadrat sampling, group discussion with CFUG etc. was carried out. And in socio-economic and cultural environment, data on population, ethnicity, religion and religious sites, infrastructure, etc. are used for the study. HH survey of project affected families, RM level checklists, Key Informant Interview (KII) and Meeting/consultations were the tools used to collect the data at the project site.

E.4 Review of Policy and Legal Provisions

The proponent will be responsible for fulfilling the provisions of all relevant acts, rules/ regulations policies, guidelines and conventions while implementing the project. Important Acts and Regulations like EPA (1997) and EPR (1997), Land Acquisition Act 1977, Forest Act (1993), and Forest Rules (1995), Local Government Operation Act, (2017) National EIA Guidelines (1993) etc. were also extensively reviewed while preparing the report.

E.5 Existing Environmental Condition

E.5.1 Physical Environment

The alignment runs through several topographic features comprising of rugged hills with mild and steep slope, undulating land forms and flat terrain. In the approved IEE, the altitudinal variation of the TL points are between 1184m to 327m at Kotbari, Pokhara MC and Byas municipality respectively. In Updated IEE, the alignment runs through several topographic features with the

altitudinal variation of the TL points are between 1184m to 301m at Kotbari, Pokhara MC and Byas municipality respectively.

In the approved IEE, approximately 68.86% of the TL passes through the cultivated land, 26% through forest and 2.68% through barren and 2.47% through others (Sand, Water Bodies, road crossings and river crossings etc.). In the Updated IEE, approximately 68.25% of the TL passes through the cultivated land, 26.73% through forest and 2.63% through barren and 2.38% through others (Sand, Water Bodies, road crossings and river crossings etc.).

E.5.2 Biological Environment

In the approved IEE, out of total land requirement, 25.99% (34.98ha) required by the project falls under forest area including private shrublands. In the Updated IEE, out of the total land requirement, 26.7% (38.1957) falls under forest area including private shrublands. According to the approved IEE, the proposed TL will pass through 13 CFs from Kaski district and 5 CFs from Tanahun district. The TL also passes through 1 national forest in Kaski district. In the Updated section of the alignment, 1 additional CF and government forest at one section is traversed by the alignment. Thus, the Updated alignment, the proposed TL will pass through 13 CFs in Kaski district and 6 CFs from Tanahun district.

The local people utilize plant resources for different purposes including mainly as timber, firewood, fodder, fruit and medicine. The major timber yielding species of the project area are Sal (*Shorea robusta*), Katus (*Castanopsis indica*), Chilaune (*Schima wallichii*), Sallo (*Pinus sp.*) and Utis (*Alnus nepalensis*). Similarly common fruits yielding plants in the project area include Mango (*Magnifera indica*), Banana (*Musa paradisiaca*), Mewa (*Carica papaya*), Naspati (*Pyrus communis*), Amba (*Psidium guajava*), Kafal (*Myrica esculenta*) and Katahar (*Arthocarpus sp.*). Citrus species like Orange (*Citrus aurantium*), Nibuwa (*Citrus sp.*), Bhogate (*Citrus maxima*), Kagati (*Citrus aurantifolia*) are also common fruit plants in the project area. Chari Amilo (*Oxalis corymbosa*), Abijalo (*Drymaria diandra*), Aduwa (*Zingiber Officinale*) Amala (*Phyllanthus emblica*), Asuro (*Justicia adhatoda*), Ghodtapre (*Centella asiatica*), Aiselu (*Rubus ellipticus*), Lapsi (*Choerospondias axillaris*), Chutro (*Berberis aristata*), Akhe Timur (*Zanthoxylum armatum*) and Paniamala (*Nephrolepsis cordifolia*) are some of the plant species available in the project area having medicinal values.

Some of the wild animals reported from the project areas are Dumsi (*Hystrix indica*), Malsapro (*Martin flavigula*), Common Langur (*Presbytis entellus*) Ratuwa Mriga (*Muntia cusmuntjak*), Leopard (*Panthera parodus*), Jackal (*Canis aureus*), Kharayo (*Lepus nigricollis*), Dhendu (*Macaca assamensis*), Ban Biralo (*Felis chaus*), Rhesus Monkey (*Macaca mulata*), etc. In addition, common bird species reported in the project area are: Crow (*Corvus splendens*), Fisto (*Phylloscopus spp.*), Dhukur (*Streptopelia chinensis*), Koili (*Surniculus lugubris*), House crow (*Corvus splendens*), House sparrow (*Passer domesticus*), Gaunthali (*Hirundo sp.*), Kalij Pheasant (*Lophural eucomelana*), Cuckoo (*Plantative cuckoo*), Baj (*Buteo sp.*), etc.

E.5.3 Socio-economic and Cultural Environment

The total area of Project Affected Districts (PADs) is 3,563 sq.km. (Kaski 2017 sq.km. and Tanahun 1546 sq.km.). The total population is 815,386 with male 379,795 (46.6%) and female 435,591 (53.4%). The total households' (HHs) number is 203982 with average HH size 4.03. The average population density of these PADs is 226.49 person/sq. km and the average population growth from the last decade is 1.41%. The average economically active population (15-59 years) is 55.05% and the average urban population is 72.38%. Similarly the average literacy rate is 79.40% consisting 87.70% male and 72.30% female. The major occupation includes subsistence farming and livestock, tourism and foreign employment. The major caste groups in these PADs

are Brahmin-Hill, Magar, Gurung, Chhetri and Dalit which covers 21.49%, 15.90%, 14.58%, 13.44%, 14.66% population respectively. Nepali (71.91%) is the main language followed by Gurung (10.48%), Magar (9.57%) and Newari (2.92%).

Total population of PAA is 536,221 with 251,552 (46.91%) male and 284,669 (53.09%) female. Similarly, there are 130,891 HHs and average HH size, sex ratio and population density (person/sq.km) is 4.10, 88.4 and 316 respectively. Major ethnic groups in the project area are Brahmin (24.32%), Chhetri (14.72%), Gurung (14.15%), Kami/Damai/Dholi/ Sarki (12.93%), Magar (13.27%), Newar (6.13%), Tamang (2.31%), Thakuri (1.65%), Musalman (1.13%) and others (10.65%). Major languages spoken in PAA are Nepali (74.60%), Gurung (9.75%), Magar (6.79%), Newari (3.03%), Tamang (1.19%) and others (4.65%). Average literacy rate of population of 5 years and above of project area is 82.7% with male literacy rate 90.4% and female literacy rate 76.1%. Out of 504,738 project population, more than half (61.9%) population is economically active population (age group 15 - 59 years).

For the Updated IEE, socio-economic survey of 27 HHs was carried out. The total population of surveyed HHs was 180 including 102 males and 78 females. The sex ratio and average HHs size is 1.31 and 6.7 respectively. According to the broad age group classification, 70.00% of the surveyed population is categorized as economically active population. Nepali is the major language (66.67%) spoken by the surveyed HHs. This is followed by Darai (25.93%) and Magar (7.41%) language is spoken by the affected HHs. Majority of the surveyed people are students. About 23.85% of the surveyed HHs mainly depend on agriculture. The percentage of HHs occupied other than agriculture is service (23.08%); student (21.54%), 11.54% HH work, 7.98% service, labor wage outside the country (9.23%), labor wage inside the country (8.46%) and unable (0.77%).

E.6 Impact Assessment

E.6.1 Physical Environment

The main physical impacts on the environment are those associated with land take (permanent and temporary) for stringing of the line, for construction of tower pads and changes in drainage patterns. No other change in topography is envisaged during this phase. The project will require 142.8796ha while in the approved IEE, the land requirement was 134.6125ha land for the placement of tower pads (angle and suspension), substation and RoW of the TL and temporary facilities. There will be altogether 51 APs and 79 STs are estimated.

E.6.2 Biological Environment

According to the approved IEE report, the total estimated forest area falling under the tower pad and TL is 34.9884ha. Along this, the government forest falling under the TL alignment is 0.7ha and CF area falling under the tower pad and TL is 21.6947ha. Also, 12.5937ha area falls in private shrub land which consist of sparse trees and bushes specially used for collection of ground fodder. Similarly, for the Updated IEE report, total area falling under forest is 38.1957ha. Among this, the government forest is 0.88ha and that under the CF is 21.99ha. Similarly, about 15.321ha falls under private shrubland.

In the approved IEE, based on the available detailed route survey report of the proposed TL and field study, out of 44 APs, 9 are located in the forestland. In the Updated IEE, out of 51 APs, 9 APs will be situated in forestland. In the approved IEE, based on the field study and sample taken during IEE, a total of 14,160 numbers of trees of 23 different species are estimated to be clear felled during project construction period from government forest and community forests.

The contribution of pole sized trees in this data is 79.24% whereas tree sized is 20.76%. In the additional section (2.66Km), as far as the standing trees are concerned, based on census survey done during the Updated IEE study, only 78 number of trees are estimated to be clear felled from the government forest and community forests. The contribution of pole sized species is 43 (55%) whereas that of tree sized species is 35 (45%). Thus the Updated IEE, there will be estimated loss of 14238 trees out of which 11263 will be pole sized and 2975 will be tree sized.

In the Approved IEE, 3200 number of trees comprising of Sal, Chilaune, Katus, Botdhairo, Padke, Uttis, Mauwa, and others are expected to be clear felled from the private shrubland during the project construction period. Species of private trees include Jack fruit (*Artocarpus heterophyllus*), Kabhro (*Ficus lacor*), Pakhuri (*Ficus glaberrima*), Orange (*Citrus aurantium*), Simal (*Bombax ceiba*), Berula (*Ficus sarmentosa*), Khanyu (*Ficus semicordata*), Banana (*Musa paradisiaca*), etc. In the additional section of the alignment (2.66Km), about 1378 number of private trees are expected to be lost. Thus, in the Updated IEE report, total loss of private trees (including bamboo patches) will be 4723.

E.6.3 Socio-economic and Cultural Environment

According to approved IEE, the total private land required for the project was 106.6046ha for the erection of tower pads (angle and suspension), substation, access road, mobile camp and RoW of the TL and temporary facilities while in the Updated IEE private land required for the project is 114.3135ha. The total private land required for the project is increased by 7.7089ha. According to approved IEE, the proposed project will affect 84 HHs (excluding those HHs who will be affected due to the suspension tower foundation). In Updated IEE 91 HHs will be affected due to land acquisition and structures under RoW. According to approved IEE, 22 structures (12 houses, 9 cowsheds and one toilet) were affected due to the project construction. In the Updated IEE also 22 structures (13 houses, 8 cowsheds/shed and one toilet) will be affected. Total annual crop loss of the project affected HHs is estimated to be 38.88MT permanently (cereal crop; paddy 21.72MT, wheat 4.08, maize 11.06MT and millet 2.02) and about 168.27MT temporarily (paddy 60.24MT, maize 13.05MT, wheat 79.12MT and millet 15.86MT).

E.7 Mitigation and Enhancement Measures

E.7.1 Physical Environment

Proper management of the muck volume will be done. The muck generated during the excavation of tower pads and substation will be used for backfilling and the area will be restored. The stability of the tower locations will be examined before excavation and special foundation design will be selected for the susceptible locations. Erection of tower in the unstable land and/or in steep slopes will be avoided. Re-vegetation and slope maintenance will be carried out in the disturbed areas to avoid erosion. Bio-engineering with combination of retaining structures will be done as per the requirement. The construction and operation of the TL will not have significant impact on the air quality of the project impact area. Vehicle utilized for construction will be complied with GoN mass emissions standards. A total of NRs. 6,625,000/- is estimated for the mitigation works in physical environment for river training structures, retaining structures and culvert in Chhabdi Khola.

E.7.2 Biological Environment

Plantation program will be carried out as compensation of trees cleared by the project. The plantation sites will be discovered and determined consulting with the Division Forest Office and project affected CFUGs. Special awareness raising training will be conducted for local people, workers to promote wildlife conservation activities. The contractor will provide LPG to the project

workers to minimize the loss of forest. The project workers will strictly be prevented from illegal cutting of trees and encroachment on forests. The total biological mitigation and enhancement cost (including land cost) is estimated to be NRs. 70,531,460 (Mitigation cost NRs 67,631,460 and Enhancement cost NRs 2,900,000).

E.7.3 Socio-economic and Cultural Environment

Compensation for land

The total compensation for the land to be acquired and utilized by the project will be given in accordance with the rate determined by Compensation Determination Committee (CDC). The required land will be acquired according to the Land Acquisition Act, 2034 BS and with mutual understanding between the affected families and the proponent.

Compensation of loss of crops

Compensation for the loss of 38.88MT for permanent lost and 168.27MT for temporary lost will be provided to the affected people

Compensation for structures

Compensation for thirteen houses, eight cowsheds, one toilet and Structure of Kahare Agriculture and Livestock Co-operative Limited (co-operative commercial structure) will be provided and short-term employment opportunity will be given to local people to reduce the impact due to influx.

Health, Sanitation and Safety Program

Awareness programs regarding health, sanitation and safety will be conducted in the project area to alert local people to the potential dangers. This program will be targeted to the people residing in and around the vicinity.

Agriculture Farming Training

The directly project affected people and vulnerable HHs will be benefited from mushroom and citrus farming trainings in their own localities.

School Support Program

Financial support will be provided to the schools in vulnerable condition and located in ward of PAA from where TL passes through. Support will be provided for purchase of computer, library establishment, drinking water facility, extension of school play-ground and other activities.

E. 8 Environment Monitoring

In order to implement the project smoothly, the mitigation program, monitoring plan, collection of issues of public concern and other relevant issues and Environmental Monitoring will be done. Under this plan, a Unit will be formed in the project area which will do the day to day monitoring works.

E. 9 Conclusion

Total land requirement will be approximately 142.8796ha for tower foundations, substation, camp, switching station and RoW. Out of that, the project requires 97.525ha of cultivated land, 38.1957 ha of forest land (including private shrubland), 3.7574ha of barren land and 3.4015ha of other land. There will be estimated loss of 14,238 trees from CF/government forest and 4,723 private tree for the RoW clearance. The total environmental and social cost (mitigation, enhancement, CSP, and monitoring costs) of the proposed project including land cost is estimated to be NRs **357,132,374**, which is **4.7%** of the total project cost.

ABBREVIATIONS AND ACRONYMS

ACSR	:	Aluminum Conductor Steel Reinforced
AGTB	:	Above Ground Tree Biomass
AM	:	Amplitude Modulation
AP	:	Angle Point
CAAN	:	Civil Aviation Authority of Nepal
CBO	:	Community Based Organization
CBS	:	Central Bureau of Statistics
CDO	:	Chief District Officer
CF	:	Community Forest
CFUG	:	Community Forest Users' Group
CFC	:	Compensation Fixation Committee
CSR	:	Corporate Social Responsibility
DBH	:	Diameter at Breast Height
DCC	:	District Coordination Committee
DDC	:	District Development Committee
DFO	:	Division Forest Office
DHM	:	Department of Hydrology and Meteorology
DoED	:	Department of Electricity Development
DSO	:	District Statistics Office
EIA	:	Environmental Impact Assessment
EMF	:	Electromagnetic Field
EMU	:	Environment Monitoring Unit
EPR	:	Environment Protection Rules
ESSD	:	Environment and Social Studies Department
FM	:	Frequency Modulation
FY	:	Fiscal Year
GoN	:	Government of Nepal
GIS	:	Geographical Information System
GPS	:	Global Positioning System
HHs	:	Households
IEE	:	Initial Environmental Examination
LCF	:	Local Consultative Forum
LDTLP	:	Lekhnath-Damauli 220kV Transmission Line Project
KII	:	Key Informant Interview
MC	:	Metropolitan City
MoEn	:	Ministry of Energy
MoFSC	:	Ministry of Forests and Soil Conservation
NEA	:	Nepal Electricity Authority
NEPAP	:	Nepal Environmental Policy and Action Plan
NGO	:	Non-Governmental Organization
NTFP	:	Non-Timber Forest Products
PAA	:	Project Affected Area
PADs	:	Project Affected Districts
PAF	:	Project Affected Family
PAP	:	Project Affected Person
PRA	:	Participatory Rural Appraisal
RM	:	Rural Municipality

RoW	:	Right of Way
RRP	:	Resettlement and Rehabilitation Plan
SPAF	:	Seriously Project Affected Family
ST	:	Suspension Tower
SWCA	:	Soil and Watershed Conservation Act
TL	:	Transmission Line
ToR	:	Terms of Reference
VDC	:	Village Development Committee

Units

AD	:	Anno Domini
BS	:	Bikram Sambat
°C	:	Degree Centigrade
ha	:	Hectare
km	:	Kilometer
kV	:	Kilo Volt
mm	:	Millimeter
m ²	:	Square meter
MW	:	Megawatt
sq. km.	:	Square Kilometer



TABLE OF CONTENTS

EXECUTIVE SUMMARY	VII
ABBREVIATIONS AND ACRONYMS	XIII
TABLE OF CONTENTS	XV
LIST OF TABLE	XIX
LIST OF FIGURE	XXI
1 INTRODUCTION.....	1-1
1.1 Proponent.....	1-1
1.2 Organization Responsible for Preparation of UPDATED IEE.....	1-1
1.3 Structure of the Report.....	1-1
1.4 Rationality for Conducting Updated IEE	1-1
1.5 Scope of Updated IEE.....	1-2
1.6 Objective of Updated IEE.....	1-2
2 PROJECT DESCRIPTION.....	2-1
2.1 Introduction	2-1
2.2 Relevancy of New Planning and Development Concept	2-1
2.3 Project Location	2-1
2.4 Project Accessibility	2-3
2.5 Salient Features	2-5
2.6 Project Components.....	2-6
2.6.1 Transmission Line	2-7
2.6.2 Substation	2-7
2.7 Project Area Delineation	2-7
2.7.1 Direct Impact Area	2-8
2.7.2 Indirect Impact Area	2-8
2.8 Construction Planning	2-8
2.8.1 Preliminary Works	2-8
2.8.2 Land Acquisition and Forest Clearance	2-8
2.8.3 Substation Construction	2-11
2.8.4 Tower Foundation	2-11
2.8.5 Erection of Tower	2-11
2.8.6 Insulator Fittings, Conductor and Ground Wire Stringing	2-11
2.8.7 Transportation	2-11
2.8.8 Spoil Dumping Site.....	2-11
2.8.9 Construction Materials	2-12
2.8.10 Requirement of Workforce	2-12
2.9 Project Schedule	2-12
3 STUDY METHODOLOGY	3-1
3.1 Physical Environment.....	3-1
3.1.1 Data Requirement	3-1
3.1.2 Data Collection Methods	3-1
3.1.3 Data Analysis	3-2
3.2 Biological Environment.....	3-2
3.2.1 Data Requirement	3-2
3.2.2 Data Collection Methods	3-2
3.2.3 Data Analysis	3-4
3.3 Socio-economic and Cultural Environment.....	3-5
3.3.1 Data Requirement	3-5
3.3.2 Data Collection Methods	3-6
3.3.3 Data Analysis	3-7
3.4 Impact Identification, Prediction and Evaluation	3-7
3.5 Public Notice and Recommendation Letters.....	3-8
3.6 Limitations of the Study.....	3-9
3.7 The Study Team.....	3-9
4 REVIEW OF POLICY AND LEGAL PROVISIONS	4-1



4.1	Introduction	4-1
4.2	Constitution of Nepal	4-3
4.3	Plan and Policy	4-4
4.3.1	National Energy Crisis Reduction and Development Decades, 2072 (2015) Concept paper	4-4
4.3.2	Fifteen Five Year Plan Approach Paper (2076/77 – 2080/81 BS), 2019	4-4
4.3.3	Hydropower Development Policy, 2058 (2001)	4-4
4.3.4	National Bio-Diversity Strategy and Action Plan 2014-2020	4-4
4.3.5	National Policy on Land Acquisition, Compensation and Resettlement, 2015	4-4
4.3.6	National Forest Policy 2075 (2019)	4-5
4.3.7	National Environmental Policy, 2076	4-5
4.3.8	National Climate Change Policy, 2076	4-5
4.3.9	Landuse Policy, 2072	4-5
4.4	Acts	4-6
4.4.1	Land Acquisition Act, 2034 (1977)	4-6
4.4.2	Soil and Watershed Conservation Act, 2039 (1982)	4-6
4.4.3	Water Resources Act, 2049 (1992)	4-6
4.4.4	Electricity Act, 2049 (1992)	4-7
4.4.5	Forest Act, 2049 (1992)	4-7
4.4.6	Labor Act, 2074 (2017)	4-7
4.4.7	Environment Protection Act, 2053 (1997)	4-7
4.4.8	Local Government Operation Act, 2074 (2017)	4-8
4.4.9	Child Labor (Prohibition and Regulation) Act, 2056 (2000)	4-8
4.4.10	Convention of International Trade of Endangered Wild fauna and Flora Act, 2073 (2017)	4-8
4.4.11	Solid Waste Management Act, 2068 (2011)	4-8
4.4.12	Contribution Based Social Security Act 2017	4-8
4.4.13	Muluki Dewani (Sanhita) Act, 2074	4-9
4.4.14	Land use Act, 2076	4-9
4.4.15	Electricity Regulatory Commission Act, 2074 (2017)	4-9
4.4.16	The Act Relating to Children, 2075 (2018)	4-10
4.5	Rules and Regulations	4-10
4.5.1	Electricity Rules, 2050 (1993)	4-10
4.5.2	Water Resources Rules, 2050 (1993)	4-10
4.5.3	Environment Protection Rules, 2054 (1997)	4-10
4.5.4	Forest Rules, 2051 (1995)	4-11
4.5.5	Labor Rules, 2075 (2018)	4-11
4.5.6	Solid Waste Management Rules, 2070 (2013)	4-11
4.5.7	Contribution Based Social Security Regulation, 2018	4-11
4.5.8	Electricity Regulatory Commission Rules, 2075 (2018)	4-12
4.6	Guidelines and Conventions	4-12
4.6.1	National EIA Guidelines, 2050 (1993)	4-12
4.6.2	EIA Guidelines for Forestry Sector, 2052 (1995)	4-12
4.6.3	Forest Production, Collection & Sales Distribution Guidelines, 2073	4-13
4.6.4	Community Forest Guidelines, 2071	4-13
4.6.5	Community Forest Inventory Guidelines, 2005	4-13
4.6.6	Working Procedure with Standards for the Use of National Forest Land for National Priority Project, 2076	4-13
4.6.7	Order for Remission of Land Ceiling Exemption, 2074	4-14
4.6.8	Directives Relating to Licensing of Power Projects 2075 (2018)	4-14
4.6.9	Hydropower Environmental Impact Assessment Manual 2018	4-14
4.6.10	Social Security Schemes Operation Directives, 2018 (2075)	4-14
4.7	Conventions	4-14
4.7.1	Convention on Biological Diversity, 1992	4-14
4.7.2	Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES), 1973	4-14
4.8	Standards	4-15
4.8.1	National Ambient Air Quality Standard, 2069 (2012)	4-15

4.8.2	Nepal Vehicle Mass Emission Standard, 2069 (2012)	4-15
4.8.3	National Ambient Sound Quality Standard, 2069 (2012)	4-15
4.8.4	Standard on Emission of Smoke by Diesel Generators, 2069 (2012)	4-15
5	EXISTING ENVIRONMENTAL CONDITION	5-1
5.1	Physical Environment	5-1
5.1.1	Topography	5-1
5.1.2	Land Use	5-2
5.1.3	Climate	5-3
5.1.4	Geomorphology and Geology	5-3
5.1.5	Seismology	5-8
5.1.6	Air and Noise Quality	5-9
5.1.7	Water Quality	5-9
5.1.8	Watershed Conditions and Drainage Patterns	5-9
5.1.9	Land Stability/ Erosion	5-10
5.1.10	Crossings of Other Utilities	5-11
5.1.11	Air Traffic	5-12
5.2	Biological Environment	5-12
5.2.1	Vegetation and Forest Resources	5-13
5.2.2	Forest Management System	5-19
5.2.3	Ethno - botany	5-20
5.2.4	Protected Species of Flora	5-21
5.2.5	Wildlife	5-21
5.3	Socio-economic and Cultural Environment	5-22
5.3.1	General Introduction of the PADs	5-22
5.3.2	Project Affected Area (RMs/Municipality/MC/Settlement)	5-27
5.3.3	Profile of the Project Affected Households	5-36
5.4	Consultation	5-42
6	IMPACT ASSESSMENT	6-1
6.1	Physical Environment	6-1
6.1.1	Watershed and Drainage Condition	6-1
6.1.2	Topography	6-1
6.1.3	Land Use and Land Take	6-2
6.1.4	Air and Noise Quality	6-2
6.1.5	Water Quality	6-3
6.1.6	Waste and Spoil Generation	6-3
6.1.7	Crossing of Other Utilities and Interferences	6-4
6.1.8	Storage of Construction Material and Camps	6-4
6.1.9	Air Traffic	6-4
6.2	Biological Environment	6-6
6.2.1	Forest/Vegetation Loss	6-6
6.2.2	Changes of Demand for Fuel Wood and Timber	6-12
6.2.3	Increased Access to Forest	6-12
6.2.4	Exploitation of Non-Timber Forest Products (NTFPs)	6-12
6.2.5	Impact on Wildlife and Avifauna	6-13
6.2.6	Impacts on Protected Species of Flora and Fauna	6-14
6.3	Socio-economic and Cultural Environment	6-16
6.3.1	Acquisition of Land and Structures	6-16
6.3.2	Loss of Crops	6-17
6.3.3	Impact on Livelihood	6-18
6.3.4	Health, Water Supply and Sanitation	6-19
6.3.5	Occupational Hazards and Safety	6-19
6.3.6	Impact on House, Settlements and Social Infrastructure	6-19
6.3.7	Impact due to Crossings	6-20
6.3.8	Impact on Communal Resources	6-20
6.3.9	Impact on PAF due to Alteration of Land and Property Values	6-20
6.3.10	Restriction of Future Land Use Development near to Settlement	6-20

6.3.11	Disturbance to Radio, Television and Mobile/Cell Phone Reception	6-21
6.3.12	Electric and Magnetic Field Effect.....	6-21
6.3.13	Gender and Vulnerable Groups	6-21
6.3.14	Economic Activities	6-22
6.3.15	Religious, Historical and Archeological Site.....	6-22
6.3.16	Infrastructure and Service Facility.....	6-22
6.3.17	Social and Cultural Practices	6-23
6.3.18	Law and Order	6-23
6.3.19	Impacts of Aesthetics	6-23
6.4	Beneficial Impacts	6-23
7	MITIGATION AND ENHANCEMENT MEASURES	7-1
7.1	Physical Environment	7-1
7.1.1	Watershed and Drainage Condition.....	7-1
7.1.2	Topography, Land Use and Land Take	7-2
7.1.3	Air Quality.....	7-2
7.1.4	Noise and Vibrations	7-2
7.1.5	Water Quality	7-2
7.1.6	Waste and Spoil Disposal	7-3
7.1.7	Storage of Construction material	7-3
7.1.8	Crossing of Other Utilities and Interference	7-3
7.1.9	Air Traffic.....	7-3
7.1.10	Summary of Mitigation Cost for Physical Environment.....	7-4
7.2	Biological Environment	7-4
7.2.1	Mitigation Measures	7-4
7.2.2	Enhancement Measures	7-7
7.2.3	Biological Mitigation and Enhancement Cost.....	7-8
7.3	Socio-economic and Cultural Environment	7-10
7.3.1	Mitigation Measures	7-10
7.3.2	Enhancement Measures	7-19
7.3.3	Corporate Social Program (CSR)	7-21
7.3.4	Summary of Socio-economic Mitigation, Enhancement and CSP Cost	7-22
7.4	Summary of Environmental Mitigation, Enhancement & CSR Cost	7-22
8	ENVIRONMENTAL MONITORING PLAN	8-1
8.1	Introduction	8-1
8.2	Requirements for Environmental Monitoring in Nepal	8-1
8.3	Environmental Monitoring Unit.....	8-1
8.4	Environmental Monitoring Plan	8-2
8.5	Grievance Redress Mechanism (GRM).....	8-2
8.6	Monitoring Cost	8-6
8.7	Agencies Responsible for Environmental Monitoring	8-7
8.8	Summary of Environmental Cost Assessment	8-7
9	CONCLUSION	9-1
REFERENCES		



LIST OF TABLE

Table 2-1: Project Affected Area	2-2
Table 2-2: Comparative Salient Features of LDTLP	2-5
Table 2-3: Details of TL Route	2-7
Table 2-4: Land Requirement for Updated LDTLP	2-9
Table 2-5: Land Requirement for Approved IEE	2-9
Table 2-6: Comparative Land Requirement for Approved IEE and Updated IEE	2-10
Table 2-7: Land Use of APs and STs in Updated IEE	2-10
Table 2-8: Land Use of APs and STs in Approved IEE	2-11
Table 2-9: Requirement of the Construction Materials to the Project	2-12
Table 2-10: List of Human Resources Required to the Project	2-12
Table 2-11: Construction Schedule	2-13
Table 3-1: Requirement of data	3-5
Table 3-2: Date, Location and Number of Participants in PRA	3-7
Table 3-3: List of Experts involved in UPDATED IEE	3-9
Table 4-1: Comparative List of Relevant Policies and Legislations	4-1
Table 5-1: River Crossing along LDTLP	5-10
Table 5-2: List of Critical APs	5-10
Table 5-3: Crossing along the TL Alignment	5-11
Table 5-4: Vegetation cover in PADs	5-14
Table 5-5: Forest Pattern in PAA	5-14
Table 5-6: Forest Status in PADs	5-17
Table 5-7: Species diversity of plants along the TL in CFs	5-18
Table 5-8: CFs along the TL	5-19
Table 5-9: National Forest along the TL	5-19
Table 5-10 : Demographic Characteristics of PADs	5-22
Table 5-11: Major Caste/Ethnic Group of PADs	5-22
Table 5-12: Major Religion of PADs	5-23
Table 5-13: Number Schools of PADs	5-23
Table 5-14: Literacy Status of PADs	5-23
Table 5-15: Major Languages Spoken in PADs	5-23
Table 5-16: Occupational Distribution of PADs	5-24
Table 5-17: Detail of the Agricultural Land of the PADs	5-25
Table 5-18: Industries in PAD	5-25
Table 5-19: Major Touristic Places of PADs	5-26
Table 5-20: Health Institutions of PADs	5-26
Table 5-21: List of Near-by Settlements of LDTLP	5-27
Table 5-22: Demographic Characteristics of the PAA	5-28
Table 5-23: Population in the PAA by Caste/Ethnic Group	5-28
Table 5-24: Literacy Status of the PAA	5-29
Table 5-25: Number of Schools in PAA	5-30
Table 5-26: Economically Active Population	5-30
Table 5-27: Absent HHs and Population of Project Area	5-31
Table 5-28: Major Irrigation Systems in the PAA	5-32
Table 5-29: Demographic Features of PAFs	5-36
Table 5-30: Distribution of Population by Broad Age Group	5-36
Table 5-31: Demographic Features of PAFs	5-36
Table 5-32: Distribution of Population by Broad Age Group	5-37
Table 5-33: Distribution of Surveyed HHs by Mother Tongue	5-37
Table 5-34: Occupational Composition of Surveyed Population (10-59 years) by Sex	5-37
Table 5-35: Literacy Status (5 years and above) of Surveyed HHs	5-38
Table 5-36: Educational Attainment among the Literate Population of the Surveyed HHs	5-38
Table 5-37: Distribution of Surveyed HHs by Landholding Size	5-38
Table 5-38: Landholdings of the Surveyed HHs by Type of Land	5-38
Table 5-39: Major Crop Area Coverage, Production and Yield for the Surveyed HHs	5-39

Table 5-40: Food Deficient Months for the Surveyed HHs	5-39
Table 5-41: Cause of Debt of the Surveyed HHs	5-39
Table 5-42: Average Income of Surveyed HHs	5-40
Table 5-43: Sources of Cooking Energy of the Surveyed HHs.....	5-40
Table 5-44: Solid Waste Management Practice by Surveyed HHs	5-40
Table 5-45: Attitude towards the project of the surveyed HHs	5-41
Table 5-46: Expectation from the Project.....	5-41
Table 5-47: Houses by Roof Type	5-41
Table 5-48: Houses by Number of Storey.....	5-42
Table 5-49: Summary of Key Issues/Concerns of Local People	5-42
Table 6-1: Fragmentation of Forest due to TL	6-2
Table 6-2: Location and Area of Storage and Camp sites	6-4
Table 6-3: Physical Environment Impact Assessment Matrix.....	6-5
Table 6-4: Total Affected Forest (by Types)	6-6
Table 6-5: Forest Loss in Different Components	6-7
Table 6-6: Tree Loss in Terms of Plant Species from Government Forest and CF	6-8
Table 6-7: Total Forest Loss	6-11
Table 6-8: Total Loss of NTFP.....	6-13
Table 6-9: Biological Environment Impact Assessment Matrix.....	6-15
Table 6-10: Comparative Land Requirement for Approved IEE and Updated IEE.....	6-16
Table 6-11: HHs Losing Land and Structures.....	6-16
Table 6-12: Comparative Table of Loss of Structures in Approved IEE and Updated IEE	6-17
Table 6-13: Permanent Loss of Agricultural Production (Due to Land Acquisition).....	6-18
Table 6-14: Loss of Agriculture Production due to Land Utilization	6-18
Table 6-15: Socio-economic and Cultural Environment Impact Assessment Matrix	6-25
Table 7-1: Detail of Cost Break Down of Physical Environment.....	7-4
Table 7-2: Cost for Awareness on Forest Management and Wildlife Conservation	7-7
Table 7-3: Estimated Cost for NTFPs Training	7-8
Table 7-4: Cost for Awareness Program.....	7-8
Table 7-5: Updated Mitigation Measures Cost.....	7-9
Table 7-6: Updated Enhancement Measures Cost.....	7-9
Table 7-7: Summary of Mitigation and Enhancement Cost for Biological Environment	7-9
Table 7-8: Estimated Cost for Land Acquisition.....	7-10
Table 7-9: Compensation Cost for Structure Loss.....	7-12
Table 7-10: Value of Total Loss of Agricultural Production due to Land Acquisition	7-13
Table 7-11: Value of Total Loss of Agriculture Production due to Land Utilization (RoW)	7-13
Table 7-12: Resettlement and Rehabilitation Plan	7-18
Table 7-13: Mitigation and Rehabilitation Cost	7-19
Table 7-14: Mushroom Farming Training.....	7-20
Table 7-15: Cost of Citrus Farming Training	7-20
Table 7-16: Cost of Micro Enterprise Training	7-20
Table 7-17: Summary of Enhancement Measure Cost.....	7-21
Table 7-18: Summary of CSR Cost	7-22
Table 7-19: Cost Estimate for Social Mitigation and Enhancement.....	7-22
Table 7-20: Cost Estimate for Environmental Mitigation, Enhancement and CSR.....	7-23
Table 7-21: Entitlement Policy Matrix	7-24
Table 8-1: Monitoring Plan and Schedule.....	8-4
Table 8-2: Monitoring Cost of the Proposed LDTLP	8-6
Table 8-3: Environmental Cost Benefit Analysis (including land cost).....	8-8
Table 8-4: Environmental Impact, Mitigation and Monitoring Matrix.....	8-9



LIST OF FIGURE

Figure 2-1: Project Location Map	2-1
Figure 2-2: PADs of LDTLP	2-2
Figure 2-3: PAAs of LDTLP.....	2-3
Figure 2-4: Accessibility Map of LDTLP.....	2-4
Figure 5-1: Altitudinal Variation along the Alignment.....	5-1
Figure 5-2: Google Image with Longitudinal Profile of LDTLP.....	5-1
Figure 5-3: Land Use Map of PAA	5-2
Figure 5-4: (a) Temperature and (b) Precipitation Data of PADs	5-3
Figure 5-5: Geological Map of Nepal and Project Location	5-4
Figure 5-6: Physiographic Map of Affected RM/Municipality	5-5
Figure 5-7: Physiographical and Soil Type Map along the Alignment	5-6
Figure 5-8: Geological Map along the Alignment.....	5-7
Figure 5-9: Seismic Map of Nepal.....	5-8
Figure 5-10: Map of Nearby Protected Areas and LDTL Components.....	5-13
Figure 5-11: Land cover in PAA showing vegetation cover	5-15
Figure 5-12: Comparative Trend of Foreign Labor Migration in the PADs	5-24
Figure 5-13: Population of PAA by Mother Tongue	5-29
Figure 5-14: Comparative Status of Male and Female in the PAA	5-35



1 INTRODUCTION

1.1 Proponent

Nepal Electricity Authority (NEA), the major electricity generator and sole agency responsible for transmission and distribution of electricity, is the proponent of the proposed **Lekhnath-Damauli 220kV TL Project (LDTLP)**. The IEE for '42.254km 220 kV' line with proposed substation at Belbas of Byas Municipality was carried out by Environment and Social Studies Department (ESSD) of NEA and approved by the then MoEn on 2074/10/28. This Updated Initial Environmental Examination (UPDATED IEE) has been carried out as per the consent letter (2075/06/21B.S.) of Department of Electricity Development (DoED).

The contact address of the project proponent is as follows:

Nepal Electricity Authority,
Durbarmarg, Kathmandu
Phone No. : 01-4220449
Fax No. : 01-4447969

1.2 Organization Responsible for Preparation of UPDATED IEE

Environment and Social Studies Department (ESSD) of NEA executes all activities related to the environmental aspects of projects studied, designed, and constructed or operated by NEA. Being the concerned department, ESSD had prepared the IEE report of this project which was approved on 2074/10/28. This UPDATED IEE report has been prepared as per change in location of the proposed substation from Belbas of Byas Municipality to Khairbote of Byas Municipality. The contact address of the organization responsible for the preparation of ToR and IEE is:

Environment and Social Studies Department,
Engineering Services Directorate,
Nepal Electricity Authority,
Kharipati, Bhaktapur,
Phone No. : 01-6611580; Fax No.: 01-6611590
Email : env.social@nea.org.np

1.3 Structure of the Report

The Updated IEE report is divided into nine chapters. Chapter-2 contains a brief description of the project, including the TL and substation, construction planning and project area delineation. Chapter-3 discusses about the data requirement and the methodology adopted for the collection of data on physical, biological, socioeconomic and cultural environment of the area. This chapter also highlights the techniques used for data analysis and impact assessment. Chapter-4 deals with the national acts, policies, rules and guidelines referred while preparing the report. The existing environmental conditions of the project area with respect to physical, biological and socioeconomic and cultural environment is given in Chapter-5. Chapter-6 highlights the positive and adverse impacts likely to occur due to implementation of the project. The mitigation and enhancement measures are presented in Chapter-7. Chapter-8 deals with the environmental monitoring plan and Chapter-9 conclusion of the study.

1.4 Rationality for Conducting Updated IEE

Due to some technical reason, the previous proposed Sub-station at Belbas now has been shifted to Khairbote, Vyas Municipality, Ward No. 13 of Tanahun district. This has increased the alignment length of 2.669Km from previous AP 42 to newly proposed New-Damauli substation and the total length of the alignment would be 44.492Km. This Updated IEE report has been prepared in reference to the letter obtained from DoED (Appendix A) and the consent letter.

1.5 Scope of Updated IEE

The major components of this project include one substation (New-Damauli), 2.66km TL towers, Right of Way (RoW) of 30m with 15m on either side for 220kV and access road. This Updated IEE includes the environmental examination of impacts of all the components mentioned above and proposed ways to mitigate the negative impacts.

1.6 Objective of Updated IEE

The aim and objective of the Updated IEE is to assess the change in impacts due to change in project configuration and capacity and also to provide mitigation measures in order to minimize the adverse impacts so as to implement the project in environmentally sound manner. The specific objective of the study is to prepare Updated IEE report. The other general objectives of the study are to:

- Document the change in physical, biological, socio-economic and cultural baseline conditions of project area;
- Identify, predict and assess the change in adverse and beneficial environmental impacts of Transmission Line (TL) in project affected areas in terms of magnitude, extent and duration during project construction and operation phases;
- Suggest changes in mitigation and enhancement measures for impact and monitoring plan wherever required;
- Familiarize various stakeholders with the change in project configuration and capacity upgradation through public consultation and participation programs and to incorporate their relevant concerns and issues



2 PROJECT DESCRIPTION

2.1 Introduction

The under construction Tanahun Hydroelectric Project (HEP) of Tanahun district has proposed its 220kV transmission line to Bharatpur substation as a major evacuation plan. In addition, LDTLP is considered as a power evacuation option for energy generated from Tanahun HEP to the nearest load centre of Pokhara Lekhnath Metropolitan City (MC). The objective of the LDTLP is to improve the supply situation of the whole nation by connecting with the national grid. 44.492Km LDTLP is proposed to be constructed by NEA. It consist of 220kV TL and one proposed substation at Khairbote of Byas Municipality as project major components. Expanding some foot trial and feeder road shall be the minor components of the project in order to ease the transportation work and placement of towers. It starts from existing substation at Lekhnath, traverse through project affected area (PAA) i.e. three rural municipalities (RMs), one municipality and one MC of Kaski and Tanahun District and ends at proposed New Damauli Substation at khairbote of Byas Municipality. It is 44.492km in length and double circuit to carry 600MW power. In addition, there is mult-circuit line from angle point (AP) 44 to New Damauli SS.

2.2 Relevancy of New Planning and Development Concept

The proposed location of substation has been changed due to some technical reasons. This has increased the length of alignment from 42.254km to 44.492Km and addition of 7 APs.

2.3 Project Location

The proposed project is located in Gandaki Province of Nepal (Figure 2-1). The TL passes through two districts namely: Kaski and Tanahun. These are termed as project affected districts (PADs). In total three RMs (one of Kaski and 2 of Tanahun), one municipality in Tanahun and one MC in Kaski District will be affected by the project. These affected RMs (गाउँपालिका) are Rupa (रूपा) of Kaski, Myagde (म्याग्दे) and Rishing (रिशिङ्ग) of Tanahun. Similarly Byas (ब्यास) Municipality and Pokhara MC (पोखरा) also lies along the alignment. The project location map has been presented in Figure 2-1. The PAA along the TL are listed in salient features (Table 2-2) below and TL map has been presented in Figure 2-3.

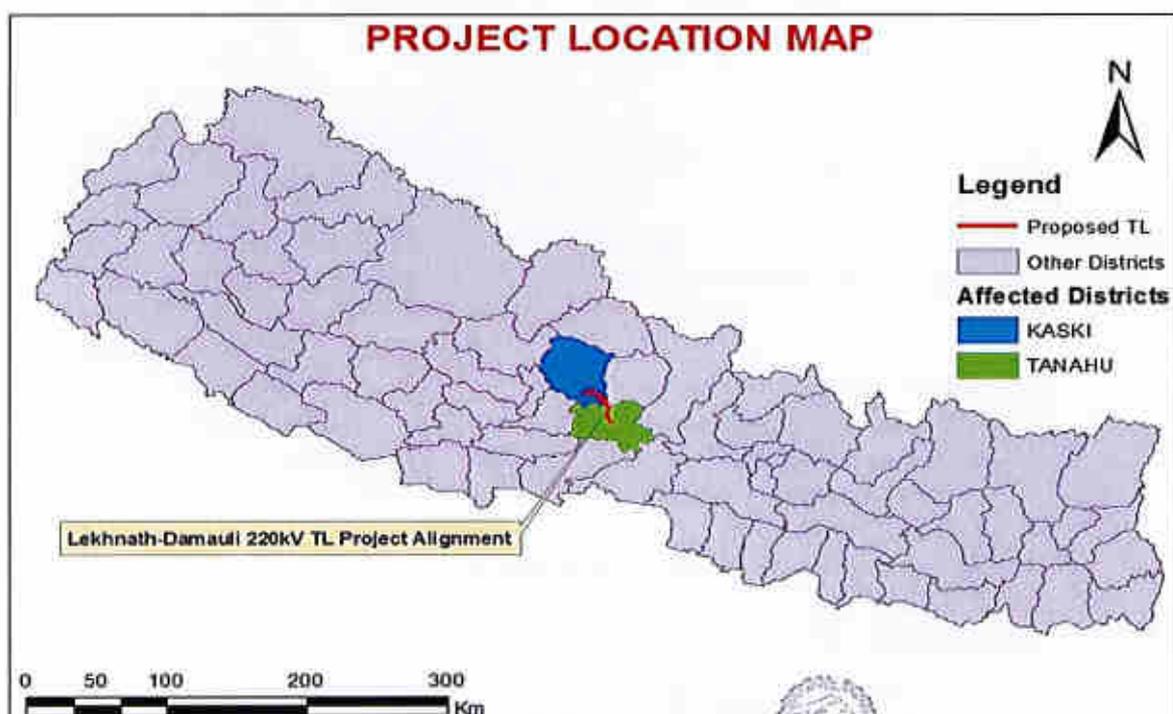


Figure 2-1: Project Location Map

Source: GIS Analysis

The VDCs have been declared to form RM/ Municipality/ MC and presented in table below.

Table 2-1: Project Affected Area

S. N.	Project Affected Current Administrative Units		Previous Administrative Units	
	RM/ Municipality/ MC	Ward	Project Affected VDCs/Municipality*	Other Merged VDCs (not affected by project)
1	Pokhara MC	27, 29, 31	Lekhnath*	Pokhara SMC, Puranchaur, Mauja, Chapakot, Badaure Tagami, Kaskikot
		28	Majhthana	
			Kalika	
2	Rupa RM	1,2	Thumki	-
		3,4	Siddha	
		5	Deurali	
		6	Rupakot	
		7	Hansapur	
3	Byas Municipality	6	Shyamgha	Keshabtar, Kyamin, Ghasikuwa, Tanahunsur, Risti, Satiswanra
		5	Byas*	
4	Rishing RM	1,2	Kahun Shivapur	Bhirkot, Baidi, Ramjakot, Kot Darbar, Rishing Ranipokhari
5	Myagde RM	1-3	Jamune	Chhang
		6,7	Manpang	

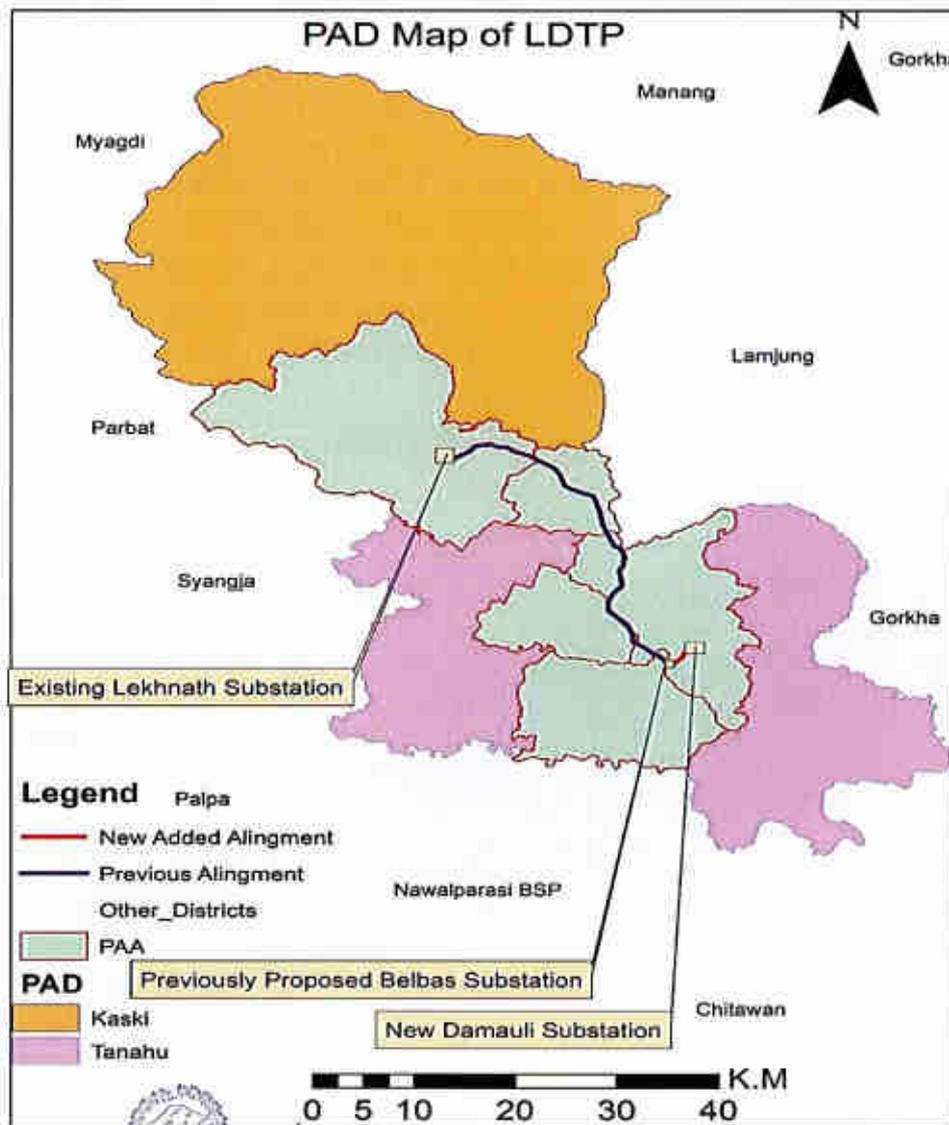


Figure 2-2: PADs of LDTP

Source: GIS Analysis

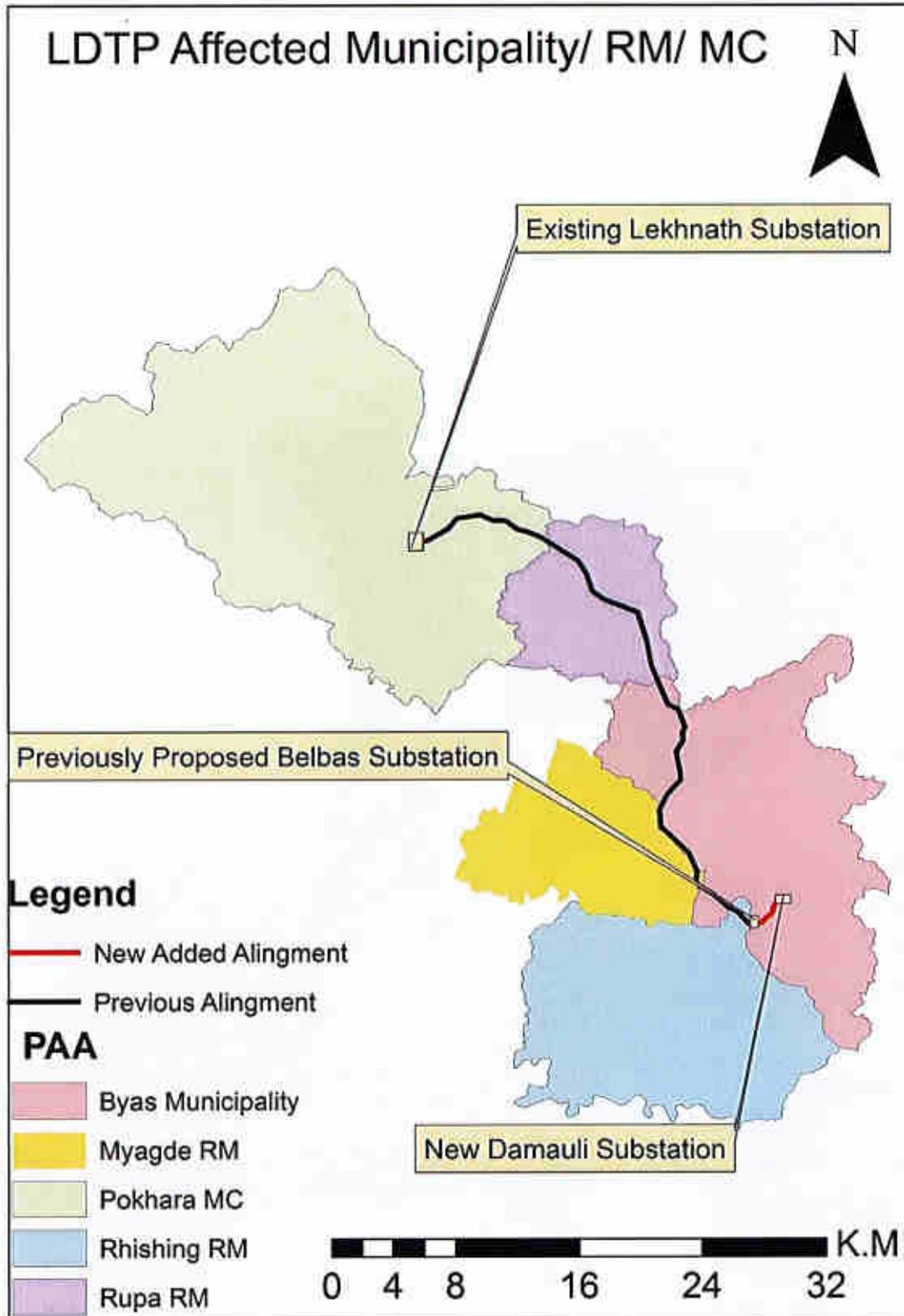
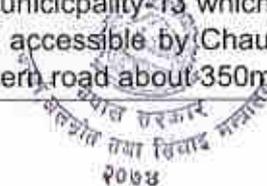


Figure 2-3: PAAs of LDTLP

Source: GIS Analysis

2.4 Project Accessibility

In the approved IEE, existing substation was at Kharene village of Kaski which can be accessed through earthen road from black-topped motorable road of Prithvi Highway at Lekhnath chowk (about 800m) which is also the same for the Updated IEE. New Damauli substation at Belbas in the approved IEE is now shifted to Khairbote of Damauli Municipality-13 which is 2350m from previous substation. The shifted substation at Khairbote is accessible by Chaudi temple road. After reaching Alegaun, substation is accessed by the earthen road about 350m.



Some section of the TL is accessible by feeder road and Prithvi highway and some section by rural local road. Some stretches in between are located at higher altitudes and are not easily accessible. Hence, the study was carried out through walk over approach and the project will be implemented by upgrading existing trails, wherever necessary so as to transport construction materials.

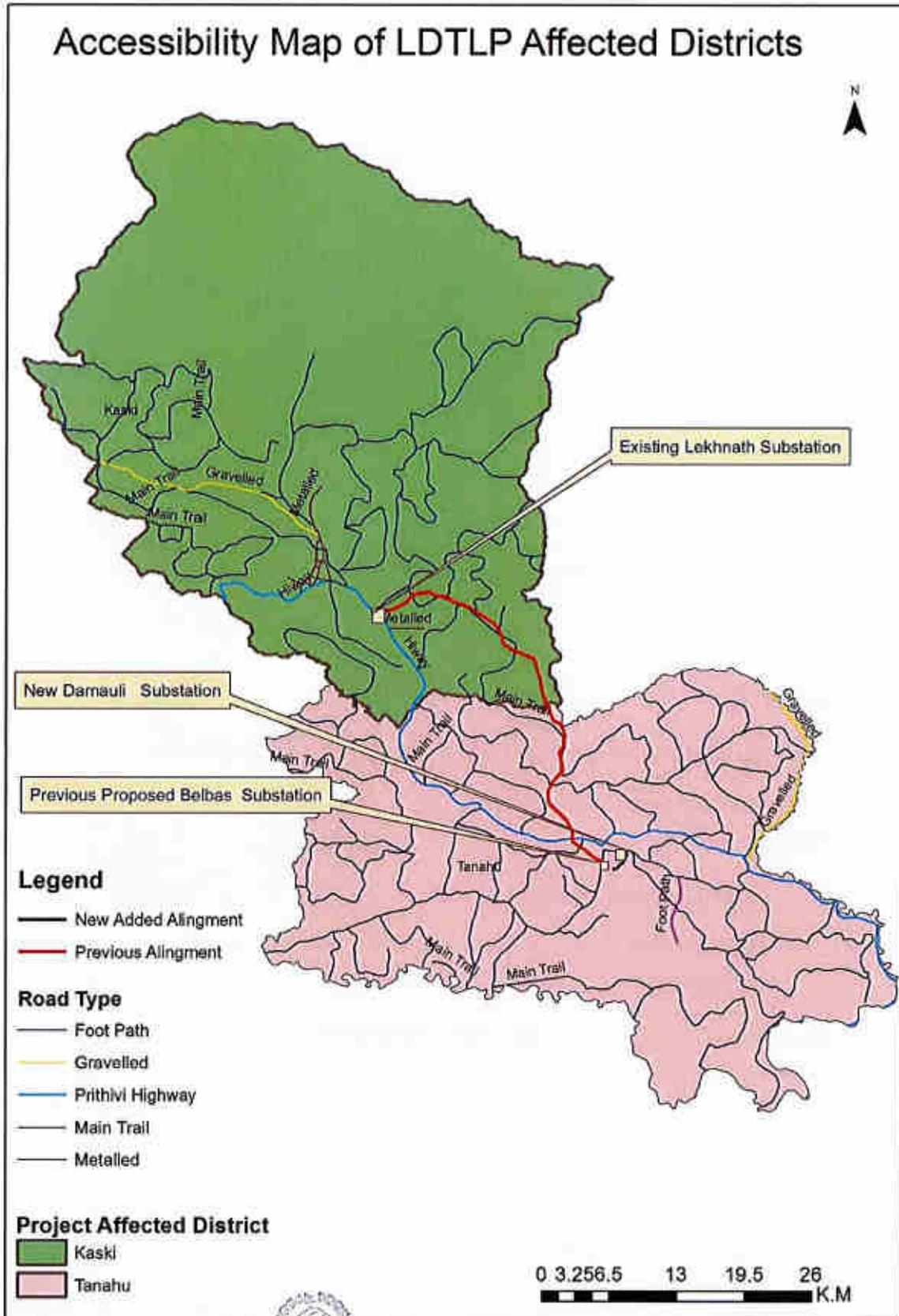


Figure 2-4: Accessibility Map of LDTLP

Source: GIS Analysis



2.5 Salient Features

The total length of the proposed TL is about approximately 44.492km. Out of which 2.194km from AP 44 to New Damauli Substation is multi circuit. Remaining 42.298km is multi circuit of 220kV. The voltage level will be 220kV. The proposed TL will be double/four circuit comprising with two separate aluminum conductor steel reinforced (ACSR) per phase. There is slight change in salient features of UPDATED IEE due to shift in alignment and technical reports provided by the project. The project comprises the following salient features presented in the table given below.

Table 2-2: Comparative Salient Features of LDTLP

SN	Particulars	As per Previous Approved IEE			Present Context			Changes
1	General							
1.1	Name of the Project	Lekhnath-Damauli 220kV Transmission Line			Lekhnath-Damauli 220kV Transmission Line			No change
1.2	Impact Area	Province No.	District	RM/ Municipality*/ MC	Province	District	RM/ Municipality*/ MC	Name of province Updated
		4	Kaski	Pokhara Lekhnath MC (पोखरा लेखनाथ), Rupa (रूपा)	Gandaki	Kaski	Pokhara MC (पोखरा), Rupa (रूपा)	
			Tanahun	Myagde (म्याग्दे), Byas* (ब्यास), Rishing (रिशिङ्ग)		Tanahun	Myagde (म्याग्दे), Byas* (ब्यास), Rishing (रिशिङ्ग)	
1.3	Initial Point	AP 1 lies at existing Substation at Kharene of Pokhara MC, Kaski District			AP 1 lies at existing Substation at Kharene of Pokhara MC, Kaski District			No change
1.4	Terminal Point	AP 43 lies at Belbas of Byas Municipality, Tanahun District			Proposed New Damauli Substation at Khairbote of Byas Municipality of Tanahun District			Terminal point shifted
1.5	Highway crossings	1 (Prithvi highway)			1 (Prithvi highway)			No change
1.6	River crossings	27			27			No change
1.7	132kV line crossings	2			2			No change
1.8	11kV line crossings	12			14			2 crossings increased
2.	Design Features							
2.1	Line Length	42.254km			44.492Km			Increase by 2.66km from AP42
2.1	Conductor Configuration	Double circuit of 37.401km length; Four circuit of 4.853km length			Double circuit of 42.298Km and Multi circuit of 2.194Km			Configuraton changed
2.3	Conductor	ACSR Moose Conductor			ACSR Moose Conductor			No change
2.4	Conductor bundling	Bundled (Number of cables in each bundled-2)			Bundled (Number of cables in each bundled-2)			No change
2.5	Nominal System Voltage	220kV and 132kV			220kV			Change in some section

SN	Particulars	As per Previous Approved IEE	Present Context	Changes
2.6	Voltage at maximum condition	245kV	245kV	No change
2.7	Current at normal operating condition	731Amp	731Amp	No Change
2.8	Current at Maximum Condition	874A	874A	No Change
2.9	Capacity	600MW	600MW	No change
2.10	Circuit	Double and Four Circuit	Double and multi Circuit	Change in alignment for double and four circuit configuration
2.11	Tower average nominal Span	330m	330m	No Change
2.12	No. of Tower	123 (44 APs and 79 STs)	130 (51 APs and 79 STs)	No of Angle Towers added
2.13	Tower Height	Around 29m for double circuit and 44m for four circuit	Around 29m for double circuit and 44m for four circuit	No Change
2.14	Ground Clearance	<ul style="list-style-type: none"> Minimum 7.1m at the maximum sag condition National highway 9.8m 	<ul style="list-style-type: none"> Minimum 7.1m at the maximum sag condition National highway 9.8m 	
2.15	Right of Way (RoW)	30m (15m on either side) for 220kV TL 18m (9m on either side) for 132kV TL	Only 220 kV, 30m (15m on either side)	
2.16	Foundation Area	15mx15m (225m ²)	15mx15m (225m ²)	No change
2.17	Land Requirement	134.6125ha	142.87962ha	Increase by 8.2671ha
3	Substation			
3.1	No. of Substation	1	1	No change
3.2	Location of Substation	Belbas of Byas Municipality	Khairbote of Byas Municipality	Location of substation changed
3.3	Area of Substation	6ha	7.101ha	Increase by 1.101ha
3.4	Switching Station	1	1	
4	Access Road			
4.1	Area	-	0.199	0.199
5	Cost of the Project	NRs 7,500,000,000	NRs 7,600,000,000	Increase by 100,000,000

Source: LDTLP

2.6 Project Components

The LDTLP consists of four major project components - TL, substation, towers and access road. The total length of the route is 44.492km. The project comprises of one substation which is to be constructed at Khairbote, Byas Municipality of Tanahun. During the field study, it has been

verified that due to the construction and operation of this proposed project, there shall be no obstruction in planned/proposed/operated hydropower, TL, reservoir area or other development projects in the vicinity. These project components are discussed in the following sections in detail.

2.6.1 Transmission Line

The proposed route will commence from the existing substation of Lekhnath, Pokhara MC and terminate at proposed New Damauli substation at Khairbote of Byas Municipality of Tanahun district. The alignment of LDTLP has been selected avoiding the settlement areas, inbuilt structures, religious places, schools and other community infrastructures wherever possible. It mostly traverse through cultivated land and at some stretches barren land, forest land and other (sand, water bodies, roads, etc.) lands. In Myagde Municipality, project will require land for RoW and no AP will be erected. The description of the proposed route has been discussed in the table given below.

Table 2-3: Details of TL Route

S. N.	RM/ Municipality/ MC	From AP to AP	No. of AP in Section	Land Use along the section	Remarks
1	Pokhara MC	AP 1 to AP 14	14	CL, BL, FL and Others	
2	Rupa RM	AP 15 to AP 22	8	CL, FL and Others	
3	Rishing RM	AP 40 to AP 42	3	CL and FL	
4	Byas Municipality	AP 23 to AP 39	18	CL, FL and Others	
		AP 43 to Substation	8	CL, FL and Others	
Total			51		

Note: CL: Cultivated Land, BL: Barren Land, FL: Forest Land and Others: Water Bodies, Sand, Road etc.

2.6.2 Substation

New Damauli substation was proposed earlier in Belbas of Byas Municipality and now has been shifted to Khairbote of Byas Municipality-13. Proposed New Damauli substation can be accessed through the road from Damauli to Chaudi-Bahari Temple. After reaching Ale Gaun, SS is accessible through the access road of 350m which needs to be acquired by the project.



a



b

Picture 2-1: Proposed a) Belbas Substation in Approved IEE b) New Damauli Substation in Updated IEE

2.7 Project Area Delineation

For the IEE of the proposed project, the project area is defined as the area for the construction of 220kV TL and substation as well as the area that will be impacted due to the construction and operation of the project. This area mainly includes three RMs, one municipality and one MC of Kaski and Tanahun districts. The project area does not lie in the national park, wildlife reserve,

buffer zone, conservation area, historically and archaeologically important sites and/or environmentally sensitive/ fragile areas. The study area is divided into two parts on the basis of the proximity and magnitude of impacts.

2.7.1 Direct Impact Area

The National EIA Guidelines 1993 defines the direct impact as a direct alteration in the exiting environmental conditions as a consequences of project activity. So, the direct impact area (DIA) includes all the components of the LDTLP which mainly consists of 30m RoW comprising 15m on each side of the center line of the TL of 44.492km length. In addition, the DIA also includes the substation area and access road. Thus, the settlement area, forests or other vegetation and places having built-up infrastructures or facilities that fall within the project components constitute the DIA of the project. On the basis of spatial coverage, this area is also termed as High Impact Area.

2.7.2 Indirect Impact Area

This consists of the surrounding area. Any built-up community infrastructures and facilities, forests, surrounding the DIA shall be studied in this impact area. The area outside DIA extending up to RM/Municipality/MC boundary is considered as IIA. This area is also termed as Moderate Impact Area. The term "project" indicates the LDTLP and "Area" refers to the core project area and the surrounding area. The term "project area" is also referred to as the study area for the IEE.

2.8 Construction Planning

The implementation of the proposed project comprises construction of 220kV TL. It includes foundation and erection of towers, wire stringing, testing and commissioning of it. The estimated periods of project completion is two years.

2.8.1 Preliminary Works

Preliminary works for the proposed TL consist of contract award, the detail design study and mobilization of the contractors. The detail design study will carry out the detailed route survey, spotting the tower locations, preparation of longitudinal profiles, geological field test and laboratory testing, tower design etc. To achieve effective tower footing resistance, earth resistance will also be measured at each tower site.

2.8.2 Land Acquisition and Forest Clearance

After finalization of the substation site and tower location, the required land will be acquired by NEA as per Land Acquisition Act, 2034 in the coordination with Compensation Determination Committee (CDC). As well, the trees will be felled for the tower foundation and under the RoW in coordination with Division Forest Office (DFO) and other stakeholders. The table below shows the land requirement details.



Table 2-4: Land Requirement for Updated LDTLF

S.N	Project Component	Land Types (ha)										Total Land Take (ha)		
		Cultivation		CF	Forest			Barren		Others	Land Restriction	Permanent	Total (ha)	
		Private	Govt.		Govt.	Private shrubland	Private	Public						
1	Land to be required under RoW (excluding tower pads)	87.88	-	21.4547	0.88	15.321	0.1725	1.7949	3.40152	130.90462	-	130.90462		
2	Land to be acquired for tower pad including ST	1.845	-	0.54	-	-	0.045	0.495	-	-	2.925	2.925		
3	Substation	7.101	-	-	-	-	-	-	-	-	7.101	7.101		
4	Access road	0.199	-	-	-	-	-	-	-	-	0.199	0.199		
5	Camp and Storage	0.5	-	-	-	-	-	-	-	-	0.5	0.5		
6	Mobile Camp	-	-	-	-	-	1.25	-	-	1.25	-	1.25		
	Sub Total	97.525	-	21.9947	0.88	15.321	1.4675	2.2899	3.40152	132.15462	10.725	142.87962		
	Total	97.525			38.1957		3.7574		3.40152					
	Percentage, %	68.25676048			26.7327		2.6297		2.3806	92.4936	7.5063	100		

Table 2-5: Land Requirement for Approved IEE

S. N.	Project Component	Land Types (ha)										Total Land Take (ha)		
		Cultivation		CF	Forest			Barren		Others	Land Restriction	Permanent	Total (ha)	
		Private	Govt.		Govt.	Private shrubland	Private	Public						
1	Land to be required under RoW (excluding tower pads)	84.3834	-	21.1547	0.7	12.5937	0.0450	1.7949	3.32334	123.9950	-	123.995		
2	Land to be acquired for tower pad including ST	1.7100	-	0.5400	-	-	0.0225	0.4950	-	-	2.7675	2.7675		
3	Substation	6.00	-	-	-	-	-	-	-	-	6.00	6.00		
4	Camp and Storage	0.50	-	-	-	-	-	-	-	-	0.50	0.50		
5	Switching Station	0.10	-	-	-	-	-	-	-	-	0.10	0.10		
6	Mobile Camp	-	-	-	-	-	1.25	-	-	1.25	-	1.25		
	Sub Total	92.693	-	21.6947	0.7	12.5937	1.3175	2.2899	3.3233	125.2450	9.3675	134.6125		
	Total	92.693			34.9884		3.6074		3.3233					
	Percentage, %	68.86			25.99		2.68		2.47	93.04	6.96	100.00		

Table 2-6: Comparative Land Requirement for Approved IEE and Updated IEE

S.N	Land Types and Components	Area in Approved IEE (ha)	Area in Updated IEE (ha)	Remarks	Changed Area (ha)
1	Cultivated Land				
	Right of way (RoW)	84.3834	87.88	increased	3.4966
	Towers	1.71	1.845	increased	0.135
	Camp and Storage	0.5	0.5	no change	0
	Substation	6	7.101	increased	1.101
	Access road	-	0.199	Increased	0.199
	Mobile Camp				
	Switching Station	0.1	-	no switching station	-0.1
	Total area	92.6934	97.525	Total increment	4.8316
2	Forest				
	Right of way (RoW)	34.4484	37.6557	increased	3.2073
	Towers	0.54	0.54	no change	0
	Camp and Storage	-	-		0
	Mobile Camp				
	Total area	34.9884	38.1957	Total increment	3.2073
3	Barren Land				
	Right of way (RoW)	1.8399	1.9674	increased	0.1275
	Towers	0.5175	0.54	increased	0.0225
	Camp and storage	-	-	-	-
	Mobile Camp	1.25	1.25	no change	-
	Total area	3.6074	3.7574	Total increment	0.15
4	Others	3.3233	3.40152	increased	0.07822
	Total	134.6125	142.87962	Total increment	8.26712

Table 2-7: Land Use of APs and STs in Updated IEE

S.N	Land Use	No. of APs	No. of STs	Area, ha		Total Area (ha)
				APs	STs	
1	Cultivation	33	49	0.7425	1.1025	1.845
2	Forest	9	15	0.2025	0.3375	0.54
3	Barren	9	15	0.2025	0.3375	0.54
	Sub Total	51	79	1.1475	1.7775	2.925
	Total	130		2.925		

Table 2-8: Land Use of APs and STs in Approved IEE

S.N	Land Use	No. of APs	No. of STs	Area, ha		Total Area (ha)
				APs	STs	
1	Cultivation	27	49	0.6075	1.1025	1.710
2	Forest	9	15	0.2025	0.3375	0.540
3	Barren	8	15	0.18	0.3375	0.5175
Sub Total		44	79	0.99	1.7775	2.7675
Total		123		2.7675		

2.8.3 Substation Construction

At first, civil works for ground leveling, boundary wall, control building, office cum staff quarter buildings, line bay foundation etc. will be done. Transformers and equipment will be transported to the sites and installed.

2.8.4 Tower Foundation

The construction of tower foundation will be undertaken by manual labor assisted by the mechanical plant wherever possible. The mechanical plant will be limited to small demountable steel skid framed concrete mixers, air compressors, air drills/chisels and tamping/compaction tools. Excavation and the concreting of the tower foundations will be carried out as per the design requirements and after necessary curing, the foundations will be backfilled with suitable material. Average area required for each tower foundation is 15m x 15m (0.0225ha).

2.8.5 Erection of Tower

Galvanized steel lattice towers manufactured in the factory will be transported to the individual tower locations and are erected manually by employing pulleys, wenchers, etc. into the tower foundations.

2.8.6 Insulator Fittings, Conductor and Ground Wire Stringing

Conductors, Optical Ground Wire (OPGW), ground wires, insulators and necessary accessories will be transported manually to the tower locations. The fitting of insulators on the tower will be carried out manually. Stringing of conductors, OPGW and Extra High Strength (EHS) wire will be carried out with the help of tension machine and other pulling devices as per the design requirements.

2.8.7 Transportation

Primary site access for the substation construction will be gained from Byas through Belbas road. TL and its foundation construction can be accessed from Prithvi highway and its various feeder road that passes near the settlements along the alignment. Access road of 350m will be required to reach New Damauli Substation from Damauli-Chaudi Baraha Road. The construction material up to the nearest road head will be carried out through vehicle and later it will be transported manually up to the individual tower foundation location.

2.8.8 Spoil Dumping Site

Since the construction of TL towers requires clearing and excavation of fairly small areas at tower locations, construction work will not require spoil dumping sites. The spoil will be filled up and compacted in the tower base area. Similarly, spoil generated from the substation and switching station during construction will be used for the river protection work near substation and for leveling of access road to substation.

2.8.9 Construction Materials

The materials required for civil construction works related to the TL, switching station and substation will be steel reinforcement, cement, coarse aggregate, fine aggregates (sand), batteries, admixtures, etc. Steel reinforcing bars and cement can be acquired from local manufacturers or can also be imported. Coarse aggregates will be produced at site from excavated materials or purchased from the nearby market. Likewise, fine aggregates will be collected from major quarries along riverbanks (Seti River, Madi Khola, Thudi Khola, Sage Khola, etc.), the excavated foundation material can be used as a backfill material required for the foundation construction.

Table 2-9: Requirement of the Construction Materials to the Project

S.N	Description	Unit	Quantity
1	Coarse aggregates	m ³	4588
2	Total Reinforcement Steel Quantity	Tons	460
3	Total Cement quantity	Bags	47120
4	Total Fine aggregates	m ³	2356

2.8.10 Requirement of Workforce

During the stages of the construction period of the project, altogether approximately 350 people will be employed including 265 unskilled, 60 semi-skilled and 25 skilled human resources. The requirement of the workforce will be from start to end of the construction stage. Most of the unskilled manpower will be hired locally as per available skill and experiences. Semi-Skilled and skilled manpower will be managed by Contractor and Employer (NEA). A list of human resources required to the project for the project construction is given in Table 2-10.

Table 2-10: List of Human Resources Required to the Project

Qualification	Expertise	No./month	Availability in local area
Skilled	Electrical engineer	5	-
	Civil engineer	3	-
	Electrical supervisor	3	-
	Civil Overseer	4	-
	Others	10	-
Semi-skilled	Foreman	8	-
	Fitter	22	-
	Mason	15	Few people
	Others	15	
Unskilled	Labor/porter	265	Some people
Total		350	

Source: LD TLP

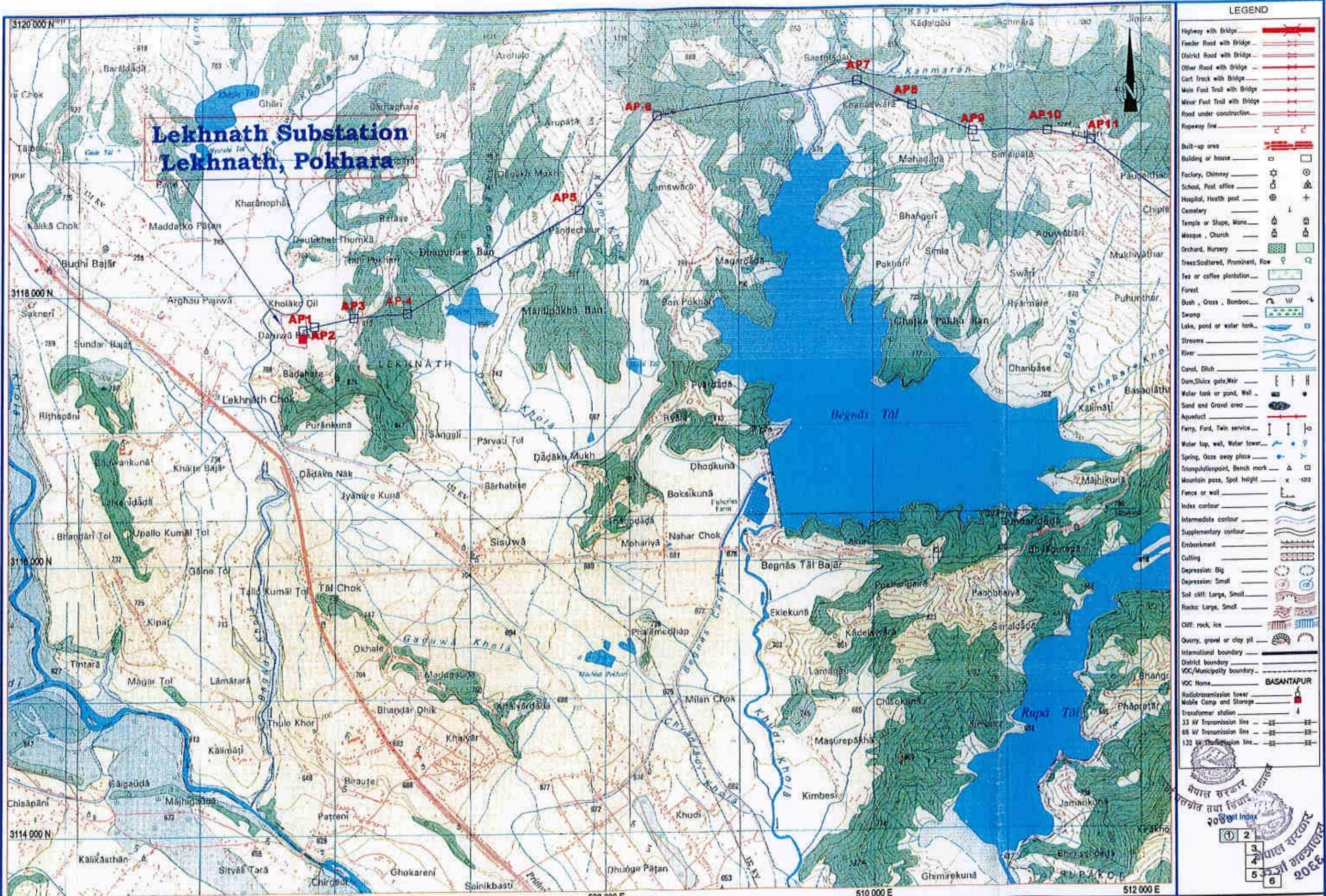
2.9 Project Schedule

The estimated completion period of the project including both section is 24 months includes 6 months pre-construction phase and 18 months construction and commissioning phase. The construction work of TL will primarily be carried out during the dry season when ground conditions are essentially dry and river flows low to allow easy movement of materials and placement of tower. Construction activities during the monsoon season will primarily be restricted to stringing of conductors, although this activity may also be restricted by the weather. However, the construction work of the switching station and substation will be conducted throughout the year.

