

Environmental Assessment Document

Initial Environmental Examination

Grant Number: 0093 NEP

March 2011

Nepal: Rural Reconstruction and Rehabilitation Sector Development Program

Kagbeni-Jhaite Road Subproject, Mustang 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
[ADB Grant 0093NEP]

Initial Environmental Examination (IEE) Report

or

Kagbeni-Jhaite Road Subproject Mustang District

Submitted to:
Ministry of Local Development
Government of Nepal

Proponent:
**District Development Committee/
District Technical Office**
Jomsom, Mustang

March, 2011

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ABBREVIATIONS

ACAP	Annapurna Conservation Area Program	IUCN	International Union for Conservation Nature
ADB	Asian Development Bank	Km	Kilometer
amsl	Above mean sea level	LDO	Local Development Officer
AP	Affected Person	LEP	Labour based, environment friendly and participatory
BG	Building Group	LEST	Livelihood Enhancement and Skill Training
CAMC	Conservation Area Management Committee	LRMP	Land Resource Management Project
Ch	Chainage	M	meter
CBO	Community Based Organization	MoU	Memorandum of Understanding
CBMC	Community Based Monitoring Committee	MoE	Ministry of Environment
CDC	Compensation Determination Committee	MoST	Ministry of Science and Technology
CDO	Chief District Officer	MI	Milliliter
CEA	Country Environmental Analysis	MLD	Ministry of Local Development
CGI	Corrugated Galvanized Iron	NGO	Non-Governmental Organization
CF	Community Forest	NRs	Nepali Rupees
CFUG	Community Forest Users Group	NTFPs	Non timber forest products
CISC	Central Implementation Support Consultants	OFID	OPEC Fund for International Development
CITES	Convention on International Trade in Endangered Species of Flora and Fauna	OP	Operational Plan
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
DG	Director General	RBG	Road Building Group
DIST	District Implementation Support Team	RCC	Reinforced Cement Concrete
DIT	District Implementation Team	RCIW	Rural Community Infrastructure Works
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads	REA	Rapid Environmental Assessment
DPO	District Project Office	RES	Rapid Environmental Screening
DPCC	District Project Coordination Committee	RIDP	Rural Infrastructure Development Project
DRSP	District Road Support Programme	RP	Resettlement Plan
DSCO	District Soil Conservation Office	RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Program
DTO	District Technical Office	RS	Resettlement Specialist
DTMP	District Transport Master Plan	SF	Social Funding
EA	Environmental Assistant/Assessment	SA	Social Appraisal
EARP	Environmental Assessment and Review Procedures	SDC	Swiss Agency for Development and Cooperation
ES	Environmental Specialist	SM	Social Mobilizer
EIA	Environmental Impact Assessment	SMC	Social Mobilization Coordinator
EMP	Environmental Management Plan	SMO	Social Mobilization Officer
EMS	Environmental Management Section	TA	Technical Assistance
EPA	Environmental Protection Act	ToR	Terms of Reference
EPR	Environmental Protection Rules	TWS	Technical Walkover Survey
ESD	Environment Screening Document	VDC	Village Development Committee
FGD	Focus Group Discussion	VICCC	Village Infrastructure Construction Coordination Committee
GoN	Government of Nepal	VOC	Vehicles Operators Committee
GIS	Geographical Information System	VRCC	Village Road Co-ordination Committee
Ha	Hectare	Zol	Zone of Influence
HH	Household		
IEE	Initial Environmental Examination		

NAME AND ADDRESS OF THE PROPONENT

Name of Proposal

Rehabilitation of Kagbeni- Jhaite Road Subproject, Mustang District, Nepal

Name and Address of Proponent

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कागबेनि भैते सडकको प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदनको कार्यकारी सारांश

पृष्ठभूमि

नेपाल सरकारले लामो दूधले गर्दा क्षति भएका ग्रामीण पूर्वाधारहरूको पुनःनिर्माण र पुनःस्थापना को कार्य एशियाली विकास बैंक (ADB), ब्रिटिस सरकार (DFID), स्विस् सरकार (SDC) तथा ओपेक फण्ड (OFID) को आर्थिक सहयोगमा ग्रामीण पूर्वाधार पुनःनिर्माण र पुनःस्थापना आयोजना नेपालको बिसवटा जिल्लाहरूमा संचालन गरिरहेको छ । मुस्ताङ जिल्लामा अवस्थित प्रस्तावित कागबेनि भैते (DTMP No. 45A002R) सडकको पुनःस्थापना सोही कार्यक्रम अन्तर्गत संचालन गर्न लागिएको एक उप-आयोजना हो । उप-आयोजना (प्रस्ताव) अन्तर्गत ३८.८ कि.मी. लामो उक्त नयाँ निर्माण गर्ने प्रस्ताव गरिएको छ ।

प्रस्तावक

प्रस्ताव (प्रस्तावित सडक उप-आयोजना) को प्रारम्भिक वातावरणीय परीक्षणको प्रस्तावक 'जिल्ला विकास समिति / जिल्ला प्राविधिक कार्यालय, मुस्ताङ हुन् । प्रस्तावकको प्रारम्भिक वातावरणीय परीक्षण स्विकृत गर्ने सम्बन्धित निकाय 'स्थानिय विकास मन्त्रालय' हो ।

प्रारम्भिक वातावरणीय परीक्षण अध्ययनको उद्देश्य

प्रारम्भिक वातावरणीय परीक्षण अध्ययनको मुख्य उद्देश्य प्रस्तावित उप-आयोजना निर्माण तथा संचालन बाट उक्त क्षेत्रको भौतिक, जैविक, सामाजिक, आर्थिक तथा सांस्कृतिक वातावरणमा पर्न सक्ने प्रभावहरू पत्ता लगाई नकारात्मक प्रभावको न्यूनिकरण र सकारात्मक प्रभाव बढाउने उपायहरू बारे सुझाव दिनु, वातावरणीय अनुगमन योजना बनाई कार्यान्वयन गराउनु, तथा प्रस्तावित सडक आयोजनाको लागि प्रारम्भिक वातावरणीय परीक्षण गरे पुग्छ, भन्ने कुराको यकिन गर्नु हो ।

प्रस्तावको सान्दर्भिकता

प्रस्तावित सडकले मुस्ताङ जिल्लाको सुदुर उतर-पूर्वी दुर्गम भेगका वासिन्दाहरूलाई सदरमुकाम संगको पहुँच बढाउनेछ भने स्थानिय स्तरमा उत्पादन हुने स्याउ, गहुँ, मकै, आलु, छुपी, दुग्ध व्यापारलाई बजार संग जोडी स्थानिय आय आर्जनमा अभिवृद्धि गर्नेछ । यो सडक खण्डले गर्दा पर्याटन विकास, काली गण्डकी राजमार्ग साथै राज्यको पहुँचमा सहयोग पुऱ्याउनेछ । मुस्ताङ जिल्लामा ३०९९ मेट्रिक टन फलफूल उत्पादन हुन्छ जस मध्ये ७२% स्याउ पर्दछ । यातायातको राम्रो सुविधा नभएकोले वार्षिक ७०० टन अर्थात कुल उत्पादनको ३०% मात्र बाहिरिन्छ । स्याउ खेती र व्यापारले गर्दा तल्लो र माथिल्लो मुस्ताङको विभिन्न ठाउँहरू विकास हुनेछ । जसले गर्दा आर्थिक उन्नति, गरिबी न्यूनिकरण र सामाजिक स्थितिमा सुधार आउँनेछ ।

अध्ययन प्रकृया

जुलाई, २००९ मा फिल्ड सर्वेक्षणबाट लिइएको तथ्याङ्क तथा अन्य उपलब्ध तथ्याङ्कहरूको साथै सामाजिक तथा प्राविधिक टोलीबाट पुनर्वास कार्यको सर्वेक्षणको सिलसिलामा संकलन गरेका तथ्याङ्कहरू केलाएर प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन तयार गरी निष्कर्ष तथा सुझावहरू दिइएको छ । यो प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन नेपाल सरकारको वातावरण संरक्षण ऐन २०५३, वातावरण संरक्षण नियमावली २०५४ अनुसार तथा स्थानिय विकास मन्त्रालयबाट मिति २०६६/०९/१६ मा स्विकृत गरिएको यसै प्रस्तावको कार्यसूची अनुसार तयार गरिएको छ । साथै, एशियाली विकास बैंकको Environmental Assessment Guideline, 2003 को समेत अनुसरण गरिएको छ ।

आयोजनाको विवरण

प्रस्तावित सडक अन्नपुणसंरक्षण क्षेत्रमा पर्दछ । प्रस्तावित सडक मुस्ताङ जिल्लाको सुदुर उतर-पूर्वी दुर्गम भेगमा पर्दछ । यसको कूल लम्बाइ ३८.८ कि.मि. छ । सडकमा १ पुल (Ch. 15+211) निर्माण गर्नु पर्ने देखिन्छ । यो सडकमा तिन वटा गाउँ विकास समितिहरू क्रमशः कागबेनि, छुसाङ्ग र घमि भएर जान्छ । सडकको कूल चौडाइ ५ मि. हुनेछ । यस उप-आयोजनाको कूल अनुमानित लागत रु.२५८,२३७,५२४ र प्रति कि.मी अनुमानित लागत रु.६,६५५,६०६ लाग्ने देखिन्छ ।

विद्यमान वातावरणीय स्थिति

प्रस्तावित उप आयोजना अन्नपूर्ण संरक्षण क्षेत्र भित्र पर्दछ । यो सडक कागबेनि गा.वि.स.को कागबेनि बाट समुद्री सतहदेखि २७७० मी. को उचाईबाट शुरु भएर ३९८० मी. उचाईको घमि गा.वि.स.को भैतेमा पुग्छ । यहाँ सशितोष्ण चिसो, हिमाली तथा चिसो लेकाली हावापानी पाइन्छ । सडक खण्डमा भुक्षयको समस्याहरू देखिन्छ । भौगोलिक दृष्टिको आधारले छुसाङ्ग र चैले चेनेज (१४+६००-१५+६००) कमजोर क्षेत्रमा पर्दछन् भने समर देखि भेना चेनेज (२२+७००-२५+००) पनि यसै अन्तर्गत पर्दछन् साथै चेनेज (०+५००, ९+२००-९+७००) हुँगे क्षेत्र अन्तर्गत पर्दछ । सडक खण्डमा पर्ने पानीको मुख्य श्रोतहरूमा चेनेज (१३+५८०) मा नरसीङ्ग खोला, चेनेज (१५+२९९) मा कालिगण्डकि खोला र चेनेज (३५+४२०) मा इताङ खोला पर्दछन् । प्रस्तावित सडक क्षेत्रको वायु तथा पानीको स्तर सफा रहेको देखिन्छ साथै ध्वनि प्रदुषणको समस्या देखिदैन । यो सडक प्रायः खेती गरिएको जमीन, खाली जमिन र बस्तीहरू भएर जान्छ ।

यस सडक खण्डमा पाइने मुख्य रुखको प्रजातिहरूमा स्याउ, भोटेपिपल, बैस, आरु, धुपि आदी पर्दछन् । यसको अलवा यस सडक खण्डको प्रभावित क्षेत्र भित्र संरक्षित NTFP हरूमा हिमालयन थिम, जिम्बु, भोटेजिरा, अदुवा, आदि पर्दछ । साधारणतया यहाँका जंगलमा रातो फ्याउरो, ब्यासो, हिमालयन भालु, नाउर, खरायो, थार आदि पाईन्छन् । यसको अलवा यस सडक खण्डको प्रभावित

क्षेत्र भित्र संरक्षित वन्य जन्तुमा हिमचीतुवा र जोखीममा परेका वन्य जन्तुमा हिम मृग पाईन्छन् । साथै काग, परेवा, डांफे, च्याखुरा, चिल, मुनाल आदि पंक्षीहरु सडक छेउको वनमा पाईन्छ ।

यो सडक खण्डको प्रभावित क्षेत्र भित्र जम्मा घरधुरी संख्या २३९ र जनसंख्या १२३६ रहेको छ र सरदर परिवार संख्या ५.२३ छ । विशेष गरि यहाँ थकालि र गुरुङ्ग जातीहरु बसोबास गर्दछन् । कागबेनी, टडवी, छुसाङ, चैले, समर, भेना, स्थाडवासा, घिलिङ र भैते यहाँको मुख्य बसोबास क्षेत्र हो । यहाँका बासिन्दाहरुको मुख्य पेसा व्यापार कृषि र पशुपालन हो । यातायातको राम्रो सुविधा नभएको तथा पहाडी क्षेत्र भएकोले कृषि उब्जनीले मात्र पर्याप्त नहुने हुँदा यहाका अधिकांश मानिसहरु श्रम रोजगारीका अन्य पेशामा काम गर्ने साथै उल्लेखनीय प्रतिशत मानिसहरु जीविकोपार्जनको सिलसिलामा हिउँदमा काठमाडौं, पोखरा तथा भारत लगायतका ठाउँमा रोजगारीको लागि जाने गर्दछन् । केही मानिसहरु जरिवुटी जस्तै अदुवा, निम्बु, भोट्टे जिरा आदिको व्यापार गर्दछ । कोही मानिसहरु गाई, बाख्रा, भेडा, घोडा न्यानो ठाउँमा चराउन जान्छन् भने कोही विभिन्न व्यापार गर्दछन् ।

प्रमुख वातावरणीय प्रभावहरू

सकारात्मक प्रभाव

उप-आयोजना बाट तत्कालै हुने लाभमा स्थानीय स्तरमा रोजगारीको सिर्जना हुनेछ । आयोजना संचालनको लागी करिव २७६५५५ मानव-दिन बराबरको अदक्ष र ११०६१ मानव-दिन बराबरको दक्ष श्रमशक्तीको आवश्यकता पर्नेछ । आयोजना संग सम्बन्धित कार्यमा (रोजगारीमा) गरीब, महिला तथा पिछ्छाडिएका स्थानीय जनताले प्राथमिकता पाउनेछन् । यस चरणमा हुने अन्य लाभहरुमा वन्द व्यापारको बृद्धि, उप-आयोजनाले प्रदान गरेको शीपमुलक तथा जनचेतनामुलक तालिम तथा उप-आयोजना निर्माण कार्यमा सहभागी भई स्थानीय जनताको शीप बृद्धि हुने अवसर पर्दछन् ।

सडक सञ्चालनका चरणमा सडकले प्रभावित क्षेत्रका बासिन्दालाई बजार, सामाजिक सेवा प्रदायक स्थान तथा देशका अन्य भागहरुसम्म पुग्न छिटो, छरितो तथा सुविधाजनक पहुँचको अवसर प्रदान गर्नेछ । हाल कागबेनीबाट भैते पुग्न २ देखि ३ दिन लाग्छ, भने सडक संचालन गएपछि ४ देखि ५ घण्टामा पुगिन्छ । साथै समानको मूल्य पनि घट्नेछ अर्थात त्याहाँको बासिन्दाहरुको खानेकुरामा खर्च गर्ने क्रय शक्ति बढ्नेछ । त्यसैगरी यातायातको सुविधाले गर्दा स्थानीय तहमा उत्पादन हुने स्याउ, ब्रयाण्डी, गहुँ, जुस, जाम आदिले बजार पाउनेछ र नेपालको विभिन्न ठाउँहरुमा पुर्‍याउन सकिनेछ । त्यसैगरी तिब्बतसंग व्यापार गर्न सजिलो हुन्छ । सडक सुविधाको कारण मल तथा किटनाशक औषधीहरुको सस्तो तथा सुलभ आपूर्तिले कृषिको उत्पादकत्वमा अभिवृद्धि हुनेछ । यसले स्थानीय जनताको आय तथा खाद्य सुरक्षामा अभिवृद्धि हुनेछ साथै स्थानीय श्रोत साधनको उपयोग गर्ने साना कृषि उद्योगहरुको प्रवर्द्धन हुनेछ । पहुँच तथा यातायातको अवसर सगै शिक्षा, स्वास्थ्य, संचार, बजार, वैकिङ्ग तथा अन्य आर्थिक तथा सामाजिक क्षेत्रहरुको विकास हुनेछ । यसले यस क्षेत्रका मानिसहरुको समग्र जीवनस्तर उकास्न मद्दत पुर्‍याउनेछ । सडकको सञ्चालनले स्थानीय जग्गा जमिनको मूल्य बृद्धि गर्न सहयोग पुर्‍याइ स्थानीय जग्गाधनीलाई लाभ पुर्‍याउनेछ ।

यो उप-आयोजनाले गर्दा बेनी-जोमसोम लोमाङ-थाङ-चाइना नाका सडक (काली-गण्डकी राजमार्ग) बनाउन सहयोग पुग्नेछ । जसले गर्दा भविष्यमा भारत - चाइना व्यापारको लागि मुस्ताङ भविष्यमा महत्वपूर्ण स्थान बन्न सक्नेछ ।

उप-आयोजना कार्यन्वयनबाट पर्न सक्ने नकारात्मक प्रभावहरू:

सडक निर्माणको दौरान बाटो चौडाइ ५ मी. कायम गर्नको लागी ४.२१ हेक्टर खाली जमिन र ०.५५ खेती जमिन प्रयोग हुनेछ । धेरै ठाउँमा सडक खुलीसकेको छ तर भीर पहिरो भएको क्षेत्रहरु चेनेज (०+५००, ९+२००-९+७००) र चैते देखि समर सम्मको बाटो नयाँ निर्माण गर्नु पर्नेछ । विभिन्न पहिरो जाने क्षेत्रहरु छन् जसलाई संरक्षण गर्न जरुरी छ । ०+८००, ५+५००, ८+८००, १४+१६०-१४+९२०, २०+०२०, २५+१७०, २८+९००, ३०+३५०, ३२+२०० र ३३+००० मा पहिरो रोकथाम गर्नु पर्नेछ । सडक निर्माणको क्रममा खन्दा निस्किएको माटो तथा ग्रेगर थुपार्दा, निर्माण सामग्री भिक्नलाई खानी सञ्चालन गर्दा त्यस क्षेत्रको भिरालो ठाँउहरुमा असर पर्न गई पहिरो तथा भु-क्षय हुन सक्ने सम्भावना रहन्छ । फोहर तथा खन्दा निस्किएका माटो, ग्रेगर को उचित व्यवस्थापन हुन सकेन भने यसले भु-क्षय बढाउन तथा जल प्रदुषण गराउन सक्छ । काली गण्डकी नदी नियन्त्रण गर्नको लागि रिभर ट्रेनिङ वर्क गरीने छ ।

विभिन्न जातका गरी करिव २३५ वटा निजी रुखहरु सडक निर्माणको क्रममा काट्नुपर्ने हुन्छ । यस उप-आयोजनाले विभिन्न ठाउँमा नर्सरी स्थापना गरी वायोईन्जिनिरिङ र वृक्षारोपण गर्नेछ । यस आयोजना अन्तर्पूर्ण संरक्षण क्षेत्र भित्र परेतापनि कुनै पनि जंगल र वन्यजन्तुलाई कुनै प्रकारको हानी नहुने गरी निर्माण संचालन गरीनेछ । संरक्षित र महत्वपूर्ण वन्य जन्तुहरु जस्तो हिमचीतुवा, भेडा, मृग, मुनाल, डाँफेहरु जाडो छल्लको लागि तलतिर आउँछन् जुन समय हिमपातले गर्दा सडक निर्माण तथा संचालन चार महिना हिउँदमा रोकिन्छ । यसले गर्दा तल भरेका महत्वपूर्ण संरक्षित तथा संकटापन्न जीवजन्तुहरुमा नकारात्मक असर धेरै कम हुनेछ ।

सडक निर्माण कार्यको दौरान ०.५५ हेक्टर निजी खेती योग्य जमीन अधिग्रहण गर्नुपर्ने हुन्छ जसले गर्दा वार्षिक गहुँ, आलु वालीको उत्पादनमा असर पुग्नेछ । सडक निर्माणले ताडवेमा एउटा खलाघर चेनेज (९+७००), १ वटा गोठ चेनेज (९+६८०), छुसाङ गा.वि.स.मा निजी पर्खाल चेनेज (१३+६४०-६८०, १३+७८०-१३+९००) र कागबेनीको खेती योग्य जमीन चेनेज (०+०००-१+०००) मा क्षति पुग्ने देखिन्छ । १५ वटा विद्युत पोल चेनेज (९+१३०-१०+१००), कागबेनी र छुसाङको सिंचाई चेनेज (०+६९५, ०+७५८, ०+७८०, १३+६९०, १३+८००-१३+९२०) र एउटा खानेपानीको लाईन चेनेज (९+२००-९+२२०) लाई पनि क्षति पुग्ने देखिन्छ । निर्माण कार्यको क्रममा धुलोले स्थानीय जनताको स्वास्थ्यमा असर पन तथा भीर र खोलामा काम गर्दा अप्रिय दुर्घटनाहरु घट्न सक्ने सम्भावना रहन्छ ।

सडक सञ्चालनको चरणमा सवारी साधनको आवगमनबाट, वर्षायामको पानीबाट तथा स्थानीय भिरपहराहरुमा गाईवस्तु चराउदा वा रुख विरुवा काट्दा भिरपहराहरुमा अस्थिरता बढ्न गई पहिरो जान सक्छ । सवारी साधनको बृद्धिले वायु तथा ध्वनी प्रदुषण बढ्नेछ । त्यसैगरी सडकको सुधार संगै वन क्षेत्रसम्म भएको पहुँचको बृद्धिले वन सम्पदा तथा वन्य जन्तुमा चाप बढ्न गई वन सम्पदाको क्षय र जीवजन्तुलाई असर पर्न सक्छ । सडकको सुधार संगै बस्ती र बजारको अव्यवस्थित विस्तार हुने सम्भावना र सडक क्षेत्र मिच्ने प्रवृत्ति देखिन सक्छ ।

प्रभाव न्युनिकरणका उपायहरु:

यस उप-आयोजनालाई वातावरण मैत्री बनाउनका लागि सकारात्मक प्रभावलाई बढावा गर्ने तथा नकारात्मक प्रभावहरुलाई नियन्त्रण या न्युनिकरण गर्ने थुप्रै उपायहरु यस प्रतिवेदनमा प्रस्तावित गरिएको छ । जनताले राजी खुशीले वाटोको लागि दिएको बाहेक आयोजनाले गरिवीको रेखामुनि परेका परिवारहरुको अधिग्रहण गर्ने सबै जग्गाको प्रचलित मूल्य तथा मुआब्जा निर्धारण समितिले तोके अनुसार क्षतिपूर्ति दिनेछ । सडक ठेक्का र मानव-श्रम प्रविधिमा आधारित हुनेछ, तथा सकेसम्म LEP (श्रम मुलक, वातावरण मैत्री, सहभागीता मुलक) ढंगले निर्माण गरिने छ । उप-आयोजनाले प्रभावित जनतालाई निर्माण कार्यमा रोजगारीमा तथा शिपमुलक तालिममा प्रथमिकता दिनेछ । उप-आयोजना निर्माणको क्रममा जग्गा फँडानी गर्दा, जमिन काट्दा, खानी सञ्चालन गर्दा, खन्दा निस्किएका माटो, ग्रेगर थुपार्दा तथा अन्य कार्य गर्दा त्यस क्षेत्रको संवेदनशील वातावरणलाई सुरक्षित राख्न विशेष ध्यान दिनेछ । वायो इन्जिनियरिङ र वाटो छेउ-छाउ वृक्षारोपण गर्न उप-आयोजनाले नर्सरी स्थापना गर्ने छ । निर्माण कार्यमा कार्यरत श्रमिकहरुको विमा गरिने छ तथा प्राथमिक उपचार र सुरक्षाका सम्पूर्ण सामग्रीहरुको व्यवस्था गरिने छ । काटिएका निजी रुख विरुवाहरुको क्षतिपूर्ति वापत १:१ अनुपातमा निजी जग्गाहरुमा वृक्षारोपण गरिनेछ । वृक्षारोपणमा संरक्षित तथा स्थानिय प्रजातिहरुलाई प्राथमिकता दिइनेछ । सडक सञ्चालनका क्रममा सडकमा देखिएका अस्थिरताहरुलाई नियमित रुपमा मर्मत संभार गरिनेछ । वायो इन्जिनियरिङ र वाटो छेउ-छाउ वृक्षारोपण गर्न उप-आयोजनाले नर्सरी स्थापना गर्ने छ । ACAP को संयोजकमा विभिन्न तालीम र जनचेतना मुलक कार्यक्रम गाडी संचालकलाई दिइनेछ । उक्त क्षेत्रमा स्थानीय गाडी व्यवसायहरुलाई मात्र गाडी संचालन गर्ने अनुमति दिइनेछ जसले गर्दा अत्यधिक गाडीको चाप नियन्त्रण गर्न सकिनेछ । स्थानीय सवारी साधनलाई मात्र प्राथमिकता दिदा उनीहरु आफ्नो क्षेत्रको वातावरण तथा वन्यजन्तुको संरक्षणमा वढी जवाफदेही हुनेछन् । जसले गर्दा वन्यजन्तुलाई क्षति हुन बाट जोगाउँछ । खुला दिसा पिसाब नियन्त्रण गर्न सार्वजनिक सौचालयको निर्माण गरिनेछ । ब्लास्टिड तथा एक्सकेभेटर जस्ता ठूला मसिनको प्रयोग पूर्णतः निषेध गरिने छ । बाटोमा भएका ठूला ढुंगालाई काट्न हाइड्रोलिक ह्यामर अथवा मानव शक्ति मात्र प्रयोग गरिनेछ । क्षति भएका निजी संरचनाको क्षतिपूर्ति गरिने छ । सडक दुर्घटना बाट बचाव गर्न उपायहरु अवलम्बन गरिनेछ । सडक निर्माण र संचालनको चरणमा नियमित अनुगमन गरिने छ ।

वातावरण व्यवस्थापन योजना

यस प्रतिवेदनमा वातावरण व्यवस्थापन योजना अन्तर्गत उप-आयोजनाबाट पर्ने संभावित असरहरु, असरहरुको प्रभाव, न्युनिकरण विधि, अनुगमन विधि तथा कार्यतालिका प्रस्तावित गरिएको छ । यसका साथै न्युनिकरणका उपायहरुको तथा अनुगमन कार्यको कार्यान्वयन गर्ने जिम्मेवार निकायहरुको पनि पहिचान गरिएको छ । अनुगमनका लागि आवश्यक भौतिक, जैविक, सामाजिक-आर्थिक तथा साँस्कृतिक वातावरणका विभिन्न अनुगमन सुचाइहरुको पनि पहिचान गरिएको छ । वातावरण व्यवस्थापन योजना कार्यान्वयन गर्न निम्नानुसार खर्च हुने अनुमान गरिएको छ:

क्र. सं.	विवरण	रकम (ने.र.)
१.	वातावरण सम्बन्धी जनचेतनामूलक तालिम तथा अन्य तालिम	२००,०००/-
२.	श्रमिकहरुको विमा	४००,०००/-
३.	वायो-इन्जिनियरिङ	१७,२०५,२५३/-
४.	पुनर्वास तथा जग्गा अधिग्रहण	३,५१५,३०९/-
५.	पुनर्निर्माण तथा अन्य	५००,०००/-
६.	क्षतिपूर्ति वृक्षारोपण	११३,०२५/-
७.	सामाजिक कार्य योजना	२२८,९०००/-
८.	पेशागत स्वास्थ्य सुरक्षा तथा जानकारीमूलक सूचनापाटी	३००,०००/-
९.	सरसफाई	१,७३८,३८५ /-
१०.	सडक सञ्चालनको समयमा वातावरण व्यवस्थापन गर्न खर्च	१,०००,००० /-
११.	अनुगमन तथा मुल्यांकन	८००,०००/-
	जम्मा :	२८,०६०,९७२/-

निष्कर्ष

परिचान गरिएका प्रायः वातावरणीय प्रभावहरुलाई उपयुक्त निकायको उपायहरु प्रयोग गरी हदै सम्म व्यवस्थापन गर्न सकिने पाइएको छ । संरक्षित क्षेत्रमा गरीने निर्माण तथा संचालनले मुख्यतया संचालनको क्रममा अत्यन्त संवेदनशीलताका साथ अनुगमन तथा व्यवस्थापन गर्न जरुरी हुनेछ । वातावरण व्यवस्थापन योजना अन्तर्गत उल्लेख गरिएको उपायहरुको कार्यान्वयन गरिएमा यस आयोजनाको कार्यान्वयनले आयोजना क्षेत्रको भौतिक, जैविक, सामाजिक - आर्थिक तथा साँस्कृतिक वातावरणमा उल्लेखनीय नकारात्मक प्रभावलाई नियन्त्रण गर्नेछ । यस प्रारम्भीक वातावरणीय अध्ययनको आधारमा यस प्रतिवेदनमा उल्लेख गरिएको वातावरणीय व्यवस्थापन योजनालाई पूर्ण रुपमा लागु गरी प्रस्तावित उप-आयोजना कार्यान्वयन गर्न सिफारिश गरिन्छ । उप-आयोजनाको 'वातावरणीय प्रभाव मुल्याङ्कन' स्तरमा अध्ययन गर्न आवश्यक नरहेको सिफारिश समेत गरिन्छ ।

EXECUTIVE SUMMARY

Background

Government of Nepal has received financial assistance from ADB, DFID, SDC and OFID for implementation of the Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP). The RRRSDP aims for reconstruction and rehabilitation of rural infrastructures damaged in the twenty conflict affected districts of the country. The Proposed 38.8 km long Kagbeni-Jhaite Rural Road (DTMP No. 45A002R) in Mustang District is one of the Subprojects selected under the RRRSDP. It is for rehabilitation of existing road together with new construction at some sections in earthen standard.

Project Proponent

The 'Proponent' of the proposed Subproject (Proposal) is District Development Committee (DDC)/ District Technical Office (DTO), Mustang. Ministry of Local Development (MoLD) is the 'Concerned Agency' for approving the IEE study.

Objectives of the IEE Study

The objectives of the IEE study is to identify the impacts on the physical, biological, socio-economic and cultural environment of the project influence area from construction and operation of the Proposal, and recommend site-specific adverse impact mitigation measures and beneficial impact augmentation measures. The Study will assess if the IEE level study is sufficient for the Subproject.

Relevancy of the Proposal

The proposed Subproject will connect remote north- eastern area of Mustang district with the district headquarters, hence it will provide easier access to people to social services, and market access for local product like apple, buck wheat, maize, wheat, potato, barley, dairy production and NTFPs. This road will also help in facilitating completion of the Beni- Jomsom – Lo manthang – China Border road (Kali Gandaki Highway), which could eventually turn Mustang into one of the most important transit points for Indo-China trade via Nepal in future. It helps to increase in tourism, reach of the state. Mustang District produces over 3099 metric tons of fruits and apple represents almost 72% of the district's total fruit production. Lack of accessibility, only 700 tons of apples is exported annually, which makes only 30% of the total production. Apple farming in commercial scale will develop in many potential places of Lower and Upper Mustang. As a result, the Subproject will assist to promote economic activities, reduce poverty and increase socio-economic conditions of the people of the area.

