

Environmental Assessment Document

Initial Environmental Examination

Grant Number: 0093 NEP

February 2010

Nepal: Rural Reconstruction and Rehabilitation Sector Development Program

Sildhunga-Jethal-Tauthali-Tekanpur Road Subproject, Sindhupalchowk District

Prepared by the Government of Nepal

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Government of Nepal
Ministry of Local Development
Department of Local Infrastructure Development and Agricultural Roads
Rural Reconstruction and Rehabilitation Sector Development Program
[ADBGrant 0093NEP]

Initial Environmental Examination (IEE) Report
of
Sildhunga-Jethal-Tauthali-Tekanpur Road Subproject,
Sindhupalchowk District

Submitted to:
Ministry of Local Development
Government of Nepal

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February, 2010

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ABBREVIATIONS/ACRONYMS

ADB	Asian Development Bank	IUCN	International Union for Conservation Nature
amsl	Above mean sea level	Km	Kilometer
AP	Affected Person	LDO	Local Development Officer
BG	Building Group	LEP	Labour based, environment friendly and participatory
Ch	Chainage	LEST	Livelihood Enhancement and Skill Training
CBO	Community Based Organization	m	meter
CDC	Compensation Determination Committee	MoE	Ministry of Environment
CDO	Chief District Officer	MLD	Ministry of Local Development
CF	Community Forest	NGO	Non-Governmental Organization
CFUG	Community Forest Users Group	NRs	Nepali Rupees
CISC	Central Implementation Support Consultants	NTFPs	Non timber forest products
CITES	Convention on International Trade in Endangered Species of Flora and Fauna	OFID	OPEC Fund for International Development
DADO	District Agriculture Development Office	OPEC	Organization of Petroleum Exporting Countries
DDC	District Development Committee	PAM	Project Administrative Memorandum
DFID	Department for International Development	PCC	Plain Cement Concrete
DFO	District Forest Office/Officer	PCU	Project Coordination Unit
DDG	Deputy Director General	RBG	Road Building Group
DIST	District Implementation Support Team	RCC	Reinforced Cement Concrete
DOCSI	Department of Cottage and Small Industries	REA	Rapid Environmental Assessment
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads	RES	Rapid Environmental Screening
DPO	District Project Office	RP	Resettlement Plan
DPCC	District Project Coordination Committee	RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Program
DRILP	Decentralized Rural Infrastructure and Livelihood Project	SDC	Swiss Agency for Development and Cooperation
DSCO	District Soil Conservation Office	SM	Social Mobilizer
DTO	District Technical Office	TA	Technical Assistance
DTMP	District Transport Master Plan	ToR	Terms of Reference
EIA	Environmental Impact Assessment	VDC	Village Development Committee
EMP	Environmental Management Plan	VICCC	Village Infrastructure Construction Coordination Committee
EMS	Environmental Management Section	ZoI	Zone of Influence
EPA	Environmental Protection Act		
EPR	Environmental Protection Rules		
FGD	Focus Group Discussion		
GoN	Government of Nepal		
GIS	Geographical Information System		
ha	Hectare		
Hh	Household		
IEE	Initial Environmental Examination		

**INITIAL ENVIRONMENTAL EXAMINATION (IEE)
OF
SILDHUNGA-JETHAL-TAUTHALI-TEKANPUR ROAD
SUBPROJECT**

Name and Address of the Proponent Preparing the Report

Name of Proposal

The name of the Proposal (also referred to as Subproject) under this study is 'Rehabilitation of Sildhunga-Jethal-Tauthali-Tekanpur Rural road in Sindhupalchowk District'.

This IEE Report has been prepared for the rehabilitation of 22.921 km long fair weather district road with earthen surface connecting Sildhunga of Jethal VDC to Balka (near Dam Site) of Tekanpur VDC. The District Development Committee (DDC) and District Technical Office (DTO), Sindhupalchowk are the implementing agencies at the district level and the proponent of the Initial Environmental Examination (IEE) study of the proposal.

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सिलढुंगा-जेठल-टौथली-टेकनपुर सडकको प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन कार्यकारी सारांश¹

प्रस्ताव / प्रस्तावक:

यो प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन सिन्धुपाल्चोक जिल्लाको जेठल गा वि स को सिलढुंगा वाट टेकनपुर गा.वि.स.को वाल्का (डयाम साईड) जोड्ने २२.९२९ कि.मी. लामो अनुकुल मौसममा चल्ने जिल्ला सडक बनाउन तयार पारिएको हो । ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना कार्यक्रम (RRRSDP) अन्तरगत जिल्लामा कार्यान्वयन निकायको जिम्मेवारी र यो सिलढुंगा-जेठल-टौथली-टेकनपुर सडक उप-आयोजनाको प्रारम्भिक वातावरणीय परीक्षणको प्रस्तावक जिल्ला विकास समिति र जिल्ला प्राविधिक कार्यालय, सिन्धुपाल्चोक हो ।

पृष्ठभूमि:

ग्रामीण पुन निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) नेपाल सरकार, एशियाली विकास बैंक (ADB), अन्तराष्ट्रिय विकास सहयोग नियोग (DFID) र स्वीस विकास सहयोग नियोग (SDC) को संयुक्त आर्थिक अनुदान सहयोगमा र ओपेकको ऋण सहयोगमा संजाल कार्यक्रम हो । आयोजनाको मुख्य उद्देश्य सडक संजाल विस्तार गर्नु , आर्थिक र रोजगारीको अवसरलाई वृद्धि गर्नु, ग्रामिण क्षेत्रमा बजार तथा सामाजिक सेवाको पहुँचमा वृद्धि गर्नु रहेको छ ।

उद्देश्य:

प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन अध्ययनको मुख्य उद्देश्य उपआयोजना क्षेत्रको भौतिक, जैविक, सामाजिक, आर्थिक तथा सांस्कृतिक वातावरणमा पर्ने प्रभावहरू पत्ता लगाउनु हो । अन्य उद्देश्यहरू निम्नानुसार छन् :

- उपआयोजना क्षेत्रमा गरिने विभिन्न निर्माण कार्यहरूले गर्दा भौतिक, जैविक, सामाजिक, आर्थिक तथा सांस्कृतिक वातावरणमा पर्ने मुख्य असरहरू पत्ता लगाउनु ।
- वातावरणमा पर्ने नकारात्मक प्रभावको न्यूनिकरणका उपायहरू र सकारात्मक प्रभाव बढाउने उपायहरू बारे व्यावहारिक सुझाव दिनुका साथै उप-आयोजनाको वातावरणीय अनुगमन योजना बनाई कार्यान्वयन गराउनु ।
- प्रस्तावित सडक उपआयोजना क्षेत्रको वातावरणको बारेमा आधारभुत तथ्याङ्कहरू उपलब्ध गराउनु साथै उपआयोजना लागि प्रारम्भिक वातावरणीय परीक्षण गरे पुग्छ भन्ने कुराको यकिन गर्नु ।

प्रस्तावको सान्दर्भिकता:

सडक स्तरोन्नति एवं निर्माणले जेठल, तौथली र टेकनपुर गा.वि.स. र वरपरका जनतालाई धेरै किसिमका फाईदाहरू पुग्ने छन् । जनतालाई सहज यातयातको सुविधा, यात्रा समयको बचतका साथै मानिस र कृषिजन्य वस्तुहरू नजिकको बजार केन्द्रहरू (खाडीचौर, लामोसाँघु) सम्म सजिलै पुग्नेछन् । परिणामस्वरूप, जनताले कृषि अन्य उत्पादनमा बढी मूल्य प्राप्त गर्न सक्नेछन् र जनताले सामाजिक सुविधाका साथै रोजगारी अवसर पनि प्राप्त गर्ने छन् । यो प्रस्तावित सडक पुनःनिर्माण तथा पुनःस्थापना गर्दा जनताको सामाजिक र आर्थिक अवस्थामा बृद्धि हुन सक्ने छ ।

वातावरणीय संरक्षण ऐन २०५३, वातावरणीय संरक्षण नियमावली २०५४ तथा एशियाली विकास बैंक को वातावरणीय मार्गदर्शन २००३ , र सेफगार्ड पोलिसी स्टेटमेन्ट २००९ अनुसार जिल्ला सडक को निर्माण गर्न प्रारम्भिक वातावरणीय परीक्षण आवश्यकता पर्दछ । यो प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन स्थानीय

¹ This is the Executive Summary of the IEE report in Nepali language and an English version is given in page viii.

विकास मन्त्रालयको मिति २०६६।२।०४ सचिव स्तर निर्णयबाट स्वीकृत कार्यसूची अनुसार तयार पारिएको छ ।

आयोजनाको विवरणः

सिलढुंगा-जेठल-टौथली-टेकनपुर सडक उपआयोजना नेपालको मध्यमान्चल विकास क्षेत्र, बागमती अन्चल अन्तर्गत सिन्धुपाल्चोक जिल्लाको दक्षिण-पूर्व क्षेत्रमा पर्दछ । यो आयोजना जेठल गा वि स को सिलढुंगावाट शुरू भई टौथली गा वि स को भू-भाग हुदै टेकनपुर गा वि स को वाल्कामा आएर टूगिन्छ । यो सडकको रेखाडकनले जेठल गा.वि.स.को सिलढुङ्गामा लामो साँघु जिरी सडक लाई र टेकनपुर गा.वि.स.को वाल्कामा अरनिको राजमार्गलाई छोएको छ । आयोजनामा सिलढुंगा, कार्की टोल, गणेशस्थान टोल, माभ टोल, जपसिले टोल, आहाल डाडा टोल, साउने पानी टोल र वाल्का आदि मुख्य बस्तीहरु पर्दछन । माभ गाउ, टौथली बजार, सिलढुंगा, साउनेपानी टोल र वाल्का यस क्षेत्रका मुख्य बजारहरु छन ।

सिलढुंगा-जेठल-टौथली-टेकनपुर सडक उपआयोजना जिल्ला सडक अन्तर्गत पर्दछ जसलाई राम्रो मौसममा चल्नेमा स्तरोन्नति तथा निर्माण गर्न प्रस्ताव गरिएको छ । यस उपआयोजनाको कुल लम्बाई २२.९२९ कि.मि. छ । यो उपआयोजना अन्तर्गत सडक फराकिलो पार्ने, मजबुत पार्ने, पुलपुलेसाहरु फेर्ने, पहिरोग्रस्त क्षेत्र सुधारने कार्यहरु पर्छन् । स्तरोन्नति कार्य ५ मी. चौडाइ सडक मार्गमा सिमित हुनेछ । पुनःनिर्माण कार्यमा गरी कुल १९२,३०८.७७ घन मी. माटोको कार्य गर्नुपर्नेछ । यस उप-आयोजनाको कूल लागत करीब नेरु १४६,२१०,११८.९२ र प्रति कि.मी नेरु ६,३७८,७५४.८५ रहने अनुमान गरिएको छ । उपआयोजना को निर्माण कार्य सन् २०१० बाट शुरू भई एक वर्षका लागि जारी रहने अपेक्षा गरिएको छ ।

अध्ययन प्रकृया

भद्रे २०६६ मा फिल्ड सर्वेक्षणबाट लिइएका तथ्याङ्क तथा अन्य उपलब्ध तथ्याङ्कहरुको साथै सामाजिक तथा प्राविधिक टोलीबाट पुनर्वास कार्यको सर्भेक्षणको लागि संकलन गरेका तथ्याङ्कहरु केलाएर प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन तयार गरी निष्कर्ष तथा सुझावहरु दिइएका छन् । सार्वजनिक छलफल २०६६।०५।२२ देखि २४ गते सम्म सिलढुंगा, जेठल र टौथली गा.वि.स.का बस्तीहरुमा गाउँ स्तरीय निर्माण तथा समन्वय समितीका सदस्य, स्थानिय व्यक्ती, शिक्षक आदि संग गरिएको थियो ।

विद्यमान स्थिति:

भौगोलिक रुपमा सडक अपयोजना मध्य पहाडी क्षेत्रमा अवस्थित छ । यो प्रस्तावित सडक समुद्र सतहबाट ७७२ देखि २०२७ मिटरको उचाइमा फैलिएको छ । प्रस्तावित सडक उपोष्ण जलवायु भएको क्षेत्रमा रहेको छ । उपयोजना क्षेत्रको तापक्रम अधिकतम र न्यूनतम क्रमश २५^० से र ५^०से रहेको छ भने औसत वार्षिक वर्षा १,६१५ मी मी रहेको छ । यो सडक खेती गरिएको जमीन, बाँझो जग्गा बस्तीहरु र वन भएर जान्छ । भु-उपयोगको हिसाबले यस सडकमा खेती गरीने जमीन (१.७२ हे), बस्ती (०.१८ हे), पाखो जमीन (०.१३ हे) र जंगल (१.३९ हे) अधिकरण गर्नु पर्ने छ ।

यस सडक खण्डमा विभिन्न प्रकारका चट्टानहरु जस्तै क्वार्टजाइट, फिलाइट, सिष्ट पाईन्छन् । साधरणतया, एलुभियल र कोलुभियल प्रकारका माटोहरु सडक खण्डमा पाइन्छन् । यस सडकमा २४ वटा साना साना सुख्खा खोल्सीहरु पर्दछन । प्रस्ताविक सडक क्षेत्रको वायु तथा पानी को स्तर सफा नै रहेकोदेखिन्छ साथै ध्वनि प्रदुषणको समस्या छैन ।

यस सडक खण्डको प्रभावित क्षेत्रमा पाइने रुखहरुको प्रजातिहरुमा मौवा, चिलाउने, सल्ला, उत्तिस, सिमल, आदि तथा गैह्र काष्ठ वन पैदावारमा चिराइतो, नागवेली, तितेपाती, ठूलो ओखती चून्ना, आदि पर्दछन् । यो सडक खण्ड ७ वटा सामुदायिक वनक्षेत्रबाट गुज्रिन्छ । चितुवा, स्याल, दुम्सी, बाँदर वन्य जन्तुका साथै कोइली, काग, कालिज, जुरेली पंक्षीहरु यस सडक खण्ड भएर जाने वनमा पाइन्छन् । यो सडक संरक्षित वा मध्यवर्ती क्षेत्रमा पर्दैन ।

यो सडक खण्डको प्रभावित क्षेत्र भित्र जेठल, टौथली र टेकनपुर गा.वि.स. को ३३ वटा ससना बस्तीहरु पर्दछन् । यो सडक खण्डमा जम्मा घरधुरी संख्या ९८० र जनसंख्या ५,३०० रहेको छ । यहाँ बसोवास गर्ने

विभिन्न जात जातिका मानिसहरुमा मुख्य गरी ब्राहमण, क्षेत्री, नेवार, जातिहरु पर्दछन् । कामी, दमाई, सार्की जस्ता विविध जात तथा जनजातीको बसोबास पनि रहेको छ ।

यहाँका बासिन्दाहरुको मुख्य पेसा कृषि र पशुपालन हो । यातायातको राम्रो सुविधा नभएको तथा पहाडी क्षेत्र भएकोले कृषि उब्जनीले मात्र जीवन निर्वाहका लागि पर्याप्त नहुने हुँदा यहाँका अधिकांश मानिसहरु अन्य पेशामा मजदुरी तथा भरियाको रुपमा काम गर्ने (३५.८३%), केहि मानिसहरु सरकारी तथा अन्य संस्थामा काम गर्ने (३%), थोरै मानिसहरुले (५%) व्यापार व्यवसाय गर्ने गर्दछन् । साथै जनसंख्याको उल्लेखनीय प्रतिशत मानिसहरु खेतीपातीको काम नहुने समयमा काठमाडौं तथा भारतका विभिन्न ठाउँमा रोजगारीको लागि जाने गर्दछन् जुन जीविकोपार्जनको मुख्य आधार हो ।

सकारात्मक प्रभाव:

यातायातको सुविधाले स्थानीय बासिन्दाहरुको जीवनमा थुप्रै सकारात्मक प्रभाव पर्दछन् । सडक निर्माण गर्दा स्थानीय बासिन्दाहरुले श्रमिकको रुपमा रोजगारीका (३३,०५६ दक्ष श्रमिक दिन र ३००,८४६ अदक्ष श्रमिक दिन) अवसरहरु प्राप्त गर्ने र प्राविधिक सीप तथा ज्ञान समेत प्राप्त गर्ने छन् । सडक निर्माण भई संचालनको अवस्थामा त्यस क्षेत्रमा खाद्यान्नको आपूर्ति सुचारु हुन गई आर्थिक तथा सामाजिक स्थायित्व बढ्न जानेछ । साथै सडक यातायातले गर्दा ग्रामीण भेगबाट बजार क्षेत्र र बजार क्षेत्रबाट ग्रामीण भेगमा सेवा तथा सामानहरुको ओसार पसार छिटो, छरितो, सुलभ तथा सस्तो हुन जानेछ । बजारमा पहुँच भएको कारण कृषि उत्पादन बढाउन कृषकहरु उत्साही हुनेछन् । यसले गर्दा उत्पादकत्वमा वृद्धि भई अन्ततोगत्वा ग्रामीण भेगका बासिन्दाको जीवनस्तरमा सुधार हुन जाने छ । सडक संचालन हुँदा व्यापार व्यवसायमा वृद्धि हुन जानेछ । त्यस क्षेत्रमा बजार लगायतका वस्तीमा व्यापार क्षेत्रको विकास भई यहाँका बासिन्दाहरुको जीवन स्तरमा सुधार हुन जानेछ । बजार क्षेत्रको विकासले गर्दा जग्गाको मूल्यमा समेत वृद्धि हुन जानेछ ।

नकारात्मक प्रभाव:

सडक पुननिर्माण गर्दा भौतिक वातावरणमा पर्ने नकारात्मक प्रभावहरुमा भू स्वामित्वको प्रयोगमा बदलाव, भिरालो जग्गामा पहिरो जाने, वायु तथा पानीमा प्रदुषण, खनेको माटो फालिँदा पर्ने प्रभावहरु मुख्य छन् । यस्तै प्रकार जैविक प्रभाव अन्तरगत १.३९ हेक्टर वन क्षेत्र र विभिन्न जातका गरी करिब २,०४० वटा रुखहरु काटिनेछन् । साथै सडक निर्माण क्रियाकलापबाट जीवजन्तुलाई अवरोध पर्न जानेछ । आर्थिक तथा सामाजिक प्रभाव अन्तरगत सडक पुननिर्माण गर्दा १.७२ हेक्टर खेती गरिने जमीन नोक्सानी पर्नुका साथै अन्य सम्पत्ति समेतको नोक्सानी हुन जानेछ । यसका साथै श्रमिक तथा अन्य बासिन्दाहरुको स्वास्थ्यमा सडक निर्माण हुँदा प्रतिकूल असर पर्न जानेछ । प्रस्तावित सडकमा पर्ने एउटा सेफ्टी ट्यांक (चे. ०+०२५), २ वटा गाईवस्तु बाध्ने कटेरो (चे. ६+४८० र चे ६+७७०), एउटा ट्वाइलेट (चे. १८+९८०), एउटा पानी घट्ट (चे. ४+६८०) एउटा घर (चे. १४+५४०) व्यक्तीका, हटाउनु पर्ने हुन्छ साथै एउटा पानी ट्यांकी (चे. १ +७२०), एउटा मन्दिर (चे. ७+३६०), खाने पानी ट्यांकी (चे. ११ +९८५) र दुइटा पानी धारो (चे. ०+०३० र चे. ८+५७३) हटाउनु पर्ने हुन्छ ।

सडक संचालनको दौरान भौतिक वातावरणमा पर्ने नकारात्मक असरहरुमा भिरालोपनको स्थायित्व र यसको व्यवस्थापन, वायु तथा ध्वनि प्रदुषण तथा सडक सुरक्षाका समस्याहरु पर्दछन् । यसै प्रकार जैविक प्रभावमा वन्य श्रोत घट्नु, वन्यजन्तुहरुलाई अप्ठेरो पर्ने हुन् भने सामाजिक तथा आर्थिक प्रभावहरुमा नयाँ वस्ती र बजारको अव्यवस्थित विस्तार, सामाजिक व्यवहारमा परिवर्तन हुनु आदि पर्दछन् ।

सकारात्मक प्रभाव बढाउने तथा नकारात्मक प्रभाव न्यूनीकरणका उपाय

यस सडकको निर्माणबाट सकारात्मक तथा नकारात्मक दुवै प्रकारका प्रभावहरु पर्ने देखिन्छन् । सकारात्मक प्रभाव बढाउने उपायहरु तथा नकारात्मक प्रभाव न्यूनीकरण गर्ने उपायहरुको प्रभावकारी कार्यान्वयनले गर्दा सकारात्मक प्रभाव बढ्न जानुका साथै नकारात्मक प्रभाव न्यून गर्न सकिने वा हटाउन सकिने छन् । प्रभावहरुको आँकलनको आधारमा सडक निर्माण तथा संचालन दुवै चरणमा सकारात्मक प्रभाव बढ्ने उपाय र नकारात्मक प्रभाव घटाउने उपायहरु उल्लेख गरिएका छन् ।

सकारात्मक प्रभाव बढाउने उपाय

कामदार तथा निर्माण समूहका सदस्यहरुको जीविकोपार्जन सुधार गर्नको लागि विभिन्न शीपमूलक तालिमहरु (आय आर्जन, इन्जिनियरिंग संरचनाको निर्माण तथा जैविक प्रविधिका कामहरु सम्बन्धी) दिईने छन् ।

सहकारीको विकास गर्न तथा वित्तीय संस्था तथा बैंक संग व्यवसाय विस्तार गर्न को लागि समन्वय गराईने छ । खेतीबाट भएको उब्जनी वृद्धिको लागी थप कृषि विकासका कार्यक्रम गर्न र बजार संगको सम्बन्ध विस्तार को लागि समन्वय गराईने छ । सडक निर्माणका क्रममा ५०% महिला सहभागिता गराईने छ ।

नकारात्मक प्रभाव न्यूनिकरणका उपाय:

श्रममा आधारित, वातावरणीय मैत्री तथा सहभागीता मूलक अवधारणा को अवलम्बन गरि वातावरणमा पर्ने प्रभावहरुको न्यूनिकरण गरिने छ । यस अनुरूप खन्ने र पुर्ने माटोको आयतनमा सन्तुलन मिलाउनु को साथै खनीएका बस्तुहरुको पुनः प्रयोग तथा जैविक प्रविधि (वायो इन्जिनियरिंग) को प्रयोग गरिने छ । भिरालो जग्गाको व्यवस्थापनको लागि पर्याप्त प्रावधानहरु सडक उपआयोजनाको डिजाईनमा राखिने छन् । खानी संचालन अस्थिर (कमजोर) क्षेत्रहरु, भूक्षय हुने क्षेत्रहरु, वन, बस्तीहरु तथा उर्वरा जमीनमा गरीने छैन ।

स्थानीय वासिन्दालाई आफ्नो निजी जग्गामा वृक्षारोपण गराउन प्रोत्साहन गराईने छ । वृक्षारोपण गर्न उपआयोजना बाट सहयोग दिइनेछ । यसै प्रकार, सामुदायिक वन लाई ५६,१०० रुखहरु (अनुमानित लागत ने रु २३,८४,२५०।००) वृक्षारोपण गराउन र ५ वर्ष सम्म संरक्षण गर्न सहयोग दिइनेछ, जसले गर्दा रुखहरुको क्षती लाई परिपूर्ति गर्न सकिने छ । वन्य जन्तु र चराहरुलाई कम मात्रामा अवरोध होस भन्नाको लागि वनको छेउ छाउमा निर्माण कार्य गर्दा व्यवस्थित तरिकाले गरिने छ । सडकमा परेको जग्गा तथा अन्य संरचना, सम्पत्तीको प्राप्ती तथा क्षतिपूर्ति सम्बन्धि कुराहरुलाई समेट्न छुट्टै पुर्नवास योजना बनाइएको छ ।

कामदारहरुलाई कामको प्रकृति अनुसार सुरक्षाका साधनहरु (हेल्मेट, मास्क, मफलर्स) दिईने छ र कामदारको लागि खानेपानी को आपूर्ति तथा अस्थायी खाल्टे चर्पी हरु बनाइने छन् । साथै पानीको श्रोत मा खनिएको माटो फालिने छैन । कामदारहरुको लागि औषधी तथा दुर्घटना बीमाको व्यवस्था गरिने छ ।

सडक संचालनको अवस्थामा साना साना पहिरो तथा माटोका खसेका ढिस्काहरुलाई तुरुन्तै उचित प्रविधिबाट सफा गरिने छ । सामुदायिक वन उपभोक्ता समूहहरु लाई वनको कार्ययोजना अनुसार संरक्षण र व्यवस्थापन गर्न सघाउ पुर्याइने छ । साथै उन्नत चुल्हो बनाउन प्रोत्साहन गरिने छ । डाइभरहरुलाई सचेत गराउन वन, स्कूल र आवास क्षेत्रमा हर्न बजाउन निषेध गरिएका साइनबोर्डहरु राखिनेछन् । व्यवस्थित बस्ती विकासको लागि जनचेतना जगाउने कार्यक्रम संचालन गरिनेछन् । साथै संभावित दुर्घटना बाट जोगाउन उपयुक्त सडक सुरक्षाका उपायहरु अवलम्बन गरिनेछन् ।

वातावरणीय व्यवस्थापन योजना

सकारात्मक असरहरुलाई बढाउने र नकारात्मक असरहरुलाई घटाउन वातावरणीय व्यवस्थापन योजना एउटा महत्वपूर्ण उपाय हो । यसले गर्दा आवश्यकीय सूचनाहरु प्राप्त भई प्रभाव न्यूनिकरणका उपायहरुको कार्यान्वयनमा सुधार गर्न सकिन्छ । यसको लागि जिल्ला विकास समिति/जिल्ला प्राविधिक कार्यालय, सिन्धुपाल्चोकले अनुगमन प्रणालीको विकास गरी वातावरणीय सुधारमा आफ्नो प्रतिबद्धता देखाउने छ । यस कामको लागि जि.वि.स. लाई जिल्लामा रहेको योजना कार्यान्वयन कार्यालय र जिल्ला कार्यान्वयन सहयोग परामर्शदाताहरु र केन्द्रीय कार्यान्वयन सहयोग परामर्शदाताको वातावरणीय टोलीले वातावरणीय अनुगमन गर्न सहयोग पुर्याउने छन् ।

निष्कर्ष तथा सुझावहरु:

सिलढुंगा-जैठल-टौथली-टेकनपुर सडकको प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदनले सकारात्मक प्रभावहरु नकारात्मक प्रभावको तुलनामा बढी महत्वपूर्ण रहेको र लामो समयसम्म रहने र नकारात्मक प्रभावहरु न्यूनिकरण गर्न सकिने कुरा देखाउँछ, साथै सार्वजनिक छलफलमा उठेका सान्दर्भिक सुझावहरु लाई समेटिएको छ । यो सडक उपआयोजनाको स्वीकृतिको लागि प्रारम्भिक वातावरणीय परीक्षण पर्याप्त रहेको छ । प्रभावहरुको न्यूनिकरण र संलग्न वातावरणीय अनुगमन योजना कार्यान्वयन गरी प्रस्तावित उपआयोजना कार्यान्वयनको लागि सिफारिस गरिन्छ ।

Executive Summary of Initial Environmental Examination (IEE) of Sildhunga – Jethal – Tauthali - Tekanpur Road Sub-Project

Proposal / Proponent

This Initial Environmental Examination (IEE) Report has been prepared for the rehabilitation and reconstruction of 22.921 km long fair weather district road connecting Sildhunga of Jethal VDC to Balka (Dam Site) of Tekanpur VDC in Sindhupalchowk District. The District Development Committee (DDC)/District Technical Office, Sindhupalchowk is the implementing agency at the district level under RRRSDP and the proponent of the Initial Environmental Examination (IEE) study for this Sildhunga-Jethal-Tauthali-Tekanpur Road subproject.

Background

The Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP) program is financed by the Government of Nepal (GoN), Grant assistance from Asian Development Bank (ADB), Department for International Development (DFID), Swiss agency for Development and Co-operation (SDC) and Loan assistance from OPEC Fund for International Development (OFID). The main objective of program is to improve the connectivity, enhance economic and employment opportunities, increase access to market and social services of rural communities.

Objective

The main objective of the IEE study is to identify the impacts of physical, biological, socio-economic and cultural environment of the Subproject area. The specific objectives of the proposed IEE study include to:

- identify the major impacts that may arise as a result of proposed works on biophysical, socio-economic and cultural environment of the project area,
- recommend practical and site specific environmental mitigation and enhancement measures, prepare and implement environmental monitoring plan for the Subproject, and
- provide information on the general environmental setting of the sub-project area as baseline data and make sure that IEE is sufficient for the proposed road Subproject .

Relevancy of the Proposal

Road upgrading and new construction work has several benefits from the project to the people living in the vicinity of Jethal, Tauthali and Tekanpur VDCs in terms of easy access, saving of time on travel, easy transportation facilities for people and agricultural products of village to the nearby markets (Khadichaur, Lamosanghu). Consequently, local people will get high price for their agricultural and others production and people will get social and employment facilities. The rehabilitation and reconstruction of the proposed road may uplift social and economical status of the local people.

Preparation of IEE report for district road is mandatory according to EPA, 1997 and EPR, 1997 of GoN and Environmental guideline, 2003 and Safeguard Policy Statement, 2009 of ADB. This IEE report is prepared based on the Terms of Reference (ToR) approved on 2066/02/04 (18 May 2009) by the Secretary level decision of the Ministry of Local Development (MLD).

Project Description

Sildhunga-Jethal-Tauthali-Tekanpur Road sub-project lies in south-eastern part of Sindhupalchowk district in Bagmati Zone of Central Development Region of Nepal. This road starts from Sildhunga of Jethal VDC and passes through Tauthali VDCs and ends at Tekanpur VDC of Sindhupalchowk district. This alignment touches Lamosanghu-Jiri highway at Sildhunga of Jethal VDC and Araniko highway at Balka of Tekanpur VDC. Major settlements along the alignment are Sildhunga, Karki Tole, Majha Tole, Japsile Tole, Ganesh

Than Tole, Aahal Danda Tole, Saune Pani Tole and Balka. Out of them Majha Gaun, Tauthali Bazaar, Sildhunga, Saune Pani Tole and Balka are the major market centers along the road alignment.

The Sildhunga-Jethal-Tauthali-Tekanpur Road subproject is classified as a District Road (DR) and is proposed for “fair weather” standard. The total length of proposed road subproject is 22.921 km. The sub-project will involve road widening, carriageway strengthening as well as culvert replacement and landslide rehabilitation. Upgrading will be confined within the existing 5 m road formation width. Rehabilitation works will require more than 192,308.77 cubic meters (m³) of earthworks. The total subproject cost is NRs. 146,210,118.92 (NRs 6,378,754.85 per Km). Site works are expected to commence in 2010 with actual work progressing for one year.

Methodology

The findings and conclusions of the report are based on the analysis of the information collected from the field during September, 2009 AD (Bhadra 2066 BS) by undertaking a walk-through environmental survey along the proposed route and secondary information supplemented by information collected by the social and technical teams working on the resettlement survey and detail survey. Public consultation was done from 07 to 09 September 2009 AD (Bhadra 22-24, 2066 BS) with the member of VICCC, local people, teacher in various settlements of Sildhunga, Tauthali and Tekanpur VDCs.

Existing Condition

Physiographically, the proposed road subproject lies in Midhills region. The elevation ranges from 772 m to 2,027 m asml. Road alignment lies in subtropical climatic zone. The average maximum and minimum temperature of the district is 25°C and 5°C respectively. The average annual rainfall in the district is 1,615 mm. This road passess through cultivated land, forest area, barren land and built up area. Approximately 1.72 ha cultivated land 1.39 forest area, 0.13 barren land and 0.18 ha built up area has to be acquired during the road construction.

The road section comprises of different types of rocks like, quartzites, phylites and schists. In general, soil type along the road can be classified as alluvial and colluvial. There are 24 streams along the alignment. Few streams are dry. Water and Air quality in the proposed road section is observed to be good. The proposed area does not have any sources of noise nuisance.

The dominant forest and fodder species reported in the road alignment are Mauwa (*Bassia latifolia*), Simal (*Bombax ceiba*), Uttis (*Alnus nepalensis*), Chilaune (*Schima wallichii*), Salla (*Pinus roxburghi*). The main NTFP species found along the road alignments are Chiraito (*Swertia chirayita*), Nagbeli (*Lycopodium clavatum*), Titepati (*Artemisia vulgaris*), Thulo Okhati (*Astilbe rivularis*), and Chutro (*Berberis aristata*). There are altogether 7 community forests along the road alignment. Chituwa (*Panthera pardus*), Syaal (*Canis aurieus*), Dumsi (*Hystrix indica*), Monkey (*Macaca mulatta*) are the wild animals reported in the proposed road area. Similarly, birds in the forest along the road alignment are Koili (*Cuculus micropterus*), Crow (*Corvus splendus*), Kalij (*Catreus wallichii*) and Jureli (*Pycnonotus cafer*). The road does not fall under any protected or buffer zone area.

There are 33 small settlements along the zone of influence (ZoI) of the proposed road alignment in Jethal, Tauthali and Tekanpur VDCs. There is 980 household with population of 5,300 persons in ZoI. Diverse ethnic groups such as Brahmin, Chhetri, and Newar, Dalit (Damai, Kami and Sarki) live along the ZoI of road alignment.

The main occupation of the people residing in the ZoI of the proposed road alignment is agriculture and livestock. Due to the lack of transportation facilities and mountainous terrain,

agriculture farming is not enough for subsistence level. Therefore, people are carrying out other economic activities like employment as labor (35.83%), working in government and non government organizations (3%), business and cottage industries (5%). A significant section of the economically active male population goes out to various foreign countries to obtain employment. Earnings of people going to foreign countries play significant role in the livelihood of the people.

Beneficial Impacts

The development efforts particularly the development of transportation network will have multifold beneficial impacts. The immediate beneficial impacts from road development are apparent in the construction phase like there will be various employment opportunities (33,056 skilled and 300,846 unskilled person days) for the local population, supports for the transfer of construction work skills and technical know-how to the local workers. During operation stage, an improved road access will bring an improvement of food security situation and overall economic and social stability. The road will also provide cheap, safe and fast transport of goods and services from rural areas to urban centers and vice versa. The farmers will be more interested to increase agricultural production due to market accessibility. This will contribute significantly to increase the productivity in rural areas and eventually improve the overall socio-economic condition of the people. There is a possibility of increased economic opportunities and significant growth and extension of the local markets along the road alignment. In addition, construction of road will lead to appreciation of land values particularly near the market and settlement areas.

Adverse Impacts

The physical adverse impacts during construction will be due to change in land use, slope instability and air, dust and water pollution, quarry sites and spoil disposal. The biological impacts during rehabilitation works will be loss of 1.39 hectares (ha) of forest area, 2,040 no. of tree and disturbance to wildlife and bird habitat. Socio-economic impacts during the rehabilitation works will be loss of 1.72 ha of agricultural land, loss of private properties, and exposure to health and safety problems during road construction. One septic tank (Ch 0+025), two cattle shed (Ch 6+480 and Ch 6+ 470), one house (Ch14+540), one toilet (Ch 18+980) and one water mill (Ch 4+680) will be affected of the private people due to the road construction. Similarly, under community infrastructures, one reservoir tank (Ch 1+720), two tap stand (Ch 0+090 and Ch 8+573), temple (Ch 7+360), drinking water tank (Ch 11+985) will be affected during the road construction.