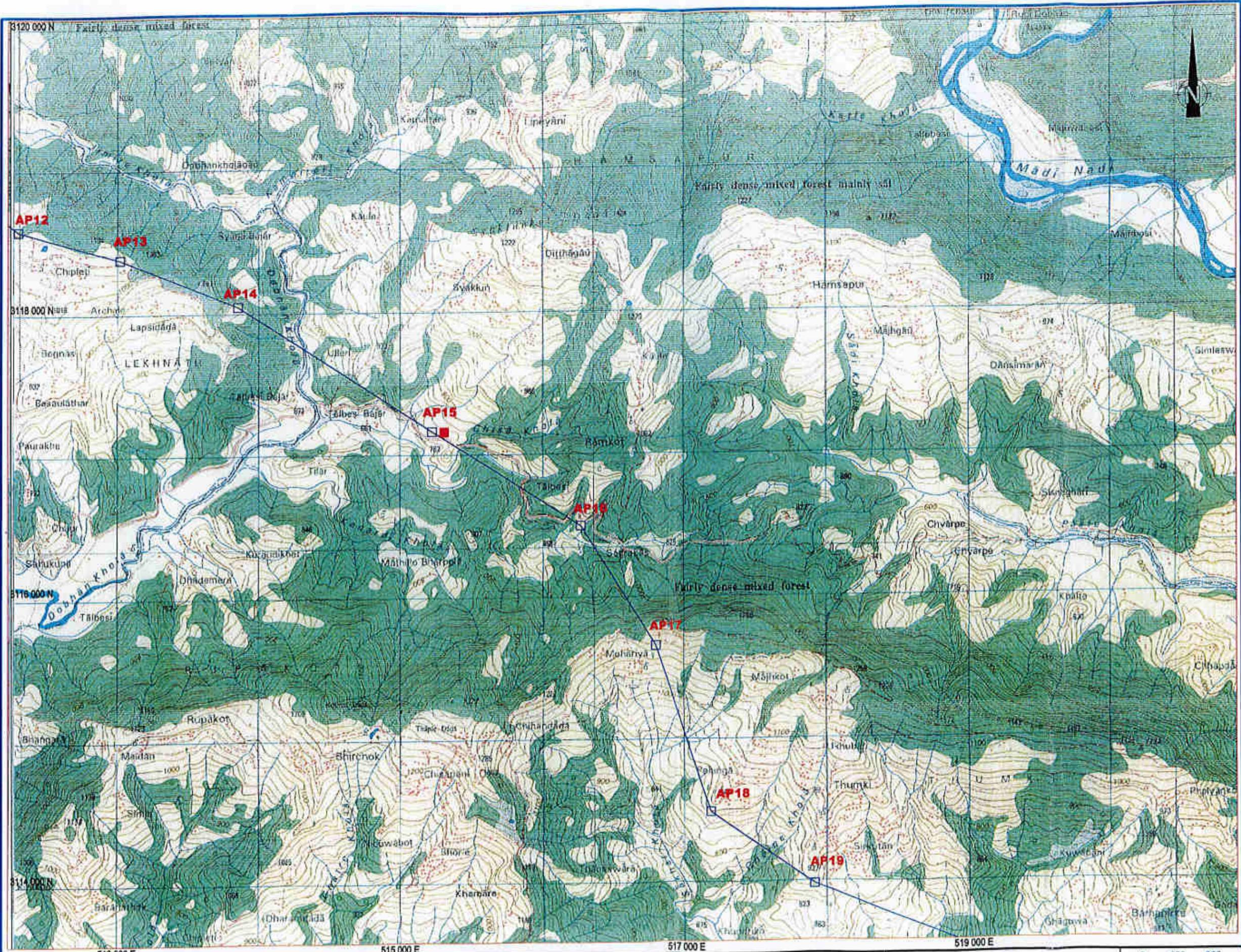
Table 2-11: Construction Schedule

S.N	Task Name	Duration (month)	Month Number																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	Conduct of Detail survey	4																									
2	Conduct of Updated IEE	6																									
3	Preparation of Estimate and approval	3																									
4	Tendering	3																									
5	Contract sign	3																									
6	Cadastral survey	3																									
7	Land acquisition	2																									
8	Soil investigation	3																									
9	Design related works	6																									
10	Construction of tower foundation	11																									
11	Supply of tower accessories and conductor, hardware, OPGW etc.	6																									
12	Erection of towers	5																									
13	Stringing of conductor and OPGW	2																									
14	Testing and commissioning	1																									





LEGEND	
Highway with Bridge	
Feeder Road with Bridge	
District Road with Bridge	
Other Road with Bridge	
Cart Track with Bridge	
Main Foot Trail with Bridge	
Minor Foot Trail with Bridge	
Road under construction	
Roadway line	
Build-up area	
Building or house	
Factory, Chimney	
School, Post office	
Hospital, Health post	
Cemetery	
Temple or Shiva, Mono	
Mosque, Church	
Orchard, Nursery	
Trees: Solitary, Prominent, Row	
Tea or coffee plantation	
Forest	
Bush, Grass, Bamboo	
Swamp	
Lake, pond or water tank	
Streams	
River	
Canal, Ditch	
Dam, Sluice gate, Weir	
Water tank or pond, Well	
Sand and Gravel area	
Aqueduct	
Ferry, Ford, Twin service	
Water tap, well, Water tower	
Spring, Oase away place	
Triangulation point, Bench mark	
Mountain pass, Spot height	
Fence or wall	
Index contour	
Intermediate contour	
Supplementary contour	
Embankment	
Cutting	
Depression: Big	
Depression: Small	
Sol cliff: Large, Small	
Rocks: Large, Small	
Cliff: rock, ice	
Quarry, gravel or clay pit	
International boundary	
District boundary	
VDC/Municipality boundary	
VDC Name	BASANTAPUR
Radio transmission tower	
Mobile Camp and Storage	
Transformer station	
33 KV Transmission line	
66 KV Transmission line	
132 KV Transmission line	

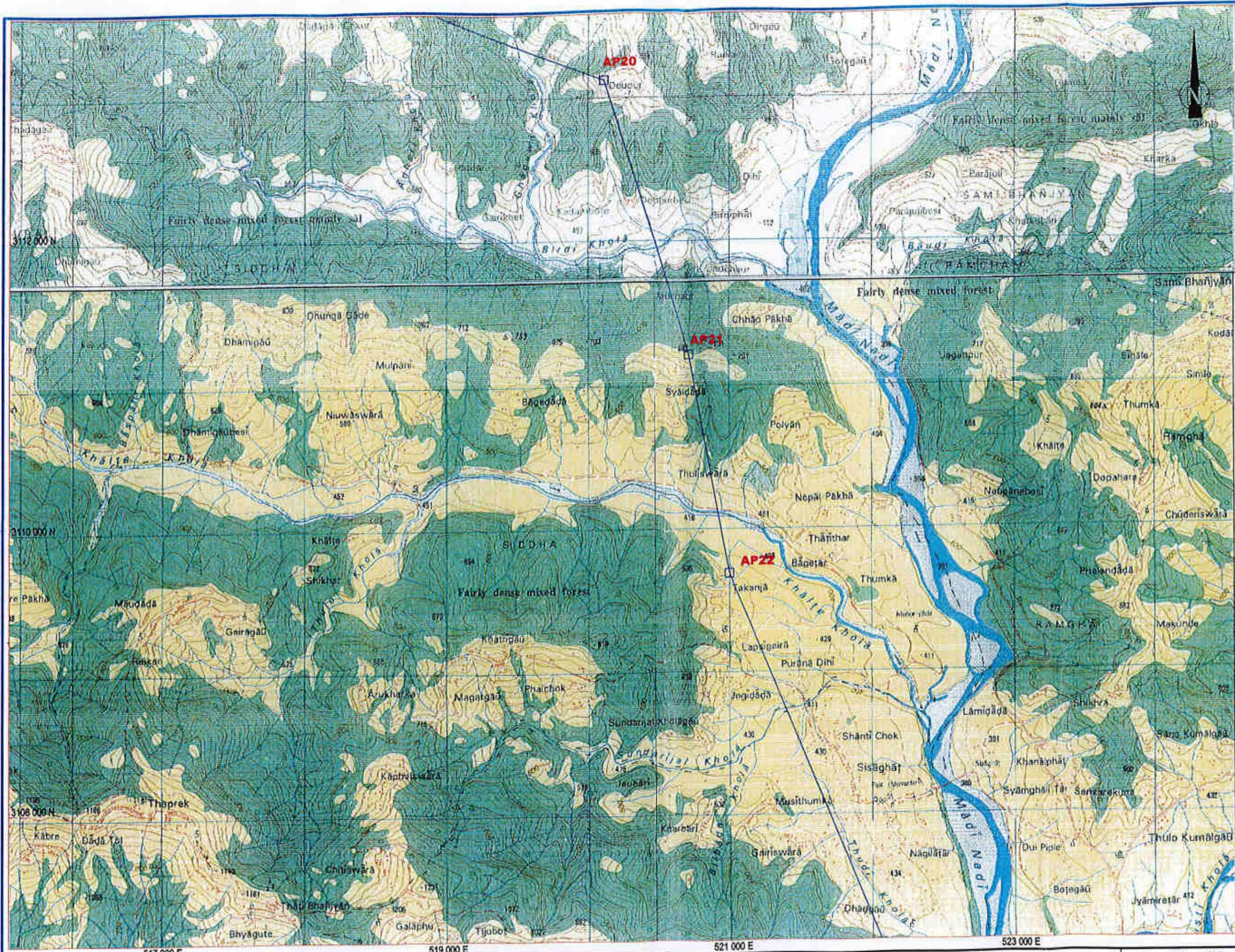


LEGEND

- Highway with Bridge
- Feeder Road with Bridge
- District Road with Bridge
- Other Road with Bridge
- Cart Track with Bridge
- Main Foot Trail with Bridge
- Minor Foot Trail with Bridge
- Road under construction
- Ropeway line
- Bull-up area
- Building or house
- Factory, Chimney
- School, Post office
- Hospital, Health post
- Cemetery
- Temple or Stupa, Mani
- Mosque, Church
- Orchard, Nursery
- Trees: Scattered, Prominent, Row
- Tea or coffee plantation
- Forest
- Bush, Grass, Bamboo
- Swamp
- Lake, pond or water tank
- Streams
- River
- Canal, Ditch
- Dam, Sluice gate, Weir
- Water tank or pond, Well
- Sand and Gravel area
- Aqueduct
- Ferry, Ford, Twin service
- Water tap, well, Water tower
- Spring, Goats away place
- Triangulation point, Bench mark
- Mountain pass, Spot height
- Fence or wall
- Index contour
- Intermediate contour
- Supplementary contour
- Embankment
- Cutting
- Depression: Big
- Depression: Small
- Soil cliff: Large, Small
- Rocks: Large, Small
- Cliff: rock, ice
- Quarry, gravel or clay pit
- International boundary
- District boundary
- VDC/Municipality boundary
- VDC Name: **BASANTAPUR**
- Radiotransmission tower
- Mobile Camp and Storage
- Transformer station
- 33 KV Transmission line
- 66 KV Transmission line
- 132 KV Transmission line

Sheet Index

1	2
3	4
5	6



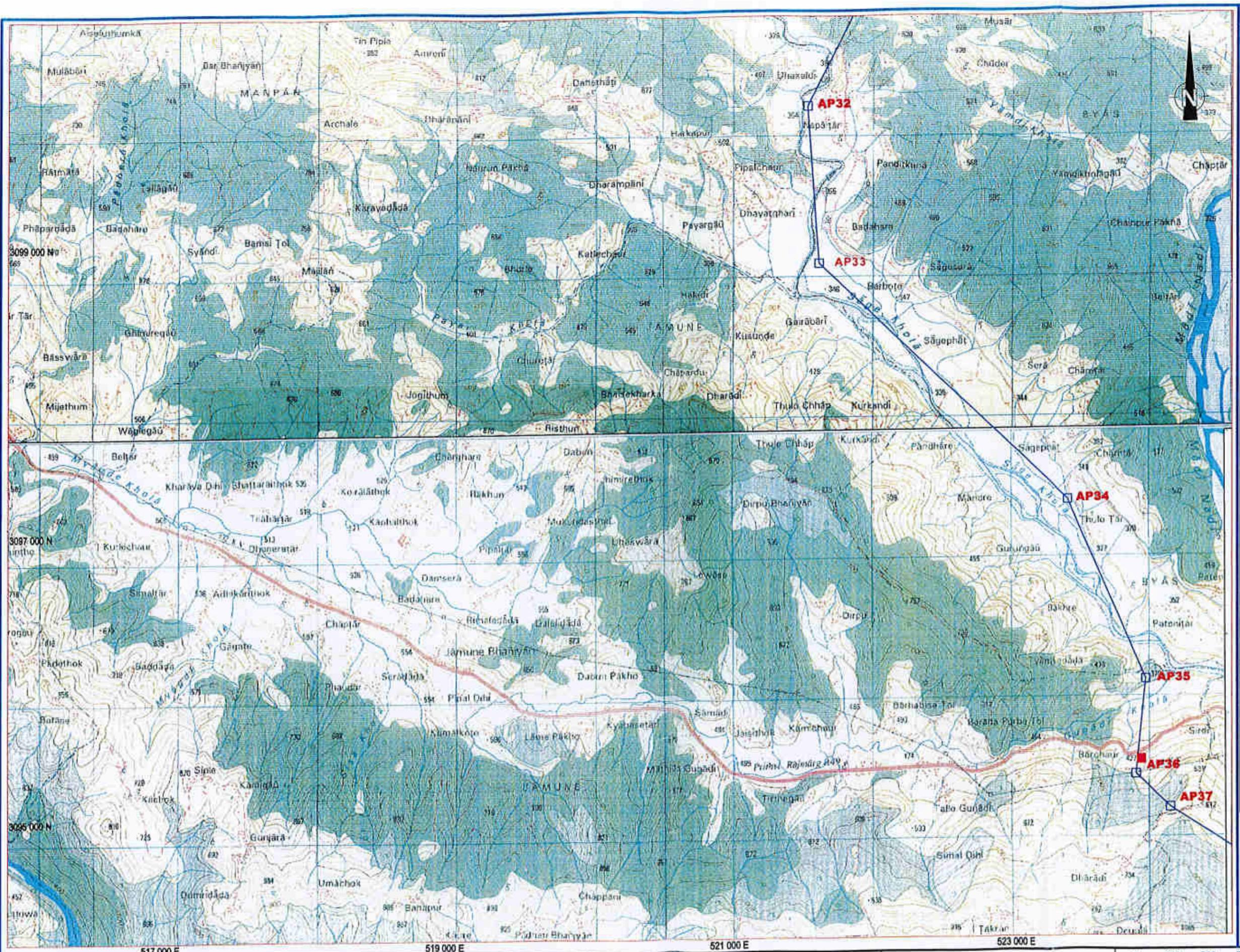
LEGEND

- Highway with Bridge
- Feeder Road with Bridge
- District Road with Bridge
- Other Road with Bridge
- Cart track with Bridge
- Main Foot Trail with Bridge
- Minor Foot Trail with Bridge
- Road under construction
- Ropeway line
- Bull-up area
- Building or house
- Factory, Chimney
- School, Post office
- Hospital, Health post
- Cemetery
- Temple or Stupa, Mane
- Mosque, Church
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- Trees: Scattered, Prominent, Row
- Tea or coffee plantation
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- Bush, Grass, Bamboo
- Swamp
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- Streams
- River
- Canal, Ditch
- Dam, Sluice gate, Weir
- Water tank or pond, Well
- Sand and Gravel area
- Aqueduct
- Ferry, Ford, Tain service
- Water tap, well, Water tower
- Spring, Ooze, dry place
- Triangulation point, Bench mark
- Mountain pass, Spot height
- Fence or wall
- Index contour
- Intermediate contour
- Supplementary contour
- Embankment
- Cutting
- Depression: Big
- Depression: Small
- Soil cliff: Large, Small
- Rocks: Large, Small
- Cliff: rock, ice
- Quarry, gravel or clay pit
- International boundary
- District boundary
- VDC/Municipality boundary
- VDC Name: BASANTAPUR
- Radiotransmission tower
- Mobile Camp and Storage
- Transformer station
- 33 W Transmission line
- 66 W Transmission line
- 132 W Transmission line

Scale: 1:25,000

Date: February - 2011

Sheet No. 3/6

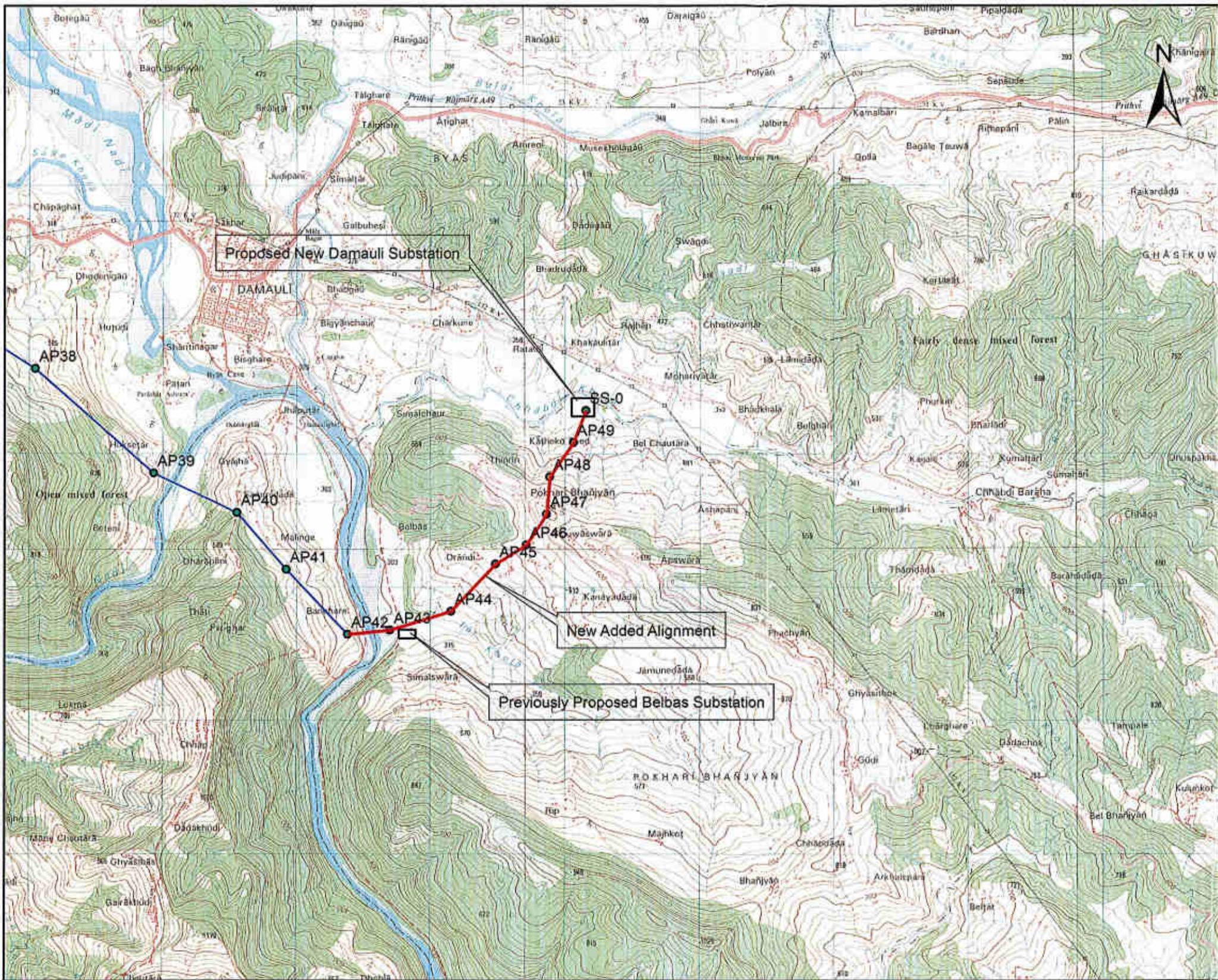


LEGEND

- Highway with Bridge
- Feeder Road with Bridge
- District Road with Bridge
- Other Road with Bridge
- Cart Track with Bridge
- Main Foot Trail with Bridge
- Minor Foot Trail with Bridge
- Road under construction
- Ropeway line
- Bull-up area
- Building or house
- Factory, Chimney
- School, Post office
- Hospital, Health post
- Cemetery
- Temple or Stupa, Mon
- Mosque, Church
- Orchard, Nursery
- Trees: Scattered, Prominent, Row
- Tea or coffee plantation
- Forest
- Bush, Grass, Bamboo
- Swamp
- Lake, pond or water tank
- Streams
- River
- Canal, ditch
- Dam, Sluice gate, Weir
- Water tank or pond, Well
- Sand and Gravel area
- Aqueduct
- Ferry, Ford, Twin service
- Water tap, well, Water tower
- Spring, Ooze away place
- Triangulation point, Bench mark
- Mountain pass, Spot height
- Fence or wall
- Index contour
- Intermediate contour
- Supplementary contour
- Embankment
- Cutting
- Depression: Big
- Depression: Small
- Soil cliff: Large, Small
- Rock: Large, Small
- Cave: rock, ice
- Quarry, gravel or clay pit
- International boundary
- District boundary
- VDC/Municipality boundary
- VDC Name: **BASANTAPUR**
- Radiotransmission tower
- Mobile Camp and Storage
- Transformer station
- 33 kV Transmission line
- 66 kV Transmission line
- 132 kV Transmission line

Sheet Index

1	2
3	4
5	6



Legend

Highway with bridge	
Feeder road with bridge	
District road with bridge	
Other road with bridge	
Cart track with bridge	
Main foot trail with bridge	
Minor foot trail with bridge	
Built-up area	
Building or house	
Temple or Stupa, Māna	
Mosque, Church	
Cemetery	
School, Post office	
Hospital, Health post	
International boundary	
District boundary	
VDC or municipality boundary	
Village Development Committee name	MADANPUR
Bush area, Forest area	
Grass area, Barren area	
Swamp	
Index contour	
Intermediate contour	
Supplementary contour	
Embankment	
Cutting	
Depression: Big	
Depression: Small	
Soil cliff: Big, Small	
Rocks: Large, Small	
Cliff: Rock, Ice	
Quarry, Gravel or clay pit	
Cultivation	
New added Alignment	

 Nepal Electricity Authority Durbarmarg, Kathmandu, Nepal	ENGINEERING SERVICES PROJECT DEVELOPMENT DEPARTMENT	Title Route Alignment Map	Lekthnath-Damauli 220KV TLP	0 0.3 0.6 1.2 1.8  KM
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 नेपाल विद्युत प्राधिकरण
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3 STUDY METHODOLOGY

The Updated IEE process is prepared in accordance with the legal requirements of Government of Nepal (GoN), based on approved IEE, field study, consultation with local people/stakeholders and officials. The study methodology for each environment (physical, biological and socio-economic and cultural) is discussed in the following section.

3.1 Physical Environment

3.1.1 Data Requirement

The following data were collected during the IEE:

- Meteorological data: maximum/minimum temperature and rainfall of the project area;
- Topographical data: Altitude and landscape;
- Air, water and noise quality of the project area;
- Physical setting: Physiographic location, river system etc. of the project area;
- Geological data: Rock type, soil type, slope stability, erosion, landslides, flood area, etc. of the project area;
- Spoil materials: Total volume, volume to be used for construction, disposal volume, etc.;
- Significant crossings along the alignment; and
- Land use pattern of the project area.

3.1.2 Data Collection Methods

3.1.2.1 Desk Study and Literature Review

Review of Updated IEE reports of similar types of TL projects, district level annual reports and other pertinent literatures was done. Topographical and land use maps of the area including the Google Earth map were studied for field study. The major reports consulted are: District Profile reports of Kaski and Tanahun published by District Statistics Office (DSO), Pokhara; Feasibility and Survey Reports of LDTLP. On the basis of the reviewed information regarding the project areas, data gaps were identified and the methodology described in this chapter was developed to collect other relevant information required for the Updated IEE.

Documents and other relevant literature were collected and reviewed. The data on climate (temperature and rainfall) was collected through secondary source; the published data of Department of Meteorology and Hydrology (DHM). The data on air, noise and water quality of the area has been collected through observation by subject expert during site visit. Geographic and geological data, such as topography, rock type and soil type, stability of the APs locations, soil erosion and other key environmental features were investigated and obtained from the geological maps and previous geological reports of the Nepal and by general observation. Physical settings, land use pattern and significant crossings were adopted from topographical maps, site observation and detail plan and profile of the TL.

Following documents were reviewed to collect relevant information on physical environment;

- 1:25000 scale topographical maps prepared by the Department of Survey, GoN;
- 1:100000 scale district map of Kaski and Tanahun districts;
- Detail Survey Report of LDTLP prepared by Engineering Service Directorate, Project Development Department, NEA;
- Approved ToR of LDTLP;
- Geological Maps and previous geological reports of the Nepal;
- District profile of affected district, district information centre; and
- Google Earth, the online software for verifying the TL.



3.1.2.2 Field Observation

A detail field study along the proposed TL was conducted to collect information on existing physical environment. The obtained data of land use pattern, river system and significant crossings along the alignment from the review of the topographical maps and plan and profile of the alignment has further been verified at site. The geology around the project area has been covered in the Updated IEE report, as per the available information in the feasibility report and site visit. The stability of slopes and the presence of landslides, fan deposits and rock fall within the project area were evaluated mainly by site observations and from topographical maps.

3.1.3 Data Analysis

The type of land use and area calculation has been prepared with reference to the topographical maps, survey report, digital maps provided by the Department of Survey with field verifications. Similarly, the numbers of structures under RoW, at substation area and near APs were determined with the help of the plan and profile of the Final Survey Report with verifications at site. The collected data from the field visit was analyzed using different software like ArcGIS 10.2.1, AutoCAD, Google Earth, MS Office by the study team in coordination with the project engineers and experts. The beneficial and adverse impacts have been predicted and appropriate mitigation measures proposed to reduce the impacts.

3.2 Biological Environment

3.2.1 Data Requirement

The following data were collected during the Updated IEE study phase:

- Types of forest and its area;
- Tree species
- Types of herbs, shrub and protected plant species;
- Type of ethnobotanical plants and NTFPs observed;
- Types of fauna (mammals, birds, protected species and others) observed and reported in the project site;
- Loss of trees from government forest, Community Forest (CF) and private forest;
- Loss of types of NTFPs; and
- Observation of bird species

3.2.2 Data Collection Methods

a) Desk Review

Secondary information was reviewed from the Community Forestry Monitoring and Annual Progress Reports of Kaski and Tanahun DFO, Forest and Vegetation Types of Nepal published by Tree Improvement and Silviculture Component of DoF, Forest Resource Inventory Guidelines, 2061, Forest Act and Rules, Government Tree Cutting Procedures, 2071. Meeting was also held with concerned officials in the Ministry of Forest Environment (MoFE), DFO of Kaski and Tanahun.

b) Walk through Survey

Walk through survey was conducted at each project site to make general observation of the vegetation type and forest area delineation in different project components including that for Updated section (2.66Km) to observe general biological conditions in the project area. Information on wildlife and birds were collected through observation and consultation with local resource persons and reverified by field observation and informal discussions with the locals. During the field visit, indirect evidence such as droppings, pug marks, foot prints and scales of the animals were also observed.

c) Quadrant Sampling and Total Enumeration

In the approved IEE, altogether twenty (20) sampling plots, each of 400 sq. m, were taken for quantitative analysis of vegetation in CF. This represents 3.57% of total CF and government forest area (0.80ha out of 22.3947ha) along the entire TL. In each plot, tree species were identified, and all trees equals or exceeding a diameter of 10 cm at breast height (dbh) were counted with their height and dbh. For enumeration of seedlings and saplings, a plot of 10 m x 10 m was made within the 20 m x 20 m. plot and their number were noted down species wise. Similarly occurrence and distribution pattern of shrubs and herbs species available in and around the sample plots and along the alignment were noted.

Whereas for the whole alignment 44.49km, with additional 2 sampling plots, 22 plots were considered. This represents 3.84% of the total government and community forest area required for the project (0.88ha out of 22.8747ha). Thus, data from 22 sampling plots were taken for the analysis of density, frequency, dominance and IVI.

In addition, for the Updated section of the alignment i.e. additional 2.66 Km, total enumeration was carried out for estimation of loss of pole and tree sized species. Within the right of way (RoW) of the alignment i.e. 15m on either side of the centerline, tree and pole sized species were counted, their dbh and height were noted. For estimation of sampling and seedlings, sampling plot was taken. Standard sampling plots were taken for enumeration of saplings and seedlings. For seedlings, 1 m x 1 m plot was used.



Picture 3-1: Delineation of Sample Plot



Picture 3-2: Measurement of dbh of tree



Picture 3-3: Establishment of plot



Picture 3-4: Measurement of dbh

Based on this information, loss of regeneration (saplings and seedlings), loss of vegetation (pole and tree class), species wise standing wood volume and biomass is calculated. In this report, trees having more than 30cm dbh are referred as tree sized, trees having 10 to 29.9cm dbh are

referred as pole sized, trees having 4.0 to 9.9cm dbh are considered as saplings and having less than 4.0cm dbh are considered as seedlings (Forest Rules, 1995). Diameter at breast height was measured at 1.3m from the ground level.

d) Group Discussion

Consultation were carried out with all affected CFUGs and officers of DFO to collect ethno-botanical information. A checklist was developed and introduced in the field to collect the primary information about the dependency of local people on CF and non-timber forest product (NTFP) etc.

During the group meetings and discussions, participants were introduced about the project features, potential impact on the environment, various mitigation and enhancement measures likely to be adopted during construction and operation phase of the project. The issues raised during meetings were discussed and recorded. Similarly, meetings, interviews and discussions were held with the members of CFUGs, local people and officials of concerned DFO and Area/Ilaka Forest Office to collect information on the availability of flora and fauna, dependency of local people on forest resources, availability of NTFPs, etc. For the Updated section, focus group discussion was carried out with one affected CFUG to collect the baseline information on forests, their views, concerns and suggestions regarding the project etc.

3.2.3 Data Analysis

The data from forest sampling were quantitatively analyzed for density, basal area, crown coverage and wood volume. These parameters were calculated using the following formulae:

$$\text{Density (D)/hectare} = \frac{\text{No. of individuals of a species}}{\text{Size of the plot} \times \text{Total no. of plots sampled}} \times 10,000$$

$$\text{Relative Density (RD)} = \frac{\text{No. of individual species}}{\text{Total number of all species}} \times 100$$

$$\text{Frequency (F) \%} = \frac{\text{Total no. of plots in which the sp. occurred}}{\text{Total no. of plots sampled}} \times 100$$

$$\text{Relative Frequency (RF)} = \frac{\text{Frequency of individual species}}{\text{Frequency of all species}} \times 100$$

$$\text{Relative dominance (RDom)} = \frac{\text{Total basal area of particular species}}{\text{Total basal area of all species}} \times 100$$

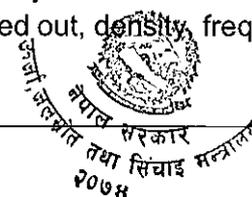
Basal Area is the trunk cross-sectional area. The basal area of each of trees was calculated on the basis of diameter at breast height.

$$\text{Basal Area (BA)} = \pi (\text{dbh}/2)^2$$

$$\text{Importance Value Index (IVI)} = \text{RD} + \text{RF} + \text{RDom}$$

$$\text{Wood volume of standing tree} = 1/2 \times \text{BA} \times \text{Height}$$

For the Updated section of the alignment, data were analysed for calculation of basal area, volume. Since both sampling and census survey was carried out, density, frequency, abundance and IVI were also calculated.



3.3 Socio-economic and Cultural Environment

3.3.1 Data Requirement

The following types of data are acquired for IEE:

Table 3-1: Requirement of data

S.N	Parameter	Area of Study	PAD	PAA	DIA/PAF
Social Features					
1	Demography	Population distribution, age group distribution	√	√	
2	Ethnicity	Ethnic groups, dominance/minority, ethnic composition.	√	√	√
3	Language	Major languages, number of people speaking, literature and media of local language	√	√	√
4	Religion	Major religion, number of religion followers.	√		√
5	Festivals	Major festivals, festive seasons, their importance	√		√
6	Migration	Migration pattern-in/out, Seasonal/permanent, causes of migration, impact of migration in population dynamics of local area.	√	√	√
7	Gender Aspect	Women's right-property and participation, violence, disparity, child marriage, human trafficking and any other social evils	√	√	√
8	Law and Order Situation	Crime and violence, major types of crime, local conflict for resources, honor etc., traditional conflict resolution system, police post, legal access etc.		√	√
9	Education and Literacy	Educational institutions; literacy rate.	√	√	√
10	Health and Sanitation	Health institutions, health facilities, common disease, drinking water supply, use of latrine.	√	√	√
11	Road and Transportation	Road network in the project area, public transportation, road access to surrounding project area, means of transportation.	√	√	
12	Energy	Electrification in the project area, means of electrification, fuel sources for household use, access to fuel wood etc.	√	√	√
13	Communication and Other Facilities	Telephone (landline/wireless) network in the project area, accessibility to internet and other means of modern communication (television, radio, newspaper).	√	√	√
14	Tourism activities	Places of touristic attraction.	√	√	
15	Community infrastructures and service	Drinking Water, Supply, Irrigation, Foot Trails, Transportation, Electricity, Telecommunication, etc.;	√	√	√
16	Local institution and activities	Government and non-government agencies, cooperatives, community based organizations;	√		
Economic Features					
17	Economy	Occupation, employment, agriculture and livestock production, trade and commerce, etc.	√	√	√
18	Land and Assets	Land holding size and ownership; measurement and valuation of houses, cowsheds and other structures to be acquired; compensation rates for land, etc.			√
19	Economic status	Income and expenditure			√
20	Crops and Livestock	Cropping pattern, practices and production; livestock raising; loss of standing crops			√
Cultural Features					
21	Archeological, Historical and Religious Sites	Existing such site, their location, their importance, fame of area-local/regional, conservation status.	√	√	√

S.N	Parameter	Area of Study	PAD	PAA	DIA/PAF
22	Places of cultural importance	cultural sites and the special occasions of celebrations/ gathering, including the relative importance of these sites; cultural practices		√	√
23	Aesthetic value	Aesthetic value of the affected landscape		√	√
24	Attitude of the local people	Attitude towards the development of this project			√

3.3.2 Data Collection Methods

a) Literature Review

Based on previous experiences and the review of relevant literature associated with IEE of various TL projects, demographic tables were developed. To fill these tables, a desk study was conducted in the office. All the relevant information associated with socio-economic and cultural environment was reviewed. On the basis of the reviewed information, data gaps were identified and the following techniques were used to generate the remaining data. The following documents were reviewed to collect relevant information on socio-economic and cultural environment;

- Population Census, Central Bureau of Statistics (CBS), GoN/ Nepal, 2011;
- Demographic profile of Nepal 2013/14;

b) Field Observation

Observation of the project site was made to obtain information on different socio-economic and cultural activities of the impact area. Religious sites of the project area were identified and analyzed the impact on these sites within the range of high impact area (HIA) or moderate impact area (MIA). At the end of each day, notes were written about the observations and a field diary was maintained.

c) Households' Survey

The land owners of the APs/substation and the land owners/structure owners of the high impact zone have been identified. These identified families were considered as PAFs. In addition, the families losing their residence irrespective of their land holding size and other off farm income and the families losing more than 50% of their total landholding were identified as Seriously Project Affected Families (SPAFs). Land/structure owners were identified, through consultation with the local people, owners, GPS and Toposheet.

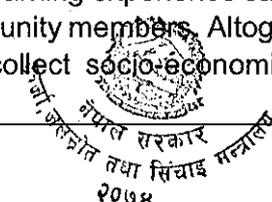
According to approved IEE, LD TLP affected 84 HHs (excluding those HHs who would be affected due to the suspension tower foundation and land under RoW) including 37 HHs of the previous proposed substation at Belbas. Due to the change in the substation location new 44 HHs are included in the list of affected whereas 37 HHs of the previous proposed substation at Belbas are excluded from the list of affected. Total number of HHs in the Updated IEE report is 91. For the Updated IEE, HH survey of 27 HHs were carried out from the additional 44 HHs (substation-39 HHs and additional tower- 5 HHs). A census survey of 27 HHs was carried out from the new 44 HHs, and remaining HHs were missing during the time of HHs survey.

d) Market Survey

Market survey was conducted in the PAA to get the prevailing price of agricultural commodity, major construction materials, and wage rate. The market survey was conducted with the help of a checklist.

e) Participatory Rural Appraisal (PRA)

PRA is an intensive systematic and semi-structured learning experience carried out in the project area by a multidisciplinary team which includes community members. Altogether, two PRAs were conducted in the PAA affected by the project to collect socio-economic information, views,



concerns and expectations of local people from the project. Similarly, the participants were also informed regarding the project and its activities during PRA.



Picture 3-5: Public Consultation Program at Byas



Picture 3-6: HH Survey at Shyamgha

Table 3-2: Date, Location and Number of Participants in PRA

S.N.	Date	RM/Municipality/MC	Male	Female	Total
1.	2075/01/13	Byas-1, Tanahun	7	3	10
2.	2073/01/15	Byas-13, Tanahun	8	2	10
Total			15	5	20

f) Key Informant Interview (KII)

KII was employed with CFUG members and teachers of the project area. The main objective of KIIs was to assess their views, concerns and expectation from the project and collect relevant information of the project area. The main objective of KIIs was to assess their views, concerns and expectation from the project and collect relevant information of the project area. Altogether 2 KIIs were conducted in the PAA. The respondents of the KIIs were purposively selected.

3.3.3 Data Analysis

The field data collected from the PAA were compiled edited and analyzed in Kathmandu using windows software like MS office software (Word, Excel). The analyzed data were then interpreted and discussed in appropriate sections of the IEE report.

3.4 Impact Identification, Prediction and Evaluation

A logical, simple and systematic approach has been adopted for impact identification, prediction and evaluation. The impact has been identified for physical, biological and, socio-economic and cultural environment of the project area. The following tools have been used for impact identification:

- VDC Checklist, KII
- HHs Questionnaire
- Table format for loss of land, crop production and property (PAFs and SPAFs)
- Expert's judgment

Topographic map of the alignment has been used in predicting the impacts of the proposed TL by analyzing the effect of project activities on the resources like existing infrastructures, rivers/rivulets, settlements, private land, forest etc. present in the location. The expert's judgment using past experiences of similar type of projects have been used to predict impacts. Wherever possible, impact predictions have been done quantitatively. The assessment of impacts is based on the baseline environmental conditions of the affected area with the project activities in relation to spatial and temporal aspects in terms of magnitude, extent and duration using various environmental prediction methods. The impact has been predicted over a specified period and within defined area. Consequences of environmental impacts were interpreted in terms of local, regional and national contexts. The significant positive and adverse environmental impacts

associated with the project components have been identified considering the impact zone. The magnitude, extent and duration of the impacts which were categorized according to the National EIA Guidelines, 1993 are given below:

Magnitude of Impacts

- Low Impact (L): If the value of the resources could be used with no or minimum inconvenience to the public
- Medium/Moderate Impact (M): If the value of the resources could be used with inconvenience to the public.
- High Impact (H): If the value of the resources reduced far below publicly acceptable level

Extent of Impacts

- Site Specific (SS): The impact is limited within RoW or within any project component then it is site specific one.
- Local (L): If the impact of the work extends to the adjoining wards and or within 100m up 300m from the TL or tower then it is termed as local.
- Regional (R): If the impact of the work extends to the entire district or further then it is termed regional.

Duration of Impacts

- Short Term (ST): If the impacts last for 3 years after project initiation it is classified as short term. Construction phase impacts are mostly categorized under this category.
- Medium Term (MT): An impact that continues for more than 3 years but less than 20 years is considered as medium-term. The construction phase impacts which carry over for few years of operation falls under this category.
- Long Term (LT): An impact that lasts beyond 20 years is considered to be long term. The operation phase impacts are mostly categorized under this category.

The National EIA Guidelines 2050 has provide the numeric value for each type of impact as follows;

<u>Extent (E)</u>	SS= Site Specific (10)	L= Local (20)	R= Regional (60)
<u>Magnitude (M)</u>	L= Low (10)	M= Medium (20)	H= High (60)
<u>Duration (Du)</u>	ST= Short Term (05)	MT= Medium Term (10)	LT= Long Term (20)

The number in the bracket refers to Impact value as per National EIA Guidelines, 1993. The sum of impact values provides a maximum of 140 and minimum of 25. Significance of impact was evaluated based on the sum of the impact values in the following manner;

S.N	Sum of Impact Values	Significance Level
1	more than 75	Highly Significant
2	50-75	Significant
3	less than 50	Less Significant

3.5 Public Notice and Recommendation Letters

A 15 days public notice was published in Gorkhapatra National Daily on 08-02-2076 BS (Appendix E). The notice consisted of a statement regarding brief project information and request to provide comments and suggestions within 15 days to the project office or ESSD. A team was mobilized in the field with copy of public notice along with cover letters to the concerned RM/Municipality/MC, district level line agencies and other local stakeholders. Copy of the notice was displayed in the project sites and proof of deed (*Muchulkas*) were collected (Appendix G). Similarly, recommendation letters were collected from the affected RM/Municipality/MC (Appendix F). Summary of the draft IEE report was distributed to the concerned RM/Municipality/SMC.

3.6 Limitations of the Study

The assessment of the site conditions was based mainly upon visual observations, literature and interviews with the local people. Since no Updated topographic maps are available, the GIS analysis was based on topo-maps mainly of mid-1990s. The GIS-generated information, mainly land-use, does not coincide with the actual field data. Field verifications were done to minimize the error but still some conflicts are encountered in mapping. The lack of site-specific location of suspension tower and ancillary facilities (construction camps, stores, etc.) during the field study created some difficulties in assessing the impact of the project.

Some information, particularly on physical and biological environment, reflects the characteristic only of that particular season and time of investigation. This resulted in generalization of impacts for such tower and facilities. Difficulties were also encountered during the socio-economic data collection as some of the land/structure owners of the affected area were not available during the questionnaire survey. Furthermore, some information mainly on land holding, agricultural production, income and expenditure are approximate value based on HH survey. Since the exact location and ownership of land required for STs and RoW was not available during IEE period (only to be determined in final check survey of the TL project), the survey of those HH was not carried out.

3.7 The Study Team

The following personnel were involved in the preparation of Updated IEE of the proposed TL:

Table 3-3: List of Experts involved in UPDATED IEE

S.N.	Name	Designation	Specialization	Address	Phone No.
1	Krishna Pd. Joshi	Team Leader	Statistics	NEA- ESSD	01- 6611580
2	Shailaza Gyawali	Team Member	Sociology		
3	Kabita Poudyal	Team Member	Environment		
4	Prabesh Wagle	Team Member	Civil Engineering/GIS		

Beside the aforementioned study team, the experts from the project were also involved in providing the project's technical data/facts and figures and suggestions for the preparation of this Updated IEE Report. As well as enumerators and field helpers were hired at the local level to assist the study team in collecting baseline on each environmental domain and other necessary field data.

4 REVIEW OF POLICY AND LEGAL PROVISIONS

4.1 Introduction

The prevailing Acts, Policies, Regulations and Guidelines, which are required for the construction and operation of TL projects in Nepal, have been reviewed as per the followings while preparing the present UPDATED IEE report. The proponent will abide by any other laws besides those already mentioned in the documents that are attracted due to different activities that will be undertaken during project implementation.

Before, moving into the review of policy and legal provision, it is worthwhile to compare the changes in these provisions from the approved IEE with this UPDATED IEE. The following table shows such comparison.

Table 4-1: Comparative List of Relevant Policies and Legislations

S.N.	Category	Approved IEE	UPDATED IEE	Remarks
1	Constitution	Constitution of Nepal (2072)	Constitution of Nepal (2072)	No change
2	Plan and Policy	Fourteenth Three Year Plan (2073/74-2075/76 BS), 2016	15 th Plan Approach Paper	New Policy
		National Energy Crisis Reduction and Development Decades, 2072 (2015) Concept paper	National Energy Crisis Reduction and Development Decades, 2072 (2015) Concept paper	No change
		Nepal Environmental Policy and Action Plan, 2050 (1993) and 2055 (1998)	National Environmental Policy, 2076	New Policy, Added
		Fourteenth Three Year Plan (2073/74-2075/76 BS), 2016	Fourteenth Three Year Plan (2073/74-2075/76 BS), 2016	No change
		Forestry Sector Policy, 2071 (2015)	National Forest Policy 2075 (2019)	New Policy, Added
		Hydropower Development Policy, 2001	Hydropower Development Policy, 2058 (2001)	No Change
		Climate Change Policy, 2067 (2011)	National Climate Change Policy, 2076	New Policy, Added
		National Bio-Diversity Strategy and Action Plan 2014-2020	National Bio-Diversity Strategy and Action Plan 2014-2020	No Change
		National Policy on Land Acquisition, Compensation and Resettlement, 2015	National Policy on Land Acquisition, Compensation and Resettlement, 2015	No Change
		-	Landuse Policy, 2072	Added
3.	Acts	Land Acquisition Act, 1977	Land Acquisition Act, 2034 (1977)	No Change
		Soil and Watershed Conservation Act, 2039 (1982)	Soil and Watershed Conservation Act, 2039 (1982)	No change
		Water Resources Act, 2049 (1992)	Water Resources Act, 2049 (1992)	No Change
		Electricity Act, 1992	Electricity Act, 2049 (1992)	No Change
		Forest Act, 2049 (1993)	Forest Act, 2049 (1993)	No Change
		Labor Act, 2074 (2017)	Labour Act, 2074 (2017)	No Change
		Environment Protection Act, 1997	Environment Protection Act, 2053 (1997)	No Change

S.N.	Category	Approved IEE	UPDATED IEE	Remarks
		Local Government Operation Act, 2074 (2017)	Local Government Operation Act, 2074 (2017)	No Change
		Child Labor (Prohibition and Regulation) Act, 2056 (2000)	Child Labor (Prohibition and Regulation) Act, 2056 (2000)	No change
		CITES Act, 2073 (2017)	Control of International Trade of Endangered Wild fauna and Flora Act, 2073 (2017)	Name modified
		Solid Waste Management Act, 2068 (2011)	Solid Waste Management Act, 2068 (2011)	No change
		-	Contribution Based Social Security Act 2017	Added, New Act
		-	Muluki Dewani (Sanhita) Act, 2074	Added, New Act
		-	Land use Act, 2076	Added, New Act
		-	The Act Relating to Children, 2075	Added, New Act
		-	Electricity Regulatory Commission Act, 2074	Added, New Act
4.	Rules/ Regulations	Electricity Rules, 2050 (1993)	Electricity Rules, 2050 (1993)	No Change
		Environment Protection Rules, 2054 (1997)	Environment Protection Rules, 2054 (1997)	No change
		Water Resources Rules, 2050 (1993)	Water Resources Rules, 2050 (1993)	No Change
		-	Forest Rules, 2051 (1995)	Added
		-	Labor Rules, 2075 (2018)	Added, New Rules
		-	Solid Waste Management Rules, 2070 (2013)	Added
		-	Contribution Based Social Security Regulation 2018	Added, New Rules
		-	Electricity Regulatory Commission Rules, 2075	Added, New Rules
5	Guidelines and Directives	National EIA Guidelines, 1993	National EIA Guidelines, 2050 (1993)	No Change
		EIA Guidelines for Forestry Sector, 2052 (1995)	EIA Guidelines for Forestry Sector, 2052 (1995)	No Change
		Forest Produce Collection, Sales and Distribution Guidelines, 2057 (1998)	Forest Produce Collection, Sales and Distribution Guidelines, 2073	Updated
		Community Forest Guidelines, 2058 (2001)	Community Forest Guidelines, 2071	Guideline Updated
		Community Forest Inventory Guidelines, 2005	Community Forest Inventory Guidelines, 2005	No change
		Working Procedure for the Use of National Forest Land for National Priority Project, 2074 (2017)	Working Procedure with Standards for the Use of National Forest Land for National Priority Project, 2076	Updated
		-	Order for Remission of Land Ceiling Exemption, 2074	Added, New
		-	Directives Relating to Licensing of Power Projects 2075 (2018)	Added, New Guideline

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S.N.	Category	Approved IEE	UPDATED IEE	Remarks
		-	Hydropower Environmental Impact Assessment Manual 2018	Added, New Manual
		-	Social Security Schemes Operation Directives, 2018 (2075)	Added, New
6	Convention	Convention on Biological Diversity, 1992	Convention on Biological Diversity, 1992	No Change
		Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	No Change
		International Labor Organization (ILO) Convention of Indigenous and Tribal Peoples	International Labor Organization (ILO) Convention of Indigenous and Tribal Peoples (No. 169)	No Change
7	Standards	-	National Ambient Air Quality Standard, 2069 (2012)	Added
		-	Nepal Vehicle Mass Emission Standard, 2069 (2012)	Added
		-	National Ambient Sound Quality Standard, 2069 (2012)	Added
		-	Standard on Emission of Smoke by Diesel Generators, 2069 (2012)	Added

4.2 Constitution of Nepal

In the Article 30 of Part 3 of the Constitution of Nepal states about the Right to Clean Environment: According to this article all citizens shall have the right to live in clean environment, and in case if there is injury caused from environmental pollution or degradation, the victim have the right to obtain compensation. In the same way, Article 51(g) explains Policies relating to Protection, Promotion and use of Natural resources under the Policies of the State as follows;

- to protect, promote, and make environmental friendly and sustainable use of, natural resources available in the country, in consonance with national interest and adopting the concept of intergenerational equity, and make equitable distribution of fruits, according priority and preferential right to the local communities,
- to make multi-purpose development of water resources, while according priority to domestic investment based on public participation,
- to ensure reliable supply of energy in an affordable and easy manner, and make proper use of energy for the fulfilment of the basic needs of citizens by generating and developing renewable energy,
- to develop sustainable and reliable irrigation by making control of water-induced disasters, and river management,
- to conserve, promote, and make sustainable use of forests, wildlife, birds, vegetation and bio-diversity, by mitigating possible risks to environment from industrial and physical development, while raising awareness of general public about environment cleanliness,
- to adopt appropriate measures to abolish or mitigate existing or possible adverse environmental impacts on the nature, environment or biological diversity,
- to pursue the principles of environmentally sustainable development such as the principles of polluter pays, of precaution in environmental protection and of prior informed consent.



4.3 Plan and Policy

4.3.1 National Energy Crisis Reduction and Development Decades, 2072 (2015) Concept paper

The MoEn has declared the decade 2016-2026 as the National Energy Crisis Reduction and Electricity Development Decade (Energy Emergency Decade). In this regard, the MoEn has issued a Concept Paper on Elimination of Energy Emergency and Electricity Development Decade, 2015 (2072) "Concept Paper" on February 18, 2016, with the objective to substantially end the power outage within the next one year, completely end power outage (even in the dry season) within the next two years, and to ensure energy security within the next decade. The concept paper also contains the provision that hydropower projects with a capacity of more than 10MW should be awarded only through competitive bidding. The proposed law is expected to facilitate the implementation of the 10-year National Energy Emergency Decade.

4.3.2 Fifteen Five Year Plan Approach Paper (2076/77 – 2080/81 BS), 2019

The GoN has drafted the approach paper of the 15th five-year plan (fiscal years 2076/77 – 2080/81 BS). The plan will focus on progression of the country from least developed country to developing country by 2079 BS and achieving the target of Sustainable Development Goals by 2087 BS. The plan has targeted the growth of 10.3% with per capita income \$1595 at the end. The plan will also be the effort made by the government of Nepal to put country league of middle-income country by 2087BS.

4.3.3 Hydropower Development Policy, 2058 (2001)

The Hydropower Development Policy was promulgated in 2001. The main objectives of the policy include producing clean energy through the development of hydroelectric projects and helps to conserve the environment. It is stipulated that one of the policies is to extend the use of electricity for achieving a reduction in the utilization of fuel wood and to render necessary assistance in the conservation of forest and environment.

4.3.4 National Bio-Diversity Strategy and Action Plan 2014-2020

The GoN prepared and implemented Nepal Biodiversity Strategy in 2002 and Nepal Biodiversity Strategy Implementation Plan in 2006. Useful experience and lessons have been learnt from the implementation of the strategy and the plan. Moreover, substantial changes have taken place in the socio-political and environmental contexts of the country over the last decade. Several new themes and issues have emerged or gained prominence since 2002. In light of these changes, MoFSC has prepared this revised 'National Biodiversity Strategy and Action Plan (NBSAP) 2014-2020'. It has been prepared to meet the national needs for managing biodiversity on a sustainable basis for the benefit of present and future generations, and also to fulfill the country's international obligations. It has a long-term (i.e. 35 years) vision, and includes specific short-term (up to 2020) strategies and priorities for action.

4.3.5 National Policy on Land Acquisition, Compensation and Resettlement, 2015

The National Policy on Land Acquisition, Compensation and Resettlement in Development Projects in Nepal was prepared by the National Planning Commission (NPC) with ADB assistance. The Policy has the following guiding principles:

- "Appropriate and adequate compensation for the loss of assets or income is a fundamental right of all project affected persons. Physically displaced people must be relocated with basic amenities such as school, health posts and other facilities.
- All affected persons should be assisted to restore at least their pre-project income and livelihood sources.
- The absence of legal title to land should not be a bar for compensation, resettlement and rehabilitation assistance.

- Vulnerable groups such as *Janajati/Adivasi*, Dalits, landless, women, especially women-headed households, differently-abled, poverty groups and senior citizens are entitled to special benefit and assistance packages in addition to compensation and resettlement.”

4.3.6 National Forest Policy 2075 (2019)

The National Forest Policy 2075 aims to strengthen the forest resources of Nepal. The main goal of this policy is to manage the forest resource sustainably, increase productivity of forest area/sector, increase overall production from forests along with conservation of biodiversity, conservation of sources, and equal sharing and distribution of environmental services gained from conservation. The policy also aims at conservation of water, soil on basin level studying and planning based on catchment level. It encourages private sector for the development and conservation of forest sector. This policy also aims to promote forest based entrepreneurships, diversification, value addition through marketing, creation and promotion of green employment. It also aims to reduce and mitigate the adverse impacts of climate related hazards and enhance climate change adaptation measures and resilience in Nepal.

4.3.7 National Environmental Policy, 2076

As environmental conservation is multidimensional and international issue, Nepal has shown obligation in various international treaties and agreements. This policy has been formulated to direct the environment related acts, rules and other sectoral laws in relation to achieving sustainable development balancing the environment and development; to fulfill the international commitment and co-ordinate and collaborate governmental, non-governmental institute, community, private sector as well as federal, provincial and local level.

Major objective is pollution control, solid waste management and greenery enhancement in order to secure the right to live in clean and healthy environment. Policy related to pollution control encompasses control, abatement and mitigation of all kinds of pollution, use of environmentally friendly technologies in operation of industries, hospitals and transportation, regulation of chemicals in products etc. Policy related to environmental mainstreaming include internalizing environmental aspects in developmental projects. Other related policies are environmental justice, public participation, sustainable development, research and capacity development. Similarly, other aspects of this policy include institutional organization, role of federal, provincial and local level in the implementation of this policy, financial and legal aspect, monitoring and evaluation.

4.3.8 National Climate Change Policy, 2076

The major aim of this policy is to direct the way for the in various levels and related sectors to establish progressive society mitigating the risks related to climate change impacts. The need for formulation of this new policy after climate change policy, 2067 (2011) change in national as well as international dimensions, to effectively address change in climate change management sector, new policy has been formulated according to lessons learnt from implementation of previous policy. The aim of this policy is to develop climate progressive society and national socio-economic development. Policies, strategy and working policy related to this policy are agriculture and food security; forest, biodiversity and watershed conservation; water resources and energy; rural and urban settlement; industry, transport and physical infrastructure; tourism, natural and cultural heritage; health, water supply and sanitation; disaster risk reduction and management; gender equality and social inclusion, livelihood and good governance; capacity development; research, technology development and communication; climate fund management.

4.3.9 Landuse Policy, 2072

Land use Policy (LUP) is a policy document relating to limits and protection of Land and Land Resources (LLRs), optimum use and effective management thereof. Legal and institutional

management for Lands and Land Resources (LLRs), and protection, use and management thereon are done under this Policy. This Policy shall bring about benefits of using Lands and Land Resources (LLRs) by creating a situation of distributing lands in a just manner. The core base of this Policy is taken from the underlying spirit and letters of sub-Section (e) (3) titled as: "Policies relating to Agriculture and Land Reform" under Article 51 of the Constitution of Nepal, 2015 on Chapter of "Directive Principles, Policies and Obligations of the State", where it is envisaged that land management and commercialization, industrialization, diversification and modernization of agriculture shall be done by pursuing a Land use Policy (LUP). :

Objectives of the Land use Policy 2072 are following:

- To categorize/classify entire lands of the country into various Land Use Zones (LUZs);
- To devise of level wise (Federal, Provincial and Local) Land Use Plans (LUPs);
- To ensure of the use of Land and Land Resources(LLRs) on the basis of land use plans (LUPs) for protection of agricultural land, hygienic, beautiful, well-facilitated settlement and sustainable urbanization,
- To assess and apply minimum property valuation and progressive tax system on lands on the basis of specific use after getting prepared of plot based records.

4.4 Acts

4.4.1 Land Acquisition Act, 2034 (1977)

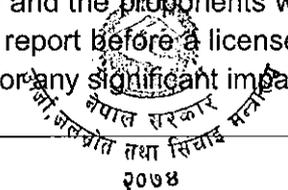
One of the important acts that have a bearing on the implementation mechanisms and mitigation of adverse impacts of power projects is the Land Acquisition Act, 2034. This Act covers all aspects of land acquisition and compensation of land and other assets. It authorizes the government to acquire land for public purpose by providing compensation to the private landowners. The compensation paid under this Act will be given in cash. To decide the amount of the compensation, the Land Acquisition Act (1977) has made provisions for the constitution of a Compensation Fixation Committee (CFC). That committee consists of the chief district officer (CDO), Chief of District Land Administration and Revenue Office, Project Chief or an officer designated by the CDO and the Representative of the DCC. The provisions made in the Act will be applied during acquisition of land. Cultivated land required for the project will be acquired by as per the rates fixed by CFC while forest land will be acquired by taking approval from GoN.

4.4.2 Soil and Watershed Conservation Act, 2039 (1982)

In order to manage watersheds of Nepal, the Soil and Watershed Conservation Act (SWCA), 1982 was enacted. The act is devoted to the protection of watersheds. Under Section 10 of SWCA, power is extended to the Watershed Conservation Officer to grant permission to construct dams, drainage ditches and canals, cut privately owned trees, excavate sand, boulders and soil, discharge solid waste and establish industry or residential areas within any protected watersheds. The Act outlines the essential parameters necessary for proper watershed management. The Act is relevant to the proposed project as the project will utilize the soil for tower foundation in different location. There is likely to impact on soil and watershed condition of the project area. Hence, the project is obliged to follow the SWCA, 2039 during project implementation.

4.4.3 Water Resources Act, 2049 (1992)

The objective of the Water Resources Act, 2049 is to make legal arrangements for determining beneficial uses of water resources, preventing environmental and other hazardous effects thereof and also for keeping water resources free from pollution. The Act strives to minimize environmental damage to water bodies, especially lakes and rivers through environmental impact assessment studies and the proponents who wish to use water resources for various purposes should prepare IEE report before a license can be granted. The Act stipulates that soil erosion, flooding, landslides or any significant impact on the environment should be avoided in all uses of



a water resource. The provisions made in Water Resources Act, 2049 are mandatory in case of the implementation of the proposed project. As per the provision, the environmental impact mitigation and enhancement measures have been proposed in view of environment conservation.

4.4.4 Electricity Act, 2049 (1992)

Electricity Act, 2049 is related to survey, generation, transmission and distribution of electricity. Electricity includes electric power generated from water, mineral oil, coal, gas, solar energy, wind energy etc. Under Section 3 of the Act, it is stated that survey, generation, transmission or distribution of electricity without obtaining a license is prohibited. The Electricity Act, 2049 also contains provisions to minimize soil erosion, flood, air pollution and damage on environment while producing electricity and transmission of the power (Article 24). NEA is responsible for electricity transmission and distribution.

4.4.5 Forest Act, 2049 (1992)

The Forest Act, 2049 (Amendment 2055) recognizes the importance of forests in maintaining a healthy environment. One of the major objectives of the enhancement and enforcement of the Forest Act is the promotion of a healthy environment. The Act requires decision-makers to take account of all forest values, including environmental services and bio-diversity. It emphasizes the development and implementation of an approved work plan for different categories of forest, i.e. CF, Leasehold Forests, Private Forests and religious forests.

4.4.6 Labor Act, 2074 (2017)

New Labour Act has been passed by the Parliament on August 11, 2017 (Shrawan 27, 2074) and accorded the assent by the President on Sept. 04, 2017 (2074-05-19). The New Labor Act is now effective from the date of assent by the President by virtue of Section 3 (f) of the Interpretation of Statute Act, 1953 (2010). The New Labor Act has repealed the Labor Act 1992 (2048) (the "Previous Act"). The New Labor Act has brought complete change in employment regime in Nepal.

The Act clearly mentions that the appointment letter should be issued for all the employees which include their working hours, working time, wages and other benefits. The Act allows for the time bond contract for the manpower required for development work. The Act specifies that working hours for the Anabolic and women must be within 6 AM to 6 PM which clearly restrict to deploy women in night works. The Act also state that equal opportunity shall be given to women as men. Similarly Working Hours continue to be 8 hours a day and 48 hours a week, overtime has been increased to 24 hours per week from 20 hours a week. New Labor Act provides that the minimum remuneration of workers, public and weekly holidays should be as prescribed. The employer can deduct the expenses incurred in providing food and lodging from the remuneration if such is provided. Domestic workers should be allowed to celebrate festivals as per their culture, religion, tradition.

4.4.7 Environment Protection Act, 2053 (1997)

Nepal has enacted a comprehensive and umbrella type Act, the Environment Protection Act, (EPA), 2053 which is now enforced through appropriate regulatory measures. The EPA provides a legal basis for the concerned authorities for regulation of IEE or EIA. Section 3 of the Act requires the proponent to conduct an IEE or EIA in relation to the prescribed proposals. The Act uses the word proposal instead of Projects which makes the scope of the Act much broader in relation to environmental studies. Proponent includes any government, semi government or non-government agency or organization submitting an application for approval of a proposal and possessing the responsibility to work according to such a proposal or implementing the proposal.

According to the provision in Section 6 (1) of the Act, the relevant agency is empowered to grant approval for the IEE and EIA report, only if it finds that no significant adverse effects will be caused to the environment by the implementation of the proposal. Implementation of any proposal without the approval of the relevant agency is prohibited by the Act. As per EPA, 2054; the proposed project has obligation to carry out IEE prior its implementation.

4.4.8 Local Government Operation Act, 2074 (2017)

As the Local Self-Governance Act, 2055 (1999) was scrapped after the implementation of new constitution, this act is enforced by GoN in 2074/06/29 accordingly. This act has paved a strong legal foundation towards institutionalizing executives, legislative and quasi-judiciary practice of the newly formed local government. The legal mechanism was enacted as per the Article 296 (1) of the Constitution of Nepal so as to leverage local leadership and governance system. It was introduced by upholding the spirit of local autonomy and full decentralization with the motive to distribute fruits of democracy in a proportional, inclusive and just manner. The act has stipulated several arrangements related to authorities, duties and responsibilities of local government.

4.4.9 Child Labor (Prohibition and Regulation) Act, 2056 (2000)

The Child Labor (Prohibition and Regulation) Act, 2056 is enacted and enforced adopting International Labor Organization (ILO) Convention concerning Elimination of Worst Forms of Child Labor and Minimum Age Convention. This Act has defined the 'Child' as a person who has not achieved the age of 16 year. Article 3 bans the employing a child below the age of 14 to work as a laborer and engaging a child in the hazardous and risky works listed in the Schedule of the Act. It is mandatory for the proponent to follow the Child Labor (Prohibition and Regulation) Act, 2056 (2000) during the project implementation phase.

4.4.10 Convention of International Trade of Endangered Wild fauna and Flora Act, 2073 (2017)

This Act is enacted and enforced adopting Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 to which GoN is a signatory state. The main objective of this Act is to implement CITES through protection of endangered species and controlling and regulating the wildlife trade. The Act has strictly prohibited the trade, use, farming, breeding or transport (export or import) of endangered species of fauna or flora or their samples. However the Act has provided some flexibility in the above provision by obtaining license.

4.4.11 Solid Waste Management Act, 2068 (2011)

Article 4 rests the responsibility of the solid waste management under the prescribed standards with the persons or institution that has generated the waste whereas Article 5 mandates reduction of the waste at source. Article 9 make the institution responsible to transport the solid waste to the waste disposal facility. The local body is made responsible for the monitoring of solid waste management by Article 21. Article 38 stipulates discharge of solid waste without the consent of the local body as an offence and Article 39 provisions for the punishment /penalty in case of offense.

4.4.12 Contribution Based Social Security Act 2017

The Social Security Act is enacted first time in Nepal on 2017, 08, 13. Government notification is required for the Social Security Act to be applicable to any industries, business or service sector. The Social Security Act provides that the government publishes the notice in Nepal gazette prescribing the sector, industries, business, service or employer undertaking certain transaction to whom the Social Security Act applies.



4.4.13 Muluki Dewani (Sanhita) Act, 2074

To maintain the morality and financial interest of the public by maintaining law and maintaining good interest in the social and cultural fields, according to the complete provision of the law and order, Nepal Government has endorsed the Muluki Dewani Samhita Act 2074, which was implemented from Bhadra 1, 2075 BS. Eligibility for marriage 20 years for both male and female, Women can use maternal family name after marriage, Government approval a must for child adoption by foreigners, Widow can claim husband's property, Husband can also file for divorce at court, One year cooling period on divorce application, Landlords cannot remove tenants without prior notice of 35 days are the major legal provisions ensured by Muluki Dewani Samhita Act 2074.

4.4.14 Land use Act, 2076

The Land Use Act, 2019 has come into force in Nepal. As per the act, land has been classified into 10 categories: agricultural; residential; commercial; industrial; mining and mineral; forest; river, stream, pond and wetland; public use; cultural and archaeological; and others. The land classification is based on the composition and use of the land. The classification has not clearly pinpointed Guthi land, which is religious land in the name of temples or shrines, from the revenue of which the religious ceremonies or festivals associated with the temples or shrines are celebrated and the repairs and maintenance of the temples or shrines are carried out. The act has been introduced based on the condition of land, population growth, requirements of land for various purposes like food and habitation and the need for economic development and infrastructure building, among others.

The act has assigned the responsibility for implementing the act to not only the federal government but also to the provincial and local governments. As per the act, three tiers of the government should constitute councils to bring provisions of the act into implementation. The federal government should draft maps of all the local levels and ensure that all the local governments are abiding by provisions of the act. The local governments, on their part, should ensure that the people are adhering to provisions of the act. For this, they will have to form implementation committees under the leadership of the heads of the local governments. So the local levels have a major role to play in ensuring implementation of the act.

The provincial and local governments are also required to formulate their own land use laws based on the act. The federal government can review the land use plan every seven years, whereas the provincial governments can do so every five years. The local governments can, however, review the land use plan as and when required. Such a review can be made on the basis of changing patterns of demography, urbanisation, specific needs for land use for economic and infrastructure development and so on.

4.4.15 Electricity Regulatory Commission Act, 2074 (2017)

In August 2017, after 20 years of effort, Nepal passed an act to establish an Electricity Regulation Commission. The new law – "Electricity Regulatory Commission Act, 2017" came into effect from 05 December 2017. The ERC Act envisages the creation of a self-governing regulatory commission headed by a Chairperson and four Members, who are selected under the recommendations of a Selection Committee constituted by the Government. Key provisions* of ERC Act, 2017:

- Sec 3(1): Regulates the generation, transmission, distribution, and trade of electricity
- Sec 4: ERC is a self-governing corporate body with perpetual succession,
- Sec 17(1): Ensure compliance of Licensees with the Act, sub-legislation (rules, orders etc) or other prevailing laws,

- Sec 37: Power to issue directions to licensees under the Act. Duty of all to comply with such directions and
- Sec 19(1): Power to fine licensees not complying with orders or directions.

4.4.16 The Act Relating to Children, 2075 (2018)

On 18th September 2018, the Government of Nepal endorsed The Act Relating to Children, 2075 (2018), paving the way to respect, protect and fulfil the rights of children in Nepal. It builds upon certain national and international provisions that are meant to promote children's rights. Nepal's 2015 Constitution actually has an article dedicated to children's fundamental rights - but this new act translates these provisions and the children's fundamental rights provided in the constitution, into a legislative provision, which then allows children to exercise their rights legally. This obligation is three-fold - the need to respect the rights, protect the rights and fulfil the rights of Nepal's children. Another new significant addition to the provision list includes that everything must be done to promote the best interest of the children.

4.5 Rules and Regulations

4.5.1 Electricity Rules, 2050 (1993)

Regulations on electricity sectors have been formulated for the implementation of the provisions made in the Electricity Act, 2049. The Electricity Rules, 2050 emphasizes environmental analysis, which should include environmental mitigation measures to minimize adverse impacts likely to occur while developing hydro-electricity (Rule 12 and 13). Rule 12 (f) and Rule 12 (g) are related to the EIA/IEE process which emphasize that the IEE report should include measures to be taken to minimize the adverse effects of the project on social, biological and physical environments and should also elaborate utilization of local labor, source of materials, benefits to the local people after the completion of the project, training to local people in relation to construction, maintenance and operation, facilities required for construction site and safety arrangements.

4.5.2 Water Resources Rules, 2050 (1993)

It is mandatory under Rule 17(e) of the Rule that any person or corporate body, who desires to obtain a license for utilization of water resources must state in his application that appropriate measures will be taken to lessen the adverse effects due to the project on the overall environment. Rule 19 stipulates that the water resources committee shall publish a notice giving detail information about the project to the people.

4.5.3 Environment Protection Rules, 2054 (1997)

EPR was endorsed in June 1997 and was made under the provisions of the EPA. The EPR has been amended several times and the recent was done in 2065/11/26. The recent amendment states that TL projects of capacity above 132kV voltage level requires only IEE unless it traverses through protected area, buffer zone or national parks. The EPR adopts the environmental assessment criteria mentioned in the EIA guidelines. However, the EPR establishes the administrative framework for assessing, exhibition and determination of the EIA/IEE, in terms of issues needing to be addressed and the format/layout of the EIA/IEE document. Under section (18) of EPA, any person who contravenes any of the provisions of the Act, or the Regulations or the guidelines issued under the Act, shall be punishable with a fine up to NRs. 50,000. If a proposal is implemented without the approval of the Ministry of Population and Environment (in case of IEE, MoEn) or relevant government agency, or the person implementing the proposal is not complying with the conditions of the approval or license, the authorized official is empowered to close down that activity and may impose fine of up to NRs. 100,000 on such person or organization. Under this Rules, the IEE of the proposed project has to be carried out by the proponent and get approval from the MoEn prior to the project implementation.

4.5.4 Forest Rules, 2051 (1995)

Rule 65 of the Forest Rules stipulated that in case the execution of any project having national priority in any forest area causes any loss or harm to any local individuals or community the proponent of the project itself will bear the amount of compensation to be paid. Similarly, the entire expenses required for the cutting and transporting the forest products in a forest area should be borne by the proponent of the project.

4.5.5 Labor Rules, 2075 (2018)

The Labor Rule has been published in Nepal Gazette on June 22, 2018 (Asar 08, 2075) with immediate effect and has repealed the then Labor Rules, 1994 (2050) ("Previous Labor Rules"). Major highlights of the Labor Rules have been briefly described in the following paragraphs. It has set out the criteria for determining if any dispute arises on whether or not an employment is regular employment. It has also specified the additional matters to be covered under the Employment Contract. Rule 4 of the Labor Rules requires the Employment Contract to cover (a) nature of employment, (b) primary work of the Employee and his/her position, (c) statement that the Employees' Service Rule will be integral part, (d) date, time, place of contract and its effective date, (e) Other important terms and conditions related to the work or service of the Employee. The Employer can determine the work hours on the basis of the nature of the work of the entity. The notice of the work hours however, should be given to all the Employees. It also provides that the Employer may put the Employee to work on rotation based on nature of its work. It seems that the Labor Rules envisages to put the Employee in different shifts.

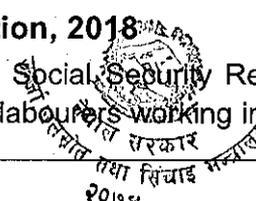
4.5.6 Solid Waste Management Rules, 2070 (2013)

The Solid Waste Management Rules have been issued by the GoN by exercising the power conferred by Section 50 of the Solid Waste Management Act, 2068. Major highlights of the Rules have been briefly described in the following paragraphs.

- The Local Body shall, while fixing segregation at least of organic and non-organic solid waste at its source under Section 6, have to make management and segregation of harmful or chemical waste separately. If it is prescribed as above, the individual, organization or agency generating such solid waste, shall have to make segregation as prescribed.
- The Local Body shall conduct programs for increasing people's awareness in relation to applying appropriate technology for making segregation through reduction of generation of solid waste at its source and management under Sub-Rule (1).
- No one shall discharge solid waste by mixing harmful, chemical, organic or inorganic waste with other waste. The arrangement for final discharge should only be made after processing of harmful, chemical, organic or inorganic waste into a general waste.
- After processing, if the harmful, chemical, organic or inorganic waste needs to be managed through the Local Body, any individual, organization or agency responsible for the management of solid waste may make a request to the Local Body for the management of the solid waste, and the Local Body may manage such solid waste by charging the required service fees.
- The collection, storage and transportation of harmful, chemical, organic or inorganic waste shall only be done by applying a safe mode. The processing of harmful, chemical, organic or inorganic waste shall be done so as to destroy the harmful elements in such waste and the final discharge and disposal shall only be done if the treated waste has turned into a normal waste.

4.5.7 Contribution Based Social Security Regulation, 2018

Nepal government has approved the Contribution-based Social Security Regulations on 11th November, 2018 and ensured the social security rights to labourers working in the country. The



Regulations has made arrangements for providing social security to the contributors. As per law, both employers and employees must mandatorily deposit their instalment for the scheme and it is applicable for all types of workers. The Regulations has provisions for enlisting in the Social Security Fund, the individuals drawing salary from the government fund, the labourers in the informal sector and self-employed individuals. This is a historical step towards achieving decent work for all. The scheme is set to initially include medical, health and maternity benefit; accidental and disability benefit; benefits for dependent family members and old-age benefit. The Government plans to extend the scheme to workers in the informal sector soon.

4.5.8 Electricity Regulatory Commission Rules, 2075 (2018)

The ERC rules, notified in 2018, clarified further about the key functions and duties of the Commission, and provided a more focused list of action points, mandatory requirements and guidance for the Commission. Key tasks/functions assigned to the commissionj under ERC Rules, 2075 (2018) are

- Approve Least Cost Expansion Plan
- Approve/ set performance standards for licensees
- Issue Directives for electricity trade
- ERC must approve transfer of ownership (shares) more than 5% change in share structure
- Procedures for approval of PPA
- Power to set generation, transmission and distribution tariffs
- Must approve direct sales from generating licensees to industries / institutions
- Develop procedures to allow consumers to select their service provider
- Set/approve standards for electricity quality (voltage, frequency, outage duration and regularity and duration, of electricity) supplied by distribution licensees, including compensation
- Customer complaints procedures and monitoring
- Process for the distribution licensee to make new connections

4.6 Guidelines and Conventions

4.6.1 National EIA Guidelines, 2050 (1993)

The National EIA Guidelines, 2050 set out the process for the environmental review and management of infrastructure projects in all sectors and the respective roles of certain GoN agencies and project proponents. The guideline is part of a comprehensive program to develop the national and sectorial guidelines for establishing a national system for EIA which is part of GoN's National Conservation Strategy. The schedules attached to the Guidelines include:

Schedule 1	:	Projects requiring an IEE Report
Schedule 2	:	Projects requiring an EIA
Schedule 3	:	EIA based on project sites
Schedule 4	:	Projects requiring an IEE Report
Schedule 5	:	Format for ToR
Schedule 6	:	Environmental Impact Report Format

It is mandatory to follow the National EIA Guidelines, 2050 during the IEE. Following the Guidelines, the environmental impact prediction and evaluation of the proposed project has been done on physical, biological and socio-economic and cultural environment of the project area. The guideline is used for analysis of significant issues.

4.6.2 EIA Guidelines for Forestry Sector, 2052 (1995)

The GoN in keeping with the spirit of the National EIA Guidelines, 2050 framed EIA Guidelines for the forestry sector in 2052 (1995). The Guideline aims to facilitate the sustainable use of forest

resources for socio-economic development and meeting basic need to the community regarding the forest products, to make proposals socio culturally acceptable, economically feasible, and environmental friendly to conserve genetic resources and biodiversity and minimize environmental damage in forest areas and facilitate in identification of positive and negative impacts of programs to be implemented by other agencies in forest areas. The guideline emphasizes the need of carrying out an EIA/IEE of development projects and programs proposed for implementation in forest areas.

4.6.3 Forest Production, Collection & Sales Distribution Guidelines, 2073

The Clauses 3 to 10 of the Guidelines have specified various procedure and formats for getting approval for vegetation clearance, delineation of lands for vegetation clearance, evaluation of wood volume etc. and government offices and officials responsible for the approval, delineation and evaluation. These provisions have a direct relevance to the development of the project and need compliance to these provisions. It is obligation to the project for getting approval in view of vegetation clearance and evaluation of wood volume from division forest office prior to the construction phase.

4.6.4 Community Forest Guidelines, 2071

This guideline has been prepared by including amendments of acts, rules by officials of GoN and related experts. Through these guidelines, persons involved in the development and management of community forest like facilitators, User Groups, forester and managers etc. will get help to understand about the process and stages of development of community forest. Clause 2 of this guideline highlights User Groups' identification and empowerment, clause 3 emphasize on user group formation and registration, clause 4 on operational plan, clause 5 on implementation of operational plan along with sustainable forest management, clause 7 on stakeholders' role in community forest process among others.

4.6.5 Community Forest Inventory Guidelines, 2005

The guideline for inventory of CFs advice to classify the forest into timber trees, pole size trees and regeneration on the basis of diameter. It has recommended using 20m x 20m size of quadrant for timber trees, 10m x 10m for shrub and 5m x 5m for regeneration plots in the CF. Plants having dbh (1.3m above ground) greater than 30cm are considered as trees. Trees having dbh between 10cm to 30cm are categorized as pole and plants having less than 10cm dbh belong to regeneration species.

4.6.6 Working Procedure with Standards for the Use of National Forest Land for National Priority Project, 2076

Guideline for the use of forest area for development projects of National Priority projects reiterates the use of the forest area only if other options are not available. The projects requiring the forest land area have to make alternative studies to minimize the forest land use areas. The proponent of the National Priority Project, National Pride Project, Priority Transmission Line Project and Investment Allocated Project from Investment Board has to get the approval from the Ministry of Forest and Environment. The proponent of the project has to provide the land equal to the forest land permanently occupied by the project to the ministry of forest and environment. The government project has to make the provision of such land cost at its cost-estimate. Otherwise, Ministry of finance has to provide such cost. The proponent has to afforest the area equal to the forest area lost at minimum or the proponent could deposit the required amount as per forest norm to the division forest office. The proponent should plant 10 trees for every loss of tree and pole and look after the plantation for 5 years to ensure their protection and growth of every planted tree. Or the proponent deposit the required amount for plantation and protection for five years to the DFO.

4.6.7 Order for Remission of Land Ceiling Exemption, 2074

Nepal Government, Ministry of Land Reform and Management published a notice in section 67 number 29 Nepal Gazette part 5 dated 2064/06/25, by using the authority given in article 12 of Land Reform Act 2021, containing the provision to purchase more than dissociated land by the education or health institution, hydropower, cultural, industrial work, work for agricultural industry and co-operative farming organization, if such industry or institutions need.

4.6.8 Directives Relating to Licensing of Power Projects 2075 (2018)

GoN has introduced new guideline for licensing power project on Kartik, 2075. Section 2 of this directive has provision for evaluating the intalled capacity of the project. Section 3 incorporate the provision for licensing the project – survey licensing application, financial capacity, technical capacity, generation licensing etc. Section 5 highlights provisions related to storage projects. Thus, this guideline focuses briefly on the procedures for taking survey license of production, generation and distribution of power project, its amendment, renewal and dissolution.

4.6.9 Hydropower Environmental Impact Assessment Manual 2018

This Manual should be used in conjunction with the Nepal's National EIA Guideline which dictates the minimum standards, administrative systems and processes and templates to be followed during an EIA for any qualifying project. Specifically, the Manual can be used at different phases and for different purposes for the preparation and review of EIAs for hydropower projects. The Manual can be used for all types of hydropower projects that require an EIA based on the Environment Protection Act and its regulations, particularly Schedule-2 of the regulations. The Manual outlines the approach for preparing, submitting, reviewing and implementing EIAs related to hydropower in Nepal. Section 4 highlights stakeholder engagement and public participation, section 5 and 6 is adhered to screening and scoping. Section 7, 8 and 9 related to identifying, assessing and managing environmental and social impacts.

4.6.10 Social Security Schemes Operation Directives, 2018 (2075)

The Social Security Fund (the "SSF") has formulated the Social Security Schemes Operational Directives ("Directives") to operate the Social Security Schemes pursuant to Section 10 of the Social Security Act. The Directive has been approved by the Ministry of Labor, Employment and Social Security on November 22, 2018 (2075/08/06) and has been effective thereof.

4.7 Conventions

4.7.1 Convention on Biological Diversity, 1992

The convention contains a series of far reaching obligations related to the conservation of biological diversity and sustainable uses of its components. One of these obligations is the requirement for environmental study. The purpose of an environmental study in relation to biodiversity conservation is to identify in advance:

- The aspects of the project which is likely to have significant adverse effects on biological diversity at genetic, species and ecosystem level, and
- The steps to be taken to avoid or minimize significant adverse effects to ensure that the proposed project comply with existing environmental legislation.

4.7.2 Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES), 1973

Nepal became a contracting party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on June 18, 1975. That aims to control the trade of certain wildlife species to prevent further endangered species of their survival. CITES classified species according to the following criteria:- (i) Species threatened with extinction; (ii) Species which could become endangered and (iii) Species that are protected.



As Nepal is a signatory member to the convention related to species conservation, attention should be given to evaluate the impacts of the project activities on meeting their obligation.

4.7.3 International Labor Organization (ILO) Convention of Indigenous and Tribal Peoples (No. 169)

Nepal ratified ILO Convention No. 169 on September 14, 2007. In 2007 the UN Declaration on the Rights of Indigenous Peoples was adopted by the General Assembly. The declaration reaffirms the importance of the principle and approaches provided for under Convention No. 169 and its adoption therefore provide a fresh impetus for promoting the ratification and implementation of 169. ILO Convention No. 169 highlights the need to recognize indigenous and tribal people's specific knowledge, skills and technologies as the basis for their traditional economies and self-determined development process. Article-6 deals the consultation of the people concerned through appropriate procedure in particular through their representative institutions.

4.8 Standards

4.8.1 National Ambient Air Quality Standard, 2069 (2012)

The National Ambient Air Quality Standards, 2012 enforced by GoN has set maximum concentration limit for nine air quality parameters. These parameters includes total suspended particles (TSP), particulate matter (PM₁₀), sulfur dioxide, nitrogen dioxide, carbon mono-oxide, lead, benzene, PM_{2.5} and Ozone. The standards has also prescribed the test methods for these parameters. The project during its construction and operation will have to comply with the set standards for the ambient air quality.

4.8.2 Nepal Vehicle Mass Emission Standard, 2069 (2012)

In order to regulate the vehicular emission, GoN released the Nepal Vehicle Mass Emission Standard, 2069. This standard has set the limit values on different parameters of emission for petrol and diesel fueled vehicles. These parameters include carbon monoxide, hydrocarbon, oxides of nitrogen particulate matters (PM) and smoke opacity. Furthermore, these standards are based on type approval and conformity of production of the vehicles.

4.8.3 National Ambient Sound Quality Standard, 2069 (2012)

It has set the limit of allowable noise/sound intensity in different areas at different time, during the day and the night. The limit of sound intensity is different for different area like industrial area, commercial area, settlement areas in rural and urban settings, etc. These standard will be complied.

4.8.4 Standard on Emission of Smoke by Diesel Generators, 2069 (2012)

Emission standards are set for the new and existing diesel generators by the GoN. The standard has set the limits on four parameters of emission including Carbon monoxide (CO), hydrocarbon (HC), oxide of nitrogen (NO_x) and Particulate Matter (PM). This standard is set in accordance with the EURO III and Bharat III standards.

5 EXISTING ENVIRONMENTAL CONDITION

5.1 Physical Environment

The proposed alignment passes through different terrain affecting variety of land use pattern. The topography, land use, climatic condition, geomorphology and geology, seismology, air, water and noise condition, watershed and drainage pattern, crossing of other utilities and air traffic that shall be influenced due to the construction of this project has been discussed in each topic ahead.

5.1.1 Topography

The alignment runs through several topographic features comprising of rugged hills with mild and steep slope, undulating land forms and flat terrain. In the approved IEE, the altitudinal variation of the TL points are between 1184m to 327m at Kotbari, Pokhara MC and Byas municipality respectively. In Updated IEE, The alignment runs through several topographic features with the altitudinal variation of the TL points are between 1184m to 301m at Kotbari, Pokhara MC and Byas municipality respectively. The altitudinal variation of the APs of Updated IEE along the alignment is given in the table below.

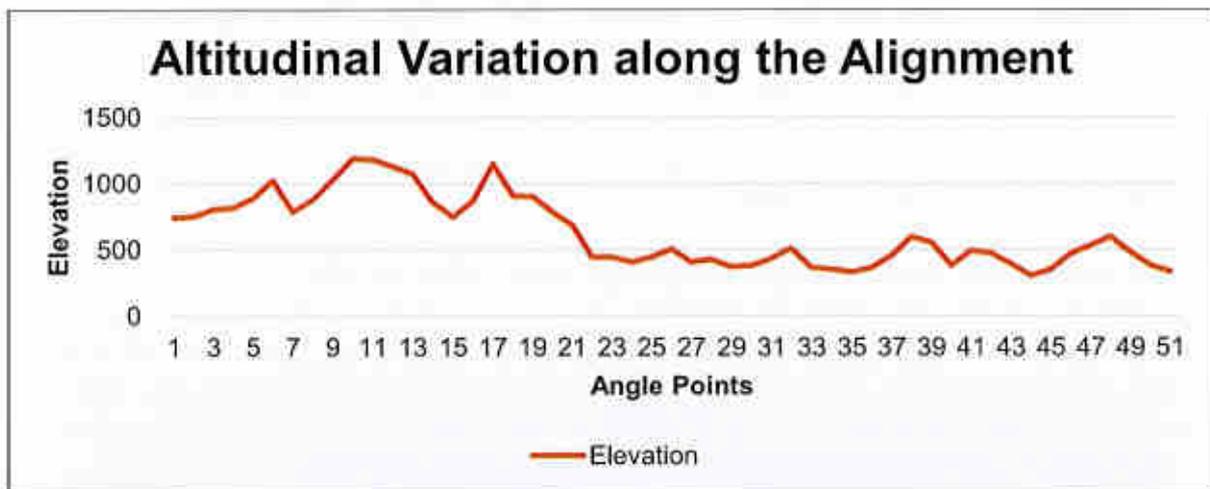


Figure 5-1: Altitudinal Variation along the Alignment

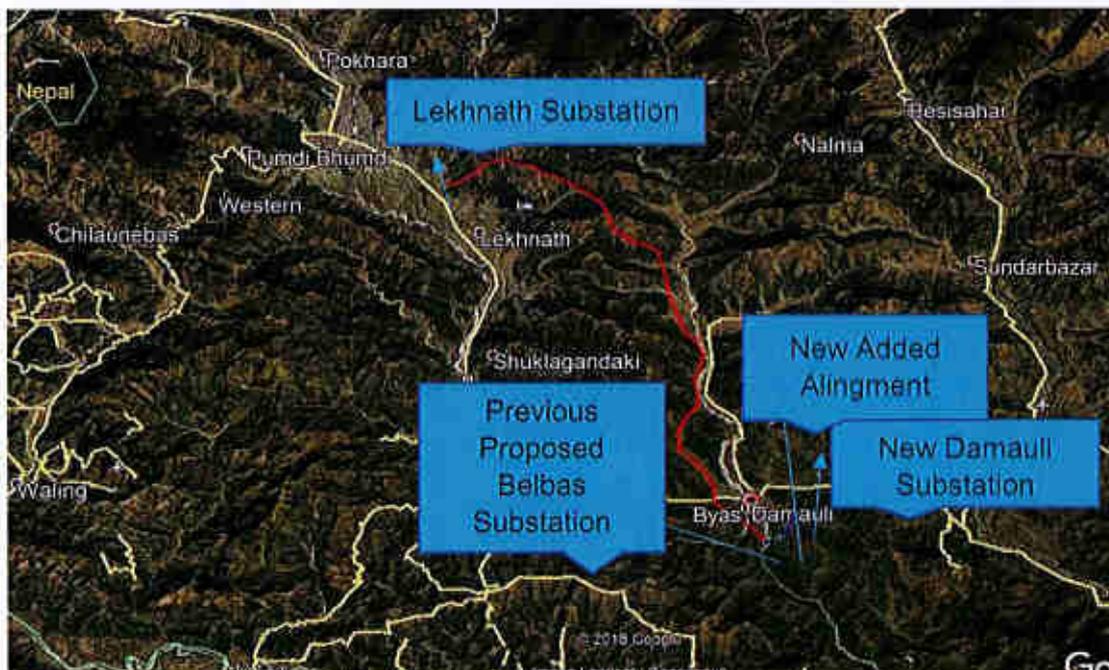


Figure 5-2: Google Image with Longitudinal Profile of LDTLP

Source: Google Earth Image



5.1.2 Land Use

The main land use pattern of the project area is cultivated land, CF, grazing land and barren land. The alignment avoids densely populated areas, major structures, protected areas and dense forests. The other land uses along the alignment consists of road crossings, rivers, rivulets, river beaches and TL. In the approved IEE, approximately 68.86% of the TL passes through the cultivated land, 25.99% through forest and 2.68% through barren and 2.47% through others (Sand, Water Bodies, road crossings and river crossings etc.).

In the Updated IEE, approximately 68.26% of the TL passes through the cultivated land, 26.73% through forest, 2.63% through barren and 2.38% through others (Sand, Water Bodies, road crossings and river crossings etc.). The land use details of Updated IEE along the alignment AP wise has been presented in Appendix B.

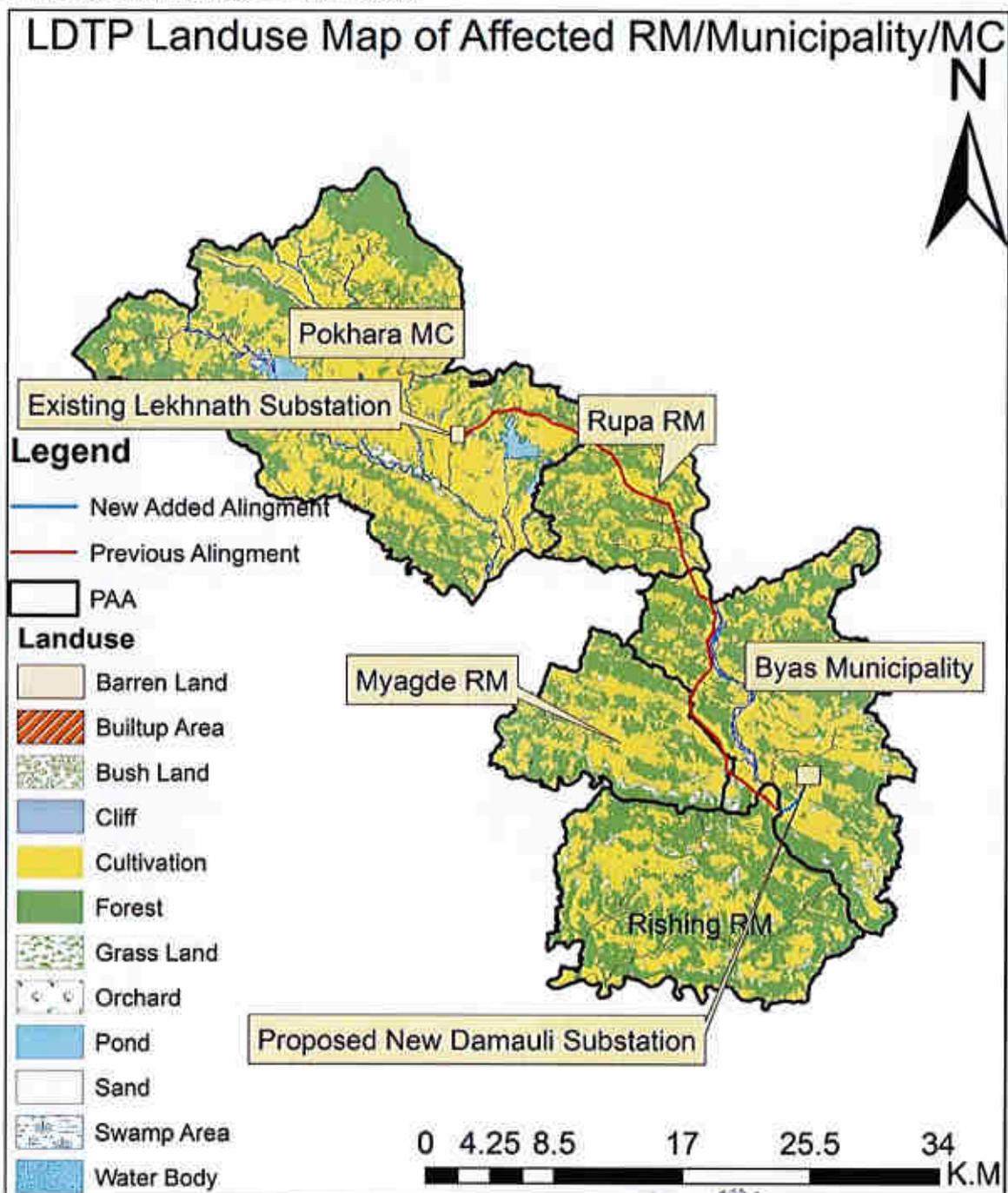
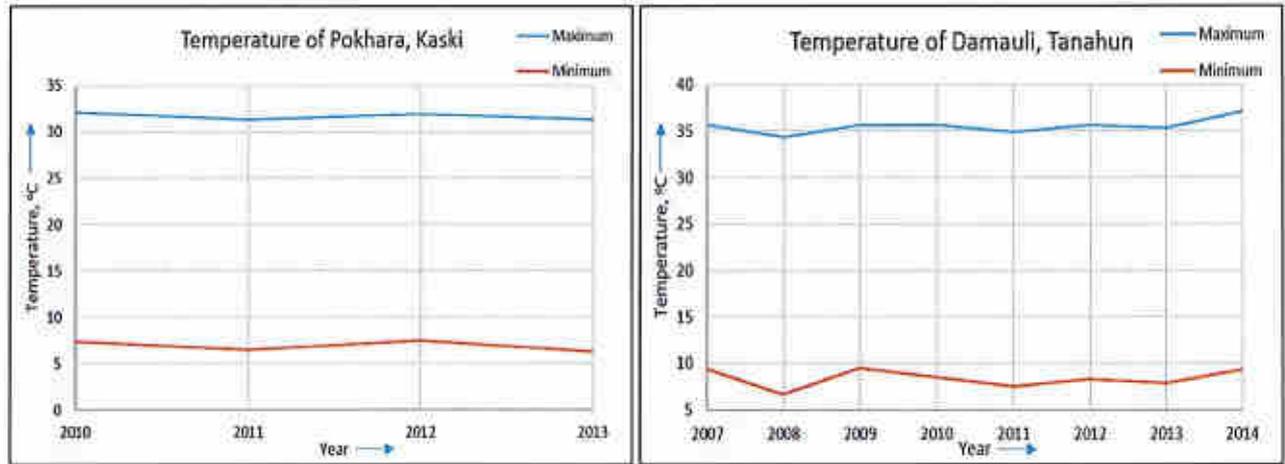


Figure 5-3: Land Use Map of PAA

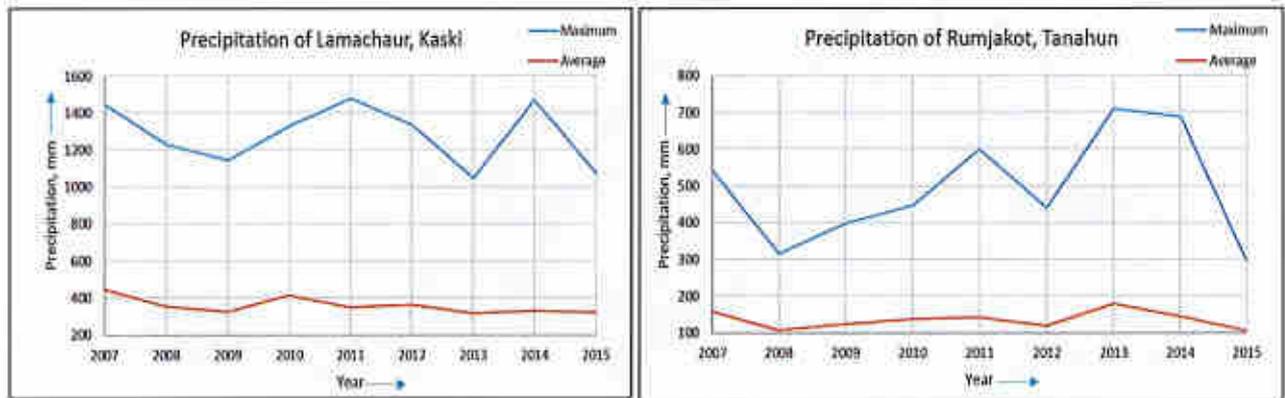
Source: GIS Analysis

5.1.3 Climate

Subtropical and upper tropical climates prevail in the project area. The project area experiences strong seasonal variations, with wet monsoons from June to September and dry weather from October to May. Temperature and precipitation along the PADs is presented in following charts. The temperature and precipitation data along the TL in tabular form is presented in Appendix B.