Methodology

The IEE study has been conducted through review of secondary information collected from relevant agencies, and primary information collected from the field survey in July 2009. The survey methods included walk-through survey along the proposed alignment with checklists, conduction of sample household survey, organizing focus group discussions (FGD) in the related VDCs, and information supplemented by the resettlement and technical team of the Subproject. The IEE report has been prepared following the Environmental Protection Act, 2053 BS (1997 AD) and Environmental Protection Rules, 2054 BS (1997 AD) (second amendment 2007) of the Government of Nepal (GoN); and Environmental Assessment Guidelines, 2003 of ADB. The report follows the Terms of Reference for IEE Study approved by MoLD on 16/01/2066 BS.

Description of the Subproject

The proposed road lies at the remote north-eastern part of Mustang district. The total road length of the proposed subproject is 38.8 km road. A bridge at Ch. at 15+211 is proposed for construction which will provide access and service for all weather condition. The road passes through Kagbeni, Chhusang and Ghami Village Development Committees (VDCs). Average width of the road will be 5m. More than 70% earthen track has already been opened. Total project cost is NRs. 258,237,524 and NRs. 6,655,606 per km.

Existing Environmental Condition

The proposed road subproject lies in Annapurna Conservation Area. The road starts from Kagbeni of Kagbeni VDC at 2770m amsl and ends at Jhaite of Ghami VDC at 3980m amsl. The road lies in cool temperature, alpine climatic region. Geological weak section of the road is from Chhusang and Chaile at chainage 14+600-15+600 and other section is from Samar to Bhena at Ch.22+700-25+000. Rocky areas are at chainage 0+500, 9+200 – 9+700. The major rivers along the road alignment are Narsing at Ch. 13+580 Chhusang, Kaligandaki at Ch. 15+211 Chaile and Ittang Khola at Ch. 35+420 Ghiling. Ambient air and water quality of the proposed project area is observed to be good and there is no noise pollution. The road passes through cultivated land, barren/bushes lands and settlements.

The dominant vegetation found in the road alignment are Apple (*Malus domestica*), Bhote pipal (*Betula utilis*), Bains (*Salix alba*), Aru (*Pashia sp.*), Dhupi (*Juniperus indica*), *Saxifraga lychnitis*, *Anaphalis contorta* and *Caragana gerardiana*. The NTFPs found in the Zol of the project area are Himalayan Thyme (*Thymus linearis*), *Asparagus sps*, *Cordyceps sinensis*, *Allium fasciculatum*, Jimbu (*Allium wallichii*), Himalayan Arnebia (*Arnebia benthamii*), Himalayan rose (*Rosa macrophylla*), Bhote jira (*Carum carvi*), Garlic. Red Fox (*Vulpes vulpes*), Gray Wolf (*Canis lupus*), Himalayan Thar (*Hemitragus jemlahicus*), Hispid Hare (*Caprolagus hispidus*), Himalayan Blue Sheep (*Pseudois nayaur*) and Himalayan Brown Bear (*Ursus arctos*) are the common wildlife; where as endangered wildlife like Snow leopard (*Panthera uncia*) and vulnerable species like Himalayan Musk Deer (*Moschus chrysogaster*) are also found in the Zol. Crow (*Corvus splendens*), Pigeon (*Columba livia*), Danphe (*Lophophorus impejanus*), Chyakhura (*Alectoris chukar*), Eurasian Eagle (*Bubo bubo hmachalana*), Monal (*Tragopan satyra*) are the common birds found in the Subproject area.

Total population of the Subproject area is 1236, total household number is 239, and average family size is 5.23. Thakali and Gurung are the main castes living in the area. Major settlements are Kagbeni, Tangbe, Chhusang, Chaile, Samar, Bhena, Syangboche, Ghiling and Jhaite. Subsistence business, hotels and lodges for tourists, agriculture and livestock farming are the main occupation. Due to limited transportation facilities and high altitude, agriculture farming is not enough even for subsistence level. Moreover, significant percentage of the economically active male population also migrates to various places including Kathmandu, Pokhara and India during winter season (snowfall season) for trade such as buying and selling of warm cloths. Some are engaged in trading agricultural and non-timber forest products such as garlic, jimbu (*Allium wallichii*), bhote jira (*Carum carvi*) etc. Some take their cows, goats, sheep, horses to warm places for grazing, and the owners are engaged in petty trade such as buying cloths and other household items from cities and selling them to different villages.

Major Environmental Impacts

Beneficial Impacts

The immediate benefit from this road Subproject is employment opportunities. The implementation of Subproject require about 276555 person days of unskilled and 11061 person days of skilled manpower. Other beneficial impacts include enhancement of local business, development in skills of local people from skill developing training, awareness raising training and involvement in the construction of the project.

During operation stage of road, the people from the Zone of Influence (Zol)¹ will get easy and fast accessibility to markets, social services and other regions of the country. At present, it takes 2 to 3 days walk to reach Jhaite from Kagbeni. After operation it will take only about 4 to 5 hours to travel the same distance. The prices of basic household commodities coming from Beni, Pokhara are expected to fall significantly in future. The current price of most of basic commodities in Jomsom is almost double as compared to the prices in Pokhara. The falling prices of commodities will be particularly beneficial to the poor people who spend their income on food. Improved access will increase export of local products apple, brandy, buckwheat, juice, jam etc. and will get cheap and faster to markets in different parts of country. The trade of local goods with Tibet will become easier and increase with the operation of this road. This will ensure better economic condition of the people living in the Zol of the project area. Moreover this will promote the small agro based industries that uses local resources. Easy access and opportunity of better transportation system will develop other sectors like education, health, communication, market, banking and other socio-economic sectors. This will increase the overall living condition of the people living in Zol of project area. This road also help in facilitating

¹ Zol is one and half hour walking distance from the road and areas of related VDCs.

decisions for the construction of the Beni- Jomsom – Lo manthang – China Border road (Kali Gandaki Highway), which could eventually turn Mustang into one of the most important transit points for Indo-China trade in future.

Adverse Impacts

During construction of road will convert 0.55 ha. of cultivated land and 4.21ha.of barren/ bushes land into road. The stretches at Tanbe rocky area (0+500, 9+200 – 9+700), Chaile to Samar are remaining for new construction. Several slide areas exists along the opened section that requires stabilization. Major slide areas along the road alignment are at Ch 0+800, 5+500, 8+800, 14+160 – 14+920, 20+020, 25+170, 28+900, 30+350, 32+200 and 33+000. The road passes through highly unstable area prone to loose soil fall from 14+160 to 14+920 and Chaile to Samar. During the road construction, the cutting of slopes and consequently disposal of soil and earth material, operation of quarries might result in an erosion and landslide during construction and operation. Furthermore, spoils generated during construction can create the water pollution to the nearby water sources.

Different type 235 nos of tree will have to be cleared from private land. The project will establish nursery and extensive bioengineering and tree plantation program will be carried out at all feasible sites. The subproject area lies within the Annapurna Conservation Area. Being sensitive habitat of wildlife special consideration will be needed to protect wild animals and birds of the surrounding area. During construction of road there will be possible impacts on wildlife as workers might harass/ hunt the wildlife in the nearby bushes/forests, however, such effects are expected to be minimum. Important and rare wildlife including Snow leopard, Blue sheep, Musk deer, Danphe and Monal live in the mountains at higher altitude. They climb down to lower level only during winter, when there is snowfall. Road will be closed during winter for about 4 months. Labours and local people will be exposed to dust nuisance, and accidents relating to construction activities.

During construction stage, there will be loss of 0.55 ha agricultural land which results in annual reduction of agricultural production mainly barley, buckwheat and potato. During road construction, private structures one Khala ghar (9+700) and one cattle shed (9+680) at Tangbe, wall structures (13+640 - 13+680, 13+780 - 13+900) at Chhusang and agricultural land (0+000 - 1+000) at Kagbeni will be affected. Public structures 15 nos Electric Poles (9+130 - 10+100), Irrigation Crossing, canal 0+695, 0+758, 0+780 at Kagbeni, 13+690 and 13+800 - 13+920 at Chhusang, trekking trails 0+000 - 9+000 at Kagneni- Tangbe, 22+000 - 24 +000 at Samar and a water supply pipe at 9+200 - 9+ 220 will be affected.

During operation stage, vehicular movement, grazing of animals on slopes might result in slope instability and hence erosion and landslides might occur because of poor geology. Vehicular emissions will result in air and noise pollution. The dust and noise however will causes nuisance to trekkers. Noise will disturb the wildlife of the area, particularly birds that will get scared by the sound of vehicle and horn, all along the road, particularly bushes/forest area between Samar to Syangboche. New settlement, bazaar area may increase encroachment of the RoW.

Mitigation Measures

The various benefit augmentation measures and adverse impact mitigation measures have been proposed in the report to make this subproject environment friendly. Other than land donated by local people for the project, adequate compensation will be provided to affected household for all the lands and other structures that need to be acquired. The construction of road will be based on contractor and RBG as possible Labour-based, Environment friendly and Participatory (LEP) Approach. Affected families will be given high priority for employment and skill development trainings. Necessary measures will be taken to reduce the adverse effects that will arise from site clearance, cutting of slopes, disposal of spoils and quarrying activities. Bio-engineering and civil engineering measures will be adopted for slope stability. At construction site, the workers will be provided insurance, first aid facilities and safety equipments. Loss of trees from the private land will be compensated by planting of trees in the ratio 1:1 from private land during construction. Local species will be given emphasis for plantation. The project will establish nursery for roadside plantation and bio-engineering works. Co-ordination with ACAP for conducting trainings and awareness programs will be conducted for vehicle operators, necessary signboard will be erected at wildlife crossing areas. Only local vehicles shall be allowed in the area. This will control poaching and harassing wildlife. Only locally operated standard vehicles operated by local beneficiaries shall be allowed. Public urinals shall be constructed at every settlement (vehicle stops) to control open defecation. Blasting shall be restricted. Hydraulic jack hammer mounted on excavator shall be used for rock cutting. All affected public services will be reinstated, relocated. Adequate road safety measures will be provided to minimize road accident. Continue monitoring will be carried during construction and operation and maintenance period.

Environmental Management Plan

Environmental management plan is prepared to ensure the implementation and monitoring of mitigation measures for minimizing adverse impacts and maximizing the beneficial impacts. The necessary mitigation measures together with environmental monitoring process and responsible bodies for environmental monitoring have been identified. Similarly, for environmental monitoring various sections of physical, biological, socio-economic and cultural environment have been identified to generate useful information and improves the quality of implementation of mitigation measures.

The cost for implementing environmental management plan has been identified as follows:

SN.	Description	Amount (NRs.)
1	Environmental awareness raising training and other training	200,000.00
2	Insurance of workers	400,000.00
3	Bio-engineering	17,205,253.00
4	Resettlement and Land Acquisition	3,515,309.00
5	Restoration or relocation of affected infrastructures, Spoil management, Reinstatement of quarry, stockpiling etc.	500,000.00
6	Compensatory Plantation cost	113,025.00
7	Social cost	2,289,000.00
8	Occupational health and safety, Information signboard	300,000.00
9	Sanitation	1,738,385.00
10	Seed Money to establish a fund for environmental management during Operation and Maintenance stage	1,000,000.00
11	Monitoring	800,000.00
	Total	28,060,972.00

Conclusion and Recommendation

The identified environment impacts can be managed to greater extent by implementing appropriate mitigation measures. Activities during construction and operation within the protected areas require proper monitoring and management especially during operation of the road. The implementation of proposed mitigation measures for identified adverse impacts will minimize as well as mitigate the adverse impacts on environment. The Resettlement Plan and compensation to the affected households shall be ensured. The implementation of measures as described in environmental management plan will mitigate the negative impacts on physical, biological, socio-economic and cultural environment. Therefore, this IEE is sufficient for approval of the proposed sub-project, and recommended for implementation with incorporation of mitigation measures and environmental monitoring plan. Therefore, the proposed Subproject does not require Environmental Impact Assessment.

1.1 Background

1. The Rural Reconstruction and Rehabilitation Sector Development Program (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 Program is financed by the Government of Nepal (GoN), Asian Development Bank (ADB), Department for International Development (DFID), Swiss Development Cooperation (SDC), Nepal and OPEC Fund for International Development (OFID). The Program covers twenty districts spread over the country. Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) under the Ministry of Local Development (MoLD) is the executing agency (EA). The District Development Committees (DDCs) / District Technical Office (DTO) are the Project Implementing Agencies. The DDC/DTO are supported by District Implementation Support Team (DIST) with engineering, safeguards and social mobilization responsibilities.

2. Mustang District is one of the project districts under RRRSDP. This Proposal is for rehabilitation / new construction of existing Kagbeni- Jhaite district road of 38.8 km long in earthen standard.

1.2 The Name and Address of Proponent

Name of Proposal : Rehabilitation of Kagbeni- Jhaite Road Subproject, Mustang District, Nepal
Name of Proponent : District Development Committee, District Technical Office, Mustang
Address of Proponent : Jomsom, Mustang District
Phone No: 069-440104
Fax No: 069-440104

1.3 Relevancy of the Proposal

3. The Project area is located at remote and underdeveloped northern part of Mustang district. This road is rehabilitation of existing road as well as new construction at some sections. The area has high potential in production of Apple. The Mustang District produces over 3099 metric tons of fruits and apple represents almost 72% of the district's total fruit production. Lack of accessibility, only 700 tons of apples is exported annually, which makes only 30% of the total production. In Lower Mustang like Kagbeni, Tanbe and Chhusang are existing areas for apple production. In Upper Mustang like Chaile, Samar, Bheni, Jhaite and Ghami also have high potentiality of apple production. In the absence of road connectivity, large quantity of fruits does not get proper market value in the district. It connects northern region of Mustang with Head Quarter Jomsom and rest of the country after construction of road. The road will open other tourist areas like Lomangthang, Damodar Kunda etc.

4. In this regard, the rehabilitation and construction of the proposed road will provide enhance access of local product, people to social services and market centers with significantly reduced travel time and cost, and will contribute in their socio-economic development. Access shall also attract other development infrastructures and open door to further development opportunities in the area. This road will also help in facilitating completion of the Beni- Jomsom – Lo manthang – China Border road (Kali Gandaki Highway), which could eventually turn Mustang into one of the most important transit points for Indo-China trade via Nepal in future. It helps to increase in tourism, reach of the state.

1.4 Need and Objectives of the IEE Study

5. **Need:** An IEE study of the Proposal is a legal requirement according to the Environment Protection Act, 2053 BS (1997 AD); and Environment Protection Rule, 2054 BS (1997 AD) (Amendment 2007) of GoN; and according to the provisions of the Environmental Assessment Guidelines, 2003 of ADB.

6. **Objectives:** The main objective of the IEE study is to identify the impacts from the construction and operation of the Proposal on the physical, biological, socio-economic and cultural environment of the Subproject area. The IEE study recommends practical and site specific environmental mitigation and enhancement measures, prepare and implement environmental monitoring plan and make sure that IEE is sufficient for the proposed road sub-project.

1.5 Methodology Adopted

7. The IEE study has followed the provisions of the EPA, 2053 BS (1997 AD) and EPR, 2054 BS (1997 AD), and the provisions of ADB. It follows methodology suggested in the approved Terms of Reference for IEE Study (please refer Annex 1). For the collection of environmental features related to bio physical environment, maximum 100 meter distance observable from the centre of the road alignment was taken as an influence area and socio-economic and cultural environment was taken of Zol (one and half hour walking distance from the centre line of the road) information of the Subproject area. Data collection on physical, biological, socio-economic and cultural environment of the Subproject area was done in July 2009. Field survey, sample household survey, organization of Focus Group Discussions in the related VDCs was carried out and necessary information was collected. The DDCs officials, ACAP, VDC and Community Groups were also contacted to verify information to solicit their concerns. Based on the analysis of information the impacts have been predicted, mitigation measures prepared and monitoring plan has been developed.

1.6 Public Consultation

8. In order to ensure the involvement of concerned stakeholders, following procedures were followed:

- Publication of Public Notice- a 15 days public notice was published on 19th of Jestha 2066 in the Himalayan times, a national daily newspaper (see Annex V) seeking written opinion from the concerned VDCs, DDC, schools, health posts and related local stakeholders. A copy of the public notice was also affixed in the offices of the above mentioned organizations and *deed of enquiry (muchulka)* was collected (see Annex VI and Annex VII).
- Interaction with local communities and related stakeholders like Annapurna Conservation Area project Office (ACAP), District Soil Conservation Office, District Agricultural Development Office (DADO) and others were carried out during field survey to collect the public concerns and suggestions (see Annex VIII). Focus Group Discussions were conducted in all the three VDCs to collect and solicit their suggestions on protection of bio-physical and socio-economic environment in the Zone of Influence (Zol) of the road. Summary of minutes of meeting is given in Annex IX and following Table 1.1.
- Draft IEE report was kept at information center of DDC, Mustang and Kagbeni, Chhusang and Ghami VDCs for public disclosure. Information was also disseminated through person to person contacts and interviews and group discussions. Recommendation Letters for implementation of the Proposal were also obtained from all the concerned VDCs (see Annex X).

Table 1.1: Summary of FGD Meeting Conducted Under IEE Study

Location	Date	No. of Participants		Issues/Suggestions	Decision
		Male	Female		
Kagbeni	2067/04/25	24	1	1. The road passes through agricultural land at Ward no.7 and 8 of Kagbeni VDC. Therefore it should be protected from animal grazing. 2. Irrigation Canal of Kagbeni River may be affected and hence it shall be reinstated. 3. As road passes through middle of agricultural land in Ward no. 7 and 8, Irrigation crossings shall be provided along the road alignment to facilitate irrigation. 4. The access road to Muktinath at Ward no. 7,8 and 9 shall be protected during road construction	1. Dry wall will be constructed to protect agricultural land. 2. After detail design it was finalized that, the irrigation canal and access to Muktinath will not be affected. 3. Irrigation crossings have been provided in detail design on Ward no.7 and 8.
Chhusang	2067/04/24	19	3	1. Irrigation canal at Tanbe, Chusang, Chaile and Samar will be affected by road construction, hence it should be rehabilitated 2. Water tank at Tanbe may be damaged. 3. Irrigation crossing shall be provided at Tanbe to protect agricultural land. 4. Religious structures like Mane, Chorten, Village Gate and Temple along the road alignment should be protected during road construction.	1. Affected irrigation canals at Tanbe, Chusang, Chaile and Samar will be rehabilitated. 2. After detail design it was decided that, Water tank will not be affected. 3. Irrigation crossing will be provided. 4. The road has been designed protecting the religious structures along the road alignment.

Location	Date	No. of Participants		Issues/Suggestions	Decision
		Male	Female		
Ghami	2067/04/23	27	4	1. The agricultural land at Ghiling and Jhaite settlements should be protected from animal grazing by providing fencing. 2. The road will damage the irrigation canal at Ward no. 1, 2, 3 and 4 of Ghami VDC and hence it shall be rehabilitated. 3. During road construction, public and religious structures like Chorten, Mane and Village Gates should be protected and old such structures should be rehabilitated.	1. Dry wall will be constructed to protect agricultural land at Ghiling and Jhaite. 2. The road has been designed protecting the religious structures along the road alignment.

1.7 Information Disclosure

9. The approved IEE report is accessible to interested parties and general public through the websites of ADB and MoLD/DoLIDAR. The copy of approved IEE report has been distributed to following offices:

1. District Development Committee, Mustang
2. District Technical Office, Mustang
3. District Project Office, Mustang
4. District Implementation Support Team, Mustang
5. Ministry of Local Development, Environment Management Section
6. Department of Local Infrastructure Development and Agricultural Roads
7. Project Coordination Unit, RRRSDP
8. Asian Development Bank, Nepal Resident Mission
9. Concerned VDCs Kagbeni, Chhusang and Ghami

2. DESCRIPTION OF THE PROPOSAL

10. The 38.8 km road in Mustang district is proposed for rehabilitation of existing section of the road and new construction in some section. The road will be of earthen surface. The vehicles do not currently ply on the overall road section. This road starts from Kagbeni of Kagbeni VDC and passes through Tangbe, Chhusang, Chaile, Samar, Bhena, Syangbocha, Ghiling and ends at Jhaite of Ghami VDC. Road from Beni to Jomsom has been recently opened and vehicle are plying. Vehicle also operate between Jomsom to Kagbeni. This road will help to link Jomsom (district headquarters) with Korrella. More than 70% earthen track has already been opened. Average width of the road is more than 4m. This road will help to link northern Mustang with Jomsom, Beni and other parts of the country. Widening, geometric correction and grade improvement, new track opening, slope stabilization, side drains and construction of cross drainage structures is planned to be implemented under the proposed rehabilitation works of the road. At Ch. 15+211, 70 m long bridge is proposed for construction which will provide access and service for all weather. The total project cost is estimated at NRs. 258,237,524 and NRs. 6,655,606 per km.

Salient Features of the Subproject:

1. Name of the Project	:	Kagbeni-Jhaite Road
2. Geographical Locations	:	
Start Point	:	Kagbeni of Kagbeni VDC
End Point	:	Jhaite of Ghami VDC
3. Geographical Feature	:	
Terrain	:	Mountainous
Altitude	:	2770 m amsl at Kagbeni to 3980m amsl at Jhaite
Climate	:	Cold temperate/ alpine
Soil	:	Sandy soil, alluvial soil, colluvial soil
4. Classification of Road	:	District Road (Rural Road Class A)
DTMP No	:	45A002R
5. Standard of Road	:	Earthen, all weather
6. Length of Road	:	38.8km
7. Design speed	:	20 km/hr
8. Major Settlements	:	Kagbeni, Tangbe, Chhusang, Chaile, Samar, Bhena, Syangbocha, Ghiling and Jhaite
9. No. of Household	:	239 HHs
10. VDCs along the Road	:	Kagbeni, Chhusang and Ghami
11. Design Standard	:	
Right of way	:	5m each side (from center line)
Formation width	:	5m
Carriageway width	:	3m
Lane	:	Single
Stopping sight distance	:	20 m
Minimum radius of Horizontal curve:	:	10m
Minimum radius of Vertical curve:	:	20m
Maximum gradient	:	12%
Minimum gradient	:	1%
Cross Slope in carriageway	:	5%
Cross Slope in shoulder	:	5%
12. Drainage	:	
Side Drain	:	Earthen drains
Cross Drain	:	Dry stone causeway and gabion causeway (4 nos) and slab culvert (2 nos)
13. Structures	:	
Dry Stone Wall	:	2782 Cum.
Gabion Wall	:	16,419.50 Cum.
14. Earth Work	:	
Cutting	:	101,207.70 Cum
Filling	:	64,923.34 Cum

15. Bio-Engineering	:	10% of total cost (NRs. 17,205,253)
16. Project cost		
Total Cost (NRs)	:	NRs 258,237,524
Costs per km (NRs.)	:	NRs 6,655,606
17. Employment generation		
Total employment	:	287616(person days)
Skilled	:	11061
Unskilled	:	276555
18. Bridge	:	At 15+211 (70 m length, Detail design is not completed)

2.1 Construction Approach and Activities

11. The construction approach will be contract based and RBG as possible (Labour-based, Environment-friendly and Participatory (LEP)) ensuring minimum damage to local environment. The important features of the approach are (i) construction with balanced cut and fill; (ii) manual work and use of hand tools and small equipment rather than heavy machinery; (iii) bio-engineering for slope stabilization; (iv) avoid blasting; excavator mounted jack hammer will be used to break rock; (v) use soft engineering structures.

12. Activities included during the road construction are: Site clearance, Pavement work, Structures work (toe wall, retaining wall, breast wall, river training etc.), Earthwork, Bio-engineering, Cross drainage works and Side drain works.

2.2 Proposed Schedule for Implementation of Subproject

13. Following Table 1.1 shows the proposed implementation schedule of the Subproject:

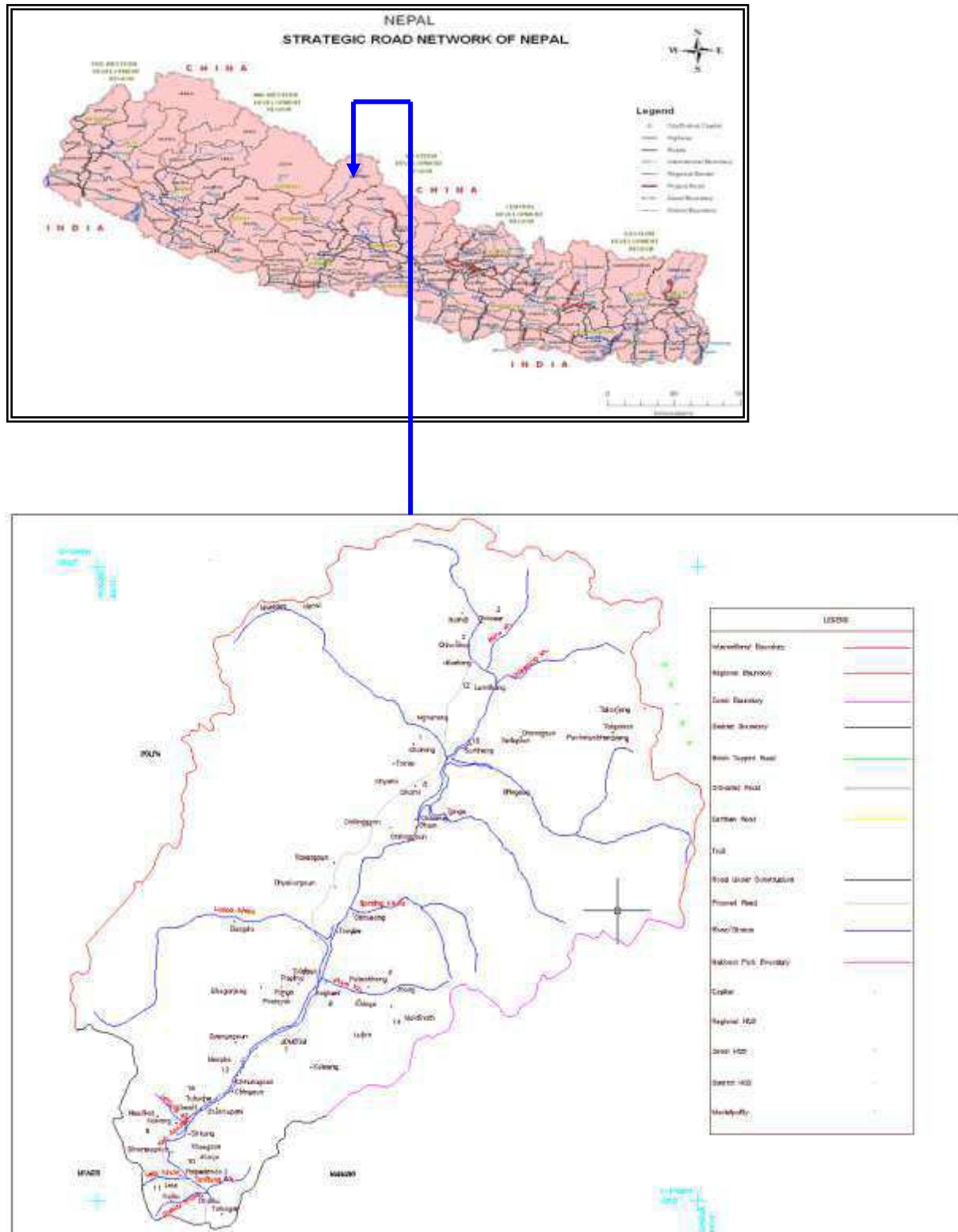
Table 1.1: Subproject Implementation Schedule

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

Note:

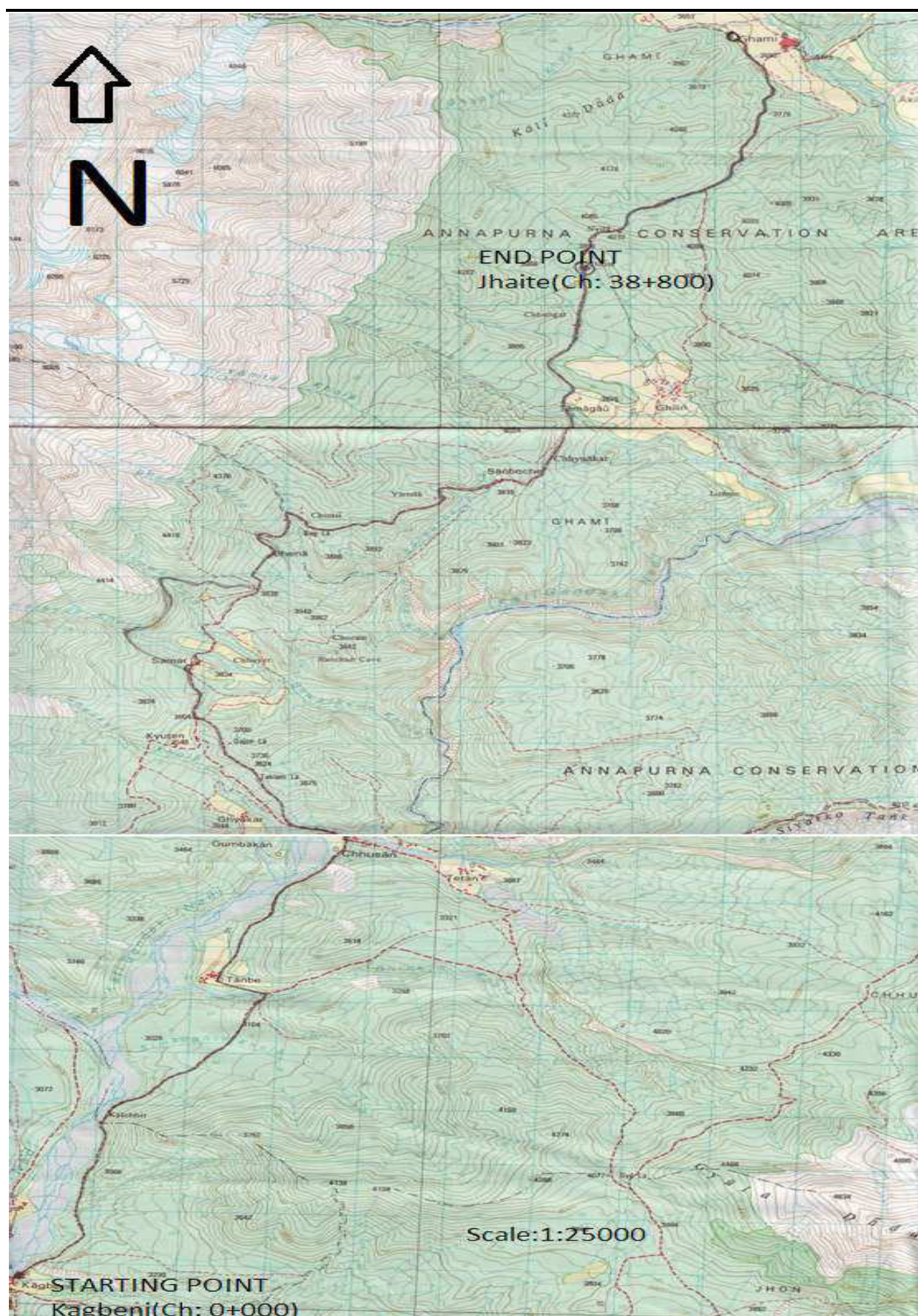
- I - January, February, March
- II - April, May, June
- III - July, August, September
- IV - October, November, December

Figure 1.1: Location of Kagbeni-Jhaite Road Subproject in Mustang District



Source : District profile

Figure 1.2: Alignment of Kagbeni-Jhaite Road Subproject



3. REVIEW OF RELEVANT ACTS, REGULATIONS AND GUIDELINES

14. The IEE study has followed the provisions of following acts, regulations and guidelines of Government of Nepal and Asian Development Bank to ensure conservation of environment during proposal implementation and operation.