The adverse physical impacts during road operation are slope instability and management, air and noise pollution, and road safety. Likewise, biological impacts are depletion of forest resources and disturbance to wildlife. Socio-economic impacts are due to new settlement and market center development, change in social behavior during road operation.

Benefit Augmentation and Mitigation Measures

Impacts from the proposed road projects can be both beneficial as well as adverse. An effective implementation of benefit maximization measures and adverse impacts mitigation measures would optimize the benefits expected from the project and avoid/minimize the adverse impact from the project. Based on the impact assessment and identification, beneficial augmentation and adverse impact mitigation measures are presented in both constructions as well as in operation stage of the road.

Benefit Augmentation Measures

Life skill training like, income generation activities, construction of soft engineering structures and bioengineering works for workers and members of BGs will be conducted to improve their livelihood. Cooperatives will be promoted and coordination with bank and other financial institutions will be done. Agricultural support services will be improved for

the increased income from the farm products and market linkages will be done. During the road construction more emphasis is given to women workers as at least 50% workers should be women.

Mitigation Measures

Spoils should be safely disposed and managed with minimum environmental damage using LEP approach which includes balanced cut and fill volume, re-use of excavated materials and minimum quantity of earth works and adoption of bio-engineering techniques. Adequate slope stabilization measures will be provisioned in design for the stabilization of slopes. Unstable sites, erosion prone area, dense forest area, settlements, fertile farm land will be avoided for quarrying operation.

Loss of trees will be compensated by encouraging local people to plant trees in their private land from project support. Likewise, CFUGs will be supported for the compensatory plantation and protection for 5 years of 56,100 trees (estimated cost is NRs. 2,384,250.00) in community forests. The construction activities near forest area will be appropriately managed so that there will be least disturbance to the wildlife and birds. A separate Resettlement Plan has been prepared to address land and property acquisition as well as compensation issues.

The workers will be provided with helmets, masks, muffs depending on the nature of the construction work. Drinking water facility and temporary pit latrine will be established and disposal of excavated materials in the water bodies will be avoided. Workers will be provided with medicines and group accidental insurance facility.

During operation stage, minor landslide and mass wasting will be immediately cleared and slope restored with appropriate technology. CFUGs will be supported to conserve and manage their CFs according to operational plans and installation of improved stoves will be promoted. Appropriate sign boards will be erected informing drivers about prohibition of blowing horns in the forest areas and potential areas for wildlife crossing. Appropriate road safety measures with the help of 3-Es i.e. engineering, enforcement and education will be applied.

Environmental Management Plan

Environmental management plan is an important tool to ensure the implementation and monitoring of mitigation measures for minimizing adverse impacts and maximizing the beneficial impacts. Similarly, environmental monitoring generates useful information and improves the quality of implementation of mitigation measures. The proponent, DDC Sindhupalchowk will develop monitoring mechanism to show its additional commitment for environmental improvement and mitigate undesirable environmental changes, if any during construction and operational stage. DDC will be supported by DPO and DIST team in the district and Environmental team from the CISC for the environmental monitoring.

Conclusion and Recommendation

The IEE study of the proposed Sildhunga-Jethal-Tauthali-Tekanpur Subproject reveals that the benefits from the implementation of the proposed road project are more significant and long term in nature against the adverse impacts most of which could be mitigated or avoided and relevant issues raised during focuss group discussion were also incorporated. Therefore, this IEE is sufficient for approval of the proposed sub-project. This sub-project is recommended for implementation with incorporation of mitigation measures and environmental monitoring plan.

Salient Features of the Subproject

Features	Description
1. Name of the Road Sub-Project	: Sildhunga-Jethal-Tauthali-Tekanpur
2. Location	
2.1 Geographical Locations	
Start Point	: Sildhunga of Jethal VDC
End Point	: Balka of Tekanpur VDC
2.2 Geographical Feature	
Terrain	: Midhills
Alignment	: Ridge/upper valley: 21km, lower valley: 1.921 km
Altitude	: 772 -2,027m above msl.
Climate	: Subtropical to temperate
Soil	: Alluvial soil, colluvial soil
3. Classification of Road	: District Road (Rural Road) Class A
4. Status of road	: Fair Weather
5. Length of Road	: 22.921Km
6. Standard of Pavement	: Earthen
7. Construction Period	: 1 Year
8. Traffic Forecast	: 200 vehicles per day in both direction
9. Design speed	: 20 km/hr
10. Major Settlements	: Sildhunga, KarkiTole, MajhaTole, JapsileTole, GaneshThan, Tole, Aahal Danda Tole, Saune Pani Tole, , Balka
No. of Household	: 980 HHs
VDCs along the Road	: Jethal, Tauthali and Tekanpur
11. Cross Section	
Right of way	: 10 m each side (center line)
Formation width	: 5 m
Carriageway width	: 3 m
Lane	: Single
12. Retaining Structures	
Dry Stone Wall	: 1258.94 Cum
Stone Massonary Wall	: 2742.42 Cum
Gabion Wall	: 14115.00 Cum
13. Bio-Engineering Cost	: NRs 4,386,304.00
14. Earth Work	
Cutting	: 168,231.78 Cum
Filling	: 24,076.99 Cum
15. Sub-project cost	
Total Cost (NRs)	: NRs 146,210,118.92
Costs per km (NRs.)	: NRs 6,378,754.85
16. Total employment generation (No. of laborer) for 90 working days	
Skilled	: 368
Unskilled	: 3,343

CHAPTER 1

1.0 Introduction

1.1 Background

1. The Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP) program is financed by the Government of Nepal (GoN), Grant assistance from Asian Development Bank (ADB), Department for International Development (DFID), Swiss agency for Development and Co-operation (SDC) and Loan assistance from OPEC Fund for International Development (OFID) to improve the connectivity, enhance economic and employment opportunities, increase access to market and social services of rural communities. The Program is focused on twenty core districts not covered by other major donor funded Rural Infrastructure Development Programs.
2. The Rural Reconstruction and Rehabilitation Sector Development Programme (RRRSDP) focuses on immediate post conflict development priorities for accelerated poverty reduction and inclusive development, thereby enhancing the effectiveness and efficiency of the delivery of public services, and improving access of rural people to economic opportunities and social services. The project components include (i) improved rural roads; (ii) developed and improved community-based supplementary rural infrastructures; (iii) enhanced equity, employment and income opportunities for the poor and disadvantaged; (iv) strengthened institutional capacity of the Ministry of Local Development (MLD), the Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR), the District Development Committee (DDC) of project districts; and (v) improved project management.
3. Labor-based, environmentally friendly, and participatory (LEP) approaches will ensure that the investment in reconstruction and rehabilitation of infrastructure results in sustainable, improved access to economic and social services, and enhanced social and financial capital.
4. The District Development Committee (DDC) and District Technical Office (DTO), Sindhupalchowk is the executing agency at the district level under RRRSDP and the proponent of the Initial Environmental Examination (IEE) study for the rehabilitation and construction of Sildhunga-Jethal-Tauthali-Tekanpur road sub-project.

1.2 Relevancy of the proposal

5. Road upgrading and new construction work has several benefits from the project to the people living in the vicinity of Jethal, Tauthali and Tekanpur VDCs in terms of easy access, saving of time on travel, easy transportation facilities for people and agricultural products of village to the nearby markets (Khadichour, Lamosanghu). Consequently, local people will get high price for their agricultural and others production and people will get social and employment facilities. Hence, the rehabilitation of the proposed road is necessary to uplift social and economical status of the local people through the easy and safe access of the transportation facilities.
6. The RRRSDP is environmental category according the Environmental Assessment Guidelines, 2003; and Safeguard Policy Statement, 2009 of ADB is Category B therefore an initial environmental examination (IEE) for the proposed Sildhunga-Jethal-Tauthali-Tekanpur Road Subproject is necessary to assess the environmental consequences of the proposed Subproject activities and suggest appropriate, practical and site-specific mitigation and enhancement measures.
7. Similarly, The Sildhunga-Jethal-Tauthali-Tekanpur Road is a Rural Class "A" District Road (DR) according to National Transport Policy (2058) and *Approach for the Development of Rural*

and Agricultural Roads (APPROACH) developed by Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR). By this classification, an IEE is required of the proposed road according to Article 3 of Nepal's Environmental Protection Act (EPA) and Rule 3 of the Environmental Protection Rules (EPR) of 1997 (amended in 2007). Preparation of IEE report by concerned District Development Committee (DDC) and approval of IEE report by the Ministry of Local Development (MLD) according to Nepali legal provision is considered sufficient by the ADB according to Project Administration Memorandum (PAM) subject to prior review of an agreed sample of subproject IEEs by ADB.

8. This IEE Report has been prepared based on the Terms of Reference (ToR) approved on 2066/2/4 (18 May 2009) by the Secretary level decision of the Ministry of Local Development (MLD) as given in **Annex I**. Rapid Environmental Assessment (REA) Checklist was also considered during IEE report preparation as given in **Annex II**.
9. The ToR for an IEE has been prepared for 23.50 km portion of the Sildhunga-Jethal-Tauthali-Tekanpur Road., However, the length of the road is found to be 22.921 km after the detailed survey. Therefore, IEE has been prepared for 22.921 km.length.

1.3 Objectives of IEE

10. The underlying objective of IEE is to gear the project as it evolves and takes shape to "*Make it environmentally sound, tailor it to and help fit in the local environment and assimilate it in the social and instructional context.*" The IEE study is to identify the impacts of physical, biological, socioeconomic and cultural environment of the Subproject area. The specific objectives of the proposed IEE study include to:
 - Identify the major issues that may arise as a result of proposed works on bio-physical, socio-economic and cultural environment of the project area,
 - recommend practical and site specific environmental mitigation and enhancement measures, prepare and implement environmental monitoring plan for the sub-project,
 - provide information on the general environmental setting of the sub-project area as baseline data. and make sure that IEE is sufficient for the proposed road sub-project,

1.4 Methodology adopted

11. The IEE approach, methodology and procedure were followed according to the provisions of the EPA and EPR. The methodology used for conducting the IEE included review of literature, sample survey/inspections/observations making simple measurements, discussion with communities and other stakeholders, and IEE team judgment. Data collection was done in September, 2009 (Aswin 2066 BS) by the staff of DIST team (Engineer, Social Development Specialist, and Environmental Specialist).
12. Necessary information was generated through field study and literature review to accommodate all issues as included in the approved ToR to analyze environmental impacts on physical, biological, socio-economic and cultural issues. Secondary information was collected through reports, maps and photographs (**Annex III**). Primary level of information was generated through questionnaires, checklist (**Annex IV**) and data sheets through walk-over survey. Furthermore, local people were contacted and interviewed to solicit information. Numbers of focus group discussions were held in settlements of Sildhunga, Tauthali and Tekanpur VDCs within Project area. The DDCs officials, VDCs and Community groups were also contacted to verify information.

1.5 Description of the proposal

13. The proposed Sildhunga-Jethal-Tauthali-Tekanpur road sub-project lies in the South-East part of Sindhupalchok district of Central Development region of Nepal. This sub-project starts from Sildhunga of Jethal Village Development Committee (VDC) and ends at Balka of Tekanpur VDC. In Between the road passes through Tauthali VDC. Major settlements along the road

alignment are Sildhunga, Karki Tole, Majha Tole, Japsile Tole, Ganeshthan Tole, Aahal Danda Tole, Saune Pani Tole and Balka. This road is one of the important roads of district which links Lamosanghu-Jiri road at Sildhunga of Jethal VDC and Araniko highway at Balka of Tekanpur VDC. Considering such exposure, this road alignment was given high priority during 15th District Council (*Jilla Parishad*) and was proposed for rehabilitation and Construction under RRRSDP.

14. This road alignment was undertaken by DTO and every year construction work was carried out but the whole road was not pliable till now. Approximately 2.57 km new track has yet to be constructed to join Jethal and Tauthali VDC. Initial track opening was done by VDC in the technical support of DTO during 2051. The Subproject will involve road widening, carriageway strengthening as well as culvert replacement and landslide rehabilitation. Upgrading shall be confined within the existing 5 m right-of-way (ROW) (5 to 10 m on either side of the road centerline). Road formation width is 5.0 m with additional width for switchback, lay-byes, extra widening in curves, mass balancing and safe disposal site for the excess excavated material. The total length of this road is 22.921 km. This road is proposed for upgrading with gravel surface. The description of the project works is given in the **Table 1.1** and location and alignment of the road is given in **Figure 1.1, 1.2 and 1.3**. The total subproject cost is NRs. 146,210,118.92 (NRs 6,378,754.85 per Km) as shown in **Annex V**.
15. This road is partially opened. Road is operational up to Ch 4.50 km from Sildhunga and 14 km (up to Ch 7+870) from Lamosangu side. Few vehicles are being operated on queue basis from Tauthali to Takenpur in winter season. The middle portion from CH 4+750- CH 7+850 is not complete and not operational.
16. The district headquarter is linked with Kathmandu by Arniko highway and Chautara-Dolalghat road. The main means of transportation for the large area of the district is motorable roads which can not be operated during rainy season. Consequently, transportation of goods and services from the market centers to the rural areas and vice-versa has been difficult, insufficient and costly. Direct beneficiaries of this road subproject will be the people of Jethal, Tauthali and Tekanpur VDCs. In addition, the proposed road sub-project connects several VDCs of south eastern part of district to Lamosanghu-Jiri and Araniko Highway and hence facilitates the easy access to Kathmandu and district headquarters of Sindhupalchok and improve income generation potentials, enhance commercial opportunities and improve market accessibility to local people especially from Jethal, Tauthali and Tekanpur VDC. Moreover, this road will also provide short term employment opportunity by engaging the rural poor people in construction of the road. Such people based development efforts will reinstall economic activities in the area by creating long term employment and other opportunities

Table 1.1 Project activities of the Sildhunga-Jethal-Tauthali-Tekanpur road Subproject.

SN	Section	Chainage	Length (km)	Description & project activity
1	Sildhunga-Jethal	0+000 to 4+750	4.750	Upgrading
2	Jethal-Tauthali	4+750 to 7+850	3.100	New construction.
3	Tauthali-Balka.	7+850 to 22+921	15.071	Upgrading
	Total		22.921	

(Source field survey 2009)

1.6 Construction Approach

17. This road will be constructed using the labour-based, environment-friendly and participatory (LEP) and Contractor approach, the important features of which are:
 - Use of local people as labour, hand tools and small equipment, rather than heavy machinery for construction.
 - Balancing cut and fill and reuse of excavated materials as construction materials, and thus not generating excess spoils, as far as possible.

- Use of bio-engineering techniques: integrated use of vegetation, simple civil engineering structures and proper water management systems for slope protection.

1.7 Proposed Schedule for Implementation of Sub-project

18. Following table shows the proposed implementation schedule for Sildhunga-Jethal-Tauthali-Tekanpur road sub-project:

Table 1.2: Sub-project implementation schedule

SN	Activity	2008 IV	2009				2010				2011	
			I	II	III	IV	I	II	III	IV	I	II
1	Detailed survey, design and estimate		■	■	■	■						
2	Preparation of resettlement plan		■	■	■	■	■					
2.1	Life skill and income generation training								■	■	■	■
3	Environment Assessment and implementation											
3.1	IEE report preparation and approval from MoLD		■	■	■	■						
3.2	Implementation of EMP							■	■	■	■	■
3.3	Environmental monitoring							■	■	■	■	■
4	Work implementation											
4.1	Civil construction work by contractors							■	■	■	■	■
4.2	Civil construction work by RBGs							■	■	■	■	■

Note:

- I - January, February, March
- II - April, May, June
- III - July, August, September
- IV - October, November, December

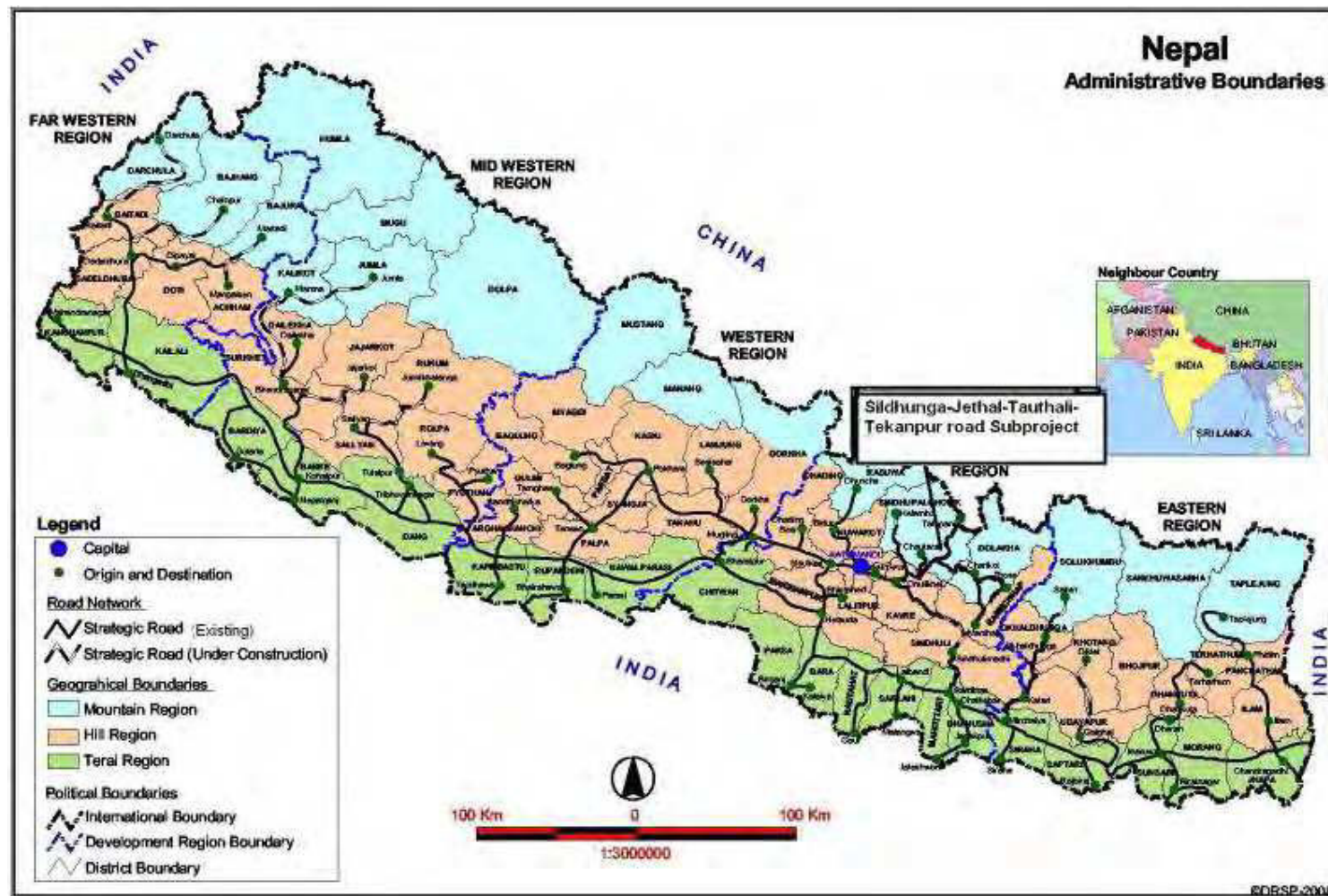


Figure.1.1 Map of Nepal showing location of Sildhunga-Jethal-Tauthali-Tekanpur road Subproject in Sindhupalchowk District

Figure 1.2 Map of Sindhupalchok district showing Sildhunga-Jethal-Tauthali-Tekanpur Road Subproject

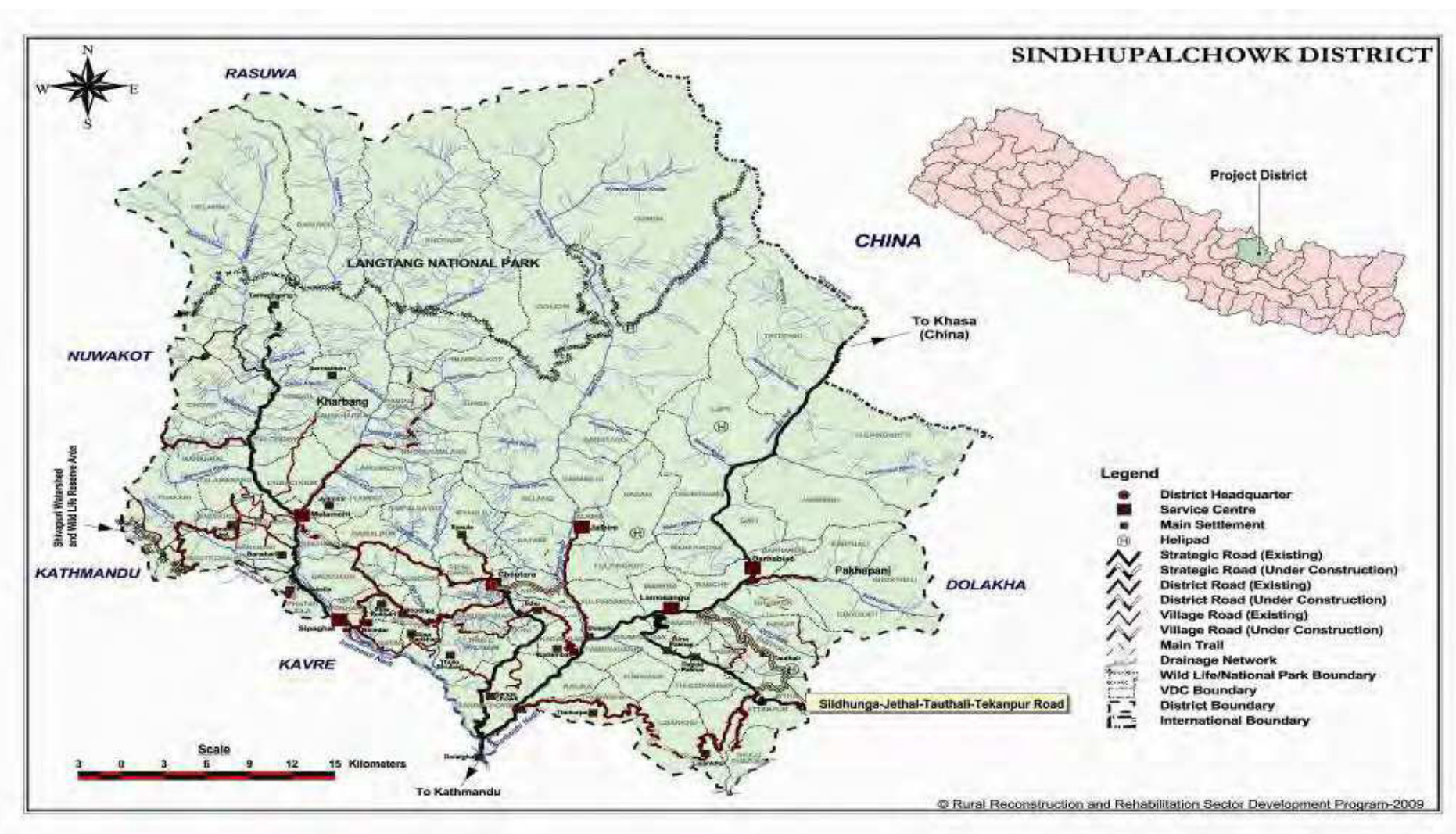




Figure1.3. Topographic Map showing the alignment of Sildhunga-Jethal-Thauthali-Tekanpur road

CHAPTER 2

2.0 Public Consultation and Information Disclosure

2.1 Public Consultation

19. In order to ensure the public involvement, the following procedures were followed during IEE report preparation.
- Publication of notice- a 15 days public notice was published on June 5 of 2009 AD (2066/02/22 Bikram Sambat) in Janadisha, a national daily newspaper (**Annex VI**) seeking written opinion from concerned VDCs, DDC, schools, health posts and related local organizations. A copy of the public notice was also affixed in the above mentioned organizations and deed of enquiry (*muchulka*) was collected (see **Annex VII** for deed of inquiry and **Annex VIII** for the names of organizations).
 - IEE team also carried out interaction with local communities and related stakeholders like District Forest Office, District Soil Conservation Office, District Agricultural Development Office and others during field survey to collect the public concerns and suggestions (see **Annex IX** for the list of persons consulted. Moreover, focus group Discussions (FGDs) were conducted to collect and solicit information regarding the bio-physical and socio-economic and cultural aspects of Sildhunga-Jethal-Tauthali-Tekanpur road. Summary of meeting minutes with local people and meeting minutes are given in **Annex X**. The FGDs were held at different major settlements along the ZoI of the road (refer **Chapter 4, 4.3.1** for the names of settlements) and the results of FGD are mentioned under the chapter 4, Existing Environmental Conditions. Socio-economic data are tabulated in **Annex XI a, b, c, d, e, f and g**.
 - Draft IEE report will be sent to Jethal, Tauthali and Tekanpur VDC for public disclosure. Recommendation letters were also obtained from above mentioned VDCs as given in **Annex XII**. Draft IEE will also be kept in information center of DDC Sindhupalchowk for public disclosure. After reviewing draft IEE report and incorporating the suggestions from the concerned stakeholders, final IEE report will be prepared and sent to PCU for approval from MLD and ADB.

2.2 Information Disclosure

20. Draft IEE will be kept in information center of DDC Sindhupalchowk for public disclosure. Information was also disseminated through person to person contacts and interviews and group discussions. However, available institutions at the local level were informed through notice distribution or pasting at concerned VDCs, school, health posts and public places within the road alignment corridors. The approved IEE report will be accessible to interested parties and general public through information center of DDC Sindhupalchowk and websites of ADB, DoLIDAR and RRRSDP. Following offices will get the IEE report:
1. District Development Committee, Sindhupalchowk.
 2. District Technical Office, Sindhupalchowk.
 3. District Project Office, Sindhupalchowk.
 4. District Implementation Support Team, Sindhupalchowk.
 5. Jethal, Tauthali and Tekanpur VDCs.
 6. Ministry of Local Development.
 7. Department of Local Infrastructure Development and Agricultural Roads.
 8. Project Coordination Unit, RRRSDP.
 9. Asian Development Bank, Nepal Resident Mission.

CHAPTER 3

3.0 Review of Relevant Acts, Regulations and Guidelines

21. Government of Nepal has adopted various acts, regulations and guidelines to ensure the integration of development and conservation of environment. The IEE study was being guided by the requirements and provisions of the applicable acts, rules and guidelines as given in **Table 3.1**.

Table 3.1 Review of Environmental Acts, Regulations and Guidelines

SN	Environmental Acts, Regulations and Guidelines	Description of Requirements
1	Environmental Protection Act, 2053 BS (1997 AD)	Any development project, before implementation, to pass through environmental assessment, which may be either IEE or an EIA depending upon the location, type and size of the projects.
2	Environmental Protection Rule, 2054 BS (1997, amendment, 1999 AD)	Obliges the proponent to inform the public on the contents of the proposal in order to ensure the participation of stakeholders.
3	Forest Act, 2049 BS (1993 AD)	Sections 68 of the Forest Act, 1993 empowers the government in case of no alternatives, to provide parts of any types of forests for the implementation of a national priority plan with assurance that it does not adversely affect the environment significantly.
4	Forest Rules, 2051 BS (1995 AD)	Elaborate legal measures for the conservation of forests and wildlife. Rule 65 of the Forest Regulation stipulates that in case the execution of any project having national priority in any forest area causes any loss or harm to any local individual or community, the proponent of the project itself shall bear the amount of compensation to be paid.
5	The Labor Act, 2048 BS (1992 AD)	Regulates the working environment, Deals with occupational health and safety.
6	National Park and Wildlife Conservation Act, 2029 BS (1973 AD)	Addresses for conservation of ecologically valuable areas and indigenous wildlife. The Act further prohibits wildlife hunting, construction of houses and huts, damage to plants and animals etc. within the park and reserve, without the written permission of the authorized person.
7	Local Self Governance Act, 2055 BS (1999 AD)	Empowers the local bodies for the conservation of soil, forest and other natural resources and implements environmental conservation activities. Sections 28 and 43 of the Act provide the Village Development Committee (VDC) a legal mandate to formulate and implement programs related to the protection of the environment during the formulation and implementation of the district level plan.
8	Land Acquisition Act, 2034 BS (1977 AD) and Land Acquisition Rules, 2026 BS (1969 AD)	Government can acquire land at any place in any quantity by giving compensation pursuant to the Act for any public purposes or for operation of any development project initiated by government institutions.
9	National Environmental Impact Assessment Guidelines, 1993 (2050 BS)	The guidelines provide guidance to project proponent on integrating environmental mitigation measures, particularly on the management of quarries, borrow pits, stockpiling of materials and spoil disposal, operation of the work camps, earthworks and slope stabilization, location of stone crushing plants, etc.

SN	Environmental Acts, Regulations and Guidelines	Description of Requirements
10	APPROACH for the Development of Agricultural and Rural Roads, 1999(2055 BS)	Emphasizes labor based technology and environmental friendly, local resource oriented construction methods to be incorporated actively in rural infrastructure process.
11	Reference Manual for Environmental and Social Aspects of Integrated Road Development, 2003(2060 BS)	This helps to integrate social and environmental considerations, including public involvement strategies, with technical road construction practices. It suggests stepwise process of addressing environmental and social issues alongside the technical, financial and others. The Manual recommends various environmental and social approaches, actions and strategies to assist developers.
12	Green Roads in Nepal, Best Practices Report: An Innovative Approach for Rural Infrastructure Development in the Himalayas and Other Mountainous Regions, 1999(2055 BS)	Focuses on participatory, labor based and environment friendly technology with proper alignment selection, mass balancing, proper water management, bioengineering and phased construction
13	<i>Batabaraniya Nirdesika</i> (Nepali), 2057	The directive is focused in the practical implementation of small rural infrastructures through the minimization of environmental impacts. This directive includes the simple methods of environmental management in the different phases of the project cycle.
14	IEE Rural Access Programme (RAP) Guidelines, 2003(2060 BS)	It clearly indicates the objectives and process of IEE in terms of project screening, preparation of terms of reference, desk review, field work, data analysis and interpretation (identification, prediction and analysis of impacts), mitigation measures, monitoring plan and reporting.
15	ADB Environmental Assessment Guidelines, 2003	Requires that environmental considerations be incorporated into ADB operations where environmental assessment is the primary administrative tool to integrate environmental considerations into decision-making of all types of development initiatives.
16	Resettlement Policy Framework,RRRSDP	It establishes the resettlement and compensation principles, organizational arrangements and design criteria to be applied to meet the needs of the people who may be affected by the project activities resulting due to land acquisition, loss of shelter, assets or livelihoods, and/or loss of access to economic resources.
17	Three Years Interim Plan, 2007/08 to 2009/10	Requires all projects will be formulated and constructed based on methods that optimally utilize the local skill and resources and generate employment opportunities.
18	The Interim Constitution of Nepal, 2063 (2007 AD).	has provision of right regarding environment and health: Every person shall have the right to live in clean environment, Every citizen shall have the right to get basic environmental service free of cost from the State as provided for in the law.
19	Safeguard Policy Statement, 2009, ADB.	ADB's Safeguard Policy Framework consists of three operational policies on the Environment, Indigenous people and Involuntary resettlement. It requires that (i) impacts are identified and assessed early in the project cycle, (ii) plans to avoid, minimize, mitigate or compensate for the potential adverse impacts are developed and implemented and (iii) affected people are informed and consulted during project preparation and implementation.

CHAPTER 4

4.0 Existing Environmental Condition

22. Baseline information on the existing physical, biological as well as socio-economic and cultural environment of the proposed sub-project are described here.

4.1 Physical Environment

23. This section describes the physical condition of the area that comes under the ZoI of the road section along its entire length and surrounding area. The data has been collected from both secondary and primary sources.

4.1.1 Topography

24. Out of Five physiographic regions of Nepal, the road alignment lies in Midhills region. Topographically the road passes through hills and valleys. The aspect of the road varies through the alignment. However, major portion of the road passes along the north and east facing slope. The altitude of the road ranges from 772 m amsl at Dam site of Tekanpur VDC to 2,027 m amsl at Sildhunga of Jethal VDC. The slope varies from 10° to 60°. There is vertical cliff from Ch 6+870 to Ch 7+050 (270m).

4.1.2 Geology and soil type

25. The road section comprises of different types of rocks. Geologically, the road corridor falls in the Lesser Himalayan Sediments zone that comprises rocks such as sandstones, phyllites, quartzites, shales and schists.
26. In general, soil type along the alignment can be classified as alluvial, colluvial and residual. Alluvium soil is dominant soil type along the road alignment General category of soil varies from light to medium texture on sloping level terraces and heavy textured soil in the river valley. The detail topography, geology and soil type along the road alignment is presented in the **Table 4.1**.

Table 4.1 Topography, geology and soil type along the road

SN	Section	Chainage	Length (km)	Aspect	Geology	Soil Type
1	Sildhunga-Jethal	0+000 - 4+750	4. 750	Eastern	Sandstones, phyllites, schists	Colluvial, Alluvial
2	Jethal-Tauthali	4+750 - 7+850	3.100	North-west	Phyllites, quartzites	Colluvial
3	Tauthali-Balka	7+850 - 22+921	15.07	South	Shales, schists, quartzites, phyllites	Colluvial, Alluvial
	Total		22.921			

Source: Field survey, 2009

4.1.3 Climate

27. Sildhunga-Jethal-Tauthali-Tekanpur road lies in the sub-tropical to temperate climatic regions. Generally, rainy season starts from June and ends in September. The meteorological record shows unevenly distributed monsoon rain in the project area with the total average annual rainfall is 1, 615 mm. Average minimum temperature 5° C and average maximum temperature of 25°C. (Source: District Profile of Sindhupalchowk, 2058).

4.1.4 Hydrology and Drainage System

28. There are about 53 small and large stream crossing along the proposed alignment. The major ones are given in **Annex XIII**. In addition; there are many dry streams along the road alignment. No wetlands are found within the vicinity of the road.

4.1.5 Soil Erosion and Sedimentation

29. The stability of slopes along the road corridor depends upon slope angle, the material constituting the slope, rock discontinuities and hydrological conditions. Proposed alignment does not pass through major landslides or erosion prone area. However, there are minor landslide and erosion prone areas at Ch 3+60 to 3+700 (50m), Ch 4+600 to 4+700 (70m) and Ch 6+850 to 7+050 (200m) along the road alignment. The main causes for occurring slides are rock weathering, precipitation and surface runoff.

4.1.6 Land use

30. Land use pattern of the area through which the road passes have been classified into: cultivated land, forest, built up area and pasture/barren land. The road alignment mainly passes through cultivated land. The existing area of the forest, builtup area, cultivated land and barren land is 2.88 ha, 0.65 ha, 4.42 ha and 0.076 ha respectively. During construction of the road additional 1.39 ha forest area, 0.18 ha builtup area, 1.72 ha cultivated land and 0.138 ha barren land have to be acquired. Details of land use pattern mentioned in **Annex XIV**.