(a)



(b)

Figure 5-4: (a) Temperature and (b) Precipitation Data of PADs

Source: DHM

5.1.4 Geomorphology and Geology

The proposed alignment of TL passes through the Hill (Figure 5-7) represented by low grade metamorphic rocks such as phyllite, quartzite and slate. During the field visit it was observed that APs of the TL are located at relatively flat and stable areas covered by colluvial and alluvial deposit. The AP that are prone to risk has been mentioned in Table 5-3.

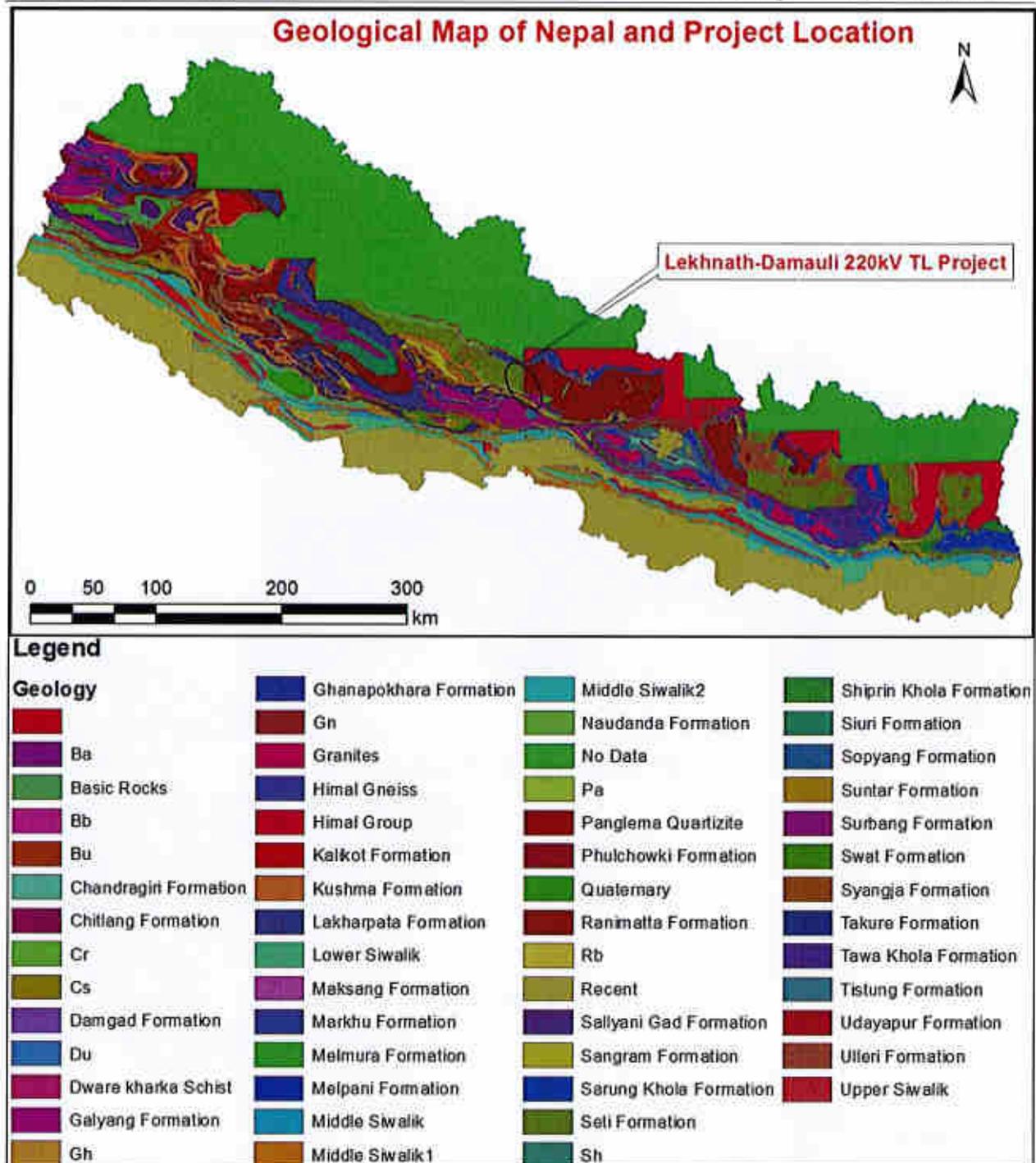


Figure 5-5: Geological Map of Nepal and Project Location

Source: DMG, Nepal (modified from Dahal, 2006)

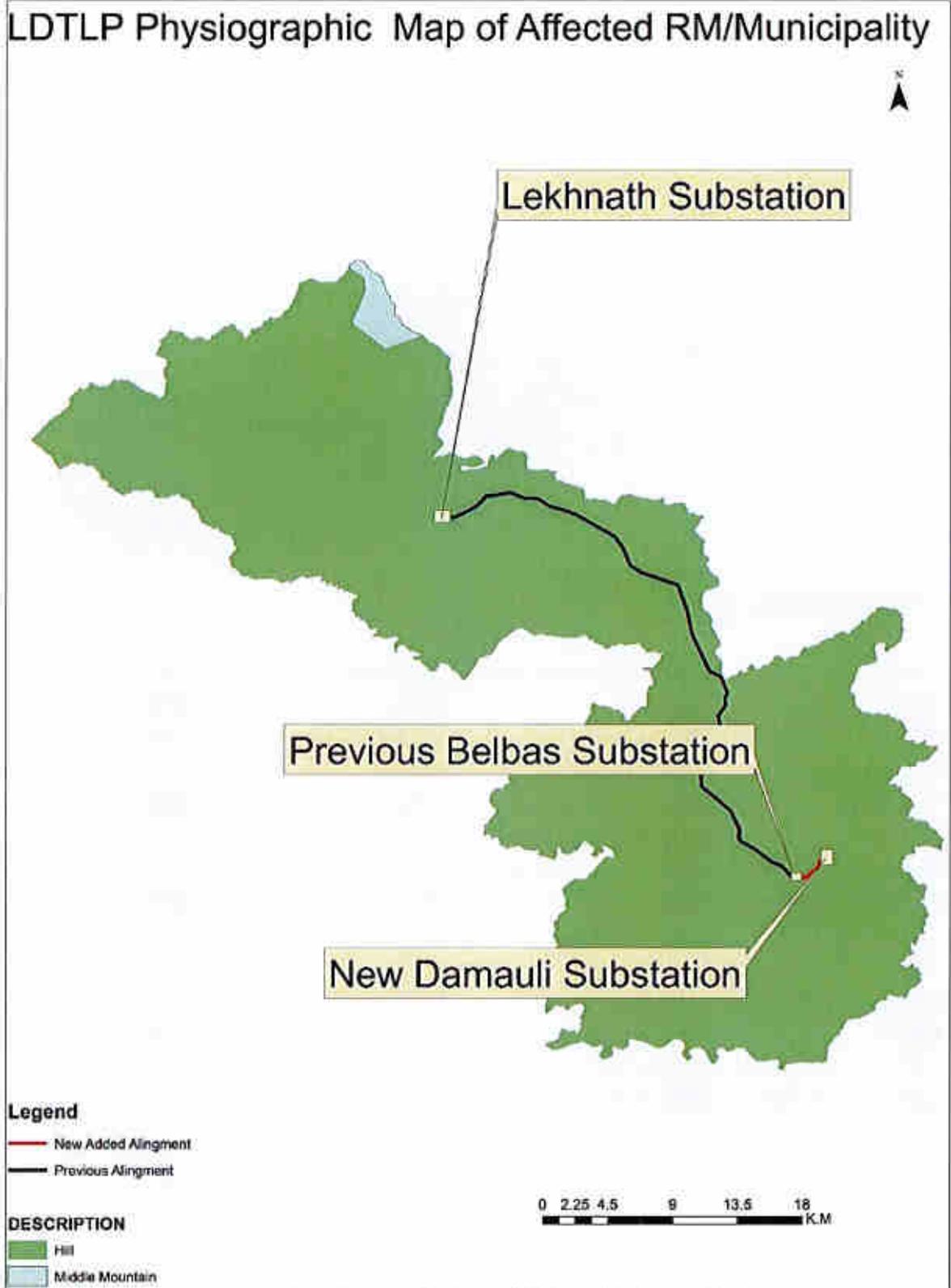


Figure 5-6: Physiographic Map of Affected RM/Municipality

Source: Department of Survey/GIS Analysis



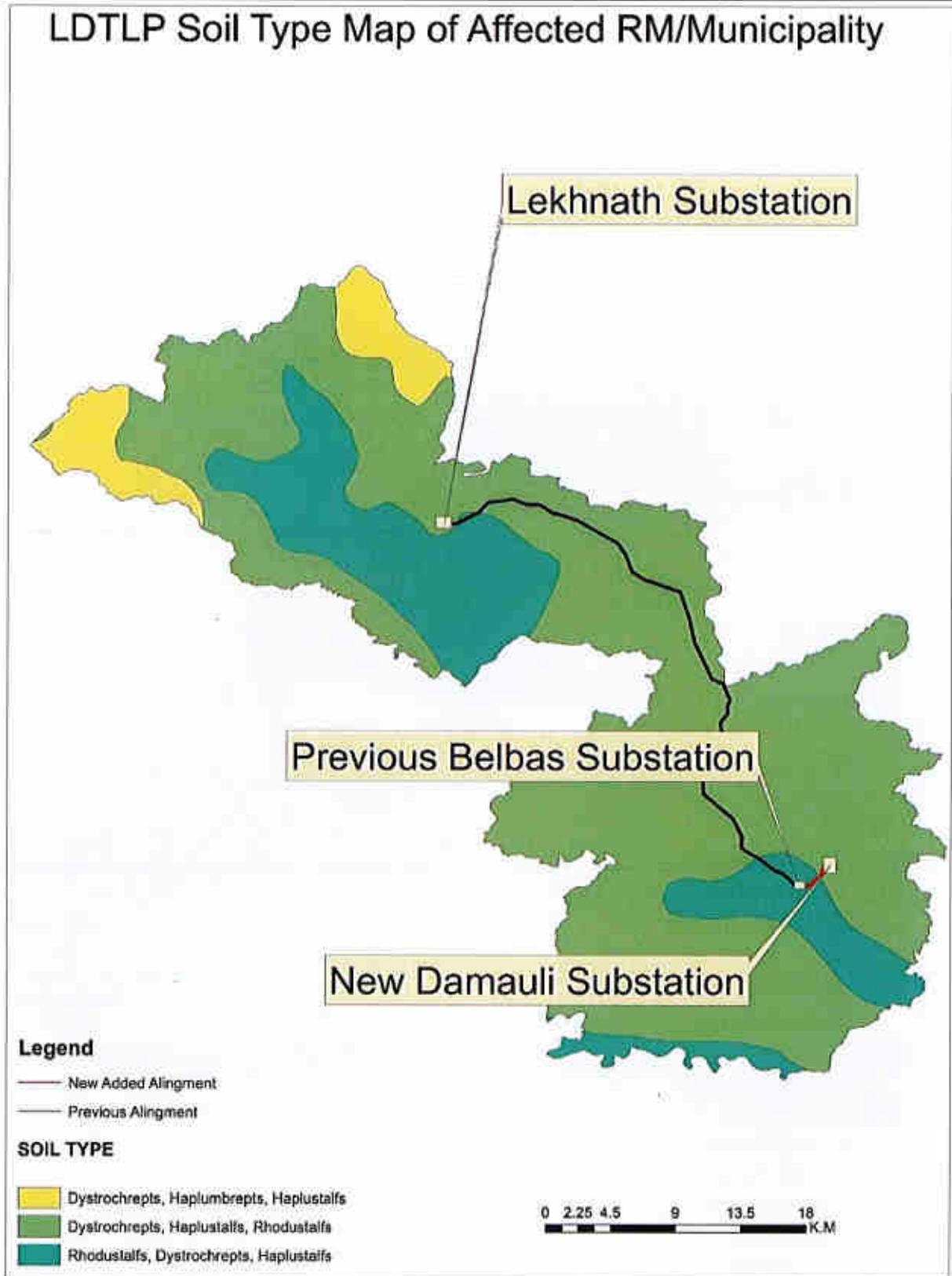


Figure 5-7: Physiographical and Soil Type Map along the Alignment
 Source: Department of Survey/GIS Analysis



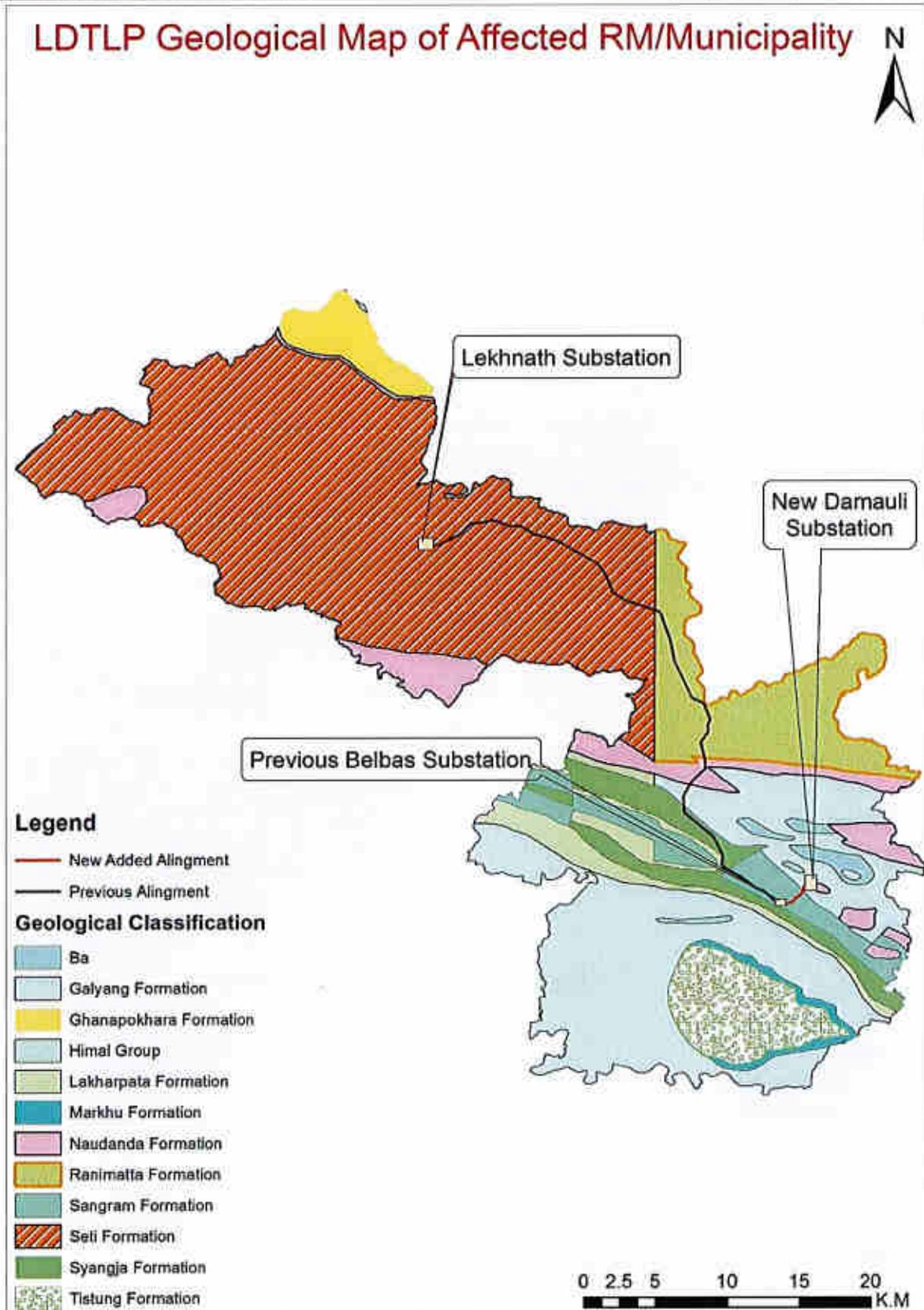


Figure 5-8: Geological Map along the Alignment

Source: Department of Survey/GIS Analysis

Geological map of Nepal in Figure 5-8 shows the project location lies along boundary of western central and mid western Nepal of regional geological map. Initial part of alignment start from mid western region and end part to the western central region.

Similarly, above geological map of PAA with alignment shows that the 220kV line mostly traverse through Seti formation. This alignment follows Ranimatta formation, Naudada formation, Galyang formation, Syangja formation, Lakharpata formation and terminate at Sangram formation. Likewise, same figure above shows previously proposed 132kV line starts on Syangja formation and terminate on Sangram formation. These formation comprise of followings:

- Seti Formation: Grey to greenish grey phyllites, gritty and quartzites with minor conglomeratic layer. Basic intrusions are also noted.
- Ranimata Formation: Grey to greenish grey shally phyllites slates garnetiferous phyllites greyish white quartzites with carbonate beds and amphibolites.
- Naudada Formation: Fine to medium grained white quartzites with ripple marks and thin intercalations of green chlorific phyllites.
- Galyang Formation: Dark grey shales with black limestones, thin calcareous slates and grey dolomitic limestones, black carbonaceous slates with fine grained dull calcareous sandstones beds. Grey to black siliceous limestones with thin marble bands.
- Syangja Formation: White milky white, pale orange, pinkish or purplish calcareous quartzites and quartzitic limestones with dark grey and purple shales pinkish calcareous quartzitic beds grey arkosic sandstones, grey and pale green shales.
- Lakharpata Formation: Fine grained gray pink limestones and dolomitic limestones with thin intercalation of purple and green shale, algal structure and stromatolites are present.
- Sangram Formation: Grey to greenish grey carbonaceous shales with highly silicified grey to grayish white dolomites.

5.1.5 Seismology

Nepal is the 11th most earthquake-prone country in the world (NPC, 2015). Ever since the first recorded earthquake of 1225 AD that killed one-third of the population of Kathmandu Valley, Nepal has experienced a major earthquake every few generations. Earthquake of Baisakh 12, 2072 is evident of such incidents. This project is situated in seismic zone factor of 1.0 which is critical from the seismic point of view. Nevertheless, it is good that this alignment does not pass through the dangerous seismic zone.

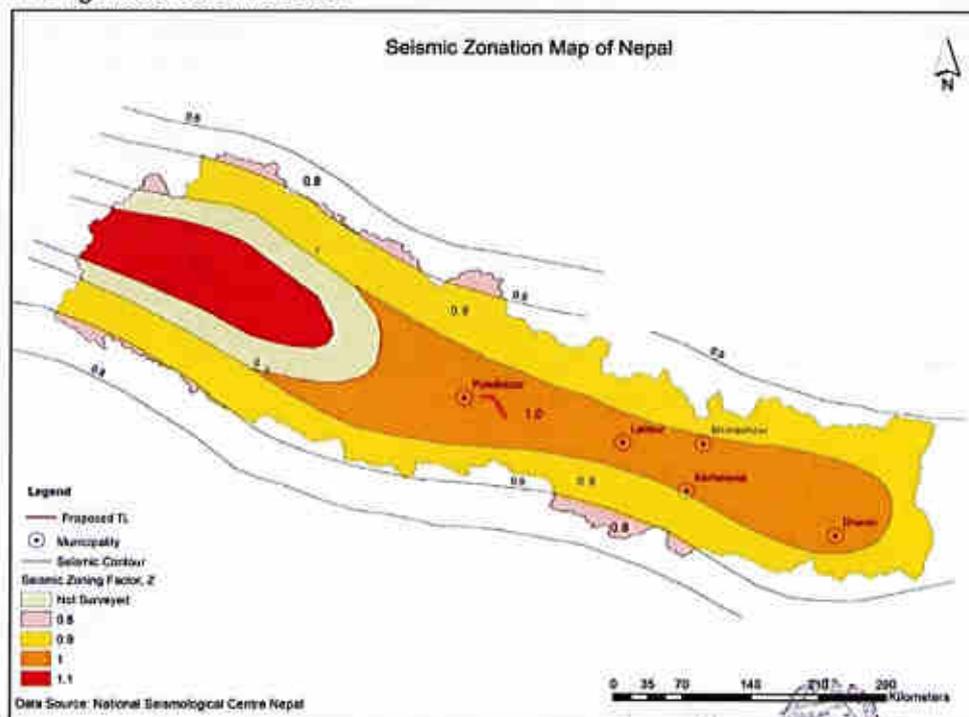


Figure 5-9: Seismic Map of Nepal
Source: National Seismological Centre Nepal

The above figure shows the seismic zone factor in Nepal and where this project alignment lies in the map. As the seismic zoning factor increases the level of seismicity increases. So from above map, the LDTLP alignment passes through the zone which has seismic zone factor 1.0.

5.1.6 Air and Noise Quality

The proposed TL passes mainly through the rugged hills with mild and steep slope, undulating land forms and flat terrain avoiding settlements and market centers. However, at some stretches, it traverses along the RoW of motorable gravel and earthen roads and even the highway. During the field visit, it was observed that the major stretch of the project stretch traverses through rural setting with some industrial activities within 500-1000m from alignment. The main source of air pollution along the alignment is due to the vehicular movement along the earthen road and construction activities like road, canal, buildings etc. Other sources of air pollution along the alignment are HH fire, fugitive dust particles created by the movement of public vehicles along the roads to the settlements and vehicular emissions. However, the transportation density and frequency of the vehicles along the road is not high. Therefore, the overall status of air quality at the project area can be considered to be satisfactory and within the range of acceptable limits.

Noise pollution may be felt by the local people of market places residing in market areas like Khareni village, Bastola gau, Talbesi, Mauriya, Sishaghat, Barhabise, Malingagau and Belbas. The overall noise levels along the TL can be considered to be within the acceptable limits.

5.1.7 Water Quality

The overall water quality of river and other water bodies along the TL appears to be unpolluted. However, dumping of solid wastes into the river was observed at some stretches as of AP5 - AP6, AP13-AP14 and AP30-AP35. But, the water quality of the streams close to the settlement areas has a high potential of microbiological contamination as the banks are used for open defecation and other HH purposes by the local people.

5.1.8 Watershed Conditions and Drainage Patterns

Drainage system also known as river system are the patterns formed by the streams, rivers and lakes in a particular drainage basin. They are governed by the topography of the land, whether a particular region is dominated by hard or soft rocks, and the gradient of the land. As per configuration of the channels, drainage system found in this area is accordant drainage pattern. In accordant drainage pattern, dendritic drainage pattern (pertaining to a tree) is the most common form of drainage system in the project area. There are many contributing streams which are then joined together into the tributaries of the main river as in figure below. They develop where the river channel follows the slope of the terrain. Dendritic systems form in V-shaped valleys; as a result, the rock types are impervious and non-porous. The alignment traverse through hilly region of Nepal. The watershed of the proposed TL including the substation proposed is observed to be fairly intact and stable.

The rivers which cross the alignment of this section include Seti River and Madi Khola. The watershed is fed by mostly Machhapuchhre Mountains' snow and its Kawache Glacier, and Annapurna I and II Mountains' snow and its glacier. The river crossing along the alignment are presented in the table given below. Drainage can be easily provided for each and every tower pads except for the tower pads which are situated in flat lands (AP 27, AP 32, AP 33 and AP 34). In this case, foundation of tower should be laid during dry season.



Table 5-1: River Crossing along LDTLP

S.N	Stretch between		Major River Crossing		No. of small Rivulets
	From	to	Name	No.	
1	AP 3	AP 4	-	-	1
2	AP 4	AP 5	Baguwa Khola	1	1
3	AP 5	AP 6	-	-	1
4	AP 6	AP 7	Chandi Khola Kanmaran Khola	1 1	-
5	AP 14	AP 15	Dhovan Khola	1	2
6	AP 15	AP 16	Chaisa Khola	1	2
7	AP 16	AP 17	-	-	3
8	AP 17	AP 18	-	-	2
9	AP 18	AP 19	Chalne Khola	1	-
10	AP 19	AP 20	Ghaguwa Khola	1	-
11	AP 20	AP 21	Birdi Khola	1	5
12	AP 21	AP 22	Khalte Khola	1	1
13	AP 22	AP 23	Bilmghe Khola Mulpani Khola Thudi Khola	1 1 3	2
14	AP 23	AP 24	Thudi Khola	1	1
15	AP 24	AP 25	Thudi Khola	1	-
16	AP 26	AP 27	-	-	1
17	AP 27	AP 28	Madi Khola	1	1
18	AP 28	AP 29	-	-	2
19	AP 29	AP 30	-	-	1
20	AP 30	AP 31	-	-	2
21	AP 31	AP 32	Sage Khola	2	2
22	AP 32	AP 33	Sage Khola	2	-
23	AP 33	AP 34	Sage Khola	2	1
24	AP 34	AP 35	Sage Khola	2	-
25	AP 35	AP 36	Gunadi Khola	1	1
26	AP 37	AP 38	-	-	1
27	AP 38	AP 39	-	-	2
28	AP 39	AP 40	Seti River	1	1
29	AP 42	AP 43	Seti River	1	-
30	AP 43	AP 44	Tai Khola		1
Total				28	37

5.1.9 Land Stability/ Erosion

In the approved IEE, all the location of APs are on stable land except AP 40 which is on steep slope. Construction of foundation will be difficult in this case. APs are located on sites susceptible to erosion and instabilities like some near the feeder road. Likewise, due to construction of rural road, some landslide was observed during the field visit along the RoW of the alignment (AP 5 to AP 6). Now in Updated IEE, all of the added APs (AP43 to AP49) are located in stable flat agricultural terraced land.

Table 5-2: List of Critical APs

S. N.	APs/ Stretch	Type of Problem	Remarks
1	AP 2, AP3 and AP4	Coincide with APs of New Modi Lekhnath 132kV TL Project	APs need to be shifted.
2	AP3 to AP4	Cross Madi 132kV TL	Clearance between the conductors shall be maintained.
3	AP 34 to AP35	Cross 132kV line	
4	AP38	Water tank near AP	AP need to be shifted slightly
5	AP 40	Located on steep slope above earthen road	Protection work is needed.

Source: Field Survey, 2019

5.1.10 Crossings of Other Utilities

The proposed LDTLP crosses 28 times the major rivers like Seti River and Madi Khola and other rivulets, 14 times by existing 11kV TL and twice by 132kV. Similarly, it crosses Prithvi Highway once and 52 times feeder road and other inter-connected gravel/earthen/trails/feeder roads numerous times. These crossings shall have required clearance (vertical and horizontal) from the proposed TL. For this, the standards referred by the Electricity Regulation, 1993 (Rule 48, 49, 50 and 55) shall be followed. Since these crossings follow the standards of clearance proposed by electricity regulation and these has been discussed in project area with stakeholders, these crossings does not create any kind of social or physical problems in future.

The field verification for other crossings like houses, huts and shed and other infrastructure of religious and archaeological significance was also done during the site visit. Altogether 23 built-up infrastructures are found under the RoW of the TL which includes tin roofed and thatched houses, cowsheds, toilet, hut, etc. From the alternative analysis, it is the most safe, easy, short and economic alignment. Hence such crossings neither be minimized nor be avoided. The summary of the crossings is given in the table below.

Table 5-3: Crossing along the TL Alignment

S. N	Stretch		Highway		Crossings				TLs	
	From	to	Name	No.	Feeder Road	Foot Track	House	Physical Structure	Voltage level	No.
1	AP 1	AP 2	-	-	1	1	-	-	400V	2
2	AP 2	AP 3	-	-	-	-	-	-	400V	1
3	AP 3	AP 4	-	-	1	-	-	-	400V 132kV	1 1
4	AP 4	AP 5	-	-	3	-	1	-	220V	1
5	AP 5	AP 6	-	-	4	1	1	-	220V	1
6	AP 6	AP 7	-	-	1	1	-	Hut-1	220V	2
7	AP 7	AP 8	-	-	1	1	-	-	220V	1
8	AP 8	AP 9	-	-	1	-	-	-	220V	1
9	AP 10	AP 11	-	-	-	1	-	-	-	-
10	AP 11	AP 12	-	-	-	1	-	-	220V	1
11	AP 12	AP 13	-	-	2	-	-	-	-	-
12	AP 13	AP 14	-	-	1	-	1	-	-	-
13	AP 14	AP 15	-	-	1	-	-	-	-	-
14	AP 15	AP 16	-	-	2	-	1	-	220V	1
15	AP 16	AP 17	-	-	1	-	-	-	-	-
16	AP 17	AP 18	-	-	1	2	-	-	11kV	1
17	AP 20	AP 21	-	-	-	1	-	-	400V	1
18	AP 21	AP 22	-	-	2	-	-	-	-	-
19	AP 22	AP 23	-	-	2	1	-	-	220V 400V 11kV	2 1 1
20	AP 23	AP 24	-	-	1	-	1	Cowshed-1	400V	1
21	AP 24	AP 25	-	-	2	-	-	-	-	-
22	AP 25	AP 26	-	-	-	-	1	Cowshed-1	220V	1
23	AP 26	AP 27	-	-	1	-	2	Toilet-1	400V 11kV	1 2
24	AP 27	AP 28	-	-	1	-	-	-	-	-
25	AP 28	AP 29	-	-	2	2	-	Cowshed-1	-	-
26	AP 29	AP 29A	-	-	1	-	-	-	220V 400V 11kV	1 1 1
27	AP 29A	AP 30	-	-	1	-	1	-	-	-
28	AP 30	AP 31	-	-	2	-	-	-	220V	1
29	AP 31	AP 32	-	-	1	1	-	-	11kV	1

S. N	Stretch		Highway		Crossings				TLs	
	From	to	Name	No.	Feeder Road	Foot Track	House	Physical Structure	Voltage level	No.
30	AP 32	AP 33	-	-	1	1	1	-	220V 11kV	1 1
31	AP 33	AP 34	-	-	1	-	-	-	11kV	2
32	AP 34	AP 35	-	-	1	-	-	-	-	-
33	AP 35	AP 36	Prithvi Highway	1	1	-	1	-	220V 132kV	2 1
34	AP 36	AP 37	-	-	-	-	-	-	220V	1
35	AP 37	AP 38	-	-	2	-	-	-	220V	2
36	AP 38	AP 39	-	-	1	1	1	-	220V	2
37	AP 39	AP 40	-	-	1	1	1	Cowshed-1	220V	1
38	AP 40	AP 41	-	-	1	1	1	Cowshed-2	220V 11kV	1 1
39	AP 41	AP 42	-	-	-	-	-	Cowshed-1	220V	1
40	AP 42	AP 43	-	-	1	-	-	-	11kV	1
41	AP 43	AP 44	-	-	1	-	-	-	11 kV	1
42	AP 44	AP 45	-	-	1	1	-	-		
43	AP 45	AP 46	-	-	2	1	-	-		
44	AP 46	AP 47	-	-	1	-	-	-		
45	AP 47	AP 48	-	-	1	-	-	-		
46	AP 48	AP 49	-	-	1	-	-	-	11kV	1
47	AP 49	SS	-	-	1	-	-	-		
Total				1	52	19	14	9		

Source: Field Survey, 2019

5.1.11 Air Traffic

A domestic airport exists in Pokhara which is located approximately 7.74km north west from the existing Lekhnath substation. The airport and substation area can be seen in the Google image in Figure 5-2. Moreover, project officials consulted with Civil Aviation Authority of Nepal (CAAN) at Kathmandu regarding probable disturbance of the proposed TL to the flying route of air plane. And it was concluded that the proposed LDTLP will not disturb to the air traffic of Pokhara airport. The consent letter from CAAN has been attached in Appendix A.

5.2 Biological Environment

The proposed TL passes through two districts namely Kaski and Tanahun. It starts from substation of Pokhara MC of Kaski District and runs along mid-hill area of Kaski and Tanahun District and finally terminates at proposed New Damauli SS at at Khairbote of Byas Municipality-13. The previous proposed substation at Belbas has been shifted to newly proposed substation at khayarbote of Byas Municipality-13 which gives additional 2.66km of the transmission line. The additional section passes through Tanahun district, encompassing Byas Municipality and Rising Rural Municipality. This will start from former proposed tower AP number 42 to newly proposed New Damauli SS. The proposed TLP does not lie in national park, wildlife reserve or other protected areas. The nearest conservation area i.e. Annapurna Conservation Area (ACA) lies at 6.2Km from project components.

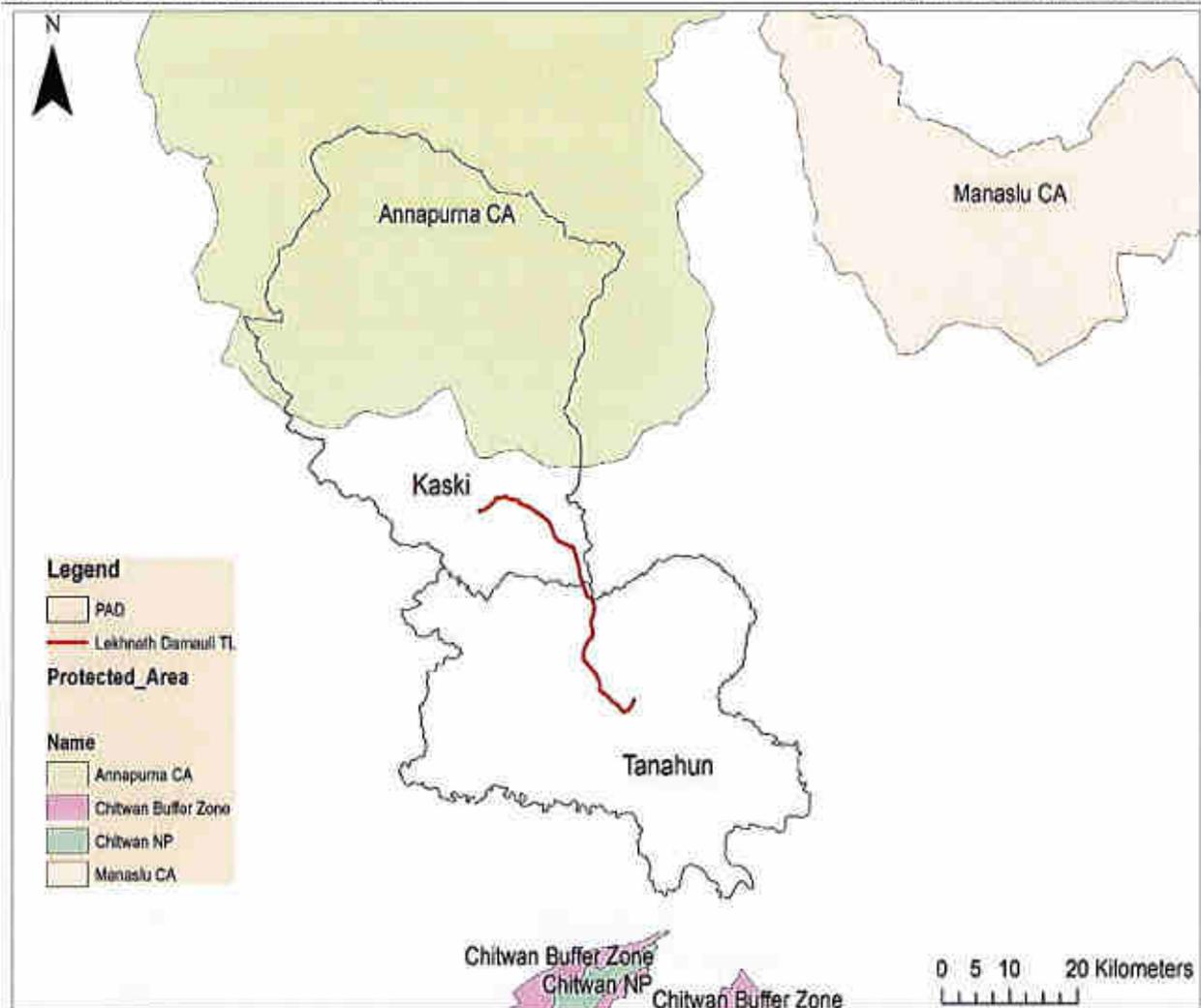


Figure 5-10: Map of Nearby Protected Areas and LDTL Components

5.2.1 Vegetation and Forest Resources

5.2.1.1 PADs

Based on the diverse climate due to changes in elevation, the PADs in general have four types of forest which include (i) Sub-Tropical Broad Leaf Forest (below 1500m elevation) characterized by Chilaune (*Schima wallichii*), Katus (*Castanopsis indica*), Uttis (*Alnus nepalensis*) and Hill saal (*Shorea robusta*); (ii) Temperate Forest (1500m to 3000m) characterized by mixed broad leaved species of Khasru (*Quercus* sp.), Gurans (*Rhododendron* sp.), etc.; (iii) Sub-Alpine Forest (3000m to 4430m) consisting of Bhojpatra (*Betula* sp.), Dhupi (*Thusa* sp.), Guran (*Rhododendron* sp.), etc. and (iv) Alpine Forest (4430m to 4800m) with dwarf varieties of *Rhododendron* and *Thusa* species (DFO-Kaski, 2074).

In PAD Tanahun (Project Affected District of changed alignment), type of forest include Tropical Forest (below 1200m) characterized by Sal, Saj, Harro, Barro, Botdhayero, Sindure, and especially present in banks of Kaligandaki, Marsyangdi, Seti, Madi etc. (DFO Tanahun, 2075); Sub-tropical forest (1200m to 1800m) comprising Chilaune and Katus; Lower temperate forest (1800m to 2300m) comprising bajh and phalant (DFO-Tanahun, 2075).



Table 5-4: Vegetation cover in PADs

S.N.	PAD	Physiographic Region	Vegetation Cover Area (ha)			Total vegetation Cover (1) ha	Other land (2) ha	Total area (1+2) ha
			Forest	Shrub	OWL			
1	Kaski	High Himal	10,002	364	844	11,210	60,610	71,820
		High Mountain	42,233	5,862	8,837	85,447	36,242	121,690
		Middle Mountain	42,233	4	6,035	48,272	12,039	60,311
Sub-total			94,468	6,230	15,716	144,929	108,891	253,821
Percentage (%)			37.22	2.45	6.19	57.10	42.90	100.00
2	Tanahun	Middle Mountain	82,196	508	344	83,048	73,576	156,624
		Chure	4	0	0	4	558	562
Sub-Total			82,200	508	344	83,052	74,134	157,186
Percentage (%)			52.29	0.32	0.22	52.84	47.16	100.00
Total of PADs			176,668	6,738	16,060	227,981	183,025	411,007
Percentage (%)			42.98	1.64	3.91	55.47	44.53	100.00

Source: DFRS, 2015

- Note: 1. OWL: Other wooded land (canopy cover of trees 5-10% with trees more than 5m high in-situ/ or canopy cover of trees less than 5% but combined cover of shrub/bush/trees over 10%; includes areas of shrubs and bushes where no trees are present).
2. The elevation of Middle Mountains region varies from 110 m to 3,300 m above mean sea level. The elevation of High Mountains region varies from 543m in the river valley floors to 4,951m. The elevation of High Himal region ranges from 1,960 m to 8,848m.

The altitude variation of the proposed LDTP alignment varies from 327m to 1184m (Figure 5-1), the project area is characterized by Sub-Tropical Broad Leaf Forest according to the above classification. In the approved IEE, out of 44 APs, 9 are located in the forest area. In the additional section of the alignment, the altitudinal variation of the angle point range from 301m (AP 43) to 595m (AP 47). Thus the altitudinal variation of the project site in Updated report ranges from 301m to 1184m.

Nine Lakes of Pokhara MC were declared as a Ramsar Site in February 2, 2016. The Lake Cluster of Pokhara Valley Ramsar Site comprises of 261.1 sq. km. of area and is rich in biodiversity. The following sections describes the baseline of the biological environment of the project area.

5.2.1.2 PAA and RoW of Alignment

The project affects Pokhara MC and Rupa RM of Kaski district and Byas Municipality, Rishing RM, Magde RM of Tanahun districts which are defined as PAA. The total area of PAA is 113720ha out of which 55958ha is occupied by forests while 58279ha is occupied by forests including grassland and shrubland.

Table 5-5: Forest Pattern in PAA

SN	Landcover category	Area (ha)	Percentage (%)
1	Agriculture	50666.42	44.55
2	Bare area	334.74	0.29
3	Broadleaved closed forest	29457.93	25.90
4	Broadleaved open forest	20825.32	18.31
5	Builtup area	2858.54	2.51
6	Grassland	780.39	0.69
7	Lake	752.8	0.66
8	Needleleaved closed forest	1977.63	1.74
9	Needleleaved open forest	3697.77	3.25



SN	Landcover category	Area (ha)	Percentage (%)
10	River	825.35	0.73
11	Shrubland	1539.55	1.35
12	Unclassified	3.74	0.00
Total		113720.18	100.00

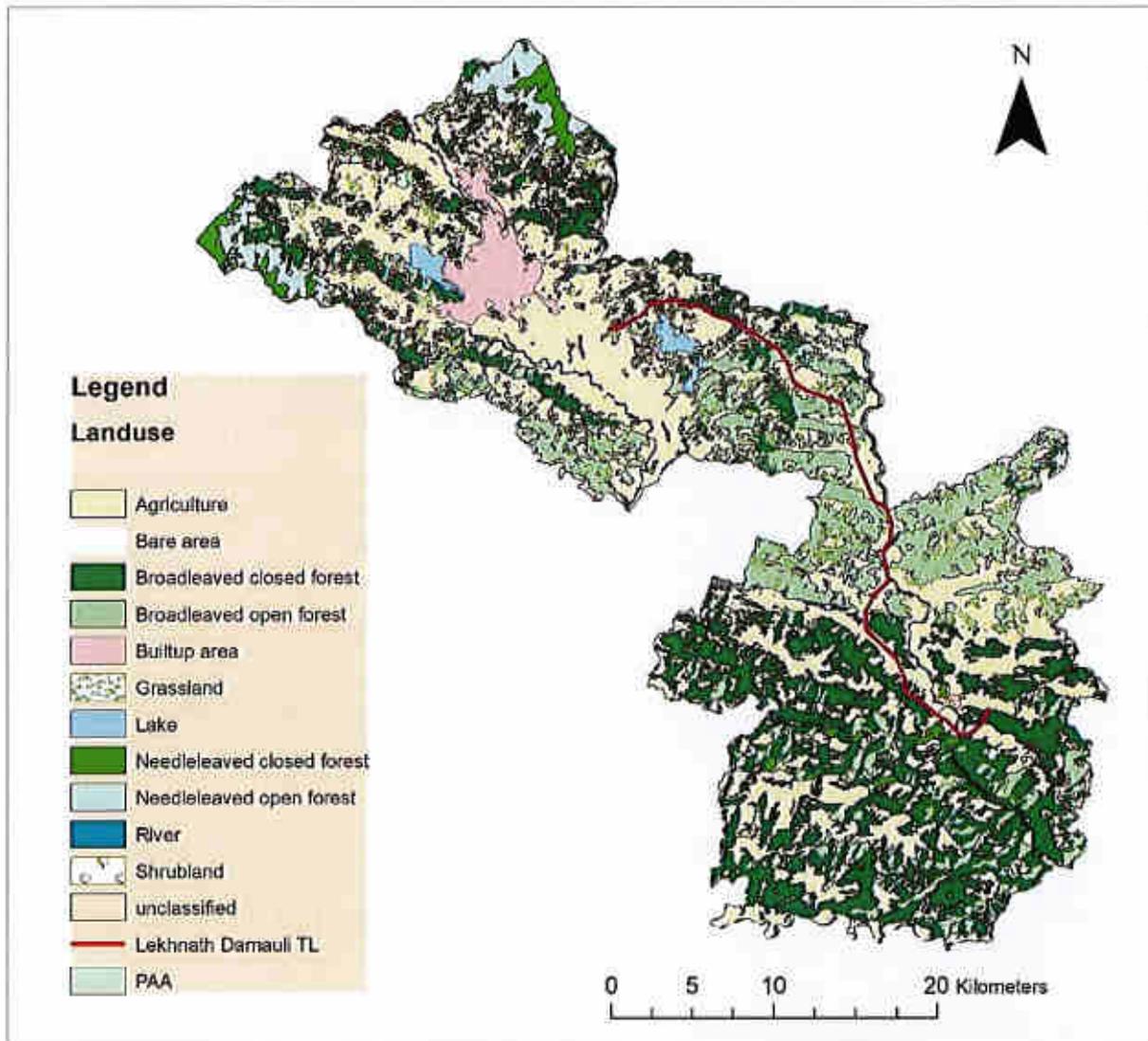


Figure 5-11: Land cover in PAA showing vegetation cover

The density measurement of plants in the approved IEE showed that Sal (*Shorea robusta*) had the highest density of 3008 per ha. It is followed by Chilaune (*Schima wallichii*) (2336/ha), Katus (*Castanopsis indica*) (1168/ha), Angeri (*Osbeckia nepalensis*) (750/ha), Tiju (*Diospyros malabarica*) (333/ha), Botdhairo (*Lagerstroemia parviflora*) (204/ha), Dhurseli (*Colebrookea oppositifolia*) (140/ha), Ramritha (*Mallotus oppositifolius*) (71/ha), Khirro (*Sapium insigne*) (70/ha), Sallo (*Pinus sp.*) (68/ha), Mauwa (*Engelhardtia spicata*) (63/ha), Padke (*Albizia julibrissin*) (46/ha). Other species are found in fewer amounts as shown in Table 5-7. Similarly, in the additional section of the alignment (2.66Km) along the forests, density measurement showed that chilaune (*Schima wallichii*) has the highest density of 175 per ha. It is followed by Khirro (*Sapium insigne*), Simal (*Bombax ceiba*), Botdhairo (*Lagerstroemia parviflora*) etc.

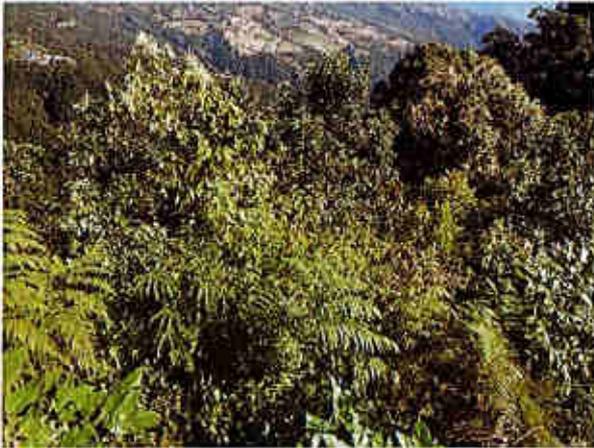
Overall, frequency measurement of plants in the approved IEE showed 90% of Chilaune (*Schima wallichii*), 55% of Angeri (*Osbeckia nepalensis*), 40% of Sal (*Shorea robusta*), 35% of Katus (*Castanopsis indica*), 25% each of Botdhairo (*Lagerstroemia parviflora*) and Khirro (*Sapium*

insigne), 20% of Dhurseli (*Colebrookea oppositifolia*) and 15% each of Mauwa (*Engelhardtia spicata*), Sallo (*Pinus sp.*) and Tiju (*Diospyros malabarica*). There is sparse presence of other species as shown in Table 5-7. In the additional section of the alignment, frequency measurement of the plants in TL showed 100% frequency of chilaune, 50% frequency of each of Simal, Botdhairo, Khirro, Saj and Karma.

The basal area of Sal (*Shorea robusta*) is highest with 26.505m² per hectare. It is followed by Chilaune (*Schima wallichii*) (14.826 m²/ha), Katus (*Castanopsis indica*) (6.013 m²/ha), Swami (*Ficus benjamina*) (2.310 m²/ha), Sallo (*Pinus sp.*) (1.650m²/ha), Angeri (*Osbeckia nepalensis*) (1.335m²/ha), Padke (*Albizia julibrissin*) (0.951m²/ha), Botdhairo (*Lagerstroemia parviflora*) (0.668m²/ha), Tiju (*Diospyros malabarica*) (0.599m²/ha), Khirro (*Sapium insigne*) (0.585 m²/ha) and Ramritha (*Mallotus oppositifolius*) (0.585m²/ha). Basal area of other species is shown in Table 5-7. Importance Value Index (IVI) of Sal (*Shorea robusta*) was 91.73. It is followed by Chilaune (*Schima wallichii*) (75.79), Katus (*Castanopsis indica*) (32.99), Angeri (*Osbeckia nepalensis*) (24.83), Botdhairo (*Lagerstroemia parviflora*) (9.76), Tiju (*Diospyros malabarica*) (8.70), Khirro (*Sapium insigne*) (8.02), Sallo (*Pinus sp.*) (7.37), Dhurseli (*Colebrookea oppositifolia*) (7.10), Swami (*Ficus benjamina*) (5.28) and Mauwa (*Engelhardtia spicata*) (4.71). IVI of other species is shown in Table 5-7. Similarly in the additional section of the alignment, basal area of Chilaune is highest with 0.98m². It is followed by Simal (0.21m²), Saj (0.1m²), Botdhairo (0.08m²), Karma (0.02m²) and Khirro (0.02m²).

The forest type available along the entire project alignment of LDTP is of sub-tropical and temperate categories. The vegetation study along the TL revealed that the major forest in the project area comprises of mixed type with dominance of Sal (*Shorea robusta*), Chilaune (*Schima wallichii*), Katus (*Castanopsis indica*) and Sallo (*Pinus sp.*). The forest area in lower stretch is dominated by Sal (*Shorea robusta*) while forest in upper stretch is dominated by Chilaune (*Schima wallichii*). The crown cover of forest in the project area varies from 40% to 80% depending upon the degradation of forest, vegetation types, altitude, etc. The forest area consists of natural endemic plant species. Few planted species of Sallo (*Pinus sp.*) were also observed in natural forest area inside the CF in the upper stretch of the route. Most of the forest area fall inside CF providing habitat for faunal species. Most of the forest was human influenced forest being utilized and conserved by local people. In the additional section, in terms of dominance of the species, highest relative dominance occurs for chilaune (69) followed by Simal (14.8), Saj (7.27), Botdhairo (5.74) and Khirro (1.55).

The major shrub species available in the area are Angeri (*Osbeckia nepalensis*), Dhurseli (*Colebrookea oppositifolia*), Asuro (*Justicia adhatoda*), Aiselu (*Rubus ellipticus*), Sisnu (*Urtica dioca*), Banmara (*Eupatorium odoratum*), Sajiwon (*Jatropha curcas*), Amriso (*Thysanolaena maxima*), Datiwon (*Achyranthes spera*), Nigalo (*Arundo donax*), Titepati (*Artemisia vulgaris*), Bilaune (*Maesia chisla*), Chutro (*Berberis aristata*), Aiselu (*Rubus paniculatus*), Hade Unyo (*Dicranopterus linearis*), Bans (*Bambusa spp.*), and others. Many herb (ground vegetation) species were identified during the field visit. Some of the important herbs observed during the field visit were Dubo (*Cynodon dactylon*), Gande (*Ageratum conyzoides*), Banmara (*Eupatorium odoratum*), Chari Amilo (*Oxalis corymbosa*), Abijalo (*Drymaria diandra*), Asthma weed (*Euphorbia hirta*), Babiyo (*Eulaliopsis binate*), Congress grass (*Parthenium hysterophorus*), Siru (*Imperata spp.*), Sisnu (*Urtica dioca*), Ghodtapre (*Centella asiatica*), Khar (*Typha spp.*), Kuro (*Bidens biternata*), Lajabati (*Mimosa pudica*), Paniamala (*Nephrolepis cordifolia*) and Tinpate (*Trifolium repens*). Major climber species observed during the field visit were Kubindo (*Kydia calycina*), Bantarul (*Dioscorea sp.*), Tito Karela (*Momordica charantia*) and Githa (*Dioscorea sp.*). In the additional section too, similar type of occurrence of shrubs and herbs occur. Bilaune, niguro, bisgaje are found in dominant numbers.



Picture 5-1: Schima-Castanopsis forest in RoW



Picture 5-2: Shorea robusta forest in RoW



Picture 5-3: Thingring Otangdi CF



Picture 5-4: Government forest near AP 42

The district wise total land area, total forest area and number of CFs along the TL in the PADs are as follows:

Table 5-6: Forest Status in PADs

S. N.	District	Total Area (ha)	Forest Area (ha)	Forest Area (%)	No. of CF in the PAD	No. of CF Affected by the Project
In the approved report						
1.	Kaski	201700	93923	46.56	489	13
2.	Tanahun	154600	78111	50.52	593	5
	Total	356300	172034	48.28	1082	18
In the Updated report						
1.	Kaski	201700	93923	46.56	489	13
2	Tanahun	156902	82549	52.61	616	6

Source: Data from Field Survey (2016) and Respective DFOs

Table 5-7: Species diversity of plants along the TL in CFs

S.N.	Common Name	Botanical Name	Density (No. of ind./ha)	Frequency (%)	Basal Area (m ² /ha)	Relative Frequency	Relative density	Relative dominance	IVI
In the Approved Report									
1	Amala	<i>Phyllanthus emblica</i>	15	5	0.073	1.23	0.18	0.13	1.54
2	Amba	<i>Psidium guajava</i>	24	5	0.050	1.23	0.28	0.09	1.60
3	Angeri	<i>Osbeckia nepalensis</i>	750	55	1.335	13.58	8.93	2.32	24.83
4	Botdhairo	<i>Lagerstroemia parviflora</i>	204	25	0.668	6.17	2.43	1.16	9.76
5	Chilaune	<i>Schima wallichii</i>	2336	90	14.826	22.22	27.81	25.76	75.79
6	Dhurseli	<i>Colebrookea oppositifolia</i>	140	20	0.285	4.94	1.67	0.50	7.10
7	Epil Epil	<i>Leucaena diversifolia</i>	3	5	0.026	1.23	0.03	0.05	1.31
8	Kafal	<i>Myrica eiculenta</i>	5	5	0.145	1.23	0.06	0.25	1.55
9	Katus	<i>Castanopsis sps.</i>	1168	35	6.013	8.64	13.90	10.45	32.99
10	Khirro	<i>Sapium insigne</i>	70	25	0.585	6.17	0.83	1.02	8.02
11	Lankuri	<i>Fraxinus floribundu</i>	15	10	0.093	2.47	0.18	0.16	2.81
12	Mango	<i>Magnifera indica</i>	15	5	0.031	1.23	0.18	0.05	1.47
13	Mauwa	<i>Engelhardtia spicata</i>	63	15	0.149	3.70	0.74	0.26	4.71
14	Padke	<i>Albizia julibrissin</i>	46	5	0.951	1.23	0.55	1.65	3.44
15	Phalat	<i>Quercus lamellosa</i>	23	5	0.083	1.23	0.27	0.14	1.65
16	Ramritha	<i>Mallotus oppositifolius</i>	71	5	0.585	1.23	0.85	1.02	3.10
17	Rato pate	<i>Ajuga bracteosa</i>	1	5	0.238	1.23	0.01	0.41	1.66
18	Sal	<i>Shorea robusta</i>	3008	40	26.505	9.88	35.80	46.05	91.73
19	Sallo	<i>Pinus sp.</i>	68	15	1.650	3.70	0.80	2.87	7.37
20	Simal	<i>Bombax ceiba</i>	10	5	0.195	1.23	0.12	0.34	1.69
21	Swami	<i>Ficus benjamina</i>	3	5	2.310	1.23	0.03	4.01	5.28
22	Tiju	<i>Diospyros malabarica</i>	333	15	0.599	3.70	3.96	1.04	8.70
23	Yitis	<i>Alnus nepalensis</i>	33	5	0.169	1.23	0.39	0.29	1.91
			8400	405	57.561	100	100	100	300
In the additional section (2.66Km)									
1	Chilaune	<i>Schima wallichii</i>	175	100	0.987	28.571	70	69.002	167.573
2	Simal	<i>Bombax ceiba</i>	12.5	50	0.212	14.286	5	14.848	34.134
3	Botdhairo	<i>Lagerstroemia parviflora</i>	12.5	50	0.082	14.286	5	5.744	25.029
4	Khirro	<i>Sapium insigne</i>	25	50	0.022	14.286	10	1.554	25.840
5	Saj	<i>Terminalia tomentosa</i>	12.5	50	0.104	14.286	5	7.269	26.555
6	Karma	<i>Adina cordifolia</i>	12.5	50	0.023	14.286	5	1.583	20.869

5.2.2 Forest Management System

5.2.2.1 PAD

According to DFO Damauli, 610 units of Community Forests have been handed over to different CFUGs which occupy the total area of 51783.08ha benefitting 67087 households. Similarly according to DFO Kaski, 501 units of Community Forests have been handed over occupying total area of 19326.69ha and benefitting 46390 households.

5.2.2.2 PAA

According to the approved IEE, the proposed TL will pass through 13 CFs from Kaski district and 5 CFs from Tanahun district. The TL also passes through 1 national forest in Kaski district (Table 5-9). In the Updated section of the alignment, 1 additional CF and government forest at one section is traversed by the alignment. Thus, the Updated alignment, the proposed TL will pass through 13 CFs in Kaski district and 6 CFs from Tanahun district.

The table given below shows the list of CFs along the TL.

Table 5-8: CFs along the TL

S. N.	Name of CF	MC/Municipality*/RM- Ward	TL location (AP to AP)	Area (ha)	Beneficiaries HHs
Kaski District					
1.	Sahelipakho Badhare	Pokhara MC-27,29 (Lekhnath-1,6)	3-4	35.02	249
2.	Pakhura	Pokhara MC-27,29 (Lekhnath-6)	3-4-5	18.50	62
3.	Bhaltari Bheteri		4-5	37.00	80
4.	Bhurtel Gaon	Pokhara Lekhnath MC-28 (Majthana-6)	6-7	104.00	85
5.	Shaakhudi Simle		6-7	19.75	57
6.	Bilaune Ghari Puranthar	Pokhara Lekhnath MC-31 (Lekhnath-9)	7-8-9	10.06	27
7.	Bhir Pani	Pokhara Lekhnath MC-31 (Lekhnath-10)	11-12-13	115.14	135
8.	Odar Thumki Sirani Danda Thuli Dhunge Sinkauli Swar Maru Ghairo & Lapsibot		12-13-14	28.49	179
9.	Jimire Bishauna Pakho	Rupa RM-7 (Hansapur-9)	14-15	20.66	92
10.	Ramkrishna	Rupa RM-7 (Hasapur-6)	15-16	75.54	94
11.	Mohariya	Rupa RM-6 (Rupakot-9)	16-17	198.47	91
12.	Jimire	Rupa RM-1 (Thumki-4)	19-20-21	69.50	83
13.	Ghewapani Kusunde	Rupa RM-2 (Siddha-8,9)	20-21-22	106	216
Tanahun District					
14.	Thulobhanjyang	Byas*-6 (Syamgha-3)	22-23-24- 25-26	174	180
15.	Sapankot	Byas*-6 (Syamgha-6)	27-28-29-30	180	148
16.	Phoksing	Byas*-5	30-31-32	214.47	177
17.	Ripa Shikhar Thumki	Myagde RM -6 (Manpang-1)	33-34	183.71	152
18.	Manung	Byas*-5	38-39-40	184.17	160
19.	Thigring otangdi	Byas*-13	47-48	88.60	

Note: names within the brackets refer to the former VDC/Municipality prior to new re-structuring of local administrative units.

Source: Field Survey, (2016) and Respective DFOs

Table 5-9: National Forest along the TL

S. N.	National Forest	MC- Wards	TL location (AP to AP)
1	Nursery	Pokhara Lekhnath MC-31 (Lekhnath-9)	8-9-10
2	-	Rising*RM	42-43

Source: Field Survey, (2016)

Cutting of trees for firewood and timber by locals, illegal felling of trees by smugglers, occasional forest fires, encroachment are the disturbing factors of the existing vegetation of the project vicinity. However, local people are making efforts to protect the forest by the formation of CFUGs and enhance natural regeneration.

5.2.3 Ethno - botany

There is no change in the ethnobotany as compared with the approved IEE. The local people utilize plant resources for different purposes including mainly as timber, firewood, fodder, fruit and medicine. The major timber yielding species of the project area are Sal (*Shorea robusta*), Katus (*Castanopsis indica*), Chilaune (*Schima wallichii*), Sallo (*Pinus sp.*) and Utis (*Alnus nepalensis*). Almost all types of trees are being used as firewood depending upon their availability.

Similarly the common fruits yielding plants in the project area include mango (*Mangifera indica*), banana (*Musa paradisiaca*), papaya (*Carica papaya*), Naspati (*Pyrus communis*), guava (*Psidium guajava*), Kafal (*Myrica eiculenta*) and jack fruit (*Artocarpus sp.*). Citrus species like Orange (*Citrus aurantium*), Nibuwa (*Citrus sp.*), Bhogate (*Citrus maxima*), Kagati (*Citrus aurantifolia*) are also common fruit plants in the project area. Orange garden was observed in and around AP 37.

Chari Amilo (*Oxalis corymbosa*), Abijalo (*Drymaria diandra*), Aduwa (*Zingiber Officinale*) Amala (*Phyllanthus emblica*), Asuro (*Justicia adhatoda*), Ghodtapre (*Centella asiatica*), Aiselu (*Rubus ellipticus*), Lapsi (*Choerospondias axillaris*), Chutro (*Berberis aristata*), Akhe Timur (*Zanthoxylum armatum*) and Paniamala (*Nephrolepsis cordifolia*) are some of the plant species available in the project area having medicinal values. Lapsi (*Choerospondias axillaris*) and Amala (*Phyllanthus emblica*) have commercial value and are being used for making pickle.



Picture 5-5: Agroforestry in Phoksing CF



Picture 5-6: Orange garden in RoW (AP-37)

Tree and shrub species used as fodder are Badahar (*Artocarpus lakoocha*), Bans (*Bambusa spp.*), Berula (*Ficus sarmentosa*), Bilaune (*Maesia chisla*), Chuletro (*Brassaopsis glomeulata*), Daar (*Boehmeria rugulosa*), Dudhilo (*Ficus nemoralis*), Kabhro (*Ficus lacor*), Khanyu (*Ficus semicordata*), Kimbu (*Morus alba*), Koiralo (*Bauhinia variegata*), Kursimlo (*Schefflera venulosa*), Kutmero (*Litsea monopelata*), Nibar (*Ficus carica*), Nigalo (*Arundo donax*), Pakhri (*Ficus glaberrima*), Phaledo (*Erythrina strica*) and Ambriso (*Thysanolaena maxima*). Herb species used as fodder are Babiyo (*Eulaliopsis binate*), Dubo (*Cynodon dactylon*), Kans (*Saccharum spontaneum*), Khar (*Typha spp.*), Siru (*Imperata spp.*), etc.

5.2.4 Protected Species of Flora

GoN has imposed restriction on the export of a number of plant species in unprocessed condition. Sal (*Shorea robusta*) is the species available in the project area banned for commercial felling, transportation and export as per the Forest Rules, 1995.

5.2.5 Wildlife

The TL and adjoining areas have various ecological and vegetation characteristics which has provided a natural habitat for different types of wildlife species along the route. As the TL passes through the forest near the settlement area, the habitat near the route is not suitable for wildlife due to the human disturbances. It is not the specific corridor for movement of wildlife. But, some of the major wildlife reported from the project area are categorized as follows.

5.2.5.1 Mammals

There is no change in the mammals of the project area as compared with the approved IEE. Some of the wild animals reported from the project areas are Dumsi (*Hystrix indica*), Malsapro (*Martin flavigula*), Common Langur (*Semnopithecus entellus*), Ratuwa Mriga (*Muntiacus muntjak*), Leopard (*Panthera pardus*), Jackal (*Canis aureus*), Kharayo (*Lepus nigricollis*), Ban Biralo (*Felis chaus*), Rhesus Monkey (*Macaca mulata*), etc. Based on the field observation and interaction with the local communities/forest user group, these species of mammals were reported in the project area. Interaction with local people and member of forest user groups in the vicinity of the forest revealed that the frequency of encounter with the wild mammals is very low.

5.2.5.2 Birds

There is no change in the birds of the project area as compared with the approved IEE. Gardens, agricultural fields, villages, forest, rivers, streams, gorges, and cliffs provide variety of habitat for different species of birds. Common bird species reported in the project area are; Crow (*Corvus splendens*), Fisto (*Phylloscopus spp.*), Dhukur (*Streptopelia chinensis*), Koili (*Surniculus lugubris*), House sparrow (*Passer domesticus*), Gaunthali (*Hirundo sp.*), Kalij Pheasant (*Lophural eucomelana*), Cuckoo (*Plantative cuckoo*), Baj (*Buteo sp.*), etc. During literature reviews, field visits and local stakeholder consultations, no any specific migratory route of bird is observed in TL.

5.2.5.3 Protected Species of Fauna

As per the National Park and Wildlife Conservation Act (1973) of Nepal, 26 mammal species and 9 bird species of Nepal have been enlisted into the protected categories. In the project area, no any protected species of mammal is reported under this protected categories. Among mammals reported in project area, 1 species is listed in CITIES Appendix I and 2 species are listed in CITIES Appendix II. The detail about these species is given in Appendix C of this report. Similarly, none of the bird species reported in the project area during the field study is under protected categories as per the National Parks and Wildlife Conservation Act, 1973. Among birds reported in project area, 4 species are listed in CITES Appendix II. The detail of these species is given in Appendix C.



5.3 Socio-economic and Cultural Environment

5.3.1 General Introduction of the PADs

The proposed LDTLP locates in Kaski and Tanahun District, Gandaki Province. The total area of these PADs is 3563 sq. km (Kaski 2017 sq.km. and Tanahun 1546 sq.km.) that comprises about 2.42 percent of total national area. There are, as per the current local level restructure, 10 RMs, 4 municipalities and one MC in these PADs (4 RMs and 1 MC in Kaski District and 6 RMs and 4 municipalities in Tanahun District).

According to CBS (2011), total population of these PADs is 815,386 with male 379,795 (46.6%) and female 435,591 (53.4%) which covers 3.08% population of Nepal. The total households' (HHs) number is 203982 with average HH size 4.03 which is lower than average national HH size (4.89). The average population density is 226.49 person/sq.km which is higher than the average national density (180). Average population growth from the last decade is 1.41 which is higher than the national growth rate (1.35%). The average economically active population (15-59 years) is 55.05% which is lower than the national average economically active population (57%). The average urban population is 72.38%. The number of the urban population has highly increased in these PADs when the GoN has recently restructured local level structure merging some exiting VDCs into municipality and MC. The socio-economic data of PADs is based on census 2011 and was prepared after restructuring the country. So there is no change in the PAD level socio-economic data.

Table 5-10 : Demographic Characteristics of PADs

S. N.	Demographic Characteristics	PADs		Total	Average
		Kaski	Tanahun		
1	Total Population	492,098	323,288	815,386	-
2	Male	236,385	143,410	379,795	-
3	Female	255,713	179,878	435,591	-
4	Total Number of HHs	125,673	78,309	203,982	-
5	Average HHs size	3.92	4.13	-	4.03
6	Population Density (persons/ sq.km)	243.98	209	-	226.49
7	Sex Ratio (Male per 100 Females)	92.44	79.73	-	86.09
8	Population growth rate	2.57	0.25	-	1.41
9	Urban Population (%)	84.16	60.61	-	72.38
10	Population below 15 years (%)	28.9	33.62	-	31.26
11	Economically Active Population 15 to 59 year (%)	62.38	55.72	-	55.05
12	Elderly Population 60+years (%)	8.73	10.66	-	9.70
13	Total Area of the Districts (sq. km)	2017	1546	3563	-
14	District Population in Total Population of Nepal (%)	1.86	1.22	3.08	-

Source: CBS, 2011

5.3.1.1 Caste and Ethnicity

PADs are polyglot society with multilingual and diversified cultural groups inhabiting with co-existence and mutual harmony. The major ethnic composition of these PADs includes Brahmin-Hill (21.49%), Magar (15.90%), Gurung (14.58%), Chhetri (13.44%) and Dalit (14.66%). Here Dalit refers to Kami, Damai/Dholi and Sarki.

Table 5-11: Major Caste/Ethnic Group of PADs

S.N.	Major Caste/Ethnic Group	PADs		Total Population	Percent
		Kaski	Tanahun		
1	Brahmin-Hill	136834	38382	175,216	21.49
2	Magar	42547	87078	129,625	15.90
3	Chhetri	71808	37809	109,617	13.44
4	Gurung	81597	37325	118,922	14.58
5	Dalit (Kami, Damai/Dholi, Sarki)	69331	50216	119,547	14.66
6	Others	89981	72478	162,459	19.92
	Total	492,098	323,288	815,386	100.00

Source: CBS, 2011

5.3.1.2 Religion

Out of the total population, 684,802 (83.99%) follow Hindu religion which is higher than the national average (81.3%). Similarly, 96,798 (11.87%) follow Buddhism, 16,005 (1.96%) follow Christianity, 8,594 (1.05%) Islam and 4,496 (0.55%) Bon (Table 5-12). Here, others refers to Jainism, Bahai, prakriti and unidentified.

Table 5-12: Major Religion of PADs

S.N.	Major Religion	Population		Total	Percent (%)
		Kaski	Tanahun		
1	Hindu	405141	279661	684802	83.99
2	Buddhism	66266	30532	96798	11.87
3	Christianity	10538	5467	16005	1.96
4	Islam	4437	4157	8594	1.05
5	Bon	2908	1588	4496	0.55
6	Others	2808	1883	4691	0.58
Total		492,098	323,288	815,386	100.00

Source: DSO (2071) and DSO (2072)

5.3.1.3 Education and Literacy Status

There are, including community and institutional schools, altogether 1,775 schools (628 in Kaski and 1,147 in Tanahun) in these PADs.

Table 5-13: Number Schools of PADs

S.N.	Description	Number		Total	Percent
		Kaski	Tanahun		
1	Community	425	861	1286	72.45
2	Institutional	203	286	489	27.55
Total		628	1,147	1,775	100.00

Source: DSO (2071) and DSO (2072)

CBS (2011) shows the average literacy rate of population of 5 years and above of these PADs is 79.40% with male literacy rate 87.70% and female literacy rate 72.30%. This figure is higher as compared to the national literacy rate 65.9%.

Table 5-14: Literacy Status of PADs

S. N	PADs	5 years & above Population			Can Read and Write			Literacy Status		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Kaski	454992	216624	238368	374802	195181	179621	82.38	90.10	75.35
2	Tanahun	295611	129445	166166	221194	108317	112877	74.83	83.68	67.93
Total/Average		750,603	346,069	404,534	595,996	303,498	292,498	79.40	87.70	72.30

Source: CBS, 2011

5.3.1.4 Language

CBS 2011 shows that there are all together 123 mother tongues in Nepal. Out of which Nepali, Magar, Gurung and Magar are four major languages use by the people of the PADs where majority of the population (71.91%) speak Nepali language. This is followed by Magar (9.57%), Gurung (10.48%) and Newari (2.92%) and others (5.13%).

Table 5-15: Major Languages Spoken in PADs

S.N.	Languages	Speakers		Total	Percent
		Kaski	Tanahun		
1	Nepali	386083	200236	586319	71.91
2	Magar	10782	67252	78034	9.57
3	Gurung	58589	26829	85418	10.48
4	Newari	10659	13127	23786	2.92
5	Others	25985	15844	41829	5.13
Total		49,2098	323,288	815,386	100.00

5.3.1.5 Migration

Migration has become a prominent phenomenon in the population dynamics of Nepal. A large volume of youth population has been consistently moving abroad for the purpose of employment. The absent population of Nepal has been a major issue in demographic, social and economic aspect. Figure 5-12 shows the increasing and decreasing trend of foreign migrants in the PADs. The Annual Report (FY 2067/68, 2068/69, 2069/70) of Department of Foreign Employment (DoFE) shows the increasing trend of foreign employment from the fiscal year 2067/68 to 2069/70; however the number of foreign migrants has decreased in the fiscal year 2070/71 in the PADs. It shows that there are 10,273, 10,635, 15,005 and 14,401 migrants had departed into abroad employment in the FY 2067/68, 2068/69, 2069/70 and 2070/71 respectively. These reports also show that male participation in foreign employment were more than female that reveals access of female in abroad employment in PADs is very low.

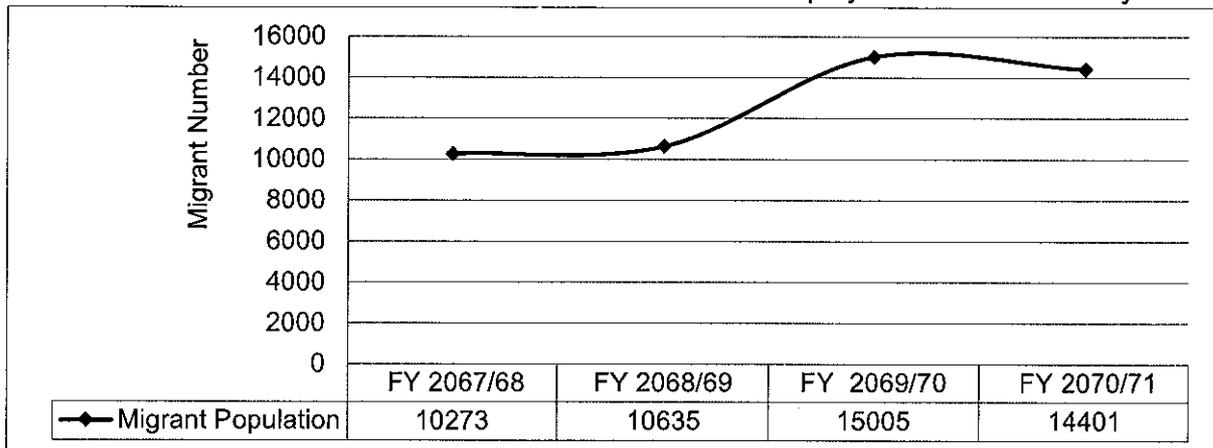


Figure 5-12: Comparative Trend of Foreign Labor Migration in the PADs

Source: DoFE (www.dofe.gov.np)

5.3.1.6 Occupation and Employment

The major occupation of families in PADs is subsistence farming and livestock and tourism for their livelihood. The PADs are also known as tourist area of the country. Thus, many people are engaged as skilled, semi-skilled and unskilled labor force in tourism sector. Rest of the people are engaged in business, government service, wage labor, agro-based industries, etc. Major occupation of the people of PADs is given in the table given below.

Table 5-16: Occupational Distribution of PADs

S. N.	Description	Kaski		Tanahun		Total		Total	Percent
		Male	Female	Male	Female	Male	Female		
1	Agriculture, forestry & fishery workers	24959	39646	34734	56470	59693	96116	155809	52.86
2	Service & sale workers	17730	11412	4323	3769	22053	15181	37234	12.63
3	Craft and trades workers	16353	4925	5716	1480	22069	6405	28474	9.66
4	Elementary occupations	7961	6632	3360	2582	11321	9214	20536	6.97
5	Professionals	6899	4415	2979	2051	9878	6466	16344	5.54
6	Plant & machine operators	6992	438	2221	111	9213	549	9762	3.31
7	Technicians & associate professionals	4564	1710	1178	415	5742	2125	7867	2.67
8	Managers	4167	2164	836	630	5003	2794	7797	2.65
9	Office assistant	2360	1434	560	294	2920	1728	4648	1.58
10	Security Workers	484	49	191	24	675	73	748	0.25
11	Others	1892	875	1850	929	3742	1804	5546	1.88
Total		94,361	73,700	57,948	68,755	152,309	142,455	294,764	100.00
Percentage (%)		56.15	43.85	45.74	54.26	51.67	48.33	100.00	

Source: DSO (2071) and DSO (2072)

DSO (2071) and DSO (2072) show still 52.86% population of PADs has involved in agriculture, forestry and fishery works is the main occupation. This is followed by service and sales workers (12.63%), craft and related trades workers (9.66%), elementary occupations (6.97%), professionals (5.54%), plant and machine operators and assemblers (3.31%), technicians and associate professionals (2.67%), managers (2.65%), office assistant (1.58%) and security workers (0.25%).

5.3.1.7 Agriculture

Agriculture is the prime economic activity which has given 36.21% contribution (23% in Kaski and 49.42% in Tanahun) in gross domestic production. The total area of the PADs is 356,300ha. Out of which, 52,460.9ha (14.72%) land is cultivated land. Out of 52460ha cultivated land, 20,392.8ha (38.87%) is irrigated. About 112,501 HHs (55.15%) of total HHs of PADs are engaged in agriculture and its related activities (livestock and forestry). Paddy, maize, wheat and millet are the major agricultural productions. Besides, oilseeds, fruits, vegetables are also produced in a large scale (DSO, 2071 and DSO, 2072). The detail of the land type of these PADs is given in the table given below.

Table 5-17: Detail of the Agricultural Land of the PADs

S.N	Description	Tanahun (ha)	Kaski (ha)	Total (ha)	Percentage (%)
1.	Total area of the district (ha)	154,600	201,700	356,300	100.00
2.	Total cultivated land	29,022.3	23,438.6	52,460.9	14.72
3.	Total irrigated land	8,022.8	12,370	20,392.8	38.88

Source: DSO (2071) and DSO (2072)

5.3.1.8 Trade and Industries

Major economic centers in the PADs are Pokhara, Lekhnath in Kaski District and Damauli, Aanbukhaireni, Dumre, Khairenitar, Bhansar and Dulegaida in Tanahun District. Some industries established in the PADs has provided numbers of employment to the people. The detail of the industries number and employment according to their category of these PADs is given in the table given below.

Table 5-18: Industries in PAD

S.N.	Category	Kaski		Tanahun	
		No of Industry	Employment	No of Industry	Employment
1.	Production oriented	138	522	74	222
2.	Commerce (banijya Farm)	-	-	374	1122
3.	Agriculture and Forestry	92	347	181	483
4.	Tourism	236	1069	116	348
5.	Service	176	524	127	381
	Total	642	2,462	872	2,556

Source: DSO (2071) and DSO (2072)

5.3.1.9 Tourism Activities

The PADs are one of the major tourist destinations in Nepal. The main tourist destinations are Mahendra Cave, Patale Chhago, Gupteshwar Mahadev Cave, Seti River, Sarankot, Machhapuchchhre, Annapurna-I, Panchase Area and so on in Kaski District and Byas Cave, Siddha Cave, Bandipur Area, Bhanu Birth Place Area, Tanahunsur Area, Seti Gandaki Area, Kali Gandaki Corridor Area, DhorBarahi Area, Highway Tourism area and so on in Tanahun District.



Table 5-19: Major Touristic Places of PADs

S. N.	Touristic Places	
	Kaski District	Tanahun District
1	Mahendra Cave	Bhanu Birth Place Area
2	Patale Chhago	Siddha Cave
3	Gupteshwar Mahadev Cave	Bandipur
4	Seti River	Tanahunsur Area
5	Sarankot	Seti Gandaki Area
6	Machhapuchchhre	Kali Gandaki Corridor Area
7	Annapurna-I	DhorBarahi Area
8	Panchase Area	Highway Tourism Area

Source: DSO (2071) and DSO (2072)

5.3.1.10 Religious, Historical and Archeological Sites

The PADs are also famous for religious and historical aspect too. Some religious places like Bindhyabasini Temple, Ram Temple, Dharmashila Buddha Bihar, Bhadrakali Temple, Shova Bhagawati Temple, Siddha Barah, Kotdanda, Yanjikot Gurung Basti in Kaski District and Devghat Dhaam, Chhabdi Barahi Temple, Dhorbarahi Temple, Chhimkeshwari Temple, Jame Masjid, Bauddha Gumba in Tanahun District are very popular.

5.3.1.11 Gender

Gender equality is a key component of human development. Overall Nepal still has a gender gap, so is found in these PADs. The female population exceed the male population, as a result the sex ratio is low (86.09). The female literacy has remarkably increased in the past decades however it is still low (72.30%) than the male literacy (87.70%). There has been a rise in female-headed HHs due to the increase of male into foreign employment. However, economic empowerment of women is still a challenge in these PADs. In addition, women's economic activity is still low in non-agriculture sector possibly due to a lack of education and a tradition of working in agriculture. DSO (2071) and DSO (2072) show that about 45.33% women of Kaski and about 31.5% women of Tanahun are engaged in agriculture sector.

5.3.1.12 Public Health, Drinking Water and Sanitation

DSO (2071) shows that there are one regional hospital, two teaching hospitals, two community hospitals, one eye hospital, one leprosy disease hospital and fourteen health posts, three primary health centers, eleven DOT centers, twenty six NGOs/INGOs working in Health Sectors and some other private health institutions/nursing homes in Kaski District. Similarly, two district hospitals, five primary health centers, fifty five health posts, twenty three birthing centers, two dental service providers, ten Ayurveda hospitals, seven NGOs/INGOs working in health sectors and some other private institutions are in Tanahun District (DSO, 2072). The health situation of these PADs is satisfactory. The health service in these PADs is delivered through the existing district government hospital, zonal hospital, medical college, other private hospitals, sub-health post, and clinics which provide local level health services. These health centers provide the health facilities not to the people within the district but outside of the districts.

Table 5-20: Health Institutions of PADs

S.N.	Types of Health Institutions	Kaski	Tanahun	Total
1.	Regional Hospital	1	-	1
2.	District Hospital	-	2	2
3.	Primary Health Centre	3	2	5
4.	Health post	14	45	59
5.	Sub-Health Post	20	-	20
6.	Birthing Centre	-	-	23
7.	Urban Health Centre	-	-	1

S.N.	Types of Health Institutions	Kaski	Tanahun	Total
8.	Community Health Unit	-	1	1
9.	Village Clinic	-	167	167
10.	Vaccine Clinic	-	219	219
11.	Private Hospital	8	8	16
12.	Eye Hospital	1	-	1
13.	Regional Tuberculosis Centre	1	-	1
14.	Leprosy Hospital	1	-	1
15.	Teaching Hospital	2	-	2

Source: DSO, 2071 and DSO, 2072

CBS (2011) shows that main sources of drinking water in the PADs are tap/piped water (85.65%), uncovered well/kuwa (5.41%), spout water (4.16%), covered well/kuwa (2.74%), river/stream (0.45%), others (0.99%). Awareness level towards health and sanitation (particularly towards safe drinking water, use of toilets, etc.) is satisfactory in the PADs. DSO (2071) and DSO (2072) show 84% HHs of Tanahun and 99.2% HHs of Kaski have toilet facilities. Both districts are declared as 'Open Defecation Free Districts'. Thus, sanitation condition is found satisfactory in the PADs.

5.3.2 Project Affected Area (RMs/Municipality/MC/Settlement)

Due to the recent restructuring of local level in Nepal, the earlier structures of VDC have either been merged to RM or Municipality or MC. In case of PADs, Pokhara MC is formed by merging the Pokhara Sub-Metropolitan City, Lekhnath Municipality, Chapakot, Kaskikot, Puranchaur, ward no. 3 to 9 of Bhadaure Tagami, ward no. 1 to 5 of Kalika and Ward no. 1 and 4 to 9 of Majhthana VDCs. In the same way, Thumki, Siddha, Deurali, Rupakot and ward no. 1 to 4, 6, 7 and 9 of Hansapur VDCs were restructured as Rupa RM. Similarly, former Byas Municipality, Kyamin, Shyamgha, ward no. 2 to 8 of Ghansikuwa, Ward no. 4 to 9 of Tanahunsur, ward no. 2 to 7 of Keshabtar, ward no. 1 to 5 and 7 to 9 of Risti and ward no. 6 to 9 of Satiswara VDCs have restructured as Byas Municipality. Kahun Shivapur, Bhirkot, Kotdarbar, Ward no. 1 to 3 of Baidi, Ward no. 1 to 8 of Ramjakot and Ward no. 1 to 8 of Rising Ranipokhari VDCs have restructured as Rising RM and Jamune Bhanjyang, Chhang and Manpang VDCs have restructured as Myagde RM. So, the proposed LDTLP passes through one MC (Pokhara) and one RM (Rupa) in Kaski District, and one municipality (Byas) and two RMs (Rising and Myagde) in Tanahun District. The socio-economic data of PAAs is based on census 2011 and was prepared after restructuring the country. So there is no change in the PAD level socio-economic data.

Table 5-21: List of Near-by Settlements of LDTLP

Kaski District			Tanahun District		
S.N.	Settlement	RM/MC	S.N.	Settlement	RMs/Municipality
1	Dharmasala Village	Pokhara MC	1	Sekhatar	Byas Municipality
2	Kaligandaki Tole		2	Tallo Dhad Village	
3	Kotbari Village		3	Pokhare Danda	
4	Kahere		4	Sekhapur Village	
5	Archal Tar		5	Sapan Kot Village	
6	Syankhudi Tol		6	Madi Besi Village	
7	Labsi Danda Village		7	Rani Tar Village	
8	Thuldhunga Village		8	Bhanungkot Saura Village	
9	Khana Swara		9	Belbas Village	
10	Aarupata		Rupa RM	10	
11	Ulleri Talbesi	11		Sami Danda	Magde RM
12	Tilkhoriya	12		Manpang	
13	Sirkutan				
14	Deupur Besi				
15	Katuje				

Except for Byas Municipality and Pokhara MC, the population of project affected RMs is predominantly rural and settlement is mostly scattered near the TL route. However, this rural characteristic of the area is gradually changing into the urban and semi-urban due to the development of infrastructures; such as transportation, communication, education and others. Along the TL route, settlements are clustered in market areas.