Table 3.1: Review of Environmental Acts, Regulations and Guidelines

SN	Environmental Acts, Regulations and Guidelines	Description of Requirements
1	Three Years Interim Plan, 2007/08-2009/10, GoN	Requires all projects will be formulated and constructed based on methods that optimally utilize the local skill and resources and generate employment opportunities.
2	Environmental Protection Act, 2053 BS (1997 AD), GoN	Any development project, before implementation, shall pass through environmental assessment, which will be either IEE or an EIA depending upon the location, type and size of the projects.
3	Environmental Protection Rule 2054 BS (1997 AD) (amendment, 2007), GoN	The EPR and its schedules clearly provide various step-wise requirements to be followed while conducting the IEE study. It also obliges the Proponent to timely consult and inform the public on the contents of the proposal and IEE study.
4	Forest Act, 2049 BS (1993 AD) (amendment, 2007), GoN	Requires decision makers to take account of all forest values, including environmental services and biodiversity, not just the production of timber and other commodities. It includes several provisions to ensure development, conservation, management, and sustainable use of forest resources based on approved work plan.
5	Forest Rules, 2051 BS (1995 AD), GoN	Elaborates legal measures for the conservation of forests and wildlife. Expenses incurred for cutting trees and transportation shall be borne by proponent.
6	<i>Batabaraniya Nirdesika</i> (Nepal; MLD), 2057, GoN	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.
7	National Park and Wildlife Conservation Act, 2029 BS (1973 AD), GoN	Addresses for conservation of ecologically valuable areas and indigenous wildlife. The Act prohibits trespassing in park areas, prohibits wildlife hunting, construction works in park area, damage to plant and animal, construction of huts and house in park area without permission of authorized person. It lists 26 species of mammals, 9 species of birds, and 3 species of reptile as protected wildlife.
8	Local Self Governance Act 2055 BS (1999 AD) (1999) and Regulation 2055 BS (1999 AD), GoN	Empowers the local bodies for the conservation of soil, forest and other natural resources and implements environmental conservation activities
9	Land Acquisition Act, 2034 BS (1977 AD) and Land Acquisition Rules, 2026 BS (1969 AD), GoN	Specifies procedural matters on land acquisition and compensation
10	National Environmental Impact Assessment Guidelines, 1993 (2050 BS), GoN	Provides 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.
11	APPROACH for the Development of Agricultural and Rural Roads, 1999 (2055 BS), GoN	Emphasizes labor based technology and environmental friendly, local resource oriented construction methods to be incorporated actively in rural infrastructure process.
12	RRRSDP Environmental Assessment & Review Procedures (EARP), 2007, GoN	For preparation of environmental assessments of future subprojects under Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP), this EARP includes: i) The process to be adopted while preparing environmental reports, ii) the potential environmental impacts that could result from undertaking the Project based on the Initial Environmental Examinations (IEEs) of sample core subprojects; iii) the proposed mitigation measures to avoid the identified impacts; iv) institutional capacity assessment and strengthening arrangements; v) legal framework for environmental assessment, domestic and the Asian Development Bank (ADB) environmental assessment and review procedures; and finally vi) the approaches to be adopted during implementation of the Project in order to ensure that environmental aspects are dealt with in a comprehensive manner.

13	Reference Manual for Environmental and Social Aspects of Integrated Road Development, 2003 (2060 BS), GoN	Suggests stepwise process of addressing environmental and social issues alongside the technical, financial and others
14	Green Roads in Nepal, Best Practices Report: An Innovative Approach for Rural Infrastructure Development in the Himalayas and Other Mountainous Regions, 1999 (2055 BS), GoN	Focuses on participatory, labor based and environment friendly technology with proper alignment selection, mass balancing, proper water management, bioengineering and phased construction
15	Environmental Assessment Guidelines, 2003, ADB	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	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.
17	The Interim Constitution of Nepal, 2063 (2007).	Has provision of right regarding environment - Every person shall have the right to live in clean environment.
18	The Labor Act, 2048 BS (1992 AD)	Regulates the working environment and deals with occupational health and safety.

4. BASELINE ENVIRONMENTAL CONDITION IN THE SUBPROJECT AREA

15. Baseline information on the existing physical, biological and socio-economic and cultural environment of the zone of influence (Zol) of the proposed subproject is described in this Chapter.

4.1 Physical Environment

4.1.1 Topography

16. The elevation of the starting point of the road at Kagbeni is 2770 m amsl and at the end of road at Jhaite of Ghami VDC is 3980 m amsl. The Mustang District lies in Himalayan Region and 83.46 % of district lies in the slope greater than 30 degree. The road alignment passes through mountainous area. The grade of the road varies from 2% to 12%. Major portion of the road passes along the north-west facing slope.

4.1.2 Geology and Soil Type

17. The road passes through fragile and erosion prone hills at different locations. There is loose type of sandy soil found along the road alignment. Mainly geological weak section of the road is from Chhusang and Chaile at Ch. 14+160 – 14+920 and other section is from Samar to Bhena at Ch.22+700-25+000. The detail geological and geotechnical study is necessary to carry out. Major slide and soil fall areas are found in some section at Ch. 14+160 – 14+920. Rocky areas are at chainage 0+500, 9+200 – 9+700. Following Table 4.1 presents the geological features recorded along the road alignment.

Table 4.1: Geological Features along the Road Alignment

Chainage	Location	Terrain slope	Geological Problem
0+000 – 9+160 Km	Kagbeni	Steep	Small scale landslide at 0+800, 5+500, 8+800
9+160 - 12+560 km	Tangbe	Moderate	-
12+560 - 16+460km	Chhusang	Moderate	Soil erosion and soil fall area (14+160 – 14+920) due to river cutting
16+460 – 22+760 km	Chaile	Steep	Landslide at 20+020
22+760- 26+720 km	Samar	Moderate	Landslide at 25+170
26+720-31+980 km	Bhena	Steep	Landslide at 28+900, 30+350
31+980-36+560km	Ghiling	Moderate	Landslide at 32+200, 33+000
36+560-38+800km	Jhaite	Moderate	-

Source: Field survey, July, 2009

4.1.3 Land Use

18. Land use pattern of the area through which the road passes have been classified into three types: barren land + bushes +forest land, cultivated land and built up area as shown in Table 4.2. About 85 % of project road alignment passes through barren land and bushes, while remaining 15% through cultivated land and Built up area.

Table 4.2: Summary of Land Use Pattern along the Road Alignment

Type of Land	Chainage		Length(m)	Existing Width(m)	Additional Width (m)	Existing area (ha)	Additional Area (ha)
	From	To					
Barren + Bushes + Forest land	0+500	9+500	9000	5	0	4.5	0
	10+500	13+000	2500	4	1	1	0.25
	13+000	15+200	2200	2	3	0.44	0.66
	15+800	16+000	200	0	5	0	0.1
	16+500	21+700	5200	0	5	0	2.6
	21+700	22+000	300	5	0	0.15	0
	23+500	25+700	2200	5	0	1.1	0
	25+700	31+700	6000	4	1	2.4	0.6
	31+700	38+800	7100	5	0	3.55	0
Sub total						13.14	4.21
Cultivated land	0+000	0+500	500	5	0	0.25	0
	9+500	10+500	1000	5	0	0.5	0
	15+200	15+800	600	0	5	0	0.3
	16+000	16+500	500	0	5	0	0.25
	22+200	22+700	500	5	0	0.25	0
Sub total						1	0.55
Built up area	22+000	22+200	200	5	0	0.1	0
	22+700	23+500	800	5	0	0.4	0
Sub total						0.5	0
Total						14.64	4.76

Source: Field Survey, July, 2009

4.1.4 Climate

19. The road lies in the cold temperate and alpine climatic region. Mustang lies in the rain shadow area and receives very little rain. The climate of the district is generally dry with strong winds and intense sunlight. The meteorological record shows total average annual rainfall of 184 mm. Snowfall starts from end of November to February. Average minimum temperature of -10 °C and average maximum temperature of 25 °C is observed in the area. (Source: District Profile of Mustang, 2060)

4.1.5 Hydrology and Drainage System

20. There are much seasonal and perennial natural drainage along the road alignment which include Simkoghiu Khola, Dhinkyu Khola, Samarkyun Khola, Jhuwa Khola, Bhena Khola and Sanboche Khola. The major rivers along the road alignment are Narsing at Ch. 13+580 Chhusang, Kaligandaki at Ch. 15+211 Chaile and Ittang Khola at Ch. 35+420 Ghiling. At Ch. 15+211 in Kaligandaki River, about 70 m long bridge is required. The detail survey and design of this bridge is not yet completed. The summary of the cross drainages along the road alignment is given in Annex XIV.

4.1.6 Soil Erosion and Sedimentation

21. 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 areas but many small slides and erosions area are found along the road. The locations are Ch 0+800, 5+500, 8+800, 14+160 – 14+920, 20+020, 25+170, 28+900, 30+350, 32+200 and 33+000.



Erosion prone area at Ch 14+160 – 14+920

4.1.7 Existing Road Condition

22. Road connection exists from Beni to Jomsom and Jomsom to Kagbeni- Muktinath. Bus, Jeep, Truck is plying from Beni. The construction of Jomsom – Korrella (Border between Nepal and Tibet) road was initiated by Mustang DDC with the contribution from each VDCs. Road track has already been opened from Korrella to Jhaite. Vehicles (Jeep, Truck, and Tractor) are plying in this section. This Kagbeni - Jhaite road subproject will help to link Jomsom (district headquarters) to Korrella. More than 70% earthen track has already been opened. Average width of the road is more than 4m.

Table 4.3: Existing Road Condition

Section	Length	Existing road width	Surface	Source of fund	Remarks
Kagbeni (0+000) - Tanbe	10 KM	>5	Earthen	DDC	10 km stretch of the road alignment from Kagbeni has been opened by the Department of Roads and DDC. The road is opened by using excavator, which has stopped further opening due to hard rocks encountered at Kalo-Bhir (black cliff) area. Track opened by excavator is observed to be highly hazardous to the local environment. Slopes are excavated without caring the vulnerability of the fragile slopes and spoil is directly dumped on down hill slopes causing damage to naturally existing vegetation that were keeping the slopes stable.
Chhusang - Chaile	3 KM	New alignment + partially open (upto 15+200)	Earthen	DDC/VDC/Community	The road follow along the Kaligandaki river, Retaining wall + Bridge+ soil erosion control, (Bio-engineering) Tree plantation along the river bank is needed.
Chaile - Samar	7KM	500m existing track + New alignment	Earthen	DDC/VDC/Community	Spoil management and Bio-engineering is required. It is one of the most critical sections of the road for new construction. The alignment passes through top of difficult rocky cliff. Careful construction will be required.

Section	Length	Existing road width	Surface	Source of fund	Remarks
Tanbe Chhusang -	3 KM	>4 partially open	Earthen	DDC, VDC	<ul style="list-style-type: none"> Road is opened at certain sections by excavator. Construction is stopped after encountering vertical rocky cliff. Alignment through the steep cliff for about 500m at 11+550 requires gabion breast wall and retaining structures to support the road. Some rock cutting is also required, which can be done manually. There is a difficult rocky cliff at 10+155. Alternative alignment of about a km length is taken. The alignment is on easy and stable slopes and will be more environmental friendly. River bank protection at the foothills is required against river-cutting (which is at a very rapid rate) and for the safety of the road on the slopes. Study of falling of soil from the higher slopes due to wind erosion requires careful consideration during design.
Samar Bhena -	4KM	>4	Earthen	DDC/VDC/Community	<ul style="list-style-type: none"> The proposed alignment crossing the gorge of Samar 1 and Samar 2 Kholas will require significant disturbance to the wall of the deep gorge. Loop improvement, Alternative alignment is proposed to avoid tree cutting and agriculture land and at kholi 1 and 2 need retaining structure and bio-engineering.
Bhena Syangboche -	6KM	>4m + new alignment	Earthen	DDC/VDC/Community	At kholi (Bhena-1 and 2) need retaining structures + Bio-engineering
Syangboche - Ghiling	4KM	>5m	Earthen	DDC/VDC/Community	At 35+100 Kholi need causeway and gully protection work
Ghiling Jhaite (38+800)	2KM	>5m	Earthen	DDC/VDC/Community	

Source: Field Survey, July, 2009

4.1.8 Air, Noise and Water Quality

23. The air, noise and water quality are not measured or tested, but are observed to be within acceptable limit. Dust emission during vehicle operation has been a nuisance which becomes more significant.

4.2 Biological Environment

24. This alignment passes through the Annapurna Conservation Area but the major forest and habitat of wildlife do not fall under Zol of subproject.

4.2.1 Vegetation

25. The forest is sparse with dominant species observed in the road alignment which are Apple (*Malus domestica*), Bhote pipal (*Betula utilis*), Dhupi (*Juniperus indica*), Bains (*Salix alba*), Aru (*Pyrus comunis*), Chhuli, *Saxifraga lychnitis*, Bhuki Phul (*Anaphalis contorta*), *Caragana gerardiana*.

NTFPS

26. The NTFPs found in the Zol of the project area are Himalayan Thyme (*Thymus linearis*), *Asparagus sps*, *Cordyceps sinensis*, *Allium fasciculatum*, Jimbu (*Allium wallichii*), Himalayan Arnebia (*Arnebia benthamii*), Himalayan rose (*Rosa macrophylla*), Bhote jira (*Carum carvi*), Garlic and *Bentula utilis*.



4.2.2 Wildlife

27. Common wildlives found in the Zol are Red Fox (*Vulpes vulpes*), Jackle (*Canis aureus*), Gray Wolf (*Canis lupus*) and Himalayan Brown Bear (*Ursus arctos*). Endangered and protected wildlife like Snow leopard (*Panthera uncia*), Hispid Hare (*Caprolagus hispidus*), Himalayan Blue Sheep (*Pseudois nayaur*), Himalayan Thar (*Hemitragus jemlahicus*), and Himalayan Musk Deer (*Moschus chrysogaster*) are also found in the surrounding area of Zol. Crow (*Corvus splendens*), Pigeon (*Columba livia*), Danphe (*Lophophorus impejanus*), Chyakhura (*Alectoris chukar*), Eurasian Eagle (*Bubo bubo hmachalana*), Monal (*Tragopan satyra*) are common birds found in the surrounding areas of the road alignment.

4.2.3 Aquatic Life

28. Fish species are very rare in sub-project area due to high mountain alpine climate.

4.2.4 Endangered and protected species

29. Endangered wildlife like Wolf (*Canis lupus*), Snow leopard (*Uncia uncia*), and Musk deer (*Moschus chrisogaster*) are listed in CITES Appendix I, Jackle (*Canis aureus*) is listed in CITES Appendix III. Snow leopard (*Uncia uncia*) is listed in IUCN Nepal's Threatened Animals as 'Endangered', and Himalayan Thar (*Hemitragus jemlahicus*) is listed in IUCN as 'Insufficiently Known'. Danphe (*Lophophorus impejanus*) is listed in CITES Appendix I, and Monal (*Tragopan satyra*) is listed in CITES Appendix III. Hispid Hare (*Caprolagus hispidus*) is listed as 'Endangered' in IUCN Red list.

4.3 Socio-economic and Cultural Environment

4.3.1 Population, Household and Ethnicity

30. The demographic profile of the concerned VDCs is presented in following Table 4.4. Major castes in the area are Thakali and Gurung.

Table 4.4: Demographic Profile of VDCs

VDC	Population			HH	Average HH Size
	Male	Female	Total		
Kagbeni	250	260	510	100	5.1
Chhusang	215	240	455	90	5.05
Ghami	100	171	271	49	5.53
TOTAL	565	671	1236	239	5.23

Source: Field Survey, July, 2009

4.3.2 Main Occupation

31. The main occupation of the area is business (hotel/tour) & commerce (63.6%), agriculture & livestock (36.4%). However, agriculture farming is not enough for subsistence due to small landholding size and low productivity, and import of food is required from Beni/Pokhara and China. No households are engaged in NGO/INGO, Cottage Industry and labour work.

4.3.3 Market Centres and Business Facilities

32. Major settlements along the road alignment are Kagbeni, Tangbe, Chhusang, Chaile, Samar, and Ghiling. Grocery shops and tea stalls attractive, lodge exists in almost all settlements. According to survey data, 40 hotel and lodges, 30 other shops (grocery, stationery, medicine, tailoring etc.) are present in the area.

4.3.4 Local Economy

33. The economy of the area is predominantly business (mainly lodge, hotel), livestock and agriculture-based. Local people are gradually being attracted towards cultivation of cash crops such as Apple. Dairy production and selling it to local market. Cultivation of fruits and vegetables for commercial purpose aiming local market and market of Pokhara seems to be increasing. Local people are also doing business activities. Many people seasonally migrate to Pokhara and India during winter season to earn money for their livelihood.

4.3.5 Agriculture Pattern

34. Major crops grown in the Subproject area are barley, buck wheat, potato, maize and beans. The crops are grown only once in a year. Cash crop farming is also increasing in recent days. Major cash

crops grown in the area is Apple. Mustang District produces over 3099 metric tons of fruits, and apple represents almost 72% of the district's total fruit production. Due to lack of accessibility, only 700 tons of apples is exported annually, which makes only 30% of the total production. Connection of Jomsom by road might increase export of apple in future.



Cultivation of wheat (Uwaa) at Tanbe



Apple farming at Tanbe

4.3.6 Livestock

35. People are raising cows for dairy, goat for meat and horses, mules to carry and transport goods. Goods transportation by mule is major income source for some family. 7-9 mules can make a net profit up to Rs. 25,000 per month.

4.3.7 Industry

36. Some local people are engaged in making furniture, and Dairy (Chhurpi, Ghee) production. The area has high potentiality for apple juice and wine industry.

4.3.8 Tourism Potential

37. Mustang is famous for tourism industry and almost all settlements have lodges and restaurants. Tourism potential sites are Kagbeni, Chhusang, Samar, Ghamsi within the sub-project Zol, and Muktinath Temple, Lomanthang, Tsharang, Tshoser of Upper Mustang which are outside the Zol. Kagbeni and Muktinath are religious places. More than 3000 foreign trekkers and hundred of thousands of Nepali and Indian tourists visit these sites every year.

4.3.9 Health and Sanitation

38. People use piped water with source at high altitude springs. Major health problems observed in the area are gastric, water borne diseases, gout, respiratory diseases, and skin disease. Sanitation awareness among local people is increasing and many of them have toilets in their home, and they are aware of keeping their premises clean, but there is no public sewerage system. ACAP has introduced solid waste management system in the villages. The settlements, also being tourist area, are cleaned in the morning.

4.3.10 Public Services and Infrastructures

Table 4.5: Infrastructure Facilities in the Project Area

Infrastructure Facilities	Details
Education	6 educational institutions ranging from primary level to college level exists in the area. Most of the families send their children to school. Female enrollment in schools is lower than that of male students. The literacy rate of males is found to be 50.2% whereas of females is 28.8%.
Health	4 health posts/sub health posts exists in various settlements
Communication	All of the settlements have telephone facilities mostly with CDMA connection. Two post offices have been serving the local people
Electricity	Electricity facility is available in Kagbeni, Tangbe, Chhusang from local micro hydropower, other settlements are not electrified. Use of solar energy for lighting is extensive.
Water Supply	Piped drinking water supply is available to all settlements.
Other Infrastructures	There is a Suspension Bridge, Agricultural Service Sub-Centre and Veterinary Service Sub Centre in the project area
Financial Institutions	There is 1 no. of saving and credit cooperatives in Kagbeni.
Community Center	3 nos. in all VDCs.

Source: Field Survey, July, 2009

Table 4.6: Public Services and Infrastructures along the Road Alignment

Type of Public Service and Infrastructure	Chainage/ Location	Distance from the Road	Remarks
Electric poles (15 nos.)	9+130 - 10+100/ Tangbe – Chhusang	Adjacent	
Irrigation crossing	0+040, 0+116, 0+158, 0+185, 0+218, 0+278, 0+320, 0+350/ Kagbeni	Crossing the road	
Irrigation Crossing	0+695, 0+758, 0+780 /Kagbeni , 13+690/ Chhusang	Crossing the road	
Irrigation Canal	13+800 - 13+920/ Chhusang	Along the road	
Trekking Trails	0+000 - 9+000/ Kagneni- Tangbe , 22+000 - 24 +000/ Samar	Along the road	
Water Supply Pipe	9+200 - 9+ 220/ Tangbe	Along the road	

Source: Field Survey, July, 2009

4.3.11 Existing Traffic Situation and Road Network

39. There is existing opened road track from Korella (Border between Nepal and Tibet) to Jhaite and from Jomsom to Kagbeni which links the Beni- Jomsom road. This subproject will link Kagbeni to Jhaite. Since all the alignment is not opened, traffic do not ply on the overall road alignment. However vehicles like trucks and jeep operate from Jomsom to Kagbeni and jeep operates from Lomanthang to Jhaite.



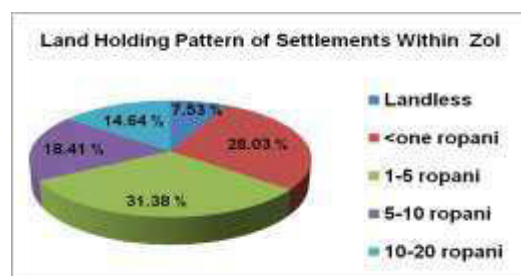
Road Section connecting Lo Manthang to Jhaite



Passenger vehicle plying from Lo Manthang to Jhaite

4.3.12 Land Holding Pattern

40. Land holding pattern within the Zol of the road demonstrates that most of the population 31.38% have 1-5 ropani (approximately 1 ha= 19.8 ropani) land while 18.41% households have 5-10 ropani and 14.64% households have 10-20 ropani, 28.03% households have less than one ropani land and 7.53% households are landless (See Annex XI c.).



Source: Field Survey, July, 2009

4.3.13 Food Security

41. About 21.75% of the households have enough food for only three to nine months, 16.74% households have food sufficient for whole year, 27.20% households have food sufficient for three months and 15.9% households are reported as food surplus ones and 18.41% households have food for only less than three months. Food sufficiency condition is given in Annex XI d.



Source: Field Survey, July, 2009

4.3.14 Migration Pattern

42. Many people from Mustang, particularly from above Jomsom, migrate to Pokhara, India during winter season for petty trade such as buying and selling of warm cloths. Some are engaged in trading agricultural and non-timber forest products such as Garlic, Jimbu (*Allium wallichii*), Bhote jira (*Carum carvi*) etc. Some take their horses to warm places for grazing, and the owners are engaged in petty trade such as buying cloths and other household items from cities and selling them to different villages.

4.3.15 Settlement pattern and Market

43. Settlements are built mainly along the Kali Gandaki river on hill tops or on flat valleys with dense cluster of houses. Settlements use mud and mud bricks with wood used mainly for pillar support, roofing and flooring. Uses of corrugated sheets, cement, mortar, glasses, etc. are also becoming popular. Major settlements within Zol are Kagbeni, Tangbe, Chhusang, Chaile, Samar, Bhena, Syangbocha, Ghiling and Jhaite. Housing pattern of these scattered settlements are mostly one to two storied.

4.3.16 Potential for Development

44. The potential of the Subproject area are as mentioned in Table 4.7 below.

Table 4.7: Development Potentialities in Various Sectors

SN	Sector	Development potentiality
1	Agriculture	Potato, Wheat, Buck wheat within the whole Zol and Apple farming in the Kagbeni, Chhusan, Tanbe and Chaile, Ghiling.
2	Tourism Promotion	There are many places along the alignment for the tourism activities in Kagbeni, Chhusang, Samar, Ghiling, and Lomanthang. Also this road wil promote Muktinath temple and Damodar kunda due to aces of road through this alignment.
3	Small and Cottage Industry	No any Industry within the Zol, but potential for apple juice, wine industry.
3	Trade and business	Development several rural market centres at various places along the road alignment and main market centres at Kagbeni, Chhusang, Chaile, Samar, Ghiling

Source: Field Survey, July, 2009

4.3.17 Religious, Cultural and Historical Sites

45. There are famous religious sites like as Kagbeni and Muktinath temple. Muktinath temple lies about 11 km far from the road alignment whereas Kagbeni lies within ZOI about 1 km far from the road alignment. About 100,000 Hindu pilgrims and 20,000 trekkers annually visit Mustang. It is estimated that annual turnover from 20,000 trekkers is about US \$2.6 million, and US \$1.1 million is collected as fee from them to enter Upper Mustang (Source: District profile 2065). Many Nepali and Indian tourists visit these sites every year especially during Janai Purnima, Dashain and Chaitra Dashain. Janai Purnima is also the time for the Yartung (rain festival) for the local people.

5. PROJECT ALTERNATIVES

46. Assessment on alternatives of the Subproject is discussed as in the following subsections.

5.1 No Action Option

47. This alternative assesses the consequences if the Proposal is not implemented. This is mainly an existing road with new construction required at some sections. The road connects a remote and poverty ridden area with high potential in Apple productions. People have been selling the products to markets of Jomsom, Beni, Pokhara. However, travel time and cost is high due to lack of access. This road will provide access facility with enhanced opportunity for development of the area without any additional significant adverse impacts. Development is must for attaining poverty reduction goal of the government, and access facility is the basic infrastructure that facilitates overall development. Thus, this option is not relevant for the Proposal.

5.2 Proposal Alternatives

48. Construction of other supporting roads could be the options for achieving the transportation and access. Considering other project alternatives, the proposed road project can be the best option to serve the purpose of efficient transportation requirement. This road is a part of Beni- Jomsom – Lomanthang – China Border road (Kali Gandaki Highway), which could eventually turn Mustang into one of the most important transit points for Indo-China trade in future.

5.3 Alternative Alignment

49. The alignment of the road is existing fair weather as well as new construction at some sections. To avoid blasting on the existing alignment the alternative alignment at Tanbe is chosen from Ch.11+780 to Ch. 11+950. In Samar alternative alignment is chosen from Ch. 22+700 to Ch. 23+ 700 to avoid the loss of cultivated land, private trees, cattle sheds and fragile land.



Alternative alignment chosen at Samar to avoid trees and settlement area and fragile area.



Alternative alignment chosen at Tanbe to avoid blasting in this rocky section.

50. After completion of this road (Kagbeni- Jhaite), Mustang – Kagbeni- Chhusang- Chaile- Jhaite- Ghami - Lomanthang road will be all weather alternative of Mustang – Kagbeni- Chhusang- Charang- Lomanthang road will be open.

5.4 Alternative Design and Construction Approach

51. Considering the nature and topography of Mustang, the proposed road has been considered to be designed using contractor and RBG as possible (Labour based, Environment friendly and Participatory (LEP)) approach. But at rocky area hydraulic jack hammer mounted on excavator can be used. LEP method focuses on balanced cut and fill; manual work and use of hand tools and small equipment rather than heavy machinery; bio-engineering for slope stabilization; avoid blasting; use soft engineering structures; use of contractors only in the works that cannot be done through manual labor.

5.5 Alternative Schedule

52. During the winter when there is snowfall (Nov-Feb), construction work will be stopped. Rehabilitation and construction work will be carried out during the remaining months. The construction period is more appropriate from March to October due to dry weather.

5.6 Alternative Resources

53. Stones, boulders, gravel fine aggregates and sand are available from nearby quarries sources and Kaligandaki river. The proposed construction will optimally use the local labour force as far as possible and local materials. If labors are not available in the district, labor from adjoining districts shall be used through labor contract.

6. IDENTIFICATION OF IMPACTS AND BENEFIT AUGMENTATION /MITIGATION MEASURES

54. The identification and assessment of impacts has been carried out by considering the proposed proposal activities examined in terms of its current condition and likely impacts during construction and subsequent operation phases. The impacts have been predicted in terms of their nature, magnitude, extent and duration. The possible impacts (positive and negative) in construction and operation phases are presented in the following sub-sections. Beneficial impacts maximization and adverse impacts mitigation measures are also suggested hereunder (see Table 7.2 in Chapter 7).

6.1 Beneficial Impacts and Benefit Augmentation Measures

6.1.1 Construction Stage

Enterprise Development and Business Promotion

55. *Impacts:* During construction period, different types of commercial activities will come into operation in order to meet the demand of workers. Since the workers will have good purchasing power due to money earned from wages, they will regularly demand for different types of food, beverage and other daily necessary items. Local shops and restaurants will be opened to meet these demands around the vicinity of the construction sites (Tangbe, Chhusang, Samar, Bheni). This impact is direct, medium significance, local and for short term.

56. *Measures:* Promote use of local products by construction crews. However, ensure that pressure to local availability of commodities is not restricted. Awareness raising programs will be facilitated for the promotion of cooperatives and linkage with other financial institutions through social action programs.

Employment Generation and Increase in Income

57. *Impacts:* Employment opportunity for local people during construction of the road, without gender biasness, is 11061 person days for skilled and 276555 person days for unskilled labor. In Mustang district local labors are not adequately available in the sub-project area. Thus, labors are to be brought from neighbouring districts under labor contract. The amount of money earned as wages will directly support various economic activities of the people. It will assist towards enterprise development with multiplier effect if wage is used for economic investments. This is one of the direct and significant impacts of the project, but it is of short-term and local extent.

58. *Measures:* Work will be implemented through contractor and RBG as possible (LEP) approach. Priority for employment will be given to local people. They will be given training to do the job. If labors are not available in the district, they will be brought from other neighboring poverty-ridden districts under labor contract. Proponent will give skill enhancement, Livelihood Enhancement Skill Training (Tour guide, Cook, Jam /jelly production, Carpentry furniture, Gabion wire weaving etc.), awareness training through resettlement and social program.

Skill Enhancement

59. *Impacts:* Working in construction of the road is likely to enhance skills of local people in construction works. Trainings on construction and maintenance of structures will further enhance their skill. The skill and knowledge thus acquired will make them find employment opportunities in future projects. This impact is indirect, medium, local and long-term in duration.

60. *Measures:* Livelihood Enhancement Skill Training will give to local people; Members of the Road Building Group will be given training on masonry, netting wires and construction of gabion wall, slope cutting, bio-engineering works.

Community Empowerment and Ownership

61. *Impacts:* During construction various road construction coordination committees and road building groups will be constituted in order to facilitate in implementation of the road. 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. This impact is indirect, medium, local and for long term.

62. *Measures:* The coordination committees (eg.DPCC, VICCC, RBG) will be constituted and training will be given to them. Supplementary infrastructure will be constructed as per local demands and local peoples will be involved for maintenance of supplementary infrastructure as well as road.

6.1.2 Operation Stage

Drop in prices of basic household commodities

63. *Impacts:* The prices of basic household commodities coming from Beni, Pokhara and other parts of the country are expected to fall significantly in future. The current price of most of basic commodities in Jomsom, Kagbeni is almost double as compared to the prices in Pokhara. In Upper Mustang, road has been constructed from Lomanthang to Tibetan border. The border is sealed for trade and human crossing. Despite this, though Nepalese are not allowed to reach near the border, Chinese trucks illegally brings construction material and household commodities to Lomanthang. This has increased access of people to the commodities at 30-40% reduced price than the goods supplied from within the country. Prices of these commodities are expected to fall significantly if the proposed road subproject is constructed. The falling prices of commodities will be particularly beneficial to the poor people who spend about 70% of their income on food. The impact will be indirect, significant, local and for long-term.

64. *Measures:* Continued maintenance of road for easy transportation of goods.

Improvement in Accessibility and Saving of Time and Transportation Cost

65. *Impacts:* Kagbeni- Jhaite road links Jomsom through Lomanthang to Tibet (China border). This road also helps to link Kathmandu- Pokhara- Beni- Jomsom road, which links Mustang district with the capital city. Upper mustang is devoid of motorable access. Implementation of the proposed sub-project will complete track opening of the Kaligandaki Highway, and bring the presently disconnected and remote part of the country into the mainstream of national integration and development, and the State will have reach in the area. This subproject will enhance the access of people to social services, and quick transportation of local product like apple from Upper Mustang to different parts of the country. Improved access making travel and transportation of people and goods easier, shorter and cost will be cheaper. At present, it takes two to three days on foot to reach Jhaite from Kagbeni. With the construction it will take only about 4 to 5 hours to travel the same distance. This impact is direct, high, regional and long term.

66. *Measures:* Proponent will undertake regular maintenance of the road.

Increase in Trade, Commerce and Development of Market

67. *Impact:* Improved access will increase economic activities and minor local markets like Kagbeni, Samar, and Ghiling markets will grow. Productivity will increase due to cheaper transportation of agricultural inputs. Sale of farm and livestock products will increase in the bigger markets of Mustang district. Export of vegetables and fruits like apple farming will become easier after construction of road. Improved access will increase demands for local products such as apple, brandy, buckwheat, juice, jam, cider etc. which are already popular in Beni, Pokhara and Kathmandu. The trade of local goods with Tibet will become easier and increase with the operation of this road. This will support the economy of rural area. The impact will be indirect, significant, regional and for long term.

68. This road will also help in facilitating completion of the Beni- Jomsom – Lo manthang – China Border road (Kali Gandaki Highway), which could eventually turn Mustang into one of the most important transit points for Indo-China trade via Nepal in future.

69. *Measures:* DDC/VDCs/ACAP shall manage planned growth with required infrastructure facilities in the market areas. Agriculture extension services, market linkages and networking for better market price will be coordinated.

Appreciation of Land Value

70. *Impacts:* Construction of road will lead to appreciation of land values more than two times due to availability of reliable access facility. The land price will increase due to the availability of reliable transportation facilities. There will be increase in tourism and commercial production of cash crops like apple due to road accessibility which is also a major factor to raise the land value. This will uplift the economy of local people. The impact is indirect, medium, local and for long term.

71. *Measures:* Control of encroachment within RoW. Awareness program shall be organized on use of high value land to get micro financing for setting up enterprise ventures.

Enhancement of Community Development Services

72. *Impacts:* Improved access will contribute in improvement of social services in the area such as education, health, government offices, saving and credits. Improved access will facilitate stay of

extension workers, teacher, and doctor to their rural duty areas. This is indirect, significant, regional and long-term impact of the proposed project.

73. *Measures:* The access will be kept maintained so that other services will follow in the area.

Reduced Pressure on Forest Resources

74. *Impacts:* Only 3.4% of Mustang is covered by forest. People have been using the scarce timber for construction of house and cooking. Rehabilitation of road will provide better access to markets and daily use commodities including alternate fuel. Positive impacts could be noticed on environment as access will facilitate transport of alternative fuel. It is expected that people will opt for other fuels rather than forest resources after the road construction. This will conserve the sparse forest resources of the project area. This impact is indirect, high, local and long term.

75. *Measures:* Regular maintenance of road so that supply of commodities like LPG gas, kerosene will become easier. Mustang also has high potential for wind power generation. Accessibility will assist to exploit this green energy potential.

Increase in Tourism

76. *Impacts:* Increase in domestic and Indian as well as international tourist. Local people reported that after opening access from Beni to Jomsom- Muktinath, more than 200 percent of domestic and Indian tourist has increased. About 100,000 Hindu pilgrims and 20,000 trekkers annually visit Mustang. It is estimated that annual turnover from 20,000 trekkers is about US \$2.6 million, and US \$1.1 million is collected as fee from them to enter Upper Mustang. It is expected that the traffic volume is likely to increase four times once the proposed road is constructed. The bulk of the pilgrims currently reaching up to Muktinath, the holy and sacred site for the Hindu and Buddhists of the world, will be able to reach up to Lomanthang and further north-east to Damodar Kunda, another holy lake at the lap of Himalayas and the source of Kaligandaki River. This can largely boost the local economy and socio-economic development of the area. The impact will be indirect, significant, local and for long-term.

77. *Measures:* Promote sustainable tourism focusing on Mustang as a unique destination, awareness raising programs will be conducted to local peoples in collaboration with ACAP to promote tourism activity and development of lodges, hotels. People will be oriented about village tourism with homestay provision for the tourist in villages. Continued maintenance of road for easy access.

6.2 Adverse Impacts and Mitigation Measures

6.2.1 Construction Stage

78. The proposed road will be constructed according to contractor and RBG as possible LEP approach. The likely impacts on physical, biological, socio-economic and cultural resources of the proposed road area and respective mitigation measures are presented hereunder.

6.2.1.1 Physical Impacts

Change in Land Use

79. *Impacts:* Construction of road will convert land use of 0.55 ha. of cultivated land and 4.21 ha. of barren/ bushes land. The impact will be permanent, irreversible, direct, medium, local and for long term.

80. *Measures:* Compensation will be given for affected private properties. Plantation of trees will be done on all water available areas and roadside slopes to increase greenery in the area.

Slope Instability

81. *Impacts:* Almost 70% road has been already opened by VDC and DDC budget. Only areas with difficult topography, rocks and bridges have been left for road opening. In particular, the stretches at Tanbe rocky area (0+500, 9+200 – 9+700), and Chaile to Samar are remaining for new construction. Several slide areas exist along the opened section that requires stabilization. Major slide areas along the road alignment are at Ch 0+800, 5+500, 8+800, 14+160 – 14+920, 20+020, 25+170, 28+900, 30+350, 32+200 and 33+000. Also from 14+160 to 14+920 is highly unstable area prone to continuously falling loose soil. The likely impact is direct, medium, site specific and long term depending on cases.

82. *Measures:* The mitigation measures will be balance cut and fill for new section; ensuring minimum cut slope depending upon the soil type; Re-vegetation of exposed areas; adoption of bio-engineering techniques (Shrub and tree plantation); and use of soft engineering structures (Toe wall, check dams) before disposing spoil. Blasting shall be restricted. If required, hydraulic jack hammer mounted on excavator shall be used for rocky area (0+500, 9+200 – 9+700). Geological and geotechnical, Bio-engineer, river engineer shall conduct detail assessment before construction work start. Recommended

civil engineering structures and bioengineering measures necessary at various chainages for slope stabilization have been given in Annex XVII.

Table 6.1: Recommended civil engineering structures and bio-engineering measures

Chainage	Civil structures	Bio-engineering	Remarks
0+800	Gabion breast wall	Shrub plantation	Geological and geotechnical, Bio-engineer, river engineer shall conduct detail assessment before construction work starts.
5+500	Gabion breast wall	Shrub plantation	
8+800	Gabion retaining and breast wall	Shrub plantation	
14+160-14+920	Valley side gabion and hill side check dam	Tree, Shrub plantation	
20+020	Gabion retaining and breast wall	Tree, Shrub plantation	
25+170		Shrub plantation	
28+900		Shrub plantation	
30+350		Shrub plantation	
32+200		Shrub plantation	
33+000		Shrub plantation	

Spoil Disposal

83. *Impacts:* Unmanaged disposal of spoil will cause gully erosion, blockage of irrigation canal, damage farm land and crops, and may threat settlements at downhill slopes. From Chaile to Samar, and Samar to Bhena will take special consideration during construction of road. This is a new track opening though road tracks are opened at several sections. The impact from spoil disposal will be direct, high, local and for long term.

84. *Measures:* Spoil will be safely disposed and managed at designated site with minimum environmental damage. Engineer will give approval for disposal site of spoil. Along the Kaligandaki River banks and sections between Chaile to Samar, and Samar to Bhena will be given special close monitoring during construction of road. Balanced cut and fill and re-use of excavated materials will be given emphasis. Spoil will be used to reclaim land or eroded areas. Disposal site will be provided with toe wall, proper drainage, vegetation and adequate protection against erosion. Potential safe spoil management areas are given in Table 6.2.

Table 6.2 :Safe Spoil Disposal Sites

S. No	Chainage	Location	Remarks
1	0+200	Kagbeni	Toe wall and Shrub/Tree plantation will be provided
2	3+300	Kagbeni	Toe wall and Shrub/Tree plantation will be provided
3	5+750	Kagbeni	Toe wall and Shrub/Tree plantation will be provided
4	11+220	Tangbe	Toe wall and Shrub/Tree plantation will be provided
5	18+560	Chaile	Toe wall and Shrub/Tree plantation will be provided
6	25+600	Samar	Toe wall and Shrub/Tree plantation will be provided
7	32+500	Syangboche	Toe wall and Shrub/Tree plantation will be provided
8	38+640	Jhaite	Toe wall and Shrub/Tree plantation will be provided

Source: Field survey, July, 2009

Water Management

85. *Impacts:* Water from the outlets of roadside drain will cause erosion and landslide affecting the stability of the road. Natural drainage will get blocked due to construction of road. The impact will be indirect, medium, site specific and medium term.

86. *Measures:* The mitigation measures will be to provide adequate numbers of drainage structures in order to have minimum interference with natural drainage pattern of the area; channelize surface water discharge from side drains; do not block or divert water away from natural watercourse. Details about necessary structures required to mitigate the water induced adverse impacts are as given in Annex XIV.

Air, Noise and Water Pollution

87. *Impacts:* Although the air quality of the project area is not measured, air does not appear to be polluted. Dust will be major problem during both construction and operation of the road. Impact on air quality will be direct, low, local, and for short term.

88. The project area at present does not experience noise pollution. However, during construction, the increased construction activities may increase noise level to some extent. The impact of road construction on noise level will be direct, low, site specific, reversible and short term.

89. The water quality in the project area appears to be fairly clean and not polluted. During construction these water bodies will be polluted by spoil and construction wastes. The impact will be direct, low, local, short term.

90. *Measures:* The mitigation measures will include use of face mask by the workers working in the areas of high dust generation at Tangbe to Chaile, Chaile – Samar, Samar- Bhena area; avoid disposal of excavated materials in the water bodies; cover dry material or make it wet during transportation. Both sides of the road will be planted with trees, as far as possible which will act as sound and noise barrier.

Quarry/ Borrow Operation

91. *Impacts:* Potential adverse impacts of quarrying and borrowing activities are accelerated land erosion, landslides, disturbance in natural drainage patterns and water pollution. The likely impact will be direct, medium in magnitude, site specific in extent and short term in duration.

92. *Measures:* Quarry and borrow operation plan will be prepared and approved by Engineer; unstable sites, erosion prone area, forest area, settlements, fertile farm land will be avoided for quarry / borrow operation; quarry sites will be rehabilitated by providing appropriate civil engineering structures and bioengineering measures after the extraction is complete. Recommended quarry sites in the area are given in Table 6.3.

Table 6.3: Recommended Quarry Sites

SN	Chainages	Places of recommended quarry sites	Measures
1.	0+000	Stone quarry at upper side of the road	Toe wall , Slope trimming and Bio-engineering
2.	2+500	Aggregates, Sand and Stone from Kaligandaki river	No disturbance of river course, Leveling the surface,
3.	18+000	Stone quarry site, along the road	Toe wall , Slope trimming and Bio-engineering
4.	25+500	Stone collection	Toe wall , Slope trimming and Bio-engineering

Source: Field Survey, July, 2009

Location of Camp Sites

93. *Impacts:* The road will be constructed by contractor and RBG (LEP) approach but the labor availability will not be sufficient in Zol of the subproject as well as in Mustang District. Thus, additional labor will be required from nearby districts. Hence camp sites will be required during construction of road. Siting of camp will cause solid waste and waste water problems. Impact will be direct, medium significance, site specific and short-term.

94. *Measures:* The mitigation measures will be use of local labors as far as possible; siting camp away from productive lands; pay compensation for using private farm or lands for storage or camp; electricity and first aid facilities will be provided in camp sites; provision of soak pit and pit latrine will be made. For waste water and solid waste management, soak pit will be made and proper management will be done. Appropriate camp sites with open space have been observed at 9+000 near Tangbe about 5 ropani, at 16+000 near Chaile, Samar, Bhena, and at 36+000 near Ghiling about 6 ropani.

Chemical Issues

95. *Impacts:* The road will be constructed through contractor and RBG (LEP) approach. Only rock splitter and truck for transportation of materials will be used. Diesel and grease required for vehicle to operate and kerosene to workers to cook meals. Storage of fuels and chemicals and operation of vehicles and machineries result in spillage of hazardous chemicals (oil and lubricants) that may pollute nearby water sources and soil; and may affect health of workers. The impact will be direct, low, site specific and medium term.

96. *Measures:* The road will be constructed through contractor and RBG as possible (LEP) approach. Proper storage of hazardous chemicals will be done at fenced areas. Safety gears (Gloves) to workers during handling of chemicals and fuels will be supplied. Close monitoring will be done during operation of crawler mounted rock splitter and material transportation vehicles.

6.2.1.2 Biological Impacts

Loss or Degradation Vegetation

97. *Impacts:* Total of 4.21 ha of barren, bushes and forest land and 0.55 ha of agricultural land will be permanently lost and 235 numbers of trees will be removed from private land. The detail is given in Annex XII. Major species to be cleared include Bhotepipal, Bains, Apple, Aru and Chhuli. The impacts on vegetation have been considered to be direct, high in magnitude, site specific in extent and long term.

98. *Measures:* The loss of trees cannot be minimized; however, it can be compensated by replantation. Following the 'Work Procedure for Providing the Forest Land for Other Use, 2063' of Government of Nepal (cabinet decision of 10.11.2063 B.S.), Proponent will manage a nursery to grow tree sapling and compensatory plantation at 1:1 will be done in private land. Total 386 trees will be planted as compensatory plantation. The project will establish nursery at Tangbe(Ch.9+500) and Samar (Ch. 21+000) , and extensive bioengineering and tree plantation program will be carried out at all feasible sites.

Impact on Wildlife Due To Loss of Habitat and Hunting

99. *Impacts:* The subproject area lies within the Annapurna Conservation Area but the major forest and habitat of wildlife do not fall under Zol of subproject. However, construction activities will disturb wild animals and birds of the surrounding area. Important and rare wildlife including Snow leopard, Musk deer, Danphe, and Monal live in the mountains at higher altitude. They climb down to lower level only during winter, when there is snowfall. Road will be closed during winter for about 4 months. The impact will be indirect, low, local and long term in nature.

100. *Measures:* Workers shall be strictly discouraged from collecting fuelwood or hunting/harassing of wildlife. Construction activities will be carried with close coordination with ACAP. Regular environmental monitor will be deployed by subproject. ACAP has been well managing the conservation area. People are not allowed to cut trees, harass or kill wild animals. Monitoring and punishment to defaulters is done by ACAP. Poaching of wildlife should be strictly restricted in cooperation with ACAP. Conservation Area Management Committee (CAMC) is working in every VDCs to regulate the conservation of wildlife species. A monitoring committee in participation of all the relevant stakeholders shall be formed which will undertake monitoring during construction and operation stages.

Impacts on Flora and Fauna (as listed in CITES and IUCN Red Data Book)

101. *Impacts:* Endangered wildlife like Snow leopard (*Panthera uncia*) which is listed in IUCN red list and CITES Appendix I, 'Vulnerable' wildlife like Himalayan Musk Deer (*Moschus chrysogaster*), endangered wildlife like Wolf (*Canis lupus*), Jackle (*Canis aureus*), Danphe (*Lophophorus impejanus*) and Monal (*Tragopan satyra*) are found in the surrounding areas of the road alignment. However, the road alignment does not pass through major forest areas. Impact on these wildlife will be indirect, medium, local and for short term.

102. *Measures:* Workers shall be strictly discouraged from collecting fuelwood or hunting/harassing of wildlife and; local people will be made aware of the importance and conservation of wildlife. Regular environmental monitor will be deployed by subproject. Coordination with CAMC/ACAP to form a monitoring mechanism will mitigate the adverse impact on flora and fauna.

6.2.1.3 Socio-economic Impacts

Loss or Degradation of Farm Land and Productivity

103. *Impacts:* There will be permanent loss of 0.55 ha of agricultural land due to road construction. This will reduce 0.75 Mt annual production of barley, buck wheat and potato. Dust from construction work may settle on crop and vegetation, which may also affect production. The impact is expected to be of direct, high in magnitude, local in extent and long term in duration.

104. *Measures:* Compensate for loss of property; for loss of standing crops and temporary use of agriculture land; Coordination with District Agriculture Office shall be maintained to implement agriculture extension program in these areas by introducing greenhouse systems and organic fertilizers.

Loss of Private Properties

105. *Impacts:* The proposed road alignment will damage one Khala ghar at Tangbe, wall structures at Chhusang and agricultural land at Kagbeni. The impact will be direct, high significance, site specific, and long term.

106. *Measures:* Compensation for the loss of property will be provided to the affected people. A separate Resettlement Plan has been prepared to address land and property acquisition as well as compensation issues. In this plan, direct cost of NRs. 3,515,309.00 has been proposed.

Table 6.4: Impact on Private Properties and Mitigation Measures

Infrastructure	Chainage/ Location	Distance from the Road Centre line	Potential Impact	Mitigation Measure
Agriculture land	0+000 - 1+000/ Kagbeni	Adjacent	Crops is affected due to grazing of cattle	Dry Wall will be constructed for the protection of agricultural

Infrastructure	Chainage/ Location	Distance from the Road Centre line	Potential Impact	Mitigation Measure
				land.
Fence around Agriculture land	13+640 - 13+680 (Both sides), 13+780 - 13+900 (Right Side)/ Chhusang	1m	Damaged during road construction	Affected wall will be reinstated.
Khala ghar	9+700 / Tangbe	2m	Damaged during road construction	Compensation will be given to the affected family.
Cattle Shed	9+680/ Tangbe	2.5m	Damaged during road construction	Compensation will be given to the affected family.

Source: Field Survey, July, 2009

Impact on Community Infrastructure

107. *Impacts and Measures:* The community infrastructure that requires reconstruction / rehabilitation during construction works, and the mitigation measures are as presented in following Table 6.5.

Table 6.5: Impact on Community Infrastructure and Mitigation Measures

Infrastructure	Chainage/ Location	Distance from the Road	Potential Impact	Mitigation Measure
Electric Poles (15 nos.)	9+130 - 10+100/ Tangbe - Chhusang	Adjacent	Damaged	Will be relocated.
Irrigation Crossing	0+695, 0+758, 0+780/Kagbeni, 13+690/ Chhusang	Crossing the road	Damaged during road construction	Irrigation crossing Will be Reinstated with 30 dia.Hume pipe
Irrigation canal	13+800 - 13+920/ Chhusang	Adjacent	Damaged	Will be reinstated.
Trekking Trails	0+000 - 9+000/ Kagbeni-Tangbe , 22+000 - 24 +000/ Samar	Along the road	Damaged during road construction	Alternative trekking route is proposed along other side of Kali Gandaki river in Kagbeni, Tangbe and Samar.
Water Supply Pipe	9+200 - 9+ 220/ Tangbe	Along the road	Damaged during road construction	Will be reinstated.

Source: Field Survey, July, 2009

Health and Safety Matters

108. *Impacts:* During construction, workers will be exposed to various risks and hazards. Potential impacts to health are respiration because of high altitude and eye and lung diseases due to exposure to dust, and risk of accident during work. The lack of proper sanitary measures and increase in waste and water pollution can lead to diseases such as jaundice, typhoid and dysentery. Increased contact between local and migrated workers can cause spread of serious health risks like STDs and HIV/AIDS. This impact is direct, high in magnitude, short term and local.

109. *Measures:* The workers shall be provided and made mandatory the use of helmets, safety belts, masks, gloves and boot depending on nature of work; provide clean drinking water at sites and camp; pit toilets at sites and camp; first aid facilities at sites and camp with training to use them; provide group accidental insurance for workers. Awareness generation to local people and workers on HIV/AIDS and other communicable diseases.

Decline in Aesthetic Value

110. *Impacts:* About 70% of the alignment has already been opened. Thus, opening of remaining road by the subproject will incur minimal impact. Construction of road in virgin region of the subproject area will create scar on topography causing visual pollution. Landscape degradation and scar on topography due to the road; quarry operations; and indiscriminate dumping of spoil on open land and hill slopes will make the area aesthetically unpleasant. The alignment is a world famous trekking route. Operation of vehicles and dust generated by them will be a nuisance to them. The likely impact will be direct, medium in magnitude, local in extent and short term in duration.

111. *Measures:* Indiscriminate dumping of spoil material will be discouraged; adopt bioengineering and manage spoils and erosions, cover road alignment with vegetation and quarry sites will be properly closed to suit the local landscape and cover by plantation of local species of trees. Alternate trekking route will be encouraged. Black topping of the road will also reduce dust generation.

Impacts on Cultural, Religious and Archeological Sites

112. *Impacts:* There will not be any foreseeable impacts on cultural, religious and archeological sites along the road alignment during construction of road.

6.2.2 Operation Stage

6.2.2.1 Physical Environment

Road Slope instability and Management

113. *Impacts:* Sensitive areas for possible slope stability problems are the areas of steep cut 5+500, 8+800 area; and Kaligandaki River bank at 14+160 - 14+920 and 20+020 area. The impact will be direct, medium, local and long term nature.

114. *Measures:* The mitigation measures to be adopted include immediate clearance of slides and restoration of slopes; regular maintenance of bio-engineering and civil structures for slope protection; restoration of rill and gully formation; and conservation of soil.

Impact Due to Air, Noise, Water and Soil Pollution

115. *Impacts:* Dust will be generated from the earthen road and vehicles emit gaseous pollutants. Continued dust pollution will 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, dust and noise pollution will be low. However it may cause nuisance to trekkers. Noise may disturb wildlife of the area, particularly birds which may get scared by the sound of vehicle and horn. Tangbe to Kaligandaki Bridge and Chaile to Samar area are more sensitive to dust pollution.

116. The impact due to air and noise pollution will be direct, low, local and long term.

117. Increase in settlements, hotels and lodges will result in increased organic and inorganic solid and liquid wastes. Unmanaged disposal of these wastes can result in pollution of soil. The disposal of household wastes, washing of vehicles in water bodies will degrade the water quality. The impact will be direct, low, local and long term.

118. *Measures:* Measures to be adopted will include plantation of trees on both sides of the road as far as possible; Speed limit of maximum 20 km/hr (rural road category); low sound generating vehicles with only green sticker should be allowed to operate in the road, limit number of vehicles at minimal required level operated by local operators who will be more accountable to their place; Ban entry of private vehicles beyond Jomsom; Only locally operated standard vehicles operated by local beneficiaries shall be allowed beyond Jomsom; Blacktopping of the road may be considered as an alternative to reduce dust generation; Awareness program for drivers to drive below design speed to avoid wildlife accident; Develop alternate route adjacent to the road alignment for trekkers, wherever possible; Minimal or no use of horn; Erect signs at wildlife crossing areas. The increased volume of traffic, agriculture mechanization, use of new technologies and new industries in future may lead to increase in air and noise pollution. To control vehicle speed, mechanism will be developed (fixed time to reach one settlement to another settlement by providing ticket to all vehicle operators) in coordination with environment management committee involving ACAP, VDC, DDC and VOC.

Change in Agricultural Pattern

119. *Impacts:* With the improvement in accessibility, there will be increase in use of chemical fertilizers, pesticides, insecticides, fungicides etc resulting in water and soil pollution. The agricultural land will be converted into fruit orchards. There might be loss of traditional crops. The impact will be indirect, medium, local and long term.

120. *Measures:* Aware local people in the use of organic farming techniques. Promote agro forestry practices in agricultural land in coordination with DADO.

Impact on Sanitation of the Area

121. *Impacts:* The ACAP has introduced solid waste management system in villages. The settlements, also being tourist area, are cleaned in the morning. The local ethnic residents are known to keep their premises clean and sanitary. Increased traffic volume will also bring several problems including solid waste management problems, open urination and defecation along the road, open disposal of food packages and plastic water bottles and bags that will pollute the settlement area. Travelers can also throw such packages from vehicles. They might cause adverse impact on wildlife if they consume the plastic materials. The impact will be direct, medium, local and long term nature.

122. *Measures:* The mitigation measures to be adopted will be plastic bags will be banned in the area. Restrict haphazard throwing of garbage by the travelers. A system of travelers carrying back their water bottles can and garbage can be introduced, or tax levied for cleaning them by local authorities. Awareness programs organized, notice boards shall be erected and travelers requested not to pollute

the area. Public urinals shall be constructed at vehicle stops, and open defecation shall be fully restricted. Drivers, lodge owners and local residents shall be given awareness and orientation trainings on maintaining clean and sanitary environment.

6.2.2.2 Biological Environment

Depletion of Forest Resources

123. *Impacts:* The road passes through area that fall under rain shadow due to which the area is arid and devoid of trees, though it has shrubs at lower altitudes and grass at higher areas. Minimum impact is expected on forest resources. However, the forest resources may deplete due to human pressure on to meet increasing needs of heating and cooking, illegal felling/cutting of trees for timber and house construction. The impact will be indirect, medium, local and long term in nature.

124. *Measures:* Support ACAP/CAMC and VDCs/DDC to encourage and support local community in controlling illegal harvesting of forest resources; awareness programs to educate local people on the importance of forest conservation. Improved access will facilitate easy transportation of LPG Gas and kerosene to replace use of firewood. Alternative energy (solar, wind, biogas) will be promoted.

Disturbance to Wildlife and Illegal Hunting

125. *Impacts:* Along the road alignment and within Zol, there are no significant habitats of wildlife but, they will be disturbed due to frequent movement of vehicle and blowing of horn. The subproject operation will have impact on wildlife, if not properly managed. Poaching and killing can increase due to access facility. Important and rare wildlife including Snow leopard, Blue sheep, Musk deer, Danphe, and Monal live in the mountains at higher altitude. They climb down to lower level only during winter, when there is snowfall. Road will be closed during winter for about 4 months. Easy movement of poachers, bio-pirates and smugglers can have adverse impacts on wildlife after the construction of road. The impact will be indirect, high significance, local and long term in nature.

126. *Measures:* Erect appropriate sign boards like 'no horn area', provide 'under passage for wildlife', informing drivers on prohibition of blowing horns in the forest areas. Rule will be made (make a fixed time to reach from one settlement to another settlement by providing ticket to vehicle operators). Only local vehicle operators shall be allowed to operate vehicular services. No outside vehicle shall be allowed beyond Jomsom. Local vehicles allowed in the area will control poaching and harassing wildlife. Wildlife crossings shall be provided at regular intervals in potential habitat areas. Vehicles shall not be stopped in between settlements. Pollution free vehicles and blowing of horn shall be restricted. ACAP has been well managing the conservation area. People are not allowed to cut trees, harass or kill wild animals. Monitoring and punishment to defaulters is done by ACAP. Poaching of wildlife should be strictly restricted in cooperation with ACAP. Conservation Area Management Committee (CAMC) is working in every VDCs. Community and authorities will remain vigilant and alert on killing of wildlife.

6.2.2.3 Socio-economic and Cultural Impacts

Unplanned Settlements and Market Center Development

127. *Impacts:* Expansion of settlement area and market can be observed at Kagbeni. Settlements having a central location will expand exponentially and will give rise to problems that are similar to other urban areas. Encroachment of RoW will take place. The issues of sewerage, solid waste, haphazard settlement development, dumping of wastes into river and streams will feature as major problems. Small scale industries may develop as the Apple industry in future. Demands for more sophisticated hotels, lodges, variety of restaurants, entertainment and other leisure activities are likely to increase. This will put enormous pressure on natural resources as well as increased use of energy for cooking and heating purposes. The impact will be direct, medium, local and long term in nature.

128. *Measures:* The mitigation measures to be adopted include regulation of settlement with proper planning; plantations of trees in the RoW so that it is not encroached; provide sewerage in market areas. Authorities and VDCs will control encroachment of road.

Change in Social Behavior

129. *Impacts:* Access facilities will bring social nuisance like increase in alcohol consumption, gambling, prostitution, and will increase girl trafficking. The impact will be indirect, medium, local and long term in nature.