4.1.7 Air, Noise and Water Quality

31. The air quality observed was good. Dust emission during vehicle operation has become common phenomena in the existing road and it is more significant during dry and winter season.
32. The project area, at present does not experience any water pollution. No noticeable defecation problem was encountered around sources of drinking water. Although the quality of water was not analysed, again it is presumed that it is within an acceptable range and only natural pollution occurs. However, during the monsoon season the quality of water may be more polluted due to high flood and accumulation of silt. Due to landslide and gully erosion streams are polluted during the rainy reason (June to September).
33. The project area at present does not experience noise pollution. Noise levels are insignificant and they are only generated by natural sources such as streams, animals, birds and winds.

4.2 Biological Environment

4.2.1 Vegetation

34. Bioclimatically, vegetation of the project area falls under subtropical and temperate Zone. The major forest types in the project area include. *Schima-Castanopsis* forest, *Pinus roxburghii* forest and *Alnus nepalensis* forest in higher altitude and Sal forest in the lower altitude in Tekanpur VDC along the road alignment.
35. The dominant forest and fodder species reported in the road alignment are Uttis (*Alnus nepalensis*), Chilaune (*Schima wallichii*), Khote Salla (*Pinus roxburghii*) Sal (*Shorea robusta*) and Katus (*Castanopsis indica*). Other plant species found within ZoI of the sub-project are Mauwa (*Bassia latifolia*), Pahlenli (*Listea salicifolia*), Chyuri (*Aesandra butyracea*), Bhimsenpati (*Buddleja asiatica*), Kaulo (*Persea odoratissima*), Mayal (*Pyrus pashia*), Kettuke (*Agave cantula*), Asare (*Osbeckia stellata*), Khanyu (*Ficus semicordata*), Khirro (*Sapium insigne*), Pipal (*Ficus religiosa*), Simali (*Vitex negundo*), Simal (*Bombax ceiba*), Bhalayo (*Rhus wallichii*), Phaledo (*Erythrina stricta*), Lampate (*Duabanga grandiflora*), Guras (*Rhodendron arboreum*), Angeri (*Lyonia ovalifolia*), Arupate (*Prunus cornuta*), Okhar (*Juglans regia*), Jigano (*Eurya acuminata*), Phalat (*Quercus lamellose*), Chap (*Michelia champaca*), Kyamuna (*Cleistocalyx operculata*), Amba (*Pisidium guyava*), Aap (*Mangifera indica*), Suntala (*Citrus* sps.), Bhogate (*Citrus maxima*), Aaru (*Prunus persica*), Naspate (*Pyrus communis*), Kimbu (*Morus rubra*), Sirris (*Albizia labbeck*), Lakuri (*Fraxinus floribunda*), Kutmiro (*Litsea monopetala*), Lapsi (*Choerospondias axillaris*), Paiyun (*Prunus cerasoides*), Dhudilo (*Ficus nerifolia*) Gogan (*Sauravia nepauensis*), Bilaune (*Maesa chisia*), Nemaro (*Ficus auriculata*).

NTFPs

36. Non timber forest products (NTFPs) are defined as any kind of products derived from forest species other than timber and fuel wood. The main NTFP species found along the road alignments are: Chiraito (*Swertia chirayita*), Lokta (*Daphne bholua*), Nagbeli (*Lycopodium clavatum*), Titepati (*Artemisia vulgaris*), Thulo Okhati (*Astilbe rivularis*), Chutro (*Berberis aristata*), Kurilo (*Asparagus racemosus*), Pakhanbed (*Bergenia ciliata*), Sugandawal (*Cinnamomum glaucescens*), Jhyau (Lichens), Bajradanti (*Potentilla fulgens*), Allo (*Diospyros malabarica*), Siltimur (*Lindera neesiana*), Dhasingare (*Gaultheria fragrantissima*).

Community Forest

37. There are seven CFs along the proposed road alignment. Name of CFs, Chainage with major species found in these CFs are given in the **Annex XV**.

Private forest

38. Local people have planted trees in some patches of their private land. The main tree species is Uttis, Chilaune and other fodder species. These are not registered as a private forest in DFO. People don't use the private tree for commercial purpose.

Religious, Leasehold and Government Forest

39. No religious, leasehold and government forest are found along the road alignment.

Trees on Farm land

40. Trees have been planted on farm land. The species are mainly fodder species and common species are Gogan, Nimaro, Dudhilo, Khanayo, Mauwa, Kutmero, Painyu, Bakaino Gedulo etc. The detail survey of the trees on farm land is summarised in **Annex XVIII**.

4.2.2 Wildlife

41. Chituwa (*Panthera pardus*), Mirga (*Muntiacus spp*), Ban biralo (*Felis chaus*), Syal (*Canis aurieus*), Dumsi (*Hystrix indica*), Bhalu (*Ursus thibetanus*), Phyauro (*Vulpes Montana*), Kharayo (*Caprolagus hispidus*), Ghorel (*Naemoredus goral*), Monkey (*Macaca mulatta*), Bandel (*Sus scrofa*) Musa (*Rattus rattus*), Malsanpro (*Martes flavigula*), Lokharke (*Ratufa spp*) are the wild animals reported in the forests of proposed road alignment. Similarly, birds found are Koili (*Cuculus micropterus*), Dhukur (*Streptopella senegalensis*), Kalij (*Catreus wallichii*), Munal (*Tragopan melanocephalus*), Chibe (*Dicrurus sp.*), Kag (*Corvus splendens*), Parewa (*Columba libiya*), Jureli (*Pycnonotus cafer*), Chil (*Milvus migrans*). The road does not fall under any protected or buffer zone area.

4.2.3 Aquatic life (Fish, Amphibians and Reptiles).

42. Fish species found in water bodies i.e. streams and kholas across the road alignment are Asala (*Schizothorax plagiostomus*), Katle (*Accrocheilus spp.*), Hile, Tite, and Budhuna (*Garra annandalei*). These fish species are mainly found in Sunkoshi and Jethal Khola.
43. Khasrebhyaguta (*Bufo sp*), Pani Bhyaguta (*Rana tigrina*) and Cheparo are recorded amphibians and reptiles respectively in the project area.

4.2.3 Endangered and protected species

44. **Faunal species:** Among the fauna present in the forest area along the road alignment, Chituwa (*Panthera pardus*) and Bhalu (*Ursus thibetanus*) are listed in CITES Appendix-I. Dumsi (*Hystrix indica*), Monkey (*Macaca mulatta*), Pani Bhyaguta (*Rana tigrina*), Ban biralo (*Felis Chaus*) are listed in CITES Appendix-II.
45. **Floral Species:** Okhar (*Juglans regia*), is protected plant species and Sugandawal (*Cinnamomum glaucescens*) and Jhyau (*Lichen sp.*) are prohibited species for export to other countries

according to the Forest Rules 2051 B.S. Likewise, Chiraito (*Swertia chirayita*) and Jhyau (*Parmelia* sp.) are vulnerable species under IUCN category.

46. This alignment does not pass through any protected area.

4.3 Socio-economic and Cultural Environment

4.3.1 Population, Household and Ethnicity

47. There are 33 small settlements distributed among 6 major settlements namely Sildhunga, Jethal, Tauthali, Gairigaon, Saunepani and Balka along the ZoI of the proposed road alignment having total population of 5,300 persons (980 households) and average family size of 5.40 as shown in **Annex XIa**. Similarly, diverse ethnic groups such as Brahmin, Chhetri, Tamang, Newar, Thami, Kusule, Sunuwar and occupational caste (Damai) live along the ZoI of road alignment. Occupational caste households are distributed in almost all the settlements.

4.3.2 Main occupation

48. The main occupation of all people residing within the ZoI of the proposed road alignment is agriculture and livestock. Almost all households (HHs) are involved in agriculture and livestock along with other occupation (Labour and porter 35.83%, 5% Business and commerce, 3% Cottage industry). However, agriculture farming is not enough for subsistence level due to small landholding size, limited transportation facilities and difficult access to modern farm inputs, etc. people are carrying out other economic activities like labour and porters, working in government and non government organizations and business. Details of occupations of the people according to the settlements in percentage are shown in **Annex XI b**.

4.3.3 Market Centres and Business Facilities

49. There is 25 tea stalls available in the ZoI of the proposed road alignment. Sildhunga, Tauthali and Gairigaun have also some hotels and restaurants (**Annex XIe 2**). Necessity of sewerage/drainage system has been felt in these places. Other smaller market centres with shops of daily commodities are Japsile, Newar tole Balka, Chhipigaun Dadagaun, Sunakheta and Bara.

4.3.4 Local Economy

50. The economy of the area is predominantly agriculture based with practicing of a mixture of harvesting of forest products such as Uttis timber. Local people are gradually attracted towards cultivation of cash crops and vegetables such as alainchi (Cardamom), amliso (Broom grass, Tea, Potatao, Cauli flower, Ginger, Lapsi (*Choerospondias axillaris*) etc. Dairy production and selling it to the market is also another source of income for local farmers. Over 80 percent of total population is dependent on agricultural activities for their livelihood. With growing closeness of the project area with capital Kathmandu due to transportation facility, cultivation of fruits, vegetables in a commercial manner seems to gain momentum. Diversity in employment pattern has been also observed in recent years. Local people have increasingly engaged in business activities in Kathmandu, Sildhunga, and Khadichour area. Seasonal migration to Kathmandu and even different parts of India to earn some money for their livelihood has significant contribution to the local economy.

4.3.5 Farming Pattern

51. The dominant crop in the project area are rice, maize and wheat. Major crops that are cultivated in the project area are rice, wheat, maize, millet, potato, beans etc. Local peoples are also found to be encouraged in cash crops in recent days. Major cash crops that are grown in the project area are mustard, vegetables, amliso, etc. Details of existing agriculture production of the people according to the settlements are shown in **Annex XIc**.

4.3.6 Livestock

52. Due to availability of good number of fodder trees, the project area has also immense potentiality of cow and buffalo farming for dairy production and goat farming for meat production. People are

already practicing livestock farming to sell milk since 2040-2045 B.S. Before 2050, people used to carry milk on their back or hire porters to sell it to nearby market centre. They were not encouraged to produce milk in commercial scale due to time consumption and difficult access. It is expected that the trend will increase in the coming days with the upgradation of the road. Poultry farming can also be encouraged due to easy market access. Details of livestock of the people according to the settlements are shown in **Annex XId**.

4.3.7 Industry, Trade and Commerce

53. Some local people are engaged in weaving of bamboo products making of furniture and tailoring. The area has the potentiality of agrobased industries such as dairy, juice production, food processing as well as furniture, bamboo products. Goods of daily commodities are major imports in the project area, which includes salt, sugar, packed food items, spices, clothes and other items of daily uses. Similarly, major items exported from the project area are milk, amliso (broom grass), Lapsi (*Choerospondias axillaris*), vegetables, fruits, timber especially of Uttis (*Alnus nepalensis*), bamboo products etc. whereas cereal crops such as rice, maize are also export and import items.

4.3.8 Tourism related services

54. Some hotel, lodges are in operation in Tauthali and Sildhunga. Since the ZoI of the project and its surrounding area has potentiality of various types of tourism activities. The road sub-project is on the way to famous religious place named Tripura sundhari Bhagawati temple. Similarly, there are many places of touristic importance like Japsile, Lawali, Bilghowa, Barna Jhyampo, Gairabari, Okharboat, Ghattedanda settlements. More lodges, restaurants and resorts are expected to be established in the area. People may engage themselves in various kinds of tourism related activities such as guide, cook, porter, promotion of local handicrafts and other local products.

4.3.9 Health and Sanitation

55. Major health problems associated with local people are gastric, water borne diseases, gaeneco related diseases, bath, respiratory diseases, skin, malnutrition, typhoid, worm etc. Sanitation awareness among local people is on the rise and many of them have toilets in their home.

4.3.10 Public Services and Infrastructures

56. There are various social sector and infrastructure facilities in different settlements as given below. Details about public services and infrastructures according to the settlements are shown in **Annex XIe 1** and **Annex XIe 2**.
57. **Education:-** The proposed project area consists of a total of 14 educational institutions ranging from primary level to Secondary level. Primary schools are found in majority of the settlements. In addition, there are 4 higher secondary schools in Majtole, Japsile, Sunakheta and Gairigaun settlement. Local people have realized the importance of education in their life and most of them send their childrens to school. However, female enrollment in schools is still lower than that of male students. Literacy rate in the project area has been estimated around 70 percent.
58. **Health Facility:-** In health sector, there are altogether 4 health posts/sub healthposts in various settlements. For serious health problem, people go to Primary Health Care Centre, in Khadichaur or district hospital in Sindhupalchok, Dhulikhel or Kathmandu.
59. **Communication:-** Regarding communication, all of the settlements have telephone facilities mostly with CDMA connection and no. of CDMA/mobiles (> 950) shows that popularity of mobile phones is also on the rise. Three post offices have been serving the local people from all settlements.
60. **Electricity:-** Almost all settlements within ZoI are electrified through national grid transmission line. There are no solar and other alternative resources facilities for eletrification within the ZoI of the road sub-project.

61. **Water Supply:** - Drinking water supply facility is available in all settlements through gravity flow schemes and natural springs or well. The water supply schemes generally use spring sources located in higher altitudes. The water is conveyed by pipes from the sources to the public taps through gravity flow. These taps are located in common places so that each serves a few households. Some houses in few settlements have private connection. At Ch 0+90 tap stand, Ch 11+985 water tank and Ch 8+573 Tap will be affected during the construction of road
62. **Irrigation:** - Irrigation facility is available to most of the settlements through gravity fed canals except Khagal, B.K tol Chhipigaun, Bbhahungaun, Palabari, Garigauan, Dadagaun, Bara, Bigal, Dandatole, Palpa, Damaitole, Saunepani, Sunakheti, Budhathoki tole. settlements where irrigation is possible only during rainy season.
63. **Other Infrastructures/services:-** There are 5 Suspension bridges, 5 wooden bridge 15 water mills mainly used for grinding purpose as shown in **Annex XIe**. At One Septic tank (Ch 0+020), Cattle Shed (Ch 6+480 and Ch 6+ 470), One house (Ch 14+540) ,one toilet (Ch 18+980) and one water mill (Ch 4+680) Reservoir Tank (Ch 1+720), Tap stand (Ch 0+090), Temple (Ch 7+320), Drinking water tank (Ch 11+985) and tap stand (Ch 8+573) will be affected during the road construction.
64. **Industries:-** Cottage and other industries are not well developed within the ZoI. There are some rice and flour mill in various settlements. Many people have skills of weaving bamboo baskets; woolen cloths etc. and these skills can be commercialized to increase their income
65. **Financial Institutions:** - There are 4 saving and credit cooperatives found in the various settlements within ZoI of Jethal, Tauthali and Tekanpur VDCs.
66. **Community Development Facilities/Organizations:** - There are 3 community centers, 12 ghat (cremation place), 1 playground found in various settlements. Ten community based organizations, youth clubs, women's group, NGOs and water/forest users groups are also active in ZoI of the project.

4.3.11 Land holding pattern

67. Land holding pattern within the ZoI of the road project demonstrates that most of the population (36%) have 1-5 ropani (approximately 1 ha = 20 ropani) land while more than one fourth households (32%) fall under 5-10 ropani land holding category. Very few HH (3.52%) are landless and few HHs (5%) have less than one ropani land. While none of the households have more than 50 ropani land on average. Details about land holding pattern are given in **Annex XI f**.

4.3.12 Food Security

68. More than half of the households (56%) have enough food for only for three to nine months. Nine percent households have enough food for three months; where as 26 % HHs have enough food for less than three months. This shows the poverty situation within the ZoI of the project area. On the contrary, 8 % of the households of the project area have food sufficiency for whole year and 2 percent households are reported as food surplus ones who are in the well off category of selling their surplus farm products. Food sufficiency condition of local people for varied time period is given in **Annex XI g**.

4.3.13 Migration pattern

69. Permanent migration takes place in limited scale towards Kathmandu. Similarly, seasonal migration also takes place from all the settlements. Majority of them migrate during slack farming season from Mangsir to Poush mainly in Kathmandu and various parts of India to work as a labourer. This shows economic dependency of the local people in the proposed road corridor. This could be reduced by providing employment opportunities at the local level.

4.3.14 Settlement Pattern

70. Most of the settlements within ZoI of the project are scattered type. Housing pattern of these settlements are mostly one or two storied, corrugated galvanized iron (CGI) sheet roofed buildings. Some of them are also thatch roofed buildings. RCC buildings have been started to appear in market centres such as Sildhunga, Jethal Thauthali, and Garigaun.

4.3.15 Potential Development area

71. Many of the places, areas and settlements within ZoI of the project have the potentialities in various sectors. These sectors and their potentialities have been mentioned in **Table 4.2**.

Table 4.2 Showing development potential areas

SN	Development potential area	Description of potential development
1	Tekanpur-1	Stone quarry site
2	Sildhunga,Jethal	Tourism, vegetable production
3	Tauthali-8	Stone quarry site
4	Tauthali Tripurasundari Temple.	Tourism
5	Taklokhu Danda,Tekanpur	Tourism

Source: Field survey, 2009

4.3.16 Religious, Cultural and Historical Sites

72. The following historical and religious sites are within ZoI of the proposed project area (within RoW and outside the road alignment) as given in **Table 4.3**.

Table 4.3 Showing religious, cultural and historical sites within ZoI

VDC	Name	Affecting or not	Distance	Remarks
Jethal	Ganeshthan Temple	No	500m	Jatra (festival) in Mangsir purnima
	Jaleshowori	No	400m	Sunkhosi mela (festival) in Thuloekadsasi
Tauthali	Aitabare than	yes		Have to rehabilitation
	Tripura Sundari	No	200	Hila jatra (festival)
	Bhimshensthan	No	300	
	Bhagbirabha	No	1 km	
Tekanpur	Kalika Mandir	No	150m	
	Ganesh Mandir	Within ROW	10m	
	Durgadevi Mandir	No	30m	
	Dhaune Gumba	No	50m	
	Kalika Gumba	No	30m	

Source: Field survey, 2009

73. Religious sites are visited and used for worship, by the local residents. However, these temples and religious sites don't fall in the proposed road alignment and their displacement is not needed. Several fairs are held on an occasion of religious festivals in various places within ZoI of the project. Among them Tripura Sundari Mandir is the famous religious place of this region which is located at Tauthali (Ch 8+00).
74. Religious faith of most of the people within ZoI of the project is Hinduism followed by Buddhism. Main festivals observed by local people are Dashain, Tihar, Maghe/Saune Sakranti, Lhosar etc.

CHAPTER 5

5.0 Project Alternatives

75. The aim of proposed subproject is to upgrade the existing road and improve the transportation network for the enhancement of safe and faster connectivity of subproject areas with the rest of the country eventually improving the living condition of people. The various alternatives to achieve the above subproject objective with minimum environmental degradation are discussed in the following sub-sections.

5.1 No action option

76. This alternative prevents the implementation of the Proposal, and therefore will forfeit the beneficial impacts identified in Chapter 4. This Proposal aims to provide links of remote rural areas with other parts of district and than district headquarters, rural accessibility and connectivity, connectivity of rural area to market centre, increase productivity in rural areas, enhance the flow of goods and services from rural area to market centres and visa versa, and eventually increase the living condition of people living in the zone of influence. If the Proposal is not implemented, the condition of existing Road proposed for upgrading will further deteriorate thus present conditions of remoteness and isolation will continue to exist. Similarly, cost for upgrading will become much higher later with increased deterioration of the road, ultimately requiring new construction. Also to be noted here is as the road is already existing, requirement for activities generating larger environmental degradation and adverse impacts will be of minimal nature. Only 2,040 no. of trees needs to be cleared from community forest where plan or geometric improvements are to be done, spoil generation will be less, and unstable slopes will be further stabilized as part of rehabilitation. The do-nothing situation will prevent some of the environmental adverse impacts at the cost of isolation, difficulty in access, remoteness and severe poverty. In balancing the trade-offs with the No-Action Option, this alternative is regarded as not viable.

5.2 Proposal alternatives

77. The people living within the ZoI require an efficient and safe mode of transportation to have the access to the market centre and other service centers. At the same time, there is need to conserve the physical, biological and socio-economic and cultural environment. Therefore, construction of ropeway, airport and road could be the options for achieving the above mentioned objectives.
78. Ropeway can be another mode of transportation to enhance accessibility of the people within ZoI. The ropeway primarily serves to transport goods and it normally does not provide facilities for human mobility except it is built with cable car facilities. It is very costly if built with cable car. Hence, ropeway without cable car will not serve the transportation need.
79. Air connection will be expensive and out of reach for poor people. There is no airport in Sindhupalchowk district.
80. Considering other subproject alternatives, the proposed road subproject can be the best option to serve the purpose of efficient transportation requirement.

5.3 Alternative Alignment

81. The alignment of the Sildhunga-Jethal-Tauthali-Tekanpur Road Subproject was finalized and constructed long time back. The Road already exists, although in partly damaged condition, and vehicles are plying in most sections of the road during fair weather. At this point of time, the analysis relating to alternate route with the consideration of environment, construction cost, serviceability etc. is not relevant. However, it is understood that the alignment has been made

after thorough investigation in terms of geology, hydrology, socio-economic and topographic aspects. This alternative is therefore not relevant.

5.4 Alternative Design and Construction Approach

82. There can be two types of road design and construction methods adopted in Nepal: conventional and green road. In conventional methods, heavy machineries and equipment, blasting, concrete structures with the application of bituminous surfacing, side drains, bridges and culverts, etc. are extensively involved.
83. Green road approach which is normally referred as a labour based, environmental friendly and participatory (LEP) focuses to conserve the delicate mountain ecology through the protection of vegetation cover as means of soil conservation. Under this approach, construction work is done manually by the local labourers without using heavy machinery and explosives. Spoil disposal is balanced with cutting and filling volume. Simple dry stone walls and stone causeways will be used at maximum possible extent. Preservation of vegetation cover is maintained. The proposed road has been designed considering the green road design concept and construction will be done accordingly.
84. The proposed road upgrading works is intended to be implemented through a labour and contractor based approach. Bio-engineering will be adopted to stabilise slopes. This is based on the successful experience of Green Roads implemented by various agencies in the past. Considering the local situation, construction cost and maintenance requirement, this concept appears most suitable for the proposed Subproject in terms of low cost for construction as well as maintenance. Local people will be benefited by availability to work in the Subproject and earning from it.

5.5 Alternative schedule and process

85. The construction schedule to be adopted may avoid rainy season as well as agriculture season where all the local people will be engaged in the field. Construction schedule also be sensitive to the period of utilization of natural drainages and waterways extensively by local farmers for irrigating their field. Working during agriculture off-season is more important when the road is to be constructed with labour based approach. The proposed alternative schedules for execution of works will be pursued during slack agriculture period in this Subproject.

5.6 Alternative Resources

86. The physical resource requirements include stone for gabions, dry masonry walls, and stone pitching. The Subproject will optimally use local labour force and local materials. Stones are easily available in Paharekholsi (Ch 2+665), Jethal Kholsi (4+750), Kalika Mandir (15+000) and Sunkoshi Dam site (23+000) of the road whereas fine aggregates; sand has to be carried out from Sunkoshi river near dam site. The pavement construction, earthwork, construction of simple structures such as drains, gabion walls, bio-engineering works etc. will be carried out manually.

CHAPTER 6

6.0 Identification of Impacts and Benefit Augmentation/Mitigation Measures

87. The identification and assessment of impacts has been carried out by considering the proposed proposal activities examined in terms of construction and operation stage. Several such impacts have been identified based on site observation, field survey, and information obtained from the stakeholders and few were identified on value judgment. The impact of the activities will be on physical, biological, socio-economic and cultural resources within the ZoI. Impacts from the proposed road sub-project can be both beneficial as well as adverse. Most of the identified impacts have been quantified to the extent possible.

88. Mitigation refers to the measures that are designed to cope with adverse consequences and to enhance the positive impacts on the environment as a result of the subproject implementation. An effective implementation of benefit maximization measures and adverse impacts mitigation measures would optimize the benefits expected from the sub-project and avoid/minimize the adverse impact from the sub-project. The impacts have been predicted in terms of their magnitude (minor, moderate and high), extent (site specific, local and regional) and duration (short, medium and long term) and appropriate benefit enhancement and mitigation measures are suggested as following (see also **Table 7.2**).

6.1 Mitigation Measures During Pre-construction phase

89. The mitigation measures adopted during design or pre-construction phases are of preventive in nature with two basic objectives:

- (i) Avoiding costly mitigation measures, and
- (ii) Increasing awareness among the stakeholders for environmental management of road construction, rehabilitation and operation.

6.1.1 Route Selection

90. Since, this is an existing road and proposed for upgrading, there is no new route selection rather designing geometrical improvements (as required) and widening of the road formation to the specified width i.e. 5.0 m. Local conditions (structures, switchback, lay-byes, mass balancing and safe disposal site for the excess excavated material, community utilities, slopes, sensitive spots etc.) will be taken into due consideration as to which side widening will take place in order to minimize land acquisition from forest, cultivable lands, settlement and cultural properties.

6.1.2 Detailed Survey and Design

91. The road design will follow the rural road standards developed by DoLIDAR. The works will be executed through labor intensive construction method as far as possible and practical in this program. Bio-engineering technique will be applied for stabilization of slopes, which is sustainable, environment friendly and can be done by using local resources and manpower. To improve the transport services for the people living along the alignment and link local area and the main market, acquisition of land would be required. At the detail design stage, several alternatives were explored to avoid and minimize further land requirement by using the existing track. The survey team has selected the least valuable, least agriculturally productive land for the lay-bys and improvement and took care to avoid the demolition of houses. These changes have been designed and incorporated into the subproject detail design.

6.1.3 Land and Property Acquisition, Compensation and Resettlement

92. ADB Guidelines has also necessary provisions for resettlement assistance including entitlements to replacement of land and other assets and/or compensation in case of involuntary resettlement, compensation cost for houses and other affected structures without deduction for depreciation or salvageable materials. However, the framework of resettlement plan also allows land donations

in cases where the donation is made freely in public and without coercion, does not affect household food security and where adequate income restoration support exists for the household. The voluntary contribution will be accepted if the following criteria are met:

- The donation is unforced and not the result of community pressure
- Donated land <20% agricultural holdings
- Food security above 9 months
- Full income restoration measures are in place

93. Land taken previously for the existing alignment will not be compensated for but any new land will be obtained through donation under the accepted criteria and acquired by paying compensation for those who comes outside the donation criteria. The structures and crops will be compensated at replacement cost and the lost trees will be compensated at the cost of harvesting (felling and sectioning) and transportation from the site to home. Being a governmental agency, the proponent will assist to form Compensation Determination Committee (CDC) under the Chairmanship of Chief District Officer. The Chief of Land Revenue Office, DDC representative, DTO will be members in the CDC and other representatives from DFO, DADO, Survey Office, VDC and affected person will be invited if needed. The Committee will decide the rates applicable for compensating different types of houses, land, trees and crops in accordance to established market rates. A separate Resettlement Plan has been prepared to address land and property acquisition as well as compensation issues. As per this Plan, Land donation agreement papers will be produced for the loss of land under the 20% of total holding. The compensation for trees will be calculated based on the replacement cost principle. Compensation payments for trees, land and structures will be disbursed by cheque/cash. The concerned households whose land will be acquired for the project were informed about the land donation process and entitlements. Finally, the Memorandum of Understanding (MoU) will be prepared and households donating the land will be signed in a written agreement with DDC.

94. Relevant issues raised during public consultaion have been addressed under respective mitigation measures. Therefore, no separate mitigation measures are warranted for the concerns raised by the local people.

6.2 Beneficial Impacts and Benefit Augmentation Measures

95. The development efforts particularly the development of transportation network will have multifold beneficial impacts. Road projects are generally intended to improve the economic and social welfare of the people. The largest beneficial impacts will be on the physical and socio-economic environment as given below:

6.2.1 Construction Stage

Employment Generation and Increase in Income

96. One of the major direct beneficial impacts of the road during construction stage is the creation of employment opportunity to the local community. The road construction will create 300,846 of unskilled and 33,056 skilled person day's work. Total 368 skilled and 3,343 unskilled persons will get employment for 90 days. Employment generation for the local people will minimize seasonal migration to other parts of the country as well as in foreign countries. The amount of money that is earned by the wages will directly enhance the operation of various economic activities and enterprise development. There will be positive impacts in other economic activities in a chain manner creating other income generating activities. This is one of the direct and significant impacts of the projects but it is of short-term and local in nature.

97. Benefit augmentation measures will be implemented as much as possible through the local Road Building Groups (RBGs). They will be given training to do the job. To utilize their money earned from the project works, RRRSDP will implement life skill training for income generation activities to improve their livelihood. These programmes will generate multiplier effect in the local economy and support significantly to uplift the socioeconomic condition of the local people

particularly poor, dalit (occupational caste), ethnic minority and women. Members from target minorities and the disadvantaged groups will have proportional representation in RBGs. At least 50% women participation as workers and women as RBG leaders will be ensured.

Skill Enhancement

98. Although many people in the project area are unskilled at present, the construction of road is likely to enhance their skills in construction, and large number of people will get practical or hands on training. This impact is indirect, medium, local and long-term in nature.
99. Road Building group members will be given on the job training during road construction which will enhance their skills and capability in works like masonry, gabion wires, construction of dry and foundation walls, slope cutting and stabilization as well as bioengineering works. These skills will not only benefit the local workers by providing long-term employment opportunity but also contribute to local human resource development. This will help them to find job as skilled worker in other future projects as an alternative occupation in addition to agriculture.

Enterprise Development and Business Promotion

100. During construction period, different types of commercial activities will come into operation in order to meet the demand of workers. Since they will have good purchasing power, they will regularly demand for different types of food, beverage and other daily necessary items. To meet these demands, many local and outside people may operate a number of small shops and restaurants around the vicinity of the construction sites. Various farm based enterprises including wide range of agricultural and livestock products will also gain momentum as a result of increased demand by labors during construction period. This will increase local trade and business in the area. This impact is also indirect, low, local and short terms in nature.
101. The benefit augmentation measures will include providing support to raise awareness to local entrepreneurs for the promotion of cooperatives and linkage with bank and other financial institutions.

Community Empowerment and Ownership

102. During construction period, various road construction coordination committees and road building groups will be constituted in order to proceed and implement the road construction activities. In this process, they will be oriented and trained to build and safeguard community infrastructures which will result in community empowerment and feeling of ownership among them. This impact is indirect, low, local and short terms in nature.
103. The benefit augmentation measure will be:
- Promotion of community development activities such as education, school, healthcamp
 - Generating awareness for enhancing social services through awareness compaigns
 - Networking and linkage with social infrastructure services.

6.2.2 Operation Stage

Improvement in accessibility and saving of time and transportation cost

104. Once the road project is completed, the people living within the road corridor will have easy access to Capital city, Kathmandu, Lamosanghu, Khasa, Dolakha etc. This will enhance the transaction of goods and services. Furthermore, the local people will have safe and fast mobility within the area as well as to the market centre. People from south east VDCs of the district also get benefited due to easy access to market centers after construction of this road.
105. Furthermore, in the hills of Nepal, the cost of transportation is equivalent to the cost of either human or animal porter wage. Porter used to charge NRs. 5/kg for the transportation of goods from Sildhunga to Jethal and Lamosanghu to Tauthali whereas the vehicle takes NRs.2/kg for the same distance. The cost of passenger transport (pedestrian travel) is the cost of time and expense

of walking. With the construction of road, there will be increase in movement of vehicles and transportation time to reach the destination will be also less. This will save the transportation cost and greatly enhance the socio-economic condition of people within the project area. Due to better accessibility to market centre, mainly in Kathmandu, Khasa more people will go to the city for employment opportunities in agriculture slack season. It means there will be increase in flow of remittance from urban to rural area, which will not only strengthen the linkage between rural and urban area, but also improve the overall economic situation of the rural areas and contribute to reduce rural poverty. This is the direct, most significant, regional impacts and will have long-term benefits.

106. Agricultural support services will be improved for the increased income from the farm products and maintainance of existing foot trails will be done.

Access to Inputs and Services

107. Access to inputs and services is expensive and not regular at present due to earthen road. Once the road is in operation, people would have cheaper and improved access to many inputs such as seeds, chemical fertilizer and technology leading to increased agricultural production and diversification. The transportation cost is expected to come down heavily for many of the inputs that are used by farmers in the farm and other goods. This will have direct, significant, local and long-term impact within ZoI of the proposed project
108. Agricultural support services will be improved for the increased income from the farm products.

Increase in Trade, Commerce and Development of Market centers

109. There is possibility of increased economic opportunities and significant growth and extension of the minor local markets along the road like in Jethal, Tauthali, Gairigaun, Balka. Number of shops, their business volume and diversity in business will also be accelerated with improved access facilities. The farmers will be more interested to increase agricultural production due to market accessibility. Similarly, there will be diversification in occupational pattern of local people, who are till now mainly dependent on subsistence farming. Ultimately it will lessen pressure on local natural resources. The impact will be indirect, low, local and long term in nature.
110. Sewerage and other basic facilities will be supported in the market centers.

Appreciation of Land Value

111. The construction of road leads to appreciation of land values particularly near the market and settlement areas. As per discussion with local people, existing land value near Sildhunga is already 1 lakh per Ana ($1\text{ Ana} = 31.79\text{ sqm}$). Where as 1-2 lakha ropani ($1\text{ ropani} = 508.64\text{ sqm}$) in Jethal and Tauthali VDC. The land price would increase due to the availability of reliable transportation facilities. There will be rapid increase in the commercial production of agricultural crops due to road accessibility which is also a major factor to raise the land value. This activity would likely uplift the economic condition of the local people. The impact is indirect, medium, local and long term in nature.
112. Benefit enhancement measures will be promotion of land development activities and control of encroachment within RoW. The local people will be made aware of the fact that high value lands are easily acceptable to the banks and microfinance institutions to provide loans. Local people can start their own business.

Increased Crop Productivity and Sale of Farm Products

113. Due to easy and cheaper availability of agricultural inputs and technologies, productivity will be increased along the road. Sale of farm and livestock products will be increased in the

settlements along the road corridor like Japsile, Lawali, Bilghowa, Barna Jhyampo settlements, which are potential areas for the production of vegetables, fruits and cash crops. Operation of road will further commercialize the subsistence agriculture of rural area. This is the indirect, significant, local and long term impacts from the proposed road.

114. Promotion of market linkages and networking for better market price will increase sale of farm and livestock products in the settlements along the road corridor. Farmers will be more interested to increase agricultural production due to market accessibility.

Enhancement of Community Development Services

115. Due to increase in employment opportunities, trade, business and agricultural income, it is expected that there will be improvement in social service such as education, health, government offices, saving and credits. The improvement can also be expected with more frequent visit of extension workers, longer stay of professionals such as teacher, doctors to their rural duty areas. Similarly, enhanced income level will encourage local people to spend more on health and sanitation, development of education facilities by employing qualified and professional teachers and upgrading the existing health posts. Production of educated manpower will also help to increase the number of employees in government/non government services. This is direct, medium, local and long-term impact of the proposed project.

116. The project will help to enhance this beneficial impact by generating awareness to the people about the ways of enhancing community development activities. Likewise, project will support to promote linkage of social infrastructure services.

Promotion of Tourism Activity

117. The road sub-project is on the way to famous religious place Tripura sundhari Bhagawati temple. Similarly, there are many places of touristic importance like, Japsile, Lawali, Bilghowa, Barna Jhyampo, Gairabari, Okharboat, Ghattedanda settlements. Flow of tourists due to road will contribute in the enhancement of economic activities of the area which will increase the living condition of the local people. The impact will be direct, medium, regional and long term in nature.