5.3.2.1 Demographic Characteristic of the PAA

Total population of one MC, one municipality and three RMs in the PAAs has 536,221 with 251,552 (46.91%) male and 284,669 (53.09%) female. Similarly, there are 130,891 HHs in PAA and average HH size, sex ratio and population density (person/sq.km) is gradually 4.10, 88.4 and 316.

Table 5-22: Demographic Characteristics of the PAA

S. N.	PAA	Population			HHs	Sex Ratio	Average HH size	Area (sq.km.)	Pop. Density (person/sq.km)
		Total	Male	Female					
Kaski									
1	Pokhara MC	402995	192977	210018	103707	91.9	3.89	464.24	868
2	Rupa RM	14519	6289	8230	3018	76.4	4.81	94.81	153
Tanahun									
3	Byas Municipality	70335	31260	39075	14940	79.9	4.71	248	284
4	Rishing RM	25870	11140	14730	3598	75.6	7.19	215	120
5	Myagde RM	22502	9886	12616	5628	78.4	4.00	115	196
Total/ Average		536,221	251,552	284,669	130,891	88.4	4.10	1,700.05	316

Source: CBS, 2011

5.3.2.2 Caste/Ethnic Composition and Religion

The PAA is populated by heterogeneous caste/ethnic communities. Major caste/ethnic groups in the PAA are Brahmin-Hill (24.32%), Chhetri (14.72%), Gurung (14.15%), Dalit (Magar (13.27%), 12.93%), Newar (6.13%), Tamang (2.31%), Thakuri (1.65%) and others (10.65%). Here, Dalit includes Kami, Sarki, Damai, Dholi and other dalit too. Similarly, other includes Darai, Kumal, Gharti/Bhujel, Badi, Sanyasi/Dashnami and other castes settle in the PAA. In addition, remarkable number of Musalman (1.13%) has been settling in the PAA.

Table 5-23: Population in the PAA by Caste/Ethnic Group

S.N.	Caste/ethnicity	Population	Percentage (%)
1	Brahmin-Hill	122759	24.32
2	Chhetri	74276	14.72
3	Gurung	71423	14.15
4	Magar	66977	13.27
5	Kami/Damai/Dholi/Sarki	65256	12.93
6	Newar	30931	6.13
7	Tamang	11649	2.31
8	Thakuri	8315	1.65
9	Gharti/Bhujel	6772	1.34
10	Musalman	6231	1.13
11	Sanyasi/Dasnami	4605	0.91
12	Badi	3988	0.79
13	Others	31556	6.25
Total		504,738	100.00

Source: CBS, 2011

During the field visit, it was observed that Brahmin-Hill, Chhetri, Magar, Gurung, Dalit and Musalman are the major caste/ethnic groups found in the settlements near to the TL. In the same way, Hinduism and Buddhism are the major religions followed by the people in the PAA. Muslim also found in the settlement between AP25 to AP26 in Pokhara Danda, Byas (former Shyamgha), Tanahun. Dashain, Tihar, Lhosar, Janaipurnima, Gaijatra, Tij, Makar Sankranti, Krishnashtami, Baishak Purnima, Matatirtha Ausi, Shreepanchami, Falgu Purnima, Udhauli, Uvauli are the major festivals celebrated by Hindus, Buddhists and Eid by Muslims in the PAA.

5.3.2.3 Mother Tongue

Nepali is widely spoken language in the PAA. Out of 504738 population, more than two third 376538 (74.60%) speak Nepali language. Other major languages spoken in the PAAs are Gurung 49191 (9.75%), Magar 34267 (6.79%), Newari 15283 (3.03%), Tamang 5988 (1.19%) and others 23471 (4.65%). Here, other languages include Urdu, Maitheli, Bhojpuri, Tharu, Limbu, Chepang, Sunuwar, Bangla, Darai, Dura, Bote, Kumal, Thakali, Chhantyal, Hyolmo/Yholmo, Ghale, Rai, Kham and Hindi etc. However, it has been observed during the field survey that the main language spoken along the TL is Nepali. Some indigeneous people use their own ethnic language to speak; however, the medium of conversation among the people is found Nepali.

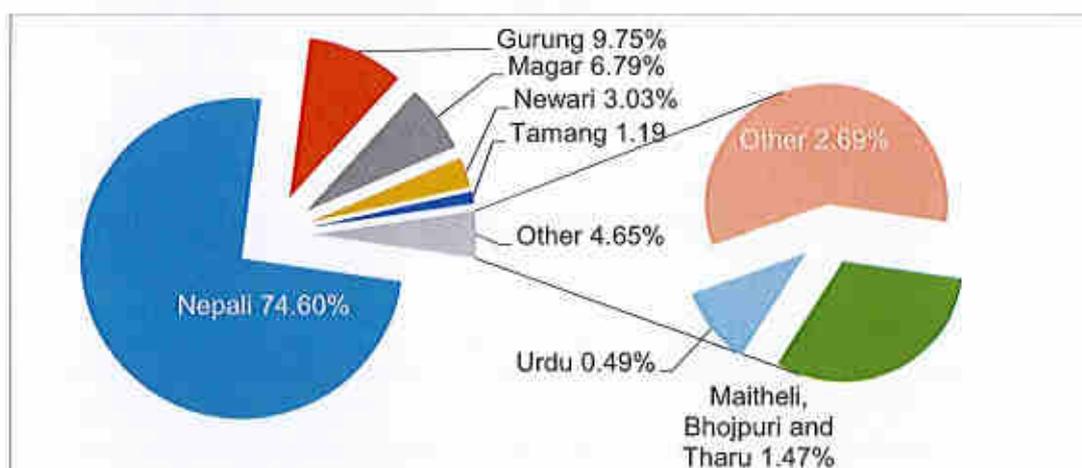


Figure 5-13: Population of PAA by Mother Tongue

Source: CBS, 2011

5.3.2.4 Literacy Status and Educational Facilities

CBS (2011) shows average literacy rate of population of 5 years and above of PAA is 82.74% with male literacy rate 90.4% and female literacy rate 76.1%. This figure is higher as compared to the district literacy rate 79.40%. This is because the literacy rate of Pokhara MC and Byas Municipality is comparatively higher than project affected RMs. Pokhara MC of Kaski has higher literacy rate (84.4%) whereas Rishing RM of Tanahun has lower literacy rate (64.1%).

Table 5-24: Literacy Status of the PAA

S. N.	PAA	5 yrs & above Population			Can Read and Write			Literacy Status		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
Kaski										
1	Pokhara MC	366095	173855	192240	308982	159478	149504	84.4	91.7	77.7
2	Rupa RM	10758	4601	6157	8149	4008	4141	75.7	87.1	67.3
Tanahun										
3	Byas Municipality	52305	23037	29268	42399	20295	22104	81.1	88.1	72.5
4	Rising RM	15857	6663	9194	10156	4961	5195	64.1	74.5	56.5
5	Myagde RM	20657	8943	11714	15614	7590	8024	75.6	84.9	68.5
Total/Average		465,672	217,099	217,099	248,573	385,300	196,332	82.7	90.4	76.1

Source: CBS, 2011

There are higher secondary schools at every project affected RMs/Municipality/MC. Schools of all levels (primary, lower secondary, secondary, higher secondary) are found in villages along the proposed TL route. During the field study, it was found that school attainment of female and male student is almost the same. However, the majority of the schools nearby TL alignment in the PAA lack physical facilities such as building/class room, toilet, drinking water, sports ground, furniture, athletics materials and library. The physical condition of almost all the schools is in poor condition. During the field visit, local people stated that almost all schools of the PAA require external support for physical facility improvement.

DDC-Kaski (2067) and DSO (2072) show that the education facility in the PAA is supported by 328 numbers of community schools and higher secondary schools; out of which number of primary level, lower secondary level, secondary level and higher secondary level schools are 218, 42, 41 and 27 respectively. Besides, there are also some schools too like Institutional Schools, Gurukul Schools, Madarsaa, Gumba, Dristibihin (Blindness/Low-vision) Schools, Sustashrawan (Deaf/Hard to Hearing) Schools, Susta Manasthiti (Mentally Disable) Schools and colleges in different academic areas that have been provided education facility in the PAA.

Table 5-25: Number of Schools in PAA

S. N.	PAA	Primary	Lower Secondary	Secondary	Higher Secondary	Total
Kaski						
1	Pokhara MC	120	15	22	13	170
2	Rupa RM	23	4	4	1	32
Tanahun						
3	Byas Municipality	32	10	8	10	60
4	Rishing RM	19	9	3	1	32
5	Myagde RM	24	4	4	2	34
Total		218	42	41	27	328

Source: DDC-Kaski, 2067 and DSO, 2072

5.3.2.5 Economically Active Population

Out of 504,738 population of PAA, more than half (61.9%) population is economically active population (age group 15-59 years). The remaining 38.1% (29.7% below 15 years and 8.4% above 60 years) population is economically in-active. The dependency ratio in the project area is 1:1.6.

Table 5-26: Economically Active Population

S. N.	PAA	Total Population			Economically Active Population (Age group 15-59)			Economically Inactive Population (Age below 15 and above 60)		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Pokhara MC	395988	189885	206103	251810	117149	134661	144178	72736	71442
2	Rupa RM	11641	5047	6594	6343	2462	3881	5298	2585	2713
3	Rishing RM	17624	7530	10094	9006	3363	5643	8618	4167	4451
4	Myagde RM	22502	9886	12616	12605	4972	7633	9897	4914	4983
5	Byas Municipality	56983	25485	31498	32844	13226	19618	24139	12259	11880
Total		504,738	237,833	266,905	312,608	141,172	171,436	192,130	96,661	95,469
Percentage (%)		100.00	47.1	52.9	61.9	45.2	54.8	38.1	50.3	49.7

Source: CBS, 2011

5.3.2.6 Migration Patterns

In the PAA, people are generally found to be migrated from hill to Terrain and rural to urban area for better opportunity of their life. According to CBS (2011), there are 61071 absent population (both inside and outside migration) of 43413 HHs where 85.3% are male and only 14.7% are female.

Table 5-27: Absent HHs and Population of Project Area

S. N.	PADs	PAA	Total HHs	Absent HHs	Absent Population		
					Total	Male	Female
1	Kaski	Pokhara MC	103507	31653	45403	37474	7929
		Rupa RM	3018	1314	1857	1693	164
2	Tanahun	Byas Municipality	14940	5894	7354	6870	484
		Rishing RM	3598	1892	2857	2669	188
		Myagde RM	5628	2660	3600	3361	239
Total			130,891	43,413	61,071	52,067	9,004
Percentage (%)			100.00	33.2	100.0	85.3	14.7

Source: CBS, 2011

Similarly, the young generation migrating to abroad seeking employment opportunities is common from the project area. The abroad countries like Saudi Arabia, Qatar, UAE (Dubai), Kuwait, Malaysia, Oman, Afghanistan, Israel, Macau, Korea, Hong Kong and even Libya too are the main destination countries of the migrants. Local people reported, during the field visit, that the push factors (social factors, economic factors, political factors, personal factors) and pull factors (easily available of unskilled work, easy entry and exit, high rate of wage, pressure of relatives and friends) have predominantly played significant role leading to abroad migration in the project area.

5.3.2.7 Health and Sanitation Condition

The finding of the HHs surveys as well as meetings, held in different places, reveals that the quality of service provided by health institutions is satisfactory. Since the project area has good road network in Byas and Pokhara MC, most of the people of these municipality/MC have easy access to hospitals and health centres. However, the participants of the meetings also suggested for providing support for infrastructure development, medicine supply to improve their services in the RMs level health posts as well as sub-health posts.

CBS (2011) shows out of total HHs (130,891), majority of the HHs 77,758 (58.85%) use covered well/kuwa for drinking water followed by tap/piped water by 41285 HHs (31.17%), spout water by 6096 HHs (5.19%), uncovered well/kuwa by 2933 HHs (2.55%), tube-well/hand pump by 1713 HHs (1.32%), river/stream by 300 HHs (0.25%), others by 316 HHs (0.25%) and not stated by 490 HHs (0.42%). Similarly, 83284 HHs (63.63%) use liquefied Petroleum Gas (LPG) as cooking fuel followed by wood/firewood by 38454 HHs (29.38%), bio-gas by 6360 HHs (4.86%), kerosene by 1748 HHs (1.34%), electricity by 148 HHs (0.11%), cow dung by 87 HHs (0.07%) and others by 320 HHs (0.24%) are the major sources of cooking fuel of people in the PAA.

5.3.2.8 Religious, Archeological and Historical Site

PAA has a number of popular historical, cultural and natural sites like Bindhya Basini Temple, Taal Barahi Temple, Shova Bhagawati Temple, Namu Baudhdha Gumba, Siddha Barah Temple, Kalika Temple, Kotbhairab Temple, Bishwa Santi Stupa (World Peace Stupa), Harihar Cave, Laxmi Narayan Temple, Gorakhnath Temple in Pokhara MC and Syaklung Kot, Lipyani, Ramkot, Bhumesthan, Deurali, Indra Cave, Jateshwar Temple, Chandisthan Temple in Rupa RM. Similarly, Kalika Temple, Thulakot Bhairabsthan, Gorakhnath Temple, Juma Masjid, Bauda Sadan, Parasar Ashram, Nuri Jame Masjid etc. in Byas Municipality and Akala

Temple, Chhabdi Barahi Temple, etc. in Myagde RM and Chhamdi Bhueyar Temple and Mai Temple in Rishing RM are popular as religious and historical site (DSO, 2071 and DSO, 2072)

5.3.2.9 Agricultural Farming and Production

a. Agricultural Land and Cropping Patterns

The PAA is the hill land, so farmers have more upland (*Bari and Pakho*) than the low lands (*Khet*) where rice is grown in monsoon season only. The agricultural land in the PAA is irrigated by some irrigation systems. There are about 19 major irrigation systems irrigating a total of 2443ha of land (DSO, 2071 and DSO, 2072). Out of these 19 projects, one project (Shaja Tar)* irrigates a total land of 65ha in both Rupa RM of Kaski and Byas Municipality of Tanahun.

Table 5-28: Major Irrigation Systems in the PAA

S. N.	Name of Irrigation System	Place (RM/Municipality*/MC)	Irrigated Area (ha.)
Kaski District			
1	Bijayapur Irrigation System	Pokhara MC	1280
2	Begnas Irrigation System	Pokhara MC	580
3	Shishuwa Irrigation System	Pokhara MC	50
4	Kimbese Irrigation System	Pokhara MC	20
5	Shaja Tar Irrigation System	Rupa RM (Siddha-1, 2,3)	65*
Tanahun District			
6	Kalesti Khola Irrigation System	Byas*	31
7	Sanghe Khola Kaphle Paani Irrigation System	Byas* (Shyamgha)	23
8	Shaja Tar Irrigation System	Byas (Shyamgha-3,4)	65*
9	Sange Pateni Irrigation System	Byas*	200
10	Parewa Rah Lift Irrigation System	Byas*	28
11	Sheshtar Irrigation System	Byas* (Shyamgha-2)	40
12	Bhattako Dihir Irrigation System	Byas*	15
13	Kaendale Kulo Irrigation System	Byas* (Shyamgha-8),	25
14	Pokheral Phant Irrigation System	Byas*	35
15	Kaphle Amreni Phat Irrigation System	Byas* (Shyamgha-8,9)	34
17	Pokheral Phant Irrigation System	Byas*	30
18	Sheshtar Irrigation System	Byas* (Shyamgha-2)	40
19	Kul Bandha Irrigation System	Byas* (Kyamin)	10
20	Myade Khola Irrigation System	Myagde RM (Chhang)	2

Source: DSO (2071) and DSO (2072)

The cropping patterns and selection of crops depend on the land quality and availability of irrigation facilities. During the field survey, local people informed more fertile and irrigated lands are cultivated thrice (rarely) or twice a year whereas non-irrigated lands are cultivated once in a year. The major agriculture cultivation practices in the PAA depend upon monsoon. The cropping pattern is mostly dominated by two cropping systems comprising of paddy and wheat, paddy and vegetable, paddy and potato, paddy and oilseeds, paddy and red lentil in irrigated area and in non-irrigated area the cropping pattern is maize and millet, potato and wheat, maize and oilseeds, maize and soya bean/black gram, maize and vegetable or other appropriate combination of leguminous plants.

b. Crop Productions and Horticulture Farming

DSO (2071) and DSO (2072) show the major crops grown in the PAA are paddy, maize, millet and so on. The major cash crops are oilseeds, potato, pulse etc. Similarly, banana, lemon, guava, orange and so on are the major fruits production PAA. Black gram, kidney bean and masyam are the pulses production in the project area. However, it has been seen during the

field visit that some fertile cultivated lands near by the TL have been seen barren due to foreign employment. According to the local people foreign employment has seriously affected the agriculture sectors in PAA.

Citrus species farming may play a significant role in cash income generation for the people of the PAA. During the field visit, it was observed that citrus species farming has decreased in the PAA due to the various diseases in its tree, cluster of buds and flowers. However, still local people were found to be interested to involve in citrus species farming applied improved new techniques and methods.



Picture 5-7: Banana Orchard in PAA

5.3.2.10 Economy

The major occupation of families in PAA is subsistence farming and livestock for their livelihood. Some of the HHs practice off-season vegetables, fruit farming and fish farming for livelihood. Small scale businesses like tea stall, small groceries and hotels have also existed in the PAA. Seasonal migration to Pokhara, Kathmandu and abroad (especially in India) in search of employment is common in project area.

The major local business trade centers near to TL route are Lekhnath, Pokhara and Damauli. There are some manufacturing industries, tourism industries (trekking and travel agencies and hotels) in Pokhara that provide employment opportunities to the locals and help to boost the local economy. Orange farming (Picture 5-4) and banana farming (Picture 5-5) was observed in the project area. Professional poultry farming, goat farming, buffalo farming and fish farming were also reported in Byas Municipality and Pokhara MC during the field study. Many HHs were found to be involved in subsistence livestock.

5.3.2.11 Income Sources and Expenditure Patterns

a. Income Source

During the field visit it was found that main income source of the people of the PAA is agriculture. Farmers are being gradually involved in professional agriculture production from traditional agriculture system. In the professional agriculture, farmers are involved in livestock, poultry farming and vegetable farming. Besides, tourism, trade and industry, wage labor, construction, service, foreign employment are other sources of income in the PAA.

b. Expenditure Patterns

As far as the PAA is concerned, the level and structures of consumption are more or less similar to the other part of the country. Most of the expenditure is for the consumption of food items following education, health, energy and other non-food items.

5.3.2.12 Infrastructure and Service Facilities

The project area is accessible by black-topped and gravel road and facilitated through market centers, telecommunication, electricity and postal services. The municipality/MC have direct road link to Kathmandu and all the affected RMs have road network to district headquarters through gravel and earthen motorable road and some higher stretch through foot trail. The bus service to Kathmandu is also available from the Damauli Bazar, Lekhnath, Pokhara and other market centers. There is also the air service from Pokhara to Kathmandu on daily basis.

Communication services through mobile and Code Division Multiple Access (CDMA) are available in the PAA. Similarly, postal and modern communication facilities like email/internet and fax are available in major market centers. Cable network is accessible in most part of the project area. Radio and Local Frequency Modulation (FM) network is accessible to public people. Local and national newspapers are available regularly in Byas, Pokhara Lekhnath, Myagde and other major markets area in the PAA.

Most of the PAA is electrified through national grid system, however Kanhunshivapur, Rising RM and Bharat Pokhari of Pokhara Lekhanath MC is partially electrified. There are some hydropower projects too in PAA like Seti Hydropower Station (1.5MW), Fewa Hydropower Station (1MW), Seti-II Hydropower Station (0.979MW) in Pokhara MC, Kaski and Deulikhola Micro Hydropower Project (22kW) in Kahun Shivapur, Bodikhola Micro Hydropower Pradasani Project (10kW) in Bhirkot, Rishing RM. Solar panels and bio-gas plants are other alternative sources of energy for the people of the project area. There are 303 bio-gas plants and 4490 solar panels in the PAA for lighting (DSO, 2071 and DSO, 2072).

CBS (2011) shows that majority of the HHs in the PAA use electricity as the source of lighting. This is followed by 3.06% Kerosene, 1.41% solar, 0.23% bio gas and 0.84% use other sources for lighting. Similarly, 63.63% HHs use LP gas as the source of cooking however only 0.11% HHs use electricity. This is followed by 29.38% use wood/firewood, 4.86% use bio-gas, 1.34% use kerosene, 0.07% use cow dung and 0.24% use other sources of cooking fuel.

The local governmental organizations are located in all PAA. The agriculture, livestock and public health services centers are also located in the PAA. In the field of finance and banking sector, various commercial banks, development banks, micro finance, saving and credit cooperation are working in the major market area of PAA.

5.3.2.13 Gender Status

In the PAA, population of female is higher than male attendance. Even the economically active populations of female in PAA are higher than male. On the other hand, male literate population, absent population and foreign migrant worker are higher than female population (Figure 5-14).

However, during the field visit it was observed the fact that land and property holding is dominated by male where collection and management of fuel wood and ownership of animal husbandry is female dominant. Due to the foreign labour migration of male, most of the women were found to be involved as natural resource manager in terms of wide range of job description from collecting fodder grass, water, animal grazing and agricultural activities to kitchen work, cleaning the house and nursing the children in one side. On the other hand, it was also observed during the field visit that decision making process about economic activities and other areas was found to be changed from male into female. Due to the change of time, female were found to be engaged in other activities like teaching, industry, business, tourism and to some extent foreign labor migration and it is interesting to note that male was also observed, during field visit, to be involved in collecting water in the PAA.

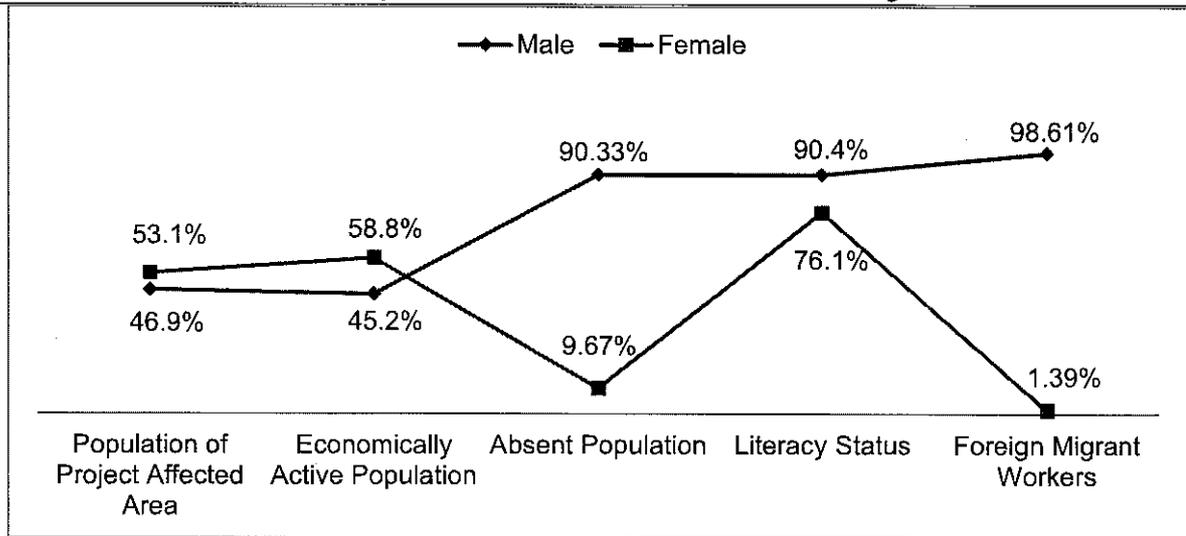


Figure 5-14: Comparative Status of Male and Female in the PAA

Source: CBS, 2011

5.3.2.14 Law and Order Situation

The existing law and order situation of the PAA was observed to be normal. The District Administration Office and police office have maintained the law and order in the area.

5.3.2.15 NGO's Activity

There are many NGOs, youth clubs, co-operatives, mother groups, *Tole Sudar Samitee* etc. are working in the field of water supply, sanitation, sports, women awareness, transportation, child sector, human rights, saving mobilization and income generating activities in the PAA. Rural Empowerment Society, Nepal Redcross Society, Environment Conservation Women Group, Rural Empowerment Society, Society Service Group are the NGOs that have been working in various sectors in the PAA.

5.3.2.16 Tourism Activities

The PAA has lots of potential of tourism due to some popular historical, religious place and natural beauty. Almost all tourists who come to visit Nepal definitely visit the area to take pleasure in trekking, paragliding, rafting, zip-flying and so on. Some major tourism attraction areas in the PAA are Syaklung Kot, Lipyani, Ramkot, Bhumesthan, Deurali, Indra Cave, Barah Temple, Chisapani Temple, Jaleshwar Temple, Chandisthan Temple, Phalyankot Darbar in Rupa RM. Similarly, Kalika Temple, Thulakot Bhairabsthan, Gorakhnath Temple, seven lakes like Begnas Lake, Rupa Lake, Dipang Lake, Sundari Danda, Sarangkot, etc. in Pokhara MC, Juma Masjid, Bauda Sadan in Byas Municipality (DSO, 2071 and DSO, 2072).

5.3.2.17 Cultural Environment

Since the PAA is dominantly inhabited by Hindu people. So, Hindu festivals like Dashain, Tihar, Teej, Janai Purnima, Chaite Dashain and Maghe Sankranti etc. are widely celebrated in the PAA. In the same way, a large number of indigenous people (IPs) are also inhabited in the PAA who celebrate Buddha Jayanti and Lhosar (New Year festival according to Tibetan calendar), Chasok Tannaam, Udhauli, Ubhauri, Gaijatra etc. Similarly, popular cultural activities in the PAA are Bhailo and Deushi (singing and dancing activities) in Tihar, Holi, Bhajan/Kirtan (praying by singing) in Ram Nawami and Kirshna Janmastami, cultural programs in Shripanchami, Dhama and Jhankri Naach (dance performed during various religious activities and festivals). Other religious activities in the PAA are Paasni (rice feeding ceremony for newly born babies), Bratabanda (thread wearing ceremony of teenage boys), marriage, Shraadhha (worship for the soul of the dead people) etc. In addition, there is presence of Muslim Community in the PAA. So, Eid is also celebrated by this Community.

5.3.3 Profile of the Project Affected Households

5.3.3.1 Population and Households

In approved IEE, survey of 69 HHs was conducted to collect socio-economic status of PAFs that are directly affected by the project. The total population of surveyed HHs was 433 including 220 males and 213 females. The sex ratio and average HHs size is 1.03 and 6.3 respectively. According to the broad age group classification, 74.36% of the surveyed population is categorized as economically active population. Similarly, the dependent population (population below age group 0-10 years and senior citizen 60 years and above) is 25.64%.

Table 5-29: Demographic Features of PAFs

S. N.	PAD	PAA	Population				Household	
			Male	Female	Total	Sex Ratio	Total	Average HH Size
1	Kaski	Pokhara MC	37	35	72	1.06	11	6.5
		Rupa RM	30	23	53	1.30	8	6.6
2	Tanahun	Byas Municipality	130	132	262	0.98	44	6.0
		Rising RM	14	18	32	0.78	5	6.4
		Myagde RM	9	5	14	1.80	1	14.0
Total			220	213	433	1.03	69	6.3

Source: HH Survey, 2016

Table 5-30: Distribution of Population by Broad Age Group

S. N.	Age Group (years)	Population	Percentage
1	0-14	59	13.63
2	15-59	322	74.36
3	60 and above	52	12.01
Total		433	100.0

Source: HH Survey, 2016

According to approved IEE, LDTLP affected 84 HHs (excluding those HHs who would be affected due to the suspension tower foundation and land under RoW) including 37 HHs of the previous proposed substation at Belbas. Due to the change in the substation location new 44 HHs are included in the list of affected whereas 37 HHs of the previous proposed substation at Belbas are excluded from the list of affected. Total number of HHs in the Updated IEE report is 91. For the Updated IEE, HH survey of 27 HHs were carried out from the additional 44 HHs (substation-39 HHs and additional tower- 5 HHs). A census survey of 27 HHs was carried out from the new 44 HHs, and remaining HHs were missing during the time of HHs survey.

The total population of surveyed 27 HHs was 180 including 102 males and 78 females. The sex ratio and average HHs size is 1.31 and 6.7 respectively. According to the broad age group classification, 70.00% of the surveyed population is categorized as economically active population.

Table 5-31: Demographic Features of PAFs

S. N.	Caste	Population				Household	
		Male	Female	Total	Sex Ratio	Total	Average HH Size
1	Brahmin	13	8	21	1.63	3	7.0
2	Chettri	26	21	47	1.24	9	5.2
3	Darai	29	21	50	1.38	8	6.3
4	Kami	7	7	14	1.00	1	14.0
5	Magar	27	21	48	1.29	6	8.0
Total		102	78	180	1.31	27	6.7

Source: HH Survey, 2019

Table 5-32: Distribution of Population by Broad Age Group

S. N.	Age Group (years)	Population	Percentage
1	0-14	17.78	17.78
2	15-59	70.00	70.00
3	60 and above	12.22	12.22
Total		180	100.00

Source: HH Survey, 2019

Type of family

Nuclear type of family is dominant in the project affected HHs. Of the total 27 HHs, 14 (51.85%) HHs are categorized as joint type and the rest 13 (48.15%) are nuclear type.

Marital status

Of the total 180 population, 68 (37.78%) are married and 105 (58.33%) unmarried. Similarly, the population of widow/widower are 7 (3.89%).

5.3.3.2 Religion

All the surveyed HHs follow Hinduism.

5.3.3.3 Mother Tongue

Nepali is the major language (66.67%) spoken by the surveyed HHs. This is followed by Darai (25.93%) and Magar (7.41%) language is spoken by the affected HHs.

Table 5-33: Distribution of Surveyed HHs by Mother Tongue

S. No.	Spoken Language	HHs	Percentage
1	Darai	7	25.93
2	Magar	2	7.41
3	Nepali	18	66.67
Total		27	100.00

Source: HHs Survey, 2019

5.3.3.4 Occupation

Majority of the surveyed people are students. About 23.85% of the surveyed HHs mainly depend on agriculture. The percentage of HHs occupied other than agriculture is service (23.08%); student (21.54%), 11.54% HH work, 7.98% service, labor wage outside the country (9.23%), labor wage inside the country (8.46%) and unable (0.77%). Table given below depicts the detail of the occupational distribution of the surveyed HHs.

Table 5-34: Occupational Composition of Surveyed Population (10-59 years) by Sex

S. N.	Major Occupation	Gender					
		Male		Female		Total	
		No.	%	No.	%	No.	%
1	Agriculture	12	16.22	19	33.93	31	23.85
2	HH Work	-	0.00	15	26.79	15	11.54
3	Business/Small Industry	2	2.70	-	0.00	2	1.54
4	Labor wage (Inside country)	9	12.16	2	3.57	11	8.46
5	Labor wage(Outside country)	11	14.86	1	1.79	12	9.23
6	Service(Inside country)	20	27.03	10	17.86	30	23.08
7	Student	19	25.68	9	16.07	28	21.54
8	Unable	1	1.35	-	0.00	1	0.77
Total		74	100.00	56	100.00	130	100.00

Source: HHs Survey, 2019

5.3.3.5 Literacy

From the HHs survey, it is revealed that 87.43% population are literate with male literacy rate 92.93% and female literacy rate 80.26%.

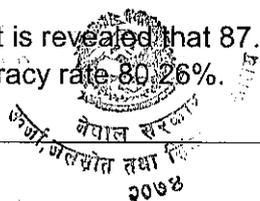


Table 5-35: Literacy Status (5 years and above) of Surveyed HHs

S. N.	Literacy Status	Male		Female		Total	
		No.	%	No.	%	No.	%
1	Illiterate	7	7.07	15	19.74	22	12.57
2	Literate	92	92.93	61	80.26	153	87.43
Total		99	100.00	76	100.00	175	100.00

Source: HHs Survey, 2019

Of the literate population, percentage of having basic level education, secondary level, and Bachelor and above is 35.95%, 38.56% and 14.38% respectively. Literate population is 11.11% only. Table 5-33 describes the educational attainment among the literate population of the surveyed HHs.

Table 5-36: Educational Attainment among the Literate Population of the Surveyed HHs

S. N.	Educational Attainment	Male		Female		Total	
		No.	%	No.	%	No.	%
1	Literate only	9	9.78	8	13.11	17	11.11
2	Basic level education	33	35.87	22	36.07	55	35.95
3	Secondary Level	35	38.04	24	39.34	59	38.56
4	Bachelor & above	15	16.30	7	11.48	22	14.38
Total (Literate)		92	100.00	61	100.00	153	100.00

Source: HHs Survey, 2019

5.3.3.5 Land Holding Size by Land Type

The HHs survey shows all of the affected HHs have their own land for cultivation. These HHs have been classified on the basis of different landholding categories such as marginal, small, medium, and large. Majority of the HHs i.e. 62.96% are categorized as marginal families having land below 0.5ha whereas 18.52% are classified as small HH with land holding size below 0.5ha. Similarly, 14.81% of HHs as medium type families having land 2.0ha to 4ha.

Table 5-37: Distribution of Surveyed HHs by Landholding Size

S.N.	Landholding Categories		HHs		Total Area	
	Category	Size of holding(ha)	No.	%	Area(ha)	%
1	Marginal	Up to 0.5	17	62.96	4.704	18.76
2	Small	0.5 - 1.0	3	11.11	2.245	8.95
		1.0 - 1.5		0.00		0.00
		1.5 - 2.0	2	7.41	3.482	13.89
3	Medium	2.0- 4.0	4	14.81	9.566	38.15
	Large	>4	1	3.70	5.076	20.24
Total		-	27	100.00	25.073	100.00

Source: HH Survey, 2019

Table 5-38: Landholdings of the Surveyed HHs by Type of Land

S. N.	Type of Land	Total Holdings (ha)	Percentage (%)
1	Khet	10.687	42.62
2	Bari	6.939	27.68
3	Pakho Bari	6.735	26.86
4	Ghaderi	0.712	2.84
Total		25.073	100.00

Source: HHs Survey, 2019

5.3.3.6 Agriculture and Livestock

Paddy, wheat, maize and millet are the main crops grown by the project affected surveyed families. The total production of crops with different varieties are 40.32MT of paddy, 6.24MT of wheat, 7.26MT of maize, 2.7MT of bean and 3.4MT of potato. Similarly, the productivity of the different crops are 4.28MT/ha of paddy, 2.78MT/ha of wheat, 2.14MT/ha of maize, 1.19MT/ha of beans and 5.46MT/ha of potato. The distribution of crops, production and yield is shown in the table given below.

Table 5-39: Major Crop Area Coverage, Production and Yield for the Surveyed HHs

S.N.	Description	Major Crops				
		Paddy	Wheat	Maize	Beans	Potato
1	Total Cropped Area (ha)	9.42	2.24	3.39	2.27	0.62
2	Total Production (MT)	40.32	6.24	7.26	2.7	3.4
3	Yield(MT/ha)	4.28	2.78	2.14	1.19	5.46

Source: HHs Survey, 2019

Cow, buffalo, goat and pig are main domesticated animals by the surveyed HHs. Of the total, 70.37% of HHs have the livestock of their own while 29.63% don't have any livestock.

5.3.3.7 Food Sufficiency

Since, the project area has the less fertile irrigated land, majority of the surveyed HHs have deficit food for them to survive. About 51.85% of the surveyed HHs have sufficient food throughout the year. Among the surveyed HHs, 15.38% have food deficiency only for less than 3 months whereas there are 7.69% families who have food deficiency for more than 9 months.

Table 5-40: Food Deficient Months for the Surveyed HHs

S. N.	Months	HHs	Percentage
1	<3	2	15.38
2	3-5	4	30.77
3	6-9	6	46.15
4	>9	1	7.69
Total		13	100.00

Source: HHs Survey, 2019

5.3.3.8 Debt Status

One major component to see the socio-economic condition of the surveyed HHs is their debt status. From the HHs survey, it is revealed that 11 (40.74%) of surveyed HHs have the burden of debt whereas 16 (59.26%) HHs have no debt burden. The survey also reveals that these people take loans for different purpose (foreign employment, house repair, education, health treatment and food/clothing). Among the surveyed HHs who have the burden of debt, majority of them take loans for foreign employment (36.36%).

Table 5-41: Cause of Debt of the Surveyed HHs

S. N.	Description	HHs	Percentage
1	Food and clothes	3	27.27
2	Foreign employment	4	36.36
3	Education	1	9.09
4	Health treatment	1	9.09
5	House Maintenance	2	18.18
Total		11	100.00

Source: HHs Survey, 2019

5.3.3.9 Business/Cottage Industry

From the HHs survey, it is revealed 7.41% of total HHs have their own business. These HHs either depends upon agriculture or other sources such as foreign employment, service or labor wage.

5.3.3.10 Income and Expenditure Patterns

The average annual income of the 27 surveyed HHs is calculated NRs. 482,110; where the source of income of the surveyed HHs agriculture as well as non-agriculture. Non-agriculture sector consists of service, remittance, daily wage, business, and briddha bhatta. Among the different sources of income, non-agriculture contributes about 87.36%. Income from

agriculture and animal husbandry contribute 12.64%. The average annual income from different sources is given in the Table 5-42. Similarly, the average annual expenditure of 27 surveyed HHs is estimated to be NRs. 416,807. Food items, clothing, education, medicine, festival, fuel, communication/electricity, transportation are the main expenditure items of the surveyed HHs. The proportion of expenditure on food items is higher (50.82%) followed by festival (10.1), education (10.63%), clothing (10.92%), medicine (6.75%), transportation (3.81%), communication/electricity (4.83%), and fuel (2.14%).

Table 5-42: Average Income of Surveyed HHs

S.N.	Income Source	Average (NRs.)	Percentage (%)
1	Agriculture and animal husbandry Income	60926	12.64
2	Business	22222	4.61
3	Daily Wages/Porter	38222	7.93
4	Pension and Briddha Bhatta	27111	5.62
5	Remittance	157037	32.57
6	Rent	5333	1.11
7	Service	171259	35.52
Total Average Income		482,110	100.00

Source: HH Survey, 2019

5.3.3.11 Drinking Water and the Source of Lighting

Of the surveyed 27 HHs, 85.19% use piped water supply for their drinking water, followed by public tap (14.81%). Electricity is the main sources of lighting for the surveyed HHs. All the surveyed HHs use electricity for lighting.

5.3.3.12 Source of Cooking Energy

LP gas, firewood and bio-gas are the main sources of energy for cooking food among the surveyed HHs. Majority of the surveyed HHs use LPG (59.26%) only. Source of cooking energy and fuelwood are given in Table 5-43.

Table 5-43: Sources of Cooking Energy of the Surveyed HHs

S. N.	Energy Type	HHs	Percentage (%)
1	Biogas	2	7.41
2	Fuelwood	6	22.22
3	Fuelwood and LPG	3	11.11
4	LPG	16	59.26
Total		27	100.00

Source: HH Survey, 2019

5.3.3.13 Health and Sanitation Condition

Out of the surveyed HHs, 25.93% suffered from disease since last year. The sanitation condition of the PAA is satisfactory. HHs survey revealed that all the surveyed HHs have their own toilet for defecation. In regards to the solid waste management, among the surveyed HHs, 48.15% burn, 29.63% dump their solid waste at the safe location and 22.22% bury the waste. Table given below shows the solid waste management practiced by the surveyed HHs.

Table 5-44: Solid Waste Management Practice by Surveyed HHs

S. N.	Solid Waste Management Practice	HHs	Percentage (%)
1	Dump at safe location	8	29.63
2	Burn	13	48.15
3	Bury	6	22.22
Total		27	100.00

Source: HH Survey, 2019
 नेपाल सरकार
 तथा विचाई मन्त्रालय
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5.3.3.14 Knowledge and Attitude Regarding the Project**Knowledge**

Out of total 27 surveyed HHs, 85.19% HHs have knowledge about the proposed project and its activities. According to the surveyed HHs, the main sources of information about the project activity are through the NEA employee, neighbors and newspapers.

Attitude

About 62.96% of the HHs have shown their positive attitude towards the proposed project while 29.63% of the HHs are negative due to the compensation process and remaining 7.41% are neutral.

Table 5-45: Attitude towards the project of the surveyed HHs

S. N.	Perception	HHs	Percentage (%)
1	Positive	17	62.96
2	Negative	8	29.63
3	Neutral	2	7.41
Total		27	100.00

Source: HHs Survey, 2019

5.3.3.15 Expectation from the Project

The expectations of the project affected HHs are mainly for good compensation for the land and property, employment, and local development. However, majority (77.78%) of the HHs have shown their interest for good compensation. Similarly, 18.52% of the HHs have shown their expectation for employment and 7.41% for local development.

Table 5-46: Expectation from the Project

S. N.	Expectation	HHs	Percentage (%)
1	Good Compensation	21	77.78
2	Employment	5	18.52
3	Local Area Development	2	7.41
Total		27	100.00

Source: HH Survey, 2019

5.3.3.16 Description of the house of the Surveyed HHs**a. House****By wall type**

All the surveyed HHs have their own house for residence. Out of the surveyed HHs, wall of 16 HHs (59.26%) is made up of cement/stone/brick whereas the remaining 11 HHs (40.74%) have mud/stone/brick used in their walls.

By roof type

Zinc plates, RCC and stone roof are prevalent in the surveyed HHs. Majority of the HHs (48.15%) have their house with RCC followed by galvanized zinc sheet (44.44%) and thatched (7.41%).

Table 5-47: Houses by Roof Type

S.N.	Type of Roof	HHs	Percentage
1	Zinc Plates	12	44.44
2	RCC	13	48.15
3	Thatched	2	7.41
Total		27	100.00

Source: HH Survey, 2019

By floor type

Mud and Cement are used on floor by the surveyed HHs. Out of the surveyed HHs, 15 (55.56%) have cement floor and the remaining 12 HHs (44.44%) have cemented floor.

By no. of Storey

One storey houses are common among the surveyed HHs. About 51.85% of the HHs have their house with two storey where 40.74% of HHs have one storeys and remaining 7.41% have three and more storey houses.

Table 5-48: Houses by Number of Storey

S.N.	No of Storey's	No. of HHs	Percentage
1	One	11	40.74
2	Two	14	51.85
3	Three and more	2	7.41
Total		27	100.00

Source: HH Survey, 2019

5.4 Consultation

Project affected people and other stakeholders were informed and consulted about the land acquisition, structures relocation and compensation issues, impact and mitigation measures. During the consultations, the participants were requested to express their views, concerns/issues regarding the project as well as they were informed regarding the project and its activities. Information such as project purpose, project type, impact area, likely impacts and potential opportunities due to project implementation were provided to the people during the consultation.

Most of the local people of the project area (SS area and TL alignment) have positive attitude regarding the construction of project. However, some people have their issues/demand regarding the project. Other issues are for good compensation of assets on time, employment, livelihood support, transparency in project activities. The issues come during public consultation is given in the table below.

Table 5-49: Summary of Key Issues/Concerns of Local People

S.N.	Key Issues /concerns	Description	Remarks
1	Livelihood	<ul style="list-style-type: none"> • Employment to local people as per their skill • Skill training program 	<ul style="list-style-type: none"> • Section 7.3.1.12 • Section 7.3.2.3
2	Compensation	<ul style="list-style-type: none"> • Compensation should be given on the basis of prevailing market price • Construction of the project should start after completion of compensation process 	<ul style="list-style-type: none"> • Section 7.3.1.1
3	Others	<ul style="list-style-type: none"> • The TL should go by minimizing the environmental effect and fencing should be done 	<ul style="list-style-type: none"> • Section 7.2.3, Table 7-5

6 IMPACT ASSESSMENT

This chapter assesses the likely adverse impacts during the construction and operation of the LDTLP, which will result in perturbations in the existing baseline conditions. The general discussions are organized in three categories namely: physical, biological and socio-economic and cultural environment, and divided into construction and operation phases.

6.1 Physical Environment

The main physical impacts on the environment are those associated with land take for stringing of the line, construction of tower foundation and changes in drainage patterns. The major impacts anticipated during the construction and operation phase are discussed in the sections below.

6.1.1 Watershed and Drainage Condition

a. Construction Phase

The TL traverses through flat and mild slope landscape in the hilly region. Most of the tower foundations are located at the top soil and on agricultural land. The interference with drainage patterns due to the construction of the foundation will be minimal. However, the activities like site clearing, stringing of the line, excavation for tower foundation, trail construction for material transportation and access road construction may disturb the watershed and increase erosion due to vegetation removal.

Though the area required for tower foundation construction may vary depending on location and weight of tower, approximately 225m² of land will be disturbed for each tower foundation. The earthwork associated with tower construction will be confined to the tower foundation base area with low impact on the adjoining areas. Nevertheless, the cultivated area around the tower foundation may be affected due to compaction during the construction and transportation of materials.

Disruption of natural drainage system and soil erosion while stringing the line across the river can be anticipated during the construction phase. However, the APs are not located near the river or streams, the probability of the disruption of natural drainage will be none. Since the requirement of land for the construction of tower foundation is limited, the impact on drainage and soil erosion is envisaged to be low. Therefore, the impact is expected to be site specific, low in magnitude and for a short duration.

b. Operation Phase

No significant impact on the watershed and natural drainage is expected during the operation and maintenance period.

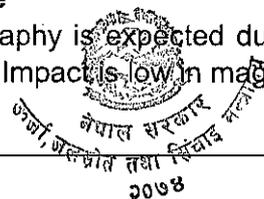
6.1.2 Topography

a. Construction Phase

The land interference during construction of the TL is related to the tower foundation, substation and lack of restraint of the RoW. This may result in the change in landscape. No other change in topography is envisaged during this phase. The visualized impact on topographic changes is considered to be low in magnitude, site specific and for long term.

b. Operation Phase

No impact on topography is expected during the operation phase except for the impact on natural scenery. The impact is low in magnitude, local and for long term.



6.1.3 Land Use and Land Take

a. Construction Phase

The land use changes involved in the implementation of the project will be basically due to the permanent and temporary land acquisition under the RoW and for the construction of tower foundation. The project will require 142.8796ha land for the placement of tower foundations (angle and suspension), substation and RoW of the TL and temporary facilities. The summary of the land take and land use are given in the Table 2-4 and Table 2-7. The alignment passes through different type of land use and CF. It has been fragmented while alignment passes and is presented in the table given below. The impact can be classified as high in magnitude, local in terms of extent and of long term in terms of duration.

Table 6-1: Fragmentation of Forest due to TL

S. N.	AP to AP	MC/Municipality/RM-wards	Fragmented CF
Kaski District			
1	3-4	Pokhara MC -27,29	Sahelipakho Badhare
2	3-4-5	Pokhara MC-27	Pakhura
3	4-5		Bhaltari Bheteri
4	6-7	Pokhara MC-28	Bhurtel Gaon
5	6-7		Shaakhudi Simle
6	7-8-9		Bilaune Ghari Puranthar
7	11-12-13	Pokhara MC-31	Bhir Pani
8	12-13-14		Odar Thumki Sirani Danda Thuli Dhunge Sinkauli Swar Maru Ghairo & Lapsibot
9	14-15	Rupa RM-7	Jimire Bishauna Pakho
10	15-16		Ramkrishna
11	16-17	Rupa RM-6	Mohariya
12	19-20-21	Rupa RM-1	Jimire
13	20-21-22	Rupa RM-2	Ghewapani Kusunde
Tanahun District			
14	22-23-24-25-26	Byas Municipality-6	Thulobhanjyang
15	27-28-29-30		Sapankot
16	30-31-32	Byas Municipality -5	Phoksing
17	33-34	Myagde RM-6	Ripa Shikhar Thumki
18	38-39-40	Byas Municipality -5	Manung
19	47-48	Byas Municipality -13	Thringring Otangdi

b. Operation Phase

The impact on the land use changes of the permanent land take for the towers and substation is expected to be high. The land under the RoW will be restricted for the erection of any type of public and private structures except for plantation of dwarf trees species. However, cultivation will be allowed. All temporary land acquired will be converted to its original use or agreed new uses towards the end of the construction period and handed over to their owners. The impact can be classified as high in magnitude, local in extent and of long-term in duration.

6.1.4 Air and Noise Quality

a. Construction Phase

The construction activities consist of site clearance, excavation for the tower foundation, concreting and stringing of the line. These activities will generate dust in the surrounding area. Apart from these activities, movement of transporting vehicles carrying the construction materials along the gravel roads will generate fugitive as well as combustion emissions and will cause temporary impact on air quality. Since the construction activities are limited to small area, the impact on the ambient air quality will be low in magnitude, site specific in terms of extent and of short duration.

The emission of noise and vibrations are inevitable during construction though only insignificant interruption in noise quality has been expected for TL projects. The location of the APs are relatively far from the settlements except for APs which are close to Khareni village, Bastola gau, Talbesi, Mauriya, Sishaghat, Barhabise, Malingagau and Belbas will feel the noise disturbances due to vehicular movement and construction activities. Noise pollution will be temporary and will not be different from the prevailing conditions due to low traffic movement along the roadside. The impact is expected to be low in magnitude, site specific and for a short duration.

b. Operation Phase

No major impact on air quality is envisaged during the operation phase. However, a kind of humming sound may be created at the substation area. The transmission overhead lines do create some noise in certain circumstances; for example during minor surface damage, dirt or change in weather conditions can cause the lines to crackle or hum slightly. This is due to a phenomenon called Corona effect. The effect of corona is conspicuous during rain. However, noise due to the corona effect of the proposed TL with voltage level of 220kV will not be significant since the alignment does not pass very close to the settlements. The impact is expected to be low in magnitude, long termed and site specific.

6.1.5 Water Quality

a. Construction Phase

During the construction period, water will be used from nearby river and streams. Therefore, there is possibility of water pollution especially in sectors where the line crosses the rivers and streams. Soil disturbances associated with construction activities of tower foundations, the improper disposal of solid wastes and chemicals such as cement slurry, construction materials, and human wastes into the river or streams may deteriorate the river water quality and other existing water bodies around the construction area. This may lead to water borne diseases and other problems especially in the adjacent villages where people use the flow from these streams for HH chores. The impact is expected to be moderate in magnitude, site specific and for a short duration.

b. Operation Phase

The operation and maintenance activities of the TL will not have impact on the water quality in the project impact area.

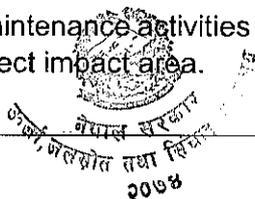
6.1.6 Waste and Spoil Generation

a. Construction Phase

The improper disposal of solid waste like cement bags, iron bar and other leftover construction materials, kitchen waste and waste generated by the temporary labour camp might cause adverse impact to the environment. The spoil generated due to the excavation of foundation is also detrimental to land and water quality of the area. There will be no muck from tower pad since the excavated volume will be used for compaction and restoration of natural ground level. Muck volume of 16,842 cubic meter will be generated at substation area. However, more than 90% of the volume of muck will be used for back filling and compaction and remaining 10% of the volume of muck will be deposited near foundation site and also will be used for feeder road gravelling and retaining wall. The magnitude of impact is considered to be low, extent is site specific and duration is short term.

b. Operation Phase

The operation and maintenance activities of the TL will not have impact on the waste and Spoil generation in the project impact area.



6.1.7 Crossing of Other Utilities and Interferences

a. Construction Phase

No impacts on crossing of other utilities and interferences is likely to happen during the construction phase.

b. Operation Phase

The proposed TL alignment crosses roads, rivers, TL of different voltages and structures. Crossings of communication utilities and transmission and distribution lines will result in the interferences to the communication system. Radio interference can disrupt television and AM (amplitude modulation) radio reception close to a line. Interference can sometime be noticed at a distance of 150m away. By contrast, FM (frequency modulation) system is affected very little by interference. Interference varies according to the position of the TL between transmitter and receiver. In some cases, receiving conditions can be improved due to the reflections caused by a TL. Since the TL mostly passes more than 500m distance from most of the settlement areas the magnitude of the impact is considered to be insignificant. The impact will be low in magnitude, site specific and for short duration.

6.1.8 Storage of Construction Material and Camps

a. Construction Phase

Storage of construction materials will result to the land degradation of the particular area. Likewise, the area designated for the camps will also damage the leased or rented area. Both temporary mobile camps and storage sites are located nearby. The locations for temporary camps and storage sites of construction materials are listed below. The impact will be low in magnitude, site specific and for short duration.

Table 6-2: Location and Area of Storage and Camp sites

S. N.	PAD	PAA	Area (ha)
1	Kaski	Pokhara MC	0.3
		Rupa RM	0.3
2	Tanahun	Myagde RM	0.3
		Rishing RM	0.3
		Byas Municipality	0.3
Total			1.5

b. Operation Phase

No impact is expected during the operation and maintenance period.

6.1.9 Air Traffic

a. Construction Phase

No impact is envisaged on the existing airport at Pokhara as the closest distance from the airport to the proposed line is approximately 7.74km North West.

b. Operation Phase

Since the entry path of the aeroplane towards the runway is in the perpendicular direction of the proposed line, no impact is envisaged on the route of the existing air traffic.

Table 6-3: Physical Environment Impact Assessment Matrix

S. N.	Issues	Impacts	Identification and Evaluation of Impact						
			D	IND	M	E	Du	Sum of Impact Values	Significance of Impact
Construction Phase									
1	Watershed and Drainage	No APs are located near the river or streams, the probability of the disruption of natural drainage does not appear.	D	L	SS	SS	ST	35	Less Significant
2	Topography	Topography of the tower site will be changed due to excavation, fill and cut for leveling the foundation area leading to the change in landscape.	D	L	SS	SS	LT	50	Significant
3	Land Use & Land Take	The project will require 142.8796ha of land for placement of foundation, substation and RoW of TL.	D	H	L	L	LT	90	Highly Significant
4	Air Quality	Different construction activities and vehicular movements will generate dust/ smoke and affect air quality in the surrounding area	D	L	SS	SS	ST	25	Less Significant
5	Noise Level	Use of Construction equipment and vehicles will increase noise level.	D	L	SS	SS	ST	25	Less Significant
6	Water Quality	There is possibility of water pollution especially in sectors where the line crosses the rivers and streams leading to deterioration of river water quality and other existing water bodies around the construction area.	D	M	SS	SS	ST	35	Less Significant
7	Waste generation	The improper disposal of solid waste like cement bags, iron bar and other leftover construction materials, kitchen waste and waste generated by the temporary labour camp might cause adverse impact to the environment.	D	L	SS	SS	ST	25	Less Significant
8	Storage of Construction Material	Lead to land degradation and damage of the particular area	D	L	SS	SS	ST	25	Less Significant
Operation Phase									
1	Topography	Impacts on natural scenery	D	L	L	L	LT	50	Significant
2	Noise Level	A kind of humming sound may be created at the substation area and corona effect might cause.	D	L	SS	SS	ST	25	Less Significant
3	Crossing of other utilities & interference	interferences to the communication system	D	L	SS	SS	ST	25	Less Significant

Note: D: Direct, IND: Indirect

Extent (E)

SS= Site Specific (10)

L= Local (20)

R= Regional (60)

Magnitude (M)

L= Low (10)

M= Medium (20)

H= High (60)

Duration (Du)

ST= Short Term (05)

MT= Medium Term (10)

LT= Long Term (20)

6.2 Biological Environment

The implementation of the project will affect the existing ecosystems in the project impact area multi-dimensionally and the effects may be both adverse and positive. However, there is no significant changes in impact on the biological environment except for some changes in the number of trees to be felled down as compared with the approved IEE report. The major impacts on the biological environment will include the loss of individual trees and loss of vegetation cover due to site clearance; increased demand of fuel wood and timber; impact on NTFPs; habitat loss of mammals, bird and reptiles because of change of vegetation cover and site disturbances.

6.2.1 Forest/Vegetation Loss

- **Impact on forest area**

- a. **Construction Phase**

According to the approved IEE report, the total estimated forest area falling under the tower pad and TL is 34.9884ha. Among this, the government forest falling under the TL alignment is 0.7ha and CF area falling under the tower pad and TL is 21.6947ha. Also, 12.5937ha area falls in private shrub land which consist of sparse trees and bushes specially used for collection of ground fodder. Similarly, for the Updated IEE report, total area falling under the government forest is 0.88ha and that under the CF is 21.99ha. Similarly, about 15.321ha falls under private shrubland.

In the approved IEE, based on the available detailed route survey report of the proposed TL and field study, out of 42 APs, 9 are located in the forestland. In the Updated IEE, out of 49 APs, 9 APs will be situated in forestland. Since large trees in this area are removed, it will leave shrubs, short trees as vegetation cover which will reduce the crown cover of the forest along the TL. The impact due to the loss of vegetation during project implementation is expected to be medium in magnitude, direct and long-term in duration.

Table 6-4: Total Affected Forest (by Types)

S. N.	Forest Type	Forest Area (ha) in Approved IEE	Forest area (ha) in Updated IEE	Forest area change
1	Government Forest	0.7	0.88	0.18
2	Community Forest	21.6947	21.9947	0.3
3	Private Shrubland	12.5937	15.321	2.7273
Total		34.9884	38.1957	3.2073

- **Tree loss**

- i) **National Forest (Government and CF)**

In the approved IEE, based on the field study and sample taken during IEE, a total of 14,160 numbers of trees of 23 different species are estimated to be clear felled during project construction period from the national forest. The contribution of pole sized trees in this data is 79.24% whereas tree sized is 20.76%. In the additional section (2.66km), as far as the standing trees are concerned, based on total enumeration done during the Updated IEE, only 78 number of trees are estimated to be clear felled from the forests. The contribution of pole sized species is 43 (55%) whereas that of tree sized species is 35 (45%). Thus the Updated IEE, there will be estimated loss of 14,238 trees out of which 11,263 will be pole sized and 2975 will be tree sized.

In the approved IEE, approximately 8772.33 cubic meter (309791.91 cu.ft) of wood volume may potentially be removed during the project construction period. This estimate is based on the forest samplings that represent the forest types and conditions of the project area. In the additional section about 1230 cu.ft (34.92 cu.m.) of wood volume is expected to be potentially removed during the project construction period. Thus in the Updated IEE, about 8807.25 cubic meter (311021.91 cu.ft.) of wood volume may be potentially removed.



The impact on forest and vegetation cover will be moderate in magnitude, local in extent and long term in duration. This loss of forest and vegetation cover might create indirect impacts resulting in the degradation of the mid hill environment for a long duration but is of little or no significance. Table provides the details of forest clearance.

Table 6-5: Forest Loss in Different Components

S. N.	Project Component	Type of Forest	Forest Area (ha.) in approved IEE report	Forest Area (ha.) in Updated IEE report	Loss of Vegetation (No of trees >10 cm DBH) in approved IEE report	Loss of Vegetation (No of trees >10 cm DBH) in Updated IEE report	Crown Cover (%)	Forest Type
1	Substation	Govt. Managed	-	-	-	-	-	-
		Community	-	-	-	-	-	-
		Leasehold	-	-	-	-	-	-
		Religious	-	-	-	-	-	-
		Private	-	-	-	-	-	-
2	Tower Pads and TL	Govt. Managed	0.7	0.88	14160	14238	40-80	Mixed Forest (Sal, Chilaune, Katus, Mauwa and Pine)
		Community	21.6947	21.9947				
		Leasehold	-	-	-	-	-	-
		Religious	-	-	-	-	-	-
		Private Shrubland	12.5937	15.321	3200	4723 (including bamboo/banana patches)	30-60	Sal, Chilaune, Katus
Total			34.9884	38.1957	17360		30-80	

Source: Field Survey, 2016

Above table reveals that construction of the proposed line affect 0.88ha government forest and 21.9947ha CF. The detail of species wise tree loss in terms of number, wood volume and biomass is given in the Table 6-6. It also shows species wise loss of regeneration in terms of seedlings per ha and saplings per ha.

ii) Loss of Trees from Private land

In the Approved IEE, 3200 number of trees comprising of Sal, Chilaune, Katus, Botdhairo, Padke, Uttis, Mauwa, and others are expected to be clear felled from the private shrubland during the project construction period. Other species of private trees includes, Jack fruit (*Artocarpus heterophyllus*), Kabhro (*Ficus lacor*), Pakhri (*Ficus glaberrima*), Orange (*Citrus aurantium*), Simal (*Bombax ceiba*), Berula (*Ficus sarmentosa*), Khanyu (*Ficus semicordata*), Banana (*Musa paradisiaca*), etc. In the additional section of the alignment (2.66km), about 1378 number of private trees are expected to be lost. The private tree species especially consists of Aanp, Badahar, Bakainao, Botdhairo, Chilaune, Dabdabe, Dumri, Gayo, Ginderi, Katahar, Katus, Khanayo, Khirro, Kutmero, Kyamuna, Ramrittho, Simal, Sindure, Thotne, Tuni, Padke etc. In addition, about 145 patches of banana and bans are expected to be lost from private land. The loss of trees from private land in the updated section of the alignment is presented in Appendix C of the report. Thus, in the Updated IEE report, total loss of private trees (including bamboo patches) will be 4723.



Table 6-6: Tree Loss in Terms of Plant Species from Government Forest and CF

S.N.	Local Name	Botanical Name	Loss of Vegetation				Standing Wood Volume, m ³	Biomass (ton)	
			Loss of Regeneration		Loss of Tree (No.)				
			Seedling s/ha	Saplings /ha	Pole Class	Tree Class			Total
In the approved IEE									
1.	Amala	<i>Phyllanthus emblica</i>	0	15	0	0	0.00	2.07	1.89
2.	Amba	<i>Psidium guajava</i>	14	10	0	0	0.00	1.41	1.27
3.	Angeri	<i>Osbeckia nepalensis</i>	483	268	0	0	0.00	37.53	33.77
4.	Botdhairo	<i>Lagerstroemia parviflora</i>	124	66	300	30	2.33	36.87	33.45
5.	Chilaune	<i>Schima wallichii</i>	1448	679	4230	810	35.59	1790.31	1624.42
6.	Dhurseli	<i>Colebrookea oppositifolia</i>	83	58	0	0	0.00	8.04	7.30
7.	Epil Epil	<i>Leucaena diversifolia</i>	0	0	60	0	0.42	1.71	1.55
8.	Kafal	<i>Myrica eiculenta</i>	0	0	120	0	0.85	9.18	8.33
9.	Katus	<i>Castanopsis</i> sps.	688	408	1530	210	12.29	567.36	514.80
10.	Khirro	<i>Sapium insigne</i>	25	30	330	30	2.54	41.37	37.54
11.	Lankuri	<i>Fraxinus floribundu</i>	0	13	60	0	0.42	4.08	3.71
12.	Mango	<i>Magnifera indica</i>	9	6	0	0	0.00	0.87	0.79
13.	Mauwa	<i>Engelhardtia spicata</i>	39	21	60	0	0.42	6.90	6.26
14.	Padke	<i>Albizia julibrissin</i>	19	13	270	90	2.54	132.66	120.38
15.	Phalat	<i>Quercus lamellose</i>	13	8	60	0	0.42	4.35	3.95
16.	Ramriha	<i>Mailotus oppositifolius</i>	38	25	180	30	1.48	66.09	59.98
17.	Rato pate	<i>Ajuga bracteosa</i>	0	0	0	30	0.21	43.32	39.32
18.	Sal	<i>Shorea robusta</i>	1763	1041	3360	1530	34.53	5114.34	4640.44
19.	Sallo	<i>Pinus</i> sp.	6	36	480	120	4.24	159.57	144.79
20.	Simal	<i>Bombax ceiba</i>	5	4	0	30	0.21	20.94	19.00
21.	Swami	<i>Ficus benjamina</i>	0	0	30	30	0.42	696.93	632.36
22.	Tiju	<i>Diospyros malabarica</i>	214	118	30	0	0.21	17.31	15.70
23.	Uttis	<i>Alnus nepalensis</i>	15	13	120	0	0.85	9.12	8.29
Total			4986	2832	11220	2940	100.00	8772.33	7959.28
In the additional section									
1.	Ankhatare/C hainchui	<i>Trichilia connaroides</i>	400	200			0.00	0.000	0.00
2.	Barro	<i>Terminalia bellirica</i>	600		1	1	2.56	0.353	0.27
3.	Botdhairo	<i>Lagerstroemia parviflora</i>		50	7	2	11.54	1.366	1.16

S.N.	Local Name	Botanical Name	Loss of Vegetation				Standing Wood Volume, m ³	Biomass (ton)		
			Loss of Regeneration		Loss of Tree (No.)					
			Seedling s/ha	Saplings /ha	Pole Class	Tree Class			Total	%
4.	Chatiwani	<i>Alstonia scholaris</i>			0	1	1	1.28	5.299	2.01
5.	Chilaune	<i>Schima wallichii</i>	2400	300	29	29	58	74.36	25.998	17.91
6.	Dabdabe	<i>Garuga pinnata</i>			1	0	1	1.28	0.144	0.09
7.	Faime (Masgedi)	<i>Cipadess abaccifera</i>		300				0.00	0.000	0.00
8.	Karma	<i>Adina cordifolia</i>			1	0	1	1.28	0.069	0.05
9.	Katus	<i>Castanopsis indica</i>	1600	250				0.00	0.000	0.00
10.	Khirro	<i>Sapium insigne</i>	600	100	2	0	2	2.56	0.226	0.16
11.	Kyamun	<i>Cleistocalyx operculata</i>			1	0	1	1.28	0.281	0.19
12.	Ramriha	<i>Mallotus oppositifolius</i>			0	1	1	1.28	0.536	0.34
13.	Saj	<i>Terminalia tomentosa</i>	400		1	1	2	2.56	0.538	0.51
Total			6000	1200	43	35	78	100.00	34.809	100.00
In the Updated IEE										
1.	Amala	<i>Phyllanthus emblica</i>	0	14	0	0	0	0.00	2.07	1.89
2.	Amba	<i>Psidium guajava</i>	13	9	0	0	0	0.00	1.41	1.27
3.	Angeri	<i>Osbeckia nepalensis</i>	439	244	0	0	0	0.00	37.53	33.77
4.	Ankhatare/C hainchui	<i>Trichilia connaroides</i>	36	18				0.00	0.000	0.00
5.	Barro	<i>Terminalia bellirica</i>	55		1	1	2	0.01	0.353	0.27
6.	Botdhairo	<i>Lagerstroemia parviflora</i>	113	65	307	32	339	2.38	38.236	34.61
7.	Chatiwani	<i>Alstonia scholaris</i>			0	1	1	0.01	5.299	2.01
8.	Chilaune	<i>Schima wallichii</i>	1316	617	4259	839	5098	35.81	1816.3	1642.33
9.	Dabdabe	<i>Garuga pinnata</i>			1	0	1	0.01	0.144	0.09
10.	Dhurseli	<i>Colebrookea oppositifolia</i>	75	53	0	0	0	0.00	8.04	7.30
11.	Epil Epil	<i>Leucaena diversifolia</i>	0	0	60	0	60	0.42	1.71	1.55
12.	Faime (Masgedi)	<i>Cipadess abaccifera</i>		27				0.00	0.000	0.00
13.	Kafal	<i>Myrica esculenta</i>	0	0	120	0	120	0.84	9.18	8.33
14.	Karma	<i>Adina cordifolia</i>			1	0	1	0.01	0.069	0.05
15.	Katus	<i>Castanopsis sps.</i>	771	382	1530	210	1740	12.22	567.36	514.80



S.N.	Local Name	Botanical Name	Loss of Regeneration			Loss of Vegetation			Standing Wood Volume, m ³	Biomass (ton)
			Seedling s/ha	Saplings /ha	Pole Class	Tree Class	Loss of Tree (No.)			
							Total	%		
16.	Khirro	<i>Sapium insigne</i>	77	36	332	30	362	2.54	37.7	
17.	Kyamun	<i>Cleistocalyx operculata</i>	0	12	1	0	1	0.01	0.19	
18.	Lankuri	<i>Fraxinus floribunda</i>	8	5	60	0	60	0.42	3.71	
19.	Mango	<i>Magnifera indica</i>	35	19	60	0	60	0.42	6.26	
20.	Mauwa	<i>Engelhardtia spicata</i>	17	12	270	90	360	2.53	120.38	
21.	Padke	<i>Albizia julibrissin</i>	12	7	60	0	60	0.42	3.95	
22.	Phalat	<i>Quercus lamellose</i>	35	23	180	31	211	1.48	60.32	
23.	Ramritha	<i>Mallotus oppositifolius</i>	0	0	0	30	30	0.21	39.32	
24.	Rato pate	<i>Ajuga bracteosa</i>	36	36	1	1	2	0.01	0.51	
25.	Saj	<i>Terminalia tomentosa</i>	1603	946	3360	1530	4890	34.34	4640.44	
26.	Sal	<i>Shorea robusta</i>	5	33	480	120	600	4.21	144.79	
27.	Sallo	<i>Pinus sp.</i>	5	4	0	30	30	0.21	19.00	
28.	Simal	<i>Bombax ceiba</i>	0	0	30	30	60	0.42	632.36	
29.	Swami	<i>Ficus benjamina</i>	195	107	30	0	30	0.21	15.70	
30.	Tiju	<i>Diospyros malabarica</i>	14	12	120	0	120	0.84	8.29	
31.	Uttis	<i>Alnus nepalensis</i>	4860	2645	11263	2975	14238	100.00	7979.971	
		Total								

Note: Seedling 0-4 cm DBH; Sapling 4-10 cm DBH; Pole Class 10-30 cm DBH; Tree Class >30cm DBH; NA: Not Applicable Source: Field Survey, 2016



Table 6-7: Total Forest Loss

S. N.	Type of forest	Area (ha) in approved IEE	Area (ha) in Updated IEE	Loss of Vegetation						Crown Cover (%)	Standing Wood Volume (m ³)		Biomass of Standing Tree (ton)		Biomass Usage*	
				Regeneration loss			Loss of Tree (no.)				IEE	UIEE	IEE	UIEE		
				Seedlings per ha	Saplings per ha		Pole class		Tree class							
					IEE	UIEE	IEE	UIEE	IEE		UIEE	IEE	UIEE			
1.	Government	0.7	0.88	4986	4860	2832	2645	11220	11263	2940	2975	8772.	8807.	7959.28	7979.97	Timber, Firewood, Fodder, NTFP
2.	Community	21.6947	21.9947									33	136			
3.	Religious	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Leasehold	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	Private Shrubland	12.5937	15.321	-	-	-	-	2200	3118+145 (patches)	1000	1460	-	-	-	-	Timber, Firewood, Fodder, NTFP
	Total	34.9884	38.1957	4981	2428	13420	14526	3940	4435	8772.3	8807.1	3	36	7959.28	7979.97	

Note

: Seedling 0-4 cm DBH; Sapling 4-10 cm DBH; Pole Class 10-30 cm DBH; Tree Class >30cm DBH; * Possible usages are- Timber, fire wood, fodder etc., Source: Field Survey, 2016, 2019



b. Operation Phase

During the operation phase of the project, only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees and growing shrubs and short trees will change the vegetation cover. This impact is low, site specific (local), and long-termed.

In terms of the biological environment, the project area will reap beneficial impacts from the project's afforestation program that will be implemented to replenish the loss of forest and vegetation especially in the project affected CFs.

6.2.2 Changes of Demand for Fuel Wood and Timber**a. Construction Phase**

The existing CF cover is found to be large enough to support the demand of forest resources such as firewood and timber to the dependent HHs. Therefore, cutting down of 14,238 number of standing trees from CF is of significance to the livelihood of local people but direct and long-termed. The economic impact will be significant because timber and firewood obtained from the felled trees can be sold in local markets.

It is assumed that most of the labor force will be from local areas. There will be a few people from outside the project area for a short period of time. Due to this, the increase in demand of fuel wood and timber during the construction period is expected to be low. Moreover, there will not be any permanent settlements that may lead to encroachment on forest land. This impact will be low in magnitude, site specific and short-termed.

b. Operation phase

During the operation phase, site-specific and short-term effects such as increase in pressure on forest resources will settle down. Patrolling and maintenance activities along the TL will involve only a few people occasionally. This activity will not have a noticeable adverse impact on the forest and vegetation.

6.2.3 Increased Access to Forest**a. Construction Phase**

The fragmentation of forest area for RoW, erection of tower and stringing of conductors during the construction phase can increase the access to forest. The impact is expected to be low in magnitude, site specific and short-termed.

b. Operation Phase

During the operation phase, site-specific and short-term effects such as increase in pressure on forest resources due to increased access will decrease. RoW management will involve patrolling and maintenance activities along the TL with very few people from the project. The re-growth of ground vegetation and short height plants will reduce the access to the forest. The overall impact is expected to be low in magnitude, site specific and long-termed.

6.2.4 Exploitation of Non-Timber Forest Products (NTFPs)

The term 'non-timber forest product' encompasses all biological materials other than timber which are extracted from forests for human use. NTFPs include edible plants (food, edible oils, spices, fodder etc.) and non-edible plant products such as medicines, ornamental plants, etc.

a. Construction Phase

Since there will be a small number of work force involved in the project construction, collection and sale of NTFPs by workers will be negligible. CFUGs have imposed strict rules regarding the collection of NTFPs in their forests. However, even the collection of tiny volumes of NTFPs might

result in social conflicts. Therefore, these impacts are considered as low in magnitude, site-specific and of a short duration.

Table 6-8: Total Loss of NTFP

S.N.	Commercially Important Species (other than trees) NTFP	Government Managed	CF	Religious Forest	Leasehold Forest	Private Forest
1	Aduwa (<i>Zingiber Officinale</i>)	-	Rare	-	-	-
2	Aiselu (<i>Rubus ellipticus</i>)	-	Frequent	-	-	-
3	Akhe Timur (<i>Zanthoxylum armatum</i>)	-	Rare	-	-	-
4	Alaichi (<i>Amomum subulatum</i>)	-	Rare	-	-	-
5	Amala (<i>Phyllanthus emblica</i>)	-	Frequent	-	-	-
6	Bel (<i>Aegle marmelos</i>)	-	Rare	-	-	-
7	Chutro (<i>Berberis asiatica</i>)	-	Frequent	-	-	-
8	Kafal (<i>Myrica eiculenta</i>)	-	Frequent	-	-	-
9	Kera-Banana (<i>Musa paradisiaca</i>)	-	Rare	-	-	-
10	Lapsi (<i>Choerospondias axillaris</i>)	-	Frequent	-	-	-
11	Tejpat (<i>Cinnamomum tamala</i>)	-	Frequent	-	-	-

(Note: Estimation of NTFPs in number could not be made. Rather it is estimated as Rare, Frequent, Abundant and Dominant)

b. Operation Phase

During the operation phase, there will be an occasional intervention of just a few people maintaining the TL. This will have an insignificant effect on the forest and NTFPs along the TL.

6.2.5 Impact on Wildlife and Avifauna

a. Construction Phase

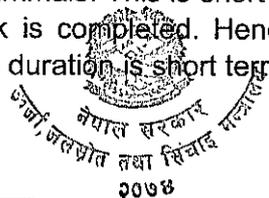
The possible adverse impacts on wildlife and avifauna population during the project construction phase are loss of physical habitat and food habitat, possibility of hunting and poaching by labor force and disturbance in the migratory movement of mammals and birds.

- **Loss of Habitat**

The construction of TL which will require site clearance and other construction related disturbances will cause loss of vegetation and will affect wildlife habitat to some extent. Since the area to be cleared is large (22.8747ha of forest area), excluding shrubland, the overall magnitude of impact is considered to be high, extent is site specific and duration is long termed.

- **Disturbances from Construction Activities**

Construction disturbances and other related activities will interrupt normal movement, feeding and other activities of wildlife. The construction disturbances resulting from excavation of foundation, vehicle movement, transportation of materials, and other related activities would interrupt normal movements, feeding and other activities of animals available in the surrounding areas. Construction activities may affect movement of birds resulting in the temporary disturbance to their normal route. These activities will affect less mobile, frequently smaller species such as frogs, lizards and small mammals. This is short-term localized impacts and will subside gradually as the construction work is completed. Hence the magnitude of impact is considered to be low, extent is local and the duration is short term.



- **Hunting and Poaching by Labor Force**

Hunting and poaching will be one of the likely impacts on the wildlife due to the presence of construction workers. The local hunters or hunters among the workforce might be attracted to hunt birds and other wild animals. The possibilities of hunting and trapping by workers during construction period will have some impact on local wild fauna. However, such pressure on wildlife will be site specific and will decrease once the work is completed. The overall magnitude of impact is considered to be low, extent is local and duration is short term.

b. Operation Phase

During operations, there will be some adverse impact on wildlife which are discussed in the following sub-sections.

- **Habitat Changes**

The vegetation of the RoW will maintain a conductor clearance compatible with safe operation. This will result in loss of some habitat. The vegetation clearance will be carried out manually and will have a minor disturbance on the wildlife during operation. In addition, the RoW will create the barrier for the movement of some wildlife. Pylons might attract population of Primates like Langur (*Macaca assamensis*) and Rato Bandar (*Macaca mulata*) in the project area as they are climbers and high voltage TL could pose a danger for such animals. The impact will be low in magnitude, site specific and long term.

- **Avian Hazards**

The existence of 220 kV line may affect bird mobility to some extent. The conductor wires, being suspended at the height and being thin, are difficult for birds to detect and avoid them. The inability of birds to notice the wires can cause fatal injuries from collisions. This type of impact is predicted to be high in low visibility conditions such as bad weather and foggy days and during nights. Since the TL route does not pass through any identified bird migration route, the impact is of low magnitude, site specific and will remain for long duration.

6.2.6 Impacts on Protected Species of Flora and Fauna

a. Construction Phase

Because of different construction activities and influx of outsiders, pressure on the vegetation and the forest will increase. Physical habitats, feeding habits, reproductive behaviors and movement of wild animals and birds might be disturbed due to construction activities and increased human presence in and around the PAA. This might change the existing ecosystem diversity altering natural communities of plants and animals. Ultimately protected plant and animal species will be more prone to such adverse impacts. This impact is of low in magnitude, site specific and long-termed. The effect will be adverse on the local biological resources and on the biodiversity of the PAA.

b. Operation Phase

During the operation phase, clearance of trees along the RoW will create open linear stretches in the forest. That would further divide small patches of forest into smaller fragments. Fragmentation of the forest would also fragment the existing habitat, which in turn, affects flora and fauna in a number of ways. For example, some wild animals like Chituwa (*Panthera pardus*) are reluctant to pass through open stretches in the forest. Likewise, an open stretch in the forest may be barrier for propagation of plants. Thus, bio-diversity of the PAA and the status of rare, endangered and threatened plants might be adversely affected. This impact is expected to be low in magnitude, site-specific and for a long duration.



Table 6-9: Biological Environment Impact Assessment Matrix

S. N.	Issues	Impacts	Identification and Evaluation of Impact								
			D	IND	M	E	Du	Sum of Impact Values	Significance of Impact		
Construction Phase											
1	Loss of forest land	The total estimated forest area falling under the tower pad and TL alignment is 38.1957 ha. Government forest area falling under TL alignment is 0.88ha and CF area falling under the tower pad and TL alignment is 21.9947ha. Also, 15.321ha area falls in private shrub land.	D		M	SS	LT	50	Significant		
2	Loss of tree	14238 numbers of trees are estimated to be clear felled from CF and government forest	D		M	SS	LT	50	Significant		
3	Demand for Fuel Wood and Timber	Cutting down of standing trees is significant to the livelihood of local people. Demand of fuel wood and timber during the construction period will be low.		IND	L	SS	ST	25	Less Significant		
4	Increased Access to Forest	Fragmentation of forest area for RoW, erection of tower and stringing of conductors during the construction phase can increase the access to forest.	D		L	SS	ST	25	Less Significant		
5	NTFPs	Collection of small volumes of NTFPs might result in social conflicts.	D		L	SS	ST	25	Less Significant		
6	Loss of Habitat	Reduction in available forest habitat due to loss of 38.1957ha forest land.	D		L	SS	LT	40	Less Significant		
7	Hunting and poaching	Likely increase in hunting and poaching.		IND	L	L	LT	50	Significant		
8	Protected, Species of Flora and Fauna	Pressure on the vegetation and forest will increase. Physical habitats, feeding habits, reproductive behaviors and movement of wild animals and birds might be disturbed.	D		L	SS	LT	50	Significant		
Operation Phase											
1	RoW Clearance/ Bush Cutting	Trees will be trimmed and cut down to make conductor clearance. Regular trimming of tall trees will change vegetation cover. Afforestation program will replenish loss of forest and vegetation.	D		L	SS	LT	40	Less Significant		
2	Access to forest	RoW management can increase access to forest		IND	L	SS	LT	40	Less Significant		
3	NTFPs	Occasional intervention of NTFPs as few people maintain TL	D		L	SS	LT	40	Less Significant		
4	Impact on wildlife	Pylons might attract Primates. Bird mobility may affect and cause fatal injuries from collisions. Fragmentation and destruction of habitat will reduce movement of wild animals, availability of their food and shelter.	D		L	SS	LT	40	Less Significant		
5	Change in Habitat	Permanent change in forest area in shrub land and grass lands.	D		L	SS	LT	40	Less Significant		
6	Protected Species of Flora and Fauna	Fragmentation of forest would fragment the existing habitat and affects flora and fauna.	D		L	SS	LT	40	Less Significant		

Note: D: Direct, IND: Indirect

Extent (E)

Magnitude (M)

Duration (Du)

SS= Site Specific (10)

L= Low (10)

ST= Long Term (05)

L= Local (20)

M= Medium (20)

MT= Medium Term (10)

R= Regional (60)

H= High (60)

LT= Short Term (20)

The number in the bracket refers to Impact value as per National EIA Guidelines, 1993. The sum of impact values provides a maximum of 140 and minimum of 25. Significance of impact: sum of impact values: more than 75 → Highly Significant, 50-75 → Significant and less than 50 → Less Significant.

Updated IEE Report

6-15

NEA-ESSD

6.3 Socio-economic and Cultural Environment

6.3.1 Acquisition of Land and Structures

a. Construction Phase

• Land Requirement

According to approved IEE, the total private land required for the project was 106.6046ha for the erection of tower pads (angle and suspension), substation, access road, mobile camp and RoW of the TL and temporary facilities while in the Updated IEE private land required for the project is 114.3135ha. The total private land required for the project is increased by 7.7089ha. Detail of the the comparative land requirement is given in the table below.

Table 6-10: Comparative Land Requirement for Approved IEE and Updated IEE

S.N	Land Types and Components	Area in Approved IEE (ha)	Area in U-IEE (ha)	Remarks	Changed Area (ha)
1	RoW				
	Cultivated	84.3834	87.88	increased	3.4966
	Private shrub land	12.5937	15.321	increased	2.7273
	Barren	0.045	0.1725	increased	0.1275
	Total area	97.0221	103.3735	Total increment	6.3514
2	Tower Foundations				
	Cultivated	1.71	1.845	increased	0.135
	Barren	0.0225	0.045	Increased	0.0225
	Total area	1.7325	1.89	Total increment	0.1575
3	Substation				
	Cultivated	6	7.101	increased	1.101
	Total area	6	7.101	Total increment	1.101
4	Access Road				
	Cultivated	-	0.199	increased	0.199
	Total Area	-	0.199	Total increment	0.199
5	Camp and Storage				
	Cultivated	0.5	0.5	No change	
	Sub-total	0.5	0.5	No change	
6	Switching station				
	Cultivated	0.1	-	No switching station	
	Sub-total	0.1	-		
7	Mobile Camp				
	Barren	1.25	1.25	No change	
	Sub-total	1.25	1.25		
		106.6046	114.3135	Total	7.7089

• Households Losing Land and Structure

According to approved IEE, the proposed project will affect 84 HHs (excluding those HHs who will be affected due to the suspension tower foundation) including 37 HHs of the previous proposed substation at Belbas. Due to the change in the substation location new 44 HHs will be included in the list of affected whereas 37 HHs of the previous proposed substation at Belbas are excluded from the list of affected. So in the Updated IEE, total number of affected HHs due to project execution are 91. In the Updated IEE, 74 HHs will loose their land only, three HHs will loose their land and structure, and 14 HHs will loose their structure only. A list of 56 surveyed HHs, who will loose their land, is given in Appendix D.

Table 6-11: HHs Losing Land and Structures

S. N.	Project Components	Type of losing Land and Structure	Affected HHs		Change
			Approved IEE	Updated IEE	
1	AP	Land Only	31	36	5
2	Belbas SS and switching station	Land Only	38	3	-35

S. N.	Project Components	Type of losing Land and Structure	Affected HHS		Change
			Approved IEE	Updated IEE	
3	Belbas SS and switching station*	Land and structure	2	-	-2
4	New damauli SS	Land only	-	28	28
5	New Damauli SS	Land and structure	-	1	1
6	New damauli SS & Access Road	Land only	-	1	1
7	Access Road	Land Only	-	9	9
8	RoW	Structure Only	14	14	No change
9	AP and RoW	Land and structure	2	2	No change
Total			84	91	

Source: HHS Survey, 2019

*Belbas SS and switching stations are avoided from the component of LDTLP.

• Households Losing Structures

According to approved IEE, 18 HHS lose their 23 structures (12 houses, 9 cowsheds, one toilet and one public structure) and in the Updated IEE, 17 HHS lose their 23 structures (13 houses, 8 cowsheds/shed, one toilet and one public structure). The number of HHS who lose their structure is mentioned in Table 6-11 while the structure loss is in Table 6-12. Detail of the structure loss is mentioned in Appendix D-II.

Table 6-12: Comparative Table of Loss of Structures in Approved IEE and Updated IEE

S. N.	Project Components	Type of losing Structure	Approved IEE	Updated IEE
1	RoW	House	12	12
2		Cowshed	7	7
3		Toilet	1	1
4		Public structure	1	1
5	New Damauli SS	House	-	1
6		Shed	-	1
7	Belbas SS	Cowshed	2	-
Total			23	23

The overall magnitude of impact is considered to be high, site specific and long termed. The level of impact may vary with the proportion of land acquired.

b. Operation Phase

Land acquisition will not be required during operation and no significant impacts are expected during this phase. Due to safety reason, houses and other permanent structures are not allowed to be constructed within the RoW as per the Electricity Regulation, 2050. The land price under the RoW and in the vicinity of RoW, especially near to the highway and built up areas will be reduced significantly. It is difficult to quantify the level of impact on the pricing of the land because there are other factors too that would play the significant role. The land used for camp will be returned to the respective land owners as in the previous condition. Thus, the magnitude of impact is moderate, extent is site specific and duration is long term.

6.3.2 Loss of Crops

a. Construction Phase

• Permanent Loss of Crops

The major parts of the TL alignment go through less fertile cultivated land. The major crops cultivated in the PAA are paddy, maize, wheat and millet. According to approved IEE, annual crop loss of the project affected HHS is estimated to be 33.63MT (cereal crop; paddy 15.75MT,

maize 11.98MT and millet 2.06 while in the Updated IEE total production loss due to land acquisition is 38.88MT.