130. *Measures:* Support awareness raising programs against such nuisances.

Road Safety Measures (Road Accident)

131. *Impacts:* Movement of vehicles and inadequate road safety measures will invite accidents. The impact will be direct, medium, local and long term in nature.

132. *Measures:* The mitigation measures to be adopted will be applying appropriate road safety measures with the help of 3-Es i.e. Engineering, Enforcement and Education; and required safety signs will be used along the road.

Impact on Livelihood of Local People

133. *Impacts:* The people having major occupation as mule business will be affected. A mule owner with 7-9 mules can make a net profit up to NRs. 25,000 per month. There will be change in ownership of the types of domestic animals. The number of horses and donkeys will decline. On the other hand, there may be increase in number of cows, yaks, goats and sheep herding. The impact will be indirect, medium, local and for long term.

134. *Measures:* The people will change their occupation by selling horses and mules, and to own agriculture land for apple farming, involve in business (shops, small hotels, lodges) and livestock (cows, yaks, goats and sheep) etc. Environment Monitoring Committee can organize regular training on cottage industry for such communities to support their livelihood.

Impact on Trekkers

135. *Impacts:* The alignment is a world famous trekking route. Operation of vehicles and dust generated by them will be a nuisance and unpleasant to them. The likely impact will be direct, medium in magnitude, local in extent and short term in duration.

136. *Measures:* Alternate trekking route will be encouraged. DDC and ACAP had already initiate the alteranative route from Jomsom to Lomanthang.

7. ENVIRONMENTAL MANAGEMENT PLAN

137. The EMP is prepared to guide implementation of mitigation measures and monitoring requirements.

7.1 Institutions and Their Roles

Table 7.1: Concerned Institutions and Their Roles

Institution	Role	Responsibility in the Project	Remark
Pre- construction Stage			
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) Environment Section	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. 	Executing Agency
Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)	Department under MoLD 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.	Executing Agency
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 / DDG of DoLIDAR has been heading the PCU.
District Development Committee / District Technical Office Environment Unit of DDC	DDC/DTO is Project Implementing 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. 	District Technical Officer is the Project Manager
Construction Stage			
Ministry of Local Development (MLD) Environment Section	Environment Management Section is responsible to look into safeguard matters for the ministry.	<ul style="list-style-type: none"> Coordinate with project on safeguard issues Conduct environmental monitoring from central level. 	At least two times a year during construction and once in a year during operation phase
Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)	Department under MoLD responsible to execute infrastructure projects under MLD. Provides back-up support to DDCs in technical matters through DTO.	Conduct environmental monitoring from central level.	Assist ministry on monitoring activities. Provide technical assistance through its department.
RRRSDP- Project Coordination Unit/Central Implementation Support Consultant	Facilitating/support	PCU will be supported by CISC at center to ensure effective monitoring and undertaking corrective actions.	
District Development Committee / District Technical Office	Implementing agency	<ul style="list-style-type: none"> Conduct environmental safeguard monitoring Reporting 	

District Project Office	Project implementation office working directly under DDC/DTO.	Responsible for overall activities related to implementation of the works at field level. ▪ Conduct environmental safeguard monitoring, Reporting	An environmental monitoring expert shall be assigned full-time during the sub-project implementation for close monitoring and reporting of EMP compliance activities
District Implementation Support Team (DIST)	Support consultants at district level	Technical and management support to DPO, ▪ Conduct environmental safeguard monitoring, Reporting	Consultant
Central Implementation Support Consultant (CISC)	Support consultants at central level	Technical and management support to PCU, DTO, DIST	Consultant
DDC environmental unit		Support for conduct environmental safeguard monitoring during construction and Operation and Maintenance period	
Annapurna Conservation Area Program (ACAP)/ Conservation Area Management Committee (CAMC)	Natural resource conservation and environment protection	Directly involved during construction as a lead agency for forestry, bio-diversity monitoring, building local capacities in environmental mainstreaming, tourism, cultural heritage.	
District Project Coordination Committee (DPCC)	Support	Provide co-ordination among all the responsible agencies or persons at district level.	
Village Infrastructure Construction Coordination Committee (VICCC)	Support	Provide co-ordination among all the responsible agencies or persons at village level.	
Road Building Group (RBG)		Execution of works	
Operation and Maintenance Stage			
Ministry of Local Development (MLD)	Environment Management Section is responsible to look into safeguard matters for the ministry.	Conduct environmental monitoring from central level.	At least once in a year during operation phase
Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)	Provides back-up support to DDCs in technical matters through DTO.	Conduct environmental monitoring from central level.	Assist ministry on monitoring activities.
DDC/DTO, DDC environmental unit	Facilitating/support	Provides monitoring inputs (person)	
Annapurna Conservation Area Program (ACAP)	Leading agency	ACAP is directly involved in execution, monitoring for forestry, bio-diversity, building local capacities in environmental mainstreaming, tourism, cultural heritage, etc.	
Vehicles Operators Committee (VOC)	Support for Operation of vehicles	Voc is involved in limit number of vehicles at minimal required level operated by local operators, ban entry of private vehicles.	
Community Based Monitoring Committee	Provide co-ordination among all the responsible agencies or persons at	Formulate, implement and monitor during operation and maintenance of	Raising awareness on environmental

(CBMC)	village level.	the road. The CBMC shall have members representing VDC, the locals from the benefited area, social organizations, technician employed for the work. DDC shall provide a room and an employee (if required) to VRCC for the conduct of meetings and other administrative works. VRCC shall implement Community Based Monitoring System and constantly monitor it and present the report to the general assembly.	safeguards
Village Road Co-ordination Committee (VRCC)	Support	Co-ordinate with CBMC Village Road Co-ordination Committee (VRCC), which will be established in each beneficiary VDC.	
VDCs leaders (Mukhiya), Local social organizations	Support	Co-ordinate with CBMC	
Conservation Area Management Committee (CAMC)	Support	Co-ordinate with CBMC, ACAP	

138. To support for smooth implementation of the sub-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 Zol, If labors are not available locally, they shall be brought from other places of the country under labor contract.

139. During operation stage environmental monitoring will be carried out by formation of a committee which will be lead by ACAP, and have participation of environment unit of DDC, Vehicles operators committee, Community Based Monitoring Committee (CBMC) and VDC/DDC representation and representation of local political/ social leaders (VRCC, local social organizations, Mukhiya of VDC, CAMC of every VDCs, Ama samuha).

140. If the environmental safeguards programmes are undertaken separately during operation the process will require budget and human resources to conduct training and awareness programme for all community people and stakeholders. Raising awareness on environmental safeguards is vital in order to increase the knowledge of the community, people and stakeholders related to the project. Then only community and people will show their concern and interest on the project. For sustainable operation of monitoring, budget will be collected through certain percent tax of vehicles, tourist, DDC, VDCs fund. The sub-project can initiate the fund by providing a seed money.

7.2 Reporting

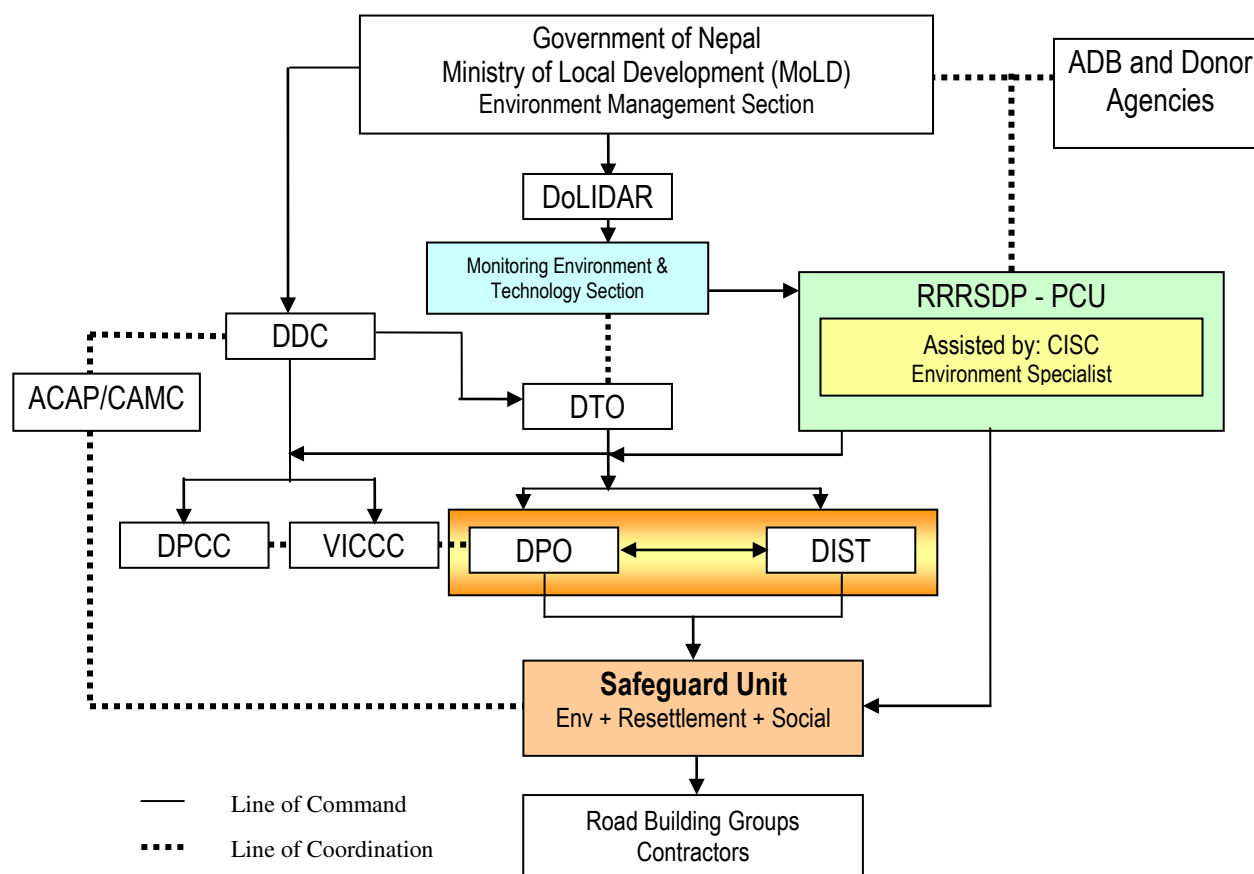
141. Monitoring checklist will be developed as per the Environment Management Action Plan (EMAP). The checklist will be used for regular monitoring. Trimmers EMP compliance report will be prepared and submitted to the DDC, and DDC will forward it to PCU / DoLIDAR.

142. The monthly reports will be based on recurrent site inspections and will report on the effectiveness of the mitigation measures.

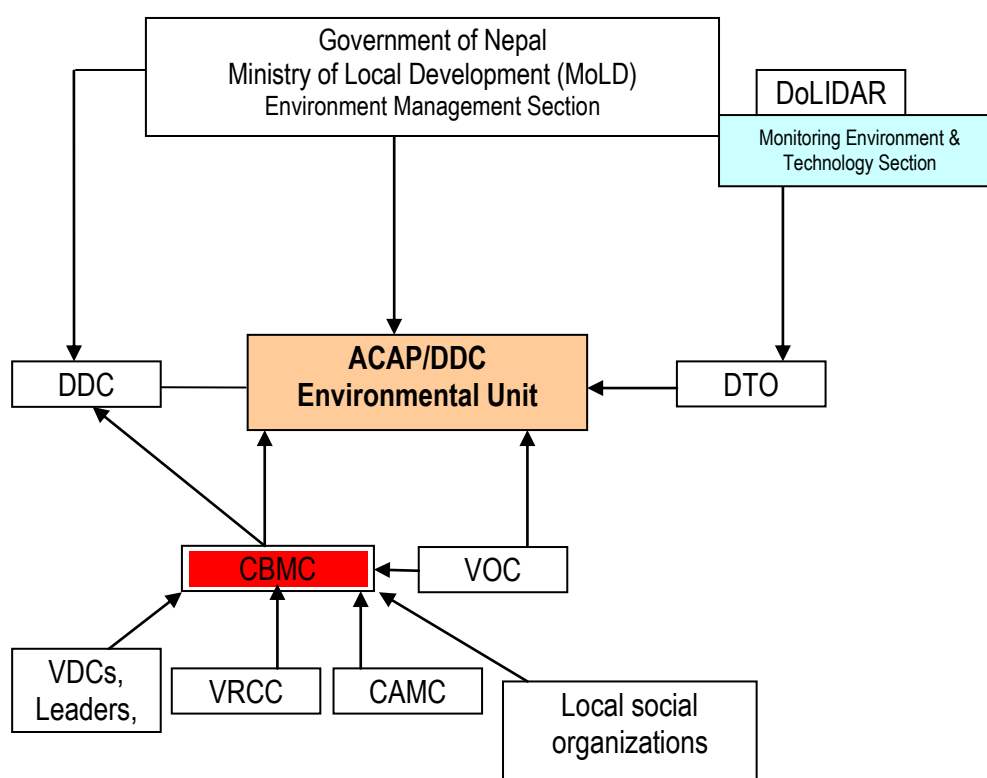
143. The trimester environment monitoring report will be submitted for the first year of operation of the road by the Proponent (DDC/DTO) to Executing Agency (PCU/DoLIDAR), who will forward the report to ADB. This is to ensure that post project monitoring is also carried out at least for one year.

Fig. 7.1: Environmental Management Organization Structure

Environmental Management Organization Structure During Construction Stage



Environmental Management Organization Structure During Operation and Maintenance Stage



7.3 Environmental Management Plan

144. The DDC/DTO with support of DPO/DIST at local level and PCU/CISC at central level will be responsible for conducting careful and routine monitoring of EMP compliance. Overall implementation of the EMP will be the responsibility of the Proponent. An environmental monitoring expert shall be assigned full-time during the sub-project implementation for close monitoring and reporting of EMP compliance activities. A geologist/geotechnical engineer will also assess the entire road alignment and proposed bridge site, A river engineer shall conduct assessment and design of river training works of left bank of Kaligandaki River. Recommended appropriate solution will be incorporated in construction. Framework for implementing environmental management plan is shown in Table 7.2.

Table 7.2: Beneficial Impacts and Proposed Enhancement Measures of Road Sub-project

Activity	Effect	Related Beneficial Impacts	Type of Impact *)				Benefit Augmentation Measures	Responsible Agencies		
			Nat	Mag	Ext	Dur		Executing Agency	Supporting Agency	
Construction Stage										
Construction of road	Enterprise Development and Business Promotion. Local shops will be opened at Tanbe, Chhusang, Samar, Bhena	Enhancement in local economy	D	M	L	ST	Promote use of local products by the construction crews. Awareness raising programs will be facilitated for the promotion of cooperatives and linkage with other financial institutions through social action programs.	Contractor/ RGB	DIST/ CISC/PCU	
Construction of road	Employment Generation (Skilled 11061 person days, unskilled 276555 person days) and Increase in Income	Increase in income level	D	H	L	ST	Maximize manual work through local, poor, vulnerable and women. Training in income generation and skill enhancement.. Proponent will give skill enhancement, Livelihood Enhancement Skill Training (Tour guide, Cook, Jam /jelly production, Carpentry furniture, Gabion wire weaving etc.), awareness training through resettlement and social program.	DDC/DTODIST	DPCC / VICCC / CISC/PCU	
On the job training to local labour	Skill Enhancement	Increase in income generating activities, employment opportunities	IN	M	L	LT	Livelihood Enhancement Skill Training will give to local people; Members of the Road Building Group will be given training on masonry, netting wires and construction of gabion wall, slope cutting, bio-engineering works.	DPO/DIST	DDC/DTO / CISC/PCU	
Construction coordination committee and RBG program	Community Empowerment and Ownership	Increase in income and ownership.	IN	M	L	LT	The coordination committees (DPCC, VICCC, RBGs) will be constituted and training will be given to them. Supplementary infrastructure will be constructed as per local demands and local peoples will be involved for maintenance of supplementary infrastructure as well as road.	DPO/DIST	DDC/DTO / CISC/PCU	
Operation Stage										
Operation of Road	Drop in prices of basic household commodities	Price of commodities will fall and poor people will be benefitted. Increase in quality of life.	IN	H	L	LT	Continued maintenance of road for easy transportation of goods.	VDC/DDC	VDC/DDC	
Operation of Road	Improvement in Accessibility and Saving of Time and Transportation Cost. Improves connectivity by linking Chinese Border and Beni-Jomsom- Kathmandu Road.	Travel time from Kagbeni to Jhaite will reduce to 4- 5 hours which currently takes 3 days to travel the same distance, similarly travel cost will significantly become cheaper.	D	H	R	LT	Proper maintenance (regular, emergency) , continuation of bioengineering	DTO/DDC	DoLIDAR	
Operation of Road	Increase in Trade, Commerce and Development of Market centers	Shifts towards improved commercial agriculture. Export of fruits and vegetables and local products will become easier. Facilitate developing Mustang as important transit point for Indo-China trade in future.	IN	H	L	LT	Manage planned growth with required infrastructure facilities in the market areas. Agriculture extension services, market linkages and networking for better market price.	DPO	DDC/VDC/ACAP	
Operation of Road	Appreciation of Land Value	Improvement in local economic condition	IN	M	L	LT	Awareness program shall be organized to control of encroachment within RoW. Awareness program shall be organized on use of high value land to get bank loans for setting up enterprise ventures.	DDC/DPO	DDC/VDC	
Operation of Road	Enhancement of Community Development Services	Ease of access to social service and raise in quality service	IN	H	R	LT	Keep road maintained to ensure access facility that will attract development of other social services facilities.Public toilet will be	Local people, DDC, VDC	DDC, VDC	

Activity	Effect	Related Beneficial Impacts	Type of Impact *)				Benefit Augmentation Measures	Responsible Agencies	
			Nat	Mag	Ext	Dur		Executing Agency	Supporting Agency
							provided in every station to control of open defecation. The cost of public toilet is included in contract packages.		
Operation of Road	Reduced Pressure on Forest Resources	Fuel alternatives to fuel wood will become popular. Reduced pressure on the forest resources.	IN	H	L	LT	Regular maintenance of road so that supply of commodities like LPG gas, kerosene will become easier.	DDC/DFO	DDC/DFO
Operation of Road	Increase in Tourism. Domestic and international tourist will increase.	Improvement in local economy.	IN	H	L	LT	Continued maintenance of road for easy transportation.	DDC, VDC	DDC, VDC, ACAP

Table 7.3: Adverse Impacts and Proposed Mitigation Measures of Road Sub-project

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
Construction Stage										
Physical Environment										
Construction of Road, site clearance	Change in land use	Loss of agricultural land (0.55 ha.); Barren land/ bushes (4.21ha.). Cause production loss, loss of property, loss of forest area.	D	M	L	LT	IR	Compensation will be given for affected private properties. Plantation of trees will be done on all water available areas of barren lands, roadsides, roadside slopes to increase greenery in the area.	DDC/DTO	DIST
Site clearance, excavation	Slope Instability	Erosion, landslide, loss of property. Minor landslide occur at Ch 0+800, 5+500, 8+800, 20+020, 25+170, 28+900, 30+350, 32+200 and 33+000. Continuously falling loose soil and unstable slopes at 14+160 to 14+920.	D	M	SS	LT	Re	Civil structures with bio-engineering application (Such as Tree/Shrub plantation) shall be used to stabilize the slopes. Drainage management (Toe wall, Retaining wall, Rip-rap drain, checkdam etc.). Blasting will be restricted. Use of hydraulic jack hammer mounted on excavator for rocky area (0+500, 9+200 – 9+700). Geological and geotechnical, Bio-engineer, river engineer shall conduct detail assessment before construction work start	DDC/DTO	DIST
Construction of Road, earth excavation	Spoil Disposal and imposed weight of spoil on fragile slopes	Gully erosion, landslide, disruption of road, damage to farmland, water pollution etc.	D	H	L	LT	Re	Proper site selection and management of spoil at designated areas approved by Engineer; provision of proper drainages, toe walls, tree/shrub plantation; Proposed spoil disposal sites are 0+200, 3+300, 5+750, 11+220, 18+560, 25+600, 32+500 and 38+640.	DDC/DTO	DIST/VICCC/ VDC
Construction of Road	Water Management, generation of large volume of surface runoff	Erosion, landslide, damage to farmland	IN	M	SS	MT	IR	Proper drainage structures and proper spoil disposal, Avoid blockage or diversion of natural channels due to construction of road and disposal of spoils.	DDC/DTO	DIST
Construction works, operation of	Air pollution due to dust from exposed surface, from	Affect on local people and workers health and affect on agriculture.	D	L	L	ST	Re	Use of face mask while working on dust prone areas, covering of dust sources	DDC/DTO / RBGs	DIST

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
construction vehicles, material hauling and unloading etc. Slope cutting, spoil and waste disposal.	construction equipments and vehicles									
	Noise pollution	Disturbance and annoyance around school, health posts, forest areas.	D	L	SS	ST	Re	Restrict horn near school, health posts, settlement, and forest areas. Cover material during transportation.	DDC/DTO / Contractor	DIST
	Water pollution due to spoils and construction wastes	Risk of water borne diseases	D	L	L	ST	Re	Proper spoil management, and prevention of leakage and spills of construction chemicals, restriction in urination and defecation in open areas	DDC/DTO/ Contractor/R BGs	DIST/VICCC
Cutting of slopes	Quarry/borrow operation and its potential effect on instability, landslide	Change in river regime, instability, land slide; damage to forest, farmland and property; water pollution	D	M	SS	ST	Re	Proper selection and management of quarry sites, rehabilitation of quarry/borrow sites after completion of work. Recommended quarry sites are Ch 0+000, 2+500 18+000, 25+500.	DDC/DTO/ Contractor/R BGs	PCU/CISC/DIST/ VICCC
Construction of road	Location of Camp Sites, Storage Depots	Solid waste and waste water will cause pollution	D	M	SS	ST	Re	Locate camp site away from productive land (potential sites at 9+000, 16+000 and 36+000); use local labor as far as possible and pay compensation to land owner of camp area; first aid facilities, pit latrine provision in camp sites; soak pit for solid and water waste management.	DPO assisted by DIST/ Contractor	DIST/VICCC
Construction of road	Chemical Pollution and Hazards due to spillage of fuels from trucks and vehicle.	Pollution of nearby water sources and soil; affect health of the workers.	D	L	SS	MT	Re	Proper storage of hazardous chemicals and providing information signboards. Use of safety gears to workers during handling of chemicals and fuels. Close monitoring will be done during operation of crawler mounted rock splitter and material transportation vehicles	DDC/DTO / Contractors	DIST/DDC
Biological Environment										
Clearance of vegetation necessary for road formation	Loss or Degradation of Vegetation (386 nos of trees from private land)	Loss of green cover; loss of environmental benefits from vegetation, disturbance in ecological function, dust and noise pollution, aesthetic value etc	D	H	SS	LT	Re	Cutting of tree only in formation width, compensatory plantation of local species of tree at ratio 1:1 in private land.	DDC/DTO/D FO	DFO/CFUGs/DIST/V DC
Construction activity	Impact on Wildlife Due To Loss of Habitat and Hunting	Killing and harassing of wildlife; Loss of biodiversity and valuable species of wildlife.	IN	L	L	ST	Re	Work only in day time, do not disturb wildlife, aware workers. Construction activities will be carried with close coordination with ACAP. Regular environmental monitor will be deployed by subproject. A monitoring committee in participation of all the relevant stakeholders shall be formed which will undertake monitoring during construction and operation stages.	DDC/DTO/A CAP/CAMC	ACAP/CFUGs/DIST
Construction activity	Impacts on Flora and Fauna	Loss of biodiversity	IN	M	L	ST	Re	Minimum site clearance, discouraging workers for collecting fuel wood from forest or hunting/harassing faunas. Coordination with CAMC/ACAP to form a monitoring	DDC/DTO/D FO	DFO/CFUGs/DIST

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
								mechanism.		
Social-economic Environment										
Acquisition of land for maintaining road width*	Loss or Degradation of Farm Land and Productivity (0.55 Ha)	Reduction in 0.75 Mt annual production of barley, buck wheat, potato, hardship, food shortage	D	H	L	LT	IR	Minimize productive land acquisition through alignment selection, Compensation for affected people. Tree plantation will be promoted to local people by free distributing plants, and roadside tree plantation will be done.	DDC/DTO	CFC ² /DADO/DIST/VI CCC
Acquisition of land and property for maintaining road width	Loss of Private Properties. Damage of one Khala ghar at Tangbe, wall structures at Chhusang and agricultural land at Kagbeni.	Displacement of people, hardship	D	H	SS	LT	IR	Compensation and resettlement to the owner as described in resettlement plan. Compensation for affected Wall at Ch.13+640 - 13+680, 13+780 - 13+900; Khala ghar at Ch.9+700. Wall protection to protect agricultural land at Ch. 0+000 - 1+000.	DDC/DTO	CFC ³ /DIST
Demolition of structures along road alignment	Impact on Community Infrastructure	Loss of services (see table 6.4)	D	M	SS	ST	Re	Restoration or relocation of affected infrastructures: 15 Electric poles (9+130-10+100), Irrigation Crossing (0+695, 0+758, 0+780, 13+690), Irrigation canal (13+800 - 13+920), Trekking Trails (0+000 - 9+000, 22+000 - 24+000), Water Supply Pipe (9+200 - 9+ 220)	DDC/DTO	PCU DIST/CISC/MICCC/DC
Occupational health and safety aspects	Health and safety matters	Injury, fatal accidents, outbreak of epidemics and diseases, decline in capacity to work	D	H	L	ST	IR	Occupational health and safety regulations, first aid facility at sites with health treatment arrangements, contingency planning; Proper drinking water and toilet facility for construction crew	DDC/DTO	DIST/CISC
Construction of Road	Decrease in aesthetic value	Disturbances in working areas and scar on topography	D	L	L	ST	Re	Cover the road alignment by planting tree on both sides; manage working areas.	DPO in assistance by DIST / Contractors	PCU / CISC / Users Committee / VDC
Operation Stage										
Physical Environment										
Operation of road	Road Slope instability and Management. Sensitive areas are at 5+500, 8+800; and Kaligandaki	Slides and slope failure, Disturbance to traffic flow, pollution of water bodies, impacts on agriculture land, loss of	D	M	L	LT	Re	Regular maintenance of slope protection structures, Selection of healthy upland farming techniques	DDC/DTO/ VDC	DoLIDAR, DFO, District Watershed and Soil

* Activities that will be carried out during pre-construction period

² The Land Acquisition Guidelines, 1991 specify the establishment of an Acquisition and Rehabilitation Committee (also known as Compensation Fixation Committee, “CFC”) for fixing the rate of compensation of private properties to be acquired, consisting of the concerned Chief District Officer (Chair), Land Revenue Officer, representative of the DDC and the Project Manager and others as deemed necessary.

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
	bank at 14+160 - 14+920 and 20+020.	vegetation.								Conservation Office (DWSSC)
Operation of vehicles, Inadequate drainage	Air, Noise, Water and Soil Pollution	Disturbance to students, patients, tourists and trekkers, affect to nearby agriculture land and crops. Disturbance to wildlife and birds due to noise nuisance. Water and soil pollution due to solid and liquid waste from settlements and hotels/lodges.	D	L	L	LT	IR	Speed limit for vehicles, no horn signs, use vegetation barrier; Regular maintenance of drainage. Rule will be made (make a fixed time to reach one settlement to another settlement providing ticket to all vehicle operators) with coordination of ACAP.	DDC/DTO	DoLIDAR/Local administration
Operation of road	Change in Agriculture Pattern	Increase in use of chemical fertilizers, pesticides, insecticides, fungicides; water and soil pollution; agricultural land will be converted into fruit orchards; loss of traditional crops	IN	M	L	LT	IR	Aware local people in the use of organic farming techniques. Promote agro forestry.	DDC/DTO/D ADO	DADO/CFUGs/DIST/ VDC
Operation of road	Impact due to poor Sanitation of the area	Poor sanitation and pollution due to increased solid and liquid wastes.	D	M	L	LT	IR	Ban plastic bags in the area. Provision of public toilets at every vehicle stops and its proper management will be done.	DDC/VDC	DDC/VDC
Biological Environment										
Road operation	Depletion of Forest Resources	Loss of timber, forest resources and benefits.	IN	M	L	LT	IR	Enforcement of law, vigilance and monitoring, participation of community.	DFO/ CFUGs/VDC /ACAP/ CAMC	DDC/CDO/ACAP
Road operation	Disturbance to the Wildlife and Illegal Hunting	Collision of wildlife with vehicles, disturbance in their normal activities, Easy movement of poachers, bio-pirates and smugglers can have adverse impacts on wildlife	IN	L	L	LT	IR	Information signboards like 'no horn area', 'under passage for wildlife' will be kept at sensitive sites. Restriction in speed, excessive horn use. No outside vehicle shall be allowed beyond Jomsom. Provision of wildlife crossing at regular intervals. Strict monitoring will be done.	DTO/ CFUG/ ACAP/CAM C	DDC/CDO / DFO/ ACAP/ CAMC
Social-economic Environment										
Easy Access by road operation	Unplanned Settlements and Market Center Development	Encroachment of Row, Pollution problems, increased accidents, delay in traffic movement, depletion of local resources, water pollution	D	M	L	LT	IR	Awareness program, enforcement of law, planning of land development, plantation of trees.	DDC/DTO	CDO / VICCC
Operation of Road	Change in Social behavior	Social and cultural conflicts	IN	M	L	LT	IR	Awareness, Enforcement of law and order, Provision of training for skill	DTO	DDC / DoLIDAR
Operation of Road	Road Accidents	Increase in accidents	D	M	L	LT	IR	Appropriate road safety measures, Safety signs along the road.	DTO	DDC/DoLIDAR
Operation of Road	Impact on Livelihood of local people	People having mule business as major occupation will get affected. Change in occupation.	IN	M	L	LT	IR	People will change their occupation by selling horses and mules, and to own agriculture land for apple farming, involve in business (shops, small hotels, lodges) and	VDC/DDC	DDC, ACAP

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
								livestock (cows, yaks, goats and sheep) etc		
Operation of Road	Impact on Trekkers	Operation of vehicles and dust generated by them will be a nuisance and unpleasant to them.	D	M	L	ST	IR	Alternate trekking route will be encouraged. Black topping of the road will also reduce dust generation.	ACAP/DDC/VDC	DDC

Table 7.4: Beneficial Impacts and Proposed Enhancement Measures of Bridge

Activity	Effect	Related Beneficial Impacts	Type of Impact *)				Benefit Augmentation Measures	Responsible Agencies		
			Nat	Mag	Ext	Dur		Executing Agency	Supporting Agency	
Construction Stage										
Construction of bridge at Ch. 15+211 in Kaligandaki River	Employment Generation and Increase in Income, temporary tea stall, shop	Increase in income level , Enhancement in some peoples economy	D	H	L	ST	Involve local people to the extent possible, will be required for bridge construction)	DDC/DTO/DIST	DPCC / VICCC CISC/PCU	
On the job training to local labour	Skill Enhancement	Increase in income generating activities, employment opportunities	IN	M	L	LT	Training on Bridge maintenance.	DDC/DPO/DIST	CISC/PCU	
Operation Stage										
Operation of bridge	Improvement in Accessibility and Saving of Time and Transportation Cost	Saving in travel time and travel cost. Easy transportation of goods and daily commodities and local people gets transport facilities in all weather condition.	D	H	R	LT	Proper maintenance (regular, emergency) , river training works	DTO/DDC	DoLIDAR	

Table 7.5. Adverse Impacts and Proposed Mitigation Measures of Bridge

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure		
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency	
Construction Stage											
Construction of bridge, site clearance, at Ch. 15+211	Change in land use Loss of 0.04 ha. of barren land	Loss of barren land.	D	H	L	LT	IR	The bridges will be regular steel structure rested on abutment. Compensatory plantation of local species of tree.	DDC/DTO	DIST/ ACAP	

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measure	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
Construction of bridge, earth excavation	Spoil disposal and imposed weight of spoil on fragile slopes	Gully erosion, landslide, disruption of road, water pollution etc.	D	M	SS	ST	Re	Proper management of spoils and waste, provision of proper drainages, toe walls Proposed spoil disposal sites are at 15+000	DDC/DTO	DIST/VICCC/VD C
Construction works, material hauling and unloading etc.	Air , dust, noise and water pollution	Affect on local people and workers health, excavated material of bridge affect on rivers aquatic life	D	L	L	ST	Re	Use of ear muffs, helmet to lessen noise pollution during rock breaking and quarrying and bridge works. Strictly follow excavated materials will be disposed in proposed location. No impact is envisaged as the snow cold water of the rivers do not have fishes and other aquatic life.	DDC/DTO/ Contractor/RBGs	DIST
Collection of Construction materials	Quarry site, or boulder, sand and aggregates	Water pollution, disturbance in natural drainage damage forest and vegetation	D	L	L	ST	Re	The bridges will be regular steel structure rested on abutment. So minimum require construction materials, rehabilitation of quarry sites after completion of work. Recommended quarry sites are 2 KM above from bridge site.	DDC/DTO/ Contractor/RBGs	CISC/DIST/ VICCC/ ACAP
Construction of Bridge	Location of Camp Sites, Storage Depots	Encroachment of forest, agriculture land, disposal of solid waste, and waste water	D	L	L	ST	Re	Proper sanitary facilities by providing Pit Latrine, sockpit. Appropriate camp sites for bridge is at 16+000.	DDC/DTO/ Contractor	DIST/VICCC
Occupational health and safety aspects	Health and safety matters	Injury, fatal accidents, outbreak of epidemics and diseases, decline in capacity to work	D	H	L	ST	Re	During bridge construction safety measures (ear muffs, helmet, boots) will be provided to workers, first aid facility at sites with health treatment arrangements, contingency planning; Proper drinking water and toilet facility for construction crew.	DDC/DTO / Contractor	DIST/CISC/PCU
Operation Stage										
Operation of bridge	River bank erosion near bridge site.	Slides and slope failure	D	L	L	ST	R	Up-stream and down-stream river protection shall be done to stabilize river banks.	DDC/DTO	VDC, CBMC

* Legend Value in parenthesis is level of significance:

Nature- IN= Indirect; D= Direct

Magnitude- L= Low; M= Medium; H= High;

Extent- SS= Site Specific; L= Local; R= Regional; N= National; CB=Cross-boundary

Duration- ST= Short Term; MT= Medium Term; LT= Long term

Re=Reversible; IR= Irreversible

7.4 Mitigation Cost

145. The estimated cost for benefit 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) program of the RRRSDP. Costs for income generation and awareness program activities for Affected Persons (APs) are included in Social Action Plan. The design and cost estimate for most of the suggested mitigation measures such as slope stabilization, quarry site management, spoil disposal, supply of safety gears, accidental insurance of RBGs, bio-engineering measures, tree plantation, land slide rehabilitation will be incorporated in the project cost. Therefore, most of the mitigation measures suggested would be a part of main project cost. All proposed mitigation measures will be integrated in the project design so that these measures will 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 7.6**.

Table 7.6: Cost Estimate for Environmental Enhancement and Mitigation Measures

SN.	Environmental Protection Measures	Estimated Budget (NRs.)	Remarks
1. Benefits Augmentation Measures			
1.1	Training to DC/DTO/DPO/DIST to conduct environmental monitoring and reporting	50,000.00	To be included in project cost
1.2	Training to Naik 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	17,205,253.00	Detail Estimate and design have been under preparation
2.2	RBG Insurance	400,000.00	To be included in BoQ
2.3	Information Signboard (6 nos)	50,000.00	To be included in BoQ
2.4	Resettlement cost (Compensation for properties).	3,515,309.00	To be 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 Re-plantation / Re-forestation	113,025.00	To be included in project cost
2.7	Social cost	2,289,000.00	To be included in Social plan, project cost
2.8	Occupational health and safety; First aid boxes, campsite sanitation (Pit latrine); solid waste management, Safety measures for workers (Helmets, gloves, masks, boots, etc.)	250,000.00	Included in BoQ
2.9	Sanitation (Toilet for every settlement)	1,738,385.00	Included in BoQ
2.10	Seed Money to establish a fund for environmental management during Operation and Maintenance stage	1,000,000.00	To be included in project cost
	Sub-Total (2)	27,060,972.00	
	Total	27,260,972.00	

7.5 Implementation of Mitigation Measures

146. The mitigation measures will be integrated into project design and tender documents so that the mitigation measures will automatically become part of the project implementation and operation.

Mitigation measures will be included as separate items in the Bill of Quantities, and monitoring will be done based on these.

147. The contract agreement document will explicitly mention the penalizing action to be taken against failure to comply with EMP requirements.

7.6 Environmental Monitoring

7.6.1 Monitoring Responsibility

148. The Proponent will develop in-built monitoring mechanism to safeguard environment during construction and operation stages. The DPO will be supported by DIST in the district, and PCU will be supported by CISC at center to ensure effective monitoring and undertaking corrective actions, as required. A Safeguard Unit will be established in DPO. An environmental monitoring expert shall be assigned full-time during the sub-project implementation for close monitoring and reporting of EMP compliance activities. Coordination shall be maintained also with the office of ACAP, CBMC, CAMC at village level, environment unit of District Development Committee, local stakeholders (vehicles operators committee, Khamba- Ngerba (Mukhiya), of every VDCs and Ama samuha) VDCs/DDC and representation of local political parties to seek their support in maintaining the safeguards during construction and O&M stages. The social, resettlement and environment specialists from DPO/DIST will work in cooperation under the Safeguard Unit. They will undertake Subproject level monitoring under supervision and coordination of Specialists from PCU/CISC.

149. MoLD/DoLIDAR will be responsible for central level monitoring of EMP compliance. A provision of NRs. 50,000 will be allocated for the periodic monitoring by the center.

150. The Safeguard Unit at Subproject level shall submit monthly monitoring report to the PCU, who will forward a copy to ADB, NRM. Total cost of environmental monitoring (field visits, observation, review of reports and report preparation), excluding the cost of personnel, is estimated at NRs.800, 000.00 as given in Table 7.7.

Table 7.7: Environmental Monitoring Cost

S. No.	Detail	Unit	Quantity	Rate	Total (NRs.)
1	Environmental Specialist	Man-month	12	50000	600,000.00
2	Sociologist / Public Relation Expert	Man-month			Included in the Cost of DIST
3	Stationary and report preparation		LS		70,000.00
4	Printing and Photocopies		LS		30,000.00
5	Transportation		LS		50,000.00
6	Cost for Monitoring by MoLD/DoLIDAR		LS		50,000.00
	TOTAL				800,000.00

7.6.2 Types of Monitoring and Monitoring Parameters

151. There will be basically three types of monitoring baseline, compliance and impact monitoring. But the subproject will follow:

- Compliance Monitoring – that verifies whether the EMP provisions are properly implemented in the field. The framework for compliance monitoring is given in the Table 7.8.
- Impact Monitoring - that confirms the result of implementing mitigation measures. The framework for impact monitoring is given in the Table 7.9.

Table 7.8: Compliance Monitoring for Kagbeni - Jhaite Road Construction Works

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
Final alignment selection as per IEE /EMP recommendation	DDC/DTO/DPO / DIST	Alignment incurs minimum requirements to acquire land from forest, agri. land, and minimum nos. of trees to clear.	Look the alignment on topo map with land use resources; verify it by walkthrough along final road alignment	preconstruction phase	PCU / CISC; DoLIDAR
Land and property acquisition and compensation Voluntary land acquisition	Proponent with assistance of DIST	Cadastral records, Land and properties acquisition procedures; Procedures followed during voluntary donation of Land; Preparation of inventory of structures likely to be affected Payment of compensation	Public consultation, photos; geo-referencing; Check inventory against cadastral records and discuss with land owners Check record of pending compensation	pre-construction phase before construction begins	CFC / PCU (CISC) / DOLIDAR / MoLD
Compliance to Environmental Protection Measures, including pollution prevention, water and soil management, slope stabilisation, cut and fill, waste management, spoils, sensitive habitats and critical sites, protection of fauna and flora	RBG/Contractor	Arrangement specified in the Code of Practice and in Manuals relating to environmental protection; EMP detail in IEE Document; records and observations on pollution, waste management, spoil deposit. Protection of wildlife and sensitive habitats, forests; and Use of fuelwood for heating and cooking.	Site inspection; Discussion with local people; Records; Photos; Sampling and laboratory tests.	During construction period and include in monthly report	DPO / DIST at district and PCU/CISC at center
Protect environment from air & noise pollution	RBG/Contractor	Dust level and noise level at work sites, major settlements and sensitive spots like health centres and schools; Crusher operated during night	Visual observation, Observation of good construction practices and discussion with residents and workers; DIST to measure air/noise level at sensitive spots.	Once in a month during construction; measurement once during peak construction	DPO / DIST at district and PCU/CISC at center
Protect water bodies from pollution	RBG/Contractor DPO / DIST	Visual observation, observation of open defecation and pit toilets at work sites/waste management/spoil disposal around water sources; Parameters like pH, hardness, DO, Turbidity for drinking water.	Site inspection, test of site-selected samples of local streams water using standard field kit, record of waterborne disease	Observation once in a month during construction; Upon demand for testing with field kit	DPO / DIST at district and PCU/CISC at center
Use of local labour, particularly vulnerable groups and women	DPCC / VICCC / RBGs / Contractor	Percentage of employment of local labour, especially vulnerable groups and women and their wage rate.	Verification from records	During the entire period where labour work is contracted	DPO / DIST at district and PCU/CISC at center
Awareness and orientation training on	DPO / DIST	Training programmes for skill development, occupational	Training records, assess feedback from	Beginning of	DPO / DIST at district

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
road construction locally employed labourers		safety and environmental protection associated with road construction works; employment generation skill	participants	construction and during construction	and PCU/CISC at center
Compliance to occupational health and safety matters	RBG/Contractor DPO / DIST	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, accident records, safety equipment at site; discussion with workers	throughout construction stage	DPO / DIST at district and PCU/CISC at center
Vegetation clearance	RBG/Contractor/ DPO / DIST	Actual number of trees felled during construction works	Record, inspection and interview with local people and CFUGs	Before construction work	DPO / DIST/ DFO/ ACAP/ CFUGs at district and PCU/ CISC at center
Measures to avoid pressure on forest and wildlife	RBG/Contractor / DIST	Use of firewood or fossil fuel by construction crew, events of hunting and poaching of wildlife	Record verification, interview with local people and CFUGs	Every week during construction	DPO / DIST ACAP at district and PCU/CISC at center / CFUGs
Restoration, rehabilitation, reconstruction of all infrastructure services disrupted or damaged during the construction work	Contractor / RBG / DPO/DIST	Continued services by the facilities and functional public life	Site observation; Public Consultation Meetings	Once in 15 days during construction	DPO / DIST at district and PCU/CISC at center
Clean up and reinstatement of the construction sites (camps, quarries, borrow pits)	Contractor	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	At end of construction period	DPO / DIST at district and PCU/CISC at center

Table 7.9: Impact / Effect Monitoring for Kagbeni-Jhaite Road Construction Works

Parameters /Issues	Verifiable Indicators	Verification Methods	Location	Schedule	Responsible Implementation and Monitoring Agency
Slope stability and erosion	Slope failures & their causes; Fresh gullies and erosion; Success/failure of bio-engineering solutions	Site observation, photos discussion with people and technicians	At landslide areas and sites where bio-engineering failed	Continuously during construction and operation	DPO/DIST during construction; Proponent /ACAP during operation
Disposal of Spoils and construction wastes	Damage to forest and agriculture land, blocked drainage, hazard to downhill residents and agricultural lands	Site observation and interviews, photos	At specific locations where such sites occur	During construction at monthly basis	DPO / DIST at district and PCU/CISC at center
Quarrying of construction materials	Erosion, changes in river regime, bank cutting, landslide due to quarrying on slope	Site observation, photos	Quarry site areas	During construction at monthly basis	DPO / DIST at district and PCU/CISC at center
Disruption of drainage system	Blocked drainage, water logging, slope cutting and erosion by water	Observation, photos	Site specific areas	During construction at rainy season	DPO / DIST at district and PCU/CISC at center
Loss of farmland , houses and properties	Decline in productivity; Quality of life of compensated people	Observation, and interview with stakeholders	Construction areas	During construction in quarterly basis	DPO / DIST at district and PCU/CISC at center / DPCC/VICCC
Water quality	Water borne disease; adverse impact on aquatic life	Record of disease, measurement of water sample using standard field kit; impact to fish in streams	Construction sites; local streams	During construction at quarterly basis	DPO / DIST at district and PCU/CISC at center
Air quality	Dust level increase	Discussion with people at sensitive locations	At construction sites and at sensitive spots (schools, health post, market and settlements)	During construction at dry season	DPO / DIST at district and PCU/CISC at center
Change in economy	Nos. of new houses built; shops opened; New enterprises by local people	Discussion with local people	Project Area	Yearly during construction phase	DPO / DIST at district and PCU/CISC at center
Occupational safety and hazard	Type and number of accident occurred during construction	Records and interview with labourers	Project Area	During construction	DPO / DIST at district and PCU/CISC at center
Social conflict and nuisance	No of social conflicts between project and people; new 'Bhatti' and prostitution proliferation.	Observations, interview with local people	Project Area	During construction	DPO / DIST at district and PCU/CISC at center / VDC
Ribbon settlement	RoW encroachment	Records, observations	Project Area	During operation	DDC/CDO

8. CONCLUSION AND RECOMMENDATION

8.1 Conclusion

152. The IEE study of the proposed Kagbeni-Jhaite road Subproject passes through Annapurna conservation area. Most of the adverse impacts predicted are of low significance and short term as well as reversible. This road will provide better access to supply local agricultural products including apple to market, and easy access to health, education and other social services, and is expected to enhance quality of life of the people. The road in section of Kaligandaki Highway links with China border. This road will also help in facilitating decisions for the construction of the Beni- Jomsom – Lomanthang – China Border road (Kali Gandaki Highway), which could eventually turn Mustang into one of the most important transit points for Indo-China trade in future. The beneficial impacts from the implementation of the proposed road are more significant and long term in nature against the adverse impacts most of which could be avoided or minimized or compensated. Despite all the beneficial impacts, the subproject must be careful in ensuring safeguards as the area is a conservation area with highly significant biodiversity.

153. 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 study. Therefore, this IEE is sufficient for approval of the Subproject.

8.2 Recommendation

154. A key consideration in selecting the road alignment is to minimize the acquisition of valuable agricultural, built up land and trees. However, some agricultural and barren land will have to be acquired, and one Khala Ghar will be affected for construction of the proposed road. A Resettlement Plan will address to ensure that the persons affected by these losses are properly compensated. The proposed road project is recommended for implementation with incorporation of mitigation measures and environmental monitoring plan.

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ANNEXES

Annex I: Terms of Reference



नेपाल सरकार
स्थानीय विकास मन्त्रालय
(वातावरण व्यवस्थापन शाखा)

फोन नं. १११/८८५१४
फ्याक्स नं. १११/८८५१४
Web page - www.mld.gov.np
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Web - www.mld.gov.np

पत्र संख्या ०६५/०६६

च.नं. २३१

मिति - २०६६/१/२९

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

स्थानीय पूर्वाधार विकास तथा कृषि सडक विभाग,
जाबलाखेल ।

ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना (RRRSDP) अन्तर्गत विभिन्न जिल्ला विकास समितिको कार्यालयबाट निम्नानुसारका सडकहरूको प्रारम्भिक वातावरणीय परीक्षणको कार्यसूची (IEE) कार्यसूची (TOR) तयार गरी त्यहाँ विभाग मार्फत वातावरणीय संरक्षण नियमावली, २०५४ अनुसार स्वीकृतिको लागि यस मन्त्रालयमा पेश भएकोमा नेपाल सरकारको मिति २०६६/१/१७ को निर्णय (सचिवस्तर) अनुसार स्वीकृत भएको प्रतिवेदन धान-२ यसै पत्रसाथ पठाइएको व्यहोरा अनुरोध गरिन्छ ।

निम्न

१. नौबिसे-चौतारा मेलम्ची सडक (सिन्धुपाल्चोक)
२. भत्केको पाटी-जितपुर- महामज्जुश्री-चरेली-नगरकोट (भक्तपुर)
३. कागबेनी-झैते (मुस्ताङ)

सचिव

विजयराज सुवेदी
शाखा अधिकृत



स्वीकृत मिति: २०१९/१/१५

Terms of Reference (ToR)
for
Initial Environmental Examination (IEE)
of
KAGBENI-JHAITE
Road Sub-Project

Submitted to:
Ministry of Local Development,
Government of Nepal

Proponent:
District Development Committee (DDC)/
District Technical Office (DTO)
MUSTANG
Telephone No. - 069- 440108
Fax No.- 069-440044

April 2009

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TABLE

Table 1. Proposed Work Schedule for Conducting IEE Study.....5



Tok for IEE khangshu shole road sub project in mustang district

[Signature]
 Date: 17/04/2014

ABBREVIATIONS

ADB	Asian Development Bank
Ch	Chainage
CF	Community Forest
CISC	Central Implementation Support Consultants
CITES	Convention on International Trade in Endangered Species of Flora and Fauna
DDC	District Development Committee
DG	Director General
DIST	District Implementation Support Team
DoLIDAR	Department of Local Infrastructure Development and Agricultural Roads
DPO	District Project Office
DPCC	District Project Coordination Committee
DTO	District Technical Office
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management Section
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
FGD	Focus Group Discussion
GoN	Government of Nepal
IEE	Initial Environmental Examination
IUCN	The World Conservation Union
Km	Kilometer
LEP	Labour based, environment friendly and participatory
MLD	Ministry of Local Development
NGO	Non-Governmental Organization
PAM	Project Administrative Memorandum
PCU	Project Coordination Unit
REA	Rapid Environmental Checklist
RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Project
SF	Social Funding
SDC	Swiss Agency for Development and Cooperation
SDS	Social Development Specialist
SM	Social Mobilizer
TA	Technical Assistance
ToR	Terms of Reference
VDC	Village Development Committee
ZoI	Zone of Influence



1.0 NAME AND ADDRESS OF THE PROPONENT

The District Development Committee (DDC)/District Technical Office (DTO), Mustang is the executing agency at the district level and the proponent of the Initial Environmental Examination (IEE) study for the rehabilitation of Kagbeni-Jhaite 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)
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2.0 INTRODUCTION

2.1 GENERAL INTRODUCTION

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.

The RRRSDP program is financed by the Government of Nepal (GoN), Asian Development Bank (ADB), Department for International Development (DFID), OPEC Fund for International Development (OFID) and Swiss Agency for Development and Cooperation (SDC) to improve the connectivity, enhance economic and employment opportunities, increase access to market and social services of rural communities. The coordinating government department is the Department for Local Infrastructure Development and Agricultural Roads (DoLIDAR) under the Ministry of Local Development (MLD).

The DDCs is the Project Implementing Agencies at the district level. The DTO of each respective DDC is responsible for technical and Project management matters in the district. The DTO will be supported by the DIST which includes engineering, safeguards, and social mobilization staff.

This Terms of Reference (ToR) is prepared to conduct an IEE study of Kagbeni-Jhaite road sub-project in Mustang District.



ToR for IEE Kagbeni-Jhaite road sub-project in Mustang District

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2.2 BACKGROUND OF THE SUB-PROJECT

The proposed Kagbeni-Jhaite road sub-project lies in the north-eastern part of Mustang district of Western Development region of Nepal. This sub-project starts from Kagbeni of VDC ward no:7,8 and ends at Jhaite of Ghami VDC ward no.1-4. Major settlements along the road alignment are Kagbeni, Chhusang tole, Chaile, Tangbe etc. Total length of the road alignment is 40 km.

The people in this project area are having many types of transportation problems due to the steep topography. Local people have no access to the market centres of the district to fulfil their daily needs. Hence, the locally produced materials like *Apple, orange* are getting low prices than it may fetch. Other development facilities are also far from the reach of people because it is very difficult to create a system like water supply, electricity, bio-gas plant and telephone without a road corridor. Having lots of transportation difficulties, people of the road corridors initiated to construct a road by using excavating machine through DDC from FY 065/066.

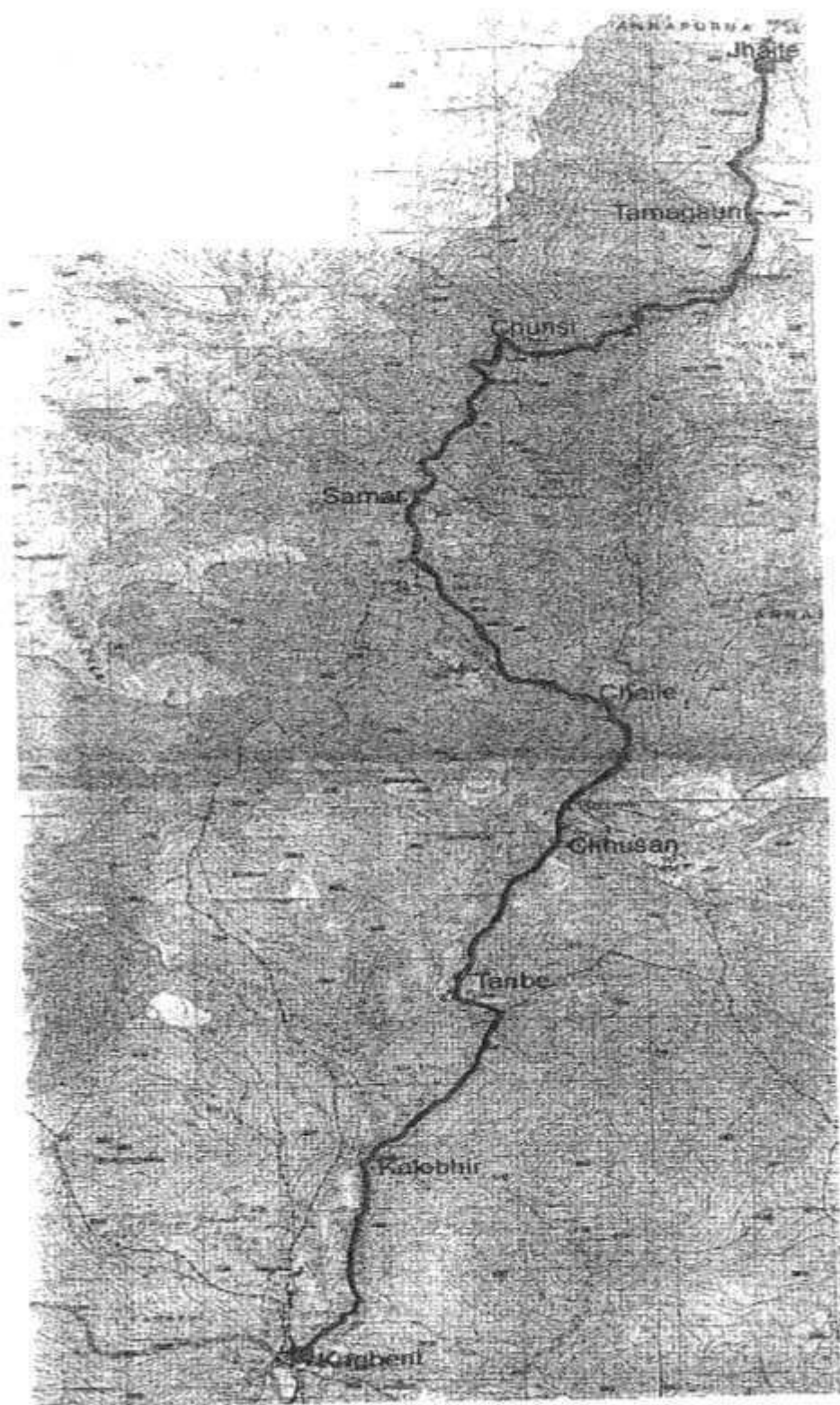
The rehabilitation of road will mainly enhance the transportation of *Apple* produced in remote areas and it will also extend physical and economical access to the people within the immediate zone of influence. For the road construction, use of local labour will generate immediate employment to local people and minimise migration to Kathmandu and Pokhara in search of work. Consequently, local people will get long-term benefit which will enhance their economic status within the ZoI of road corridor and adjoining area of Magdi district.

This road is identified as a priority road in the District Transport Master Plan (DTMP). Rehabilitation of this road with gravelling will provide physical and economical access to the people of north-eastern part of the district with district.



For I.E. Kagbeni-Jhaite road sub-project in Mustang District

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MUSTANG DISTRICT (D42) WESTERN REGION (G42)



International Boundary	-----
National Boundary	-----
County Boundary	-----
Town Boundary	-----
Major Road	=====
Minor Road	-----
Water Course	~~~~~
Settlement	●
Religious Site	○
Other	△

SCALE
0 5 10 15 20 KM

2.3 OBJECTIVES

The 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 SUB-PROJECT

The proposed road will connect Kagbeni, Tangbe, Chhusang, Chaile, Ghami VDCs. This road starts from Kagbeni, which is a small settlement likely to be changed to a bazaar area due to economical growth. Then the road runs towards north-east direction to uphill side. The end point of this rehabilitation section of road is Jhaite(1-4). The end point of the road deserves the possibility of being market centre for several VDCs.

An IEE of the proposed road is necessary in order to assess the environmental consequences of the proposed rural road construction activities and suggest appropriate, practical and site specific mitigation and enhancement measures. Since this is a Village 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) 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.

3.0 REVIEW OF RELEVANT LAWS, RULES AND GUIDELINES

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 Nirdeśika* (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

4.0 PROCEDURE TO BE ADOPTED WHILE PREPARING THE REPORT

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 REVIEW

The following steps will be followed during the desk review:

- Collection and review of secondary sources of information from various sources.
- Initial interaction and consultation with the local community and district level stakeholders
- Delineation of geographical boundary of the Zone of Influence (Zoi) on the topographical map
- Preparation of project specific checklist

4.2 PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

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:

- Publication of notice- A public notice of 15 days will be published 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.
- 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

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.



5.0 ALTERNATIVES FOR THE IMPLEMENTATION OF THE PROPOSAL

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.

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

6.0 REQUIREMENT OF THE IEE STUDY

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

6.1 TIME SCHEDULE

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:

Table 1. Proposed work schedule for conducting IEE study

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								■
10	Approval of the final report.								





6.2 ESTIMATED BUDGET AND STUDY TEAM

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

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

The IEE will be carried out and prepared by DIST Environmental Specialist, with support from DIST team Mustang, Environment specialist from CISC. CISC Environment specialist will provide necessary training to DIST for the environmental assessment procedures. 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, specific subject matter experts will be hired for short term basis if needed.

7.0 ENVIRONMENTAL BASELINE

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.

8.0 ANALYSIS AND INTERPRETATION

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.

9.0 IDENTIFICATION, PREDICTION AND EVALUATION OF IMPACT

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).

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.



9.1 BENEFICIAL IMPACTS

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 and Indigenous People Empowerment

9.2 ADVERSE IMPACTS

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 - 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

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 works i.e. springs, streams, rain water (Drainage and Cross Drainage Works
- Air Dust, Noise and Water Pollution
- Quarrying and Borrow Pit
- Decline in Aesthetic Value

Biological environment

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.

Socio-economic and cultural environment

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

Physical environment

- Road slope stability 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 behaviour
- Impact on livelihood and economic opportunities
- Road safety measures

10.0 BENEFIT AUGUMENTATION/MITIGATION MEASURES

The IEE study will propose site-specific benefit augumentatin and mitigation measures to optimize the benefits expected from the sub-project and minimize/mitigate avoid or control of proposal's adverse impacts. The benefit augumentation 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.

11.0 ENVIRONMENTAL MANAGEMENT PLAN

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.

12.0 IEE report format

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.

ix. **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 IEL
- 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
- Meeting minutes of community consultation
- 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

Annex II: Rapid Environmental Assessment (REA) Checklist

Rapid Environmental Assessment (REA) Checklist

Instructions:

- ☐ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- ☐ This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- ☐ 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.

Country/Project Title:

Nepal / RRRSDP

Name of the sub Project:

Kagbeni-Jhaite

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Sitting			
Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		✓	
▪ Protected Area	✓		Annapurna Conservation Area
▪ Wetland		✓	
▪ Mangrove		✓	
▪ Estuarine		✓	
▪ Buffer zone of protected area		✓	
▪ Special area for protecting biodiversity	✓		Annapurna Conservation Area
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
<ul style="list-style-type: none"> Alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site? 		✓	
<ul style="list-style-type: none"> Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction? 		✓	
<ul style="list-style-type: none"> Increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing? 		✓	Rock cutting
<ul style="list-style-type: none"> Noise and vibration due to blasting and other civil works? dislocation or involuntary resettlement of people 		✓	
<ul style="list-style-type: none"> Other social concerns relating to inconveniences in living conditions in the project areas that will trigger cases of upper respiratory problems and stress? 		✓	
<ul style="list-style-type: none"> Hazardous driving conditions where construction interferes with pre-existing roads? 		✓	
<ul style="list-style-type: none"> Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations? 		✓	
<ul style="list-style-type: none"> Creation of temporary breeding habitats for mosquito vectors of disease? 		✓	
<ul style="list-style-type: none"> Dislocation and compulsory resettlement of people living in right-of-way? 		✓	
<ul style="list-style-type: none"> Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials and loss of life? 		✓	
<ul style="list-style-type: none"> Increased noise and air pollution resulting from traffic volume? 	✓		Noise from operating vehicles will be added noise during operation stage of road. However, traffic volume is expected to be below 20 vehicles per day, and not expected to increase rapidly.
<ul style="list-style-type: none"> Increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road? 		✓	

Source: Field survey, July, 2009

Annex III: Abstract of Cost

Office of District Development Committee
District Technical Office/District Project office
Mustang

Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP)
Cost Estimate on Engineering Basis

Road: Kagbeni-Jhaite

Chainage: 0+000 to 38+800

S.N.	Resp. Clause of Specifications	Description of works	Unit	Estimated	Rate(NRs)	Amount
				Quantity	In Figure	(NRs)
1		General				
1.1		Insurance of works, Plants and materials, construction equipments and against accident to workmen including third party insurance.		Provisional Sum		1,000,000.00
1.2		Providing site office(s) for supervision team		Provisional Sum		800,000.00
1.3		Additional testing of materials as instructed by the Engineer if required.		Provisional Sum		500,000.00
					Sub-Total (A)	2,300,000.00
2	1-1.5(a),1-1.5(b),1-1.6	Site clearance work	sq.m	19,400.00	12.00	232,800.00
					Sub-Total (B)	232,800.00
3	2 - 4	Excavation for structures and drain including cutting of slopes, shoring, shuttering, planking, ordinary sealing and disposal of materials up to a lead of 50 m along the lead route in:				
3.1		a) ordinary soil	Cum.	1,152.04	150.00	172,805.87
3.2		b) hard soil	Cum.	2,243.16	180.00	403,769.64
3.3		c) Ordinary Rock	Cum.	179.70	600.00	107,821.50
3.4		d) Medium rock	Cum.	273.78	1,200.00	328,531.44
3.5		e) hard Rock	Cum.	57.15	5,100.00	291,478.01
					Sub-Total (C)	1,304,406.45
4	2-1.2.2,2-1.8 and 2-1.9.5	Excavation in roadway including removal and satisfactory disposal of all materials up to a lead of 50 m along the lead route. This includes handling and stacking or hauling (to sites of embankment construction) of suitable cut materials as required and also the disposal of unsuitable cut materials in specified manner. This further covers trimming and finishing of the road way. For,				
4.1		a) ordinary soil	Cum.	27,594.30	69.25	1,910,905.38
4.2		b) hard soil from	Cum.	53,127.82	83.10	4,414,921.47
4.3		c) Ordinary Rock	Cum.	2,636.72	260.00	685,548.24
4.4		d) Medium rock	Cum.	6,528.49	605.00	3,949,735.24
4.5		e) Hard Rock	Cum.	7,414.54	1,785.00	13,234,955.69
					Sub-Total (D)	24,196,066.01
5	2 - 5	Construction of roadway in embankment and miscellaneous backfilling areas with approved material obtained from roadway excavation including average transportation distance up to 50 m along the lead route, spreading in layers, watering and compaction;				
5.1		a) ordinary soil	Cum.	64,923.34	75.00	4,869,250.20
					Sub-Total (E)	4,869,250.20
6	17-2,17-5 and 17-6	Dry Stone Cause Way				
6.1	2-1.2.2,2-1.8 and 2-1.9.5	Earth Work in Hard Soil	Cum.	473.00	180.00	85,140.00
6.2	17-2,17-5	Dry Stone Pitching in Cause Way	Cum.	473.00	3,176.06	1,502,276.85

	and 17-6					
					Sub-Total (F)	1,672,556.85
7		Gabion Works				
7.1	17-1.4,17-5 and 17-6	Assembling of gabion and gabion breast wall, baskets and placing them in position including stretching, binding them together and tying down lids				
7.1.1		Box size 2*1*1	Nos.	5,012.50	27.00	135,337.50
7.1.2		Box size 1.5*1*1	Nos.	2,663.00	19.64	52,291.64
7.1.3		Box size 3*1*0.5	Nos.	1,600.00	27.00	43,200.00
7.2	17-1.4,17-5 and 17-6	Stone Packing in Gabion Crates Including quarrying and transportation from:	Cum.	16,419.50	2,624.35	43,090,449.15
					Sub-Total (G)	43,321,278.28
7.3	17-1.4,17-5 and 17-6	Supply of Gabion boxes of having hexagonal mesh size (100mmX120mm) using heavy zinc coated 8Swg Selvedge wire, 10 Swg mesh wire & 12Swg binding wire including rolling, cutting & weaving of wire crates/gabion and supply at site. (Respective clause of specifications 17-1.4,17-5 and 17-6) (testing in presence of office and weaving at site).				
7.3.1		Box size 2*1*1	Nos.	5,012.50	3,093.80	15,507,672.50
7.3.2		Box size 1.5*1*1	Nos.	2,663.00	2,286.97	6,090,213.21
7.3.3		Box size 3*1*0.5	Nos.	1,600.00	3,207.75	5,132,400.00
7.3.4		Geo-textile work inside of gabion wall	sq.m	10,244.68	80.00	819,574.27
					Sub-Total (H)	27,549,859.99
8	17-2,17-5 and 17-6	Stone Pitching Works				
8.1		Stone Pitching Work	Cum.	14,174.00	3,176.06	45,017,488.61
8.2		5cm thick beddig for stone pitching with screened Granular material	Cum.	3,543.50	1,414.04	5,010,636.57
8.3	2-1.2.2,2-1.8 and 2-1.9.5	Earthwork Excavation (HS)	Cum.	2,834.80	180.00	510,264.00
					Sub-Total (J)	50,538,389.18
9	8	Dry Wall				
9.1		Dry stone Wall (Road Stone available from road excavation within initial lead from 150m to 200m)	Cum.	2,782.31	2927.35	8,144,769.41
					Sub-Total (K)	8,144,769.41
					Total (L) of Sub-Total A,B,C,D,E,F,G,H,I,J and K	164,129,376.37
10		1m span Slab Irrigation Crossing 13 numbers				
10.1		Un-Coursed Rubble Masonry Cement Stone Masonry 1:4	Cum.	91.00	8,730.76	794,499.20
10.2		Cement concrete work 1:3:6	Cum.	3.25	11,937.75	38,797.68
10.3		Cement concrete work 1:1.5:3	Cum.	11.70	18,987.36	222,152.10
10.4		Reinforcement for RCC work	mt.	0.87	102,493.75	89,575.85
10.5		Form work	sq.m	70.20	2,259.63	158,625.68
10.6		Stone Soling & Levelling Works	Cum.	13.00	3,176.06	41,288.79
					Sub-Total (M)	1,344,939.29
11		6m span Slab culvert 2 numbers				
11.1		Un-Coursed Rubble Masonry Cement Stone Masonry 1:3	Cum.	323.05	8,730.76	2,820,468.65
11.2		Cement concrete work 1:3:6	Cum.	45.74	11,937.75	545,994.36
11.3		Cement concrete work 1:1.5:3	Cum.	38.37	18,987.36	728,590.54
11.4		Reinforcement for RCC work	mt.	2.64	102,493.75	270,583.50
11.5		Form work	sq.m	167.00	2,259.63	377,357.38
11.6		Stone Soling & Levelling Works	Cum.	30.49	3,176.06	96,841.91
					Sub-Total (N)	4,839,836.34
12		Public Toilet 5 numbers				
		Earth work excavation	cum.	75.94	180.00	13,668.75
		Dry stone soling work	cum.	6.62	3176.06	21,033.46
		Stone masonry work in mud mortar	cum	88.87	3347.35	297,472.78
		1:2:4 Concreting work (PCC)	cum.	3.69	15361.93	56,656.71
		12.5 mm thick cement sand plastering work for toilet and	sqm	221.50	5342.13	1,183,280.69

		septic tank 1:4				
		Double coat White washing for toilet house	sqm	187.90	26.81	5,037.90
		Double coat enamel painting for door and ventilator	sqm	32.05	138.38	4,435.13
		26 Gauge color CGI sheet roofing	sqm	71.19	821.10	58,453.82
		Fitting and fixture	LS	5.00	1550.61	7,753.05
		Sanitary accessories	LS	5.00	7590.00	37,950.00
		Bar cutting ,binding and placing for RCC work	kg	178.56	104.38	18,638.76
		Form work For RCC work	sqm	16.05	293.09	4,704.05
		Door and Window works				-
		Door	set	10	2450.00	24,500.00
		Ventilator	set	10	480.00	4,800.00
		Sub-Total (O)				1,738,385.10
		Total (P) of Sub-Total				172,052,537.11
		A,B,C,D,E,F,G,H,I,J,K,L,M ,Nand O				
13	18-6	Bio-Engineering Works				
13.1		Planting Shrubs and tress including supply of materials all complete @ 10% of Total Budget.				17,205,253.71
		Sub-Total (P)				17,205,253.71
		Total (Q)				189,257,790.82
		OVERHEAD @ 15%				28,388,668.62
		(R)Total				217,646,459.45
		13% VAT excluding RBG package.				28,294,039.73
		(S)Total				245,940,499.17
		Contingencies @ 5%				12,297,024.96
		(T)Total				258,237,524.13
		For all item Cost Per KM				6,655,606.29

Annex IV: RRRSDP Environmental Field Checklist

A. GENERAL SOCIO-ECONOMIC SITUATION OF THE INFLUENCE AREA⁴

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

VDC	Name of Settlement	Household and Population	Caste/ethnic distribution	General Comment

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

2. Economic activities/main occupation

VDC	Settlement	Number of HH and Percentage of Population engaged in					
		Agriculture & Livestock	Labor & Porter	Business/ Commerce	Cottage Industry	GO/NGO Employees	Others (specify)

3. Existing services and infrastructures

[illegible]

[illegible]

4. Land holding pattern

[illegible]

5 Food grain availability

Source:

[illegible]

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										

A. _____ B. _____ C. _____
D. _____ E. _____ F. _____
G. _____ H. _____ I. _____

7. Migration for employment

(a) No. of HHs from where at least one person (will 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

(b) Seasonal migration in search of work.

Month	No. of Total HH	Destination	Purpose

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

B. DEVELOPMENT POTENTIAL ACCORDING TO SETTLEMENT

B.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. N.	Name of Area	Description of Development Potential

B.2. Scope of the proposed linkage in view of promoting socio-economic development (communication, agricultural production, education and health).

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

C. Historic and Cultural Resources Within The Settlement

Type of Resource	Name/specification	Affecting activities	Location from project

Annex V: Public Notice

३३३३

मिति २०२२/०७/१९ भा. म. २०२२/०७/१९

संस्कृत संस्कृत

स्थानीय विकास मन्त्रालय

निलया विकास समितिशी कार्यलय

जिल्हा प्राविधिक कार्यालय

महाराज जोससोभ

प्रारम्भिक वातावरणीय परीक्षण सम्बन्धी सय
सुझावका लागि सार्वजनिक श्रवणा

प्रकाशित मिति: २०३३ ०२ १९

पारिजात पुनः निर्माण तथा पुनःस्थापना आयोग (RRSDP) अन्तर्गत एशियाली विकास बैंक, डिफेंड तथा स्थित सरकार विकास निर्माणको अनुदान सहयोग तथा एफिडको तथा सहयोग तथा नेपाल सरकार, जिल्ला विकास समिति र लाभग्राही समेतको लगानीसा निर्माण गर्न प्रस्ताव गरिएको सडक उप आयोजना अन्तर्गतको कागडको-धुलाइ-भर्ने छण्डको पारिभाषिक नाम र पैरा परिभाषा पनिबेदा आधारभूत नभई नयाँसमाप्त नभएकोसँगै पारिभाषिक नाम र पैरा परिभाषा नभएको कारण २०२६ आर्थिक वर्ष २०२७ मा निर्माण गर्न अनुसार यो सार्वजनिक सूचना प्रकाशित गरिएको छ ।

प्रस्ताविकाको साथ: जिल्ला विकास समिति, जिल्ला विकास समितिको कार्यालय जिल्ला प्राविधिक कार्यालय,
गण्डाघाट पुनः विचारण तथा पुनः स्थापना जिल्ला आयोजना कार्यालय, सुस्ताह ।

१) विभिन्न प्रकार के प्रभाव प्राप्त या वि. त. ह. र. कागवली, १५००, १५००, १५००

कामाखी विहरण : शिवादेव कामाखी-छुसाड-कोत तड़क अवाजना, कामाखी गाविस को कामाखीबराड
तुल भई छुसाड हूँ धमि गाविस को मैतैया हूँगिण्ड : यो तड़क कामाखी गाविस को उत्तर पूर्वी
कामाखी तड़क भई छुसाड गाविस को नाउदे, छुसाड देव, समर, भना हूँ धमि गाविस को स्वाधुवांचे

[illegible][illegible]

राज्य मन्त्रालय, नवम्बर १९५६

जिल्हा शिक्षण समितिका कर्मचारी भुवनाथ दुर्मिका नं ०६९-४४०१५३ फोननं ०६९-४४००४४	जिल्हा प्राविधिक कार्यालय नांदेड, धुळे दुर्मिका नं ०६९-४४००८० फोननं ०६२०१-२००६९	ग्रामिण पुन निर्माण तथा पुन स्थापना जिल्हा आयोजना कार्यालय, जयशंकर मुन्ताड दुर्मिका नं ०६९-४४०१०० Email address: dpmustang@yahoo.com dpmustang@pr.gov.in
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Annex VI: Deed of Enquiry (Muchulka)

FROM : DDC MUSTANG

PHONE NO. : 869 29444

AUG. 12 2018 12:51PM P3



श्री कागबेनी गाउँ विकास समितिको कार्यालय

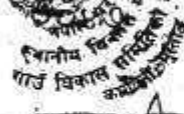
कागबेनी गाउँ विकास समिति

पत्र संख्या:-

२०६६/२०६८

चलानी नं.:-

६



मिति:-

२०६६/०४/२३

विषय:- खान्ना हाँस सम्बन्धी मुचुल्का कोष

श्री

मिति २०६६/०२/२९ मा यस कागबेनी गा.वि.सं. कार्यालयमा गाँवभरि शिन्टी/रेडिओ रेसोसीयन्स प्राप्त भएका कर्मचारी श्री अंकुश कुमार थापले आलाबखरा सम्बन्धी विषयमाथि २०२४ को नियम ६(२) बमोजिम प्रारम्भ आलाबखरीय परिक्षण (I.E.E) गर्ने बारेको मिति २०६६/०२/१९ मा हिमालपन शर्मिस्त देल्लिकामाथि शिन्टी/रेसोसीयन्सको प्रतिलिपी हाँस गरेको व्यहोरा प्रमाणित गरिन्छ। उक्त खान्ना कागबेनी गाँव हाँस वरुदा सम्बन्धी (I.E.E) को लागी खान्ना हाँस गरिएको व्यहोरा जानकारी गराइएको छ।

(हस्ता. र.म.)

गा.वि.स. सचिव

(यस पत्र २ भागमा बाँटिएको)



श्री गाउँ विकास समितिको कार्यालय



पत्र नम्बर- २०६६/२०६८
पृष्ठ नं- ४

मिति- २०६६/०२/२३

विषय:- खलना टोल सम्बन्धी छलुल्छा गर्ने।

मिति २०६६/०२/२३ मा यस छलुल्छा गा.वि.सं. को कार्यालयमा गौबन स्मिथोटेड एसोसिएट्स प्रा. लि. कार्यालयी श्री मरुण कुमार आदरले बालावरण संश्लेषण आफ्नो २०२४ को नियम ६ (३) बमोजिम प्रारम्भिक बालावरणीय परिक्षण (I E E) गर्ने बारेको मिति २०६६/०२/१९ मा हिमालय चार्वस राफ्टिङ रनिङ मा प्रकाशित खलनाको प्रतिलिपी टोल ठाउँको माथो प्रमाणित गरिन्छ। उक्त खलना कार्यालयी भन्ने सङ्ग वनङ सङ्गको (I E E) को लागी खलना टोल ठाउँको माथो जानकारी गराइएको।

(स.स. रा.स.)
संवि.स. सचिव
(स.स. रा.स.को कार्यालय)

विधान सरकार
स्थानीय विकास मंत्रालय

पृष्ठ : ०१

जिल्ला विकास समितिको कार्यालय

गाउँ विकास समितिको कार्यालय

धामी, मुस्ताङ


दिनांक २०६८/०८/२८

मिति : २०६८/०८/२८

३२

विषय :- सुचना टाँस सम्बन्धित मुसुल्का

मिति २०६८/०८/२९ मा यस समी गा.वि.स.को कार्यालयमा गाउँ रव इन्टिग्रेटेड स्कोलीयर्स प्रार्थना कु.व. चारी श्री अम्बु कुमार यादवले वातावरण संरक्षण वि.वनी २०५४ को नियम ७(२) कम्पोजिभ प्रारम्भिक वातावरण परिदृश्य (IEE) गर्ने गरेको मिति २०६८/०८/१९ मा विद्यालयमा राष्ट्रिय मैत्रिकमा प्रकाशित सुचनाको प्रतिलिपि टाँस गरेको उल्लेख प्रमाणित गरिन्छ । उक्त सुचना क.व.नी - सौते सडक खण्डको IEE को लागि टाँस गरिएको जानकारी जनाइएको छ ।


रेवक कुमारी

Annex VII: Name of the Organizations

Name of the Organizations (notice pasted and deed of inquiry obtained)

SN	Name or Organization	Address
1	Office of Village development Committee	Chhusang, Mustang
2	Office of Village development Committee	Kagbeni, Mustang
3	Tangbe primary school	Tangbe, Mustang
4	Aama samaua	Chhusang, Mustang
5	District health office	Jomsom, mustang
6	Shree jana narmal lower secondary school	Chhusang, Mustang
7	Annapurna conservation management committee	Chhusang, Mustang
8	Dip jyoti primary school	Chaile, Mustang
9	Shree Ariniko primary school	Ghykar, Mustang
10	Jana Shanti secondary school	Kagbeni, Mustang
11	Office of Village development Committee	Ghami

Source: Field Survey, July, 2009

Annex VIII: List of Persons Consulted

List of persons consulted

S.N.	Name	Address	Occupation
1	Mani Kumar Gyawali	LDO, Mustang	LDO
1	Rhidaya Raj Tripathi	DWSSC Jomsom, Mustang	Officer
3	Paras Bikram Singh	ACAP, Mustang	Officer
Kagbeni VDC			
1	Dhara Gurung	Kagbeni	Shopkeeper
2	Tashi Gurung	Kagbeni	Farmer
3	Karma Gurung	Kagbeni	Farmer
4	Dorje Gurung	Kagbeni	Farmer
5	Paljung Gurung	Kagbeni	Farmer
Chhusang VDC			
1	Prakash Gurung	Chhusang	Shopkeeper
2	Uttam Gurung	Chhusang	Farmer
3	Yam pd. Gurung	Tangbe	Farmer
4	Bishnu Gurung	Chaile	Farmer
5	Nabin Gurung	Samar	Shopkeeper
6	Deepak Gurung	Chhusang	Farmer
Ghami VDC			
1	Wangdi Gurung	Chhunkar	Farmer
2	Chhoto Ghamjo	Chhunkar	Shopkeeper
3	Pasang Gurung	Ghiling	Shopkeeper
4	Palden Gurung	Ghiling	Farmer
5	Chhiring Gurung	Syangbocha	Farmer
6	Thinle Gurung	Jhaite	Shopkeeper

Source: Field Survey, July, 2009

Annex IX: Summary of Meeting With Local People


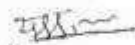

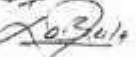
असमिति २०६७ साउन २३ गतेका दिन आश्रित पुनर्निर्माण तथा पुनर्वास्यता आयोजना (RRSDP) अन्तर्गत मुस्ताङ जिल्लामा कार्यरत हुन लागेको काठेनी झिरे सडक उपआयोजना को प्रारम्भिक जानकारीय परिचय अध्ययनको शिलशिलामा दामो आ. वि. स. वडा नं १, २, ३ र ४ मा पर्ने बस्ती छिलिङमा निम्न स्थानीय वासिन्दाहरुको उपस्थितिमा राश सुझाव नीति कार्य सम्पन्न भयो।

उपस्थिति

- १- उपस्थित श्री बाङदी गुरुङ, दामो ४ वडा नं. १
- २- अध्यक्ष सन्धि श्री रेनुका गुरुङ दामो
- ३- सदस्य श्री पैमा बाङदी गुरुङ, नेपाली काङ्ग्रेस पैमा
- ४- " श्री झिरेत गुरुङ, नेपाली काङ्ग्रेस पैमा
- ५- " श्री कुष्ठा रि. क. ने.प. एम. से. वि. स. वडा नं. १
- ६- " श्रीमती घाङजीन गुरुङ, दामो २ वडा नं. २
- ७- " श्री कर्मा दल्यु गुरुङ, दामो ठाकुर
- ८- " श्री पाराङ गुरुङ, दामो ठाकुर
- ९- " श्री झिरेत पाल्छुम गुरुङ, दामो ठाकुर

अन्य उपस्थितिहरु

- १०- श्री - धर्मो गुरुङ
- ११- श्री - छिङ्मी गुरुङ
- १२- श्री - बुङका दयाल्वि. गुरुङ
- १३- श्री - सन्धुङ गुरुङ
- १४- श्री - लिङ्मिङ गुरुङ
- १५- श्री - किण गुरुङ
- १६- श्री - लाम्दुङ गुरुङ
- १७- श्री - गम्थाप गुरुङ
- १८- श्री - बुङलाङ कोटेन गुरुङ
- १९- श्री - घाङ्गेलेन गुरुङ
- २०- श्री - कर्मा लिङ्मिङ
- २१- श्री - शिराङ लिङ्मिङ गुरुङ
- २२- श्री - लिङ्मा गुरुङ
- २३- श्री - आठ्थार लिङ्मिङ गुरुङ

- २४- ताकना सुरंग ताकना
- २५- देवाड. सिंजित सुरंग देवा
- २६- लोकर सुरंग लोकर
- २७- कमी देवाड. सुरंग
- २८- चुडामणी शर्मा आ.ए.ई. RRRDP.  
- २९- रविन्द्र रत्निका सा.प. RRRDP - 
- ३०- जाल बहादुर डानामगर सा.प. RRRDP 

राम सुभाषदा

- १- हमी गा.वि. सा. को छिन्दि, झैने गाउँको खेती योजना जसमा करिबको डाईदरमा पशुनस्तु हरु रोकतको लागि व्यवस्था गरिदिने ।
- २- हामी गा.वि. सा. वडा नं. १, २, ३ र ४ छिन्दि गाउँको सिंसाइ कृती सडकले काटिने भएको हुँदा व्यवस्था - व्यवस्थित रूपमा पुननिर्माण गरिदिने ।
- ३- सडक निर्माणका क्रममा निर्माण स्थलमा पर्ने धार्मिक संस्थानहरू जस्तै देवैत, माने, गाउँ जेठहरूलाई आसुर नपार्ने गरि काम गर्नुपर्ने र जिर्ण भएका यास्ता संस्थान हरुको पुनः निर्माण गर्ने ।






आज मिति २०६८ साल साउन २४ गते का दिन ग्रामिण फल निर्माण तथा फल स्थापना कार्योपता R.R.D.D. अन्तर्गत मुस्ताङ, जिल्लामा कार्यन्वयन हुन लागेको कारणवैतो रोजे सडक उप-कार्योपताको प्रारम्भिक वातावरणिय परिष्कार अध्ययन को डिल-डिलामा - खुसाङ, गा. वि. सं. वडा नं. १ देखि ६ सम्म पर्ने वस्ति खुसाङमा निम्न स्थानिय वासिन्दाहरूको उपस्थितिमा राय सुझाव लिने कार्य सम्पन्न भयो।

उपस्थिति

उपस्थित	१) विष्णु गुरुङ -	PICCC अध्यक्ष
सचिव	२) तन्वित कुमार गुरुङ -	उपाध्यक्ष
सचिव	३) राज प्रसाद समी -	सचिव
सदस्य	४) रिड होर्जे गुरुङ -	सदस्य
रासी	५) प्रेम गुरुङ -	"
राजु (६)	६) लसो बानु गुरुङ -	"
सिद्धु (७)	७) राजु गुरुङ -	"
जन्तुमारी (८)	८) समु गुरुङ -	"
सुनु (९)	९) मती मतकुमारी वि.ड. -	"
प्राज (१०)	१०) समु गुरुङ -	"
डा. (११)	११) होर्जे गुरुङ -	"
डा. (१२)	१२) डा. होर्जे गुरुङ -	"
डा. (१३)	१३) मती कल्पना गुरुङ -	"

अन्य उपस्थिति

१. डा. होर्जे गुरुङ (ताङचे मुखिया धर्जे)
२. गुरु प्रसाद सापकोटा (उपकार्योपता)
३. समी गुरुङ (स्थानिय वासिन्दा)

R.R.D.D

१. सल वि. वहा
२. बर्ष वि. माझी
३. फेन डार्प
४. निमो वि. सा
५. सुषा व्याख्याता
६. सुडाला वि. सी

राय सुभाषबहादुर
























- १) कुसाङ गा. वि. स. मा १.२ ताङबै ५.५-कुसाङ-६ चौलो र समर-९ मा खेति योग्य भूमिमा पाती लाती कोलो लार्डि सडकले असर पर्ने ठाँवा सो कुलालाई सडकले असर पार्ने ठाँवा सो कोलो लार्डि स्थावस्थित गर्ने ।
- २) कुसाङ गा. वि. स. मा १.२ ताङबै गाँफेमा खानेपाती को ल्याङकोलाई असर पर्ने ठाँवा ल्यासलाई फर्की डाँ मा बनाई दिने र स्थावस्थित गर्ने ।
- ३) कुसाङ गा. वि. स. मा १.२ ताङबै गाँफे को सिचाई कुलो सडक भन्दा माथि भएको ले तलको खेति योग्य भूमिमा असर पर्ने भएको ठाँवा सो सिचाई कुलीलाई Irrigation overhauled गरिने स्थावस्थित गर्ने ।
- ४) कुसाङ गा. वि. स. मा मित्र Road को Alignment मा पर्ने चार्मिँव खेतीबाट असर पर्ने:- माते, कोर्देत, गाफ, गेट, मठ मन्निङ्गकुला असर पर्ने गरी स्थावस्थान मिलाउने ।

राय सुभाषबहादुर

५०६५

आजमिति २०६०/१२/१२ गतेका दिन गाबिया पुनः निर्माण तथा पुनर्स्थापना आयोजना (RRSDP) अर्न्तगत मुल्ताङ जिल्लामा कार्यरत हुन लागेको कार्यालय देखी मैले सम्बन्धित सबै उपआयोजनाको प्राथमिकताका साथै परिधान भएभनको जिल्लास्थितमा कार्यरत आ. वि. प्र. वडा नं. ५, ८, ९ मा पर्ने वस्तिवा कार्यालयका लागि स्वयंसेवक वाहिराको उपस्थितिमा राय सुझाव लिने कार्य सम्पन्न भयो ।

उपस्थिति

हस्ताक्षर	नामवार	पद
	१) श्री लक्ष्मण गुरुङ	अध्यक्ष
	२) श्री केदार गुरुङ	उपाध्यक्ष
	३) श्री दया प्रसाद आचार्य जोगले	सचिव (आ. वि. प्र. वडा)
	४) श्री कृष्ण सुर्मी गुरुङ	सदस्य
	५) श्री देवप्रसाद आचार्य गुरुङ	सदस्य
	६) श्री रमेश गुरुङ	सदस्य
	७) श्री नैगेव गुरुङ	सदस्य
	८) श्री देवप्रसाद गुरुङ	सदस्य
	९) श्री जित वहादुर गुरुङ	सदस्य
	१०) श्री कुवडा गुरुङ	सदस्य
	११) श्री सुभाष गुरुङ	सदस्य
	१२) श्री कोडण्डा टोली गुरुङ	अग्रा प्रभावित
	१३) श्री सोनाम फुर्का गुरुङ	" "
	१४) श्री कर्मा ठकुरी गुरुङ	" "
	१५) श्री कैमी गुरुङ	" "
	१६) श्री रिमा आम्स गुरुङ	" "
	१७) श्री शिव गुरुङ	आमा समूह अध्यक्ष
	१८) श्री पद्म वहादुर गुरुङ	
	१९) विनोद के.सी. RRSDP (D.P.O) sub-engineer	
	२०) कृष्ण प्रसाद आचार्य RRSDP (D.P.O) A sub-engineer	
	२१) लाल वहादुर खलामा " Social mobilizer	
	२२) सुशिला के.सी. " " "	
	२३) रविन्द्र खतिवडा " " "	
	२४) रमेश व. पुन RRSDP	
	२५) बर्मा अम्बारी RRSDP	

राष्ट्रिय सुझावहरू

- १) कृषिवेनी गा.वि.स.का वडा नं. ७, ८, मा पर्ने खेति योग्य भूमिको बिच बाट सुडक आगे भएकै हुदा पशु-चरपाखा रूख रोक्नको लागि (animal trap) को व्यवस्था गर्नुपर्ने ।
- २) कृषिवेनी को ठाणखेला बाट बाहरो खिचाई कुलो लाई सुडकले भएर गर्ने हुदा भएसलाई व्यवस्थापित गर्नुपर्ने ।
- ३) कृषिवेनी गा.वि.स.का वडा नं. ७, ८, मा पर्ने खेति योग्य भूमिको बिच बाट सुडक आगे भएकै हुदा तल तिर पानि जानको लागि सुडकको बिच-बिचमा Drainage system construction गर्नो पानी सार्ने तिर औन भएर भित्राउने ।
- ४) कृषिवेनीको वडा नं. ८, ७, मा पर्ने सुकी दोब्रको रुपमा पहचानि कृषिवेनी माट स्थल आगे कोटेलार्ड भएर नपारी व्यवस्थापित गर्ने ।

सुझावकर्ता : बिप्लव बस्नेत

बस्नेत

Annex X: Recommendation Letters from VDCs

श्री गाउँ विकास समितिको कार्यालय
छुम्राङ, मुस्ताङ
२०६६/०८/३८
मिति: २०६६/०८/२६।
विषय:- सिफारिस गरिएको बारे।

ग्रामिण पुनर्निर्माण तथा पुनर्स्थापना आयोजना
खिल्ला आयोजना कार्यालय गौरीगंगाखुला

प्रस्तुत विषयका सन्दर्भमा कागजको भौतिक रूप
उप आयोजनाको प्रारम्भिक बालावरीय परिक्षण प्रति
वेदन सन्दर्भमा यो पत्र लेखिएको छ। उक्त प्रस्तावको
प्रारम्भिक बालावरीय परिक्षण प्रति वेदनमा उल्लेख
रूप भएका विषय तथा बालावरीय प्रभाव
संरक्षणका उपग्रहको बारेमा यस कार्यालयलाई
जानकारी भएकोले उक्त प्रस्ताव आयोजना
दुतालागी सिफारिस गरिन्छ।

(सि. र. म.)

स. वि. स. सचिव
(प्र. स. र. म. गौरीगंगा)

नेपाल सरकार
स्थानीय विकास मन्त्रालय
जिल्ला विकास समिति, कैलाली
गाउँ विकास समिति, कार्यालय
धमी, मुस्ताङ

३०६६/०५८

नं. २३

मिति २०६६/०५/२३

विषय :- सिफारिस गरिएको बारे ।

श्री माधिका पुनः निर्माण तथा पुनः स्थापना आयोगका
जिल्ला आयोगका कार्यालय जैमसोम मुस्ताङ,

प्रस्तुत पत्रिका सम्बन्धी कार्यालयी - जेठै सडक उ
जगछौ प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदन सम्ब
न्धी पत्र लेखिएको छ । उक्त प्रस्तावको प्रारम्भिक वाता
वरणीय प्रतिवेदनमा उल्लेख भएका विषय तथा वातावर
ण प्रभाव र संरक्षणका उपायहरूको बारेमा यस कार्यालय
आगाडारी गरिएकोले उक्त प्रस्ताव कार्यन्वयन हुनक
सिफारिस गरिन्छ ।

२३
खेडुङ



श्री कागबेनी गाउँ विकास समितिको कार्यालय

कागबेनी गाउँ विकास समिति

पत्र संख्या:- २०३६/२०६८

चलानी नं:- २

मिति:- २०३६/०८/२०

विषय:- सिफारिस गर्नेको बारे।

श्री ~~कागबेनी पुनर्निर्माण तथा पुनर्स्थापना समितिका~~
समिल्ला ~~आयोजना समितिका~~ कार्यालयमा

प्रस्तुत विषयका हदभित्र कागबेनी भूमेका
आयोजनाको प्रारम्भिक बालावरीय परिचिप्ता
बेहद सम्बन्धमा यो पत्र लेखिएको छ। उक्त प्रस्तावको
वृत्तमय बालावरीय प्रतिवेदनमा उल्लेखमा
अनुसार विषय तथा बालावरीय प्रभाव र
संरक्षणका आधारहरूको बारेमा यस कार्यालयलाई
आगफारे भएकोले उक्त प्रस्ताव कार्यालयमा
का लागी सिफारिस गरिन्छ।

(हस्ताक्षर)
गा.वि.स. सचिव

(यस प्रसाद रानीको)



नेपाल सरकार

सङ्घीय मामिला, संविधानसभा, संसदीय व्यवस्था तथा संस्कृति मन्त्रालय

पुरातत्त्व विभाग

(यो.मू. तथा प्र. शाखा)

E-mail: info@doa.gov.np
website: www.doa.gov.np



४२५०६८३
४२५०६८५
४२५०६८६
४२५०६८७
४२५०६८८

फ्याक्स: ९७७-१-४२६२८५६

अभिलेखालय भवन
रामशाहपथ, काठमाडौं

पत्र संख्या:-

चलानी नं:- ११११

५०.०६७६८ च.नं १६४

मिति: २०६७/१२/१३

विषय :- जानकारी उपलब्ध गराइएको सम्बन्धमा ।

श्री ग्रामीण पुनः निर्माण तथा पुनः स्थापना जिल्ला आयोजना कार्यालय
जोमसोम, मुस्ताङ्ग ।

प्रस्तुत सम्बन्धमा त्यस आयोजना कार्यालयको मिति २०६७१२।८ को पत्र साथ संलग्न
सडक रेखाङ्कनको नक्शा प्राप्त भई व्यहोरा अवगत भयो ।

संलग्न नक्शा अनुसार कागवेनी - भुइते सडक निर्माणको रेखाङ्कनभित्र मुक्तिनाथ
विकास क्षेत्रको कुनै पुरातात्विक, सांस्कृतिक एवं धार्मिक महत्वका संरचनाहरुमा कुनै असर नपर्ने
तर छुक्साड गा.वि.स.को क्षेत्रभित्र पर्ने काली गण्डकी किनारामा रहेको चैले गेट (फलामे पुल)
माथिको प्राचीन मानवहरुबाट निर्मित पुरातात्विक महत्वको गुफाहरुलाई मानवीय
क्रियाकलापहरु (एक्साभेटर, बुल्डोजर एवं विष्फोटक पदार्थ आदि) बाट असर नपर्ने गरी खोला
किनारामा सुरक्षा पर्खाल लगाई कार्य गर्न गराउन हुन र अन्य सम्भावित पुरातात्विक
स्थलहरुमा कार्य गर्दा कुनै किसिमको क्षति नहुने सावधानी अपनाउन हुन समेत जानकारी
गराईन्छ ।

महेश सिंह लामा
अनुसन्धान अधिकृत

Annex XI

Annex XI a: Distribution of households by major occupation

Annex XI b: Summary of public services & infrastructures

Annex XI c: Land holding pattern of settlements within Zol

Annex XI d: Number of households belonging to different food security category

Annex XIa: Distribution of Households by Major Occupation

SN	VDC	Settlement/ Code	Number of HH and Percentage of Population engaged in					
			Agriculture & Livestock	Labour & Porter	Business/ Commerce	Cottage Industry	GO/ NGO Employees	Total
1	Kagbeni	Kagbeni	30	-	70	-	-	100
2	Chhusang	Tangbe	15	-	6	-	-	21
		Chhusang	13	-	10	-	-	23
		Chaile	7	-	13	-	-	20
		Samar	5	-	14	-	-	19
		Bhena	2	-	5	-	-	7
3	Ghami	Syangbocha	0	-	9	-	-	9
		Ghiling	15	-	20	-	-	35
		Jhaite	0	-	5	-	-	5
	Total		87	-	152	-	-	239
	Average%		36.4	-	63.6	-	-	100

Source: Field Survey, July, 2009

Annex XIb: Summary of Public Services & Infrastructures

Settlement Name/ Public services and Infrastructure	School (no)	Health post (no)	Post office (no.)	Communication(no) CDMA/MOBILE	Hydro power (no)	Solar (no)	Shops/lodge (no)	Water supply (no)	Irrigation (KULO)	Mill (no)	Bridge (no)	Fin. Institution (no)	Community CENTRE
Kagbeni	1	1	1	400	-	60	40		1			1	3
Tangbe	1			15		8	3	1					
Chhusang	1	2	1	16		10	2				1		
Chaile	1			25		10	10				1		
Samar	1			8	-	5	5		-				
Bhena				1		2	1		-				
Syangbocha				3		2	3						
Ghiling	1	1		40		20	5	1			1		
Jhaite						2	1						
Total	6	4	2	508	0	119	70	2	1	0	3	1	3

Source: Field Survey, July, 2009

Annec XI c: Land Holding Pattern of Settlements Within Zol

Settlement Name(VDC)	Number of HH					
	Landless	<one ropani	1-5 ropani	5-10 ropani	10-20 ropani	Total
Kagbeni	5	30	40	15	10	100
Tangbe	1	5	5	5	5	21
Chhusang	0	7	4	6	6	23
Chaile	2	6	5	3	4	20
Samar	1	4	8	5	1	19
Bhena	2	1	3	1	0	7
Syangbocha	2	5	2	0	0	9
Ghiling	3	6	8	9	9	35
Jhaite	2	3	0	0	0	5
Total	18	67	75	44	35	239
Percentage	7.53	28.03	31.38	18.41	14.64	100

Source: Field survey, 2009

Annex XI d: Number of Households Belonging to Different Food Security Category

Settlement Name	Surplus	Sufficient for whole year	Sufficient for 3-9 months	Sufficient for three months	Less than three months	Total
Kagbeni	20	20	20	30	10	100
Tangbe	3	3	10	3	2	21
Chhusang	4	2	3	6	8	23
Chaile	2	4	6	5	3	20
Samar	4	2	3	6	4	19
Bhena	0	0	1	2	4	7
Syangbocha	0	0	3	3	3	9
Ghiling	5	9	6	10	5	35
Jhaite					5	5
Total	38	40	52	65	44	239
Percentage	15.90	16.74	21.75	27.20	18.41	100

Source: Field survey, 2009

Annex XII : List of Trees to be Removed

S.N	Name of the owner	Total no. of trees	Local Name	Scientific Name	Location	Chainage	
						From	To
1	Nima Hainjing Gurung(Yam Prasad)	4	Aru	<i>Pyrus comunis</i>		9+000	9+700
2	Arjun Kumar Gurung	3	Chhuli			9+000	9+800
3	Dhorje Chhiring Gurung	1	Aru	<i>Pyrus comunis</i>		9+000	9+900
4	Pema Dharke Gurung	2	Apple	<i>Malus domestica</i>		9+000	9+800
5	Samtu Gurung	2	Apple	<i>Malus domestica</i>		16+000	16+170
6	Dhuli Gurung	2	Chhuli			16+000	16+800
7	Makpa takla gurung	3	Chhuli			16+000	16+800
8	Ngahehek Gurung (Bishnu)	3	Chhuli			16+000	16+800
9	Ngahehek Gurung (Bishnu)	2	Aru	<i>Pyrus comunis</i>		16+000	16+800
10	Raju gurung	3	Chhuli			16+000	16+800
11	Raju gurung	2	Aru	<i>Pyrus comunis</i>		16+000	16+800
12	Chhikewangdi gurung	2	Chhuli			16+000	16+800
13	Chhikewangdi gurung	2	Aru	<i>Pyrus comunis</i>		16+000	16+800
14	Karma Dhendul gurung	2	Chhuli			16+000	16+800
15	Tenging Gurung	1	Aru	<i>Pyrus comunis</i>		16+000	16+800
16	Dhan Bahadur Gurung	1	Bhotepipal	<i>Betula utilis</i>	Chhusang	13+000	13+140
17	Chhiring Utuk Gurung	4	Bains	<i>Salix alba</i>	Chhusang	13+000	13+600
18	Chhiring Utuk Gurung	4	Bains	<i>Salix alba</i>	Chhusang	13+000	13+150
19	Prem Sing Gurung	3	Bhotepipal	<i>Betula utilis</i>	Tangbe	9+000	9+100
20	Mahendra/ Indra Gurung	5	Bains	<i>Salix alba</i>	Chhusang	13+000	13+140
21	Arjun Kumar Gurung	3	Bains	<i>Salix alba</i>	Tangbe	13+000	13+140
22	Sona yangdi Gurung	150	Bhotepipal	<i>Betula utilis</i>	Chaile	16+000	16+500
23	Sona yangdi Gurung	20	Bhotepipal	<i>Betula utilis</i>	Chaile	16+000	16+750
24	Dhorje Chhiring Gurung	2	Bhotepipal	<i>Betula utilis</i>	Tangbe	9+000	9+700
25	Dhorje Chhiring Gurung	1	Bains	<i>Salix alba</i>	Chaile	16+000	16+800
26	Chhikep Yangdi Gurung	1	Bains	<i>Salix alba</i>	Chaile	16+000	16+800
27	Temba Chhiring Gurung	3	Bains	<i>Salix alba</i>	Tangbe	9+000	9+800
28	Rinjin Daba	1	Bhotepipal	<i>Betula utilis</i>	Chhusang	13+000	13+900
29	Parbin Gurung	3	Bains	<i>Salix alba</i>	Chhusang	13+000	13+800
Total		235					

Source: Field Survey, July, 2009

Annex XIII: Photographs



Irrigation canal along the road alignment from Ch.



Drinking water pipelines



Erosion prone area at Ch 8+800



Required river training work from 14+160 – 14+920



Rocky area near Tanbe



Proposed bridge at Ch 15+211



Temple at Kagbeni ,which is with in Zol about 1km far from the road alignment



The road alignment fallow left bank of Kaligandaki river, and fragile area



Way to Lomangthang from Jhaite



Road Alignment near Syanboche



Affected Cattle Shed at Ch. 9+680, Tangbe



Affected Khala Ghar at Ch. 9+700, Tangbe

Annex XIV: Summary of Cross Drainage Structures

SN	Chainage	Name of the river	Type of Cross Drainage	Width of river(m)
1	0+740	Kholi	DSC	10
2	0+840	Kholi	DSC	6
3	0+980	Kholi	DSC	6
4	1+240	Kholi	DSC	6
5	1+600	Kholi	DSC	6
6	1+800	Kholi	DSC	6
7	2+780	Kholi	DSC	6
8	3+500	Kholi	DSC	6
9	3+540	Kholi	DSC	10
10	3+960	Kholi	DSC	6
11	4+200	Kholi	DSC	6
12	4+220	Kholi	DSC	6
13	5+700	Kholi	DSC	6
14	7+040	Kholi	DSC	6
15	7+600	Kholi	DSC	10
16	9+200	Kholi	DSC	6
17	9+400	Kholi	DSC	6
18	10+720	Kholi	DSC	12
19	10+960	Kholi	DSC	12
20	11+040	Kholi	DSC	10
21	11+420	Kholi	DSC	6
22	11+980	Kholi	DSC	6
23	13+580	river	GC	
24	13+520	Kholi	DSC	6
25	13+840	Kholi	DSC	10
26	14+320	Kholi	DSC	6
27	14+580	Kholi	DSC	12
28	15+211	River	Bridge (Detail survey and design not complete)	70
29	15+360	Kholi	DSC	6
30	15+900	Kholi	DSC	10
31	16+160	Kholi	DSC	6
32	16+940	Kholi	DSC	12
33	16+980	Kholi	DSC	12
34	17+000	Kholi	DSC	10
35	17+700	Kholi	DSC	10
36	17+960	Kholi	DSC	12
37	20+200	Kholi	DSC	12
38	20+300	Kholi	DSC	12
39	20+460	Kholi	DSC	10

40	21+540	Kholi	DSC	12
41	22+530	Kholi	DSC	10
42	22+700	Kholi	SC	6
43	23+220	Kholi	DSC	10
44	23+700	Kholi	SC	6
45	24+140	Kholi	DSC	6
46	24+600	Kholi	DSC	10
47	25+960	Kholi	DSC	10
48	29+160	Kholi	DSC	10
49	30+960	Kholi	DSC	10
50	31+800	Kholi	DSC	6
51	31+940	Kholi	DSC	12
52	35+420	river	GC	
53	35+800	Kholi	DSC	10
54	36+360	Kholi	DSC	12
55	37+180	Kholi	DSC	12
56	37+600	Kholi	DSC	10

Source: Field survey, July, 2009

*GC: Gabion Causeway, SC: Slab Cluvert, DSC: Dry Stone Causeway

Annex XV: Affected Houses and Structures along the Road Alignment

S.N	Type of structures	Chainage	Location	Distance from Centre Line of Road	Remarks
1	15 Electric Pole	9+130 to 10+100	Tangbe	2m	Affected
2	Khala ghar	9+700	Tangbe	2 m	Affected
3	Cattle Shed	9+680	Tangbe	2.5 m	Affected

Source: Field Survey, July, 2009

Summary of Resettlement Plan Cost

SN	Item		Unit	Total Loss	Amount (NRs)
1.	DIRECT COST				
	1.1	Compensation for private land	Sqm	0	0
	1.2	Other Trees	Number	201	48508.00
	1.3	Fruit Trees	Number	34	45000.00
	1.4	Private structure compensation	Number	2	144168.00
	Sub Total (A)				237676.00
2.	INDIRECT COST				
	2.1	Transportation allowance	LS		100000.00
	2.2	Deed transfer Assistance	LS	34HHs	100000.00
	2.2	Official Deed transfer fees	LS		75000.00
	2.3	Public appreciation programme	LS		75000.00
	Sub Total (B)				350000.00
3.	Livelihood Enhancement Skill Training				2665000.00
	Total (A+B)				3252676.00
4.	Contingency (5%)				162633.00
5.	Reserve fund for absentee owner compensation(28HHs)		Sqm	28HHs	100000.00
	Grand Total				3515309.00

Annex XVI: Structure for Slope Stabilization

SN	Chainages	Civil structures/Mitgation Measures	Bio-engineering Measures
1.	0 + 800	Dry wall	Shrub and tree plantation
2.	5 +500	Gabion wall	Shrub and tree plantation
3.	8 + 800	Dry wall	Shrub and tree plantation
4.	14 + 200	Gabion wall	Shrub and tree plantation
5.	20+ 020	Gabion wall	Shrub and tree plantation
6.	25 + 170	Gabion wall	Shrub and tree plantation
7.	28 + 900	Gabion wall	Shrub and tree plantation
8.	30 +350	Dry wall	Shrub and tree plantation
9.	32+200	Dry wall	Shrub and tree plantation
10.	33+000	Dry wall	Shrub and tree plantation

Source: Field Survey, July, 2009

Annex XVII: Mitigation Measures Recommended by Due Diligence Report

Description	Current Status	Related Impacts from Subproject Implementation and Potential Vulnerable Locations	Type of Impact before Application of Mitigation Measures*					Mitigation Measures proposed by the Due Diligence	Impact after Mitigation Measures	
			Nat	Mag	Ext	Dur	Rev			
Physical Environment										
Cutting of slopes, disposal of spoil and its impact on the highly fragile geology of the area.	The subproject area has highly fragile and erosion prone hills of clay, shingles and sand. The dry arid climate in the rain shadow has been keeping the slopes stable, though continuously being eroded by wind. It has been noted that the road stretches opened in sections along the proposed alignment by excavators has been highly hazardous disturbing the delicate balance of nature. Excavated earth and rocks have been carelessly dumped on the downhill slopes without providing any protection measures.	<u>Impact from Subproject:</u> Almost 30% of the >5m width road has already been opened. Only areas with difficult topography have been left for new construction. <u>Potential locations:</u> In particular, the stretches between Chaile to Samar, and Tangbe (11+800), and Kalo Bhir near Tangbe.	D	H	SS	LT	R	Two types of mitigation approach: <u>Opened road:</u> – Correction of impacts already incurred due to track opening. Slopes at downhill and uphill shall be stabilized by providing breast wall, toe wall and extensive bio-engineering using local species of shrubs and trees. <u>New road::</u> – Change alignment bypassing fragile slopes at Tangbe (10+150) – Careful cutting of slopes with balanced cut & fill particularly between Samar to Chaile, and Tangbe (11+800), and Tangbe to Kagbeni. – Bioengineering with protection structures shall be extensive. – Construction shall be labor-based. – Blasting shall be restricted. If required, hydraulic jack hammer shall be used.	The impact will be positive, as the structures and bio-engineering will keep the slopes stable and protect from further erosion. The adverse impacts incurred by opened road sections will also be corrected through application of mitigation measures. The impact after mitigation measure will thus be positive in long term perspective.	
Construction of road along the river bank of Kaligandaki River	The left bank of Kaligandaki River bank beyond Kagbeni to Mustang Gate through which the road alignment is proposed is being eroded at a rapid rate. The road above the bank and at places on the bank will be at risk of being washed away by the river.	<u>Impact from Subproject:</u> The road will remain vulnerable from being washed away by erosion due to bank cutting by the river. <u>Potential locations:</u> The left bank of Kaligandaki River between Tangbe to Mustang Gate (15+412) where a 70m long bridge is proposed across the river. Bank protection is also required between Kagbeni to Tabgbe.	D	H	SS	LT	R	– High flood level is at about 1.5 m above the flood plain. Thus, a 2m high protection structure is needed along the bank. – Good quality and size of boulders for construction of gabion structure is not available nearby. Cost of transportation will be high if the stones are to be brought from long distance. Thus, earthen embankment using the river bed material covered by a layer of gabion matting with launching apron is recommended. The apron will settle upto the scour level of the river. – The embankment shall be wide enough at top to support the road near the Mustang Gate (bridge) where the road has to be built almost above the flood plain.	The impact will be positive, as the bank cutting is an ongoing process. The foot trails are also being annually washed away. The proposed river bank protection measure will support the fragile and eroding slopes, as well as facilitate the trekkers who are facing difficulty to cross the area. Protection of river bank by the subproject will contribute to prevent high level of erosion and enhance the sustainability of the area in long term perspective.	

Description	Current Status	Related Impacts from Subproject Implementation and Potential Vulnerable Locations	Type of Impact before Application of Mitigation Measures*					Mitigation Measures proposed by the Due Diligence	Impact after Mitigation Measures
			Nat	Mag	Ext	Dur	Rev		
Drainage crossings	It has been observed that crossings at few drainages including Samar 1 & 2; Bhena 1 and 2; and Narsing Khola require careful approach to cross them incurring least disturbance to the existing ecological balance. The first four drainages, though small ones, flow through deep gorge requiring climbing down and up on fragile vertical slopes of the gorge. The currently proposed alignment is found inappropriate due to the topography and from the perspective of least disturbance to the environmental setting.	<u>Impact from Subproject:</u> The road will remain vulnerable from slope erosion and slide. The proposed alignment at Samar 1 and 2 are not feasible due to vertical gorge at the proposed site. <u>Potential locations:</u> – Bhena Khola 1 (28+100) – Bhena Khola 2 – Samar Khola 1 – Samar Khola 2 – Narsing Khola	D	H	SS	LT	R	– At Bhena 1 and 2: Provide breast wall with bio-engineering at areas of loop on both sides of the stream at proposed site. Provide dry stone causeway as crossing. – At Samar 1 and 2: the proposed crossing sites are inappropriate. The Due Diligence exercise carried out a reconnaissance of the area and has proposed an alternate alignment that passes about 350 m upstream of the proposed site. The new alignment is easier and negotiable to the topography, simple dry causeway will be adequate to cross the stream, and avoids numbers of loops otherwise proposed in the previous alignment. Structures and bio-engineering shall be done to stabilize the gentle slopes. – Bank protection and gabion cut-off wall is proposed. The road will cross the natural river bed with annual maintenance. The river generally does not observe high that is difficult to cross by vehicles.	– The impact will be avoiding the cutting of vertical and highly fragile conglomerate walls of the gorges. Structural protection measure will support the fragile and eroding slopes. It will also avoid the need of cutting precious trees and acquiring scarce productive land of the settlement at Samar. – It is recommended by the Due Diligence that the proposed causeway is not appropriate for the Narsing river crossing. The river is recommended to be crossed in its natural state with annual maintenance of the stretch.
Operation of vehicles and induced dust and noise pollution.	– The area is an arid and dry land with high velocity winds. The wind blows dust and small pebbles. Thus, dust from vehicles will not change the existing environment of the area. – The dust and noise however has been causing nuisance to trekkers trekking. – Noise has begun to disturb common wildlife of the area, particularly birds that get scared by the sound of vehicle and their blowing of horn.	<u>Impact from Subproject:</u> – Dust and noise from vehicles – The dust and noise will cause nuisance to trekkers – Noise will disturb wildlife of the area. <u>Potential locations:</u> – All along the road.	D	L	SS	ST	IR	The suitable mitigation measures could be: – Speed limit of maximum 20 km/hr, which is the standard design speed of rural road category. – Plantation of vegetation on both sides of the road where possible. – Vehicles like Tractors produce noise nuisance. Thus, certain types of vehicles with only green sticker and pollution level can be allowed to ply in the road. Number of vehicles can also be limited to minimal required level operated by local operators who will be more accountable to their place. – Private vehicles can be banned from entry in the region. Only vehicles operated by local beneficiaries can be allowed. – Current traffic level does not call for blacktopping of the road, though this could be one of the alternatives at sensitive sites. – Awareness program for drivers to drive below design speed.	– Earthen or gravel road causes dust and sound nuisance. The impact, if all the mitigation measures are observed, can be reduced significantly.

Description	Current Status	Related Impacts from Subproject Implementation and Potential Vulnerable Locations	Type of Impact before Application of Mitigation Measures*					Mitigation Measures proposed by the Due Diligence	Impact after Mitigation Measures
			Nat	Mag	Ext	Dur	Rev		
								<ul style="list-style-type: none"> – Alternate route adjacent to the road alignment for trekkers, wherever possible. – Drivers to drive slow wherever trekkers are walking. – Minimal use of horn. – Erect No Horn signs and common wildlife areas. 	
Land scar and depletion of aesthetics.	About 30% of the alignment has already been opened. Thus, opening of remaining road by the subproject will incur minimal impact.	<u>Impact from Subproject:</u> Construction of road in virgin region of the subproject area will create scar on topography causing visual pollution. <u>Potential locations:</u> All along the road alignment.	D	L	SS	LT	IR	<ul style="list-style-type: none"> – Adopt bioengineering and manage spoils and erosions already incurred while opening tracks. – Cover road alignment with local vegetation and landscaping. 	– Through adoption of bioengineering and managing spoils and erosions already incurred while opening tracks, the Subproject will rather maintain the aesthetics of the area.
Impact on sanitation of the area	The ACAP has introduced solid waste management system in the villages. The old settlements, also being tourist area, are cleaned in the morning. The local ethnic residents are known to keep their premises clean and sanitary.	<u>Impact from Subproject:</u> Increased traffic volume will also bring several problems including solid waste management problems, open urination and defecation along the road, open disposal of food packages and plastic water bottles and bags that will pollute the area. <u>Potential locations:</u> In the settlement areas. Travelers can also throw such packages from vehicles. They might cause adverse impact on wildlife if they consume the plastic materials.	ID	L	L	LT	R	<ul style="list-style-type: none"> – Ban plastic bags in the area. – Restrict haphazard throwing of garbage by the travelers – A system of travelers carrying back their water bottles and garbage can be introduced, or tax levied for cleaning up the area. – Awareness programs organized, notice boards shall be erected and travelers requested not to pollute the area – Public urinals shall be constructed at bus stops, and open defecation shall be totally banned. 	– Through adoption of awareness program and implementing Polluters Pay principle, the area can be kept safe and sanitary.
Biological Environment									
Loss of vegetation	Upper Mustang area, being highly arid and dry, only small thorny shrubs exists on hill slopes. People grow timber and fodder tree wherever there is water available to irrigate the field.	<u>Impact from Subproject:</u> The Subproject does require clearing of few trees at some settlement areas. <u>Potential locations</u> All along the alignment	D	L	L	ST	R	<ul style="list-style-type: none"> – Extensive bioengineering and tree plantation program will be carried out at all feasible sites. – Coordination with District Agriculture Office shall be maintained to implement agriculture extension program in these areas by introducing greenhouse systems and organic fertilizers. 	<ul style="list-style-type: none"> – Bioengineering and tree plantation will enhance the green cover of the area – The road alignment will be stable and look aesthetically good. – The current trend of haphazardly opening road will be controlled, which will have positive impact on vegetation cover of the area.

Description	Current Status	Related Impacts from Subproject Implementation and Potential Vulnerable Locations	Type of Impact before Application of Mitigation Measures*					Mitigation Measures proposed by the Due Diligence	Impact after Mitigation Measures
			Nat	Mag	Ext	Dur	Rev		
Impact on wildlife	The Due Diligence spotted common wild rabbit, Tibetan fox, sand partridge, rock pigeon, eagle, crow, and other birds. The wild animals were disturbed by human activity and running vehicles. However, the important and rare wildlife including snow leopard, brown bear, blue sheep, musk deer, lophophorous, and tragopans live in the mountains at higher altitude. They climb down to lower level only during winter, when there is snowfall and the road will be closed for about six months.	<u>Impact from Subproject:</u> The subproject implementation and operation will have impact on wildlife, if not properly managed. Poaching and killing can increase due to access facility. <u>Potential locations</u> All along the alignment.	ID	H	L	LT	R	<ul style="list-style-type: none"> – ACAP has been well managing the conservation area. People are not allowed to cut trees, harass or kill wild animals. Monitoring and punishment to defaulters is done by ACAP. – The road will facilitate access, bring more business in the area and increased income can be used for better and sustainable environment. – Only local vehicles shall be allowed to ply on the road. This will assist to control poaching and harassing wildlife. – Speed limit will be observed at wildlife areas to avoid accidents. Wildlife crossings shall be provided at regular intervals in potential areas. – Vehicles shall not be allowed to be stopped in between settlements. – Pollution free vehicles with low noise shall be used. Blowing of horn shall be restricted. 	<ul style="list-style-type: none"> – The subproject can positively contribute in conservation of wildlife through awareness programs, increased numbers of tourists to watch wildlife and the pristine environment of the area. – Poaching of wildlife should be strictly restricted in cooperation with ACAP.
Socio-economic and Cultural Environment									
Labor based road construction.	It has been noted that due to higher income activities, availability of local labors for working in the road works will be minimal.	<u>Impact from Subproject:</u> The district labor rate is lower (Rs. 270 per day) than what an average labor earns by being porter or doing other business. Thus, labors have to be brought from outside the district. <u>Potential locations</u> All along the alignment.	D	H	R	ST	R	<ul style="list-style-type: none"> – The Subproject shall be strictly labor based. Use of excavator shall be restricted. If labors are not available locally, they shall be brought from other places of the country under labor contract. – Labor camps shall be well managed. – Labor insurance and other Occupational Health and Safety matters shall be fully addressed. 	<ul style="list-style-type: none"> – It is observed that a strictly labor-based method of construction if adopted will enhance the development of a sustainable road access.

Recommendations from Due Diligence Report

Following are the recommendations made by Due Diligence Report of Kagbeni - Jhaite Road Sub-project in Mustang District:

- The Due Diligence has assessed the full alignment of the road and has made several recommendations on avoiding, minimizing and compensating measures. Several alternative alignments and design of the road structures in several sections (refer table 3) have been recommended. Careful resurvey and design is required in these areas.
- It is recommended that the bio-engineering shall be extensive with 7 to 10% of total sub-project cost (current practice under RRRSDP is to keep only 3%). A bioengineer shall assess and prepare bio-engineering plan and arrange nursery for the sub-project.
- It has been noted that local labors for road construction are not available in the area. However, the road should be constructed only by adopting labor-based method, and in no case mechanized intervention shall be permitted. Options for forming building groups shall be the prime activity for initiation of the sub-project works.
- A senior geologist shall conduct reconnaissance of the road alignment and contribute in design before finalizing the detailed project report (DPR).
- A river engineer shall assess and recommend appropriate type of bank protection structure for the Kaligandaki River using cost effective technology.
- An environment expert shall be assigned full-time during the sub-project. S/he shall be preferably a local, and conduct close monitoring and reporting compliance of environmental management plan (EMP). S/he shall maintain close coordination with the office of ACAP.