118. Awareness raising programs will be conducted in collaboration with concerned stakeholders to support the promotion of tourism activity and development of lodges, hotels and restaurants.

Women and Indigenous People Empowerment

119. All the people will be benefited from the road construction. However, women and indigenous people in particular may be benefited more from improved access to the market centers and various service providing agencies like health centers, banks, training institutions, women development office etc. Frequency of visit to such agencies will increase awareness level and empower the women and indigenous people. Thus, the project will have indirect, local and long-term impact in ZoI.

120. During the road construction and rehabilitation, more emphasis is given to women workers and indigenous people as at least 50% workers should be women.

6.3 Adverse Impacts and Mitigation Measures

6.3.1 Construction Stage

121. The proposed road will be constructed according to LEP approach. Therefore, there will not be severe damage to environment compared to conventional construction approach. However, it is likely to occur following impacts on physical, biological, socio-economic and cultural resources of the proposed road area. To minimize these impacts, following mitigation measures are suggested.

Physical Impacts

Change in Land Use

122. The land acquired for the implementation of the project can undergo a long-term permanent change in the land use. Changes of land use due to the construction of road are mainly conversion of agricultural land and forest into built up area. Cultivated land (1.72 ha) of the local people will be permanently lost during road construction. Similarly 1.39 ha of forest, 0.138 ha of barren land and 0.18 ha built up area will be permanently lost due to road construction work. The changes in land use will have impact on loss of agricultural land, which will directly reduce the agricultural production. Similarly, there will be also some change in land use due to expansion of roadside settlements like tea shops, temporary shops and labor camps etc. The impact from changes in land use will be high, direct, local and long term in nature.
123. Following mitigation measures will be adopted:
- Plantation of trees in the community forests
 - Improving agricultural extension services
 - Applying additional protective measures so that the remaining land will not be lost due to erosion.
 - Temporary lost vegetation on work site and material storage yards shall be revegetated after the completion of road construction. During re-vegetation, local species identified during the survey shall be used. The spoil sites shall be stabilized with bio-engineering technologies.

Spoil Disposal

124. Fresh cuts whenever is required, invites landslides and erosion during the monsoon. The common likely problems from the inappropriate disposal of spoils are: gullying and erosion of spoil tips especially when combined with unmanaged surface water runoff, damage to farm lands, and destruction of vegetation, crops and property at downhill through direct deposition or indirectly as result of mass flow. The impact from spoil disposal will be direct, medium, site specific and short term in nature.
125. Spoils should be safely disposed and managed with minimum environmental damage using LEP approach which includes balanced cut and fill volume, re-use of excavated materials and minimum quantity of earth works. The following mitigation measures will be adopted:
- Wherever possible, surplus spoil will be used to fill eroded gullies, quarries and depressed areas etc.
 - Excess spoils will be disposed in specified tipping sites (Ch 6+150, Ch 6+750, Ch 9+200, Ch 11+600, Ch 16+00, Ch 17+170, Ch 17+410 and Ch 7+800) in a controlled manner and the tipping sites should be covered by vegetation by bio-engineering techniques after surplus material is tipped.
 - Spoils should not be disposed on fragile slopes, farmland, marshy land, forest areas, natural drainage path, canals and other infrastructures.
 - After the disposal, the site will be provided with proper drainage, vegetation and adequate protection against erosion.
 - Necessary toe walls and retaining walls will be provided to protect the disposal of soil.

Slope Instability

126. Removal of vegetation and open cuts with exposed soil to rain will cause soil erosion as well as landslide. This can become a major source of silt that the monsoon runoff carries away. The stability of slopes along the road corridor depends upon slope angle, the material constituting the slope, rock discontinuities and hydrological conditions. The degree of sliding increases during the road excavation and it may cause regular sliding during operational phase. These slides will undoubtedly cause more problems during monsoon period. However, the proposed road adopts the green road and LEP approach which, heavy machineries are not used so that the chance of

slope instability and erosion decreases. The likely impact of slope instability and soil erosion is indirect, medium, site specific and mid-term nature

127. Cut and fill mass management methods will be applied. Environmental awareness raising activities will be implemented. Local people will need to make aware about how to protect instable slope. Protective measures such as construction of gabion wall catch drains and plantation will be adopted in those areas where serious problem of landslides exist. However the project has avoided the significant areas with problems of landslides. There is slide areas at Ch 3+60 to 3+700 (50m), Ch 4+600 to 4+700 (70m) and Ch 6+850 to 7+050, along the road alignment and vertical cliff at Ch 6+900.
128. The following mitigation measures will be adopted during the construction and upgrading of the proposed road and cost for these mitigation measures will be included in detail design and cost estimates of the road sub-project:
- Ensuring minimum cut slope and cement stone masonry wall in cliff area.
 - Selecting cut and fill slope at correct angle depending upon the soil type
 - Re-vegetation of cut and fill slope or exposed areas as soon as possible by using native plant species
 - Adoption of bio-engineering techniques
 - Ensuring minimum damage of vegetation during construction
 - No construction work during rainy season
129. Recommended engineering structures, gabion wall structures and dry stone masonry structures necessary at various chainages for slope stabilization have been given in **Annex XVI**.

Water Management

130. Roads usually generate large volumes of concentrated surface runoff. The concentrated water from the road outlet causes erosion and landslide eventually affecting the stability of the road itself. The impact will be indirect, medium, site specific and medium term.
131. Following mitigation measures are suggested
- Provide adequate and appropriate numbers of drainage structures in order to have minimum interference with and impact on natural drainage pattern of the area,
 - Avoid surface water Discharge into farmland or risky locations,
 - Do not divert water away from natural water course unless it is absolutely necessary
 - Avoid blockage or diversion of natural channels due to construction of road and disposal of spoils.
 - Adopt outward road slope as per green road standard to minimize water accumulation.
132. Details about structures required to mitigate the water induced adverse impacts are as given in **Annex XVII**.

Air Dust, Noise and Water Pollution

133. Although the air quality of the project area is not measured, the air does not appear to be polluted. During the construction of the road, there is a strong possibility of dust emission. This may affect the local people and workers, agricultural crops, markets, schools and health posts. Contractor may use heavy equipment during surfacing works, which might be source of dust nuisance. Impact on air quality will be direct, low, local and short term in nature.
134. The project area at present does not experience high levels of noise. However, during construction, the increased construction activities may increase the noise level to some extent. The impact of road construction on the noise level will be direct, low, local, reversible and short term in nature.
135. The water quality data within the project area is not tested. Nevertheless the quality of water in the water bodies, within the project area appears to be fairly good, as they are widely utilized

households for drinking. During construction these water bodies may be polluted by spoil and construction wastes. The impact will be direct, low, local, short term and reversible in nature.

136. The following mitigation measures will be adopted:

- Use of face mask by the workers to minimize air pollution due to dust generation
- Plantation of local species along the roadside
- Use of ear muffs to lessen noise pollution during rock breaking and quarrying
- Avoiding the disposal of excavated materials in the water bodies

Quarrying

137. The construction of road particularly retaining walls and other structures will require boulders, sand and aggregates. The quarry site for these materials will be largely on local stream and rocky area near the road alignment i.e. Paharekholi (Ch 2+665), Jethal Kholi (Ch 4+750), Kalika Mandir (Ch15+000) and Sunkoshi Dam site (Ch 23+000) which will be adequate to meet the requirement. A fine aggregate i.e. sand has to be taken from Sunkoshi Dam site. The extraction of materials from inappropriate places or in excessive amount can damage the local environment. The potential adverse impacts of quarrying are accelerated erosion, landslides, disturbance in natural drainage patterns, water logging and water pollution. The likely impact from the operation of quarry sites will be direct, low in magnitude, local nature and short term in duration.

138. Following mitigation measures will be adopted:

- Appropriate planning for quarrying and extraction of materials will be made during construction.
- Unstable sites, erosion prone area, dense forest area, settlements, fertile farm land will be avoided for quarrying operation.
- After the extraction is completed, the quarry site will be rehabilitated to suit the local landscape.

Decline in Aesthetic Value

139. Landscape degradation relates particularly to poorly designed or monitored activities resulting from quarrying operations and from indiscriminate dumping of spoil material. Road induced activities may lead to the generation and mismanagement of wastes in the roadsides and create scars on the landscape. The likely impact will be direct, low in magnitude, local nature and short term in duration.

140. The following mitigation measures will be adopted:

- Indiscriminate dumping of spoil material will be discouraged.
- After the extraction is completed, the quarry site will be rehabilitated to suit the local landscape.
- Plantation of local species along the roadside will be done.

Biological Impacts

Loss or degradation of forests and vegetation

141. Total of 1.39 ha of forest area will be lost due to road construction work. The proposed road passes through 7 community forests. From the community forest and private cultivated land, total 6,919 numbers (4,879 from private land and 2,040 from community forest area) of various species will be removed during road construction as given in **Annex XVIII** and **Table 6.1**.

142. The loss of trees can not be minimized; however, it can be compensated by the plantation. According to the Work Procedure for Providing the Forest Land for Other Use, 2063 of Government of Nepal, project has to carry out plantation (with protection for five years) equivalent to the forest area lost from the construction of the road or pay for the plantation and protection cost to the District Forest Office. If the trees lost are having more than 10 cm diameter

than 25 times more trees plus 10% trees will be planted. **Table 6.1** shows the number of trees to be removed and compensatory plantation cost in community forest. This cost will be provided to the concerned community forest user groups (CFUGs) by the project. Location and type of species for the plantation will be selected by the concerned CFUGs. However, emphasis will be given to local, rare, endangered and protected species. The forest products from the CFs will be utilized by the CFUGs according to their operational plans. Likewise, for the loss of trees from the private land, plantation at the ratio of 1:3 trees will be done by the project or the seedling and plantation cost will be provided by the project. For the plantation of 14,637 trees, total estimated cost is NRs. 238,436.73 (plantation cost is NRs. 16.29/plant).

Table 6.1: Compensatory plantation area, number of trees and cost

Chainage	Name of CF	Major Species	Trees to be removed (GBH>30 cm)	Compensatory plantation no. (1:25 ratio Plus 10%)	Cost NRs @42.5 /plant
1+600 to 1+800, 2+000 to 2+400	Bhangeli Chapp	Chilaune, Mauwa, Painyu, Uttis	28	770	32,725.00
5+200 to 7+200, 8+600 to 9+200	Mulkharka	Chilaune, Khotesalla, Kafal, Uttis	156	4290	182,325.00
7+200 to 7+220	Dudhila	Khotesalla	3	82.5	3,506.25
9+200 to 9+600	Bhumidevi	Chilaune, Khotesalla	41	1,127.5	47,918.75
15+600 to 16+600	Kalika	Chilaune, Dudhilo, Katus, Lankuri, Mauwa	596	16,390	696,575.00
17+580 to 17+760 17+780 to 17+920	Chuli Devi	Chilaune, Katus, Uttis, Simal	420	11,550	490,875.00
18+000 to 18+400, 18+600 to 21+000, 21+800 to 22+800	Dabi Bhirpakha	Chilaune, Katus, Mauwa, Uttis	796	21,890	930,325.00
Total			2,040	56,100	2,384,250.00

Source: Field Survey, 2009

Impact on wildlife including birds due to loss or degradation of habitat, increased hunting and other form of human pressure

143. The proposed area is not significant habitat for wildlife and bird species. However, the construction of road may disturb wildlife and bird species present along the road corridor due to increased noise level. The impact will be indirect, low, local and short term in nature.

144. The following mitigation measures will be adopted:

- When alignment passes through forest area, site clearance for construction shall be limited to the minimum width. No tree or vegetation shall be cut unless absolutely necessary.
- The construction activities near forest area will be appropriately managed so that there will be least disturbance to the wildlife and birds.

- Workers shall be actively discouraged from collecting fuel wood from forest or hunting of birds or animals.
- Proponent shall provide counseling services for the promotion of agro-forestry, non-timber forest products, and horticulture in private land providing seeds, seedlings, slips, training and other incentives to the farmers residing in adjoining the road corridor in coordination with District Forest Office (DFO).
- Coordination with DFO and CFUGs to control the activities like illegal hunting and poaching by enforcing acts and regulations strictly.

Impacts on flora and fauna (as listed in CITES and IUCN Red data book)

145. Chituwa (*Panthera pardus*) and Bhalu (*Ursus thibetanus*) are listed in CITES Appendix-I. Likewise, Dumsi (*Hystrix indica*), Monkey (*Macaca mulatta*), Pani Bhyaguta (*Rana tigrina*), Ban biralo (*Felis Chaus*) are listed in CITES Appendix-II. Okhar (*Juglans regia*) is protected plant species according to the Forest Rules 2051 B.S. Likewise, Chiraito (*Swertia chirayita*) and Jhyau construction (*Parmelia* sp.) are vulnerable species under IUCN category. Some of these wildfauna and flora will be affected during road construction. The impact will be indirect, low, site specific and short term in nature
146. The following mitigation measures will be adopted:
- Construction activities near forest area will be appropriately managed so that there will be least disturbance to the wildlife and birds
 - Restriction to wildlife harassment by the workers
 - Coordination with DFO and CFUGs to control the activities like illegal hunting, felling and poaching of wild fauna and flora by enforcing acts and regulations strictly
 - Conducting conservation awareness program for the construction workers
 - Compensatory plantation of felled

Socio-economic Impacts

Loss or degradation of farm land and productivity

147. There will be permanent loss of 1.72 ha of agricultural land due to road construction. This will lead to loss of food grain production among the families losing lands to the project. But, spoils on farm land will also affect the production of agricultural crops. It is clear that the loss of crops from the land acquired by the project will have adverse impact on the financial stability of the affected households who are dependent on the agricultural productivity of their land. This impact is expected to be of high in magnitude, local in extent and of long term in duration
148. Productive land acquisition for the road alignment will be minimized as far as possible. Compensation for the loss of property will be provided to the affected people. A separate Resettlement Plan will be prepared to address land acquisition and compensation issues.

Loss or degradation of private properties such as houses, farm sheds, and other structures

149. The proposed road alignment passes through the settlements of Jethal, Tauthali and Tekanpur VDCs. During the construction phase, the people of such settlements suffer by their property losses and damage by road construction works in some extent. One septic tank (Ch 0+025), two cattle shed (Ch 6+470 and Ch 6+ 480), one house (Ch 14+540), one toilet (Ch 18+980) and one water mill (Ch 4+680) will be affected due to the road construction. The impact will be direct, site specific, short term and medium in magnitude. Details about affected structures are described in **Annex XIXa**, photographs are given in **Annex XIXb** and demographic profile of a family whose house will be affected is given in **Annex XIXc**.
150. Productive land acquisition for the road alignment will be minimized as far as possible. Compensation for the loss of property will be provided to the affected people A separate Resettlement Plan up to 8 km section has been prepared and for remaining section it is under preparation to address land and property acquisition as well as compensation issues. In this plan,

direct cost of NRs. 708,501.43 (compensation for structures and trees), indirect cost of 400,000.00 (deed transfer etc.) and livelihood enhancement skill training cost of NRs. 832670.00) has been proposed. Total resettlement cost proposed is NRs. 2,038,230.00 (including miscellaneous cost).

Impact on community infrastructure such as irrigation, water supply, schools, health post, trail and trail bridges

151. The sources of drinking water and tap stands across and along/down to road alignment will be affected during road construction. Reservoir tank (Ch 1+720), two tap stand (Ch 0+090 and Ch 8+573), temple (Ch 7+360), drinking water tank (Ch 11+985) will be affected during the road construction as described in **Annex XVIII**. The impact will be direct, site specific, short term and medium in magnitude.
152. In order to avoid such impacts, the following mitigation measures are suggested:
- Restore all disturbed infrastructures to the condition before disturbance or improve where appropriate in coordination with local water users' committee
 - Avoid contamination of water resources systems during construction
 - Adopt outward slope as per Green Road Standard to minimize water accumulation.
 - Schedule the construction activities during crop off-season not to disrupt water bodies being used for irrigation purposes by the road. Costs for mitigation measures have been included in project cost

Impacts on cultural, religious and archeological sites

153. Aitbare temple at Ch 7+360 will be affected during road construction. This impact is expected to be of low in magnitude, local in extent and of short term in duration. There will be likely no impact on local culture and tradition during construction stage.
154. Relocation of temple will be done by the project in consultation with local people.

Impacts on health and safety matters

155. During construction, workers will be exposed to various risks and hazards. Potential impacts to health are respiration and eye diseases due to exposure to dust, risk of accident during work. The proper sanitation system should be developed to reduce the air and water pollution otherwise the surrounding environment may be polluted. It affects the health of local people. The lack of proper sanitary measures and increase in waste and water pollution can lead to an outbreak of epidemics, diseases as jaundice, typhoid etc. The most vulnerable will be women and children.
156. Furthermore, the road construction will encourage roadside settlement, which will increase the dumping of solid waste around the bridge may cause stomach problems due to poor quality drinking water. This impact is considered to be of the direct, high in magnitude, for the short term and localized.
157. The following measures will be adopted:
- The workers will be provided with helmets, masks, muffs depending on the nature of the construction work.
 - Drinking water facility and temporary pit latrine will be established at construction sites to control open defecation and pollution of water bodies by the workers.
 - Workers will be provided with first aid and health facilities.
 - Group accidental insurance will be done for the workers.
 - First aid training will be provided to field staffs like sub-engineer, social mobilizers and supervisors.

6.3.2 Operation stage
Physical Environment

Road slope stability and management

158. The destabilization of slope may also be expedited due to human activities in the road neighborhood such as quarrying stones or soil, animal grazing, irrigated cultivation. Similarly, there's also possibility of slope destabilization of road alignment due to opening of branch roads that will connect the road with other village settlements. Most of these roads are/will be opened by local efforts/VDCs/DDC and necessary considerations on technical/environmental aspects have not been made during its route selection, survey, design and construction. This may cause damage to road section, disruption to transportation and other social impacts in the nearby areas. The inadequate maintenance of the road due to the blockage of drains damages the road surface that can lead to slides and slope failure. Sensitive areas for possible road slope stability problems are: periphery areas of Ch 3+600 to 3+700, Ch 4+600 to 4+700 and Ch 6+850 to 7+050. The impact will be direct, medium local and long term nature.

159. The following mitigation measures will be adopted:

- Rill and gully formations should be regularly monitored and immediately fixed at critical areas;
- Correction of maintenance of the slope protection measures and drainage works;
- Minor landslide and mass wasting shall be immediately cleared and slope restored with appropriate technology (bioengineering);
- Soil conservation will be promoted in the right of way and vulnerable areas beyond the road alignment;
- CFUG will be promoted to conserve and manage their CFs properly.

Impact due to air, noise and water pollution

160. During operation period, a number of vehicles will ply along the road and will emit gaseous pollutants. This will increase the pollution level of ambient air along the road corridor. At the same time, as it is an earthen road, the air pollution is likely from the dusts emitted from the road surface due to movement of vehicles and also from wind. This will also increase air pollution level, which in turn, may cause adverse health impact to the people living in the vicinity. As the road is of district road category and the vehicular movement is not expected to be very high. The overall impact of air pollution will, thus, be direct, low, local and long term.

161. As stated earlier noise level during the operation period will increase due to the movement of vehicles and other activities. However, due to low traffic volume, the impact due to noise pollution will be direct, low, local and long term. During operation period, the disposal of gases and liquid pollutants from vehicles into water bodies may cause water pollution. The disposal of spoil and other construction materials and wastes into water bodies may also degrade the water quality. The impact of this kind will be direct, low, local and long term.

162. Following mitigation measures will be adopted:

- Community and road user awareness program will be organized to enhance public understanding
- Plantation will be done near the settlements
- Use of horns should be restricted near dense forest, health posts, schools and settlements
- For control of dust nuisance, sprinkling of water, speed limit of vehicle and vegetative barrier of earthen bounds should be designed.

Biological Environment

Depletion of Forest Resources

163. The forest resources depletion may occur due to ineffective drainage works, inappropriate spoil disposal and construction practices. The development of market centers may exert pressure on forest and eventually deplete the forest resources. To meet the increasing needs of the forest products, illegal felling/cutting of poles and trees may occur. Operation of road may increase in timber smuggling due to easy access and easy transportation facilities. The impact will be

indirect, medium, local and long term in nature. However, provision of forest products distribution in community forest operational plan will minimize the depletion of forest resources.

164. The pressure on forest resources during road operation is likely to occur. The mitigation measures recommended are:

- CFUGs will be supported to conserve and manage their CFs according to operational plans
- Encourage and support local community for controlling illegal harvesting of forest resources.
- Awareness programmes shall be organized to educate local people on the conservation of forest.

Disturbance to the Wildlife and Illegal Hunting

165. Although the wildlife population is reported low, however, they may be disturbed due to the frequent movement of the vehicles. Vehicular flow, horn blowing in the forest area will have impact on the wildlife and bird species. There may occur illegal hunting during operation period by the people from market areas due to easy accessibility. The impact will be indirect, low, local and long term in nature.

166. Wildlife and birds will be disturbed due to the vehicle movement. The mitigation measure for this is to erect appropriate sign boards informing drivers about:

- Prohibition of blowing horns in the dense forest areas
- Potential areas for wildlife crossing

Socio-economic and Cultural Impacts

New Settlement and Market Center Development

167. The existing trend is to settle along the road side for the economic activities. This is primarily attributed to increased opportunities for trade and commerce through the establishment of shops, restaurants, stalls and hotels. So, there is expansion of settlement area and development of market centers in Sildhunga, Jethal, Gairigaun, Balka etc. This may trigger the practice of encroaching right of way (RoW). Consequently, this will reduce road capacity and increase road accidents. The increasing trend of roadside settlement is likely to increase household waste as well as wastewater on the road. The impact will be direct, medium, local and medium term in nature.

168. The following mitigation measures will be adopted:

- Awareness raising programme through local organizations to plan proper settlements.
- Regulate settlement growth with proper planning/zoning along RoW.
- Plantation of trees along the road.

Change in Social behavior

169. People may leave their family in their villages to dwell near the new spots for economic incentives. This will ultimately affect the traditional bonds, norms and functions of the family. This will also cause impact on social and cultural transition. However, on the other side, there will be also increased interdependence among diverse social groups and interlinkage between different geographical areas which will promote the social cohesion and culture of tolerance among people. The impact will be indirect, medium, local and long term in nature.

170. The mitigation measures recommended will be facilitating awareness raising programmes to the communities about negative social behavior like gambling, excess use of alcohol.

Road safety Measures

171. Movement of vehicles in the road will invite accidents. Inadequate provisions of road safety measures like no provisions of signals and lack of enforcement of traffic rules during operation period may invite accidents. The impact will be direct, medium, local and long term in nature.

172. The mitigation measures adopted will be:

- Applying appropriate road safety measures with the help of 3-Es i.e. Engineering, Enforcement and Education.
- Appropriate spoil disposal sites should be identified and utilized
- Required safety signs will be used along the road

Impact on Livelihood and economic activities

173. There may be inflation and price hike due to the flow of outside visitors which will affect the subsistence living condition of the people. Nevertheless, there will be more employment opportunities resulting into increased economic activities. The adverse impact may be overshadowed by the increased working opportunities. Therefore, no mitigation measures are needed. Similarly Total 1.74 ha of agricultural land will be permanently converted into built up area as road. This will result into loss of about NRs. 68,486.19 equivalent of food grain production per year from cultivated land. Consequently it will cause adverse impact in the income and livelihood of the local people. However, it is expected that agricultural production in the adjoining area may rise substantially due to easy and increased access to agricultural inputs. Moreover, value of remaining land will also be increased which may nullify the adverse impact related to the loss of agricultural production to a great extent. So, there will be no significant adverse impact in the livelihood of the people.

CHAPTER 7

7.0 Environmental Management Plan

174. The EMP is prepared to guide implementation of mitigation measures and monitoring requirements. It includes institution and their roles, environmental management activities, environmental management organizational structure and budget for mitigation measures.

7.1 Institutions and Their Roles

175. The various institution involves in the EMP implementation and their roles are given in Table 7.1.

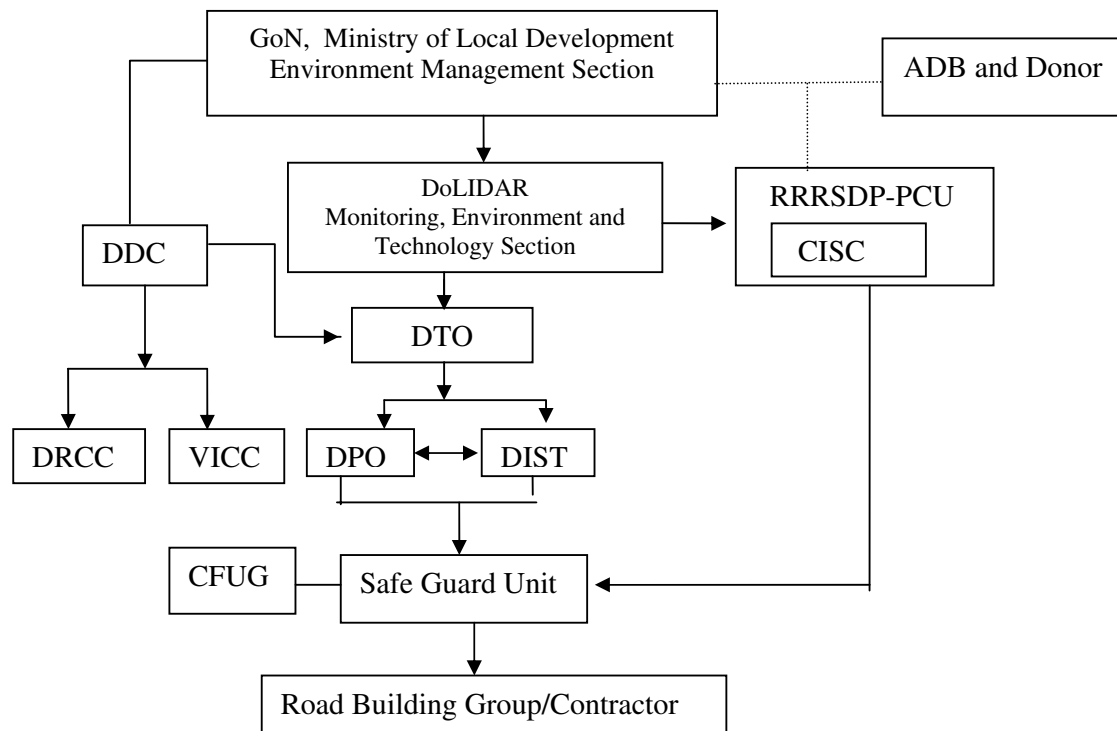
Table 7.1 Institutions, Responsibility and Their Roles

Institution	Role	Responsibility in the Project	Remark
Ministry of Environment	Mandated to formulate and implement environmental policies, plans and programs at national level	Facilitate when needed on environmental safeguards	No direct responsibility in the project
Ministry of Local Development (MLD)	It is concerned line ministry, executive agency and concerned agency as per EPA/EPR. Environment Management Section is responsible to look into safeguard matters for the ministry.	<ul style="list-style-type: none"> To review IEE ToR and Report, and give approval. Coordinate with project on safeguard issues Conduct environmental monitoring from central level. 	
Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)	Department under MLD responsible to execute infrastructure projects under MLD. Provides back-up support to DDCs in technical matters through DTO.	RRRSDP is being executed under overall coordination and supervision of the Department for the Ministry. It is also supporting DDCs through DTOs to implement the project.	
RRRSDP- Project Coordination Unit	Project specific unit.	Technical Unit to support and coordinate all activities for implementation of RRRSDP. Review, comment, and forward IEE ToR and Report for review to ADB and for approval to MLD	First Class Officer / DoLIDAR has been heading the PCU.
District Development Committee / District Technical Office	DDC/DTO is Project Executing Agency.	<ul style="list-style-type: none"> Prepare IEE ToR and submit for approval to PCU/MLD Conduct IEE Study, Public Consultation, and prepare IEE Report Receive comments from PCU/ADB/MLD and modify accordingly. Get final approval from MLD. Conduct environmental safeguard monitoring and Reporting 	District Technical Officer is the Project Manager
District Project Office	Project implementation office working directly under DDC/DTO.	Responsible for overall activities related to implementation of the works at field level.	
CISC	Support consultants at central level	Technical and management support to PCU	
DIST	Support consultants at district level	Technical and management support to DPO	
RBG/Contractor	Road construction and rehabilitation support	Implementation of road construction and rehabilitation works	

176. To support for smooth implementation of the project, there are various district level committees and groups including District Project Coordination Committee (a sub- committee of DDC), Village Infrastructure Construction Coordination Committee (to coordinate at VDC level). Road Building Groups are formed under participation of local people from ZoI. The environmental management organizational structure is illustrated by **Figure 7.1**

7.2. Reporting and Documentation

177. As part of EMP, reports will be produced at regular time intervals. Three monthly progress reports will be prepared and submitted to the DDC, and DDC will forward it to the PCU and DoLIDAR. Monitoring checklist will be developed as per the Environment Management Action Plan (EMP). The checklist will be used for regular monitoring and included in the Progress Report.
178. The Contract with contractor will clearly state that the DDC/DTO must approve the road building groups/contractor's arrangements for environmental protection, health and safety, waste management and other environment related actions identified during the detailed design phase.
179. The DIST through DPO will inform the DDC/DTO in case of non-compliance and of any other environmental issue that requires immediate attention. The contract will detail the remedies for non-compliance by the Contractor. The 'Naika' (Leader) of RBGs will be given orientation training on ensuring environmental protection measures. Routine monitoring of such measures will be carried-out through supervision staff (environmental, social and technical staff).
180. The monthly reports will be based on recurrent site inspections and will report on the effectiveness of the mitigation measures; the contractor's compliance with the environmental specifications; measures recommended in the events of non-compliance, and recommendations for any other remedial actions.
181. The trimester environment monitoring report will be submitted for the first year of operation of the road by the Proponent (DDC/DTO) to EA (PCU/DoLIDAR), who will forward the report to ADB. This is to ensure that post project monitoring is also carried out at least for one year.



_____ Line of command
..... Line of coordination

Fig. 7.1: Environmental Management Organization Structure

182. The DDC/DTO with project support will be responsible for the implementation of mitigation measures and environmental monitoring. Overall implementation of the EMP will become proponent's responsibility. Framework for implementing environmental management plan is shown by **Table 7.2**.