Table 6-13: Permanent Loss of Agricultural Production (Due to Land Acquisition)

S.N.	Crop Type	Production Loss (MT)	
		Approved IEE	Updated IEE
1	Paddy	15.75	21.72
2	Wheat	3.84	4.08
3	Maize	11.98	11.06
4	Millet	2.06	2.02
Total		33.63	38.88

• Temporary Loss of Crops

There will be loss of standing crops along TL RoW during the construction phase. The impact will depend upon the timing of the construction and cropping in the impacted area. Preferably the construction of TL will be carried out during clean season so that standing crops are not damaged or minimum damaged. However, the adjoining of RoW may be disturbed due to the movement of vehicles and stringing of line.

According to approved IEE, 164.91MT of crops (paddy 58.74MT, maize 78.25MT, wheat 12.58MT and millet 15.34MT) would be lost due to the construction of TL. The loss is calculated considering that stringing of the line will be completed in one year. In the approved IEE 168.27MT of crops will be damaged during the project construction. The magnitude of this impact is considered to be high, extent is site specific and duration is long termed.

Table 6-14: Loss of Agriculture Production due to Land Utilization

S. N.	Crop type	Production Loss (MT)	
		Approved IEE	Updated IEE
1	Paddy	58.74	60.24
2	Wheat	12.58	13.05
3	Maize	78.25	79.12
4	Millet	15.34	15.86
Total		164.91	168.27

b. Operation Phase

Tower constructed in cultivated area, especially those erected in the middle of land parcels will pose hindrance while tilling agricultural field. The field may be cultivated by using human labor that will increase the cost of agriculture production. The overall magnitude of impact is considered to be low, extent is site specific and duration is long term for loss of crops in permanent land. Whereas, there is no such impact on temporary land.

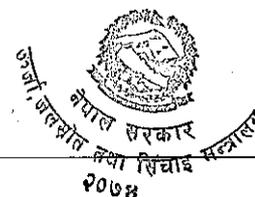
6.3.3 Impact on Livelihood

a. Construction Phase

The HHs survey shows that people of the PAFs do not rely on only single income source; instead they maintain their daily life involving on various occupations like the foreign employment, service, subsistence farming and livestock, tourism, pension and so on. Similarly, the proposed TL alignment will acquire less fertile land and the proposed substation will acquire some hectares of fertile cultivated land so some HHs will lose their cultivated land permanently which causes, to some extent, scarcity of food permanently on their daily living; however they do not fully depend on their agricultural incomes so, the overall magnitude of impacts on livelihood is considered to be moderate, extent is site specific and duration is long term.

b. Operation Phase

The impact on livelihood will remain same in this period.



6.3.4 Health, Water Supply and Sanitation

a. Construction Phase

- **Health and Sanitation**

The local people may come regular undesirable contact with the outsiders so, the likely increase of the outsiders' influence during this phase may add further stress on the local health and sanitation situation. There could lead the spread of other communicable diseases such as diarrhea, worm, and respiratory diseases and so on too. However, the impact is considered to be low, site specific and for short term considering the small number of manpower and their short-term mobility at one site.

Besides, the increase in the noise level due to vehicular movement in the project area is likely to influence the physical and mental health of the local community. Discharge of wastes of various types including metals, paper, kitchen wastes etc. is potential to degrade the sanitary hygienic conditions particularly around the construction sites and camp sites. The lack of proper sanitary measures and increase wastes and water pollution may lead to the outbreak of epidemic diseases. However, the impact is considered to be low, site specific and for short term considering the small number of manpower and their short-term mobility at one site.

- **Drinking Water**

With the increase in population along with the construction activities of substation, a potential decline of the access to the drinking water and existing sanitation condition will occur in the project area. The overall impact on water supply and sanitary situation will be: shortage of drinking water, increase pressure on the existing water supply system, increase distance to the safe drinking water, increase in disease vectors, and reduced water quality due to increased sanitation problems etc. However, the impact on water supply and sanitation shall be low, short term and site specific but the pressure on water supply and sanitation will be long term in substation.

b. Operation Phase

The same impact is anticipated during the operation phase.

6.3.5 Occupational Hazards and Safety

a. Construction Phase

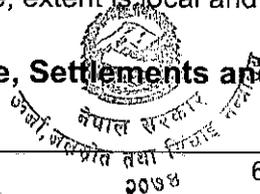
This job involves moderate risks mainly in the form of falling from height or being pulled by the cable and vehicle accidents. If careless, there will be possibility of injury or even deaths of the workers become a reality. Inadequate provision of health safety equipment such as hard hats, boots etc. may create health hazard. The magnitude of impacts is considered to be moderate, extent is local and duration is long term.

b. Operation Phase

During the operation phase, the people residing in the vicinity of the TL will be vulnerable to electrical hazards such as fire, electrical shocks or even electrocution. Similarly, lack of operation and maintenance skill and unavailability of the essential safety equipment may add further risk with safety regards. The public can be affected principally through their own activities, such as tendency of climbing towers by children; high vehicles attempt to pass beneath the TL, surveyors using metal leveling staffs under the conductors, etc. These risks have low probability of occurrences, but a great significance to individuals involved. The overall magnitude of impacts is considered to be moderate, extent is local and duration is long term.

6.3.6 Impact on House, Settlements and Social Infrastructure

a. Construction Phase



There are 31 settlements which are close (within 300m) to the TL. All together 12 residential houses, 9 cowsheds, one toilet, structures of a cooperative farm and two water tanks fall under the RoW as already discussed in section 6.3.1. A school Shree Bhanung Primary School is very close (approximately 70m) to the TL alignment in Saura, Byas. Similarly, Some schools like Shree Shiva Shakti Primary School in Pokhara MC, Byas and Jana Jukta Saahi Higher Secondary School in Byas are close (within 300m) to the TL alignment. The magnitude of impact on above mentioned private and social infrastructures are high, extent is local and duration is long term.

b. Operation Phase

The impact on settlements and community structures remain same in this period also. The magnitude of impact is high, extent is local and duration is long term.

6.3.7 Impact due to Crossings

a. Construction Phase

The baseline study shows the proposed TL crosses highway, some roads/trails, residential/non-residential homes, physical structures of agriculture farm, drinking water tanks, irrigation canals, pond and distribution lines. The proposed alignment crosses the Prithvi Highway in Byas, Damauli to Ranipokhari gravel/earthen road, Damauli to Shyamgha gravel/earthen road and some other inter-connected gravel/earthen/trails. The alignment crosses 132kV TL two times and 11kV line 12 times. Similarly the LDTLP crosses the 400/200V distribution lines 33 times. The LDTLP also crosses physical structures like residential homes/non-residential homes in Shyamgha, Byas, some structures of Kahare Agriculture and Animal Husbandry Co-operative Ltd. farm in Labsi Danda, Pokhara MC, some irrigation canals like *Chhar Hajar* Irrigation canal and Sanghepateni Irrigation Canal in Byas, Saura drinking water tank in Saura, Byas and another drinking water tank in Aarupata Village and buffalo ponds in Pokhara MC. Hence, there will be impact due to crossing over of power cables, foot trails and roads on local infrastructures and facilities. The impact is expected to be low, local and long term.

b. Operation Phase: The same impact is observed during operation phase.

6.3.8 Impact on Communal Resources

a. Construction Phase

No impact on the communal resources during the construction phase.

b. Operation Phase

There is no impact on communal resources during operation phase of the TL.

6.3.9 Impact on PAF due to Alteration of Land and Property Values

a. Construction Phase

The aforementioned TL alignment had crossed some residential houses of nearby settlement, so AP-8, AP-9 and AP-26 have been slightly shifted and AP-29A has been inserted in between AP-29 to AP-30 in order to avoid impact on dense settlement and likely social conflict (see figure in Chapter-2). The land and property values under RoW and close to settlement will be devalued due to construction of TL. The nature of impact is expected to be high, local and long term.

b. Operation Phase

The same impact is anticipated during the operation phase.

6.3.10 Restriction of Future Land Use Development near to Settlement

a. Construction Phase:

No impact is anticipated during this phase.

b. Operation Phase

The proposed TL mostly passes through rural and semi urban sections. The metropolitan area and municipality area from where the alignment passes through is rural and semi urban types too. Due to implementation of TL, land nearby settlement and road will be affected. It restricts the multipurpose land use potentiality of the area mostly in Shyamgha, Byas where the area may spread as market area in future. Plan and programs proposed by concern RMs/Municipality/MC and DCC will be affected. Hence, impact is expected on future land use development. The nature of impact is high, local and long term.

6.3.11 Disturbance to Radio, Television and Mobile/Cell Phone Reception**a. Construction Phase**

During construction period, there will be no impact on radio, television, telephone or cell phone.

b. Operation Phase

There will be some interference with the radio, television and cell phone waves with the Electromagnetic Field (EMF) of the TL within the RoW; however, there are no findings of impact due to high voltage TL outside RoW. Hence, the nature of impact is expected to be low, site specific and long term.

6.3.12 Electric and Magnetic Field Effect**a. Construction Phase**

No impact is anticipated during construction phase.

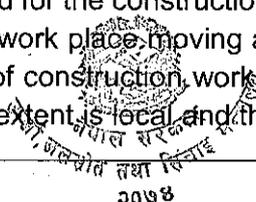
b. Operation Phase

Electric powered TL creates electric and magnetic field together is known as EMF. Electric field is created by the presence of voltage and is expressed in volt per meter (V/m). Magnetic field is produced by the present of current in the line and is expressed in terms of ampere per meter (A/m). Power lines EMFs are strongest beneath the lines and diminish rapidly with distance. Numerous researches have been done abroad to investigate the effect of EMF associated with TL but none has proved and quantify about the health risks. Scientific research on the effects of EMFs on public health has not demonstrated clearly the existence of a significant risk, nor has it proven the complete absence of risk.

Electric field of high voltage line gives rise to corona effect causing ionization leading to the generation of ozone and oxides of nitrogen, possible radio and television interference and audible noise at high levels. Such noise will increase under rain and smog conditions. Similarly, there will be impact on pacemaker users. The magnitude of overall impact is considered to be low, extent is site specific and duration is long term.

6.3.13 Gender and Vulnerable Groups**a. Construction Phase**

People will be, during the project construction, employed as unskilled, semi-skilled and skilled manpower on daily wages for excavation, transportation of construction materials and other construction related works. In equal value of work, the contractor, especially the sub-contractors, may discriminate the women and vulnerable group while hiring the worker. Despite, the GoN ban on child labor, it remains a potential temptation in an economically poor region such as the proposed project area for children to be exploited to pursue menial jobs. It is assumed that most of the labor force required for the construction of the TL will be farmers and landless people from the vicinity of the actual work place moving around the alignment as the construction proceeds. Considering the nature of construction work and manpower employed the magnitude of impact is considered to be low, extent is local and the duration is short term.



b. Operation Phase

Most of the population involved directly or indirectly in the project work will be deprived from the job after the completion of the project which will make the female population to look for alternative source of income. This may add extra burden to their normal daily activities. This impact is expected to be medium in magnitude, local in extent and long term in duration.

6.3.14 Economic Activities**• Construction Phase**

Some section of the TL passes very near to market area like Lekhnath, Nepaltar, Seshtar, etc. where economic activities are high in comparison to other section of project area. Similarly, most of the section of the TL passes close to the rural roads which are considered as the semi-urban area. The interaction among different people/stakeholders and ethnic group may attract rural people towards more advance society. However, the experience with other project has revealed fact that sudden cash flow may cause unproductive spending earned by the workers. The availability of cash may divert some workers towards gambling and other awful habits like alcohol consumption. The magnitude of impact is low, extent is local and duration is short term.

• Operation Phase

Project induced economic opportunities will be beneficial for the local people. However, these opportunities will be closed and the workers will lose their job after the project completion. Demand for local agricultural production and local commodity transactions will be reduced. The decrease or withdrawal in economic activity during operation phase may affect the habitual life of local people of spending more like the construction phase. They will face difficulty in managing the lifestyle. However, due to the linear nature of the project, the local labors will be hired at the different locations only for the short duration of time. Thus, the magnitude of the impact is considered to be low because the economic activities are limited and are spread throughout the settlements of the alignment. The extent is local and duration is of long term.

6.3.15 Religious, Historical and Archeological Site**a. Construction Phase**

Though there are numbers of temples, religious and cultural sites in the project area, none of the religious, historical and archaeological sites fall under the RoW.

b. Operation Phase

No impact is expected during the operation phase.

6.3.16 Infrastructure and Service Facility**a. Construction Phase****• Infrastructure**

Damauli and Lekhnath are the main markets/trade centers of the project area. The average distance of these market centers from the proposed TL is ranged from 1km to 3km. The implementation of project will likely to affect these market centers. The magnitude of the impact is moderate, extent is local and duration is long term.

• Service Facility

The construction work and related influx of population in the project area will make the existing institutions regarding health, water supply, telecommunication, electricity, etc. unable to deliver the required service. Besides, existing market and hotels will come under pressure. However, privately operated service is expected to cope-up with this situation considering the nature of job and limited workers staying with their families in the project area. The impact is expected to be low in magnitude, local in extent and short duration.

b. Operation Phase

No impact is anticipated during the operation phase.

6.3.17 Social and Cultural Practices**a. Construction Phase**

There might be some possible effects that are most likely to occur on the social structures, norms and cultural practices of the communities located close to the construction area. During the project construction, the influence of the outside workforce on the local way of life and traditional cultural practice may result into cultural erosion, undesired social practices, disputes, conflicts and possible dilution of social bonds among the local people. However, the social and cultural life style of the local people will hardly be affected by the influx of workers due to nature of project. This is because of the linear type of the PAA, low number of the construction workers from outside and their fast mobility. These impacts are expected to low in magnitude, local and short term in duration.

b. Operation Phase

After completion of the construction work, the impact on culture by the construction work force will subside and will slowly return to its normal social condition.

6.3.18 Law and Order**a. Construction Phase**

The contractor will, during the construction period, employ labor from different places with different religion and faiths, so there will be possibilities of conflict of interest that may affects the law and order situation. The past experience reveals the fact that local people have misunderstanding with the employers and contractor's staff. Since the project is of linear type and the number of local labor for construction activities will be less, the likely impact on law and order situation due to project is expected to be low in magnitude, local and short term.

b. Operation Phase

No impact is anticipated during operation phase.

6.3.19 Impacts of Aesthetics**a. Construction Phase**

No impact is anticipated during construction phase.

b. Operation Phase

Impacts to visual resources are examined in terms of changes between the existing landscape character and proposed actions, sensitivity of viewing points available to the general public, their viewing distances and visibility of proposed changes. The existence of towers and TL will likely to create aesthetic impact on natural and manmade resources by hindering the mountain. Hence, the magnitude of impact on aesthetic will be moderate, local and long term in nature.

6.4 Beneficial Impacts**a. Construction Phase****• Local Employment**

During the construction phase, one of the major beneficial impacts of the project is the creation of employment opportunities that, to some extent, may check out migration of the project area and promote in-migration. In this regard, this contributes to poverty alleviation to some extent. The availability of reliable power in the western part of the country will assist in establishing new industries which will generate employment for the local people. The magnitude of impact is considered to be moderate, extent is local and duration is short term.

- **Local Economy**

During construction period, the area of income of local people will be employment opportunity, income from house rental, rental/lease of land, shops, increased demand for fresh vegetables, fruits and meat. Furthermore, local contractor and local people will also be engaged for some construction work, which is considered as beneficial impacts for the local economy. As a result of increased trade and business, significant amount of cash will be introduced into local economy. This short term economic boom will contribute to the development of local economy. The growth in business will enhance the economic status of local people. The magnitude of impact is considered to be moderate, extent is local and duration is medium term. The people of project area will have opportunity to sell their products to construction workforce and project farmers in terms of cash economy. With the start of proposed project construction, visible and significant impact will be realized in the local economy of the area as whole and economic activities of the urban, semi-urban area like Byas, Lekhnath and Shyamgha.

b. Operation Phase

- **Regional Economy**

The reliability in power distribution will enhance the production of the industries and boost the economic activity in the western Nepal.

- **Living Standard**

Beneficial impacts of the development project are development of urban and semi urban area with better facilities and amenities, which avail short-term economic benefits to the local community. Given the opportunity of job to the locals in the project, the unemployed people of the area and HHs depend upon labor will benefit immensely. Their purchasing power is expected to improve the living standard. People thriving in subsistent agriculture will have cash flow, then exposed to the direct cash earning economic activities will certainly lead to positive changes in the existing social relationships and socio-economic value. Similarly, local people will be benefitted through acquiring training on different sectors related to agriculture, vegetable farming, education, environment awareness program, health, etc. The magnitude of impact is considered to be moderate, extent is regional and duration is long term.

Table 6-15: Socio-economic and Cultural Environment Impact Assessment Matrix

S. N.	Issues	Impacts	Identification and Evaluation of Impacts						
			D	IND	M	E	Du	Sum of Impact Values	Significance of Impact
Construction Phase									
1.	Acquisition of Land and Structure	Project will require 114.3135ha private land of which 9.1ha private will be acquired permanently. Total 23 structures will be affected.	D	H	SS	LT	90	Highly Significant	
2.	Loss of Crops	Loss of 207.15MT food crops from permanent land acquisition and RoW.	D	H	SS	LT	90	Highly Significant	
3.	Impact on Livelihood	Likely impact on livelihood to the PAFs.	D	M	SS	LT	50	Significant	
4.	Health, Water Supply and sanitation	Likely impact on physical and mental health of local community	D	L	SS	ST	25	Less Significant	
5.	Occupational Hazards and safety	Likely increase in construction related accidents.	D	M	L	LT	45	Less Significant	
6.	Impact on house, settlement and social infrastructure	Likely impacts on house, settlements and social infrastructures.	D	H	L	LT	100	Highly Significant	
7.	Impact due to crossings	Likely impact due to crossings (Power cables/Communication lines/ roads etc.)	D	L	L	LT	50	Significant	
8.	Impact on PAF due to alteration of land and property values	Likely impact on PAF due to Alteration of Land and Property Values	D	H	L	LT	45	Less Significant	
9.	Gender and Vulnerable group	Likely discrimination while hiring workers, compensation or other project related benefits.	D	L	L	ST	100	Highly Significant	
10.	Economic Activities	Likely increase in economic activities as well as unproductive spending.	D	L	L	ST	35	Less Significant	
11.	Infrastructure and Service Facility	Likely impact on infrastructures and service facilities.		IND	M	L	LT	50	Significant
12.	Social and Cultural Practices	Likely impact on social and cultural practices		IND	L	L	ST	60	Significant
13.	Law and Order	Likely increase in pressure to maintain the law and order		IND	L	L	ST	35	Less Significant
Operation Phase									
1.	Acquisition of Land and Structures	No significant impacts are expected on Land acquisition. Houses and other structures are not allowed to be constructed within RoW.	D	M	SS	LT	50	Significant	
2.	Loss of Crops	Placement of tower at center of field pose difficulty for the cultivation which further increase production cost	D	L	SS	LT	40	Less Significant	
3.	Impact on Livelihood	Likely impact on livelihood to the PAFs.	D	M	SS	LT			
4.	Occupational health and safety	Likely increase risks with safety regards.	D	M	L	LT	60	Significant	
5.	Impact on House, Settlements and Social Infrastructures	Likely impacts on house, settlements and social infrastructures.	D	H	L	LT	100	Highly Significant	

S. N.	Issues	Impacts	Identification and Evaluation of Impacts						
			D	L	L	L	LT	50	Significant
6.	Impacts due to crossings	The project will cross Prithvi highway one time, feeder road, foot track, 220/400V, 11kV line, 132kV TL.	D	L	L	L	LT	50	Significant
7.	Impact on PAF due to alteration of land and property values	Land and property values under RoW will be devalued.	D	H	L	L	LT	100	Highly Significant
8.	Impact due to restriction of future land use development	Restriction on the multipurpose land use potentiality for the growing up market area.		IND	H	L	LT	100	Highly Significant
9.	Disturbances to radio, television and cell phone reception	Likely disturbances to radio, television and mobile/ cell phone reception		IND	L	SS	LT	40	Less Significant
10.	Electric and magnetic field	Electromagnetic impact due to long term exposure		IND	L	SS	LT	40	Less Significant
11.	Gender and Vulnerable group	Male population become jobless; this will compel extra burden to female population.	D		M	L	LT	60	Significant
12.	Economic Activities	Withdrawal of economic activities. Negative impacts on locals.	D		L	L	LT	50	Significant
13.	Impact on Aesthetics	Likely impacts on Aesthetic values	D		M	L	LT	60	Significant

Note: D: Direct, IND: Indirect

Extent (E)

SS= Site Specific

L= Local

R= Regional

Magnitude (M)

L= Low

M= Medium

H= High

Duration (Du)

ST= Short Term

MT= Medium Term

LT= Long Term

The number in the bracket refers to impact value as per National EIA Guidelines, 1993. The sum of impact values provides a maximum of 140 and minimum of 25. Significance of impact: sum of impact values: more than 75 → Highly Significant, 50-75 → Significant and less than 50 → Less Significant.



7 MITIGATION AND ENHANCEMENT MEASURES

The mitigation and enhancement measures outlined in this chapter have been proposed to curtail potential adverse impacts and enhance beneficial impacts identified during the study. Those adverse and beneficial impacts not identified or predetermined during the study if later discovered during the construction phases will be explicitly mitigated or enhanced by the project. The discussion is organized into three categories of physical, biological, and socio-economic and cultural aspects, and has been split into construction and operation phases in an equivalent manner as for Chapter 6 - Impact Assessment.

NEA as the project proponent will implement all the proposed mitigation measures and enhancement measures, monitoring plans described in the respective chapters as NEA's prime responsibility. In addition, the project will take responsibility of compensating as per the prevailing law for any losses or damage caused to lives and property during construction and operation phases. The impacts/issues which are not seen now, and if seen/encountered later will be mitigated/addressed by project on its own cost.

7.1 Physical Environment

Minimization of land take and soil disturbances wherever feasible will be the primary mitigation measures of the project.

7.1.1 Watershed and Drainage Condition

a. Construction Phase

Proper management of the muck volume will be done. The muck generated during the excavation of foundation and substation will be used for backfilling and the area will be restored. The following mitigation measures will be anticipated during the construction phase:

- Vegetation clearing and ground disturbances will be confined within the foundation and required RoW.
- Proper compaction of the excavated soil will be done. After compaction 10% volume of muck will be deposited near foundation site and also will be used for feeder road gravelling and retaining wall.
- Adequate surface and subsurface drainage will be provided at all the APs area and at substation area to drain away the excess water and prevent water logging.
- Excavation will be done in phases with higher number of laborers so that the required target stretch is completed on time.
- Restoration of the area around the tower foundation for cultivation and regeneration of vegetation will be done.
- If quarry site found to be vulnerable for landslide/erosion of bank, bank protection work need to be carried out by contractor.
- Erection of tower and stringing of line will be carried out in dry season if possible.

b. Operation Phase

Proper inspection and maintenance of impact areas will be done to reduce the risk of soil erosion. The annual costs for such site verifications will be borne by the project developer and thus included in operation and maintenance budget. If the amount of this title is included in the main project cost, this amount can be reduced from the cost of environmental mitigation measures. No mitigation measures on the watershed and natural drainage is needed during the operation and maintenance period.



7.1.2 Topography, Land Use and Land Take

a. Construction Phase

- The natural slope disturbances will be minimized during the construction of foundation.
- Erection of foundation in the unstable land and/or in steep slopes will be avoided.
- Proper landscaping will be done at each tower site.
- The stability of the tower locations will be examined before excavation and special foundation design will be selected for the susceptible locations.
- Re-vegetation and slope maintenance will be carried out in the disturbed areas to avoid erosion. Bio-engineering with combination of retaining structures will be done if necessary.

The permanent land use changes due to foundation construction cannot be mitigated. However, the land under the RoW will not be restricted for the current use except that the construction of any structure will be prohibited. The construction area will be reinstated to the present condition after the construction is over. Land for temporary facilities will be rehabilitated to original status to minimize the land use impacts. The camp sites are proposed mostly in barren land to minimize the impact on land use pattern of cultivated land. The private land required for the project will be compensated through rental in agreement with the land and property owners.

b. Operation Phase

The impact on the land use changes under the RoW and permanent land take for the tower will remain forever. The restriction for the erection of any type of structure of land under the RoW and plantation of trees of tall species cannot be mitigated. However, cultivation will be allowed. All temporary land acquired will be converted to its original use or agreed new uses towards the end of the construction period and handed over to their owners.

7.1.3 Air Quality

a. Construction Phase

The project will not lead to a significant deterioration in air quality except in much localized instances and localized areas during the construction phase. Vehicle utilized for construction will be complied with GoN mass emissions standards. Regular checkup; up keeping and maintenance of the equipment will be carried out as per the Manufacturer's Specifications to meet the emission standards. Proper maintenance of all vehicles and construction machinery will be done regularly. Helmets and air mask will be provided to labor force working in areas susceptible to dust pollution. The working hours will be limited near the settlements and temporary relocation of particularly vulnerable people (old/sick, etc.) to acceptable locations will be done if required.

b. Operation Phase

There is no significant impact on air quality during the operation and maintenance period.

7.1.4 Noise and Vibrations

a. Construction Phase

No construction work will be carried out during the night time so as to minimize the noise and vibrations. Ear mufflers will be provided to labor force working in the areas susceptible to noise pollution. The construction work will be limited to daytime as far as possible.

b. Operation Phase: The impacts due to corona effect cannot be mitigated.

7.1.5 Water Quality

a. Construction Phase

The waste generated from the mixing concrete will be disposed in pits and filled with soil. Such pits will be made in barren land at approximately 500m distance from the water bodies. Dykes are proposed around the storage tanks to avoid water pollution. Toilets will be provided to the workforce. Care will be taken to locate the temporary construction worker sheds away from the

water bodies. Garbage and solid wastes generated by the workforce will be dumped safely away from water bodies. All waste oils and chemicals will be collected and stored in suitable storage tanks and disposed through incineration.

b. Operation Phase

Since the impact on water quality during the operation period is expected to be minimal, no mitigation measure is proposed.

7.1.6 Waste and Spoil Disposal

a. Construction Phase

The domestic waste will primarily consist of organic food waste because this is easily biodegradable and non-hazardous. It will be managed by burying in pits at reasonable distance from water bodies and subsequently covering with soil.

Waste generated from construction activities are usually inert material which are non-biodegradable e.g. empty cement bags and containers, rejected material, plastic, wooden planks. These waste materials will be stored out and kept separated instead of throwing haphazardly elsewhere. Some of these items (cement bag, plastic drum etc.) can be sold in the markets in order to be re-used or recycled. The contractor will be responsible for the establishment of the waste management system at the construction and camp areas.

b. Operation Phase

There is no impacts on waste and spoil disposal on operation phase, hence no mitigation measures is proposed.

7.1.7 Storage of Construction material

a. Construction Phase

The area for the substation will be used as the storage of construction materials in order to mitigate the land degradation. The locations for the temporary camps will be selected at degraded or the lower value lands. The area proposed for storage will be taken on lease at the prevailing market price based on the production loss. The temporary yards will be fenced properly. Cement will be stored in private storage facilities taken on rent. The other materials will be stored properly at the designated storage site.

b. Operation Phase

There is no impacts on storage of construction material on operation phase, hence no mitigation measures is proposed.

7.1.8 Crossing of Other Utilities and Interference

a. Construction Phase

There is no impacts on crossing of other utilities and interference on construction phase, hence no mitigation measures is proposed.

b. Operation Phase

All crossings of existing transmission and distribution lines will be designed with standard safe vertical and horizontal clearances for 220kV lines. Design clearances for communication lines will be maintained. For this, the standards referred by the Electricity Regulation 1993 (Rule 48, 49, 50 and 55) shall be followed.

7.1.9 Air Traffic

a. Construction Phase

There is no impacts on air traffic on construction phase, hence no mitigation is proposed.



b. Operation Phase

As per the recommendation of CAAN in the approved IEE, pylon should be colored red and white painted below the air route. Similarly, obstacle light should be placed at the top of pylon and in between adjacent pylon cable at top should be placed with marker ball of alternate color of red and white. The maximum height of tower should be limited to 40m from ground except pylon from AP 1 to AP 4 height should be limited to 35m. The recommendation letter is attached in Appendix A.

7.1.10 Summary of Mitigation Cost for Physical Environment

A total of NRs. 6,625,000/- is estimated for the mitigation works in physical environment. The detail of cost of physical environment along the different headings has been discussed below:

a. River Training Structures:

As a river training structure, bank protection for tower near Seti River is proposed. AP 43 and New Damauli SS need the protection work. Gabion work and flood retaining structure at these sites are proposed.

b. Retaining Structure:

Some of the APs which are located below or above the existing rural road are vulnerable to landslide due to excavation of tower foundation. These APs are AP 5, AP 30, AP 35 and AP 40. Retaining structure of gabion and concrete whichever is best suited shall be constructed for the stability of land above and below the rural road.

c. Culvert for Chaabdi Khola

To access the New Damauli Substation from the access road, crossing on chaabdi khola is necessary. A culvert is proposed for such crossing.

Table 7-1: Detail of Cost Break Down of Physical Environment

S.N	Description	Cost (NRs.)	
		Approved IEE	Updated IEE
1	River Training Structures	4,000,000	5,500,000
2	Retaining Structure	1,000,000	1,000,000
3	Culvert for Chaabdi Khola (near substation)	-	1,25,000
Total		5,000,000	6,625,000

7.2 Biological Environment

7.2.1 Mitigation Measures

The mitigation measures that will be adopted for the impact on floral and faunal resources during the project construction and operation phases are as follows:

7.2.1.1 Minimizing the Forest Clearance

a. Construction Phase

Selective felling of trees in the RoW of the TL will be done to minimize the forest loss. Similarly, the trees in the gully and valley will be avoided from felling as far as possible. In such area, it is proposed that the minimum forest clearance that are needed for the laying and stringing of conductor will be maintained and remaining trees of the RoW will be kept intact. This will not only minimize the forest loss but also indirectly contribute to conserve the biodiversity of the project area. RoW vegetation clearance will be carried out manually. As far as practicable, towers will be placed in ridges to avoid the forest clearance to the extent possible.

Trees that are likely to be removed will be counted, marked and harvested with the proper forest techniques by involving technical staffs from the respective DFOs. For the RoW clearance in CF,

the preference will be given to the users of concerned CFUGs rather than outside labors which will help for the conservation of forestland indirectly and will provide work opportunity to locals as well. The project proponent will adopt methodology to minimize loss of saplings during construction to the extent possible. Wood and other forest products extracted as part of the site clearance from the forest will be utilized as per the Forestry Regulations, 1995. The project proponent will prohibit project workers for the collection of NTFPs. Informative and warning sign at each construction sites located in and around the forest area will also be placed.

b. Operation Phase

All type of growing trees within the RoW will be trimmed regularly in every alternate year. The project will use Electricity Regulation, 1993 for the minimum clearance required for the TL, which is 30 meter (15 meter on either side of the centre line) for 220kV capacity.

7.2.1.2 Compensatory Plantation

a. Construction Phase

As a compensatory measure for the loss of trees due to the site clearance, plantation in 1:25 ratio will be carried out in the area provided by the concerned CFUGs and DFOs, as per the provision made in Working Procedure for the Use of National Forest Land for National Priority Project, 2074 (राष्ट्रिय प्राथमिकता प्राप्त योजनाको लागि राष्ट्रिय वन क्षेत्र प्रयोग गर्ने सम्बन्धी कार्यविधि, २०७४).

In the approved IEE, the compensatory plantation was proposed for 14,160 trees (pole and tree sized) which are estimated to be fallen down from the project affected CFs during project construction. A total of 354,000 seedlings (@ 25 seedlings per tree cut down) of different species of plants were proposed to be planted. In addition, the plantation of 35,832 number of seedlings was proposed in 22.3947ha of government forest and CF area (at the standard ratio of 1600 seedlings per ha which is equivalent to the total CF area occupied by the project components.

In addition, for the additional section of the alignment (2.66Km), an additional 78 trees (both pole and tree sized) are estimated to be fallen down from the project affected CFs and government forest during construction. Thus additional 1,950 seedlings will be planted. Therefore in totality, in the Updated IEE, 355,950 seedlings will be planted as compensatory plantation. Also in addition, the plantation of 864 number of seedlings will be done in 0.540ha of government and CF area to be permanently acquired by the project (at the standard ratio of 1600 seedlings per ha. Thus in totality 356,814 seedlings will be planted.

The total government forest and CF area having vegetation that need to be clear felled along the project alignment is estimated to be 22.8747ha. The estimated cost for compensatory plantation is kept in Table 7-5. Due attention will be paid to plant local species suitable to the area, species cut down by the project as far as possible, species preferred by the local communities and species which contribute to improvement of habitats for available wildlife. NEA will take care of planted site for the period of 5 years and handover to the respective CFUGs and DFOs. Also, land area equal to 0.540ha will be bought by the project and handled to respective DFOs in replacement to the permanently acquired forest land for construction of tower pads.

The sites for compensatory plantation will be finalized after discussion with the members of concerned CFUGs and officials of respective DFOs. The proponent will request to DFOs and CFUGs to locate the land for plantation. Plantation designs for each specific identified sites will be developed after consultation and interaction with the concerned stakeholders. The initial discussion made with DFOs and concerned CFUGs reveals that the plantation area is available in the affected CFs and its vicinity for compensatory plantation. For the purpose of plantation work, the seedlings required may be purchased from the plant nurseries / DFO or there may need to establish a nursery in the project site. If it is determined to establish a nursery, the appropriate location for the nursery will be finalized in consultation with the concerned stakeholders. There

shall also be the provision of replacement plantation after one year of tree plantation based on the mortality rate of seedlings. As per discussions reached with CFUGs in the additional section of the alignment, they have highlighted and made recommendations for plantation of species like Champ, Chiuri, Tejpatta, Sillighans, Bans, Tanki etc. which were also successfully afforested in the nearby areas.

b. Operation Phase

As per the Working Procedure for the Use of National Forest Land for National Priority Project, 2074, the plantation site shall be managed by the proponent for five years or required cost for such management must be paid to DFOs. In order to comply with this requirement, the proponent will either manage the plantation site for five years or the estimated cost for the entire management work will be provided to the respective DFOs, and/or concerned forest user groups.

7.2.1.3 Harvesting Costs

a. Construction Phase

The cost of harvesting, logging and transporting of the trees and other forest products in CFs will be provided as per the district norms to the concerned agency following the provision made in Article 65 of Forest Regulations, 2051. The harvesting costs for each CF will be provided by the project proponent. The compensation cost for the harvesting, logging and transportation of forest is part of project construction work and will be included in construction cost hence it is not estimated separately in this IEE Report.

b. Operation Phase

During operation phase, there will not be the issue of harvesting of trees. However, the growing trees within RoW will be trimmed regularly in every alternate year at the cost of the proponent.

7.2.1.4 Compensation Cost for Private Trees

a. Construction Phase

The trees removed from the private land will be compensated as per prevailing rates. Due consultation will be made with the concerned DFOs and stakeholders while determining the rate. The estimated cost for compensation of private tree is kept in Table 7-5.

b. Operation Phase: This issue will not exist. Hence no mitigation measure will be adopted.

7.2.1.5 Supply of Fuel to Workers

a. Construction Phase

If practically feasible, construction workers will be prevented from the use of fuel wood for cooking their food items. The project proponent will provide kerosene/LPG to the extent possible to project workers staying at temporary/permanent labour camps to minimize forest loss in order to meet their fuel wood demand. If the use of alternative fuel is not possible, haphazard collection of fuel wood from the nearby forest will be controlled in coordination with the Forest User Groups, Sub-Division Forest Office and DFOs.

b. Operation Phase: There will not be the issue of fuel wood management to workers.

7.2.1.6 Habitat Loss/Change of Wild Animals and Birds

a. Construction Phase

The impact of forest clearance on habitat loss/change is a permanent phenomenon. However, the compensatory plantation of trees and awareness for forest management and wildlife conservation is considered to help for minimizing the impact to some extent. The clearing of trees will be done manually causing less impact on adjoining vegetation. As far as possible construction work will be labour based. The project proponent will be responsible to avoid unnecessary machinery disturbances and lighting.

b. Operation Phase

During operation phase, no mitigation measures will be adopted regarding habitat loss/change of wild animals and birds. However, the growth of planted tree species is expected to reap some benefit to the available species of animals and birds.

7.2.1.7 Restriction on Hunting and Poaching**a. Construction Phase**

The project workers will strictly be prevented from hunting and poaching and any other kind of illegal activities related to hunting and poaching. The construction work within CF area will be coordinated through DFO and CFUGs. Informative and warning sign will be placed at relevant construction sites. The contractor who is liable to control his labor in this regard will be instructed strictly for application of specification regarding hunting and poaching control.

b. Operation Phase: During operation phase, no mitigation measures will be adopted.

7.2.1.8 Avian Hazards

Measures to minimize bird injury and death associated with the TL will be considered in line design as far as possible. Markers such as color balls will be attached to conductors to improve line visibility for bird wherever it is necessary and technically feasible.

7.2.2 Enhancement Measures

In addition to the above mentioned mitigation measures, following biological enhancement measures will be adopted in order to provide project benefit to the affected CFUGs and their members.

7.2.2.1 Awareness on Forest Management and Wildlife Conservation

The project proponent will implement awareness program to aware local people and member of forest users group of the project area about the forest management, techniques and methods of forest management, forest conservation, tree plantation, economic importance of forest, its role in rural society and other relevant forest management matters.

Similarly, awareness for wildlife conservation will be implemented to minimize the adverse impacts on local wild fauna. This will include the importance of wildlife conservation, existing rules and regulation with respect to wildlife, benefits associated with the wildlife conservation and other relevant topics. The awareness program will be provided to the selected executive members and users of CFUG. The awareness program will be provided to the selected executive members and users of CFUGs. Such programs will be implemented at 4 different places of the PAA (two in each PAD). The program will be implemented in close coordination with DFOs, local NGOs, CBOs and other concerned agencies. Organization of lectures, field visits, documentary shows, distribution of informative materials will be the methods to be utilized for awareness program.

Table 7-2: Cost for Awareness on Forest Management and Wildlife Conservation

S. N	Description	Unit	Day	Quantity	Rate (NRs)	Amount (NRs)
1	Participant allowances (including lunch)	Day	4	25	700	70,000
2	Expert	Class	4	4	2500	40,000
3	Materials and logistics			LS		140,000
Total Cost for conducting one program						250,000
Grand Total for conducting 4 program						1,000,000

There is no change in the cost of awareness on Forest Management and Wildlife Conservation in the approved IEE and Updated IEE.



7.2.2.2 Non Timber Forest Products (NTFPs)

Training for cultivation of NTFPs especially medicinal aromatic plants and other herbs and/or agro forestry will be given to selected members and users of affected CFUGs. Appropriate agro-forestry models using suitable NTFP species will be developed for different land types in consultation with the concerned communities.

The members from affected CFUGs will be encouraged for the plantation of NTFPs and other vegetation having economic values along the RoW of the line falling under CFs. This will provide them with the opportunities of long term income source as well as maintaining the vegetation cover under RoW. The species to be planted will be selected in consultation with concerned DFOs and project affected CFUGs. Four such training programmes will be conducted in the PAA (2 in Tanahun and 2 in Kaski). The detail of training program will be developed with due consideration of the needs of the local communities in consultation with DFOs. The modalities of the training will be delivery of lecture by experts, visual shows, posters, reading material and discussion. The communities after receiving the training will be aware about various NTFPs, their cultivation practices, harvesting techniques, storage method, processing and marketing.

Table 7-3: Estimated Cost for NTFPs Training

S. N	Description	Unit	Day	Quantity	Rate (NRs)	Total Amount (NRs)	
1	Participant allowances (including lunch)	Day	7	25	700	1,22,500	
2	Training Expert	Class	7	4	2500	70,000	
3	Training material and logistics	LS					2,45,000
Total Cost for conducting one program						4,37,500	
Grand Total for conducting 4 training program						1,750,000	

In the approved IEE, estimated cost for NTFPs training was NRs. 1,312,500 while in the Updated IEE, the cost for such program is estimated to be NRs. 1,750,000.

7.2.2.3 Awareness Program for DFO/Area Forest Office Staffs

To provide general information about the project, the type of mitigation and enhancement measures on biological environment, one day awareness program will be given to staffs of DFOs and Sub-Division Forest Office staffs of both districts (1 in Tanahun and 1 in Kaski). The details of orientation program will be developed with due consideration of the needs in consultation with DFOs and Sub-Division forest offices. The modalities of the training will be delivery of lecture by experts, visual shows, posters, reading material and discussion.

Table 7-4: Cost for Awareness Program

S. N.	Description	Unit	Day	Quantity	Rate (NRs)	Total Amount (NRs)	
1	Participants allowances (including lunch)	Day	1	25	700	17,500	
2	Expert	Class	1	4	2500	10,000	
3	Material and logistics	LS					47,500
Total Cost for conducting one program						75,000	
Grand Total for conducting 2 program						150,000	

There is no change in the cost of awareness Program for DFO/Area Forest Office Staffs in the approved IEE and Updated IEE.

7.2.3 Biological Mitigation and Enhancement Cost

The total biological mitigation and enhancement cost (including land cost) is estimated to be NRs. 70,531,460 (Mitigation cost NRs 67,631,460 and Enhancement cost NRs 2,900,000) and excluding land cost is NRs. 68,461,460.

Table 7-5: Updated Mitigation Measures Cost

S. N.	Mitigation Program	Unit/Rate	Total Amount (NRs) in the Updated IEE	Total Amount (NRs.) in the approved IEE
1	Compensatory plantation of 356814 seedlings (including seedling purchase/preparation, site preparation, pitting, transplanting, composting, mulching and replacement plantation based on mortality of seedlings).	140	49,953,960	46,779,840
2	Management/ take care of planted site for 5 years	Rs 30,000/ month	1,800,000	1,800,000
3	Support for fencing at specific planted sites	LS	1,500,000	1,200,000
4	Compensation cost for the loss of private trees (estimated no.=4723)	2500	11,807,500	8,000,000
5	Placement of informative and warning signs regarding forest management and wildlife conservation	LS	500,000	200,000
6	Cost of buying land in place of permanently acquired tower pad area of CF (0.540ha) for handing to DoF	LS	2,070,000	2,070,000
	Sub Total-1 (Including land cost)		67,631,460	60,049,840
	Sub Total-1 (Excluding land cost)		65,561,460	57,979,840

In the approved IEE, the mitigation measures cost was NRs. 60,049,840 (including land cost) while in the Updated IEE, mitigation measures cost is NRs. 67,631,460 (including land cost).

Table 7-6: Updated Enhancement Measures Cost

S. N.	Enhancement Program	Refer	Total Amount (NRs) in the Updated IEE	Total Amount (NRs) in the approved IEE
1	Awareness program on Forest Management and Wildlife Conservation	Table 8-2	1,000,000	1,000,000
2	Awareness/Training program on NTFPs	Table 8-3	1,750,000	1,312,500
3	Awareness Program for DFO/Area Forest Office Staffs	Table 8-4	150,000	150,000
	Sub-total-2		2,900,000	2,462,500

The total enhancement measures cost in the approved IEE was NRs. 2,462,500 while in the Updated IEE, the total enhancement measures cost is NRs. 2,900,000.

The title of the training programs as mentioned above could be changed as per the demand from DFOs and CFUGs. The training will be provided to the selected users and members of the affected CFUGs. The number of training programs to be conducted will be determined depending upon the number of participants, demand from communities and availability of resource persons. Technical resource persons and experts shall be deployed for the training programs from DFOs and other relevant offices. Thus, in the Updated IEE, the summary of mitigation and enhancement cost for biological environment is estimated to be NRs. **68,461,460** excluding land cost which is presented in the table below:

Table 7-7: Summary of Mitigation and Enhancement Cost for Biological Environment

S. N.	Enhancement Program	Refer	Total Amount (NRs)
1	Mitigation measures cost (including land cost)	Table 8-5	67,631,460
	Mitigation measures cost (excluding land cost)		65,561,460
2	Awareness program on Forest Management and Wildlife Conservation	Table 8-2	1,000,000
3	Awareness/Training program on NTFPs	Table 8-3	1,750,000
4	Awareness Program for DFO/Area Forest Office Staffs	Table 8-4	150,000
	Total (Including land cost)		70,531,460
	Total (Excluding land cost)		68,461,460

In the approved IEE, the summary of mitigation and enhancement cost for biological environment excluding land cost was **60,442,340**.

7.3 Socio-economic and Cultural Environment

Mitigation as well as enhancement measures for all identified significant impacts on socio-economic and cultural environment have been considered in this section of IEE report. In the same way, corporate responsibility of the project for different social sector has been identified and discussed briefly here.

7.3.1 Mitigation Measures

Each of the identified impacts during construction as well as operation phase has been evaluated in detail and cost effective mitigation measures are suggested to minimize the impacts. The cost of mitigation measures is calculated and mentioned in different titles below.

7.3.1.1 Acquisition of Land and Structure

a. Construction Phase

i) Land

• Compensation for Permanently Acquired Land

The proponent will provide appropriate compensation to all of the PAFs. The compensation rate will be fixed by Compensation Determination Committee (CDC). Based on the discussions with the local people, cash compensation will be provided for affected land. According to the GoN laws and regulations, it is mandatory to provide cash compensation for the acquired land and property. Compensations paid and settled immediately after acquisition are administratively much simpler and economically cheaper than those that last over a long period. Direct cash compensation is appropriate for HHs that lose only a small portion of their land holdings, or to HHs that have other forms of income generation schemes they wish to invest in.

Project will acquire and utilize 114.3135ha of private land. Out of total private land, 9.19ha is permanent land (land required for APs, STs, substation and access road), 103.3735ha for RoW and 1.75ha for mobile camp. Land will be acquired to Land Acquisition Act 2034. Total land acquisition cost is estimated to be NRs. 136,435,600.

Table 7-8: Estimated Cost for Land Acquisition

S. N.	Project Component	Description		
		Area (ha)	Rate (NRs/ha)	Amount (NRs)
1.	APs and Suspension Tower	1.89	7840000	14817600
2.	Substation	7.101	16660000	118302660
3	Access road	0.199		3315340
Total		9.19	-	136,435,600

The land price varies from place to place, parcel to parcel and according to proximity of road and market centers. The average land price in the area is considered for the estimate of compensation. Landless (tenants), Guthi holders etc. affected by the project will also be compensated as per the recommendation of the CDC.

• Compensation for Restricted Land (RoW)

The land used for TL (RoW) is considered as permanently utilized land. This land is also known as restricted land. The total of 103.3735ha private land falls under the RoW. The total amount for the land requirement of 103.3735ha of private land is NRs. 81,04,48,240/- (NRs. 78,40,000/ha). As per NEA practice, project will provide only 10% of the total land value for land of RoW. Therefore compensation cost for RoW land is NRs. 8,10,44,824/- However, in recent practice,

project will provide maximum amount to the land in accordance with their use and local market price.

- **Leased Land**

Project will use 1.75ha of private land for camp and storage. The total amount proposed for leased land is NRs. 5,14,500.

Total compensation amount for land to be acquired, RoW and leased land is estimated NRs. 21,79,94,924.

- ii) **Compensation for Structures**

Based on the discussions with the local people, cash compensation will be provided for structures. Compensation will be provided for 23 structures (13 houses, 7 cowsheds/sheds, two toilets and one public structure). Compensation cost for structures has been calculated classifying into two categories i.e. cost for plinth area of the structures and construction cost of the structures. The total compensation cost for the structures is NRs. 10,732,850/ however the cost was 10,583,150/- in the approved IEE.



Table 7-9: Compensation Cost for Structure Loss

Type of structure	Project component	Name of Owner	Approved IEE			Updated IEE			Change			
			Plinth Area (sq. ft.)	No. of storey	Total area (sq. ft.)	Total Compensation Cost (NRs)	Plinth Area (sq. ft.)	No. of storey		Total area (sq. ft.)	Total Compensation (NRs.)	
1. House	AP4-AP5	Jit Bahadur Gurung	247	1	247	321100	247	1	247	321100	No change	
	AP5-AP6	Khem Raj Bajgai	320	2	640	704000	320	2	640	704000	No change	
	AP13-AP14	Hari Prasad Tiwari	286	1	286	343200	286	1	286	343200	No change	
	AP15-AP16	Raj Kumar Subedi	280	2	560	812000	280	2	560	812000	No change	
	AP23-AP24	Bishnu Gurung	374	2	748	1122000	374	2	748	1122000	No change	
	AP25-AP26	Som Bahadur Nepali	308	2	616	677600	308	2	616	677600	No change	
	AP26-AP27	Kopila Dawadi	238	1	238	404600	238	1	238	404600	No change	
	AP26-AP27	Krishna Bdr. Thapamagar	352	2	704	774400	352	2	704	774400	No change	
	AP32-AP33	Hari Maya Wagle	345	2	690	741750	345	2	690	741750	No change	
	AP38-AP39	Iman Singh Ale	294	1	294	367500	294	1	294	367500	No change	
AP40-AP41	Kesh Bahadur Saru	330	1	330	412500	330	1	330	412500	No change		
AP29A-AP30	Bir Bahadur Gurung	342	2	684	752400	342	2	684	752400	No change		
Substation		Lalit Pandey	-	-	-	-	775	1	775	300000	300000	
		Total(1)			6037	7433050			6812	7733050	300000	
2. Cowshed	AP6-AP7	Nrayan Pd Lamichhane	208	2	416	436800	208	2	416	436800	No change	
	AP23-AP24	Bishnu Gurung	242	1	242	314600	242	1	242	314600	No change	
	AP25-AP26	Purnima Nepali	228	1	228	296400	228	1	228	296400	No change	
	AP32-AP33	Hari Maya Wagle	372	1	372	465000	372	1	372	465000	No change	
	AP40-AP41	Kesh Bahadur Saru	143	1	143	178750	143	1	143	178750	No change	
	AP40-AP41	Durga Bahadur Thapa	135	1	135	168750	135	1	135	168750	No change	
	AP41-AP42	Khim Bahadur Ale	110	1	110	137500	110	1	110	137500	No change	
	Substation		Gam Bahadur Ale	121	1	121	157300	-	-	-	-	-157300
	Substation		Suk Bd Rana	110	1	110	143000	-	-	-	-	-143000
	New Damauli SS		Lalit Pandey	-	-	-	-	396	1	396	150000	150000
		Total (2)			1877	2298100			2042	2147800	-150300	
3. Toilet	AP26-AP27	Krishna Bd Thapamagar	40	1	40	52000	40	1	40	52000	No change	
4. Public Structure	AP13-AP14	Kahare Agriculture Cooperative	500	1	500	800000	500	1	500	800000	No change	
		Total (1+2+3)	5425		7954	10,583,150				10,732,850	149700	

(Note: construction cost for the structures is calculated on the basis of the consultation with public in different project affected areas.)



iii) Compensation for Commercial Structure

Structures of Kahare Agriculture and Livestock Cooperative Limited located between AP13-AP15 will be relocated and compensated. The amount of compensation is estimated NRs. 800,000.

iv) Other Structures

Water tanks likely to be affected by AP5 and AP38 will be avoided and shifted.

7.3.1.2 Compensation for Loss of Standing Crops**a. Construction Phase****• Production Loss in Permanently Acquired Land**

The total production loss of different crops of the project affected HHS is calculated as 38.88MT and the total compensation for the loss is estimated to be NRs. 1,122,960. The value of total loss of crops is estimated based on their yield, production, and local market rate. The crop wise value with area is shown in the table given below.

Table 7-10: Value of Total Loss of Agricultural Production due to Land Acquisition

S.N.	Crop type	Approved IEE		Updated IEE		Change in Price
		Production Loss (MT)	Amount (NRs.)	Production Loss (MT)	Amount (NRs.)	
1	Paddy	15.75	441,000	21.72	608160	167,160
2	Wheat	3.84	115,200	4.08	122400	7,200
3	Maize	11.98	359,400	11.06	331800	-27,600
4	Millet	2.06	61,800	2.02	60600	-1,200
Total		33.63	977,400	38.88	1,122,960	145560

• Production Loss in Permanently Utilized Land (RoW)

The total loss of cereal crops produced in land restricted area is estimated as 168.27MT (Paddy: 60.24MT, Wheat: 13.05MT, Maize: 79.12MT and Millet: 15.86MT) which value is estimated to be NRs. 4,927,620/- for one year. The crop wise area allocation, production and value is shown in the table given below.

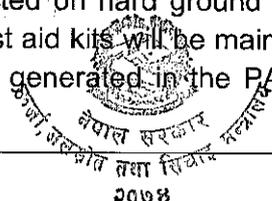
Table 7-11: Value of Total Loss of Agriculture Production due to Land Utilization (RoW)

S. N.	Crop type	Approved IEE		Updated IEE		Change in Price
		Production Loss (MT)	Amount (NRs.)	Production Loss (MT)	Amount (NRs.)	
1	Paddy	58.74	1,644,720	60.24	1686720	42,000
2	Wheat	12.58	377,400	13.05	391500	14,100
3	Maize	78.25	2,347,500	79.12	2373600	26,100
4	Millet	15.34	460,200	15.86	475800	15,600
Total		164.91	4,829,820	168.27	4,927,620	195,600

Total compensation for crop loss is estimated NRs. 6,050,580.

7.3.1.3 Health, Water Supply and Sanitation**a. Construction Phase****• Health and Sanitation**

The project proponent will keep the project area clean and hygienic to ensure the project activities will not cause the spread of communicable diseases. The labor camp will be provided with simple dry pit toilet constructed on hard ground and far from water sources. Toilets will be made in temporary camps First aid kits will be maintained for preliminary treatment in emergencies. The domestic solid waste generated in the PAA will be either buried in designed landfill areas or



converted in to compost. A joint awareness program on health and sanitation will be launched in association with the existing NGOs and other local communities during the construction phase. Health check-up of workers and documentation of health status will be made periodically. Priority will be given to the local people in project works to minimize the impacts on health and sanitation. The project must ensure adequate safety gears for workers (Personal Protective Equipment, accommodation, First Aid box, etc.). It must arrange the training for contractors and workers. It should provide temporary security fencing surrounding the construction site and safety signboard at all sites in Nepali languages should be put.

- **Drinking Water**

To minimize the impact on water supply at least one drinking water supply system will be installed at each camp site to cope the demand of the drinking water supply for the labors and technicians. The water supply of the project area will be strengthened by installation of new pipe lines, keeping taps at a regular interval, and by improving storage of water at the source.

b. **Operation Phase:** No mitigation measures are required during this phase.

7.3.1.4 Occupational Hazards

a. Construction Phase

The construction area will be cleared up and all the necessary precaution and warning signs will be placed at construction site. This area will be restricted for the entry of unauthorized people. The project proponent will provide safety helmet, eye glass, safety boot, safety belt, fire-fighting accessories, caution signals and other safety equipment as required at particular site and work area. Safety training will be implemented and any loss of life or injury will also be compensated as per prevailing rules. The safety training for the project workers will be conducted prior to the construction work. Community safety awareness program about the TL and potential risks associated with TL construction will also be implemented. The project workers involved in construction work will also be trained for health and occupational measures. Total cost for such trainings will be NRs. 500,000.

b. Operation Phase

Safety equipment required for the operation of the TL will be provided. During the maintenance, the construction area will be restricted for entry of unauthorized person to avoid disturbances and risk. Safety helmet and glass, safety boot, ear plugs, good electric light system, good earthing devices, fire-fighting accessories, caution signals, safety belt and other safety equipment as required at particular site and working area will be provided. The RoW of close settlements shall be strictly maintained to minimize the likely risks of conductor breakage, induced voltages, etc. Appropriate protection system and equipment will be installed at the substation to ensure the automatic isolation of the line in case of abnormal conditions.

7.3.1.5 House, Settlements and Social Infrastructures

a. **Construction Phase:** No mitigation measures are required during this phase.

b. Operation Phase

Protection measures will be applied in around the tower pads and construction area after the consultation with local people/stakeholders. Fencing, sign and other appropriate tools of public awareness will be adopted to reduce the likely impact on people, their property and public infrastructures. Furthermore, following points will be considered: Design criteria; RoW maintenance and Fencing of tower area in critical location.

7.3.1.6 Crossing of Power Cables, Communication lines, Foot Trails, Roads

a. **Construction Phase:** No mitigation measures are required during this phase.

b. Operation Phase

The proposed TL crosses inter-connected gravel road /earthen road /foot trails number of times. Similarly, the alignment crosses distribution lines. The TL also crosses irrigation canals and communication lines. Hence, there will be impact due to crossing over of power cables, communication lines, foot trails and road/highways on local infrastructures and facilities. As mitigation measures, following points will be considered:

- Maintenance of ground clearance;
- Avoidance of infrastructures as far as possible;
- Placement of signboard where necessary
- Public awareness program at critical location.

7.3.1.7 Communal Resources

a. **Construction Phase:** No mitigation measures shall be required during this phase.

b. **Operation Phase:** No mitigation measures are required during this phase.

7.3.1.8 Impact on PAFs due to Alteration of Land and Property Value**a. Construction Phase**

Land fragmentation will be minimized as far as possible. Remaining portion of land that will not significant for agriculture purpose will be acquired for tower foundation. Compensation for permanently acquired and temporarily used lands will be provided. The temporarily used land will be return to respective land owner as in the previous condition.

b. **Operation Phase:** No mitigation measures are required.

7.3.1.9 Impact due to Restriction of Future Land use Development close to Settlement**a. Construction Phase**

Coordination with the project affected HHs, RMs/DCC/municipality/MC authority and concern stakeholders will be done during the construction phase. Land Use Policy-2072 will be followed while designing the project to the extent possible.

b. **Operation Phase:** No mitigation measures are required.

7.3.1.10 Electric and Magnetic Field (EMF) Effect**a. Construction Phase**

No mitigation measure is required during the construction phase since the TL will not be charged until the completion of the stringing.

b. Operation Phase

In order to reduce the impact of the EMF effect, phase split in either of the circuit will be considered during the Detail Design Stage. Market centers are far from the TL, will itself reduce the impact of EMF to certain extent. However, for the safeguard of the local people, an awareness program about the concept EMF and risk of neglecting maintenance of RoW will be conducted.

7.3.1.11 Gender and Vulnerable Group**a. Construction Phase**

The project will ensure not to discriminate the local people based on their gender, caste, color and place of origin. Similarly, priority for jobs will be given to the vulnerable group as per their ability and skills and willingness to work in the project area. Child labor will be prohibited in the

project area. The project proponent will consult and assist the local NGO working for the welfare of the women and children to monitor and control. Child Labor Act, 2049 will be effectively implemented during construction period.

b. Operation Phase: No mitigation measures required during operation phase.

7.3.1.12 Economic Activities

a. Construction Phase

To minimize the adverse impacts on local economy and enhance the living standards of the affected HHs, following measures will be implemented:

- Compensation for the hindrance due to use of land for the TL has been done through private negotiation route. Replacement value has been added to the average value of the land to bring it closer to or at par with the prevailing market rate. The disturbance allowances will be provided to the affected HHs;
- To minimize the impacts of loss of agricultural products due to the land acquisition, and any effect on the occupation will be compensated through appropriate agricultural extension program, livelihood skill training programs, etc.
- Maximum job opportunities will be provided to the local people in prudential order and assistance to local communities into the planning through coordination with district level and local government office of the respective district.

b. Operation Phase: No mitigation measures required during operation phase.

7.3.1.13 Religious, Historical and Archeological Sites

a. Construction Phase

None of religious, historical and archeological structures are affected and need to be relocated due to the proposed pylon and TL construction. However, some temples are found within the distance of 300m from TL.

b. Operation Phase: No mitigation measures are required.

7.3.1.14 Infrastructure and Service Facility

a. Construction Phase

To minimize the impacts on the existing institutions and service facilities, following measures will be implemented:

- Separate communication facilities other than the existing facilities through extension
- Provision of health and support program;
- Provision of additional support police force (if required) through coordination with the District Administration Office, and District Police Office, etc.

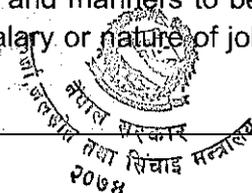
b. Operation Phase: No mitigation measures are required during this phase.

7.3.1.15 Social and Cultural Practice

a. Construction Phase

The impacts on social structures and practices in the project area are related mostly with the influx of construction workforce and their number. Besides, to minimize the impacts on local communities, following code of conduct will be enforced to the outside construction workers:

- The labor force will be instructed about the conducts and manners to be maintained while working along the TL. No discrimination in terms of salary or nature of job among local and migrant workers will be allowed.



- Respecting the rights, properties and practices of local people;
- Prohibiting all the outside labors to live outside construction camps.
- Prohibiting the use of alcohol in the project site, camp and nearby villages.
- No child labour or forced labour would be engaged by the project proponent.
- The project proponent will demonstrate its concerns about health and safety of the workers as well as the community through awareness programmes and grievance redressed.
- The workers will be briefed about the health risk of communicable diseases due to unhygienic environment as well as sexually transmitted diseases.
- Management of the short term influx of labors during construction and stringing phases will include communication about technical aspect of construction and operation, and to allay fears about any apprehensions of perceived accidents during operational phase.

b. Operation Phase

Employment in the substations and RoW maintenance will be given to the local people in accordance with their qualification to reduce tension and potential conflicts with local residents.

7.3.1.16 Law and Order

• Construction Phase

During the construction of the TL, labor from different places with different religions and faiths with their own norms and values will be employed by the project contractor and there may conflict of interest between locals and the outsiders affecting law and order situation in the project area. Local employment, wage/ labor rate, working hours, use of local resources by the project workers, etc. are the major factors that may create conflict in the project area which may pose threat to law and order situation. The proponent will implement a strict code of conduct for the workforces. In case any worker is found as a drunkard or soliciting prostitution and gambling etc. will be penalized and terminated too. The existing facilities of GoN from affected district will be used to maintain the law and order situation as when required basis. The proposed awareness program will also minimize this impact to some extent.

- **Operation Phase:** No mitigation measures are required at this phase.

7.3.1.17 Aesthetic Value

a. Construction Phase: No mitigation is required at this phase.

b. Operation Phase

The significant impact of TL and towers on aesthetic value cannot be mitigated completely. The stringing of the 220kV TL will cause minor visual change to the existing landscape and scenery.

7.3.1.18 Resettlement and Rehabilitation Plan (RRP)

The objective of this plan is to ensure that the effects of acquiring land and property and its impact on the livelihood of the affected parties and individuals will be addressed adequately and in time prior to the start of the project construction in an amicable and conducive environment with mutual consensus and agreement. Any grievances of the affected parties will be handled to the satisfaction of the affected parties or individuals through proper information sharing

a. Relocation of House

Nine HHs will be relocated as these HHs do not have any other houses. They lose their place of residence and are categorized as SPAFs. Kahare Agriculture and Livestock Co-operative Limited will lose business.



b. Applicable Policy and Legislation

Land Acquisition Act 2034 (1977) will be the main legislative system for land and other physical asset acquisition. The procedure defined in the Act will be followed for the acquisition; Compensation Determination Committee (CDC) will determine the compensation rates of each unit at replacement cost. Project proponent is the responsible for the implementation of RRP.

c. Entitlement Framework

The entitlement framework accordingly specifies compensation and /or rehabilitation measures for two units of entitlement individuals including affected individuals and their HHs, and groups. Loss of private assets will be valued and compensated based on entitlement policy

d. Government Property

Government infrastructures and facilities affected by the project will be repaired or replaced in consultation with the relevant department authorities. Government forest land will be acquired by getting approval from MoFE.

e. Displacement Allowance

In addition to the compensation for asset losses, HHs who are losing houses will be entitled for the displacement allowances. HHs, which required to be relocated, will receive a housing displacement allowance for six month. Displacement allowance for 9HHs who will lose their place of residence is estimated to be NRs. 2,700,000 (NRs. 50,000/month for 6 months). Kahare Agriculture and Livestock Co-operative Limited will lose its commercial structures so NRs. 50,000 for 3 months will be provided for displacement allowance. Total displacement allowance is estimated NRs. 2,850,000. Titleholders, tenants in own accommodation and squatters will be entitled to this allowance, to be paid at the time of compensation payment.

f. Transportation Allowance

Eighteen HHs of PAFs who will get transportation allowance. A total of NRs. 540,000 (@ NRs 30,000 per HH) has been allocated as transportation allowances. Hence, total displacement and transportation allowance is calculated NRs 3,390,000.

Table 7-12: Resettlement and Rehabilitation Plan

S. N.	Actions	Timing of Action	Responsibility
1	Re verification of the owners of the land to be acquired permanently including their affected land areas, land plot numbers and landownership.	Pre-construction (6 months before construction)	Project / LARU
2	Identification of the HH or parties traditionally using land without land certificates in case of acquisition /lease of such land	Pre-construction (6 months before construction)	Project/ LARU
3	Verify and publish the list of land owners affected by the project	Pre-construction (6 months before construction)	Project/CDC
4	Meeting of CDC to discuss on the land acquisition and compensation issues	Pre-construction	Project/CDC
5	Compensation Determination Committee decides the rates of land to be acquired	Pre-construction	Project/CDC
6	Payment of compensation to PAFs	Pre-construction at least one month before mobilization of Contractor to construction site	Project/ LARU

S. N.	Actions	Timing of Action	Responsibility
7	Implementation of resettlement and rehabilitation (R&R) packages as per approved EIA documents.	Pre-construction and construction (initial phase)	Project/ LARU
8	Evacuation of the owners from the structures affected by the project.	Pre-construction (At least 2 months will be given to the affected parties to remove their belongings if any)	Project/ LARU
9	Handling of grievances of the affected parties and individuals (formalities of Grievance Redress Mechanism)	Pre-construction and construction	Project/ LARU
10	Monitoring of the implementation of R&R	Pre-construction and construction	EMU/Central Line Agencies/ Panel of Expert (PoE)

Note: EMU-Environment Monitoring Unit

Summary of Social Mitigation Cost

The total socio-economic mitigation and rehabilitation cost including land cost is calculated to be NRs. 238,668,354 and excluding land cost is NRs. 20,673,430 while the was NRs. 225,338,481 and NRs. 20,280,370 in the approved IEE. The detailed cost analysis is shown in the table given below.

Table 7-13: Mitigation and Rehabilitation Cost

S. N.	Mitigation Measures	Unit	Approved IEE		Updated IEE		Remarks
			Quantity	Amount (NRs)	Quantity	Amount (NRs.)	
1	Compensation for Land	Ha	106.6042	205,058,111	114.3135	217,994,924	12,936,813
2	Compensation for structures	No.	23	10,583,150	23	10732850	149,700
3	Compensation for loss of crops	MT	198.54	5,807,220	203.79	6050580	243,360
4	Safety training		LS	500,000	LS	500,000	No change
5	Displacement & Transportation Cost		LS	3,390,000		3,390,000	No change
	Total Mitigation and Rehabilitation Cost (including land cost)			225,338,481		238,668,354	13,329,873
	Total Mitigation and Rehabilitation (excluding land cost)			20,280,370		20,673,430	393,060

7.3.2 Enhancement Measures

7.3.2.1 Agriculture Farming

• Mushroom Farming Training

The mushroom farming plays the significant role in cash for income generation for the people of the PAA. To increase the production of the mushroom in the area, improved techniques and methods will be introduced. A special mushroom farming program was proposed in approved IEE. A total of 15 PAFs will be trained under this training program. The duration of the training will be of 5 days. There is no change in the price and number of participants in the Updated IEE.

Table 7-14: Mushroom Farming Training

S. N.	Particulars	No. of persons	No. of days	Unit cost (daily allowance) NRs	Total Cost (NRs)
1	Program Coordinator	1	7	4000	28,000
2	Allowance including Lunch	20	5	800	80,000
3	Resource Persons	4	5	2500	50,000
4	Improved Seeds distribution			LS	200,000
5	Training material and Logistics			LS	300,000
Total					658,000

• Citrus Farming Training

During the field visit, it was observed that citrus species farming can play significant role in cash income generation for the people of the PAA mainly in Rupa RM (former Siddha and Thumki VDC), Byas Municipality and Myagde RM (former Manpang VDC). The production of citrus species farming has decreased in this area due to the various diseases in its tree, cluster of buds and flowers. However, during the field visit, local people revealed their eagerness to involve in citrus farming applying improved new techniques and methods. Training program on improved citrus farming will be conducted for the local farmers, which will provide opportunities for increasing production in their farmlands. This program is especially focused in the assumption that they can improve production and productivity by applying new methods and techniques. A total of 20 PAFs will be trained under this training program and the duration of this will be for 5 days. The total cost allocated for training programs is NRs 658,000 (including cost for trainee's allowance, expert hiring, training materials and logistics). No additional amount is proposed in the Updated IEE.

Table 7-15: Cost of Citrus Farming Training

S.N.	Particular	No. of person	No. of days	Unit cost (daily allowance)	Total Cost (NRs)
1.	Program Coordinator	1	7	4000	28,000
2.	Local Farmers /participants	20	5	800	80,000
3.	Training Experts	4	5	2500	50,000
4.	Distribution of seed/improved materials			LS	200,000
5.	Training Materials and Logistics			LS	300,000
Total					658,000

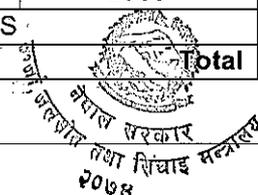
7.3.2.2 Micro Enterprise Creation Training

Micro Enterprise Creation Training program will be provided to the PAFs particularly for women (Women-headed HHs, Dalits, and Indigenous People). One program covering 20 participants in each and 5 days duration will be conducted. There is no additional amount is proposed in the Updated IEE. The main objectives of training are:

- To motivate the women group of PAF create/start their own business
- To develop entrepreneurship competency
- To identify and select viable business of their own
- To help for preparation of their own business plan

Table 7-16: Cost of Micro Enterprise Training

S.N.	Particular	No. of person	No. of days	Unit cost (daily allowance)	Total Cost (NRs)
1.	Program Coordinator	1	7	4000	28,000
2.	Participants	20	5	800	80,000
3.	Resource Persons	4	5	2500	50,000
5.	Training Materials and Logistics			LS	300,000
Total					458,000



* Note: Training cost will include participant's allowance for accommodation, food and others. The topics of skill training and number of participants may change than specified above depending upon demands from PAFs.

7.3.2.3 Skill Development Training

Skill development related training programs such as driving and automobile (special focus for those households who lose land more than 50% and HHs who lose their residential structure) will be conducted to tackle the adverse impact of the project. Duration of training will be 180 hours as per the CTEVT standard. A total of 30 SPAFs will be trained under this program. In approved IEE NRs. 1000000 was proposed for 20 participants and in the Updated IEE, Total cost for 30 participants has been estimated NRs. 1,80,0000 (NRs. 60,000/person).

7.3.2.4 Social Awareness (Health, Sanitation and Safety) Program

An awareness program will be conducted in the PAA to alert local people to the potential dangers related to health, sanitation and safety. This program will be targeted to the people residing in and around the vicinity of the substation. Awareness program on construction related safety issues and electrocution will also be given to the local residents. Community safety awareness program about the TL will be implemented. Hoarding board will be placed in the sensitive area. In approved IEE, NRs. 800000 was proposed for the social awareness program and in the Updated IEE it is increased by NRs. 2,00,000.

7.3.2.5 Summary of Enhancement Measures

The total enhancement cost for socio-economic and cultural environment is NRs. 3,574,000.

Table 7-17: Summary of Enhancement Measure Cost

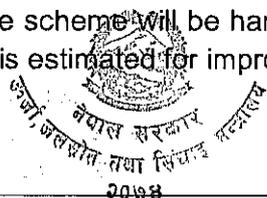
S. N.	Description	Amount (NRs.)		Change
		Approved IEE	Updated IEE	
1	Mushroom farming	658,000	658,000	No change
2	Citrus farming training	658,000	658,000	No change
3	Micro-enterprise training	458,000	458,000	No change
4	Skill development training	1,000,000	1800000	800000
5	Social awareness program	800,000	1000000	200000
Total		3,574,000	4,574,000	1000000

7.3.3 Corporate Social Program (CSR)

As a corporate responsibility, the proponent has allocated some money for the betterment of local people. Money on different programs sectors like education, health, infrastructure, service facility and religious sites has been allocated. Following are the sectors covering as CSP:

- **Drinking Water**

It was observed during the field visit that some area like Byas (former Shyamgha and Saura Village), Pokhara MC (former Lekhnath Municipality), Rupa RM (former Siddha and Thumki VDC) from where the proposed TL alignment passes through have scarcity of drinking water due to the lack of sources of water, storage tank and proper management of water stream. The water supply of the project area will be strengthened by installation of new pipe lines, keeping taps at a regular interval and by improving the storage of water at the source. The project will do further consultation with the community to finalize such schemes in close coordination with NEA-ESSD. After the completion, the scheme will be handed over to the Consumer User Groups. The total cost of NRs. 2,500,000 is estimated for improving drinking water supply in the PAA.



• Education Support Program

During the field visit, some schools nearby TL alignment viz. Shree Manung Primary School in Saura, Byas and Bhawani Primary School in Shyamgha, Janajukta Saahi Secondary School in Byas, Suryadaya Lower Secondary School in Pokhara MC were observed as weak condition with lack of proper infrastructures like drinking water facility, extra curriculum goods and library facility etc. These schools and other schools which are in vulnerable condition and located nearer from the TL alignment will be supported through educational support program. Support will be provided for establishment of library, purchase of computer, support for drinking water facility and extra curriculum activities. The total amount for this provision will be NRs. 3,000,000.

• Infrastructure and Service Facility

Project also aims to support to people/stakeholders of PAA in the infrastructures and service facility sector. Support will be provided for renovation of community building centers, renovation of the temples near to the TL alignment, renovation of the play-ground for the community, strengthening public meeting place, etc. The project will do further consultation with the community to finalize such schemes in close coordination with NEA-ESSD. For this NRs. 15,000,000 will be allocated.

Summary of CSP Cost

The total CSP cost for the socio-economic and cultural environment is NRs. 20,500,000 while the CSP cost was NRs. 15,500,000 in the approved IEE.

Table 7-18: Summary of CSR Cost

S.N.	Description	Amount (NRs)		
		Approved IEE	Updated IEE	Change
1	Drinking Water	2,500,000	2,500,000	No change
2	Education Support Program	3,000,000	3,000,000	No change
3	Infrastructure and Service facility	10,000,000	15,000,000	5,000,000
Total		15,500,000	20,500,000	5,000,000

7.3.4 Summary of Socio-economic Mitigation, Enhancement and CSP Cost

The socio-economic mitigation and enhancement cost including CSP cost for implementing various mitigation and enhancement measures (including land cost) mentioned above is estimated to be NRs 263,742,354 and excluding the land the cost is NRs. 45,747,430 while the cost was 244,412,481 and 39,354,370 respectively in the approved IEE. The cost breakdown is given in the table below.

Table 7-19: Cost Estimate for Social Mitigation and Enhancement

S.N.	Description	Amount (NRs)		Change
		Approved IEE	Updated IEE	
1	Mitigation Measures	225,338,481	238668354	13,329,873
2	Enhancement Measures	3,574,000	4574000	1,000,000
3	Corporate Social Responsibility (CSR) Cost	15,500,000	20500000	5,000,000
Total (including land cost)		244,412,481	263,742,354	19,329,873
Total excluding land cost)		39,354,370	45,747,430	6,393,060

7.4 Summary of Environmental Mitigation, Enhancement & CSR Cost

The total environmental mitigation including land cost, enhancement cost and CSR cost for implementing various mitigation and enhancement measures mentioned above for physical, biological and socio-economic and cultural environment is estimated to be NRs. 340,898,814

while the cost was NRs. 307,724,821 in the approved IEE. The cost breakdown is given below in the following table.

Table 7-20: Cost Estimate for Environmental Mitigation, Enhancement and CSR

S. N.	Environment	Description	Approved IEE	Updated IEE	Change
1	Physical	Mitigation	5,000,000	6,625,000	1,625,000
2	Biological	Mitigation	60,049,840	67,631,460	7,581,620
		Enhancement	2,462,500	2,900,000	437,500
3	Socio-economic	Mitigation	225,338,481	238,668,354	13,329,873
		Enhancement	3,374,000	4,574,000	1,200,000
		CSR	15,500,000	20,500,000	5,000,000
Total (including land cost)			307,724,821	340,898,814	33,173,993
Total (excluding land cost)			100,596,710	120833890	20,237,180



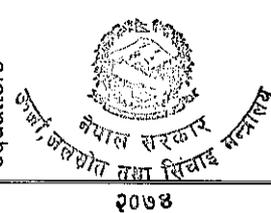
Table 7-21: Entitlement Policy Matrix

Nature of Loss	Application	Definition of AP	Entitlements	Actions	Responsibility
Permanent acquisition of agricultural/Residential/commercial and other private lands by landowners	Land and other assets permanently acquired for the Project	Owners with legal or legalizable right (9.19ha land for permanently acquisition; and for RoW)	Cash compensation at replacement cost determined by CDC. All fees, taxes and other charges as applicable under the relevant laws and regulations.	CDC to compensate the owner (preferably in joint account of husband and wife, if married and with the consent of the title holder)	NEA and CDO
Permanent acquisition or restriction to use of agricultural/Residential/other private commercial and private lands by Tenants	Land and other assets permanently acquired or restricted use to maintain RoW	Registered tenant(s)	Fifty percent or as provisioned in applicable acts compensation to the tenants out of the total compensation fixed for the permanently acquired land or land restricted to maintain the RoW. The remaining fifty percent compensation amount will be given to the titleholders of the affected land as provisioned in the prevailing Acts of Nepal.	Compensation for the tenants of affected land	NEA and CDO
Temporary effects on land due to use by the contractors during construction phase	Land temporarily acquired by the contractors during the implementation phase	Person(s) owning land	Contract will be signed between the DPs and property owner for temporary use/acquisition of land/assets. The contract to confirm rental rate/compensation and mode of payment. Project Office and the Contractor to ensure compensation for the land/assets temporarily acquired during the construction phase.	Compensation for the temporarily acquired land/assets by the contractors	NEA and Contractor

of Residential/Commercial Structures



<p>Loss of residential and non-residential structures</p>	<p>Residential and non-residential structures (e.g. cattle shed, toilet.) on land permanently acquired for the project.</p>	<p>Owners of structures regardless of ownership of land on which the structure stands (22 structures)</p>	<p>Cash compensation for structures at replacement cost based on current market price without considering depreciation. DPs will be allowed to take/reuse their salvageable materials. DPs will be provided one time shifting allowances (@ LS NRs 30,000) to move the household effects and materials. DPs loosing residential structures will also be provided transitional allowance to meet to cost of renting accommodation and other management cost for a period of 3 months (estimated time to rebuilt the house) @ NRs 50,000 per month (Total NRs 150,000 per affected household).</p>	<p>Compensation for the residential/commercial structures</p>	<p>CDO/NEA</p>
<p>Loss of residential / commercial structures by squatters</p>	<p>Structures on RoW / Govt. land either permanently or temporarily affected.</p>	<p>Squatters/ informal dwellers (defined as a person who occupy vacant government land/ ROW)</p>	<p>Cash compensation for the loss of built-up structures at replacement costs without considering depreciation. Owners of affected structures will be allowed to take/reuse their salvageable materials. The DPs will be provided one time shifting allowances to move the effects and materials. The allowance will be paid @ NRs 30,000 per affected households as estimated based on consultation with the DPs on current market price. The DPs will also be provided transitional allowance to meet to cost of renting accommodation and other management cost for a period of 3 months (estimated time to rebuilt the house) @ NRs 50,000 per month (Total NRs 150,000 per affected household)</p>	<p>The NEA/ CDO will ensure payment prior to physical displacement.</p>	<p>NEA, CDO</p>



Loss of residential / commercial structures by encroachers	Structures on Govt. land permanently or temporarily affected	Encroachers (defined as a person who has legal title holding to land but illegally extends his occupation onto the contiguous, vacant government land)	Cash compensation for non-land assets at replacement costs without considering depreciation for vulnerable households. Owners of affected structures will be notified and allowed to take/reuse their salvageable assets.	Encroachers who are vulnerable/ below poverty line are to be assisted on a case by case basis considering their household income and assets.	NEA, CDO
Loss of fruit and timber trees	-Trees on Land permanently acquired for tower foundation and RoW.	Owners of trees including encroachers, squatters, sharecroppers or tenants.	<ul style="list-style-type: none"> - One time compensation for loss of fruit trees for average fruit production for next 5 years will be computed at current market value. - One time compensation for loss of wood-trees at current market value of wood (timber or firewood, as the case may be). 	Cash compensation for loss of trees	CDO, NEA, Division Forest Office, District Agriculture Office and Contractor
Loss of crops	<ul style="list-style-type: none"> - Loss of crops from the land permanently acquired for the project. - Loss of crops either temporarily or within the ROW corridor. 	Owners of crops regardless of legal status	<ul style="list-style-type: none"> - One time cash compensation for the loss of agricultural crops at current market price based on average production of the affected area. 	Cash compensation for loss of crops as per rates from the Department of agriculture	CDO, NEA, District Agriculture Office and Contractor



<p>Temporary Loss of Livelihood</p> 	<p>Temporary loss of livelihood/ source of income.</p>	<p>Business owner (s), tenant (s), leaseholder(s), employee(s), agricultural worker(s)/Mobile vendors(s).</p>	<p>30 days advance notice regarding construction activities, including duration and type of disruption. Contractor's actions to ensure there is no income/access loss through provision of access etc. For business, affected by construction activities involving unavoidable livelihood disruption, compensation for lost income or a transitional allowance for the period of disruption whichever is greater. Restoration of affected land, structure. For employees, assistance equivalent to 30 days wages will be computed at local wage rates¹.</p>	<p>In the absence of tax receipts, compensation for income loss of affected business/shops will be calculated using the prevailing legislated minimum daily wage.</p>	<p>NEA</p>
<p>Vulnerability Allowance</p>	<p>Vulnerable households</p>	<p>Female headed house, households having senior members, disabled family members, ethnic minority households.</p>	<p>Enrolment of the family members in income generation or skill training activities for the improvement of household income. Priority employment via contractors during project construction.</p>	<p>Involvement of vulnerable households on livelihood improvement programs</p>	<p>NEA</p>
<p>Unanticipated adverse impact due to Project intervention or associated activities (re-cabling of overhead distribution line, under grounding of distribution cables, collaboration with the local users groups and other agencies will occur.</p>	<p>The NEA will ensure adequate fund to meet the need of such unexpected costs and the project implementation authorities will deal with any unanticipated consequence of the Project during and after the implementation- shall be documented and mitigated.</p>				

8 ENVIRONMENTAL MONITORING PLAN

8.1 Introduction

This section discusses and outlines the environmental monitoring program of LDTLP. It also assists to ensure compliance with environmental laws and in ameliorating and eliminating adverse impacts. This chapter on monitoring is formulated in accordance with EPR, 1997 and its amendment.

8.2 Requirements for Environmental Monitoring in Nepal

An Environmental Monitoring Plan will be required to define the responsibilities for the monitoring, the parameters that will be monitored, where the monitoring will take place and its frequency. Effective monitoring of the whole project cycle, particularly the resettlement related aspects, will assist in the identification of unexpected problems/outcomes, and facilitate the correction of these. Monitoring of socio-economic impact indicators should wherever possible be participatory, involving local groups assessing their own situations as part of the process. This will assist local communities raise their awareness about their situations and the chain of causality bringing about their situations of relative gain or loss.

Social monitoring will also be incorporated in the scope of work for construction management, so that the local labor recruitment norms and requirements, their operating conditions, rights and penalties can be closely observed in order to avoid inequities and conflicts. Social monitoring is the most effective if local community leadership and administration structures are involved in a process that is participatory, and provides recourse to recognized authority structures. Involving community leaders and local authorities often provides the means to resolve social problems identified in a direct, efficient and effective manner. Project proponent will primarily be responsible for the implementation of monitoring program. MoEWRI, DoED, MoFE and local bodies will also be involved during the monitoring.

The environmental monitoring will be carried out at all the project impact areas in a regular or intermittent schedule. Compliance monitoring will be carried out regularly whereas the impact monitoring will be done at the middle and at the end of construction phase or as prescribed in the monitoring plan and schedule. (In general, observation, inspection, review of official records, interview, counting and/or measurements will be used for monitoring. Furthermore, scientific methods will be used for the monitoring requirements, where and whenever necessary.

8.3 Environmental Monitoring Unit

An Environment Monitoring Unit (EMU) will be formed which will consist of experts from ESSD and other qualified personnel from the local market. Two site offices will be established in proper place for conducting monitoring and mitigation activities. EMU will be responsible for day-to-day Environment monitoring works. This Unit will consist of experts including the following;

- Environmentalist
- Sociologist
- Civil Engineer
- Field Assistant

This unit will have two principal functions. The first is to conduct community related mitigation measures on behalf of the project (which are not specifically related to the activities of the construction contractors); while the second is the implementation of mitigation measures. The Unit, in addition of foreseeing mitigation and monitoring will also take care of the community problems arising during project construction. Furthermore, the Unit will use EMP as the guideline for implementing the mitigation specified in IEE, Tender Documents and Technical Specifications such that the deleterious environmental impacts were minimized.

The co-ordination of the compliance monitoring and mitigation program allocated under the contractor will be the responsibility of the project proponent. As already stated, the Environmental Unit will work for the monitoring of compliance issues of construction contractors. The Unit will be responsible for the approval of contractors Environmental Protection Plan (EPP) and Environmental Safety Plans. In addition, the Unit in coordination of Project Manager will have the authority to penalize contractors for violation of environmental tender clauses and non-performances.

8.4 Environmental Monitoring Plan

A monitoring program required for the project to evaluate the application and effectiveness of mitigation measures is formulated in three phases.

a) Baseline Monitoring

The primary concern during this phase will be to implement field data collection programs needed to enhance the knowledge of baseline conditions. Focus will be on the gathering of scientific and sociological information needed to verify and update the data provided by this IEE process.

b) Compliance Monitoring

In this monitoring, the GoN licensing entity (MoEWRI/DoED) oversees and ensures the implementation of the required mitigation measures according to GoN guidelines and approved mitigation plan. The Unit will be delegated the day-to day responsibilities in this respect.

c) Impact Monitoring

Impact monitoring will focus on key indicators to assess whether the impacts have been accurately predicted, and whether the mitigation measures are sufficient and effective. The monitoring of the proposed 220kV TL Project will include:

Physical Environment

- Watershed monitoring /Land use
- Stability of the area around the tower foundations

Biological Environment

- Vegetation Clearing
- Plantation
- Casualty replacement/ re-vegetation
- Tree management
- Stability along the river crossings

Socio-economic and Cultural Environment

- Employment monitoring
- Land-use along the RoW
- Economic status of the affected people and relocated people
- Adaptation of resettlement households to their new homes and communities
- Public safety and security monitoring
- Health and sanitation monitoring
- Compensation

8.5 Grievance Redress Mechanism (GRM)

Grievance redress mechanism will be established to allow project affected persons (PAPs)/HHs to appeal any disagreeable decisions, practices and activities arising from compensation for land and assets. The PAPs will have access to both locally constructed grievance redress

committees i.e. Local Consultative Forums (LCFs), CDC and the Ministry, and formal courts of appeal system. Under the latter system every AP can appeal to the court if they feel that they are not compensated or entitlements are not provided for appropriately. They may appeal to court within 35 days of the public notice given to them.

