

Environmental Assessment Document

Initial Environmental Examination

Grant Number: 0093 NEP

July 2011

Nepal: Rural Reconstruction and Rehabilitation Sector Development Program

Upgrading of Kageshwori Ring Road Subproject, Kathmandu District

Prepared by the Government of Nepal

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

Initial Environmental Examination (IEE) Report
of
Upgrading of Kageshori Ring Road Subproject
Kathmandu District

Submitted to:
Ministry of Local Development
Government of Nepal

Proponent:
District Development Committee/
District Technical Office
Kathmandu

July, 2011

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ABBREVIATIONS

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

NAME AND ADDRESS OF THE PROPONENT

Name of Proposal

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कागेश्वरी रिङ्ग सडकको प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदनको कार्यकारी सारांश

पृष्ठभूमि

नेपाल सरकारले लामो दून्दले गर्दा क्षति भएका ग्रामीण पूर्वाधारहरूको पुनःनिर्माण र पुनःस्थापना को कार्य एशियाली विकास बैंक(ADB), स्विस् सरकार (SDC), ब्रिटिस सरकार (DFID) तथा ओपेक फण्ड (OFID)को आर्थिक सहयोगमा 'ग्रामीण पूर्वाधार पुनःनिर्माण र पुनःस्थापना आयोजना' नेपालको बीसवटा जिल्लाहरूमा संचालन गरिरहेको छ । काठमाडौँस्थित प्रस्तावित कागेश्वरी चक्रपथ ग्रामीण सडकको पुनःस्थापना सोही कार्यक्रम अन्तर्गत संचालन गर्न लागिएको एक उप-आयोजना हो । उप-आयोजना (प्रस्ताव) अन्तर्गत ९.०५३ कि.मी.(ToR मा ९.२कि.मी भएतापनी Detail Survey गर्दा ९.०५३कि.मी भएको) लामो उक्त कच्ची सडकको कालोपत्रे स्तरमा पुनःस्थापना गर्न प्रस्ताव गरिएको छ ।

प्रस्तावक

प्रस्ताव (प्रस्तावित सडक उप-आयोजना) को प्रारम्भिक वातावरणीय परीक्षणको प्रस्तावक 'जिल्ला विकास समिति र जिल्ला प्राविधिक कार्यालय, काठमाडौँ' 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 हो ।

प्रस्तावको सान्दर्भिकता

प्रस्तावित सडकले काठमाडौँ जिल्लाको उत्तरी-पूर्वी भेगका वासिन्दाहरूलाई सदरमुकाम संगको पहुँच बढाउनेछ भने स्थानिय स्तरमा उत्पादन हुने तरकारी तथा दुध लाई बजार संग जोडी स्थानिय आय आर्जनमा अभिवृद्धि गर्नेछ ।

अध्ययन प्रकृया

जुलाई, २००९ मा फिल्ड सर्वेक्षणबाट लिइएको तथ्याङ्क तथा अन्य उपलब्ध तथ्याङ्कहरूको साथै सामाजिक तथा प्राविधिक टोलीबाट पुनर्वास कार्यको सर्भेक्षणको 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 १९९७, वातावरण संरक्षण नियामावली १९९७ अनुसार तथा स्थानिय विकास मन्त्रालयबाट मिति २०६६/०२/२५ मा स्विकृत गरिएको यसै प्रस्तावको कार्यसूची अनुसार तयार गरिएको छ । साथै, एशियाली विकास बैंकको Environmental Assessment Guideline, 2003 तथा Safeguard Policy Statement, 2009 को समेत अनुसरण गरिएको छ ।

आयोजना को विवरण

प्रस्तावित सडकले काठमाडौँ जिल्लाको उत्तरी-पूर्वी दुर्गम भेगका वस्तीहरूलाई जिल्लाको सदरमुकाम संग जोड्दछ । यसको कूल लम्बाइ ९.०५३ मि. छ । हाल उक्त पक्की ग्रामीण सडकको पुरै सडक खण्डमा सुख्खा याममा मात्र गाडी चल्छ । सडकमा एउटा पुल (Ch. 5+060 मा) निर्माण गर्नु पर्ने देखिन्छ । यो सडक पाँचवटा गाउँ विकास समितिहरू क्रमशः गागलफेदी, आलापोट, भद्रवास, इन्द्रायणी र डाँछी भएर जान्छ । सडकको कूल चौडाइ ५ मि. हुनेछ । यस उप-आयोजनाको कूल अनुमानित लागत रु. १०८,८७८,४९५।९५ र प्रति कि.मी अनुमानित लागत रु.१२,०२६,७८६।२५ प्रति कि.मी लाग्ने देखिन्छ ।

विद्यमान वातावरणीय स्थिति

यो सडक इन्द्रायणी गा.वि.स.को इन्द्रायणी बाट समुद्री सतहदेखि १३३० मी. को उचाईबाट शुरु भएर १३३१ मी. उचाईको डाँछी चोकमा पुग्छ, बजारमा पुग्छ । गत भदौ महिनामा यस सडक खण्डमा दुईवटा ठूला पहिरो गएको पाइयो । प्रस्तावित सडक क्षेत्रको वायु तथा पानीको स्तर सफा रहेको देखिन्छ साथै ध्वनि प्रदूषणको समस्या देखिदैन । यो सडक प्रायः खेती गरिएको जमीन तथा बस्तीहरू भएर जान्छ ।

यस सडक खण्डमा पाइने मुख्य रुखको प्रजातिहरूमा उत्तिस,चिलाउने र लप्सी पर्दछ । काग, भँगेरा, परेवा आदि पंक्षीहरू सडक छेउको वनमा पाईन्छ । यो सडक खण्ड संरक्षित क्षेत्र वा मध्यवर्ती क्षेत्रमा पर्दैन ।

यो सडक खण्डको प्रभावित क्षेत्र भित्र जम्मा घरधुरी संख्या १३८३ र जनसंख्या ६९९६ रहेको छ र सरदर परिवार संख्या ५.७१ छ । यहाँ ब्राह्मण, क्षेत्री, तामाङ, मगर तथा दलित (दमाई, कामी) जातीहरु बसोबास गर्दछन् ।

यहाँका वासिन्दाहरुको मुख्य पेसा कृषि र रोजगार (निजी तथा सरकारी) हो । यातायातको राम्रो सुविधा नभएको तथा पहाडी क्षेत्र भएकोले कृषि उब्जनीले मात्र पर्याप्त नहुने हुँदा यहाँका अधिकांश मानिसहरु श्रम रोजगारीका अन्य पेशामा काम गर्ने साथै उल्लेखनीय प्रतिशत मानिसहरु जीविकोपार्जनको सिलसिलामा हिउँदमा काठमाडौँ उपत्यका तथा भारत लगायतका ठाउँमा रोजगारीको लागि जाने गर्दछन् ।

प्रमुख वातावरणीय प्रभावहरु

सकारात्मक प्रभाव

उप-आयोजना बाट तत्कालै हुने लाभमा स्थानीय स्तरमा रोजगारीको सिर्जना हुनेछ । आयोजना संचालनको लागी करिव ३१३५८ मानव-दिन बराबरको अदक्ष र ९३३४ मानव-दिन बराबरको दक्ष श्रमशक्तीको आवश्यकता पर्नेछ । आयोजना संग सम्बन्धित कार्यमा (रोजगारीमा) गरीब, महिला तथा पिछडिएका स्थानीय जनताले प्राथमिकता पाउनेछन् । यस चरणमा हुने अन्य लाभहरुमा वन्द व्यापारको वृद्धि, उप-आयोजनाले प्रदान गरेको शीपमुलक तथा जनचेतनामुलक तालिम तथा उप-आयोजना निर्माण कार्यमा सहभागी भई स्थानीय जनताको शीप वृद्धि हुने अवसर पर्दछन् ।

सडक सञ्चालनका चरणमा सडकले प्रभावित क्षेत्रका वासिन्दालाई बजार, सामाजिक सेवा प्रदायक स्थान तथा देशका अन्य भागहरुसम्म पुग्न छिटो, छरितो तथा सुविधाजनक पहुँचको अवसर प्रदान गर्नेछ । 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 संगै शिक्षा, स्वास्थ्य, संचार, बजार, वैकिङ्ग तथा अन्य आर्थिक तथा सामाजिक क्षेत्रहरुको विकास हुनेछ । यसले यस क्षेत्रका मानिसहरुको समग्र जीवनस्तर उकास्न मद्दत पुऱ्याउनेछ । सडकको सञ्चालनले स्थानीय जग्गा जमिनको मुल्य वृद्धि गर्न सहयोग पुऱ्याइ स्थानीय जग्गाधनीलाई लाभ पुऱ्याउनेछ ।

उप-आयोजना कार्यन्वयनबाट पर्न सक्ने नकारात्मक प्रभावहरु:

सडक निर्माणको क्रममा जमिन काट्दा, खन्दा निस्किएका माटो तथा ग्रेगर थुपादा 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 । सडक निर्माणको दौरान बाटो चौडाइ ५ मी. कायम गर्नको लागी ०.५५५ हेक्टर खेती र १.२ हेक्टर बस्ती भएको क्षेत्र प्रयोग हुनेछ । निर्माण कार्यको क्रममा श्रमिकहरु तथा स्थानीय जनताको स्वास्थ्यमा असर पर्ने अथवा 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 । सडक किनाराका नाला बाट वगेको अनियन्त्रित पानीले सडक मुनिका खेतवारीमा भु-क्षय हुन सक्छ । सवारी साधनको वृद्धिले धुलो तथा ध्वनी प्रदुषण बढ्नेछ । त्यसैगरी सडकको सुधार संगै वन क्षेत्रसम्म भएको पहुँचको वृद्धिले 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 लागी सकारात्मक प्रभावलाई बढावा गर्ने तथा नकारात्मक प्रभावहरुलाई नियन्त्रण या न्युनिकरण गर्ने थुप्रै उपायहरु यस प्रतिवेदनमा प्रस्तावित गरिएको छ । जनताले राजी खुशीले बाटोको लागी दिएको बाहेक आयोजनाले गरिवीको रेखामुनि परेका परिवारहरुको अधिग्रहण गर्ने सवै जग्गाको प्रचलित मुल्य अनुसार क्षतिपूर्ति दिनेछ । उप-आयोजनाले प्रभावित जनतालाई निर्माण कार्यमा रोजगारीमा तथा शिपमुलक तालिममा प्रथमिकता दिनेछ । उप-आयोजना निर्माणको क्रममा जग्गा फँडानी गर्दा, जमिन काट्दा, खन्दा निस्किएका माटो, ग्रेगर थुपादा तथा अन्य कार्य गर्दा त्यस क्षेत्रको संवेदनशील वातावरणलाई सुरक्षित राख्न विशेष ध्यान दिनेछ । निर्माण कार्यमा कार्यरत श्रमिकहरुको विमा गराउने छ तथा सुरक्षाका सम्पूर्ण सामग्री श्रमिकहरुलाई प्रयोगमा ल्याउन दिइने छ । वन, जीवजन्तुको संरक्षण गर्न तथा सामाजिक अक्षुण्णतालाई कायम राख्न जनचेतनामुलक कार्यक्रमहरु तथा तालिमहरु सञ्चालन गरिनेछ । निर्माण स्थलहरुमा प्राथमिक उपचारको सामग्रीहरुको व्यवस्था गरिने छ । वृक्षारोपणमा संरक्षित तथा स्थानिय प्रजातिहरुलाई प्राथमिकता दिइनेछ । सडक सञ्चालनका क्रममा सडकमा देखिएका अस्थिरताहरुलाई नियमित रुपमा मर्मत संभार गरिनेछ । सडकमा तथा सडकको कारण नजिकैको खेतवारीमा पानी जम्मा हुन नदिन उचित निकासको व्यवस्थापन गरिनेछ । सडक दुर्घटना बाट बचाव गर्न उपायहरु अवलम्बन गरिनेछ ।

वातावरण व्यवस्थापन योजना

यस प्रतिवेदनमा वातावरण व्यवस्थापन योजना अन्तर्गत उप-आयोजनाबाट पर्ने संभावित असरहरू, असरहरूको प्रभाव, न्युनिकरण विधि, अनुगमन विधि तथा कार्यतालिका प्रस्तावित गरिएको छ। यसका साथै न्युनिकरणका उपायहरूको तथा अनुगमन कार्यको कार्यान्वयन गर्ने जिम्मेवार निकायहरूको पनि पहिचान गरिएको छ। अनुगमनका लागी आवश्यक भौतिक, जैविक, सामाजिक-आर्थिक तथा साँस्कृतिक वातावरणका विभिन्न अनुगमन सुचाङ्कहरूको पनि पहिचान गरिएको छ। वातावरण व्यवस्थापन योजना कार्यान्वयन गर्न निम्नानुसार खर्च हुने अनुमान गरिएको छ:

क्र. सं.	विवरण	रकम (ने.रु.)	कैफियत
१.	वातावरण सम्बन्धी जनचेतनामूलक तालिम तथा अन्य तालिम	२००,०००/-	आयोजनाको बजेटमा समावेश गरिने।
२.	श्रमिकहरूको विमा	८०२,४१५.९४/-	BoQ मा समावेश गरिने।
३.	वायो-इन्जिनियरिङ्ग	६,१६६,११३।५७	BoQ मा समावेश गरिने।
	जानकारीमूलक सुचनापाटि	२१,६९०.००/-	BoQ मा समावेश गरिने।
४.	पुनर्वास तथा जग्गा अधिग्रहण	८,१११,१४३.७४/-	पुनर्वास योजनामा समावेश गरिने।
५.	पुनर्निर्माण तथा अन्य	५०,०००/-	आयोजनाको बजेटमा समावेश गरिने।
६.	सामाजिक कार्य तथा अन्य	४२७,०००.००	सामाजिक योजना तथा आयोजनाको बजेटमा समावेश गरिने।
७.	पेशागत स्वास्थ्य सुरक्षा तथा जानकारीमूलक सुचनापाटी	२००,०००/-	BoQ मा समावेश गरिने।
८.	बढी भएको माटो आदि र खानी व्यवस्थापन	१०,००,०००/-	आयोजनाको बजेटमा समावेश गरिने
९.	अनुगमन तथा मूल्यांकन	२००,०००/-	आयोजनाको बजेटमा समावेश गरिने।
	जम्मा :	१७,१७८,३६३.२५	

निष्कर्ष

पहिचान गरिएका प्रायः वातावरणीय प्रभावहरू कम महत्वका तथा मुख्य गरी निर्माणकार्यका वखतमा सिमित रहेको पाइएको छ। वातावरण व्यवस्थापन योजना अन्तर्गत उल्लेख गरिएको उपायहरूको कार्यान्वयन गरिएमा यस आयोजनाको कार्यान्वयनले आयोजना क्षेत्रको भौतिक, जैविक, सामाजिक - आर्थिक तथा साँस्कृतिक वातावरणमा उल्लेखनीय नकारात्मक प्रभाव नपर्ने देखिन्छ। 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 मूल्याङ्कन' स्तरमा अध्ययन गर्न आवश्यक नरहेको सिफारिश समेत गरिन्छ।

EXECUTIVE SUMMARY

Background

Government of Nepal has received financial assistance from ADB, SDC, DFID 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 9.053 km long Kageshori Ring Road in Kathmandu District is one of the Subprojects selected under the RRRSDP. It is an existing earthen/gravel road proposed for upgrading in bituminous standard.

Project Proponent

The 'Proponent' of the proposed Subproject (Proposal) is District Development Committee (DDC)/ District Technical Office (DTO), Kathmandu. 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 a remote rural area within Kathmandu District with the district headquarters. It will provide easier access to people to social services, and market access for local products like vegetables, milk and coffee. As a result, the Subproject will assist to promote economic activities, reduce poverty and increase socio-economic conditions of the people of the area.

Study 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, 1997 and Environmental Protection Rules, 1997 (second amendment 2007) of the Government of Nepal (GoN); and Environmental Assessment Guidelines, 2003, and Safeguard Policy Statement, 2009 of ADB. The report follows the Terms of Reference for IEE Study approved by MoLD on 25/02/2066 BS.

Brief Description of the Subproject

The proposed road lies at the remote north-eastern part of Kathmandu district. The 9.053 km road is already motorable, and passes through Indrayani, Gagalphedi, Alapot, Bhadrabas and Danchhi village development committees (VDCs). Average width of the road will be 5 m. One culvert at Mahadev Khola with 6m span is required at 5+060, and improvements in geometry and grade of the road will be required. Total project cost is NRs. **108,878,495.95** and per km cost is NRs. **12,026,786.25**.

Existing Environmental Condition

The elevation of the starting point of the road at Indrayni is 1330 m amsl and at Danchhi is 1380 m amsl. The road alignment passes through the upper valley slopes and ridges of middle hills. Two major landslide occur during last summer at chainages 7+148 and 7+300. The grade of the road varies from 2% to 10%. The road passes through cultivated land and settlements.

1. The dominant vegetation found in the road alignment is *Alnus nepalensis* (Uttis), (*Schima Wallichii*) Chilaune, and (*Castanopsis Indica*) Kattus. The road does not fall under any protected area or buffer zones. Lapsi (*Choerospondias axillaries*) is also found which is listed as rare Species.

Total Influenced population of the Subproject area is 6996, total household number is 1383, and average household size is 5.71. Brahmin, Chettri, Tamang, Magar and occupational caste (Damai, Kami) are the main castes living in the area.

Subsistence agriculture and livestock farming are the main occupation. Due to limited transportation facilities and high altitude, agriculture farming is not enough for subsistence level. Moreover, significant percentage of the economically active male population also migrates to various places including Kathmandu valley.

Major Environmental Impacts

Beneficial Impacts

The immediate benefit from this road Subproject is employment opportunities. The implementation of Subproject require about 31358 person days of unskilled and 9334 person days of skilled manpower. The project will give priority to the poor, ethnic minorities and disadvantaged local people for employment opportunity. 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. The fertilizers and pesticides will become cheaper with better transportation facility hence, agricultural production will increase. This will ensure better economic condition and food security 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. The better land network will result in increased land price which will be beneficial for land owners.

Adverse Impacts

During the road construction, the cutting of slopes and consequently disposal of soil and earth material, might result in on erosion and landslide during construction and operation. Furthermore, spoils generated during construction can create the water pollution to the nearby water sources.

During road widening and construction required 0.555 Ha of agricultural land and 1.2 Ha of Settlement area. Labours and local people are prone to health effects and accidents relating to construction activities.

During operation stage, vehicular movement, monsoon rain, grazing of animals and cutting of trees on the unstable slopes might result in slope instability and hence erosion and landslides might occur. The flowing water on the side drain of the road might cause erosion of soil on adjacent agricultural land. Vehicular emissions will result in air and noise pollution. New settlement, bazaar area will be expanse and this 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 project environment friendly. Other than land donated by local people for the projects, adequate compensation will be provided to affected poor and marginalize household for all the lands that need to acquire. Affected families will be given high priority for employment and skill development trainings. Necessary measures will be taken to reduce the adverse effects that might arise from site clearance, cutting of slopes, disposal of spoils and quarrying activities. Necessary trainings and awareness programs will be conducted. Necessary measures will be adopted for protection of flora and fauna. At construction site, the workers will be provided insurance, first aid facilities and safety equipments. Protected species will be given emphasis for plantation. Proper maintenance and proper drain system will be provided to prevent accumulation of water on the nearby agricultural lands during operation. Adequate road safety measures will be provided to minimize road accident.

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

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

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.)	Remarks
1	Environmental awareness raising training and other training	200,000.00	To be included in project cost
2	Insurance of workers	802,415.94	To be included in BoQ
3	Information Signboard (9 nos)	21,690.00	To be included in BoQ
4	Ladnslide protection and Bio-engineering	6,166,113.57	To be included in BoQ
5	Resettlement and Land Acquisition	8,111,143.74	To be included in Resettlement plan
6	Restoration or relocation of affected infrastructures, Spoil management, Reinstatement of quarry, stockpiling etc.	50,000.00	To be included in Project cost
7	Social cost (Awareness programmes, Capacity building, LEST programmes)	427,000.00	To be included in Social plan
8	Occupational health and safety, First aid box, safety measures for workers (helmets, gloves, masks, boots)	200,000.00	To be included in BoQ
9	Soils disposal site and reinstatement of quarry	1,000,000.00	To be included in project budget
10	Environmental Monitoring	200,000.00	To be included in project cost
	Total	17,178,363.25	

Conclusion and Recommendation

The identified environment impacts will be seen in limited small areas and mainly during construction period. 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 should 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. INTRODUCTION

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 (MLD) 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. Kathmandu District is one of the project districts under RRRSDP. This Proposal is for upgrading of Kageshori Ring Road of length 9.053 km.

3. The Name and Address of Proponent

Name of Proposal

Rehabilitation of Kageshori Ring Road, Kathmandu District, Nepal

Name and Address of Proponent

District Development Committee (DDC), District Technical Office (DTO), Kathmandu District

Phone No: 01-4490085

Fax No: 01-4490085

Email: dtokathmandu@rrr.gov.np

1.2 Relevancy of the Proposal

4. Despite the project area being within Kathmandu District, it belongs to remote and underdeveloped North- eastern part of the valley. The area has high potential in production of vegetable and milk. The proposed road will enhance access to market and social services to the people of the area, and will significantly contribute in their socio-economic development. Better access will also open door to new development opportunities. Access shall also attract other development infrastructures and open door to further development opportunities in the area.

1.3 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, 1997; and Environment Protection Rule, 1997 (Amendment 2007) of GoN; and according to the provisions of the Environmental Assessment Guidelines, 2003; and Safeguard Policy Statement, 2009 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.

1.4 Methodology Adopted

7. The IEE study has followed the provisions of the EPA, 1997 and EPR, 1997, the provisions of ADB and approved ToR for IEE Study by MoLD on 25/02/2066 BS. It follows methodology suggested in the approved Terms of Reference for IEE Study (please refer Annex I). 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 ZoI (one and half hour walking distance from the centre line of the road) information of the Subproject area. The IEE study has been conducted through review of secondary information collected from relevant agencies, and primary information collected from the field survey

in May 2010. 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, VCDs 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.

1.5 Description of the Proposal

The proposed 9.053 km long Black top, Gravel and earthen road in Kathmandu District constructed in 2003 links the VDCs of Kathmandu District and from VDCs to its headquarter. The road is currently of Black top at some section, Gravel and earthen surface and vehicles ply all weather. This road starts from Indrayni of Indrayni Village Development Committee (VDC) and ends at Danchhi of Danchhi VDC. In Between the road passes through Bhadrabash, Alapot and Galgalphedi VDCs of the District (see in Figure 1.1 and 1.2). Widening, geometric correction and grade improvement, slope stabilization, side drains and construction of cross drainage structures is planned to be implemented under the proposed rehabilitation works of the road. The total project cost is estimated including bridge at average of NRs. **108,878,495.95** and per km cost is NRs. **12,026,786.25**.

8.

Salient Features of the Subproject:

1. Name of the Project	:	Kageshori Ring Road
2. Project Component	:	Road Construction, Upgrading of Bridge
3. Project Activities	:	Construction Stage Site Clearance, Pavement Works, Cross-Drainage Works, Side Drainage Works Operation Stage Maintenance Works
4. Location		
4.1 Geographical Locations		
4.1.1 Start Point	:	Indrayni of Indrayni VDC
4.1.2 End Point	:	Danchhi of Danchhi VDC.
4.2 Geographical Feature		
4.2.1 Terrain	:	Mid Hills
4.2.2 Alignment	:	Valley: approx. 9.053km
4.2.3 Altitude	:	At Indrayni is 1330 m amsl and at Danchhi is 1331 m amsl.
4.2.4 Climate	:	Sub-Tropical, Temperate
4.2.5 Soil	:	Boulder Mix Soil, Hard soil
5. Classification of Road	:	District Road (Rural Road Class A)
6. Length of Road	:	9.053 km
7. Standard of Pavement	:	Premix Carpet
8. Design speed	:	20 km/hr
9. Major Settlements:		
9.1 Major Settlements	:	Indriyani, Lankila, Sanagaun, Pasikhel, Suyalgaun, Pewadol, Lakilaukhutar, Satghattecho, Bhurletar, Manantar, Kurkuretol, Dhunganagaun, Dhakredanda, Tallo Alopot, Krishnachaur, Mathilo Alapot, Jaribote, Phuyalgaun, Bagarphat, Nayagaun, Bhutampur and Danchhichowk.
9.2 No. of Household	:	1383 HHs
9.3 VDCs along the Road	:	Indrayani, Galgalphedi, Alapot, Bhadrabas and Danchhi
10. Cross Section		
10.1 Right of way	:	5m each side from center line
10.2 Formation width	:	5 m
10.3 Carriageway width	:	3 m
10.4 Lane	:	Single

11. Structures		
11.1 Gabion Wall	:	3755.30 Cum.
11.2 Stone Pitching	:	2.50 Cum.
12. Bio-Engineering (Landslide protection)	:	(5,475,270.86)
13. Earth Work		
13.1 Cutting	:	15313.73 Cum
13.2 Filling	:	2347.93 Cum (back filling with compaction)
14. Project cost		
14.1 Total Cost (NRs)	:	NRs 108,878,495.95
14.2 Costs per km (NRs.)	:	NRs 12,026,786.25
15. Employment generation:		
15.1 Total employment	:	40692 (person days)
15.1.1 Skilled	:	9334
15.1.2 Unskilled	:	31358
16.DTMP Code	:	27A031R

1.6 Construction Approach and Activities

9. The construction approach will be Contractor Approach. The important features of the approach are (i) phased 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; (v) use soft engineering structures; and (vi) use of contractors only in the works that cannot be done through manual labor. Machine Intensive Road Construction Approach will be used in works that cannot be done manually through road building groups. In such works, the construction will be carried by using the equipment and machineries but it will be used in such a way to ensure the minimum environmental damage.

10. Activities included during the road construction are: Site clearance, Pavement work, Structures (Toe wall, retaining wall etc.), Earthwork, Bioengineering, Graveling, Cross drainage works and Side drain works

1.7 Proposed Schedule for Implementation of Subproject

11. 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													

Note:

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

Figure 1.1: Location of Kageshori Ring Road Subproject in Kathmandu District

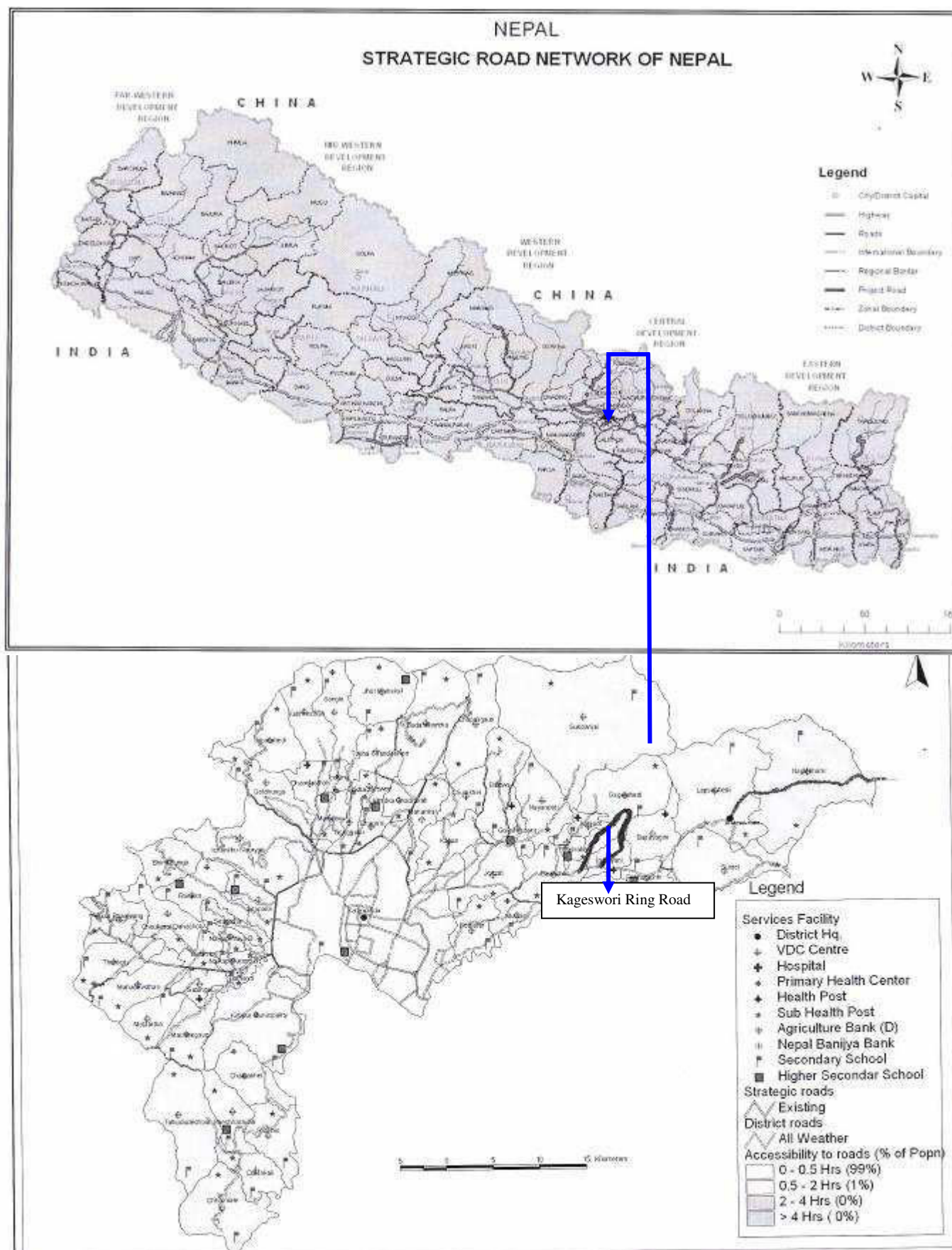
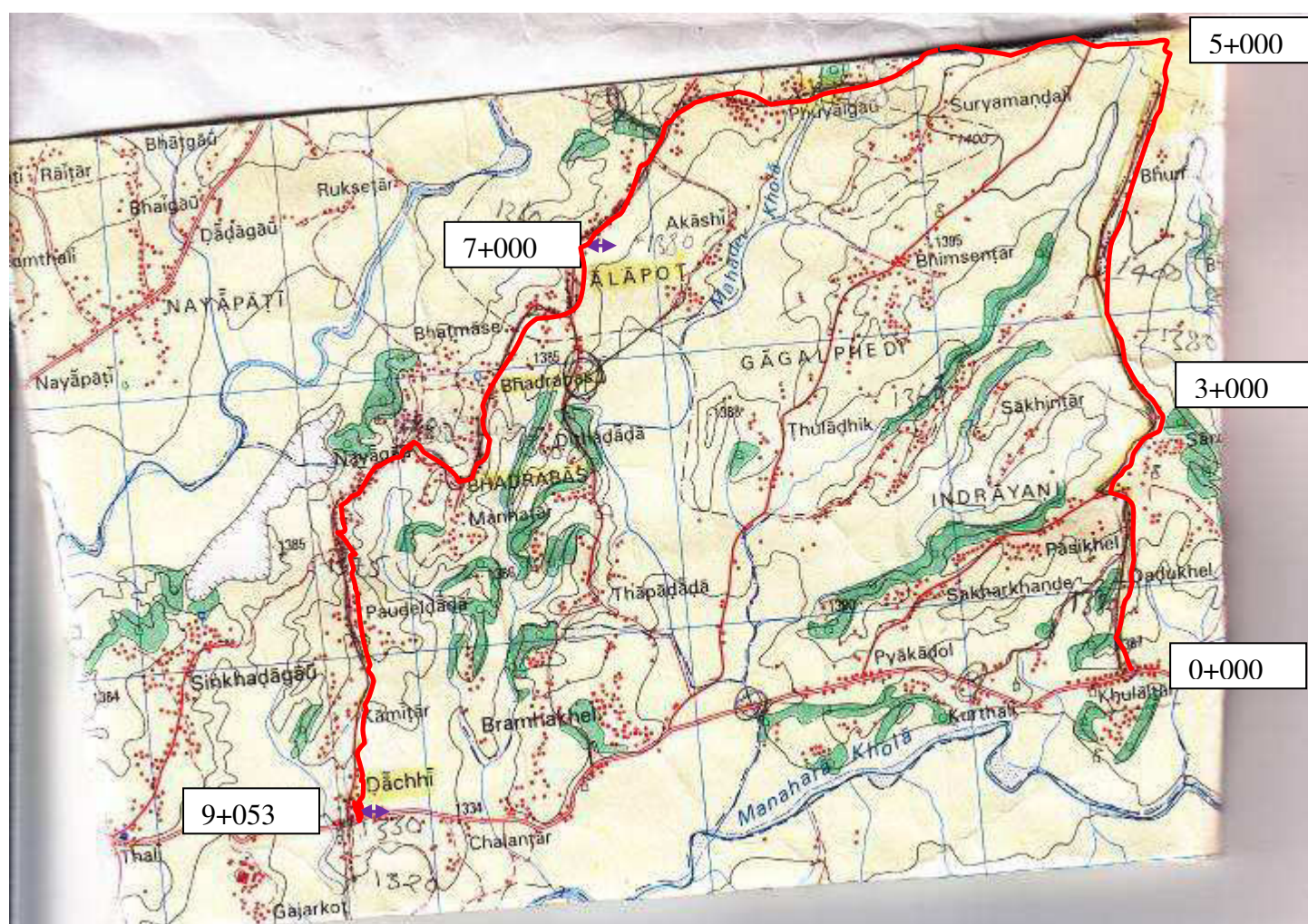


Figure 1.2: Alignment of Kageshori Ring Road Subproject



2. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

2.1 Public Consultation

12. 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 15/06/2009 in the Nagarik 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 District Forest Office, District Soil Conservation Office, District Agricultural Development Office and others were carried out during field survey to collect the public concerns and suggestions. Focus Group Discussions were conducted in all the five 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 Table 2.1.
- Draft IEE report was kept at information center of DDC, Indrayani, Gagalphedi, Alapot, Bhadrabas and Danchhi 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 IX).

Table 2.1: Summary of FGD Meeting Conducted Under IEE Study

Location	Date	No. of Participants		Issues/ Suggestion	Decisions
		Male	Female		
Alapot	2066/02/26	21	1	1. FGD program disseminated information on the project to stakeholders. 2. Participants committed on providing land voluntarily for the road. 3. Affected community structures should be rehabilitated. 4. Compensation shall be given for all affected private houses.	Issues/suggestions raised during the FGD meetings will be addressed in the mitigation measures and benefit augmentation measures.
Bhadrabas	2066/02/28	12	0		
Danchhi	2066/03/21	17	0		
Indrayani	2066/02/27	14	1		
Gagalphedi	2066/02/27	13	1		

13. 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, Kathmandu
2. District Technical Office, Kathmandu
3. District Project Office, Kathmandu
4. District Implementation Support Team, Kathmandu
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. Allied VDCs

3. VIEW 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 ADB 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 may 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) 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,2050 BS (1993 AD), 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, 2055 BS (1999 AD), 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, 2060BS (2003 AD), 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, 2055 BS (1999 AD), 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 BS (2007 AD).	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.
19	Child Labor (Prohibition and Regulation) Act, 2056 BS (2000 AD)	No child having not attained the age of 14 years shall be engaged in works as a labroer

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 (ZoI) 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 Indrayani is 401 m amsl and at Danchhi is 402 m amsl. The road alignment passes through the upper valley slopes and ridges of middle hills. The grade of the road varies from 2% to 10%. Major portion of the road passes along the south-west facing slope.

4.1.2 Geology and Soil Type

17. The road section comprises of different types of quartzite and schists. Soil type along the alignment can be classified as alluvial, colluvial, residual, boulder mixed soil, and hard and soft rock. Following Table 4.1 presents the geological features recorded along the road alignment.

Table 4.1: Geological Features along the Road Alignment

Chainage	VDC	Location	Terrain slope	State of Land	Land Use Pattern
0+000 – 3+050 Km	Indirayani	Indirayani, Lakila, Suyalgaun, Pasikhel, Pewadol, Sanagaun	Moderate	Moist	Settlement+ Cultivated
3+050 - 5+370 km	Gagalphedi	Lakila, Satghattechok	Moderate	Moist	Settlement+ Cultivated
5+ 370 – 6+960 km	Alapot	Talloalapot, Krishnachaur, Mathillo Alapot, Jaribute, Bagarphat	Moderate	Moist	Settlement+ Cultivated
6+960 – 7+680 km	Bhadrabas	Manantar, Kurkurechatole, Dhunganagaun, Dharekdanda	Moderate	Moist	Settlement+ Cultivated
7+680 – 9+053 km	Dachhi	Nayagaun, Bhumpur, Dachhichok	Moderate	Moist	Settlement+ Cultivated

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 two types: cultivated land, Built up area as shown in Table 4.2.

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 (Sq.m)	Additional Area (ha)
	From	To					
Agricultural land	0+300	0+700	400	5	0	0.2	0
	0+840	1+120	280	5	0	0.14	0
	1+300	1+900	600	3.5	1.5	0.21	0.09
	2+240	2+670	430	3.5	1.5	0.15	0.06
	4+300	4+780	480	2.7	2.3	0.13	0.11
	5+040	5+060	20	2.7	2.3	0.005	0.005
	5+070	5+130	60	2.7	2.3	0.02	0.01
Sub total			1220	2.7	2.3	0.33	0.28
Settlement/ Built up area	0+000	0+300	300	5	0	0.15	0
	0+700	0+840	140	5	0	0.07	0
	1+120	1+300	180	3.5	1.5	0.06	0.03
	1+900	2+240	340	3.5	1.5	0.12	0.05
	2+670	4+300	1630	2.7	2.3	0.44	0.4
	4+780	5+040	260	2.7	2.3	0.07	0.06
	5+060	5+070	10	2.7	2.3	0.003	0.002

	5+130	7+120	1990	2.7	2.3	0.54	0.46
	8+340	9+053	790	2.7	2.3	0.21	0.2
Sub total							1.2
Total							1.755

Source: Field Survey, July, 2009

4.1.4 Climate

19. The road lies in the temperate climatic region of Kathmandu Valley. Rainy season starts from June and ends in September. The meteorological record shows total average annual rainfall of 1947.90 mm. Average minimum temperatures of 12.10 °C and average maximum temperature of 25.3 °C is observed in the area. (1996 Record)(Source: District Profile of Kathmandu, 2058)

4.1.5 Hydrology and Drainage System

20. There are 15 numbers of existing Hum Pipe drainage with one khola is at 5+060 for culvert construction. The proposed summary of the cross drainages along the road alignment is given in Annex XIII.

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. The proposed alignment passes through two landslides at chainages 7+148 and 7+300. The detail of landslide is given in Annex XVI.

4.1.7 Existing Road Condition

22. The road is Black Top from 0+000 to 1+560 and 5+570 to 9+053, remaining are gravel and earthen and motorable all weather. Average width of the road is 4.0m.

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 during dry and winter seasons.

4.2 Biological Environment

24. This alignment does not pass through any national park, protected area or their buffer zones.

4.2.1 Vegetation

25. The alignment touches Indrayani community forest and the dominant species observed in the road alignment are Uttis (*Alnus nepalensis*), (*Schima Wallichii*) Chilaune, and (*Castanopsis Indica*) Kattus, Lapsi (*Choerospondias axillaries*).

4.2.2 Wildlife

26. No wildlife found owing to the alignment in the settlement area.

4.2.3 Aquatic Life

27. There are no major rivers along the road alignment. There are two small ponds near the road alignment.

4.2.4 Endangered and protected species

28. Since the road alignment does not passes through forest. No any endangered or protected species are found in the project area.

4.3 Socio-economic and Cultural Environment

4.3.1 Population, Household and Ethnicity

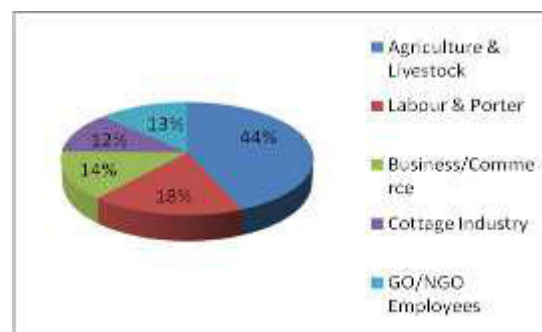
29. The demographic profile of the concerned VDCs is presented in following Table 4.3. Major castes in the area are Chhetri, Brahman and Newar, Tamang, Magar, Damai, Kami.

Table 4.3: Demographic Profile of VDCs

VDC	Population			HH	Average HH Size
	Male	Female	Total		
Indirayani	1765	1440	3205	603	5.60
Gagalphedi	4123	3890	8013	852	5.78
Bhadrabas	2546	2255	4801	551	5.68
Alapot	1597	1470	3067	564	5.69
Dachhi	3670	3341	7011	1550	5.80
TOTAL	13560	12396	26097	4120	5.71

4.3.2 Main Occupation

30. The main occupation of the area is agriculture & livestock (44%), business & commerce (14%), cottage industry (12%), labour & porter (18%), and services (13%). However, agriculture farming is not enough for subsistence due to small landholding size and low productivity. Therefore people also depend on seasonal labour in Kathmandu valley and India.



4.3.3 Market Centres and Business Facilities

31. Major settlements along the road alignment are Indirayani, Lakila, Suyalgaun, Pasikhel, Pewadol, Sanagaun, Lakila, Satghattechok, Talloalapot, Krishnachaur, Alapot, Mathillo, Jaribute, Bagarphat, Manantar, Kurkurechatole Dhunganagaun Dharekdanda, Nayagaun, Bhumpur and Dachhichok. Grocery shops and tea stalls exist in almost all settlements. According to survey data, 19 hotel and lodges, 87 tea shops, 56 grocery shops, and 20 other shops (stationery, medicine, tailoring etc.) are present in the project area.

4.3.4 Local Economy

32. The economy of the area is predominantly agriculture and Poultry farm. Local people are gradually attracted towards cultivation of cash crops such as ginger, rice, wheat and vegetable. Dairy production and selling it to the local market has been also another source of income for local farmers. Local people also do business activities in Kathmandu, Lalitpur and Bhaktapur Districts area. Many people seasonally migrate to Kathmandu, Lalitpur and Bhaktapur to earn money for their livelihood.

4.3.5 Agriculture Pattern

33. Major crops grown in the Subproject area are rice, wheat, maize, millet, potato and beans. Cash crop farming is also increasing in recent days. Major cash crops grown in the area are mustard, amliso and vegetable. The area has appropriate climate and soil for farming of citrus fruits such as orange, lemon, nibuwa.

4.3.6 Livestock

34. Due to availability of cultivated land, the subproject area has good potentiality of cash crops. Despite being potential, they were not encouraged to produce milk in commercial scale due to time consumption and not sufficient forest in this area for animal food. Currently there are poultry farm in all VDCs.

4.3.7 Industry

35. Some local people are engaged in weaving of bamboo products, making furniture, dairy, Khuwa (butter) production, and tailoring. The area has high potentiality for agro-based industries. There are 14 nos. of rice/flour mill and 4 milk collection center are available within ZoI.

4.3.8 Tourism Potential

36. Two religious places Kageswori temple and Indrayani temple can be tourism promotion places within Zol. The Subproject area has potentiality of eco-tourism development.

4.3.9 Health and Sanitation

37. People use water from from taps (128 nos.). Open defecation is also prevalent. Major health problems observed in the area are gastric, water borne diseases, gout, respiratory diseases, skin disease, malnutrition, and typhoid. Sanitation awareness among local people is increasing and most of them have toilets in their home, but there is no public sewerage system. People discharge their wastewater in the nearby natural streams.

4.3.10 Public Services and Infrastructures

Table 4.4: Infrastructure Facilities in the Project Area

Infrastructure Facilities	Details
Education	21 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 higher. and male also. Literacy rate in the project area has been estimated around 79 percent.
Health	6 health posts/sub health posts exists in various settlements
Communication	All of the settlements have telephone facilities mostly with Cell phone and wireless phone.
Electricity	All settlements in Zol are connected with national grid transmission line
Water Supply	Piped drinking water supply is available to all settlements
Other Infrastructures	There is a Suspension Bridge, water mills; Agricultural Service Sub-Centre, dairy firms and Veterinary Service Sub Centre are also available in the project area
Financial Institutions	There are no any saving and credit cooperatives in Zol.
Community Center	7 nos. in all settlements.

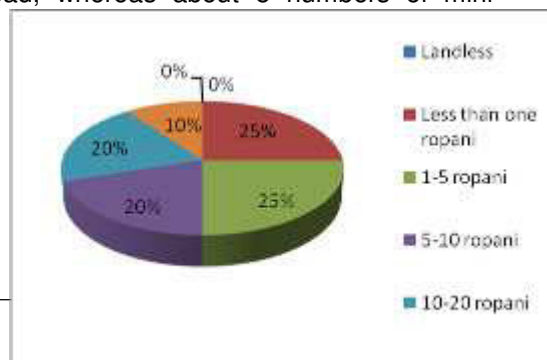
Table 4.5: Public Services and Infrastructures along the Road Alignment

Type of Public Service and Infrastructure	Chainage/ Location	Distance from the Road CL	Remarks
Temple	0+530, 0+720, 1+300, 6+560, 7+234	Adjacent	Damaged during road construction
Community Building	0+548, 3+200, 4+230	Adjacent	Affected during road construction
Irrigation channel	1+175 – 1+355	Outside formation width on LHS	Damaged during road construction
	1+355 – 1+495	Outside formation width on LHS	
	2+300 – 3+000 (Earthen Canal)	Outside formation width on LHS	
	4+000 – 4+700	Outside formation width on LHS	
Irrigation Crossing	1+355, 3+100, 3+900	Across the road	Damaged during road construction
Private houses	0+240, 0+300, 3+240, 4+500, 5+203, 5+213, 5+223, 5+234, 5+400, 5+640, 5+811, 5+913, 6+421, 6+442, 6+511, 6+773, 7+206, 7+432, 7+456, 7+840, 8+200, 8+756, 8+821, 8+990, 9+000 and 9+045	Adjacent	Damaged during road construction
Pond	1+200, 1+225	Adjacent	Damaged during road construction
Pipal chautari	1+230	Adjacent	Damaged during road construction

4.3.11 Existing Traffic Situation

38. Fifteen regular passenger buses daily ply on the road, whereas about 5 numbers of mini truck/pick-up and 202 motorcycles are found to operate in the road. Road is almost closed during rainy season. Vehicles are mainly used for commuting and transportation of milk and vegetables.

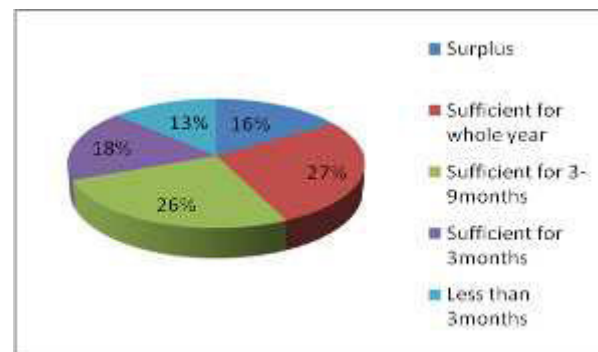
4.3.12 Land Holding Pattern



39. Land holding pattern within the Zol of the road demonstrates that most of the population (25%) have 1-5 ropani (approximately 1 ha= 19.8 ropani) land while 20% households have 5-10 ropani and 25% HHs have less than one ropani land. No households are landless (see Annex XI c.).

4.3.13 Food Security

40. About 26% of the households have enough food for only three to nine months, 27% for whole year, 13% households are of hand to mouth category and 16% households are reported as food surplus ones. Food sufficiency condition is given in Annex XI d.



4.3.14 Migration Pattern

41. Few permanent migrations take place annually towards Kathmandu, and seasonal migration to Kathmandu during slack farming season from months of Mangsir to Poush (Nov-Jan).

4.3.15 Settlement and Market

42. Major settlements within Zol are Indirayani, Lakila, Suyalgaun, Pasikhel, Pewadol, Sanagaun, Lakila, Satghattechok, Talloalapot, Krishnachaur, Alapot, Mathillo, Jaribute, Bagarphat, Manantar, Kurkurechatole Dhunganagaun Dharekdanda, Nayagaun, Bhumpur and Dachhichok. Housing pattern of these scattered settlements is mostly. Some of them are also of thatch roof. Most of the section is RCC buildings have started to appear in the market centres of Indirayani, Dhunganagaun and Dachhichok.

4.3.16 Potential for Development

43. The potential of the Subproject area are as mentioned in Table 4.6 below.

Table 4.6: Development Potentialities in Various Sectors

SN	Sector	Development potentiality
1	Agriculture	potato, vegetable farming, timber (uttis) production, dairy production within the whole Zol
2	Tourism Promotion	There are many places along the alignment in which the tourism activities can be enhanced such as to newly built a number of pond with park and water species.
3	Small and Cottage Industry	Bamboo products, furniture, dairy industry within the whole Zol
3	Trade and business	Development several rural market centres at various places along the road alignment and main market centres at Indirayani, Dhunganagaun and Dachhichok.

Source: Field Survey, July, 2009

4.3.17 Religious, Cultural and Historical Sites

44. There are two religious places known as Kageswori Temple and Indrayani Temple. There are no other significant sites of religious, cultural and historical importance in the Zol.

5. PROJECT ALTERNATIVES

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

5.1 No Action Option

46. This alternative assesses the consequences if the Proposal is not implemented. An earthen road currently exists, which is operable only in fair weather. The road connects a remote and poverty ridden area with high potential in dairy and vegetable productions. People have been selling the products to the markets of Kathmandu Valley. However, travel time and cost is high due to seasonal nature and earthen standard of the existing road. Rehabilitation of the road will decrease the cost as well as provide better access facility with enhanced opportunity for development of the area without any additional significant adverse impacts. The no action option may avoid environmental impacts, but only at the cost of poverty and underdevelopment of the area. 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

47. Construction of other supporting roads could be the option for achieving the transportation and access. Considering other project alternatives, the proposed Kageswori ring road can be the best option to serve the home to home services. The proposed road project is the best alternative for cheap and efficient transportation.

5.3 Alternative Alignment

48. The alignment of the road is an existing motorable and fair weather Black Top, Gravel and Earthen track with 4.0m width and proposed for upgrading which need to acquire minimum additional land and few numbers of tree will be cleared. Hence, new alternative alignment is not feasible and the proposed existing alignment can be the best option.

5.4 Alternative Design and Construction Approach

49. The conventional road construction use contractors with heavy machineries and equipment, explosives, heavy concrete structures for retaining slopes, and bituminous surfacing. Labour based, Environment friendly and Participatory (LEP) method focuses on phased construction with 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.

50. The proposed road has been designed considering combination of both the LEP approach for works possible through manual labor (earth excavation, bio-engineering, gabion structures), and Contractor Approach for works that require mechanized applications (gravelling or construction of RCC cross drainage structures).

5.5 Alternative Schedule

51. During the rainy season, the construction work will be stopped. Upgrading and construction work will be carried out during the remaining months. The construction period is more appropriate from October to June due to dry weather, and then the people are generally free from farming activities.

5.6 Alternative Resources

52. Stones and boulders for gabions, masonry and fine aggregates like sand are available in river, whereas has to be transported from other location. The proposed construction will optimally use the local labour force and local materials.

6. IDENTIFICATION AND EVALUATION OF IMPACTS BENEFIT AUGMENTATION AND MITIGATION MEASURES

53. 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 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

6.1.1.1 Employment Generation and Increase in Income

54. *Impacts:* Employment opportunity for local people during construction of the road, without gender biasness, is 40692 person days, with 9334 for skilled and 31358 for unskilled labor. Efforts will be made to employ more than 50% women workers. The amount of money earned as wages will directly support various economic activities of the people, and assist to empower women and indigenous 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 in extent.

55. *Measures:* Work will be implemented through the Contractor. Priority for employment will be given to local poor, dalit, vulnerable groups and women. They will be given training to do the job. Proponent will implement skill training, awareness, and income generation programs encouraging them to utilize their money earned through wage.

6.1.1.2 Skill Enhancement

56. *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 for long-term.

57. *Measures:* Members of the contractor works will be given training on masonry, netting wires and construction of gabion wall, slope cutting, bioengineering works.

6.1.1.3 Enterprise Development and Business Promotion

58. *Impacts:* During construction period, different types of commercial activities will come into operation in order to meet the demand of workers. Since they will have good purchasing power, they will regularly demand for different types of food, beverage and other daily necessary items. Development of several rural markets at Indiryani, Dhunganagaun and Dachhichok settlements. This impact is direct, low significance, local and for short term.

59. *Measures:* Training in cooperatives, and promote use of local products by the construction crews

Training packages for institutional capacity building of SHGs

Sn	Proposed trainings	Unit	Quantity	Rate/unit	Total (NRs)
1	SHG mobilization training	No	1	10000	10000
2	Leadership development training	No	1	20000	20000
3	Account keeping/Management training.	No	1	10000	10000
	Total				40,000.00

Training packages for implementation of LEST program

SN	Budget category	Unit	Quantity	Rate/unit	Total amount (NRs)
1.	Agriculture Training				
1.2	Off season Vegetable Production	Batch	1	52,000.00	
	Total				52,000.00

SN	Budget category	Unit	Quantity	Rate/unit	Total amount (NRs)
2.	Micro Enterprises				
2.1	Candle production	Batch	1	57,000.00	
2.2	Saving & Credit Training	Batch	1	22,000.00	
Total					99,000.00
3.	Life Skilled Training				
3.1	Mobile (CDMS & GSM)	Batch	1	136,000.00	
Total					136,000.00
Grand Total					327,000.00

6.1.1.4 Community Empowerment and Ownership

60. *Impacts:* During construction various road construction coordination committees 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, low, local and for short term.

61. *Measures:* The coordination committees will be constituted and training will be given to them.

6.1.1.5 Women Empowerment

62. *Impacts:* Women in particular may be benefited more from improved access to the market centers and various service providing agencies like health centers, banks, training institutes, women development office etc. Frequency of visit to such agencies will increase awareness level and empowerment. The impact will be indirect, significant, local and for long-term.

63. *Measures:* Assist to organize women groups, provide training and social mobilization, provide micro-finance and encourage cooperatives to undertake commercial scale farming activities. Women and will be empowered through GAP program of project.

Sn	Proposed activities/trainings	Unit	Quantity	Rate/unit	Total amount (NRs)
a	Health and sanitation orientation classes	No-VDCs	1	20000	20,000.00
b	Women leadership development training	No	1	30000	30,000.00
c	Gender and social inclusion training	No-VDCs	1	20000	20,000.00
d.	GAP implementation monitoring workshops	No	3	10000	30,000.00
	Total				100,000.00

6.1.2 Operation Stage

6.1.2.1 Improvement in Accessibility and Saving of Time and Transportation Cost

64. *Impacts:* Upgrading of road will enhance the access of people to social services, and quick transportation of goods. Travel time will reduce by one hour with the upgrading of road. This impact is direct, high, regional and for long term.

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

6.1.2.2 Increase in Trade, Commerce and Development of Market

66. *Impact:* Improved access will increase economic activities and minor local markets like Indiryani, Dhunganagaun and Dachhichok settlements markets will grow. Productivity such as paddy, wheat, vegetables will increase due to cheaper transportation of agricultural inputs. Sale of farm and livestock products will increase in the bigger markets of Kathmandu valley. This will support the economy of rural area. The impact will be indirect, significant, local and for long term.

67. *Measures:* DDC/VDCs 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 with district agriculture office.

6.1.2.3 Appreciation of Land Value

68. *Impacts:* Construction of road will lead to appreciation of land values due to availability of reliable access facility. This will uplift the economy of local people. Financial institutions may accept their land as mortgage for lending. **The Land Price will increase by two times.** The impact is indirect, medium, local and for long term.

69. *Measures:* Promotion of land development activities and 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.

6.1.2.4 Enhancement of Community Development Services

70. *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.

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

6.2 Adverse Impacts and Mitigation Measures

6.2.1 Construction Stage

72. The proposed road will be constructed according to contractor approach where manual works are possible; and Machine Intensive Road construction approach where the work cannot be done manually. 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

1. Change in Land Use

73. *Impacts:* Construction of road will convert 0.555 ha. of cultivated land, 1.2 ha. of built of land and 0 ha. of forest areas into road structure. There is no impact.

2. Slope Instability

74. *Impacts:* Removal of vegetation and open cuts with exposed soil to rain may cause soil erosion as well as landslide. As the road is an existing corridor, hill slopes will not be disturbed by new cuttings of slope. The likely impact is direct, high to medium, site specific and short to medium term depending on cases. **Due to heavy rainfall two major landslides occur during last summer at chainages 7+148 and 7+300.**

75. *Measures:* **Civil engineering structures and bioengineering measures necessary at chainages 7+148 and 7+300.** Cut slope will be maintained depending upon the soil type; use of Bio-engineering techniques (Grass plantation, Brush layering, Palisades, Shrub/Tree plantation, Bamboo plantation, live check dams etc.); no construction work during rainy season; and use of soft engineering structures (dry wall, toe wall, riprap drain, check dams etc.) before disposing spoil. Recommended civil engineering structures and bioengineering measures necessary at various chainages for slope stabilization have been given in Annex XVII.

3. Spoil Disposal

76. *Impacts:* Unmanaged disposal of spoil may cause gully and erosion, block drainages, damage farm lands, crops and forest, waterlogging and may threat settlements. The impact from spoil disposal will be direct, high, local and for long term.

77. *Measures:* Spoil will be safely disposed and managed at designated site with minimum environmental damage. Engineer will give approval for disposal site of spoil. 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 proper drainage, vegetation and adequate protection against erosion. Potential safe spoil management areas are given in Table 6.1.

Table 6.1 Potential Spoil Disposal Sites

S. No	Chainage	Location	Remarks
1	0+000	Indiryani	Open place
2	4+540	Dhunganagaun	Open place
3	7+230	Bhmpur	Open place

Source: Field survey, July, 2009

4. Quarry/ Borrow Operation

78. *Impacts:* Potential adverse impacts are accelerated land erosion, landslides, disturbance in natural drainage patterns, water logging and water pollution. The likely impact will be direct, medium in magnitude, site specific in extent and short term in duration. Quarry materials like sand, gravel, stones will be bought from nearby market. Thali in Danchhi VDC is the nearest borrow pit.

79. *Measures:* The mitigation measures will be 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 (toe wall, retaining wall) and bioengineering measures (Grass plantation, Shrub/Tree plantation, Brush layering) after the extraction is complete. Recommended quarry sites in the area are given in Table 6.2.

Table 6.2: Recommended Quarry Sites

SN	Chainages	Places of recommended quarry sites
1.	4+500	Stone quarry in a limited scale.
2.		Stone collection from Sali Nadi.

Source: Field Survey, July, 2009

5. Air, Noise and Water Pollution

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

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

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

83. *Measures:* The mitigation measures will include use of face mask by the workers working in the areas of high dust generation; contractor will frequently sprinkle water during surfacing of the road; avoid disposal of excavated materials in the waterbodies; cover dry material or make it wet during transportation. Both the sides of the road alignment will be planted with trees, as far as possible which will act as sound and noise barrier.

6. Water Management

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

85. *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 XIII.

7. Location of Camp Sites and Storage Depots

86. *Impacts:* In Contractor approach, if used, will establish camp at if they bring labors from outside the area. Siting of camp may cause encroachment of forest, agriculture land, alteration of drainage, fuel leakage, solid waste and waste water problems. Impact will be direct, medium significance, site specific and for short-term.

87. *Measures:* The mitigation measures will be use of local labors to avoid camp; rent local house instead of camp to keep labors; siting camp away from productive lands and forest areas; pay compensation for using private farm or lands for storage or camp; fuel and chemical storage areas will be on paved surface with surrounding catch drain to protect soil from leakage. Appropriate camp sites have been observed at 0+000 near Indrayani VDC Building and at 4+500 near Lakila at Galgal phedi

VDC. At camp sites will be provided with drinking water and latrine facilities. For waste water and solid waste management, soak pit will be made and proper management will be done.

8. Use of Bitumen

88. *Impacts:* Bitumen is required for black topping which needs heating before using. Contractors tend to use local fuel wood collected from nearby forest to heat bitumen. Spillage of bitumen also damage soil productivity.

89. *Measures:* The following mitigation measures will be adopted

- Use kerosene for heating and strict prohibition to heat bitumen by using fuelwood.
- Appropriate storage of material.
- Use of appropriate safety gears to ensure safe health of workers such as masks, boot, gloves, hat.

9. Construction equipment vehicles

90. *Impacts:* The Contractor Approach will use machineries and tools (Rollers, tippers, spreader, water tanker etc.). The related negative impacts are increase in air pollution due to emission of smoke, increase in vibration due to vehicular movement. Impact will be direct, high significance, site specific and short-term.

91. *Measures:* The equipment/vehicles deployed for construction activities shall be regularly maintained. All the vehicles deployed for material movement shall be spill proof to the extent possible. Fencing for the equipments camp.

6.2.1.2 Biological Impacts

1. Loss or Degradation of Forests and Vegetation

92. *Impacts:* The road doesnot passes through any forest area. So there are no impacts on vegetation/forest resources.

6.2.1.3 Socio-economic Impacts

1. Loss or Degradation of Farm Land and Productivity

93. *Impacts:* There will not be much loss of agricultural land due to upgrading of existing road. There is no impact.

2. Impact on Community Infrastructure

94. *Impacts and Measures:* The community infrastructure that requires reconstruction / rehabilitation during construction works, and the mitigation measures are as presented in following Table 6.3.

Table 6.3: Impact on Community Infrastructure and Mitigation Measures

Type of Public Service and Infrastructure	Chainage/ Location	Distance from the Road CL	Remarks
Temple	0+530, 0+720, 1+300, 6+560, 7+234	Adjacent	Required to reinstate
Community Building	0+548, 3+200, 4+230	Adjacent	Relocation required
Irrigation channel	1+175 – 1+355	Outside formation width on LHS	Reinstate of damaged section.Avoid disposal of construction waste near those sites
	1+355 – 1+495	Outside formation width on LHS	
	2+300 – 3+000 (Earthen Canal)	Outside formation width on LHS	
	4+000 – 4+700	Outside formation width on LHS	
Private houses	0+240, 0+300, 3+240, 4+500, 5+203, 5+213, 5+223, 5+234, 5+400, 5+640, 5+811, 5+913, 6+421, 6+442, 6+511, 6+773, 7+206, 7+432, 7+456, 7+840,	Adjacent	Shall be compensated

Type of Public Service and Infrastructure	Chainage/ Location	Distance from the Road CL	Remarks
	8+200, 8+756, 8+821, 8+990, 9+000 and 9+045		
Pond	1+200, 1+225	Adjacent	Required to reinstate
Pipal chautari	1+230	Adjacent	Required to reinstate

3. Health and Safety Matters

95. *Impacts:* During construction, workers will be exposed to respiration and eye diseases due to exposure to dust, risk of accident during work, polluted drinking water, unhygienic sanitary facilities, hearing loss due to high level of noise. 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.

96. *Measures:* Make mandatory the use of helmets, safety belts, masks, gloves and boot by workers depending on nature of work; sprinkle water at high dust sites; 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.

4. Decline in Aesthetic Value

97. *Impact:* Landscape degradation and scar on topography due to the road; quarrying operations; and indiscriminate dumping of spoil on open land and hill slopes. The likely impact will be direct, low in magnitude, local in extent and short term in duration.

98. *Measures:* Discourage indiscriminate dumping of spoil material; quarry sites will be properly closed to suit the local landscape and cover by plantation of local species trees. Number of plantation of trees in possible area i.e both side plantation

5. Impacts on Cultural, Religious and Archeological Sites

99. *Impacts:* There are no any cultural, religious and archeological sites along the road alignment.

6.2.2 Operation Stage

6.2.2.1 Physical Environment

1. Road Slope Stability and Management

100. *Impacts:* Destabilization of slope (quarrying stones or soil, animal grazing, irrigated cultivation, opening of branch roads), poor maintenance of road, and blockage of drains can lead to slides and slope failure. There are not any sensitive areas for possible slope stability. The impact will be direct, medium, local and long term.

101. *Measures:* The mitigation measures to be adopted include immediate clearance of slides and restoration of slopes; clear drainages; restoration of rill and gully formation; and conservation of soil.

2. Impact Due to Air, Noise and Water Pollution

102. *Impacts:* Dust will be generated from the gravel road and vehicles emit gaseous pollutants. Continued dust pollution may cause adverse health impact to the people living in the vicinity. As the road is of district road category and the vehicular movement is not expected to be very high. Thus, the impact will be direct, low, local and long term.

103. Noise during operation of road will increase. However, due to low traffic volume, the impact due to noise pollution will be direct, low, local and long term.

104. The disposal of spoil and household wastes, washing of vehicles in water bodies may degrade the water quality. The impact will be direct, low, local and long term.

105. *Measures:* Measures to be adopted will include plantation of trees on both sides of road as far as possible; restrict horn near forest, health posts, schools and settlements; provide speed limit for vehicle at sensitive areas.

6.2.2.2 Socio-economic and Cultural Impacts

1. New Settlement and Market Center Development

106. *Impacts:* Expansion of settlement area and market can be observed at Indirayani, Dhunganagaun and Dachhichok. Encroachment of RoW may take place. This will reduce road capacity, increase road accidents, and adversely impact road. The impact will be direct, medium, local and for long term.

107. *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.

2. Change in Social Behavior

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

109. *Measures:* Support awareness raising programs and strengthen communities against such nuisances.

3. Road Safety Measures

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

111. *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.

7. ENVIRONMENTAL MANAGEMENT PLAN

112. 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
Ministry of Environment	Mandated to formulate and implement environmental policies, plans and programs at national level	Facilitate when needed on environmental safeguards	No direct responsibility in the project
Ministry of Local Development (MLD)	It is concerned line ministry, executive agency and concerned agency as per EPA/EPR. Environment Management Section is responsible to look into safeguard matters for the ministry.	<ul style="list-style-type: none"> To review IEE, ToR and Report, and give approval. Coordinate with project on safeguard issues Conduct environmental monitoring from central level. 	Executing Agency
Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)	Department under MLD responsible to execute infrastructure projects under MLD. Provides back-up support to DDCs in technical matters through DTO.	RRRSDP is being executed under overall coordination and supervision of the Department for the Ministry. It is also supporting DDCs through DTOs to implement the project.	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	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 Conduct environmental safeguard monitoring Reporting 	District Technical Officer is the Project Manager
District Project Office	Project implementation office working directly under DDC/DTO.	Responsible for overall activities related to implementation of the works at field level.	Implementing Agency
Central Implementation Support Consultant (CISC)	Support consultants at central level	Technical and management support to PCU	Consultant
District Implementation Support Team (DIST)	Support consultants at district level	Technical and management support to DPO	Consultant

113. To support for smooth implementation of the project, there are various district level committees and groups including District Project Coordination Committee (a sub-committee of DDC), Village Infrastructure Construction Coordination Committee (to coordinate at VDC level). Road Building Groups are formed under participation of local people from ZoI. They carryout the manual construction works. Contractor will be appointed for works requiring higher skill and mechanized support.

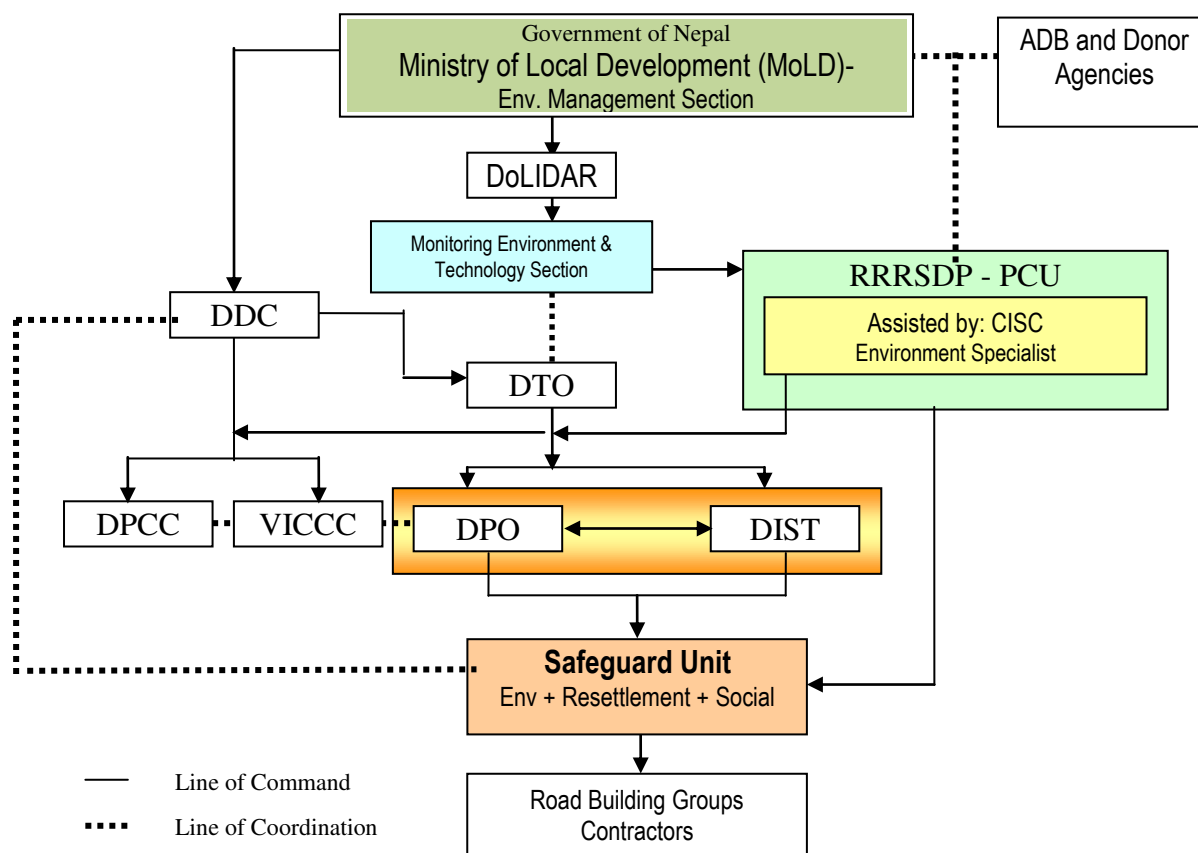
7.2 Reporting

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

115. The monthly reports will be based on recurrent site inspections and will report on the effectiveness of the mitigation measures; the contractor's compliance with the environmental specifications; measures recommended in the events of non-compliance, and recommendations for any other corrective plan.

116. 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. 1.3: Environmental Management Organization Structure



7.3 Environmental Management Plan

117. 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. Framework for implementing environmental management plan is shown in Table 7.2.

Table 7.2: Beneficial Impacts and Proposed Enhancement Measures

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	Employment Generation 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. Employment opportunity will get Skilled 9334 person days and unskilled 31358 person days respectively.	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	Priority to Affected Peoples (APs) and vulnerable groups, job training on various constructions works.	DPO/DIST	DDC/DTO / CISC/PCU	
Construction of road	Enterprise Development and Business Promotion	Enhancement in local economy	D	M	L	ST	Training in cooperatives, and promote use of local products by the construction crews.	Contractor/ RGB	DIST/ CISC/PCU	
Construction coordination committee and RBG program	Community Empowerment and Ownership	Increase in income and ownership.	IN	L	L	ST	Coordination committees will be constituted and training will be given to them.	DPO/DIST	DDC/DTO / CISC/PCU	
Operation of Road	Women and Indigenous People Enhancement	Poor, indigenous and women will have easy and frequent access to social services (education, health, community development, bank,training, CBOs and networking)	IN	H	L	LT	Assist to organize women's groups, provide training in enterprise development, organize cooperatives, provide micro-financing to undertake production of commercial products, provide market services.	VDC / DDC	VDC / DDC	
Operation Stage										
Operation of Road	Improvement in Accessibility and Saving of Time and Transportation Cost	Saving in travel timeby half and lower travel cost	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	Minor Local markets at Sanagaun, Lakila, Satghattechok, Mathillo Alapot, Jaribute, Dhunganagaun Dharekdanda, Nayagaun, Bhumpur and DachhichokMarkets will grow.Shift towards improved commercial agricultura and increase in non agriculture occupation	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	
Operation of Road	Appreciation of Land Value	Improvement in local economic condition	IN	M	L	LT	Promotion of land development activities and control of encroachment within RoW. Awareness program shall be organized on use of high	DDC/DPO	DDC/VDC	

Activity	Effect	Related Beneficial Impacts	Type of Impact *)				Benefit Augmentation Measures	Responsible Agencies	
			Nat	Mag	Ext	Dur		Executing Agency	Supporting Agency
							value land to get bank loans for setting up enterprise ventures.		
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	Local people, DDC, VDC	DDC, VDC

Table 7.3: Adverse Impacts and Proposed Mitigation Measures

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measures	
			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 (0.555 ha.); Built of area (1.2 ha.). Cause production loss.	D	H	L	LT	IR	Minimize use of fertile land, forest, settlement areas. Compensation will be given for loss of private properties	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; Proposed spoil disposal sites are Ch 0+000, 4+450 and 7+230	DDC/DTO	DIST/VICCC/ VDC
Site clearance, excavation	Slope Instability	Erosion, landslide, loss of property.	D	M	SS	MT	Re	Civil structures with bio-engineering application (Such as Grass plantation, Tree/Shrub plantation, Brush layering, Palisades, Bamboo plantation, Live checkdam construction etc.) shall be used to stabilize the slopes. Drainage management (Catch drain, rip-rap drain, checkdam etc.)	DDC/DTO	DIST
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 construction vehicles, material hauling and unloading etc. Slope cutting, spoil and waste disposal.	Air pollution due to dust from exposed surface, from construction equipments and vehicles	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
	Noise pollution	Disturbance and annoyance around school, health posts, forest areas.	D	L	SS	ST	Re	Restrict horn near school, health posts, settlement, forest areas. Locate crusher plant away from these areas; cover material during transportation.	DDC/DTO / Contractor	DIST
	Water pollution due to sediment level, spills and leakage of oils and chemicals to water bodies	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/RBGs	DIST/VICCC

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measures	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
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 4+500, 6+200.	DDC/DTO/ Contractor/RBGs	PCU/CISC/DIST/ VICCC
Construction of road	Location of Camp Sites, Storage Depots	Encroachment of forest, agriculture land, solid waste, and waste water may cause pollution	D	M	SS	ST	Re	Locate camp site away from productive land and forest area (potential sites at 0+000, 4+500) ; use local labor and local houses as camp; pay compensation to land owner of camp area; proper storage of chemical and materials; drinking water facilities and latrine.	DPO assisted by DIST/ Contractor	DIST/VICCC
Operation of heavy equipments	Crusher Plants	Dust and Noise pollution and health risks to workers	D	H	SS	ST	Re	Procure from market centre as far as possible. Locate site away from farm and forest area; away from settlement and sensitive habitat; do not operate at night; water sprinkling facility to reduce dust.	DPO assisted by DIST/ Contractor	DIST/CISC/PCU
Construction of road	Use of Bitumen	Damage in soil productivity, air pollution due to heating of bitumen	D	M	L	ST	Re	Use kerosene for heating and strict prohibition on firewood uses, safety gears to workers (Such as gloves, boots, masks etc), appropriate storage of materials	DPO assisted by DIST/ Contractor	DIST/CISC/PCU
Operation of construction equipments	Construction machineries and tools (Rollers, tippers, spreader, water tanker etc.)	Air pollution due to emission of smoke, increase in vibration and noise pollution	D	H	SS	ST	Re	Equipment/vehicles deployed for construction activities shall be regularly maintained. All the vehicles deployed for material movement shall be spill proof to the extent possible	DPO assisted by DIST/ Contractor	DIST/CISC/PCU
Clearance of vegetation necessary for road formation	Loss or Degradation of Forests and Vegetation (0 Ha)	Loss of green cover; loss of environmental benefits from vegetation, disturbance in ecological function (dust and noise absorbance, aesthetic value etc	D	H	SS	LT	Re	Cutting of tree only in formation width, compensatory plantation of local species of tree at 1:25 ratio + 10 percent in forest land and 1:1 in private land.	DDC/DTO/DFO	DFO/CFUGs/DIST/VD C
Construction activity	Impact on Wildlife Due To Loss of Habitat and Hunting	Killing and harrasing 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	DDC/DTO/DFO	DFO/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	DDC/DTO/DFO	DF/CFUGs/DIST
Social-economic Environment										

Activity	Potential Negative Effects	Related Adverse Impacts	Type of Impact *)					Mitigation Measures	Responsibility for Mitigation Measures	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
Acquisition of land for maintaining road width*	Loss or Degradation of Farm Land and Productivity (0.555 Ha)	Reduced production, hardship, food shortage	D	H	L	LT	IR	Compensation for affected people	DDC/DTO	CFC ² DIST/VICCC
Acquisition of land and property for maintaining road width	Loss of Private Properties	Displacement of people, hardship	D	H	SS	LT	IR	Compensation and resettlement to the owner as described in resettlement plan	DDC/DTO	CFC ³ /DIST
Demolition of structures along road alignment	Impact on Community Infrastructure	Loss of services (see table 6.3)	D	M	SS	ST	Re	Restoration or relocation of affected infrastructures: Temple(0+530, 0+720, 1+300, 6+560, 7+234); Community building (0+548, 3+200 and 4+230); Irrigation channel regulator (0+718); Private houses (0+240, 0+300, 3+240, 4+500, 5+203, 5+213, 5+223, 5+234, 5+400, 5+640, 5+811, 5+913, 6+421, 6+442, 6+511, 6+773, 7+206, 7+432, 7+456, 7+840, 8+200, 8+756, 8+821, 8+990, 9+000, 9+045); Pond (1+200, 1+225); Pipal chautari (1+230);	DDC/DTO	PCU DIST/CISC/MICCC/VD C
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 / Contractors	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										

* 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 Measures	
			Nat	Mag	Ext	Dur	Rev		Executing Agency	Supporting Agency
Quarrying, operation of construction equipments	Road Slope Stability and Management	Slides and slope failure, Disturbance to traffic flow, pollution of water bodies, impacts on agriculture land, loss of vegetation.	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 Conservation Office (DWSSC)
Operation of vehicles, Inadequate drainage	Air, Noise and Water Pollution	Disturbance to students, patients, wildlife, effect to nearby agriculture land and crops	D	L	L	LT	Re	Speed limit for vehicles, no horn signs, use vegetation barrier; Regular maintenance of drainage.	DDC/DTO	DoLIDAR/Local administration
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/VDCs	DDC/CDO
Road operation	Disturbance to the Wildlife and Illegal Hunting	Collision of wildlife with vehicles, disturbance in their normal activities, Loss of biodiversity	IN	L	L	LT	IR	Warning traffic signal, Awareness training to driver to limit speed and horn use	DTO/ CFUGs	DDC/CDO / DFO
Social-economic Environment										
Easy Access by road operation	New Settlement and Market Center Development	Encroachment of RoW, 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	Re	Awareness, Enforcement of law and order, Provision of training for skill	DTO	DDC/DoLIDAR
Operation of Road	Road Safety Measures	Increase in accidents	D	M	L	LT	IR	Appropriate road safety measures, Safety signs along the road.	DTO	DDC/DoLIDAR

* Legend:

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

118. 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 may automatically form part of the construction and operational phases of the project. The indicative cost for environmental enhancement and mitigation is presented in the **Table 7.4**.

Table 7.4: 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	100,000.00	To be included in project cost
1.2	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	Landslide protection and Bio-engineering work	6,166,113.57	To be included in project cost
2.2	Provision for Insurance	802,415.94	To be included in BoQ
2.3	Information Signboard (9 nos)	21,690.00	To be included in BoQ
2.4	Compensation for properties	8,111,143.74	To be included in Resettlement plan
2.5	Restoration or relocation of affected infrastructures, spoils disposal site management and rehabilitation, reinstate of quarry etc.	500,00.00	To be included in Project cost
2.6	Social cost (Awareness programmes, Capacity building, LEST programmes)	427,000.00	To be included in Social plan, project cost
2.7	Occupational health and safety; First aid boxes, campsite sanitation (Pit latrine); solid waste management, Safety measures for workers (Helmets, gloves, masks, boots, etc.)	200,000.00	To be included in Project cost
2.8	Spoils disposal site management and rehabilitation, reinstate of quarry etc.	10,00,000.00	To be included in project budget
2.9	Environmental Monitoring	200,000.00	
	Total	17,178,363.25	

7.5 Implementation of Mitigation Measures

119. 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. The Proponent and the contractor will be bound by the parameters identified in the IEE Report and specific mitigation measures spelled in the contract. The final acceptance of the

completed works will not occur until all the environmental clauses have been satisfactorily implemented.

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

7.6 Environmental Monitoring

7.6.1 Monitoring Responsibility

121. 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. The social, resettlement and environment specialists / officers 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.

122. 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.

123. 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.200,000.00 as given in Table 7.5.

Table 7.5: Environmental Monitoring Cost

S. No.	Detail	Unit	Quantity	Rate	Total (NRs.)
1	Environmental Management Specialist	Man-month			Included in the Cost of DIST
2	Sociologist / Public Relation Expert	Man-month			Included in the Cost of DIST
3	Stationary and Computer		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				200,000.00

Thus, total environmental monitoring and management cost is NRs. 16,487,520.54, including cost of resettlement and bio-engineering.

7.6.2 Types of Monitoring and Monitoring Parameters

124. Monitoring is an on going component of the environmental assessment process and subsequent environmental management and mitigation activities. There will be basically three types of monitoring: Baseline, Compliance and Input monitoring.

The environmental monitoring for this subproject only includes:-

- Compliance Monitoring – that verifies whether the EMP provisions are properly implemented in the field. The framework for compliance monitoring is given in the Table 7.6.
- Impact Monitoring - that confirms the result of implementing mitigation measures. The framework for impact monitoring is given in the Table 7.7.

Table 7.6: Compliance Monitoring for Kageshori Ring Road Construction Works

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
Final alignment selection as per IEE /EMP recommendation	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	Preconstruction 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	Contractor / RBG	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	Contractor / RBGs	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	Contractor / RBG 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 road construction locally employed	DPO / DIST	Training programmes for skill development, occupational safety and environmental protection associated with road	Training records, assess feedback from participants	Beginning of construction and	DPO / DIST at district and PCU/CISC at

Parameters/Issues	Responsible Implementing Agency	Verifiable Indicators	Verification Methods	Schedule	Responsible Monitoring Agency
labourers		construction works; employment generation skill		during construction	center (DTO)
Compliance to occupational health and safety matters	DPO / DIST; Contractor (if involved)	Health and safety regulations, first aid and medical arrangements, contingency plan, number and type of safety equipments such as mask, helmet, glove, safety belt.	Spot checks at work sites, accident records, safety equipment at site; discussion with workers	Throughout construction stage	DPO / DIST at district and PCU/CISC at center
Vegetation clearance	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 at district and PCU/CISC at center; CFUGs
Measures to avoid pressure on forest and wildlife	Contractor / RBG / 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	Once a month during construction	DPO / DIST at district and PCU/CISC at center / CFUGs
Restoration, rehabilitation, reconstruction of all infrastructure services disrupted or damaged during the construction work	Contractor / RBG / 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 7.7: Impact / Effect Monitoring for Kageshori Ring 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	DIST during construction; Proponent / DPO / Soil Conservation Office 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, waterlogging, 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 / 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

125. The IEE study of the proposed Kageshori Ring Road Subproject does not pass through any environmentally sensitive area, and have minimal adverse impact associated with loss of forest and agricultural land. Most of the adverse impacts predicted are of low significance and short term as well as reversible. The rehabilitated road will provide better access to market and social services, and is expected to enhance productivity and improving quality of life of the people. Local people will get direct employment opportunity as workers during construction works, which will contribute in improving their income. 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.

126. 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

127. The proposed road project is recommended for implementation with incorporation of mitigation measures and environmental monitoring plan.

128. A key consideration in selecting the road alignment is to minimize the acquisition of valuable agricultural and forest land. However, some agricultural and forest land and some houses will have to be acquired for construction of the proposed road. A Resettlement Plan will be required to ensure that the persons affected by these losses are properly compensated.

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ANNEXES

Annex I: Terms of Reference



नेपाल सरकार
स्थानीय विकास मन्त्रालय
स्थानीय पूर्वाधार विकास तथा कृषि सडक विभाग (डोलिडार)
ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना
आयोजना समन्वय इकाई

प.स. ०६५/६६
च.नं: १३३६

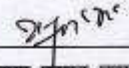
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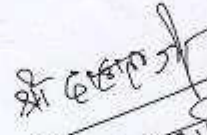
विषय: प्रारम्भिक वातावरणीय परीक्षण (IEE) को स्वीकृत कार्य सृचि पठाईएको सम्बन्धमा ।

✓ श्री जिल्ला प्राविधिक कार्यालय
ग्रामीण पुनर्निर्माण तथा पुनर्स्थापना आयोजना
जिल्ला आयोजना कार्यालय:
काठमाण्डौ ।

उपर्युक्त सम्बन्धमा त्यस जिल्लामा निर्माण हुने खगेश्वरी-रिङ्गरोड, साँखु-जर्सिङ्गपौवा-फटकेश्वर-भोटेचौर, घ्याम्पेडोल-बाणभञ्ज्याङ्ग सडक उप आयोजनाहरूको प्रारम्भिक वातावरणीय परीक्षण (IEE) को कार्य सृचि (ToR) नेपाल सरकार (सचिव स्तर) को मिति २०६६/२/२५ को निर्णय अनुसार स्वीकृत भएकोले स्वीकृत ToR यसै साथ संलग्न गरी सो अनुसार आवश्यक कारवाहीको लागि अनुरोध छ ।

बोधार्थ:
श्री जिल्ला विकास समितिको कार्यालय,
काठमाण्डौ ।


नारायण प्रसाद बराल
प्रोजेक्ट इन्जिनियर


श्री ग. क. ज्ञा
नेपालक सूचना प्रकृष्टित गरी लक्ष्य
(आ.का.)
२.३१

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:

Kageshori Ring Road Sub Project Road

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		✓	
▪ Wetland		✓	
▪ Mangrove		✓	
▪ Estuarine		✓	
▪ Buffer zone of protected area		✓	
▪ Special area for protecting biodiversity		✓	
B. Potential Environmental Impacts			
Will the Project cause...			
▪ Encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		✓	

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> Encroachment on precious ecology (e.g. sensitive or protected areas)? 		✓	
<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? 		✓	
<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 may 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? 		✓	
<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
Rural Reconstruction and Rehabilitation Sector Development Program (RRRSDP)
Kathmandu
Name of Sub -Project : Kageshowari Ring Road Sub Project
Chainage: 0+000-9+053

Summary of Total Cost (Item-wise)

SN	Description of works	Unit	Estimated Quantity	Rate(NRs)	Amount (NRs)
1	General				
1.1	Insurane of Works,Construction equipments and against to workman including third party insurance(Clause 13 GCC)	PS			480,000.00
1.2	Traffic management and saftey of works during construction all complete as per Instruction of Engineer.	LS			50,000.00
1.3	Carry out additional Laboratory testing of material and quality control tests as per requirement of site and specification and Engineers instruction	PS			100,000.00
1.4	Provision of site Engineer's office(floor area 1000 sqft or above) and its maintenance including furnitures furnishing necessary utensils and office boy all complete as per specification and instruction of Engineer.	Month	12.00	20,000.00	240,000.00
1.5	Purchase and supply of brand new four stroke motorbike of engine capacity 150 cc or above includeing cost of ownership transfer and insurance all complete as per instruction of Engineer.	Nos	2.00	190,000.00	380,000.00
1.6	Supply of double cab four door vehicle for supervision of works having engine capacity 3000 cc or equivalent(not older than 6 months of procurement or running not more than 5000 km) Including Fuel ,Driver,Servicing & other Maintenance work all complete.	Month	12.00	80000.00	960,000.00
	Sub Total of General Item				2,210,000.00
2	Earthwork				
2.1	Site Clearance including Clearing and grubbing as per specification(DoLIDAR'- 1-1)	Sq.m.	9,053.00	12.65	114,520.45
2.2	Earth work excavation by machine in boulder mix soil or related material for road way formation and foundation of retaining and drainage structures including removal and disposal .	Cu.m.	13,815.30	64.20	886,942.35

SN	Description of works	Unit	Estimated	Rate(NRs)	Amount (NRs)
2.3	Earth work excavation in hard soil for foundation of structures and drains including removal and disposal as per specification (DoLIDAR SN 5, Clause 2-1.2.2, 2-1.8, 2-1.9)	Cu.m.	6,130.58	189.75	1,163,276.92
2.4	Construction of roadway in embankment and miscellaneous backfilling areas with approved suitable material obtained from roadway excavation including haulage, spreading in layers, watering and compaction all complete as per design, drawing, specification and engineer's Instruction; (DoLIDAR SN 10, clause 2-5)	Cum.	5,631.96	79.06	445,262.59
	Sub Total of Earthwork Item				2,610,002.30
3	Structural work				
3.1	Supply, fabrication and assembling of gabion boxes (woven with heavily Zinc coated wires) of hexagonal mesh with size 100 mm x 120 mm, with mesh wire 10 swg, selvedge wire 7 swg, binding wire 12 swg and stone filling in gabion boxes including transportation and fixing of gabions in position. (DoLIDAR SN-44.1, 44.2, 45, Clause 17-1.4, 17-5, 17-6)				
3.1(a)	Box size (1*1*1)	Box	80.00	3,420.06	273,604.68
3.1(b)	Box size (1.5*1*1)	Box	567.00	4,831.87	2,739,670.29
3.1(c)	Box size (2*1*1)	Box	603.00	6,676.77	4,026,092.31
3.1(d)	Box size (3*1*1)	Box	20.00	9,803.70	196,074.06
3.2	Geo-textile work inside of gabion wall	Sq.m	844.19	98.00	82,730.82
3.3	RCC Hume Pipe Culvert/Slab Culvert/Drain & Others Structures to all complete work.				
3.3.1	Dry stone soling works in foundation and levelling including haulage distance up to 30 m. (Building Norms, Clause 6-5)	Cu.m.	1,089.06	2,263.60	2,465,200.06
3.3.2	Plain cement concrete work (1 : 3 : 6) mix by volume. It includes all labour and material required for mixing, placing in position, vibrating, compacting, finishing, curing and all incidentals required to produce concrete of specified strength as per the specifications. (DoLIDAR SN-41 Clause-11-a)	Cu.m.	1,280.17	6,887.38	8,817,020.70

SN	Description of works	Unit	Estimated	Rate(NRs)	Amount (NRs)
3.3.3	Plain cement concrete work (1 : 2 : 4) mix by volume. It includes all labour and material required for mixing placing in position, vibrating,compacting,finishing,curing and all incidentals required to produce concrete of specified strength as per the specifications.(DoLIDAR SN-41 Clause-11-a)	Cu.m.	53.92	7,819.22	421,610.39
3.3.4	Plain cement concrete work (1 : 1.5 : 3) mix by volume. It includes all labour and material required for mixing placing in position, vibrating,compacting,finishing,curing and all incidentals required to produce concrete of specified strength as per the specifications.(DoLIDAR SN-41 Clause-11-a)	Cu.m.	91.29	9,346.34	853,243.27
3.3.5	Uncoursed stone rubble masonry works(1:4 cement sand mortar) including full compensation for labour, materials and other incidentals required using dressed stone on the face of wall with batter all complete as mentioned in specification and directed by the Engineer (DoLIDAR SN 38A-c, Clause-8).	Cu.m.	4,882.22	5,730.85	27,979,285.04
3.3.6	12.5 mm th. Plastering with (1:4 cement sand mortar) on concrete surfaces with all necessary operations including full compensation for all labours, materials scaffolding and other incidentals required to complete the work as per the specifications (DoLIDAR Clause-7-9.4,7-12,7-13.2)	Sq.m.	12.72	192.62	2,450.13
3.3.7	Cement Pointing work (1:3) with cement sand mortar masonry wall with all required operations including full compensation for all labours, materials and other incidentals necessary to complete the work as per the specifications.(DoLIDAR Clause-7-9.3,7-12,7-13.3)	Sq.m.	67.33	88.30	5,944.89
3.3.8	Form work where it is provides as separate item with timber as material. It includes all labour, materials and other incidentals required for the construction and removal of forms as deccribed in the specification .(DoLIDAR SN-9, Clause-39.a)	Sq.m.	178.41	371.03	66,195.87
3.3.9	Reinforcement for RCC work.It includes procuring steel,its bending,placing, binding and fixing in position as shown on the drawings and as directed by the Engineer(DoLIDAR SN-40 Clause-10)	Kg	14897.86	84.91	1,264,977.62
3.3.10	Supply and laying of hume pipes with collar joint as per engineer instruction.				
3.3.10.1	300 mm NP3 Hume Pipe (in 20 places)	Rm	50.00	2,822.32	141,115.87
3.3.11	600mm Dia (NP3).	Rm	30.00	5,444.60	163,337.97
3.3.12	Dimolishing Works for stone masonry wall, slab and others structures.	Cu.m.	11.24	670.00	7,529.46
3.3.13	<i>Heavy duty G.I.Pipe for Railing posts,(50mm)</i>	Rm	26.04	943.00	24,555.72

SN	Description of works	Unit	Estimated	Rate(NRs)	Amount (NRs)
3.3.14	HDP pipe for Weep hole (75mm)(2.5Kg/cm2)	Rm	255.08	130.90	33,389.97
3.3.15	Dry Graded Gravel Filter	Cu.m.	2.90	2,344.50	6,794.36
3.3.16	Painting	Lit	3.00	360.00	1,080.00
	Sub Total of Structural Item				49,571,903.46
4	Pavement work				
4.1	Preparation of subgrade as mentioned in the specification and directed by the engineer. (DOR Specification, 10.03, clause-1003)	Sq.m	25,500.00	12.65	322,575.00
4.2	Providing and Laying Capping layer of compacted 200mm thick preparation with sand mixed gravel aggregates having CBR =25% including transportation , watering and compaction all complete as per specification (DOR Specification, clause-1201)	Cu.m.	1,332.00	688.76	917,427.96
4.3	Supply, Place & compacte gravel subbase 150mm thick (passing sieve of 63 mm and down) over prepared subgrade according to the designed camber all complete as mentioned in the specification and directed by the engineer. (DoLIDAR SN 26, Clause-3,1)	Cu.m.	5,329.58	2,007.28	10,697,955.33
4.4	Supply ,place and compact crusher run materials (passing sieve of 40 mm and down) for base course(WBM) over subbase according to the designed camber all complete as mentioned in the specification and directed by the engineer. (DoLIDAR SN 27, Clause-3,2)	Cu.m.	3,799.58	2,767.65	10,515,902.05
4.5	Providing and spraying Bituminous prime coat MC30/MC70 at spray rate of 1ltr/m ² including cleaning the road surface using wire, brushes, broom etc. before application as mentioned in the specification and directed by the engineer. (DOR new Specification, clause-1301,1302)	Sq.m	26,254.52	125.06	3,283,390.27
4.6	Providing and spraying Bituminous tack coat at spray rate of 0.5ltr/m ² as mentioned in the specification and directed by the engineer. (DoLIDAR SN 30, Clause-4-2)	Sq.m	26,254.52	63.84	1,676,088.56
4.7	Providing, mixing, laying and compaction of 20mm thick premixed carpet all complete as mentioned in the specification and directed by the engineer. (DOR new Specification, Clause-1307,1308)	Cu.m.	506.61	10,341.57	5,239,146.91
	Sub Total of Pavement Works				32,652,486.08
5	Miscellaneous Works				

SN	Description of works	Unit	Estimated	Rate(NRs)	Amount (NRs)
5.1	Construction of affected infrastructure (Irrigation cannel crossing, foot trail, tap stand and stircase) as instructed by Engineer			PS	2,500,000.00
5.2	Supply and Installation of standard sized sign board (Project information Board) at site as per instruction of Engineer all complete.	Nos	2.00	4,000.00	8,000.00
5.3	Supply and Installation of standard sized Trafic sign boards at different locations all complete as per instruction of Engineer .	LS		50,000.00	50,000.00
5.4	Supply and installation of standard size Kilometer post as per DoR Standard(0+000 9+053)				
	1 Km Post	Nos	9.00	2421.57	21,794.13
	5 Km Post	Nos	2.00	4500	9,000.00
	Sub-Total of Miscellaneous Works				88,794.13
6	Landslide Protection Works including Bio-Engineering(Detail report attached in separte Volume)				6,166,113.57
		A	Total Cost.(A)		93,210,505.42
			VAT @13% of (A)		11,315,770.94
		B	Sub Total		104,526,276.36
		C	Provion for contingencies @ 5% of (A)		4,352,219.59
			Grand Total = [B+C +BIO]		108,878,495.95
			Cost Per Kilometer		12,026,786.25

A. GENERAL SOCIO-ECONOMIC SITUATION OF THE INFLUENCE AREA⁴

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

2. Economic activities/main occupation

3. Existing services and infrastructures

[illegible]

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

[illegible]

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

SN	VDC	Settlement	Number of HHs having food sufficiency for					Total HHs
			Surplus (Sufficient for > 12 months)	Sufficient for whole years	Sufficient for 6 months	Sufficient for 3 months	Hand to mouth existence	
1								
2								

Source:

[illegible]

2.3	Tobacco										
2.4	Potato										
2.5	Vegetables										
2.6	Fruits										
2.7	Tea/Coffee										
2.8	Amliso										
2.9	Sericulture										
2.10	Others (list)										
3.0	LIVESTOCK & FISHERIES										
3.1	Cattle (cows & buffaloes)										
3.2	Horses, Mules										
3.3	Yak										
3.4	Goat										
3.5	Sheep										
3.6	Rabbit										
3.7	Pig										
3.8	Fisheries										
3.9	Poultry										
3.10	Bee-keeping										
3.11	Others										

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

7. Migration for employment

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

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

- (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



नेपाल सरकार
स्थानीय विकास मन्त्रालय
जिल्ला विकास समितिको कार्यालय
जिल्ला प्राविधिक कार्यालय
ग्रामीण पुनःनिर्माण तथा पुनर्स्थापना आयोजना
जिल्ला आयोजना कार्यालय
काठमाण्डौ

०१-४४९४३२९
०१-४४८४००५
फ्याक्स ०१-४४९४३२९

तारिख २२ गते २०६६

प्रारम्भिक वातावरणीय परीक्षण (IEE) सम्बन्धी राय २०६६

सुभावकालागि सार्वजनिक सूचना ।

(सूचना प्रकाशन मिति : २०६६/०३/१)

यस जिल्ला विकास समितिको कार्यालय/जिल्ला प्राविधिक कार्यालय, ग्रामीण पुनःनिर्माण तथा पुनर्स्थापना आयोजना, जिल्ला आयोजना कार्यालय, काठमाण्डौद्वारा निर्माण गर्न प्रस्ताव गरिएका निम्न सडकहरुको प्रारम्भिक वातावरणीय परीक्षण(IEE) प्रतिवेदन कार्यान्वयन गर्ने शिलशिलामा वातावरणीय संरक्षण नियमावली २०५४, (पहिलो संशोधन २०५५ समेत)को नियम ७२ (२) अनुसार यो सार्वजनिक सूचना प्रकाशित गरिएको छ ।

प्रस्तावकको नाम : -जिल्ला प्राविधिक कार्यालय/जिल्ला आयोजना कार्यालय, काठमाण्डौ

सि.न.	आयोजनाको नाम	आयोजनाले प्रभावित पार्ने गा.वि.स.हरु
१	साँखु - जर्सिपौवा - फट्केश्वर, जर्सिपौवा-भोटेचौर सडक	सुन्टोल, बज्रयोगिनी, लप्सेफेदी, नाङ्गेभारे र फट्केशिला
२	कलकी-ध्याम्पेडोल -वाडभञ्ज्याङ्ग सडक	का. म. न. पा. -१४,स्यूचाटार, पुरानो नैकाप, नयाँ नैकाप, दहबाँक र वाडभञ्ज्याङ्ग
३	कागेश्वरी चक्रपथ	डाँछी, भद्रबास, आलापोट गागलफेदी र इन्द्रायणी

उक्त प्रस्तावको कार्यान्वयनबाट वातावरणमा पर्ने सम्बन्धित प्रभावका बारेमा सम्बन्धित गा.वि.स., विद्यालय, स्वास्थ्य चौकी, वन उपभोक्ता समिति तथा अन्य सरोकारवाला व्यक्ति वा संस्थाले यो सूचना प्रकाशित भएको मितिले १५ (पन्ध्र) दिन भित्र निम्न ठेगानामा आफ्नो सुभाव पठाईसहयोग गरिदिनु हुन अनुरोध गरिन्छ ।

राय सुभाव पठाउने ठेगाना :

जिल्ला प्राविधिक कार्यालय, मध्यबानेश्वर काठमाण्डौ
ग्रामीण पुनःनिर्माण तथा पुनर्स्थापना आयोजना
जिल्ला आयोजना कार्यालय, काठमाण्डौ
टेलिफोन नं.: ०१ ४४८४००५
फ्याक्स नं.: ०१ ४४९४३२९

Annex VI: Deed of Enquiry (*Muchulka*)

[illegible][illegible][illegible][illegible]

Annex VII: Name of the Organizations

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

SN	Name or Organization	Address	Remarks
1	Office of Village Development Committee, Danchhi	Danchhi , Kathmandu	
2	Office of Village Development Committee, Bhadrabas	Bhadrabas, Kathmandu	
3	Office of Village Development Committee, Alapot	Alapot, Kathmandu	
4.	Office of Village Development Committee, Gagalphedi	Gagalphedi, Kathmandu	
5	Office of Village Development Committee, Indrayani	Indrayani, Kathmandu	

Source: Field Survey, July, 2009

Annex VIII: List of Persons Consulted

List of persons consulted

Name	Contact Number	Address
Dhan Bahadur Shrestha	9841827193	Danchhi VDC
Annanda Simkhada	9841391116	Danchhi VDC
Durga Bahadur Subedi	9849051690	Danchhi VDC
Harsa Bahadur Shrestha	9851027913	Danchhi VDC
Shambhu Prasad Pudasaini	01-4450279	Danchhi VDC
Bijay Karki	01-4450171	Danchhi VDC
Ram Krishna Bhandari	9841061188	Bhadrabas VDC
Rupendra Pudasaini	9741024063	Bhadrabas VDC
Govinda Pudasaini	9851045369	Bhadrabas VDC
Gita Prasad Pudasaini	9841693896	Bhadrabas VDC
Salikaram Pudasaini	9841332996	Bhadrabas VDC
Prakash Phuyal	9841283434	Alapot VDC
Balakrishna Shrestha	9851111741	Alapot VDC
Baikuntha Phuyal	01-2141852	Alapot VDC
Pradip Phuyal	9741114444	Alapot VDC
Yogeshor Ghorasaini	9841415511	Alapot VDC
Suresh Shrestha	9841138673	Alapot VDC
Purna Shrestha	9849227870	Alapot VDC
Rajan Shrestha	9803418454	Alapot VDC
Govinda Phuyal	9741041822	Alapot VDC
Sudarsan Dhimal	9841818283	Alapot VDC
Ram Saran Phuyal	9741025397	Alapot VDC
Raj Kumar Thapa	9841374630	Gagalphedi VDC
Raj Kumar Sunuwar	9851011548	Gagalphedi VDC
Narayan Khadka	9841374630	Gagalphedi VDC
Srawan Thapa	9841565482	Gagalphedi VDC
Som Bahadur Tamang	9803378804	Gagalphedi VDC
Basant Shrestha	9841201218	Gagalphedi VDC
Mukunda Gajurel	9851048869	Gagalphedi VDC
Raj Kumar Thapa	9841616558	Indrayani VDC
Radha Krishna Thapa	9841504648	Indrayani VDC
Sahadev Shrestha	9841370430	Indrayani VDC
Sarala Khadka	9849305481	Indrayani VDC
Shova Karki	01-4151300	Indrayani VDC
Subarna Shrestha	9841387383	Indrayani VDC
Shushila Budathoki	9841864100	Indrayani VDC
Jayaram Thapa	9841293902	Indrayani VDC
Yudhistir Baniya	9841376645	Indrayani VDC
Jayaram Pudasaini	9841223217	Indrayani VDC
Kumale Mijar	9841616558	Indrayani VDC

Source: Field Survey, July, 2009

Annex IX: Meeting minutes of community consultation

Meeting minutes of Alapot VDC

Small for Community
COMMUNITY CONSULTATION MEETING NOTES RECORD SHEET
 (Detailed outline)

1. What is the purpose of the experiment?
 2. What is the objective of the experiment?
 3. What is the theory behind the experiment?
 4. What is the procedure of the experiment?
 5. What is the result of the experiment?
 6. What is the conclusion of the experiment?
 7. What is the discussion of the experiment?
 8. What is the error analysis of the experiment?
 9. What is the final report of the experiment?
 10. What is the final conclusion of the experiment?

Meeting minutes of Bhadrabas VDC

Blank for Consultancy

COMMUNITY CONSULTATION MEETING NOTES RECORD SHEET
(Sample outline)

उप-प्रशासकीय कार्य
कमलेश्वरी गा.वि.स. अ.प्र.स. सं. ४
कार्यक्रम आयोजक/पदाधिकारी का नाम

आज दिनांक २०१६ साल चैत्र २० गुरुवार को बिहारीपुर गा.वि.स. उप-प्रशासकीय कार्य कार्यक्रम आयोजित (MANAGE) को आयोजित किया गया। उप-प्रशासकीय कार्य आयोजक का नाम श्री प्र.वि.स. प्रशासक। कार्यक्रम का आयोजन श्री प्र.वि.स. प्रशासक द्वारा किया गया। कार्यक्रम का आयोजन श्री प्र.वि.स. प्रशासक द्वारा किया गया।

क्र.सं.	प्रशासकीय कार्य	अवधि	स्थान	लक्ष्य
१	प्रशासकीय कार्य	१	बिहारीपुर	प्रशासकीय कार्य
२	प्रशासकीय कार्य	२	बिहारीपुर	प्रशासकीय कार्य
३	प्रशासकीय कार्य	३	बिहारीपुर	प्रशासकीय कार्य
४	प्रशासकीय कार्य	४	बिहारीपुर	प्रशासकीय कार्य
५	प्रशासकीय कार्य	५	बिहारीपुर	प्रशासकीय कार्य
६	प्रशासकीय कार्य	६	बिहारीपुर	प्रशासकीय कार्य
७	प्रशासकीय कार्य	७	बिहारीपुर	प्रशासकीय कार्य
८	प्रशासकीय कार्य	८	बिहारीपुर	प्रशासकीय कार्य
९	प्रशासकीय कार्य	९	बिहारीपुर	प्रशासकीय कार्य
१०	प्रशासकीय कार्य	१०	बिहारीपुर	प्रशासकीय कार्य
११	प्रशासकीय कार्य	११	बिहारीपुर	प्रशासकीय कार्य
१२	प्रशासकीय कार्य	१२	बिहारीपुर	प्रशासकीय कार्य
१३	प्रशासकीय कार्य	१३	बिहारीपुर	प्रशासकीय कार्य
१४	प्रशासकीय कार्य	१४	बिहारीपुर	प्रशासकीय कार्य
१५	प्रशासकीय कार्य	१५	बिहारीपुर	प्रशासकीय कार्य

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SP - 5

[illegible]

Meeting minutes of Danchhi VDC

[illegible][illegible]

Meeting minutes of Gagalphedi VDC

[illegible][illegible]

Test for Correlation

प्रा. - प्रवेशपत्र के द्वारा गोविन्दगढ़ विहार में 21/26
दिनांक 14/11/2018 को 2018/19 में गण विभाग में इंटरमीडिएट गण विभाग
अध्यक्ष प्रमुख के द्वारा गोविन्दगढ़ विहार में अंकन

आज दिनांक २०/०५/२०२० को, मी. सुनील कुमार को, जो कि एक कर्मचारी है, को
मैंने पुरस्कार प्रदान किया (REASON) कि वह अपने काम में बहुत मेहनत करता है
लाभकारी है। मैंने उसे पुरस्कार प्रदान किया।
मैंने उसे पुरस्कार प्रदान किया।
आज दिनांक २०/०५/२०२० को, मी. सुनील कुमार को, जो कि एक कर्मचारी है, को
मैंने पुरस्कार प्रदान किया (REASON) कि वह अपने काम में बहुत मेहनत करता है
लाभकारी है। मैंने उसे पुरस्कार प्रदान किया।
मैंने उसे पुरस्कार प्रदान किया।

क्र.सं.	आयोजित नाम	प्रमाण	निष्कर्ष	लक्ष्य
01	जयदेव राव	रजपूत	अज्ञान	अज्ञान
02	सुनील राव	इ.रा.पू.	(अज्ञान)	अज्ञान
03	जयदेव राव	अ	अज्ञान	अज्ञान
04	जयदेव राव	अ	अज्ञान	अज्ञान
05	जयदेव राव	अ	अज्ञान	अज्ञान
06	जयदेव राव	अ	अज्ञान	अज्ञान
07	जयदेव राव	अ	अज्ञान	अज्ञान
08	जयदेव राव	अ	अज्ञान	अज्ञान
09	जयदेव राव	अ	अज्ञान	अज्ञान
10	जयदेव राव	अ	अज्ञान	अज्ञान
11	जयदेव राव	अ	अज्ञान	अज्ञान
12	जयदेव राव	अ	अज्ञान	अज्ञान
13	जयदेव राव	अ	अज्ञान	अज्ञान
14	जयदेव राव	अ	अज्ञान	अज्ञान
15	जयदेव राव	अ	अज्ञान	अज्ञान
16	जयदेव राव	अ	अज्ञान	अज्ञान
17	जयदेव राव	अ	अज्ञान	अज्ञान
18	जयदेव राव	अ	अज्ञान	अज्ञान
19	जयदेव राव	अ	अज्ञान	अज्ञान
20	जयदेव राव	अ	अज्ञान	अज्ञान

Gift for Configuration

aplicaciones: libros e imágenes:

पृष्ठ संख्या २२३ अ. १२ (अ. १२)

1. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
2. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
3. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
4. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
5. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
6. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
7. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
8. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
9. કોરોના વાયરસ 2019-2020 ના વર્ષમાં
10. કોરોના વાયરસ 2019-2020 ના વર્ષમાં

सुपरीत इलाक़ा सुबह ७:०० निर्वपण

- [illegible]

Annex X: Recommendation Letters from VDCs

[illegible][illegible][illegible][illegible]



गाउँ विकास समितिको कार्यालय
Office of the Village Development Committee

आपसरे, बन्दिडाडी
Aaspasre, Bhandi
Sore

फोन नं. :- २४४२२२२
Phone :- 4-450211

स.स. :- ०६६/०६६
स.स. :- २१०
स.स. :- २१०

दि. ०६६/०६६
Date

विषय :- वि.प.स.को कार्यवाही
Subject :-

श्री जिला विकास समितिको कार्यालय
जिला प्राविधिक कार्यालय
जिला आयोजना कार्यालय
काठमाडौं

प्रस्तुत विषयमा जिला आयोजना कार्यालय काठमाडौंबाट
ले गरी ००६६/११११ मा ग.स.को कार्यालय मा काठमाडौंको
को प्रारम्भिक ताराचरणीय परिक्षण प्रतिवेदन माग्यो।
विषयमा जिला प्राविधिक कार्यालय दिनु भएको छ।
हो। उक्त प्रस्ताव को प्रारम्भिक ताराचरणीय परिक्षण प्रति
वेदनमा उल्लेख्य रूपमा विषय तथा ताराचरणीय विषय
को अंशका को प्रस्ताव ह.स.को ताराचरणीय माग्यो
जानकारी माग्यो। उक्त प्रस्ताव कार्यालयमा हुन को ह.स.को
वि.प.स.को ताराचरणीय

००६६/११११
गाउँ विकास समितिको
कार्यालय

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	Influenced VDC	Number of HH engaged in					
		Agriculture & Livestock	Labour & Porter	Business/Commerce	Cottage Industry	GO/NGO/ Employees	Others
1	Indirayani	173	13	34	1	19	4
2	Gagalphedi	92	7	11	1	15	0
3	Alapot	361	14	42	16	35	11
4	Bhadrabas	171	6	24	1	28	0
5	Danchhi	213	22	25	4	34	5
Total		1010	62	136	23	131	20
Percentage		73	4	10	2	9	2

Source: Zol Survey

Annex XIb: Summary of Public Services & Infrastructures

S N	Settlements	EDUCATION			HEALTH		COMMUNICATION (Post office)	ELECTRICITY SUPPLY (National Grid)	BUSINESS & COMMERCE				DRINKING WSS	INDUSTRY		FIN. INSTITUTIONS	OTHER INFRASTRUCTURES			COMMUNITY USE					
		Higher secondary	Lower secondary	Primary School	Hospital	HP/SH/			Hotels & Lodges	Restaurant & Tea Stall	Grocery Shops	Other Shops		Spring/Dug-wells	Weaving Industry		Rice & flour Mills	Cooperative	Suspension Bridges	Wooden Bridges	Other Bridges	Ghat	Hatia/Bazaar	Playground	Community Centre
1	Indirayani	1	-	-	-	1	-	√	1	1	2	1	-	-	1	-	-	-	-	-	1	1			
2	Lakila	-	-	-	-	-	-	√	1	8	3	1	-	-	-	-	-	-	-	1	1	1			
3	Suyalgaun	-	-	-	-	-	-	√	1	9	2	1	-	-	1	-	-	-	-	-	1	1			
4	Pasikhel	-	-	-	-	1	-	√	2	1	3	1	-	-	1	-	-	-	-	1	1	-			
5	Pewadol	-	-	-	-	-	-	√	1	6	2	1	-	-	-	-	-	-	-	-	1	1			
6	Sanagaun	1	-	-	-	-	-	√	3	8	3	1	-	-	2	-	-	-	-	1	1	1			
7	Lakila	1	2	1	-	-	-	√	1	3	2	1	-	-	1	-	-	-	-	-	1	1			
8	Satghattechok	-	-	-	-	1	-	√	1	2	1	1	-	-	2	-	-	-	-	1	-	-			
9	Talloalapot	1	3	1	-	1	-	√	-	2	2	1	-	-	-	-	-	-	-	-	-	-			
10	Krishnachaur	-	-	-	-	-	-	√	-	1	3	1	-	-	-	-	-	-	-	-	-	-			
11	Mathillo Alapot	1	-	-	-	-	-	√	-	3	4	1	-	-	-	-	-	-	-	-	1	-			
12	Jaribute	-	-	-	-	-	-	√	-	4	5	1	-	-	3	-	-	-	-	-	-	-			
13	Bagarphat	-	-	-	-	-	-	√	5	1	1	1	-	-	-	-	-	-	-	-	-	-			
14	Manantar	1	2	-	-	-	-	√	-	-	3	1	-	-	-	-	-	-	-	-	1	-			
15	Kurkurechatole	-	-	-	-	1	-	√	-	3	4	1	-	-	-	-	-	-	-	-	-	-			
16	Dhunganagaun	-	-	-	-	-	-	√	-	-	6	1	-	-	2	-	-	-	-	-	-	1			
17	Dharekdanda	1	-	-	-	-	-	√	-	2	2	1	-	-	-	-	-	-	-	1	1	-			
18	Nayagaun	-	1	-	-	-	-	√	-	1	3	1	-	-	-	-	-	-	-	-	-	-			
19	Bhumpur	-	1	-	-	1	-	√	2	2	1	1	-	-	-	-	-	-	-	-	-	-			
20	Dachhichok	1	2	-	-	-	-	√	1	4	4	1	-	-	1	-	-	-	-	1	-	-			

S N	Settlements	EDUCATION			HEALTH		COMMUNICATION (Post office)	ELECTRICITY SUPPLY (National Grid)	BUSINESS & COMMERCE				DRINKING WSS	INDUSTRY		FIN. INSTITUTIONS	OTHER INFRASTRUCTURES			COMMUNITY USE		
		Higher secondary	Lower secondary	Primary School	Hospital	HP/SHP			Hotels & Lodges	Restaurant & Tea Stall	Grocery Shops	Other Shops		Weaving Industry	Rice & flour Mills		Cooperative	Suspension Bridges	Wooden Bridges	Other Bridges	Ghat	Hatia/Bazaar
	Total	8	11	2		6			19	87	56	20			14					6	10	7

Source: Zol Survey (HP: Health post, SHP: SubHealth Post, WSS: Water Supply Scheme)

Annec XI c: Land Holding Pattern of Settlements Within Zol

SN	Influenced VDCs/MC	Ownership /land holdings by Distribution of HHs						Total
		Less than one ropani	Less than 5 ropani	5-10 ropani	10-20 ropani	20-50 ropani	More than 50 ropani	
1	Indirayani	44	160	37	5	1	-	247
2	Gagalphedi	11	91	13	9	-	-	124
3	Alapot	100	301	68	10	-	-	479
4	Bhadrabas	57	134	39	2	-	-	232
5	Danchhi	52	172	15	40	22	-	301
Total		264	858	172	66	23	-	1383
Percentage		19.08	62.03	12.43	4.77	1.66	-	100

Source: Zol Survey

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

SN	Influenced VDCs/MC	Distribution of HHs by food sufficiency level				Total HHs
		0-3 months	3-6 months	6-9 months	9-12 months	
1	Indirayani	117	51	21	58	247
2	Gagalphedi	32	51	7	34	124
3	Alapot	170	153	35	121	479
4	Bhadrabas	87	42	36	67	232
5	Danchhi	152	69	32	48	301
Total		558	366	131	328	1383
Percentage		40.34	26.46	9.47	23.71	100

Source: Zol Survey

Annex XII :**Annex XII a: Vegetation Found in the Project Area****Annex XII b: Wild Animals Found in the Project Area****Annex XII a: Vegetation Found in the Project Area**

S.N.	Local Name	Scientific Name	Use
1	Uttis	<i>Alnus nepalensis</i>	Fodder
2	<i>Chilaune</i>	<i>Schima Wallichii</i>	
3	<i>Kattus</i>	<i>Castanopsis Indica</i>	
4	<i>Lapsi</i>	<i>Choerospondias axillaries</i>	

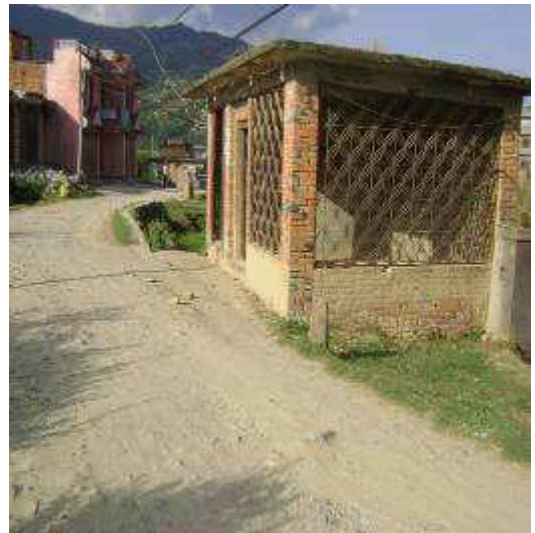
Annex XII b: Wild Animals Found in the Project Area

S.N	Local Name	Common Name	Scientific Name	Remark
Animals				
1	Syaal	Jackal	<i>Canis aureus</i>	
2	Badar	Monkey	<i>Macaca mulatta</i>	
3	Ban Biralo	Jungle Cat	<i>Felis chaus</i>	
4	Lokharke	Squirrel	<i>Ratufa sp.</i>	
Birds				
7	Bhangera	Sparrow	<i>Passer domesticus</i>	
8	Kaag	Crow	<i>Corvus splendens</i>	
9	Kalij	Pheasant	<i>Lophura leucomelana</i>	
10	Parewa	Pegion	<i>Columba livia</i>	
Fish, Reptiles, Amphibian				
11	Asala		<i>Schizothorax plagiostomus</i>	
12	Katle		<i>Accrocheilus spp</i>	

Annex XIII: Photographs



Starting Point of Road alignment



Road alignment passing through community structure at Ch. 0+548



Photograph showing alignment passes through settlement area



Road alignment passing through Pond



Photograph showing alignment passes through settlement area



End Point of Road Alignment

Landslide at chainage 7+300



Annex XIV: Summary of Cross Drainage Structures

SN	Chainage	Name of the river	Terrain	Type of Cross Drainage	Width of river(m)	Soil type	Remarks
1	2+080	Bhadrabas	Plain	CMW	7	OR	60 cm dia(Existing)
2	3+540	Alapot	Plain	PC	6	OR	15*4.5 m(Proposed)
3	5+350	Gagalphedi	Plain	DSC	5	OR	60cm dia(Proposed)
4	7+365	Indrayani	Plain	DSC	8	OR	60cm dia (Proposed)

Source: Field survey, July, 2009

Annex XV: Affected Private Houses and Structures along the Road Alignment

S.N	VDC	Type of structures	Owner	Chainage	Dist.from CL of Road	Remarks
1	Indrayani -2	House	Rajkumar Thapa	0+811	2.1	
2	Gagalphedi-2	House	Bhoj Bdr Thapa	3+355	2.7	
3	Aalapot-7	Bardali	Siddhaman Putuwal	6+448	2.3	
4	Aalapot-7	Bardali	Buddiman Putuwal	6+375	2.15	
5	Aalapot-7	Bardali	Chyase Nagarkoti	6+353	2.3	
6	Aalapot-7	House	Nepre Shrestha	6+715	2.4	
7	Aalapot-7	Bardali	Nepre Shrestha	6+715	1.85	
8	Aalapot-5	Bardali	Jhamka Bdr Shrestha	5+921	2.3	
9	Aalapot-5	House/Goth	Rameshwor Shrestha	6+109	2.4	
10	Bhadrabas -5	Temple	Temple		1.2	
11	Aalapot -5	Bardali	Ramchandra Putuwal	5+917	2.1	
12	Aalapot -2	Staircase	Kanchha Nepali	5+171	2.3	
13	Danchhi-3	House/Goth	Kanchhi Budhathoki,Suyra Bd	8+461	2.3	
14	Danchhi-4	RCC	Chandra +Rabi+Sasi Pd.Poudel	8+081	2.4	
15	Danchhi-5	House	Bhairab Bdr Shrestha	7+800	2.2	
16	Bhadrabas-3	House	Home Nath Dhungana	7+177	2.4	
17	Bhadrabas-4	House	Harka Bd.Nagarkoti	6+934	2.1	
18	Danchhi -3	House	Ram Bhadel	8+878	3.7	
19	Danchhi -3	House	Swarna Maya Manandhar	8+878	2.8	
20	Danchhi -5	House	Dhan Bdr. Shrestha	7+917	3.2	
21	Danchhi -5	House	Dhan Bdr. Shrestha	7+917	3.2	
22	Danchhi -4	Guthi	Sitaram Pokhrel (Guthi)	8+105	3.2	
23	Danchhi -4	Temple	Public Temple		3.2	
24	Danchhi -4	public structure	Public structure			
25	Danchhi -5	house	Jhalak Bdr. Shrestha	7+823		

Annex XVI: Summary of Cost for RP

Item	Unit	Total loss	Amount (NRs.)	Remarks
1. DIRECT COST				
1.1	Public structure (Ganesh and Shiv Temple)	No.	2	83,165.33
1.2	Private structure (house,Goth & Bardali)	No.	23	4,380,184.54
1.3	Reserve fund for non-interviewer	HHs	297	1,000,000.00
Sub-total			5,463,349.87	
2. INDIRECT COST				
2.1	Transportation and dismantling allowance	LS	25 hhs	223,167.49
2.2	Rental Stipend	LS	13hhs	195,000.00 for 3 months
2.3	Deed Transfer Assistance	Plots	872	1,046,400.00 @ 1200 per parcels
2.4	Official Deed Transfer fees	LS		300,000.00
Sub-Total			1,764,567.49	
3	Income generation and Livelihood improvement programme	LS		445,000.00
4	Appreciation Program for APs	LS		350,000.00
Sub-Total			795,000.00	
Total			8,022,917.36	
5	Provisional Sum (5%)			88,228.37
GRAND TOTAL			8,111,145.73	

Annex XVII: Structure for Slope Stabilization

SN	Chainages	Necessary structures/Mitigation Measures
1.	0+060	Retaining wall
2.	0+150	Retaining wall
3.	0+600	Retaining wall
4.	1+200	Retaining wall
5.	1+750	Toe wall
6.	2+400	Retaining wall
7.	3+300	Breast wall
8.	4+200	Retaining wall
9.	5+110	Toe wall
10.	5+950	Breast wall
11.	6+830	Retaining wall
12.	7+148	Landslide Protection
13.	7+250	Retainig wall
14.	7+300	Landslide Protection
15.	8+540	Toe wall

Source: Field Survey, July, 2009