Table 7.2: Framework of Implementing Environmental Management Plan (EMP)

Project Activity	Potential Environmental Impacts	Nature	Magnitude	Extent	Duration	Proposed Benefit Augmentation/Mitigation Measures	Verification Method	Institutional Responsibility
Construction of road	Employment Generation and Increase in Income	D	H	Lc	St	<ul style="list-style-type: none"> Members from target minorities and the disadvantaged groups will have proportional representation in RBGs. At least 50% women participation as workers and women as RBG leaders will be ensured 	Records, Discussion	DDC/DTO/DPO/DIST
	Skill Enhancement	In	M	Lc	Lt	Training in road construction, soft engineering structures and bioengineering works for members of RBGs.	Records, Discussion	DDC/DTO /DPO/DIST
	Enterprise Development and Business Promotion	In	L	Lc	St	Providing support to raise awareness to local entrepreneurs for the promotion of cooperatives and linkage with bank and other financial institutions.	Records, Discussion	DDC/DTO DPO/DIST/ DoCSI
	Community Empowerment and Ownership	In	L	Lc	St	Promotion of community development activities such as education, school, health camp and generating awareness for enhancing social services through awareness campaigns	Discussion	DDC/DTO /DPO/DIST
Operation phase (plying of vehicles)	Improvement in accessibility, saving of time and transportation cost	D	H	R	Lt	<ul style="list-style-type: none"> Improve agricultural support services for the farmers Improvement of foot trails 	Records, Discussion	DDC/DTO /DADO/NGO/ local farmers
	Access to Inputs and Services	D	H	Lc	Lt	Agricultural support services will be improved for the increased income from the farm products	Records, Discussion	DDC/DTO /VDC
	Increase in Trade, Commerce and Development of Market centers	Int	L	Lc	Lt	Promote cooperative and provide linkage with bank and other financial institutions for setting up business enterprises	Records, Discussion	DDC/DTO/VDC
	Appreciation of Land Value	In	M	Lc	Lt	Promotion of land development activities and check encroachment within RoW	Records, Discussion	DDC/DTO/VDC
	Increased Crop Productivity and Sale of Farm Products	In	H	Lc	Lt	Improve agricultural support services for the farmers	Records, Discussion	DDC/DTO /VDC/local people
	Enhancement of Community Development Services	D	M	Lc	Lt	Support promotion of community development activities and development and linkage of social infrastructure services	Records, Discussion	DDC/DTO /VDC/local people
	Promotion of Tourism Activity	D	M	R	Lt	Awareness raising programs in collaboration with concerned stakeholders to support the promotion of tourism activity and development of lodge, hotels and restaurants	Records, Discussion	DDC/DTO/Nepal Tourism Board
	Women and Indigenous People	In	L	Lc	Lt	Minorities and the disadvantaged groups will be targeted for	Discussion	DDC/DTO /VDC

Project Activity	Potential Environmental Impacts	Nature	Magnitude	Extent	Duration	Proposed Benefit Augmentation/Mitigation Measures	Verification Method	Institutional Responsibility
	Empowerment					proportional representation in RBGs. At least 50% female participation will be ensured as RBG leaders.		
Construction of road	Change in land use Permanent conversion of cultivated land (1.72 ha) and 1.39 ha of forest will be converted to road built up area	D	H	Lc	Lt	<ul style="list-style-type: none"> Plantation of trees in the community forests Improving agricultural extension services Applying additional protective measures that the remaining land will not be lost due to erosion. The spoil sites shall be stabilized with bio-engineering technologies. 	Records, observation	DDC/DTO /DADO/DFO/NGO /Local farmers
Construction of road (Spoil disposal)	<ul style="list-style-type: none"> Gullying and erosion Slope failure and mass wasting Disruption of natural drainage pattern, causing scouring, erosion and landslide Damage to irrigation systems and crops through direct deposition or indirectly as result of mass flow Water pollution and degradation of water quality 	D	M	St	St	<ul style="list-style-type: none"> Wherever possible, surplus spoil will be used to fill eroded gullies, quarries and depressed areas etc. Excess spoils will be disposed in specified tipping sites (Ch 6+150, Ch 6+750, Ch 9+200, Ch 11+600, Ch 16+00, Ch 17+170, Ch 17+410 and Ch 7+800) in a controlled manner and the tipping sites will be covered by vegetation after surplus material is tipped. Spoils should not be disposed on fragile slopes, farmland, marshy land, forest areas, natural drainage path, canals and other infrastructures. After the disposal, the site will be provided with proper drainage, vegetation and adequate protection against erosion. Necessary toe walls and retaining walls will be provided to protect the disposal of soil. 	Records, observation	DDC/DTO /DIST/DSCO/RBG /Contractor
Construction of road	Slope instability (Ch 3+60 to 3+700 (50m), Ch 4+600 to 4+700 (70m) and Ch 6+850 to 7+050 along the road alignment and vertical cliff at Ch 6+900.)	In	M	Ss	Mt	<ul style="list-style-type: none"> Ensuring minimum cut slope Selecting cut and fill slope at correct angle depending upon the soil type Re-vegetation of cut and fill slope or exposed areas as soon as possible by using native plant species Adoption of bio-engineering techniques Ensuring minimum damage of vegetation during construction No construction work during rainy season 	Records, observation	DDC/DTO /DIST/DSCO/RBG/C ontractors
	Water Management	In	M	Ss	Mt	<ul style="list-style-type: none"> Provide adequate and appropriate numbers of drainage structures in order to have minimum interference with and 	Records, observation	DDC/DTO /DFO/DIST

Project Activity	Potential Environmental Impacts	Nature	Magnitude	Extent	Duration	Proposed Benefit Augmentation/Mitigation Measures	Verification Method	Institutional Responsibility
						<ul style="list-style-type: none"> impact on natural drainage pattern of the area, • Avoid surface water discharge into farmland or risky locations, • Do not divert water away from natural water course unless it is absolutely necessary • Avoid blockage or diversion of natural channels due to construction of road and disposal of spoils. • Adopt outward road slope as per green road standard to minimize water accumulation. 		
Construction of road	Air dust, noise and water pollution: (dust emission, water quality deterioration due to disposal of excavated materials and waste by workers)	D	L	Lc	St	<ul style="list-style-type: none"> • No heavy equipments will be used during construction • Buffer zones shall be developed in nearby settlements by planting trees on right of way • Uses of ear muffs and face masks should be maintained. • Avoid the disposal of excavated materials in the water bodies. 	Records, observation	DDC/DTO /DPO/DIST
	Quarrying (Paharekholi (Ch 2+665), Jethal Kholi (Ch 4+750), Kalika Mandir (Ch15+000) and Sunkoshi Dam site (Ch 23+000).	D	L	Lc	St	<ul style="list-style-type: none"> • Appropriate planning for quarrying and borrowing of materials will be made during construction. • Unstable sites, erosion prone area, dense forest area, settlements, fertile farm land will be avoided for quarrying operation. • After the extraction is completed, the quarry site will be rehabilitated to suit the local landscape. 	Records, observation	DDC/DTO /DPO/DIST
	Decline in aesthetic value	D	L	Lc	St	Indiscriminate dumping of spoil material will be discouraged. After the extraction is completed, the quarry site will be rehabilitated to suit the local landscape.	Observation	DDC/DTO /DPO/CFUG/ DFO
	Loss or degradation of forests and vegetation (4,879 trees from private land and 2,040 trees from community forest area)	D		Lc	Lt	Compensatory plantation (1:25 plus 10% for dead sapling) and protection cost for five years to the District Forest Office as per Work Procedure for Providing the Forest Land for Other Use, 2063 of GoN. Concerned CFs will carry out plantation in their community forests with project support.	Records, observation, meeting	DDC/DTO /CFUG/DFO

Project Activity	Potential Environmental Impacts	Nature	Magnitude	Extent	Duration	Proposed Benefit Augmentation/Mitigation Measures	Verification Method	Institutional Responsibility
	Impact on wildlife including birds due to loss or degradation of habitat, increased hunting and other form of human pressure	In	L	Lc	St	When alignment passes through forest area, site clearance for construction will be limited to the minimum width. The construction activities near forest area will be appropriately managed so that there will be least disturbance to the wildlife and birds. Workers will be actively discouraged from collecting fuel wood from forest or hunting of birds or animals. Coordination with DFO and CFUGs to control the activities like illegal hunting and poaching by enforcing acts and regulations strictly.	Records, observation, discussion	DDC/DTO /CFUG/DFO
	Impacts on flora and fauna (as listed in CITES and IUCN Red data book)	int	L	Ss	St	Coordination with DFO and CFUGs to control the activities like illegal logging, hunting and poaching by enforcing acts and regulations strictly.	Records, meeting, observation	DDC/DTO DPO/CFUG/ DFO
	Loss or degradation of farm land and productivity(loss of 1.72 ha of agricultural land)	Dt	H	Lc	Lt	Improvement of agricultural extension services	Records, observation,	DDC/DTO /DPO/DIST
	Loss or degradation of private properties: one septic tank (Ch 0+025), two cattle shed (Ch 6+470 and Ch 6+480) , one house (Ch14+540) , one toilet (Ch 18+980) and one water mill (Ch 4+680)	D	M	Ss	St	A separate Resettlement Plan has been prepared to address land and property acquisition as well as compensation issues.	Records, observation	DDC/DTO /DPO/DIST/CDO
	Impact on community infrastructure : Reservoir Tank (Ch 1+720), Tap stand (Ch 0+090), Drinking water tank (Ch11+985) and tap stand (Ch8+573)	D	M	Ss	St	Restore all disturbed infrastructures to the condition before disturbance or improve where appropriate in coordination with local users' committee,Avoid contamination of water resources systems during construction	Records, meeting, observation	DDC/DTO/ DPO/DIST
	Impacts on cultural, religious and archeological sites. Aitbare temple at Ch 7+360 will be affected.	D	L	Lc	St	Relocation of temple with consultation with local people	Records, observation, meeting	DDC/DTO /DPO/DIST/ VICCC

Project Activity	Potential Environmental Impacts	Nature	Magnitude	Extent	Duration	Proposed Benefit Augmentation/Mitigation Measures	Verification Method	Institutional Responsibility
	Health and safety matters	D	H	Lc	St	The workers will be provided with helmets, masks, muffles. Provision of drinking water facility and temporary pit latrine at construction sites to control open defecation and pollution of water bodies by the workers. Workers will be provided with first aid and health facilities. Insurance for workers for accidents will be done.	Records, observation	DDC/DPO/DIST
Operation phase (plying of vehicles)	Slope Instability: Ch 3+600 to 3+700, Ch 4+600 to 4+700 and Ch 6+850 to 7+050.	D	M	Lc	Lt	Correction of maintenance of the slope protection measures and drainage works, minor landslides and mass wasting will be immediately cleared and slope restored with appropriate technology (bio-engineering). Soil conservation will be promoted in the right of way and vulnerable areas.	Observation, records	DDC/DTO
	Air, Noise and Water Pollution	D	L	Lc	Lt	Speed limit for vehicles, no horn signs, use vegetation barrier.	Observation, records	DDC/DTO
	Forest resource depletion Increase in poaching and illegal trafficking	In	L	Lc	Lt	<ul style="list-style-type: none"> • Encourage and support local CFUG and authorities in controlling illegal harvesting of forest resources. • Awareness programmes shall be organized to educate local people on the conservation of forest. • Workers shall be briefed regularly about the importance and rules and regulation of DFO and in order to make them comply with. • Appropriate sign boards will be erected informing drivers about potential areas for wildlife crossing. 	observation, records	DDC/DTO/DFO/CUG
	New settlement, market centre development and population pressure.	D	M	Lc	Mt	Awareness program, enforcement of law, planning of land development, plantation of trees.	Records discussion	DDC/DTO
	Change in social behavior	In	M	Lc	Lt	Facilitate awareness raising programmes to the communities about negative social behavior like gambling, excess use of alcohol	Records, meeting, discussion	DDC/DTO
	Road Safety Measures	D	M	Lc	Lt	Applying appropriate road safety measures Applying appropriate road safety measures with the help of 3-Es i.e. Engineering, Enforcement and Education.	observation, records	DDC/DTO

Note: Nature: D-Direct ,In –indirect **Magnitude:** This can be low-L (minor), medium-M (moderate), and high-H (major), depending on the scale or severity of change.**Geographical extent:** If the action is confined to the project area, it is referred as sitespecific (Ss), if it occurs outside area but close to project area, the extent of impact is local (Lc), if it occurs far away from the project, it is referred as regional (R).**Duration:** It can be short term (St - i.e. less than 3 years), medium term (Mt - i.e. 3-20 years), and long term (Lt - i.e. more than 20 years

7.3 Mitigation cost for Executing the Environmental Management Plan

183. The estimated cost for beneficial augmentation measures like awareness raising program, skill training, promotion of small scale industries, and income generation activities will be covered by the Community Empowerment Component and Livelihood Enhancement Skills Training (LEST) programme of the RRRSDP. Costs for income generation and awareness programme activities for Affected Persons (APs) are included in Resettlement Plan. The design and cost estimate for most of the suggested mitigation measures such as slope stabilization, quarry site management, spoil disposal, supply of face masks, helmets, muffles, accidental insurance, bioengineering measures, plantation, land slide rehabilitation, supporting CFUGs shall be incorporated in the design and cost estimates. Therefore, most of the mitigation measures suggested would be a part of road design and construction without additional cost. All proposed mitigation measures will be integrated in the project design so that these measures may automatically form part of the construction and operational phases of the project. The indicative cost for environmental enhancement and mitigation is presented in the **Table 7.3**.

Table 7.3: Cost Estimate for Environmental Enhancement and Mitigation Measures

SN.	Environmental Protection Measures	Estimated Budget (NRs.)	Remarks
1. Benefits Augmentation Measures			
1.1	Training to DDC/DTO/DPO/DIST to conduct environmental monitoring and reporting	50,000.00	To be included in project cost
1.2	Training to Naika (about LEP approach) of RBGs	50,000.00	To be included in project cost
1.3	Enhancement in Technical Skills (Bio-engineering)	100,000.00	To be included in project cost
	Sub-Total (1)	200,000.00	
2. Adverse Impacts Mitigation Measures			
2.1	Bio-engineering work	4,386,304.00	3% of total project cost
2.2	Insurance of workers	400,000.00	Included in project cost
2.3	Information Signboard		To be included in BoQ
2.4	Compensation for affected/demolition structures		Included in Resettlement plan
2.5	Restoration or relocation of affected infrastructures, spoils disposal site management and rehabilitation, reinstate of quarry etc.	500,000.00	To be included in BoQ
2.6	Compensatory plantation	2,622,686.73	To be included in project cost
2.7	Health / HIV AIDS / STD prevention awareness; other awareness program such as adult literacy; support to local school etc		To be included in Community Empowerment Component of the project.
2.8	Occupational health and safety; first aid boxes, campsite sanitation (pit latrine); solid waste management, safety gears for workers (helmets, gloves, masks, boots, etc.)	500,000.00	Will be included in Particular condition of contract for contractor package, for BG it will be included in project cost.
	Sub-Total (2)	8,408,990.73	
	Total	8,608,990.73	

7.4. Implementation of Mitigation Measures

184. The mitigation measures will be integrated into project design and tender documents. Using this approach, the mitigation measures will automatically become part of the project construction and operation phase. By including mitigation measures in the contract or in specific items in the Bill of Quantities, monitoring and supervision of mitigation implementation could be covered under the normal engineering supervision provisions of the contract. The project contractor will be bound by the parameters identified in the environmental assessment pertaining to specific mitigation measures in the contract. The final acceptance of the completed works should not occur until the environmental clauses have been satisfactorily implemented.
185. The tender instruction to bidders will explicitly mention the site-specific mitigation measures to be performed, the materials to be used, labor camp arrangements, and waste disposal areas, as well as other site specific environmental requirements. Action to be taken against failure to comply with EMP requirements will also be clearly agreed in the contract agreement document.

7.5 Environmental Monitoring

186. The IEE prescribes the mitigation measures in order to minimize adverse impacts and to enhance beneficial impacts. Environmental monitoring plan is an important tool to ensure the implementation of mitigation measures.

Monitoring Responsibility

187. Monitoring is an integral part of the subproject proponent so as to know the unlikely impacts and implement corrective measures. The proponent, DDC/DTO Sindhupalchok will develop in-built monitoring mechanism to show its additional commitment for environmental improvement and mitigate undesirable environmental changes, if any during construction and operational stage. DDC/DTO will be supported by District Implementation Team (DPO and DIST) in the district and Environmental Management Specialist from the CISC for environmental monitoring. There is a need to support these organizations to carry out environmental monitoring effectively.
188. According to EPR, 1997, the MLD/DoLIDAR is responsible for monitoring and evaluation of the impact of the implementation of the project. The MLD/DoLIDAR checks whether the DDC/DTO is carrying out monitoring activities as per the IEE, and if the prescribed mitigation measures are being implemented. Total cost estimated for central level environmental monitoring is NRs. 50,000.
189. DDC/DTO with RRRSDP/PCU support will make arrangements for sub-project level monitoring. It should constitute a monitoring team, which must be independent from the implementation team and should consist of relevant persons in the context of a sub-project being monitored, for example persons from the forest, agriculture, social and NGO sectors. The monitoring team will be constituted separately for each monitoring event. Project's district management team should be responsible for forming the monitoring team, financing the monitoring works, providing logistics and other necessary support. Thus, it is recommended that an external team hired by DDC/DTO take responsibility for periodic monitoring of the environmental performance, in addition to the regular supervision and guidance provided by the DIST at the site. At least one monitoring in each construction season is necessary. The sub-project level monitoring team should submit its report to RRRSDP district management, which should forward a copy to the RRRSDP-PCU. Total cost of environmental monitoring (field visits, observation, review of reports and report preparation as well as central level monitoring cost) is estimated NRs. 280,000 as given in **Table 7.4**.

Table 7.4: Environmental Monitoring Cost

Description	Duration (month)	Rate (NRs)	Amount (NRs)
District level monitoring			
1. TeamLeader/Environmental Specialist	1	75,000	75,000
2. Engineer	1/2	60,000	30,000
3. Biologist/Forester	1/2	60,000	30,000
4. Socio-economist	1/2	60,000	30,000
5. Support staff	1	25,000	25,000
6. Transportation cost		LS	20,000
7. Report preparation and sampling/lab test		LS	20,000
Central level monitoring(Monitoring by MoLD)			
Monitoring cost		LS	50,000
Total			280,000

Thus, total environmental monitoring and management cost is NRs. 8,888,990.73 including bio-engineering cost.

7.5.1 Types of Monitoring

190. The National EIA Guidelines of 1993, the EIA Guidelines for the Forestry Sector of 1995 and the three stages for monitoring. They are baseline monitoring, compliance monitoring and impact monitoring.

Baseline Monitoring

191. Baseline monitoring helps to determine the baseline condition of the environmental resources. In general, it is carried out if there is a significant time lapse between the preparation of the IEE report and the construction stage or a change in environmental quality is noticeable. This Subproject will proceed for construction immediately after the approval of this IEE report and hence, baseline monitoring is not required for this Subproject.

Compliance Monitoring

192. Compliance monitoring is essential in order to ensure that environmental protection measures recommended by this study and other requirements set forth during the approval of the subproject are complied with. This monitoring is not concerned with determining the actual effect of the subproject activities on the environment

193. Although, environmental monitoring is not the responsibility of the Proponent, under the existing environmental laws, the subproject has included the monitoring for the compliance of the technical specification as an in-built practice. The agencies responsible for monitoring should ensure compliance of activities such as; inclusion of mitigation measures in the design and tender documents, budget allocation for mitigation measures and monitoring, compensation arrangements, operation of burrow pits and spoil disposal sites, storage procedure, arrangement of construction activities etc.

Impact Monitoring

194. Impact monitoring is generally carried out to assess the effectiveness of the environmental mitigation measures and provides actual levels of impacts in the field. Hence an impact monitoring evaluation study is proposed by the end of the subproject construction phase or within two years of subproject implementation. Impact monitoring evaluation will focus on each predicted impact and effectiveness of environmental protection measures. This will also focus on the stability of slopes; spoil disposal sites, work camps and labour camps, wastes on the local environment. The utilization of cash compensation to the extent possible, condition of the forest in the vicinity of the subproject area, water management, damage to human facilities,

incremental change in production of high value commodities, increase in other sources of income, employment generation, road side plantation, social status, impediment to wildlife movement, etc.

7.5.2 Monitoring Parameters

195. These would be based on the level of site-specific information or existing data series and impacts prediction. Efforts should be made to make the indicators measurable and diagnostic with low natural variability and broad applicability. In this context, the following physical, biological and social indicators will be monitored during the construction and operational stages of the subproject.

7.4.2.1 Pre-Construction Phase

196. During this phase the Consultant (DIST) bear the main responsibility in ensuring that the environmental and social safeguard considerations are adequately incorporated in the Project design and that the respective clauses to address the identified impacts are sufficiently included in the specifications and work contracts.

7.5.2.2 Construction Phase

197. In this phase the monitoring focuses on impacts on the environmental and social setting caused by the ongoing subproject. This monitoring checks compliance with the practices, norms, standards and technical solutions prescribed in the design and in the EMP. It specifically controls whether the Environmental Code of Practice is adequately applied in all works, and if the management practices are satisfactory with respect to the prescribed requirements. The specific monitoring tasks will include

- Collecting of data that identify, qualify and quantify distinct impacts on certain receptors (soils, water, habitats, species, local communities, services and utilities), and conduct a cause-effect analysis;
- Verify and quantify the ongoing slope protection measures, and propose rectifying measures as needed;
- Verify and quantify the ongoing activities in quarry operations, and propose rectifying measures as needed;
- Verify and quantify the ongoing/completed tree felling actions;
- Verify and quantify the course of any environmental degradation caused by Project activities, their likely consequences, and propose corrective measures, including the identification of responsibilities and costs;
- Verify and quantify the effects of disposal of spoil and construction wastes and their consequences;
- Verify and quantify the effects of disruption of natural water courses, drainage work, and their consequences;
- Monitor, by utilizing structure checklists and questionnaires, the contractor's full compliance with the health and safety regulations for the work staff;
- Verify and make scheduled proposals for improving the contractor's and VICC efforts in awareness training both for the work forces and the public general in the affected communities;
- Verify and quantify the effects of losses in wildlife, degradation of forests, illegal extraction of forest products, hunting, wildlife trade and disturbance to wildlife;
- Identify and assess the environmental implications on the people's status of knowledge and awareness in relation to ongoing education campaigns;
- Verify and quantify losses/damage to private property and community facilities;
- Verify and quantify losses/damage to cultural properties;
- Explore mechanisms to stipulate strict application of the EMP and identify consequences to be born by the contractors in case of non-compliance.

7.5.2.3 Operation Phase

198. The specific monitoring tasks in this phase will include:
- Assess changes in land-use patterns, development of cottage industries, services and demographic composition that may be caused by the road development;
 - Verify and quantify the occurrence of ribbon development, resulting in encroachment and hindrance of traffic on the Road;
 - Verify all activities for decommissioning work sites and rehabilitation to their former functional stage, as applicable. This refers also to quarry sites and borrow pits, and propose rectifying measures as needed.
 - Verify and quantify the adequacy of the executed bio-engineering works for slope protection and erosion control;
 - Verify and quantify the adequacy of the drainage structures, functionality of these structures, shortcomings in maintenance, and possible effects on private and communal lands, as well as on aquatic resources;
 - Verify and quantify the course of any environmental degradation caused by Project activities, their likely consequences, and propose corrective measures, including the identification of responsibilities and costs;
 - Verify and quantify the effects of disruption of natural water courses, drainage work, and their consequences;
 - Verify the success/failure of skill development and job opportunities' training carried out ;
 - Verify and quantify the effects of losses in wildlife, degradation of forests, induced/accelerated logging, illegal extraction of forest products, hunting, wildlife trade and disturbance to wildlife;
 - Verify and quantify damage to private property and community facilities;
 - Verify and quantify losses/damage to cultural properties;

7.5.3 Monitoring Indicators

199. Monitoring will be carried out in a transparent and credible manner by using established indicators. To ensure that the monitored parameters are replicable, i.e. do not depend on the person or specific methodology used, the selected indicators are easy to be verified and controlled by the agencies where the final monitoring and supervision responsibility remains.
200. It is also foreseen to use standard checklists and formats to be used by the monitoring staff both for site surveys and in the subsequent reports. Much of the monitoring is related to quantifying the observed impacts, and to verify the nature and extent of impacts, photos, parameter tests, collect local accounts of stakeholders and technical/social experts. The monitoring will also include specific cause-effect analyses for the impacts observed. Following Table 7.5 specify the set of verifiable indicators that will be used for monitoring.

Table 7.5: Monitoring Indicators Selected for this IEE

Monitored Sector	Parameters Selected for Monitoring
Soils, Landslides, Erosion Waste management Sites	<ul style="list-style-type: none"> ▪ Number, location and extent of slope failures ▪ Cause analysis for slope failure natural/man-made ▪ Area (ha.) of land, forest and properties affected ▪ Nos and extent of gully erosions and pavement failures ▪ Nos and extent of road subsiding effects ▪ Suitability of corrective/bio-engineering measures ▪ Nos of days and nature of traffic delays due to slides ▪ Sites and suitability for safe disposal of wastes and garbage
Bio-engineering	<ul style="list-style-type: none"> ▪ Nos and plant species selected for bio-engineering, disaggregated by protective function
Seismicity	<ul style="list-style-type: none"> ▪ Nos and magnitude of local seismic activities and respective damage to structures, including road

Monitored Sector	Parameters Selected for Monitoring
Water Pollution, Water Resources and their uses: Surface/ ground water Irrigation waters Drinking water Public taps	<ul style="list-style-type: none"> Nos and extent of water-logging at operative and/or decommissioned construction sites Blockage of waterways - extent and secondary impacts Water pollution incidents due to unsafe disposal of waste and spoil, analysing effects on local fisheries Damage to farm lands due to water shortage or pollution Use of field kit for drinking water quality, determining pH, particulates, turbidity etc.
Air and Noise Level In relation to traffic volume	<ul style="list-style-type: none"> Assessment of noise level in site by direct observation and interview with stakeholders Visual assessment of dust development at selected sites/sensitive spots and interview with local stakeholders Traffic volume measurements
Road Safety	<ul style="list-style-type: none"> Speed measurements at selected spots Nos and type of road accidents recorded in the Traffic Police and in local health service centres Suitability of local road signs Records on public and driver road safety awareness campaigns
Wildlife/ Habitat Disturbance Impacts on Forest Resources	<ul style="list-style-type: none"> Nos and extent of road accidents inflicting wildlife DFO records of illegal timber extraction and wildlife trade Observations and handling of invasive species
Socio-economic Development near Road alignment	<ul style="list-style-type: none"> Demographic, economic and education data Nos and extent of new settlements /types and ethnic groups Nos and extent of new businesses Nos and extent of new services and utilities
Resettled Households and livelihood restoration	<ul style="list-style-type: none"> Nos of HHs resettled HH questionnaire to identify livelihood conditions of resettlers Income situation and opportunities for the resettlers Verification of compensation and assistance to resettlers
Community awareness programmes relating to environment protection and avoidance of social conflicts	<ul style="list-style-type: none"> Nos/schedule of campaigns and nos of beneficiaries Revision of training agenda & propagated information material Questionnaire evaluation, interviewing selected participants on the impacts of the training provided by associated NGOs and Contractors Nos of beneficiaries having received awareness training against the spread of HIV/AIDS and girl/boy trafficking Records from locals and local police concerning social conflicts

201. The following **Table 7.6** identify the specific **compliance monitoring** activities. Phase-wise/chronological details are provided for the methods, schedules, responsible implementing agency and the responsible monitoring agency. The compliance monitoring refers primarily to the pre-construction and construction stage of the Project.

202. **Table 7.7** details the **impact and effect monitoring** activities envisaged for this Project. As in the previous table, details are provided for the applied methods, schedules, location, responsible implementing agency and the responsible monitoring agency.

Table 7.6: Compliance Monitoring for Sildhunga-Jethal-Tauthali-Tekanpur Road Subproject.

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
Final alignment selection as per IEE recommendation	DIST	Incorporation of IEE recommendations into alignment selection process and design document	Walkthrough along final road alignment, verifying sensitive areas	Initial stage preconstruction phase	DDC/DTO through PCU-CISC, DoLIDAR
Land and property acquisition and compensation	Proponent with assistance of DIST	Cadastral records, land and properties acquisition procedures; Procedures followed during voluntary donation of Land; Preparation of inventory of infrastructures likely to be affected	Public consultation, photos; geo-referencing; Check inventory against cadastral records and discuss with people	Initial stage pre-construction phase - well ahead of construction	CDC/PCU - CISC/ DOLIDAR
Resettlement, assistance and compensation	Proponent / DIST	Legal provisions by GoN; Compensations paid	Check compliance to legal procedures	Well ahead of construction	CDC/PCU - CISC/ DOLIDAR
Site selection and preparation of construction logistics	Proponent / VICC	Project's arrangement for materials storage, and construction activities	Site observation, geo-referencing and photographic documentation	Beginning of construction period	DIST/DTO
Use of local labour, particularly vulnerable groups and women	DICC/ VICC / DIST	Specifications which obligate the contractors/BG to observe certain quotas for employing local labour, specially vulnerable groups and women, use of child labour	Records of the NGO that facilitates and coordinates the process for local people's employment, interviews	During the entire period where labour work is contracted, trimester	DDC/DTO
Awareness and orientation training on road construction to technicians, and locally employed labourers	DIST/VICC	Training programmes for skill development, occupational safety and environmental protection associated with road construction works	Specifications; training records, check training programme reports, assess feedback from participants	Beginning of construction and during construction	DDC/DTO
Compliance to Occupational health and safety matters	DIST / Contractor (if involved)	Health and safety regulations, first aid and medical arrangements, contingency plan, number and type of safety equipments such as mask, helmet, glove, safety belt	Spot checks at work sites, photos, accident records, interviews	throughout construction activities, trimester	DDC/DTO/DPO
Compliance to environmental protection measures, including pollution prevention, water and soil management, slope stabilisation, cut and fill,	Contractor/RBG/ DIST	Records and observations on pollution, waste management, spoil deposit. Training programmes for labourers to prevent impacts on wildlife sensitive habitats, forests and fuel wood use.	Site inspection, discussion with Project management, consultants, and local people. Quantifying site-specific impacts, photos, laboratory tests where required.	Before and during construction period	DDC/DTO/DPO

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
waste management, spoils, sensitive habitats and critical sites, protection of fauna and flora			Existing patrol, control and enforcement mechanisms, enforcement records		
Vegetation clearance	Contractor / RBG / DIST	Actual number of trees felled during construction works	Record, inspection and interview with local people and CFUGs	After detail design and before construction work	CFUGs/DTO/D DC/DFO
Measures to avoid pressure on forest and wildlife	Contractor /R BG/DIST	Use of firewood or fossil fuel by construction crew, events of hunting and poaching of wildlife	Inspection, interview with local people and CFUGs	Once a month during construction	DDC/DTO/DFO CFUGs
Measures to protect environment from air & noise pollution	Contractor / RBG/DIST	Dust level and noise level at work sites, major settlements and sensitive spots like health centres and schools	Visual observation and discussion with residents and workers	Once in a month during construction	DDC/DTO
Measures to protect water bodies from pollution	Contractor / RBG/DIST	Visual observation, observation of open defecation and waste disposal around water sources near construction sites	Site inspection, test of site-selected samples of local streams water using standard field kit, interview	Once in a month during construction; upon demand for testing with field kit	DDC/DTO
Restoration, rehabilitation, reconstruction of all infrastructure services disrupted or damaged by the proposal activities	Contractor/R BG/DIST	Continued services by the facilities and functional public life	Site observation; VDC/DDC records; public consultation meetings; photos	Once in 15 days during construction	DDC/DTO
Adequate technical and environmental supervision	DIST	Adequate number of technicians regularly at site with ability to implement labour based road construction concept	Check number and type of technicians available at site; skill of work carried out; discussion	Twice a month during construction	DDC/DTO
Clean up and reinstatement of the construction sites (camps, quarries)	Contractor/RBG /DIST	Decommissioned sites indicate no adverse/residual environmental impacts, and are rehabilitated to the satisfaction of the supervisor and land owners	Site observation; comparing photos; consultation with land owners and community based organizations	At the end of construction period	DDC/ DTO

Table 7.7: Impact/Effect Monitoring for the Sildhunga-Jethal-Tauthali-Tekanpur Road Subproject.

Parameters /Issues	Verifiable Indicators	Verification Methods	Location	Schedule	Responsible Implementation and Monitoring Agency
Slope stability and erosion	Inclination, slope failures, causes; drainage facilities such as catch drain, side drains and functionality of cross drainage structures; fresh gullies and erosion; success/failure of bio-engineering solutions	Site observation, photos discussion with people and technicians	Near steep slopes and at landslide areas and sites	Continuously during construction and operation	DIST during construction; DDC/DTO/Soil Conservation Office during operation
Bio-engineering of disturbed slopes	Re-vegetation through bio-engineering application on disturbed slope; establishment of nursery	Site observation; inspection of nursery and its production rate, photos, measurements	Cut slope area, where vegetation is cleared; nursery siyes	During and at end of project construction	DIST/DDC/DTO
Disposal of spoils and construction wastes	Affected aesthetic value, affected forest and agriculture, initiated land erosion by local blocked drainage, hazard to downhill slope residents and agricultural lands	Site observation and interviews, photos, geo-referencing sites	At specific locations where such sites occur	During construction	DIST/DDC/DTO
Quarrying of construction materials	Initiated erosion, changes in river regime, erosion by river systems, landslide due to quarrying, degradation of vegetation, water logging, waterborne diseases	Site observation, photos, records from local health centres	Quarry site areas	During construction	DIST/DDC/DTO
Disruption of drainage system	Status of rehabilitation, service status of irrigation and water supply system; operation and maintenance requirement	Observation and interviews, photos, records	Irrigation schemes and water supply system	During construction	DIST/DDC/DTO
Loss or degradation of farmland, houses and properties	Status of road side land; Production / yield; Status of road side houses; Status of standing crop along alignment	Observation, data collection and analysis and interview with stakeholders	Road side land and houses	During construction	DDC/DTO/DIST/VICCC
Water quality	Observation of open defecation and waste disposal around water sources near construction sites	Visual observation, measurement of water sample using field kit	Local streams	During construction; upon demand for testing with field kit	DDC/DTO/DIST/VICCC
Air quality	Dust level in ambient air	Visual inspection	At construction sites and at sensitive spots (schools, health spots, major settlements)	During construction	DDC/DTO/DIST
Forest and vegetation	Numbers of trees, presence of ground vegetation, signs of illicit logging and	Observations, DFO records, photos; interview with	In and around the construction sites, markets,	During construction and operation	DIST/CFUGs/DFO during construction;

Parameters /Issues	Verifiable Indicators	Verification Methods	Location	Schedule	Responsible Implementation and Monitoring Agency
	extraction of NTFPs	CFUGs members			CFUGs/DFO/DDC during operation
Wildlife	Wildlife hunting trapping and poaching by work force, trade of wildlife, road accidents inflicting wildlife	Interview with local people/ DFO/CFUGs members, photos, observations	Forest areas at roadside	Twice a year during construction and routine during operation	DIST/DFO/CFUG during construction; CFUGs/DFO/DDC during operation
Change in economy	Numbers of people employed by the project during construction, numbers of women in work forces	Records kept by the project management, discussion with stakeholders	Project area	Trimester during construction phase	DDC/DTO/DIST
Trade and commerce	Numbers of shops increased or decreased, rental of houses and land spaces	Records, interviews, observations, photos	Throughout project area	Once in a year	DDC/DTO/DIST/VDC
Occupational safety and hazard	Type and number of accident occurred during construction; adequacy of occupational safety measured provided; compensation provided in case of fatal accidents or invalidity	Observations, photos, spot checks, contractors' and health centre records interview with workers	Throughout project area	During construction	DDC/DTO/VDC
Change in socio-economic structure	No and extent of new settlements/types and ethnic groups; nos and extent of new businesses; nos and extent of new services and utilities, social conflicts	Observations, interview with local people, DDC Police and VDC records	Throughout project area	During operation	DDC/DTO/Local administration
Ribbon settlement	Congestions to road users nos. of accidents, RoW encroachment	Records, observations	Throughout project area	During operation	DIST during construction; DDC/DTO/Soil Conservation Office during operation

CHAPTER 8

8.0 Conclusion and Recommendations

8.1 Conclusion

203. The IEE study of the proposed Jethal-Tauthali-Tekanpur road sub-project does not pass through any environmentally sensitive area and have minimal detrimental effects associated with loss of forest and agricultural land. Relevant issues raised during focuss group discussion were also incorporated .Most of the adverse impacts predicted are of low significance and short term as well as of reversible nature. The beneficial impacts with the facility of access to market centers and location of social services will enhance productivity in rural area and improve the quality of life of the people. In addition, local people will get direct employment as workers which will contribute significantly in improving their livelihood. These benefits from the implementation of the proposed road subproject are more significant and long term in nature against the adverse impacts most of which could be mitigated or avoided.
204. The IEE has shown that none of the anticipated environmental impacts of constructing the proposed road is significant enough to need a detailed follow-up EIA or special environmental study. Therefore, this IEE is sufficient for approval of the sub-project.

8.2 Recommendation

205. The proposed road subproject is recommended for implementation with incorporation of mitigation measures and environmental monitoring plan.
206. A key consideration in selecting the road alignment is to minimize the acquisition of valuable agricultural and forest land. However, some agricultural and forest land and possibly some built areas will have to be acquired for construction of the proposed road.

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ANNEXES

Annex I: Terms of Reference for IEE study
Letter of Approval from MLD and
Approved ToR from MLD

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  **स्थानीय विकास मन्त्रालय**
वातावरण संरक्षण विभाग
(स्थानीय विकास मन्त्रालय शाखा)

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पत्र संख्या ०६४/०६६
च.नं. ६४६

*Attention to
Environment Section*

मिति: २०६६/२/४

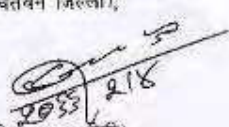
विषय:- प्रारम्भिक वातावरणीय परीक्षण (IEE) को कार्यसूची (TOR) स्वीकृत भएको ।

स्थानीय पूर्वाधार विकास तथा कृषि सल्लाह विभाग,
जयलार्हे त ।

सामाजिक पुनर्निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) अन्तर्गत निम्न जिल्ला विकास समितिको कार्यालयबाट प्राप्त निम्नानुसारका सडकहरूको प्रारम्भिक वातावरणीय परीक्षणको कार्यसूची (IEE) कार्यसूची (TOR) तयार गरी त्यहाँ विभाग मार्फत वातावरणीय संरक्षण नियमावली, २०५४ अनुसार स्वीकृतिको लागि यी मन्त्रालयमा पेश भएकोमा नेपाल सरकारको मिति २०६६/२/४ को निर्णय (सचिवस्तर) अनुसार स्वीकृत भएको प्रतिवेदन थान-२/२ यसै पत्रसाथ पठाइएको व्यहोरा अनुरोध गरिन्छ ।

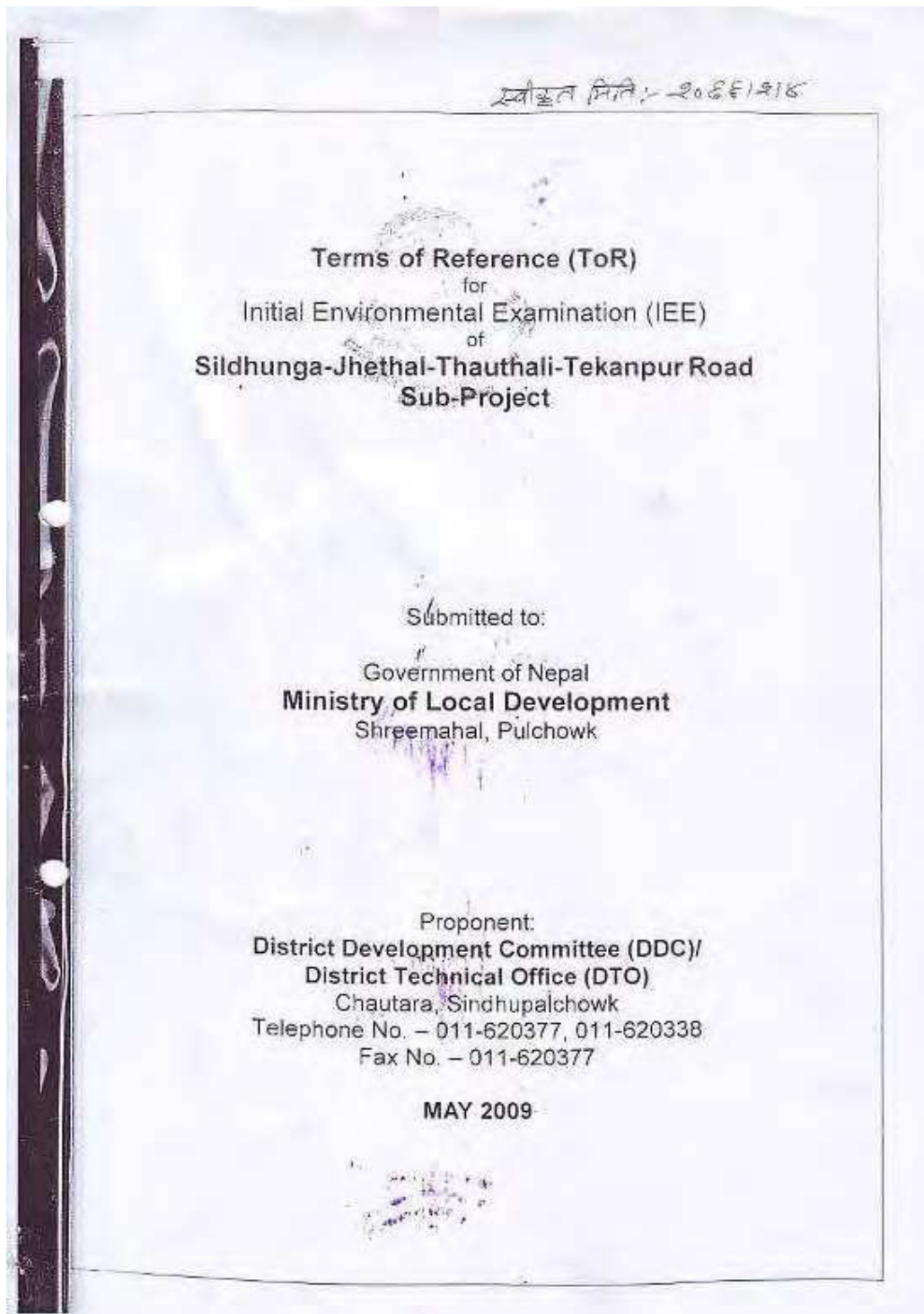
निम्न

१. गतिखोर-पुष्पराजमार्ग सडक खण्ड तथा बनकट्टा-बगई सडक खण्ड (चितवन जिल्ला),
२. बेलदुहा-तौथली-टेकानपुर सडक खण्ड (सिन्धुपाल्चोक जिल्ला)


२०६६/२/४
(विजयराज सुवेदी)
शाखा अधिकृत

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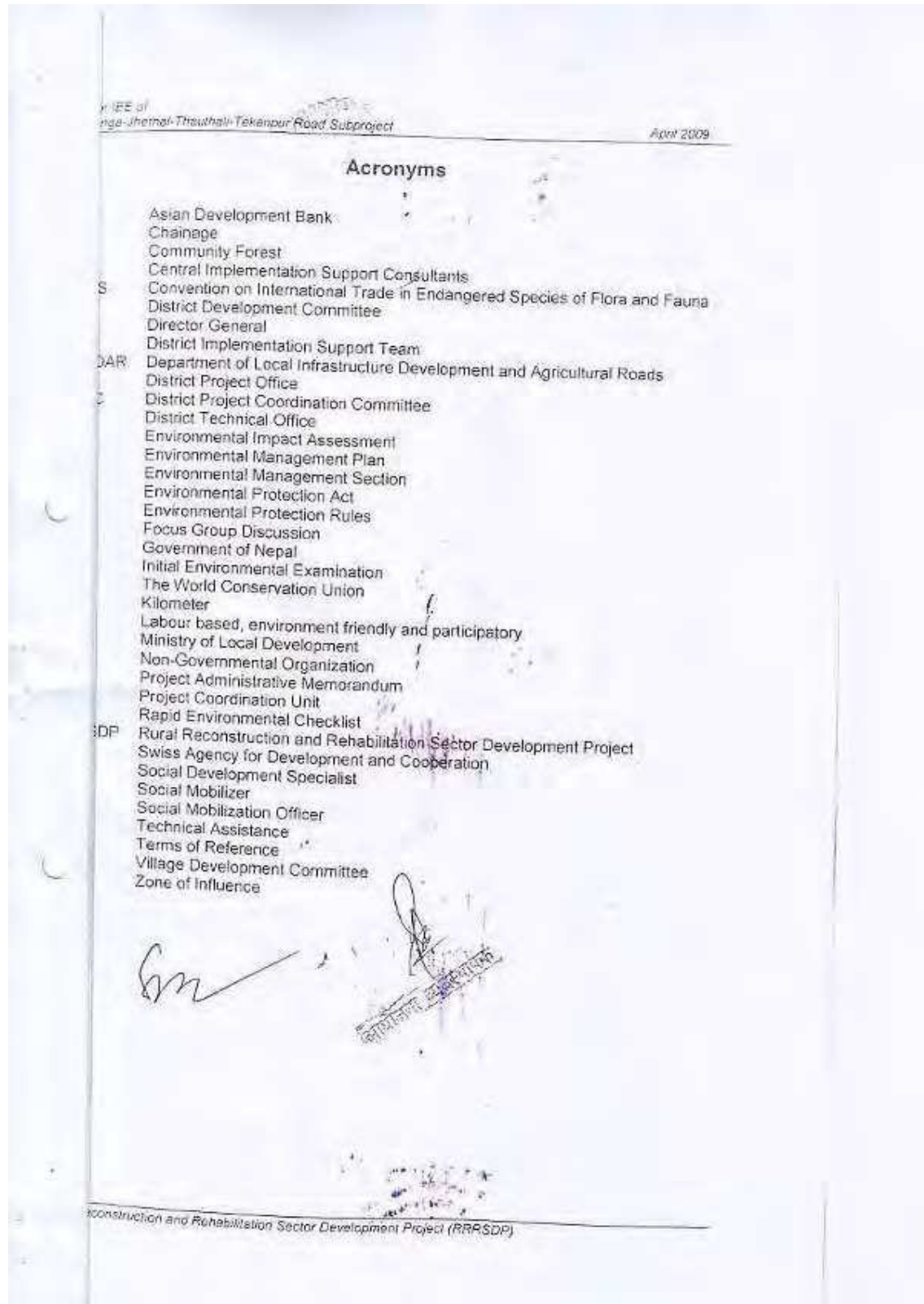
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Rural Reconstruction and Rehabilitation Sector Development Project (RRRSDP)



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1. NAME AND ADDRESS OF THE PROPONENT

1 The District Development Committee (DDC)/District Technical Office (DTO), Sindhupalchowk is the executing agency at the district level and the proponent of the Initial Environmental Examination (IEE) study for the rehabilitation and construction of Sildhunga-Jethal-Thauthali-Tekanpur road sub-project. The Ministry of Local Development (MLD) is the concerned authority for the approval of IEE study report.

Address of the Proponent

District Development Committee (DDC)
District Technical Office (DTO)
Chautara, Sindhupalchowk
Telephone No. – 011-620377, 011-620338
Fax No. – 011-620377

2. GENERAL INTRODUCTION

2.1 Background

2 The Rural Reconstruction and Rehabilitation Sector Development Project (RRRSDP) covers 20 districts spread over the country, which focuses on immediate post conflict development priorities for accelerated poverty reduction and inclusive development, thereby enhancing the effectiveness and efficiency of the delivery of public services, and improving access of rural people to economic opportunities and social services.

3 RRRSDP is funded by grant assistance from the Asian Development Bank (ADB); loan assistance from OPEC fund for International Development, counterpart fund of GoN, grant from DFID and Swiss Agency for Development and Cooperation (SDC). The coordinating government agency is the Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR), under the Ministry of Local Development (MoLD).

4 FRISA/ITECO joint venture (in association with SKAT) on behalf of SDC is District Implementation Support Team (DIST) for RRRSDP and have the responsibility of providing technical assistance in four districts; Kabhre Palanchowk, Sindhupalchowk, Dolakha and Sindhuli.

5 Sildhunga-Jethal-Thauthali-Tekanpur road subproject is a high priority rural road in Sindhupalchowk district and is proposed for upgrading under RRRSDP. An IEE of the proposed road is necessary in order to assess the environmental consequences and suggest appropriate, practical and site specific mitigation and enhancement measures. Therefore, terms of reference (ToR) is prepared to conduct an IEE study of Sildhunga-Jethal-Thauthali-Tekanpur road sub-project in Sindhupalchowk District.

2.2 Brief Description of the Project Area and Works

6 The proposed Sildhunga-Jethal-Thauthali-Tekanpur road subproject lies in Sindhupalchowk district in Bagmati Zone of the Central Development Region of Nepal. The road starts from Sildhunga of Jethal VDC and passes through Thauthali VDCs and ends at Tekanpur VDC. Major settlements along the alignment are Sildhunga, Karki Tole, Majha Tole, Japsile Tole, Ganshi Thari Tole, Aahal Danda Tole, Saune Pari Tole and

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Balka. Out of them Majha Gaun, Tauthali Bazaar, Saune Pani Tole and Balka are the major market centers along the road alignment.

7. The total length of the road alignment is 23.50 Km. Formation width and Right of Way of alignment is 5m and 10m (either side) respectively. The elevation ranges from 772 - 2027 m amsl at Dam site and Sildhunga respectively.

8. The subproject area has a tropical and sub-tropical climate with a yearly precipitation of 1615 mm. The average maximum and minimum temperature of the subproject area are 32.5 - 5.0°C respectively (District soil and watershed conservation office, 2008).

9. This is the existing road and has been proposed for upgrading with gravelling work. However, the road section from Jethal to Tauthali VDC (2.9km) needs new track opening. At Ch 4+600, Jethal khola is crossed which is the perennial stream so RCC bridge (20m span) has been proposed. 8 RCC causeway and 4 PCC causeway in various locations of the alignment has been proposed in small perennial khola. 11 dry stone causeway in various locations of the alignment has been proposed in natural kholsi which remains dry in most of seasons.

10. Three alternative routes were proposed by the local people in the beginning to join Jethal VDC and Tauthali VDC. Walkover surveys of all the three alternative routes were carried out. One of the route follows the existing trail passing through forest and main bazaar of Tauthali (option 1), another alternative passes through cultivated land and passes through main bazaar as well (option 2) and the third route bypasses major Tauthali bazaar and passes through lower part of the settlement reaching Kalapani Kholshi (option 3). Later, the community people agreed on the route mentioned in option 1 so this has been recommended as socially and technically feasible.

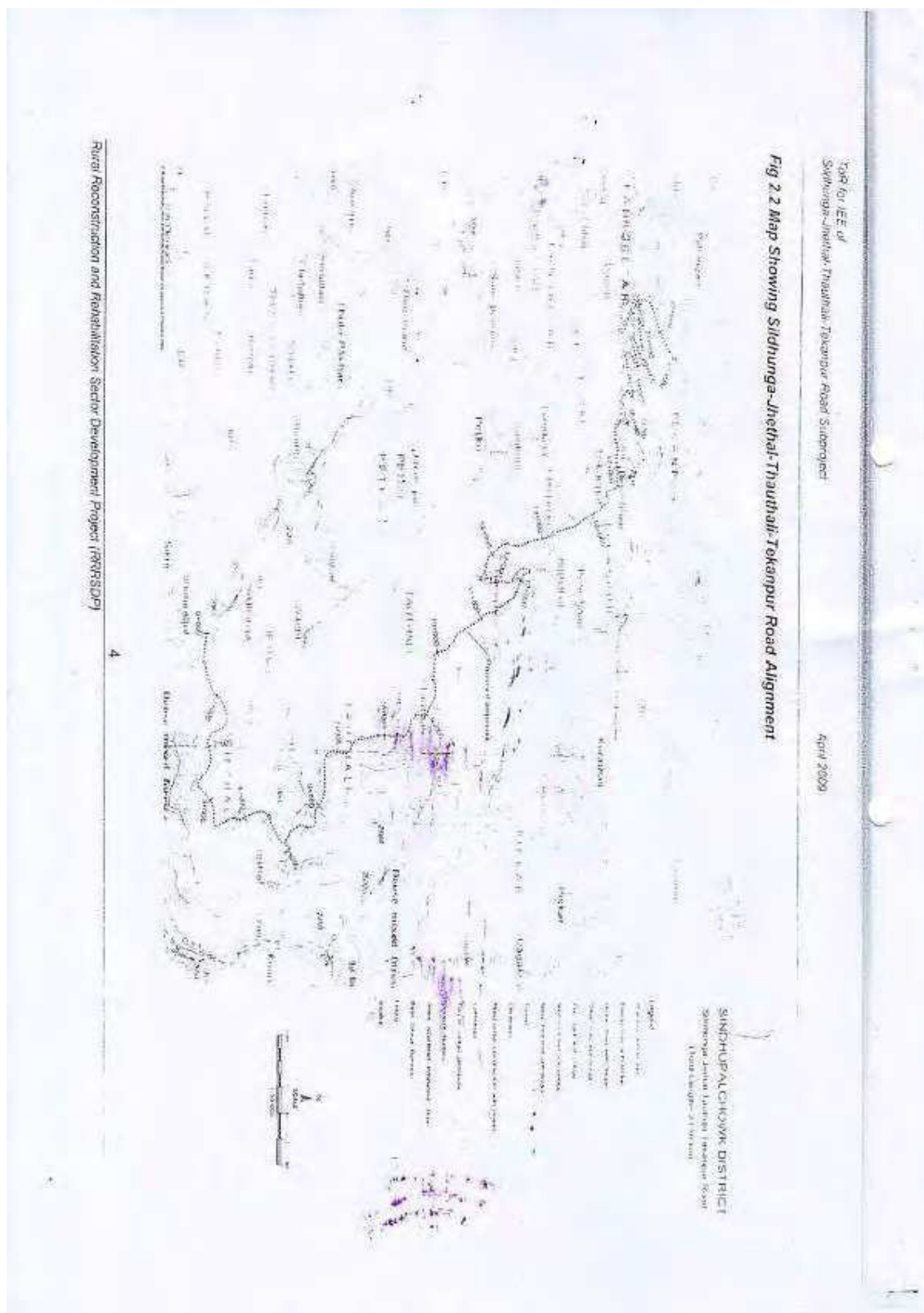
11. The road mainly passes through cultivated area, barren land, community, public and private forest. The alignment requires clearance of about 0.5 ha of private forest. The forest is sparse with dominant species such as Sal (*Shorea robusta*) utilis (*Ainus nepalensis*), chilaune (*Schima wallichii*), kutmiro (*Litsea monopetala*), lapsi (*Choerospondias axillaris*), pipal tree (*Ficus religiosa*), Fox (*Vulpes spp.*), monkey (*Macaca mulatta*), and other common wild animals and different common birds reported in the forest of the proposed road area.

12. Rehabilitation and construction of this road will provide physical and economical access to the people of western part of the district with district headquarter and other part of Nepal.

13. The location and the alignment of the road are shown in Figures 2.1 and 2.2 overleaf.

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2.3 Objectives

14. The main objectives of the TOR is to guide the preparation of the subsequent IEE study, to produce a comprehensive and coherent IEE report as per environment protection Act (EPA) 1997 and environment protection rules (EPR) 1997 and amendment 1999
15. The specific objectives of the proposed IEE study includes to:
- Identify the major issues that may arise as a result of proposed works on bio-physical, socio-economic and cultural environment of the project area,
 - recommend practical and site specific environmental mitigation and enhancement measures; prepare and implement environmental monitoring plan for the sub-project,
 - make sure that IEE is sufficient for the proposed road sub-project, and
 - Provide information on the general environmental setting of the sub-project area as baseline data

2.4 Relevancy of the Proposal

16. Road upgrading with gravelling work has several benefits from the project to the people living in the vicinity of the project area in terms of easy access, saving of time on travel, easy transportation facilities for people and agricultural products of village to the near by markets (Melamchi, Dhulikhel, Banepa, Chautara, Kathmandu etc). It creates social and employment securities to the local beneficiaries during the construction stage of the Project. Therefore, the construction and rehabilitation of the proposed road is necessary to uplift social and economical status of the local people through the easy and safe access of the transportation facilities.

17. An IEE of the proposed road is necessary in order to assess the environmental consequences of the proposed rural road construction and rehabilitation activities and suggest appropriate, practical and site specific mitigation and enhancement measures. Since this is a district road, an IEE is a legal requirement according to Environmental Protection Act, 1997 (EPA, 1997) and Environmental Protection Rules, 1997 (EPR, 1997). Preparation of IEE report by concerned District Development Committee (DDC)/District Technical Office (DTO) and approval by the Ministry of Local Development (MLD) according to Nepali legal provision is considered sufficient by the ADB. However, rapid environmental assessment (REA) checklist will also be considered during IEE report preparation based on ADB Environmental Guideline.

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3. REVIEW OF RELEVANT LAWS, RULES AND GUIDELINES

18 Government of Nepal has adopted various acts, regulations and guidelines to ensure the integration of development and conservation of environment. The IEE study will be guided by the requirements and provisions of the following acts, rules and guidelines as applicable

- Environment Protection Act, 1997 and Environment Protection Rules, 1997 (amended 1999)
- Forest Act, 1993 and Forest Rules, 1995
- Batabaraniya Nirdesika (Nepal: MLD), 2057
- National Park and Wildlife Conservation Act, 1973
- Local Self Governance Act, 1999 and Local Self Governance Rules, 2000
- Land Acquisition Act, 1977 and Land Acquisition Rules, 1969
- National Environmental Impact Assessment Guidelines, 1993
- APPROACH for the Development of Agricultural and Rural Roads, 1999 (DoLIDAR)
- RRRSDP Environmental Assessment & Review Procedures (EARP) guidelines, 2007
- REFERENCE MANUAL for Environmental and Social Aspects of Integrated Road Development, 2003 (Department of Road)
- Green Roads in Nepal, Best Practices Report – An Innovative Approach for Rural Infrastructure Development in the Himalayas and Other Mountainous Regions, GTZ, SDC, 1999
- ADB Environmental Assessment Guidelines, 2003
- Three Years Interim Plan, 2007/08-2009/10

4. PROCEDURE TO BE ADOPTED WHILE PREPARING THE REPORT

19 The IEE approach, methodology and procedure should generally follow the provisions of the EPA and EPR. In this connection, following approach and methodology will be adopted during the IEE report preparation.

4.1 Desk Study

20 The following steps will be followed during the desk review:

4.2 Public Consultation and Information Disclosure

21 The role of public consultation and participation is to ensure the quality, comprehensiveness, effectiveness of IEE as well as to ensure that the public view's are adequately taken into consideration in the decision making process. It is done during the preparation of an IEE. In order to ensure the public involvement, the following procedures will be followed during IEE report preparation:

- In a national level daily newspaper seeking written opinion from concerned VDCs, DDC, school, health posts and related local organizations. A copy of the public notice will be affixed in the above mentioned organizations and deed of enquiry (*muchulka*) will be collected.
- Recommendation letter from concerned VDCs and/or municipality will also be obtained.
- IEE team will also carryout interaction with local communities and related stakeholders and will also collect the public concerns and suggestions.
 - Draft IEE report will be sent to concerned VDCs for information disclosure.

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- The approved IEE report will be made accessible to interested parties and general public through information center of DDC and websites of ADB, DoLIDAR and RRRSDP.

4.3 Field Work

22. The IEE team will walk through along the road alignment visiting the significant environmental features in the probable influence corridor, and make necessary measurements, inspect/observe and discuss it with the local stakeholders. The information collection will be made covering physical, biological, socio-economic and cultural aspects of the environment.

5. ALTERNATIVES FOR THE IMPLEMENTATION OF THE PROPOSAL

23. Alternative analysis has been considered as an integral part of IEE study, which involves an alternative ways of achieving the objectives of a proposed sub-project. The aim of alternative analysis is to arrive at a development option, which maximizes the benefits while minimizing the unwanted impacts.

24. The study team will conduct alternative analysis considering the following issues:

- No action option
- Project alternatives
- Alternative alignment
- Alternative design and construction approach
- Alternative schedule and process
- Alternative resources

6. REQUIREMENT OF THE IEE STUDY

25. This includes time schedule, estimated budget and appropriate manpower (experts) for conducting IEE study.

6.1 Time Schedule

26. IEE report will be completed within eight weeks after the approval of ToR. An indicative time frame for conducting IEE is given in the table 1 below:

Table1. Proposed work schedule

SN	Activities	Week							
		1	2	3	4	5	6	7	8
1	Orientation training to the team	■							
2	Desk study and review		■						
3	Public notice publication			■					
4	Field visit for survey and consultation with community			■	■				
5	Collection of suggestions and recommendations from stakeholders					■			
6	Analysis and interpretation					■	■		
7	Draft report preparation						■	■	
8	Comments on draft report							■	■
9	Final Report preparation and submission								■

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SN	Activities	Week							
		1	2	3	4	5	6	7	8
10	Approval of the final report								

6.2 Estimated Budget and Study Team

27. Most commonly an IEE of an infrastructure sub-project in the district need expert inputs from the following sectors:

- Landslides, slope stability, bio-engineering and erosion
- Forestry and wildlife
- Geology
- Road engineering
- Social, economic and culture

28. The IEE will be carried out and prepared by DIST Environmental Specialist, with support from DIST team Sindhupalchowk, Environmental Specialist (CISC) and District Project Office (DPO). In the preparation of the IEE, CISC Environmental Specialist will provide the necessary training to DIST. The activity of IEE preparation will be supervised by DPO office. Since, the IEE report will be prepared by the DIST team with the support of the CISC, no separate budget and manpower is required. However, if needed specific subject matter experts will be hired for short term input.

7. ENVIRONMENTAL BASELINE

29. This will describe environmental setting of the project location and surrounding areas and will contain information on relevant bio-physical, socio-economic and cultural factors and features. The updated, processed and analyzed information and data on each of the relevant bio-physical, socio-economic and cultural aspects will be presented in the IEE study. As far as possible, other environmental features such as, sensitive area, population and settlements, forests, geological features will be shown in the map.

8. ANALYSIS AND INTERPRETATION

30. Both secondary and primary information and data collected will be analyzed and interpreted. The bio-physical information will be tabulated to the extent possible. The socio-economic, cultural and religious information will be cross checked and analyzed.

9. IDENTIFICATION, PREDICTION AND EVALUATION OF IMPACT

31. The identification and prediction of impacts shall be carried out by considering the proposed project actions/activities in terms of rehabilitation and construction of the road project. The impacts of the activities shall be on bio-physical, socio-economic and cultural resources in a defined zone of influence (i.e. 1.5 hours walking distance from the road alignment or 5 km distance).

32. The impacts shall be classified in terms of extent (site specific, local and regional), magnitude (low, medium and high) and duration (short term, medium term and long term) as well as reversible, irreversible, severe, moderate and significant. The likely impact shall be assessed covering both adverse and beneficial ones. The methodology adopted for impact identification and prediction will be checklists and matrix method. The likely impacts of the proposed road construction as well as operation are described in the following sections.

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9.1 Beneficial Impacts

33. Beneficial impacts due to the construction of the road shall be assessed by the study team in terms of impacts on physical, biological, socioeconomic and cultural systems of the project area. The impacts shall also be assessed in the category of extent, duration and magnitude. Based on the identification and prediction of the impacts, the suitable enhance measures to maximize the project benefits shall be explored and designed. The largest beneficial impacts will be on the physical and socio-economic environment as given below:

9.1.1 Construction Stage

- Employment Generation and Increase in Income
- Skill Enhancement
- Enterprise Development and Business Promotion
- Community Empowerment and Ownership

9.1.2 Operation Stage

- Access to Inputs and Services
- Development of Market centers
- Appreciation of Land Value
- Increased Crop Productivity and Sale of Farm Products
- Enhancement of Community Development Services
- Promotion of Tourism Activity
- Women Empowerment and Indigenous People Empowerment

9.2 Adverse Impacts

34. The likely adverse impacts during construction and subsequent operation and maintenance in terms of physical, biological, socioeconomic, cultural and religious aspects due to project actions shall be identified, predicted and evaluated. Based on the identified impacts, appropriate mitigation measures shall be recommended.

9.2.1 Construction Stage

35. Though the sub-projects will apply LEP approach to the extent possible during the implementation, it may not be possible to avoid all likely impacts; the study shall take into account the following issues:

Physical environment

36. The issues and concerns generally related to physical environment typically include, but not necessarily limited to:

- Change in Land Use
- Spoil Disposal
- Slope Instability
- Water Management: Spring, Streams, Rain Water (Drainage and Cross Drainage Works etc.)
- Air Dust, Noise and Water Pollution
- Quarrying and Borrow Pit
- Decline in Aesthetic Value

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Biological environment

37. The issues and concerns generally related to biological environment typically include, but not necessarily limited to:

- Loss or degradation of forests and vegetation.
- Impact on wildlife including birds due to loss or degradation of habitat, increased hunting and other form of human pressure.
- Impacts on flora and fauna (as listed in CITES and IUCN Red data book)

Socio-economic and cultural environment

38. The issues and concerns generally related to socio-economic and cultural environment typically include, but not necessarily limited to:

- Loss or degradation of farm land and productivity
- Loss or degradation of private properties, such as houses, farm sheds, and other structures, crops and fodder/ fruit trees
- Impact on community infrastructure such as irrigation, water supply, schools, health post, trail and trail bridges
- Impacts on cultural, religious and archeological sites
- Impacts on health and safety matters

9.2.2 Operation stage

39. The following issues will be taken into account during operation and maintenance stage:-

Physical environment

- Road slope instability and management
- Impact due to air, noise and water pollution

Biological environment

- Depletion of forest resources
- Disturbance to wild life and illegal hunting

Socio-economic and cultural environment

- New settlement along the road alignment
- Change in social behaviors
- Impact on Livelihood and economic activities
- Road safety measures

10. BENEFIT AUGUMENTATION / MITIGATION MEASURES

40. The IEE study will propose site-specific benefit augmentation and mitigation measures to optimize the benefits expected from the sub-project and minimize/mitigate

Rural Reconstruction and Rehabilitation Sector Development Project (RRRSDP)

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avoid or control of proposal's adverse impacts. The benefit augmentation and mitigation measures will be selected based upon appropriateness and cost analysis and these will be suggested for pre-construction, construction and post-construction phase of the project. Mitigation measures will be proposed for the impacts on physical, biological, socio-economic and cultural environment.

11. ENVIRONMENTAL MANAGEMENT PLAN

41. The study will ensure the implementation and monitoring of mitigation measures for minimizing adverse impacts and maximizing the beneficial impacts. This plan will also identify the key environmental monitoring indicators with respect to activities, methods and responsibilities in order to monitor the environmental condition and adoption of suitable mitigation measures.

12. IEE REPORT FORMAT

42. This format will be in line with provision made in the Schedule 5 of EPR, 1997 and should be adapted to project specific situation. The IEE report will contain the following sections:

- i. Cover page with name of the proposal and proponent and address
- ii. Table of content
- iii. List of Abbreviation (acronyms)
- iv. Executive Summary that includes:
 - Background
 - Project Proponent
 - Objective
 - Relevancy of the Proposal
 - Project Description
 - Existing Condition
 - Identification of Impacts and Benefit Augmentation/Mitigation Measures
 - Environmental Management Plan
 - Conclusions and recommendations
- v. Salient Features of the Project
- vi. Introduction: This section should describe the project in simple terms and concisely, without missing relevant points but avoiding unnecessary details. The project description should provide following information:
 1. Background
 2. Relevancy of the proposal
 - Objectives
 - Methodology adopted
 3. Name and Address of the Proponent
 4. Description of the Sub-project
 5. Construction Approach
 6. Proposed Schedule for Implementation of Sub-project
- vii. Public Consultation and Information Disclosure
- viii. Review of Relevant Acts, Regulations and Guidelines: During the study relevant policies, legislations and guidelines should be reviewed and their salient features should be mentioned in this section. Similarly related institutions should be consulted.

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- x. **Existing Environmental condition:** Baseline information on the existing physical, biological as well as socio-economic and cultural resources of the proposed sub-projects is described here. Environmental features such as sensitive areas, population and settlements, forests should be shown in a map.
- x. **Project Alternatives:** This section summarizes the alternatives by environmental comparison. This may include the following sub-headings:
- a. Project alternative
 - b. Alternative routes
 - c. Alternative design and construction approach
 - d. Alternative schedule and process
 - e. Alternate resources
 - f. Any other alternatives
- xi. **Identification of Impacts and Benefit Augmentation/Mitigation Measures:** This section contains the process, findings and conclusions of analysis and interpretations. The impacts are predicted in terms of their magnitude (minor, moderate and high), extent (site specific, local and regional) and duration (short, medium and long term) and appropriate benefit enhancement and mitigation measures are suggested as following:
- a) **Physical Impacts:** such as land, air, water, noise, infrastructure impacts and other factors
 - b) **Biological Impacts:** such as flora, and fauna, population, and natural habitats and ecosystems
 - c) **Socio-economic-cultural impacts:** such as agricultural land, human health, social, cultural and religious values, implications of physical and biological impacts and other relevant socio-cultural-economic impacts.
- This section also summarizes the recommended mitigation measures including basis for selection and cost if possible.
- xii. **Environmental Management Plan:** This section summarizes the recommended implementation of IEE, monitoring parameters/indicators, activities, methods and responsibilities.
- xiii. **Conclusion and Recommendations:** This section should clearly indicate whether IEE report is sufficient or further assessment is needed. Likewise, it should also be recommended that what aspects should be covered if further environmental assessment is needed.
- xiv. **Miscellaneous:** Reference materials should be mentioned here if used during IEE report preparation in standard format.
- xv. **Annex:**
- ToR of IEE
 - Rapid Environmental Assessment (REA) Checklist
 - Abstract of cost
 - RRRSDP environmental checklist
 - Public notice
 - Deed of enquiry (*muchulka*)
 - Name of the organizations
 - List of person contacted

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- Recommendation letters from municipality and VDC's
- Existing condition
 - a. Distribution of household by major occupation
 - b. Summary of public services and infrastructures according to settlement
 - c. Land holding pattern of settlements within Zol
 - d. Number of households belonging to different food security category
- List of trees
- Maximization of slope cutting and preservation of vegetation cover
- Photographs

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SILDHUNGA JETHAL THAUTHALI TEKANPUR
ROAD SUBPROJECT

Annex II: Rapid Environmental Assessment (REA) Checklist

Rapid Environmental Assessment (REA) Checklist

Instructions:

- ☐ This checklist is to be completed with the assistance of an Environment Specialist.
- ☐ This checklist focuses on environmental issues and concerns.
- ☐ Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

Project Title:

Rural Reconstruction and Rehabilitation Sector Development Project (RRRSDPP)

Subproject:

Sildhunga-Jethal-Tauthali-Tekanpur Road Sub-Project in Sindhupalchowk District

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
■ Cultural heritage site		√	
■ Protected Area		√	
■ Wetland		√	
■ Mangrove		√	
■ Estuarine		√	
■ Buffer zone of protected area		√	
■ Special area for protecting biodiversity		√	
B. Potential Environmental Impacts			
Will the Project cause...			
■ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		√	
■ encroachment on precious ecology (e.g. sensitive or protected areas)?		√	

SCREENING QUESTIONS	Yes	No	REMARKS
■ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	
■ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		√	
■ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?		√	
■ noise and vibration due to blasting and other civil works? ■ dislocation or involuntary resettlement of people	√	√	
■ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		√	
■ hazardous driving conditions where construction interferes with pre-existing roads?		√	
■ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?		√	
■ creation of temporary breeding habitats for mosquito vectors of disease?		√	
■ dislocation and compulsory resettlement of people living in right-of-way?	√		houses will be severely affected
■ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials and loss of life?	√		Due to road situation, geography and its stander, accident can happen but till date its frequency is very less.
■ increased noise and air pollution resulting from traffic volume?	√		Very less as because of the earthen surface
■ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		√	

Annex III: Photographs



Starting point of the road at Sildhunga.



Bhangeli Chapp CF at Ch1+700



Pahere Kholsa (Ch 2+660): one of the stone quarry site in Jethal.



Vertical cliff (Ch 6+950):
Betase in Tauthali VDC



Public consultation meeting at Tekanpur



Jethal Khola (Ch 4+750) :
Minor slide area along the alignment

Annex IV: RRRSDP Environmental Checklist

A. GENERAL SOCIO-ECONOMIC SITUATION OF THE INFLUENCE AREA

1. Overview of settlements in the zone of influence (ZoI) area

Settlement Code*	Name of Settlement and address	Household and Population	Caste/ethnic distribution	General Comment
A				
B				
C				
D				
E				
F				
G				
H				
I				
J				
K				

* Use the same codes as in strip map and topographical map.

2. Economic activities/main occupation

Settlement Code	Number of HH and Percentage of Population engaged in				
	Labour & Porter	Business/Commerce	Cottage Industry	GO/NGO Employees	Others (specify)
A					
B					
C					
D					
E					
F					
G					
H					
I					
J					
K					

3. Existing services and infrastructures

S. N.	Service/Infrastructure	Settlement Code									
1	Category	A	B	C	D	E	F	G	H	I	J
1.1	EDUCATION										
1.2	Campus (no.) Students (no.)										
1.3	High School (no.) Students (no.)										
2	Primary School (no.) Students (no.)										
2.1	HEALTH										
2.2	Hospital /health centre (no.)										

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2.8	Amliso											
2.9	Sericulture											
2.10	Others (list)											
3.0	LIVESTOCK & FISHERIES											
3.1	Cattle (cows & buffaloes)											
3.2	Horses, Mules											
3.3	Yak											
3.4	Goat											
3.5	Sheep											
3.6	Rabbit											
3.7	Pig											
3.8	Fisheries											
3.9	Poultry											
3.10	Bee-keeping											
3.11	Others											

7. Migration for employment

- (a) No. of HHs from where at least one person (may be HH head) is away from home for more than 6 months.

Settlement (No. of HH)									
A	B	C	D	E	F	G	H	I	J

8. **Name of settlement:**

Address:

A. Seasonal migration in search of work

Month	No. of Total HH	Destination	Purpose
Baisakh			
Jestha			
Ashad			
Shrawan			
Bhadra			
Ashwin			
Kartik			
Marga			
Poush			
Magh			
Falgun			
Chaitra			

B. Dominant off-farm occupation in the settlement in descending order

- 1.....
- 2.....
- 3.....

C. DEVELOPMENT POTENTIAL OF THE INFLUENCE AREA

C.1. Areas which have significant potential for development, for instance, high agricultural production, tourism development, local mines, etc. (indicate these areas in map/sketch).

S.No.	Name of Area	Description of Development Potential
1		
2		
3		

C.2. Scope of the proposed linkage in view of promoting socio-economic development

S.No.	Sectors to get direct benefit	Describe how it will benefit
1		
2		

D. Historic and Cultural Resources

Type of Resource	Name/specification	Affecting activities	Location from project
Temples			
monuments			
Religious place			
others			

E. Name of Existing Community Organisation

F. Trading pattern - Imported items and Exported Items


G.a. Travel time from starting point - By Walking, By Vehicle

G.b. Transportation cost - Porter, Mule, Vehicle

Annex V Abstract of Cost

Abstract of cost				
Name of Subproject: Sildhunga Tauthali Tekanpur Road			Chainage: CH 0+000 - CH 22+921	
Item No	Description	Unit	Quantity	Total Cost (NRs.)
1	General			
1.1	Insurance of Works, Plants and Materials			400,000.00
1.2	Insurance for worker	L.S.		400,000.00
1.2	Occupational health safety	L.S.		250,000.00
1.3	Providing Site Office For Supervising Team	L.S.		192,000.00
1.4	VICC Operation and Management Cost	L.S.		600,000.00
1.5	Environmental Monitoring Cost	L.S.		280,000.00
1.6	Transportation Means for Supervisors	L.S.		400,000.00
2	Site Clearance	m ²	13,603.57	113,774.78
3	Earthworks	m ³	217286.190	62,017,268.04
4.00	Stone masonry work including full compensation for all labour, materials and other incidentals required to complete the work. It includes full compensation for using specially dressed stones on the face of walls with batter.			
4.10	Dry stone masonry (For Dry wall)	m3	1,258.95	1,588,278.90
4.20	Stone Masonry Wall	m3	2,742.44	10,984,880.91
5.00	Gabion Masonry Work			
5.10	Supply and delivery of gabion (all heavy coated)	Mt.	189.26	13,910,896.65
5.20	Fabrication of gabion boxes including rolling, cutting, weaving (Hexagonal Mesh Size:	Nos.	7,765.00	1,308,618.68
5.30	Stone packing in gabion Box, with face stone dressed	m3	14,115.00	12,350,398.64
5.40	Transportation of gabion wires to the site	Kg	189,263.90	304,551.88
6.00	Cross Drainage Structures	Nos.	61.00	4,868,318.12
6.10	Irrigation Crossings	m2	510.00	219,235.07
	Sub Total			219,235.07
		Excluding Bio-Engine		110,188,221.68
7.00	Bio Engineering works(3% of Total)			
TOTAL				113,493,868.33
	A. Abstract of cost carried out through RBGs			
	Cost of works			27,504,339.22
	Work Charge Establishment (Staff)(2.5% of Total)			687,608.48
	Operational Petty Expenses(2.5% of total)			687,608.48
	Total cost for RBGs works			28,879,556.18
	B. Works carried out through contractor			
	Cost of works			85,989,529.11
	Provision for contractor's overhead expense (15% of I)			12,898,429.37
	II.Sub Total			98,887,958.48
	VAT 13% on contractor work			12,855,434.60
	III.Sub Total			111,743,393.08
	Work Charge Establishment (Staff)(2.5% of Total)			2,793,584.83
	Operational Petty Expenses(2.5% of total)			2,793,584.83
	Total cost for contract works			117,330,562.74
	Grand Total for the project construction			146,210,118.92
	Cost per Km by Contract			6,378,754.85

Annex VI: Public Notice



जनदिशा

Janadisha National Daily राष्ट्रिय दैनिक

www.krishnasenonline.org

नेपाल सरकार
स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय
जिल्ला प्राविधिक कार्यालय

**ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना
जिल्ला आयोजना कार्यालय, सिन्धुपाल्चोक, चौतारा
प्रारम्भिक वातावरणीय परीक्षण (IEE) सम्बन्धी राय सुझावका लागि
सार्वजनिक सूचना**

(सूचना प्रकाशित मिति: २०६६/०२/२२)

ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) अन्तर्गत एशियाली विकास बैंक, डिफिड तथा स्वीस सरकार विकास नियोगको अनुदान सहयोग तथा ओफिडको ऋण सहयोग तथा नेपाल सरकार, जिल्ला विकास समिति र लाभग्राही समेतको सगानीमा स्तरोन्नती गर्नको लागि प्रस्ताव गरिएको नौबिसे-चौतारा-मेलम्ची सडक उप आयोजना र सिलबुद्धा-जेठल-तोथली-टेकनपुर सडक उप आयोजनाको प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन कार्यान्वयन गर्न सिलसिलामा वातावरणीय संरक्षण नियमावली २०५४ (पहिलो संसोधन २०५५ समेत) को नियम ७२(२) अनुसार यो सार्वजनिक सूचना प्रकाशित गरिएको छ।

प्रस्तावकको नाम: जिल्ला विकास समितिको कार्यालय/ जिल्ला प्राविधिक कार्यालय, सिन्धुपाल्चोक

प्रस्तावित सडक उपआयोजनाहरूको विवरण:-

क्र.सं.	सडकको नाम:	प्रभाव पार्ने गा.वि.स.हरू	प्रस्तावको विवरण	सम्बाई
१	नौबिसे-चौतारा-मेलम्ची सडक उप आयोजना	फुलिपट्टकोट, बत्तसे, कुबिण्डे, चौतारा, पिपलडाँडा, कुन्चोक, नवलपुर र शिखरपुर	यो उप आयोजना फुलिपट्टकोट गा.वि.स.को नौबिसे बजारबाट शुरू भई शिखरपुर गा.वि.स.को सिम्लेमा गई टुङ्गिन्छ। यो सडकमा नौबिसे बजार, कुबिण्डे बजार, चौतारा बजार, पिपलडाँडा, कुन्चोक डाँडा, नवलपुर बजार, शिखरपुर बजार र मेलम्ची बजार आदि बस्तीहरू पर्दछन्।	३७.९ कि.मि.
२	सिलबुद्धा-जेठल-तोथली-टेकनपुर सडक उप आयोजना	जेठल, तोथली र टेकनपुर	यो उप आयोजना जेठल गा.वि.स.को सिलबुद्धाबाट शुरू भई टेकनपुर गा.वि.स.को सुनकोशी ड्यामसाईडमा गई टुङ्गिन्छ। यो सडकमा सिलबुद्धा, कार्की टोल, माफ टोल, गणेशथान टोल, साउनेपानी टोल र बाल्का आदि बस्तीहरू पर्दछन्।	२३.५ कि.मि.

उक्त प्रस्तावको कार्यान्वयनबाट वातावरणमा पर्ने सबै प्रभावका बारेमा सम्बन्धित गा.वि.स.विद्यालय, स्वास्थ्य चौकी, वन उपभोक्ता समिति तथा अन्य सरोकारवाला व्यक्ति वा संस्थाले यो सूचना प्रकाशित भएको मितिसे १५ (पन्ध्र) दिन भित्र निम्न ठेगानामा आफ्नो राय सुझाव पठाई सहयोग गरी दिनु हुन अनुरोध गरिन्छ।

राय सुझाव पठाउने ठेगाना:-

जिल्ला विकास समितिको कार्यालय, सिन्धुपाल्चोक फोन नं ०११-६२०१०२ फ्याक्स ०११-६२००८७	जिल्ला प्राविधिक कार्यालय, सिन्धुपाल्चोक फोन नं ०११-६२०३३८ फ्याक्स ०११-६२०३७७
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A Sample of Public Notice

Government of Nepal
Office of District Development Committee, Sindhupalchowk

Public notice for comments and suggestion on the Initial Environmental Examination

(Date of first publication: 5 June, 2009)

An Initial Environmental Examination (IEE) report is under preparation for the implementation of Sildhunga-Jethal-Tauthali-Tekanpur road sub-project in Jethal Tauthali and Tekanpur VDCs of Sindhupalchowk district by Rural Reconstruction and Rehabilitation Sector Development Programme (RRRSDP). In accordance with the provision of the Rule 7 (2) of the Environment Protection Rules 1997, this public notice has been published to solicit comments and suggestions, in writing, about the impacts of the sub-project on the environment and local people within 15 days from the first date of its publication in Janadisha, national daily newspaper in the following address. Comments and suggestions may be sent to Department of Local Infrastructure Development and Agricultural Roads, Jawalakhel and Ministry of Local Development, Pulchowk, Lalitpur.

Address:-

District Development Committee (DDC)
Chautara, Sindhupalchowk
Telephone No. – 011-620377
Fax No. – 011-620087

District Technical Office (DTO)
Chautara, Sindhupalchowk
Telephone No. –011-620338
Fax No. – 011-620087

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1. **प्रतिभाषितकर्ता का नाम**
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 3. **आवृत्ति का प्रकार**
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A Sample of Deed of inquiry

This is to certify that District Project Office, Sindhupalchowk has affixed the following notice in the notice board of Jethal VDC, Sindhupalchowk.

Government of Nepal

Office of District Development Committee, Sindhupalchowk

Public notice for comments and suggestion on the Initial Environmental Examination

(Date of first publication: 5 June, 2009)

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Address:

District Development Committee (DDC)
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Telephone No. – 011-620377
Fax No. – 011-620087

District Technical Office (DTO)
Chautara, Sindhupalchowk
Telephone No. –011-620338
Fax No. – 011-620087

Name of person certifying the affix of notice: Mr.

Designation: Technical Assistant

Office: Village Development Committee,

Office Seal (stamp):

**Annex-VIII: Name of the Organizations
(Notice pasted and deed of inquiry obtained)**

S.N	Name of the organization	Address	Remarks
1	Office of Jethal Village Development Committee.	Jethal, Sindhupalchowk District.	
2	Office of Tauthali Village Development Committee.	Tauthali Sindhupalchowk District.	
3	Office of Tekanpur Village Development Committee.	Tekanpu, Sindhupalchowk District.	
4	District Forest Office.	Chautara, Sindhupalchowk.	
5	Bhangali Chhap Community Forest User Group.	Jethal , Sindhupalchowk	
6	Mulkharka Community Forest User Group.	Jethal, Sindhupalchowk	
7	Dudhila Community Forest User Group.	Tauthali, Sindhupalchowk	
8	Bhumidevi Community Forest User Group.	Tauthali, Sindhupalchowk	
9	Dabibhirkharka Community Forest User Group.	Tekanpur, Sindhupalchowk	
10	Sanakishan Agriculture Co-operative Ltd.	Jethal-5, Sindhupalchowk	
11	Jaleshowery Lower Sec. School.	Jethal-2, Sindhupalchowk	
12	Tripurasundari Secondary School.	Tauthali-3, Sindhupalchowk	
13	Bhagbhairab Lower Sec. School.	Tauthali-7, Sindhupalchowk	
14	Kalika Secondary School.	Tekanpur-5, Sindhupalchowk	
15	Agriculture Development Committee.	Jethal, Sindhupalchowk	
16	Jethal Sub health post office.	Jethal, Sindhupalchowk	
17	Tauthali Sub health post office.	Tauthali, Sindhupalchowk	
18	District Agriculture Development Office	Chautara, Sindhupalchowk.	

Annex IX: List of persons consulted

SN	Name	Designation	Address
1.	Krishna P. Aryal	Local Development Officer	District Development Committee Chautara, Sindhupalchowk
2.	Ram Chandra Shrestha	DE	District Technical Office (DTO), Sindhupalchowk
3.	Pawan Kaji Shrestha	DPO-Engineer	District Project Office, Sindhupalchowk
4.	Shiva Aryal	Engineer	DDC, Sindhupalchowk
5.	Buddhi Baral	Engineer	DIST, Sindhupalchowk
6.	Nirajan Shrestha	District Forest and Soil Conservation Officer	District Forest and Soil Conservation office, Chautara, Sindhupalchowk
7.	Sukman Bamjan	Assistant Forest Officer	District Forest office, Sindhupalchowk
8.	Lokendra Bohora	Chief - DADO	District Agriculture Development office (DADO), Sindhupalchowk
9.	Roshan Tamang	Teacher	Jethal-4, Sindhupalchowk
10.	Shantalal Shrestha	Farmer	Jethal-2, Sindhupalchowk
11.	Bishnu Kumar Shrestha	Social Service	Jethal-2, Sindhupalchowk
12.	Pramila Shrestha	Farmer	Jethal-2, Sindhupalchowk
13.	Sabina Shrestha	Farmer	Jethal-2, Sindhupalchowk
14.	Sabita Shrestha	Farmer	Tauthali-4, Sindhupalchowk
15.	Salina Shrestha	Carpenter	Tauthali-4, Sindhupalchowk
16.	Durga maya Shrestha	Teacher	Tauthali-5, Sindhupalchowk
17.	Narendra Tuladhar	Teacher	Tauthali-6, Sindhupalchowk
18.	Dipak B.K	Student	Tauthali-7, Sindhupalchowk
19.	Lila Bdr.shrestha	Farmer	Tauthali-8, Sindhupalchowk
20.	Pemba Tamang	Farmer	Tauthali-8, Sindhupalchowk
21.	Sabitri B.k	Farmer	Tauthali-7, Sindhupalchowk
22.	Dal Bdr. Sharki	Farmer	Tekanpur-4, Sindhupalchowk
23.	Bhupendra Shrestha	Teacher	Tekanpur-5, Sindhupalchowk
24.	Ram K shrestha	Farmer	Tekanpur-5, Sindhupalchowk
25.	Arjun Bohora	Farmer	Tekanpur-7, Sindhupalchowk
26.	Bhakta Shrestha	Business	Tekanpur-5, Sindhupalchowk
27.	Laxmi Shraki	Farmer	Tekanpur-5, Sindhupalchowk
28.	Punya B. Bohora	Farmer	Tekanpur-5, Sindhupalchowk
29.	Shruka Maya Shrestha	Social Service	Tekanpur-1, Sindhupalchowk
30.	Rana B.Khadka	Farmer	Tekanpur-2, Sindhupalchowk
31.	Durga Poudel	Farmer	Tekanpur-5, Sindhupalchowk
32.	Shiva Ram Shrestha	VDC Secretary	Jethal, Sindhupalchowk
33.	Khadga B. Shrestha	VDC Secretary	Tauthali, Sindhupalchowk
34.	Chetnath Timalina	VDC Secretary	Tekanpur, Sindhupalchowk
35.	Hiralal Shrestha	Chairperson	Bhagelichhap CFUG, Jethal
36.	Uttam Bhakta Shrestha	Chairperson	Dudhila CF, Tauthali
37.	Shankar Budhathoki	Chairperson	Dhabibhirkharka CFUG, Tekanpur, Sindhupalchowk
38.	Kailash Bhandari	Teacher	Tauthali-7, Sindhupalchowk
39.	Chandra Narayan Shah	A.H.O	Tauthali sub health post.
40.	Bhim Pd.Dahal	A.H.O	Jethal sub health post.

[illegible]

24.	सुखदा	॥	६	मन्ना
25.	विजय	विजय	६	मन्ना
26.	अम्बा	॥	३	मन्ना
27.	लक्ष्मी	॥	६	मन्ना
28.	सुखदा	॥	६	मन्ना
29.	विजय	॥	६	मन्ना
30.	सुखदा	॥	६	मन्ना
31.	विजय	॥	६	मन्ना
32.	सुखदा	॥	६	मन्ना
33.	विजय	॥	६	मन्ना
34.	सुखदा	॥	६	मन्ना
35.	विजय	॥	६	मन्ना

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क्र.सं.	विवरण	प्रमाण	दिनांक
1	पेपर	100	10/10/20
2	पेपर	100	10/10/20
3	पेपर	100	10/10/20
4	पेपर	100	10/10/20
5	पेपर	100	10/10/20
6	पेपर	100	10/10/20
7	पेपर	100	10/10/20
8	पेपर	100	10/10/20
9	पेपर	100	10/10/20
10	पेपर	100	10/10/20

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Annex X. Table showing summary of meeting minutes

Date	Location	Address	Issues and Suggestion of the meeting	Remarks
2066/5/22 BS (7/9/09 AD)	Sildhunga	Jethal VDC-5, Sindhupalchowk	<ul style="list-style-type: none"> During the construction, houses and land at chainage 1+500 should be protected properly. Measures should be adopted to minimize the likely damage to be caused during road construction. Compensatory plantation should be done in CF Soil erosion and water management should be done properly during road construction. Training should be given to the Affected Persons (APs). 	Relevant issues raised by local people during FGD are incorporated in their respective impact and mitigation measures.
2066/5/22 BS (7/9/09 AD)	Jethal	Jethal VDC-2, Sindhupalchowk	<ul style="list-style-type: none"> Proper measures should be adopted to minimize the likely damage to be caused to the land, water resources, school and forest from the road construction. 	
2066/5/23 BS (8/9/09 AD)	Tauthali	Tauthali VDC, Sindhupalchowk	<ul style="list-style-type: none"> Drinking water pipe and Ganesh temple of the Tauthali Bazar may be affected during the road construction. So proper care should be done. Spoil management should be done properly 	
2066/5/23 BS (8/9/09 AD)	Gairigaun	Tauthali-7, Sindhupalchowk	<ul style="list-style-type: none"> Drinking water supply sources and irrigation canal falling along the road alignment should be conserved Construction work to be carried out to protect houses, land and forest along the road alignment. Spoil management should be done properly. 	
2065/8/24 BS (9/9/09 AD)	Bagkhor	Tekanpur VDC, Sindhupalchowk	<ul style="list-style-type: none"> Drinking water supply, school, foot trail and temple falling on road alignment should be rehabilitated. Spoil management should be done properly. 	
2065/8/24 BS (9/9/09 AD)	Bukeni	Tekanpur VDC - 5, Sindhupalchowk	<ul style="list-style-type: none"> Community infrastructures (school, Temple, drinking water pipe etc) falling along the road alignment should be properly managed. Spoil management should be done properly. Compensatory plantation should be done in CF. 	

Annex XI a. Settlement along the road alignment

SN	Major Settlements	VDCs & ward no.	Total Households	Total Population	Caste
1.	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	Jethal-4,5,6	160	800	Tamang,Newar, Pandey,Chhetri
2.	Jethal (Totale, Majtole, Cheutole)	Jethal-1,2,3	170	1200	Newar,Sunuwar, Chherti
3.	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	Tauthali-2	200	1100	Newar, Kusule. Kapali
4.	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari,Garigauan, Dada gaun, Bara, Bigal)	Tauthali-7,8,9,4	300	1400	Dalit,Newar,Chhetri,Brahamin,Thami
5.	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	Tekanpur-2,3,4,5,6, 9	50	250	Bohora,Shrestha, Sharki,Budhathoki, Paudel,Damai
6.	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	Tekanpur-1,2	100	550	Pahari,Newar,Brahamin,Chhetri
	Total		980	5300	

Annex XI b: Distribution of households by major occupation

SN	Settlements Name	Number of HH engaged in percentage					
		Agriculture & Livestock	Labour & Porter	Business/ Commerce	Cottage Industry	Employees	Others
1.	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	95	45	2	-	1	
2.	Jethal (Totale, Majtole, Cheutole)	90	40	1	-	1	
3.	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	80	50	5	3	5	
4.	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari,Garigauan, Dada gaun, Bara, Bigal)	90	10	-	-	2	
5.	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	60	50	5	-	4	
6.	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda,Balka)	80	20	5	-	3	
	Percentage	82.5	35.83	5	3	2.67	

Annex XI c1. Agricultural pattern along the road alignment

S.N	Settlement Name	Rice	Wheat	Maize	Millet	Junelo	Phaper	Others
1	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	4	3	1	2	-		
2	Jethal (Totale, Majtole, Cheutole)	4	3	1	2	-	-	
3	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	-	3	1	2	-	-	
4	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari, Garigauan, Dada gaun, Bara, Bigal)	1	4	3	2	-	-	
5	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	3	4	1	2	-	-	
6	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	3	-	2	1	-	-	

Note: 1= most dominant cereals, 2= Second dominant cereals, 3= third dominant cereals and so on.

Annex XI c2. Agricultural pattern along the road alignment

S.N	Settlement Name	Oil Seed	Beans/ Dal	Tobacco	Potato	Vegetable	Fruits	Tea/ Coffee	Amliso	Seri culture	Others
1	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	-	-	-	1	2	-	-	-	-	-
2	Jethal (Totale, Majtole, Cheutole)	-	-	-	1	2	3	-	4	-	-
3	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	-	-	-	1	2	-	-	3	-	-
4	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari, Garigauan, Dada gaun, Bara, Bigal)	5	-	-	1	2	-	-	3	-	4
5	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	1	-	-	2	3	4	-	5	-	-
6	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	1	-	-	2	3	4	-	-	-	-

Note: 1=Most dominant cash crops, 2=Second dominant cash crops, 3=third dominant cash crops and so on

Annex XI d. Livestock within the ZoI of road alignment

S.N.	Settlement Name	Cattle	Horse, Mules	Yak	Goat	Sheep	Rabbit	Pig	Fisheries	Poultry	Bee-Keeping	others
1	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	2	-	-	1	-	-	-	-	3	4	-
2	Jethal (Totale, Majtole, Cheutole)	2	-	-	1	-	-	-	-	3	4	-
3	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	1	-	-	2	-	-	-	-	3	4	-
4	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari, Garigauan, Dada gaun, Bara, Bigal)	1	-	-	2	-	-	4	-	3	5	-
5	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	1	-	-	2	-	-	-	-	3	4	-
6	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	3	-	-	2	-	-	-	-	1	4	-

Note: 1=Most dominant livestock, 2=Second dominant livestock, 3=third dominant livestock and so on.

Annex XI e1: Summary of public services & infrastructures.

S.N.	Settlement Name	Type of educational institution	School (no)	Student no	health centre	Telephone/Fax	Tele phone (mobile/CDMA)	Post office	Micro-hydro	Mini-hydro	National Grid	Solar System	Diesel Generator
1	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	Campus High School Primary School	- - 1	- - 160	1	10	300	1	-	-	1	-	-
2	Jethal (Totale, Majtole, Cheutole)	Campus High School Primary school	- 1 1	- 180 130	-	-	50	-	-	-	1	-	-
3	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	Campus High School Primary School	- 1 3	- 130 150	2	9	50	1	-	-	1	-	-
4	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari, Garigauan, Dada gaun, Bara, Bigal)	Campus High School Primary School	- 1 2	- 200 200	-	1	200	-	-	-	1	-	-
5	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	Campus High School Primary School	- 1 2	- 450 300	1	13	150	1	-	-	1	-	-
6	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	Campus High School Primary School	- - 1	- - 16	-	5	200	-	-	-	1	-	-
	Total		14	1916	4	38	950	3					

Annex XI e2: Summary of public services & infrastructures.

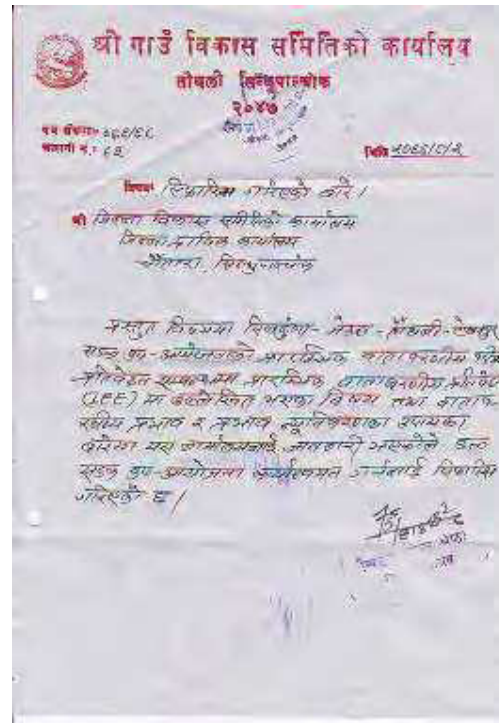
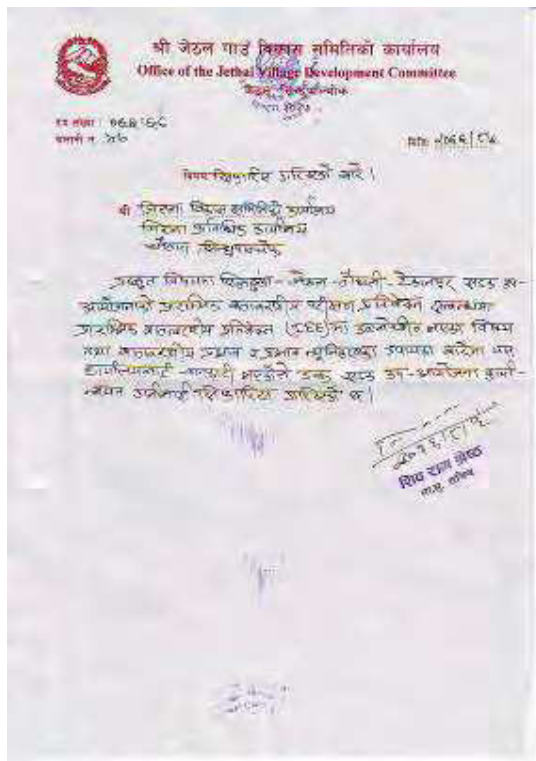
S.N.	Settlement Name	Restaurants/tea	Grocery (no)	Other Shops(no)	Gravity flow(no)	Spring/dug wells(no)	Irrigation (no)	Micro-hydro (KW)	Water mill(no)	Suspension bridge(no)	Wooden bridge(no)	Weaving Industry	Rice and flour	Cooperative(no)	Ghat(no)	Hatia/ Bazar (no)	Playground ground	Community	Community organization(no)
1	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	5	-	3	6	7	1	-	4	-	-	2	1	1	3	-	-	1	-
2	Jethal (Totale, Majtole, Cheutole)	-	1	3	3	2	-	-	2	1	1	-	-	-	1	-	-	1	3
3	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	1 3	-	-	2	3	3	-	7	-	3	6	7	1	3	1	1	-	7
4	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari, Garigauan, Dada gaun, Bara, Bigal)	-	-	7	5	4	-	-	2	2	-	1	2	1	2	-	-	-	-
5	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	3	-	4	3	4	-	-	-	1	1	1	4	1	2	-	-	1	-
6	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	4	-	6	5	3	1	-	-	1	-	-	1	-	1	-	-	-	-
	Total	2 5	1	2 3	2 4	2 3	5		1 5	5	5	1 0	15	4	1 2	1	1	3	10

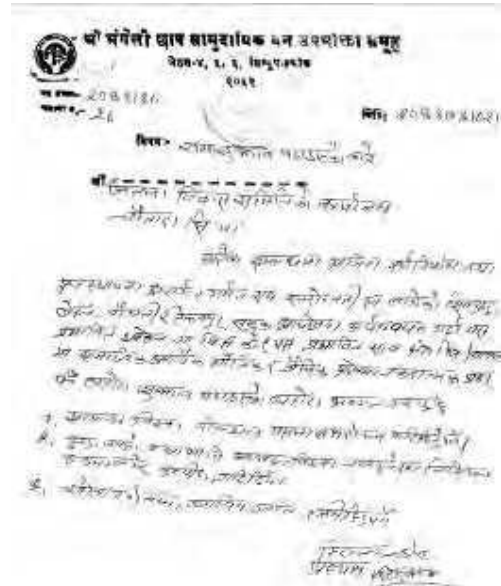
Annex XI f: Land holding pattern of settlements within ZoI in percentage

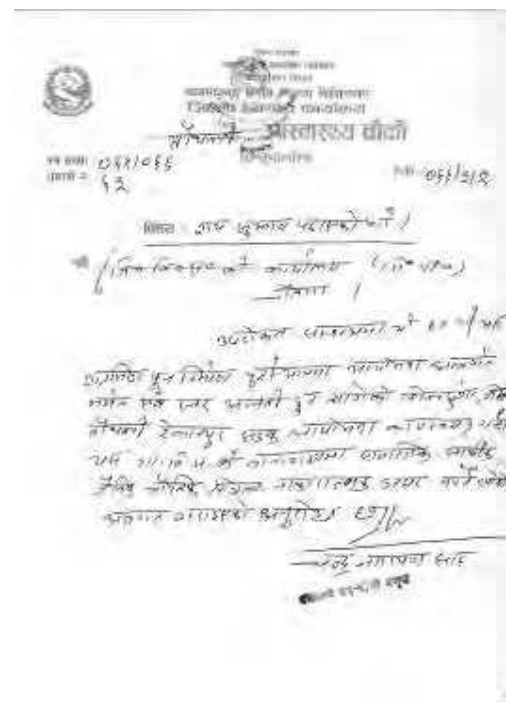
S N	Settlement Name	Landless	<1 ropani	1- 5 ropani	5 -10 ropani	10 -20 ropani	20 -50 ropani	>50 ropani
1	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gegar)	0.625	0	31.25	31.25	36.87	0	0
2	Jethal (Totale, Majtole, Cheutole)	0	5.88	35.29	58.82	0	0	0
3	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	0.5	0	50	25	24.5	0	0
4	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari, Garigauan, Dada gaun, Bara, Bigal)	0.5	0	50	25	24.5	0	0
5	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	14.54	18.18	45.45	0	0	0	0
6	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	5	0	5	50	40	0	0
	Total	3.52	5	36.165	31.673	23		

Annex XI g: Percentage of households belonging to different food security category.

S. N	Settlement Name	Surplus	Sufficient for whole year	Sufficient for 3-9 months	Sufficient for three months	Less than three months
1	Sildhunga (Lokharke, Newar tole, Gewar tole, Pandey tole and Gagar)	0	0	93.75	3.125	3.125
2	Jethal (Totale, Majtole, Cheutole)	0	2.941	88.235	2.94	5.88
3	Tauthali (Japsile, Lawali, Bilghowa, Barna, Jhyampo)	0	0	50	10	40
4	Gairigaon (Khagal, B.K tole, Chhipi gaun, Bahun gaun, Palabari, Garigauan, Dada gaun, Bara, Bigal)	0	10	15	25	50
5	Saunepani (Danda tole, Palpa, Damai tole, Saunepani, Sunakheti, Budhathoki tole).	10	30	40	0	20
6	Balka (Pipaldanda, Gairabari, Okharboat, Ghattedanda, Balka)	0	5	50	10	35
	Percentage	1.6	7.9	56.2	8.5	25.6

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श्री कालिका माध्यमिक विद्यालय
Shree Kalika Secondary School
बेल्गा-२, दिन्नामाली
मिरापुरा ५ Bidargahalli
पिन- ५८३१३४
Dist:924

संख्या क्रमांक :-

विषय: राज. सुशासन १६/१२/२०१७

१० जिल्हा - पिकाळ हासिलीचे बाबतचा

पिन्धुपात्रोऽर्चोऽर्चः ।

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अपमोक्ष

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(पृष्ठ १११) आर्य समाज
मुम्बई, १९१९



मिशन ऑफ़ द फ़्यूचर (मिशन ऑफ़ द फ़्यूचर)

सदर अतिशय: 08/12/25
संख्या: २३

अथर्ववेदः

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मिनि - यारा पुष्पात्कसाडरुको को।

॥ वि० वि० दृष्टेः समीपतः

प्रियाभक्तकौट - श्रीराम

राष्ट्रवादी विचारणा शक्ति युक्ति रमा
पुनरापण अन्वेषण अन्वेषण शक्ति रमा
इत्यन्तं विचारणा शक्ति युक्ति रमा
अन्वेषण शक्ति युक्ति रमा
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अन्वेषण शक्ति युक्ति रमा

1/25/2017
1/25/2017
 1/25/2017 - 1/25/2017



श्री बाघमंरु नि. माध्यमिक विद्यालय
Saras Baghmankur Ni. Secondary School
मोबा. 98960 22222
Tuttur (C) 686005 Madhuprabha

संख्या: १००/१९९९/१०००
अथवा १००/१९९९/१०००

www.kpge-hs.de

विषय- राजसूयार्थ पशुद्वयं, गौ ।

^(*) कृष्णा पिताय समितिः प्रकृतम्।

सि.पा. -वीकुरा

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कृषि विकास सन्धि

ਬਿਠਲ, ਲਿਖਤ, ਪਾਠ ੧੬

● 2010 年 10 月 1 日

40. $\frac{1}{2} \times 100 = 50$
 41. $\frac{1}{2} \times 100 = 50$

पृष्ठ सं. - १७

10/10/2025, 11:12

विषयः ० गुरु पुस्तक पठनार्थम् ।

बौद्धिकता विद्या प्रविष्टि कार्यलय
विष्णुवाहनसौत्र सौभाग्य

1. Regulating \rightarrow $\frac{1}{2}$ \rightarrow $\frac{1}{2}$

आर्थिक व्यवस्था का विकास सुनिश्चित न हो पुरातन
अर्थशास्त्र के अनुसार यह है कि अर्थशास्त्र का विकास
सिवाय भाग्य के अन्य कोई और कारण नहीं है। अर्थशास्त्र का विकास
आर्थिक व्यवस्था का विकास ही है। अर्थशास्त्र का विकास
ले यह व्यवस्था का विकास ही है। अर्थशास्त्र का विकास
और अर्थशास्त्र का विकास ही है। अर्थशास्त्र का विकास
यह ही है। अर्थशास्त्र का विकास ही है। अर्थशास्त्र का विकास

अथर्ववेद (नामः)
(अथर्ववेद)

A Sample of Recommendation letter from VDC

Government of Nepal
Ministry Of Local Development
Office of Village Development Committee Sindhupalchowk
Jethal, Sindhupalchowk

Reference No: 46

Subject : Recommendation letter for the implementation of IEE report

To,

The Office of District Development Committee, Sindhupalchowk

We have received the IEE report prepared for the Sildhunga-Jethal-Tauthali-Tekanpur road sub project. We reviewed the environmental impacts and mitigation measures as mentioned in the report and satisfied with the IEE report and recommend for the implementation of road sub-project.

Signature

Narahari Poudel

VDC Secretary

Annex XIII: Major river/stream along the road alignment

S. N.	Name of River/Stream	Chainage	Span (m)	Characteristics*
1	Devithan Kholshi	0+800	12	D
2	Aaitabare Kholshi	1+000	12	D
3	Odiko Kholshi	1+300	12	C
4	Guiye Kholshi	1+770	12	C
5	Ghatte Kholshi	1+940	15	B
6	Pahire Khola	2+690	15	B
7	Ghurmuse Kholshi	3+160	15	B
8	Sitbar Kholshi	3+200	20	B
9	Tople Khola	3+700	15	B
10	Jethal Khola	4+600	20	B
11	Katike Kholshi	5+170	10	C
12	Koaya Kholshi	5+310	20	B
13	Mandre Kholshi	5+950	12	C
14	Katigahero Kholshi	7+309	15	C
15	Surke Chour Kholshi	7+615	12	D
16	Jhyali Kholshi	7+770	12	D
17	Japsile Kholshi	8+100	12	D
18	Kala Pani Kholshi	9+530	12	D
19	Rakas Poko Kholshi	10+280	12	D
20	Gahiri Gaun Kholshi	13+490	12	D
21	Barla Kholshi	13+920	15	C
22	Palba Kholshi	14+600	12	D
23	Saune Pani Khoshi	17+130	15	C
24	Tirtere Dhara Kholshi	21+360	12	D

Source: Field survey, 2009

*A: Perennial, snow-fed B: Perennial, spring-fed C: Dry-up for short period
D: Dry-up in winter E: Dry-up most of the year and having high flash-floods

Annex XIV: Landuse Pattern

Land use pattern along the road alignment within 5m formation width.

Landuse pattern						
Land Type	Chainage	Length (m)	Existing Width (m)	Additional Width (m)	Existing area (ha)	Additional Area (ha)
Forest	1+600 - 1+800	200	3	2	0.06	0.04
	2+000 - 2+400	400	4	1	0.16	0.04
	5+200-6+870	1670	1.3	3.7	0.2171	0.6179
	7+050 - 7+220	170	1	4	0.017	0.068
	8+600 - 9+200	600	3.4	1.6	0.204	0.096
	9+200 - 9+600	400	4.3	0.7	0.172	0.028
	15+600 - 16+600	1000	4	1	0.4	0.1
	17+580 - 17+760	180	4.2	0.8	0.0756	0.0144
	17+780 - 17+920	140	4.5	0.5	0.063	0.007
	18+000 -18+400	400	4.5	0.5	0.18	0.02
	18+600 - 21+000	2400	4	1	0.96	0.24
	21+800 - 22+800	1000	3.8	1.2	0.38	0.12
	Sub Total				2.88	1.39
Builtup Area	4+500-4+750	250	3	2	0.075	0.05
	9+600-10+200	600	3.8	1.2	0.228	0.072
	13+000-13+230	230	3.7	1.3	0.0851	0.0299
	17+000-17+580	580	4.5	0.5	0.261	0.029
	Sub Total				0.65	0.18
Cultivated Land	0+000-1+600	1600	4	1	0.64	0.16
	1+800-2+000	200	5	0	0.1	0
	2+400-4+500	2100	3.4	1.6	0.714	0.336
	5+000-5+200	200	1.4	4.6	0.028	0.092
	7+220-8+600	1380	2	3	0.276	0.414
	10+200-13+000	2800	4.3	0.7	1.204	0.196
	13+230-15+600	2370	3.5	1.5	0.8295	0.3555
	16+600-17+000	400	4.3	0.7	0.172	0.028
	17+760-17+780	20	4.5	0.5	0.009	0.001
	17+920-18+000	80	4.2	0.8	0.0336	0.0064
	18+400-18+600	200	5	0	0.1	0
	21+000-21+800	800	3.5	1.5	0.28	0.12
	22+800-22+921	121	3.5	1.5	0.04235	0.01815
	Sub Total				4.42	1.72
Barren/pasture land	6+870-7+050	180	0.8	4.2	0.0144	0.0756
	4+750-5+000	250	2.5	2.5	0.0625	0.0625
	sub Total				0.0769	0.138
Total		22921			8.0269	3.428

Annex XV: Community Forests along road alignment

Chainage	Community Forest	Length (m)	Width (m)	Area (ha)	Major Species
1+600 - 1+800	Bhangeli Chapp CF	200	3	0.06	Chilaune (<i>Schima wallichii</i>), Paiyun (<i>Prunus cerasoides</i>), Uttis (<i>Alnus nepalensis</i>)
2+000 - 2+400	Bhangeli Chapp CF	400	4	0.16	Chilaune (<i>Schima wallichii</i>), Uttis (<i>Alnus nepalensis</i>)
5+200 - 7+200	Mulkharka CF	1670	1.3	0.217	Chilaune (<i>Schima wallichii</i>), Sallo (<i>Pinus roxburghi</i>), Uttis (<i>Alnus nepalensis</i>)
7+200 - 7+220	Dudhila CF	170	1	0.017	Sallo (<i>Pinus roxburghi</i>)
8+600 - 9+200	Mulkharka CF	600	3.4	0.204	Sallo (<i>Pinus roxburghi</i>)
9+200 - 9+600	Bhumidevi CF	400	4.3	0.172	Chilaune (<i>Schima wallichii</i>) , Sallo (<i>Pinus roxburghi</i>)
15+600 - 16+600	Kalika CF	1000	4	0.4	Chilaune (<i>Schima wallichii</i>), Khirro (<i>Sapium insigne</i>), Uttis (<i>Alnus nepalensis</i>)
17+580 - 17+760	Chuli Devi CF	180	4.2	0.076	Chilaune (<i>Schima wallichii</i>), Sal (<i>Shorea robusta</i>), Simal (<i>Bombax ceiba</i>)
17+780 - 17+920	Chuli Devi CF	140	4.5	0.063	Chilaune (<i>Schima wallichii</i>), Katus (<i>Castanopsis indica</i>) , Kutmero (<i>Litsea monopetala</i>), Mauwa (<i>Bassia latifolia</i>)
18+000 - 18+400	Dabi Bhirpakha Cf	400	4.5	0.18	Chilaune (<i>Schima wallichii</i>), Katus (<i>Castanopsis indica</i>) Sal (<i>Shorea robusta</i>), Kyamuna (<i>Cleistocalyx operculata</i>), Mauwa (<i>Bassia latifolia</i>), Uttis (<i>Alnus nepalensis</i>)
18+600 - 21+000	Dabi Bhirpakha Cf	2400	4	0.96	Chilaune (<i>Schima wallichii</i>), Katus (<i>Castanopsis indica</i>), Sal (<i>Shorea robusta</i>)
21+800 - 22+800	Dabi Bhirpakha Cf	1000	3.8	0.38	Chilaune (<i>Schima wallichii</i>), Katus (<i>Castanopsis indica</i>) Sal (<i>Shorea robusta</i>)
Total				2.88	

Source: Field survey, 2009

Annex XVI: Recommended Structures Necessary for Slope Stabilization along the Alignment

A. Recommended Gabion wall Structures

Chainage	left			Right		
	Height	Area(m ²)	Volume(m ³)	Height	Area(m ²)	Volume(m ³)
0+160	2	2.5	25			
0+170	2	2.5	25			
0+180	3	4.5	45			
0+190	3	4.5	45			
0+280	2	2.5	25			
0+290	2	2.5	25			
0+300	2	2.5	25			
0+310	2	2.5	25			
0+320	3	4.5	45			
0+330	3	4.5	45			
0+340	3	4.5	45			
0+350	3	4.5	45			
0+360	3	4.5	45			
0+370	4	6.5	65			
0+390				4	7	70
0+430				3	4.5	45
0+430	1	1	10			
0+440				4	6.5	65
0+450				2	2.5	25
0+460				2	2.5	25
0+470				4	6.5	65
0+480				4	6.5	65
0+490				3	4.5	45
0+500	4.5	45				
0+520	5	9	90			
0+530	5	9	90			
0+540	3	4.5	45			
0+600	4	7	70			
0+600				1	1	10
0+610	3	4.5	45			
0+780	2	2.5	25			
0+780				2	2.5	25
0+890	4	6.5	65			
0+900	4	6.5	65			
0+910	4	7	70	2	2.5	25
0+920	5	9	90			
0+930	5	9	90			
0+940	4	6.5	65			
0+950	4	6.5	65			
1+030				7	14.5	145
1+040				5	9	90
1+120	4	6.5	65			
1+130	7	14.5	145			
1+140	3	4.5	45			
1+170				3	4.5	45
1+320	4	6.5	65			
1+380	4	6.5	65			
1+390	4	6.5	65			
1+420	1	1	10			
1+420				2	2.5	25
1+830	2	2.5	25	1	1	10
1+880	3	4.5	45			
1+890	3	4.5	45	1	1	10
1+930	3	4.5	45			
1+940	3	4.5	45			
1+950	2	2.5	25			
2+030	1	1	10	1	1	10
2+200	1	1	10			
2+200				2	2.5	25
2+280	4	6.5	65			
2+410	1	1	10			
2+410				1	1	10
2+470	2	2.5	25			
2+470				1	1	10

Chainage	left			Right		
	Height	Area(m ²)	Volume(m ³)	Height	Area(m ²)	Volume(m ³)
2+530	4	6.5	65			
2+590	1	1	10	1	1	10
2+860	4	6.5	65			
2+950	3	4.5	45			
3+000				3	4.5	45
3+150	1	1	10			
3+150				2	2.5	25
3+230	2	2.5	25			
3+230				1	1	10
3+240	1	1	10	1	1	10
3+280	1	1	10			
3+280				2	2.5	25
3+750	1	1	10	1	1	10
3+760	1	1	10			
3+760				1	1	10
3+810	4	6.5	65			
3+830	1	1	10			
3+830				2	2.5	25
3+850	4	6.5	65			
3+930	2	2.5	25			
3+930				2	2.5	25
4+000	2	2.5	25			
4+090	4	6.5	65			
4+100	3	4.5	45			
4+190	4	6.5	65			
4+440				3	4.5	45
4+700	4	6.5	65			
4+780	4	6.5	65			
4+790	5	9	90			
5+310	4	6.5	65			
5+320	6	11.5	115			
5+330	6	11.5	115			
5+340	3	4.5	45	1	1	10
5+350	7	14.5	145			
5+360	6	11.5	115			
5+370	3	4.5	45			
5+400	3	4.5	45			
5+410	4	6.5	65			
5+420	6	11.5	115			
5+480						
5+670	4	6.5	65			
5+680	3	4.5	45			
5+690	4	6.5	65			
5+810	3	4.5	45			
5+820	3	4.5	45			
5+830	3	4.5	45			
5+860	3	4.5	45			
5+880	4	6.5	65			
5+980	3	4.5	45			
6+060	5	10	100			
6+060				2	2.5	25
6+110	3	4.5	45			
6+250	6	11.5	115			
6+260	3	4.5	45			
6+270	4	6.5	65			
6+280	3	4.5	45			
6+290	5	9	90			
6+530	3	4.5	45			
6+620	3	4.5	45			
6+630	2	2.5	25			
6+630				2	2.5	25
7+180	3	4.5	45			
7+220	2	2.5	25			
7+300				5	10	100

B. Recommended Stone masonry wall Structures

Chainage	Length	Left		
		Height	Area(m ²)	Volume(m ³)
3+470	10	3	3.06	30.6
3+480	10	1.5	0.96	9.619
3+560	10	3	3.06	30.6
5+020	10	2.2	1.8	17.996
5+030	10	3.5	4.01	40.119
5+040	10	3.2	3.43	34.256
5+340	10	7.5	16.2	161.719
5+540	10	2.8	2.72	27.146
5+550	10	2.8	2.72	27.146
5+570	10	2.5	2.23	22.344
5+580	10	2.5	2.23	22.344
5+610	10	3.8	4.64	46.436
5+620	10	4.20	5.56	55.566
5+630	10	2.5	2.23	22.344
5+640	10	4	5.09	50.9
5+650	10	3.5	4.01	40.119
5+660	10	3	3.06	30.6
6+010	10	2.7	2.55	25.495
6+020	10	3.3	3.62	36.16
6+200	10	2.5	2.23	22.344
6+210	10	2	1.54	15.35
6+220	10	3	3.06	30.6
6+230	10	2	1.54	15.35
6+240	10	2	1.54	15.35
6+810	10	2	1.54	15.35
6+820	10	2.5	2.23	22.344
6+830	10	3.5	4.01	40.119
6+840	10	4	5.09	50.9
6+850	10	4	5.09	50.9
6+860	10	3.8	4.64	46.436
6+870	10	4.2	5.46	54.6
6+880	10	4.5	6.19	61.875

Chainage	Length	Left		
		Height	Area(m ²)	Volume(m ³)
6+980	10	7.5	15.938	159.375
6+990	10	8	18	180
7+000	10	5.19999981	8.06	80.6
7+060	10	3.20000005	3.426	34.256
7+070	10	3	3.06	30.6
7+350	10	2.5	2.234	22.344
7+360	10	2	1.535	15.35
18+430	10	6.5	12.374	123.744
18+440	10	4	5.09	50.9
18+450	10	3	3.06	30.6
18+690	10			
18+700	10			
20+950	10	6	10.665	106.65
20+960	10	2	1.535	15.35
21+040	10			
21+050	10			
22+570	10			
6+890	10	4.5	6.188	61.875
6+900	10	4.5	6.188	61.875
6+940	10	3.5	4.012	40.119
6+950	10	3	3	30
6+960	10	3	3	30
6+970	10	7	14	140
Chainage	Length	Right		
		Height	Area(m ²)	Volume(m ³)
18+690	10	4.5	6.294	62.944
18+700	10	5	7.625	76.25
20+950	10			
20+960	10			
21+040	10	5.5	9.082	90.819
21+050	10	2.5	2.234	22.344
22+570	10	5	7.625	76.25

C. Recommended Dry Stone Masonry Structures

Chainage	Length	Left			Right		
		Height	Area(m ²)	Volume(m ³)	Height	Area(m ²)	Volume(m ³)
0+020	10	1.5	1.24	12.347			
0+020	10				1.5	1.24	12.347
0+030	10	2.8	3.47	34.65			
0+380	10				2	1.97	19.65
1+000	10				2.5	2.86	28.547
1+010	10				2.5	2.86	28.547
1+680	10	2.2	2.3	23.017			
2+040	10				2	1.97	19.65
2+050	10				2	1.97	19.65
2+160	10				2	1.97	19.65
2+170	10				2	1.97	19.65
2+180	10				2	1.97	19.65
2+460	10				2	1.97	19.65
2+640	10				2	1.97	19.65
2+650	10				2	1.97	19.65
4+710	10	2	1.97	19.65			
4+740	10				2	1.97	19.65
4+750	10				2	1.97	19.65
4+760	10				2	1.97	19.65
4+770	10				2	1.97	19.65
7+560	10	2	1.97	19.65			
7+570	10	2.2	2.3	23.017			
8+700	10				2	1.97	19.65
8+710	10				2	1.97	19.65
8+740	10				2	1.97	19.65
8+750	10				2	1.97	19.65
8+760	10				2	1.97	19.65
8+770	10				2	1.97	19.65
8+920	10				2	1.97	19.65
8+930	10				2	1.97	19.65
8+940	10				2	1.97	19.65
10+370	10				2	1.97	19.65
11+270	10	2.2	2.3	23.017			
11+280	10	2	1.97	19.65			
11+290	10	2	1.97	19.65			
11+550	10				2	1.97	19.65
11+560	10				2	1.97	19.65
11+570	10				2	1.97	19.65
11+910	10	2	1.97	19.65			
11+920	10	2	1.97	19.65			
11+930	10	2	1.97	19.65			
11+940	10	2	1.97	19.65			
11+950	10	2	1.97	19.65			
11+960	10	2	1.97	19.65			
12+110	10	2	1.97	19.65			
12+500	10				1.5	1.24	12.347
12+530	10				2	1.97	19.65
13+820	10				2	1.97	19.65
13+930	10				2	1.97	19.65
13+940	10				2	1.97	19.65
14+060	10				2	1.97	19.65
14+070	10				2	1.97	19.65
14+080	10				2	1.97	19.65
15+190	10				2	1.97	19.65
15+200	10				2	1.97	19.65
15+500	10				2	1.97	19.65
15+900	10				2	1.97	19.65
15+910	10				2	1.97	19.65
15+920	10				2	1.97	19.65
15+930	10				2	1.97	19.65
15+940	10				2	1.97	19.65
16+460	10				2	1.97	19.65
16+470	10				2	1.97	19.65
16+470	10				2	1.97	19.65

Annex XVII Recommended Structure for Water Management along the Alignment

a) Recommended Cross drainage structures

1.Causeway

Chainage	Span(m)	structure	Remarks	Chainage	Span(m)	structure	Remarks
0+390	6	causeway		6+627	6	Proposed Causeway	
0+427	6	causeway		7+155	6	Katigahero_Causeway	
0+500	6	causeway		7+236	6	Proposed Causeway	
0+598	9	causeway		7+300	6	Proposed Causeway	
0+780	9	Devisthan_causeway		7+386	6	Proposed Causeway	
0+910	6	Aaitabare_causeway		7+467	6	Surke_Causeway	
1+170	6	Odiko_causeway		7+520	6	Jhyali_Causeway	
1+420	6	causeway		7+859	6	Japsile_Causeway	
1+715	6	Guiye_Causeway		8+570	6	Causeway	
1+833	6	Ghatte_Causeway		8+690	6	Proposed Causeway	
1+886	9	causeway		9+187	6	Kala Pani_Causeway	
2+030	9	causeway		11+969	6	Proposed Causeway	
2+200	6	causeway		12+077	6	Gahiri_Causeway	
2+410	6	causeway		12+157	6	Proposed Causeway	
2+590	6	causeway		12+372	6	Proposed Causeway	
2+665	9	causeway		12+877	6	Baria_Causeway	
3+153	9	Sitbar_causeway		13+247	6	Proposed Causeway	
3+235	18	causeway		13+567	9	Proposed Causeway	
3+283	9	causeway		13+657	6	Proposed Causeway	
3+755	15	Tople_causeway		14+004	6	Proposed Causeway	
3+827	9	causeway		14+337	6	Palba Causeway	
3+933	9	causeway		15+876	6	Proposed Causeway	
4+095	9	causeway		18+858	6	Proposed causeway	
4+438	9	causeway		19+388	6	Proposed causeway	
5+343	9	proposed Causeway		19+618	6	Proposed causeway	
5+476	9	Koaya_proposed Causeway		20+073	6	Proposed causeway	
5+492	6	Proposed Causeway		21+108	6	Proposed causeway	
5+830	6	Proposed Causeway		22+688	6	Proposed causeway	
5+866	6	Proposed Causeway		22+728	6	Proposed causeway	
6+058	6	Proposed Causeway		22+748	6	Proposed causeway	

2.Irrigation Crossing

2+470	3	Irrigation crossing		12+627	3	Irrigation crossing	
3+000	3	Irrigation crossing		12+698	3	Irrigation crossing	
4+202	3	Irrigation crossing		12+787	3	Irrigation crossing	
8+212	3	Irrigation Crossing		13+105	3	Irrigation Crossing	
8+415	3	Irrigation Crossing		14+034	3	Irrigation Crossing	
8+570	3	Irrigation Crossing		14+203	3	Irrigation Crossing	
8+825	3	Irrigation Crossing		14+756	3	Irrigation Crossing	
8+866	3	Irrigation Crossing		14+820	3	Irrigation Crossing	
8+967	3	Irrigation Crossing		16+591	3	Irrigation Crossing	
8+993	3	Irrigation Crossing		16+796	3	Irrigation Crossing	
9+559	3	Irrigation Crossing		16+918	3	Irrigation crossing	
9+853	3	Irrigation Crossing		16+990	3	Irrigation crossing	
9+889	3	Irrigation Crossing		17+033	3	Irrigation crossing	
10+417	3	Irrigation Crossing		18+028	3	Irrigation crossing	
11+693	3	Irrigation Crossing		18+088	3	Irrigation crossing	
12+468	3	Irrigation Crossing		20+638	3	Irrigation crossing	
12+532	3	Irrigation Crossing					
12+572	3	Irrigation Crossing					

3.Pipe Culvert

Chainage	length (m)	remark
8+367	5	Existing
8+900	5	Existing

Annex XVIIIa
List of trees to be removed from private land

Name of plant species	Tree (GBH>=30cm)	Pole (16>=GBH<30cm)	Sapling	Remarks
Amba (<i>Pisidium guyava</i>)	10			There are altogether 17 nigalo and Bamboo clump along the alignment
Anar (<i>Citrus sinensis</i>)	1			
Angeri (<i>Lyonia ovalifolia</i>)	56			
Asare (<i>Osbeckia stellata</i>)	1			
Badahar (<i>Sphaeranthus indicus</i>)	5			
Bakaino (<i>Melia azederach</i>)	5			
Banjh (<i>Quercus lanata</i>)	1			
Bhimsenpati (<i>Buddleja asiatica</i>)	78			
Bilaune (<i>Maesa chisia</i>)			4	
Chhap (<i>Michelia Champaca</i>)	5			
Chilaune (<i>Schima wallichii</i>)	2,232			
Chiuri (<i>Aesandra butyracea</i>)		1		
Chutro (<i>Berberis aristata</i>)	12			
Dhursul (<i>Ribes takare</i>)	2			
Dudhilo (<i>Ficus nerifolia</i>)	145			
Gayo (<i>Bridelia retusa</i>)				
Gogan (<i>Sauravia nepauensis</i>)		4		
Gauva(<i>Pisidium guyava</i>)	57		5	
Guras (<i>Rhodendron arboreum</i>)	9	3		
Jamun (<i>Sygium cumini</i>)	3			
Jhinagne (<i>Eurya acuminate</i>)	140	111		
Kaphal (<i>Myrica esculenta</i>)	27	2		
Katus (<i>Castanopsis indica</i>)	131			
Kaulo (<i>Persea odoratissima</i>)	9			
Kettuke (<i>Agave cantula</i>)	3			
Khanayo (<i>Ficus semicordata</i>)	43			
Khasreto (<i>Ficus hispida</i>)	9			
Khasru (<i>Quercus semicarpifolia</i>)	2			
Khirro (<i>Sapium insigne</i>)	97			
Kimbu (<i>Morus rubra</i>)	16			
Kutmero (<i>Litsea monopetala</i>)	222			
Kyamuno (<i>Cleistocalyx operculata</i>)	4			
Lankuri (<i>Fraxinus floribunda</i>)	286			
Lapsi (<i>Choerospondias axillaris</i>)	35			
Lemon (<i>Citrus sps</i>)	40			
Mango (<i>Mangifera indica</i>)	2			
Mauwa (<i>Bassia latifolia</i>)	60			
Mayel (<i>Pyrus pashia</i>)	1			
Naspati (<i>Pyrus communis</i>)		1		
Nemaro (<i>Ficus auriculata</i>)	71			
Rural Reconstruction and Rehabilitation Sector Development Programme (RRRSDP)				

Pade (<i>Pieris formosa</i>)	1			
Paiyun (<i>Prunus cerasoides</i>)	240			
Panheli (<i>Listea salicifolia</i>)	3	3		
Peach (<i>Prunus persica</i>)	92	3		
Peach (<i>Prunus persica</i>)	2			
Phalant (<i>Quercus lamellose</i>)	5			
Phaledo (<i>Erythrina stricta</i>)	5		11	
Pipal (<i>Ficus religiosa</i>)	7		6	
Salla (<i>Pinus roxburghii</i>)	39		5	
Simal (<i>Bombax ceiba</i>)	2		14	
Simali (<i>Vitex negundo</i>)	14			
Sirish (<i>Albizia labbeck</i>)	269			
Suntala (<i>Citrus sps</i>)	1			
Timmur (<i>Zanthoxylum armatum</i>)	2			
Tooni (<i>Toona ciliate</i>)	4			
Uttis (<i>Alnus nepalensis</i>)	307			
Walnut (<i>Juglans regia</i>)	8	1		
Others	58	15	17	
	4,879	144	67	

Annex XVIIIb

List of trees to be removed from Community Forest

Chainage	Name of plant species	Tree (GBH≥30cm)	Pole (16≥GBH<30cm)	Sapling (GBH<16cm)	Name of CF
1+600 to 1+800	Chilaune (<i>Schima wallichii</i>)	6	1		Bhangeli Chapp
	Dudhilo (<i>Ficus nerifolia</i>)	1			Bhangeli Chapp
	Gurans (<i>Rhodendron arboreum</i>)			5	Bhangeli Chapp
	Jhingane (<i>Eurya acuminata</i>)			2	Bhangeli Chapp
	Mauwa (<i>Bassia latifolia</i>)		1		Bhangeli Chapp
	Pahneli (<i>Listea salicifolia</i>)		3		Bhangeli Chapp
	Painyu (<i>Prunus cerasoides</i>)	8	2		Bhangeli Chapp
	Uttis (<i>Alnus nepalensis</i>)	5	7		Bhangeli Chapp
	Others	1	1		Bhangeli Chapp
2+000 to 2+400	Uttis (<i>Alnus nepalensis</i>)	3		3	Bhangeli Chapp
	Chilaune (<i>Schima wallichii</i>)	4			Bhangeli Chapp
	Gurans (<i>Rhodendron arboreum</i>)			1	Bhangeli Chapp
	Others		1	1	Bhangeli Chapp
5+200 - 7+200	Chilaune (<i>Schima wallichii</i>)	9	4	17	Mulkharka
	Sallo (<i>Pinus roxburghii</i>)	132	1	20	Mulkharka
	Kafal (<i>Myrica esculenta</i>)	1	2	5	Mulkharka
	Uttis (<i>Alnus nepalensis</i>)	8	21	40	Mulkharka
	Gurans (<i>Rhodendron arboreum</i>)			8	Mulkharka
	Jhingane (<i>Eurya acuminata</i>)			15	Mulkharka
	Mauwa (<i>Bassia latifolia</i>)		1	3	Mulkharka
	Pahneli (<i>Listea salicifolia</i>)	2	2	6	Mulkharka
7+200- 7+220	Chir Pine (<i>Pinus roxburghii</i>)	3	1	11	Dudhila
8+600 - 9+200	Sallo (<i>Pinus roxburghii</i>)	3			Mulkharka
	Chilaune (<i>Schima wallichii</i>)			2	Mulkharka
	Painyu (<i>Prunus cerasoides</i>)			3	Mulkharka
	Others	1		4	Mulkharka
9+200 to 9+600	Chilaune (<i>Schima wallichii</i>)	4	2	2	Bhumidevi
	Chir Pine (<i>Pinus roxburghii</i>)	37	1		Bhumidevi
15+600- 16+600	Angeri (<i>Lyonia ovalifolia</i>)			100	Kalika
	Asare (<i>Osbeckia stellata</i>)	5			Kalika

Chainage	Name of plant species	Tree (GBH>=30cm)	Pole (16>=GBH<30cm)	Sapling (GBH<16cm)	Name of CF
	Bhimsenpati (<i>Buddleja asiatica</i>)	4			Kalika CF
	Chilaune (<i>Schima wallichii</i>)	368			Kalika CF
	Dudhilo (<i>Ficus nerifolia</i>)	5			Kalika CF
	Guva (<i>Pisidium guyava</i>)	13			Kalika CF
	Guras (<i>Rhodendron arboreum</i>)	3			Kalika CF
	Katus (<i>Castanopsis indica</i>)	13			Kalika CF
	Khaniyu (<i>Ficus semicordata</i>)	1			Kalika CF
	Khirro (<i>Sapium insigne</i>)	40			Kalika CF
	Kutmero (<i>Litsea monopetala</i>)	18			Kalika CF
	Lankuri (<i>Fraxinus floribunda</i>)	6			Kalika CF
	Mauwa (<i>Bassia latifolia</i>)	17			Kalika CF
	Siris (<i>Albizia labbeck</i>)	2			Kalika CF
	Utti (<i>Alnus nepalensis</i>)	53			Kalika CF
	Sal (<i>Shorea robusta</i>)	1			Kalika CF
	Simal (<i>Bombax ceiba</i>)	2			Kalika CF
	Simali (<i>Vitex negudo</i>)	12			Kalika CF
	Tooni (<i>Toona ciliate</i>)	1			Kalika CF
	Others	32			Kalika CF
17+580- 17+760	Angeri (<i>Lyonia ovalifolia</i>)	2			Chuli Devi
	Chilaune (<i>Schima wallichii</i>)	184			Chuli Devi
	Dudhilo (<i>Ficus nerifolia</i>)	5			Chuli Devi
	Gedulo	4			Chuli Devi
	Guva (<i>Pisidium guyava</i>)	7			Chuli Devi
	Katus (<i>Castanopsis indica</i>)	10			Chuli Devi
	Gurans (<i>Rhodendron arboreum</i>)	2			Chuli Devi
	Kutmero (<i>Litsea monopetala</i>)	12			Chuli Devi
	Mauwa(<i>Bassia latifolia</i>)	15			Chuli Devi
	Phaledo (<i>Erythrina stricta</i>)	2			Chuli Devi
	Siris (<i>Albizia labbeck</i>)	2			Chuli Devi
	Uttis (<i>Alnus nepalensis</i>)	2			Chuli Devi
	Khaniyu (<i>Ficus semicordata</i>)	1			Chuli Devi
	Khirro (<i>Sapium insigne</i>)	2			Chuli Devi
	Lapsi (<i>Choerospondias axillaris</i>)	1			Chuli Devi
	Nemaro (<i>Ficus auriculata</i>)	2			Chuli Devi
	Sal (<i>Shorea robusta</i>)	2			Chuli Devi
	Simali (<i>Vitex negudo</i>)	3			Chuli Devi
	Toni (<i>Toona ciliate</i>)	3			Chuli Devi
	Others	4			Chuli Devi

Chainage	Name of plant species	Tree (GBH>=30cm)	Pole (16>=GBH<30cm)	Sapling (GBH<16cm)	Name of CF
17+780- 17+920	Angeri (<i>Lyonia ovalifolia</i>)	9			Chuli Devi
	Chilaune (<i>Schima wallichii</i>)	100			Chuli Devi
	Katus (<i>Castanopsis indica</i>)	13			Chuli Devi
	Sal (<i>Shorea robusta</i>)	11			Chuli Devi
	Kyamuna (<i>Cleistocalyx operculata</i>)	1			Chuli Devi
	Mauwa (<i>Bassia latifolia</i>)	17			Chuli Devi
	Pipal (<i>Ficus religiosa</i>)	1			Chuli Devi
	Sal (<i>Shorea robusta</i>)	5			Chuli Devi
	Toni (<i>Toona ciliata</i>)	1			Chuli Devi
	Uttis (<i>Alnus nepalensis</i>)	1			Chuli Devi
18+000- 18+400	Chilaune (<i>Schima wallichii</i>)	58			Dabi Bhirpakha
	Katus (<i>Castanopsis indica</i>)	25			Dabi Bhirpakha
	Sal (<i>Shorea robusta</i>)	36			Dabi Bhirpakha
	Kyamuna (<i>Cleistocalyx operculata</i>)	1			Dabi Bhirpakha
	Mauwa (<i>Bassia latifolia</i>)	1			Dabi Bhirpakha
	Uttis (<i>Alnus nepalensis</i>)	1			Dabi Bhirpakha
18+600- 21+000	Chilaune (<i>Schima wallichii</i>)	53			Dabi Bhirpakha
	Katus (<i>Castanopsis indica</i>)	7			Dabi Bhirpakha
	Sal (<i>Shorea robusta</i>)	42	20		Dabi Bhirpakha
	Kyamuna (<i>Cleistocalyx operculata</i>)	1			Dabi Bhirpakha
21+800 to 22+800	Angeri (<i>Lyonia ovalifolia</i>)	1			Dabi Bhirpakha
	Chilaune (<i>Schima wallichii</i>)	160	38		Dabi Bhirpakha
	Katus (<i>Castanopsis indica</i>)	118	24	23	Dabi Bhirpakha
	Sal (<i>Shorea robusta</i>)	264	123	107	Dabi Bhirpakha
	Siris (<i>Albizia labbeck</i>)	1			Dabi Bhirpakha
	Uttis (<i>Alnus nepalensis</i>)	12			Dabi Bhirpakha
	Kadam (<i>Anthocephalus chinensis</i>)	2			Dabi Bhirpakha
	Kyamuna (<i>Cleistocalyx operculata</i>)	3			Dabi Bhirpakha
	Lapsi (<i>Choerospondias axillaris</i>)	1			Dabi Bhirpakha

Chainage	Name of plant species	Tree (GBH>=30cm)	Pole (16>=GBH<30cm)	Sapling (GBH<16cm)	Name of CF
	Chilaune (<i>Schima wallichii</i>)	3			Dabi Bhirpakha
	Kutmero (<i>Litsea monopetala</i>)	3			Dabi Bhirpakha
	Kyamuna (<i>Cleistocalyx operculata</i>)	1			Dabi Bhirpakha
	Uttis (<i>Alnus nepalensis</i>)	2			Dabi Bhirpakha
	Total	2,040	256	378	

Annex XIXa

Affected house/structures along road alignment

S. N.	Chainage	Feature	Number	Location	Remarks
1	0+005	Toilet	1	ROW	
2	0+025	Septic tank	1	On alignment	
3	0+900	Tap stand	1	On alignment	
4	1+580	House	1	ROW	
5	1+720	Water tank	1	On alignment	
6	2+473	Source of drinking water	1	ROW	
7	3+625	House	1	ROW	
8	3+640	House	1	ROW	safe in 4m
9	4+200	House including toilet	1	ROW	
10	4+220	House	3	ROW	safe in 4m
11	4+240	House	1	ROW	safe in 4m
12	4+335	House	1	ROW	
13	4+680	Water mill	1	On alignment	
14	6+470, 680	Cattle shed (Katero)	2	On alignment	
15	7+360	Temple	1	On alignment	Aitabare than
16	8+080	House	2	ROW	
17	8+215	House	1	ROW	safe in 4m
18	8+250	Toilet	1	ROW	safe in 4m
19	8+320	House	1	ROW	
20	8+550	House	1	ROW	
21	8+570	Toilet	1	ROW	
22	8+573	Tap	1	On alignment	
23	8+685	Tap	1	ROW	
24	8+620-8+820	Houses	13	ROW	
25	8+620-8+820	Shed	2	ROW	
26	8+890	House	1	ROW	
27	8+900	House	1	ROW	safe in 4m
28	8+910	House	1	ROW	
29	8+925	Toilet	1	ROW	
30	10+960	House	1	ROW	
31	11+933	Toilet	1	ROW	safe in 4m
32	11+945	House	1	ROW	
33	11+960	Toilet	1	ROW	
34	11+985	Water tank	1	On alignment	
35	11+985	Toilet	1	ROW	
36	11+985	Tap	1	ROW	
37	12+030	House	1	ROW	safe in 4m
38	13+170	House	2	ROW	
39	13+435	House	1	ROW	
40	13+450	House	1	ROW	
41	13+445	Toilet	2	ROW	
42	13+470	Hut (Katero)	1	ROW	
43	13+750	Toilet	1	ROW	
44	13+755	Hut (Katero)	1	ROW	

S. N.	Chainage	Feature	Number	Location	Remarks
45	14+130	House	1	ROW	
46	14+190	House	2	ROW	
47	14+270	Katero	1	ROW	
49	14+540	House	1	On alignment	
50	16+170	House	1	ROW	
51	16+200	House	1	ROW	
52	16+520	House	2	ROW	
53	18+980	House	1	ROW	
54	18+980	Toilet	1	On alignment	
55	18+990	Water tank	1	ROW	
56	19+000	Tap	1	ROW	
57	19+015	House	1	ROW	
58	19+190	House	1	ROW	
59	22+265	House	1	ROW	
60	22+340	Tap	1	ROW	
61	22+320	House	4	ROW	
62	22+555	House	1	ROW	

Annex XIXb

Brief socio-economic status of the affected family (house will be removed)

S.N	Particulars	Description
1	Name of the owner	Jit Bahadur Bohora
2	Chainage	14+540
3	Occupation	Agriculture cum bussiness
4	Income	
4.1	Agriculture income (NRs.)	65,000
4.2	Non Agriculture income (NRs.)	40,000
5	Total Expenditure (NRs.)	82,500
6	Food Sufficiency	10 Month
7	Land holding	
7.1	Total landholding	15,770.85 sq.m
7.2	Loss land	3,801.55 sq .m (2.42 % of total)
8	Total family Member	5 (Male 3 Female 2)
9	Education satatus	4 people literate, 1 illiterate

Annex XIXc

Photograph of structure to be acquired



Birkha Bdr Shrestha: Cattleshed (Ch 6+480)



Birkha Bdr Shrestha: Cattleshed (Ch 6+470)



Fauda Singh Shrestha: Pani Ghatta (Ch 4+680)



Common Property: Reservoir Tank (Ch 1+720)



Common Property: Tap Stand (Ch 0+900)



Common Property: Temple (Aitabare at Ch 7+360)



Water Tank at Ch 11+985



House at Ch 14+540



Toilet at Ch 18+980



Tap at Ch 8+573