A grievance recording register will be maintained at the Environment and Social Management Unit (ESMU) established at site and at Project Manager Office. Project affected people as well as local people can lodge their complaints at the Unit related to compensation, entitlement and construction related activities. Special project grievance mechanisms such as on site provision of complain hearings allow project affected persons and communities to interface and get fair treatment on time. The project authority will ensure that funds are delivered on time to CDC and the implementing partners for timely preparation and implementation of social activities, as applicable. The compensation issues and rehabilitation measures will be completed before civil work starts. Civil works contracts will not be awarded unless required compensation payment has been completed. PAPs and community will be exempted from all administrative fees incurred, pursuant to the grievance redress procedures except for cases filed in court. Proposed mechanism for grievance resolution will be as follows:

Stage -I

Complaints of PAPs and community on any aspect of compensation, relocation, or unaddressed losses of private and community property shall in first instance be settled verbally or in written form in field based project office at sites. The complaint can be discussed in an informal meeting with the PAPs and Environment and Social Management Unit. This Unit will be created within the Project Director/ Manager Office at NEA. The Unit will be solely responsible to be in close contact with all affected people and public and hear record and formally file their complaints in the registers on a regular basis. The Unit will carry out necessary inquiry and verification regarding redressal of issue within 7 days of complains registered. If the issue is settled, the process ends.

Stage -II

If issue is not addressed within 7 days of written application to the satisfaction of PAPs they can file formal type-written complain to Environment and Social Management Unit. While lodging the complaint, the PAP and community must produce documents to support their claim. The Social Development Expert of the Unit will carry out field observation and discuss the issue with Project Director/Manager through the Coordinator. If issue is still not resolved to the satisfaction of both the parties, the issue will be discussed in LCFs. The LCF will be established in each district to handle initial grievances of the project affected people and community and will be based in appropriate project site/ location of the district to provide easy access to the people. Although formed at district level, the LCF will be led by RMs/municipality/MC Chair or a locally respected person with other members being the RMs/municipality/MC representatives and AP representative and will be inclusive in nature i.e., with adequate representatives of female, Dalits, Janajatis, etc.

The ESMU will coordinate the meetings with LCF and come up with amicable solutions acceptable to all parties. The LCF will play key roles in public consultations, grievance handling/ managing at local level, participate proactively in planning and implementation process and key decision making matters that contribute to better outcomes and performances, especially in IEE implementation. The issue thus brought to LCF will be resolved within 15 days from the date of the complaint received. If the issue is settled, the process ends.

Stage -III

If no understanding or amicable solution is reached or no response from the project office, the PAPs or community can appeal to the CDC, particularly if the issue is related with loss of private

assets and compensation. As a formal body with legal standing, all other relevant complaints/grievances not resolved at earlier stages may also be registered with CDCs for timely resolution. While lodging the complaint, the PAP and community must produce documents to support their claim. The CDC will come up with acceptable decision within 15 days of registering the appeal. For other unresolved social and environmental issues PAPs or community can appeal to MoEn or Ministry of Home in case of compensation. The Ministry may address the issues as per the current practices Rules and Regulations of the GoN. If the issue is settled, the process ends.

Stage -IV

If the PAPs and local community are not satisfied with the decision of CDC and the MoEn/Home or in absence of any response of its representatives within 35 days of the complaint, the PAPs and community may submit their case to the District Court. The decision of the court will be acceptable to both parties.

Table 8-1: Monitoring Plan and Schedule

SN	Parameter	Indicators	Method	Location	Schedule
A Baseline Monitoring					
Physical Environment					
1	Land Use	Changes in land use pattern	Site observation	RoW and nearby areas	Once during the construction phase and operation phase
2	Stability	Stability at tower foundations	Site observation	Near tower foundations	Before and after rainy season prior to construction
Biological Environment					
3	Vegetation/ Forest cover	Observation of Vegetation and maintenance of RoW	Discussions with Users Group, observation, local people and Division Forest Office	Under the RoW and in the vicinity of the corridor	Once each during preconstruction, construction and operational phase
4	Wildlife	Wildlife habitat and clearance	Observation, discussion with local people	RoW and near project area	Once each during preconstruction, construction and operational phase
Socio-economic and Cultural Environment					
5	Settlement/ infrastructure	Increase in settlements/infrastructure, migration	Discussion with local people, VDCs, observation	PAA	Once each prior to construction and operation
6	Socioeconomic cultural baseline	Update socio-economic/cultural baseline	Discussion with local people, observation, review	PAA	Once prior to construction
B Impact Monitoring					
Physical Environment					
1	Land use	Stability/ landuse changes from the baseline	Observation	Around the tower foundation area	Continuous observation during construction, annually during operation
2	Waste disposal	Unpleasant odour and visual impact	Observation	Temporary camps/ construction sites	Weekly during construction
3	Air Quality/ water quality		Observation	Project area	Weekly during construction
Biological Environment					
4	Vegetation Clearance	No. of trees felled, ground cover	Observation of the area, discussion counting	Under the RoW	During construction

SN	Parameter	Indicators	Method	Location	Schedule
5	Pressure on Forest	Forest Cover	Observation and survey of forest area before and after construction, discussion with local people and CFUGs.	Along TL	Regular basis during construction and annually during operation
6	Wildlife	No. of wildlife seen	Observation, keeping records on wildlife, birds and reptiles killed	In the vicinity of the corridor	Regular basis during construction and annually during operation
Socio-economic and Cultural Environment					
7	Compensation	Socio-economic parameters like economic status, living conditions etc. of the affected people.	Housing assets, living conditions, income etc.	Affected local people	Regularly for at least three years following land acquisition
8	Land Loss	Acquisition of land, lease of land and temporary disturbances in land	Cross checking the compensation list	Tower foundation, RoW and the leased area	Quarterly during construction and once during operation
9	Health issues	Types of Diseases and record of outbreak of diseases	Inspection of camps, Record of diseases	Project area and camps	Continuous during construction period
10	Safety	No. of casualties	Records of accidents	Project area	Continuous during construction period/ operation phase
11	Employment	No. of local people employed by project	Records kept by management	Project area	Continuous during construction and annually during operation
12	Impact on Women/ Children	Status of women children	Record of women employment; children education; Inspection on child labor	Project area	Continuous during construction period
13	Indirect economic benefits	Economic activities in the area	Trade and business revenues	PAA	Once a year during construction and once during operation
C Compliance Monitoring					
1	Incorporation of recommendations of IEE into project documents	Yes/No	Review/cross checking of tender and design documents	Kathmandu Office	During and after the project design stage completion of tender documents
2	Incorporation of Environmental considerations mentioned in tender documents in the contractors proposed work plans	Yes/No	Review of proposed work plan submitted by the contractor	Kathmandu Office/site office	During contract negotiations
3	Integration of mitigation measures in the detail design and contract document	Yes/No	Review process	Kathmandu office	During project approval



SN	Parameter	Indicators	Method	Location	Schedule
4	Allocation of adequate budget for implementation of environmental mitigation measures and monitoring works		Review, inquiry and consultation	Kathmandu office	During detail design and contract agreement
5	Clean-up and reinstatement of the project area	Muck disposal, drainage around the tower	Site observation, and inspection	Around tower area, substation area	At the end of construction period
6	Compensatory plantation of native species and conservation of planted seedlings for 5 years	Type of planted Species, survival of seedlings	Site observation/ sampling	Corridor inspection, tower area, plantation areas	Periodically during construction and operation
7	Land/property acquisition procedures	Compliance with national legal requirements	Discussions with local people	Affected area/site office	At the time of acquisition
8	Trainings and trainees	No. of trainings and trainees	Survey/observation	PAA	Periodic during construction and operation

8.6 Monitoring Cost

The monitoring costs have been estimated in table below. The total cost for monitoring activities (for pre-construction and construction phase) has been estimated as NRs. 16,233,560/-.

Table 8-2: Monitoring Cost of the Proposed LDTLP

S.N.	Item	No. of Persons	Man-month	Rate/Month (NRs.)	Amount (NRs.)
A. Pre-construction Phase					
1	Manpower				
	Senior Environmental Expert	1	1	40,688	40,688
	Team Leader	1	2	34,220	68,440
	Environmental Expert	1	1	34,220	34,220
	Socio-economist	1	1	34,220	34,220
	Civil Engineer	1	1	34,220	34,220
	Support Staff	2	2	30,500	61,000
	Sub-total	7	7		272,788
2	Out of Pocket Expenses				
	TA/DA		LS		80,000
	Field Assistant		LS		30,000
	Transportation		LS		100,000
	Report Production		LS		20,000
	Miscellaneous		LS		10,000
	Sub-total				240,000
	Total of Pre-construction Phase				512,788
B. Construction Phase					
1	Manpower				
	Senior Environmental Expert	1	4	40,688	162,752
	Co-ordinator	1	12	34,220	410,640
	Civil Engineer	1	6	34,220	205,320

S.N.	Item	No. of Persons	Man-month	Rate/Month (NRs.)	Amount (NRs.)
	Environmentalist	1	6	34,220	205,320
	Socio-economist	1	6	34,220	205,320
	Electrical Engineer	1	6	34,220	205,320
	Liasion Officer	1	2	30,550	61,100
	Support Staff	5	30	30,500	915,000
	Sub -total	12	72		2,370,772
	From Outsourcing				
	Environmental Safeguard Officer	1	24	80,000	1920,000
	Social Safeguard Officer	1	24	80,000	1920,000
	Support Staff Site Office-1	1	24	35,000	840,000
	Database Expert	1	2	80,000	160,000
	Sub-total	4	74		4,840,000
2	Out of Pocket Expenses				
	TA/DA		LS		500,000
	Fuel and maintenance		LS		1,000,000
	Vehicle hire/ purchase/ Maitenance		LS		4,000,000
	Fuel for Vehicle		LS		600,000
	Report Production		LS		100,000
	Office Rent (Site Office)	24		15000	360,000
	Computer and Printer		LS		100,000
	Electricity, Drinking Water and Communication		LS		100000
	Community Consultation		LS		80,000
	Site office Furnishing		LS		150,000
	Computer and Printer		LS		120,000
	Office Accessories and Operation Cost		LS		200,000
	Institutional Strenghtening		LS		1,000,000
	Community Consultation		LS		100,000
	Miscellaneous		LS		100,000
	Sub-Total				8,510,000
	Total of Construction Phase Monitoring				15720772
	Grand Total (Pre-construction and construction monitoring)				16233560

8.7 Agencies Responsible for Environmental Monitoring

As per the EPR, MoEWRI/DoED will be responsible for monitoring. However, the project proponent NEA will have the prime responsibility for carrying out the monitoring activities. ESSD of NEA will be the organization responsible for pre-construction and construction phase monitoring of the proposed project. EMU comprising the staff from ESSD will be established for the construction phase of monitoring of the project. The Unit will be responsible for compliance and impact monitoring works.

8.8 Summary of Environmental Cost Assessment

The total environmental cost (mitigation including land cost, enhancement, CSR, and monitoring costs) of the proposed project including land cost is estimated to be NRs 357,132,374/- which is 4.7% of the total project cost. The summary of environmental cost benefit analysis is shown in the table given below. The proponent has obligation to carry out the mitigation, enhancement and monitoring activities of the project.

Table 8-3: Environmental Cost Benefit Analysis (including land cost)

S. N.	Description of Cost	Amount (NRs.)		
		Approved IEE	Updated IEE	Change
1	Cost for environmental mitigation measures			
	including land cost	285,388,321	312,924,814	27,536,493
	excluding land cost	78,260,210	92,859,890	14,599,680
2	Cost for enhancement measures	6,036,500	7,474,000	1,437,500
3	Cost for other social support program and CSP cost	15,500,000	20,500,000	5,000,000
4	Cost for environmental monitoring	16,233,560	16,233,560	No change
Total environmental mitigation (including land cost) and monitoring cost		323,158,381	357,132,374	33,973,993
Total environmental mitigation (excluding land cost) and monitoring cost		116,030,270	137,067,450	21,037,180
Total Project cost		7,500,000,000	7,600,000,000	100,000,000
Percentage of total environmental cost (including land cost) to total project cost		4.31%	4.7%	0.39%
Percentage of total environmental cost (excluding land cost) to total project cost		1.55%	1.8%	0.25%

Implementation of Mitigation/Enhancement Measures, CSP and Monitoring Activity

The proponent has prime responsible for implementing the proposed mitigation/ enhancement measures, CSP and the monitoring activities. Proponent has an obligation to carry out all these activities along with cost.

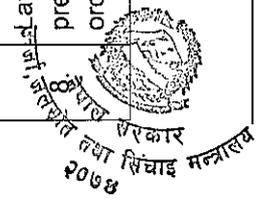


Table 8-4: Environmental Impact, Mitigation and Monitoring Matrix

S.N	Impact	Mitigation Measure	Mitigation/Enhancement Cost (NRs.)	Responsible	Monitoring Plan	Responsible
A. Physical Environment						
1	Topography of the tower site will be changed due to excavation, fill and cut for leveling the foundation area leading to the change in landscape.	Re-vegetation and slope maintenance will be carried out in the disturbed areas to avoid erosion. Bio-engineering with combination of retaining structures will be done as per the requirement. Proper landscaping will be done at each tower site.	Included in Project Cost	Contractor, LDTLP	Weekly field observation during construction	LDTLP-EMU
2	Different construction activities and vehicular movements will generate dust/ smoke and affect air quality in the surrounding area	Vehicle utilized for construction will be complied with GoN mass emissions standards. Regular checkup; up keeping and maintenance of the equipment will be carried out as per the Manufacturer's Specifications to meet the emission standards.	Included in Project Cost	Contractor, LDTLP	Weekly field observation during construction	LDTLP-EMU
3	Use of Construction equipment and vehicles will increase noise level.	Ear mufflers will be provided to labor force working in the areas susceptible to noise pollution.	Included in Project Cost	Contractor, LDTLP	Weekly field observation during construction	LDTLP-EMU
4	There is possibility of water pollution especially in sectors where the line crosses the rivers and streams leading to deterioration of river water quality and other existing water bodies around the construction area.	Waste disposed in pits and filled with soil. Such pits will be made in barren land at approximately 500m distance from the water bodies. Dykes are proposed around the storage tanks to avoid water pollution. Toilets will be provided to the workforce	Included in Project Cost	Contractor, LDTLP	Weekly field observation during construction	LDTLP-EMU
5	The improper disposal of solid waste like cement bags, iron bar and other leftover construction materials, kitchen waste and waste generated by the temporary labour camp might cause adverse impact to the environment.	Waste materials will be stored out and kept separated instead of throwing haphazardly elsewhere. Some of these items (cement bag, plastic drum etc.) can be sold in the markets in order to be re-used or recycled.	Included in Project Cost	Contractor	Weekly field observation during construction	LDTLP-EMU

S.N	Impact	Mitigation Measure	Mitigation/Enhancement Cost (NRs.)	Responsible	Monitoring Plan	Responsible
6	Lead to land degradation and damage of the particular area	Re-vegetation, slope maintenance will be carried out in the disturbed areas to avoid erosion. Bio-engineering with combination of retaining structures will be done as per the requirement. Proper landscaping will be done at each tower site.	Included in Project Cost	Contractor	Continuous observation during construction, annually during operation	Contractor, LDTLP-EMU
B. Biological Environment						
1	Government forest area falling under TL alignment is 0.88ha and CF area falling under the tower pad and TL alignment is 21.9947ha.	Purchase of 0.54ha of land as replacement of permanently acquired forest land	2,070,000/-	NEA, MoFE	During construction	Contractor, LDTLP-EMU
2	14238 numbers of trees from CF will be clear felled.	356,814 number of seedlings will be planted as a compensatory plantation	49,953,960/-	NEA, MoFE	During construction	Contractor, LDTLP-EMU
3	Removal of 4723 private trees (ToF)	Cash compensation	11,807,500/-	NEA, MoFE	During construction	Contractor, LDTLP-EMU
	Increase in pressure on local vegetation with increasing demand for firewood and timber	Provide kerosene/LPG to the extent possible to project workers staying at temporary/permanent labor camps	Included in Project Cost	Contractor, NEA	Regular basis during construction and annually during operation	Contractor, LDTLP-EMU
	Likely increase in hunting and poaching	Prohibit project workers for the collection of NTFPs, hunting and poaching	-	Contractor, NEA	During construction	CFUG
6	Avian Hazards (LDTLP in operation phase may affect bird mobility to some extent. The inability of birds to notice the wires can cause fatal injuries from collisions).	Markers such as color balls will be attached to conductors to improve line visibility for bird wherever it is necessary and technically feasible	Included in Project Cost	Contractor, NEA	Observation/keeping records on birds killed in the vicinity of TL annually during operation	NEA, MoEn
C. Socioeconomic and Cultural Environment						

S.N	Impact	Mitigation Measure	Mitigation/Enhancement Cost (NRs.)	Responsible	Monitoring Plan	Responsible
1.	Acquisition of Land and Structure (require 106.6042ha private land out of which 8.3325ha acquired permanently, total 23 structures will be affected.)	Compensation will be provided to affected land and structure (full compensation for permanent land and 10% of land utilization)	NRs 217,994,924 for land and NRs 10,732,850 for structures)	CDC, NEA (LDTLP)	Cross checking the compensation list, Quarterly during construction, once during operation.	LDTLP-EMU
2.	Crops Loss (33.63MT crops from permanent land and 164.91 crops from land utilization)	Compensation will be provide to PAFs.	NRs 1,122,960 for crop loss from land acquisition and NRs 4,927,620 from land utilization	CDC, NEA (LDTLP)	Discussions with, PAFs, site observation and market survey	LDTLP-EMU
3.	Livelihood	Skill development training will be provided		NEA (LDTLP)		LDTLP-EMU
4.	Occupational Hazards and safety (Likely increase in construction related accidents)	Construction area will be cleared up and warning signs/hoarding boards will be placed.	NRs. 500,000 for awareness program and hoarding board	NEA (LDTLP), Contractor	Records of accidents.	LDTLP-EMU
5	Impact due to crossings (Likely impact due to Crossings on power cables/communication lines/ roads etc.)	Maintenance of ground clearance, Avoidance of infrastructures as far as possible, Placement of signboard where necessary, Public awareness program at critical location	Included in project cost	NEA (LDTLP), Contractor	Cross checking during the operation phase.	LDTLP-EMU
6.	Economic Activities (Likely increase in economic activities)	Compensation for the hindrance due to use of land, agricultural extension program, livelihood skill training programs, Maximum job opportunities.	Nrs. 658,000 for mushroom farming and NRs. 658,000 for training on citrus species.	NEA (LDTLP)	Economic activities in the area, Trade and business revenues	LDTLP-EMU
7.	Social and Cultural Practices (Likely impact on Social and Cultural Practices)	Appropriate code of conduct will be enforced to the outside construction workers	Included in project cost	NEA (LDTLP), Contractor	Records of such incidents.	LDTLP-EMU
8.	Law and Order (Likely increase in pressure to maintain the law and order)	The proponent will implement a strict code of conduct for the workforces.	Included in project cost	NEA (LDTLP), Contractor	Ensure that appropriate code of conduct will be adopted.	LDTLP-EMU



9 CONCLUSION

This chapter sums up the findings and conclusions of the environmental team responsible for carrying out the UPDATED IEE report of LDTLP 220kV TL project. An overall assessment is provided first, followed by sections giving specific conclusions and recommendations.

The total land requirement will be approximately 142.8796ha for tower foundations, substation, camp, switching station and RoW. Out of that, the project requires 97.525ha of cultivated land, 38.1957 ha of forest land (including private shrub land), 3.7574ha of barren land and 3.4015ha of other land. There will be estimated loss of 14,238 trees from CF/government forest and 4723 private trees for the RoW clearance.

The environmental issues/impacts identified during the Updated IEE can be mitigated and manageable. The finding of Updated IEE shows that the adverse impacts on physical, biological, socio economic and cultural environment due to the implementation of the proposed project low/medium, local and short term. Wherever possible, efforts have been made by the project planning team to limit adverse impacts on the environment by selecting environmentally benign design options and otherwise suggesting appropriate mitigation measures. Mitigation measures has been proposed for all identified/predicted adverse impacts and enhancement measures are developed for maximize the project benefits. However, those impacts/issues now not predicted/documentated in this Updated IEE report but might appear later; will also be undertaken by Environmental Management Unit during the construction phase.

The proponent NEA will have obligation to carry out the mitigation, enhancement and monitoring activities of the project. The environmental impact mitigation measures will be incorporated in detail design of the substation and so on, contract documents. The project proponent will be primarily responsible for following acts, rules, regulations (legislation and other relevant directive of GoN) while implementing the project.

The total environmental and social cost (mitigation, enhancement, CSP, and monitoring costs) of the proposed project including land cost is estimated to be NRs **357,132,374/-** which is 4.7% of the total project cost.



REFERENCES

Approved IEE Report of Lekhnath-Damauli 220kV TL Project

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CBS, 2011. *National Population Census 2011- Household and Population by Sex- Ward Level*, Central Bureau of Statistics, Kathmandu.

NEA, 2011. *Final Survey Report of Lekhnath-Upper Seti 220kV Transmission Line Project*, prepared by Engineering Services, Project Development Department, Nepal Electricity Authority, Kathmandu.



APPENDIX



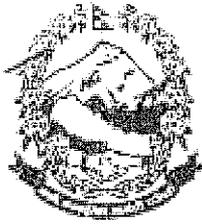


Appendix A: Survey License and Consent Letter



नेपाल सरकार
जुम्ला, जुम्लाकोट तथा विनायक सम्मालय
२०७४

Appendix A-I: Survey license



नेपाल सरकार
उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय
विद्युत विकास विभाग
(अनुमतिपत्र महाशाखा)

फोन नं. ४४१६००४, ४४१६२३७
४४१६३६८, ४४१६२०१
४४२५७७५, ४४२५९९९
४४२९३६२
क्याम्पस ४४४३९,०३
पोष्ट बक्स नं. २५७७
सानोबौचरण
काठमाडौं, नेपाल
मिति: २०७५.०९.२६.....

पत्र संख्या : अनुमतिपत्र/०७५/७३
चलानी नम्बर : ११७५

विषय:- लेखनाथ-दमौली २२० के.भी. विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र बारे ।

MK

श्री नेपाल विद्युत प्राधिकरण
पी.ओ.नं. १००२०, प्रधान कार्यालय,
दरबारमार्ग, काठमाडौं ।
सम्पर्क नं. ०१-४१५२१९४, ४१५३०५३ ।
फ्याक्स : ०१-४१५३००९ ।

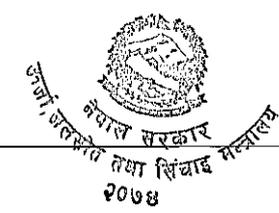
प्रस्तुत विषयमा तहसते नेपाल विद्युत प्राधिकरणको लेखनाथ-दमौली २२० के.भी. विद्युत प्रसारण लाइन आयोजनाको क्रमागत १३२/२२० के.भी. लेखनाथ सबस्टेशन तहसते १३२/२२० के.भी. दमौली सबस्टेशन सम्मको २२० के.भी. (डबल सर्किट) प्रसारण लाइनको विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र पाउन दिएको दरखास्त उपर कारवाही गर्दा विद्युत ऐन, २०४९ को एफा ४ को उपवचन ३ र विद्युत नियमावली, २०५० को नियम नं. बमोक्षिण मिति २०७५/११/०६ को निर्णयानुसार मिति २०७७/११/०५ सम्म (दुई वर्ष) यहाल रहने गरी जारी भएको प्रसारण लाइनको विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र संख्या : वि.वि.वि.०७५/७६ वि.प्र.स. ३६५ (दोश्रो पटक जारी गरिएको) गरी पत्र साथ संलग्न गरी पठाइएको ब्यहोरा अनुरोध छ ।

संलग्न : विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र संख्या वि.वि.वि. ०७५/७६ वि.प्र.स. ३६५ (दोश्रो पटक जारी गरिएको) ।

श्री जितेंद्र भुजेल
(ईन्जिनियर)

बोधार्थ :
श्री उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय, सिंहदरवार
श्री विद्युत विकास विभाग

- आयोजना अध्ययन महाशाखा
- निरीक्षण महाशाखा
- योजना महाशाखा
- आर्थिक प्रशासन शाखा मिति २०७५/१०/०४ मा श.प.नं. ३३१६, ने.न.बैंक अ.भी.नं. १०२२२६ काठ अनुमतिपत्र जारी भएको गणकी श्रेणी रकम रु १,००,००० - (अधारेवी रु एक लाख मात्र) र मिति २०७५/१०/०४ मा श.प.नं. ३३१७, ने.न.बैंक अ.भी.नं. १०२६२६ काठ अनुमतिपत्र जारी भएको गणकी श्रेणी रकम रु १,००,००० - (अधारेवी रु एक लाख मात्र) गरी जम्मा रु. २,००,०००/- (अधारेवी रु दुई लाख मात्र) रकमको अन्तर्गत जम्मा गरिनुहुन ।
- श्री जिल्ला जलधोत समिति (जिल्ला समन्वयन समिति मार्फत), कस्की
- श्री जिल्ला जलधोत समिति (जिल्ला समन्वयन समिति मार्फत), धनकुटा ।





नेपाल सरकार
उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय
विद्युत विकास विभाग

विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र
 (लेखनाथ - दमौली २२० के.भी. विद्युत प्रसारण लाईन आयोजना।)

अनुमतिपत्र संख्या: वि.वि.वि. ०७५/७६, वि.प्र.स.३८५ (दोश्रो पटक जारी गरिएको।)

श्री नेपाल विद्युत प्राधिकरण
 प्रधान कार्यालय, बरदासमार्ग, काठमाडौं।

महोदय,

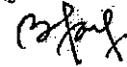
विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र प्राप्त गर्ने मिति २०७२/१०/२० मा पेश गर्नुगएको प्रस्तावना अनुसार विद्युतको विवरण छेती विद्युत ऐन, २०७१ को दफा ४ को उपदफा १५। र विद्युत नियमावली २०७० को नियम ६२ बमोजिम मा अनुमतिपत्र प्रदान गरिएको छ।

- विद्युत प्रसारणको सर्वेक्षण गर्ने चाहने व्यक्ति वा संगठित संस्थाको पूरा नाम र ठेगाना:
 श्री नेपाल विद्युत प्राधिकरण
 बरदासमार्ग, काठमाडौं।
 पौर.स.नं. १००२०, सशान कार्यालय।
 सम्पर्क फोन नं.-०१-४१५३१९४, ४१५३०५४
 फ्याक्स नं.-०१-४१५३००९
- प्रसारण गरिने विद्युत उपलब्ध गराउने परियोजनास्थानको विवरण:
 प्रमद्विगत १३३/२२० के.भी. लेखनाथ सबस्टेशन देखि प्रस्तावित १३३/२२० के.भी. लामो सबस्टेशन सम्मको २२० के.भी. प्रसारण लाईन आयोजना।
- विद्युत प्रसारण कम्प्लाइत कही गरिने हो सो को विवरण:
 काभ्रेपि जिल्लाको विष्णुनाथ नगरपालिकाको वडा नं. स्थित १३३/२२० के.भी. लेखनाथ सबस्टेशन देखि बाइबाता गा.वि.स., रुपाकोट गा.वि.स., देउराही गा.वि.स., सिद्ध गा.वि.स., तथा अमरौँ जिल्लाको स्याङ्गा गा.वि.स., काही विष्णु गा.वि.स., ईट्टे ब्यास नगरपालिका स्थित १३३/२२० के.भी. दमौली सबस्टेशन सम्मका करिब ५५ कि.मी. लम्बाई रहेको प्रसारण लाईन।
- सर्वेक्षण गर्ने क्षेत्र:
 (क) अञ्चल: मध्यपश्चिमी
 (ख) जिल्ला: काभ्रेपि अमरौँ
 (ग) न.पा./गा.वि.स.: लेखनाथ नगरपालिका, बाइबाता गा.वि.स., रुपाकोट गा.वि.स., देउराही गा.वि.स., सिद्ध गा.वि.स., स्याङ्गा गा.वि.स., काही विष्णु गा.वि.स. र अमरौँ नगरपालिकाहरू।
- विद्युत प्रसारणको मोल्डेज र परिमाणहरू:
 मोल्डेज: २२०,००० मोल्डेज इन्जल सर्किट।
 परिमाण: ६०० मीटरमात्र।
- सर्वेक्षण प्रकृति :- स्याङ्गा अडचनले तोक बाधाहरूमात्र अध्ययन।
- अनुमतिपत्र बहाल रहने अवधि :-
 मिति: २०७५/११/०६ देखि २०७७/११/०६ सम्म।
- अन्य शर्तहरू :-
 (क) नयाँ समस्याले विद्युत विकास विभाग आफैले पेश गरेको प्रस्तावना माथि पेश गरिएको प्रस्तावना माथि पेश गरिएको विवरणहरूको अध्ययन रही प्रस्तावना प्रसारण लाईन आयोजनाको सम्भाव्यता अध्ययन तथा कालान्तरिक अध्ययन गर्नुपर्नेछ।
 (ख) विद्युत नियमावली, २०७० को नियम २५ बमोजिम सर्वेक्षण कक्षा तीन महिनाभित्रै पूरा गर्नु पर्ने छ। तत्पश्चात विद्युत विकास विभागले सिफारिसलाई दिनुपर्नेछ। सर्वेक्षण कार्य प्रगति विवरण प्रत्येक ६० दिनमा विद्युत विकास विभागलाई दिनुपर्नेछ। विभागको आदेशपत्र देखाएमा अनुमतिपत्रको प्राधान्यलाई नमानि कुनै पनि समयात् कतव्यपूर्ण शिवालयहरू तथा कोठा आयोगना क्षेत्रको स्थलगत निरीक्षण गर्न सक्नेछ।

विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र संख्या: वि.वि.वि. ०७५/७६, वि.प्र.स.३८५ (दोश्रो पटक जारी गरिएको।) पान १/२



Appendix A-II: Consent Letter from DOED

	 नेपाल सरकार उर्जा जलस्रोत तथा सिंचाइ मन्त्रालय विद्युत विकास विभाग २०५०	फोन नं. ४४७४६५२, ४४८०२७६ ४४७८०८५, ४४८०३२६ ४४८०४२५, ४४९६८०० ४४८१६१४, ४४७६१९०
पत्र संख्या :- ०६५/६४ -च.न. ६६४	(.....) वातावरण शाखा	फ्याक्स (२७७-९)-४४८०२५७ पोस्ट बक्स नं. २५०७ थापागाउँ, अनामनगर काठमाडौं, नेपाल मिति:
२०७५/०७/०६		
विषय:- प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदन अध्यावधिक (Update) को अध्ययन सहमति बारे ।		
श्री नेपाल विद्युत प्राधिकरण रत्नपार्क, काठमाडौं		
उपरोक्त संबन्धमा तहाँ बाट प्रस्तावित लेखनाथ - दमौली २२० के.भी. प्रसारण लाईन आयोजनाको प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदन Update को अध्ययन सहमति सम्बन्धमा उक्त आयोजनामा हुने परिवर्तनहरू समावेश गरि त्यस बाट पार्ने असर र त्यसका Mitigation Measures स्पष्ट रूपमा उल्लेख गरि यस अघि स्वीकृत IEE प्रतिवेदन Update गर्न मिति २०७५/०६/०१ को श्री उर्जा जलस्रोत तथा सिंचाइ मन्त्रालय (सचिवस्तरीय) निर्णयानुसार अध्ययन सहमति प्रदान गरिएको व्यहोरा अनुरोध छ।		
 (शंकर शम्भु चौधरी) इन्जिनियरिंग जियोलोजिस्ट		


 नेपाल सरकार
 उर्जा, जलस्रोत तथा सिंचाइ मन्त्रालय
 २०७४

Appendix A-III: Consent Letter from CAAN

फोन नं. : ४२६२३२६, ४२६२४१६, ४२६२५१८, ४२६२५२३
फ्याक्स : ४७७-९-४२६२५१६
इमेल : cnsatm@mos.com.np
केवल : AIRCIVIL
AFTN : VNKTYAYX

 **नेपाल नागरिक उड्डयन प्राधिकरण**
प्रधान कार्यालय, बबरमहल, काठमाडौं, नेपाल ।

पत्र संख्या:- ATM विभाग
०८४/८५-४०७७३२

मिति:- २०७४/५/१५

श्री नेपाल विद्युत प्राधिकरण,
ईन्जिनियरिङ्ग सेवा निर्देशनालय,
वातावरण तथा सामाजिक अध्ययन विभाग, काठमाडौं ।

नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
दर्ता नं. १५५
मिति २०७४/५/१५

विषय: राय पठाइएको सम्बन्धमा ।

प्रस्तुत सन्दर्भमा तहाँ विभागबाट प्रेषित प.सं. ०७३/७४, च.नं. ४३३ मिति २०७३/९/२९ को लेखनाथ – दमौलि २२० के. भि. प्रसारण लाईन संवन्धि पत्रमा उल्लेख भएका Data Analysis गर्दा यस प्राधिकरणको मिति २०७४/०५/१९ को निर्णय अनुसार निम्न बमोजिम हुने गरी मात्र प्रसारण लाईन निर्माण गर्नु हुन अनुरोध छ ।

तपशिल

(क) प्रसारण लाईनका Pylon हरु AP 1 देखि AP4 सम्मको उचाई ३५ मीटर भन्दा बढी हुन नहुने र अन्य सबै Pylon को उचाई ४० मीटर भन्दा बढी हुन नहुने । सो भन्दा बढी उचाई आवश्यक पर्ने भएमा Re-alignment गर्नु पर्ने ।

(ख) Air Route मुनी प्रसारण लाईन पर्ने ठाउँमा Pylon हरु Red and White Painted हुनु पर्ने ।

(ग) ती स्थानहरुमा Pylon को टुप्पोमा Obstacle Light हुनु पर्ने ।

(घ) ती Pylon हरुको बीचमा प्रसारण लाईनको माथिल्लो Cable मा alternate red and white (or alternate orange and white) marker balls राख्नु पर्ने ।

(ङ) एक डाँडाको टुप्पादेखि अर्को डाँडाको टुप्पासम्म सोभै तार नतानि पहिला डाँडाको टुप्पाबाट तल फेदिमा ल्याई अनि मात्र अर्को डाँडाको टुप्पोमा तार तान्नु पर्ने ।

नेपाल विद्युत प्राधिकरण वातावरण तथा सामाजिक अध्ययन विभाग चरिपट्टी, भक्तपुर	
श्री वातावरण अध्ययन महाशाखा	श्री प्रसारण सेवा
श्री सामाजिक अध्ययन महाशाखा	श्री सेवा शाखा
श्री अनुगमन महाशाखा	श्री वि.ए.
१. आ.का. गर्ने र. पैसा गर्ने ३. परिपत्र गर्ने	सहि: _____
४. छलफल गर्ने ५. राय दिने ६. फाइल गर्ने	मिति: _____

श्रीमान् उपमहानिर्देशकज्यू, ANSनिर्देशनालय, ने.ना.उ.प्रा., प्रधान कार्यालय ।

(मुकेश राज दाहाल)
प्रबन्धक
ATM Department

नेपाल सरकार
जल विभाग, जलस्रोत तथा वि
२०७४

Appendix B: Documents related to Physical Environment



Line Components	Stretch		Land Type, ha										Total Area, ha
			Cultivated			Forest Area (ha)			Barren		Others		
	From AP	To AP	Govt.	Pvt.	Government	CF	Private shrub land	Govt.	Pvt.	Public	Pvt.		
30	31	1.6568	-	0.3492	0.2	-	-	-	-	-	-	2.206	
31	32	1.9463	-	0.5311	0.4	-	-	-	-	0.52572	-	3.40312	
32	33	2.6917	-	-	-	-	-	-	-	0.68079	-	3.37249	
33	34	7.1909	-	-	-	-	-	-	-	0.22086	-	7.41176	
34	35	3.92	-	-	-	-	-	-	-	0.06984	-	4.2155	
35	36	1.8709	-	-	-	-	-	-	-	0.16815	-	2.03905	
36	37	0.6474	-	-	-	-	-	-	-	0.3756	-	1.023	
37	38	3.1928	-	-	-	-	-	-	-	0.03	-	3.2228	
38	39	2.8961	-	0.3988	0.22	-	-	-	-	0.018	-	3.5329	
39	40	1.4304	-	0.21	0.144	-	-	-	-	0.28506	-	2.06946	
40	41	1.4193	-	-	0.2609	-	-	-	-	-	-	1.6802	
41	42	2.0054	-	-	-	-	-	-	-	-	-	2.0054	
42	43	0.5604	0.18	-	-	-	-	-	-	0.35412	-	1.09452	
43	44	0.9	-	-	-	-	-	-	-	0.09	-	1.395	
44	45	0.54	-	-	0.84	-	-	-	-	0.06669	-	1.44669	
45	46	0.50652	-	-	0.3	-	-	-	-	-	-	0.80652	
46	47	0.564	-	-	0.24	-	-	-	-	0.012	-	0.816	
47	48	0.18	-	0.3	0.357117	-	-	-	-	-	-	0.837117	
48	49	0.465	-	-	0.435	-	-	-	-	0.021	-	0.921	
49	SS	0.47346	-	-	0.3	-	-	-	-	-	-	0.77346	
Tower Pads	Total number of Tower Pads/Area	82/1.84 5	-	24/0.54	-	-	-	22/0.49 5	2/0.045	-	-	-	
Substation	Substation	7.101	-	-	-	-	-	-	-	-	-	7.101	
Access road	Access road	0.199	-	-	-	-	-	-	-	-	-	0.199	
Camp and Storage	Camp and Storage	0.5	-	-	-	-	-	-	-	-	-	0.5	
Mobile Camp	Along the stretch	-	-	-	-	-	-	-	1.25	-	-	1.25	
Total Area	Total Area	97.5226 8	0.88	21.994 7	15.321017	3.75737	3.40152	142.8773					

Note: BL = Barren Land, CL = Cultivated Land and FL = Forest Land



Appendix B-II: Altitudinal Variation along the Alignment

S.N	APs	Elevation	Village	Address		Land Use
				Rural Municipality/ Municipality*/ MC**	District	
1	AP 1	740.643	Kharene	Pokhara**	Kaski	BL
2	AP 2	749.639	Badaare Danda			CL
3	AP 3	798.241	Dharmashala			CL
4	AP 4	814.073	Pakhuridada			FL
5	AP 5	887.064	Aarupata			BL
6	AP 6	1019.689				FL
7	AP 7	783.912				BL
8	AP 8	874.952				FL
9	AP 9	1025.128	Simalpata			BL
10	AP 10	1184.699	Kotpari			CL
11	AP 11	1176.165	Kotbari	CL		
12	AP 12	1123.658	Chipleti Bhangere dada	FL		
13	AP 13	1070.282	Begnagau	FL		
14	AP 14	853.429	Lapsidada Kahare	CL		
15	AP 15	744.497	Ulleri-Talbesi	CL		
16	AP 16	868.245		CL		
17	AP 17	1144.203	Pakhagau-Mauriya	BL		
18	AP 18	905.923	Pelungthumki	CL		
19	AP 19	900.133	Sirkutanidada	CL		
20	AP 20	780.225	Bhurung Deupur	CL		
21	AP 21	682.464		FL		
22	AP 22	441.54		CL		
23	AP 23	1014.942	Dandagau Sisaghat	FL		
24	AP 24	786.514	Chaudal thok	CL		
25	AP 25	443.839	Pokharedada	FL		
26	AP 26	503.7	Shekhatar	CL		
27	AP 27	405.633	Shekhatar	CL		
28	AP 28	424.157		FL		
29	AP 29	368.25		CL		
30	AP 29A	375.395		CL		
31	AP 30	851.038	Pakhure bhanyang	CL		
32	AP 31	505.354	Ratadada	BL		
33	AP 32	364.175		CL		
34	AP 33	347.675		CL		
				Byas*	Tanahun	

S.N	APs	Elevation	Address			Land Use
			Village	Rural Municipality/ Municipality*/ MC**	District	
35	AP 34	327.508				CL
36	AP 35	361.241				CL
37	AP 36	454.031	Panamdigau			CL
38	AP 37	595.069				CL
39	AP 38	550.858	Saurahagau			CL
40	AP 39	379.292	Beteni gau			FL
41	AP 40	489.495	Swamidada Gyaja			BL
42	AP 41	469.528	Ghyansingdada		Rishing	CL
43	AP 42	389.226	Malingagau			CL
44	AP 43	301.426	Belbas		Byas*	CL
45	AP 44	347.791	Bhuyarthan		Byas*	CL
46	AP 45	465.956	Ale Gaun		Byas*	CL
47	AP 46	529.848	Ghartigaire		Byas*	CL
48	AP 47	595.367	Keshabtar		Byas*	CL
49	AP 48	476.95	Kamalbari, Nisapani		Byas*	CL
50	AP 49	377.195	Kamalbari, Nisapani		Byas*	BL



Appendix B-III: Temperature Data**Table 1: Temperature Data of Pokhara Regional Office, Kaski**

S.N	Year	Tmax		Tmin	
		°C	Month	°C	Month
1	2010	32.1	April	7.4	January
2	2011	31.3	June	6.5	January
3	2012	31.9	June	7.5	January
4	2013	31.3	August	6.3	January

Table 2: Temperature Data of Damauli, Tanahun

S.N	Year	Tmax		Tmin	
		°C	Month	°C	Month
1	2007	35.6	May	9.4	December
2	2008	34.3	July	6.7	December
3	2009	35.6	April	9.5	January
4	2010	35.7	April	8.5	February
5	2011	34.9	May	7.5	January
6	2012	35.6	May	8.3	January
7	2013	35.3	September	7.9	January
8	2014	37.1	May	9.3	January

Appendix B-IV: Precipitation Data**Table 3: Precipitation Data of Lamachaur, Kaski**

S. N	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	No v	Dec	Max	Avg
1	2007	22	46.1	199	404.6	803.4	1100.4	799.6	1444.8	249	92.4	4	1444.8	447.1	
2	2008	11.4	0	36.6	65	402.2	103.0	722.6	1225.6	704.6	41.4	8.8	0	1225.6	354.0
3	2009	4	0	16.4	65.6	275.4	474.4	1142.4	966.2	752	180.2	2	4.8	1142.4	323.6
4	2010	0	80.8	97.8	114.4	392.8	813	1328.6	1304.2	734.6	92.5	2	0	1328.6	413.3
5	2011	10	22.2	30	160.4	212.6	584.3	1476.6	860.8	711.8	55.2	49.2	0	1476.6	347.7
6	2012	6	36.6	30.8	176	174.8	697	1333.2	1004	722.4	181.4	0	0	1333.2	363.5
7	2013	10	32.2	39	113.6	275.9	921.1	1045.6	727.1	318.6	299.6	2.2	2	1045.6	315.5
8	2014	12.8	14.8	61.6	58	110.7	463.8	1031.6	1469.4	638.8	96.2	0	21.2	1469.4	331.5
9	2015	56.4	44.8	13.4	92.8	143.2	461.2	1075.4	1063	629.4	112.8	52.6	0	1075.4	322.1

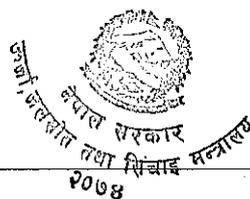


Table 4: Precipitation Data of Rumjakot, Tanahun

S. N	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max	Avg
1	2007	0	172.3	52.6	75.2	70	305.2	311.9	296.8	542.4	65.3	0	0	542.4	157.64
2	2008	8.7	0	48.3	28.2	194.4	274.8	316.1	219.4	130.5	62.4	0	0	316.1	106.90
3	2009	0	0	0	2.1	241.8	334.6	399.1	307.7	50.6	146.7	0	0	399.1	123.55
4	2010	0	32.4	4.1	19.4	181	213.9	446.5	443.3	288.7	29.4	0	0	446.5	138.23
5	2011	5.1	25.7	16.7	46.7	181.5	324.6	598.6	307.1	149.9	9.2	43.5	0.5	598.6	142.43
6	2012	23.4	64.2	15.5	108.6	112.6	183.5	440.6	229.6	253.5	0	0	0	440.6	119.29
7	2013	14.8	65.5	23.4	110.9	251.4	617.2	709.8	199.3	28.5	132.5	0	0	709.8	179.44
8	2014	14.2	5.2	16.6	9.1	77	186.8	355.4	687.7	153.1	188.5	0	22.1	687.7	142.98
9	2015	0	61.7	5.2	130.2	196.6	297.3	234	296.4	28.6	12.3	0	0	297.3	105.19



**Appendix C: Document related to Biological
Environment**





Appendix C-I: Estimated Loss of trees from Private land in the additional section (2.66km)

Project Components	Species	Pole	Tree	Total	Patch	Remarks
New Damauli Substation	Ram ritho	18	10	28		
	Pipal		2	2		
	Dumri		2	2		
	Gideri	2		2		
	Sindure	1		1		
	Jigane	1		1		
	Chilaune	3		3		
	Aanp		2	2		
	Bar		1	1		Chautara
	Banana			0		11
SS to AP 49	Dabdabe	8	15	23		
	Simal	2	2	4		
	Chilaune	56	37	93		
	Bans			0		1
	Chatiwani	2		2		
	Botdhayero	15	2	17		
	Banana			0		35
	Gayo	1		1		
	Amba	4		4		
	Aanp		3	3		
	Sindure	13		13		
	Thotne	6		6		
	Kutmero			0		
	Kyamuna	7	7	14		
	AP 49	Kyamuna	7		7	
Chilaune		3	1	4		
Sindure		3		3		
Sikhatare		1		1		
AP 49 to AP 48	Chilaune	63	46	109		
	Kyamuna	14	3	17		
	Dabdabe	18	11	29		
	Botdhayero	11	9	20		
	Padke		1	1		
	Gideri	1	2	3		
	Gayo	1	2	3		
	Sindure	16		16		
	Kutmero	4		4		
	Simal		2	2		
	Sami		1	1		
	Katus	3		3		
	Dumri	1		1		
	Amba	4		4		
	Nibuwa	2		2		
	Bar	1		1		
	Pipal	1		1		
	Phalame	1		1		
	Ram ritho	1	1	2		
	Thotne	7		7		
	Khirro	3		3		
	Amala	1		1		
	Suntala	1		1		
	Simal		1	1		
	Padke	5		5		
	Sisau	1		1		
	Kera			0		32
	Nimaro	1		1		

Project Components	Species	Pole	Tree	Total	Patch	Remarks
AP 48	Katus	1		1		
	Padke	1		1		
	Kyamuna	1		1		
AP 48 to AP 47	Chilaune	113	73	186		
	Katus	23	3	26		
	Kyamuna	1		1		
	Ramritho		3	3		
	Simal		1	1		
	Kutmero	2		2		
	Padke	2		2		
	Ratpate	4		4		
	Tuni	1		1		
	Khirro	6		6		
	Aanp			1	1	
	Dabdabe			5	5	
	Khanayo			1	1	
	Katahar			1	1	
	Naspati	1			1	
	Bakaino			1	1	
	Botdhayero	7			7	
AP 47	Chilaune	1	1	2		
	Barro		1			
	Sindure	1				
	Botdhayero	3				
AP 47 to AP 46	Chilaune	21	5	26		
	Barro		1	1		
	Sindure	2		2		
	Botdhayero	16		16		
	Mate Khirro	4		4		
	Sami		1	1		
	Simal	1		1		
	Pipal	3	2	5		
	Katus	1		1		
	Dabdabe	12	10	22		
	Gideri		2	2		
	Thotne	10		10		
	Kutmero	1		1		
	Bakaino	2		2		
Katahar		1	1			
AP 46				0		
	Dabdabe		3	3		
	Botdhayero		2	2		
	Badahar		1	1		
	Simal		1	1		
AP 46 to AP 45	Barro		2	2		
	Badahar		2	2		
	Chilaune	35	5	40		
	Dabdabe	16	13	29		
	Botdhayero	3	1	4		
	Khirro	4		4		
	Simal		2	2		
	Pipal		1	1		
	Padke	4	1	5		
	Amaro	1		1		
	Dumri	2	3	5		
	Ramritho	2		2		
	Bel	1	1	2		
Aanp	1		1			

Project Components	Species	Pole	Tree	Total	Patch	Remarks
	Ginderi		4	4		
	Bahunkath	1		1		
	Firfire		1	1		
	Total		1	1		
	Amba	6	6	12		
	Sami		1	1		
	Khanayo		1	1		
AP 45	Chilaune		1	1		
	Dabdabe	2		2		
	Kafal	1		1		
AP 45 to AP 44	Sal	5	4	9		
	Champ		4	4		
	Dabdabe	24	6	30		
	Sisau	1		1		
	Katahar	4	1	5		
	Botdhayero	51	45	98		
	Ramritho	4	1	5		
	Aanp	6	13	19		
	Naspati	2	2	4		
	Nimaro	1		1		
	Janto	1		1		
	Bans			0	62	
	Chilaune	16	4	20		
	yelogad	1	3	4		
	Tejpat	2		2		
	Dumri	1	5	6		
	Amba	5		5		
	Litchi	1	1	2		
	Pakuri	6	1	7		
	Khanayo	2		2		
	Karma	7	5	12		
	Veller	2	1	3		
	Amaro	1		1		
	Kutmero	2		2		
	Padke	4	2	6		
	Sigane	1		1		
	Simal	1		1		
	Sindure	1		1		
	Bakaino	25		25		
	Khirro	4		4		
Badahar	4		4			
Tuni			1	1		
AP 44	Dabdabe	7	5	12		
	Bakaino	1		1		
	Gayo	1		1		
	Thotne	2		2		
AP 44 to AP 43	Bakaino	1		1		
	Barro		1	1		
	botdhayero	2	1	3		
	Khayar	1		1		
	Khirro	2	1	3		
	Padke	2		2		
	Thotne	1		1		
	Ginderi	2	1	3		
	Khayar	16	6	23		
	Singane	1		1		
	Ramritho	4	1	5		
Simal			1			

Project Components	Species	Pole	Tree	Total	Patch	Remarks
	Dumri	1		1		
	Bakhre	1		1		
	Amba	4		4		
AP 43	Simal	1	2	3		
	Khanayo	1		1		
	Thotne	3		3		
	Dumri	2		2		
	Amba	1		1		
	Kera			0		2
	Ipil ipil	4		4		
AP 43 to AP 42	Dumri	2		2		
	Sisau	6	2	8		
	Thotne	9		9		
	Karma	1		1		
	Ramritho	5		5		
	Simal	2		2		
	Chilaune	5	7	14		
	Saaj		1	1		
	Khirro	2	1	3		
	Dabdabe	1	1	2		
	Aanp	2	1	3		
	Amba	1		1		
	Nibuwa	1		1		
	Kera					2
	Katus	1		1		
Total		918	460	1378	145	



Appendix C-II: Forest wise and species wise loss of trees in the additional section (2.66km)

S. N.	Tree Species		Loss of (Seedlings per ha)	Saplings per ha	Loss of Tree (No.)			Total volume (cft)	Timber (cu.ft)	Firewood (cu.ft)	Remarks
	Botanical Name	Local Name			Total	Pole class	Tree class				
Thriving Otangdi CF											
1	<i>Schima wallichii</i>	Chilaune	1200	300	49	25	24	722.96	398.15	324.77	
2	<i>Mallotus oppositifolius</i>	Ramritha			1	0	1	18.92	0	18.92	
3	<i>Cleistocalyx operculata</i>	Kyamun			1	1	0	9.91	0	9.91	
4	<i>Cipadess abacifera</i>	Falme (Masgedi)		600							
5	<i>Castanopsis indica</i>	Katus	3200	500							
6	<i>Trichilia connaroides</i>	Ankhatare/ Chaichuin	800	400							
Sub-total					51	26	25	751.79	398.15	353.6	
Government Forest											
1	<i>Sapium insigne</i>	Khirro	1200	200	2	2	0	7.97	0	7.97	
2	<i>Schima wallichii</i>	Chilaune	3600	300	9	4	5	195.16	110.29	84.89	
3	<i>Lagerstroemia parviflora</i>	Botdhairo		100	9	7	2	48.23	8.15	40.05	
4	<i>Terminalia tomentosa</i>	Saj	800		2	1	1	19	9.51	9.51	
5	<i>Adina cordifolia</i>	Karma			1	1	0	2.44	0	2.44	
6	<i>Terminalia bellirica</i>	Barro	1200		2	1	1	12.47	6.24	6.24	
7	<i>Garuga pinnata</i>	Dabdabe			1	1	0	5.08	0	5.08	
8	<i>Astonia scholaris</i>	Chatiwan			1	0	1	187.12	125.37	61.75	
Sub-total					27	17	10	477.47	259.56	217.93	
Total					78	43	35	1229.26	657.71	571.53	

Appendix C-III: Total forest loss in approved and updated IEE

S. N.	Type of forest	Area (ha.) in approved IEE	Area (ha.) in updated IEE	Loss of Vegetation						Standing Wood Volume (m ³)	Biomass of Standing Tree (ton)	Biomass Usage ^{s*}				
				Regeneration loss		Loss of Tree (no.)		Cro wn Cover (%)	App				Upd	App	Upd	
				Seedlings per ha	Saplings per ha	Pole class	Tree class									
1.	Government	0.7	0.88	4986	4860	2832	2645	11220	11263	2940	2975	40-80	8772.33	7959.28	7979.97	Timber, Firewood, Fodder, NTFP
2.	Community	21.6947	21.9947													

Updated IEE

NEA-ESSD

3. Religious	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Leasehold	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Private Shrubland	12.5937	15.321	-	-	2200	3118+1 45 (patches)	1000	1460	30- 60	-	-	-	-	-	-	-	-	-	-
Total	34.9884	38.1957	4981	2428	13420	14526	3940	4435	30- 80	8772	8807	7959.28	7979.97						

Note: Seedling 0-4 cm DBH; Sapling 4-10 cm DBH; Pole Class 10-30 cm DBH; Tree Class >30cm DBH; * Possible usages are- Timber, fire wood, fodder etc.,
Source: Field Survey, 2016

Appendix C-IV: Details of vegetation loss in Approved and Updated IEE

S.N.	Local Name	Botanical Name	Loss of Vegetation				Standing Wood Volume, m ³		Biomass (ton)		
			Loss of Regeneration Seedlings s/ha	Saplings /ha	Pole Class	Tree Class	Total	%			
In the approved IEE											
1.	Amala	<i>Phyllanthus emblica</i>	0	15	0	0	0	0	0.00	2.07	1.89
2.	Amba	<i>Psidium guajava</i>	14	10	0	0	0	0	0.00	1.41	1.27
3.	Angeri	<i>Osbeckia nepalensis</i>	483	268	0	0	0	0	0.00	37.53	33.77
4.	Botdhairo	<i>Lagerstroemia parviflora</i>	124	66	300	30	330	2.33	36.87	33.45	
5.	Chilaune	<i>Schima wallichii</i>	1448	679	4230	810	5040	35.59	1790.31	1624.42	
6.	Dhurseli	<i>Colebrookea oppositifolia</i>	83	58	0	0	0	0.00	8.04	7.30	
7.	Epil Epil	<i>Leucaena diversifolia</i>	0	0	60	0	60	0.42	1.71	1.55	
8.	Kafal	<i>Myrica eiculenta</i>	0	0	120	0	120	0.85	9.18	8.33	
9.	Katus	<i>Castanopsis</i> sps.	688	408	1530	210	1740	12.29	567.36	514.80	
10.	Khirro	<i>Sapium insigne</i>	25	30	330	30	360	2.54	41.37	37.54	
11.	Lankuri	<i>Fraxinus floribunda</i>	0	13	60	0	60	0.42	4.08	3.71	
12.	Mango	<i>Mangifera indica</i>	9	6	0	0	0	0.00	0.87	0.79	
13.	Mauwa	<i>Engelhardtia spicata</i>	39	21	60	0	60	0.42	6.90	6.26	
14.	Padke	<i>Albizia julibrissin</i>	19	13	270	90	360	2.54	132.66	120.38	
15.	Phalat	<i>Quercus lamellose</i>	13	8	60	0	60	0.42	4.35	3.95	
16.	Ramriha	<i>Mallotus oppositifolius</i>	38	25	180	30	210	1.48	66.09	59.98	
17.	Rato pate	<i>Ajuga bracteosa</i>	0	0	0	30	30	0.21	43.32	39.32	
18.	Sal	<i>Shorea robusta</i>	1763	1041	3360	1530	4890	34.53	5114.34	4640.44	
19.	Sallo	<i>Pinus</i> sp.	6	36	480	120	600	4.24	159.57	144.79	

Updated IEE

NEA-ESSD



S.N.	Local Name	Botanical Name	Loss of Vegetation				Standing Wood Volume, m ³	Biomass (ton)
			Loss of Regeneration		Loss of Tree (No.)			
			Seedling s/ha	Saplings /ha	Pole Class	Tree Class		
20.	Simal	<i>Bombax ceiba</i>	5	4	0	30	20.94	19.00
21.	Swami	<i>Ficus benjamina</i>	0	0	30	60	696.93	632.36
22.	Tiju	<i>Diospyros malabarica</i>	214	118	30	0	17.31	15.70
23.	Uftis	<i>Alnus nepalensis</i>	15	13	120	0	9.12	8.29
Total			4986	2832	11220	2940	14160	7959.28
In the additional section								
1.	Ankhatare/ Chainchui	<i>Trichilia connaroides</i>	400	200			0.00	0.00
2.	Barro	<i>Terminalia bellirica</i>	600		1	2	0.353	0.27
3.	Botdhairo	<i>Lagerstroemia parviflora</i>		50	7	9	1.366	1.16
4.	Chatiwani	<i>Alstonia scholaris</i>			0	1	5.299	2.01
5.	Chilaune	<i>Schima wallichii</i>	2400	300	29	58	25.998	17.91
6.	Dabdabe	<i>Garuga pinnata</i>			1	0	0.144	0.09
7.	Falme (Masgedi)	<i>Cipadess abaccifera</i>		300			0.000	0.00
8.	Karna	<i>Adina cordifolia</i>			1	0	0.069	0.05
9.	Katus	<i>Castanopsis indica</i>	1600	250			0.000	0.00
10.	Khirro	<i>Sapium insigne</i>	600	100	2	2	0.226	0.16
11.	Kyamun	<i>Cleistocalyx operculata</i>			1	0	0.281	0.19
12.	Ramritha	<i>Mallotus oppositifolius</i>			0	1	0.536	0.34
13.	Saj	<i>Terminalia tomentosa</i>	400		1	1	0.538	0.51
Total			6000	1200	43	78	34.809	100.00
In the Updated IEE								
1.	Amala	<i>Phyllanthus emblica</i>	0	14	0	0	2.07	1.89
2.	Amba	<i>Psidium guajava</i>	13	9	0	0	1.41	1.27
3.	Angeri	<i>Osbeckia nepalensis</i>	439	244	0	0	37.53	33.77
4.	Ankhatare/ Chainchui	<i>Trichilia connaroides</i>	36	18			0.000	0.00
5.	Barro	<i>Terminalia bellirica</i>	55		1	2	0.353	0.27

S.N.	Local Name	Botanical Name	Loss of Vegetation				Standing Wood Volume, m ³	Biomass (ton)		
			Loss of Regeneration		Loss of Tree (No.)					
			Seedling s/ha	Saplings /ha	Pole Class	Tree Class			Total	%
6.	Botdhairo	<i>Lagerstroemia parviflora</i>	113	65	307	32	339	2.38	38.236	34.61
7.	Chatwan	<i>Alstonia scholaris</i>			0	1	1	0.01	5.299	2.01
8.	Chilaune	<i>Schima wallichii</i>	1316	617	4259	839	5098	35.81	1816.3	1642.33
9.	Dabdabe	<i>Garuga pinnata</i>			1	0	1	0.01	0.144	0.09
10.	Dhurseli	<i>Colebrookea oppositifolia</i>	75	53	0	0	0	0.00	8.04	7.30
11.	Epil Epil	<i>Leucaena diversifolia</i>	0	0	60	0	60	0.42	1.71	1.55
12.	Falme (Masgedi)	<i>Cipadess abaccifera</i>		27				0.00	0.000	0.00
13.	Kafal	<i>Myrica esculenta</i>	0	0	120	0	120	0.84	9.18	8.33
14.	Karma	<i>Adina cordifolia</i>			1	0	1	0.01	0.069	0.05
15.	Katus	<i>Castanopsis sps.</i>	771	382	1530	210	1740	12.22	567.36	514.80
16.	Khirro	<i>Sapium insigne</i>	77	36	332	30	362	2.54	41.596	37.7
17.	Kyamun	<i>Cleistocalyx operculata</i>			1	0	1	0.01	0.281	0.19
18.	Lankuri	<i>Fraxinus floribundu</i>	0	12	60	0	60	0.42	4.08	3.71
19.	Mango	<i>Magnifera indica</i>	8	5	0	0	0	0.00	0.87	0.79
20.	Mauwa	<i>Engelhardtia spicata</i>	35	19	60	0	60	0.42	6.90	6.26
21.	Padke	<i>Albizia julibrissin</i>	17	12	270	90	360	2.53	132.66	120.38
22.	Phalat	<i>Quercus lamellose</i>	12	7	60	0	60	0.42	4.35	3.95
23.	Ramrilha	<i>Mallotus oppositifolius</i>	35	23	180	31	211	1.48	66.63	60.32
24.	Rato pate	<i>Ajuga bracteosa</i>	0	0	0	30	30	0.21	43.32	39.32
25.	Saj	<i>Terminalia tomentosa</i>	36		1	1	2	0.01	0.538	0.51
26.	Sal	<i>Shorea robusta</i>	1603	946	3360	1530	4890	34.34	5114.34	4640.44
27.	Sallo	<i>Pinus sp.</i>	5	33	480	120	600	4.21	159.57	144.79
28.	Simal	<i>Bombax ceiba</i>	5	4	0	30	30	0.21	20.94	19.00
29.	Swami	<i>Ficus benjamina</i>	0	0	30	30	60	0.42	696.93	632.36
30.	Tiju	<i>Diospyros malabarica</i>	195	107	30	0	30	0.21	17.31	15.70
31.	Uttis	<i>Alnus nepalensis</i>	14	12	120	0	120	0.84	9.12	8.29
		Total	4860	2645	11263	2975	14238	100.00	8807.136	7979.97
										1

नेपाल सरकार
जलस्रोत तथा विद्युत विभाग

Appendix C-V: List of Plant Species

S.N.	Botanical Name	Local Name	Growth Form	S.N.	Botanical Name	Local Name	Growth Form
1	<i>Zingiber officinale</i>	Aduwa	H	27	<i>Lagerstroemia spp.</i>	Bot Dhayaro	T
2	<i>Magnifera indica</i>	Aanp	T	28	<i>Sambucus sp.</i>	Buki	H
3	<i>Drymaria diandra</i>	Abijalo	H	29	<i>Oxalis corymbosa</i>	Chari Amilo	H
4	<i>Rubus ellipticus</i>	Ainselu	S	30	<i>Schima wallichii</i>	Chilaune	T
5	<i>Walsura triguga</i>	Akhataruwa	T	31	<i>Madhuca butyraceae</i>	Chiuri	T
6	<i>Phyllanthus emblica</i>	Amala	T	32	<i>Brassaopsis glomeulata</i>	Chuletro	T
7	<i>Psidium guajava</i>	Amba	T	33	<i>Berberis asiatica</i>	Chutro	S
8	<i>Thysanolaena maxima</i>	Amriso	S	34	<i>Parthenium hysterophorus</i>	Congress grass	H
9	<i>Osbeckia nepalensis</i>	Angeri	S	35	<i>Boehmeria rugulosa</i>	Daar	T
10	<i>Mimosa rubicaulis</i>	Areli Kanda	S	36	<i>Lannea coromandellica</i>	Dabdabe	T
11	<i>Euphorbia hirta</i>	Asthma weed	H	37	<i>Truimfetta rhomboides</i>	Dallekuro	S
12	<i>Justicia adhatoda</i>	Asuro	S	38	<i>Achyranthes spera</i>	Datiwan	S
13	<i>Eulaliopsis binata</i>	Babiyo	H	39	<i>Woodfordia fruticosa</i>	Dhanyero	S
14	<i>Artocarpus lakoocha</i>	Badahar	T	40	<i>Ficus nemoralis</i>	Dudhilo	T
15	<i>Melia azedarach</i>	Bakaino	T	41	<i>Juniperus indica</i>	Dhupi	T
16	<i>Quercus lanata</i>	Banjh	T	42	<i>Colebrokia oppositifolia</i>	Dhurseli	S
17	<i>Eupatorium odoratum</i>	Banmara	H	43	<i>Cynodon dactylon</i>	Dubo	H
18	<i>Bambusa spp.</i>	Bans	S	44	<i>Ficus nerifolia</i>	Dudhilo	T
19	<i>Dioscorea sp.</i>	Bantarul	C	45	<i>Cirsium arvense</i>	Gaidakade	S
20	<i>Ficus bengalensis</i>	Bar	T	46	<i>Ageratum conyzoides</i>	Gande	H
21	<i>Ficus sarmentosa</i>	Berula	T	47	<i>Campanula pallida</i>	Ghantejhar	H
22	<i>Aegle marmelos</i>	Bel	T	48	<i>Centella asiatica</i>	Ghodtapre	H
23	<i>Chenopodium album</i>	Bethe	H	49	<i>Dioscorea sp.</i>	Githa	C
24	<i>Rhus wallichii</i>	Bhalayo	T	50	<i>Rhododendron arboreum</i>	Gurans	T
25	<i>Buddleja asiatica</i>	Bhimensepati	T	51	<i>Ziziphu incurva</i>	Hade bayar	T
26	<i>Maesia chisla</i>	Bilaune	S	52	<i>Dicranopteris linearis</i>	Hade Unyu	S
53	<i>Eurya acuminata</i>	Jhingane	T	82	<i>Pyrus communis</i>	Naspati	T
54	<i>Ficus lacor</i>	Kabhro	T	83	<i>Ficus carica</i>	Nibaro (Nebharo)	T
55	<i>Tectaria macrodonta</i>	Kali neuro	H	84	<i>Arundo donax</i>	Nigalo	S
56	<i>Saccharum spontaneum</i>	Kans	H	85	<i>Ficus glaberrima</i>	Pakhri	T
57	<i>Myrica eiculenta</i>	Kafal	T	86	<i>Prunus cerasoides</i>	Paiyu	T
58	<i>Artocarpus heterophyllus</i>	Katahar (Jack fruit)	T	87	<i>Nephrolepis cordifolia</i>	Paniamala	H

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S.N.	Botanical Name	Local Name	Growth Form	S.N.	Botanical Name	Local Name	Growth Form
59	<i>Castanopsis indica</i>	Katus	T	88	<i>Erythrina strica</i>	Phaledo	T
60	<i>Machilus gamblei</i>	Kaulo	T	89	<i>Ficus religioisa</i>	Pipal	T
61	<i>Musa paradisiaca</i>	Kera (Banana)	T	90	<i>Mallotus oppositifolius</i>	Ramritha	T
62	<i>Diospyros malabarica</i>	Khailu (Tiju)	T	91	<i>Ajuga bracteosa</i>	Rato pate	H
63	<i>Ficus semicordata</i>	Khanyu	T	92	<i>Jatropha curcas</i>	Sajiwon	S
64	<i>Typha spp.</i>	Khar	H	93	<i>Terminalia elliptica</i>	Saj	T
65	<i>Pogonatherum crinitum</i>	Khari banso	H	94	<i>Shorea robusta</i>	Sal	T
66	<i>Ficus hispida</i>	Khasreto	T	95	<i>Pinus spp.</i>	Salla	T
67	<i>Sapium insigne</i>	Khirro	T	96	<i>Lindera neesiana</i>	Siltimur	T
68	<i>Morus alba</i>	Kimbu	T	97	<i>Bombax ceiba</i>	Simal	T
69	<i>Bauhinia variegata</i>	Koiralo	T	98	<i>Albizia spp.</i>	Siris	T
70	<i>Kydia calycina</i>	Kubindo	C	99	<i>Imperata spp.</i>	Siru	H
71	<i>Asparagus spp.</i>	Kurilo	H	100	<i>Urtica dioica</i>	Sisnu	S
72	<i>Bidens biternata</i>	Kuro	H	101	<i>Citrus aurantium</i>	Suntala (Orange)	T
73	<i>Schefflera venulosa</i>	Kursimlo	C	102	<i>Ficus benjamina</i>	Swami	T
74	<i>Litsea monopelata</i>	Kutmero	T	103	<i>Bauhinia purpurea</i>	Tanki	T
75	<i>Mimosa pudica</i>	Lajabati	H	104	<i>Cinnamomum tamala</i>	Tejpat	T
76	<i>Euphorbia pulcherrima</i>	Lalupate	S	105	<i>Zanthoxylum armatum</i>	Timur	T
77	<i>Fraxinus floribundu</i>	Lankure	T	106	<i>Trifolium repens</i>	Tinpate	H
78	<i>Choerospondias axillaris</i>	Lapsi	T	107	<i>Artemisia vulgaris</i>	Titepati	S
79	<i>Macaranga indica</i>	Malato	T	108	<i>Momordica charantia</i>	Tito karela	C
80	<i>Engelhardtia spicata</i>	Mauwa	T	109	<i>Cedrella toona</i>	Tuni	T
81	<i>Carica papaya</i>	Mewa	T	110	<i>Saccharum officinarum</i>	Ukhu	S
111	<i>Alnus nepalensis</i>	Utis	T	Growth Forms: H: Herbs, S: Shrubs, T: Tree, C: Climbers			



Appendix C-VI: List of Mammals

S.N.	Scientific Name	Common Name	Local Name	CITIES Appendix	IUCN Red list
1.	<i>Canis aerus</i>	Jackal	Syal	-	LC
2.	<i>Felis chaus</i>	Jungle cat	Ban Biralo	II	LC
3.	<i>Funambulus sp.</i>	Squirrel	Lokharke	-	LC
4.	<i>Herpestes edwardsii</i>	Common Mongoose	Nyauri Musa	-	LC
5.	<i>Hystrix indica</i>	Porcupine	Dumsi	-	LC
6.	<i>Lepus nigricollis</i>	Rabbit	Kharayo	-	LC
7.	<i>Macaca mulatta</i>	Rhesus Macaque	Rato Bandar	II	LC
8.	<i>Martes flavigula</i>	Yellow throated marten	Mal sapro	-	LC
9.	<i>Muntiacus muntjak</i>	Barking deer	Mriga	-	LC
10.	<i>Mus musculus</i>	House mouse	Musa	-	LC
11.	<i>Panthera pardus</i>	Common Leopard	Chituwa	I	VU
12.	<i>Pteropus spp</i>	Bat	Chamero	-	-
13.	<i>Semnopithecus entellus</i>	Common Langur	Langur	-	LC
14.	<i>Rattus rattus</i>	House rat	Musa	-	LC

No any protected mammal is reported as per the National Parks and Wildlife Conservation Act, 1973.

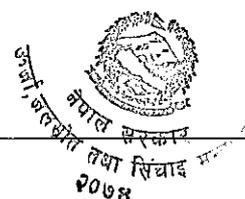
Appendix C-VII: List of Birds

S.N.	Scientific Name	Local Name	Habitat	CITIES Appendix	IUCN Red list
1.	<i>Apus affinis</i>	Gaunthali	O	-	LC
2.	<i>Bubulcus ibis</i>	Bakulla	O	-	LC
3.	<i>Buteo sp.</i>	Baj	O	II	LC
4.	<i>Chrysocolaptes lucidus</i>	Kath Phoruwa	F	-	LC
5.	<i>Cissa erythrorhyncha</i>	Lampuchchhre	F	-	-
6.	<i>Corvus splendens</i>	Kag	O	-	LC
7.	<i>Cuculus canorus</i>	Koili	F	-	LC
8.	<i>Dicrurus spp.</i>	Chibe	O, F	-	LC
9.	<i>Falco tinnunculus</i>	Baudai	O	II	LC
10.	<i>Gyps sp.</i>	Giddha	O	II	-
11.	<i>Lophura leucomelana</i>	Kalij	F	-	LC
12.	<i>Megalaima virens</i>	Nyauli	O	-	LC
13.	<i>Milvus migrans</i>	Chil	O	II	LC
14.	<i>Myophonus caeruleus</i>	Kalchaudo	F, R	-	LC
15.	<i>Passer domestius</i>	Bhangera (House sparrow)	O	-	LC
16.	<i>Phylloscopus spp.</i>	Fisto	F	-	LC
17.	<i>Pycnonotus cafer</i>	Jureli	O	-	LC
18.	<i>Streptopelia chinensis</i>	Dhukur	O	-	-
19.	<i>Surniculus lugubris</i>	Koili	O	-	LC

Habitat Code: O = Open or mixed country, F = Forest, R = On or nearby river

No any protected bird species is reported as per the National Parks and Wildlife Conservation Act, 1973.

Updated IEE




 प्रस्तावित कामदार सब स्टेशनको ROW मा परेका उपकरणको मूल्य र १३ मा रहेका काठमाडौंको मूल्य

क्र.सं.	वस्तु	माप	मापमाथि मूल्य	कुलमाथि (माप)	मूल्य आधारमा	माप	मापमाथि मूल्य	कुलमाथि
१	चलाउने	१	२२२२२	२२	३३३३	२	२२२२२	३३३३
२		२	३३३३	३३	४४४४	३	३३३३३	४४४४४
३		३	४४४४	४४	५५५५	४	४४४४४	५५५५५
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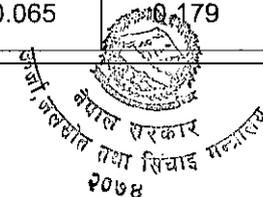
Appendix D: Documents related to Socio-economic Environment





Appendix D-I: Percentage of loss of land due to Land Acquisition in Approved and Updated IEE

S. N.	RM/Municipality*/ MC	Project Component	Name of Land Owner	Affected Land	Total Land	Percentage of Land Loss
1	Pokhara MC	AP2	Bindu Thapamagar	0.0225	0.102	22.06
2	Pokhara MC	AP3	Mitra Lamichhane	0.0225	2.618	0.86
3	Pokhara MC	AP5	Bodh Raj Tripathi	0.0225	0.867	2.60
4	Pokhara MC	AP10	Hari Bahadur Sapkota	0.0225	0.204	11.03
5	Pokhara MC	AP11	Ramesh	0.0225	0.521	4.32
6	Pokhara MC	AP14	Dilmaya Tiwari	0.0113	0.306	3.69
7	Pokhara MC	AP14	Rajendra Tiwari	0.0113	0.561	2.01
8	Rupa RM	AP15	Bhim Bahadur Gurung	0.0225	0.51	4.41
9	Rupa RM	AP16	Yam Bahadur Gurung	0.0225	1.122	2.01
10	Rupa RM	AP18	Bhagwan Subedi	0.0225	1.888	1.19
11	Rupa RM	AP19	Mahadev Subedi	0.0225	0.459	4.90
12	Rupa RM	AP20	Hem Raj Koirala	0.0113	0.255	4.43
13	Rupa RM	AP20	Narayan Krishna Koirala	0.0113	1.122	1.01
14	Rupa RM	AP22	Pun Narayan Shrestha	0.0225	0.786	2.86
15	Byas*	AP24	Hema Dura	0.0225	0.255	8.82
16	Byas*	AP27	Jas Narayan Shrestha	0.0225	0.459	4.90
17	Byas*	AP29 & 29A	Bishnu Prasad Neupane	0.0338	0.375	9.01
18	Byas*	AP29	Laxmi Shrestha	0.0225	1.341	1.68
19	Byas*	AP30	Bir Bahadur Gurung	0.0225	0.306	7.35
20	Byas*	AP32	Nanu Maya Subedi	0.0225	0.306	7.35
21	Byas*	AP33	Narayan Giri	0.0225	0.281	8.01
22	Byas*	AP33	Surendra Pandit	0.0225	0.306	7.35
23	Byas*	AP34	Jhilke Kumal	0.0225	0.515	4.37
24	Byas*	AP35	Purna Chandra Khanal	0.0225	0.357	6.30
25	Byas*	AP36	Hari Bahadur Thapa	0.0225	0.408	5.51
26	Byas*	AP37	Tek Bahadur Rana	0.0225	0.515	4.37
27	Byas*	AP38	Padam Bahadur Ale	0.0225	1.735	1.30
28	Rishing RM	AP40	Lok Bahadur BK	0.0225	0.179	12.57
29	Rishing RM	AP41	Lal Bahadur Bk	0.0225	0.153	14.71
30	Rishing RM	AP42	Khim Bahadur Ale	0.0225	1.939	1.16
Progress in additional section						
31	Byas*	AP45	Rana Singh Baral	0.0225	1.977	1.14
32	Byas*	AP46	Rim Maya Pun	0.0225	0.944	2.38
33	Byas*	AP48	Tak Bahadur BK	0.0225	0.791	2.84
34	Byas*	AP49	Ram Krishna Gharti	0.0225	2.015	1.12
35	Byas*	Substation	Krishna Maya Pandey	0.849	5.076	16.73
36	Byas*	Substation	Dipak Bahadur Pandey	0.761	2.296	33.14
37	Byas*	Substation	Lalit Pandey	1.396	2.398	58.22
38	Byas*	Substation	Bhim Nar Singh Basnet	0.049	0.296	16.55
39	Byas*	Substation	Surya Bahadur Basnet	0.10	0.281	36.30
40	Byas*	Substation	Arjun Bahadur Basnet	0.086	0.286	30.07
41	Byas*	Substation	Lal Bahadur Bhat	0.32	2.857	11.20
42	Byas*	Substation	Kali Pandey, Bhimsen Pandey	0.065	0.179	36.31



43	Byas*	Substation	Praladh Gharti	0.08	0.128	62.50
44	Byas*	Substation	Tulashi Bahadur Darai	0.082	0.459	17.86
45	Byas*	Substation	Hira Nand Sedhai	0.109	0.281	38.79
46	Byas*	Substation	Bhoj Bahadur Darai	0.037	0.077	48.05
47	Byas*	Substation	Bal Bahadur darai	0.053	0.357	14.85
48	Byas*	Substation & Access road	Purna Bahadur Darai	0.187	0.51	36.67
49	Byas*	Substation	Sakta Bahadur Darai	0.368	0.485	75.88
50	Byas*	Substation	Dhan Bahadur Thapa	0.102	1.505	6.78
51	Byas*	Substation	Ram Bahadur Gharti	0.193	0.204	94.61
52	Byas*	Substation	Khadga & Radha Gharti	0.209	0.281	74.38
53	Byas*	Access Road	Kamal Bahadur Darai	0.045	0.398	11.31
54	Byas*	Access Road	Jivan Pantha	0.156	0.204	76.47
55	Byas*	Access Road	Durga Bahadur Darai	0.121	0.306	39.54
56	Byas*	Access Road	Santa Bahadur Darai	0.009	0.306	2.94
Total				6.1105	45.648	13.39

Note: RM: Rural Municipality; MC: Metropolitan City; *: Municipality



Appendix D-II: Comparative Structure loss in Approved and Updated IEE

Type of structure	Project component	Name of Owner	Approved IEE			Updated IEE			Change
			Plinth Area (sq. ft.)	No. of storey	Total area (sq.ft.)	Plinth Area (sq.ft.)	No. of storey	Total area (sq.ft.)	
1. House	AP4-AP5	Jit Bahadur Gurung	247	1	247	247	1	247	No change
	AP5-AP6	Khem Raj Bajgai	320	2	640	320	2	640	No change
	AP13-AP14	Hari Prasad Tiwari	286	1	286	286	1	286	No change
	AP15-AP16	Raj Kumar Subedi	280	2	560	280	2	560	No change
	AP23-AP24	Bishnu Gurung	374	2	748	374	2	748	No change
	AP25-AP26	Som Bahadur Nepali	308	2	616	308	2	616	No change
	AP26-AP27	Kopila Dawadi	238	1	238	238	1	238	No change
	AP26-AP27	Krishna Bdr. Thapamagar	352	2	704	352	2	704	No change
	AP32-AP33	Hari Maya Wagle	345	2	690	345	2	690	No change
	AP38-AP39	Iman Singh Ale	294	1	294	294	1	294	No change
	AP40-AP41	Kesh Bahadur Saru	330	1	330	330	1	330	No change
	AP29A-AP30	Bir Bahadur Gurung	342	2	684	342	2	684	No change
Substation	Lalit Pandey	-	-	-	775	1	775	775	
Total(1)					6037		6812	775	
2. Cowshed	AP6-AP7	Nrayan Pd Lamichhane	208	2	416	208	2	416	No change
	AP23-AP24	Bishnu Gurung	242	1	242	242	1	242	No change
	AP25-AP26	Purnima Nepali	228	1	228	228	1	228	No change
	AP32-AP33	Hari Maya Wagle	372	1	372	372	1	372	No change
	AP40-AP41	Kesh Bahadur Saru	143	1	143	143	1	143	No change
	AP40-AP41	Durga Bahadur Thapa	135	1	135	135	1	135	No change
	AP41-AP42	Khim Bahadur Ale	110	1	110	110	1	110	No change
	Substation	Gam Bahadur Ale	121	1	121	-	-	-	-121
Substation	Suk Bd Rana	110	1	110	-	-	-	-110	
New Damauli SS	Lalit Pandey	-	-	-	396	1	396	396	
Total (2)					1877		2042	165	
3. Toilet	AP26-AP27	Krishna Bd Thapamagar	40	1	40	40	1	40	No change
4. Public Structure	AP13-AP14	Kahare Agriculture Cooperative	500	1	500	500	1	500	No change
Total (1+2+3+4)			-	-	8454	-	9394	940	



Appendix E: Public Notice



नेपाल
उर्जा, जलस्रोत तथा
२०००



नेपाल विद्युत प्राधिकरण

**लेखनाथ दमौली २२० के.वी. प्रसारण लाईन आयोजनाको
अद्यावधिक पारम्भिक वातावरणीय परीक्षण (I.E.E.) प्रतिवेदन तयारीको
सिलसिलामा राय सुझावको लागि सार्वजनिक सूचना**

(प्रकाशित मिति २०७६/०२/२५)

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली २२० के.वी. प्रसारण लाईन आयोजनाको प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन वातावरण संरक्षण नियमावली २०५४ अनुसार तत्कालीन श्री ऊर्जा मन्त्रालयबाट स्वीकृत भइसकेको छ । IEE प्रतिवेदनमा उल्लेखित सबस्टेशनको स्थान चेलवासबाट व्यास नगरपालिका-१३, खयरबोटे मा प्रस्ताव गरिएकाले प्रसारण लाईनको टावर नं. ४२, सिस्डि गाउँपालिका-१, बन्धरे देखि प्रस्तावित न्यू दमौली सबस्टेशन, व्यास नगरपालिका-१३, खयरबोटसम्म परिवर्तन गर्ने प्रस्ताव गरिएको छ जसको लम्बाइ २,६९९ कि.मि. हुनेछ । डबल सर्किटको उक्त प्रसारण लाईन आयोजना लेखनाथ सबस्टेशनबाट सुरु भई प्रस्तावित न्यू दमौली सबस्टेशनसम्म रेखाङ्कन गरिएको छ जसको कुल लम्बाइ ४४,४९२ कि.मि. हुनेछ ।

प्रस्तावको कार्यान्वयनबाट वातावरणमा पर्ने सक्ने प्रभावको सम्बन्धमा यो सूचना प्रकाशित भएको मितिले १५ (पन्ध्र) दिनभित्र सम्बन्धित जिल्ला समन्वय समिति, गाउँपालिका, नगरपालिका, वडा, सरोकारवाला व्यक्ति वा संय-संस्थाहरूले तल उल्लेखित ठेगानामा लिखित रायसुझाव उपलब्ध गराई दिनुहुन अनुरोध छ । साथै राय सुझावको प्रतिलिपि श्री ऊर्जा, जलस्रोत तथा सिंचाई मन्त्रालय तथा विद्युत विकास विभागमा समेत पठाउन सकिनेछ ।

रायसुझाव पठाउने ठेगाना

<p style="text-align: center;">नेपाल विद्युत प्राधिकरण इन्जिनियरिङ सेवा निर्देशनालय वातावरण तथा सामाजिक अध्ययन विभाग खरीपाटी, भक्तपुर</p> <p>फोन नं. : ०१-६६११५८०, फ्याक्स नं. : ०१-६६११५९० email:env.social@nca.org.np</p>		<p style="text-align: center;">नेपाल विद्युत प्राधिकरण प्रसारण निर्देशनालय लेखनाथ दमौली २२० के.वी. प्रसारण लाईन आयोजना पोखरा महानगरपालिका</p> <p>email:ld220kvtlp@gmail.com</p>
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नेपाल विद्युत प्राधिकरण
लेखनाथ-दमौली २२० के.भी. प्रसारण लाईन आयोजनाको
अद्यावधिक प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन तयारीको सिलसिलामा
रायसुभायको पठाउने सूचना
सुर्खेत जिल्ला
(मिति: २०७४/०९/१९)

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली २२० के.भी. प्रसारण लाईन आयोजनाको प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन वातावरण संरक्षण नियमावली २०५४ अनुसार तत्कालीन श्री ऊर्जा मन्त्रालयबाट स्वीकृत भइसकेको छ। IEE प्रतिवेदनमा उल्लेखित सबस्टेशनको स्थान बेलवासबाट व्यास नगरपालिका-१३, खयरबोटे मा प्रस्ताव गरिएकाले प्रसारण लाईनको टावर नं. ४२, रिसिड गाउँपालिका-१, बन्धरे देखि प्रस्तावित न्यू दमौली सबस्टेशन, व्यास नगरपालिका-१३, खयरबोटेसम्म परिवर्तन गर्ने प्रस्ताव गरिएको छ जसको कूल लम्बाई २,६६९ किलोमिटर हुनेछ। डबल सर्किटको उक्त प्रसारण लाईन आयोजना लेखनाथ सबस्टेशनबाट सुरु भई प्रस्तावित न्यू दमौली सबस्टेशनसम्म रेखाङ्कन गरिएको छ जसको कूल लम्बाई ४४,४९२ कि.मी. हुनेछ।

प्रस्तावको कार्यान्वयनबाट वातावरणमा पर्ने सक्ने प्रभावको सम्बन्धमा यो सूचना प्रकाशित भएको मितिले १५ (पन्ध्र) दिन भित्र सम्बन्धित जिल्ला समन्वय समिति, गाउँपालिका, नगरपालिका, वडा, सरोकारवाला व्यक्ति वा संघ-संस्थाहरूले तल उल्लेखित ठेगानामा निखित रायसुभाव उपलब्ध गराई दिनु हुन अनुरोध छ। साथै राय सुभवको प्रतिलिपि श्री ऊर्जा, जलस्रोत तथा सिंचाई मन्त्रालय तथा विद्युत विकास विभागमा समेत पठाउन सकिनेछ।

रायसुभाव पठाउने ठेगाना

नेपाल विद्युत प्राधिकरण
 ईन्जिनियरिङ सेवा निर्देशनालय
 वातावरण तथा सामाजिक अध्ययन विभाग
 खरीपाटी, भक्तपुर
 फोन नं. : ०१-६६९९५५०
 फ्याक्स नं. : ०१-६६९९५५०
 email:env.social@nea.org.np



नेपाल विद्युत प्राधिकरण
 प्रसारण निर्देशनालय
 लेखनाथ दमौली २२० के.भी.
 प्रसारण लाईन आयोजना
 पोखरा महानगरपालिका
 email:ld220kvtip@gmail.com

Appendix F: Recommendation Letters





"विद्युतायुक्त जाड शहर, समृद्ध मेरो व्यास नगर"



व्यास नगरपालिका

नगर कार्यपालिकाको कार्यालय

समान्य ग्रामस्थान शाखा
चमौली, तनहुँ
गण्डकी प्रदेश, नेपाल
२०७३



पत्र संख्या - २०७६/०७७
चलानी नम्बर- १०९

मिति- २०७६/०४/१०

बिषय - सिफारिस गरिएको सम्बन्धमा ।

श्री नेपाल विद्युत प्राधिकरण,
वातावरण तथा सामाजिक अध्ययन विभाग,
खरीपाटी, भक्तपुर ।

उपर्युक्त सम्बन्धमा नेपाल विद्युत प्राधिकरण, वातावरण तथा सामाजिक अध्ययन विभागको मिति २०७६/०३/२३ को पत्र साथ प्रस्तावित लेखनाथ-दमौली २२० के.भी. प्रसारण लाइन आयोजनाको अद्यावधिक प्रारम्भिक वातावरणीय परीक्षण (U-IEE) प्रतिवेदनको सारांश प्राप्त भई व्यहोरा अवगत भयो । सो सम्बन्धमा उक्त प्रतिवेदनमा उल्लेख भएका वातावरणीय प्रभाव न्यूनीकरणका कार्यक्रमहरु कार्यान्वयन हुने गरी वातावरण संरक्षण नियमावली, २०५४ को नियम १० बमोजिम उक्त प्रस्ताव कार्यान्वयन हुनको लागि सिफारिस साथ अनुरोध छ ।

(Signature)

मेघ नाथ आचार्य
शाखा अधिकृत/प्रवक्ता

"सुक्ष्म प्रतिरोधी सरचना निर्माण गरी, सार्वजनिक प्रकोपबाट बच्ने र बचाउने"

Phone No. 085-560162/560163, Fax No.: 977-05-560233 Email: vyasamunicipality@gmail.com Web: www.vyasamun.gov.np



"ऋषिङ्ग सम्बन्धिको आधार, कृषि, संस्कृति, पर्यटन र पूर्वाधार"
ऋषिङ्ग गाउँपालिका
गाउँ कार्यपालिकाको कार्यालय
 कोटदरवार, तनहुँ
 गण्डकी प्रदेश, नेपाल

पत्र संख्या :- २०७९/०७७

चलानी नम्बर :- ९५



मिति : २०७९/०४/०९

श्री नेपाल विद्युत प्राधिकरण
 वातावरण तथा सामाजिक अध्ययन विभाग
 खरीपाटी, भक्तपुर ।

विषय:- सिफारिस गरिएको सम्बन्धमा ।

उपरोक्त सम्बन्धमा नेपाल विद्युत प्राधिकरण, वातावरण तथा सामाजिक अध्ययन विभागको मिति २०७९/०३/२३ को पत्र साथ प्रस्तावित लेखनाथ - दमौली २२० के.भी. प्रसारण लाइन आयोजनाको अद्यावधिक प्रारम्भिक वातावरणीय परिक्षण (U-IEE) प्रतिवेदनको सारांश प्राप्त भई व्यहोरा अवगत भयो । उक्त प्रतिवेदनमा उल्लेख भएका वातावरणीय प्रभाव न्यूनिकरणका कार्यक्रमहरू कार्यान्वयन हुने गरी वातावरण संरक्षण नियमावलीको २०५४ को नियम १० बमोजिम उक्त प्रस्ताव कार्यान्वयन हुनको लागि सिफारिस गरिन्छ ।

गोनु माया थापा
 उपाध्यक्ष

फोन नं. : ०६५-६२००९९, ०६५-६२००९५
 website www.rishingham.gov.np e-mail: info@rishingham.gov.np or rishingham@gmail.com

Appendix G: Public Deeds and Suggestions





संविधानद्वारा संरक्षित स्थानमा रहेको यस क्षेत्र, संसदको इच्छामा निर्वाह गरिने कार्यमा बाधित हुने



व्यास नगरपालिका
Vyas Municipality
१ नं. वडा कार्यालय
1 No. Ward Office

तहसील: Manahun



गण्डकी प्रदेश, नेपाल
Gandaki Province, Nepal

पत्र संख्या: २०७५/२०७६

चलानी नम्बर: ३१०५

मिति: २०७५/०९/१५

विषय: जातकारी सल्लसमा/।

श्री नेपाल रिपब्लिक प्रतिकरण

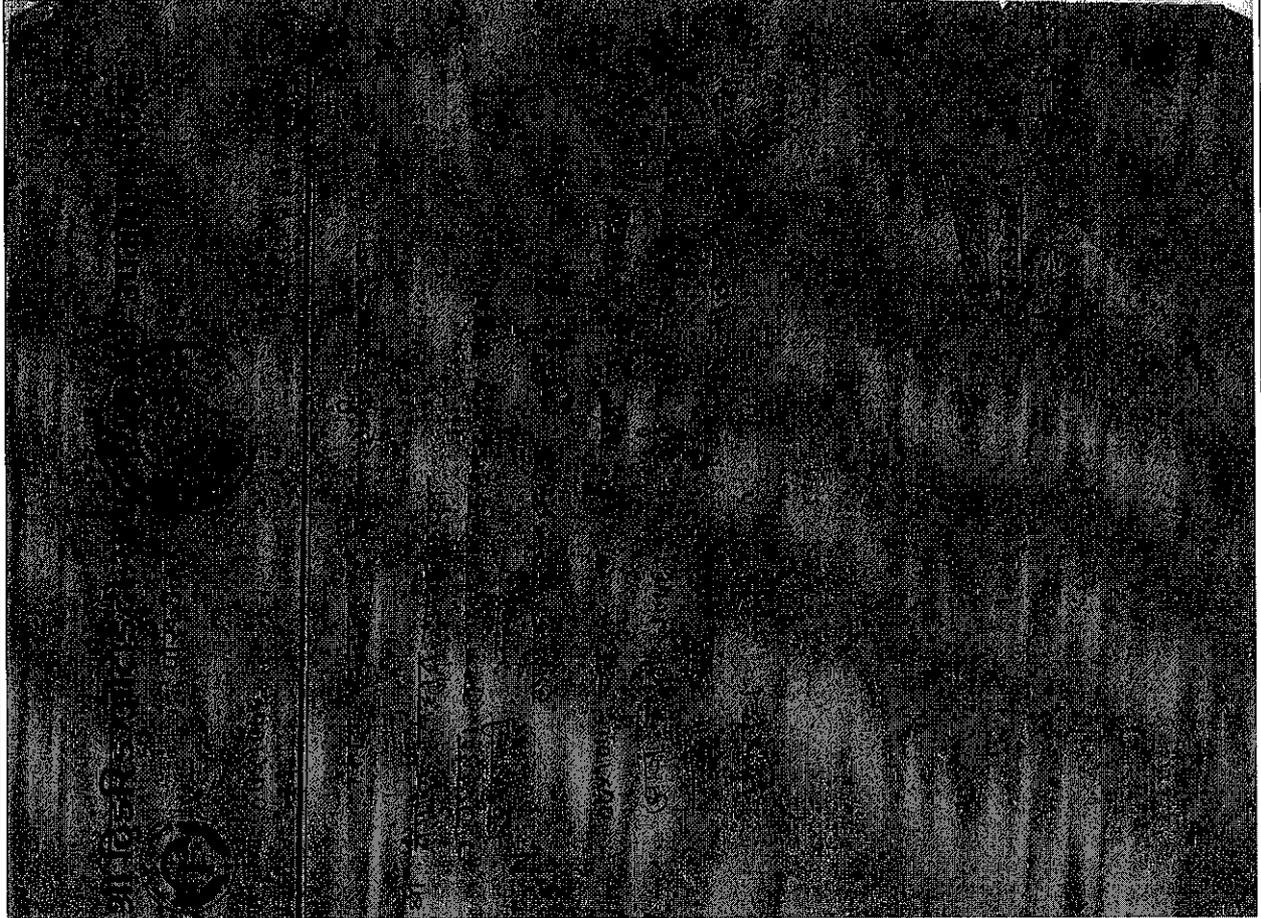
आवावरण तथा सामाजिक आध्ययन विभाग, भक्तपुर

प्रस्तुत विषयमा तहसील कार्यालयको मिति २०७५/०९/१५ गतेको च नं. २०५ को प्राप्त पत्र अनुसार प्रस्तावित लेखनाथ दमौली-२२० डेभी प्रमाण लाइन आयोजनाको अत्यावधिक प्राथमिक आवावरणीय परिक्षण प्रतिवेदन उपर आयोजना प्रभावित गाउँपालिका/नगरपालिका/तहसील अथवा संरक्षितस्थल विकासको सम्बन्धमा प्राप्त गर्ने उपरोक्त प्रस्तावित सामाजिक सुचनाको मितिमा यस कार्यालयको सुचना मितिमा मिति गरी जातकारी दिनुका लागि अनुरोध गर्नुभएको मिति २०७५/०९/१५ गतेका दिन सुचना देास भएको व्यहोरा जातकारीका लागि अनुरोध गरिन्छ।



(Signature)
अध्यक्ष

सुदूरपश्चिम प्रदेश, कैलाली जिल्ला, सल्यान नगरपालिका, वडा नं. १
Phone No: ९७७-९७५-५६२१११ Email: syedman.ward@syedman.gov.np Web: www.syedman.gov.np



[Type text]



व्यास नगरपालिका
Vyas Municipality
१३ नं. बडा कार्यालय
13 No. Ward Office

तह्रा, Janahun
२०१३, २०७३

गण्डकी प्रदेश नेपाल
Gandaki Province, Nepal

पत्र संख्या: ०१४/०१६
संलग्नी नम्बर: ११८८१

मिति: २०७६/०१/१४

विषय: सूचना टाँस गरिएको बारे ।

श्री नेपाल प्राधिकरण
इन्जिनियरिङ सेवा निर्देशनालय
वातावरण तथा सामाजिक अध्ययन विभाग



सुर्भोग, पश्चिम लुम्बिनी वातावरण मन्त्रालय
सुर्भोग, पश्चिम लुम्बिनी वातावरण मन्त्रालय

पत्र संख्या: २०७६/०१६
सं.नं.: २६०३३६

मिति: २०७६/०१/१३

विषय: जानकारी गराइएको सम्बन्धमा ।

श्री नेपाल विद्युत प्राधिकरण,
वातावरण तथा सामाजिक अध्ययन विभाग,
बारिवाटी, भरतपुर ।

प्रस्तुत विषयमा तारही प्राधिकरणको पत्र सं. २०७६/०१६ सं.नं. ८०२४ मिति २०७६/०१/११ को
पत्रसाथ सार्वजनिक सूचना प्राप्त भई यस कार्यसम्बन्धी सूचना पाटीमा टाँस गराइएको व्यहोरा
अनुप्रेषण गरिन्छ ।

प्रस्तुत विषयमा यस व्यास नगरपालिका ल्याहाको मिति २०७६/०१/११ सं.नं. ८०२४ को प्रालय पत्र अनुसार
नेपाल विद्युत प्राधिकरणबाट प्राप्त विवरणको आधारमा प्रस्तावित लेखापत्र दमौली २२० के. मी. प्रशारण लाईन आयोजनाको सार्वजनिक
सूचना यस बडा कार्यालयको सूचना पाटिसमा मिति २०७६/०१/१४ मा टाँस गरिएको व्यहोरा जानकारी
गरिन्छ ।

रमेश थापा
का.वा. अध्यक्ष
२०७६/०१/१४

२०७६/११/१२
विभागीय इन्कोर
सहायक वल अधिकारी



सूचना सँगैको लेखापत्र विवरण पत्र, सम्बन्धित फाइलबाट कमी र कमीको
सूचना सँगैको लेखापत्र विवरण पत्र, सम्बन्धित फाइलबाट कमी र कमीको
Phone No: 977-98569603104 Email: vyas@vyas.gov.np Web: www.vyas.gov.np

लेखनाथ दमौली २२० के.भी. प्रसारण लाइन आयोजना

अद्यावधिक प्रारम्भिक वातावरणीय परीक्षण



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
बरिपाटी, भक्तपुर

लेखनाथ दमौली २२० के.भी. प्रसारण लाइन आयोजनाको
अद्यावधिक प्रारम्भिक वातावरणीय परीक्षण (U-IEE) को लागि तयार गरिएको
आयोजना क्षेत्रमा पाइने वन, वन्यजन्तु र वनस्पति सम्बन्धि प्रश्नावली तथा रायसुझावहरूको अनुसूची

नेपाल विद्युत प्राधिकरण प्रस्तावक रहेको लेखनाथ दमौली २२० के.भी. प्रसारण लाइन आयोजना कार्यान्वयन गर्दा आयोजना प्रभावित गाउँपालिका/नगरपालिकाहरूमा रहेको वन, वन्यजन्तु तथा जैविक वातावरणको वस्तुस्थिति बारेमा ने.वि.प्रा., वातावरण तथा सामाजिक अध्ययन विभाग, भक्तपुरबाट अद्यावधिक प्रारम्भिक वातावरणीय परीक्षण (Updated Initial Environmental Examination, U-IEE) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा वन उपभोक्ता समूह, स्थानीयबासी, सरोकारवालाहरू बिच निम्न मिति, समय र स्थानमा छलफल गरी निम्न प्रश्नावली अनुरूप विवरण तथा रायसुझाव संकलन गरियो।

स्थान: जिल्ला : ताप्लेजु गाउँपालिका/नगरपालिका : छाप्लेजु वडा नं./ठाउँ : १३
मिति : २०७३/११/१५ समय : विश्रुति ओट्टोली सा.व.
आयोजनाको नजिकको प्रस्तावित संरचना (AP No. / RoW AP to AP) (Substation/Switchyard.....)

क्र.सं.	नाम	स्थायी ठेगाना	सामुदायिक वन/संस्था	पद/पेशा	सम्पर्क न.	हस्ताक्षर
१	विष्णु के.रि.सेठ	छाप्लेजु-१३	विष्णुके.रि.सेठ	अध्यक्ष	९८०६५०६५४६	
२	इन्द्रजनी प्रसाद रिप्ल	छाप्लेजु-१३	सिटीसिटीटोल किंग	अध्यक्ष	९८७५४३२१०	
३	श्याम कृष्ण सुब्बा	छाप्लेजु-१३	विष्णुके.रि.सेठ	सदस्य	९८७५४३२१०	
४	शुभल अ.अ.कार्की	छाप्लेजु-१३	"	"	९८७५४३२१०	
५	ताल बहादुर सुब्बा	छाप्लेजु-१३	"	"	९८७५४३२१०	
६	भरत थापा	छाप्लेजु-१३	"	"	९८७५४३२१०	
७	ताल बहादुर पुत	छाप्लेजु-१३	"	"	९८७५४३२१०	
८	धन बहादुर थापा	छाप्लेजु-१३	"	"	९८७५४३२१०	
९	सरील राताभट्ट	छाप्लेजु-१३	विष्णुके.रि.सेठ	सचिव	९८७५४३२१०	
१०	इन्द्रजना रिप्ल	छाप्लेजु-१३	"	सदस्य	९८७५४३२१०	

वातावरणीय अध्ययन टोलीका सदस्यहरू

क्र.सं.	नाम घर	ठेगाना	पद/पेशा	सम्पर्क न.	हस्ताक्षर
१	कपिता वैद्यपाल	ने.वि.प्रा., भक्तपुर	सचिव	९८७५४३२१०	
२					

रायसुझाव: बाँस अमरीसो टिक वृद्धा सेपनी र तारु वार गर्ने लक्ष्यमा
का साथ काठ्ठी सामुदायिक वन को कार्यक्रम छ यस बाई
मदया नकार गरी आयोजना ले कार्यक्रम गरी दिन
का लागी अनुरोध गर्दै छौं

नेपाल विद्युत प्राधिकरण

वातावरण तथा सामाजिक अध्ययन विभाग



Appendix H: Declaration Sheet



नेपाल सरकार
उर्जा, जलजोत तथा सिञ्चन विभाग
२०७४

Title of the Updated IEE Report: Lekhnath-Damauli 220kV TL Project.

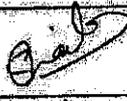
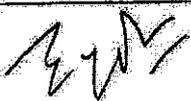
Name/Address of the Project Proponent:

Nepal Electricity Authority
 Durbar Marg, Kathmandu, Nepal
 Phone No. : 01-4220449
 Fax No. : 01-4447969

We declare the following:

- (i) We have conducted the study professionally using acceptable and standard methodologies;
- (ii) The study findings are correct to the best of our knowledge; and have not been altered in any manner and
- (iii) We will be accountable for any misleading information in the part of this report related to my area(s) of study.

List of Updated IEE Team Members

Name/Position in Updated IEE Team	Qualification	Area(s) of study in Updated IEE	Signature
Krishna Prasad Joshi (Statistician-Team Leader)	M.Sc. Statistics	Data Analysis/ Socio-economic and Cultural Environment/Overall Report	
Shailaza Gyawali Sociologist -Team Member)	M.A. Sociology	Socio-economic and Cultural Environment	
Kabita Poudyal (Environmentalist-Team Member)	M.Sc. Environmental Science	Biological Environment	
Prabesh Wagle (Civil Engineer -Team Member)	B.E. Civil Engineering	Physical Environment	

Date:



४

Appendix I: Approved ToR







सर्वकार
उद्योग विभाग
विद्युत वितरण विभाग

सं. ११२२२०/११६०२११
११६०२११/११२२२०
११६०२११/११२२२०
११२२२०/११६०२११

वातावरण शाखा

सं. ११२२२०/११६०२११
११६०२११/११२२२०
११६०२११/११२२२०
११२२२०/११६०२११

विषय - लेखताथ - दमौली २२० के.वी. प्रसारण लाइन आयोजनाको शारदावाटि वातावरणीय परिक्षण (IEE) प्रतिवेदन स्वीकृत भएको सम्बन्धमा।

श्री नेपाल विद्युत प्राधिकरण
रक्षक, काठमाडौं

उपरोक्त प्रस्तावमा तल्लोबाट प्राप्त भएको लेखताथ - दमौली २२० के.वी. प्रसारण लाइन आयोजनाको प्राथमिक वातावरणीय परिक्षण (IEE) प्रतिवेदन श्री एजा मन्त्रालयको मिति २०७३/११/०७३२ को मन्त्रिकरणिय निर्णय अनुसार विमर्श गर्नका लागि स्वीकृत भएको कुराको खासरी जानकारीमा आएको भन्ने संदर्भमा।

[Signature]

[Title]

शर्तहरू

- आयोजना निर्माण एवं संचालनको समयमा प्राविधिक तथा पहिचान भएका प्रभावकारी अवरोध प्रतिवेदनमा हाल पहिचान वा आकलन नभएको प्रभावकारी अवरोधको पहिचान भएमा तथा पहिचान नभएको अवरोधको पहिचान गर्न र प्रतिकूल प्रभावहरूलाई दूर गर्नको लागि प्रस्तावको आयोजना स्वयंभूत रूपमा उत्तरदायी हुने।
- स्वीकृत प्रतिवेदनमा उल्लेख भए अनुसारको वातावरणीय अनुसन्धान योजना लाई आधार बनाई प्रस्तावको निर्माणकार्यको समयमा मध्यमवर्गीय निर्माण कार्य सम्पन्न भएपछि अनुसन्धान वातावरणीय अनुसन्धान प्रतिवेदन प्रस्तुत गर्नका लागि विद्युत वितरण विभागमा पेश गत गर्ने छ।

नेपाल विद्युत प्राधिकरण	
वातावरण तथा सामाजिक विकास विभाग	
१. वातावरणीय अनुसन्धान प्रमाणित २. वातावरणीय अनुसन्धान प्रतिवेदन ३. प्रतिकूल प्रभावहरू	४. वातावरणीय अनुसन्धान ५. वातावरणीय अनुसन्धान ६. वातावरणीय अनुसन्धान

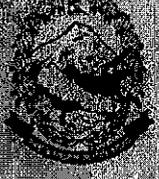
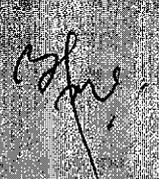
[Signature]

[Title]

[Date]

[Location]



	नेपाल सरकार ऊर्जा मन्त्रालय विद्युत विकास विभाग (.....)		पत्र नं. ५४५५२/५४५५३ ५४५५४/५४५५५ ५४५५६/५४५५७ ५४५५८/५४५५९
	पत्र संख्या -		फारम (१९९७-११-४४८०२५७) पोस्ट बक्स नं. २५०९ धापाचौर, अनामचौर काठमाडौं, नेपाल मिति:
विषय -			
<p>१. स्वीकृत प्रासंगिक वातावरणीय परीक्षण प्रतिवेदनमा उल्लेखित आयोजनाको संरचना तथा क्रियाकलापहरूको स्थल, डिजाइन, आकार वा प्रकारमा उल्लेखनीय परिवर्तन गर्ने परे माफो जानकारी विद्युत विकास विभाग जाई गराई थप अध्ययन गर्ने विषयहरूका बारेमा अनुमति लिनु पर्ने छ।</p> <p>२. उक्त आयोजना निर्माण गर्दा सम्बन्धित सरोकारवालाहरू तथा सामुदायिक वन सँग आवश्यक समन्वय तथा सहमति गरिनु पर्नेछ।</p>			
बोधार्थ श्री ऊर्जा मन्त्रालय सिंहदरवार, काठमाडौं, स्वीकृत प्रतिवेदनको एक वान यसै माथ संलग्न छ। श्री वन तथा भू संरक्षण मन्त्रालय सिंहदरवार, काठमाडौं, स्वीकृत प्रतिवेदनको एक वान यसै माथ संलग्न छ।			
			



८२११२१६
८२११२०६

फुलबाचर २०७०-१-८२११२१०
सिंहदरबार, काठमाण्डौ

प.सं. ०६४१६४
ख.सं. २३३

मिति: २०७३।०७।७

विषय: लेखनाथ - दमौली २२० के.भि विद्युत प्रसारण लाइनको प्रारम्भिक वातावरणीय परीक्षणको कार्यसूची (TOR) स्वीकृत भएको सम्बन्धमा ।

श्री नेपाल विद्युत प्राधिकरण,
दरवारमार्ग, काठमाण्डौ ।

तहाँवाट पेश भएको लेखनाथ - दमौली २२० के.भि विद्युत प्रसारण लाइनको प्रारम्भिक वातावरणीय परीक्षणको कार्यसूची (TOR) प्रतिवेदन वातावरण संरक्षण ऐन, २०५३ तथा वातावरण संरक्षण नियमावली, २०५४ बमोजिम निम्न शर्तहरू सहित संलग्न अनुसारको विषयहरू अध्ययनमा समेटने गरि मन्त्रालयको मिति ०७३।०७।०२ को निर्णय (सचिवस्तर) अनुसार स्वीकृत भएको व्यहोरा अनुरोध गरिन्छ । (स्वीकृत प्रतिवेदनको एकप्रति संलग्न छ ।)

शर्तहरू

१. आयोजनाले प्रारम्भिक वातावरणीय परीक्षणको अध्ययन गर्दा सरोकारवाला निकाय सँग आवश्यक समन्वय गरी गर्नु पर्नेछ।
२. प्रारम्भिक वातावरणीय परीक्षणमा उल्लिखित गा.वि.स तथा जिल्ला अनुमतिपत्रमा उल्लेख भए अनुसार हुनुपर्नेछ ।
३. स्वीकृत प्रारम्भिक वातावरणीय परीक्षणको कार्यसूचीमा उल्लेखित आयोजनाको संरचना तथा क्रियाकलापको स्थल, डिजाइन, आकार वा प्रकारमा परिवर्तन गर्नुपरे सोको जानकारी यस मन्त्रालयमा गराई थप अध्ययन गर्न आवश्यक विषयहरूका वारेमा अनुमति लिनु पर्नेछ ।

बोधार्थ

श्री विद्युत विकास विभाग,
अनामनगर, काठमाण्डौ ।

.....
कल्प मोहन सोती
सि.डि.ई







NEPAL ELECTRICITY AUTHORITY

TERMS OF REFERENCE
FOR
INITIAL ENVIRONMENTAL EXAMINATION
OF
LEKHNATH-DAMAULI 220kV TRANSMISSION LINE PROJECT



Submitted to:
Ministry of Energy
Through
Department of Electricity Development



Prepared and Submitted by:
Environment and Social Studies Department
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May, 2016



ACRONYMS AND ABBREVIATIONS

ACSR	:	Aluminum Conductor Steel Reinforced
AP	:	Angle Point
CBOs	:	Community Based Organization
CBS	:	Central Bureau of Statistics
CFUG	:	Community Forest Users' Group
CSR	:	Corporate Social Responsibility
DDC	:	District Development Committee
DIA	:	Direct Impact Area
DoED	:	Department of Electricity Development
EIA	:	Environmental Impact Assessment
EMF	:	Electromagnetic Field
EPA	:	Environmental Protection Act
EPR	:	Environment Protection Rules
ESSD	:	Environment and Social Studies Department
FGD	:	Focused Group Discussion
GIS	:	Geographic Information System
GoN	:	Government of Nepal
GPS	:	Global Positioning System
HHs	:	Households
HIA	:	High Impact Area
IEE	:	Initial Environmental Examination
IIA	:	Indirect Impact Area
ILO	:	International Labor Organization
LPG	:	Liquefied Petroleum Gas
MoEn	:	Ministry of Energy
MoFSC	:	Ministry of Forest and Soil Conservation
MIA	:	Moderate Impact Area
NEA	:	Nepal Electricity Authority
NGOs	:	Non-Governmental Organizations
NTFPs	:	Non-Timber Forest Products
RoW	:	Right of Way
ST	:	Suspension Tower
TL	:	Transmission Line
ToR	:	Terms of Reference
VDC	:	Village Development Committee

Units

BS	:	Bikram Sambat
°C	:	Degree Centigrade
ha	:	Hectare
km	:	Kilometer
kV	:	Kilo Volt
mm	:	Millimeter
m ²	:	Square meter
MW	:	Megawatt
sq. km.	:	Square Kilometer
USD	:	United States Dollar



TABLE OF CONTENT

ACRONYMS AND ABBREVIATIONS.....	I
TABLE OF CONTENT.....	II
LIST OF TABLE.....	III
LIST OF FIGURE.....	III
LIST OF ANNEXES.....	III
1 INTRODUCTION.....	1-1
1.1 Background.....	1-1
1.2 Proponent.....	1-1
1.3 Organization Responsibility for Conducting IEE Study.....	1-1
1.4 Objectives of the ToR.....	1-1
1.5 Objectives of IEE Study.....	1-2
1.6 Rationality for Conducting IEE Study.....	1-2
2 PROJECT DESCRIPTION.....	2-1
2.1 Project Location.....	2-1
2.2 Project Accessibility.....	2-1
2.3 Project Technical Features.....	2-2
2.4 Salient Features of the Project.....	2-5
2.5 Delineation of Project Impact Area.....	2-6
2.6 Construction Planning.....	2-6
3 STUDY METHODOLOGY.....	3-1
3.1 Type of Data.....	3-1
3.2 Data Collection Method.....	3-3
3.3 Data Analysis.....	3-4
3.4 Identification, Evaluation and Prediction of Impact.....	3-5
3.5 Public Involvement.....	3-5
4 REVIEW OF POLICIES AND LEGAL PROVISION.....	4-1
4.1 Constitution of Nepal, 2072.....	4-1
4.2 Plans and Policies.....	4-1
4.3 Acts.....	4-1
4.4 Rules/Regulations.....	4-1
4.5 Guidelines/Conventions.....	4-1
5 EXISTING ENVIRONMENTAL CONDITION.....	5-1
5.1 Physical Environment.....	5-1
5.2 Biological Environment.....	5-4
5.3 Socio-economic and Cultural Environment.....	5-6
6 ENVIRONMENTAL IMPACTS.....	6-1
6.1 Issues Raised by Public and Stakeholders.....	6-1
6.2 Issues Identified by Experts.....	6-1
6.3 Issues Prioritized for IEE study.....	6-3
7 ALTERNATIVE ANALYSIS.....	7-1
7.1 Introduction.....	7-1
7.2 No Action Alternative.....	7-1
7.3 Other Alternatives.....	7-1
8 MITIGATION AND ENHANCEMENT MEASURES.....	8-1
8.1 Introduction.....	8-1
8.2 Types of Mitigation Measures.....	8-1
9 ENVIRONMENTAL MONITORING.....	9-1
10 REPORT FORMAT AND DELIVERABLES.....	10-1
REFERENCES.....	10-1

LIST OF TABLE

Table 2-1: Details of Angle Points	2-3
Table 2-2: Salient Features	2-5
Table 3-1: Detail of Topographic Maps of Project Area	3-1
Table 5-1: Land Use along the alignment	5-2
Table 5-2: Climatological Data along the Project Area	5-3
Table 5-3: List of Affected Community Forests	5-5
Table 5-4 : Demographic Characteristics of the Project Affected Districts	5-6
Table 5-5: Demographic Characteristics of the Project Affected VDCs/Municipalities	5-6
Table 5-6: Caste wise Population in the Project Affected VDC/Municipalities	5-7
Table 5-7 : Literacy rate of the Project Affected VDCs/Municipalities	5-7
Table 7-1: Alternative Routes	7-1

LIST OF FIGURE

Figure 2-1: Project Location Map	2-1
Figure 2-2: Project Affected VDCs/ Municipalities	2-2
Figure 5-1: Altitudinal Variation along the Alignment	5-1
Figure 5-2: Land Use Map of Affected VDCs/Municipalities of Lekhnath-Damauli TL Project	5-2

LIST OF ANNEXES

- Annex -I: Survey License
- Annex-II: Table for Forest Loss, Land Loss, Crop Loss and Structure/Other Properties Loss
- Annex-III: Sample of Household Questionnaire, KII Guidelines and VDC Checklist
- Annex-IV: News covered by Local Media
- Annex -V: Attendance of Group Meeting
- Annex VI: IEE Format



1 INTRODUCTION

1.1 Background

Nepal possesses immense hydropower potential which has yet not be realized. However, the present situation is that Nepal has developed only approximately 750 MW of hydropower. The demand of power has been increasing with an average of 9% annually. At present, the generation capacity is not sufficient to feed the electricity demand of the country. It has triggered the severe load shedding in the country. Nepal Electricity Authority (NEA), the only public utility in Nepal responsible for generation, transmission, and distribution of electricity, is finding difficulty to cope with the increasing demand due to poor investment in generation and transmission.

Recently, System Planning Department of NEA has completed Power Evacuation Study for Lekhnath-Damauli 220kV TL. The hydropower projects namely Tanahun hydropower project (140MW), Upper madi (25MW), Namarjun Madi (12MW) and Bajra Madi (24.8MW) are in vicinity of the Lekhnath-Damauli; some of them are in construction and remaining others in study phase. It is essential to develop the 220kV transmission line to evacuate the power from these above mentioned projects. The current project **Lekhnath-Damauli 220kV Transmission Line Project** is a major step for evacuating the power generated from the Seti-Madi River basin and the vicinity area.

1.2 Proponent

Nepal Electricity Authority (NEA), the major electricity generator and sole agency responsible for transmission and distribution of electricity, is the proponent of the proposed Lekhnath-Damauli 220kV TL Project. The Ministry of Energy (MoEn) has granted a survey license on B.S. 2072/11/02 to NEA for feasibility and Initial Environmental Examination (IEE) study which is valid up to 2074/11/01 B.S. A copy of survey license is attached in Annex-I.

Address of the Project Proponent:

Nepal Electricity Authority
Durbar Marg, Kathmandu, Nepal
Phone No. : 01-4220449
Fax No. : 01-4447969

1.3 Organization Responsibility for Conducting IEE Study

Environment and Social Studies Department (ESSD) of NEA is responsible for the preparation of the ToR for the IEE study of the proposed project

Environment and Social Studies Department

Engineering Service Directorate

Nepal Electricity Authority

Kharipati, Bhaktapur, Nepal

Phone No. : 01-6611580

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Email : neaessd@wlink.com.np



1.4 Objectives of the ToR

The primary objective of the ToR for IEE is to inform the stakeholders about the project, receive their comments and feedback on relevant environmental impacts/ issues and identify the priority based components on social and environmental parameters for assessment.

The other objectives of ToR are to:

- To Collect brief information on physical, biological and socio-economic and cultural environment of the project area;
- To Identify all the beneficial and adverse impacts likely to arise as a result of the implementation of the proposed project;
- To Collect issues from the local community and summarize the significant issues
- To Describe the study methodology and provide guidance for the IEE study;
- To identify data requirement and describe methodology to collect these data;
- To identify the acts, rules, policies that needs to be reviewed and consulted;
- To develop the alternative study plan and monitoring plan
- To Clarify of the responsibilities of the different institutions involved in the IEE procedures;
- To Set out a time frame, with required expert manpower for carrying out the IEE study, together with estimated budget required; and
- Technical guidance relating to the main aspects of the environment that will require delineation during the courses of the IEE study.

1.5 Objectives of IEE Study

The aim and objective of the IEE is to assess and inform decision makers by identifying the potentially significant environmental effects and risks of the proposed project and to suggest appropriate mitigation measures to mitigate and/or minimize the adverse impacts so that the project is implemented in an environmentally sound manner. The specific objective of the study is to prepare and IEE report. The other general objectives of the study are to:

- Document physical, biological, socio-economic and cultural baseline conditions of project area;
- Analyze alternative TL routes;
- Identify, predict and assess adverse and beneficial environmental impacts of the project in affected areas in terms of magnitude, extent and duration during project construction and operation phases;
- Purpose mitigation measures for adverse impact and enhancement measures for positive impact;
- Familiarize various stakeholders with IEE outcomes through public consultation and participation programs and to incorporate their relevant concerns and issues in environmental mitigation plan;
- Prepare an environment monitoring plan; and
- Facilitate informed decision making including setting the environmental terms and conditions for implementing the proposed project.

1.6 Rationality for Conducting IEE Study

As per the Schedule 2 of Environment Protection Rules (EPR), 1997 and the subsequent amendment (published in 2066/10/13 BS on Nepal Gazette) an IEE study is mandatory for TL of voltage level of 132kV or above. Thus, this project having a voltage level of 220kV requires an IEE study. All the project components along with substation fall within the boundary of survey license. The proposed project does not lie in any National Parks, Conservation Areas, Wildlife Sanctuary Areas, Buffer Zone, Wetlands or any other environmentally sensitive and fragile zones and the proposed alignment does not cross any settlement in its entire length.



2 PROJECT DESCRIPTION

2.1 Project Location

The proposed project is located in Gandaki zone of the Western Development Region of Nepal (Figure 2-1). The TL alignment passes through two districts namely: Kaski and Tanahun. In total 11 VDCs (7 VDCs of Kaski and 4 VDCs of Tanahun) and two municipalities (one in each District) will be affected by the project. These affected VDCs include Kalika (कालिका), Majhthana (माझठाना), Rupakot (रुपाकोट), Hansapur (हंशपुर), Thumki (थुम्की), Deurali (देउराली), Shidha (शिद्ध), Syamgha (श्याम्घा), Manpang (मनपाङ्ग), Jamune Bhanjyang (जामुने भञ्ज्याङ्ग), and Kahun Shivapur (काहुँशिवपुर). The two municipalities, namely, Lekhnath (लेखनाथ) of Kaski and Byas (ब्यास) of Tanahun also lies along the alignment. It starts from the existing Lekhnath substation at Kharene village, Lekhnath Municipality and end at the proposed substation at Malingagau, Kahu Shivapur VDC. The project location map has been presented in Figure 2-1.

2.2 Project Accessibility

Existing Lekhnath substation at Kharene village of Kaski (already in operation) can be accessed through earthen road from black-topped motorable road of Prithvi Highway at Lekhnath chowk (about 800m). Proposed Substation at Malingagau, Kahu Shivapur VDC shall be constructed by the project and it can be accessed through the earthen road which is under-construction via Tanahu Hydro Limited. Access road to the proposed substation need to be constructed and its detail shall be presented in IEE report. Some section of the TL is accessible by feeder road and Prithvi highway and some section by rural local road. Some stretches in between are located at higher altitudes and are not easily accessible. Hence, the study was carried out through walk over approach and the project will be implemented by upgrading existing trails, wherever necessary so as to transport construction materials.

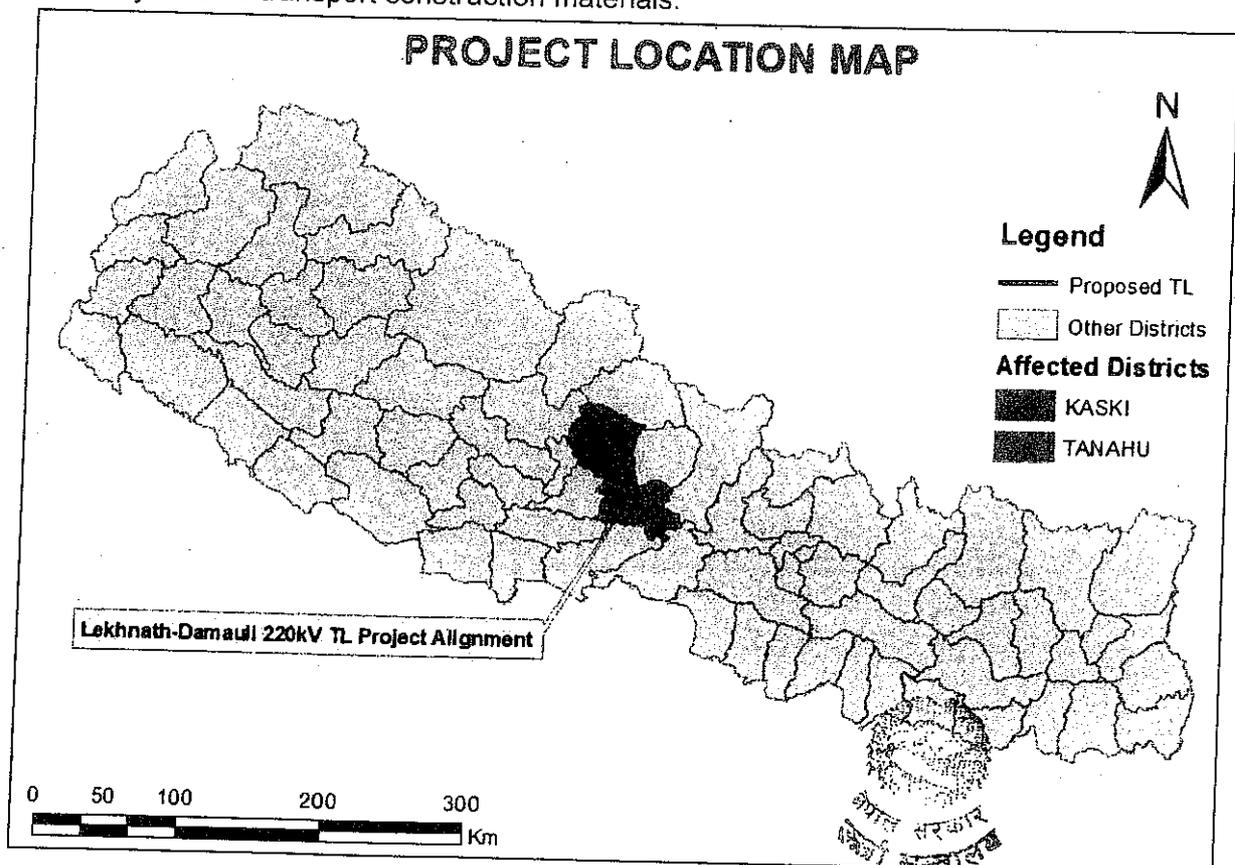


Figure 2-1: Project Location Map

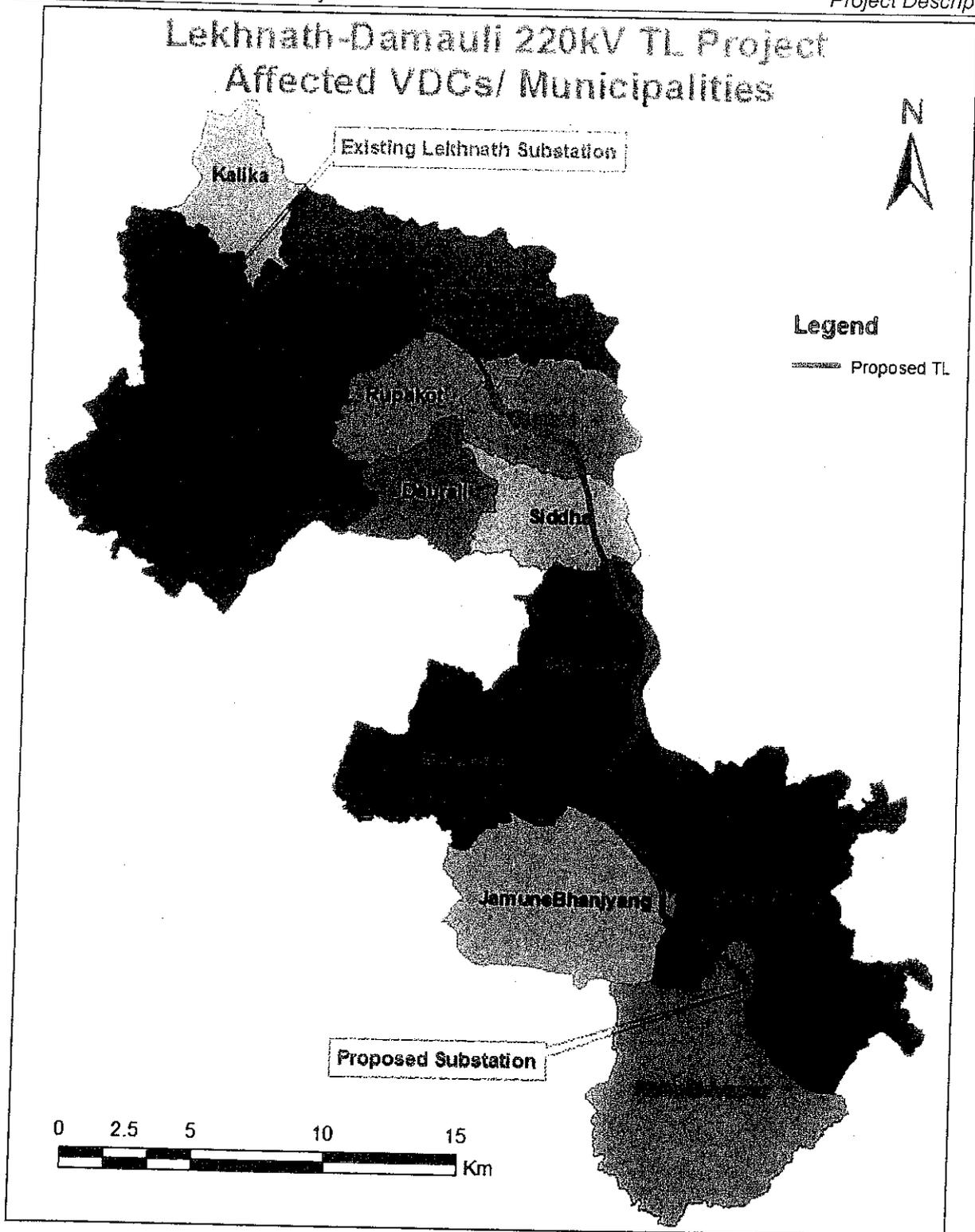


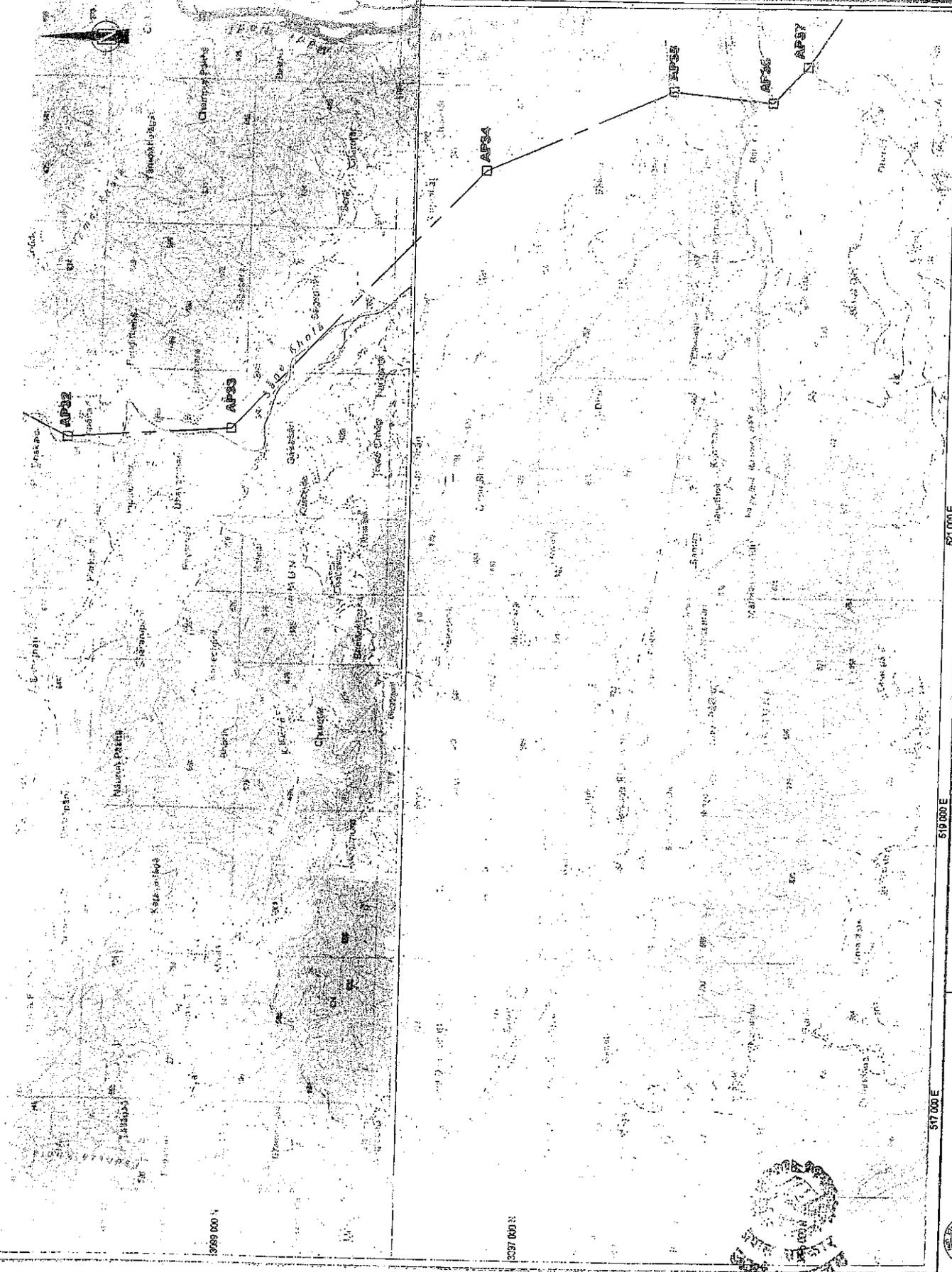
Figure 2-2: Project Affected VDCs/ Municipalities

2.3 Project Technical Features

The study area of the route alignment starts from existing Lekhnath Substation, Lekhnath Municipality of Kaski District to proposed substation at Malinga gau, Kahun Shivapur VDC of Tanahun. This proposed substation shall be built by the project and the detail about area requirement and other facilities shall be mentioned in IEE study. The alignment lies within coordinates 84° 20' 00" E to 84° 02' 30" E and 28° 13' 45" N to 27° 57' 00" N. The alignment has been presented in in Figure 2-2.



Highway with Bridge	Center Road with Bridge	Other Road with Bridge	Other Road with Single	Other Road with Double	Other Road with Triple	Other Road with Quadruple	Other Road with Quintuple	Other Road with Sextuple	Other Road with Septuple	Other Road with Octuple	Other Road with Nonuple	Other Road with Decuple	Other Road with Undecuple	Other Road with Duodecuple	Other Road with Tredecuple	Other Road with Quattuordecuple	Other Road with Quindecuple	Other Road with Sexdecuple	Other Road with Septendecuple	Other Road with Octodecuple	Other Road with Nondecuple	Other Road with Vigintuple	Other Road with Trigintuple	Other Road with Quadragintuple	Other Road with Quingentuple	Other Road with Sexcentuple	Other Road with Septingentuple	Other Road with Octingentuple	Other Road with Nongentuple	Other Road with Millesimum
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Sheet Index

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ENGINEERING SERVICES

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AP32 AP33 AP34 AP35 AP36 AP37

Table 2-1: Details of Angle Points

S.N.	Angle Points	Coordinates			Elevation	Village	Address		District	Land Use
		Easting	Northing				VDC			
1	AP 1	505758.73	3117746.29	740.643	Kharene	Lekhnath-7			Substation	
2	AP 2	505844.57	3117771.50	749.639	BadaareDanda				Cultivated Land	
3	AP 3	506137.37	3117834.35	798.241	Dharmashala	Lekhnath (Archale-6)			Cultivated Land	
4	AP 4	506536.58	3117865.41	814.073	Pakhuridada	Lekhnath-6			Barren Land	
5	AP 5	507818.06	3118608.97	887.064	Aarupata				Public Land	
6	AP 6	508406.12	3119301.55	1019.689		Kaika-1			Barren Land	
7	AP 7	509887.43	3119543.25	783.912					Public Land	
8	AP 8	510186.61	3119356.21	860.611					Cultivated Land	
9	AP 9	510763.23	3119057.41	1021.1	Simalpata	Lekhnath-9			Public Land	
10	AP 10	511310.09	3119162.33	1184.699	Kotpari				Cultivated Land	
11	AP 11	511629.64	3119087.28	1176.165	Kotbari				Cultivated Land	
12	AP 12	512299.32	3118586.49	1123.658	Chiplei Bhangere dada				Cultivated Land	
13	AP 13	513017.42	3118386.10	1070.282	Begnasgau				Barren Land	
14	AP 14	513850.36	3118051.87	853.429	LapsidadaKahare	Lekhnath-10			Barren Land	
15	AP 15	515223.42	3117170.29	744.497	Ulleri-Talbesi	Hansapur-3			Cultivated Land	
16	AP 16	516263.28	3116504.00	868.245					Cultivated Land	
17	AP 17	516788.29	3115662.15	1144.203	Pakhagau-Mauriya	Rupakot-9			Cultivated Land	
18	AP 18	517185.83	3114499.86	905.923	Pelungthumki				Barren Land	
19	AP 19	517907.86	3113989.02	900.133	Sirkutanidada	Pelunga Salyandada-6			Cultivated Land	
20	AP 20	520110.94	3113131.02	780.225	BhurungDeupur	Thumki-8			Cultivated Land	
21	AP 21	520717.04	3111216.39	682.464		Thumki-4			Cultivated Land	
22	AP 22	521004.27	3109685.38	441.54		Siddha-7			Forest Land	
23	AP 23	508369.03	3119310.03	1014.942	Dandagau Sisaghat	Siddha-1			Cultivated Land	
24	AP 24	509938.02	3119505.09	786.514	Chaudalthok	Syamgha-3			Forest Land	
25	AP 25	523194.14	3105610.72	443.839	Pokhare-dada	Syamgha-3			Cultivated Land	
26	AP 26	523105.57	3105152.61	484.534	Shekhatar	Syamgha-3			Forest Land	
27	AP 27	523053.12	3104725.42	405.633	Shekhatar	Syamgha-2			Cultivated Land	
28	AP 28	522600.45	3104000.66	424.157		Syamgha-2			Cultivated Land	
						Syamgha-6			Forest Land	

ToR Report

S.N.	Angle Points	Coordinates			Address			District	Land Use
		Easting	Northing	Elevation	Village	VDC			
29	AP 29	522866.66	3102754.46	368.25		Syamgha-6		Cultivated Land	
30	AP 30	510176.43	3119335.57	851.038	Pakhure-bhangyang	Syamgha-6		Cultivated Land	
31	AP 31	522033.42	3101238.47	505.354	Ratadada	Byas M-6		Public Land	
32	AP 32	521531.92	3100225.99	364.175		Byas M-6		Cultivated Land	
33	AP 33	521613.73	3099104.80	347.675		Byas M-6		Cultivated Land	
34	AP 34	523407.09	3097405.51	327.508		Byas M-6		Cultivated Land	
35	AP 35	523966.26	3096117.26	361.241		Byas M-8		Cultivated Land	
36	AP 36	523898.59	3095441.15	454.031	Panamdigau	Byas M-8	Tanahun	Cultivated Land	
37	AP 37	524145.20	3095205.65	595.069		Byas M-6		Cultivated Land	
38	AP 38	525050.61	3094627.47	550.858	Saurahagau	Byas M-7		Cultivated Land	
39	AP 39	525932.30	3093846.83	379.292	Betenigau	Byas M-7		Cultivated Land	
40	AP 40	526556.25	3093552.64	489.495	Swamidada Gyaja	Kahun Shivapur-1		Forest Land	
41	AP 41	526921.38	3093128.00	469.528	Ghyansingdada	Kahun Shivapur-1		Cultivated Land	
42	AP 42	527380.03	3092641.69	389.226	Malingagau	Kahun Shivapur-1		Cultivated Land	



The proposed TL alignment was selected on the basis of following details:

- Provide the shortest possible length and straight route as far as possible;
- Minimize or avoidance the crossing through forest areas;
- Minimize the number of structures or assets crossings;
- Avoid built-up, swampy and unstable areas;
- Provide easy access for construction and maintenance works;
- Minimize adverse impacts on the environment, and
- Proximity to the road.

2.4 Salient Features of the Project

The total length of the proposed TL is about approximately 41.851km. The voltage level will be 220kV. The proposed transmission line will be double circuit comprising with two separate aluminum conductor steel reinforced (ACSR) per phase. The vertical double circuit configuration tower will have an average height of 40m and the standard tower base dimensions will be 15m x 15m (for 220kV) from center to center of each tower leg foundation/ footing. Steel tower leg and body extensions will be utilized to reduce foundation excavation on slopes and provide greater tower foundation structural security. The ruling span between tower structures is 350m. The right of way (RoW) of the proposed TL is 15m on each side from the centerline from 220kV. as per the Electricity Regulation, 2050 (1993). The TL design features are given in Table 2-2 below:

Table 2-2: Salient Features

Features	Description		
General			
Project	Lekhnath-Damauli 220kV Transmission Line		
Impact Area	Zone	Districts	VDCs/ Municipalities*
	Gandaki	Kaski	Lekhnath* (लेखनाथ), Kalika (कालिका), Majhthana (माझठाना), Rupakot (रुपाकोट), Hansapur (हंशपुर), Thumki (थुम्की), Deurali (देउराली), Shidha (शिद्ध),
		Tanahun	Syamgha (श्याम्घा), Manpang (मनपाङ्ग), Byas* (ब्यास), Jamune Bhanjyang (जामुने भञ्ज्याङ्ग), and Kahun Shivapur (काहुँशिवपुर).
Initial Point	AP 1 lies at existing Substation at Kharene, ward no 7 of Lekhnath Municipality, Kaski District		
Terminal Point	AP 42 lies at Malingagau, ward no 1 of Kahun Shivapur VDC, Tanahun District		
No. of Major Highways crossings	1 (Prithvi Highway)		
No. of major River crossings	27		
No. of 132kV line crossings	1		
No. of 11kV line crossings	9		
No. of 400V line crossings	8		
No. of 220V line crossings	26		
Design Features			
Line Length	41.851km		
Nominal System Voltage	220kV		
Capacity	600 MW		
Circuit	Double Circuit		

Nominal Span	300m
No. of Angle Tower	42
Foundation Area	15m x 15m (225m ²)
Ground Clearance	Minimum 8.84 m at the maximum sag condition
Min. clearance between power line to power line	4.58m
Right of Way	30m
Project Cost	USD 25 Million

2.5 Delineation of Project Impact Area

The study area is defined as the project area consisting of the alignment as well as the area that will be impacted due to the construction and operation of the project. The project impact area that will be considered during IEE study has been defined as follows:

2.5.1 Direct Impact Area (DIA)

This consists of 30m Right of Way (RoW) comprising 15m on each side of the center line of the TL alignment of 41.851km. Thus, the settlement area, forests or other vegetation and places having built up infrastructures or facilities that fall within the RoW constitute the 'Direct Impact Area' of the project. The detail of defragmented land use due to the TL shall be covered in IEE report. On the basis of spatial coverage this area is also termed as High Impact Area (HIA).

2.5.2 Indirect Impact Area (IIA)

This consists of the surrounding area. Any built-up community infrastructures and facilities, forests, surrounding the DIA shall be studied in this impact area. This area is also termed as Moderate Impact Area (MIA).

2.6 Construction Planning

The implementation of the proposed project comprises construction of a 220 kV TL. It included foundation and erection of transmission towers, wire stringing, testing and commissioning of 220kV TL. The estimated years of project completion is two years.

2.6.1 Requirement of Workforce

During the stages of the construction period of the project, altogether approximately 300 people will be employed including 150 unskilled, 100 semi-skilled and 50 skilled human resources. Most of the unskilled manpower will be hired locally as per available skill and experiences.

2.6.2 Material

The construction materials required for substation and towers shall be acquired from river bank of Madi and through local availability. The details of source, quantity and material shall be included in IEE report. The main construction material related with substation and Tower will be as follows;

- Cement, sand and aggregates;
- Steel reinforcement.

2.6.3 Investment

The project proponent and the project contractors' office will be established in rental buildings at appropriate locations of Tanahun and Kaski districts. Site office will be established as per the requirement. The project contractor will also establish its office at the suitable places for its staff and camps for its workers at suitable sites. Due to the linear nature of the construction works,



smaller warehouse and construction yard facilities will be built at appropriate locations along the alignment. The details shall be worked out during the IEE. The estimated total cost for the project is USD 25 Million.

2.6.4 Land

The project shall permanently acquire approximately 7.208 ha of land for tower pads and substation, whereas 122.472ha of land will be restricted as RoW (excluding tower pads). The detail and exact requirement of land for the project shall be covered in IEE report.

Table 2.2. Land Requirement for the Project

S. N.	Project Features	Land required (approx.)	Remarks
1.	Tower Pads	3.128 ha	Including 42 AP and approximately 97 ST
2.	Substation	4.08 ha	
3.	RoW including tower pads (land restriction)	125.6 ha	

Source: Field Survey 2016

The detail of land requirement for tower pads as permanent requirement right of way as temporary land requirement, substation land as permanent requirement and other land requirement like camp site, storage facilities and access road for substation shall be studied and presented in IEE. The table to be filled in IEE for the land loss is attached in Annex II.

2.6.5 Construction/Operation Strategy

The implementation of the proposed project comprises construction of a new 220 kV transmission line. It comprised of foundation and erection of transmission towers, wire stringing, testing and commissioning of 220 kV TL Project. The estimated years of project completion is two years.

Due to the linear nature of the construction works, smaller storage facilities shall be built at appropriate locations along the transmission line alignment. These details shall be worked out during the IEE. The linear nature of the transmission line construction suggests that the construction work will be carried out by manually, where possible, for each location in various works such as land clearing, excavation, and concreting, transporting tower and other materials, etc. No permanent access road shall be constructed to tower site from the existing road head. Only the existing roads and tracks will be used for the construction and maintenance where available.

2.6.6 Project Schedule (Construction and Operation)

The estimated completion period of the project is 24 months which includes 6 months pre construction phase and 18 months construction and commissioning phase. The construction work of the transmission line will be carried out during the month October to May when ground conditions are essentially conducive to allow easy movement of materials and construction towers. Construction activities during rainy season (June–September) will be restricted to the stringing of conductor. However, construction of the substation can be carried out throughout the year. The construction schedule of the project shall be presented in IEE.



2.6.7 Work Schedule and Budget

It has been planned to complete the IEE study for the proposed Lekhnath-Damauli 220kV TL project within sixteen month. The total estimated budget for the IEE study of the project is NRs. 2.49million. The following experts will be involved in the IEE study

- Team Leader
- Environmentalist
- Sociologist/Socio-economist
- Statistician
- Civil engineer
- Electrical Engineer
- Forester
- Senior Surveyor
- Liaison Officer



3 STUDY METHODOLOGY

The IEE process follows the Environment Protection Rules, 1997, and its amendments 2009 (2065/11/26) and National EIA Guidelines, 1993. This ToR report is prepared in accordance with the legal requirements of GoN, field study, consultation with stakeholders and officials.

3.1 Type of Data

Primary and secondary data shall be acquired on physical, biological, and socio-economic and cultural environment of the project area for IEE study. The project area includes the VDCs and municipalities affected by the project unless otherwise stated. Primary information shall be obtained by field visit whereas secondary information by consulting the project maps, survey report and other related document. The data of the core project area or direct impact zone shall be site specific and quantitative. Information on project affected VDCs/ Municipalities shall also be collected. Following are the types of data to be collected on physical, biological and socio-economic and cultural environment.

3.1.1 Physical Environment

- Meteorological data: Temperature, rainfall, and humidity of the project area;
- Air and noise quality of the project area;
- Land use and land use pattern;
- Geological data: Rock type, slope stability, erosion, landslides, etc. of the project area;
- Spoil materials: Total volume, type, volume to be used for construction, disposal volume and others.

Table 3-1: Detail of Topographic Maps of Project Area

S.N	Name of Topographic Sheet	Sheet No.	Scale
1	Pokhara	2884 13A	1:25000
2	Bhorletar	2884 13B	1:25000
3	Sisaghat	2884 13D	1:25000
4	Naya Risin	2784 01B	1:25000
5	Damauli	2784 02A	1:25000

3.1.2 Biological Environment

Characterization of bio-climatic zone, species and forest type of the project area, forest management practice, forest categories by management- community forest, government forest etc. along the proposed TL alignment, community forest users group (CFUG), estimated number of trees and wood volume along the RoW, other data as per given tables in Annex- II. In addition the following information shall be collected;

- Flora: Floral diversity of the project area, dominant species, density, non-timber forest product (NTFP), ethno-botanical use.
- Fauna: Major wild species of mammals, birds, reptiles and amphibians in the project area, their habitat, occurrence, migration, illegal hunting.
 - Site Description (Water body/holes, vegetation cover, ground and soil/rock features),
 - Important habitat type/features including trees/shrub/herbs/epiphytes and others.
 - Habitat use- active/temporary/migratory corridor; breeding/feeding or hunting/resting and others.
 - Habitat continuity and connectivity on either side of RoW.
 - State of habitat in terms of degradation/fragmentation and human encroachments.
- Rare, Endangered, Threatened and Protected Species: presence of these species along the TL alignment and its immediate surroundings, overall conservation status of wildlife in and around the project area.

3.1.3 Socio-economic and Cultural Environment

- **Demography:** Population, male/female ratio, population- age group wise, number of household, household size, population growth rate, population density etc.
- **Settlements:** Settlement pattern- scattered or aggregated, in uphill or lowland, name of major settlements in vicinity of the proposed alignment, growing settlements, types of settlement near the substation and transmission line corridor
- **Ethnicity:** Ethnic groups, dominance/minority, ethnic composition, vulnerable community and marginalized group of the project area.
- **Language:** Languages in the project area, number of people speaking, script, literature and media of local language.
- **Religion:** Religion in the project area, number of religion followers, religious harmony/influence.
- **Festivals:** Festivals in the project area, festive seasons, their importance.
- **Archeological, Historical and Religious Sites:** Existing such site, their location, distance to the proposed TL alignment/substation, their importance, fame of area- local/regional, conservation status.
- **Migration:** Migration pattern- in/out, seasonal/permanent, causes of migration, impact of migration in population dynamics of local area.
- **Gender Aspect:** Women's right- property and participation, privilege, violence, disparity, child marriage, human trafficking, any other social evils.
- **Law and Order Situation:** Crime and violence, major incidents, major types of crime, causes and trends of crime and violence, local conflict for resources, honor etc, traditional conflict resolution system, police post, legal access etc.
- **Occupation:** Major occupation of local people in the project area, local people in their occupation by numbers/percentage, traditional occupation, local employment opportunities, economically active people by percentage.
- **Agriculture:** Available agricultural land, cropping pattern, irrigation facility, productivity, farming trends- traditional/modern, average land holding size, food security, market access for agro-products, livestock, support to farmers etc.
- **Trade and Industries:** Market centers in the project area, trading commodities, trading routes, exports to local/regional/foreign market, local craftsmanship, cottage industries, potential sector/products/resources identified in the project area, tourism and other service sector etc.
- **Income Level:** Average income level of local people, sources of income, poverty level (in percentage) in Districts/VDCs/ Municipalities poverty by ethnic group wise.
- **Education and Literacy:** Educational institutions in the project area, enrolment rate, dropout rate, literacy- male and female, literacy in ethnic/group wise, non-formal education program, etc.
- **Health and Sanitation:** Health institutions in the project area, health facilities, common disease, child/mother mortality rate, malnutrition, drinking water supply, use of latrine, general cleanliness, hygiene awareness etc.
- **Road and Transportation:** Road network in the project area, public transportation, road access to surrounding project area, means of transportation, transportation cost, impact of road construction in rural setting etc.
- **Energy:** Electrification in the project area, means of electrification, fuel sources for household use, access to fuel wood, local price of fuel (firewood, kerosene) etc.

- Communication and Other Facilities: Telephone (landline/wireless) network in the project area, accessibility to internet and other means of modern communication (television, radio, newspaper),
- Development Initiative/Activities in the Project Area: Development projects of local level (District/VDC), regional and national level in the project area, nature and size of the projects, its future impact in the project area, development issues/ initiatives / activities in the local area.

3.2 Data Collection Method

The EPR, 1997 and other environmental provisions govern the methodology of the IEE study. Literature review, field investigation (households' survey, observation, photographs, etc.) and stakeholders meetings shall be used to collect the facts and figures.

3.2.1 Literature Review

While carrying out the IEE, literature review on topographic maps, land use maps, CBS publications; project survey report and other hydropower related environmental reports shall be done. Information on climate (temperature, rainfall, and relative humidity), etc. shall be obtained from Department of Meteorology. Similarly, data on geology, hydrology and sedimentation shall be obtained from project feasibility study report. District level data on forests, species and the community identification, and identification of wildlife and birds will initially be gathered from literature review. The literatures published by the Ministry of Forest and Soil Conservation will be collected and reviewed for the data on forest and wildlife. On socio-economic and cultural environment District and VDC level demographic data and other related information shall be collected through literature review.

3.2.2 Field Investigation

Field visit by multidisciplinary experts to collect baseline information on physical, biological, and socio-economic and cultural environment shall be conducted during IEE report preparation. The following methods shall be adopted to collect baseline information on physical, biological and socio-economic and cultural environment.

a. Physical Environment

- Site specific observation of air and noise quality;
- Field observation by Civil Engineer using checklist for data on land use pattern, topography, drainage, watershed, etc. and
- Photographs of the project area.

b. Biological Environment

- Field observation by ecologist/environmentalist;
- Quadrat (20mx20m size) samplings in representative forest types at different locations of project structures and facilities;
- Key informants survey; stakeholders meetings;
- Meeting with Community Forest Users' Groups (CFUGs) and District Forest Office.

The data from forest sampling will be quantitatively analyzed for frequency, density, basal area, importance value index (IVI) and estimated wood volume. The aforementioned parameters were calculated by using the following formula:



$$\text{Frequency (F) \%} = \frac{\text{Total number of plots in which the species occurred}}{\text{Total number of plots sampled}} \times 100$$

$$\text{Density (D)/hectare} = \frac{\text{No. of individuals of a species}}{\text{Size of the plot} \times \text{Total number of plots sampled}} \times 10,000$$

The basal area is the trunk cross-sectional area. The basal area of each of the forest component will be calculated on the basis of diameter at breast height.

$$\text{Basal area (BA)} = \pi r^2 = 3.142 (\text{dbh}/2)^2$$

Wood volume of standing tree was calculated by using the following formula:

$$\text{Wood volume of standing trees} = 1/2 \times \text{BA} \times \text{Height}$$

The forest/vegetation loss due to the project implementation will be studied based on the format on "Table for Forest Loss" provided by the Ministry of Energy (Annex- II).

c. Socio-economic and Cultural Environment

- Field observation by Sociologist/ Socio-economist and Statistician;
- Households survey of the project affected families (a sample copy of the households survey questionnaire is given in Annex-III);
- Key informant survey: interactions with the local leaders, government officials, teachers and other knowledgeable persons; and stakeholders meetings (a sample copy of VDC checklist is presented in Annex-III);
- At least one Market Survey will be carried out in each VDC/Municipality;
- Focused Group Discussion (FGD): FGD meeting with forest users groups.

3.3 Data Analysis

A team of experts specialized in engineering, forestry, and socioeconomics visited the project area in March 2016, to collect baseline information of the area, identify the likely impacts of the proposed project during construction and operation phases and inform stakeholders regarding the project. During this visit, the team visited the project site proposed for structures and facilities as well as settlements of the affected VDCs and collected required data on physical, biological and socioeconomic and cultural environment of the area. Topographical maps were referred for site investigations. The study team observed various assets and took GPS location point references and photographs to establish the baseline. The team also visited relevant government offices of the affected district to interact with concerned officials and collect necessary information and their concerns.

The study team has adopted a participatory approach with maximum involvement of different stakeholders of the project at the local and district levels to generate relevant information for the IEE. The study team has maintained a close contact with the district level government relevant line agencies, VDC level key stakeholders and other stakeholders while conducting fieldwork for the IEE.



3.4 Identification, Evaluation and Prediction of Impact

The proponent/ consultant shall identify, predict and evaluate impacts of the proposal on the physical, biological, socio-economic and cultural environment. After data collection, analyses and interpretation of impacts on the issues shall be identified, predicted and organized accordingly.

To identify impacts, the following 'Impact Identification Methods', depending on the nature of impact shall be employed:

- Checklists
- Interaction Matrix
- Map Overlays in ArcGIS
- Expert Judgment

To predict the impacts, the following 'Impact Prediction Techniques', depending on the nature of impact shall be used:

- Extrapolative
- Normative
- Mathematical Models
- ArcGIS, Maps
- Expert Judgment

While categorizing the impacts into 'identified' and predicted', depending on the nature of impact, the following aspects shall be affixed to each of the impact:

- Nature: direct or indirect
- Magnitude: high, moderate, low
- Extent: IIA, DIA, regional, national, trans-boundary
- Timing: short term, medium term, long term
- Duration: Temporary, Permanent

Once known impacts are grouped, they shall be evaluated in terms of their environmental significance as important or unimportant. To evaluate, identified and predicted impacts, the following 'Impact Evaluation Methods', depending on the nature of impact shall be employed:

- Consultation with experts and stakeholders
- Use of numerical values (National EIA Guidelines 1993)
- Consideration of Policies, Laws and Local Customs

After impacts evaluation, significant and important impacts on physical, biological, socio-economic and cultural environmental domain shall be sort out to meet the requirements stipulated by rule 7 of Schedule-6 of Environmental Protection Rules (EPR).

3.5 Public Involvement

A team of experts visited the project site for field investigation during the month Falgun, 2072 BS to collect the baseline information of the project area and identify the potential environmental impact areas and the pertinent issues. The news about the field study during ToR phase was covered by a local newspaper "Damauli Khabar" (Annex IV).

During the field visit, the team met the local stakeholders and discussed with some key persons. Meetings were mainly focused on issues likely to arise due to implementation of the project, existing environment of the project area and views/concerns of stakeholders. The views,

opinions, suggestions and information received from the participants were documented for incorporation in the ToR.



Picture 1: Group Meetings at Syamgha VDC

Besides, consultation with stakeholders, project affected families; peoples' representatives, government officials, etc. have been done to obtain the valuable suggestions. During IEE study public consultation will be carried out to involve the public in all the activities in the project area. Such consultation will be based on the manual for public involvement prepared by DoED (2058 BS). The study shall document public issues and make public participation during the IEE process. The study shall document public issues and make public participation during the IEE process. Local and district level government institutions/bodies, local user groups, local NGOs and CBOs, etc. shall be consulted during IEE report preparation. The public consultation shall mainly focus on the findings of the IEE, building up the awareness about the project plans and programs, building up the mutual consensus on the implementation of the project, identification of key issues and consideration of these issues in the IEE report and in the project design.



Picture 2: Group Meetings at (a) Kahu Shivapur VDC and (b) Byas Municipality

Public views, options and relevant issues raised during the consultation will be recorded. In addition to the aforementioned plan, the IEE team perform other public consultation according to the requirements, situations and demands of the stakeholders. The study will also be analyzed the possible alternatives of project as per EPR, 1997. The draft IEE report will be made available to stakeholders in corresponding VDCs and DDCs to take feedback and suggestions regarding

the procedure adopted and implemented in the project. The comments and suggestions from stakeholders will be incorporated while preparing the IEE report.

3.5.1 Consultation of the Concerned Agencies

The following organizations will be consulted during the preparation of IEE report.

Central Level Agency: Ministry of Energy, Ministry of Forest and Soil Conservation (MoFSC), Department of Electricity Development (DoED), and Department of Forest.

District Level Agency: District Development Committee, District Administrative Office, District Agriculture Office, District Health Office, District Forest Office, and other concerned district level agencies.

Local Level Agency: Village Development Committees, Community Forest Offices, Health/sub-health posts, non-governmental organizations, Community Based Organization, etc.

3.5.2 Public Notice

As per EPR 1997, a 15 days public notice will be published in a national daily newspaper. The notice will consist of a statement regarding brief project information and request to provide comments and suggestions within 15 days to the project office or ESSD. The local people and stakeholders will be requested to provide their concerns or issues or suggestions regarding the IEE report in written form.

A team from ESSD will be mobilized in the field with copy of public notice along with cover letters to the concerned VDCs/Municipalities, CFUGs, district level line agencies and other local stakeholders. A copy of the notice will be affixed at the DDCs office, VDCs offices, local schools, clubs, health posts, local NGOs and other suitable places and proof of deed (*Muchulkas*) will be collected. Summary of the draft IEE report will be distributed to the concerned VDCs/Municipalities and CFUGs and a copy of IEE report provided to DDCs and District Forest Offices. The recommendation letters will be collected from the affected VDCs. In addition, consent letter will be collected from the affected CFUGs. The comments/suggestions raised by local people/stakeholders/institutions will be incorporated in the IEE report.



4 REVIEW OF POLICIES AND LEGAL PROVISION

The IEE shall review the following Plans/Policies, Acts, Rules/Regulations, Guidelines, Standards, Strategies and relevant documents provide an account of the review in the IEE report in the context of project implementation:

4.1 Constitution of Nepal, 2072

4.2 Plans and Policies

- Three Years Interim Plan, 2070 B.S
- Nepal Environmental Policy and Action Plan, 2050 (1993) and 2055(1998)
- Hydropower Development Policy, 2058 (2001)
- National Water Plan, 2062 (2005)
- वन क्षेत्रको जग्गा अन्य प्रयोजनको लागि उपलब्ध गराउने कार्यविधि, २०६३
- शासकीय तथा आर्थिक सुधारको तत्कालीन कार्ययोजना, २०६९

4.3 Acts

- Environment Protection Act, 2053 (1997)
- Water Resources Act, 2049 (1992)
- Electricity Act, 2049 (1992)
- Land Acquisition Act, 2034 (1977)
- Forest Act, 2049 (1993)
- Labor Act, 2048 (1992)
- Soil and Water Conservation Act, 2039 (1982)
- Local Self-Governance Act, 2055 (1999)

4.4 Rules/Regulations

- Environment Protection Rules, 2054 (1997)
- Electricity Regulation, 2050 (1993)
- Forest Regulations, 2051(1995)
- Water Resources Regulation, 2050 (1993)
- Local Self Governance Regulation, 2056 (1999)

4.5 Guidelines/Conventions

- National Environmental Impact Assessment Guidelines, 2050 (1993);
- EIA Guidelines for Forestry Sector, 2051 (1995);
- Forest Produce collection and sale / Distribution Guidelines, 2054 (1998);
- Convention on Biological Diversity, 1992;
- Convention on International Trade in Endangered Species of wild Fauna & Flora, 1973
- Community Forest Guidelines, 2058.



The review of these relevant documents shall be presented in the IEE report by considering the following;

- Highlight of Articles, Clauses, Rules, Chapters, and Sections that are attracted to the study and project/proposal implementation.

- How the provisions are relevant and mandatory to the study process as well as to the project implementation, are observed and followed in the study, mitigation measures/planning and construction and operation.
- Identification and discussion of legal provisions that hinders the project implementation with possible way out for easement.



5 EXISTING ENVIRONMENTAL CONDITION

Existing Physical, Biological and Socio-economic Condition along the TL alignment has been discussed in detail in this chapter.

5.1 Physical Environment

The proposed alignment passes through different terrain affecting variety of land use pattern. The topography, land use, climatic condition, geomorphology and geology, seismology, air, water and noise condition, watershed and drainage pattern, crossing of other utilities and air traffic that shall be influenced due to the construction of this project has been discussed in each topic ahead.

5.1.1 Topography

The proposed route alignment of length 41.851km traverses through hilly region of Western Nepal. The alignment runs through several topographic features comprising of rugged hills with mild and steep slope, undulating land forms and flat terrain. The altitudinal variation of the transmission line points are between 1184m to 327m at Kotbari, Lekhnath-9 Municipality and Byas-6 Municipality respectively. The altitudinal variation of the angle points along the alignment is given in Figure 5-1.

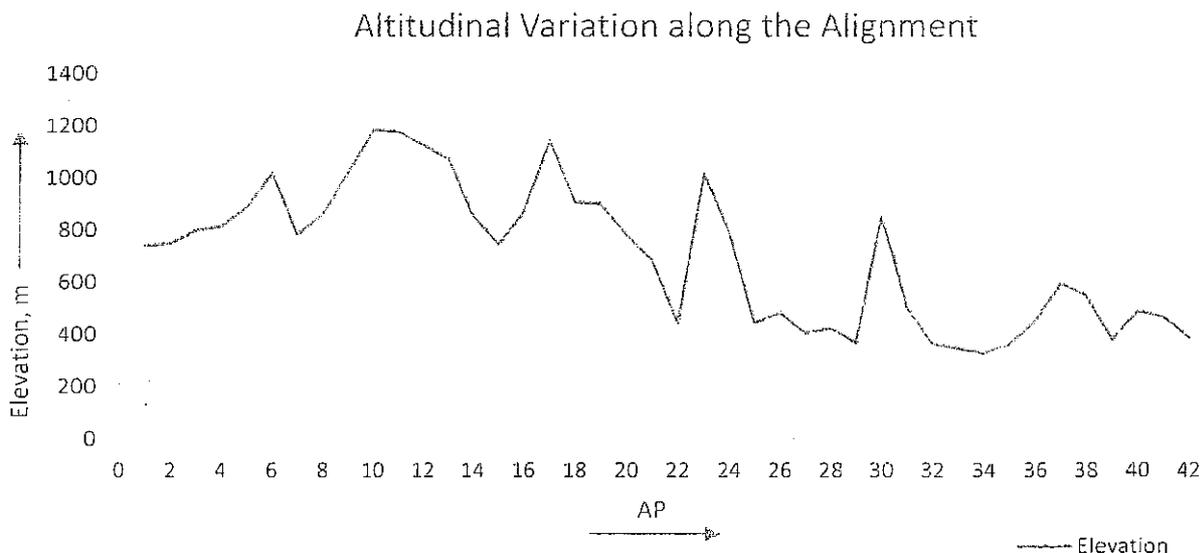


Figure 5-1: Altitudinal Variation along the Alignment

5.1.2 Land Use

For transmission line of 220kV capacity, the right of way (RoW) is defined as 15m on either side from the central line. A total of 125.62ha of land will be acquired by the project as RoW including both temporary and permanent acquired land. The main land use pattern of the project area is cultivated land, forest, grazing land/grassland, sand, bush, river and barren land. The alignment avoids densely populated areas, major structures and dense forests. The other land uses along the alignment consists of crossing of road, rivers, rivulets, river beaches, transmission lines, telephone lines and distribution lines. The land use data is presented in Table 5-1 and land use map is in Figure 5-2 below.

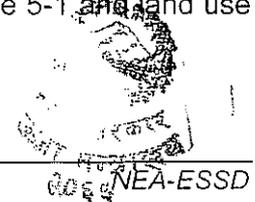


Table 5-1: Land Use along the alignment

S.N	Land Use	Area (ha)	Percent
1	Cultivation	86.303	68.70 %
2	Forest	34.081	27.13 %
3	Bush	2.357	1.88 %
4	Barren	2.725	2.17 %
5	River	0.153	0.12 %
Total		125.620	100.00 %

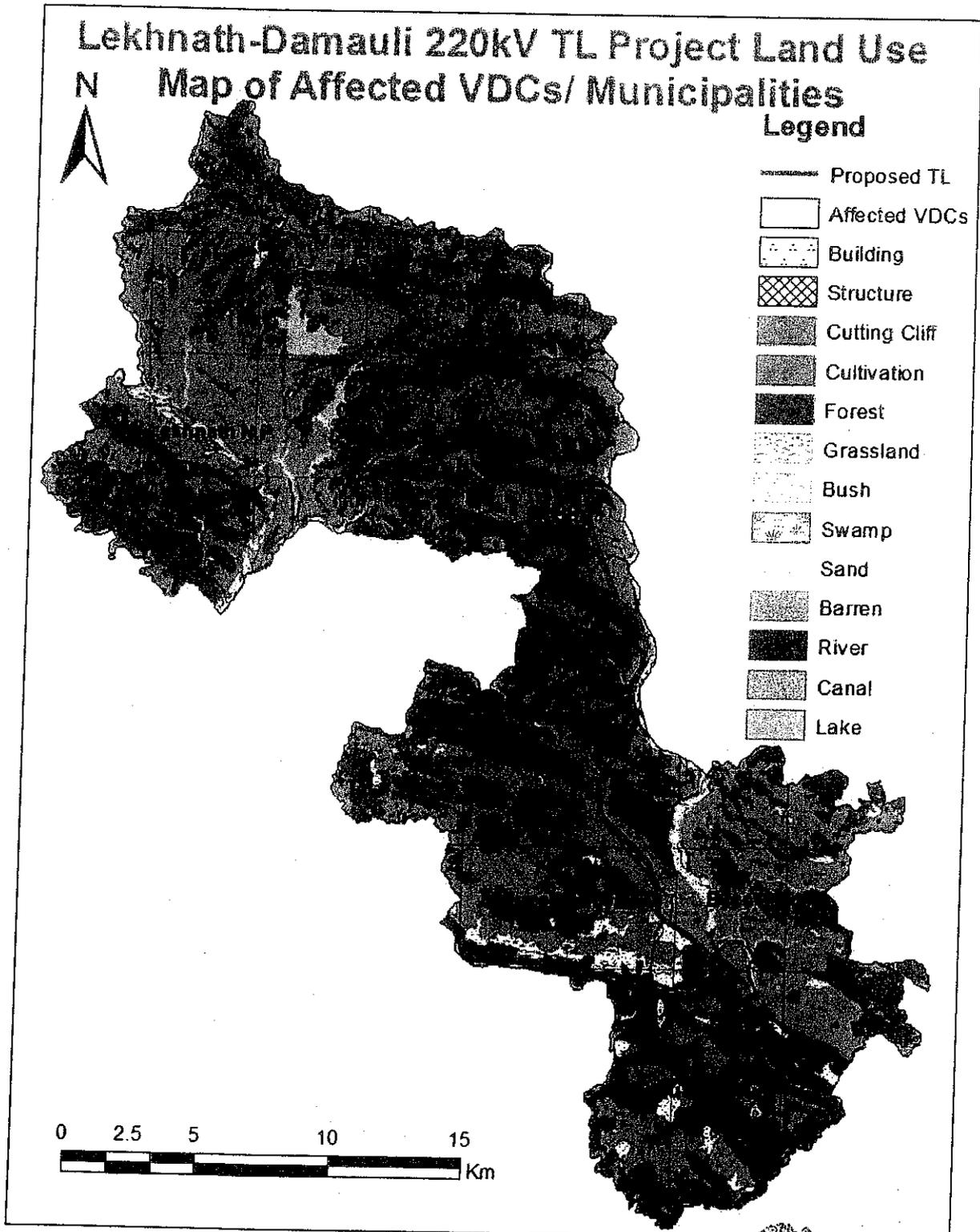
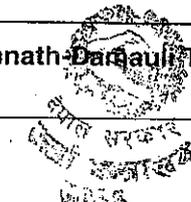


Figure 5-2: Land Use Map of Affected VDCs/Municipalities of Lekhnath-Damauli TL Project



5.1.3 Climate

Subtropical and tropical climates prevail in the project area. The project area experiences strong seasonal variations, with wet monsoons from June to September and dry weather from October to May. The table below lists the climatic data such as minimum and maximum temperature, maximum monthly rainfall of the project affected districts.

Table 5-2: Climatological Data along the Project Area

S.N.	District	Climatic Zone	Max Temp. (°C)	Min. Temp. (°C)	Average annual rainfall (mm)
1	Kaski	Subtropical and Upper tropical	31.9°C in June	7.53°C in January	2840
2	Tanahun	Subtropical and Upper tropical	38.0°C in May	6.2°C in January	2406

Source: District Profile of Kaski and Tanahun districts

5.1.4 Geomorphology and Geology

The proposed alignment of TL passes through Hilly region represented by low grade metamorphic rocks such as phyllite, quartzite and slate. During the field visit, it was observed that some APs of the TL are located at relatively flat and stable areas covered by colluvial and alluvial deposit.

5.1.5 Seismology

This project is situated in seismic zone factor of 1 which is not satisfactory from the seismic point of view but as a whole of country Nepal, it is good that this alignment does not pass through the most dangerous seismic zone.

5.1.6 Air and Noise Quality

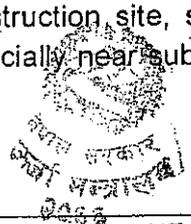
The proposed TL passes mainly through the hill ridge avoiding roads and settlements and market centers. However, at some stretches, it traverses along the RoW of gravel and earthen roads. It also traverses through Prithvi highway along section AP35 to AP36 and some local roads in some stretch. The main source of air pollution along the alignment is due to the vehicular movement along the earthen road.

5.1.7 Water Quality

The water quality of river and other water bodies along the TL corridor appears to be unpolluted. However, dumping of solid wastes into the river was observed at some stretches. But, the water quality along the stretch was fair enough from the eye sight point of view as it was clean and clear at most of the stretch. Water quality data are not in practice to obtain in TL projects.

5.1.8 Watershed Conditions and Drainage Patterns

The alignment traverse through the hilly region of Nepal. The watershed of the proposed TL route is observed to be fairly intact and stable. The major rivers which cross the alignment of this section include Seti River and Madi Khola. The watershed is fed by mostly Machhapuchhre Mountains' snow and its Kawache Glacier, and Annapurna I and II Mountains' snow and its glacier. An identification of water body, springs and rivers in proximity of the construction site, storage facilities where it is likely to get toxic and hazardous chemicals leak especially near substation shall be identified in IEE.



5.1.9 Soil Erosion and Land Stability

The site observation of the corridor revealed that the line traverses through undulated topography. No major unstable areas were observed along the alignment. The Angle Points have been located on stable ground.

5.1.10 Crossings of Other Utilities

The proposed Lekhnath-Damauli 220kV TL are crosses 27 times the major rivers like Seti River, Madi Khola, Gunadi Khola, Sage Khola, and Thudi Khola etc. and other rivulets, 1 time by 132kV TL, 9 times by existing 11kV line; 8 times by 400V and 26 times by 220V lines. Similarly, it crosses Prithvi Highway once, many others black-topped roads and other inter-connected gravel/earthen/trails/feeder roads numerous times.

5.1.11 Air Traffic

Pokhara airports exist around 7.7km west from the proposed alignment. Moreover, project officials will consult with Civil Aviation Authority at Kathmandu regarding probable disturbance of the proposed TL to the flying route of air plane during IEE study.

5.2 Biological Environment

Vegetation of the project area covers tropical to sub-tropical types of forest. The project area covers agricultural lands, community forest area and private trees area.

5.2.1 Vegetation and Forest Resources

Proposed Lekhnath-Damauli 220 kV TL alignment starts from substation at Lekhnath of Kaski district and runs mostly along the Madi river valley and finally terminates at substation proposed at Kahu-Shivapur of Tanahu district. The altitudinal variation of the route ranges from about 327m (AP34) to 1184m (AP10). This change in the elevation provides a variety of niches for different types of vegetation to grow.

The walk over survey along the TL alignment revealed that the major vegetation in the project area comprises of *Schima-Castanopsis* forest and in the upper stretch of the route whereas *Shorea robusta* forest in the lower stretch. The walk over survey also divulged that the villagers at the peripheral of the TL have planted fodder, fire wood, timber and fruit bearing species to meet their local needs. The people have planted Bamboo (*Bambusa* sp.), Kutmero (*Litsea monopelata*), Khanyu (*Ficus semicordata*), Badahar (*Artocarpus lakoocha*), etc. Other trees like Kapro (*Ficus lacor*), Khirro (*Sapium insigne*), Simal (*Bombax ceiba*), Tooni (*Toona ciliata*), Pipal (*Ficus religiosa*), Mauwa (*Engelhardtia spicata*) and Uttis (*Alnus nepalensis*) were also reported. Similarly, shrubs and herbs such as Banmara (*Eupatorium adenophorum*), Simali (*Vitex negundo*), Titepati (*Artemisia vulgaris*), Dhurseli (*Colebrokia oppositifolia*), Hade Unyo (*Dicranopterus linearis*), Aiselu (*Rubus paniculatus*), Asuro (*Adhatoda vasica*), etc. are available in the project area.

5.2.2 Community Forests

During the ToR phase, about 16 community forests have been identified in project affected VDCs and Municipalities. The final verification of the community forests shall be done in detail IEE phase. The following table shows the details of the community forests that are likely to be affected by the proposed TL Project.

Table 5-3: List of Affected Community Forests

S. N.	District	VDC/Municipality*	Name of CF	Area of CF (ha)	Remarks	
1.	Kaski	Lekhnath*	Sailapakho Badahara	35.08	AP 3-AP4	
			Pakhure Dada	6.5	AP4	
			Puranothar-Bilauneghari		AP7, AP6-AP8	
			Saunepani Jurethumka			
		Kalika	Kapase	25.0		
			Maidipakha	48.5		
		Hansapur	Kaule	34.5		
			Gaira Pokhari	6.04		
		Rupakot	Indrako pakho	40.06		
			Saldanda			
		Thumki	Kalukhola			
		Siddha	Jimire	69.5	AP 20	
2.	Tanahu	Shyamgha	Shyaldada Thuloswara	204.0		
			Sapankot	180.0	AP28-AP29	
			Byas*	Tekan Thumka	83.0	
			Kahu Shivapur	Beltar Bachang Gauda	7.3	

5.2.3 Wildlife

Some of the major wildlife reported from the project area are categorized as follows.

5.2.3.1 Mammals

Some of the wild animals reported from the project areas are Leopard (*Panthera pardus*), Jackal (*Canis aureus*), Common Langur (*Presbytis entellus*), Porcupine (*Hystrix indica*), Squirrel (*Funambulus sp.*) and Rhesus Monkey (*Macaca mulatta*). These records were made mainly from the consultation with villagers.

5.2.3.2 Birds

Forests, bamboo grooves, gardens, agricultural fields, rivers, streams, and cliffs provide variety of habitat for different species of birds. Common bird species reported in the project area are; Common Myna (*Acridotheres tristis*), Gaunthali (*Hirundo sp.*), House crow (*Corvus splendens*), House sparrow (*Passer domesticus*), Lampuchhre (*Urocissa sp.*), Kalij Pheasant (*Lophura leucomelana*), Jureli (*Pycnonotus cafer*), Titra (*Francolinus sp.*), Ullu (*Otus scops*), Chibe (*Dicrurus adsimilis*), etc.

5.2.3.3 Rare and Protected Species of Flora and Fauna

Sal (*Shorea robusta*) and Simal (*Bombax ceiba*) found in the project area are protected tree species of Nepal. The GoN has banned the commercial felling, transportation or export of these tree species. None of the bird species reported during the ToR phase study in the project area fall under this category.



5.3 Socio-economic and Cultural Environment

5.3.1 Demography

According to the Census 2011, total population of Kaski and Tanahun districts is 8,15,386 and with 3,79,795 (46.58%) male and 4,35,591 (53.42%) female respectively. Total number of households (HH) of two districts is 2,03,982 with an average size of 4.0. Literacy rate and population density of Tanahun district is less than in Kaski district. Details of demographic characteristics of the project affected districts are given in Table 5-4:

Table 5-4 : Demographic Characteristics of the Project Affected Districts

S.N.	District	Kaski	Tanahun
1	Total Population	492098	323288
2	Male	236385	143410
3	Female	255713	179878
4	Total Numbers of Households	125673	78309
5	Average Households size	3.92	4.13
6	Area	2017	1546.83
7	Population Density (persons/ sq.km)	244	209
8	Sex Ratio (males per 100 females)	92.44	79.73
9	Percent of Literacy Rate (5 years & above)	82.38	74.8

Source: Population Census, 2011

Total population of 11 VDCs and 2 municipalities in the project area is 1,66,115 with 74,490 (44.84%) male and 91,685 (55.16%) female. Similarly, there are 42,290 HHs in the project VDCs/Municipalities and average HH size is 3.93. Table 5.5 shows demographic characteristics of the project VDCs.

Table 5-5: Demographic Characteristics of the Project Affected VDCs/Municipalities

District/VDCs/ Municipalities*	Population			HHs	Sex Ratio	Average HH size	Area (sq.km.)	Pop. Density (person/sq.km)
	Total	Male	Female					
Kaski								
Lekhnath*	68622	31218	37404	17405	83.46	3.94	105.77	648.8
Kaika	3880	1745	2135	1026	81.73	3.78	23.03	168.5
Majhthana	2933	1254	1739	833	72.11	3.52	13.89	211.2
Deurali	2373	1017	1356	648	75.00	3.66	18.6	127.6
Rupakot	2958	1277	1681	728	75.97	4.06	16.78	176.3
Hanshpur	3635	1581	2054	963	76.97	3.77	17.96	202.4
Siddha	2982	1253	1729	814	72.47	3.66	20.8	143.4
Thumki	3328	1500	1828	828	82.06	4.02	24.28	137.1
Tanahu								
Shyamgha	4893	2096	2797	1263	74.94	3.87	39.01	125.4
Manpang	6698	2863	3835	1721	74.65	3.89	59.94	111.7
Jamune Bhanjyang	9838	4416	5422	2408	81.45	4.09	61.73	159.4
Byas*	46877	21191	25686	12300	82.50	3.81	97.03	483.1
Kahun Shivapur	7098	3079	4019	1353	76.61	5.25	70.52	100.7
Total/Average	166115	74490	91685	42290	81.25	3.93	569.34	291.8

Source: CBS, 2011

5.3.2 Ethnicity

The project area is populated by heterogeneous ethnic communities. Major ethnic groups in the project area are Brahmin, Chhetri, Magar, Gurung and Dalit (Kami, Sarki, Damai, Dholi). Similarly, other ethnic groups are Newar, Thakuri, Darai, Kumal and other castes settle in the project area. Remarkable number of Muslims, have been settling in the project area, mainly in Syamgha VDC.

Table 5-6: Caste wise Population in the Project Affected VDC/Municipalities

S.N.	Caste	Population	Percentage (%)
1	Brahmin	38447	23.14
2	Magar	27886	16.79
3	Chettri	21671	13.05
4	Gururng	16750	10.08
5	Kami	15407	9.27
6	Newar	9874	5.94
7	Damai	6110	3.68
8	Sarki	5976	3.60
9	Thakuri	3523	2.12
10	Darai	3273	1.97
11	Kumal	1160	0.69
12	Other	16038	9.65
Total		166115	100.00

5.3.3 Language

Majority of the population in the project area speaks Nepali language. Besides that, some people speak their own ethnic languages- Magar, Gurung, Tamang and others.

5.3.4 Religion

Majority people in the project area practice Hindu, followed by Buddha and Islam. In recent years, some local people are getting converted to Christianity.

5.3.5 Education and Literacy

The literacy rate of the project affected VDCs and Municipalities is 79.6%. Out of the total literate person, male literacy rate is 87.94% and that of female is 72.86% (Table 5-7).

Table 5-7 : Literacy rate of the Project Affected VDCs/Municipalities

Districts	VDC/Municipality*	5 years & above Population			Literacy Status (%)		
		Total	Male	Female	Total	Male	Female
Kaski	Lekhnath*	63419	28486	34933	82.2	90.5	75.45
	Kalika	3641	1622	2019	79.21	90.32	70.28
	Majhthana	2765	1130	1635	71.75	86.28	61.71
	Deurali	2197	924	1273	70.51	81.49	62.53
	Rupakot	2708	1153	1555	77.07	88.29	68.75
	Hanshpur	3382	1445	1937	72.56	82.91	64.84
	Siddha	2779	1160	1619	74.63	85.6	66.77
	Thumki	3074	1364	1710	79.34	91.2	69.88
Tanahun	Shyamgha	4452	1868	2584	75.29	84.31	68.77
	Manpang	6135	2576	3559	72.03	81.33	65.3
	Jamune Bhanjyang	9036	3993	5043	78.53	84.48	71.45
	Byas*	43012	19167	23845	81.85	88.42	76.57
	Kahun Shivapur	6332	2711	3621	64.18	74.92	56
Total		152932	67599	85333	79.6	87.94	72.86

Source: CBS, 2011

There are higher secondary schools at every VDCs of the project area. Schools of all levels (primary, lower secondary, secondary, higher secondary) are found in villages along the proposed TL route besides government school there are private boarding schools in nearby settlement along the TL route.

5.3.6 Festivals

Since the project area is dominantly inhabited by Hindu people, Hindu festivals like Dashain, Tihar, Maghe Sankranti are widely celebrated in the project area. Some Magar and Gurung people celebrates Lhosar (New Year festival according to Tibetan calendar) and Muslim people celebrate Id.

5.3.7 Migration

The proposed 220 kV TL route runs through rural area. The starting and termination point located nearby the city area. As mentioned above, settlements are growing along the highway and in and surrounding of Lekhnath and Damauli cities. Therefore, it is apparent that people are migrating to these cities from remote VDCs of the project districts.

5.3.8 Gender Aspect

Land and property holding is dominated by male. School enrolment is higher among boys as compared to girls. Women in the project area are mostly engaged as housewives. Some women are observed as engaged in small business. Girl trafficking was not reported during the field visit.

5.3.9 Occupation

Agriculture is major occupation of local people in the project area. More than 85% of the people are engaged in agricultural activities having land, livestock and poultry. Rest of the people are engaged in business, government service, labor, agro-based industries, livestock poultry farming and bee keeping, etc. However, large number of young locals is in foreign employment from the project area.

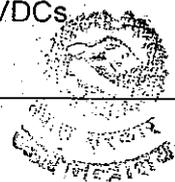
5.3.10 Agriculture

Agriculture is the prime economic activity in Project area. But the main constraint in agriculture development here is water logging by drainage congestion, irrigation shortage and traditional farming system. The cropping patterns are depended on factors like land types, soil characteristics, rainfall pattern, and seasonal fluctuations of temperature. In the project area paddy, wheat, maize, millets are the most important food crops and oilseed and vegetables are the major cash crops. The cropping pattern in project area is paddy-wheat-maize, paddy-potato-empty, paddy-winter vegetable- maize, paddy-potato and maize.

Livestock raising (mainly cattle, buffaloes and goats) is an important subsistence farming activity in the project area. Livestock provide meat, milk, eggs, and a cash income. Large livestock are also an integral part of cropping activities, providing draught power and producing organic fertilizer. Livestock is grazed on private and communal land.

5.3.11 Trade and Industries

Major markets in the project area are Lekhnath and Damauli. Local emerging markets also observed, in the project area along the road during the field survey. Few small scale industries and business such as block, marble stone cutting, fisheries farm, stone crusher, hotel/restaurant, traditional ornament, agro-vet service etc. are reported in the project VDCs.



5.3.12 Income Level

Major income sources of the households are agriculture, livestock and business in the settlements along the proposed 220 kV TL route. Secondary sources of income are off-farm activities such as labor work, service and local level small industries. Foreign remittance is now one of significant income sources to many HHs in the project area as in other parts of Nepal.

5.3.13 Health and Sanitation

The health situation of the project area is satisfactory and water related diseases (diarrhea, dysentery, influenza, cough/cold, typhoid) and common fever, pneumonia, pox, gastric, measles, jaundice skin diseases urinary tract infection, chronic bronchitis etc. are still common here. There is a sub-health post in each VDC. The health service in the project area is delivered through the existing district government hospital, private hospitals, sub-health post, and clinics which provides local level health services satisfactory. Traditional healing by Dhama, Jhankri and Lama is also practiced in some place of the project area. Awareness level towards health and sanitation (particularly towards safe drinking water, use of toilets, etc.) is apparently satisfactory in the project districts.

5.3.14 Road and Transportation

The district headquarters are linked by black topped road and there are regular bus services from major cities of country. The inner project areas are also almost accessible by gravel or earthen roads.

5.3.15 Energy

All 11 VDCs and 2 municipalities in the project area have been electrified partially or fully. They are electrified almost through NEA Grid system. Fuel wood is main source of energy for cooking food in the project area. Improved cooking stove, kerosene and liquefied petroleum gas (LPG) are also found in use for cooking food in the project affected area.

5.3.16 Communication and Other Facilities

Communication services through wireless and landline telephone are available in the project area. Similarly, the postal and modern communication facilities like television, cable network, email/ internet and fax are also available in major market centers. Local and national newspapers are also available regularly in the main market centers.

5.3.17 Income Pattern

During the field survey, it was observed that the main sources of household income are agriculture, animal husbandry, and off-farm (non-agricultural) activities. Off-farm activities include professional services, petty trade, business (hotel and restaurant), cottage industry, pensions, wage labor, fishing, hatchery, boating and sale of non-timber forest products in the settlements along the proposed 220 kV TL route. Foreign remittance is now one of significant income sources to many households in the project area as in other parts of Nepal. Since the alignment is nearby of the touristic route, so tourism is another major income source of the people of project area. Cash expenditure in non-food item (education, medicine, festival, purchasing assets and consumption goods) is higher in recent year.

5.3.18 Religious, Historical and Archeological Sites

Kaski district itself is a famous for natural resources. High Mountain, spring water, gorge, forest and vegetation, livestock, etc. are the main attraction of the district. The famous mountain Machapuchhre, Davi's falls, Fewa Lake etc. are the world famous places of the district.

Bindabasini, is the main religious place for Hindu in the project area and some mosque and church were also observed in the project area. Similarly, there are religious and archeological places like Gupteshwor cave, Mahendra cave and Byas cave are some other historical, archeological and religious places of the project area. However, none of these will be affected by the project.

5.3.19 Tourism Activity

Kaski district itself is a main destination for tourism in Nepal. Almost tourists who come to visit Nepal definitely visit Pokhara and Lekhnath. The main tourist destination in the project area are Fewa lake, Begnas lake, Davi's falls, Guteshwor cave, Mahendra cave, Seti river, Bindhyabashini temple, Sarangkot, Machhapuchhre, Panchase area, Devghat and Bandipur area.

5.3.20 Non-Governmental Organization (NGO) Activities

Some NGOs and Clubs are working in the field of water supply (drinking and irrigation), health and sanitation, sports, women awareness Dalit awareness and income generating activities in the project area.

5.3.21 Status of Women

Women in the project area are mostly engaged as housewives. Rural women are mostly engage in collection of firewood/ fodder, and caring of children and old family member is common but urban women are engage in other activities like teaching, industry, business etc. Project affected districts are touristic area so some women are engage in this field too. Some women are observed as engaged in small business along the highway. Decision making process about economic activities is mostly exercised by both sexes. Land and property holding is dominated by male. School enrolment is higher in boys as compared to girls. This is significantly low in the Dalit community. Girl trafficking was not reported during the field visit. Domestic violence, child marriages are also not common in the project area.



6 ENVIRONMENTAL IMPACTS

This chapter addresses issues raised by stakeholder and issues considered in IEE in the construction and operation of the Lekhnath-Damauli 220kV TL Project. The construction and operation of the project will result in changes to the existing baseline condition.

6.1 Issues Raised by Public and Stakeholders

Following the ToR meetings and group discussion, the IEE team analyzed the opinions, suggestions and concerns expressed by the local level agencies in response to public notice.

Major issues and impacts that are raised by the stakeholders are presented below;

- Works should be carried out in due consultation and coordination with CFUGs and there should be minimum impacts on Community Forest by the project;
- Technical and financial support for the improvement of infrastructure of school, health post and road located in the project affected VDCs;
- Consensus should be taken from forest users' group and affected people whose land falls under the transmission line alignment;
- Plantation should be carried out in barren land;
- Compensation to be given as per the market rate;
- Private land and house should be avoided as far as possible;
- Training and forestation program should be carried out;
- Priority for employment should be given to local people;
- Due care should be given to minimize the impacts on existing environment;
- Continue interaction with local people and local institutions before and during implementation of the project;
- Minimize impact on occupation and safety hazards; and
- Maximum utilization of local resources and manpower for project implementation.

6.2 Issues Identified by Experts

The environmental issues that are likely to occur during the construction as well as the operation and maintenance phases of the proposed project are discussed here. The IEE will not be limited to the issues mentioned below. Additional issues identified during the course of the IEE shall also be covered in detail. The main environmental issues identified during the ToR field visits are listed for following three types of environment.

6.2.1 Physical Environment

A) Construction Phase

- Permanent land take for tower pads;
- Soil erosion during the construction of tower pads;
- Impact due to stock piling;
- Impact on air, noise and water quality;
- Impact on drainage pattern;
- Soil erosion and sedimentation related to excavation works; temporary access roads;
- Waste disposal during construction.

B) Operation Phase

- Impact due to land fragmentation;
- Visual/aesthetic impacts;
- Impact on land use;



- Interference with air traffic;
- Impact of change in natural drainage system;
- Impact due to Electromagnetic effect.

6.2.2 Biological Environment

A) Construction Phase

- Loss of forest and vegetation cover due to site clearance within the RoW;
- Impact on nearby forest due to increase in demand for firewood and timber;
- Disturbances to wildlife habitat and movement due to construction related activities;
- Likely illegal hunting and poaching;
- Likely impacts on rare, endangered and protected species of flora and fauna (if any, identified during the detail IEE study);
- Risk of forest fire.

B) Operation Phase

- Electrocution of birds and mammals;
- Habitat Fragmentation;
- Likely changes in biological environment.

6.2.3 Socio-economic and Cultural Environment

6.2.3.1 Adverse Issues

A) Construction Phase

- Acquisition of land and private property;
- Relocation and resettlement;
- Occupational health and safety hazards;
- Conflict among the outsiders and local people resulting impacts on law and order situation;
- Loss of standing crops and farming hindrances;
- Pressure on infrastructures, communal resources and practices;
- Sudden cash flow due to increased economic activities and its effects on local economy and people;
- Change in land value;
- Influx of workers;
- Issues of vulnerable group and gender issues;
- Increase pressure on existing health and sanitation facilities.

B) Operation Phase

- Loss of agricultural productions;
- Restriction on land use pattern within the RoW;
- Land fragmentation;
- Farming hindrances due to tower foundations;
- Electro-magnetic effects due to transmission line;
- Noise from the substations;
- Occupational health and safety hazards;
- changes in land value near to tower and substation;
- Aesthetic value.



6.2.3.2 Beneficial Issues

A) Construction Phase

- Employment opportunity for local people;
- Increase in local skills in the relevant areas;
- Increase in economic activities and economic opportunities;
- Development of new infrastructures;
- Creation of fire line in dense forest area.

B) Operation Phase

- Reduction in system loss;
- Enhancement of power supply;
- Opportunities for hydropower development;
- Plantation of NTFPs of short height along the RoW in the forest.

6.3 Issues Prioritized for IEE study

The priority issues identified during the ToR with regard to physical, biological, socio-economic and cultural environment are presented below;

- Acquisition of land and assets;
- Loss of vegetation and plant species;
- Loss of wildlife habitat; compensation for land and property;
- Restriction of land use along the RoW;
- Employment opportunity to the local people;
- Appropriate mitigation measures for the affected people and area.



7 ALTERNATIVE ANALYSIS

7.1 Introduction

The IEE shall examine and describe all alternatives that were examined in the course of developing the proposed project and identify other alternatives which would achieve the identified objectives of the project. The alternatives shall be examined in order to minimize the adverse impacts and maximize the benefits in the context of cost effectiveness, labor intensiveness and low risks of environmental hazards.

The IEE shall compare the alternatives in terms of potential environmental impacts, location, designs and technologies. It shall also study alternatives in terms of methods, operation procedures and the materials to be used during construction. The alternatives proposed for consideration in the IEE are discussed below.

7.2 No Action Alternative

In the "no action" or "do nothing" alternative, no environmental impacts due to project implementation shall occur, as this option represents the *status quo* condition. There are a number of hydropower project under construction in the Seti-Madi river basin. The power generated by such projects cannot be fully consumed in the project area itself, therefore evacuation of power through TL is necessary. Without the construction of this line, the power generated by the different hydro projects will be wasted. Therefore, there is no other option but to construct the proposed line. The IEE team shall assess these impacts.

The following table shows the assessment of the different alternative routes. Out of these, Route-II was selected based on following description presented in Table 7-1.

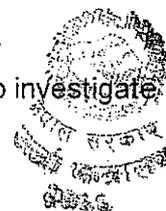
Table 7-1: Alternative Routes

S.N.	Description	Route-I	Route-II	Route-III
1.	Total Length (km)	43.56	41.851	63.590
2.	No. of AP	21	42	25
3.	Access Facility	Near to Prithvi Highway	Village road	Village road
4.	No of Crossing of Existing lines (132/33 kV TL)	4/1	3/0	4/1
5.	No. of river/khola/kholsi crossing	2/11/75	4/12/75	2/16/123
6.	No of village crossing	21	17	26
7.	No of road/highway crossing	6/2	1/2	6/2
8.	Forest area (in length km)	20.84	19.5	41.16
9.	Advantage	Easily accessible, easy construction and maintenance, length less than route -III	Settlements and forest area less than other two alternatives route I and III	Easily accessible from village road
	Priority of Order	2	1	3

7.3 Other Alternatives

In addition to the above mentioned alternatives, the IEE team shall also investigate the following:

- Design alternatives;
- Technology, time schedule and construction materials;



- Construction methods, use of construction materials and equipment, time schedule;
- Alternative in the context of power evacuation methods;
- Study of alternative by considering future plans;
- Alternative measures to reduce the effect of electromagnetic field (EMF).

7.3.1 No Forest Option

Although practically, it is not possible to avoid forest, no forest option will also studied in the IEE phase. The proposed alignment has been routed nose to nose, valleys and at ridges so as to avoid forest clearance to the extent possibility. Furthermore, the locations for APs have been also selected at elevated spots to avoid felling of the trees and trimming. Efforts to avoid the dense forest area have been made.



8 MITIGATION AND ENHANCEMENT MEASURES

8.1 Introduction

The IEE shall recommend appropriate and pragmatic mitigation measures for all of the identified environmental impacts. These actions shall be designed to eliminate or minimize adverse environmental impacts to reasonable levels or to the levels as indicated by national standards. Similarly, enhancement measures shall be proposed to enhance the beneficial impacts. The cost required for mitigation and enhancement measures shall be identified in detail and incorporated in IEE report.

The cost for mitigation and enhancement measures shall be provided separately differentiating into "Physical Environment", "Biological Environment", and "Socio-economic and Cultural Environment". Furthermore the cost shall be differentiated according to "Construction Phase" and "Operation Phase".

All the proposed mitigation and enhancement measures are the prime responsibility of the proponent. Summary of Cost Benefit Assessment shall be given which shall include the followings:

- Cost of Environmental Mitigation Measures
- Cost of Enhancement Measures
- Cost for other Social Support Programs and Corporate Social Responsibility (CSR)
- Cost of Environmental Monitoring
- Total Project Cost, and
- Percentage of Total Environmental Cost to the Total Project Cost

8.2 Types of Mitigation Measures

The IEE team shall recommend the following types of mitigation measures:

- Preventive measures
- Design and corrective measures
- Compensatory measures

Moreover, the IEE report shall propose the organizational structures and agencies to be consulted while implementing the mitigation programs. A matrix including identified impacts and proposed mitigation measures shall also be included in IEE report. The proposed impact mitigation measures matrix shall be categorized in terms of physical, biological, socio-economic and cultural environments. The matrix shall be further categorized in terms of construction and operation phases. The cost for mitigation and enhancement measures shall be provided.



9 ENVIRONMENTAL MONITORING

The monitoring plan shall be required for assessing the actual impacts during project construction and operation. The plan shall specify the physical, biological and socio-economic and cultural environment in terms of parameters, indicators, location, sampling and measurement variables.

The IEE report shall also be specific about the nature of monitoring required, agency carrying out these activities, the cost and any other necessary inputs. In monitoring plan, the following areas shall be described for the construction as well as operation phase:

- The monitoring plan shall be categorized in terms of "Physical", "Biological" and "Socio-economic and Cultural Environment". Moreover, baseline, impact and compliance monitoring plan shall be categorized in terms of construction and operation phases.
- Baseline and impact monitoring plan shall include parameters, indicators, methods, schedule, and location.
- Compliance monitoring plan shall include parameters, indicators, method and schedule.
- Organization set-up, budget and manpower required for carrying out monitoring plan shall be proposed. Furthermore, the monitoring cost includes cost of impact and compliance monitoring activities at least for 2 years of project operation phase.
- Agencies to be consulted while implementing monitoring plan shall also be identified.

All the proposed monitoring plans are the prime responsibility of the proponent.



10 REPORT FORMAT AND DELIVERABLES

A full-fledge report of IEE will be prepared as per EPR, 1997 (Schedule-5 Pertaining to Rule 7). The main text of the report will contain details of assessment and its finding, impacts, mitigation/enhancement measures, institutional requirement including local public and stakeholders concerns together with annexes, maps, photographs, etc.

The IEE report including public concerns and issues shall be submitted to Ministry of Energy (MoEn) through Department of Electricity Development (DoED). The report will be finalized incorporating all possible comments and suggestions to be obtained from the Ministry of Energy. The report shall be deemed to be final after approval by this Ministry.

A list of references cited in the text of main report shall be presented in IEE report. The published or name of publication and journal/unpublished (reports) information shall be listed in the following order: author(s); date of publication; title of the report; volume, number, series if any; and page number.

In addition to the information required under Schedule-5 pertaining to Rule 7 of EPR, 1997 the followings shall be attached as annexes; A copy of approved ToR; records of the public involvement in the project activities; copy of public comments and concerns, a copy of valid survey license; a copy of public notice; recommendation letters from concern VDCs and affected CFUGs; relevant photographs of project area; list of human resource involved during IEE report preparation; list of contact persons during IEE process; tables, maps, charts, graphs, figures, etc. A colour map showing the project affected VDC boundary and project layout shall also be included in it. The executive summary of the IEE shall be presented both in Nepali and English language.

If the project requires land from government forest/community forest or trees are needed to be cut down from government forest/community forest, then comments and suggestions from district forest office and affected community forest will be attached in the IEE report along with their recommendation letters.



Annex-I
Survey License



अनुमतिपत्र महाशाखा

२०७२/११/२७

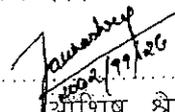
अनुमतिपत्र: २०७२ ७३
चलानी नम्बर :- २६१

लेखनाथ-दमौली २२० के.भी. विद्युत प्रसारण लाईन आयोजनाको सर्वेक्षण
अनुमतिपत्र वारे ।

✓ श्री नेपाल विद्युत प्राधिकरण
पो.ब.नं. १००२०, प्रधान कार्यालय
दरबारमार्ग, काठमाडौं
फोन: ०१-४१५३०५४ ।

प्रस्तुत विषयमा तहल्ले लेखनाथ - दमौली २२० के.भी. विद्युत प्रसारण लाईन आयोजना
को सर्वेक्षण अनुमतिपत्र पाउन दिएको दरखास्त उपर कारवाही हुँदा विद्युत ऐन, २०४९को दफा ४
को उपदफा २ र विद्युत नियमावली, २०५० को नियम ८ बमोजिम नेपाल सरकार,
ऊर्जा मन्त्रालय (सचिवस्तर)को मिति २०७२.११.०२को निर्णयानुसार मिति २०७४/११/०१ सम्म ।
दुई बर्ष) बहाल रहने गरी जारी भएको २२० के.भी. प्रसारण लाईनको सर्वेक्षण अनुमतिपत्र संख्या:
वि.वि.वि. ०७२/७३ वि.प्र.स. २३६ यसै पत्र साथ संलग्न गरी पठाइएको व्यहोरा अनुरोध छ ।

संलग्न: विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र संख्या वि.वि.वि. ०७२/७३ वि.प्र.स. २३६ ।


२०७२/११/२७
आशिष श्रेष्ठ
इन्जिनियर

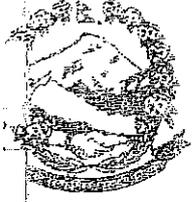
साधार्थ:

श्री ऊर्जा मन्त्रालय, सिंहदरवार
श्री विद्युत विकास विभाग

- आयोजना अध्यक्ष महाशाखा
- निरीक्षण महाशाखा

➤ आर्थिक प्रशासन शाखा : मिति २०७२ ०६ १९ मा आ.र.नं. ४५६७, ने.रा.वैक.ध.भौ.नं.०२८९३७
बाट अनुमतिपत्र दस्तुर बापत राखेको धरौटी रकम रु १,००,०००/१०० अक्षरेपी रु.एक लाख मात्र। र
मिति २०७२*०८ १६ मा आ.र.नं. ४५९७, ने.रा.वैक.ध.भौ.नं.०२९९९७ बाट अनुमतिपत्र दस्तुर बापत
राखेको धरौटी रकम रु १,००,०००/१०० अक्षरेपी रु.एक लाख मात्र। गरी जम्मा भएको रु
२,००,०००/१०० अक्षरेपी रु.दुई लाख मात्र। राजश्व खातामा जम्मा हुन ।





नेपाल सरकार

ऊर्जा मन्त्रालय

विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र

(लेखनाथ-दमौली २२० के.भि. विद्युत प्रसारण लाईन आयोजना)

अनुमतिपत्र संख्या : वि. वि. वि. ०७२/७३, वि.प्र.स. २३६

श्री नेपाल विद्युत प्राधिकरण
प्रधान कार्यालय, काठमाडौं ।

महाशय,

विद्युत प्रसारणको सर्वेक्षण अनुमतिपत्र पाउन मिति २०७२/०८/२१ मा दिनु भएको दरखास्त अनुसार देहायको विवरण खोली विद्युत ऐन, २०४९ को दफा ४ को उपदफा (२) र विद्युत नियमावली, २०५० को नियम ८ बमोजिम यो अनुमतिपत्र प्रदान गरिएको छ ।

१. विद्युत प्रसारणको सर्वेक्षण गर्न चाहने व्यक्ति वा संगठित संस्थाको पूरा नाम र ठेगाना :
श्री नेपाल विद्युत प्राधिकरण
पो.ब.नं. १००२०, प्रधान कार्यालय,
दरबारमार्ग, काठमाडौं
फोन: ०१-४१५३०५४ ।

२. प्रसारण गरिने विद्युत उपलब्ध गराउने परियोजना /स्थानको विवरण :-
नेपाल विद्युत प्राधिकरणको केन्द्रिय प्रसारण प्रणाली ।

३. विद्युत प्रसारण कहाँबाट कहाँ गर्ने हो सो को विवरण :-
गण्डकी अञ्चल कास्की जिल्लाको लेखनाथ नगरपालिकामा नेपाल विद्युत प्राधिकरणको सवस्टेशन देखि सोहि जिल्लाको कालिका, माभथाना, हंसपुर हुँदै गण्डकी अञ्चल तनहुँ जिल्लाको रूपाकोट, देउराली, पेलुङ्गा, सल्यानडाँडा, थुम्की, सिद्ध, स्याम्घा, ब्यास नगरपालिका, मनपन, जामुने गा.वि.स.हुँदै कहु शिवपुरमा प्रस्तावित नेपाल विद्युत प्राधिकरणको सवस्टेशन सम्म र ब्यास नगरपालिकाको दमौली सवस्टेशन सम्म ।

४. सर्वेक्षण गर्ने क्षेत्र :
(क) अञ्चल : गण्डकी ।
(ख) जिल्ला : कास्की र तनहुँ ।
(ग) गा.वि.स.र नगरपालिका : प्रकरण ३ मा उल्लेख भएको प्रसारण लाईनको रूटमा पर्ने गा.वि.स. तथा न.पा हरू।
(घ) पूर्व: ८४° २०' ००" पू पश्चिम: ८४° ०२' ३०" पू
उत्तर: २६° १३' ४५" ऊ दक्षिण: २७° ५७' ००" ऊ

५. विद्युत प्रसारणको भोल्टेज र परिमाणहरु :-
भोल्टेज : २२०,००० भोल्ट (डबल सर्किट) ।
परिमाण : ६०० मेगावाट ।

६. सर्वेक्षण प्रकृति :- संभाव्यता अध्ययन तथा वातावरणीय अध्ययन ।

७. अनुमतिपत्र बहाल रहने अवधि :-
मिति : २०७२/११/०२ देखि २०७४/११/०१ सम्म ।



अन्य शर्तहरू :

- (क) त्यस संस्थाले विद्युत विकास विभाग मार्फत पेश गरेको दरखास्त साथ पेश गरिएका विवरणहरूको अधीनमा रहेा प्रस्तुत प्रसारण लाइन आयोजनाको संभाव्यता तथा वातावरणीय अध्ययन गर्नु पर्नेछ ।
- (ख) विद्युत नियमावली, २०५० को नियम २१ बमोजिम सर्वेक्षणको कार्य तीन महिनाभित्र शुरु गरी सो को जानकारी विद्युत विकास विभागलाई दिनु पर्नेछ । सर्वेक्षण कार्य प्रगति विवरण प्रत्येक ६ महिनामा विद्युत विकास विभागलाई दिनु पर्नेछ । विभागले आवश्यक देखेमा अनुगमनको प्रयोजनको लागि कुनै पनि समयमा आवश्यक विवरणहरू माग गर्न सक्नेछ ।
- (ग) प्रस्तावित प्रसारण लाइन आयोजनाको दायीं बायाँ अन्य विद्युत प्रसारण लाइन आयोजनाहरू भएमा तिनको RoW मा असर नपर्ने गरी आयोजनाको संभाव्यता अध्ययन कार्य गर्नुपर्नेछ । साथै प्रस्तावित प्रसारण लाइन आयोजनाको क्षेत्र वरिपरि अन्य प्रसारण लाइन आयोजनाहरूको सर्वेक्षण कार्य भईरहेको भए ती आयोजनाहरूसँग पनि आवश्यक समन्वय गर्नुपर्नेछ ।
- (घ) सर्वेक्षण कार्यको सिलसिलामा कुनैको घर जग्गामा प्रवेश गर्नु परेमा सम्बन्धित व्यक्तिलाई पूर्व सूचना दिएर मात्र त्यस्तो घर जग्गामा प्रवेश गर्न सकिनेछ । त्यसरी प्रवेश गर्दा कुनै हानी, नोक्सानी हुन गएमा अनुमितपत्र प्राप्त व्यक्ति वा संस्थाले नै क्षतिपूर्ति दिनुपर्नेछ ।
- (ङ) सर्वेक्षण कार्य सम्पन्न भएको ३० दिन भित्र ३ प्रति प्रतिवेदन विद्युत विकास विभागमा पेश गर्नुपर्नेछ ।
- (च) त्यस संस्थाले पेश गरेको सर्वेक्षण कार्यको कार्य तालिका (Work Schedule) बमोजिम अनुमितपत्रको प्रकरण ७ मा उल्लेखित अवधिभित्र सम्पन्न गर्नुपर्ने आवश्यक अध्ययन कार्यहरू पूरा गरी विद्युत विकास विभागमा उल्लेखनीय प्रगती सहितको गुणात्मक प्रतिवेदन पेश गर्नुपर्नेछ । कुनै कारणवश अध्ययन कार्य सम्पन्न गर्न थप समय आवश्यक परेमा कार्य सम्पन्न गर्न नसकेको यथोचित कारण समेत खुलाई पुरा भईसकेका अध्ययन कार्यहरूको प्रगति विवरण सहित प्रक्रिया पुर्चाई नविकरणका लागि दरखास्त दिएमा यस अनुमितपत्रलाई नविकरण गर्न सकिनेछ । अन्यथा यो अनुमितपत्र स्वतः रद्द हुनेछ ।
- (छ) आयोजनाको मोटामोटी रुट नक्सा संलग्न अनुसूची १ (टोपो नक्शाको Route Alignment) बमोजिम हुनेछ ।
- (ज) प्रस्तावित आयोजनाको अध्ययन कार्य गर्दा प्रचलित कानून अनुसार IEE वा EIA गर्नुपर्ने भएमा सो पनि गर्नुपर्ने छ । वातावरण सम्बन्धी अन्य कुराहरू प्रचलित कानून अनुसार हुनेछ ।
- (झ) यस अनुमितपत्रद्वारा सर्वेक्षण गर्न अनुमति दिइएको आयोजना निर्माण गर्न चाहेमा प्रकरण (६) मा उल्लेख भएका सम्पूर्ण अध्ययन कार्यहरू सम्पन्न गरी विद्युत नियमावली, २०५० को नियम १९ बमोजिम यस सर्वेक्षण अनुमितपत्रको म्यादभित्रै नियम १३ बमोजिमका विवरणहरू खुलाई विद्युत प्रसारणको अनुमितपत्रको लागि दरखास्त दिनुपर्नेछ ।
- (ञ) यस अनुमितपत्र बमोजिमको सर्वेक्षण गर्न लाग्ने सम्पूर्ण रकम त्यस संस्था आफैले व्यवस्था गर्नुपर्नेछ र त्यस्तो खर्चप्रति नेपाल सरकारको कुनै दायित्व हुनेछैन ।
- (ट) नेपाल सरकारको अनुमतिविना यो अनुमितपत्र बिक्री गर्न वा अन्य कुनै प्रकारले कुनैलाई हस्तान्तरण गर्न पाइने छैन ।
- (ठ) त्यस संस्थाको स्वामित्वको संरचनामा कुनै हेरफेर वा परिवर्तन भएमा सो को जानकारी विद्युत विकास विभागलाई अविलम्ब दिनुपर्नेछ ।
- (ड) यस अनुमितपत्रमा उल्लेख भए भन्दा फरक हुने गरी आयोजनाको अध्ययन गर्नु पर्ने भएमा सो को पूर्व स्वीकृति लिनु पर्ने छ ।
- (ढ) यस अनुमितपत्रमा कुनै संशोधन गर्नु पर्ने भएमा आवश्यकता एवम् औचित्यताका आधारमा गर्न सकिनेछ ।



अनुमितपत्र दिने अधिकारीको

सही :

नाम : सुमन प्रसाद, शर्मा

पद : सचिव

ऊर्जा मन्त्रालय

मिति : २०७२/११/०२

Annex-II

**Table for Forest Loss, Land Loss, Crop Loss and
Structure/Other Properties Loss**



**A. Tables Related to Biological Environment
1. Forest loss at different Project Components**

S.N.	PROJECT COMPONENT*	TYPE OF FOREST	FOREST AREA (ha.)	LOSS OF VEGETATION			CROWN COVER (%)	BASAL AREA (%)	VEGETATION TYPE
				Seedling per ha.	Saplings per ha.	No. of trees >10 cm DBH			
1	Switch yard	Gvt. managed							
		Community							
		Leasehold							
		Religious							
		Private							
2	TP1 to TP2							
								
								
								
								
3	TP.. to TP..							
								
								
								
								
4	TL Access Road / Service Road							
								
								
								
								
5	Substation							
								
								
								
6	Total						Sum	

Note: Other components can be added as appropriate/required as per the project layout.



ToR Report

2. Total loss in terms of plant species

BOTANICAL NAME	LOCAL NAME	AVG. DBH/RANGE' (for >= 10 cm DBH)	LOSS OF VEGETATION**				STANDING WOOD VOLUME		BIOMASS FOR STANDING TREE		BIOMASS USAGES***
			LOSS OF REGENERATION		LOSS OF TREE (number)		Timber (cft.)	Fuel wood (chatta)	(Wet)	(Dry)	
			Seedlings per ha.	Saplings per ha.	Pole class	Tree class					
1.											
2.											
...											
Total			Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum

Note: * Avg. DBH and Range of DBH to be given for Pole and Tree Class
 ** Seedling 0-4 cm DBH; Sapling 4-10 cm DBH; Pole Class 10-30 cm DBH; Tree Class >30 cm DBH
 *** Possible usages are - fire wood, fodder, etc.

3. Total Forest Loss

TYPE OF FOREST	AREA (ha.)	LOSS OF VEGETATION				CROWN COVER (%)	STANDING WOOD VOLUME		BIOMASS FOR STANDING TREE AND GROUND VEGETATION		BIOMASS USAGES
		LOSS OF REGENERATION		LOSS OF TREE (no)			Timber (cft.)	Fuel wood (chatta)	(Wet)	(Dry)	
		Seedlings per ha.	Saplings per ha.	Pole class	Tree class						
1. Govt.											
2. Community											
3. Religious											
4. Leasehold											
5. Private.											
Total		Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum

Note: - Seedling 0-4 cm DBH; Sapling 4-10 cm DBH; Pole Class 10-30 cm DBH; Tree Class >30 cm DBH
 * Possible usages are - fire wood, fodder, etc.



4. Loss of Non-Timber Forest Product (NTFP)

COMMERCIALY IMPORTANT SPECIES (NTFP)	Government Managed		Community Managed		Religious		Leasehold		Remarks
	Seedlings per ha. (no./ha.)	Saplings per ha. (no./ha.)	Seedlings per ha. (no./ha.)	Saplings per ha. (no./ha.)	Seedlings per ha. (no./ha.)	Saplings per ha. (no./ha.)	Seedlings per ha. (no./ha.)	Saplings per ha. (no./ha.)	
1.									
2.									

Note: -Seedling 0-4 cm DBH; Sapling 4-10 cm DBH;

= Use Govt. approved methodologies, if available. If not, other methodologies can be used.

5. Land Requirement

LAND TYPE	LAND REQUIREMENT (ha.)		PROJECT COMPONENT
	Temporary	Permanent	
1. Agricultural.			[TL RoW, Tower Pads, Campsite, Spoil deposit, Road, Substation, etc.]
2. National forest			
3. Community forest			
4. Leasehold forest			
5. Religious forest			
6. Private forest			
Total	Sum	Sum	Total
	Sum	Sum	Sum



**B. Table Related to Land Loss
1-Types of Land FALLING under Transmission Line Corridor**

LINE COMPONENTS.	Particulars	LAND TYPE (In hectare)												Total area (In ha.)	Remarks	
		Forest			Cultivated		Barren		River & Flood Plain	Built up/ Residential						
		Gvt.	CF	LHF	Rel.	Pvt.	Govt. (रेसार्वा)	Pvt.		Govt.	Pvt.	Public	Pvt.			
Under T/L conductor	TP1 to TP2															
	TP1. to TP3															
 to															
	TP.. to TP..															
	Sub-Total															
Tower Pads	Total number of Tower Pads/area*															
Substation/s	Near Power house															
	Near delivery point															
	Total Area															

Note:

1. The area shall include all the land irrespective of need to clear of vegetation and others, including tower foundations.
2. * - Number of Tower Pads and area required are to be given as - no./ha.
3. ** - If there are more than one substations, all have to be included identifying locations
4. LAND REQUIREMENT FROM NATIONAL PARK, RESERVE FOREST, BUFFER ZONE, AND CONSERVATION AREA SHALL BE ACCOUNTED USING SIMILAR TABLES SUITABLE BY DIFFERENT FIELD/COLUMN



2 Types of Land to be ACQUIRED under Transmission Line Corridor

LINE COMPONENTS.	Particulars	LAND TYPE (In hectare)												Total area (In ha.)	Remarks		
		Forest			Cultivated			Barren		River & Flood Plain	Built up/ Residential						
		Gvt.	CF	LHF	Rel.	Pvt.	Govt. (राज्य)	Pvt.	Gvt.		Pvt.	Public	Pvt.				
Under T/L conductor	TP1 to TP2																
	TP1. to TP3																
 to ...																
	TP.. to TP..																
	Sub-Total																
Tower Pads	Total number of Tower Pads/area																
Substation/s**	Near Power house																
	Near delivery point																Only if needed. Clearly state if not required
	Total Area																

Note:

- a) The area shall include all the land irrespective of need to clear of vegetation and others, including tower foundations.
- b) * - Number of Tower Pads and area required are to be given as - no./ha.
- c) ** - If there are more than one substations, all have to be included identifying locations
- d) LAND REQUIREMENT FROM NATIONAL PARK, RESERVE FOREST, BUFFER ZONE, AND CONSERVATION AREA SHALL BE ACCOUNTED USING SIMILAR TABLES SUITABLY ADJUSTED BY FIELD/COLUMN NAMES.



3. Types of Temporary Land required for the Project

S.N.	PROJECT COMPONENTS :	LAND TYPE (in hectare)											Total area (in ha.)	Remarks			
		Forest			Cultivated		Barren		River & Flood Plain		Built up/ Residential						
		Govt.	CF	LHF	Rel.	Pvt.	Govt. (रिजर्व)	Pvt.	Govt.	Pvt.	River & Flood Plain	Public			Pvt.		
1	Campsites																
2	Storage Facilities																
	Total Area																

Note:

- 1) * - Other components can be added as appropriate/required based on the project layout. The table shall account all the land required by the project
- 2) Give separate tables for Permanent and Temporary land requirements. However, it is advised to use temporary land for these facilities.
- 3) LAND REQUIREMENT FROM NATIONAL PARK, RESERVE FOREST, BUFFER ZONE, AND CONSERVATION AREA SHALL BE ACCOUNTED USING SIMILAR TABLES SUITABLY ADJUSTED BY DIFFERENT FIELD/COLUMN NAMES.



C. Tables Related to Socio-Economic and Cultural environment

1(A)-Loss of Land of Project Affected Families and Households

S.N.	Owner's Name and Family size	VDC/ Ward No.	Project Component*	Loss of Land in the project area (m ²)				Total land loss ha.	Value of lost land (Rs.)	Total Land owned ha.	% of land loss	Remarks
				Khet	Bari	Pakho/Parti/Ghar Bari*	Forest					

Note:

- # - Mention the category loss for each family
- * - Use separate row for each project component for the family as required

1(B)-Total Loss of Land of Project Affected Families and Households

S.N.	VDC	Project Component*	Loss of Land in the project area (Ropani/ ha.)				Remarks
			Khet	Bari	Pakho/Parti	Ghar Bari	
	VDC1						
	VDC2						
						
Total							
Total land available in all VDCs							
% of lost land in all VDCs							
Value of Lost Land (Rs.)							

Note:

- Use separate row for each project component



2(A)-Loss of Cereal Crops Production of Project Affected Families and Households

S.N.	Owner's Name and Family size	VDC/ Ward No.	Project Component*	Loss of Cereal Crops due to land Acquisition (Mt)				Crops Production of the family/Percentage of loss (Mt)/%				Remarks		
				Paddy	Wheat	Maize	Millet	Others##	Paddy	Wheat	Maize		Millet	Others##
1.														
			Total											

Note:

* Use separate row for each project component for the family as required

Give values as -Mt/%

Use additional columns as required for other cereal crops

2(B)-Loss of Cash Crops Production of Project Affected Families and Households

S.N.	Owner's Name and Family size	VDC/ Ward No.	Project Component*	Loss of Cash Crops due to land Acquisition (Mt)			Crops Production of the family/Percentage of loss (Mt)/%			Remarks
				Potato	Vegetables	Others##	Potato	Vegetables	Others##	
1.										
			Total							

Note:

* Use separate row for each project component for the family as required

Give values as -Mt/%

Use additional columns as required for other cereal crops



ToR Report

NEA-ESSD

4 (A) - Distribution of Settlements/Infrastructures/etc. within 100 m and up to 300 m from TOWER POINT

Tower Point	Geographical Co-ordinate	Location (VDC, Ward)	Land Types under tower pad and its ownership	Settlements/ Infrastructures/ houses/ schools/ temples /Hat-Bazars /etc. within 100 m	Distance from the edge of Tower Point (m)	Settlements/ major infrastructures/ within a distance greater than 100 m (up to 300 m)	Distance from the edge of Tower point (m)	Remarks
TP								

4 (B) - Distribution of Settlements/infrastructures/etc. within 100 m and up to 300 m from the Transmission LINE CONDUCTOR

Transmission line section (from TP to TP)	VDCs/Ward No	Settlements/ infrastructures//houses/schools/ temples/ Hat-Bazar/ within 100 m from T/L conductor	Distance from the Conductor (m)	Settlements/Major structures within a distance greater than 100 m (up to 300 m) from TL Conductor	Distance from the Conductor (m)	Remarks
TP... to TP...						

4 (C) - Distribution of Settlements/Infrastructures/etc. within 100 m substation

Substation	Location (VDC, Ward)	Settlements/ Infrastructures/ houses/ schools/temples/Hat-Bazars/etc. within 100 m	Distance from the edge of perimeter (m)	Remarks
Near Power house				
Near Delivery point				



Annex-III
Sample of Households Questionnaire, KII Guidelines
And VDC Checklist



नेपाल विद्युत प्राधिकरण
लेखनाथ-दमौली २२० के.भी. प्रसारण लाइन आयोजनाको
प्रारम्भिक वातावरणीय परिक्षण (IEE) को लागि तैयार गरिएको
घरधुरी प्रश्नावली

२०७३

जग्गा मात्र पर्ने / घर मात्र पर्ने / घर र
जग्गा दुवै पर्ने / अन्य संरचना पर्ने
(.....)

यस प्रश्नावलीमा सोधिएका सबै व्यक्तिगत सूचना तथा डाटा एन २०१५ अनुसार गोप्य राखिने छन् र तथ्याङ्किय प्रयोजनका लागि मात्र प्रयोग गरिनेछन् ।

१. आयोजना क्षेत्र सम्बन्धि सामान्य जानकारी:

१. जिल्ला: २. गा.वि.स./न.पा.
३. वडा नं. ४. गाउँ/टोल
५. आयोजना स्थल: ५.१. सव्रस्टेशन ५.२. टावर (टावर नं.)
५.३ टावर नं. देखि सम्म

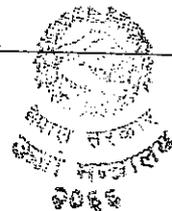
२. परिवार सम्बन्धी जानकारी :

- २.१ घरमूलीको नाम:
- २.२ लिंग: १. पुरुष २. महिला
- २.३ धर्म: २.४ जात/जाति:
- २.५ परिवारमा बोलिने भाषा: २.६ परिवार संख्या:
- २.७ तपाईं यस गाउँमा कहिलेदेखि बसिरहनु भएको छ ?
१. जन्मदेखि नै बसोबास गर्दै आएको २. बसाई सरी आएको, कति वर्ष पहिले
- २.८ परिवारको प्रकार: १. एकल परिवार (छुट्टिएर बसेका) २. संयुक्त परिवार:

२.९ पारिवारिक बिबरण :

कृपया तपाईंको परिवारको सदस्यहरुबारे (मानो नछुट्टिई बसेका) विस्तृत विवरण दिनुहोस् (घरमुलीबाट शुरु गर्ने)

क्र.सं	नाम	लिंग	उमेर (वर्ष)	शिक्षा (५ वर्ष माथि)	वैवाहिक स्थिति	पेशा (१४ वर्ष माथि)		सिप/ तालिम प्राप्त भए सो को बारेमा उल्लेख गर्ने	६ महिना भन्दा बढी समय बाहिर बसेको भए		
						मुख्य	सहायक		समय (महिना)	कारण	ठार्ने
१.					वि. / अवि						
२.					वि. / अवि						
३.					वि. / अवि						
४.					वि. / अवि						
५.					वि. / अवि						
६.					वि. / अवि						
७.					वि. / अवि						
८.					वि. / अवि						
९.					वि. / अवि						
१०.					वि. / अवि						
११.					वि. / अवि						
१२.					वि. / अवि						



३. कृषि, पशुपालन तथा व्यापार व्यवसाय:

३.१ कृषि

कृषया तपाईको आफ्नो वा परिवारको नाममा भएको जग्गा जमीन वारे निम्न विवरण दिनुहोस् ।

जग्गाको स्वामित्व	सिंचित खेत (क्षेत्रफल)	बारी (क्षेत्रफल)	अन्य (खुलाउने).....
आफ्नै			
अरुको कमाई आएको			
अरुलाई कमाउन दिएको			

३.१.१ के तपाईले गत वर्षमा कुनै जग्गा बेच्नुभयो ? १. बेचें २. बेचेको छैन

३.१.२ गत वर्षमा तपाईले खेती गर्नुभएको जग्गामा कुन कुन खाद्यान्न बाली/नगदे वाली/फलफुलहरु लगाउनु भयो, तिनीहरुको उत्पादन, उत्पादन खर्च एवं आम्दानी वारे बताउनुहोस् ।

	वालीहरु	खेती गरेको जमिनको क्षेत्रफल	कुल उत्पादन	प्रति इकाई मूल्य	जम्मा आम्दानी (रु.)	उत्पादन खर्च	जम्मा खुद आम्दानी (रु.)
खाद्यान्न बालिहरु	धान						
	गहु						
	मकै						
	कोदो						
	दाल गेडागुडी						
	अन्य....						
	जम्मा						
नगदेबालीहरु (व्यवसायिक उत्पादन)	आलु						
	तोरी						
	ऊखु						
	तरकारी						
	जम्मा						

३.१.३ के तपाईको जग्गामा भएको गत वर्षको उत्पादनले तपाईको परिवारलाई पर्याप्त भयो ?
१. भयो २. भएन

३.१.४ यदि अपर्याप्त भयो भने कति महिनाको लागि पुगेन ? महिना

३.१.५ आफ्नो उत्पादित खाद्यान्न अपर्याप्त भएको बेला आफ्नो परिवारलाई तपाई कसरी खुवाउनु हुन्छ ?

१. ऋण गरेर २. दैनिक ज्यालादारी काम गरेर
३. घरको अन्य सामान बेचेर ४. जंगली खाद्य पदार्थ खाएर
५. भारी बोक्ने काम गरेर ६. अन्य

३.१.६ के तपाईको परिवारको ऋण छ ? १. छ २. छैन

३.१.७ यदि ऋण छ भने, ऋण लिनुको कारण के हुन् ? (३ भन्दा बढीमा चिन्ह नलगाउने)

१. घर निर्माण/सुधार २. खेतीको लागि जग्गा किन्न
३. घडेरी किन्न ४. आप्रवाशनको लागि / बैदेशिक रोजगारीको लागि
५. शिक्षाको लागि ६. औषधोपचारको लागि
७. विहे/व्रतवन्ध आदि काम ८. खाद्यान्न/लत्ताकपडा खरिद
९. अन्य कार्य भए उल्लेख गर्ने



३.१.८. तपाईंको परिवारको न्यूनतम आधारभूत आवश्यकताहरू पूरा गर्न मासिक आम्दानी कति जति हुनुपर्छ जस्तो लाग्छ? मासिक आम्दानी रु.

३.२ पशुपालन :

३.२.१ तपाईंले गाईवस्तु पाल्नु भएको छ ?

१. छ २. छैन

३.२.२ यदि पाल्नुभएको छ भने निम्न विवरण दिनुहोस् ।

क्र.स.	पशुपक्षी को प्रकार	संख्या	पशु/पक्षी पालनबाट जम्मा वार्षिक आम्दानी (रु.)	पशु/पक्षी पालनको लागी जम्मा वार्षिक लागत (रु.)	खुद आम्दानी (रु.)	कैफियत
१.	गाई		पशुपक्षी बेचेर			
	गोरु					
२.	भैसी		दुध, दही, घिऊ बाट			
	राँगा					
३.	भैंडा/वाखा/खसी/बोका		अन्य बाट			
४.	सुँगुर/बंगुर					
५.	कुखुरा/हाँस /परेवा					
६.	अन्य					
	जम्मा					

३.३ व्यापार तथा साना उद्योग :

तपाईंको परिवारका सदस्यहरूमध्ये कसैको आफ्नै व्यापार वा घरेलु उद्योग छ कि ? (२.९ को पेशा संग सम्बन्धित)

१. छ २. छैन

यदि छ भने तलको विवरण दिनुहोस् ।

व्यवसायको किसिम	स्थान	औसत मासिक आम्दानी

४. घर र घरायसी सामग्रीहरूको विवरण

४.१. यो घर तपाईंको आफ्नै हो ?

१. हो २. होईन

४.२. यदि होईन भने तपाईंले भाडामा लिनु भएको हो ?

१. हो २. होईन ३. अरुको घरमा बसेको

४.३. आफ्नो घरको भित्ताको सामग्री :

४.४. भुईको सामग्रीहरू:

४.५. छानाको सामग्री:

४.६. घरको तला:

१. एक तला २. दुइ तला ३. तिन तला ४. तिन तला भन्दा माथि

५. आम्दानी तथा खर्चको विवरण :

५.१ खर्च : गत महिना तपाईंको घरमा निम्न शिर्षक/वस्तुहरूमा भएको खर्चको विवरण दिनु होस् :

शिर्षक	मासिक रु.	बार्षिक रु.
१. खाना खर्च		
२. लत्ता कपडा		
३. घरभाडा		
४. शिक्षा		
५. यातायात		
६. इन्धन (मिट्टितेल, ग्यास, दाउरा आदि)		
७. टेलिफोन/पत्रपत्रिका/केबुल टि.भी.		
८. पानी/बिजुली		
९. अन्य (खुलाउने)		
जम्मा		

५.२ आम्दानी : विगत १२ महिना यता तपाईंको परिवारले निम्न श्रोतबाट कति आम्दानी गर्नु ?

आम्दानीका श्रोतहरू	रु.	
१. कृषिजन्य उत्पादनको विक्रि र उपभोग [अफैले उत्पादन गरेको] बाट		(३.१.२ बाट लिने)
२. पशुपालनबाट आम्दानी		(३.२.२ बाट लिने)
३. उद्योग/व्यवसाय /व्यापार/ ठेक्कापट्टा		
४. नोकरी (तलव)		
५. दैनिक ज्याला मजदूरी		
६. बैदेशिक रोजगारीको कमाई (विप्रेषण)		
७. बहाल/ब्याज/लाभांश		
८. पेन्सन		
९. सामाजिक सुरक्षा भत्ता (वृद्ध, एकल महिला, अपांग आदि)		
१०. अन्य आम्दानी (खुलाउने)		
जम्मा		

६. ऊर्जा तथा खानेपानीको आपूर्ति:

६.१ तपाईंको खानेपानीको मुख्य श्रोत के हो ? १. ईनार/कूवा २. ट्यूब वेल ३. सार्वजनिक घारा
४. पाइपबाट आपूर्ति ५. अन्य.....

६.२ हाल भईरहेको पानीको स्रोतले तपाईंको खानेपानी आवश्यकता पुरा गर्छ ? १. गर्छ २. गर्दैन

६.२.१ यदि पुरा गर्दैन भने कति महिनाको लागि पुग्दैन ? महिना

६.२.२ ति अपुग महिनामा खानेपानीको आवश्यकता कसरी पुरा गर्नुहुन्छ ?

१..... २..... ३.....

६.३ तपाईंको गाउँघरमा बिजुली बत्ती छ ? छ। छैन।

यदि छैन भने तपाईं उज्यालोको लागि के प्रयोग गर्नुहुन्छ ?

१. टुकी (मिट्टितेल) २. तेल (दियो)

३. सौर्य ऊर्जा ४. अन्य.....



- ६.४ तपाईं खाना पकाउनको लागि निम्न मध्ये के प्रयोग गर्नु हुन्छ ?
- | | |
|-----------------|----------------|
| १. दाउरा | २. मट्टिलेला |
| ३. गुईठा | ४. त्रिजुली |
| ५. ग्यास: | ६. अन्य: |

- ६.४.१ यदि तपाईं दाउरा बाल्नुहुन्छ भने एक महिनामा कति भारी दाउरा बाल्नुहुन्छ ?

परिणाम भारीमा अन्दाजी (तौल: १ भारी बराबर २५ के.जी.)
(मूल्य: १ भारी रु.)

- ६.४.२ तपाईं घरमा बाल्नको लागि दाउरा कहाँबाट ल्याउनुहुन्छ ?

१. सरकारी वन	२. निजी वन
३. सामूदायिक वन	४. किनेर
५. अन्य	

- ६.४.३ तपाइलाई घाँसपात, स्याउला, दाउरा, काठ आदिको लागि पायक पर्ने वन कुन हो ?

१. वनको नाम : गा.वि.स. / वडा नं. :

२. ठाँउ : दुरी (घण्टा/मिनेट)

३ वनको प्रकार: सामुदायिक/राष्ट्रिय/कवुलियती/नीजि / धर्मिक/ अन्य

७. स्वास्थ्य र सरसफाई :

- ७.१ तपाईं वा तपाईंका परिवारका सदस्यहरु दिशापिसाव कहाँ गर्नुहुन्छ ?

१. आफ्नै चर्पीमा	२. खुला चौरमा	३. नदीको किनारामा
४. वनजङ्गलमा	५. अन्य	

- ७.२ सडेगलेको वा ठोसपदार्थ/फोहोरमैला कहाँ फाल्ने गर्नु भएको छ ?

१. सुरक्षित ठाउँमा थुपारेर २. जलाएर ३. गाडेर ४. अन्य

- ७.३ के तपाईंको परिवारको कुनै सदस्य गत वर्ष सिकिस्त विरामी भएका थिए ?

१. थिए २. थिएनन्

- ७.४ कस्तो किसिमको रोग लागेको थियो र कुन उपचार विधि अपनाउनु भएको थियो ?

रोग	उपचार विधि	उपचार गराएको स्थान
.....
.....

८. प्रसारण लाइन आयोजनाबाट पर्ने प्रभावहरु :

- ८.१ यदि जग्गा/जमिन आयोजना बाट प्रभावित भएको खण्डमा मात्र :

- ८.१.१ यस आयोजनाबाट तपाईंको प्रभावित हुने जग्गा जमिनको निम्नलिखित विवरण दिनुहोस ।

गा.वि.स / न.पा. वार्ड नं	ठाउको नाम	कुल क्षेत्रफल	हाल जग्गाको प्रयोग	जग्गाको स्वामित्व	आयोजनाबाट प्रभावित जग्गाको		
					किसिम खेत/बारी / अन्य	क्षेत्रफल	मूल्य रु. हजारमा
				नम्बरी / ऐलानी			
				नम्बरी / ऐलानी			
				नम्बरी / ऐलानी			

(नोट : जग्गाको मूल्य चलन चल्तीको भाऊ बमोजिम राख्ने)

८.२ यदि घर, गोठ वा अन्य संरचना आयोजना बाट प्रभावित भएको खण्डमा मात्र :

(Tower To), Substation, Tower No

८.२.१ तपाईंको जम्मा कति वटा घर गोठ छन् ? घर संख्या गोठ संख्या

८.२.२ आयोजनाबाट तपाईंको के के संरचना प्रभावित भएका छन् ? घर/गोठ वारे

१. घर वटा २. गोठ वटा ३. अन्य संरचना वटा (खुलाउने)

८.२.३ आयोजनाबाट प्रभावित संरचनाहरु तपाईंको आफ्नै हो ? १. हो २. होइन

प्रभावित हुने संरचनाको बारेमा निम्न विवरण दिनुहोसः

<p>संरचनाको नाम :</p> <p>ल (मिटर) चौ.....</p> <p>तला : किसिम :</p> <p>गारोको किसिम : छानोको किसिम :</p>	<p>संरचनाको नाम :</p> <p>ल (मिटर) चौ.....</p> <p>तला : किसिम :</p> <p>गारोको किसिम : छानोको किसिम :</p>
<p>संरचनाको नाम :</p> <p>ल (मिटर) चौ.....</p> <p>तला : किसिम :</p> <p>गारोको किसिम : छानोको किसिम :</p>	<p>संरचनाको नाम :</p> <p>ल (मिटर) चौ.....</p> <p>तला : किसिम :</p> <p>गारोको किसिम : छानोको किसिम :</p>

९. घर जग्गाको मुआब्जा/पुनर्वास सम्बन्धि

९.१ यहाँ बाहेक अन्यत्र तपाईंको घर वा जग्गा छ ? १. छ २. छैन

९.२ यदि छ भने के र कहाँ छ ?

किसिम ठाँउ

घर

जग्गा

घडेरी

९.३ तपाईंले पाउने / पाएको मुआब्जा रकम के को लागी प्रयोग गर्नु हुन्छ/ भयो ?

१. जग्गा किन्ने २. घर बनाउने ३. ऋण तिर्ने

४. ब्यापार गर्ने ५. घरेलु उद्योग ६. अन्य

९.४ तपाईंले उचित मुआब्जा पाएमा अन्यत्र बसाई सनु हुन्छ ?

१. सधैं २. सधैंन

९.६ यदि बसाई सन चाहनु हुन्न भने किन ?

१. २. ३.

१०. आयोजनाप्रतिको अवधारणा

१०.१ तपाईंलाई यस प्रस्तावित प्रसारण लाइन आयोजनाको बारेमा केही जानकारी छ ?

१. छ २. छैन

यदि छ भने कुन श्रोतबाट जानकारी प्राप्त गर्नुभयो ?

१. २. ३.



१०.२ प्रस्तावित प्रसारण लाइन आयोजना प्रति तपाईंको कस्तो अवधारण छ ?

१. सकारात्मक २. नकारात्मक ३. तटस्थ
४. केही पनि थाहा छैन ५. आयोजना प्रति अवधारण बनाउने बेला भएको छैन

१०.२.१ यदि नकारात्मक धारणा भएमा किन होला ? कारण बताईदिनु हुन्छ कि ?

- १..... २..... ३.....

१०.३ यस प्रसारण लाइन आयोजनाबाट तपाईंले कुनै कुराको आशा राख्नु भएको छ?

१. छ १. छैन , यदि छ भने के कुराको आशा राख्नु भएको छ ?

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-
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-

११. स्थानिय सहभागिता :

११.१ तपाईं वा तपाईंको परिवारको कुनै सदस्य यस क्षेत्रमा संचालित सरकारी , गैरसरकारी वा अन्य संस्थाहरुमा सहभागी हुनु हुन्छ ?

१. छु १. छैन

११.२ यदि सहभागी हुनु हुन्छ भने निम्न विवरण दिनु होस् ।

संस्थाको नाम र ठेगाना	सहभागीता को किसिम	स्थापना भएको साल	संस्थाले गर्ने काम/उद्देश्य

१२. आयोजनाको बारेमा तपाईंका अन्य केही भनाई अथवा धारणा भएमा उल्लेख गर्नुहोस्

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-
-
-
-

उत्तरदाताको नाम:

सम्पर्क टेलिफोन:

प्रश्नावली भर्नेको नाम र सही:.....

मिति:.....

रजु गर्नेको नाम र सही:.....

मिति:.....



नेपाल विद्युत प्राधिकरण

लेखनाथ-दमौली २२० के.भी. प्रसारण लाइन आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (IEE) को लागि
कृषिजन्य र अन्य वस्तुको मूल्य सम्बन्धी बजार सर्वेक्षण फारम

२०७३

- | | | |
|--|------------------------------|--|
| १. <u>जग्गा</u>
सिंचित खेत
असिंचित खेत
वारी
खरवारी | <u>मूल्य रु. (रोपनी)</u> | |
| २. <u>खाद्यान्न मूल्य (रु. /किलो)</u> | | ३. <u>फलफूल मूल्य (रु./किलो/दर्जन)</u> |
| धान | | लिच्ची |
| गहुं | | कागती र निवुवा |
| मकै | | आरु |
| कोदो | | नासपाती |
| जौ | | अम्बा |
| दाल | | कटहर |
| आलु | | केरा |
| मासको दाल | | मेवा |
| गहत | | आप |
| तोरी | | अन्य |
| अन्य | | |
| ४. <u>अन्य उत्पादन</u> | <u>मूल्य रु. (लिटर/माना)</u> | ५. <u>मासु मूल्य रु. (किलो)</u> |
| दूध | | कुखुरा |
| दहि | | खसी |
| घिउ | | रांगो |
| तेल | | सुंगुर |
| माछा | | |



६. पाल्तु जनावर (अनुमानित मूल्य प्रति गोटा रु.)

रांगा

भैसी

हलगोरु

बाखा

सुंगुर

कुखुरा

७. निर्माण सामग्री इकाई मूल्य रु.

काठ

ईट्टा

सिमेन्ट

फलामे डण्डी

दुङ्गा

बालुवा

बांस

८. ज्याला मजदुरी (प्रतिदिन) ज्याला खाना जम्मा रु.
 कृषि मजदुर (पुरुष)
 कृषि मजदुर (महिला)
 सिकर्मी
 डकर्मी
 अन्य.....

१. गा.बि.स..... २. वडा नं..... ३. ठाउँ.....
 मिति.....



Annex-IV
News Covered by Local Media



Annex-V
Attendance of Group Meetings



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली (अपर सेती) २२० के.भी प्रसारण लाईन आयोजनाबाट प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरुका बारेमा वातावरण तथा सामाजिक अध्ययन विभागबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानीयबासी, सरोकारवालाहरु विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुभाब संकलन गरियो ।

मिति :- २०७२-११-१९ स्थान :- व्या.स. ८ समय :-
उपस्थिति

क्र.सं.	नाम थर	पेशा/पद	ठेगाना/संस्था	सम्पर्क नं.	सही
१	मनव. पौडेल	कृषक	व्या.स. ८	९८०६६९९३६०	मनव. पौडेल
२	राजेश्व. पौडेल	कृषक	"		राजेश्व. पौडेल
३	लासम्प. गुरुङ	श्रमिक	"		लासम्प. गुरुङ
४	पौडीया. शर्मा	गृहिणी	"		पौडीया. शर्मा
५	प्रकाश शर्मा	श्रमिक		९८२६०९९९९०	प्रकाश शर्मा
६	कमल शर्मा	नोकरी	"	९८९९०९९९९९	कमल शर्मा
७	सुन्दर शर्मा	श्रमिक	"		सुन्दर शर्मा
८	श्रीराम शर्मा	"	"		श्रीराम शर्मा
९	लक्ष्मण शर्मा	कृषक	"		लक्ष्मण शर्मा
१०	प्रकाश शर्मा	श्रमिक	व्या.स. ८	९८२९९९९९९९	प्रकाश शर्मा
११	शुभा शर्मा	"	"		शुभा शर्मा
१२	सुलभ शर्मा	"	"	९८२९९९९९९९	सुलभ शर्मा
१३					
१४					
१५					

राय सुभाब :

- १) व्या.स. ८ को शान्ति शांति शांति
- २) शेरपा सुभाब काय शर्मा
- ३) राजेश्वरी काय शर्मा



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली (अपर सेती) २२० के.भी प्रसारण लाइन आयोजनाबाट प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा वातावरण तथा सामाजिक अध्ययन विभागबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरोकारवालाहरू विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुभाब संकलन गरियो ।

मिति :- २०७२-११-२० स्थान :- हंसपुर-९, ताप्लेजुली समय :-
उपस्थिति

क्र.सं.	नाम थर	पेशा/पद	ठेगाना/संस्था	सम्पर्क नं.	सही
१	पुष्पराज सुब्बा	विद्युत नं. वि. प्र.	हंसपुर-९	९७४६०९६९०६	
२	चिप्लिङ्ग सुब्बा	कृषि	हंसपुर-९	९७४६०९६९०९	
३	बिष्णु सुब्बा	लाभ	हंसपुर-९	०६९६३२२६६	
४	सुब्रह्मण्य सुब्बा				
५	शम्भु सुब्बा		ले. प्र. पा. प्र.	-	
६	शुक्ला सुब्बा	विद्युत	हंसपुर-९	९७४६०९६९०९	
७	जिता सुब्बा	लाभ	हंसपुर-९	०६९६३६९४६	
८	दिउरा सुब्बा	कृषि	हंसपुर-९	९७४६०९६९०९	
९	जोरा सुब्बा	कृषि	सुवाङ्गेर-३ (ताप्लेजुली)		
१०	दिउरा सुब्बा	कृषि	हंसपुर-९		
११	दिउरा सुब्बा	कृषि	हंसपुर-९		
१२	शम्भु सुब्बा	कृषि	हंसपुर-९	९७४६०९६९०९	
१३	शम्भु सुब्बा	कृषि	हंसपुर-९	९७४६०९६९०९	
१४	दिउरा सुब्बा	कृषि	हंसपुर-९	९७४६०९६९०९	
१५	दिउरा सुब्बा	कृषि	हंसपुर-९	९७४६०९६९०९	
१६	दिउरा सुब्बा	कृषि	हंसपुर-९	९७४६०९६९०९	

राय सुभाब :

- १) पर लया प्रस्तावको शर्त र शर्तमा अनुमति
- २) सुवाङ्गेर (हंसपुर-९) ताप्लेजुलीको नयाँ लया
- ३) प्रस्तावित वातावरण र सामाजिक प्रभावको नयाँ लया
- ४) आयोजना निर्माणमा पारदर्शिता हुनुपर्ने
- ५) सीपूलाक ताप्लेजुलीको प्रस्तावित वातावरण र सामाजिक प्रभावको नयाँ लया
- ६) प्राथमिकता दिनुपर्ने



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली (अपर सेती) २२० केभी प्रसारण लाईन आयोजनाबाट प्रभावित क्षेत्रमा पर्न सक्ने वातावरणीय प्रभावहरूका बारेमा वातावरण तथा सामाजिक अध्ययन विभागबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरोकारवालाहरु विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुभाव संकलन गरियो ।

मिति :- २०७२-११-२१ स्थान :- पतेनीटार समय :-
उपस्थिति

क्र.सं.	नाम थर	पेशा/पद	ठेगाना/संस्था	सम्पर्क नं.	सही
१	शिवी राम पौडेल	कृषि	पतेनीटार		
२	मित्रलाल श्रेष्ठ	कृषि	पतेनीटार		
३	मिना पौडेल	कृषि	पतेनीटार	९८५६१९५८५१	मिना
४	नवराज पौडेल	कृषि	पतेनीटार	९८५६५१७५५१	
५	सुमित्रा श्रेष्ठ	कृषि	पतेनीटार	९८५६०६७४३६	सुमित्रा
६	कमल कुमार श्रेष्ठ	वैदेशिक रोजगार	पतेनीटार		
७	प्रविषा श्रेष्ठ	"	"	९८१३५९९५६०	
८	पद्म थापा	शिक्षण	"	९८१६१४७९५९४	
९	ओम ब. थापा	शिक्षण	सिर्की	९८१६१८९५००	
१०	दिग लाल श्रेष्ठ	कृषि	पतेनी टार	९८५६२७५९५५	
११	तिलु मल्ल	सिलाइ	पतेनी टार	९८५६८०६७३५	
१२	वासुदेवी श्रेष्ठ	कृषि	"		
१३	तिलु माया मल्ल	कृषि	"		
१४	सुकु मल्ल उमरङ	कृषि	"	९८५६१७९५६५	सुकु मल्ल
१५	रमण पौडेल	नागरिक	पतेनी टार	९८५९९६८०६६	
१६	पद्मिनी पौडेल	नागरिक	पतेनी टार	९८५९९२६३३३	

राय सुभाव :

- १) प्रस्तावित लाईनको अन्तर्गत पतेनीटारमा लाईनको
- २) अन्तर्गत पतेनीटारको इन्फ्रस्ट्रक्चर
- ३) लाईनको अन्तर्गत पतेनीटारमा
- ४) वातावरणलाई हानि नपुग्ने गरी निर्माण कार्यलाई अगाडि



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली (अपर सेती) २२० के.भी प्रसारण लाइन आयोजनाबाट प्रभावित क्षेत्रमा पर्न सक्ने वातावरणीय प्रभावहरूका बारेमा वातावरण तथा सामाजिक अध्ययन विभागबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरोकारवालाहरु विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुभाव संकलन गरियो ।

मिति : २०७२-११-२१ स्थान : खरिपाटी-४, समय :-
उपस्थिति

क्र.सं.	नाम थर	पेशा/पद	ठेगाना/संस्था	सम्पर्क नं.	सही
१	चैत्र ब. नेपाली	कर्मी/काम	खरिपाटी-४		चैत्र ब. नेपाली
२	राम राज दिमाल	शिक्षक	खरिपाटी-४	९८५६७२३१२१	
३	नरेन्द्र विक्रम शर्मा	क्र.पु. इन्जिनियर	खरिपाटी-४	९८१७१५७६३३	
४	रामजी दुःजाणा	कृषी	खरिपाटी-४	९८५६३७१३०५	
५	दिपक ज्ञानु दुःजाणा	कृषी	खरिपाटी-४	९८५६२५३५८६	
६	प्रकाश जीउल	लेकरी	ने. वि. प्र.	९८५११५६३३३	
७	कृष्ण प्र. जोशी	"	"	९८५११६८०७६	
८	सुलभ शर्मा	"	"	९८५१६९८६२५	
९					
१०					
११					
१२					
१३					
१४					
१५					

राय सुभाव :

- १) प्रस्तावित लाइन बाली/हल/मक्या/होवा तथा पतारागललाई प्रभावित हुने गरी लक्ष्याउनुपर्ने ।
- २) प्रस्तावित लाइन बाली/हल/मक्या/होवा/पतारागललाई प्रभावित हुने गरी लक्ष्याउनुपर्ने ।
- ३) प्रस्तावित लाइन बाली/हल/मक्या/होवा/पतारागललाई प्रभावित हुने गरी लक्ष्याउनुपर्ने ।
- ४) बनेनेसाले खरिपाटी तथा खरिपाटीको लागि विद्युत लाइनको प्रभावित हुने गरी लक्ष्याउनुपर्ने ।



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली (अपर सेती) २२० के.भी प्रसारण लाईन आयोजनाबाट प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा वातावरण तथा सामाजिक अध्ययन विभागबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानीयबासी, सरोकारवालाहरू विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुभाव संकलन गरियो ।

मिति :- २०७२-११-११ स्थान :- लेखनाथ-६ समय :-
उपस्थिति

क्र.सं.	नाम थर	पेशा/पद	ठेगाना/संस्था	सम्पर्क नं.	सही
१	सामिर तिमिल्सिना	कार्तिका गाउँपालिका	लेखनाथ-६	९८४६३९७४४६	सही
२	सुभाष चन्द	कार्तिका गाउँपालिका	लेखनाथ-६	९८०६४२०१२	सही
३	कल्पना तिमिल्सिना		लेखनाथ-६	९८२६९८२२६९	सही
४	कृष्ण व. विष्ट	कार्तिका गाउँपालिका	लेखनाथ-६	९८४६०४०३९८	सही
५	राधा तिमिल्सिना		लेखनाथ-६	९८४६६९०६००	सही
६	निष्ठा तिमिल्सिना		लेखनाथ-६		
७	तन्वी वि. क.	कार्तिका गाउँपालिका	लेखनाथ-६	९८०४८८४४२९	सही
८	सुभाष तिमिल्सिना	कार्तिका गाउँपालिका	लेखनाथ-६	९८०४८८३३६६	सही
९	कल्पना तिमिल्सिना	कार्तिका गाउँपालिका	लेखनाथ-६	९८२९९६८८६	सही
१०	पद्मा तिमिल्सिना	कार्तिका गाउँपालिका	"	९८५९९४६३३३	सही
११	सुलभ श्रेष्ठ	"	"	९८४५६३२६२४	सही
१२					
१३					
१४					
१५					

राय सुभाव :

- १) करिब १५० जनाको संख्यामा उपस्थित भएको गाउँपालिका (कार्तिका गाउँपालिका) जसको जसको प्रभाव गरी पर्ने हुनाले आतिथ्यको व्यवस्था गरिने।
- २) प्रसारण लाईनको कालो तथा चम्पलको कालो पार्ने गरी योजना गरिने।
- ३) सडकको चौडाई तथा लामोको व्यवस्था गरिने।



नेपाल विद्युत प्राधिकरण
वातावरण तथा सामाजिक अध्ययन विभाग
खरिपाटी, भक्तपुर

नेपाल विद्युत प्राधिकरणद्वारा प्रस्तावित लेखनाथ-दमौली (अपर सेती) २२० के.भी प्रसारण लाईन आयोजनाबाट प्रभावित क्षेत्रमा पर्ने सक्ने वातावरणीय प्रभावहरूका बारेमा वातावरण तथा सामाजिक अध्ययन विभागबाट प्रारम्भिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) तयार गर्ने सिलसिलामा खटिआएका वातावरणीय अध्ययन टोली तथा स्थानीयवासी, सरोकारवालाहरू विच निम्न मिति, समय र स्थानमा छलफल गरी निम्नलिखित रायसुझाव संकलन गरियो ।

मिति :- २०७२-११-२२ स्थान :- गाउँपालिका-६, खरिपाटी समय :-
उपस्थिति

क्र.सं.	नाम थर	पेशा/पद	ठेगाना/संस्था	सम्पर्क नं.	सही
१	एकबंजारा		गाउँपालिका-६	९८०२८३६९९३	
२	बिष्णुनाथ बस्नेत		"	९७४६०९२०८६	दामा
३	सदानन्द	कार्यकारी	"		
४	विष्णुनाथ तिवारी		"		
५	नारायण प्र. बस्नेत		"	९८०६६२१०५६२	
६	रविमोहन बस्नेत	शिक्षक	"	९८४६६०२८००	सुभा
७	बिष्णुनाथ तिवारी	कृषक	गाउँपालिका-६	९८०६९९६९२८	सुभा
८	कालिदास सुवेदी	कृषक	गाउँपालिका-६	९८९६९४३९२२	सुभा
९	नारायण प्र. बस्नेत	"	"	९८९६६०८९२८	सुभा
१०	श्री प्र. बस्नेत			९८९६९१०६८०९	सुभा
११	राजु सायब	"	स.स.स.स.	९८४६२०९८२६	सुभा
१२	सुभा मोहन बस्नेत		गाउँपालिका-६	९८४६३२३२२४	सुभा
१३	सुभा मोहन बस्नेत		"	९८४६३९९२०९	सुभा
१४	कृष्ण प्र. सायब	नायक	स.स.स.स.	९८२९९६८०६	सुभा
१५	सुभा मोहन बस्नेत	"	"	९८२९९२८३३३	सुभा
१६	सुभा मोहन बस्नेत	"	"	९२८९६९८६२४	सुभा

राय सुझाव :

- १) गाउँपालिका अन्तर्गत सुभा मोहन बस्नेत
- २) सुभा मोहन बस्नेत
- ३) सुभा मोहन बस्नेत
- ४) सुभा मोहन बस्नेत



Annex-VI
IEE Format



Lekhath-Damauli 220 kV Transmission Line Project

Chapter Plan for the IEE Report

Abbreviation and Acronyms
Executive Summary (English)
Executive Summary (Nepali)
Table of Content

1. INTRODUCTION

- 1.1 Proponent
- 1.2 Institution responsible for preparing the document
- 1.3 Rationality for conducting IEE
- 1.4 Objective of IEE Study
- 1.5 Structure of the Report

2. PROJECT DESCRIPTION

- 2.1 Project Location
- 2.2 Salient Features
- 2.3 Project Accessibility
- 2.4 Project Components
- 2.5 Project Area Delineation
- 2.6 Construction Planning
- 2.7 Project Schedule

3. DATA REQUIREMENT AND STUDY METHODOLOGY

- 3.1 Desk study and literature review
- 3.2 Data requirement, collection methods and analysis
 - 3.2.1 Physical environment
 - 3.2.1.1 Data requirement and collection methods
 - 3.2.1.2 Data analysis
 - 3.2.2 Biological Environment
 - 3.2.2.1 Data requirement and collection methods
 - 3.2.2.2 Data analysis
 - 3.2.3 Socio-economic and cultural environment
 - 3.2.3.1 Data requirement and collection methods
 - 3.2.3.2 Data analysis
- 3.3 Impact identification and prediction
- 3.4 Public involvement
- 3.5 Time, cost and specialists used for the study



4. REVIEW OF POLICY AND LEGAL PROVISIONS

5. EXISTING ENVIRONMENT CONDITION

5.1 Physical

5.2 Biological

5.3 Socio-economic and cultural

6. ENVIRONMENTAL IMPACTS

6.1 Beneficial Impacts

6.2 Adverse Impacts

6.2.1 Physical

6.2.1.1 Construction phase

6.2.1.2 Operational phase

6.2.2 Biological

6.2.2.1 Construction phase

6.2.2.2 Operational phase

6.2.3 Socio- economic and cultural

6.2.3.1 Construction phase

6.2.3.2 Operational phase

7. ALTERNATIVE ANALYSIS

8. MITIGATION AND ENHANCEMENT MEASURES

8.1 Enhancement measures

8.2 Mitigation measures

8.2.1 Physical

8.2.1.1 Construction phase

8.2.1.2 Operational phase

8.2.2 Biological

8.2.2.1 Construction phase

8.2.2.2 Operational phase

8.2.3 Socio- economic and cultural

8.2.3.1 Construction phase

8.2.3.2 Operational phase

8.3 Mitigation and enhancement cost

9. ENVIRONMENTAL MONITORING

10. CONCLUSION

REFERENCES

APPENDICES



DECLARATION FROM IEE STUDY TEAM MEMBERS

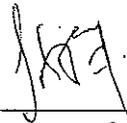
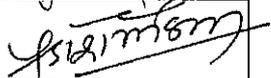
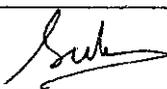
Title of the IEE Report: IEE of Lekhnath Damauli 220kV Transmission Line Project

Name/Address of the Project Proponent: Nepal Electricity Authority, Durbar Marg, Kathmandu

We declare the following:

- i. We have read and checked the content of this IEE report;
- ii. We have conducted the study professionally using acceptable methodologies;
- iii. The study findings are correct to the best of our knowledge; and have not been altered in any manner;
- iv. The mitigating measures proposed are, to the best of our knowledge, reliable, practical and adequate to comply with the relevant legal requirements; and
- v. We shall be accountable for any misleading information in any part of this report

LIST OF IEE STUDY TEAM MEMBERS

S.N.	Name	Qualification	Area(s) of study in IEE	Signature
1	Rabindra Prasad Chaudhary	M.Sc. Zoology	Biological Environment	
2	Krishna Prasad Joshi	M.Sc. Statistics	Socio-economic and Cultural Environment	
3	Prakash Gaudel	M.Sc. Env. Science	Biological Environment	
4	Anup K.C.	M.Sc. Env. Science	Biological Environment	
5	Sulav Shrestha	B.E. Civil	Physical Environment	
6	Ramesh Gautam	M.A. Sociology	Socio-economic and Cultural Environment	

Date:

Official stamp:

