CHAPTER 13

ENVIRONMENTAL AND SOCIAL CONSIDERATION STUDY

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13.1 EIA AND RAP SYSTEM IN NEPAL

13.1.1 EIA in Nepal

(1) Laws, Rules and Standards

1) National Laws and Others Related to Environmental and Social Impacts Control

Following table is the list of laws, guidelines and reviewing institutions the Project need to consult with. For EIA review procedure, both the EPA/EPA of MOSTE and the ESMF of DOR/GESU shall be the legal base. For detailed technical guidance of EIA survey and review procedure, the ESMF shall be the main resource.

In Nepal, soil disposal activity related to a road project is considered as a part of the Road Construction Project, and impacts from the proposed road and the soil disposal are reviewed in the same process. Therefore, the soil disposal activity does not require separate permission.

TABLE 13.1-1 NATIONAL LAWS AND OTHERS RELATED TO ENVIRONMENTAL AND SOCIAL IMPACTS CONTROL

Topic		Name of Laws and Regulations	Reviewing Institution
Development review and permission	EIA/IEE	Environmental Protection Act (1997) Environmental Protection Rules (1997)	MOSTE
		Environmental and Social Management Framework (2007)	DOR/GESU
Power generation licensing		Electricity Act (1993)	Ministry of Energy Nepal Electricity Authority
Pollution prevention	Environmental Standards	Nepal Gazette B.S. 2060/4/19 (4 August, 2003) (Air) Nepal Gazette, BS 2054-9-8 (Gas emission from vehicles)	MOSTE Ministry of Works and Transport
	Soil disposal	Environmental and Social Management Framework (2007)	DOR/GESU MOSTE District Village
	Waste control	Environmental and Social Management Framework (2007)	DOR/GESU MOSTE District Village
Natural environment	Forest clearance Biodiversity conservation	Nepal Forest Guidelines (2006)	MOFSC
	Underground water	None	
	Rivers	None	
	Nature conservation	National Parks and Wildlife Conservation Act (1973)	MOFSC
Cultural heritage		Ancient Monument Preservation Act, Ancient Monuments Preservation Rules 2046 (1989)	Ministry of Culture, Tourism and Civil Aviation
Social considerations	Community forest	Forest Act (1993)	MOFSC District Forest users' group
	Drinking water	Water Resources Act (1992)	District Irrigation Office
	Indigenous groups	National Foundation for Upliftment of Aadibasi/Janjati Act 2058 (2002)	DOR/GESU

Topic		Name of Laws and Regulations	Reviewing Institution
	Dalit groups	Caste-based Discrimination and Untouchability (Offence and Punishment) Act (2011)	DOR/GESU
	Land acquisition and compensation	Land Acquisition Act 2034 (1977)	DOR District
	Additional assistances	Environmental and Social Management Framework (2007)	DOR/GESU
	Underground property right	None	
	Land use change (agriculture to urban)	No governmental procedure is required.	N/A (Land owner's consent)

Source: JICA Survey Team

2) IEE/EIA According to EPA and EPR

According to the Section 3 of the Environmental Protection Act (EPA), and the Schedule 1 (IEE) and Schedule 2 (EIA) of the Environmental Protection Rule (EPR), the IEE/EIA report is required to include positive and negative impacts on physical, natural/biological, social, economic and cultural environment. The resettlement action plan and the vulnerable community development plan, which are required by the ESMF, will also be reviewed together with the EIA report. Those plan may be a part of the EIA report, or may be prepared as separate volumes. The final approval of the EIA report shall be awarded by the Environmental Auditing Committee, which is a consultative body of the MOSTE.

The EPA and the EPR went into practice in 1997. The EPR was amended in 1999. The electric files of English version of the 1997 EPA and the 1999 EPR are the only version available from the web site of the Nepal Law Commission. The EPA and the EPR are, however, have been amended 9 times in total, as shown in the next Table.

The amended Section 14 of the EPA is in **Annex13.1-1**.

The amended Schedule 2 of the EPA is in **Annex13.1-2**.

TABLE 13.1-2 HISTORY OF AMENDMENTS OF EPA AND EPR

Amendments			1	2	3	4	5	6	7	8	9
Date			2007. Aug.20	2009. Feb.2	2009. Feb.16	2009. Mar.9	2009. May.4	2010. Jan.27	2010. Aug. 12	2010. Oct.14	2012. Oct.29
EPA	Sec.14	Power to constitute Environment Protection Council			X						
EPR	Sec.15	Prevention and control of pollution					X		X		X
	Schedule 1 (Re: Sec. 3)	IEE target project Under Rule Section 3	X	X		X		X			
	Schedule 2 (Re: Sec. 3)	EIA target project Under Rule Section 3	X	X		X				X	

Source: JICA Survey Team, Nepal Gazettes

3) ESMF

The Environmental and Social Management Framework (ESMF) (2007, DOR) was developed to implement the World Bank supported 'Road Sector Development Project (RSDP)'. Then in 2012, the ESMF was made as Ministry-approved policy and since then the ESMF is the guideline applied for all the DOR projects. The reviewing institution for the ESMF is the Geo-Environmental and Social Unit (GESU) of DOR.

If a project is subject to IEE, GESU shall be the final reviewing and approving institution. For a project subject to EIA, GESU shall forward the EIA report to MOSTE through MOPIT for further review and approval.

The English and Nepali versions of the ESMF are available at the web site of DOR.

(http://www.dor.gov.np/documents/8.%20Environmental%20and%20Social%20Management%20Framework.pdf)

4) Eligibility of the Project for EIA Review

The list of the projects which are required impact review are summarized in the Schedule 1 (IEE) and Schedule 2 (EIA) of the Environmental Protection Rule.

This Project is subjected to EIA study 1) because it is a construction of new alignment of national highway, and 2) because the investment shall surpass NRs. 250 million (250,000,000).

Also, the Project is required to apply for MOFSC Project Approval, in the view point of biodiversity conservation, since the Western Portal of the proposed tunnel is located in national forest.

MOFSC and MOE (Ministry of Energy) may join the review of the EIA report as members of the Environmental Auditing Committee, when the scale of the national forest clearance and the electricity transmission line is decided by the Project.

TABLE 13.1-3 ELIGIBILITY OF THE PROJECT FOR EIA REVIEW

	Target Project	Eligibility of this Project
EPR Schedule 2	**EIA Eligibility**	
A. Forest Sector	12. Proposal implementing through other organization instead of forest related government agencies clearing more than 5 hectares of forest.	Yes (national forest) No (area of clearance)
D. Road Sector	1. Construction of the following roads: (a) National highways.	Yes
L.1.	Operation of any plan, project or programme relating to any developmental work physical activity or change in land use except the proposals mentioned in Clause (a) to Clause (K), and those below the standards of such proposals, as well as the proposals below the standards of those mentioned in schedule -1, with a cost of more than Two Hundred Fifty millions Nepali Rupees (Rs. 250,000,000.).	Yes
EPR Schedule 1	**IEE Eligibility (Overruled by Schedule 2)**	
A. Forest Sector	4. Clear felling or rehabilitation of national forests with an area of not more than 5 hectares.	Yes (national forest) Yes (area of clearance)
D. Road Sector	5. Construction of tunnels	Yes
E. Water Resources and Energy Sector	1. Supply of electricity through the constructions of transmission lines of 33 to 66 KV capacity.	No (11 KV)

Source: Schedule 1 and 2, Environmental Protection Rule (2012)

TABLE 13.1-4 EIA STATUS SUMMARY

Issue	Condition	Additional Information
EIA Status Based on the Nepal Laws and Regulations	Required (Under official procedure)	Full EIA and approval of MOSTE for new construction of National Highway
Status of other necessary environmental permit(s) Name(s) of required permit(s) :	Required. The review process is ongoing as of August 2014. Forest clearance permission from Ministry of Forest and Soil Conservation	Application was submitted June 26, 2014 to DOR. The application is to be forwarded to MOFSC and relevant (Kathmandu) District Forest Office.

Source: JICA Survey Team

(2) STEPS AND SCHEDULE OF EIA APPROVAL PROCEDURE

1) Nepali Standard Procedure

Based on the EPR, the ESMF, and interviews with DOR/GESU, MOSTE, MOFSC, and local consultants, the steps necessary in the Nepali EIA approval procedure are summarized in

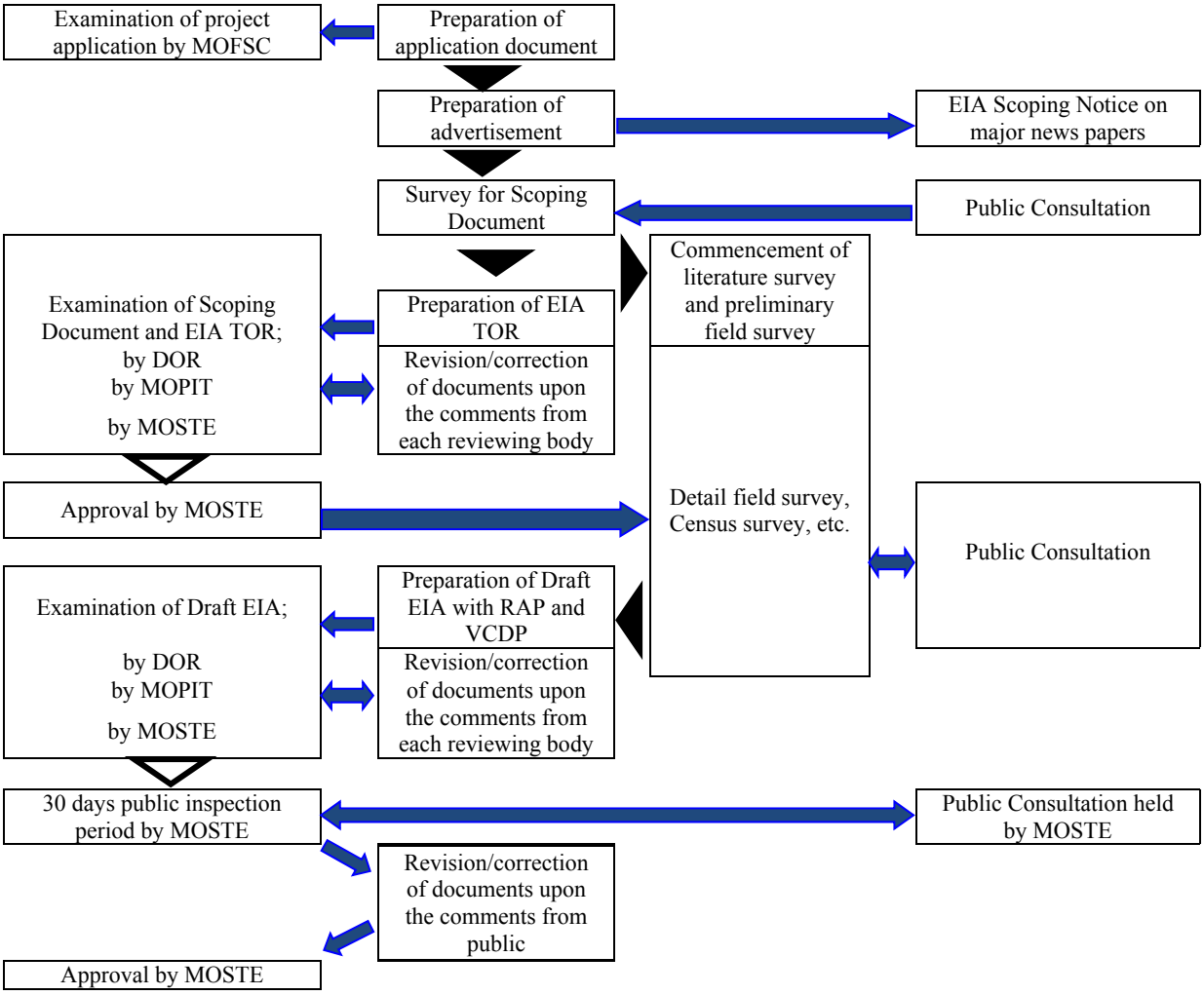
Figure 13.1-1 and **Table 13.1-5**.

First, the Project Proponent shall submit the Scoping Document and the EIA TOR for approval of all related institutions, i.e. DOR, MOPIT and MOSTE.

After obtaining the above approval, detailed field survey, such as interviews and census survey of the residents located on the ROW, may be started, with further local meetings to explain the purpose of such surveys.

The results of the surveys, together with evaluation of the impacts and their mitigation plans, shall be documented as the draft EIA report. The draft EIA report shall go through the same review and approval procedure as the Scoping Document.

The final approval of the EIA report by MOSTE is required before the commencement of the construction works.



Source: JICA Survey Team

FIGURE 13.1-1 EIA APPROVAL PROCEDURE

TABLE 13.1-5 EIA APPROVAL PROCEDURE

CONSULTANCY WORK **ADMINISTRATIVE DURATION**

No.	Activities	Duration Month
●	**MOFSC Permission**	
●	Document preparation for MOFSC approval	
●	Permission to start the EIA study is required from the Ministry of Forest and Soil Conservation (MOFSC) before executing Environmental Assessment	2 months
●	**Scoping and TOR**	
●	Publication of 15 days Scoping Notice (EPR, 2054- Rule 4.3)	0.5 month
●	Preliminary field survey and investigation. Scoping Notice affix and collection of deeds of notice affix at local institutions	0.5 month
●	Preparation and Submission of Scoping Report and TOR (In the format of EPR, 2054- Schedule 4) to DOR	1-1.5 month
●	Review of the Reports by DOR	0.5 month
●	Incorporation of suggestions and recommendations provided by the DOR and submission to MOPIT through DOR	0.5 month
●	Review of Scoping and TOR by MOPIT	1 month
●	Presentation of Scoping and TOR at MOPIT	1 day
●	Incorporation of suggestions and recommendations provided during presentation in Scoping and TOR and submit to MOPIT through DOR	0.5 month
●	Forward of Scoping and TOR to MOSTE from MOPIT	0.5 month
●	Review of Scoping and TOR by MOSTE	0.5 month
●	Presentation of Scoping and TOR at MOSTE	1 day
●	Incorporation of suggestions and recommendations in Scoping and TOR provided by MOSTE and its resubmission	0.5 month
●	Approval of Scoping and TOR from MOSTE	1 month
●	**EIA Study**	
●	Survey Team Mobilization, Interaction with stakeholders and meetings at local level	0.5 month
●	RAP Study, Cadastral Survey, Census Survey, Data Enumeration	1 month
●	Literature Review, Review of Acts, Policies, Legislations and Guidelines and Analysis and prediction of impacts	0.5 months
●	Propose Mitigation and Augmentation Measures and Preparation of Environmental Management Plan; Vulnerable Community Development Plan; Acquisition, Compensation and Resettlement Action Plan	1 month
●	Preparation of Draft EIA Report as per Schedule 6 of EPR, 2054	2 months
●	Publication of Notice for Public Hearing and Public Hearing as per EPR, Rule 7.2 at field sites	0.5 month
●	Submission of Draft EIA Report to DOR with the incorporation of opinions and suggestions collected from Public Hearing and Recommendation Letters from affected VDCs.	0.5 month
●	Review of the Draft EIA Report by DOR	0.5 month
●	Incorporation of Suggestions and Recommendations provided by DOR in Draft EIA Report and Submission 10 copies to MOPIT through DOR	0.5 month
●	Review of the Draft EIA Report by MOPIT	0.5 month
●	Incorporation of Suggestions provided by MOPIT in Draft EIA Report and Submission of 10 copies to MOSTE through DOR and MOPIT	0.5 month
●	Review of the Draft Final EIA Report by MOSTE	0.5 month
●	PP Presentation of Draft Final EIA Report at MOSTE	1 day
●	Incorporation of Suggestions provided by MOSTE during presentation in Draft Final EIA Report and Re-Submission to MOSTE through DOR and MOPIT	0.5 month
●	Issuance of 30 day public notice in daily newspaper for public opinions and suggestions by MOSTE and Approval of EIA report by MOSTE as per EPR, Rule 11.2, 11.4, 11.5 and 11.6)	3 to 4 months

Source: JICA Survey Team

13.1.2 RAP System in Nepal and Resettlement Policy for this Project

This Project Activity that may lead to land being expropriated or to people being resettled by the construction of the approach (access) road, construction of the proposed tunnel, soil disposal site development by excavation of the tunnel, and land use alteration for ancillary facilities. Therefore, it is necessary to consider and to prepare a Resettlement Action Plan (RAP), which could be based on the JICA Environmental and Social Guidelines, 2004, as well as the World Bank Safeguard Policy.

On the other hand, there are some RAPs, which are based on the Environmental and Social Management Framework (ESMF), April 2007 as the main guideline for environmental and social issues associated with new road construction and upgrading in Nepal. Based on the ESMF, present main RAP system for road development project of Nepal are as follows:

(1) Institutional Responsibilities and Implementation Arrangements for RAP

1) Key Agencies at Different Level

At central level, the Ministry of Physical Planning and Works (MoPPW) will be the Executing Agency (EA) and Department of Roads (DoR) will be the Implementing Agency (IA) for this Sector Wide Road Program.

For all sub-projects forth coming under this Program, a Project Implementation Unit (PIU) will be established at DoR, headed by the Project Manager (PM). This PIU will be responsible for the overall planning, implementation and coordination of the sub-projects. All aspects relating to resettlement and land acquisition activities will be addressed in close consultation and collaboration of the GESU of DoR.

At District and village level, offices of various line ministries such as Home Physical Planning and Works, Agriculture and Co-operatives, Forest, Health, Education and Sports and others will be consulted during RAP implementation. Similarly, CBOs, NGOs and Civil Society of the concerned project area will equally be considered during the preparation and the implementation of the RAP.

2) Geo-Environment and Social Unit (GESU)/or Social Unit (SU) of DoR

The Geo-Environment and Social Unit (GESU) plays a key role while incorporating proper social safeguard measures in all projects designs related to road development in Nepal. The GESU will have a Senior Resettlement Expert (SRE) to assist PIU.

The SRE will monitor of land acquisition and resettlement operations and vulnerable/indigenous people's issues. S/he will report to the Project Manager at PIU. S/he will work in close coordination with the concerning Division Road Offices under DoR, field-based consultants' offices and Project NGO/s on the day-to-day activities of the resettlement plan implementation.

A Social Development/Resettlement Specialist from the Project Supervision Consultants will support the SRE updating the sub project RAPs based on detailed design. S/he will also be responsible in supervision and coordination of all activities related to resettlement implementation for all the sub-projects.

3) Implementing NGOs

NGOs experienced in resettlement, rehabilitation and livelihood restoration will be engaged as partner organization with Project Supervision Consultant (PSC) to provide facilitation services for implementation of resettlement plan and activities.

4) Implementation Schedule for the RAP

The Project Proponent will ensure that funds are delivered on time to the Compensation Fixation Committees (CFC) and the implementing Consultants and partner NGOs for timely preparation and implementation of the RAP, as applicable. Civil works contracts will not be awarded unless required compensation payment has been completed.

However, a social preparation initiative including income rehabilitation measures may continue and be completed even after civil works has begun.

(2) Resettlement Policy for this Project

The development projects undertaken by the Department of Road (DoR) must serve the public well and in the design and implementation of such projects, all efforts will be executed to help ensure that Project-affected Persons (PAPs) are not worse off. In addition, the Project should provide an opportunity for the local population to derive benefits from the Project.

This portion shall provide a tool, which will also help ensure that all PAPs along the road project, regardless of their number, receive the appropriate assistance in a fast and timely manner. For achieving the goal, the Project will follow the principles in accordance with those in the ESMF in Nepal, which has been mainly based on the World Bank Policy OP/BP 4.12.

Main basic resettlement policies/principles for this Project are as follows:

- The Government of Nepal is bound to follow the Project Resettlement Policy (the Project Policy) for the Nagdhunga Tunnel Construction Project specifically which is intended to comply with the JICA Guidelines.
- Where there are gaps between the Government of Nepal legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practices and JICA's Policy.
- Land acquisition and involuntary resettlement will be avoided where feasible, or minimized, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.
- Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.
- Compensation and rehabilitation support will be provided to any PAPs, that is, any person or household or business which on account of project implementation would have his, her or their:
  - Standard of living adversely affected;
  - Right, title or interest in any house, interest in, or right to use, any land (including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently;
  - Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently; or
  - Social and cultural activities and relationships affected or any other losses that may be identified during the process of resettlement planning.

- All affected people will be eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing and any such factors that may discriminate against achievement of the objectives outlined above.
- Lack of legal rights to the assets lost or adversely affected tenure status and social or economic status will not bar the PAPs from entitlements to such compensation and rehabilitation measures or resettlement objectives.
- All PAPs residing, working, doing business and/or cultivating land within the project impacted areas as of the date of the latest census and inventory of lost assets(IOL), are entitled to compensation for their lost assets (land and/or non-land assets), at replacement cost, if available and restoration of incomes and businesses, and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.

13.2 GAP ANALYSIS BETWEEN NEPAL EIA/RAP SYSTEM AND JICA GUIDELINE

The compensation and assistance requirements of the ESMF are prepared for the WB-assisted project, the Road Sector Development Project, in 2007, and are used for all the projects of DOR since 2011.

The DOR projects, therefore, are implemented according to the framework which is equivalent to the requirements of the JICA guidelines, including in the area such as calculation of compensation amount, additional assistances for resettlement of residents without legal ownership of lands, and assistances for business losses as shown in **Table 13.2-1**.

Remaining issue is to verify how to define 'market price' in Nepali society, and whether the decisions in Kathmandu and Dhading District Compensation Committees justly reflect the market price.

Such conditions are confirmed by interviews with DOR/GESU, and by the existing reports listed in the following **Table 13.2-2**.

TABLE 13.2-1 GAPS BETWEEN JICA AND GON RESETTLEMENT POLICY

Gaps listed in the M/M dated April 17, 2014 and others			Typical operation of DOR based on ESMF	Remaining GAP and/or survey
Key Policy Gaps	JICA Guideline (World Bank O.P.4.12)	Government Laws		
Compensation Principle	All the compensation is based on the principle of replacement cost	Compensation rate will be determined by CDC, consisting of CDO , (ii) representative from DDC (iii) Chief of Land Revenue Office (iv) Project Manager, (Land Acquisition Act Clause 13) The Land Acquisition Act 1977, also mention the need of considering periodic circulations issued by the GoN while fixing compensation for the affected assets (Land Acquisition Act Clause 16)	DPs are allowed to take salvaged materials. CDC will make final decision on the compensation rates after viewing and verification of affected.	1) Whether the provisions be made for the replacement cost for the loss of land, houses/ structures by CDC is under survey. 2) There is no official license for real estate appraiser/valuer for land, houses/ structures. Most transactions are conducted face to face of selling and buying side. Real estate broker industry is not licensed without any common professional rules. How to determine rational replacement cost is under survey.
Compensation for Non-titleholders	Squatters/ vulnerable encroachers/non- title holders are entitled to the payment for affected structures/ houses/ business/ crops, trees, and other assistance	Do not consider squatters/ encroachers/ non-titled land users for compensation	ESMF (p. 7-9, 10) provides encroacher/ squatter and non-registered tenant/renter/lease holder does not qualify for compensation for land losses; however they will be entitled to compensation for crops, and compensation for full or partial loss of house and other structures at full replacement cost of materials and labor according to house/structure type, with no deduction for depreciation. Every displaced household will receive transportation allowance on actual cost basis.	None.
Relocation Assistance	A all the eligible DPs including tenants, employees are entitled to receive financial assistance to cover physical and economical displacement	LA Act Clause 16-2 provisions to consider extent of losses caused due to relocation/ shifting of Displaced people, while fixing the compensation rate (LA Act Clause 16-2.	ESMF (p. 7-11) provides Displacement Allowances; 1) each displaced household will receive equivalent to 2 months poverty line income, 2) Renters will receive 35 days notice or rental stipend equivalent to 0.5 month poverty line income plus transportation assistance; 3) every household of displaced businesses will be entitled to a	None.

Gaps listed in the M/M dated April 17, 2014 and others			Typical operation of DOR based on ESMF	Remaining GAP and/or survey
Key Policy Gaps	JICA Guideline (World Bank O.P.4.12)	Government Laws		
			business displacement allowance for loss of commercial establishment.	
Income Restoration	Income restoration program such as training and other measures to restore and improve the standard of living of the displaced households of those having more than 10 % of the total landholdings and income	Apparently, the Land Acquisition Act 1977, do not consider for income restoration.	ESMF (p. 7-11, 12) requires assistance with training in life skills, preferential access to road construction employment for 1) households/APs having significant impacts, 2) households of the vulnerable categories, 3) APs family members over 16 years of age.	None.
Grievance Procedures	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.	There are provisions for the Compensation Determination Committee (CDC).	ESMF (p 7-15) provides. For each sub-project a grievance redress mechanism will be established to allow APs to appeal any disagreeable decisions, practices, and activities arising from compensation for land, assets settlements, and technical and general project-related disputes.	None
Compensation payment timing	Compensation and other kinds of assistance must be provided prior to displacement.	There are provision that compensation for land is paid after determination of rates and verification of the list of entitled applicants by the Compensation Determination Fixation (CFC).	ESMF (p 7-24) provides. The project will ensure that civil works are not started on any subproject sites before compensation and assistance to the affected population have been provided in accordance with the Resettlement Policy Framework.	No major gap.

Source: JICA Survey Team

TABLE 13.2-2 RECENT CASE OF THE ESMF-APPLIED PROJECTS

Project	Report Title	Dated
Nepal India Trade and Transport Facilitation Project(NITTFP)	Vulnerable Community Development Plan, Narayanghat- Mugling Road	January, 2013
	Resettlement Action Plan, Narayanghat-Mugling Road	January, 2013
Road Sector Development Project (New Project Preparation and Supervision Services) (IDA grant NO: H339 – NEP)	(Draft) Review and update of initial environmental examination study report for upgrading of Gokuleswor to Thaktholi (chainage: km 54+000 – km 92+400)	August 2010
	(Draft) Initial Environmental Examination Study Report for Upgrading of Thaktholi to Darchula (Chainage: km 92+400 – km 126+000)	August 2010
Road Sector Development Project (AF) (IDA GRANT NO: H629 – NEP) (IDA CREDIT NO: 4832 – NEP) (New Project Preparation and Supervision Services)	Resettlement Action Plan, Gokuleswor-Thaktholi- Darchula Road	January 2011

All the above reports were prepared by;
MMM Group ltd. (Canada), in JV with Sai Consulting Engineers (p) Ltd. (India), in association with Iteco Nepal (p) Ltd. (Nepal) & Total Management Services (Nepal)
Source: http://www.dor.gov.np/publication/index_category.php?cat=RSDP-RESETTLEMENT ACTION PLAN
http://www.dor.gov.np/publication/index_category.php?cat=Nepal India Regional Trade and Transport Project NIRTTP
http://www.dor.gov.np/publication/index_category.php?cat=Supplementary Resettlement Action Plan SRAP
http://www.dor.gov.np/publication/index_category.php?cat=ADB reports
http://www.dor.gov.np/publication/index_category.php?cat=Updated ESMF

One condition that may need attention is that the compensations and assistances in urban area are paid in cash. Land-for-land type compensation and provision of resettlement housing is

quite difficult in the urban area where every piece of land, including steep slopes, is intensely used by private owners.

The other limitation of Nepali condition is that, in terms of environmental impacts during the construction phase, governmental agencies may not have proper monitoring capacity, and most part of responsibility shall be on the contractor. Further study is necessary for the standard operation as well as the capacity of quantitative monitoring by private consultants.

13.3 ACHIEVEMENT SO FAR REGARDING THE EIA APPROVAL PROCEDURE

13.3.1 Consultation with MOF and Awarding the Priority Project Status

In the meeting with MOPIT and JICA in July 2014, the Project was nominated as the Priority Project (P1 Project).

In the meeting between DOR and the Team on August 12, DOR confirmed that the Project will surely be regarded as the National Priority Project from its importance and necessity.

The Team shall continue its effort to obtain any official document to prove the P1 status of the Project either from DOR, MOPIT or MOF. At the same time, the Team shall pay its full effort for faster handling of EIA approval at MOPIT and MOSTE, with support of DOR and JICA Nepal.

13.3.2 Project Application to MOFSC

On June 26, 2014, the Team submitted the project application document for MOFSC to DOR/GESU to request approval to commence the EIA study of the Project that affect national forest. The document was forwarded to MOFSC through MOPIT for approval. As of September 11, 2014, the application document had been reached to the Kathmandu District Forest Office for review. DOR/GESU notified the Team that neither Department of Forest nor the District Office had found any substantial cause to stop the Project. DOR/GESU is expected to receive an official approval document from MOFSC.

The application document is included in **Annex 13.3-1**.

13.3.3 JICA Screening Result

The Team drafted the following Screening Sheet and submitted to DOR/GESU on June 30, 2014.

Screening Format

Name of Proposed Project: The Preparatory Survey for Nagdhunga Tunnel Construction Project
Project Executing Organization, Project Proponent or Investment Company:
Ministry of Physical Infrastructure and Transport, Department of Roads
Name, Address, Organization, and Contact Point of a Responsible Officer:

Name: Engineer Devendra KARKI, Director General
Address: Babarmahal, Kathmandu
Organization: Department of Roads, Ministry of Physical Infrastructure and Transport
Tel: +977-1-4262675
Fax: +977-1-4262993
E-Mail: devendra@dor.gov.np
Date:
Signature:

Check Items

Please write "to be advised (TBA)" when the details of a project are yet to be determined.

Question 1: Address of project site:

From Naubise VDC at Dhading District to Balambu VDC at Kathmandu District

Question 2: Scale and contents of the project (approximate area, facilities area, production, electricity generated, etc.)

2-1. Project profile (scale and contents)

New construction of 3-lane tunnel and 2-lane approach road (national highway) as follows:

- Tunnel Length: 2.45 km
- Approach Road Length: 2.60 km
- Approach Road ROW: 50 m

2-2. How was the necessity of the project confirmed?

Is the project consistent with the higher program/policy?

■YES: Please describe the higher program/policy）

"An Approach Paper to the 13th Plan (FY2013/14 – FY2015/16)"

□NO

2-3. Did the proponent consider alternatives before this request?

■YES: Please describe outline of the alternatives

（A detailed comparison of 3 alternatives were conducted after a screening process from the 5 initially proposed alternatives during the Data Collection Survey on Thankot Area Road Improvement in Nepal" ）

□NO

2-4. Did the proponent implement meetings with the related stakeholders before this request?

□Implemented ■Not implemented

If implemented, please mark the following stakeholders.

□Administrative body

□Local residents

□NGO

□Others （ ）

Question 3:

Is the project a new one or an ongoing one? In the case of an ongoing project, have you received strong complaints or other comments from local residents?

■New □Ongoing (with complaints) □Ongoing (without complaints)

□ Other （ ）

Question 4:

Is an Environmental Impact Assessment (EIA), including an Initial Environmental Examination (IEE) Is, required for the project according to a law or guidelines of a host country? If yes, is EIA implemented or planned? If necessary, please fill in the reason why EIA is required.

■Necessity (□Implemented ■Ongoing/planning)

(Reason why EIA is required: This proposed development activities include construction of a new section of National Highway in Nepal. In this case an EIA needed based on Environmental Protection Act in Nepal.)

☐Not necessary

☐Other (please explain)

Question 5:

In the case that steps were taken for an EIA, was the EIA approved by the relevant laws of the host country? If yes, please note the date of approval and the competent authority.

□Approved without a supplementary condition	□Approved with a supplementary condition	■Under appraisal

(Date of approval: Competent authority:)

□Under implementation

□Appraisal process not yet started

□Other ( )

Question 6:

If the project requires a certificate regarding the environment and society other than an EIA, please indicate the title of said certificate. Was it approved?

□Already certified

Title of the certificate: ( )

■Requires a certificate but not yet approved

Title of the certificate:(Approval to proceed EIA study by Ministry of Forest and Soil Conservation)

□Not required

□Other 〔 〕

Question 7:

Are any of the following areas present either inside or surrounding the project site?

□Yes ■No

If yes, please mark the corresponding items.

□National parks, protection areas designated by the government (coastline, wetlands, reserved area for ethnic or indigenous people, cultural heritage)

□Primeval forests, tropical natural forests

□Ecologically important habitats (coral reefs, mangrove wetlands, tidal flats, etc.)

□Habitats of endangered species for which protection is required under local laws and/or international treaties

□Areas that run the risk of a large scale increase in soil salinity or soil erosion

□Remarkable desertification areas

□Areas with special values from an archaeological, historical, and/or cultural points of view

□Habitats of minorities, indigenous people, or nomadic people with a traditional lifestyle, or areas with special social value

Question 8:

Does the project include any of the following items?

□Yes ■No

If yes, please mark the appropriate items.

□ Large-scale Involuntary resettlement (scale: households persons)

□ Large-scale Groundwater pumping (scale: m3/year)

□Large-scale Land reclamation, land development, and/or land-clearing (scale: hectors)

□ Large-scale Logging (scale: hectors)

Question 9:

Please mark related adverse environmental and social impacts, and describe their outlines.

■Air pollution

☐Water pollution

☐Soil pollution

■Involuntary resettlement

☐Local economies, such as employment, livelihood, etc.

☐Waste
■Noise and vibrations
☐Ground subsidence
☐Offensive odors
☐Geographical features
☐Bottom sediment
☐Biota and ecosystems
■Water usage
☐Accidents
☐Global warming

☐Land use and utilization of local resources
☐Social institutions such as social infrastructure and local decision-making institutions
☐Existing social infrastructures and services
☐Poor, indigenous, or ethnic people
☐Misdistribution of benefits and damages
☐Local conflicts of interest
☐Gender
☐Children's rights
☐Cultural heritage
☐Infectious diseases such as HIV/AIDS
☐Other ( )

Outline of related impact:

- Small-scale involuntary resettlement may occur.
- Some adverse impacts such as air, noise/vibration during construction and operation phase may occur.
- Excavation of the tunnel may affect ground water level and local aquifer.
- Depending on the alignment, any poor (lower cast) may affect adverse impacts on the present living conditions. The impacts will be avoided and/or minimized by implementation of the Vulnerable Community Development Plan.

Question 10:

In the case of a loan project such as a two-step loan or a sector loan, can sub-projects be specified at the present time?

☐Yes ■No

Question 11:

Regarding information disclosure and meetings with stakeholders, if JICA's environmental and social considerations are required, does the proponent agree to information disclosure and meetings with stakeholders through these guidelines?

■Yes ☐No

End.

13.3.4 JICA Scoping Result

As of July 2014, The Project activities that may cause environmental and/or social impacts were recognized as listed in **Table 13.3-1**.

TABLE 13.3-1 RECOGNIZED CAUSE OF IMPACTS

Phase	No.	Cause of Impacts: Activities, Existence of Facilities and Structures
Planning Phase	1	Land acquisition of the Work Area
	2	Lease of land parcels along the existing District Road
	3	Clearing of ROW of existing highway
Construction Phase	4	Transportation generation of construction materials and workers
	5	Clearance of forest trees
	6	Activities of construction equipments and tools
	7	Construction and use of the staging area, concrete mixing plant, storage, etc.
	8	Construction and use of the Workers' Camp, including septic tanks
	9	Employment of workers and caretakers
	10	Construction and operation of the water treatment plant for the turbid water from construction sites.

Phase	No.	Cause of Impacts: Activities, Existence of Facilities and Structures
	11	Water intake for the concrete plant, other construction facilities and the Workers' Camp
	12	Construction of the soil disposal site, and disposal
	13	Construction of the Tunnel (Excavation, facilities, pavement, etc.)
	14	Construction of road facilities (Toll post, tunnel management office, electricity system, backup generator, weigh bridge, etc.)
	15	Construction of the Approach Road (Filling, cutting, bridges and culverts)
	16	Construction of the temporal stand-by area/ holding parking space for construction vehicles along the District Road (on lease)
Operation Phase	17	Existence of new road and traffic
	18	Existence of road facilities (Used site for staging area and other facilities)
	19	Used site for disposal area
	20	Traffic on the existing highway

Source: JICA Survey Team, 2014

Environmental and social items that may be affected by the above listed activities, facilities and structures are selected as shown in **Table 13.3-2**.

Then the Team drafted the Scoping Table, shown as **Table 13.3-3**, and submitted to JICA on June 30, 2014,

TABLE 13.3-2 ENVIRONMENTAL IMPACT SCOPING MATRIX

Pollution

			Planning Phase			Construction Phase													Operation Phase			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			Land acquisition of the Work Area	Lease of land parcels along the existing District Road	Clearing of ROW of existing highway	Transportation generation of construction materials and workers	Clearance of forest trees	Activities of construction equipments and tools	Construction and use of the staging area, concrete mixing plant, storage, etc.	Construction and use of the Workers' Camp, including septic tanks	Employment of workers and caretakers	Construction and operation of the water treatment plant for the turbid water from construction sites.	Water intake for the concrete plant, other construction facilities and the Workers' Camp	Construction of the soil disposal site, and disposal	Construction of the Tunnel (Excavation, facilities, pavement, etc.)	Construction of road facilities (Toll post, tunnel management office, electricity system, back up generator, weigh bridge, etc.)	Construction of the Approach Road (Filling, cutting, bridges and culverts)	Construction of the temporal stand-by area/ holding parking space for construction vehicles along the District Road (on lease)	Existence of new road and traffic	Existence of road facilities (Used site for staging area and other facilities)	Used site for disposal area	Traffic on the existing highway
1	Air	NO2 or NOx				X		X											X			+
		SO2 or SOx																				
		Dust, SPM (PM10, PM2.5)				X		X	X	X				X	X	X		X				+
2	Water (surface, public)	BOD or COD								X										X		
		SS												X	X		X					
		N and P																				
		Temperature																				
		pH																				
		DO																				
3	Waste	Solid Waste							X	X		X								X		
		Soil													X		X					
		Liquid Waste								X		X			X							
4	Soil	Soil contamination						X	X													
5	Noise and vibration	Noise						X											X			
		Vibration																				
6	Ground subsidence	Ground subsidence																				
7	Odor	Odor																				
8	Bottom sediment	Bottom sediment																				

Natural Environment

			Planning Phase			Construction Phase													Operation Phase			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			Land acquisition of the Work Area	Lease of land parcels along the existing District Road	Clearing of ROW of existing highway	Transportation generation of construction materials and workers	Clearance of forest trees	Activities of construction equipments and tools	Construction and use of the staging area, concrete mixing plant, storage, etc.	Construction and use of the Workers' Camp, including septic tanks	Employment of workers and caretakers	Construction and operation of the water treatment plant for the turbid water from construction sites.	Water intake for the concrete plant, other construction facilities and the Workers' Camp	Construction of the soil disposal site, and disposal	Construction of the Tunnel (Excavation, facilities, pavement, etc.)	Construction of road facilities (Toll post, tunnel management office, electricity system, backup generator, weigh bridge, etc.)	Construction of the Approach Road (Filling, cutting, bridges and culverts)	Construction of the temporal stand-by area/ holding parking space for construction vehicles along the District Road (on lease)	Existence of new road and traffic	Existence of road facilities (Used site for staging area and other facilities)	Used site for disposal area	Traffic on the existing highway
9	Protected Area	Protected Area																				
10	Ecology	Protected flora species					*															
		Protected vegetation					*															
		Protected fauna species					*															
11	Water regime	Surface water (Volume, speed, depth)											X	X	X		X		X			
		Ground water (depth, location of aquifer)													X				X			
		Springs													X				X			
12	Geology	Slope stability												X	X		X		X		X	

Social and Economical Environment

		Planning Phase			Construction Phase													Operation Phase			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Land acquisition of the Work Area	Lease of land parcels along the existing District Road	Clearing of ROW of existing highway	Transportation generation of construction materials and workers	Clearance of forest trees	Activities of construction equipments and tools	Construction and use of the staging area, concrete mixing plant, storage, etc.	Construction and use of the Workers' Camp, including septic tanks	Employment of workers and caretakers	Construction and operation of the water treatment plant for the turbid water from construction sites.	Water intake for the concrete plant, other construction facilities and the Workers' Camp	Construction of the soil disposal site, and disposal	Construction of the Tunnel (Excavation, facilities, pavement, etc.)	Construction of road facilities (Toll post, tunnel management office, electricity system, back up generator, weigh bridge, etc.)	Construction of the Approach Road (Filling, cutting, bridges and culverts)	Construction of the temporal stand-by area/ holding parking space for construction vehicles along the District Road (on lease)	Existence of new road and traffic	Existence of road facilities (Used site for staging area and other facilities)	Used site for disposal area	Traffic on the existing highway
13	Involuntary Resettlement and/or Loss of Properties	X		X																	
14	Poor,	X		X																	
15	indigenous, and marginalized groups, refugees																				
16	Local economy such as employment and livelihood				+					+			X			X		+			X
17	Land use, Local resource use, Communal/ Common resource use rights					X						X	X			X					
18	Water Rights /Water use	X										X	X			X		X	X		
19	Traffic/Public Facilities, infrastructures, Social services				X								X			X		+	+		
20	Social institutions/ infrastructures such as local decision-making systems, corporative																				
21	Uneven distribution of benefits and damages					X												X			X
22	Local conflict of interests					X												X			X
23	Physical splits of Communities															X					
24	Historical and cultural resources												X		X	X					
25	Landscape																				
26	Gender															X		+			
27	Children's rights																				
28	Sanitation, Public Health Condition, Infectious diseases such as HIV/AIDS								X			X							X		
29	Industrial safety and health, Working environment				X	X	X	X	X		X		X	X	X	X	X				
30	Accidents, crime Traffic accidents				X													X			
	Fire after traffic accidents																	X			
	Crime								X	X											
	Smuggling																	X			
31	Greenhouse gas																				
	Ozone depleting substances																				

TABLE 13.3-3 JICA ENVIRONMENTAL IMPACT SCOPING FORMAT

No.	Items		Planning Phase, Construction Phase	Operation Phase	Selected Reason (Reason of Priority, Location of Impacts)
1	Air	NO2 or NOx	B-	B-	CONSTRUCTION PHASE : Transportation vehicle on road and construction equipment at the work areas of the Project shall emit exhaust gas. OPERATION PHASE : Traffic exhaust gas on the Approach Road shall alter the existing air quality condition.
		Dust, SPM (PM10, PM2.5)	B-	C	CONSTRUCTION PHASE : Activities of the construction equipment at the work areas listed in the left cell, and the transportation vehicle of the Project shall cause dust, that will be diffused in the surrounding area..
2	Water (surface, public)	BOD	B-	C	CONSTRUCTION PHASE : Waste water from kitchen, bath and toilet shall be generated at the Camp at West Portal. OPERATION PHASE : Road facilities at West and East Portal, shall be equipped with toilet, and may also have kitchen and shower facilities.
		SS	B-	D	CONSTRUCTION PHASE : Culverts and bridges shall be constructed at the bottom of the Soil Disposal Site and at the Approach Road. During the construction of those structures, the river water will be muddier than its original state. The ground water discharged from the work area of the Tunnel shall be mixed with sands and clay on site.
3	Waste	Solid Waste	B-	C	CONSTRUCTION PHASE : Bags, containers and other wastes shall be generated at the staging area and work areas. Kitchen wastes and other types of wastes shall be generated at the Workers' Camp. Sludge from septic tank and water treatment plant shall be discarded at designated locations. OPERATION PHASE Workers at road facilities constructed at the used stock yard shall generate general wastes and septic tank sludge.
		Soil Waste	B-	D	CONSTRUCTION PHASE : The construction work shall generate excavation material.
		Liquid Waste	B-	C	Groundwater discharge is expected during the construction of the tunnel Kitchen, bath, and toilet at the Workers' Camp shall be treated in septic tank then overflow shall seep into the surrounding soil or discharged to waste water pipe. OPERATION PHASE Workers at road facilities constructed at the used stock yard shall generate liquid waste.
4	Soil	Soil contamination	B-	C	CONSTRUCTION PHASE : Oils and chemicals used in the construction phase may spill over at the Work Areas and the Stock Yards.
5	Noise	Noise	B-	C	CONSTRUCTION PHASE : Construction equipments and tools shall generate noise at the Work Areas. OPERATION PHASE : The noise from the traffic on the Approach Road shall be felt by local residents along the road.
6	Ground subsidence		D	D	No activities that may cause ground subsidence are planned related to the Project.

No.	Items		Planning Phase, Construction Phase	Operation Phase	Selected Reason (Reason of Priority, Location of Impacts)
7	Offensive Odor		D	D	No activities that may cause offensive odor are planned related to the Project.
8	Bottom Sediment		D	D	No activities that may cause contamination of bottom sediment in water bodies are planned related to the Project.
9	Ecology	Protected Areas	D	D	No protected areas are located in and near the Project Area.
10		Protected flora species	C	D	CONSTRUCTION PHASE : About 0.5 ha of national forest shall be cleared for the West Portal. Although there is low possibility of finding protected flora species in the Work Area, detailed field survey has never been done in the area, and it is worth studying at least for the academic record of the flora condition of the area.
		Protected vegetation	C	D	CONSTRUCTION PHASE : About 0.5 ha of national forest shall be cleared for the West Portal. Although there is low possibility of finding protected vegetation types in the Work Area, detailed field survey has never been done in the area, and it is worth studying at least for the academic record of the vegetation condition of the area.
		Protected fauna species	C	D	CONSTRUCTION PHASE : About 0.5 ha of national forest shall be cleared for the West Portal. Although there is low possibility of finding protected fauna species in the Work Area, detailed field survey has never been done in the area, and it is worth studying at least for the academic record of the fauna condition of the area.
11	Water regime	Surface water (Volume, speed, depth)	B-	D	CONSTRUCTION PHASE : 1. Water intake at Khatripauwa river for the concrete plant, other construction facilities and the Workers' Camp at the Stock Yard, throughout the Construction Phase, may affect water use of downstream. 2. During the first phase of the construction of soil disposal site, water drainage pipes or culverts shall be set at the bottom. While the construction is underway, water flow in Sisnekhola may be manipulated temporally. 3. By constructing the Tunnel, the ground water level in the area may become lower, and the volume of surface water flow may decrease. 4. During the construction of the bridges and culverts at the Approach Road, water flow in Bhanjyang Khola may be manipulated temporally. 5. During the construction of the Approach Road, the condition of the rain water discharge may be altered at the places where the road is located on the fill, until proper drainage is installed. OPERATION PHASE : Although the culverts and bridges shall be designed to accommodate sufficient volume of water, those structures may cause obstruction when the area suffers unusual scale of flood, and overflow in the surrounding area.
		Ground water (depth, location of aquifer)	B-	B-	CONSTRUCTION PHASE : OPERATION PHASE : By constructing the Tunnel, the ground water level in the area may become lower.
		Springs	B-	B-	CONSTRUCTION PHASE : OPERATION PHASE : By constructing the Tunnel, the ground water level in the area may become lower, and the volume of spring water may decrease.

No.	Items		Planning Phase, Construction Phase	Operation Phase	Selected Reason (Reason of Priority, Location of Impacts)
12	Geology	Slope stability	D	D	CONSTRUCTION PHASE : The Project road shall not cut natural steep slopes except at the West Portal. Artificial slopes, however, shall be constructed at the soil disposal site (fill slope), and at the Approach Road (cut slope and fill slope). OPERATION PHASE : Artificial slopes at the West Portal and the Approach Road need to be monitored and maintained to avoid slope collapse.
13	Involuntary Resettlement and/or Loss of Properties		B-	D	PLANNING PHASE: CONSTRUCTION PHASE : In total, about 14 ha of private land shall be acquired for ROW of the Approach Road and tunnel Portals. In the area, 3 residence houses and 2 business operation are recognized. Number who will be resettled are estimated as 8 households, 16 persons. Other area of the ROW is used mainly for private farming. Clearing of ROW of existing highway at Sisnekhola for the West Portal and the Stock Yard will require resettlement of 2 households, 12 persons. In addition to above, about 0.5 ha of national forest shall be cleared for the West Portal.
14	Poor		C	D	PLANNING PHASE: CONSTRUCTION PHASE : In total, about 14 ha of private land shall be acquired for ROW of the Approach Road and the West Portal. In total, the area, 5 residence houses 10 households, 28 persons shall be required to resettle. Other area of the ROW of the Approach Road is used mainly for private farming. Those who are affected may include people who belong to disadvantaged or marginalized social groups or other vulnerable population.
15	Indigenous or minority groups		D	D	According to the information from MOSTE, DOR, and related VDC Secretaries, there are no specific area in and near the Project Area where people who belong to indigenous or minority groups are residing in special circumstances. In general, the ratio of indigenous, minority, or marginalized groups among the total population in Kathmandu District is about 30 %. Similar situation is expected in the Project Area.
16	Local economy such as employment and livelihood		C	C	CONSTRUCTION PHASE : Local residents will lose their farming land for the construction of the soil disposal site and the Approach Road. The farming may be either subsistence farming or commercial farming. Such loss may have negative impacts on their livelihood. OPERATION PHASE : Road-side businesses may be activated along the Approach Road, while the bypassed part of the existing highway may receive less traffic and similar businesses may decline in the area.
17	Land use, Local resource use, Communal/ Common resource use rights		C	D	CONSTRUCTION PHASE : Most of the land to be included in the ROW is owned privately. In the Project Area, however, forest at Sisnekhola, and river water are used by local people as communal resource. Clearance of forest trees of about 0.5 ha at the West Portal will limit the yields of NTFP (NTFP : Non timber forest products) available. Water intake for the construction from Khatripauwa river

No.	Items	Planning Phase, Construction Phase	Operation Phase	Selected Reason (Reason of Priority, Location of Impacts)
				throughout the Construction Phase, may affect water use of downstream. While the drainage pipes or culverts are installed at the bottom of the soil disposal site at Sisnekhola, water flow of the river and irrigation canals may be disrupted temporally. Access to water for washing or any other purpose may be required to change during the Construction Phase of the Approach Road.
18	Water Rights /Water use	B-	C	PLANNING PHASE : Construction plan in the Work Area may affect water rights or facilities provided by the local water provider. CONSTRUCTION PHASE : Water intake for the concrete plant, other construction facilities and the Workers' Camp may affect existing water use during the Construction Phase (about 4 years). While the drainage pipes or culverts are installed at the bottom of the soil disposal site at Sisnekhola, water flow of the river and irrigation canals may be disrupted temporally. Access to water for washing or any other purpose may be required to change during the Construction Phase of the Approach Road. OPERATION PHASE : Access to water for washing or any other purpose may be required to change by construction of the Approach Road and heavy traffic. Road facilities located at each Portals shall need water for the staff. New demand for water may affect existing water use.
19	Traffic/Public Facilities, infrastructures, Social services	B-	B+	CONSTRUCTION PHASE : Daily traffic generation of the workers' movement, and material transportation to the Stock Yard and to the Work Areas will be added on to the traffic volume of the existing highway. Construction of the east and west intersections at the existing highway may require closure of 0.5 lane for one day. Construction of the drainage and retaining wall of the soil disposal site may require temporal closure of 0.5 lane. Construction of the Approach Road may affect access to public facilities or social services located nearby.
20	Social institutions such as social infrastructure and local decision - making institutions	D	D	The Project aims to construct a bypass road of already existing highway in the area near the existing road. Therefore, no significant impact is expected on the Social institutions such as social infrastructure and local decision - making institutions in the Project Area.
21, 22	Uneven distribution of benefits and damages Local conflict of interests	C	C	CONSTRUCTION PHASE : By reducing the area of registered community forest in the upper slope of Sisnekhola, the users may have to compete for the NTFP, or they may try to join in other Forest User's Groups located nearby. OPERATION PHASE : Road-side businesses may be activated along the Approach Road, while the bypassed part of the existing highway may receive less traffic and similar businesses may decline in the area.
23	Physical splits of Communities	C	C	CONSTRUCTION PHASE : During the Construction Phase, temporal closure of existing road may cause difficulties of movement among the population nearby. OPERATION PHASE : The linear Approach Road might split existing community for permanently.

No.	Items	Planning Phase, Construction Phase	Operation Phase	Selected Reason (Reason of Priority, Location of Impacts)
24	Historical and cultural resources	C	D	CONSTRUCTION PHASE : Locally worshipped cultural or religious resources may be affected by the Project.
25	Gender	C	D	CONSTRUCTION PHASE : During the construction of the Approach Road, access to the market, water source, or river (washing place) may be temporally obstructed and walking distance of homemaker may increase.
26	Children's rights	C	C	No specific negative impacts are expected by the activities of the Project. During the field survey, however, data collection on field and interviews to DOR/GESU and other related institutions shall be conducted for better decision and evaluation.
27	Sanitation, Public Health Condition, Infectious diseases such as HIV/AIDS	B-	C	CONSTRUCTION PHASE : If the living environment and water source are not kept in clean condition, infectious diseases may occur among the workers and may spread to the local residents.
28	Industrial safety and health, Working environment	B-	D	CONSTRUCTION PHASE : At every activity and location of construction works, there is possibility of accident, involving the workers or the general public passing by.
29	Accidents, crime Traffic accidents	B-	B-	CONSTRUCTION PHASE : Increased traffic on the existing highway may cause increase of traffic jam and accidents. OPERATION PHASE : Existence of Approach Road, Portals and Tunnel may cause increase of self-inflicted accidents and accidental encounters between people and cars.
	Fire after traffic accidents	D	B-	OPERATION PHASE : If a fire erupts following traffic accidents in tunnel, the impact shall be severe, and the tunnel may need to be closed for several months to re-install all the facilities.
	Crime	B-	D	CONSTRUCTION PHASE : Influx of workers with low morale may cause increase of troubles in the vicinity of Workers' Camp.
	Smuggling	D	B-	OPERATION PHASE : Since the traffic on the Project road shall not go through the Nagdhunga Police Check Point, illegal smuggling into Kathmandu Valley may increase.
30	Climate change, transboundary impacts	D	D	The Project plans to construct rather short, about 5 km, bypass road near the existing national highway. Therefore, there is no possibility of causing significant impact on climate change or transboundary impacts, i.e. impacts that cross over major watershed, jurisdiction of local government, or national borders. On the other hand, the Project need to consider impacts from climate change, such as increased possibility of slope failures and unexpectedly large storm and flooding. The Project is expected to contribute on reducing consumption of fossil fuel per vehicle on the section between the planned Portals, because the Project road offer shorter distance with gentler grade compared to the existing road.

A+/-: Significant positive/negative impact is expected.
B+/-: Positive/negative impact is expected to some extent.
C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)
D: No impact is expected.

Source: JICA Survey Team, 2014

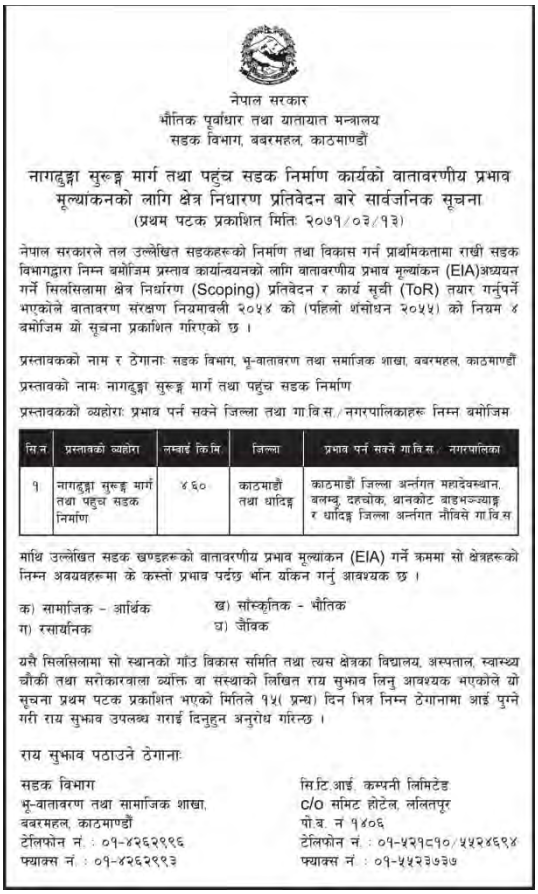
13.3.5 Fifteen Days Notice According to EPA

The public notice for scoping was published in Nepali on the Gholkapatra, a national daily newspaper, on June 28, 2014, on behalf of DOR. The copies of the public notice were also posted at the offices of the concerned VDCs of the project area, with approvals from the VDC Secretaries.

The purpose of public notice is to inform the stakeholders particularly of the project influence area about the project. The notice calls upon the concerned parties, project affected people, and in broader sense stakeholders to offer suggestions and concerns about natural systems, cultural practices, social systems, economic and human activities and interrelationships of environmental components.

Following are the issues and concerns raised by Local Government agencies, through their letters, in response to the Public Notice.

Those comments were also collected during the preparation of the Public Consultation, when the Team circulated general notice requesting local level stakeholders for participation in the meeting as shown in **Table 13.3-4**.



नेपाल सरकार
भौतिक पूर्वाधार तथा यातायात मन्त्रालय
सडक विभाग, बबरमहल, काठमाण्डौं

नागढुङ्गा सुरूङ्ग मार्ग तथा पहुंच सडक निर्माण कार्यको वातावरणीय प्रभाव मूल्यांकनको लागि क्षेत्र निधारण प्रतिवेदन बारे सार्वजनिक सूचना
(प्रथम पटक प्रकाशित मितिः २०७१/०३/१३)

नेपाल सरकारले तल उल्लेखित सडकहरूको निर्माण तथा विकास गर्न प्राथमिकतामा राखी सडक विभागद्वारा निम्न बमोजिम प्रस्ताव कार्यान्वयनको लागि वातावरणीय प्रभाव मूल्यांकन (EIA)अध्ययन गर्ने सिलसिलामा क्षेत्र निर्धारण (Scoping) प्रतिवेदन र कार्य सूची (ToR) तयार गर्नुपर्ने भएकोले वातावरण संरक्षण नियमावली २०५४ को (पहिलो संशोधन २०५५) को नियम ४ बमोजिम यो सूचना प्रकाशित गरिएको छ ।

प्रस्तावकको नाम र ठेगानाः सडक विभाग, भू-वातावरण तथा समाजिक शाखा, बबरमहल, काठमाण्डौं

प्रस्तावको नामः नागढुङ्गा सुरूङ्ग मार्ग तथा पहुंच सडक निर्माण

प्रस्तावकको व्यहोराः प्रभाव पर्न सक्ने जिल्ला तथा गा.वि.स./नगरपालिकाहरू निम्न बमोजिम

सि.नं	प्रस्तावको व्यहोरा	लम्बाई कि.मि.	जिल्ला	प्रभाव पर्न सक्ने गा.वि.स./ नगरपालिका
१	नागढुङ्गा सुरूङ्ग मार्ग तथा पहुंच सडक निर्माण	४.६०	काठमाडौं तथा धादिङ्ग	काठमाडौं जिल्ला अर्न्तगत मगदेवस्थान, बलम्बु, दहचोक, थानकोट वाइभञ्ज्याङ्ग र धादिङ्ग जिल्ला अर्न्तगत नौविसे गा.वि.स

माथि उल्लेखित सडक खण्डहरूको वातावरणीय प्रभाव मूल्याकन (EIA) गर्ने क्रममा सो क्षेत्रहरूको निम्न अवयवहरूमा के कस्तो प्रभाव पर्दछ भनि यकिन गर्नु आवश्यक छ ।

क) सामाजिक - आर्थिक　　ख) सांस्कृतिक - भौतिक
ग) रसायनिक　　घ) जैविक

यसै सिलसिलामा सो स्थानको गाँउ विकास समिति तथा त्यस क्षेत्रका विद्यालय, अस्पताल, स्वास्थ्य चौकी तथा सरोकारवाला व्यक्ति वा संस्थाको लिखित राय सुझाव लिनु आवश्यक भएकोले यो सूचना प्रथम पटक प्रकाशित भएको मितिले १५(पन्ध्र) दिन भित्र निम्न ठेगानामा आई पुग्ने गरी राय सुझाव उपलब्ध गराई दिनुहुन अनुरोध गरिन्छ ।

राय सुझाव पठाउने ठेगानाः

सडक विभाग
भू-वातावरण तथा सामाजिक शाखा,
बबरमहल, काठमाण्डौं
टेलिफोन नं. : ०१-४२६२९९६
फ्याक्स नं. : ०१-४२६२९९३

सि.टि.आई. कम्पनी लिमिटेड
c/o समिट होटेल, ललितपुर
पो.ब. नं १४०६
टेलिफोन नं. : ०१-५२१८१०/५५२४६९४
फ्याक्स नं. : ०१-५५२३७३७

Source: JICA Survey Team, 2014

FIGURE 13.3-1　　FIFTEEN DAYS NOTICE

TABLE 13.3-4 RECOMMENDATIONS / SUGGESTION / CONCERNS AND ISSUES FROM STAKEHOLDERS

Topics		Recommendations / Suggestion / Concerns and Issues from VDC offices	Balambu	Mahadevsthan	Dahachok	Thankot	Baad Bhanjyang	Naubise
		PROJECT COMPONENTS						
Improving Road alignment	1	The improvement and upgrading of existing roads, up to some limited extent, seems to be touched by proposed road.	X		X	X	X	
Road facilities	2	In the proposed road, there must be proper facility of footpath and road lights.	X		X	X	X	
Road alignment	3	For the Oil Corporation Depot in Thankot, the proposed road must link that area. If not, then new approach road must be constructed.				X		
	4	The Tunnel road starting point is in Sisne khola at present. If it started by Naubise it will be much better.					X	
	5	The Tunnel road must start by Naubise and end at Badbhanjyan VDC, ward-2.					X	
Employment opportunities to local people	6	Priority must be given to locals in employment opportunities in the Project	X		X	X	X	
Local resource use	7	There must be maximum utilization of local sources and resources.	X		X	X	X	
Public consultation meetings	8	Only after the intensive public consultation meetings with the locals of affected VDCs, the project work is to be started.	X		X		X	
		LAND ACQUISITION AND COMPENSATION						
Compensation price for land	9	Keeping in view the sentiments and concerns of local people, there must be adequate compensation pattern and assurance	X		X	X	X	
	10	Throughout the Baad Bhanjyang VDC, there is tunnel road. Adequate compensation must be provided to the land owners who are having their land on the tunnel road. Then only work is to be started.					X	
Grievance redress mechanism	11	The proposed road seems to be economically and socially advantageous for the new the community. But the people who are living and earning in the previous route will be affected. So, the concerned agency must focus on the people who may negatively affected on the existing road.	X		X	X	X	
		NATURAL AND SOCIAL ENVIRONMENT						
Resource protection	12	The work construction work must be done without hampering the geography and environment of that area.	X		X	X	X	
Flora and fauna protection	13	Construction work will affect flora and fauna of the area. They should be protected.					X	
Water resource protection	14	The project work is to be done without hampering the local drinking water sources. If it happens the concerned agency must look upon the alternative drinking water source.	X		X	X	X	
	15	The drinking water source may be wipe out after construction of Tunnel road. Alternative of drinking source must be arranged.					X	

Topics		Recommendations / Suggestion / Concerns and Issues from VDC offices	Balambu	Mahadevsthan	Dahachok	Thankot	Baad Bhanjyang	Naubise
	16	Near the proposed tunnel road there are many natural drinking water sources. The people of ward-3 and 4 of Naubise VDC depend upon that source. So, during the construction of proposed tunnel road, the drinking water source must not be affected.						X
Soil disposal without affecting irrigation, agriculture and settlement	17	During construction of tunnel, the soil generated is planned to be disposed in Sisne khola. There are paddy fields and Irrigation at lower parts. During soil disposal there, it might affect settlements and fields by soil debris during rain. So, soil must be disposed in other place, or without affecting present irrigation system and settlement.						X

13.3.6 Public Consultation for Information Dissemination and Collection

After having the interval of 15 days from the publication of the Notice, the first public consultation meeting for scoping was held at two locations as shown in **Table 13.4-13**.

The detail of the meeting is described in **Section 13.4.5**.

13.3.7 Preparation and Submission of the Scoping Document and EIA TOR

As shown in **Table 13.3-5**, including the information obtained in the public consultation, the Team drafted the Scoping Document and the EIA TOR and submitted to DOR on August 1, 2014. After receiving the comments from DOR, the revised version of the documents were submitted to DOR, on August 12, 2014, for the second time, to be forwarded to MOPIT for review.

The documents are submitted to MOSTE by MOPIT, and MOSTE planned the Environmental Audit Committee on September 23. The meeting, however, was cancelled the day before due to an urgent family responsibility of the chair person.

The Committee was held on October 17. With the reflection of the expert comments submitted by October 19 from 5 experts, the revised version of the SD and TOR were submitted to MOSTE on October 22. The MOSTE approval is expected to be issued within one week after the revised documents are submitted to MOSTE.

TABLE 13.3-5 PREPARATION AND SUBMISSION OF THE SCOPING DOCUMENT AND EAI TOR

DATES	ACTIVITIES
June, 2014	Start preparation of the Scoping Document and EIA TOR
August 1, 2014	1st submission to DOR
August 7, 2014	Comments from DOR received
August 12, 2014	2nd submission of revised documents to DOR
August 15, 2014	The Scoping Document and EIA TOR reached to MOPIT for review
August 21, 2014	The Scoping Document and EIA TOR reached to MOSTE for review
September 23, 2014	The presentation at MOSTE to the Environmental Audit Committee was planned but cancelled the day before
October 17, 2014	The presentation at MOSTE to the Environmental Audit Committee
October 22, 2014	2nd submission of revised documents to MOSTE
November 16, 2014	*MOSTE approval of Scoping Document and EIA TOR*

13.3.8 Draft Preparation of JICA Environmental Checklist

The Team prepared the draft of JICA Environmental Checklist in August, 2014, and updated in October. The Checklist is included in **Annex 13.3-2**.

13.3.9 Remaining Works and Procedure

(1) Field Survey for EIA Report

Starting from August 2014, works for the data collection, impact prediction, and mitigation planning for the items listed in the following Table shall be conducted to prepare the draft EIA report.

Detailed census survey and property survey for RAP shall be conducted after the Scoping Document and the EIA TOR are approved by MOSTE.

TABLE 13.3-6 FIELD SURVEY ITEMS FOR EIA

No.	Field Survey Items for EIA	
1	Air	NO2 or NOx
		Dust, SPM (PM10, PM2.5)
2	Water (surface, public)	BOD
		SS
3	Waste	Solid Waste
		Soil Waste
		Liquid Waste
4	Soil	Soil contamination
5	Noise	Noise
10	Ecology	Protected flora species
		Protected vegetation
		Protected fauna species
11	Water regime	Surface water (Volume, speed, depth)
		Ground water (depth, location of aquifer)
		Springs
12	Geology	Slope stability
13	Involuntary Resettlement and/or Loss of Properties	
14	Poor	
16	Local economy such as employment and livelihood	
17	Land use, Local resource use, Communal/ Common resource use rights	
18	Water Rights /Water use	
19	Traffic/Public Facilities, infrastructures, Social services	
21, 22	Uneven distribution of benefits and damages Local conflict of interests	
23	Physical splits of Communities	
24	Historical and cultural resources	
26	Gender	
28	Sanitation, Public Health Condition, Infectious diseases such as HIV/AIDS	
29	Industrial safety and health, Working environment	
30	Accidents, crime Traffic accidents	
	Fire after traffic accidents	
	Crime	
	Smuggling	

Source: JICA Survey Team, 2014

(2) Preparation of the EIA Report

In the preparation of the EIA report, the Team shall stand on the following basic policies.

1) **Proposal of environmental monitoring plan based on the enforcement capacity of the local institutions**

It is the present condition that even MOSTE does not have sufficient ability to conduct periodical monitoring of environmental items such as traffic noise, vibration, air pollution, and ground water level.

Existing condition prior to the commencement of the construction works, together with the condition throughout the construction works, of such items must be monitored to define and evaluate the impacts of the Project scientifically.

Based on such reality, the environmental monitoring plan shall contain monitoring items and measures that are implementable by DOR or other responsible institutions. And the field survey during the EIA study shall also be conducted using the same items and measures so that the pre- and post-construction condition can be compared in simple manner.

2) **Selection of technology related to tunnel construction to avoid and minimize negative impacts**

While selecting the technology of tunnel construction and waste water management, the Team shall aim to avoid and minimize the negative impacts such as changes in ground water level, decrease of volume of drinking water source, and negative changes in the vegetation in community forest.

The Team shall also assume alternative water sources, such as wells and water distribution systems within the scope of the Project as preparation for unexpected impact arises.

3) **Social communications in recognition of the uneven distribution of the Project merit**

Among the local governments of the Project concerned, the section in Baad Bhanjyang VDC will be the Tunnel section and will not receive direct merit from the Approach Road or improved road network. In addition, the existing highway in the VDC may receive less traffic and the shops and eateries may see less customers and sales.

In Naubise VDC, where the soil disposal site is proposed, the merit of the Project may not be significant.

Based on such recognition, public consultations and other intercommunications with local offices and residents shall be carefully planned with the advises of consultants, local officers, and staff of DOR, to avoid unnecessary oppositions as well as to increase positive attitudes among the local stakeholders.

4) **Information collection and communication with the District Compensation Committees, Legal Departments of DOR and MOPIT**

The procedure of determination of compensation and assistance is still under survey. The Team shall continue information collection and communication regarding the 'market price,' and the amount of compensation and assistances in sample project.

Legal and governmental system to protect the tunnel structure is still under development in Nepal. Whether it is possible to monitor and restrict construction activities above the Tunnel, and whether there will be any compensation for such restriction, is not decided by GON.

In the mean time, the Land Acquisition Law and the Compensation Determination Committee shall be the legal and governmental system to handle the issue, since both are well used and recognized by ordinary society.

In the long term, however, considering that many road tunnel project will be implemented throughout Nepal, specific and technical legal base is necessary, as well as the permission system for construction activities and daily monitoring of tunnel structures.

The Team shall collect information in Nepal and in other countries and provide them to DOR or other respective institutions for assistance.

13.3.10 Updated Approval Schedule

So far, the EIA approval schedule is almost on time with the originally expected Fast Track procedure. In the most optimistic schedule, processing up to step No.26 as shown in **Table 13.3-7**, MOSTE is expected to award approval of the Project 5.5 to 6.5 month after February 2015

TABLE 13.3-7 EIA APPROVAL SCHEDULE OF THE PROJECT

No.	Activities	Month	Achievement
1	**MOFSC Permission**		
2	Document preparation and submission for MOFSC approval		Submitted June 26 to DOR/GESU.
3	Permission to start the EIA study is required from the Ministry of Forest and Soil Conservation (MOFSC) before executing Environmental Assessment	2	Permission granted Feb. 2, 2015
4	**Scoping and TOR**		
5	Publication of 15 days Scoping Notice (EPR, 2054- Rule 4.3)	0.5	Published on June 28.
6	Preliminary field survey and investigation. Scoping Notice affix and collection of deeds of notice affix at local institutions	0.5	
7	Preparation and Submission of Scoping Report and TOR (In the format of EPR, 2054-Schedule 4) to DOR	1-1.5	Submitted on August 1.
8	Review of the Reports by DOR	0.5	Comments received on August 7.
9	Incorporation of suggestions and recommendations provided by the DOR, and	0.5	Revised documents submitted on August 12 to DOR/GESU.
	Submission to MOPIT through DOR		August 15.
10	***Review of Scoping and TOR by MOPIT***	***1***	
11	PP Presentation of Scoping and TOR at MOPIT	1 day	Not required.
12	***Incorporation of suggestions and recommendations provided during presentation in Scoping and TOR and submit to MOPIT through DOR***	***0.5***	Not required.
13	***Forward of Scoping and TOR to MOSTE from MOPIT***	***0.5***	August 21.
14	***Review of Scoping and TOR by MOSTE***	***0.5***	
15	PP Presentation of Scoping and TOR at MOSTE	1 day	Oct. 17.
16	***Incorporation of suggestions and recommendations in Scoping and TOR provided by MOSTE and its resubmission***	***0.5***	Oct. 22
17	***Approval of Scoping and TOR from MOSTE***	***1***	Nov. 16
18	**EIA Study**		
20	RAP Study, Cadastral Survey, Census Survey, Data Enumeration	1	Cut off date (Refer to Section 13.4)
22	Propose Mitigation and Augmentation Measures and Preparation of Environmental Management Plan; Acquisition, Compensation and Resettlement Action Plan	1	
24	Publication of Notice for Public Hearing and Public Hearing as per EPR, Rule 7.2 at field sites	0.5	Public Hearing conducted on Jan. 2, 2015
25	Submission of Draft EIA Report to DOR with the incorporation of opinions and suggestions collected from Public Hearing and Recommendation Letters from affected VDCs.	0.5	Submission on Jan. 22, 2015
26	***Review of the Draft EIA Report by DOR***	***0.5***	DOR issued written comments on Feb. 18, 2015 (Delay occured since GESU Chief position became vacant by promotion of ex-chief.)
27	***Incorporation of Suggestions and Recommendations provided by DOR in Draft EIA Report and Submission 10 copies to MOPIT through DOR***	***0.5***	
28	***Review of the Draft EIA Report by MOPIT***	***0.5***	
29	***Incorporation of Suggestions provided by MOPIT in Draft EIA Report and Submission of 10 copies to MOSTE through DOR and MOPIT***	***0.5***	
30	***Review of the Draft Final EIA Report by MOSTE***	***0.5***	
31	PP Presentation of Draft Final EIA Report at MOSTE	1 day	
32	***Incorporation of Suggestions provided by MOSTE during presentation in Draft Final EIA Report and Re-Submission to MOSTE through DOR and MOPIT***	***0.5***	
33	***Issuance of 30 day public notice in daily newspaper for public opinions and suggestions by MOSTE and Approval of EIA report by MOSTE as per EPR, Rule 11.2, 11.4, 11.5 and 11.6)***	***3 to 4***	

Items in Italic are the critical passes of the schedule. The critical timing in future is shown by thick line in the chart.
Nepali holidays or unexpected governmental holidays are not considered in the above chart.

Source: JICA Survey Team

13.3.11 Summary of Baseline Survey and Forecast

The result of baseline survey and forecast of impacts are shown in **Table 13.3-8**.

Serious impacts on natural, pollution and socio-economic items are not expected.

Detailed information will be included in the Draft EIA Report to be prepared in the first half of

November.

TABLE 13.3-8 SUMMARY OF BASELINE SURVEY AND FORECAST

No.	Items		Final Rating		Summary of Result	
			Planning & Construction Phase	Operation Phase	Baseline	Forecast
1	Air	NO2	B-	B+/-	Measurement results are between 10.28 and 26.26 microgram/m3, below 80, the ambient air standard.	**CONSTRUCTION PHASE :** Construction vehicles and machines will add the emission, but condition will not surpass the standard. **OPERATION PHASE :** Concentration will increase at East Portal, will decrease at West Portal, stay same at the end of Approach Road, but all below the standard.
		PM10	B-	B+/-	Measurement results are between 217 and 337 microgram/m3, far over 120, the ambient air standard.	**CONSTRUCTION PHASE :** Construction vehicles and machines will add the emission, but contribution to the existing condition will be small. **OPERATION PHASE :** Concentration will increase at East Portal, will decrease at West Portal, stay same at the end of Approach Road, but condition will remain over the standard.
2	Water (surface, public)	BOD	B-	B-	Measurement results are between 1.8 and 6.2 mg/L, far below 100, the emission standard.	**CONSTRUCTION PHASE :** Emission of toilet and kitchen waste water to septic tank may affect the water quality but the contribution will be insignificant. **OPERATION PHASE :** Emission of toilet and kitchen waste water at road facilities may affect the water quality but the contribution will be insignificant.
		TSS	B-	B-	Measurement results are between 28.3 and 63.3 mg/L, far below 200, the emission standard.	**CONSTRUCTION PHASE :** While constructing the Bridges, Culverts, and drainage pipes under the Soil Disposal Site, TSS in Balkhu Khola and Sisnekhola will increase. Waste water from the Tunnel construction site will be treated under the standard. **OPERATION PHASE :** Slopes of fill and cut section of the Approach Road and the Soil Disposal Site may erode with heavy rain and contribute higher TSS in water downstream.
3	Waste	Solid Waste	B-	B-	Local municipalities provide a disposal site, and private services are available for waste transportation in the Project Area.	**CONSTRUCTION PHASE :** Sludge and toxic materials will be disposed to officially designated disposal area. House wastes shall be segregated and reused as much as possible. **OPERATION PHASE** Office wastes and septic tank sludge shall be in small volume and be treated in the same manner with wastes in the area.

No.	Items		Final Rating		Summary of Result	
			Planning & Construction Phase	Operation Phase	Baseline	Forecast
		Soil Waste	B-	D	Soil disposal is recognized as part of a road project in Nepal. No specific approval is required.	**CONSTRUCTION PHASE :** All the excavated material from the Approach Road shall be reused. All the excavated material from the Tunnel shall be used to construct relocated Highway and Roadside Rest Area at Sisnekhola. With appropriate handling of drainage and irrigation canal existing in Sisnekhola, negative impacts of soil waste will be insignificant.
		Liquid Waste	B-	B-	Measurement results of BOD are between 1.8 and 6.2 mg/L, far below 100, the emission standard.	**CONSTRUCTION PHASE :** Emission of toilet and kitchen waste water to septic tank may affect the water quality but the contribution will be insignificant. **OPERATION PHASE :** Emission of toilet and kitchen waste water at road facilities may affect the water quality but the contribution will be insignificant.
4	Soil	Soil contamination	B-	D	Sandstone, Phyllite, talus, and the fourth alluvial bed in the Project Area do not contain natural hazardous minerals and chemicals such as heavy metals.	**CONSTRUCTION PHASE :** Oils and chemicals used at the Construction Yards and the Work Areas may spill over, but can be contained in small area and soil contamination outside of the area will be avoided.
5	Noise	Noise	B-	B+/-	Measurement results are between 59.33 and 78.25 dB(A). All measurements are over the daytime and night time guideline standard.	**CONSTRUCTION PHASE :** Construction vehicles and machines will add the noise level, but contribution to the existing condition will be small. **OPERATION PHASE :** Compared to the existing conditions, noise level will be higher at East Portal, lower at West Portal, stay the same at the end of Approach Road, but conditions will remain over the standard.
6	Ground subsidence		D	D	No geological layers that may cause subsidence were found.	Direct and indirect activities in the Project will not cause ground subsidence.
7	Offensive Odor		D	D		No activities that may cause offensive odor are planned related to the Project.
8	Bottom Sediment		D	D		No activities that may cause contamination of bottom sediment in water bodies are planned related to the Project.
9		Protected Areas	D	D	No protected areas are located in and near the Project Area.	
10	Ecology	Protected flora species	*D*	*D*	Interview survey and field survey was conducted	**CONSTRUCTION PHASE :** No protected flora species are expected to be affected.

No.	Items		Final Rating		Summary of Result	
			Planning & Construction Phase	Operation Phase	Baseline	Forecast
		Protected vegetation	*D*	*D*	in the Work Area and in the 0.25 ha of national forest used by Community Forest User's Group.	**CONSTRUCTION PHASE :** No protected vegetation is expected to be affected.
		Protected fauna species	*B-*	*D*		**CONSTRUCTION PHASE :** 7 listed fauna species are reported to be spotted in the area near the Community Forest and their habitat may be negatively affected during the Construction Phase.
11	Water regime	Surface water (Volume, speed, depth)	B-	B-	The flow volume of Sisnekhola was average 19 Litter/ minute, that of Balkhu Khola was average 2,151 Litter/ minute in July and August, and 492 Litter/ minute in August and September.	**CONSTRUCTION PHASE :** Construction of drainage system in Sisnekhola, and bridges and culverts at Balkhu Khola will temporally affect the water flow. Location of water intake and discharge will be determined in the **Detailed Design Phase**, and the impacts of the intake shall be evaluated based on the design. **OPERATION PHASE :** The culverts and bridges on Balkhu Khola may cause obstruction when the area suffers unusual scale of flood, and overflow in the surrounding area.
		Ground water (Depth, location of aquifer)	B-	B-	Monitoring of water level and water quality was started in July 2014.	**CONSTRUCTION PHASE & OPERATION PHASE :** By constructing the Tunnel, the ground water level in the area will become lower, at least temporally. It is difficult to forecast the timing and level of recovery.
		Springs	B-	B-	Monitoring of water flow and water quality was started in July 2014.	**CONSTRUCTION PHASE & OPERATION PHASE :** By constructing the Tunnel, the volume of spring water in the area will become smaller, at least temporally. It is difficult to forecast the timing and level of recovery.
12	Geology	Slope stability	D	D	No vulnerable slopes are located along the Alignment.	**CONSTRUCTION PHASE & OPERATION PHASE :** Cut slopes and fill slopes are designed according to the slope standards. Surrounding area of the cut slopes and alignment shall be treated appropriately to prevent slope failure or debris flow. With measures above, no negative impacts are expected.
13	Involuntary Resettlement and/or Loss of Properties		B-	D	Cadastral Survey and Census Survey was conducted on the land owners and the house owners to be affected.	**PLANNING PHASE & CONSTRUCTION PHASE :** The estimated total land acquisition areas, which may need for compensation, will be 11.6 ha. The total number of the resettlement households will be 5 and the resettled peoples will be 27.

No.	Items	Final Rating		Summary of Result	
		Planning & Construction Phase	Operation Phase	Baseline	Forecast
14	Poor	*D*	D	Census Survey was conducted on the land owners and the house owners to be affected.	**PLANNING PHASE & CONSTRUCTION PHASE :** The PAPs to be resettled or whose farm land to be affected do not belong to the poor or vulnerable group.
15	Indigenous or minority groups	*D*	D	ditto.	*ditto.*
16	Local economy such as employment and livelihood	*D*	*D*	Field observation and sample interviews were conducted.	**CONSTRUCTION PHASE & OPERATION PHASE :** The negative impact of loss of farming land and decrease of traffic volume on existing HWY will be insignificant on local employment and livelihood.
17	Land use, Local resource use, Communal/ Common resource use rights	D	D	Farming in Nepal is mainly subsistence farming, and loss of farming land to public works may mean loss of livelihood for some households. 0.25 ha of a Community Forest will be cleared.	**CONSTRUCTION PHASE & OPERATION PHASE :** Loss of farming land or a part of a community forest will not cause negative impact on the local resource use.
18	Water Rights /Water use	B-	B-	Local residents use water wells and piped water for household needs. The source of the piped water is located on the ridge area about 2 km north east of the Eastern Portal. River water is used for washing, bathing, herding and irrigation, but at limited locations.	**CONSTRUCTION PHASE :** Construction of drainage system in Sisnekhola, and bridges and culverts at Balkhu Khola will temporally increase the turbidity of the water. Location of water intake and discharge will be determined in the **Detailed Design Phase**, and the impacts of the intake shall be evaluated based on the design. **CONSTRUCTION PHASE & OPERATION PHASE :** By constructing the Tunnel, the ground water level and spring water volume in the area will become lower, at least temporally. It is difficult to forecast whether the change affects water use by the residents.
19	Traffic/Public Facilities, infrastructures, Social services	B-	B+	East Portal is located close to a District Road. Existing Hwy need to be relocated at West Portal. Emergency vehicles are stopped by traffic jams on existing Hwy.	**CONSTRUCTION PHASE :** Relocation of existing road will cause traffic jam during the **Construction Phase**. **OPERATION PHASE :** Ambulances will have better access to the hospitals in Kathmandu.
20	Social institutions such as social infrastructure and local decision - making institutions	D	D	Alignment of the Project Road avoided physical impacts on social infrastructures.	**CONSTRUCTION PHASE & OPERATION PHASE :** No negative impacts are forecasted.

No.	Items	Final Rating		Summary of Result	
		Planning & Construction Phase	Operation Phase	Baseline	Forecast
21, 22	Uneven distribution of benefits and damages Local conflict of interests	B-	B-	Entire stretch of the Alignment in Baad Bhanjyang VDC is tunneled. Existing Hwy in the VDC will receive less traffic.	**CONSTRUCTION PHASE & OPERATION PHASE :** Since the existing road network in Baad Bhanjyang VDC does not provide good access to the Approach Road, it is understandable that the VDC may feel 'left out' from the Project benefit, unless additional improvement of road access to the Project Road is provided.
23	Physical splits of Communities	D	D	Alignment of the Project Road avoided physical splits of continuous communities.	**CONSTRUCTION PHASE & OPERATION PHASE :** No impacts are forecasted.
24	Historical and cultural resources	D	D	In the Basic Design Phase, no significant resources are to be affected by the Project.	**CONSTRUCTION PHASE :** In **Detailed Design Phase**, new information may become available.
25	Gender	D	D	The Approach Road crosses with major/moderate roads and foot passes at 4 places.	**CONSTRUCTION PHASE :** Alternate route for the closed section of the existing road and foot passes can be provided and the negative impacts on access to market or wash places will be insignificant.
26	Children's rights	D	D	In Nepali Child Labour Act 2001 (2056), it is prohibited to engage children below 16 years in works in construction works. However, children between 14 and 16 years may work light and low-risk jobs such as roadside planting and drainage clearing. (ESMF 3.4.9)	**CONSTRUCTION PHASE :** Contractor shall be responsible to fulfill the requirement of JICA and Nepali Law during the **Construction Phase**. **OPERATION PHASE :** DOR shall be responsible to fulfill the requirement of Nepali Law and other international guidelines during the **Operation Phase**.
27	Sanitation, Public Health Condition, Infectious diseases such as HIV/AIDS	B-	B-	Measurement results of BOD are between 1.8 and 6.2 mg/L, far below 100, the emission standard. Higher rate of HIV holders is reported from Nepali workers returned after working in India.	**CONSTRUCTION PHASE :** Emission of toilet and kitchen waste water to septic tank may affect the water quality but the contribution will be insignificant. Since the limited number of unskilled workers, occurrence possibility of infectious diseases is small when the workers are hired from local community. **OPERATION PHASE :** Emission of toilet and kitchen waste water at Roadside Rest Area may affect the water quality but the contribution will be insignificant.

No.	Items	Final Rating		Summary of Result	
		Planning & Construction Phase	Operation Phase	Baseline	Forecast
28	Industrial safety and health, Working environment	B-	B-	Many accidents and deaths are reported with the tunnel construction works for hydropower projects in Nepal. DOR road maintenance workers are provided with equipments, work manuals, and accidents insurances.	**CONSTRUCTION PHASE :** Negative impacts on health of workers and possibility of accidents shall be minimized by project design. However, it will be necessary to prepare for worst case scenario during the **Construction Phase**. **OPERATION PHASE :** DOR will need to provide special trainings and manuals to the maintenance workers of the Tunnel to reduce the accidents and health impacts.
29	Accidents, crime *Traffic accidents on surface road*	D	B-	Results of traffic count were 7,890 at Nagdhunga, and 15,450 near the end of the Approach Road.	**CONSTRUCTION PHASE :** Trip number of construction-related vehicle on public road are expected about 10 both way, and insignificant on existing Highway and District Road. **OPERATION PHASE :** With new opening of Highway section in agriculture area, the number of traffic accidents caused by drivers and pedestrians will increase for the mean time.
	Traffic accidents on tunnel road	D	B-	There is no road tunnel in Nepal yet. DOR does not have experience in road tunnel management.	**OPERATION PHASE :** With unfamiliar rule for Tunnel road, self-inflicted accidents are expected in and near the Tunnel. Until the Tunnel Management Office gets sufficient experiences and trainings, the operation of safety measures for the Tunnel traffic may be unreliable.
	Crime	B-	D	Human resource requirement in total will be between 50 to 130. The number of unskilled workers is expected to be between 18 to 34.	**CONSTRUCTION PHASE :** Since the limited number of unskilled workers, crime occurrence possibility is small when the workers are hired from local community. With migrant workers who do not have local community relationship, more careful monitoring and training may be necessary.
	Smuggling	D	D	The role of Nagdhunga Police Checkpoint against smuggling is not yet surveyed.	**OPERATION PHASE :** Coordination of police existence at West Portal shall be discussed in **Detailed Design Phase**.

No.	Items	Final Rating		Summary of Result	
		Planning & Construction Phase	Operation Phase	Baseline	Forecast
30	Climate change, transboundary impacts	D	B+	Baseline condition data will be available on the **Detailed Design Phase.**	**CONSTRUCTION PHASE :** No specific climate change and trans-boundary impacts are forecasted due to the site and the scale of the constructions. **OPERATION PHASE :** This Project will be contributed to adaptation measures (e.g. expansion capacity of the corrugated pipes in the drainage system) for expected increase on rainfall intensity as an adaptation option for climate change. But, necessary information/data for the prediction scenarios for expected climate change will be identified and available during the **Detailed Design Phase**.

A+/-: Significant positive/negative impact is expected.
B+/-: Positive/negative impact is expected to some extent.
C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)
D: No impact is expected.

Source: JICA Survey Team, 2014

13.3.12 Environmental Management Plan

A proposed mitigation plans during and after construction are shown in **Table 13.3-9**.

All cost for mitigation measures are to be finalized in the **Detail Design Phase**.

TABLE 13.3-9 ENVIRONMENTAL MANAGEMENT PLAN

No.	Parameters		Environmental Management Measures	Implementation Agency	Responsible Agency
1	Air	NO2	CONSTRUCTION PHASE : Appropriate preventive mitigation measures, such as selection of equipment and proper maintenance, will be taken. OPERATION PHASE : Control of the quality and amount of exhaust gas on the Approach Road will be difficult within the scope of road development project.	CONSTRUCTION PHASE : Contractor OPERATION PHASE : DOR	CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR, MOSTE, Traffic Police
		PM10	CONSTRUCTION PHASE : Appropriate preventive mitigation measures, such as spraying water at the work areas and washing the vehicles before they leave the construction sites, will be taken.	CONSTRUCTION PHASE : Contractor	CONSTRUCTION PHASE : DOR
2	Water (surface, public)	BOD	CONSTRUCTION PHASE & OPERATION PHASE : Appropriate capacity of septic tanks shall be installed at the facilities. The septic tanks shall be managed in appropriate manner.	CONSTRUCTION PHASE : Contractor OPERATION PHASE : DOR (Site office) Facility operators (Rest Area)	CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
		SS	CONSTRUCTION PHASE : Turbid water discharged from the Tunnel construction site shall be appropriately treated at the Water Treatment Plant before discharge. Maximum turbidity avoidance measures shall be designed in the Construction Plan of the bridges and culverts.	CONSTRUCTION PHASE : Contractor	CONSTRUCTION PHASE : DOR

No.	Parameters		Environmental Management Measures	Implementation Agency	Responsible Agency
			Appropriate communication during the Construction Phase between the Contractor, water users and community leaders (i.e. VDC secretaries) and DOR shall be undertaken for information dissemination and grievance redress.		
3	Waste	Solid Waste	CONSTRUCTION PHASE & OPERATION PHASE : Necessary institutional coordination and budget plan for hiring collection and disposal service providers shall be undertaken. Workers and managers shall be trained for appropriate segregation and handling of solid wastes.	CONSTRUCTION PHASE : Contractor OPERATION PHASE : DOR (Site office) Facility operators (Rest Area)	CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
		Soil Waste	PLANNING & CONSTRUCTION PHASE : Careful and thorough communication shall be undertaken in the Planning Phase so that the Disposal Site to be accepted. Design the Disposal Site so that the impacts on the water use downstream to be minimized.	PLANNING & CONSTRUCTION PHASE : Contractor	PLANNING & CONSTRUCTION PHASE : DOR
		Liquid Waste	CONSTRUCTION PHASE & OPERATION PHASE : Appropriate capacity of septic tanks shall be installed at the facilities. The septic tanks shall be managed in appropriate manner.	CONSTRUCTION PHASE : Contractor OPERATION PHASE : DOR (Site office) Facility operators (Rest Area)	CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
4	Soil	Soil contamination	CONSTRUCTION PHASE & OPERATION PHASE : Education of the workers about the negative impacts of soil contamination. Training of good handling of the oils and chemicals to avoid soil contamination. Preparation of clear guidelines of handling, recycling and discarding the empty containers or bags of the chemicals. Designation of site managers who monitors condition of stock yards.	CONSTRUCTION PHASE : Contractor OPERATION PHASE : DOR (Site office) Facility operators (Rest Area)	CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
5	Noise	Noise	CONSTRUCTION PHASE : Selection of low-noise type equipments and providing noise barriers at necessary locations. Control of work hours and days, i.e. stopping at night and weekends, near the vulnerable facilities and settlements. OPERATION PHASE : Proper management of the road to avoid unnecessary noise pollution.	CONSTRUCTION PHASE : Contractor OPERATION PHASE : DOR, Kathmandu Division Office	CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
10	Ecology	Protected flora species	CONSTRUCTION PHASE : Avoid unnecessary disturbance of forest. Take all legal procedures, appropriate communication and coordination with the Community Forest User's Group and the Kathmandu Forest Office.	CONSTRUCTION PHASE : Contractor	CONSTRUCTION PHASE : DOR
		Protected vegetation	CONSTRUCTION PHASE : ditto.	CONSTRUCTION PHASE : ditto.	CONSTRUCTION PHASE : ditto.
		Protected fauna species	CONSTRUCTION PHASE : ditto.	CONSTRUCTION PHASE : ditto.	CONSTRUCTION PHASE : ditto.

No.	Parameters		Environmental Management Measures	Implementation Agency	Responsible Agency
11	Water regime	Surface water (Volume, speed, depth)	PLANNING & CONSTRUCTION PHASE : 1,2. Carefully select and decide the location and volume of the water intake to avoid disruption of important water use. Carefully and thoroughly take communication with the water users well before the commencement of the construction works.	PLANNING & CONSTRUCTION PHASE : Engineer, Contractor	CONSTRUCTION PHASE : DOR
			3. Continue the monitoring activities at important water use locations to examine the significance of the impact of tunnel construction. If the impact is found significant, mitigation measures, such as provision of alternative water source, shall be discussed with the water users. 4,5. Install sufficient capacity of rain water discharge facilities at the fill part of the Approach Road. Take good care of the discharge facilities to avoid clogging. If there are vulnerable areas or facilities, protection work shall be installed. OPERATION PHASE : Monitor the bridges and culverts to allow designed capacity of water flow.	OPERATION PHASE : DOR, Kathmandu Division Office	OPERATION PHASE : DOR
		Ground water (depth, location of aquifer)	PLANNING, CONSTRUCTION & OPERATION PHASE : Continue the monitoring activities through the Construction Phase and Operation Phase at important water use locations to examine the significance of the impact of tunnel construction. If the impact is found significant, mitigation measures, such as provision of alternative water source, shall be discussed with the water users.	PLANNING PHASE : Engineer CONSTRUCTION PHASE : Contractor OPERATION PHASE : DOR, Kathmandu Division Office or Tunnel Management Office	PLANNING PHASE : DOR CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
		Springs	PLANNING, CONSTRUCTION & OPERATION PHASE : Continue the monitoring activities through the Construction Phase and Operation Phase at important springs to examine the significance of the impact of tunnel construction. If the impact is found significant, mitigation measures, such as provision of alternative water source, shall be discussed with the water users.	PLANNING, CONSTRUCTION & OPERATION PHASE : ditto.	PLANNING, CONSTRUCTION & OPERATION PHASE : ditto.
12	Geology	Slope stability	PLANNING & CONSTRUCTION PHASE : Adjust the Project design to comply with the safety standards, guidelines and good examples. OPERATION PHASE : Patrol the ROW to take preventive action for large scale slope failure.	PLANNING & CONSTRUCTION PHASE : Engineer, Contractor OPERATION PHASE : DOR, Kathmandu Division Office or Tunnel Management Office	PLANNING & CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR

No.	Parameters	Environmental Management Measures	Implementation Agency	Responsible Agency
13	Involuntary Resettlement and/or Loss of Properties	PLANNING & CONSTRUCTION PHASE: During the survey of the affected families to be resettled, information on the Project, the rights of the affected people, and Grievance redress system of DOR shall be disseminated. Resettlement Action Plan including land and asset evaluation, compensation and resettlement plan shall be implemented. When found necessary, Vulnerable Community Development Plan shall be implemented. Preference shall be given to the residents in the Affected Area who wish to work as unskilled labor in the Project. The advertisement of the recruitment shall be designed in the manner that as many local residents as possible has access to the information.	PLANNING & CONSTRUCTION PHASE: Engineer, Construction Supervisor	PLANNING & CONSTRUCTION PHASE: DOR
14	Poor	PLANNING & CONSTRUCTION PHASE: When found necessary, Vulnerable Community Development Plan shall be implemented. *<Limits of survey in Basic Design Phase>* *1. Only the list of the land owners shall be produced. Tenants of the farming land are not to be listed.* *2. The list of land owners shall be based on the information on the available Property Registration Form. Whether the information is updated or not shall not be examined.*	PLANNING & CONSTRUCTION PHASE: Engineer, Construction Supervisor	PLANNING & CONSTRUCTION PHASE: DOR
16	Local economy such as employment and livelihood	PLANNING PHASE: When found necessary, disadvantaged, marginalized, or other vulnerable population related to ROW shall be included as the target of the Vulnerable Community Development Plan. CONSTRUCTION PHASE : When found necessary and appropriate, trainings and consultation for job/skill improvement shall be operated.	PLANNING PHASE: Engineer CONSTRUCTION PHASE : Construction supervisor	PLANNING PHASE: CONSTRUCTION PHASE : DOR
17	Land use, Local resource use, Communal/ Common resource use rights	PLANNING & CONSTRUCTION PHASE : 1. Forest If there occur unexpected opposition against clearance of the forest in Detailed Design Phase or Construction Phase, with coordination of District Forest Offices, alternative source of the similar resource for the users shall be discussed. 2. Water If it is found that the planned water intake affects significantly to the existing water use in Detailed Design Phase or Construction Phase, consider developing alternative water source(s) to minimize the impact to acceptable level. Respect and reflect the access to important and popular water use spots by providing road crossings and other facilities that will benefit the water users.	PLANNING & CONSTRUCTION PHASE : Engineer, Contractor	PLANNING & CONSTRUCTION PHASE : DOR
18	Water Rights /Water use	PLANNING & CONSTRUCTION PHASE : If any water supply facilities are necessary to be destroyed by the Project, alternative facilities shall be provided as a part of the	PLANNING & CONSTRUCTION PHASE : Engineer,	PLANNING & CONSTRUCTION PHASE : DOR

No.	Parameters	Environmental Management Measures	Implementation Agency	Responsible Agency
		Project. If the planned water intake affects significantly to the existing water use, alternative water source(s) shall be provided to minimize the impact to acceptable level. Respect and reflect the access to important and popular water use spots by providing road crossings and other facilities that will benefit the water users. *For Operation Phase, see 'Water Regime.'*	Contractor *For Operation Phase, see 'Water Regime.'*	*For Operation Phase, see 'Water Regime.'*
19	Traffic/Public Facilities, infrastructures, Social services	CONSTRUCTION PHASE : If there occur unexpected, significant impact of the Construction on the access to public facilities and services, propose mitigation plan such as minimizing the number of days of the obstruction, or flexible opening and closure of the access for the convenience of the users of the facilities and services.	CONSTRUCTION PHASE : Contractor	CONSTRUCTION PHASE : DOR
21, 22	Uneven distribution of benefits and damages Local conflict of interests	PLANNING PHASE: Outside of the Project scope, DOR shall discuss with Kathmandu District Engineer and Baad Bhanjyang VDC about the possible measure to improve the road access condition in the VDC, including black topping of existing road or new provision of the access road to the Project Road and Tunnel.	PLANNING PHASE: DOR	PLANNING PHASE: DOR
		CONSTRUCTION PHASE : *(Same as 17)* If there occur unexpected opposition against clearance of the forest in Detailed Design Phase or Construction Phase, with coordination of District Forest Offices, alternative source of the similar resource for the users shall be discussed.	CONSTRUCTION PHASE : Engineer, Contractor	CONSTRUCTION PHASE : DOR
		CONSTRUCTION PHASE : *(Same as 16)* When found necessary and appropriate, trainings and consultation for job/skill improvement shall be operated.	CONSTRUCTION PHASE : Construction supervisor	CONSTRUCTION PHASE : DOR
23	Physical splits of Communities	PLANNING PHASE: Identified important / priority crossings shall remain either as underpasses or bridges, no matter the size of the existing passes.	PLANNING PHASE: Engineer	PLANNING PHASE: DOR
		CONSTRUCTION PHASE : Where the Approach Road passes a community, the construction and road control schedule shall be notified and coordinated with concerned community, well before the commencement of the construction work at the particular place.	CONSTRUCTION PHASE : Contractor	CONSTRUCTION PHASE : DOR
24	Historical and cultural resources	CONSTRUCTION PHASE : In case unexpected resources are found during the Construction Phase, careful and thorough communication with the local community shall be taken to find out the way to minimize the significance of the impact.	CONSTRUCTION PHASE : Contractor Construction supervisor	CONSTRUCTION PHASE : DOR
26	Gender	CONSTRUCTION PHASE : Avoid total closure of the important access to the market, water source or river as much as possible. If obstruction is not avoidable, information dissemination to the community regarding the	CONSTRUCTION PHASE : Contractor Construction supervisor	CONSTRUCTION PHASE : DOR

No.	Parameters	Environmental Management Measures	Implementation Agency	Responsible Agency
		timing of start and finish of the obstruction shall be carefully and thoroughly conducted in the manner that as many local women as possible has access to the information. Preference shall be given to the residents in the Affected Area who wish to work as unskilled labor in the Project without discrimination by sex. The advertisement of the recruitment shall be designed in the manner that as many local women as possible has access to the information. *(Same as 16, 21, 22)* When found necessary and appropriate, trainings and consultation for job/skill improvement shall be operated.		
28	Sanitation, Public Health Condition, Infectious diseases such as HIV/AIDS	CONSTRUCTION PHASE : Provide HIV test to the willing workers. Provide training on awareness about sanitation, hygiene, safe-sex and family planning for the workers. Provide sufficient care-taking staff to conduct cleaning and monitoring activities on camp site.	CONSTRUCTION PHASE : Contractor, Construction supervisor	CONSTRUCTION PHASE : DOR
29	Industrial safety and health, Working environment	CONSTRUCTION & OPERATION PHASE : Appropriate preventive measures will be applied. Special training shall be provided to the workers prior to the types of works not popular in Nepal. Insurance for each laborer shall be proposed.	CONSTRUCTION PHASE : Contractor OPERATION PHASE : Tunnel Management Office, DOR	CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
30	Accidents, crime Traffic accidents	PLANNING, CONSTRUCTION & OPERATION PHASE : Appropriate preventive mitigation measures will be applied to reduce and avoid accident. Fulfill all the safety standards by DOR.	PLANNING PHASE: Engineer CONSTRUCTION PHASE : Contractor, Construction supervisor OPERATION PHASE : Tunnel Management Office, DOR Division Office Kathmandu	PLANNING PHASE: DOR CONSTRUCTION PHASE : DOR OPERATION PHASE : DOR
	Fire after traffic accidents	CONSTRUCTION & OPERATION PHASE : Necessary fire extinguisher and other emergency safety measures shall be provided. Necessary traffic control to prevent significant traffic accidents shall be imposed. (e.g. tankers carrying flammable chemical to be prohibited to pass the Tunnel).	CONSTRUCTION PHASE : Contractor Traffic Police OPERATION PHASE : Tunnel Management Office, DOR Traffic Police	CONSTRUCTION PHASE : DOR District Chief Office, Kathmandu OPERATION PHASE : District Chief Office, Kathmandu
	Crime	CONSTRUCTION & OPERATION PHASE : Appropriate preventive mitigation measures shall be proposed to reduce and avoid unsocial activities in the construction area, such as awareness raising education. Monitoring of such activities shall be proposed	CONSTRUCTION PHASE : Contractor Metropolitan Police, Traffic Police	CONSTRUCTION PHASE : DOR District Chief Office, Kathmandu

No.	Parameters	Environmental Management Measures	Implementation Agency	Responsible Agency
			OPERATION PHASE : Metropolitan Police, Traffic Police	OPERATION PHASE : District Chief Office, Kathmandu
	Smuggling	ditto.	ditto.	ditto.

Source: JICA Survey Team, 2014

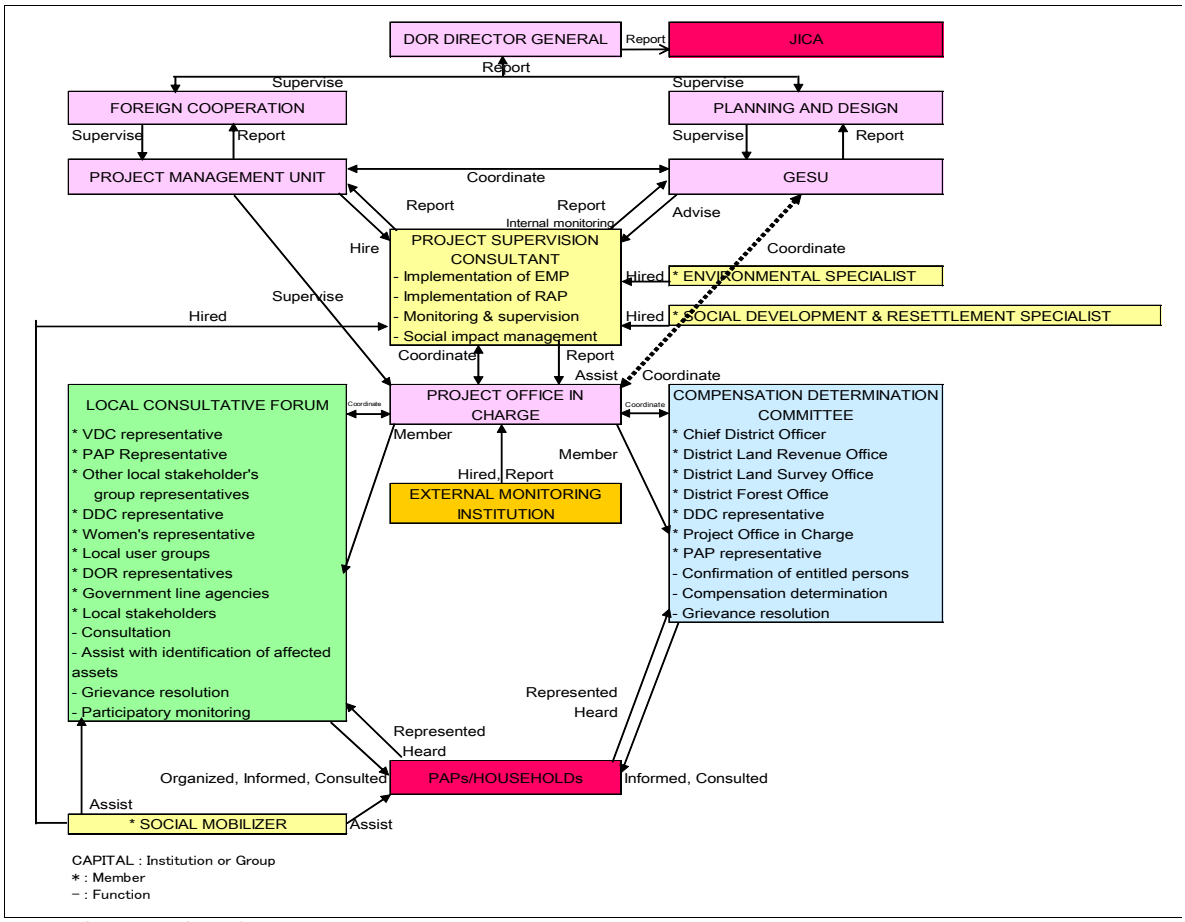
13.3.13 Environmental Monitoring Plan

(1) Institutional Arrangement

Monitoring and evaluation framework is established in ESMF 7.6.

Although Chapter 7 of ESMF is titled 'Resettlement Policy Framework,' the same framework is applied for environmental monitoring by DOR.

As shown in **Figure 13.3-2**, Institutions, consultants, specialists and Project Affected Persons/ Households will be coordinated as described in the following Figure in the implementation of RAP and Environmental Management Plan. DOR DG will be responsible for reporting to JICA.



Source: DOR, 2014

FIGURE 13.3-2 ORGANIZATION FRAME WORK FOR THE IMPLEMENTATION OF RAP AND ENVIRONMENTAL MANAGEMENT PLAN

(2) Funding for Implementation of Environmental Management Action Plan

Budget for the monitoring activities are negotiated with DOR and the funding agencies for each project.

In this Project, each organization listed in **Table 13.3-10** shall bear the responsibility for implementation of the Environmental Management Plan in the described Phases using JICA Loan or GON budget.

TABLE 13.3-10 FUNDING AND RESPONSIBLE ORGANIZATION FOR THE IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN

Funding	Phase	Responsible Organization
JICA Loan	Planning Phase (Detailed Design Phase)	Engineering Design Consultant
	Construction Phase	Construction Supervision Consultant or Construction Contractor. (Responsible organization to be decided in the beginning of the Construction Phase.)
GON	Operation Phase	DOR

Source: JICA Survey Team, 2014

(3) Environmental Monitoring Plan

1) Environmental Monitoring Plan

Among the environmental and socio-economic items studied in the EIA survey, items listed in the following **Table 13.3-11** and **Table 13.3-12** are selected for monitoring targets during the planning/construction phase and the operation phase.

TABLE 13.3-11 ENVIRONMENTAL MONITORING PARAMETERS IN PLANNING/CONSTRUCTION PHASE

1	Air	NO2
		PM10
2	Water	BOD
		TSS
3	Noise	Noise
4	Waste	Soil
		Solid Waste
		Liquid Waste
11	Water regime	Surface water (Volume, speed, depth)
		Ground water (depth, location of aquifer)
		Springs
12	Geology	Slope stability
17	Land use, Local resource use, Communal/ Common resource use rights	
18	Water Rights /Water use	
28	Sanitation, Public Health Condition, Infectious diseases such as HIV/AIDS	
29	Industrial safety and health, Working environment	
30	Accidents, crime Traffic accidents	
	Crime	

'13. Involuntary Resettlement and/or Loss of Properties' shall be monitored as the RAP/VCDP monitoring.
Source: JICA Survey Team, 2014

TABLE 13.3-12 ENVIRONMENTAL MONITORING PARAMETERS IN OPERATION PHASE

11	Water regime	Surface water (Volume, speed, depth)
		Ground water (depth, location of aquifer)
		Springs
12	Geology	Slope stability
18	Water Rights /Water use	

Source: JICA Survey Team, 2014

a) Reporting

The ESMF 7.6.2 requires quarterly reports of Internal Monitoring. Also, External Monitoring agency hired by the Project Implementing Units will conduct bi-annual review of EMP and RAP implementation. Both reports will be sent to the finding agency.

b) Environmental Monitoring Form

DOR, as the project owner, shall conduct periodical monitoring at each project phase, using the following monitoring formats.

■ Planning and Construction Phase

1. Air (Ambient air quality)

Item (Unit)	Measurement (24 hr)	Nepal Environmental Standard (24 hr)	Pre-Project Measurement (24 hr)	Survey Method
NO2 (micro gram/m^3)		150 (WHO) Maximum 80		**Location : 1** (West Portal), **2** (East Portal), **3** (East end point of the east Approach Road (Connectivity)) **Interval:** 1 measurement in every month (work day), or upon urgent request/complaint from local residents. **Survey method :** Continuous measurement for 1 hour to obtain the average concentration of the hour. Then take average of the 24 measurements.
PM10 (micro gram/m3)		70 (WHO) Maximum 120		
Other (Complaints, Observations)	Date : Location : Problem : Solution measures taken : Follow-up condition observation :			

2. Water (Public surface water quality)

Item (Unit)	Measurement	Nepal Environmental Standard	Pre-Project Measurement	Survey Method
				Location : 1 (Sisnekhola, downstream of the Soil Disposal Area (outside of the Work Area)), **2** (Balkhu Khola, culvert bridge near medical college, downstream of the east Approach Road Work Area) **Interval :** 1 measurement in every month (work day), or upon urgent request/complaint from local residents.
TSS		30-200 mg/L		**Survey method :** 1 to 3 sampling per measurement. Take average as the survey result.
BOD		50 mg/L		
Other (Complaints, Observations)	Date : Location : Problem : Solution measures taken : Follow-up condition observation :			

For Waste Water monitoring, see Liquid Waste.

3. Noise (Ambient noise)

Item (Unit)	Measurement (dBA)	International Environmental Standard (dBA)	Pre-Project Measurement (dBA)	Survey Method
Noise		WHO Uncomfortable :	On the existing HWY (expected	**Location :** Just outside of the following Work Areas : **Tunnel-1**

Item (Unit)	Measurement (dBA)	International Environmental Standard (dBA)	Pre-Project Measurement (dBA)	Survey Method
		120 - Very high : 90 - Medium : 70 - Peace : 50 -	level): At the Eastern Portal (peace condition):	(West Portal), **Tunnel-2** (East Portal), **Surface-1** (West Approach Road/Soil Disposal Area), **Surface-2** (East Approach Road) **Interval :** 1 measurement in every month (work day), or upon urgent request/complaint from local residents. **Survey method :** 10 minutes continuous measurement in one hour for at least 4 times in day time for all 4 Locations, and another 4 times in night time for Tunnel Locations.
Other (Complaints, Observations)	Date : Location : Problem : Solution measures taken : Follow-up condition observation :			

4. Waste

Items	Sub-items/Location	**Monitoring** (once in every month)
1) Soil	West excavation Disposal to construct the base for the west Approach Road	Planned volume : Excavated volume (m3, %): Remaining volume (m3, %): Disposal and/or storage condition : Problems/Concerns : Solution measures taken : Follow-up condition observation :
	East excavation Temporal Storage Area Reuse for road embankment Disposal or reuse for public/private purposes	Planned volume : Excavated volume (m3, %): Remaining volume (m3, %): Disposal and/or storage condition : Problems/Concerns : Solution measures taken : Follow-up condition observation :
2) Solid Waste	Construction work areas Tunnel (West) (East) Road/Bridge (West) (East)	Main types of the waste generated : Total volume for disposal : Date of disposal : Contractor name for disposal : Location of disposal : Cost of disposal : Reused/Recycled waste types :
	Stock yards (West) (East)	Main types of the waste generated : Total volume for disposal : Date of disposal : Contractor name for disposal : Location of disposal : Cost of disposal : Reused/Recycled waste types :
	Water Treatment Plant (Discharge from the tunnel)(West) (East)	Main types of the waste generated : Sludge Total volume for disposal : Date of disposal : Contractor name for disposal : Location of disposal : Cost of disposal :

Items	Sub-items/Location	**Monitoring** (once in every month)
		Reused/Recycled waste types :
	Other Rest houses(West, East)	Main types of the waste generated : Total volume for disposal : Date of disposal : Contractor name for disposal : Location of disposal : Cost of disposal : Reused/Recycled waste types :
3) Liquid Waste	Water Treatment Plant (Discharge from the tunnel)(West) (East)	**Location : 1** (West Plant discharge point), **2** (East Plant discharge point) **Interval :** 1 measurement in every month (work day), or upon any irregularity or request/complaint from local residents. **Survey method :** 1 to 3 sampling per measurement. Take average as the survey result.
	Other Rest houses(West, East) Construction facility areas (West, East)	**Location : 1** (West), **2** (East) **Interval : Everyday in morning and evening**. **Survey method :** Patrol observation by guard men and facility managers to check water flow in ditches, any abnormal odors etc. to indicate over flow from the treatment plants, or irregularity of seepage from the septic tanks

5. Water regime, water use

Items	**Monitoring (**1 measurement in every month, or upon any irregularity or request/complaint from local residents.**)**
1) Surface water sources	Location : Any change compared to Pre-Project condition : YES / NO If YES, describe : PHOTO : Related water users' association : Solution measures taken : Follow-up condition observation :
2) Groundwater sources	Location : Any change compared to Pre-Project condition : YES / NO If YES, describe : PHOTO : Related water users' association : Solution measures taken : Follow-up condition observation :
3) Spring water sources	Location : Any change compared to Pre-Project condition : YES / NO If YES, describe : PHOTO : Related water users' association : Solution measures taken : Follow-up condition observation :

6. Slope stability

Items	Monitoring (Everyday in morning and evening)
Slope stability	Location : Any abnormality from planned condition : YES / NO If YES, describe : PHOTO : Potential cause : Solution measures taken : Follow-up condition observation :

7. Land use, Local resource use, Communal/ Common resource use rights

Items	Monitoring (as occurrence of issues)
Community forest	Date : Communication originated by : Responded by : Issue : Field observation conducted by (Date) : PHOTO : Potential cause : Solution measures taken : Follow-up condition observation : Communication with Ranger Post / District Forest Office :

8. Work related issues

Items	Monitoring (as occurrence of issues)
Negative impacts on sanitation and public health condition involving the workers hired by the Project Infectious diseases such as HIV/AIDS involving the workers hired by the Project	Date : Issue : Field observation conducted by (Date) : PHOTO : Potential cause : Solution measures taken : Follow-up condition observation : Report / Communication with respective public offices :
Industrial safety and health, Working environment among the workers hired by the Project	Date : Issue : Field observation conducted by (Date) : PHOTO : Potential cause : Solution measures taken : Follow-up condition observation : Report / Communication with respective public offices :
Traffic accidents involving the vehicles hired by the Project	Date : Issue : Field observation conducted by (Date) : PHOTO : Potential cause : Solution measures taken : Follow-up condition observation : Report / Communication with respective public offices :
Crime involving the workers hired by the Project	Date : Issue : Field observation conducted by (Date) : PHOTO : Potential cause : Solution measures taken : Follow-up condition observation : Report / Communication with respective public offices :

■ Operation Phase

1. Water regime, water use

Items	**Monitoring (**1 measurement in every month, or upon any irregularity or request/complaint from local residents.**)**
1) Surface water sources	Location : Any change compared to Pre-Project condition : YES / NO If YES, describe : PHOTO : Related water users' association : Solution measures taken : Follow-up condition observation :

Items	**Monitoring (**1 measurement in every month, or upon any irregularity or request/complaint from local residents.**)**
2) Groundwater sources	Location : Any change compared to Pre-Project condition : YES / NO If YES, describe : PHOTO : Related water users' association : Solution measures taken : Follow-up condition observation :
3) Spring water sources	Location : Any change compared to Pre-Project condition : YES / NO If YES, describe : PHOTO : Related water users' association : Solution measures taken : Follow-up condition observation :

2. Slope stability

Items	Monitoring (once in every month)
Slope stability	Location : Any abnormality from planned condition : YES / NO If YES, describe : PHOTO : Potential cause : Solution measures taken : Follow-up condition observation :

13.3.14 Considerations of Adaptation Measures for Climate Change

(1) Basic Understanding of the Adaptation of Climate Change

In general, the adaptation (measures) in the road sector; including bridge, tunnel, and railway are to secure the safety of traffic as a requisite for roads, bridges, tunnels, and railways, and to mitigate the damages of related structures and for road users.

In case of roads, including tunnel project, it is considered that climate change may bring an increase in rainfall intensity, exceeding the drainage capacity of roads, and cause slope failures and landslides resulting in traffic disturbance. Likewise fatal damages for the residents is probable if the slope failures and landslide are large-scale in the area.

The occurrence of traffic accidents and traffic restrictions will increase, and it will slowed down the economic activities, damage traffic structures, and trigger other accidents.

1) Necessity of Adaptation for the Road Sector

For the road sector, the climate change would bring an intensified flooding, which may cause inundation, slope failures and landslides, affecting roads. There are certain risks in road functions and related facilities that are adversely affected or damaged due to climate change impacts.

2) Adaptation Measures

In order to improve the disaster (climate change related impacts) prevention capacity for road functions and related facilities, the following adaptation measures are mainly required in general:

- Slope stabilization
- Realignment or change of route
- Raising of roadbed
- Installation and enhancement of drainage facilities and capacity
- Flood prevention measures

- Raising, reinforcement or replacement of bridge
- Road related facilities, which can be used as evacuation areas during disasters
- Strengthening institutional and human capacity in facing adverse effects of climate change
- Adopt better preparatory activities in disaster situations
- Revision of standards, and design norms to accommodate anticipated adverse impacts.

3) Outcome of Adaptation Measures

The impacts of climate change related to structural damage, traffic restriction and interruption, as well as damage on related facilities and users will be mitigated.

(2) Understanding for Adaptation Measures of Climate Change for this Project

There are mainly five (5) landslide and collapse points exist along existing road (see **Section 6.2.3**). During a rainy season in 2008, the stream brought a huge amount of debris in the road at Jhapre Khola that created a huge problem for the passage of vehicles for about 7 hours. The similar event was repeated the following year but since then, it has not caused any disturbance to the traffic. Though landslide or collapse of cut slope caused in other points, there was no traffic closure due to improvement of slope protection as shown in **Table 13.3-14**. It is assumed that the major reason of landslide or collapse was mainly due to poor soil conditions such as Tistung Formation composed psammitic phyllite and phyllitc sandstone, but not due to climate change.

Though extreme rainfall was recorded on July 23, 2002 as shown in **Figure 13.3-3**, climate change did not be seen in the past 45 years (1968-2013). As the trend of annual rainfall shown in **Figure 9.14-1,** there was also no indication of climate change.

Currently there is no traffic closure due to landslide. Since slope protection was done and climate change was not seen, there will be no high risk of traffic closure due to landslide by heavy rain in the future.

As the project road section has the same geological conditions, there is no need to adapt new measures against climate change to the existing road.

Table 13.3-14 Landslide and Collapse points along Existing Road

Landslide and Collapse Points	Major incident
1. Near police check post at Nagdhunga	Around 2005, a new landslide started to move in the hillslope. Now a retaining structure has been constructed and the landslide is almost inevitable.
2.Near Chisapanidhara	About 3 years ago, a big landslide occured .Later retaining wall was constructed on the hillside and gabion wall was constructed in the valley side to stabilize the road.
3.At Jhapre Khola	At a rainy season of 2008, the stream brought a huge amount of debris in the road and created problem for the passage of vehicles for about 7 hrs. Since slope protection was done, it has not caused any disturbances to the traffic.
4.At a small tributary with little water flowing	10 years ago, there was a large landslide. No landslide now was recorded.
5.In front of a big Landslide north of the Sisne Khola	About 15 to 20 years ago, landslide was active and recurrent. A strong concrete support and bolting was done to stabilize the road.

Source: JICA Survey Team, hearing from local people

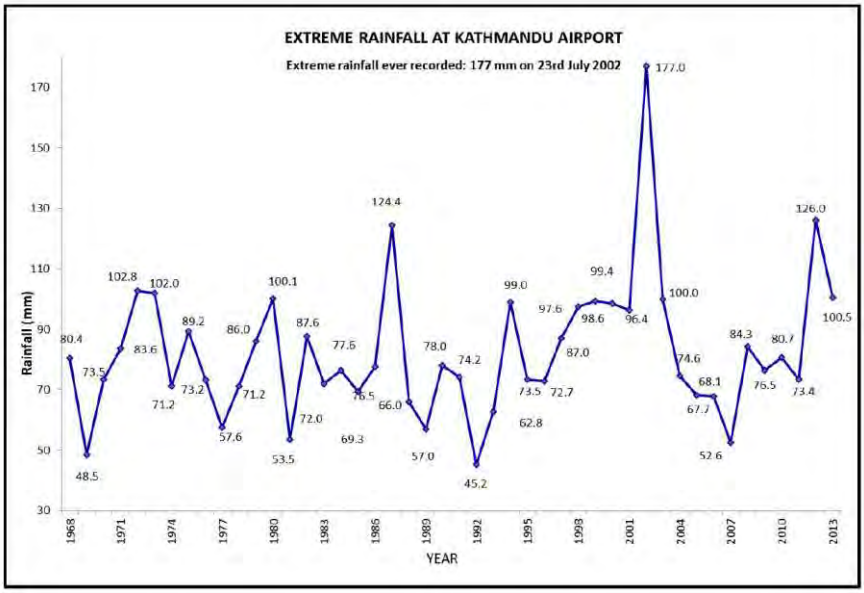


Figure 13.3-3 Extreme Rainfall at Kathmandu Airport

Source: Department of Hydrology and Meteorology, Climate Rainfall of each year

13.4 RAP OF THE PROJECT

13.4.1 Necessity of Land Acquisition, Resettlement, and Review of Alternatives

This Project Activity that will lead to land being expropriated or to people being resettled by the construction of the approach (access) road and tunnel, soil disposal site development by excavating of tunnel, and land use alteration for ancillary facilities.

(1) Project Main Components and Impact Area

1) Approach Road and Tunnel

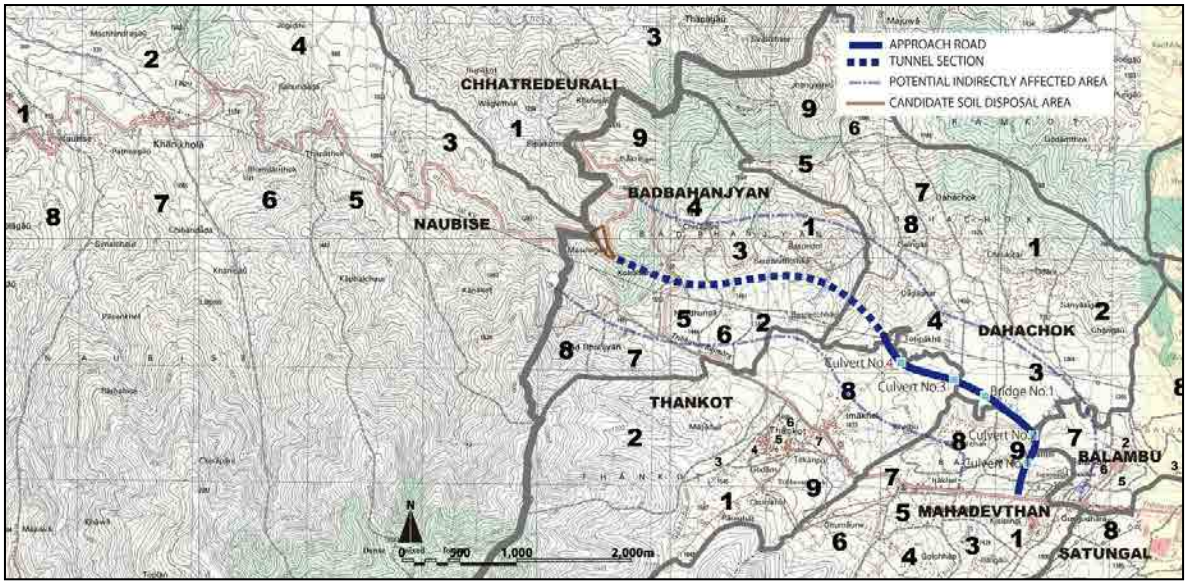
The two major components of the Project are newly construction of the access road (approximately 2.2 km length) and tunnel (approximately 2.5 km length).

The Project is located in two districts; Kathmandu and Dhading. The Project Affected Area, including 500 m 'indirectly affected area,' includes lands in six VDCs in two Districts.

TABLE 13.4-1 THE VDCS INCLUDED IN THE PROJECT AFFECTED AREA

District	VDC	Planned alignment			Existing road
		Approach road	Tunnel road	Soil disposal	Section of existing road to be bypassed
Kathmandu	Balambu	X			
	Mahadevsthan	X			Y
	Dahachok	X	X		Y
	Thankot	X			Y
	Baad Bhanjyang		X	X	
Dhading	Naubise			X	

X : 50 m ROW for surface road, and tunnel alignment. Defined as 'directly affected area.'
** : Within 500 m from the boundary of the ROW. Defined as 'indirectly affected area.'*
Source: JICA Survey Team



Source: JICA Survey Team

FIGURE 13.4-1 THE VDCS INCLUDED IN THE PROJECT AFFECTED AREA

2) Soil Disposal Site Development

The excavated material from the tunnel is expected to be approximately 250,000 m3. The elevation of the approach road shall be designed to balance the cut and fill volume as much as possible to minimize the disposal of soil. Excavation shall also occur at both tunnel portals.

The soil disposal site is planned at Sisnekhola, just across the western portal to minimize the transportation distance of the excavated materials and to avoid traffic generation on the already congested highway.

The surface stream of Sisnekhola basin shall be collected into the pipes at the bottom of the disposal site. Therefore, the water flow at the lower stream of Sisnekhola shall not be changed.

The existing irrigation canals on the slope that will be covered by the disposed material shall be studied further in the EIA survey so that the rice paddies connected to the canals shall not remain without water.

In case that the volume of soil for disposal exceeds the acceptable volume at the Sisnekhola site during the basic design and EIA survey phase, an additional disposal area shall be identified further west along the Tribhuvan Highway. The suitable conditions for the additional disposal areas are as follows:

- Valley-shaped area right next to the lower side (north-side) of the highway.
- Nobody is residing in the area
- No significant water use or registered community forest is affected by the disposal
- The area is as close as possible to the Western Portal.

(2) Review of Alternative Alignment

In the basic design phase, the following values shall be considered in the design of road alignment, to reach the most feasible and rational alignment.

- Secure the traffic and pedestrian safety on the Project Road and vicinity.
- Minimize the volume of soil disposal
- Minimize the number of persons required for involuntary resettlement
- Avoid or minimize negative impacts on resource usage, such as farmland, water and forest

- Avoid negative impacts on local cultural and religious places and activities.

1) Alternatives of the Technology That May Affect the Significance of the Project Impact

The Project Road is a National Highway and a quality standard in any aspect should not be compromised. The technology, including the selection of the construction equipment and the operational facilities, however, may have alternatives considering the following issues.

- Requirement to achieve the highest standard results.
- Availability in Nepal
- Suitability and duplicability in Nepali condition

2) Alternatives of the Raw Materials That May Affect the Significance of the Project Impact

Source of the raw materials for construction shall be examined in the EIA study whether to purchase from the local suppliers, to import from Japan or the third country, or to plan (such as queries) the Project specific sites.

3) Detail of the Construction Schedule That May Affect the Significance of the Project Impact

Construction time schedule shall be further studied during the basic design phase. Following Nepali-specific conditions shall be taken into consideration, formulate the most feasible and realistic schedule.

- Nepali calendar and holidays.
- Agriculture season and off-season in the surrounding area of the ROW
- Dry season and monsoon season.
- Acceptability of night shift working

4) Alternatives of the Energy Source in Operation Phase That May Affect the Significance of the Project Impact

Electricity/power supply for the tunnel has not been settled yet between the NEA and MOPIT. During the basic design phase, various discussions, coordination and agreement are expected to settle .

5) Alternatives of the Operation and Management Structure That May Affect the Significance of the Project Impact

Since the road tunnel is a new project in Nepal, the regular institutional structure for the following monitoring activities shall be reviewed considering the operation and management structure of the tunnel to formulate the most suitable distribution of responsibilities and funding.

- Environmental monitoring.
- Resettlement monitoring

13.4.2 Method of RAP Preparation and Activities

The methodology includes social impact assessment followed by a cadastral survey, a census of potentially affected persons and verification of their affected assets.

(1) Cadastral Survey

At first, it is mapped out the Project alignment and impact zones on the cadastral maps. The engineering survey team collected the cadastral maps of the Project Area from the District Land Survey Office at Kathmandu District and at Dhadine District during July to August in 2014. The Sub-contracted Survey Team, using the basic designs, the roadway width, carriage width, required RoW and the land areas to be acquired on the cadastral maps. Actually, these activities are divided into field verification, cadastral map scanning, cadastral survey in the field, and cadastral map digitization.

After that, the affected lands are measured at the site and the cadastral surveyors enumerate the premises. The social survey team conducted the census of affected households. The identified landowners and the plot number of the affected land are further verified in the land revenue office at the district headquarter to confirm the land ownership status.

(2) Preliminary Socio-Economic Survey, Census Survey and Asset Verification

Firstly a preliminary socio-economic survey within the zone of influence of the road was conducted on June 2014, by a JICA Survey Team and local social survey team. This survey covered 500 m either side of the road corridor as a zone of influence. The purpose of this survey was to assess preliminary possible social impacts of the road including the impact of land acquisition and compensation. During survey period, a questionnaire survey to the possible affected VDC's key persons was also conducted to assess the probable Project Affected Person (PAP) s and the land areas.

Furthermore, a Census Survey had conducted during October 2014. The objectives of the census survey are to prepare socio-economic profile of the PAPs, assess household income and expenditure, identify productive assets and income generating activities and plan for income restoration, as well as develop relocation options and develop social and economic support measures for vulnerable groups, if the vulnerable groups/communities are identified. This survey was also recorded demographic features of the PAPs and verification of lost assets ownership.

To confirm the actual loss of land and other property, the survey team collected the cadastral maps of the alignment and scans. The detailed engineering design superimposed on the scanned cadastral map to locate the center line of the road. By identifying the center line of the road, the affected land and property are measured accordingly.

The Census Survey team enumerated all types of loss due to the road improvement. During the Census Survey of the PAPs, the total land holding of the PAPs are enumerated. The lost land, houses and structures, number and types of expected affected trees and expected public properties like forest, land and structures are also enumerated.

However, this Census Survey at this Preparatory Survey stage could not cover all affected households due to difficulties to identify some land owners because of living outside from the Kathmandu Valley. It could not find their present residential address. According to the local peoples in the area, the absentee land owners have bought the land for business (investment) purposes. Therefore, the Census Survey needed to update at the Detailed Design Stage as well.

In terms of the Cut-off Date of a project in Nepal, the date of publication of preliminary notification for land acquisition as provisioned by the Land Acquisition Act 1977 will be treated as the Cut-off Date. It means that the real Cut-off Date will be the date of publishing for notification on the major newspapers in Nepal, after finalizations of the alignment at the Detailed Design State of the Project.

It is also recommended that the DOR could consider any countermeasures such as setting signboards of the notification of the alignment in the site, to avoid the encroachment.

For the non-titleholders such as squatters and encroachers, the Cut-off Date is the date of the Census Survey conducted by this JICA's Preparatory Survey.

(3) Asset Inventory

As a part of Census Survey, the inventory enumeration has conducted during October 2014. The survey team was consisted of social development experts, research supervisor, cadastral surveyors, enumerators, represented of District Land Survey, and other concerned District Level Officials.

(4) Social Impact Assessment

The social impact assessment is undertaken as a part of resettlement impact assessment. The

Study identified the following key social issues for investigation:

Loss of private property and other assets (land, houses and trees) and compensation modalities for these losses

- Population displacement
- Construction employment opportunities
- Potentiality for social development

(5) Scope of RAP

The government of Nepal has fixed a legal Right of Way (RoW) of 50 m for the highways and 30m for feeder roads, according to the Land Acquisition Act, 1977 and the Land Acquisition Guidelines 1989 in Nepal. This Project includes new roads both tunnel section and approach sections, which will be a part of Tribhuvan Highway. Therefore, the RoW of the roads is 50 m, according to the standards of Nepal.

The 50 m RoW for the surface road and tunnel alignment is defined as "directly affected area". In other words, directly affected area is defined as Corridor of Impact (CoI). Within 500 m from the boundary of the RoW is defined as "indirectly affected area".

In terms of the important facilities near the RoW within the 500 m (Corridor of Impact) from the boundary of the RoW of the Access Road, there are some local temples, cremation sites and other important facilities. But these important facilities are not located within the 50 m of the RoW.

The scope of RAP is basically applicable to persons who are directly affected by the loss of privately owned structure or community property within the CoI.

13.4.3 Socio-Economic Profile and Assets Loss

This section presents the socio-economic profile of the Survey Area. Main objectives to conduct the socio-economic survey are:

i) To assess socio-economic condition of Project Affected Families (PAFs) based on socio- economic survey across the project alignment sections;
ii) To assess local issues that should address in RAP;
iii) To assess various impacts and suggest more sustainable and equitable mitigation measures to the PAFs.

(1) Socio-Economic Profile

1) Demography

According to the Population Census 2011, total population of the project affected VDCs is 42,699, where the male and female population is 21,326 and 21,373 respectively. The population of the affected VDCs is presented in **Table 13.4-2.**

TABLE 13.4-2 THE VDCS INCLUDED IN THE PROJECT AFFECTED AREA

VDC	No. of HH	Male	Female	Total	Ave. HH Size
Mahadevsthan	3,731	7,731	7,783	15,514	4.1
Balambu	1,734	3,625	3,698	7,323	4.2
Thankot	2,820	6,106	5,941	12,047	4.2
Dahachko	878	1,991	2,045	4,036	4.5
Bad Bhanjyang	817	1,873	1,906	3,779	4.6
Total	**9,980**	**21,326**	**21,373**	**42,699**	**4.2**

Source: Census 2011, Central Bureau of Statistics (CBS) in Nepal

As revealed by the Census data, an estimated number of 1,026 Persons of 190 households likely to be affected due to resettlement affect their land and structures. Among them, information from the Census Survey could be actually obtained from 64 households due to the difficulties of the identification of the unconfirmed land owners, which are mentioned in the previous section. Therefore, the socio-economic information of the affected persons is based on the information obtained from 64 (33.7%) households of the total 190 affected households/landowners.

The population composition of project affected surveyed households is presented in **Table 13.4-3**.

TABLE 13.4-3 POPULATION DISTRIBUTION OF PROJECT AFFECTED HOUSEHOLD BY VDC

VDC	No. of HH	Male	Female	Total	Ave. HH Size
Mahadevsthan	26	83	74	157	6.0
Balambu	5	10	13	23	4.6
Thankot	29	74	80	154	5.3
Dahachok	4	11	12	23	5.7
Total	**64**	**178**	**179**	**357**	**5.4**

Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

2) Ethnic Composition

Among the total affected household, about 75 % households are Newar ethnic groups where 14.1 % Janajati. Similarly, the percentage of Chhetrri and Brahmin are 7.8 and 3.1 % respectively. The VDC wise ethnic composition of the project affected households is presented in **Table 13.4-4**.

TABLE 13.4-4 ETHNIC COMPOSITION OF AFFECTED HOUSEHOLD

VDC	Newar		Janajati		Chhetri		Brahmin		Total HH
	No.	%	No.	%	No.	%	No.	%	
Mahadevsthan	15	23.4	9	14.1	2	3.1	-	-	26
Balambu	5	7.8	-	-	-	-	-	-	5
Thankot	25	39.1	-	-	2	3.1	2	3.1	29
Dahachok	3	4.7	-	-	1	1.6	-	-	4
Total	**48**	**75.0**	**9**	**14.1**	**6**	**7.8**	**2**	**3.1**	**64**

Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

Actually, it was not confirmed any specific vulnerable groups/communities, who should need to be considered special assistances for possible adverse impacts by this Project in the affected households.

Based on the above understandings, DoR/GESU confirmed that separate Vulnerable Community Development Plan is not necessary to be prepared in this Preparatory Survey stage at least.

3) Occupational Status

The Census shows that about 23.9 % populations depend on trade/industry and 17.2 % population depend on service. A remarkable percentage (about 38.9 %) of affected peoples involve into the household works. The road alignment passes through semi- urban area where dependency on agriculture is low than the other occupations, only 13.3 % affected people depends on agriculture. Occupational status of the surveyed household is given in **Table 13.4-5**.

TABLE 13.4-5 OCCUPATIONAL STATUS OF SURVEYED HOUSEHOLD

Main Occupation	Gender	Balambu VDC	Daha chowk VDC	Mahadevsthan VDC	Thankot VDC	Total	%
Agriculture	Male	1	2	9	5	17	7.5
	Female	1	1	9	2	13	5.8
Trade/ industry	Male	3	3	11	31	48	21.2
	Female	-	-	1	5	6	2.7
Service	Male	-	1	24	9	34	15.0
	Female	-	-	3	2	5	2.2
Household work	Male	-	-	1	2	3	1.3
	Female	5	6	38	36	85	37.6
Dependent	Male	-	-	2	-	2	0.9
	Female	-	-	1	-	1	0.4
Agriculture labor	Male	2		1	-	3	1.3
Pension	Male	-	1	3	-	4	1.8
	Female	-	-	1	-	1	0.4
Other labor	Male	-	-	3	1	4	1.8
	Female	-	-	0	0	0	0.0
Total		12	14	107	93	226	100.0

Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

4) Educational Status

The overall educational status of project affected population is generally high. The Census shows that about 95.2 % populations are literate. Of the total population, 16.8 % are having higher degree (Bachelor and above) where 8.7 % male and 8.1 % female are in this level. **Table 13.4-6** presents the educational status of the project affected people.

TABLE 13.4-6 EDUCATIONAL STATUS OF THE PROJECT AFFECTED POPULATION

Education Level	Gender	Balambu VDC	Daha chowk VDC	Mahadevsthan VDC	Thankot VDC	Total	%
Less than 5 Year	Male	-	1	2	4	7	2.0
	Female	1		1	3	5	1.4
Illiterate	Male	-	2	4	1	7	2.0
	Female	-	2	6	2	10	2.8
Literate but no schooling	Male	1	3	10	7	21	5.9
	Female	4	3	17	11	35	9.8
Grade 1-10	Male	6	2	26	24	58	16.2
	Female	4	5	24	30	63	17.6
SLC Pass	Male	1	2	12	7	22	6.2
	Female	1	-	7	9	17	4.8
Certificate level Pass	Male	1	1	13	17	32	9.0
	Female	2	2	5	11	20	5.6
Bachelor level or above	Male	1	-	16	14	31	8.7
	Female	1	-	14	14	29	8.1
Total		**23**	**23**	**157**	**154**	**357**	**100.0**

Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

Based on the results of the Census/Socio-economic survey, any specific gender and social weak group issues, which should be considered special assistances for possible adverse impacts by this Project, was not confirmed in the affected area.

5) Land Holding Size

The project alignment passes through semi-urban area however agriculture is still predominant activities over there. The land is also utilized as intensive commercial agriculture such as tomato farming, mushroom farming by outsiders while other cereal crops such as rice and wheat are produced as traditionally. The landholding size of the project affected households is lower than other rural area of Nepal in general. However, both the productivity of land and the value of land are high. The land holding size of the project affect households is presented in

Table 13.4-7.

TABLE 13.4-7 DISTRIBUTION OF HOUSEHOLDS BY LAND HOLDING SIZE

VDCs	Less than 0.025 ha	0.025-0.05 ha	0.05-0.1 ha	0.1-0.2 ha	Above 0.2 ha	Total HH
Mahadevsthan	1	6	7	7	5	26
Balambu	5	-	-	-	-	5
Thankot	3	5	8	10	3	29
Dahachko	-	1	1	1	1	4
Total	**9**	**12**	**16**	**18**	**9**	**64**
Percent	**14.1**	**18.7**	**25.0**	**28.1**	**14.1**	**100**

Source: Census/Socio-economic Survey of This JICA Preparatory Survey, October 2014

6) Annual Household Income, Income range of affected households

The Census revealed that majority (68.8 %) of the project affected people's annual household' income range in between NRs 200,000 to 500,000. Average annual income of the project affected HHs by VDCs is shown in **Table 13.4-8**.

TABLE 13.4-8 AVERAGE ANNUAL INCOME RANGE OF THE SURVEYED HOUSEHOLDS

Income Range	Balambu	Daha chowk	Mahadevsthan	Thankot	Total	%
less than 50,000	-	-	1	-	1	1.6
50,000 to 100,000	-	-	-	-	-	0.0
100,000 to 200,000	-	1	4	2	7	10.9
200,000 to 500,000	5	2	15	22	44	68.8
more then 500,000	-	1	6	5	12	18.8
Total	5	4	26	29	64	100.0

Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

7) Income by Different Sources

Business, service, house rents have been reported as the major income sources of the affected households. Among them business is the main sources of income of affected households. On an average the annual household's income of the affected households has been reported to be NRs 265,818. As per Central Bureau of Statistics (CBS) survey 2011, the less than NRs. 9,567 as per month/per family (5.57 persons) (equivalent to NRs. 114,804 annual households' income) is considered as below poverty level. By comparing with these criteria, the project affected families are not considering as below poverty level for most of the affected households.

8) Food Sufficiency from Own Agriculture Production

Food sufficiency is measured in terms of months that the families' sufficiency of own production to household need. The Census also shows that agriculture is not prime source of income at project area, however small pieces of land can provide sufficient production for the small size family due to fertile land. The household survey revealed that only 9.4% households have produced sufficient food for whole year. About 56.3 % households have food sufficiency for 6-12 months by their own production, remaining households depends on other income sources for their living. It has categorically analyzed by the food sufficiency status up to 3 months, 3 to 6 months, 6 to 12 months and above 12 months. The food sufficiency status of surveyed household is presented in **Table 13.4-9**.

TABLE 13.4-9 FOOD SUFFICIENCY MONTHS OF THE HHS FROM OWN PRODUCTION

Food sufficiency	Balambu	Daha chowk	Mahadevsthan	Thankot	Total	%
Less than 3 months	4	-	5	11	20	31.3
3 to < 6 months	-	-	2	-	2	3.1
6 to 12 months	1	4	15	16	36	56.3
> 12 months	-	-	4	2	6	9.4
Total	5	4	26	29	64	100.0

Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

13.4.4 Project Impacts and Assessment

This section describes the details of the project affected persons, and the affected assets due to this Project Implementation.

(1) The Project Affected Units (PAUs) and the Affected Persons (APs)

The summary of the number of the PAUs and the APs is shown in **Table 13.4-10**.

TABLE 13.4-10 SUMMARY OF THE NUMBER OF PAUS AND THE APS

Type of Loss	No. of PAUs			No. of APs		
	Legal	Illegal	Total	Legal	Illegal	Total
Required for displacement						
1. HH (Structure owner on Gov. land)	0	2	2	0	10	10
2. HH (Structure and Private land)	3	0	3	17	0	17
3. HH (Tenants)	0	0	0	0	0	0
4. CBEs (Structure owner Gov. land)	0	0	0	0	0	0
5. CBEs (Structure owner on Private land)	0	0	0	0	0	0
6. CBEs (Tenants)	0	0	0	0	0	0
7. Community owned structures including physical cultural resources	0	0	0	0	0	0
Not required for displacement						
8. Land owner	185	0	185	999	0	999
9. Wage earners	0	0	0	0	0	0
10. Grand Total (1-9)	188	2	190	1,016	10	1,026

Note: HH (House Hold), CBEs (Commercial and Business Enterprises)
Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

(2) Loss of Structures and Factories

The proposed Project will cause resettlement of the total five residential houses and two factories along the proposed RoW of the project in this Preparatory Survey stage. On the other hand, none of the community and government structures falls under the road alignment section. The resettlement needed private structures and factories are presented in **Table 13.4-11**.

TABLE 13.4-11 RESETTLEMENT NEEDED PRIVATE STRUCTURES AND FACTORIES

No.	VDC	Type	Description	Present Use
1	Thankot	House	1 story RCC building with cemented plaster	Residential
2	Thankot	House	2 story RCC building with cemented plaster	Residential
3	Thankot	House	1 story Corrugated sheet roofing house with brick wall	Residential
4	Bad Bhanjyang	House	Corrugated Galvanized roofing sheet with brick wall	Residential+business
5	Naubise (*Dhading District*)	House	Corrugated Galvanized roofing sheet with brick wall	Residential+business
6	Thankot	Factory	Bhola Ganesh Brick Klin	Business
7	Mahadevsthan	Factory	United Concrete Pvt. Ltd	Business

Source: Census/Socio-economic Survey of this JICA Preparatory Survey, October 2014

(3) Loss of Land

The cadastral survey shows that approximately total 11.6 ha. is belonging to private land and approximately total 0.6 ha. is belonging to governmental land in the affected area. These lands will be required for the proposed Project.

The VDC wise land requirement of the private land for the Project is presented in **Table 13.4-12**.

TABLE 13.4-12 VDC WISE LAND REQUIREMENT OF THE PRIVATE LANDS

S.N.	VDC	Land Requirement (ha.)
1	Mahadevsthan	3.9
2	Balambu	0.2
3	Dahachok	3.5
4	Thankot	4.0
Total		**11.6**

Source: Cadastral Survey of this JICA Preparatory Survey, October 2014

(4) Loss of Private Trees and Crops

Based on the results of the Census Survey, none of the private trees were confirmed with the affected land owners within the RoW. There are not private trees with the affected households because there are newly resettled areas.

In terms of the required lots and the types of cultivated crops, only tomatoes are cultivated for approximately 0.4 ha. at Dahachok VDC and for approximately 0.7 ha. at Thangkot VDC within the ROW in the affected area.

For compensation for the crops in general practices in Nepal, there will not be necessary to pay compensation for the crops, if a Project provides sufficient time (at least 6 months) to the crop farmer for harvesting the crops. However, there will be required to be paid the compensation for the crops, in the case of short notification (less than 6 months) of the Project to the crop farmers.

(5) Loss of Public Resources and Utilities

Based on the results of the Census Survey, none of the community structures or public utilities was found to be relocated. During considerations of the road alignment in this Preparatory Survey, the public utilities were avoided at all. 17 affected parcels are belonging to government land parcels; but, there is no provision to compensate such the land parcels. One community forest namely: Subbako Ban lies in the west portal of Tunnel site where 128 different trees will be cut down.

(6) Temporary Loss of Land

Temporary loss of private land will be undertaken within the framework of the Public Road Act 1974. This project will also take land temporarily to the construction activities. The temporarily land will require in the west and east portal of Tunnel side, vehicle parking side and so on in general. The compensation for the temporary occupation of land will be provided to the affected owners. Contractor will be responsible to negotiate a contract agreement on the rental rate with the owner for temporary acquisition of land. The practice is that if the government land is available, the project will use such type of land with the coordination of concerned government agency.

(7) Associated Social Issues and Action during Construction

Following health and safety measures are proposed for both project staffs and local people.

- The child below 16 years of age will be strictly prohibited to use as child labor, although it is regulated by a Napali Law.
- There will be same wage rate for men and female workers for same types of work.
- The contractor(s) will be made responsible to adopt Safe Construction Practices (SCP) in order to minimize construction related accidents
- Trainings will be provided to all construction workers about health and safety measures
- Protective gear such as helmets, boots, gloves and masks will be provided to construction workers, supervisors and visitors
- Warning signs/posts will be installed for informing the local people about the potentially dangerous areas such as quarry site, weir site (dam site), tunnel outlets and tailrace outlet
- Only authorized persons will be given responsibility to operate machinery and other

heavy equipment

- Temporary support structures will be constructed to avoid rock falls, erosion and landslides during construction. Soil excavation during monsoon in unstable areas will be minimized, if not totally avoided
- Adequate lighting and ventilation facilities will be maintained at all construction sites
- Emergency equipment like first-aid kits, flashlights, fire extinguishers, siren, emergency vehicles and phones will be made available at construction sites
- Qualified medical personnel will be appointed at the construction sites to oversee emergencies related to occupational health and safety
- An Emergency Response Contingency Plan will be prepared to appropriately deal with emergencies. The workers will be trained to follow the plan in case of accidents
- The contractor(s) or the client will obtain insurance against any possible injury to all project staff/workers including client's personnel. Furthermore, the responsible party will also obtain third party insurance against any possible injury to visitors and possible victims
- A health center will be established in the project area for attending health matters of workers and local population during construction phase
- The construction contractor is responsible for all preparatory works and ensuring drinking water and sanitation facilities required for construction workers before the commencement of work
- A solid waste collection and storage system will be established in all the construction related camps and construction sites. The collected waste will be segregated as to the property of the waste such as degradable, glass, metals, plastics, cloths and leather etc. and will be stored in separate bonded areas. These materials will be disposed as to the recommendations and approval of the project environmental officer. The contractor will be made responsible for the measure
- Garbage containers of adequate size will be placed at critical places in the construction related camps and construction sites. The garbage will be collected daily and segregated while storing. The contractor will be made responsible for the measure.

13.4.5 Public Consultation

(1) Introduction and Strategy of Public Involvement

Public consultation process with local people, various stakeholders has been initiated to involve public and other stakeholders from the feasibility stages of the Project to share the information of the Project, get their view, concerned and suggestion regarding the different aspect of the Project site and value.

The aim of these public consultations is to aware publics and to provide good understandings and disseminate substantial information of the Project and its modality of implementation and operation. It also aims to understand the viewpoint of the stakeholders and to respond to their concerns and suggestions about each and every possible aspect of the Nagadunga Tunnel Road Project. It is expected that this process will continue through all stages of the project in order to accommodate stakeholders' aspirations and to orient the stakeholders positively towards the project implementation and harnessing cooperation to facilitate timely completion.

Public consultation is also one of the basic tools and best sources of information for identifying the missing Project Affected Persons (PAPs) and helping group to estimate the cost for lost assets. The public are local stakeholders and have social as well as personal relationship among all concerned persons. There are different types of publics in connection to development projects, those who deserve detail knowledge about each other, so they can help the RAP Survey Team member in many respects to obtain corrected information.

In parallel to the Public Consultation, the following public involvement activities, which will be lead deeper understandings among the Project implementers, local stakeholders, and local residents, shall be set up, which are described in the Monitoring and Evaluation Section of this

RAP Report.. DOR and related agencies shall be considered and be conducted in the course of the Project progress from the Preparatory Survey Phase to the Contraction Phases:

- Interaction Meetings
- Socio Economic Surveys for the affected persons
- Focus Group Discussions

(2) Types of Consulted Persons

Each representative of the governmental organizations and the community groups such as the following organizations and groups were participated in the Project.

- Village Development Committee (VDC) Representatives: though there are no elected VDC representatives at present, but the VDC secretary has deputed as VDC chief or office-in-charge by law, so the VDC secretary was included as a responsible source of information and major stakeholders in the area.
- The group of women in different sections were consulted to understand and to assess the access to development infrastructures as well as the pattern of economic subsistence.
- Political party representatives from different political ideologies were consulted to facilitate the discussion.

(3) Methods of Public Consultation

The task of public consultation was carried out in different settlements during the project preparation. In fact, from the earlier stage of the reconnaissance survey to the period of census, the process of consultation remained continuous varying over different times. The number of participants and the other facts in each consultation is shown in **Table 13.4-13**.

TABLE 13.4-13 OVERVIEW OF THE PUBLIC CONSULTATIONS AND INTERACTION MEETINGS

Date	Interaction Location	Number of Participants			Participants from:
		Male	Female	Total	
12th July 2014	Naubise VDC hall, Dhading	34	6	40	Naubise VDC ward no. 2,3,4-kanakot,5,6- Bhandari Gaun, Khanikhola 7- Naubise Bazaar,8,9; Dharke; Gajuri; Khanikhola
19th July 2014	Kot Ghar, Thankot VDC, Kathmandu	66	1	67	Mahadevsthan VDC ward no. 1,7,9; Balambu VDC; Dahachowk-4; Thankot VDC ward no. 3,5,6,7,8,9 and Baad Bhanjyang VDC ward no. 3, 5, 6, 7.
2nd September 2014	Mahadevsthan VDC	46	3	49	Affected persons at Mahadevstan VDC (Interaction Meeting)
2nd September 2014	Badbhanjyang VDC	55	5	60	Affected persons at Badbhanjyang VDC (Interaction Meeting)
9th October 2014	Mahadevsthan VDC	9	0	9	Affected persons at Mahadevstan VDC (Interaction Meeting)
9th October 2014	Dahachok VDC	7	0	7	Affected persons at Dahachok VDC (Interaction Meeting)

Source: This JICA Preparatory Survey, 2014

(4) Issues Raised in Public Consultation

The major queries were raised by the participants and response during the Public Consultation at Naubise VDC and at Tankot VDC, as well as interaction meetings are summarized in **Table 13.4-14**, **Table 13.4-15**, and **Table 13.4-16** respectively.

TABLE 13.4-14 MAIN PARTICIPANT'S QUESTIONS AND PROJECT IMPLEMENTER'S EXPLANATIONS OF THE PUBLIC CONSULTATION AT NAUBISE VDC

Participants' Questions / Opinion/ Sought	Project Implementer's Explanations presented
1. Why the tunnel has 3 lanes tunnel as compare to the 2 lanes on approach road?	Two lanes are planned for incoming and outgoing purpose. The third one is planned for the maintenance of the vehicle (in case it needs some maintenance and other worst cases).
2. When will be the construction of this project is intended to be carried out?	The feasibility study is going on. If it is feasible the detail engineering design will be carried out and then the construction work is intended to be completed by 2020.
3. How the private property and assets to be acquired by the project be compensated? What will be in case if the Government rate may not be acceptable by the locals?	Valuation of such properties will be made based on the existing evaluation guidelines. Survey will be carried out in proper and appropriate way with mutual understanding and coordination with the locals.
4. How the natural resources, forest resources and existing water supply and irrigation facilities will be protected?	The project will try to avoid such natural and forest resources; if not possible will do the best to minimize and mitigate the adverse impact on resources and facilities with the compensatory approach.
5. Is the proposed Sisne Khola site is sufficient for the disposal of soil from the tunnel?	The project is seeking others suitable places for the disposal of the mud from the tunnel apart from the Sisne khola if it requires.
6. Will the proposed project provide employment opportunities to local people?	The employment opportunity to the local is possible during implementation and will be based on the needs of the project and expertise and experiences of the skill and unskilled labor. First priority will be given to the locals and project affected peoples for the employment during construction work.
7. Why proposed 2 tunnel projects (Nagdhunga tunnel construction and Sitapaila Dharke Tunnel) are so closer?	The feasibility studies of the both projects are being undertaken by the Government and DOR. Based on the study, result, acceptance by the local people and technical feasibility of the project government will implement accordingly.
8. Near the Khatripauwa there is a public organization building and during the extension of the road that building might be affected so what will be the alternative or the compensation mechanism regarding such situation.	At this stage the project alignment is up to the upper hill side of the Sisne khola and it might not be affected and the extension of the road does not fall in the scope of this project. If it gets affected by this project then at that stage the detail study will be carried out and compensated accordingly.
9. Peoples residing on the lower level of the Sisne Khola are fully dependent on the Sisne khola as the major source of drinking water. What will be the alternative management for this matter if the soil will be disposed at the place and the source gets affected?	The project will try to avoid such problem of change in water level source. If the affect is unavoidable in that case the project will mitigate the adverse impact of water supply with the alternative and compensatory approach.
10. There is the Fertile agricultural land situated at the lower west side of the Sisne Khola, if the soil/muck are to be disposed on the Sisne Khola it might flow/slide down to the agricultural land disturbing the locally build irrigation canal by the debris.	The soil/muck will not be just thrown/pileup/ dispose in the Khola without the proper precaution, compaction, and management with engineering structures for the protection of such action.
11. It was notified that there is cremation site located around 200m below the Sisne Khola.	This matter will be noted and will be consider during the detail EIA study.
12. It is suggested that the excessive soil that is generated from the Tunnel can be managed by filling the unleveled places on the side of the road having narrow turnings and protecting it with the Check dam so that the sharp narrow turns of road will be widen.	The suggestion was noted and will be taken care wherever possible.

Source: This JICA Preparatory Survey, 2014

TABLE 13.4-15 MAIN PARTICIPANT'S QUESTIONS AND PROJECT IMPLEMENTER'S EXPLANATIONS OF THE PUBLIC CONSULTATION AT TANKOT VDC

Participants' Questions / Opinion/ Sought	Project Implementer's Explanations presented
1. How the private assets/ properties will be acquired and compensated?	Valuation of assets/properties will be made based on the existing laws. Detail survey will be carried out in this regard.
2. How the resources and facilities will be protected?	The project will try to avoid such natural and forest resources; if not possible will do the best to minimize the adverse impact on resources and facilities.
3. Will the proposed project provide employment opportunities to local people?	The employment opportunity to the local is possible during implementation and will be based on the needs of the project and expertise and experiences of the skill and unskilled labor.
4. Why the tunnel is proposed instead of the extension of the existing Tribhuwan highway?	Tunnel is proposed to reduce the distance and curved section of the road between Nagdhunga to Naubise, and also because of the high slope gradient between Nagdhunga to Sisnekhola.
5. Will Nepal oil corporation depot be affected by the project?	No, the depot will not be affected by the project in fact it is at a distance of around 400 m from the road alignment.
6. How do you handle the quarrel of land acquisition?	Appropriate compensation for the affected land will be provided according to the land price set by the compensation committee. Moreover the land price will be set considering the existing market rate.
7. While constructing the tunnel what happens to the land above it, does the government acquire all the land above it?	No the government doesn't need to acquire the land above it. But for the land just above the tunnel some rules might be regulated like no deep boring is allowed as it might disturb the tunnel structure.
8. There are existing sources of water just above the tunnel. Will the source of water be affected by the tunnel?	The detail study about the sources of water above the tunnel is still going on. If such sources are found then alternative route will be considered.
9. Is this project a different one from the one being studied from Sitapaila to Dharke? If yes, is there a need for two similar projects?	This project is different from the Sitapaila route. Whether or not Sitapaila route will be realized is not known at present. This project envisages improving the most critical section of the Tribhuvan Highway.
10. Why need a tunnel? Why not make an open cut route?	From economic, environmental and technical aspects, it is not feasible.
11. How the private assets/ properties will be acquired and compensated?	Valuation of assets/properties will be made based on the existing laws. Detail survey will be carried out in this regard.
12. How the resources and facilities will be protected?	The project will try to avoid such natural and forest resources; if not possible will do the best to minimize the adverse impact on resources and facilities.

Source: This JICA Preparatory Survey, 2014

TABLE 13.4-16 MAIN PARTICIPANT'S QUESTIONS AND PROJECT IMPLEMENTER'S EXPLANATIONS OF THE INTERACTION MEETINGS

Main Participants' Questions / Opinion/ Sought	Project Implementer's Explanations presented
1. How the acquired land will be compensated? (2nd September at Mahadevsthan VDC)	After the Detail Design stage, the land will be identified which needs to be acquired. After that the Compensation Determination Committee (CDC) will be formed under the Chairmanship of Chief District Officer that will decide the compensation rate considering the various factor after that the name of the land owner will be published in the newspaper for the compensation process.

Main Participants' Questions / Opinion/ Sought	Project Implementer's Explanations presented
2. Will there be replacement cost for the farmers whose land will be acquired? (2nd September at Mahadevsthan VDC)	We will provide the replacement and relocation cost will be provided to the affected land owners and household owners.
3. How to consider the compensation cost? (9th October at Mahadevsthan VDC)	Resettlement Action Plan (RAP) will recommend compensation rate taking into account of government price and reasonable market price.
4. Local people should be involved in the road construction works. Employment should be given to the project affected people (9th October at Mahadevsthan VDC)	Priority will be given to the local people in road construction Priority will be given to the project affected people.
5. Fair compensation at current rate. Employment opportunity for affected people. Safety measures for public transportation (9th October at Dhachock VDC).	RAP will address the concern of affected people and give employment priority and safety measures to local people during project construction.

Source: This JICA Preparatory Survey, 2014

Based on the results of the public consultations and internal meetings, it could be understood that the peoples expressed generally their positive remarks about tunnel project, and there were no reasonable strong opposite opinions for the Project implementation.

On the other hand, many of the possible affected persons very concerned compensation prices. Because, the peoples expressed that there were some Project cases, which were big differences between each governmental compensation price and each market-based compensation price. It was not applied the market-based compensation costs for the past Projects, according to the local peoples.

13.4.6 Resettlement Policy and Entitlements

(1) Related Acts and Policies in Nepal and the World Bank Guidelines

In Nepal, there are different laws interrelated to each other such as for construction of road there are independent acts like road act, forest act, land act and the property right mentioned in the constitution and some guidelines to be entertained for this RAP. The relevant Acts and Regulations in Nepal is reviewed in this RAP as prescribed in the Environmental and Social Management Framework (ESMF) as the main guideline for environmental and social issues associated with new road construction and upgrading in Nepal. Some of the acts and regulations are relevant to EIA and resettlement policies in Nepal. On the other hand, the World Bank Guidelines is one of the most important legal documents for the RAP, so this is also reviewed and summarized of this RAP Report..

1) Government Acts and Policies

In the past, the size of affected population in development project was not significant so that requirement of resettlement policy was not so important for the development projects. Now, resettlement, rehabilitation, land acquisition, and compensation are key issues for all types of development projects in Nepal. However there is lack of comprehensive national resettlement and Rehabilitation policy to address the issues of resettlement and rehabilitation. A draft national resettlement policy has been prepared under technical assistance of Asian Development Bank (ADB) in 2006 again reviewing in 2013; it will takes further more time to came into execution. However, resettlement policy has more guided by donor agencies that applied by Asian Development Bank and the World Bank.

The Land Acquisition Act (1977) and its subsequent amendment in 1993 specify procedures of land acquisition and compensation. The Act empowers the Government to acquire any land, on the payment of compensation, for public purposes or for the operation of any development project initiated by government institutions. There is a provision of Compensation Fixation Committee (CFC), which is also called as "Compensation Determination Committee (CDC)"

chaired by Chief District Officer and other members are representative of District Development Committee (DDC), Chief of District Land Revenue Office, and Chief of the Project to determine compensation rates for affected properties. Steps of Land Acquisition plan as per Land Acquisition Act 1977 are presented in **Figure 13.4-2**.

FIGURE 13.4-2 LAND ACQUISITION PROCESS (BASED ON LAND ACQUISITION ACT 1977)

2) World Bank Guidelines

Land acquisition, compensation and resettlement will comply with World Bank Operational Directive 4.30 (being reissued as Operational Policy 4.12 and Bank Procedure 4.12), dealing with involuntary resettlement and compensation for losses associated with development projects. The overall principle of OP/BP 4.10/OP 4.12 is that PAPs are provided with prompt and effective compensation for all loses directly attributable to the project, with lost assets valued at full replacement cost. The value of benefits to be derived from the project is also not deducted from the valuation of the affected asset, not is depreciation of the asset or the value of salvage materials.

Apart from legal titleholders, OP/BP 4.10/OP 4.12 additionally specifies the compensation entitlements of different categories of non-titleholders. Those, with no legal rights at the time of the census and verification exercise, who have a claim to such rights under domestic law (from uninterrupted use of public land with no official eviction orders) should qualify for the full range of entitlements, provided that "such claims become recognized under the laws of the country through a process identified in the resettlement plan." Other PAPs who occupy land in violation of domestic laws are entitled to compensation for assets such as buildings and standing crops but not to compensation for land losses. Where they have had uninterrupted possession of the land "for at least one year prior to the commencement of census, they are entitled to resettlement assistance in lieu of compensation for land."

(2) Entitlement Matrix

Through the acquisition of private and public assets, the Project will affect property owners, their dependents and the communities and the local peoples. This Entitlement Matrix accordingly will specify compensation and/or rehabilitation measures for each different targets

such as i) House and other Structure, ii) Land, iii) Other privately Owned Resources, iv) Community Structures and Resources, v) Rehabilitation Assistance, and vi) Governmental Property, of entitlement individuals including affected individuals and their households, and groups.

1) Compensation Policies for this Project

Compensation to the affected households for their private property will be provided. Furthermore, displacement allowance will be given to the residential house owners. During the time of replacement, the factory owners may lose their income due to disturbance in their business therefore; project has managed to allow them some amount of displacement allowance. In the case of permanent and temporary loss of land and other structure, compensation will determined with equal to replacement cost and with mutual negotiation between two parties

2) Displacement Allowance

In addition to compensation for asset losses, some households who are losing houses will qualify for the displacement allowances. Households, which require to be relocated, will receive a housing displacement allowance equal 90 days minimum wage rate as established at the national or local level.

A package of cash compensation will be provided to the affected households. The package includes cash compensation for the structure at replacement cost, and displacement allowances, which includes any necessary administration fee such as land registration fee, transfer tax, and leveling fee, if needed.

The provision of displacement allowance is that the house owners are free to demolish the affected house and can carry away to reuse the materials for new housing. The displacement allowance is a provisional compensation for facing trouble for the transitional period. It is recommended by the public consultation in different place that three month (90 days) period is sufficient for replacement of households since they have their another house nearby areas and villages, so they can shift in new residence within three months.

Owners of factories, who require to be relocated, will receive land improvement/ factory establishment cost, business closure allowance and labor allowance. The cost of this item is calculated based on existing market price discussion with factory owner and other relevant stakeholders.

3) Rehabilitation Measures

In the RAP there is provisioned for Livelihood Enhancement Skill Training (LEST). One person of each affected households belonging to low income group will be provided LEST according to their choices. The trainings will be conducted based on result of training need assessment report. Apart from the above mention provision, the PAPs will be getting additional support through preferential access to employment as per their willingness and capabilities to work in road construction. The PAPs will be employed in a construction project with a high priority. It does not mean that all PAPs are economically weak and willing to work in the construction project. All rehabilitation activities will be monitored by Social Development and Resettlement Expert

4) Government Property

Government infrastructure and facilities affected by the project will be repaired or replaced in consultation with the relevant department and ministry. But there are none of government infrastructures except government land and forest will be affected by the project. There is no provision of compensation of the government land. The DOR acquires government land and forest in coordination with the Ministry of Forest. Clearance of trees is undertaken taking permission of Department of Forestry (DOF). The legal provision is that the DOR is responsible to plant 25 seedlings in the government land against one tree cutting. The cut down

logs are the properties of DOF. DOR is responsible to establish nursery in an accessible areas of new plantation, supply seedlings, and bear the cost for five years to take care of new plantation to get the plant mature. But the execution part is of the Department of Forestry.

In this Preparatory Survey stage, the entitlement matrix is proposed in **Table 13.4-17**.

TABLE 13.4-17 ENTITLEMENT MATRIX

Type of Loss	Entitlement Unit	Description of Entitlements	Implementation Measures
1. House and **Other Structure**			
1.1 Loss of own house and residential plot	Titleholder	Cash compensation for full or partial loss of house at replacement cost, according to house type.	• Compensation rates of land and structures negotiated by Compensation Determination Committee (CDC) taking reference to succeeding bullet 2 and 3 (which is legal authority), • Land valuation undertaken by District Land Survey and Revenue Office (mostly negotiated) on the reference of local market price and government rate fixed for land registration; • Building valuation undertaken by project authorities (on the basis of standard norms of Department of Urban Development and Building Construction and existing local market price) ; Material may be salvaged with no deduction from compensation. • Displaced households will receive a housing displacement allowance. • Notice to vacate will be served at least 35 days prior to acquisition. • An appropriate compensation advance and housing displacement allowance to be paid at time of notice to vacate; balance payable prior to possession of property. • Compensation for partial losses payable prior to acquisition. • To ensure fair compensation, determination of rates will be done not more than one year prior to property acquisition.
1.2 Loss of commercial establishment	Titleholder Non-titleholder	Cash compensation for full or partial loss at replacement cost, according to building type.	• Compensation determination, notice to vacate, and compensation payment as for 1.1. • Owners of displaced commercial establishments will receive a business displacement allowance.
1.3 Loss of other private structures	Titleholder	Cash compensation for full or partial loss at replacement cost, according to structure type.	• Other structures include: sheds, water reserve tank, etc. • Loss of structures other than houses and commercial establishments does not entail payment of a displacement allowance.

Type of Loss	Entitlement Unit	Description of Entitlements	Implementation Measures
2. Land			
2.1 Loss of private land	Titleholder	Provide compensation at full replacement cost Provide cash compensation at full replacement cost based on current market rate or Government rate whichever is higher. Resettlement assistance in lieu of compensation for land occupied (land, other assets, employment) at least restore their livelihoods and standards of living to pre-displacement levels. In the case of farmland, the PAP will be entitled the cultivation disruption allowance equal to one-year production.	• A list of affected and entitled persons and the area of land loss is required. • Notice to vacate will be served at least 35 days prior to acquisition date. • Case-wise compensation will be either by cash or check, depending on the owner's preferences. • To ensure fair compensation, determination of rates will be established not more than one year prior to property acquisition.
2.2 Temporary loss of private land	Titleholder	Compensation for crop, land productivity and other property losses for the duration of temporary occupation. Compensation for other disturbances and damages caused to property. Contractor to negotiate a contract agreement on the rental rate with the owner for temporary acquisition of land. Land should be returned to the owner at the end of temporary acquisition period, restored to its original condition or improved as agreed with owner.	• A temporary occupation contract will be signed with the affected landowner, specifying; - Period of occupancy - Formula for the calculation of production losses (the market value of crops normally produced on the land) and annual inflation adjustments - Frequency of compensation payment; and - Land protection and rehabilitation measures. • The land will be returned to the owner at the end of temporary acquisition, restored to its original condition.
3 Other Privately Owned Resources			
3.1 Loss of non-perennial crops	Titleholder; other evidence of ownership	Advance notice to harvest crops. Net value of crops where harvesting is not possible.	• Crop market values will be determined by the CDCs coordinating with District Agriculture Office
3.2 Loss of privately-owned trees and perennial crops	Titleholder; other evidence of ownership	Advance notice to harvest crops. Net value of crops where harvesting is not possible. Right to all other resources from privately owned trees	• Crop market values and production losses will be determined by the CDCs with assistance from a local resource specialist. • The Departments of Agriculture and Forestry will be requested to assist affected owners and communities with the reestablishment of new trees and other perennial crops.

Type of Loss	Entitlement Unit	Description of Entitlements	Implementation Measures
3.3 Potential regulation of land-use activities (land use right) above the Tunnel	Titleholder; other evidence of ownership Non-titleholder Tenant	Restoration of the land use right, which will be followed by a newly preparation of the land use guideline above the tunnel alignment.	• If any house or physical assets are damaged during tunnel construction, it will be addressed by CDC • Development activities (Land use change) above the tunnel alignment will be regulated and secured by the newly preparation of the land use guideline
4 Community Structures and Resources			
4.1 Community buildings and Structures	Local Community	Restoration of affected community structures to at least previous condition, or replacement in areas identified in consultation with affected communities.	• Affected community buildings/ structures include: schools, temples, health posts, water points, irrigation canals, trails etc. will be rehabilitated by project.
4.2 Land and trees	Local community or user groups	Assistance with improvement of remaining grazing areas. Restoration of access to community resources.	• The Departments of Agriculture and Forestry will requested to assist communities so that benefits from grazing areas are adequately mitigated.
5 Rehabilitation Assistance			
5.1 Displacement of household	Titleholder Non-titleholder	Housing displacement allowance for loss of own residential accommodation. Rental stipend for loss of rented accommodation.	• The housing displacement allowance will be based on two months per capita poverty level income (PLI), as established by the Nepal Living Standards Survey, for a household of 5.5 members. The value of the allowance will be adjusted annually for price escalation. • The rental stipend will be based on 0.5 months PLI as defined above. • Allowances will be paid at the time of serving the notice to vacate. • Displacement allowances (housing, business and cultivation) will be paid severally.
5.2 Displacement of commercial enterprise	Titleholder Non-titleholder	Business displacement allowance for loss of commercial establishment.	• Calculation as for housing displacement allowance. • Payment as detailed in 5.1.
5.3 Severe disruption to cultivation	Titleholder Tenant	Cultivation disruption allowance for severe disruption to household cultivation levels.	• The following cultivation disruption allowances will apply to; - Households with total landholdings of 0.25 ha and smaller who lose more than 10 percent of their landholdings; - Households with total landholdings above 0.25 ha who lose more than 25 percent of their landholdings; - Households whose production levels are to be severely affected. • The cultivation disruption allowance will be equal to one season's production on the area of land lost, based on the norms of District Agriculture Office for the year of acquisition.

Type of Loss	Entitlement Unit	Description of Entitlements	Implementation Measures
5.4 Vulnerable social categories	Any identified groups/peoples, who identified as vulnerable group/peoples	In this Preparatory Survey stage, it was not confirmed any vulnerable group/peoples. If, any vulnerable social categories identified during the Detail Design/ implementation Phase, it will be considered.	-
6 Government Property			
6.1 Loss of Infrastructure	Relevant agency	Facilities will be repaired or replaced.	• To be undertaken in consultation with the relevant department or ministry.
6.2 Loss of forest areas	Community Forest/Department of Forest	Mitigation by means of afforestation.	• Cash compensation by DOR payable to the Community Forest/District Forest Offices equivalent to 25 sampling plantation to clearance of 1 tree with 15 cm diameter or larger. • To be undertaken in consultation with Community Forest Users/Department of Forestry.
6.3 Loss of other Government Land	Relevant agency	No provision of compensation.	• Consultation with relevant government agencies.
7 General Counseling			
7.1 All project impacts	Persons within and adjacent to the road corridor	General counseling on project impacts; construction schedules and acquisition dates; valuation, compensation, and grievance resolution mechanisms; construction employment procedures; and local development initiatives.	• This will be achieved through the periodic distribution of information sheets and consultation with local officials. • Cooperation with GoN ministries and departments such as Departments of Agriculture, Forest, and Local Development to support effective resource utilization and community development.
7.2 Priority in poverty reduction /social development programs	All APs	Below poverty line HH due to loss of physical asset.	• Participation of APs with priority in saving credit scheme facilitated by the Project. • Participation of APs with priority in life skills, income generation, and other entrepreneurship.
8. Additional Assistance			
8.1 Preference in employment in wage labor in project activities	All APs	Below poverty line* HH due to loss of physical assets.	• Construction contracts include provision that APs will have priority in wage labor on project construction during implementation. • APs shall be given priority after construction for work as maintenance worker, mandated in local body agreement

Type of Loss	Entitlement Unit	Description of Entitlements	Implementation Measures
8.2 Skill training and income generation support	One member of each PAF belonging to below poverty line.	Below poverty line HH due to loss of physical asset.	• Skill training and income generation support financed by project • RAP to include a need assessment and skill training program for APs.
8.3 Priority in poverty reduction /social development programs	All APs	Below poverty line HH due to loss of physical asset.	• Participation of APs with priority in saving credit scheme facilitated by the Project. • Participation of APs with priority in life skills, income generation, and other entrepreneurship.
9 Damage caused During Construction			
9.1 Public and private building and structures, infrastructure, land crops and trees	All categories of entitled persons as defined in clause 1, 2 and 3 above in this table.	Appropriate countermeasures should be taken by contractors to avoid damaging public and private property unnecessarily	• Where damages do occur to public or private property as a result of construction works, the affected families, groups, communities, or government agency shall be compensated for damages to crops and trees; damage land, structure, and infrastructure shall be restored to their former conditions.

Note: Below poverty line* means that less than NRs. 9,567 as per month/per family income (5.57 persons) (equivalent to NRs. 114,804 annual households' income) is considered as below poverty level*

13.4.7 Resettlement and Rehabilitation

(1) Compensation and Livelihood Restoration

Key impacts on affected households are land acquisition and loss of structures. The census data revealed that all the respondents have preferred cash compensation for all types of loss. Most of the affected land is of high quality and productive from agricultural point of view. The cash compensation has high value in such semi-urban areas because they can buy similar quality of land or operate businesses to mitigate land loss. Besides, the project will have given high priority for project affected people for construction related jobs during project implementation period.

(2) Relocation Needs and Approach

The project Affected Persons (APs) who lose their land, house or other property due to project will get compensation. Altogether five houses and two factories need to demolish due to this proposed Project. The resettlement needed households are scattered individually along the road alignment. The Interaction meetings during the Preparatory Survey with the affected households show that there is no need of group resettlement (relocation site) due to scatter households in different places. All the affected households expressed their opinions that they preferred to get cash compensation. Therefore, it is not necessary to consider the relocation site by this Project.

A package of cash compensation will be provided to the affected households. The package includes cash compensation for the structure at replacement cost, and displacement allowances, which includes any necessary administration fee such as land registration fee, transfer tax, and leveling fee, if needed.

Furthermore, employment priority will be given to the displaced households during road construction. Cash compensation and support allowance will be provided to the affected households or families for lost assets. It will be a main income restitution measure envisaged for this project. As far as possible, the project will provide job opportunities through contractor

for the affected people during the project implementation, in order to enable families to earn sufficient to restore their income, if needed.

(3) Livelihood Enhancement Skill Training

One member of each affected household may belonging to low income group, will be provided income restoration measures under the Livelihood Enhancement Skills Training (LEST) program. LEST will include trainings on income generating activities which will be delivered through trainings and other supplementary investments. These programs are expected to re-establish APs' lost livelihood options and development of new income generating opportunities.

The trainings will be based on the need assessment of the affected families. It is estimated that 48 persons (25 % of total affected households) will be selected through training need assessment. Training will be conducted according to their desire. The cost of the training program is included in the RAP.

(4) Temporary Acquisition of Land

Temporary acquisition of private land is also required for the dumping construction material and equipment at project site. The compensation for the temporary acquisition of land will be provided to the land owners as a rental payment. The rental payment will be equal to the cost of standing crop loss during the acquisition period. Contractors will be responsible for the rental payment and the restoration of the land to its previous productive status after construction.

(5) Public Health

Health awareness programs for the local people as well construction labors shall be organized by the project and contractor on a regular basis (prior to construction commencement and in an yearly interval) to provide knowledge to construction workers and local population on health including the dangers and consequences of STD and HIV/AIDS. Additional training for awareness rising will be given by the professional health workers in association with social supervision consultant on health aspects of STD and HIV/AIDS and human trafficking.

The awareness program related to public health, HIV/AIDS and human trafficking will be organized inviting public health expert (specially a medical practitioner of the concerned districts and concern district police officer). The social Development and Resettlement Expert will highlight the social impacts of the STD and HIV/AIDS plus human trafficking in project affected area. The role of social mobilizer and resettlement expert will be to neutralize the conflicting relationship between contractors and local stakeholders, outside labors and local labors, in relation to competition over natural and economic resources.

13.4.8 Implementation Arrangement

For the RAP implementation, reasonable organization framework must be considered. It also discusses monitoring requirements, before concluding an overview of the major planning, administrative and logistical requirements for the successful implementation of the RAP.

As the project authority, DOR should be retained overall responsibility for the management procedures of the RAP as well. Key activities to be undertaken to ensure effective implementation of resettlement, compensation and rehabilitation activities are:

- Implementation of procedures to (i) minimize adverse social impacts including acquisition of land and assets throughout the planning, design and implementation phases and (ii) accurate recording of all project-affected persons, by means of census and asset verification and quantification exercises, and the issuing of identification;
- Establishment of systems and procedure for the co-ordination of resettlement and compensation activities;
- Establishment of grievance re-dresses committee to address the social issues with participation of affected people. The objectives of this participation program will be to: (a) ensure ongoing dissemination of project information to affected households, (b)

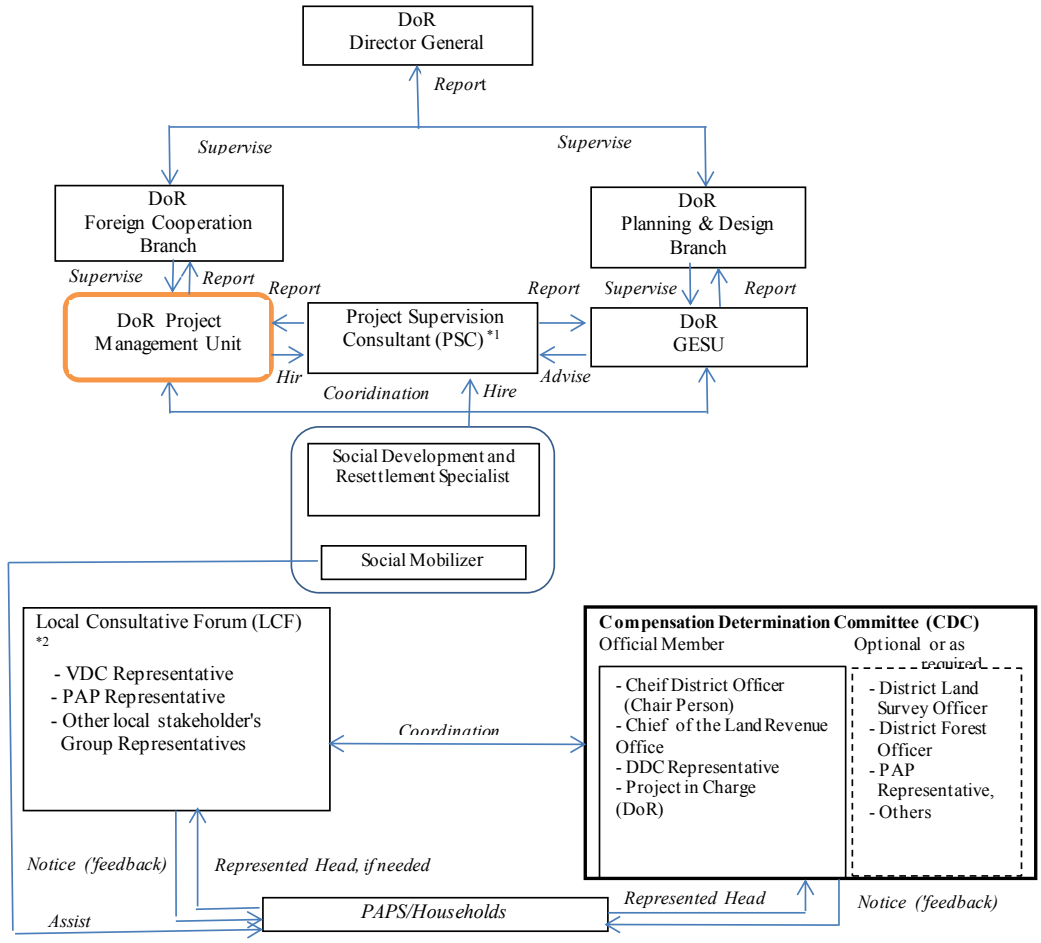
structure, regulate and strengthen communication between roadside communities, (c) involve affected communities and local government structures in social impact management, grievance resolution and monitoring.

- Capacity-building initiatives to create a supportive environment for the implementation of RAP activities, including training on accepted resettlement and rehabilitation practices, training in the establishment of compensation plans for affected household;
- Co-ordination with other government line agencies like Department of Forestry and Ministry of Local Development to ensure effective delivery of mitigation and rehabilitation support measures; and
- Disclosure of RAP will be at two levels:
  - At the first level this report will be submitted to the DoR and the JICA preparing both hard copy and electronic version. The electronic version will be attached in the website of DoR and JICA.
  - At the second level summary of RAP will be translated into Nepali and distributed among the concerned stakeholders at national as well as local level, especially focusing to the Project Affected Households.

(1) Organization Framework

An organizational setup for RAP implementation is necessary for effective coordination to ensure compliance with policies and procedures, land acquisition and resettlement activities and implementation of mitigation measures. To ensure the achievement of these activities, organization for RAP implementation and management will occur at both central and project level.

Figure 13.4-3 shows proposed organization framework for RAP Implementation. The details each role for the related organizations and persons are described in **Section 13.10** as well.



Note 1): PSC is the actual implementation body for RAP.
2): LCF is also the locally established as a "Grievance Redress" committee, communication link between the PAPs, and the Project as well as the PSC.
3): PAP is project affected person
4): GESU is Geo-environment and Social Unit, DOR
Source: Prepared by JICA Preparatory Survey Team

FIGURE 13.4-3 PROPOSED ORGANIZATION FRAMEWORK FOR RAP IMPLEMENTATION

1) Central Level Arrangement

The central level arrangement of resettlement starts from the financial management for land acquisition and compensation. The required money for compensation will send to the Project Management Unit (PMU) through the Department of Road (DOR). The DoR PMU will be responsible for overall project coordination and management of the RAP implementation. The Geo-Environment and Social Unit (GESU) will also lead the overall management of social issues, review and approval of RAP and monitoring of timely and successful implementation of RAP.

2) Project Level Arrangement

While central level arrangements are necessary for coordination of RAP activities, project level arrangements are required for effective RAP implementation. The Compensation Determination Committee (CDC) is chaired by Chief District Officer (CDO) of the concerned districts. The CDC determines the rate of compensation in consultation with PAPs and local stakeholders, categorizing land, and structures. Other relevant district officials will be deputed during the land and assets acquisition process when required. As the project authority, the PMU will resume overall responsibility for RAP implementation. This will require:

- Implementation of procedures to minimize adverse social impacts throughout the planning, design and implementation phases

- Implementation of procedures for the recording of all project affected persons by means of census and asset verification and quantification exercises;
- Establishment of procedures for the coordination of resettlement and compensation activities;
- Implementation of information dissemination campaigns
- Capacity building initiatives to create a supportive environment for the implementation of RAP activities;
- Coordination with other government line agencies, local stakeholders, NGOs to ensure effective delivery of mitigation and rehabilitation support measures.

3) Funding for Implementation of RAP and Reporting of the Monitoring Results for RAP

As mentioned in **Section 13.3.13** of this Report, budget for the monitoring activities for Environmental Management Plan (EMP) are negotiated with DOR and the funding agencies for each project. The budget for the monitoring activities for the RAP is also negotiated with DOR and the funding agencies for this Project as well.

In this Project, each organization listed in **Table 13.4-18** shall bear the responsibility for implementation of the Environmental Management Plan as well as RAP in the described Phases using JICA Loan or GON budget.

TABLE 13.4-18 FUNDING AND RESPONSIBLE ORGANIZATION FOR THE IMPLEMENTATION OF EMP AND RAP

Funding	Phase	Responsible Organization
JICA Loan	Planning Phase (Detailed Design Phase)	Engineering Design Consultant
	Construction Phase	Construction Supervision Consultant or Construction Contractor. (Responsible organization to be decided in the beginning of the Construction Phase.)
GON	Operation Phase	DOR

Source: JICA Survey Team, 2014

In terms of reporting of monitoring activities, the ESMF 7.6.2 requires quarterly reports of the Internal Monitoring. Also, the External Monitoring Agency hired by the Project Implementing Units will conduct bi-annual review of EMP and RAP implementation. Both reports will be sent to the funding agency such as JICA in each above phase.

(2) Grievance Redress Mechanism

Grievance redress mechanism will be established so that project affected people can appeal any disagreeable decisions, practices, and activities arising from compensation for land and assets to the responsible authority. Project affected people have formal option to appeal CDO and Ministry of Home Affairs in case of grievance under regulations specified in Land Acquisition Act 2034 (1997).

There is the potentiality for two types of grievances: grievances related to land acquisition and resettlement requirements, and grievances related to compensation or entitlement. The PAPs will have access to both locally constructed grievances redress committees specified under ESMF i.e. Local Consultative Forum (LCF) and formal courts of appeal system. Under the latter system every PAP can appeal to the court if they feel that they are not compensated appropriately. They may appeal to appellate court within 35 days of the public notice given to them.

Proposed mechanism for grievance resolution is given below:

Stage 1:

Complaints of PAPs on any aspect of compensation, relocation, or unaddressed losses shall in

first instance be settled verbally or in written form in field based project office. The complaint can be discussed in an informal meeting with the PAP by the concerned personnel to settle the issues at the local level. The community consultation, involvement of social/ resettlement experts will be helpful in this regard. It will be the responsibility of Project In-charge to resolve the issue within 15 days from the date of the complaint received.

Stage 2:

If no understanding or amicable solution reached or no response from the project office, the PAP can appeal to the CDC. While lodging the complaint, the PAP must produce documents to support his/her claim. The CDC will provide the decision within 15 days of registering the appeal.

Stage 3:

If the PAP is not satisfied with the decision of CDC or in absence of any response of its representatives, within 35 days of the complaint, the PAP, in his/her last resort, may submit its case to the court.

(3) Implementation Schedule

The project authority will ensure that funds are delivered on time to CDC and the implementing consultants for timely preparation and implementation of RAP, as applicable. Generally, civil works contracts will not be awarded unless required compensation payment has been completed. In the context of this project compensation process as well as income rehabilitation measures may continue and be completed even after civil works has begun. Tentative implementation schedule for RAP is given in **Table 13.4-19**.

TABLE 13.4-19 TENTATIVE IMPLEMENTATION SCHEDULE FOR RAP

S.N.	Tasks	2014	2017	2018												2019				2020				2021		
		Dec	Jan	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul - Sep
1.	Submission of Draft RAP to DOR	♦																								
2.	Submission of Final RAP to DOR for approval		♦																							
3.	Submit final report to CDO for compensation determination			♦																						
4.	Notice publication of affected land			♦																						
5.	Consultation and Grievance resolution				♦																					
6.	CDC meeting and Compensation Determination				♦																					
7.	Inform APs for the compensation claim				♦																					
8.	Collect application from the PAPs for compensation				♦																					
9.	Verify the application and prepare final list of PAPs				♦																					
10.	Pay compensation for eligible PAPs					♦																				

S.N.	Tasks	2014	2017	2018												2019				2020				2021		
		Dec	Jan	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul - Sep
11.	Contract agreement with Contractors						♦																			
12.	Transferring the land ownership						♦																			
13.	Internal Monitoring of RAP implementation progress							♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
14.	External monitoring of RAP implementation																				♦			♦		

Source: Prepared by JICA Preparatory Survey Team

13.4.9 Cost Estimation

This section provides the estimated costs in this Preparatory Survey stage for the implementation of the RAP activities described in preceding chapters under the following items.

(1) Cost Estimation for Private Land

The Land Revenue Office of Kathmandu district has fixed the minimum land cost which is basically used for land transaction purpose. During the Census and Socio-economic survey, the Affected Persons (APs) expressed that they will not accept the government rate which is very low than current market rate. The estimated cost of affected land is calculated based on current government price and current market price.

It is assumed that the current market price denotes the replacement cost by which the APs can purchase similar types of land nearby project area with the compensation amount. It covers the land registration fee and the other necessary fee such as leveling fee, if needed, within this cost. The current market prices are estimated based on a Replacement Cost Survey of this JICA Preparatory. Each estimate market price is derived from relevant information from the local peoples such as real estate planner, indirect affected persons, and direct affected persons in the Area.

All of the affected lands by the Project are located within the urban areas. Therefore, each estimation cost is basically calculated based on the distances from the main roads with actual land conditions such as undulation, but without considerations of the types (farm land, housing land, or commercial land) of the land.

The estimated compensation for private land is summarized in **Table 13.4-20**.

TABLE 13.4-20 ESTIMATED COMPENSATION FOR PRIVATE LAND

S.N.	VDC	Area (ha)	Amount as per government Price (NRs)	Amount as per Current Market Price (NRs)
1	Mahadevsthan	3.9	115,819,698	945,225,133
2	Balambu	0.2	6,104,576	43,557,186
3	Dahachok	3.5	64,715,495	771,533,343
4	Thankot	4.0	121,529,682	824,961,196
Total		**11.6**	**308,169,451**	**2,585,276,858**

Source: Replacement Cost Survey of this JICA Preparatory Survey, 2014

(2) Cost Estimation for Private Structures

The Census and Socio-economic survey at the basis of cadastral map shows that 3 various types of residential structure need to be demolished due to project. The estimated costs for the houses/ structures are presented in **Table 13.4-21**.

TABLE 13.4-21 ESTIMATED COMPENSATION FOR PRIVATE STRUCTURE

VDC	Type	Number	Area (Sq. Feet)	Rate/Sq. Feet	Amount (NRs)
Thankot	RCC Building 1 story	1	1,008.0	2,500	2,520,000
Thankot	RCC Building 2 story	1	1,848.0	2,500	4,620,000
Thankot	Jasta roofing with brick wall structure	1	1,320.0	1,000	1,185,145
Baad Bhanjyang	Corrugated Galvanized roofing sheet with brick wall	1	548.2	1,000	548,200
Naubise	Corrugated Galvanized roofing sheet with brick wall	1	338.9	1,000	338,900
Total					**9,212,245**

Note: 3.28 sq. = 1 meter
Source: Replacement Cost Survey of this JICA Preparatory Survey, 2014

(3) Cost Estimation for Private Factories

There are two factories located along the road alignment namely: United Concrete Pvt. Ltd. and Bhola- Ganesh Brick Klin. This factory requires 6 month relocation cost for shifting another place. The relocation cost covers land improvement and factory establishment cost, structure cost, factory relocation cost, rent of land, labor cost and business closure allowance. Estimated compensation for private factories is presented in **Table 13.4-22**.

TABLE 13.4-22 ESTIMATED COMPENSATION FOR PRIVATE FACTORIES

VDC	Factory	Amount (NRs)
Mahadevsthan	United Concrete Pvt. Ltd	6,004,338
Thankot	Bhola Ganesh Brick Klin	2,050,000
Total		**8,054, 338**

Source: Replacement Cost Survey of this JICA Preparatory Survey, 2014

(4) Housing Displacement Allowances

The displacement/rehabilitation allowance basically covers the housing displacement allowance for residential houses. Displacement/rehabilitation allowances are based on 90 days minimum wage as established at the national or local level. The national minimum wage rate is NRs 500.00/day in Nepal. The estimated cost for the displacement/rehabilitation allowances is shown in **Table 13.4-23**.

TABLE 13.4-23 DISPLACEMENT AND REHABILITATION ALLOWANCES

Allowances	Quantity	Unit Cost (NRs per 90 days)	Amount (NRS)
Housing displacement/rehabilitation	5	45,000	225,000
Total	**-**	**-**	**225,000**

Source: Replacement Cost Survey of this JICA Preparatory Survey, 2014

(5) Livelihood Enhancement Skills and Training (LEST) Program

48 persons from project affected family (25 % of total affected households) selected through training need assessment of all affected households will be provided Livelihood Enhancement Skills Training (LEST) program. The training cost for each participants is estimated NRs 65,000 (including lodging, foods, transportation, trainer cost etc., so total training cost = 48 person x NRs. 65,000 = **3,120,000**.

(6) Resettlement Action Plan (RAP) Implementation Cost

There are several RAP implementation activities need to be carried out during the project implementation period such as public consultation and information dissemination, the Compensation Determination Committee (CDC) meeting, RAP updating etc. The estimated cost for RAP implementation is presented in **Table 13.4-24**.

TABLE 13.4-24 ESTIMATED COST FOR RAP IMPLEMENTATION

S.N	Description	Quantity	Unit Rate (NRs)	Cost (NRs)
1	Information dissemination/ meeting with APs and other stakeholders with tea and snacks	15	15,000	225,000
2	CDC meeting and follow-up activities	10	25,000	250,000
3	Other RAP related meetings	15	20,000	300,000
4	Public notification/ resettlement leaflet		LS	200,000
5.	RAP updating if required		LS	500,000
	Total			**1,475,000**

Source: Replacement Cost Survey of this JICA Preparatory Survey, 2014

(7) Total Cost Estimates

The total estimated cost, which includes the affected private land, private structure, private factory, displacement, LEST Program, and the RAP implementation cost, is presented in **Table 13.4-25**.

TABLE 13.4-25 SUMMARY OF THE COMPENSATION COST

Cost Item	Unit	Quantity	Amount (NRs)
1. Land*	Ha.	11.6	2,585,276,858
2. Structure	Number	5	9,212,245
3. Factories	Number	2	8,054,338
4. Allowances	Household	5	225,000
5. Livelihood Enhancement Skill Training	Person	48	3,120,000
6. RAP implementation	Lump sump		147,500
7. Sub-total			**2,606,035,941**
Contingencies (5 % of total cost)**			130,301,797
Grand Total			**2,736,337,738**

*Note: * The cost of the land is calculated as current market price*
***The contingencies amount will be used for community infrastructure, compensation payment for trees and crops if required during project implementation period and other unidentified item during the Project Detailed Design Phase.*
Source: Replacement Cost Survey of this JICA Preparatory Survey, 2014

13.4.10 Monitoring and Evaluation

The Project has objective to ensure that the economic condition of affected households shall not be worse than that of their situation without the Project intervention.

Regular monitoring is essential and only an instrument to understand the socio-economic condition of the affected household. Two types of monitoring, internal and external will be administered in three levels: (i) process level (ii) output level and (iii) impact level of*:* (a) record and assess project inputs and the number of persons affected and compensated and (b) confirm that former subsistence levels and living standards should be reestablished.

(1) Internal Monitoring

A quarterly report of internal monitoring will be prepared by GESU in consultation with Social Development and Resettlement Specialist. The Project Management Unit (PMU) will maintain a record of all transaction in their resettlement data, followed by entitlement records signed by the affected persons and survey based monitoring of resettlement and land acquisition progress. The Local Consultative Forums (LCF) will play an important role in monitoring providing feedback on community concerns, grievances, and requests. Internal monitoring focuses and ensures the followings:

- Verification that there are not outstanding or unresolved land acquisition issues with respect to the project and that property valuation and economic rehabilitation in accordance with the provision of plan
- Information campaign, discrimination and consultation with affected persons
- Status of land acquisition and timely payments on land compensation
- Value of entitlement received equal to that of actual land and structure acquired
- Use of entitlement and check its misuse
- Compensation for affected structures and other assets
- Payments for loss of income
- Relocation of affected persons and supports provided
- Implementation of economic rehabilitation and income restoration measures
- Effective operation of the Grievance Redress Committees
- Funds for implementing land acquisition and economic rehabilitation activities as timely manner and sufficient for the purposes and spent in accordance with the plan

The Social Development and Resettlement Specialist will submit reports to GESU on a quarterly basis. The Social Mobilizers prepare the monthly progress report to the Social Development and Resettlement Specialist. Project field offices will be responsible for monitoring the day-to-day resettlement activities. The Social Mobilizers will play an important role to assist the project field office in course of regular monitoring.

A performance data sheet will be developed to monitor the project at the field level. Social Development/Resettlement Specialist will monitor the RAP implementation and proceeds quarterly reports to DOR and the JICA, received from the Social Mobilizers from the field offices.

The proposed internal monitoring is presented in **Table 13.4-26**.

TABLE 13.4-26 PROPOSED MONITORING FORM FOR THE INTERNAL MONITORING

Indicators	Issue	Procedure	Timing	Responsibility	Results
Process level monitoring					
RAP implementation in project works	Employment of local labor including women and children	Site observation, attendance record, interaction with laborers and contractors	Monthly	Project/social mobilizer /SDRS	
	Campsite management including lodging arrangement and campsite facilities	Site observation, interaction with laborers, contractors	Monthly	Project/social mobilizer/SDRS	
	Use of health and safety measures	Site observation, interaction with laborers, contractors	Quarterly	Project/SDRS	
	Temporary leasing of private land and house	Site observation, contractors, check contract agreement	Monthly	Project/social mobilizer/SDRS	
	Discrimination of wage rate between male and female workers	Interaction with laborers, labor survey, record of wage payment	Monthly	Project/social mobilizer/SDRS	
Output level					
Land Acquisition	Encroachment into public land like grazing land, temples etc.	Visit the identified public land interact with local people, take photographs	Biannually	Project/social mobilizer /SDRS	
	Development of new settlements/slum along the roadside	Observation, recording of sites, photograph	Quarterly	Project/social mobilizers/ SDRS	
	Migration to the road side/displacement of local people	Review of land holding records, discussion with local people	Quarterly	Project/social mobilizer/SDRS	
	Incidence of road accidents	Discuss with local people, health institutions' records	Biannually	Project/SDRS	
	Incidence of communicable diseases like respiratory, STD, HIV/AIDS etc.	Discuss with local people, health workers/ health post/ center	Annually	Project/social mobilizer/SDRS	
Input level					
Change in household level income and economic activities	Changes in the land price, land use and agricultural practices, productivity and crop export	Discuss with farmers and extension workers, agricultural statistics of District Agriculture Office	Annually	Project/social mobilizer/SDRS	
Social safety	State of social harmony and social security like alcoholism, narcotism, etc.	Police records, discussion with local residents	Annually	Project/SDRS	
	Changes in the living standard of people	Interview with families, VDC records, discussion with local leaders, CBOs	Annually	Project/SDRS	
Cultural impact	Condition of cultural and historical areas and aesthetic qualities	Visit the area, discuss with people, observation and photographs	Annually	Project/SDRS	

Note 1: Social mobilizer: Field level staff hired by the Project Supervision Consultant.
Note 2: SDRS: Social Development and Resettlement Specialist hired by the Project Supervision Consultant.

(2) External Monitoring

The actual external monitoring will be carried out by annually by an independent monitoring agency. The external monitor will review the internal resettlement implementation activities. The external monitoring involves on:

- Review of internal monitoring Reports
- Review of compensation status
- Monitor Rehabilitation support program
- Information disclosure system
- Process and mechanism of compliance redress
- Employment status of the PAPs
- Effectiveness of Livelihood restoration program
- Effectiveness of Awareness in HIV/AIDS and human trafficking

Based on the above mentioned activities the external monitor will focus on:

- Evaluation of social and economic impact of land acquisition and economic rehabilitation of the project affected persons.
- Verify the objectives of enhancement of economic condition PAPs, or at least restoration of income levels and standard of living of the affected persons.
- Furnishing creative suggestions and modifications in land acquisition and economic rehabilitation, if necessary.
- Making to ensure all resettlement and land acquisition activities are properly conducted.

The external monitoring agency will require the following activities to be performed:

- Verification of internal monitoring to ensure the appropriateness of activities carried out by program implementation unit in the field.
- Evaluation of delivery system to the PAPs and assess impacts of entitlements to determine the approved resettlement action plan.
- Evaluation of consultation and grievance redress procedures to identify the levels of public awareness of grievance-redressed procedures, accessed by project affected persons and households for information and rapid conflict resolution.
- Evaluation of actual operations of grievance committee to assist project affected persons as required and to act as observers.
- Declaration of successful implementation for summing up of activities related to entitlements, distribution, and resettlement.
- Recommend follow up action relating to outstanding actions required to complete achievement of objectives of the RAP and resettlement policies, additional mitigation measures for project affected persons

The proposed external monitoring is presented in **Table 13.4-27**.

TABLE 13.4-27 PROPOSED MONITORING FORM FOR THE EXTERNAL MONITORING

Indicators	Procedure	Timing	Results
Employment of local labor including women and children	Site observation, attendance record, interaction with laborers and contractors	Annually	
Campsite management including lodging arrangement and campsite facilities	Site observation, interaction with laborers, contractors	Annually	
Use of health and safety measures	Site observation, interaction with laborers, contractors	Annually	
Temporary leasing of private land and house	Site observation, contractors, check contract agreement	Annually	
Discrimination of wage rate between male and female workers	Interaction with laborers, labor survey, record of wage payment	Annually	
Encroachment into public land like grazing land, temples etc.	Visit the identified public land interact with local people, take photographs	Annually	
Development of new settlements/slum along the roadside	Observation, recording of sites, photograph	Annually	
Migration to the road side/displacement of local people	Review of land holding records, discussion with local people	Annually	
Incidence of road accidents	Discuss with local people, health institutions' records	Annually	
Incidence of communicable diseases like respiratory, STD, HIV/AIDS etc.	Discuss with local people, health workers/ health post/ center records	Annually	
Changes in the land price, land use and agricultural practices, productivity and crop export	Discuss with farmers and extension workers, agricultural statistics of District Agriculture Office	Annually	
State of social harmony and social security like alcoholism, narcotics etc.	Police records, discussion with local residents	Annually	
Changes in the living standard of people	Interview with families, VDC records, discussion with local leaders, CBOs	Annually	
Condition of cultural and historical areas and aesthetic qualities	Visit the area, discuss with people, observation and photographs	Annually	

CHAPTER 14

OPERATIONS AND MAINTENANCE OF THE PROJECT

CHAPTER 14
OPERATIONS AND MAINTENANCE OF THE PROJECT

14.1 OPERATION AND MAINTENANCE OF THE TUNNEL

14.1.1 O&M Activities for Tunnel

Major O & M activities are classified as follows;

MAJOR O&M ACTIVITIES

1) Inspection
2) Maintenance; tunnel structure and facilities
3) Monitoring of traffic movement, traffic accident, fire incident, etc.
4) Immediate actions when some incidents are found or reported
5) Vehicle Control (vehicles carrying hazardous materials, vehicle height, and overloaded trucks.)

14.1.2 Inspection

Inspection of a tunnel must be undertaken daily by an inspection team, and check the following:

- Facilities inside the tunnel such as lighting facility, jet fans, etc. are properly functioning.
- Cleanliness of the tunnel wall, road surface, facilities, etc.
- Any cracks on concrete lining and pavement, water seepage from concrete lining, etc.
- Drainage facility (no clogging, etc.)
- Deformation of the tunnel arch.
- Any other problems.

Inspection items for civil work components and electrical/communication facilities are shown in **Table 14.1-1.**

TABLE 14.1-1 INSPECTION ITEMS

Component			Inspection Items
Civil work Component	Road Surface	Pavement	(1) Surface roughness, (2) Cracks, (3) Joint failure, (4) Heaving, (5) Pumping, (6) Local settlement
	Tunnel Portion	Tunnel Portal	(1) Cracks, (2) Drainage, Water Flow, (3) Any deformation, (4) Slope condition
		Lining	(1) Cracks, (2) Leakage of water, (3) Free Lime, (4) Delamination, (5) Difference at a joint
		Interior Wall	(1) Damage, (2) Damages to the accessories
		Drainage	(1) Clogging, (2) Damage
Electrical/ Mechanical/ Communication Component	Jet Fans		Abnormal noise, vibration, cable connection and voltage. Interlocking with visibility index (VI) sensors and carbon dioxide (CO) sensors.
	Lighting Facilities		Intensity of illumination. As for distribution board, checking abnormal heating, looseness and breaking of wire etc. by visual check and check with measuring instrument.
	Power supply system and distribution equipment and buck up generator		Appearance (dirt, damage), looseness, breaking of wire, oil leakage, pipe damage, abnormal noise and vibration etc. by visual check and check with measuring instrument.
	Information collection and provision equipment		Performance, communication and appearance (dirt, damage) of each equipment. Facility/equipment which also defined as ventilation, information collection and provision should be inspected.

Component		Inspection Items
	Emergency Facilities	Performance and appearance (dirt, damage) of each equipment. As for signal receiving and control board, abnormal noise and heating etc. are checked by visual check etc.

Source: NEXCO-WEST and JICA Survey Team

14.1.3 Maintenance of Tunnel

Routine maintenance activities are summarized in **Table 14.1-2.** Routine maintenance should be implemented based on the findings of inspection and regular requirements.

TABLE 14.1-2 ROUTINE MAINTENANCE ACTIVITIES

Component			Routine Maintenance Activity
Civil work Component	Road Surface	Pavement	(1) Crack sealing, (2) Joint repair, (3) repair of heaving, pumping and local settlement (4) Road surface cleaning
	Tunnel Portion	Tunnel Portal	(1) Crack sealing, (2) Cleaning of drainage facilities, (3) Repair of Slope protection work
		Lining	(1) Lining cleaning, (2) Crack sealing, (3) Water leakage prevention, (4) Reinforcement work for the cavity at the back of lining, (5) Joint repair, (6) Delamination repair
		Interior Wall	(1) Wall cleaning
		Drainage	(1) Drainage cleaning
Electrical/ Mechanical/ Communication Component	Jet Fans		(1) Cleaning, (2) Check the stability, (3) Replacement and overhauling of aged jet fan
	Lighting Facilities		(1) Cleaning, (2) Change a light, (3) Check the stability, (4) Replacement of lighting facility in case of luminance reduction
	All kinds of Signboards		(1) Cleaning, (2) Change a light, (3) Check the stability, (4) Replacement of deteriorated facility
	Emergency Facilities such as Fire Hydrant, Fire Detector, Fire Extinguisher, etc.		(1) Cleaning, (2) Functioning or not, (3) Replacement of facility depending on the deterioration or the damage of the parts
	CCTV, Control system		(1) Cleaning, (2) Check the stability, (3) Functioning or not, (4) Replacement of deteriorated facility
	Other Equipment such as CO Sensor, Visibility Index Sensor, Wind Velocity Sensor		(1) Cleaning, (2) Check the stability, (3) Functioning or not, (4) Replacement of deteriorated facility
	Back Up Generator		(1) Cleaning filters, spark plug, nozzle, (2) Functioning or not, (2) Fuel Amount, (3) Replacement of deteriorated facility

Source: JICA Survey Team

14.1.4 Monitoring Traffic Movement, Traffic Accident, Fire Incidents, etc.

This work must be undertaken for 24-hours a day for 365 days a year. Traffic movements are monitored through CCTV, report from a patrol group and road users. Information shall be compiled at a traffic control center of the Tunnel Management Office, and necessary actions shall be quickly decided and informed to proper agencies and the action team.

Monitoring will be focused on the following:

- Reckless driving

- Overtaking
- Over speeding
- Stopped (stalled)/parked vehicles
- Vehicle breakdown
- Obstacles dropped from vehicles
- Accident
- Fire

Information collected shall be properly recorded and necessary information shall be provided to road users through Variable Information Signboards and a Loudspeaker.

Monitoring is quite important to assure safe operation of a tunnel and to protect road users' lives.

Emergency actions shall be made in accordance with the instructions of the head of the monitoring team.

14.1.5 Immediate Actions when some incidents are found or reported

The head of the monitoring team shall immediately decide what to do when some incidents are found or reported from road users. He must decide whether a case must be informed to Action Team, Fire Department and/or Police.

Major incidents are as follows;

- Traffic accident
- Fire
- Vehicle breakdown
- Obstacle dropped from vehicles
- Parked/stopped (stalled) vehicles

Actions to be taken during emergency cases are illustrated in **Figure 14.1-1.**

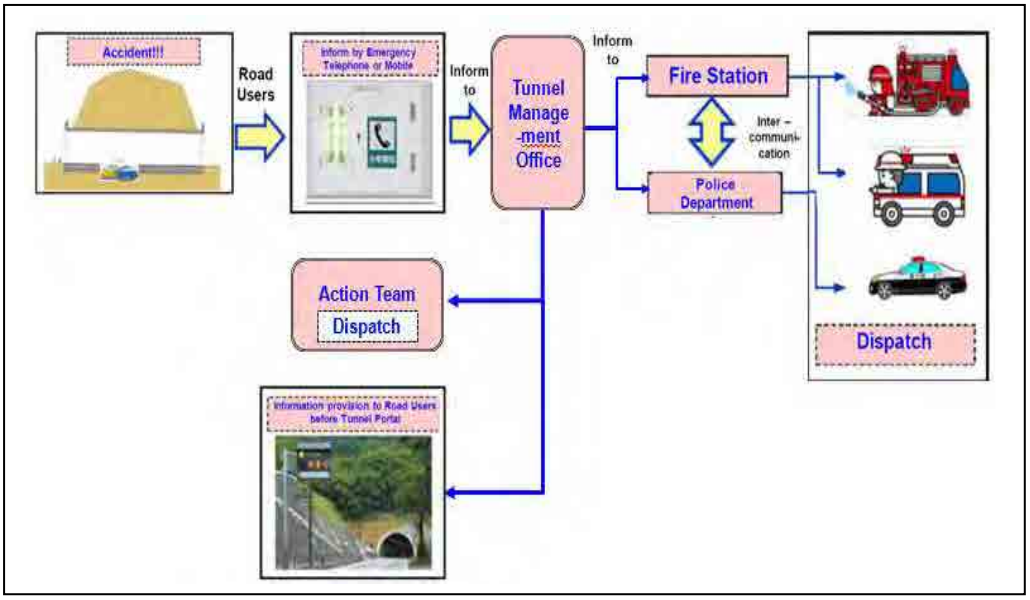
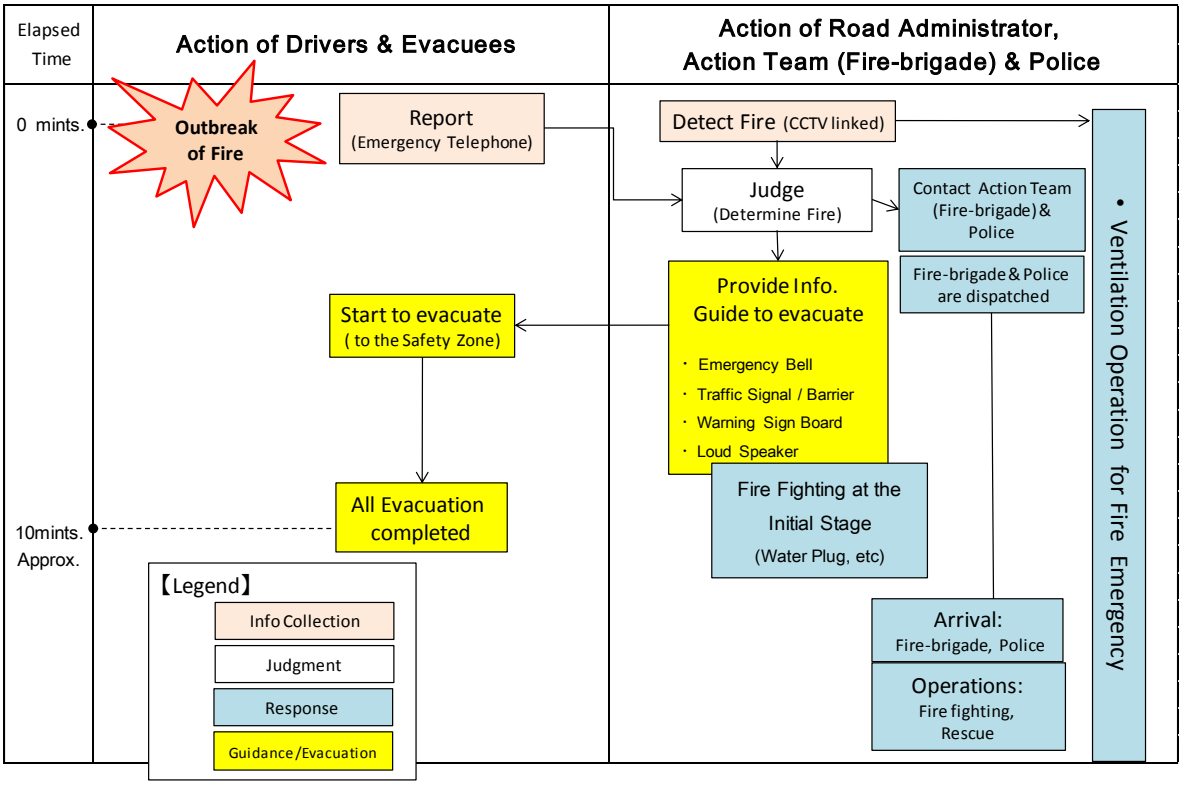


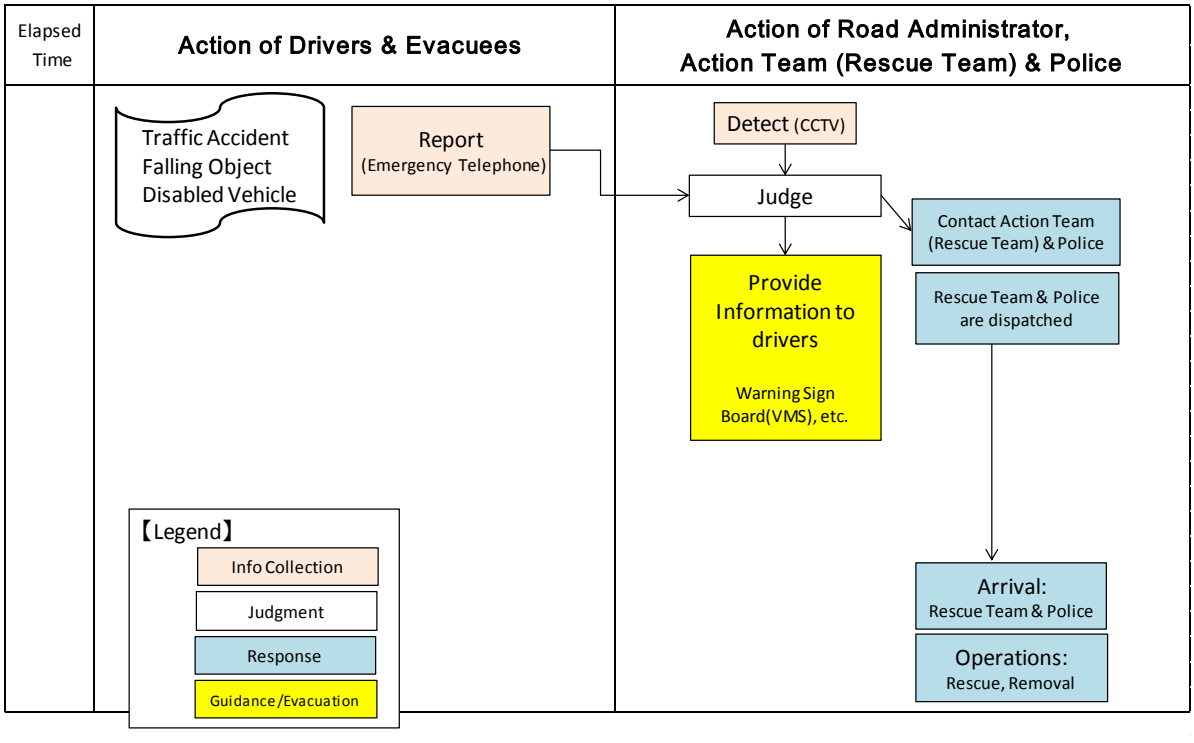
FIGURE 14.1-1 ACTIONS TO BE TAKEN DURING EMERGENCY

Action flows in case of a fire and traffic accident/vehicle breakdown/falling objects are shown in **Figure 14.1-2** and **Figure 14.1-3.**



Source: JICA Survey Team

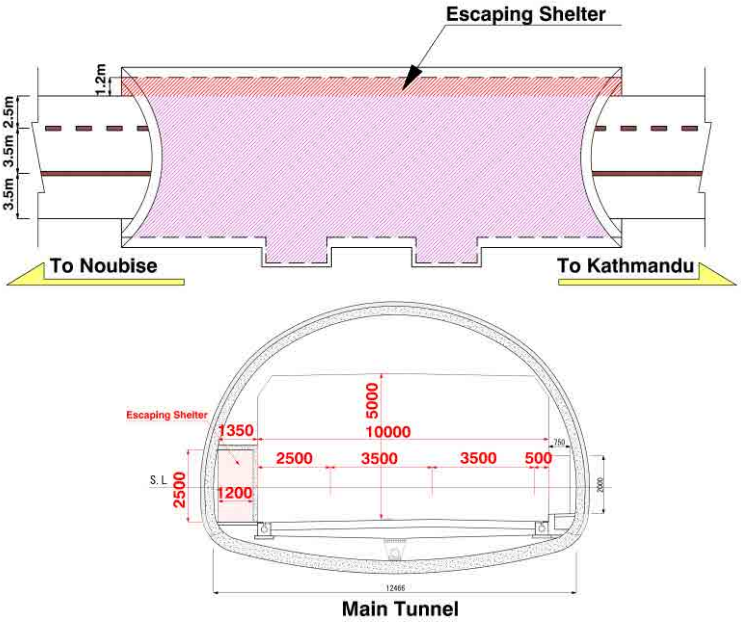
FIGURE 14.1-2 ACTION FLOW IN CASE OF FIRE



Source: JICA Survey Team

FIGURE 14.1-3 ACTION FLOW IN CASE OF TRAFFIC ACCIDENT, FALLING OBJECT AND VEHICLE BREAKDOWN

In case of fire, Tunnel Management Office will provide the evacuation instruction to people inside the tunnel via loud speaker. The tunnel will be constructed the escaping shelter shown in **Figure 14.1-3**.



Main Tunnel +Escaping Shelter (W=1.2m)

FIGURE 14.1-4 ESCAPING SHELTER INSIDE TUNNEL

14.1.6 Vehicle Control

The following vehicles should not be allowed to use a tunnel, thus these vehicles should be controlled before entering a tunnel;

- Two and three wheelers(motorbikes and tricycles[Tempo]) – high probability incidence of causing traffic accident
- Vehicles carrying hazardous materials such as vehicles carrying oil or highly inflammable items– when these get an accident or a fire, it will be dangerous to people and tunnel facilities causing much disaster
- Overloaded trucks – high risk of vehicle breakdown, weighing scale will be installed at toll gates
- Vehicles of which height is exceeding the limit – these will damage jet fans and other facilities. Height Restricting Devices must be installed at toll gates.
- Others (Mechanically defected vehicles, pedestrians and animals)

It is necessary to coordinate with Department of Transport Management and Traffic Police Department prior to the tunnel opening.

14.1.7 Equipment Needed for Tunnel O&M

Table 14.1-3 shows the equipment needed for tunnel O&M.

TABLE 14.1-3 EQUIPMENT NEEDED FOR TUNNEL O & M

Name of Equipment		No. of Unit
Inspection & Maintenance Work	Road Sweeper	1
	Wall Cleaning Vehicle	1
	Water Supply Equipment for Cleaning	1
	High Platform Mounted Vehicle	1
	Station Wagon	1
	Inspection Machinery, Measuring Instrument and Tools	1 set

Name of Equipment		No. of Unit
Traffic Monitoring and Information Provision	Monitor System	1 set
	Patrol Car	2
	Traffic Control Devices	2 set
Emergency Case	Towing Vehicle	2
	Air Jack	2
	Truck for Transport of Air Jack	2
	Fire Truck	2
	Ambulance Car	2
Vehicle Control	Weight Scale (Mat Type)	2
	Height Restricting Device (Gate Type)	2

Source: JICA Survey Team

14.2 TUNNEL O&M ORGANIZATION, COST AND FUND SOURCE

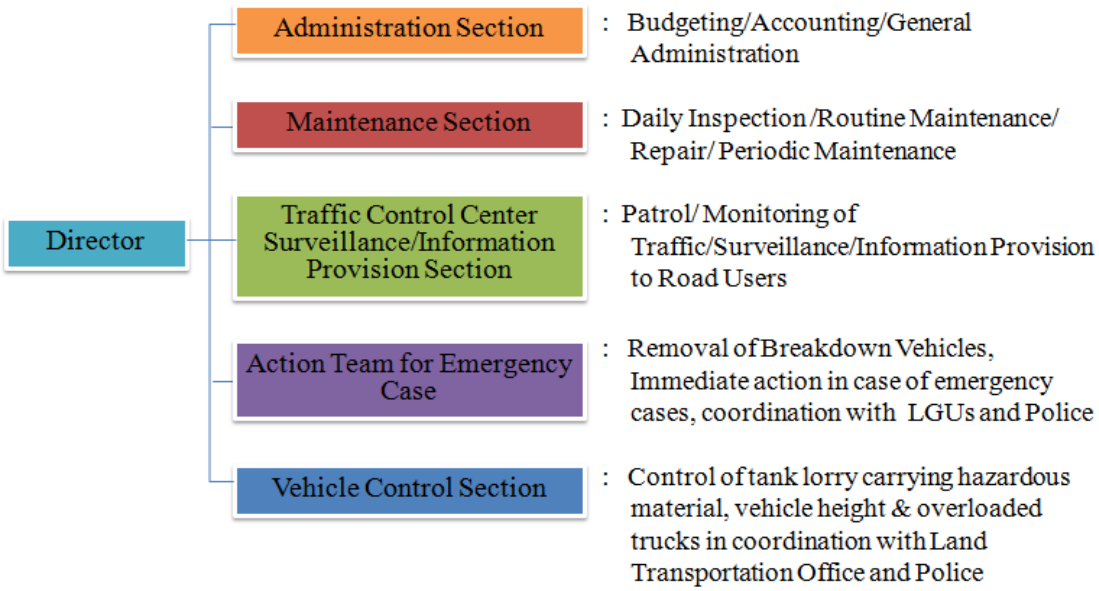
14.2.1 Tunnel O&M Organization

Nagdhunga Tunnel will be the first tunnel in Nepal, there is no organization which has an experience of tunnel O&M, thus the Government is required to create responsible organization for tunnel O&M.

In order to assure safe operation inside a tunnel and to save road users' lives in case of critical incidents, the **"Tunnel Management Office"** must be established. The proposed structure of Tunnel Management Office is shown in **Figure 14.2-1.**

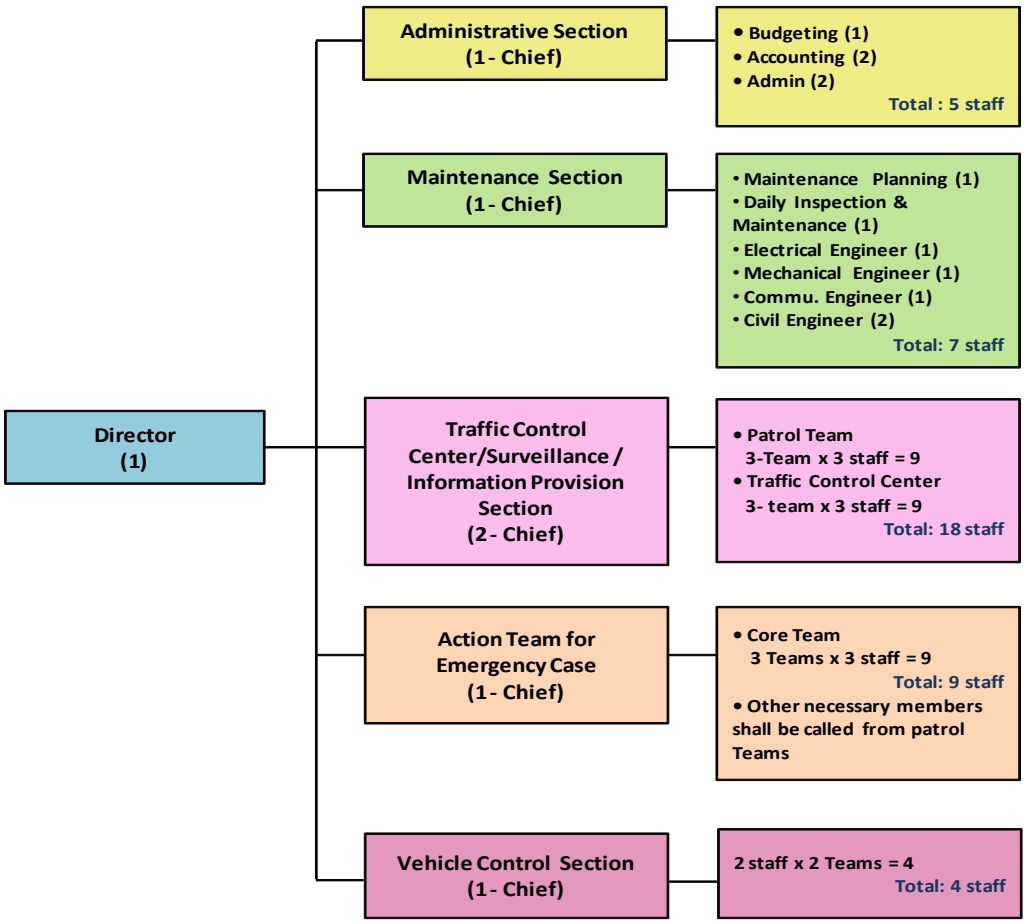
If a toll is collected to produce fund for tunnel O&M cost, **Toll Collection Section** must be organized.

Number of staff required will be fifty (50) comprising of one (1) Director, six (6) Chiefs and forty three (43) staff as shown in **Figure 14.2-2.**



Source: JICA Survey Team

FIGURE 14.2-1 PROPOSED ORGANIZATION OF TUNNEL MANAGEMENT OFFICE



No. of Staff: 1 Director, 6 Chiefs, 43 Staff
Total Staff = 50 staff

Source: JICA Survey Team

FIGURE 14.2-2 ESTIMATED STAFF REQUIREMENT

14.2.2 O&M Cost Estimate

O & M cost was estimated as follows;

(1) Tunnel Management Office O & M

● Staff Cost	12.5 Million NPR
● Office Running Cost	0.5 Million NPR
Sub-total	**13.0 Million** NPR

(2) Electricity Cost

● Jet fan @ 1,000,000[1] kwh x 20	20.0 Million NPR
● Lighting and others	5.0 Million NPR
Sub-total	**25.0 Million** NPR

(3) Maintenance Work/Replacement of Parts, etc

500,000 NRP/month x 12 months = **6.0 Million** NPR

(4) Toll Collection

● Staff Cost	4.5 Million NPR
● Others(running cost, etc.)	0.5 Million NPR
Sub-total	**5.0 Million** NPR

[1] 230kw x 12 hrs x365days=1,000,000kwh

(5) Total = 49.0 Million NPR /year

14.2.3 Fund Source of Tunnel O&M Cost and Tunnel Management Office Operator

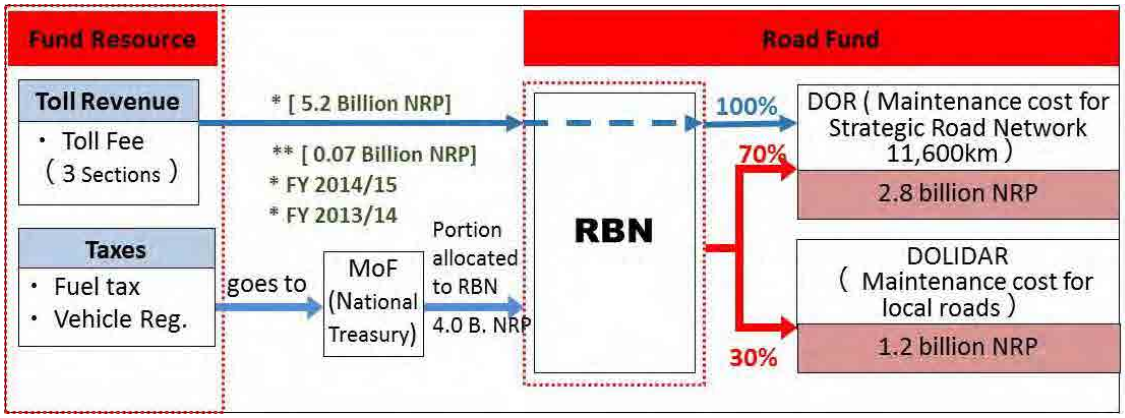
(1) Fund Source

There are two (2) possible fund sources as follows;

Case-1: To be allocated from Road Fund
Case-2: A toll is collected from tunnel users

Case-1: To Be Allocated from Road Fund

Road Fund is being collected from fuel tax and vehicle registration fee and is used for road maintenance fund. A toll is also collected by RBN at the specific road section and is used exclusively for the designated section where a toll is collected. **Figure 14.2-3** shows the amount and flow of road fund.



Source: Prepared by JICA Survey Team based on RBN Information

FIGURE 14.2-3 FLOW OF ROAD FUND

DOR receives 2.8 Billion NRP in FY2014/15 for maintenance of 11,600km of roads. An average road maintenance budget allocation to DOR from Road Fund is 241,400 NRP per km per year. If tunnel O&M budget is allocated from Road Fund, tunnel O&M budget consumes the maintenance budget of 183km of road, or 2.5km tunnel consumes the 183km road maintenance budget. Since it is said that current road maintenance budget is far from satisfactory level, it is not advisable to utilize Road Fund for tunnel O&M.

Case-2: A Toll is collected from Tunnel Users

If a toll is collected from a tunnel user, a toll fee was estimated as follows;

TOLL FEE FOR TUNNEL USERS	
Light Vehicle	25 NRP
Heavy Vehicle	35 NRP

The interview survey on willingness-to-pay revealed that about 90% of passenger car users are willing to pay a toll and a big truck company owner answered that he is willing to pay even if a toll rate is higher than 35 NRP.

Road users are willing to pay a toll for tunnel utilization, since they can save higher cost than a toll by passing through a flatter and smoother tunnel.

It is recommended that a toll should be collected from tunnel users to be able to raise tunnel O&M cost.

(2) Toll Collection by RBN

RBN is the only public entity which is authorized to collect a toll from road users. RBN is at present collecting a toll at three (3) locations to raise road maintenance fund. RBN is currently

outsourcing toll collection activities to the private sector. The same system can be applied to this tunnel project.

RBN and DOR should agree on toll collection to raise tunnel O&M fund and toll revenue shall be exclusively used for a tunnel O&M.

(3) Tunnel Management Office Operator

Tunnel Management Office should be operated and managed by DOR. Since this is the first tunnel construction project in Nepal, DOR has no experience for tunnel management. Prior to opening of the tunnel, DOR staff should undergo various capacity development programs.

Although there is an option that tunnel O&M be carried out by a private sector, it is not recommended, simply because a private sector still has no experience of public infrastructure management.

14.2.4 Financial Study of Tunnel O&M Cost and Toll Collected from Road Users

Based on the following conditions, Tunnel O&M cost and toll revenue was estimated.

[Common]

- Price escalation 4%
- Base year 2014

[O&M Cost]

- Routine and Periodic Maintenance Cost: 49.5 Million NRP in 2014 price/year
- Periodic Maintenance Cost: 400 Million NRP in 2014 price / 10 year (Replacement of deteriorated facility such as jet fans, lightings, other equipment and etc.)

[Revenue]

- Toll Setting: 25 NRP for Light vehicle and 35 NPR for Heavy vehicle in 2014 price
- Consideration of price escalation, toll rate starts from 33 NPR in 2021.
- Toll rate is assumed to raise every 2years based on the price escalation.

Estimated Toll Revenue is shown in **Table 14.2-1** and cash flow of tunnel O&M cost is shown in **Table 14.2-2**. Though the balance of periodic maintenance year (year 2030 and year 2040) will become minus, these periodic maintenance costs will be covered by the previous year's saving cost.

TABLE 14.2-1 ESTIMATED TOLL REVENUE

	AADT		Toll Rate		No. Day	Revenue
	Light Vehicle	Heavy Vehicle	Light Vehicle	Heavy Vehicle		Mil. NPR/year
2021	3,235	3,872	33	47	180	52.0
2022	3,335	4,008	33	47	365	108.9
2023	3,435	4,144	36	50	365	120.8
2024	3,538	4,284	36	50	365	124.7
2025	3,644	4,429	39	54	365	139.2
2026	3,753	4,580	39	54	365	143.7
2027	3,866	4,735	42	59	365	161.2
2028	3,982	4,896	42	59	365	166.5
2029	4,102	5,063	46	64	365	187.1
2030	4,225	5,235	46	64	365	193.2
2031	3,828	3,715	49	69	365	162.0
2032	3,921	3,808	49	69	365	166.0
2033	4,016	3,903	53	74	365	183.1
2034	4,113	4,000	53	74	365	187.6
2035	4,213	4,100	57	80	365	207.4
2036	4,213	4,100	57	80	365	207.4
2037	4,213	4,100	62	87	365	225.5
2038	4,213	4,100	62	87	365	225.5
2039	4,213	4,100	67	94	365	243.7
2040	4,213	4,100	67	94	365	243.7
2041	4,213	4,100	73	101	365	263.4
2042	4,213	4,100	73	101	365	263.4
2043	4,213	4,100	78	110	365	284.6
2044	4,213	4,100	78	110	365	284.6
2045	4,213	4,100	85	119	365	308.8

Source: JICA Survey Team

TABLE 14.2-2 ESTIMATED TOLL REVENUE

Unit: Million NPR

	Year	(Inflow)	(Outflow)	(Inflow-Outflow)	(Cumulative)	Remarks
		Revenue(a)	O&M Cost(b)	Balance(b-a)		
1	2021	52.0	32.1	19.9	19.9	Open on July,2021
2	2022	108.9	67.7	41.2	61.0	
3	2023	120.8	70.5	50.3	111.3	
4	2024	124.7	73.3	51.4	162.7	
5	2025	139.2	76.2	63.0	225.7	
6	2026	143.7	79.3	64.4	290.1	
7	2027	161.2	82.4	78.8	369.0	
8	2028	166.5	85.7	80.8	449.7	
9	2029	187.1	89.1	98.0	547.7	
10	2030	193.2	654.6	-461.4	86.4	Facility's Exchange
11	2031	162.0	96.4	65.6	152.0	
12	2032	166.0	100.3	65.7	217.7	
13	2033	183.1	104.3	78.8	296.5	
14	2034	187.6	108.5	79.2	375.7	
15	2035	207.4	112.8	94.6	470.2	
16	2036	207.4	117.3	90.1	560.3	
17	2037	225.5	122.0	103.5	663.8	
18	2038	225.5	126.9	98.7	762.5	
19	2039	243.7	132.0	111.7	874.2	
20	2040	243.7	969.0	-725.3	148.9	Facility's Exchange
21	2041	263.4	142.7	120.7	269.6	
22	2042	263.4	148.4	115.0	384.6	
23	2043	284.6	154.4	130.2	514.8	
24	2044	284.6	160.5	124.0	638.8	
25	2045	308.8	167.0	141.8	780.6	

Source: JICA Survey Team

14.3 CAPACITY DEVELOPMENT FOR TUNNEL O&M

14.3.1 Necessity of Capacity Development

Since DOR staffs have no experience of tunnel O&M, capacity for tunnel O&M must be developed prior to opening of the tunnel. Capacity development should cover various aspects in relation to tunnel O&M as follows;

14.3.2 Legal Aspects in relation to Tunnel O&M

For the management of this tunnel, the following issues should be confirmed:

- What kind of powers will be required?
- Which agencies have these powers?
- What kind of powers can be delegated to Tunnel Management Office (TMO)?

After confirmation, define the act of TMO and the request of the related agencies.

(1) Violation of traffic rules (coordination with traffic police)

Confirm rules and regulations included in the "Road Safety Rules", an example follows:

- Legal speed limit
- Prohibition of motorbikes passing in tunnels
- Prohibition of overtaking in tunnels
- Obligation of vehicle maintenance
- Prevention of load shifting and falling objects
- Obligation of relief activities in accidents

Basically, TMO, against violating vehicles of these traffic rules, will request related agency (traffic police) to control them (arrest, penalty, etc.), and as a part which keeps constant monitoring, will engage to 'call attention, give instruction and remove' to them for the delegated matters, and for the undelegated matters, will request the related agency (traffic police) to dispatch.

(2) Traffic accident (coordination with traffic police)

Request the related agency (traffic police) to investigate the cause of the accident and to take legal actions. At the same time, TMO will conduct lane regulation, close the road and remove (tow away) damaged vehicles immediately for prevention of the secondary accidents and restoration of the normal traffic. TMO will also conduct necessary emergency repairs to restore the traffic.

(3) Fire incident (coordination with Fire Department of LGUs)

Confirm which powers are necessary for fire-fighting activities at a fire incident, an example follows:

- Right-of-way
- Order to remove vehicles
- Rights regarding damage, etc

And coordinate with the related agency (fire department of LGUs) to determine which tasks could be delegated to TMO.

TMO carries out fire-fighting activities within the delegated powers. If TMO cannot extinguish the fire within its delegated powers, it will request the fire department to dispatch.

If fire-fighting activities within the delegated powers are difficult and the arrival of the fire department may take time, consider to request for establishing a fire department in proximity (or within TMO).

(4) Vehicle control (coordination with Land Transportation Department and Police Department)

Confirm rules and regulations included in the "Rules to Protect Road Structures", an example follows:

- Height limitations of a vehicle
- Weight limitations of a vehicle
- Width limitations of a vehicle
- Prohibition of passage of the vehicles carrying hazardous materials

TMO will give warnings to and remove vehicles which violate these rules within its delegated powers. It will take joint actions in coordination with the related agency (traffic police) for issues outside its delegated powers.

(5) Lane regulation and Road closing (coordination with traffic police)

Confirm which powers is necessary for lane regulation and road closing, and will coordinate with the related agency (traffic police) to identify which actions are necessary for TMO to conduct lane regulation and road closing.

14.3.3 Inspection and Maintenance Work

The performance of inspection and maintenance work often depends on the five physical senses of the worker. Therefore, it is required for the worker to have advanced knowledge and experience.

For this reason, the following topics should be covered in the field of inspection and maintenance work.

- Responsibilities of the Maintenance Section and coordination with other sections.
- Inspection frequency
- What to inspect and how to record findings of inspection
- Preparation of Inspection and Maintenance Manual
- Traffic Control/Management during maintenance work

The details are as follows:

- An "Inspection Manual" will be developed which covers the following objects:
  - Contents of an inspection
  - Frequency of an inspection
  - Criteria of an inspection
  - How to record the results
  - How to report the results
- The manual will be distributed to workers and a training course will be held to familiarize them with the manual.
- A training course will be held to familiarize workers with usage of vehicles, measuring instruments, tools and equipment for an inspection based on their instruction manuals and through usage demonstrations of the actual machine.
- Inspection and maintenance work may be dangerous because of work on the road currently in use, in high places, related to electricity and oil, etc. For this reason, safety training will be conducted, a check sheet will be developed and a safety manager will be appointed. A safety manager in this context is a person who is responsible for safe work by supervising workers.
- Prior to opening, field training and an initial inspection will be held at the actual objects for inspection in order to obtain actual experience and to understand and record the initial condition of the objects.
- Some work require joint work with other sections, such as lane regulation (coordination with Patrol Team), and confirmation of signal reception/concerted work (coordination with

Traffic Control Center). Therefore, necessary tasks for smooth work should be identified and organized.

- Documents useful for understanding details of the object should be compiled as a reference so that they could be referred to as necessary during the maintenance work.

14.3.4 Traffic Monitoring and Information Provision

Traffic Control Center gathers various information continuously and makes judgment as shown in **Figure 14.3.4-1** and takes actions (i.e. provide information, operate, instruct and request) accordingly.

The following topics should be covered in the field of traffic monitoring and information provision.

- Responsibilities of Patrol Teams and Traffic Control Center
- What kinds of equipment installed and functions of each equipment
- What to be monitored by Traffic Control Center and Patrol Teams
- What information to be collected and what information to be provided to tunnel users
- What actions to be made when some irregularities are found
- What to be coordinated with other sections/teams and traffic police/fire department of LGUs/hospitals
- What communication systems to be established with other sections, traffic police, concerned LGUs and hospitals

Show the summary of Traffic control center in **Figure 14.3-1**.

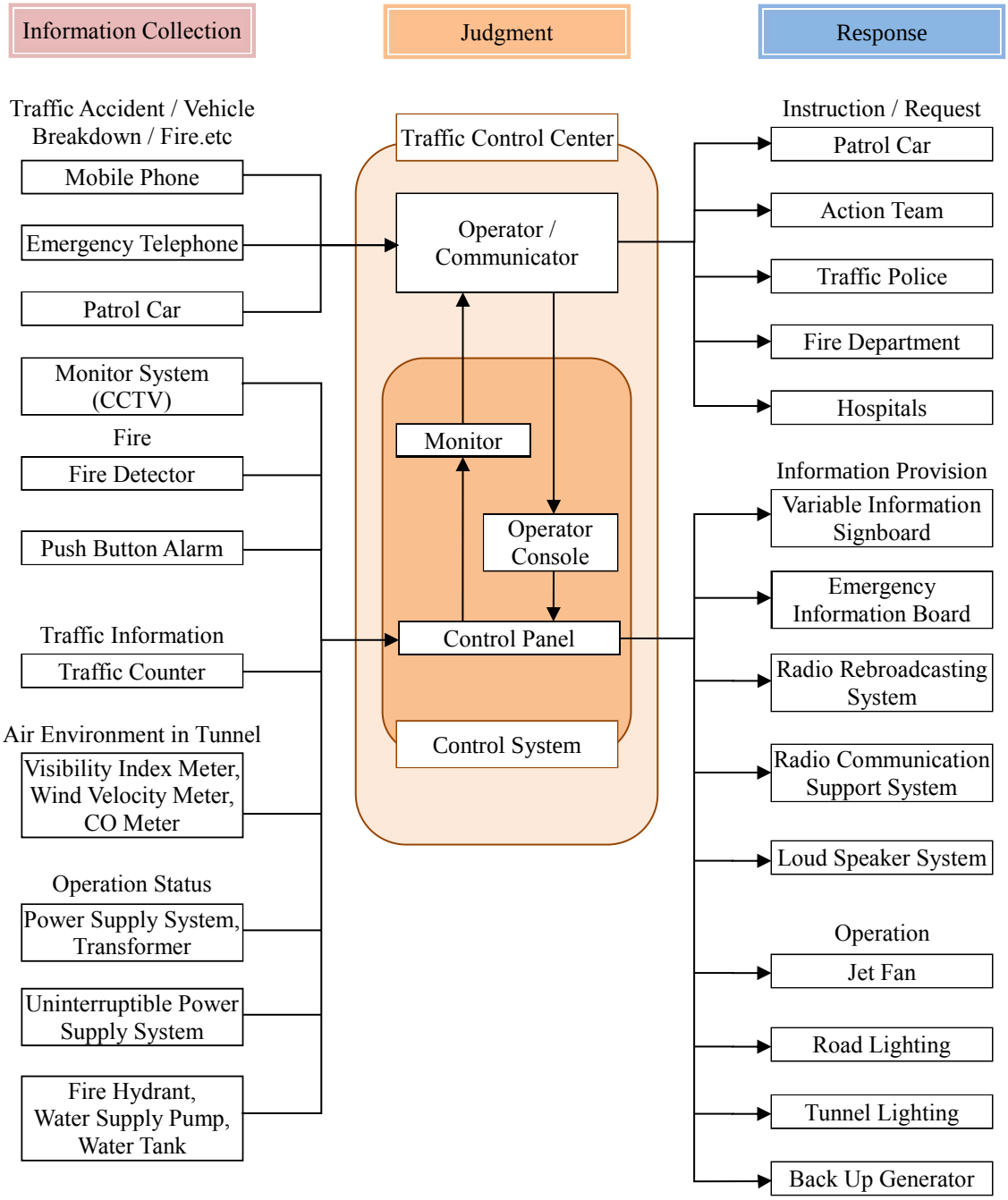


FIGURE 14.3-1 SUMMARY OF TRAFFIC CONTROL CENTER

The details in Traffic Control Center are as follows:

– Develop an "Operation Manual" which summarizes the following items:
  - Details of the information gathered in the control system
  - Content of the monitor display
  - Functions of each facilities
  - Content of the automatic control of facilities
  - Install location of facilities
  - How to operate from the control system
  - Handling of alarms
  - Content of information providing in a certain situation
  - Handling of reckless driving vehicles and parked/stopped (stalled) vehicles

    - List of contacts for individual situations.
- Hold a training course including usage demonstrations of the actual system and equipment.
- Establish communication measures with relevant sections, cars and related agencies (traffic police/fire department of LGUs/hospitals).
- Develop an "Emergency Manual" for handling emergency situations and hold a training course. Conduct an emergency drill including how to contact related agencies.
- Include multiple scenarios in the "Emergency Manual" and clarify the standard to instruct/request related sections/teams and related agencies.
- Inspection and maintenance of the control system will be conducted by the Maintenance Section. Cooperation with the Maintenance Section will be requested to conduct joint work such as confirmation of communication.

The details in Patrol Team are as follows:

- Patrol Team will report Traffic Control Center upon encountering irregularities on the road during the patrol. Irregularities in this context include existence of reckless driving vehicles, parked/stopped (stalled) vehicles, obstacles dropped, the damages of road structures or facilities which may disorder traffic flows.
- Develop a "Patrol Manual" which includes as follows:
    - Frequency
    - Routes
    - Equipment and its usage of patrols
    - Examples of irregularities
    - Responses to individual situations (instruction from Traffic control center)
    - Rules regarding prohibited vehicles on the road
    - How to handle vehicles violating the rules during the patrol
    - How to handle obstacles dropped from vehicles
    - How to conduct lane regulation and close the road
- Hold a training course to familiarize members of patrol with the manual.
- Also include how to handle obstacles dropped from vehicles, how to conduct lane regulation and how to close the road in the "Patrol Manual". Conduct field training on top of a training course for these topics.
- Road lane regulations may be necessary not only for emergency situations but also for work by the Maintenance Section. Cooperation and joint work will be requested in such occasions.

14.3.5 Actions to be taken during emergencies

In the case of an emergency, it is important that not a single section/team but multiple sections/teams cooperate and coordinate to handle the situation.

For this reason, the following topics should be covered for actions against the emergency.

- What to be done and how to do these during emergencies (traffic accident, fire incident, vehicle breakdown, obstacles dropped from vehicles and parked/stopped vehicles).
- Coordination required with other sections, traffic police and LGUs

All information should be gathered at Traffic Control Center. Other teams should act according to the instruction by Traffic Control Center.

If necessary, Traffic Control Center will request dispatch of the related agencies (traffic police/fire department of LGUs/hospitals).

An "Emergency Manual" will be developed (as mentioned in the previous section 14.3.4) and a training course will be held so that relevant teams are well informed about the scope of their responsibility during an emergency. Relevant teams will cooperate and conduct emergency

drills for different situations. In particular, Action Team will conduct drills for removal of vehicles and fire-fighting using the actual machines and equipment.

(1) Traffic accident, Vehicle breakdown

Upon receiving a report of (or confirming via CCTV) traffic accident (vehicle breakdown), Traffic Control Center communicates with Patrol Team and confirms details of the incident on site, then conducts lane regulation and other regulations to prevent further incidents. At the same time, it also displays information on the emergency information board.

If necessary, it requests Action Team to remove accident vehicles, instructs dispatch of ambulance, communicates with related agencies (traffic police, hospitals), and instructs the Maintenance Section to conduct emergency repair to restore traffic.

(2) Fire

Upon receiving a report of (or confirming via a fire detector/CCTV) outbreak of fire, Traffic Control Center provides information about the fire on the emergency information board, etc., and change the mode of ventilation operation to the fire mode. At the same time, Traffic Control Center instructs Patrol Team to close the tunnel, Action Team to extinguish fire/rescue/provide first-aid services.

Traffic Control Center will also provide evacuation guidance for those who remain in the tunnel and communicate with related agencies (traffic police/fire department of LGUs/hospitals).

(3) Obstacle dropped from vehicles

Upon receiving a report of (or confirming via CCTV) the obstacles dropped from vehicles, Traffic Control Center communicates with Patrol Team and confirms details on site, and instructs removal of the obstacles dropped from vehicles. At the same time, it also displays information on the emergency information board.

(4) Parked/stopped (stalled) vehicles

Upon receiving a report of (or confirming via CCTV) parked/stopped (stalled) vehicles, Traffic Control Center communicates with Patrol Team and instructs the team to confirm details on site (a cause of the vehicle stop). At the same time, it also displays information on the emergency information board.

If the accident vehicle cannot move by itself, Traffic Control Center instructs Action Team to remove the vehicle.

14.3.6 Vehicle control

- In cooperation with the related agency (traffic police), identify vehicles which may endanger road traffic (e.g. motorbikes, reckless driving vehicles, dangerous vehicles with unstable loads) or which may damage road structures (e.g. overweight vehicles, vehicles with excessive height, vehicles carrying hazardous materials) on a regular basis and remove them before entering into the tunnel.
- Develop a "Vehicle Control Manual" which covers vehicles to be removed (based on legal requirements) and control methods (e.g. stop, guide, confirm and remove), and hold a training course and a field training.
- Also conduct a training course and a field training regarding how to use tools/equipment for controlling vehicles.

14.3.7 Safety Driving Campaign to Drivers

This is the first road tunnel built in Nepal, and passing through a tunnel will be a new experience for many local drivers. Therefore, it is necessary to well inform them with precautions regarding passing through a tunnel.

At the same time, drivers should also be informed about "Road Safety Rules" and "Rules to Protect road Structures" as mentioned in the previous **section 14.3.2**.

In order to achieve these goals, the following safety driving campaign will be conducted.

- Develop fliers and brochures which contain outlines of the tunnel, driving rules, precautions regarding passing through, how to behave in emergency situations as well as contact details, and distribute them to drivers using the relevant road currently in use and the neighborhood.
- Establish an administrative office to receive questions and provide answers via telephone, etc.
- Develop sign boards which outline the tunnel and the contact information and set them next to or near the relevant road currently.
- Conduct several training sessions for general drivers and encourage general/commercial drivers and responsible persons from truck/bus companies to receive the training.
- Continue to distribute fliers about safe driving on a regular basis after opening of the tunnel.

14.3.8 Drills for Emergency Cases

- As a culmination of various emergency drills, conduct a full-scale disaster prevention drill based on the assumption of a fire incident within the tunnel prior to opening of the tunnel.
- All relevant staff from TMO should participate in this drill. Other related agencies (traffic police/fire department of LGUs/hospitals) will also be invited to join.
- The drill not only includes fire-fighting but also evacuation training.
- This training will be opened to mass media so that safety of the tunnel will be promoted.
- The fire-fighting (from outbreak to extinguishing of fire through to completion of rescue activities) will be timed (including the time difference between the estimated time and actual time) and taped so that the data will be used as a reference for future improvement and training purposes.

14.3.9 Training in Japan

Actual practices in Japan will be experienced for proposed staff to be assigned to the TMO.

	Content	Venue	Total time required
1	Outline of management, operation and maintenance of highways in Japan (lecture)	—	Half day – 1 day
2	Management, operation and maintenance of tunnels (lecture) -Inspection and maintenance of tunnel structures -Patrol and vehicle control (legal requirements, patrol and vehicle control) -Emergency handling (monitor, information provision, traffic operation and communication structure)	—	1 day – 2 days
3	Tunnel emergency facilities (e.g. ventilation, fire-fighting, alarms, evacuation routes)	tunnel	Half day – 1 day
4	Inspection and maintenance of structures and facilities inside a tunnel	Maintenance office	Half day – 1 day
5	Traffic control (monitoring, information provision, facility operation)	Traffic control center	1 day – 2 days
6	Traffic management (patrol, accident handling, tow-away, balloon air jack)	Patrol office	Half day – 1 day
7	Vehicle control (on-site)	On-site	Half day – 1 day
8	Training for emergency (inspection of emergency facilities of a tunnel, disaster prevention drill)	On-site, etc.	Half day – 1 day
		Total 1 -2 week(s)	

The combination of and allocated time for the training contents are subject to change according to the availability of the trainer and venue.

14.3.10 Lessons from Previous Projects

Facility not working or in a malfunctioning state inside a tunnel can result into disastrous circumstances. Therefore regular and proper maintenance of the tunnel facilities is very important for safe and smooth operation inside the tunnel. But, it is easy said than done. Like other road facilities, negligence in maintenance of tunnel facilities is often found in developing countries. Some examples and reasons of such negligence in maintenance reported in other tunnel projects are as follows;

i) Only the surface of electrical equipment is cleaned, whereas the inner part or portions not easily reachable are left unattended due to lack of proper manual.

ii) The inspector or the person in charge of maintenance lack sufficient technical knowledge making them unable to detect technical defects.

iii) The life span of big facilities such as jet-fans and sensors in general are 20 years and 10 years respectively, given that it is properly managed. An overall replacement of all these facilities required huge amount of budget and procedure for obtaining the budget takes long period.

iv) Operation and maintenance manual exists, but not put into practice.

The above mentioned examples and reasons should be considered as lessons learned from the past similar projects and effort should be made by DOR to prevent such cases with regard to the Nagdhunga Tunnel in its operation stage.

CHAPTER 15

PROJECT IMPLEMENTATION PLAN

CHAPTER 15
PROJECT IMPLEMENTATION PLAN

15.1 PROJECT SCOPE OF WORK

Scope of the project is listed below;

i) Civil Work Component

- Construction of a Tunnel (L=2,450m, 2lanes and wide shoulder)
- Construction of Approach Road (L=2,600m) and two Bridge
- Disposal Area Development of Excavated Rocks/Soils (near West Tunnel Portal)
- Power Supply dedicated line installation for tunnel operation
- Other facilities (including toll facility, control office)

ii) Consulting Services

- Detailed Design
- Tender Assistance
- Construction Supervision
- Capacity Development for Tunnel Operation and Maintenance

iii) Right-of-Way Acquisition and RAP Implementation

15.2 IMPLEMENTATION STRATEGY INCLUDING APPROVAL OF THE PROJECT

Estimated construction cost and ROW acquisition cost are as follows;

Civil Work Cost	11,872 Million NPR
Consulting Service Cost	1,116 Million NPR
Land Acquisition Cost	3,010 Million NPR
Total	15,998 Million NPR

Note: 2014 Prices, Vat, Physical Contingency and Price Escalation are not included.

As shown above the project scale in terms of cost is quiet big and this is the first road tunnel construction project. This project is recommended to be implemented by Japan's ODA. Especially, JUMP (Joint Undertaking for Multi-Partnership) Loan is recommended for this project due to the following reasons;

- JUMP is a new type of Japanese Yen Loan.
- JUMP is applicable to projects of sophisticated infrastructure which require special and advanced technology in construction.
- JUMP requires a joint venture between (a) capable and experienced Japanese contractors and (b) local contractor(s).
- Japanese contractors' know-how and technologies are transferred to Nepal contractors through execution of a project. Nepal contractors can receive an on-the-job training throughout the construction period, thus Nepal contractors can obtain enough know-how and technologies from Japanese contractors.
- Nepal contractors can challenge similar nature of projects in the near future.

The implementing agency is the Department of Roads (DOR) and Operation and Maintenance Agency is also DOR.

Since huge amount of electricity cost for tunnel operation is necessary, toll fee will be collected. Toll collection will be implemented by Roads Board of Nepal (RBN).

15.3 IMPLEMENTATION SCHEDULE

Implementation schedule is shown in **Table 15.3-1**.

- Project Appraisal by JICA is expected in November 2014 Loan Agreement is expected to be signed in March 2015.
- Selection of Consultant for the detailed engineering design will start from March 2015 and be completed in February 2016.
- Detailed engineering design will start in March 2016 and be completed in February 2017 (12 months).
- Selection of Contractor will start in November 2016 and be completed in December 2017(14 months).
- ROW Acquisition will start in November 2016 and completed in December 2017 (14 months).
- Construction will start in January 2018 and completed in June 2021 with construction period of 42 months with defect liability period of 12 months.
- Capacity Development for O&M will start in July 2020 and be completed in June 2022.

TABLE 15.3-1 OVERALL IMPLEMENTATION SCHEDULE

	Period	2014	2015	2016	2017	2018	2019	2020	2021	2022
JICA Preparatory Survey	10 months (2014.6 ~ 2015.3)	6 — 3 (10months)								
EIA Preparation (EIA Appoval on 2015.3)	10 months (2014.6 ~ 2015.3)	6 — 3 (10months)								
Project Approval & Programming(P1 Project)	10 months (2014.10 ~ 2015.7)	10 — 7 (10months)								
Project Appraisal	November 2014	●								
Pledge	February 2015		●							
E/N	March 2015		●							
L/A	March 2015		●							
Procurement of Consultant	12 months (2015.3 ~ 2016.2)		3 — 2 (12months)							
Detailed Engineering Design	12 months (2016.3 ~ 2017.2)			3 — 2 (12months)						
Procurement of Contractor	14 months (2016.11 ~ 2017.12)			11 — 12 (14 months)						
Right-of-Way Acquisition	14 months (2016.11 ~ 2017.12)			11 — 12 (14 months)						
Construction	42 months (2018.1 ~ 2021.6)					1 — 6 (42 months)			6 — 6 (Defect Liability)	
Construction Supervision	54 months (2018.1 ~ 2022.6)					1 — 6 (42 months)			6 — 6	
Capacity Development for O & M	24 months (2020.7 ~ 2022.6)							7 — 6 (24 months)		
Operation and Maintenance	2021.7 ~								7 ➡	

Source: JICA Survey Team

15.4 CIVIL WORK CONTRACT PACKAGING

Project is not divided into contract packages considering the cost, scale of works and characteristics of works. It is only one (1) contract package.

15.5 CONSTRUCTION EXECUTION PLAN

15.5.1 Construction Schedule

Construction schedule of each contract package is shown in **Table 15.5-1**. Total Construction period is 42 months.

15.5.2 Major Materials To Be Used

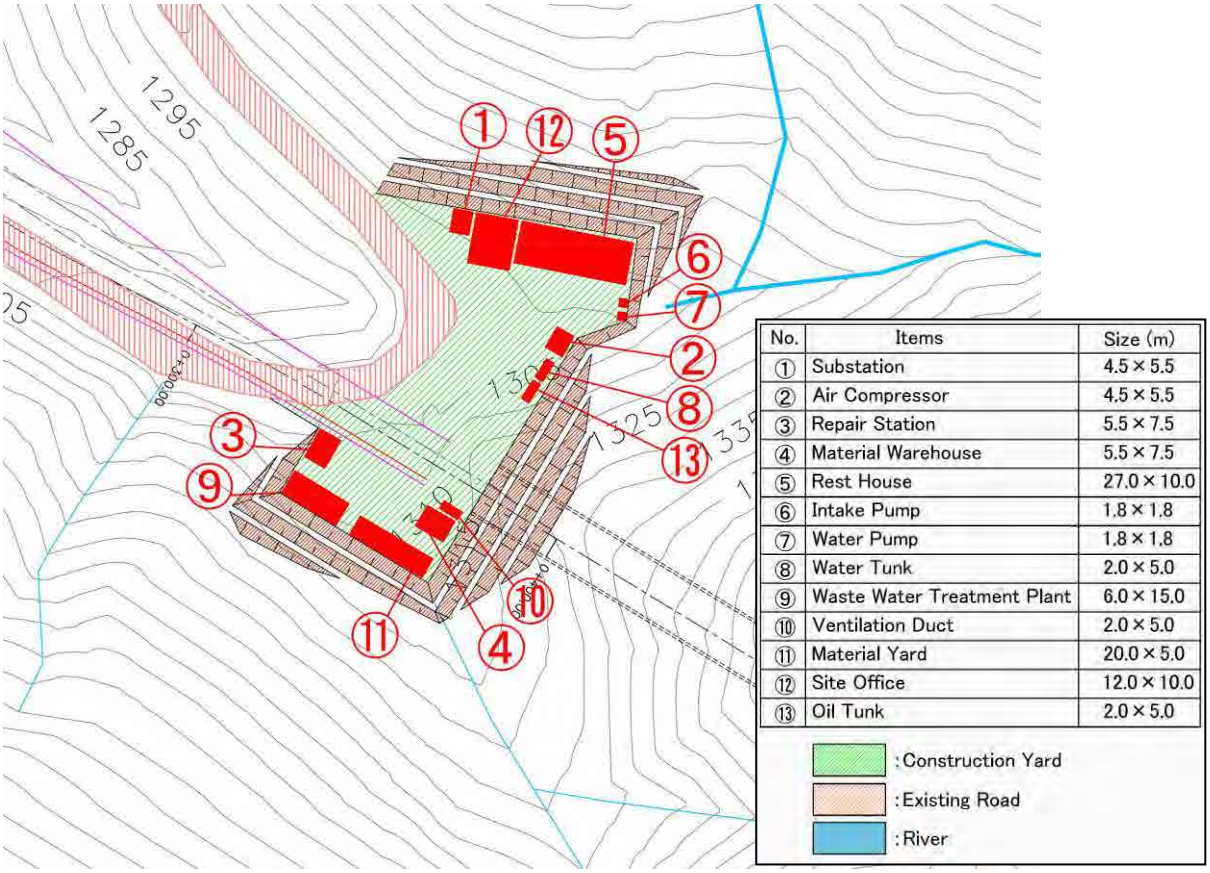
Major materials to be used is shown in **Table 15.5-2**.

15.5.3 Major Equipments To Be Used

Major equipments to be used is shown in **Table 15.5-3**.

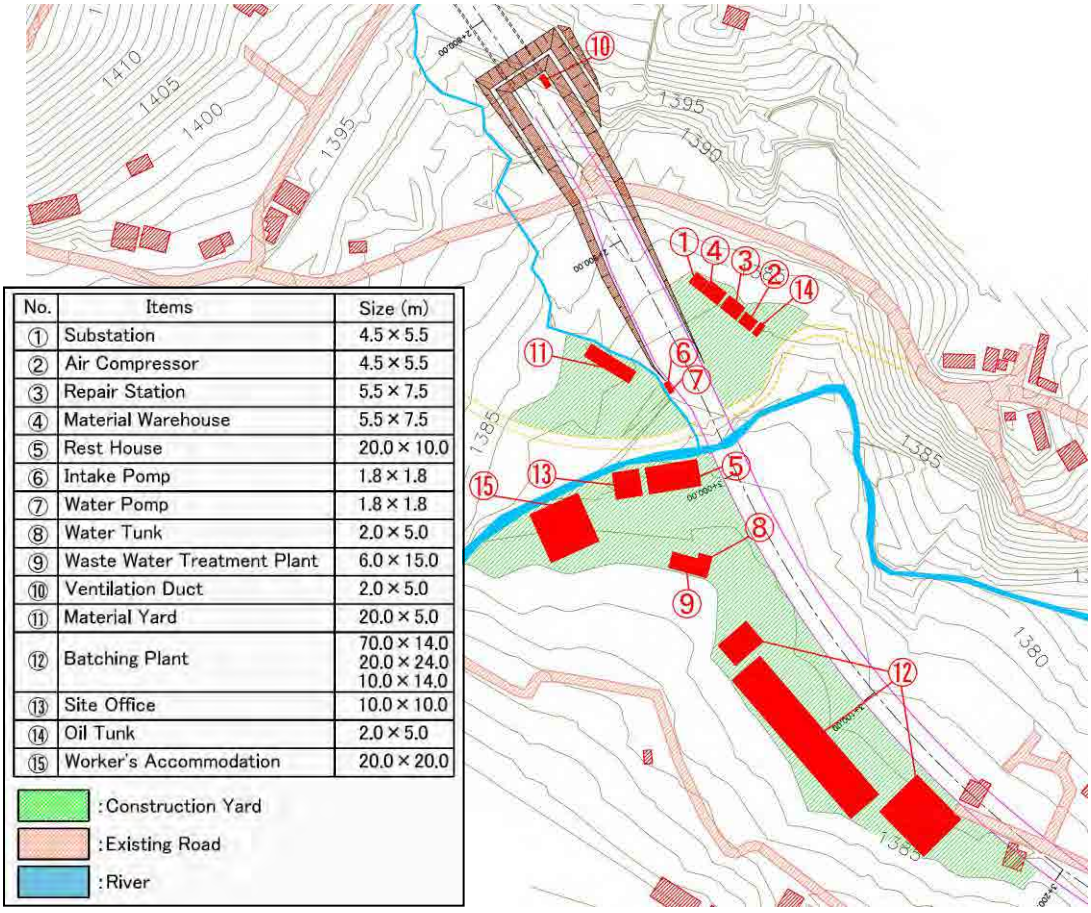
15.5.4 Construction Camps and Temporary Roads for Construction

Construction camp will be established as shown in **Figure 15.5-1**. Roads to be used during construction are also shown in **Figure 15.5-2**. Area within the acquired road right- of-way (50m and 60m) shall be fully utilized as temporary roads for construction.



Source: JICA Survey Team

FIGURE 15.5-1 CONSTRUCTION CAMP



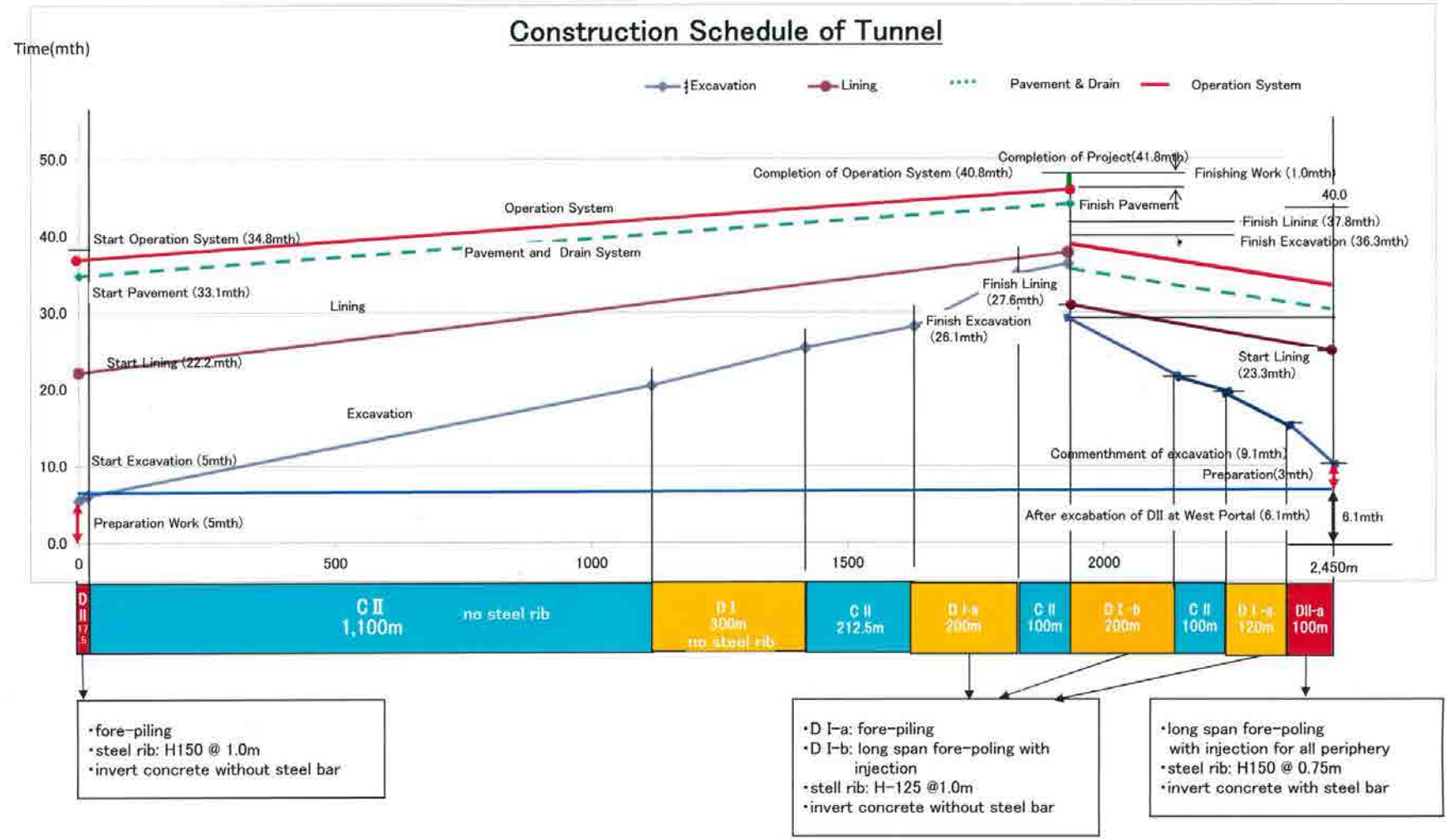
No.	Items	Size (m)
①	Substation	4.5 × 5.5
②	Air Compressor	4.5 × 5.5
③	Repair Station	5.5 × 7.5
④	Material Warehouse	5.5 × 7.5
⑤	Rest House	20.0 × 10.0
⑥	Intake Pomp	1.8 × 1.8
⑦	Water Pomp	1.8 × 1.8
⑧	Water Tunk	2.0 × 5.0
⑨	Waste Water Treatment Plant	6.0 × 15.0
⑩	Ventilation Duct	2.0 × 5.0
⑪	Material Yard	20.0 × 5.0
⑫	Batching Plant	70.0 × 14.0 20.0 × 24.0 10.0 × 14.0
⑬	Site Office	10.0 × 10.0
⑭	Oil Tunk	2.0 × 5.0
⑮	Worker's Accommodation	20.0 × 20.0

: Construction Yard
: Existing Road
: River

Source: JICA Survey Team

FIGURE 15.5-2 CONSTRUCTION CAMP SHOWING EXISTING ROADS

TABLE 15.5-1 NAGDHUNGA TUNNEL CONSTRUCTION SCHEDULE



Source: JICA Survey Team

TABLE 15.5-2 MAJOR MATERIAL LIST FOR NAGDHUNGA TUNNEL

No	Name of Material	Specification	Unit	Quantity		
				West	East	Total
1	Mesh for shotcrete		m^2	9,936	8,064	18,000
2	Water proof sheet		m^2	50,180	13,520	63,700
3	Steel rib	H-125	t	146	233	379
4	Steel rib	H-150	t	22	125	147
5	Rock bolt	TD24 L=3m	no	23,525	7,400	30,925
6	Rock bolt	TD24 L=4m	no	467	2,667	3,134
7	AGF Pipe	Dia. 114.3mm, L=12m	no	0	1,879	1,879
8	FP Bolt	TD24 L=3m	no	4,133	2,280	6,413
9	Silica resin		t	0	280	280
10	Dry mortar		m^3	187	88	275
14	Air supplying tube	Dia. 1,700mm	m	520	520	1,040
15	Compressed air supplyin pipe	Dia. 2"	m	520	520	1,040
16	Lighting system		m	1,930	520	2,450
17	Water supplying pipe	Dia. 2"	m	520	520	1,040
18	Power cable		m	520	520	1,040
19	Corrugated pipe	Dia. 2,000mm	m	400	0	400
20	Stee board for temporary stage		m^2	360	0	360
21	Steel structures for temporary state		t	196	0	196
22	Concrete for arch		m^3	13,483	3,732	17,215
23	Concrete for invert		m^3	1,245	2,448	3,693
24	Concrete for shotcrete		m^3	5,259	1,873	7,132
25	Concrete for cutting face		m^3	1,895	1,631	3,526
26	Concrete for pavement		m^3	4,860	1,309	6,169
27	Concrete for drain and pavement		m^3	2,221	599	2,820
28	Concrete for road structures		m^3	0	1,200	1,200
29	Reinforced steel bar		t	26	264	290
30	Asphalt concrete		m^3	0	910	910
31	Asphalt concrete binder		m^3	0	910	910

Source: JICA Survey Team

TABLE 15.5-3 MAJOR EQUIPMENT TO BE USED

No	Name	Specification	Quantity		
			West	East	Total
1	Boom type Road header	300kW (MRH-S300)	1	1	2
2	Drilling Jumbo, 2 booms	Wheel 2boom 150kg	1	1	2
3	Wheel loader	full bucket 2.3m^3	1	1	2
4	Wheel loader	full backet 1.4m^3	1	0	1
5	Shotcrete Spreading Machine	6~20m^3/hr	1	1	2
6	Shotcrete plant	25m^3/hr	1	1	2
7	Dump truck	10t	4	4	8
8	Dust collector	3,000m^3/min	1	1	2
9	Giant Breaker	1,300kg	1	1	2
10	Excavator (back-hoe)	full bucket 0.45m^3	1	1	2
11	Concrete pump (with boom)	90~110m^3/hr	1	1	2
12	Concrete transit lorry	25m^3/hr	4	4	8
13	Bulldozer	32t	1	0	1
14	Bulldozer	15t	1	1	2
15	Tire roller	8~20t	1	1	2
16	Sliding center (invert)	L = 10.5m	1	1	2
17	Sliding center (arch)	L = 10.5m	1	1	2
18	Stage truck for Water Proof Sheet	4ton truck and stage	1	1	2
19	Crane	25ton	1	0	1
20	Truck mounted crane	4.9ton	1	0	1
21	Generator	500KVA	1	0	1
22	Generator	300KVA	2	3	5
24	Contra Fan	1,000 or 3,000m3/min	1	1	2
25	Compressor	11~12.4m^3/min	1	1	2
26	Waste water treatment plant	30m^3/hr	1	1	2
27	Concrete spreader	pavement purpose	0	1	1
28	Concrete finisher	pavement purpose	0	1	1
29	Concrete leveler	pavement purpose	0	1	1
30	Water Tanker	5ton	1	0	1
31	Fuel Tanker	5ton	1	0	1
32	Winch	temporary work	1	0	1
33	Batching Plant	concrete production	1	0	1
34	Submergible pump	Dia.2"	2	4	6
35	Submergible pump	Dia. 3"	2	4	6
36	Turbine pump	Dia. 4"	2	2	4

Boom type Road header

Drilling Jumbo, 2 booms

Dust Collector

Shoctcrete Spreading Machine

15.6 NEPAL AND JAPAN CONTRACTER

15.6.1 NEPAL CONTRACTORS

15.6.1.1 Classification of Nepal Contractors

Nepal contractors are classified into Class A, B, C and D based on their Bid Capacity as shown in **Table 15.6-1**.

TABLE 15.6-1 CLASSIFICATION OF NEPAL CONTRACTORS

Class	No. of firms (as of 2008)	Bid limit (1999 price level)
A	173	Above 20 Million NPR
b	337	Up To 20 Million NPR
c	1,328	Up To 6 Million NPR
d	10,268	Up To 3 Million NPR

Source: DOR

15.6.1.2 Questionnaire Survey of Nepal Contractors

Questionnaire survey was undertaken to grasp Nepal contractor's characteristics. Form of Questionnaire is shown in **Table 15.6-2.**

TABLE 15.6-2 FORM OF QUESTIONNAIRE

QUESTIONAIRE ON NEPALI CONTRACTOR			
1	Name of company		
2	Head office Address		
3	Year Established		
4	Capital		
5	Number of Board Members		
6	Number of Employees		
7	Amount of ANNUAL scale		
	year 2013		
	year 2012		
	year 2011		
	year 2010		
	year 2009		
8	Specialized Fields of work of Your company (please check in box)	☐	Road Construction (Earth work)
		☐	Road Construction (Pavement)
		☐	Bridge Construction
		☐	Building Construction
		☐	Dam Construction
		☐	Power Related work (Transmission Line, etc.)
		☐	Others, please specify

12	Do you have any experiences working together with Foreign Contractors other than japanese contractor(s)?	☐	Yes
		☐	No
			If Yes, please list up names of Foreign contractors;
			1)
			2)
			3)
			4)
			5)
13	Are you interested in Tunnel Construction?	☐	Yes
		☐	No
			If No, pleaseexplain why you are not interested;
14	Do you want to acquire tunel construction technology by working Jointly with Japanese contractors?	☐	Yes
		☐	No
			If No, pleaseexplain why you do not want;
15	Do you have any comments/opinions/ suggestions on Naghdhunga Pass Tunnel Construction Project?		Please write your comments, suggestions below:
	Thank you very much for answering this Questionnaire!		

Source: JICA Survey Team

TABLE-A WORK EXPERIENCE(on-going & Completed Projects in the past 5 years)

Name of project	Client	Contract Amount	Single or J.V/Association	Contract Period		Name of Japanese or Foreign Contractor Involved
				Start	End	

(Please use another sheets, if you have more projects)

TABLE-B NAME OF EQUIPMENT YOU OWN

Name of Equipment	Capacity	Model (year)	No. of Unit	Condition (No. of Unit)	
				Functional	Under Repair
1)					
2)					
3)					
4)					
5)					
6)					
7)					
8)					
9)					
10)					
11)					
12)					
13)					
14)					
15)					

Source: JICA Survey Team

Contractors were selected based on the following criteria;

- To be Class A Contractor
- Contractors recommended by DOR
- Contractors recommended by Federation of Contractors' Associations of Nepal

- Contractors recommended by JICA Nepal Office

A total of 18 contractors were selected and questionnaire was sent to them. Among the 18 contractors, 10 contractors responded to questionnaire and summarized in **Table 15.6-3**.

TABLE 15.6-3 SUMMARY OF ANSWERS FROM RESPONDENT CONTRACTORS

1	2	3	4	5	6		7	8	9		10
ID	Year Established	Capital(000 NPR)	No. of Board members.	No. of Employees	Amount of Annual Sale		No. of Major Pro in 5 years	Experience of working with Japanese Firm	Experience working with Foreign Firms		Willingness of tunnel technology
					Max. Amount for 5yrs (000NPR)	Ave.Amount for 5yrs (000NPR)			Company Name	Country	
1	1974	25,000	5	50	344,200	241,052	34	N/A		1)China 2)China	yes
2	1981	53,500	3	23	125,957	56,490	9	N/A		1)India 2)India	yes
3	1974	20,000	3	65	956,114	674,559	28	one(1)		1)China 2)China 3)India 4)China	yes
5	1966	150,000	8	300	1,087,590	818,718	20	one(1)		1)China 2)China 3)China 4)China 5)India 6)German 7)Austrian	yes
7	1984	300,000	5	400	1,029,522	764,625	28	1)Marucsin shikta construction		1)Spain 2)India 3)India 4)China 5)China 6)India	yes
8	1966	200,000	5	100	215,655	86,734	3	three(3)		1)China 2)Neitherlan 3)India 4)India 5)UK	yes
9	1987	500,000	3	968	835,400	603,254	21	three(3)		1)Korea 2)China 3)India 4)China 5)China	yes
10	1984	350,000	3	60	620,000	456,000	24	one(1)		1)China 2)India 3)Spain	yes
14	1976	100,000	3	60	262,991	179,285	40	one(1)		1)China 2)Bhutan 3)UK 4)Germany 5)France	Yes
17	1992	50,000	5	215	1,640,000	481,527	9	three(3)		1)Bhutan	yes

Source: JICA Survey Team

Features of Nepal contractors are summarized as shown below;

Amount of Capital	
Range	No. of Contractors
Less than 49 Million NPR	2
50 ~ 99 Million NPR	2
100 ~ 199 Million NPR	2
200 ~ 299 Million NPR	1
Over 300 Million NPR	3

No. of Employees	
Range	No. of contractor
Less than 100	5
100 ~ 199	1
200 ~ 299	1
300 ~ 399	1
400 ~ 499	2

Max. Annual Sale for the past 5 Years	
Less than 249 Million NPR	2
250 ~ 499 Million NPR	2
500 ~ 749 Million NPR	1
750 ~ 999 Million NPR	2
1,000 ~ 1,499 Million NPR	2
1,500 ~ 1,999 Million NPR	1
Over 2,000 Million NPR	0

Average annual Sale for the past 5 Years	
Less than 249 Million NPR	4
250 ~ 499 Million NPR	2
500 ~ 749 Million NPR	2
750 ~ 999 Million NPR	2
1,000 ~ 1,499 Million NPR	0
1,500 ~ 1,999 Million NPR	0
Over 2,000 Million NPR	0

- Number of Contractors who have experience(s) working with Japanese Contractor(s) 8
- Number of Contractors who have experience(s) working with foreign contractors other than Japanese Contractor(s) 10

15.6.1.3 Summary of Nepal Characteristics of Nepal Contractors

- Scale of Nepal contractors is not so big in terms of capital, annual sale and number of employees.
- Most contractors have an experience(s) working with Japanese contractors and/or foreign contractor(s).
- All contractors are eager to acquire tunnel construction technology.

15.6.2 JAPAN CONTRACTORS

Based on the hearing from the major construction companies in Japan, mountain road tunnel's experiences were summarized below.

Major Japan contractors have many experiences of longer mountain road tunnel, Especially Company C has 31 projects of more than 2,000m mountain road tunnel.

As they also have experiences of many road/bridge or tunnel projects at overseas, it is expected to work well at Nepal.

TABLE 15.6-4 NUMBER OF MOUNTAIN ROAD TUNNEL EXPERIENCES IN PAST 10 YEARS (ON-GOING AND COMPLETED WORKS)

Company	Number of Mountain Road Tunnel(NATM)			Number of AGF method in mountain road tunnel
		More than 1000m Tunnel	More than 2000m Tunnel	
A	40	12, (10)	10	17(16)
B	83	46(39)	12	19(19)
C	91	61	31	Many
D	110	71(38)		44(24)
E	More than 60	14(9)	11(7)	18(11)
F	55	26(21)	10	39(33)
G	122	55	10	53

H	21	11(11)	4(4)	8(8)
I	49	22	5	32

Note; ( ) the number of only completed construction works
Hearing results from Japan contractors

TABLE 15.6-5 NUMBER OF ROAD/BRIDGE OR TUNNEL WORKS EXPERIENCES IN PAST 10 YEARS AT OVERSEAS (OUTSIDE JAPAN)

Company	Road Projects	Bridge Projects	Tunnel Projects	Total
A	5	7	10	22
B	15	18	1	34
C	16	8	5*	29
D	6	16	Mountain 6 Shield 9	37
E	21	9	6	39
F	7	21	0	28
G	3	2	1	6
H	0	2	0	2
I	5	3	0	8

Note:* Shield tunnel works excluded.
Hearing results from Japan contractors

15.7 CONSULTING SERVICES

The following Consulting services are required for Project;

- Detailed Engineering Design
- Tender Assistance for Selection of Contractor
- Construction Supervision
- Capacity Development for Tunnel O&M

Draft Term of Reference (TOR) for consulting services is attached in **Annex 15.7-1**.

(1) Detailed Engineering Design

Major scope of work for the Consulting services are as follows;

- Finalization of the highway and tunnel alignment with due consultation with the concerned land developers.
- Engineering surveys (topographic survey, soils/material survey, geo-technical survey)
- Detailed engineering design
- Preparation of tender documents
- Land Parcel Survey

(2) Tender Assistance for Selection of Contractor

- Provide assistance to DOR in the all process of selecting contractor.
- Monitoring of RAP implementation.

(3) Construction Supervision

- Overall construction supervision.
- Keep and compile all records including material test results, inspection results, problems encountered.
- Prepare an asset in including condition assessment.
- Monitoring of environmental requirements.

(4) Capacity Development for Tunnel O&M

Major items for the Capacity Development are as follows;

- Legal Aspects in relation to Tunnel O&M
- Inspection and Maintenance Work
- Traffic Monitoring and Information Provision
- Actions to be taken during emergency
- Safety Driving Campaign to Drivers
- Drills for Emergency Cases
- Training in Japan

15.8 PROCUREMENT PLAN

Consulting services and civil work contractor will be procured through the following method in accordance with JICA Guidelines for Procurement under Japanese ODA Loans, March 2009.

(1) Consulting Services

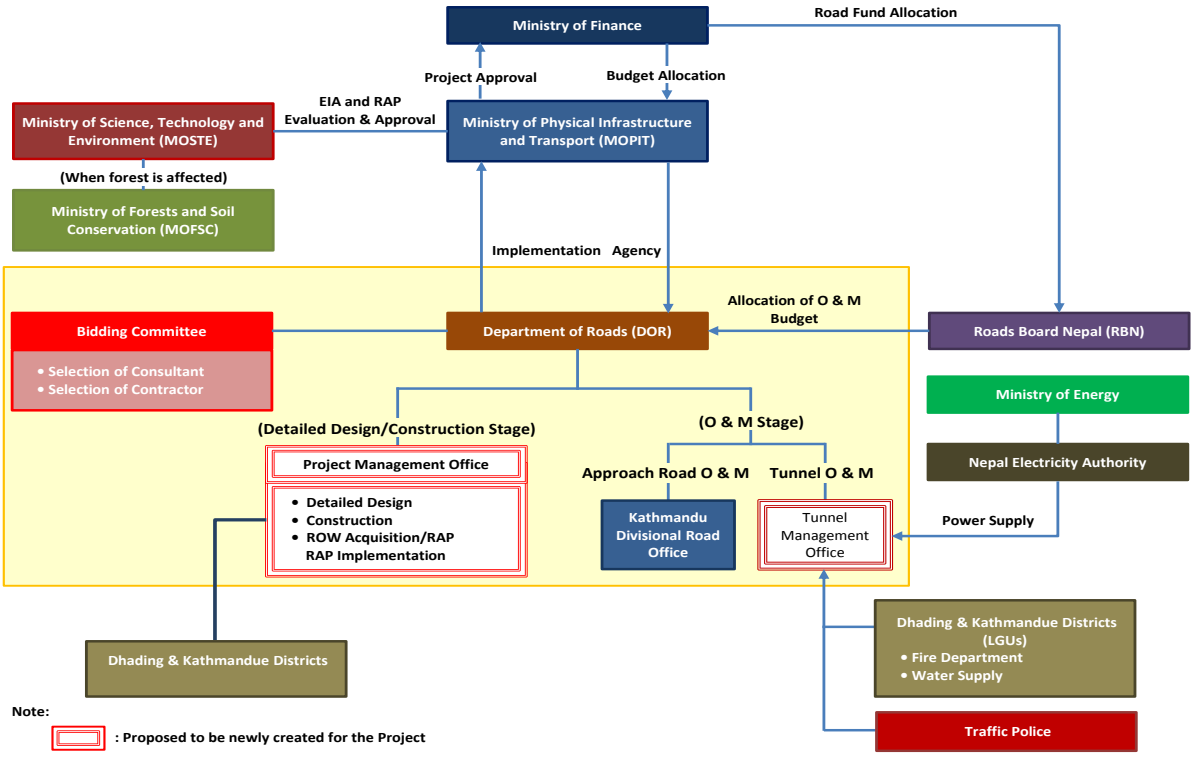
Consulting services will be procured by two (2) steps, EOI and Tendering, under the International Competitive Bidding (ICB). Quality-Based Selection (QBS) method will be adopted.

(2) Civil Work Contactor

Civil work contractor will be provided by 1stage 2envelop (Pre-qualification included).

15.9 PROJECT IMPLEMENTATION ORGANIZATION STRUCTURE

Overall project implementation organization is shown **Figure 15.9-1** Implementing Agency is Department of Roads (DOR) Implementing office is created Project Management Office.



Source: JICA Survey Team

FIGURE 15.9-1 PROJECT IMPLEMENTATION ORGANIZATION

15.10 FINANCIAL PLAN

15.10.1 Project Cost

Table 15.10-1 shows the project cost by JICA portion and others. Total JICA is estimated at 14,826 Million NPR which is 74.7% the total project cost.

TABLE 15.10-1 PROJECT COST

Breakdown of Cost	Foreign Currency Portion (million NPR)			Local Currency Portion (million NPR)			Total (million NPR)		
	Total	JICA Portion	GON Portion	Total	JICA Portion	GON Portion	Total	JICA Portion	GON Portion
Civil Work	8,223	8,223	0	2,569	2,569	0	10,793	10,793	0
Price Escalation	904	904	0	640	640	0	1,544	1,544	0
Physical Contingency	913	913	0	321	321	0	1,234	1,234	0
Consulting Services	977	977	0	273	273	0	1,250	1,250	0
Land Acquisition	0	0	0	3,395	0	3,395	3,395	0	3,395
Administration Cost	0	0	0	911	0	911	911	0	911
VAT	0	0	0	621	0	621	621	0	621
Import Tax	0	0	0	100	0	100	100	0	100
Interest during construction	6	6	0	0	0	0	6	6	0
Commitment Charge	0	0	0	0	0	0	0	0	0
Total	11,023	11,023	0	8,831	3,803	5,028	19,853	14,826	5,028

Source: JICA Survey Team

15.10.2 Annual Fund Requirement

In accordance with the implementation schedule, the annual fund requirement is summarized in **Table 15.10-2** and was estimated as shown in **Table 15.10-3.**

TABLE 15.10-2 ANNUAL FUND REQUIREMENT

Unit: Million NPR

Breakdown of Cost	Total	JICA Portion	Others
2015	0	0	0
2016	870	321	549
2017	3,186	95	3,091
2018	5,925	5,419	505
2019	3,164	2,885	279
2020	3,333	3,032	301
2021	2,535	2,307	228
2022	841	767	74
2023	0	0	0
Total	19,853	14,826	5,028

Source: JICA Survey Team

TABLE 15.10-3 ANNUAL FUND REQUIREMENT BREAKDOWN

Annual Fund Requirement

Base Year for Cost Estimation: Apr, 2014 FC & Total: million JPY
Exchange Rates NPR = Yen 1.1 LC : million NPR
Price Escalation: FC: 2.0% LC: 4.3%
Physical Contingency 10%
Physical Contingency for Consultant 10%

Item	Total			2015			2016			2017			2018			2019			2020			2021			2022		
	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total
A. ELIGIBLE PORTION																											
Ⅰ) Procurement / Construction	11,044	3,530	14,927	0	0	0	0	0	0	0	0	0	4,308	1,338	5,780	2,197	698	2,965	2,241	728	3,042	1,714	569	2,341	583	198	801
Package-1	9,046	2,569	11,872	0	0	0	0	0	0	0	0	0	3,618	1,028	4,749	1,809	514	2,374	1,809	514	2,374	1,357	385	1,781	452	128	594
Base cost for JICA financing	9,046	2,569	11,872	0	0	0	0	0	0	0	0	0	3,618	1,028	4,749	1,809	514	2,374	1,809	514	2,374	1,357	385	1,781	452	128	594
Price escalation	994	640	1,698	0	0	0	0	0	0	0	0	0	298	188	506	188	120	321	228	148	391	202	132	347	78	51	134
Physical contingency	1,004	321	1,357	0	0	0	0	0	0	0	0	0	392	122	525	200	63	270	204	66	277	156	52	213	53	18	73
Ⅱ) Consulting services	1,075	273	1,375	0	0	0	292	55	353	88	16	105	131	46	181	149	54	207	219	67	292	159	33	195	38	3	42
Base cost	891	204	1,116	0	0	0	255	46	306	75	13	89	110	35	148	122	39	166	177	47	228	125	22	150	30	2	32
Price escalation	83	43	130	0	0	0	10	4	15	5	2	6	9	6	16	13	9	23	22	14	37	19	8	27	5	1	6
Physical contingency	98	25	125	0	0	0	27	5	32	8	1	10	12	4	16	14	5	19	20	6	27	14	3	18	3	0	4
Total (Ⅰ + Ⅱ)	12,119	3,803	16,302	0	0	0	292	55	353	88	16	105	4,439	1,383	5,961	2,346	751	3,172	2,460	794	3,334	1,873	602	2,536	621	201	842
B. NON ELIGIBLE PORTION																											
a Procurement / Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base cost for JICA financing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Price escalation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Physical contingency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b Land Acquisition	0	3,395	3,735	0	0	0	0	468	515	0	2,927	3,220	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base cost	0	2,736	3,010	0	0	0	0	391	430	0	2,345	2,580	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Price escalation	0	350	385	0	0	0	0	34	38	0	316	347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Physical contingency	0	309	340	0	0	0	0	43	47	0	266	293	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
c Administration cost	0	911	1,002	0	0	0	0	39	43	0	151	166	0	271	298	0	144	159	0	152	167	0	115	127	0	38	42
d VAT	0	621	684	0	0	0	0	42	46	0	12	14	0	195	215	0	115	127	0	129	142	0	97	107	0	31	34
e Import Tax	0	100	110	0	0	0	0	0	0	0	0	0	0	39	43	0	20	22	0	20	22	0	16	17	0	5	6
Total (a+b+c+d+e)	0	5,028	5,530	0	0	0	0	549	604	0	3,091	3,400	0	505	556	0	279	307	0	301	331	0	228	251	0	74	82
TOTAL (A+B)	12,119	8,831	21,833	0	0	0	292	604	956	88	3,106	3,505	4,439	1,889	6,517	2,346	1,031	3,479	2,460	1,095	3,665	1,873	830	2,786	621	275	924
C. Interest during Construction	6	0	6	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	2	0	2	2	0	2
Interest during Construction(Const.)	6	0	6	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1
Interest during Construction (Consul.)	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D. Commitment Charge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL (A+B+C+D)	12,125	8,831	21,839	0	0	0	292	604	957	88	3,106	3,505	4,440	1,889	6,517	2,347	1,031	3,480	2,461	1,095	3,666	1,875	830	2,788	623	275	925
E. JICA finance portion incl. IDC (A + C + D)	12,125	3,803	16,308	0	0	0	292	55	353	88	16	105	4,440	1,383	5,961	2,347	751	3,173	2,461	794	3,335	1,875	602	2,537	623	201	844

Source: JICA Survey Team

CHAPTER 16

OPERATION AND EFFECT INDICATORS

CHAPTER 16
OPERATION AND EFFECT INDICATORS

16.1 SELECTION OF OPERATION AND EFFECT INDICATORS

Based on the JICA guideline about "the evaluation of operation and effect indicators", indicators to be applied are selected in this tunnel construction project shown in **Table 16.1-1**. This is the indicators to identify the effect and achievement by this project monitoring the change of situations between a case before project and a case around 3 years after project. And also, the operation and effect indicators should be used as benchmarks for the appropriate O&M of tunnel and road.

The indicator was adopted indicators of 2023 that is after 3 year from service of new tunnel section.

TABLE 16.1-1 OPERATION AND EFFECT INDICATORS

Classification	Indicator	Purpose
Basic indicator	AADT: Annual average daily traffic	To evaluate the growth of traffic volume for evaluation period.
Basic indicator	Reduction of travel time	To evaluate the reduction of travel time compare to the business as usual case
Sub. indicator	Reduction of travel cost	To evaluate the reduction of travel cost including TTC :travel time cost, and VOC: vehicle operation cost compare to the business as usual case
Sub. indicator	Increase of average travel speed	To evaluate the upgrading of average travel speed of project road section compare to the existing road section.
Sub. indicator	Reduction of traffic accident	To evaluate the reduction of number of traffic accidents between new road section and existing road.

Source: JICA Survey Team

16.2 OPERATION AND EFFECT INDICATORS

(1) AADT: Annual average daily traffic

The indicator for annual average daily traffic is set the value shown in **Table 16.2-1**.

TABLE 16.2-1 ANNUAL AVERAGE DAILY TRAFFIC

	Current (2014)	2023	2030
Existing road section	7,700	2,600	3,200
Tunnel section	-	7,600	9,500
Total of Nagdhunga section	7,700	10,200 (1.3)	12,700 (1.6)

Source: JICA Survey Team

(2) Reduction of travel time

The indicator for reduction of travel time is set the value shown in **Table 16.2-2.**

TABLE 16.2-2 REDUCTION OF TRAVEL SPEED

		Current (2014)	2023	2030
Eastbound (To Kathmandu)	Travel time	30 min	7 min	8 min
	Reduction time	-	*23 min*	*22 min*
Westbound (From Kathmandu)	Travel time	20 min	6 min	7 min
	Reduction time	-	*14 min*	*13 min*

Source: JICA Survey Team

(3) Reduction of travel cost

The indicator for reduction of travel cost in 2023 is set the value shown in **Table 16.2-3**, reduction of travel time cost, and in **Table 16.2-4** for reduction of vehicle operating cost of 2014 value.

TABLE 16.2-3 REDUCTION OF TRAVEL TIME COST IN 2023

(NPR million/year)

	TTC of without project case (NPR/year)	TTC of with project case (NPR/year)	Reduction of cost (Rate of reduction)
Eastbound (To Kathmandu)	2,239	514	1,725 (77%)
Westbound (From Kathmandu)	1,281	481	800 (62%)
Total	3,520	995	2,525 (72%)

Source: JICA Survey Team

TABLE 16.2-4 REDUCTION OF VEHICLE OPERATING COST IN 2023

(NPR million/year)

	VOC of without project case (NPR/year)	VOC of with project case (NPR/year)	Reduction of cost (Rate of reduction)
Eastbound (To Kathmandu)	1,233	463	770 (62%)
Westbound (From Kathmandu)	1,007	397	610 (61%)
Total	2,239	860	1,380 (62%)

Source: JICA Survey Team

(4) Increase of average travel speed

The indicator for increase of average travel speed in 2023 is set the value shown in **Table 16.2-5**.

TABLE 16.2-5 INCREASE OF AVERAGE TRAVEL SPEED

	Current (2014)	2023	Reduction (2014-2023)
Eastbound (To Kathmandu)	15 km/hr	40 km/hr	25 km/hr
Westbound (From Kathmandu)	25 km/hr	50 km/hr	25 km/hr

Source: JICA Survey Team

(5) Reduction of traffic accident

The improvement of poor vertical, poor horizontal curvature and narrow road width by tunnel project contributes to reduce the number of accidents. In this study, it is expected the reduction of half by the project.

TABLE 16.2-6 REDUCTION OF NUMBER OF TRAFFIC ACCIDENTS

	Current (2014)	2023	Reduction (2014-2023)
Num. of vehicle involved in accidents	240	120	120(50%)
Num. of people involved in accidents	130	65	65 (50%)

Source: JICA Survey Team

CHAPTER 17

VARIOUS ISSUES AND MOU TO BE AGREED

CHAPTER 17
VARIOUS ISSUES AND MOU TO BE AGREED

17.1 UNINTERRUPTED ELECTRICITY SUPPLY FOR TUNNEL O&M

For the routine operation of the tunnel, stable electricity supply will be critically required especially for running of ventilation fan and lighting facilities.

In this regard, it is necessary arrangement such as Memorandum of Understanding (MOU) between related parties (ex. MOPIT, DOR, Ministry of Energy (MOE) and Nepal Electricity Authority (NEA)) in order to assure that MOE and NEA will put priority to supply electricity to the tunnel 24 hours per day by isolating from load shedding. In principle, MOPIT will request the work for electric supply to MOE, and install the transmission line. In order to enhance the necessary process, the draft MOU on Uninterrupted Power Supply and Dedicated Feeder including grid connection for Tunnel was prepared.

Memorandum of Understanding
on
Uninterrupted Power Supply and Dedicated Feeder for Tunnel

This MoU on Uninterrupted Power Supply and Dedicated Feeder for Tunnel has been signed on this …….th day of August 2014

By and Between

Ministry of Physical Infrastructure and Transport, having its address ……., duly represented by its authorized …….. Mr. ……..(hereinafter referred to as MoPIT, which expression, unless repugnant to the context or meaning thereof shall be deemed to include its successors and permitted assign) of the other part,

And

Ministry of Energy, having its address Singhadurbar, Kathmandu, duly represented by its Secretary Mr. …….. (hereinafter referred to as MoE, which expression, unless repugnant to the context or meaning thereof shall be deemed to include its successors and permitted assign) of the other part,

Whereas, MoPIT in coordination with DoR and RBN intends to construct underground tunnel highway of 2.5 kilo Meters starting from Badbhanjyang of Nagdhunga to Sisnekhola, Dhading District and intends to have uninterrupted 24 hours power supply for the operation of the same.
Whereas MOE, being the authority in respect of energy sector in Nepal intends to coordinate with Nepal Electricity Authority (hereinafter referred to as NEA) for the supply and distribution of electricity in Nepal, which has formulated a policy guideline for 24 hours uninterrupted power supply to highly sensitive area vide the resolution of 671st Meeting of the Board of Directors of NEA dated 2070/9/16 (corresponding to …….) and in accordance therewith NEA has vide its decision of the Board of Directors dated ……. approved the application for 24 hours uninterrupted power supply as may be required for the operation of the said Nagdhunga – Naubise tunnel highway project being implemented by Government of Nepal in coordination with MoPIT, RBN and DoR.
NOW THEREFORE, in consideration of the premises and the mutual covenants made and contained herein, the Parties hereto hereby agree as follows:

1. <u>Classification of Dedicated Feeder:</u>

The tunnel highway being under the ownership of Government of Nepal and also being highly sensitive place, this project has been categorized for the supply of uninterrupted power for 24 hours a day year through .

2. Supply through Dedicated Feeder High Voltage Cable/ACSR:

The supply of 2 MW of electricity for the tunnel highway for its operation and maintenance shall be carried out through High voltage cable and in the case of non existence of problems in respect of Right of Way (ROW), the supply may be given through overhead lines also. While constructing dedicated feeder, MOPIT, in coordination with RBN and DOR shall be responsible for necessary ROW. All costs pertaining to the construction of dedicated feeder in accordance with the norms, specification and construction standards of NEA shall be borne by MOPIT. The specification of the equipment to be installed during the construction of dedicated feeder shall be as per NEA standards. Upon request from MOPIT, MoE shall, in coordination with NEA, provide the specification of NEA by charging onetime fee of Rs. 20,000.00 (in words Rupees twenty thousand only) payable to NEA.

3. Construction and Maintenance of Transmission Line:

It shall be the responsibility of MoPIT to construct the transmission line necessary for the operation and maintenance of the tunnel. Under the authority and instructions of MoPIT, DoR shall have the transmission line constructed through a contractor selected through appropriate procedure, who shall, through nominated sub-contractor of NEA, have the transmission line constructed as per NEA guideline and supervision. Upon request of MoPIT or DoR; NEA shall issue the certificate for the same. Subsequent to the completion of the construction of the transmission line, such shall be handed over to NEA and it shall be the responsibility of NEA to effect timely maintenance of the transmission line from time to time as and when so required.

While constructing transmission line, DoR shall select, through appropriate procedures of laws of Nepal, the Contractor and Consultant for the Tunnel Project.

4. Rent for necessary space and equipment operation:

a) Necessary space for the installation of control building and control relay panel at the substation of NEA shall be provided by MOE in coordination with NEA for the construction of dedicated feeder. Annual rent of such space payable to NEA by MOPIT shall be Rs. 108,000.00 (Rupees one hundred eight thousand only).

b) The operation of control building and control relay panel within the switchyard of NEA shall be operated by NEA and annual fixed cost in respect of the operation thereof shall be Rs. 108,000.00 (Rupees one hundred eight thousand only) payable to NEA. MOPIT shall make necessary arrangements in this respect.

c) The abovementioned amount shall be paid by MOPIT to NEA on 12 equal monthly installments in a year.

5. Maintenance of Dedicated Feeder:

It shall be the responsibility of MOPIT to timely effect maintenance of dedicated feeder regularly.

6. Compensation:

In case of substantial loss or damage to NEA due to non maintenance of dedicated feeder on time, the compensation thereof shall be provided by MOPIT to NEA. The amount of loss or

damage due to the reason attributable to non maintenance of the dedicated feeder shall be as determined by the technical committee as specified in Annex 1 of this MoU

7. Shutdown Charge:

In case of any obstruction in the supply of NEA due to Busbar shutdown and crossing etc during the construction of dedicated feeder, the shutdown charge for the period of such shutdown shall be paid by MOPIT in accordance with Electricity Distribution Bylaws of NEA.

8. Construction of Busbar Extension & Line Bay:

If it is necessary to expand the bay in the switchyard while constructing dedicated feeder, the requisite land for the same shall be arranged by MOPIT. However, if the land of NEA within its switchyard can be used, MOPIT shall be responsible to pay the rent of Rs. ……. per year to NEA.

9. Tariff:

Tariff for extra supply of electricity through dedicated feeder shall be as determined by the Tariff Commission from time to time. Unless otherwise determined by the Tariff Commission, the tariff for the supply of the electricity shall be Rs. …… per unit.

10. Capacity of the Dedicated Feeder:

The capacity of the dedicated feeder shall be maximum 5 MW in 11 Kv.

11. Supervision Charge:

If MOPIT intends to construct the dedicated feeder by itself instead of through NEA under rechargeable works, an amount equivalent to 1.5 percent of total cost estimate shall be payable by MOPIT to NEA as supervision charge. If MOPIT decides to have the construction of the dedicated feeder by itself, MOE in coordination with NEA shall be responsible for the supervision of construction works of the dedicated feeder.

12. Metering and other specifications:

Provision in respect of metering and other arrangements shall be carried out by MOPIT in accordance with the standards as specified by NEA from time to time.

12. Validity:

This MoU shall be valid for a period of one year from the date of signing of these understanding. The validity hereof may be extended for a period as may be determined through mutual consent of all the parties hereto.

13. Confidentiality :

(a) The Parties hereto agree to keep confidential all information furnished to them by the other party which are designated as confidential by the other party or considered desirable to remain confidential. With respect to all such Confidential Information, however obtained, each Party shall:

(i) maintain the secrecy and confidentiality of all such information;

(ii) not disclose any such information directly or indirectly, by any means, to any person or entity, except to its directors and other personnel engaged in the management of or providing assistance to the Company and who need to know such information to perform their responsibilities;

(iv) not use any such information for any purpose other than the implementation of this MoU.

(b) Notwithstanding anything contained in Clause (a), the provisions of Agreement shall not be deemed to have been breached if:

(i) such information have been disclosed prior to receiving by the Party and are in public domain;

(iii it was obtained by the receiving Party from a third party having no obligation of confidentiality with respect to such information; or

(iii) it is required to be disclosed by applicable law and specifically in compliance of a Party's obligations under the applicable law.

(c) Each Party shall be responsible to ensure that its directors, staff and other employees, and those of its Affiliates, who may receive such information, comply with the obligations set out in Clause (a).

14. Exclusivity:

Subsequent to the execution of this Understanding, the First Party shall be not be entitled to appoint any other party or parties, whether individually or in partnership on in cooperation with any other third party, as the distributor of the products within the territory.

15. Governing Law :

The formation, validity, interpretation and implementation of this MoU, shall be governed by the laws of Nepal. The courts at Nepal shall have exclusive jurisdiction in all matters arising out of and/or concerning this Agreement.

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16. Settlement of Disputes:

(a) In case of any dispute arising in connection with this interpretation or implementation of this understanding the Parties shall endeavor to settle such dispute amicably through consultations and negotiations between the Parties.

(b) If no settlement could be reached through consultations and negotiations of the senior corporate management of each Party within 35 days of either Party delivering a notice of the dispute to the other Party, then such matter shall be finally referred to the court of Nepal having competent jurisdiction.

(c) Contract Act, 2056 shall be the governing laws in respect of settlement of disputes between the parties

17. Waiver and Severability:

(a) Any failure or delay on the part of any Party to exercise any right under this MoU

shall not operate as a waiver thereof; nor shall a single or partial exercise of any right preclude any other future exercise thereof.

(b) If any provision of this MoU shall be determined to be invalid or unenforceable under applicable laws, all other provisions of this MoU shall continue in full force and effect unless such invalidity or unenforceability adversely affects the underlying intent of this Agreement or unless the invalid or unenforceable provision comprises an integral part of, or is inseparable from the remainder of this Agreement.

18. Amendment:

Any amendment to this MoU shall come into force only when it is executed in writing by all the Parties.

19. Language:

This MoU is executed in English language, which shall be deemed to be original. In case of any discrepancy between any translation and the above version the English version shall be considered in all respects.

20. Matters not Included in this MoU:

Matters referred to this MoU shall be duly carried out and in regard to the matters not mentioned in this MoU the same shall be addressed and resolved in mutual consultation.

21. No Partnership or Agency:

Nothing contained or implied in this MoU shall constitute or be deemed to constitute a partnership or agency between the Parties hereto and none of the Parties hereto will have any authority to bind, commit or make any representations on behalf of any of the other Parties hereto.

22. Representation and Warranties:

(a) Each Party hereby represents and warrants to the other Party that:

(i) it is duly organised and validly existing under the laws of the jurisdiction of its establishment or incorporation;

(ii) it has all necessary consents, approvals, powers, licenses, waivers, exemptions and authorities and approvals to enter into and perform its obligations under this MoU;

(iii) its representative whose signature is affixed below hereto is fully authorised to sign this Agreement and to bind it pursuant to a valid authorisations or resolutions passed by their respective Board of Directors;

(iv) this MoU shall constitute the legal, valid and binding obligations of such Party, enforceable against it in accordance with its terms;

(v) neither the execution of, nor the performance of its obligations under, this MoU will conflict with, or result in a breach of, or constitute a default under respective incorporation document or Acts, Articles of Association, of either

of the parties, or any law, rule, regulation, authorisation or approval of any government agency or body, or of any agreement to which it is a party or is subject; and

(vi) there is no lawsuit, arbitration, or legal, administrative or other proceedings or governmental investigation pending or, to the best of the knowledge of such Party, threatened, against it with respect to the subject matter of this MoU that would affect in any way its ability to enter into or perform its obligations under this MoU.

(b) The Parties acknowledge and agree that the representations and warranties mentioned in Clause (a) are true, accurate, complete and not misleading at the date of this MoU. Each Party further agrees and acknowledges that the other Party is entering into this MoU on the faith and basis of these representations and warranties and is relying on their *bona fides*, accuracy and completeness.

(c) Each Party undertakes and agrees to compensate, indemnify, defend and hold harmless the other Party for all liability, losses, damages and claims, including, without limitation, fines, penalties, interest, legal, engineering, or consultants' fees and other costs arising out of any liability of such Party and any misrepresentation or breach of any warranty.

23. <u>Termination:</u>

This Understanding may be terminated by any of the Parties by providing a prior notice of ..... months and final settlement of accounts.

24. <u>Notice</u> :

All notices, consents, confirmations, or other communications between the Parties provided for in this Agreement shall be in writing, in English and delivered personally, by courier, registered airmail, facsimile or email to the Parties at the following addresses or fax numbers or email id:

to MOE

Attn.:
Address: …….
……
Telephone: ……
Facsimile: ……
Email: …….

to MoPIT:

Attn.: …….
Address: ……..
……..
Telephone: ……..
Facsimile: ……..
Email: ……..

to RBN:

Attn.: …….
Address: ……..
……..
Telephone: ……..
Facsimile: ……..
Email: ……..

(b) All notices and other communications required or permitted under this MoU that are addressed as provided in Clause (a) will be deemed to have been delivered:

(i) if delivered personally or by courier;

(ii) if delivered by facsimile and electronically confirmed; and

(iii) if sent by registered air mail, and received by the addressee four days after the same is dispatched.

(c) If a Party changes its address such Party may give notice to the other Party.

25. Entire Understanding:

This MoU (included with all addendum, amendment referred to herein) shall constitute the entire understanding between the Parties and supersede any previous all written or oral statements, arrangement, representation and warranties which may have been made between them or on behalf of either party to the subject matter hereof.

26. Counterparts:

This MoU shall be executed in the English in separate counterparts, each of which when so executed and delivered shall be an original and all such counterparts shall together constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have caused their duly authorized representatives to execute this MoU on the date set forth below.

<table>
<tr><td colspan="2">For and on behalf of
MOE</td><td colspan="2">For and on behalf of
MoPIT</td></tr>
<tr><td colspan="2">Signature:
Name:
Designation:
Date:</td><td colspan="2">Signature:
Name:
Designation:
Date:</td></tr>
<tr><td colspan="4">Witnesses:</td></tr>
<tr><td>Signature:
Name:
Address: DoR
Date:</td><td>Signature:
Name:
Address: RBN
Date:</td><td>Signature:
Name:
Address: NEA
Date:</td><td>Signature:
Name:
Address:
Date:</td></tr>
<tr><td colspan="4"></td></tr>
</table>

Annex 1

Technical Committee

The Technical Committee shall be constituted as under:
There shall be following three members in the Technical Committee
1……
2……..
3……..

ToR of Technical Committee:

17.2 TUNNEL O&M

Annual operation and maintenance cost for 2.45km tunnel is assumed to be approximately 49.0 Million Nepali Rupee (NPR) while electricity fee is about 25.0 Million NPR, although road maintenance cost is covered by Road Fund and managed by Roads Board Nepal (RBN). In this regard, it is proposed to apply the toll rate system for tunnel users to allocate the annual operation and maintenance cost and the collected fee from this toll will be used for this Project. In this regard, the Project will be designed with toll facility including the road expansion before tollgate. Toll will be collect by RBN and DOR will undertake O&M. RBN and DOR agreed on toll collection to raise tunnel O&M fund and toll revenue shall be exclusively used for a tunnel O&M. The draft MOU for Toll Collection for Operation and Maintenance of Tunnel was prepared.

Memorandum of Understanding
For
Toll Collection For Operation and Maintenance of the Tunnel

This MoU has been signed on this 15th day of November 2014
By and Between

Ministry of Physical Infrastructure and Transport, having its address ……., duly represented by its authorized …….. Mr. ……..(hereinafter referred to as MoPIT, which expression, unless repugnant to the context or meaning thereof shall be deemed to include its successors and permitted assign) of the other part,

And

Ministry of Finance, having its address at duly represented by its authorized …….. Mr. ……..(hereinafter referred to as MoF, which expression, unless repugnant to the context or meaning thereof shall be deemed to include its successors and permitted assign) of the other part,

Whereas, MoPIT in coordination with DoR and RBN intends to construct underground tunnel highway of 2.5 kilo Meters starting from Badbhanjyang of Nagdhunga to Sisnekhola in Dhading District, in accordance with the decision of Government of Nepal dated ……. and intends to have the same operated and maintained
NOW THEREFORE, in consideration of the premises and the mutual covenants made and contained herein, the Parties hereto hereby agree as follows:

1. <u>Construction of the Tunnel:</u>
MoPIT shall, with the appropriate decision and permit from Government of Nepal, construct a 2.5 Kilo meters long tunnel starting from Badbhanjyang of Nagdhunga to Sisnekhola with

all facilities installed therein through the contractor selected by DoR through appropriate procedures as per the laws of Nepal. While having construction through the contractor, DoR shall appoint the consultant for the project.

2. Land Acquisition:

MoPIT shall take all necessary steps to acquire the land over the proposed tunnel. For the purpose, MoPIT shall fully acquire the land over the tunnel having earth cover between top of tunnel and the existing ground level is 2D or less (D is tunnel diameter and 20 meter, for this project) for ROW. The landowners of such land shall be compensated as per the decision of Compensation Determination Committee formed as per the provisions of amended Land Acquisition Act, 2034. For lands where earth cover between top of tunnel and the existing ground level is more than 2D (20m for this project), ROW shall not be acquired. However, any development on the land above the tunnel shall be restricted. As there exists no law in Nepal to restrict the development on such land, MoPIT shall take necessary steps to have the Land Acquisition Act, 2034 amended to enable it to restrict certain developments on such land and the land owner be compensated as per the decision of Compensation Determination Committee as established in accordance with amended Land Acquisition Act, 2034. Accordingly MoPIT shall take necessary steps to have tunnel location indicated in the Cadastral Map of each land owner and the Tunnel Management Office as established in accordance with the MoU shall periodically monitor the development on such land.

3. Authority:

Government of Nepal, vide its decision dated …… empowers DoR for the operation and maintenance of the tunnel highway through "Tunnel Management Office for Tunnel" to be formulated under its auspices.

4. Scope:

Subject to and in accordance with the provisions of this MoU, the Applicable Laws and the Applicable Permits and the decision of Government of Nepal dated …….. DoR has been entrusted with the authority set forth herein including the exclusive right, license and authority during the subsistence of this MoU to operate and maintain the tunnel highway by way of raising tolls through RBN from the specified vehicles plying through the tunnel for a period of ……. years commencing from the date of this MoU and DoR hereby accepts the obligations and agrees to implement operation and maintenance of the tunnel highway subject to and in accordance with the terms and conditions set forth herein.

5. Operation and Maintenance (O&M):

It has been agreed that DoR shall formulate O&M manual that may be required for the operation and maintenance of tunnel highway in accordance therewith.

a) Inspection:

It shall be the responsibility of DoR to carryout daily routine inspection of the tunnel through its personnel.

b) Routine Maintenance:

DoR shall be responsible for the routine maintenance of the structure of the tunnel as well as the facilities installed therein.

c) Repair/Replacement:
DoR shall during its routine checkup programme, repair and replace the facilities installed in the tunnel to keep it always in good condition.

d) Monitoring:
DoR shall monitor the traffic movement, traffic accident, fire incidents, all the time. It shall be the responsibility of DoR to implement appropriate round the clock monitoring throughout the validity period of this MoU.

e) Immediate Action:
In order to take immediate action that may be required due to breakdown of vehicles or accidents, fire incidents and/or any damage or malfunctions of the installed facilities, DoR shall always keep ready an immediate action team in order to smooth functioning of the tunnel.

f) Vehicle Control:
DoR shall be responsible to control the vehicles carrying dangerous materials, vehicle height and overloaded trucks and shall have authority to stop the vehicles, movement of which in its opinion, is detrimental to the safety of the tunnel.

6. Operation and Maintenance Organization:

DoR shall, with the permission from Government of Nepal, if so required, constitute a separate unit named "Tunnel Management Office for the Tunnel" exclusively for the purpose of operation and maintenance of the tunnel. DoR shall deploy sufficient numbers of personnel as may be required from time to time. For the purpose it shall have one Director looking after the following Sections with their scopes specified as hereunder:

a) Administration Section:
Administration Section shall have the responsibility on Budgeting, Accounting, General Administration and other functions as may be directed by the Director from time to time.

b) Maintenance Section:
Maintenance Section shall have the responsibility on daily Inspection, routine maintenance, repair, periodic maintenance works and other functions as may be directed by the Director from time to time.

c) Surveillance and Information Section:
Surveillance and Information Section shall have the responsibility to carryout effective Patrolling, surveillance, information provision to Road Users round the clock throughout the validity period of this MoU.

d) Action Team for Emergency Cases:
Action Team shall be responsible for removal of breakdown Vehicles, immediate action during emergency cases, coordination with Police, Fire Brigade, ambulance, local governments, etc.

e) Vehicle Regulation Section:
Vehicle Regulation Section shall be responsible for regulation of tank lorry or other vehicles carrying hazardous material, over height as well as overloaded vehicles in coordination relevant authorities.

7. Toll:

a) Subject to and in accordance with the provisions of this MoU, the Applicable Laws and other necessary permits from Government of Nepal, RBN shall raise the toll from different categories of vehicles using the tunnel highway in accordance with the toll rate as determined by Government of Nepal from time to time. While collecting tolls, RBN shall, by itself or through selection of private sector operators as per the procedure as determined by Roads Board Act, 2058 Road Board Rules, 2060, Roads Board Directive, 2061, Procedure for Raising toll Rules, 2060 and its first amendment 2061 as well as other requisite permits from Government of Nepal, shall raise the toll from the users of the tunnel. RBN shall have the power to refuse the entry of any such vehicles to the tunnel, which it deems detrimental to the structure and safety of the vehicle.

b) RBN may not collect the tolls from certain categories of vehicles such as Government vehicle, ambulance, fire brigade, etc., and other vehicles as may be instructed by Government of Nepal from time to time.

c) For the purpose of raising toll, the vehicles are categorized as specified in Annex III.

8. Funds for Operation and Maintenance of the Tunnel:

In order to meet the requirement of the operation and maintenance cost, RBN shall, after deducting its administrative costs, provide DoR the following funds from following sources:

a) 100% of the funds collected through toll after the deduction of the administrative costs of RBN.
b) …..% of the amount raised by Government of Nepal in one fiscal year against fuel tax as well as vehicle registrations. MoF shall be responsible for providing such fund to DoR.

The funds from both the sources shall be provided by RBN to DOR in every 6 months for its exclusive use in the tunnel operation and maintenance.

However, during the first year of the operation and maintenance of the tunnel, DoR would not have sufficient resources for the operation and maintenance of the tunnel. Therefore, MoF vide its decision dated …… decided to provide the amount of Rs. ……. (in words Rupees ……) to DoR for initial 6 months.

RBN, from time to time, effect periodical monitoring to check as to whether or not the toll revenue provided by RBN to DOR has been exclusively used for tunnel operation and maintenance and instruct DOR in order to use the fund exclusively for the tunnel operation and maintenance, should there be any discrepancy in the use of the fund and it shall be the duty of DOR to abide by such instructions of RBN.

9. Road Furniture, Safety Signs and Information Boards:

It shall be the responsibility of the DoR to place appropriate numbers of appropriate road furniture, safety signs and information boards in appropriate places.

10. Closure of the Tunnel:

DoR may close the tunnel for a period as may be required for the periodic repair and maintenance of the tunnel to keep the structure, facilities installed therein as well as condition of the tunnel vehicle worthy.

11. Insurance:

It shall be the responsibility of DoR to effect appropriate insurance policies that may be

required for the safety of the structure, facilities, personnel etc.

12. Audit:

It shall be the responsibility of DoR to maintain appropriate books of accounts clearly reflecting day to day incomes and expenses of the Operation and Maintenance Unit (i.e. Tunnel Management Office for the Tunnel) and have them audited as per the laws and Government instructions.

13. Inspection and Monitoring:

RBN shall be responsible to inspect and monitoring of toll collection by the third party, operation and maintenance of the tunnel by DoR and proper utilization of collected fund by DoR exclusively for operation and maintenance of the tunnel.

12. Validity:

This MoU shall be valid for a period of …… years from the date of signing of these understanding. The validity hereof may be extended for a period as may be determined through mutual consent of all the parties hereto.

13. Confidentiality :

(a) The Parties hereto agree to keep confidential all information furnished to them by the other party which are designated as confidential by the other party or considered desirable to remain confidential. With respect to all such Confidential Information, however obtained, each Party shall:

(i) maintain the secrecy and confidentiality of all such information;

(ii) not disclose any such information directly or indirectly, by any means, to any person or entity, except to its directors and other personnel engaged in the management of or providing assistance to the Company and who need to know such information to perform their responsibilities;

(iv) not use any such information for any purpose other than the implementation of this MoU.

(b) Notwithstanding anything contained in Clause (a), the provisions of Agreement shall not be deemed to have been breached if:

(i) such information have been disclosed prior to receiving by the Party and are in public domain;

(iii was obtained by the receiving Party from a third party having no obligation of confidentiality with respect to such information; or

(iii) it is required to be disclosed by applicable law and specifically in compliance of a Party's obligations under the applicable law.

(c) Each Party shall be responsible to ensure that its directors, staff and other employees, and those of its Affiliates, who may receive such information, comply with the obligations set out in Clause (a).

14. Exclusivity:

Subsequent to the execution of this Understanding, the First Party shall be not be entitled to appoint any other party or parties, whether individually or in partnership or in cooperation with any other third party, as the distributor of the products within the territory.

15. Governing Law :

The formation, validity, interpretation and implementation of this MoU, shall be governed by the laws of Nepal. The courts at Nepal shall have exclusive jurisdiction in all matters arising out of and/or concerning this Agreement.

16. Settlement of Disputes:

(a) In case of any dispute arising in connection with this interpretation or implementation of this understanding the Parties shall endeavor to settle such dispute amicably through consultations and negotiations between the Parties.

(b) If no settlement could be reached through consultations and negotiations of the senior corporate management of each Party within 35 days of either Party delivering a notice of the dispute to the other Party, then such matter shall be finally referred to the court of Nepal having competent jurisdiction.

(c) Contract Act, 2056 shall be the governing laws in respect of settlement of disputes between the parties

17. Waiver and Severability:

(a) Any failure or delay on the part of any Party to exercise any right under this MoU shall not operate as a waiver thereof; nor shall a single or partial exercise of any right preclude any other future exercise thereof.

(b) If any provision of this MoU shall be determined to be invalid or unenforceable under applicable laws, all other provisions of this MoU shall continue in full force and effect unless such invalidity or unenforceability adversely affects the underlying intent of this Agreement or unless the invalid or unenforceable provision comprises an integral part of, or is inseparable from the remainder of this Agreement.

18. Amendment:

Any amendment to this MoU shall come into force only when it is executed in writing by all the Parties.

19. Language:

This MoU is executed in English language, which shall be deemed to be original. In case of any discrepancy between any translation and the above version the English version shall be considered in all respects.

20. Matters not Included in this MoU:

Matters referred to this MoU shall be duly carried out and in regard to the matters not mentioned in this MoU the same shall be addressed and resolved in mutual consultation.

21. No Partnership or Agency:

Nothing contained or implied in this MoU shall constitute or be deemed to constitute a partnership or agency between the Parties hereto and none of the Parties hereto will have any authority to bind, commit or make any representations on behalf of any of the other Parties

hereto.

22. Representation and Warranties:

(a) Each Party hereby represents and warrants to the other Party that:

(i) it is duly organised and validly existing under the laws of the jurisdiction of its establishment or incorporation;

(ii) it has all necessary consents, approvals, powers, licenses, waivers, exemptions and authorities and approvals to enter into and perform its obligations under this MoU;

(iii) its representative whose signature is affixed below hereto is fully authorised to sign this Agreement and to bind it pursuant to a valid authorisations or resolutions passed by their respective Board of Directors;

(iv) this MoU shall constitute the legal, valid and binding obligations of such Party, enforceable against it in accordance with its terms;

(v) neither the execution of, nor the performance of its obligations under, this MoU will conflict with, or result in a breach of, or constitute a default under respective incorporation document or Acts, Articles of Association, of either of the parties, or any law, rule, regulation, authorisation or approval of any government agency or body, or of any agreement to which it is a party or is subject; and

(vi) there is no lawsuit, arbitration, or legal, administrative or other proceedings or governmental investigation pending or, to the best of the knowledge of such Party, threatened, against it with respect to the subject matter of this MoU that would affect in any way its ability to enter into or perform its obligations under this MoU.

(b) The Parties acknowledge and agree that the representations and warranties mentioned in Clause (a) are true, accurate, complete and not misleading at the date of this MoU. Each Party further agrees and acknowledges that the other Party is entering into this MoU on the faith and basis of these representations and warranties and is relying on their *bona fides*, accuracy and completeness.

(c) Each Party undertakes and agrees to compensate, indemnify, defend and hold harmless the other Party for all liability, losses, damages and claims, including, without limitation, fines, penalties, interest, legal, engineering, or consultants' fees and other costs arising out of any liability of such Party and any misrepresentation or breach of any warranty.

23. Termination:

This Understanding may be terminated by any of the Parties by providing a prior notice of ..... months and final settlement of accounts.

24. Notice :

All notices, consents, confirmations, or other communications between the Parties provided

for in this Agreement shall be in writing, in English and delivered personally, by courier, registered airmail, facsimile or email to the Parties at the following addresses or fax numbers or email id:

to MoPIT:

Attn.: …….
Address: ……..
……..
Telephone: ……..
Facsimile: ……..
Email: ……..

to MoF:

Attn.: …….
Address: ……..
……..
Telephone: ……..
Facsimile: ……..
Email: ……..

(b) All notices and other communications required or permitted under this MoU that are addressed as provided in Clause (a) will be deemed to have been delivered:

(i) if delivered personally or by courier;

(ii) if delivered by facsimile and electronically confirmed; and

(iii) if sent by registered air mail, and received by the addressee four days after the same is dispatched.

(c) If a Party changes its address such Party may give notice to the other Party.

25. Entire Understanding:

This MoU (included with all addendum, amendment referred to herein) shall constitute the entire understanding between the Parties and supersede any previous all written or oral statements, arrangement, representation and warranties which may have been made between them or on behalf of either party to the subject matter hereof.

26. COUNTERPARTS:

This MoU shall be executed in the English in separate counterparts, each of which when so executed and delivered shall be an original and all such counterparts shall together constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have caused their duly authorized representatives to execute this MoU on the date set forth below.

For and on behalf of MoPIT	For and on behalf of MoF
Signature:	Signature:
Name:	Name:
Designation:	Designation:
Date:	Date:

Witnesses:

For and on behalf of DoR	For and on behalf of RBN
Signature:	Signature:
Name:	Name:
Address:	Address:
Date:	Date:

Annex 1

Technical Committee

The Technical Committee shall be constituted as under:
There shall be following three members in the Technical Committee
1……
2……..
3……..

ToR of Technical Committee:

Annex-II
Time Schedule

a) Finalization of the concept for setting the toll policy by MOPIT by Mid-September, 2014.
b) Finalization of MOU for toll collection among MOPIT and MOF by Mid-November, 2014.
c) Submission of the signed MOU above to JICA by Mid- November, 2014.
d) Decision by RBN on who collect tolls (RBN by itself or outsourcing) by Mid-2019.
e) Decision by MOPIT, DOR and RBN on toll rates to be collected by Mid-2019.
f) Recruitment and training of toll collection work or selection of a private toll collection company by RBN by Mid-2020.
g) Creation of Toll Management Office by DOR by Mid-2020.
h) Start of O&M of the tunnel by DOR and collection of a toll by RBN when the tunnel is opened for traffic which is expected August 2021.

Annex III

Toll Rate (per entry)

Heavy Vehicles – NRs. 35.00

Light Vehicles – NRs. 25.00

17.3 DRAFT GUIDELINE FOR UNDERGROUND RIGHT OF LAND OWNERS

For the construction for tunnel, the rule and/or guideline for area of above tunnel are necessary for the management of safety surrounding tunnel area. Especially it is necessary to confirm the underground right of surface land owner and confirmation among related parties (ex. MOPIT, DOR, Ministry of Law and Justice(MOLJ),) In order to enhance the necessary process, the concept paper was prepared and option 4 as "no land acquisition by Government but certain activities restricted with the payment of compensation" was recommended. In order to realize the above situation, survey team prepared the draft documents for amendment in Land Acquisition Act, 2034.

Draft concept note for Rule of Tunnel Construction (Draft ROW acquisition, underground right for tunnel)

Right-of-Way (ROW)

As per the laws of Nepal, the landowner shall have exclusive right on the lands held by them. However, the Government may exercise its right of eminent domain for the acquisition of the land by the payment of appropriate compensation as determined by the Compensation Committee to the landowner and disallow the landowners to use their land.

The land owners have unlimited underground right on their land and the only provision in respect of underground findings are mentioned in Mines and Minerals Act, which categorically specified that the ownership on findings of any mines and minerals under the land of the landowner shall be of Government of Nepal. No other such specific underground restrictions to the landowner are available as of now.

ROW in respect of electricity transmission lines are however to some extent clear. According to the practice, the landowners are restricted from planting trees, construction of buildings etc, under the stretch of transmission lines. However, the land required for the construction of transmission towers are required to be acquisitioned. The land owners under the stretch of transmission lines are however, allowed for cultivation of crops and also allowed to sell the land to any other person, if they want. As regards the compensation for disturbance to the landowners, a compensation equivalent to 10% of the land value has been determined.

Despite of this, now problems are coming up as the landowners feel that the provision of 10% of the land value are not adequate and do not compensate their problems. Khimti-Dhalkebar transmission line project has recently seen such problem and ultimately the government has come up with the proposal to acquire 100% of the land under the stretch of transmission line. But land acquisition has not yet been effected.

In respect of tunnel, no such norms have yet been determined by Government of Nepal. It may be appropriate to either acquire 100% of the land through the exercise of Eminent Domain by

Government of Nepal and fully compensate the landowners and rehabilitate the landowners to other place, or with proper arrangements with the local landowners, relevant local governments, the landowners be compensated as disturbance fee and let the landowners remain there itself and carryout general cultivations. The amount of compensation as well as restriction to the landowner may be determined through mutual discussion with the committee of landowners and local government.

However, while doing so, the Government must restrict the landowners from carrying out certain underground activities which may be detrimental to the structure of the tunnel, such as piling works, digging of well, or any other activities to extract ground water, construction of high rise buildings etc. The local government should always monitor the construction works in such places and not approve any construction plans hampering the tunnel. Besides, it should always monitor illegal constructions on such demarcated land property.

Constitutional Provision on Eminent Domain:

Interim Constitution of Nepal, 2063

Article 19
Right to property:

(1) Every citizen shall, subject to the laws in force, have the right to acquire, own, sell, dispose of, and otherwise deal with, property.

(2) The State shall not, except in the public interest, requisition or acquire, or otherwise create any encumbrance on, the property of any person.

Provided that, this Clause shall not apply to any property acquired in an illicit manner.

(3) Compensation shall be provided for any property requisitioned, acquired or encumbered by the State in the course of enforcing a scientific land reform program or in the public interest, in accordance with law. The amount and basis of compensation and the procedure therefor shall be as determined by law.

In accordance with the Constitutional provision, the power to acquire the land is vested with the State. However, right to property being the fundamental right of the citizen of Nepal, the state is restricted to exercise its power of eminent domain only for the purpose of public interest. At the time of acquisitioning the land in public interest by the State, the aggrieved party is entitled by the Constitution to the compensation as determined by the law.

From the above, it can be well deduced that the State can acquire the land as per the law with the payment of compensation as determined by the law.

The law of Nepal in respect of acquisition of the land containing legal provision for the determination of compensation is Land Acquisition Act, 2034.

Major Highlights of Land Acquisition Act, 2034

Section 2 (a)
"Land" shall mean, any land under the ownership and possession of any person and building, wall, trees fixed thereon. It shall also include anything that are permanently fixed to the land.

Section 2 (b)
"Public Works" shall mean the work that may be carried out in public benefit, interest and use or any works that is carried out on behalf of Government of Nepal. It shall also include the following works:

1) Projects approved by Government of Nepal.
2) Projects to be implemented by local government.

Section 2(c)
"Local Officer" shall mean the officer specified by Government of Nepal. It shall mean Chief District Officer, If such officer is not specified.

Section 3
Right of Government of Nepal to acquisition the land for the purpose of public works:

If Government of Nepal deems necessary to acquire any land for any public works, Government of Nepal may, subject to the availing of the compensation thereof, acquire the land of any place in any quantity.

Section 4
Land may be acquisitioned for institutions:

(1) In the case of application to Government of Nepal by any institution for the acquisition of land for the following purposes, subject to the bearing of all other expenses and the compensation in accordance with the Act by it, Government may effect the decision for the acquisition of the land for such institutions:
   a) For the construction of residential buildings for the employee, workers of such institution or in order to make arrangement for other facilities for them or for any other works of public welfare.
   b) For the operation of project related to the institution fully owned by Government of Nepal or for the purpose of construction of storage facility for the goods related to or produced by such institution.

(2) No proceeding on the acquisition of the land in accordance with the Act shall be initiated unless a deed of consent on the following subject matter is not executed by such institution:
   a) To avail to Government of Nepal, the expenses that is incurred or to be incurred in the course of land acquisition,

Section 5
Decision on land acquisition and officer to initiate preliminary proceedings:

(1) Subsequent to the decision by Government of Nepal on the acquisition of land for the purposes of Section 3 and 4, ……. the concerned project in charge, if the land is to be acquisitioned for project, shall initiate the preliminary proceeding to determine the land to be acquisitioned.

(2) If the concerned institution requests to Government of Nepal in order to have the employee of the institution nominated for the purpose of preliminary proceedings as per Sub Section (1), Government of Nepal may issue an order entitling the employee at least of officer level of such institution to initiate such preliminary proceedings.

Section 6
Preliminary proceeding on land acquisition

(1) The land acquisition officer as per Section 5 shall, for the purpose of information to the

concerned person, affix a copy of notice at each of following offices and places:

a) The place near the concerned land to be acquisitioned where there is a high movement of general people.
b) Office of concerned Village Development Committee or Municipality.
c) On the gate or compound wall , if the building and the surrounding land is to be acquisitioned.

(2) The land acquisition officer may, within three days from the date of affixation of notices, enter the land or building to be acquisitioned, along with necessary employee and workers for

a) Carrying out survey works
b) collect the sample of soil, stones, to dig a pit or carry out boring for the purpose to examination as to whether such land is appropriate for acquisition or not.
c) demarcation of land appropriate for acquisition
d) to install any equipment

Section 8
Reporting on preliminary proceedings

(1) The land acquisition officer shall, within fifteen days from the date of initiation of preliminary proceedings, complete such works of preliminary proceedings and determine the land appropriate for acquisition and submit a report thereof along with necessary details to local officer at the earliest.

(2) Such report shall contain the complete detail of amount of compensation and the damages for loss

Section 9
Notice of land acquisition

(1) The local officer shall, subsequent to the receipt of report on preliminary proceedings, issue a notice specifying the following matters

(a) Purpose of land acquision
(b) Whether only the land is to be acquisitioned or even the building constructed thereon is to be acquisitioned.
(c) Name of Village Development Committee or Municipality and the Ward No. where the land is located.
(d) Plot number, if survey has been conducted.
(e) any other particulars for the identification of the land, if survey has not been conducted.
(f) area of the land
(g) other necessary particulars

(2) A copy of notice shall be affixed on each of the following place or office:

(a) local office of the project for which the land is being acquitioned
(b) District Administration Office
(c) office of concerned Village Development Committee or Municipality
(d) Land Administration Office or Land Revenue Office
(e) The place near the concerned land to be acquisitioned where there is a high movement of general people.
(f) Other places deemed necessary by local officer.

Section 10
Necessary matters to be specified in the Notice

a) The notice shall mention the time period and office of distribution of compensation, if the amount of compensation has already been determined. Such notice shall also

mention about the time period of 15 days for the submission of application to claim the compensation along with the documents substantiating the ownership.

b) Standing crops, trees, building, wall etc., entitled to be cleared and collected by the owner.

Section 11
Complaint by the land owner

1) The concerned land owner may, if he has any reason in order not to have the land acquisitioned, file the complaint at Government of Nepal, Ministry of Home Affairs, through local officer, within 7 days from the date of affixation of notice as per Section 9 specifying the reasons thereof.
2) Government of Nepal, Ministry of Home Affairs shall, before reaching the decision thereon, consult the officer to effect preliminary proceeding and the local officer, if such is deemed necessary.
4) The decision thereon shall generally be taken within 15 days from the date of filing of complaint.

Section 12
Right to acquisition the land

(1) Subsequent to the issue of notice as per Section 9(1) and final settlement on complaint as per Section 11 (1) or subsequent to the elapse of notice period, if no complaint has been filed, the local officer may at any time acquire the possession of the concerned land and provide the land to the institution for which the land has been acquisition, if the land is acquisitioned for any institution. Subsequent thereto, the land so acquisitioned may be used for the specified purpose.

Section 13
(1) The amount of compensation for land acquisitioned as per the Act shall be provided in cash.
(2) There shall be a Compensation Committee consisting following officers to determine the amount of compensation:
   a) Chief District Officer
   b) Chief of Land Administration or Land Revenue Office
   c) Project in charge, if the land is acquisitioned for project, or any officer deputed by Chief District Officer, if such land is being acquisitioned for any other purposes.
   d) a representative of District Development Committee

Section 22
Transfer of title to the land

Subsequent to the possession of the land as per Section 12, the title to such land shall be transferred to the Government or the institution for which the land has been acquisitioned.

Section 25(7)
The person dissatisfied on the amount of compensation my file the complaint with Government of Nepal, Ministry of Home Affairs within 15 days from the date of issue of notice on compensation. The decision of Ministry of Home Affairs shall be final in respect thereof.

Section 27
Land may be acquisitioned through negotiation

Notwithstanding anything specified anywhere in the Act, Government of Nepal may acquisition any land for public works through negotiation with concerned land owner. Other formalities of the Act is

not necessary to be fulfilled while acquisitioning the land through negotiation.

Section 40
Officer to hear the case and appeal

1) Chief District Officer shall be the officer to hear preliminary proceeding and decide on the matter pertaining to offences under the Act.
2) An appeal may be filed on the decision of Chief District Officer within 35 days at the concerned Appellate Court.

Electricity Act, 2049

Section 33
Utilization or Acquisition of Other's Land and House:

(1) If it is required that the land and house of any person be used or acquired for the purpose of generation, transmission, or distribution of electricity, the licensee may submit an application to Government of Nepal.

(2) On receipt of an application pursuant to Sub-section (1), Government of Nepal may, after conducting necessary enquiries into the matter, make available such land and house in the same manner as it makes available to any corporate body under the prevailing laws. If the land is owned by the government, such premises shall be made available on lease for the period up to the term of license.

(3) If a construction work relating to the generation, transmission, or distribution of electricity has been performed by Government of Nepal or a licensee, Government of Nepal may prohibit to use the premises of a house or land located in the area where such construction work is performed or the premises of a house or land located in the prescribed distance from such place of construction by any other person for any specified purpose. Government of Nepal or the licensee shall pay compensation, as prescribed, to the concerned person for such damage or loss caused due to such prohibition.

Forest Act, 2049

Section 68
Forest May be Used:

(1) Notwithstanding anything stated elsewhere in the Act, if there is no alternate than to use the forest for national priority project, and if there is no substantial adverse impact in the environment, the Government of Nepal shall grant the permit for the use of any part of such Government Managed Forest, Protected Forest, Community Forest, Contract Forest or Religious Forest.

(2) While granting such permit, if such causes any loss or damage to any person or community, the Government of Nepal shall make appropriate arrangement in that regard.

Procedure for the Availing of Forest Land for Other Purposes, 2063

(1) The forest area shall not be made available for the implementation of other purposes other than for the project of national priority of Government of Nepal. If various authorities of Government of Nepal specifically require forest area for the implementation of the project, such authorities shall request for the forest area along with the fact based information details and a letter from National Planning Commission stating such project to be project of national

priority. The decision as to whether or not a project is of national priority shall be made by Government of Nepal (Council of Ministers).

(5) If there is no other alternative other than the use of forest land for the implementation of the projects with profit motive having national priority such as hydropower, telecommunication, etc., such project shall, at its own cost effect the plantation on the land, equivalent to the land covered by its physical infrastructure, as designated by the concerned District Forest Office as a compensation and the same shall be handed over to District Forest Office subsequent to their conservation for 5 years. If the project is unable to effect such works, the estimated cost for the plantation and conservation for 5 years as per norms shall be made available to the concerned District Forest Office and the District Forest Office shall, in accordance therewith, effect the plantation and conservation thereof.

For all the forest area to be used by the project shall, unless provided otherwise, be charged a sum equivalent to the charges as specified for Contract Forest as per schedule 20 of Forest Rules, 2051 and such shall be deposited in the concerned revenue account. If the trees at the area designated to the project by obtaining charges are found essential to cut down for the construction and implementation of the project, such project shall, without the decrease in the area of forest area of which the tress have been fallen down, effect plantation of trees in a number 25 times of the number of fallen down trees (of radius more than 10 cm) at its own cost at the place designated by the same to concerned District Forest Office subsequent to the conservation thereof for 5 years. If the above works could not carried out by the project, such project shall make available the amount as per the estimate to the concerned District Forest Office and the District Forest Office shall effect plantation and conservation thereof accordingly.

RoW in respect of Electricity Transmission Projects

In respect of transmission line projects, applicable and enabling laws in respect of RoW are Electricity Act and Electricity Rules. The provisions of the Act and Rules are illustrated in the case as mentioned hereunder. For your information, the compensation of 10% is nowhere specified in policy, Acts or Rules. It is the amount determined by Compensation Determination Committee formed under Electricity Rules. In this particular case the title to the land was not transferred to Government. Only certain activities of the land owners were restricted. The Supreme Court of Nepal validated the compensation of 10% of land value being provided to the landowners.

Binod Prasad Mainali and others Vrs. Cabinet Secretariat of Government of Nepal and others **(case no. 3427 of 2053 BS, date of decision 2055.5.25 / 10 September 1998, Full Bench; decision published in Nepal Kanoon Patrika 2056 decision no. 6680)**

Supreme Court of Nepal refused to issue an order as demanded by the petitioners to invalidate gazetted notification with reference to land acquisition for Nepal Electricity Authority (NEA) for the transmission line strengthening project. The petitioner had demanded for compensation as per market rates for land under the transmission line, instead of 10%. The decision observed the followings:

- that section 33(3) of Electricity Act, 2049 allows Government of Nepal to prohibit use of premises of a house or land located in the area where construction work of transmission line etc. is performed, for which compensation as prescribed, has to be paid.
- that rule 66 of Electricity Rules, 2050 provides for issuance of notice for the purpose of

Section 33(3) of the Act, Rule 87 grants compensation, Section 88 provides for formation of Compensation Determination Committee. The objective of such provision in Act and Rules is to regulate, operate and ensure safety of the generation, transmission and distribution related works;

- that such construction and operation of transmission line is not attributable to provide more benefit to any limited number of people but for public at large and that all in the affected area have to be treated equally.
- that the restrictions are for construction and to plant trees, for which compensation has been provided, however use of land for agriculture has not been prohibited.
- that the notice in accordance with Electricity Act and Rules has not infringed the constitutional right to equality and also that the right to property under Article 17 of the constitution, where such property may be acquired or expropriated for public benefit.
- that there the **land may be used for purpose other than those restricted, that 10% compensation is being paid for such restriction** and that the ownership on land shall remain unchanged, therefore the plea that there is an infringement of fundamental right cannot be accepted.

Verdict of the Court:

"Upon analysis of the above mentioned legal provisions and the notice issued in accordance therewith, there is no factual basis to conclude that the acts are against the constitution. The petitioner's plea and their attorneys submission that there has been an infringement of rights granted by the constitution is not acceptable on the basis that those are in accordance with the provisions of Electricity Act and the Electricity Rule formulated under its authority for electricity survey, generation, transmission and distribution are matters of public benefit and interest and enacted to manage and to make it safe".

RoW for Tunnel

As of now, there is no Act, Rules, Policies in Nepal which regulate the RoW for tunnel works. In order to have the RoW for tunnel works, there may be the following options:

Option No. 1
Total Acquisition

For the exercise of this option, the Government shall have to exercise the Power of Eminent Domain and acquire the lands in question with the payment of compensation equivalent to 100 percent of the land value in accordance with Land Acquisition Act, 2034.

The provisions of Land Acquisition Act have already been mentioned hereinabove and the said law is therefore, an enabling law in this respect.

Though this option can be exercised through existing legal provisions, this is a costly affair.

Compensation in respect of the land in this option is determined by legally constituted Compensation Determination Committee.

Option No. 2
Partial Acquisition and Partial Restrictions:

For the exercise of this option, the lands above the tunnel can be categorized in two categories:

a) Lands for total acquisition
b) Lands with limited rights

While exercising this option, the Government shall, instead of acquiring whole of the land, acquire those lands identified under group (a) above, which is most necessary for tunnel safety and have the title thereon transferred in the name of Government of Nepal.

The lands which have the cover less than 20 Meters above the tunnel are identified as the lands wherein all activities of the surface landowners are required to be restricted and therefore necessary to be acquisitioned by the Government.

Existing legal provisions shall not hinder the implementation of this part (a) of Option No. 2.

Compensation in respect of the land in this option is determined by legally constituted Compensation Determination Committee.

While exercising part (b) of this option, the Government of Nepal shall not acquire the identified land, but places certain restrictions on the land with the payment of compensation to concerned land owners.

There are legal hurdles in the exercise of this part (b) of the option. In the absence of any enabling legal provisions in respect of placing of restrictions to surface land owners, the option could be challenging one. Placing of restriction shall, in the absence of enabling legal provision as mentioned in Electricity Act and Electricity Rules, constitute an infringement of the legal rights of the landowners.

There shall be another question in respect of determination of amount of compensation. In the absence of legal provisions, Compensation Determination Committee cannot be constituted legally.

Third problem may come up if the landowner sells the land to any third party after obtaining the compensation.

Mitigation measures:

The enabling legal provisions may be incorporated either through new enactment or through amendment in Land Acquisition Act, 2034.

Option No. 3
Full acquisition of the land but possessory rights with landowners

In this option, the Government shall acquire whole of the land and the title to the land shall be transferred in the name of Government of Nepal. Government of Nepal shall place restriction on the activities but allow the person to effect only the agricultural activities on the acquired land. The amount of the compensation shall be negotiated by Government with the individual

landowners and contract shall be effected with every individuals.

While implementing this option, legal hurdle is lesser and the amount of compensation to be provided to the landowners can be negotiated and minimized. Having already transferred the title to the land, the landowners cannot sell or lease the land to any third party.
This option may be less costly than that of Option No. 1, but costlier than that of Option No. 2. Secondly entering into agreement with each individual landowner may be cumbersome process.

Option No. 4
No land acquisition by Government but certain activities restricted with the payment of compensation

In the absence of legal provisions to restrict the landowners from uninterrupted use of the land, and also in the absence of legal provisions on determination of compensation, this option, despite being suitable (as in the case of electricity transmission line projects), cannot be implemented.

Mitigation measures:

The enabling legal provisions may be incorporated either through new enactment or through amendment in Land Acquisition Act, 2034.

Option No. 5
Long Term Lease (of maybe 100 years)

While implementing this option, Government of Nepal shall enter into long term lease agreement with individual landowners and the amount of compensation is mutually determined. In this option the landowners shall have the facility to use the land for agricultural purpose but are restricted to carry out certain activities.

There will not be legal issues while obtaining the land on lease by government and allowing the landowners to use the land for agriculture purpose during the lease period. However, there will be legal issues after the expiry of lease period. If the landowner's successor does not intend to extend the lease period, it will be a problem in the operation of tunnel in safe manner.

Conclusion:

We can observe from the above cited case decided by the Supreme Court, the basis of the decision to confirm and validate the compensation amount to be 10% of the land value, has been the enabling Clause of Electricity Act and Electricity Rules.

In conclusion, there is a lack of enabling legal provision for the acquisition of RoW specifically for tunnel. Though there exists enabling provisions in Electricity Act and Rules, those provisions are not applicable in respect of tunnel. Therefore, in the case of tunnel, new enactment of legislative framework to restrict the concerned landowners from carrying out certain activities or amendment in the existing Land Acquisition Act, 2034, incorporating the provision to pose specific restriction on concerned landowners in respect of major infrastructure works is necessary in order to address long term problem associated therewith.
If any new enactment can be achieved or if some legal provision could be incorporated in

existing Land Acquisition Act, 2034 by way of amendment in the Act, in our opinion, the most suitable option shall be Option No. 4, wherein government shall not acquire the land and the landowners shall have limited rights and the landowners are paid minimum compensation for their restricted use of land.

ORIGINAL PROVISIONS IN LAND ACQUISITION BILL

Section 2 (d)
"Land Acquisition" shall mean expropriation or acquisition or creation of any right on the land of any person in permanent, temporary or any other manner by the state for the purpose of public interest.

Section 12
Restriction on transfer of title:
Subsequent to the affixation of the notice as per Section 10, the officer to initiate the initial proceeding shall, within three days, write to the concerned office in order not to register the deed for the transfer to title and upon such letter, the concerned office shall also stop the registration of transfer of title on such land.

Section 14(3)
The notice as per Sub-Clause (2) shall specify the following matters:
(b) Whether only the land is to be acquisitioned or the building and walls are also to be acquisitioned.

Section 29
Notice to acquisition the land:
(b) Whether only the land is to be acquisitioned or the building and walls are also to be acquisitioned.

Section 51
Entire land is to be acquisitioned:
If only a portion of the land is to be acquisitioned, or if the land is to be acquisitioned by acquiring some of the rights thereon, the proceeding shall be initiated to acquire any land remaining after social impact assessment or the entire land, if such land cannot be used commercially.

AMENDMENT REQUIRED TO READ AS FOLLOWS:
Section 2 (d)
"Land Acquisition" shall mean expropriation or acquisition or creation of any right *OR LIMIT THE RIGHT OF THE LANDOWNER* on the land of any person in permanent, temporary or any other manner by the state for the purpose of public interest.

Section 12
Restriction on *CERTAIN ACTIVITIES OR* transfer of title:
Subsequent to the affixation of the notice as per Section 10, the officer to initiate the initial proceeding shall, within three days, write to the concerned office in order not to register the deed for the transfer of title *OR EFFECTUATE THE RESTRICTION ON CERTAIN ACTIVITIES OF THE LANDOWNER* and upon such letter, the concerned office shall also stop the registration of transfer of title on such land *OR EFFECTUATE THE RESTRICTION ON CERTAIN ACTIVITIES OF THE LANDOWNER. WHILE DOING SO, THE OFFICER SHALL ALSO WRITE TO THE CONCERNED AUTHORITY IN ORDER TO MARK THE LAND IN QUESTION IN THE CADESTERAL MAP.*

Section 14(3)

The notice as per Sub-Clause (2) shall specify the following matters:

(b) Whether only the land is to be acquisitioned or the building and walls are also to be acquisitioned *OR ONLY CERTAIN RIGHTS OF THE LANDOWNER SHALL BE RESTRICTED*.

Section 29

Notice to acquisition the land:

(b) Whether only the land is to be acquisitioned or the building and walls are also to be acquisitioned *OR ONLY CERTAIN RIGHTS OF THE LANDOWNER SHALL BE RESTRICTED*.

Section 51

Entire land is to be acquisitioned:

If only a portion of the land is to be acquisitioned, or if the land is to be acquisitioned by acquiring some of the rights thereon, the proceeding shall be initiated to acquire any land remaining after social impact assessment or the entire land, if such land cannot be used commercially. *IF LAND IS NOT TO BE ACQUISITIONED WHILE EFFECTUATING RESTRICTIONS ON CERTAIN ACTIVITIES OF THE LANDOWNER, NONE OF THE LAND SHALL BE ACQUIRED, BUT THE COMPENSATION AS DETERMINED IN ACCORDANCE WITH THIS ACT SHALL BE PROVIDED TO THE AFFECTED LANDOWNER.*

17.4 CREATION OF PROJECT IMPLEMENTATION UNIT (PIU)

Survey Team proposed to create Project Implementation Unit (PIU) shown **Figure 17.4-1** and **Table 17.4-1**.

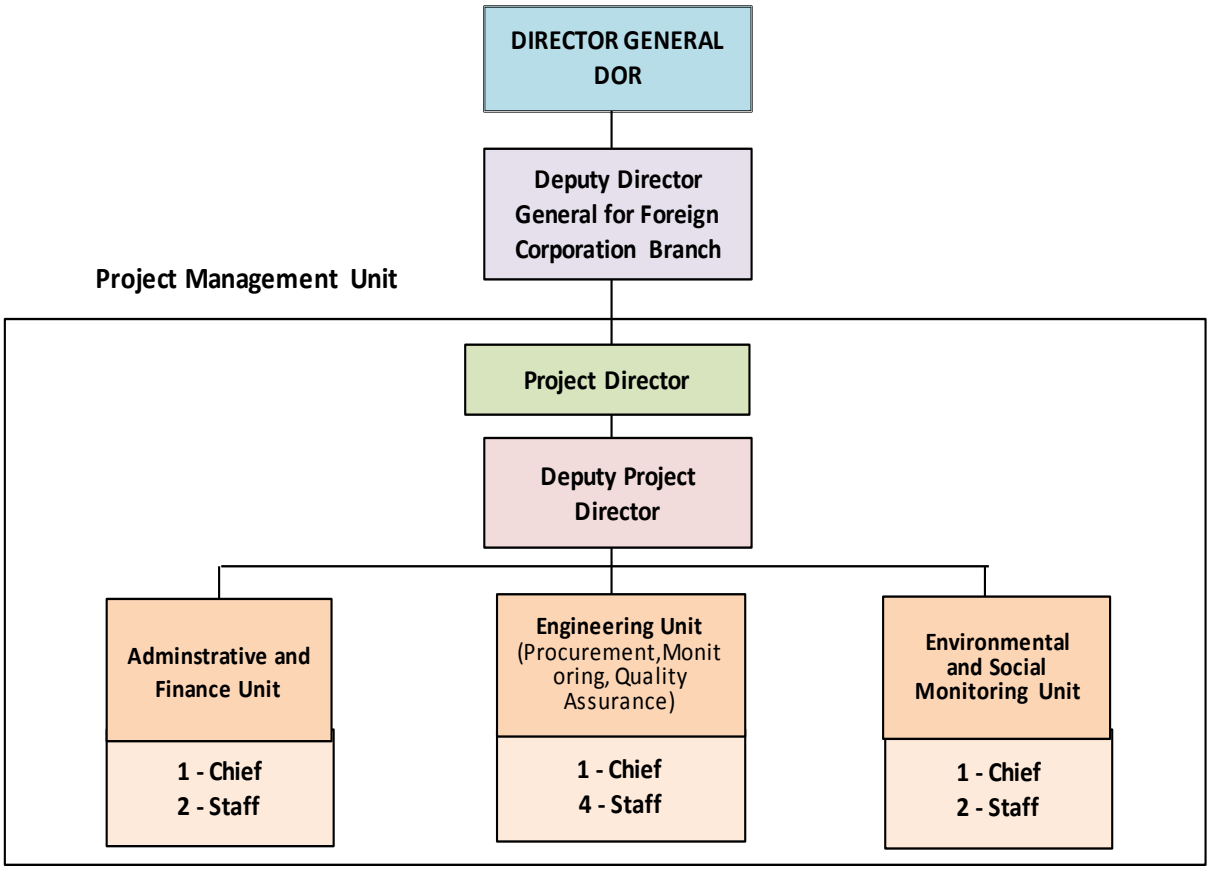


FIGURE 17.4-1 PROJECT MANAGEMENT UNIT ORGANIZATION CHART

TABLE 17.4-1 ROLES AND FUNCTION OF UNIT/ STAFF

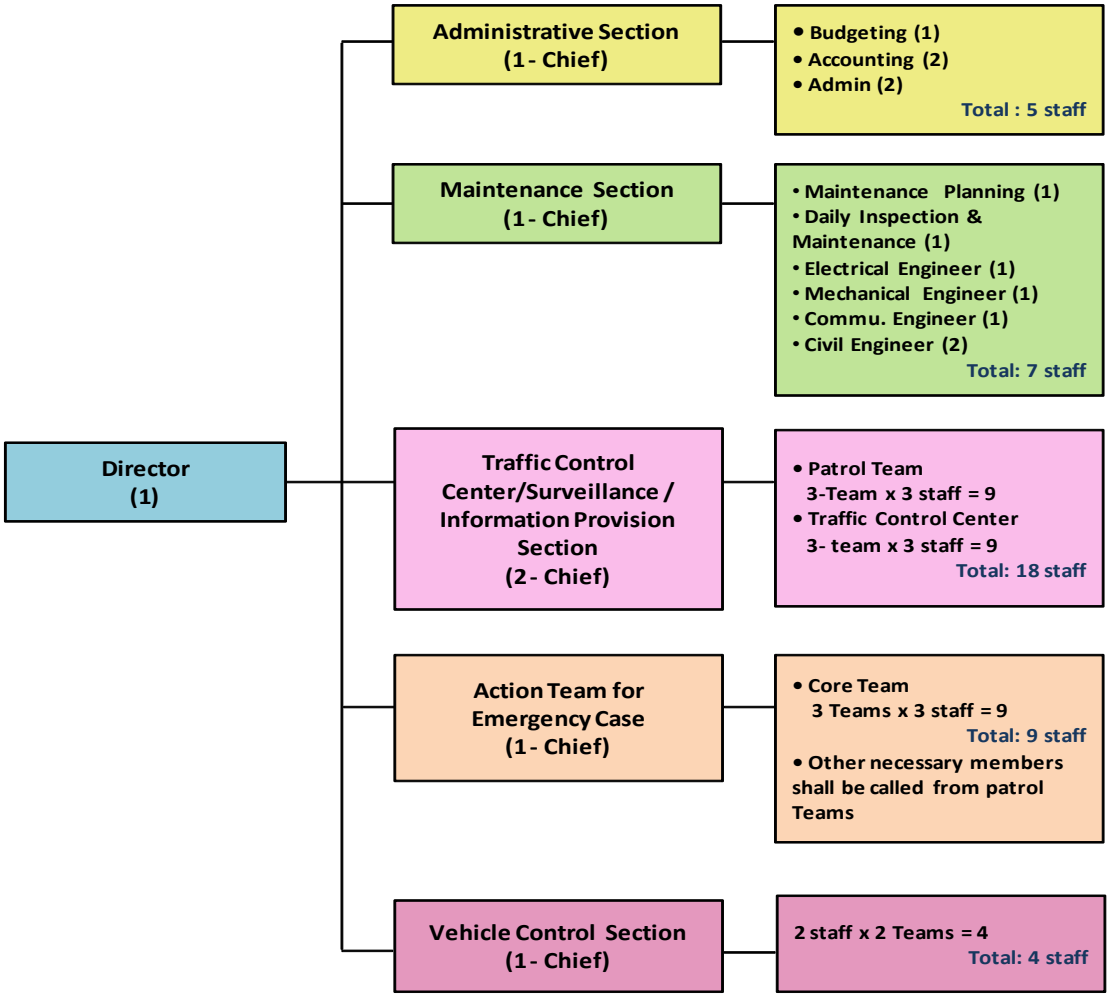
Unit	Roles and Function of Unit	Roles and Function of Staff
Project Director	● Responsible for overall activities of Project Management Unit	
Deputy Project Director	● Deputy for Project Director	
Administrative and Finance Unit	● General administrative work ● Budgeting and payment of expenditure ● Evaluate monthly billings from the Consultant and the Contractor and make recommendation on payment ● Evaluate claims from the Consultant and the Contractor	● Chief : Responsible for overall activities of this unit ● Budget: In charge of budget planning and book keeping ● Accountant: In charge of management of monthly billings and claims from the consultant and the contractor
Engineering Unit (Procurement, Monitoring, Quality Assurance)	● Assist tendering of Consultant and Contractor procurement ● Evaluate the detail design based on the established design criteria ● Monitor quality of work of the contractor ● Assess the monthly progress report submitted by the Consultant and the Contractor	● Chief Engineer : Responsible for overall activities of this unit ● Engineer for tender : In charge of assisting tendering ● Engineer of design review: In charge of evaluation of detailed design and assessment of monthly progress report ● Engineer of supervision : In charge of monitoring of quality of works

Unit	Roles and Function of Unit	Roles and Function of Staff
Environmental and Social Monitoring Unit	● Assess Environmental Monitoring Reports from the Consultant and the Contractor ● Undertake periodic environmental monitoring ● Attend the stakeholders' meeting ● Keep close dialogue with PAPs	● Chief : Responsible for overall activities of this unit ● Engineer of environment: In charge of monitoring of environmental requirement by EIA ● Public relations officer: In charge of monitoring social aspects and dialogue with PAPs.

17.5 CREATION OF TUNNEL MANAGEMENT OFFICE

Survey Team proposed to create the Tunnel Management Office.

Figure 17.5-1 shows the organization and staff of O&M for tunnel and **Table 17.5-1**, **Table 17.5-2** shows the Roles and function of section.



No. of Staff: 1 Director, 6 Chiefs, 43 Staff

Total Staff = 50 staff

If a toll is collected to produce fund for tunnel O&M cost within this, ***Toll Collection Section*** *must be organized.*

FIGURE 17.5-1 ORGANOGRAM AND STAFFS OF O&M FOR TUNNEL

TABLE 17.5-1 ROLES AND FUNCTION OF SECTION/ STAFF

Section	Roles and Function of Section	Roles and Function of Staff
Director	Responsible for overall activities of tunnel management office (2nd lank officer)	
Administration Section	● General Administration ● Budgeting ● Accounting	● Chief : Responsible for overall activities of this unit ● Admin: In charge of general affairs for tunnel management office ● Budget: In charge of budget planning and book keeping ● Accountant: In charge of accounting
Maintenance Section	● Daily Inspection ● Routine Maintenance ● Repair ● Periodic Maintenance	● Chief : Responsible for overall activities of this unit ● Maintenance Planner: In charge of planning of maintenance. ● Inspector & Maintenance enginer: In charge of daily inspection and maintenance ● Electrical Engineer: In charge of maintenance of Electrical facilities ● Mechanical Engineer: In charge of maintenance of Mechanical facilities ● Communication Engineer: In charge of maintenance of communication facilities ● Civil Engineer: In charge of maintenance of civil structure
Traffic Control Center/Surveillance/Information Provision Section	● Patrol ● Monitoring of traffic ● Surveillance ● Information provision to road users	● Chief : Responsible for overall activities of this unit ● Patrol Team: In charge of daily patrol in tunnel ● Traffic Controller: In charge of monitoring of traffic, of surveillance activity and of information provider to road users.
Action Team for Emergency Case	● Removal of breakdown vehicles ● Immediate action in case of emergency cases ● Coordination with LGUs and Police	● Chief : Responsible for overall activities of this unit ● Action team: In charge of Removal of breakdown vehicles, Immediate action in case of emergency cases and coordination with LGUs and police
Vehicle Control Section	● Control of tank lorry carrying hazardous material ● Vehicle height & overloaded trucks in coordination with Land Transportation office and police	● Chief : Responsible for overall activities of this unit ● Vehicle controller: In charge of vehicle control and of controlling with Land Transportation office and police

TABLE 17.5-2 SECTION IN CHARGE OF EQUIPMENT

Name of Equipment		Section in Charge
Maintenance Work	Road Sweeper	Maintenance Section
	Wall Cleaning Vehicle	
	Water Supply Equipment for Cleaning	
	Aerial Work Platform	
	Station Wagon	
	Inspection Machinery and Tools	

Name of Equipment		Section in Charge
Traffic Monitoring and Information Provision	Tunnel Monitoring Facilities	Traffic Control Center/Surveillance/Information Provision Section
	Patrol Car	
	Traffic Control Devices	
Emergency Case	Towing Vehicle	Action Team for Emergency Case
	Air Jack	
	Truck for Transport of Air Jack	
	Fire Truck	
	Ambulance Car	
Vehicle Control	Weight Scale (Mat Type)	Vehicle Control Section
	Height Restricting Device (Gate Type)	

17.6 PROJECT IMPLEMENTATION RISKS AND COUNTERMEASURES

Table 17.6-1 shows the Risk Matrix of Project Implementation.

TABLE 17.6-1 RISK MATRIX

No.	Associated Risk	Responsibility	Measures
1	**Preparatory Stage**		
1.1	Delay in organizing Project Management Unit (PMU) for the Project	DOR	• DOR should establish PMU as soon as possible. • PMU staff should be trained on Yen Loan procedures.
1.2	Delay in Selection of the Consultant	DOR	• Consultant selection schedule shall be firmly established and strictly followed. • Selection criteria shall be firmly established and evaluated in accordance with the established criteria.
1.3	Delay in the Detailed Design	DOR	• Competent Consultant shall be selected.
1.4	Delay in selection of Contractor	DOR, Consultant	• Bid schedule shall be firmly established and strictly followed. • Detailed bid documents shall be prepared so as to avoid confusion, misinterpretation, and so on.
1.5	Delay in Right-of-Way Acquisition and relocation of affected people	DOR, Consultant	• During preparation of Final RAP, constant dialogues shall be exercised to obtain consents from affected people. • Acquisition unit cost shall be based on the fair market value. • Budget for ROW acquisition and relocation shall be prepared in time. • Start ROW acquisition and relocation of people as early as possible.
1.6	Design error, over design and/or under design	DOR, Consultant	• Competent Consultant shall be selected. • Careful design checks shall be exercised by the Consultant.
1.7	Objection to the Project by people	DOR, Consultant	• Constant dialogue with people shall be made.
2	**Implementation Stage**		
2.1	Delay in work schedule and completion	Contractor, DOR, Consultant	• Competent Contractor shall be selected. • Progress of work shall be strictly monitored by the Consultant. • Any signs of delay such as negative slippage of progress, delay in delivery of materials, etc. shall be

No.	Associated Risk	Responsibility	Measures
			noticed as early as possible by both the Consultant and the Contractor. Recovery plan/measures shall be established and agreed by DOR, the Consultant and the Contractor and implemented accordingly.
2.2	Encountering unexpected geological conditions and ground water conditions.	Contractor, Consultant, DOR	• Advanced boring shall be implemented. • As soon as the unexpected geological conditions are observed, the Contractor shall propose countermeasures and the Consultant shall evaluate and recommend countermeasures to DOR, • Necessary change order shall be approved by DOR.
2.3	Poor quality of material and work	Contractor, Consultant, DOR	• Quality of materials and works shall be strictly monitored by the Consultant. • When these are found, materials and works shall be refused.
2.4	Accidents	Contractor, Consultant, DOR	• The Contractor must exercise all kinds of countermeasures to prevent accidents. • The Consultant shall always evaluate the safety measures by the Contractor, and necessary cautions shall be issued to the Contractor.
2.5	Delay in transportation of materials and equipment due to the Third Country's condition	Contractor, Consultant, DOR	• The Contractor shall always collect information on the Third Country's economic and political situations. Enough time shall be allocated for delivery of materials and equipment.
2.6	Cost overrun due to change orders	Contractor, Consultant, DOR	• Unnecessary change order shall not be approved. • When change orders become necessary, the Consultant shall study if there is any negative change order.
2.7	Cost overrun due to unexpected high rate of inflation and other economic conditions	DOR, Consultant, Contractor	• This shall be fairly treated in accordance with Terms and Conditions of contract.
2.8	Suspension or abandonment of construction works due to Contractor's own reasons	Contractor, DOR, Consultant	• Sanctions against the Contractor shall be specified in the contract. • Competent and faithful Contractor should be selected.
2.9	Failure to follow Environmental Requirements	Contractor, Consultant, DOR	• The Consultant shall strictly monitor environmental requirements.
2.10	Traffic Management of existing roads	Contractor, Consultant, DOR	• The Contractor shall pay extra care to maintain smooth flow of traffic during construction, particularly at West Portal area.
3	**Operation Stage**		
3.1	Delay in establishment of Tunnel Management Office (TMO)	DOR	• DOR shall establish TMO at least a year ahead of opening of tunnel and necessary staff shall be recruited. • TMO staff shall be trained on how to operate and maintain a tunnel safely. • DOR shall allocate budget for TMO staff capacity development.
3.2	Delay in preparation of Toll Collection	RBN	• RBN should determine if it will outsource toll collection to the private sector. • If so determined, a company should be selected at least six (6) months ahead of tunnel opening. • Selected company shall finish preparation of toll

No.	Associated Risk	Responsibility	Measures
			collection at least three (3) months ahead of tunnel opening.
3.3	Insufficient coordination with Traffic Police and LGUs	DOR	• DOR shall complete coordination with Traffic Police and LGUs at least three (3) months ahead of tunnel opening.
3.4	Bad driving manner of drivers inside the tunnel	DOR	• DOR should undertake safety driving campaigns to private car users and trucks/bus drivers
3.5	Lack of Toll Revenue	RBN	• In case of shortage of toll revenue for tunnel O&M, RBN shall allocate additional fund to DOR from Road Fund.
3.6	New Development above land of a tunnel	DOR	• TMO should periodically monitor if there is any new development above land of a tunnel.
3.7	Lack of environmental monitoring	DOR	• DOR through TMO should monitor environmental condition required in EIA periodically.
3.8	Insufficient electricity supply	NEA	• In accordance with MOU exchanged between DOR and NEA, NEA shall supply electricity for tunnel O&M.

CHAPTER 18

HIGH OFFICIAL'S VISIT TO JAPAN

CHAPTER 18
OTHER ACTIVITIES

18.1 HIGH OFFICIALS' VISIT TO JAPAN

18.1.1 BACKGROUND

There are no road tunnels in Nepal yet. Most roads in the mountainous area are long and winding requiring unnecessarily long travel time. This tunnel project expects construction of a tunnel, first of its kind in the road history of Nepal. Literally, the responsible agency (DOR) and other relevant authorities have little or no knowledge and experience regarding construction, operation and maintenance of a road tunnel. For realization of this project, enhancing understanding of decision makers on the demand and importance of road tunnels is important. Equally important is the enhancement of knowledge regarding advanced technology on tunnel construction and sound management of the tunnel during and after its construction.

Geologically, Japan resembles Nepal in that the geology is very fragile, complicated and consists of faults and fractured zone. However, Japan has rich, safe and reliable road network consisting numerous tunnels in the mountain areas. Japan has so far successfully constructed more than 9000 road tunnels by year 2011. Such achievement and experience have enabled the construction industry to develop innovative methods of tunnel construction.

Under such circumstances, inviting concerned officials of Nepal to visit actual tunnel construction sites and management centers were planned under this project. The visits have been organized and implemented twice so far and the third visit is presently scheduled for February. Outline of these visits is briefly discussed hereunder.

18.1.2 VISITS

18.1.2.1 First Visit

(1) Period

The first visit was conducted for a period of six days from August 16 to August 21, 2014.

(2) Objective

The objectives of the visit are;

i) To enhance understanding of the concerned officials regarding the importance of tunnels,
ii) To understand the technological level of Japanese contractors through observation of tunnel construction sites and operation and maintenance centers, and
iii) To share views with private companies related to construction of tunnels

(3) Participants

The team was headed by Honorable Minister of Ministry of Physical Infrastructure and Transport (MoPIT) and was composed of nine high ranking officials from Office of Prime Minister and Council of Ministers (OPMCM), Ministry of Foreign Affairs (MoFA), Ministry of Finance (MoF), MoPIT, Department of Roads (DoR) and Roads Board Nepal (RBN). The organization and position of the participants are listed in **Table 18.1-1**.

TABLE 18.1-1 LIST OF PARTICIPANTS

No.	Organization	Position
1.	MOPIT	Honorable Minister
2.	OPMCM	Secretary
3.	MOFA	Joint Secretary/Director General
4.	MOPIT	Joint Secretary
5.	DOR	Deputy Director General
6.	DOR	Deputy Director General/Superintendent Engineer
7.	MOF	Under Secretary
8.	RBN	Executive Director
9.	MOPIT	Technical Officer

Five out of nine members were from Ministry of Physical Infrastructure and Transport (MOPIT), and Department of Roads (DOR) and the rest were from other related organizations, such as Office of Prime Minister and Council of Ministers (OPMCM), Ministry of Foreign Affairs (MOFA) and Ministry of Finance (MOF) and Roads Board Nepal (RBN).

(4) Program

The participants belonged to different organizations. Some of the participants have no technical background. Therefore, emphasis was given to undertake observation of different construction sites and management centers (control centers). To supplement learning from observing, lectures and meetings were adequately inserted in the program. The outline of the program is summarized in **Table 18.1-2**.

TABLE 18.1-2 OUTLINE OF PROGRAM

Date		Program hours	Program Location	Training items		Stay
Date	Day			Type	Contents	
16, Aug.	Sat	Travel (15th 13:30 Kathmandu→16th Narita, 08:10 Tokyo)				
		17:00-21:00	Tokyo	Interaction	Nepalese Community (Japan)	Tokyo
17, Aug.	Sun	9:00-15:00	Site	City Tour	City tour of Tokyo	Shizuoka
		16:00-17:00	Site	Move	Move to Shizuoka (Briefing)	
18, Aug.	Mon	9:00-12:00	Site	Visit	Tarutoge Tunnel	Tokyo
		12:00-14:00	Site	Observe	Neopasa (Parking Area)	
		14:00-17:00	Site	Lecture	Communication Plaza Fuji (NEXCO)	
19, Aug.	Tue	9:00-12:00	Site	Visit	Yamate Tunnel, (MEX)	Tokyo
		14:00-15:00	MOFA	Visit	Courtesy Call on MOFA	
		15:15-16:00	JICA	Visit	Courtesy Call	
20, Aug.	Wed	10:00-14:00	Site	Observe	Aqua-line (Umihotaru)	Tokyo
		14:00-14:45	MLITT	Visit	Courtesy Call	
		15:00-18:00	MEX	Lecture	Traffic Control Center	
		18:30-21:00	EON	Interaction	Embassy of Nepal, Tokyo	
21, Aug.	Thur	Leave Japan – Arrive Bangkok/Kathmandu (22nd at 12:15)				-

(5) Expected Outcome

The participants are expected to have;

i) Understood the topographic similarities between Nepal and Japan and understand the role (importance) of tunnels in the road network,
ii) Experienced advanced tunneling technology of Japan that has been innovated and developed from basic tunneling methods by Japanese contractors for adaptability to the distinct topography, geology, and natural conditions of Japan. Also, see the construction quality including health and safety control measures during construction, and
iii) Enhanced knowledge on the operation and maintenance of tunnel.

18.1.2.2 SECOND VISIT

(1) Period

The second visit was conducted for a period of five days (not including travel from/to Nepal) from September 17, 2014 till September 21, 2014.

(2) Objective

The objectives of the visit are similar to the first visit, except that the main participants of this

visit were targeted for the high ranking officials of the ministry of finance. Therefore, the objective of the visit was more focused on enhancing understanding of the role and importance of tunnels rather than focusing on the technical matters.

(3) Participants

The list of the participants is shown in **Table 18.1-3**. The list shows only two participants; one from MOF and the other from MOPIT. However, initially, the visit team was composed of four officials. On contrary to the first visit, which included officials from various organizations, the second visit was targeted for the ministry of finance. The team was scheduled to be headed by the Finance Minister and composed of four members. However, due to other important national issues, the minister was compelled to postpone the visit.

TABLE 18.1-3 LIST OF PARTICIPANTS

No.	Organization	Position
1.	MOF	Joint Secretary
2.	MOPIT	Deputy Director General/ Superintendent Engineer

(4) Program

The program was composed of three main activities. Visits to tunnel construction site, attend to lectures and conducting meetings. The outline of the program is summarized in **Table 18.1-4**.

TABLE 18.1-4 OUTLINE OF PROGRAM

Date	Day	Schedule	Stay
Sep 16	Tue	Leave Kathmandu (13:30) - Arrive Bangkok (18:15) Leave Bangkok (23:50)	On board
Sep 17	Wed	AM: Arrive Narita (08:10) PM: Communication Plaza Fuji (NEXCO) Leave Fuji (15:40), Arrive Tokyo (18:00)	Tokyo
Sep 18	Thr	Site Observation of Shimoshiobara 2nd Tunnel Construction site PM: Return to Tokyo	Tokyo
Sep 19	Fri	AM: Courtesy Calls on JICA PM: Tokyo Metropolitan Expressway O & M	Tokyo
Sep 20	Sat	AM: Aqualine (Umihotaru) PM: Reception at Embassy of Nepal	Bangkok
Sep 21	Sun	Bangkok Site visit	Bangkok
Sep 22	Mon	Leave Narita (12:15) Arrive Bangkok/Kathmandu (Sept 23 at 12:15)	-

(5) Expected Outcome

The participants are expected to have;

i) understood the topographic similarities between Nepal and Japan and understand the role (importance) of tunnels in the road network,
ii) Experienced advanced tunneling technology of Japan that has been innovated and developed from basic tunneling methods by Japanese contractors for adaptability to the distinct topography, geology, and natural conditions of Japan. Also, see the construction quality including health and safety control measures during construction

18.1.2.3 THIRD VISIT

(1) Period

The third and final visit was conducted for a period of nine days (not including travel from/to Nepal) from February 5, 2015 till February 13, 2015. The delegation of the visit was divided in to two groups. The first group was from the Ministry of Finance visited and the second group

was from MoPIT and DoR. The first group visited Japan for six days (not including travel from/to Nepal). The second visited Vietnam and Japan and the visit lasted for a period of nine days (not including travel from/to Nepal). The second group departed Kathmandu on February 4, 2015, while the first group departed on February 7, 2015.

(2) Objectives

The objectives of the visit are;

i) To enhance understanding of the concerned officials regarding the importance of tunnels,
ii) To understand the technological level of Japanese contractors through observation of tunnel construction sites and operation and maintenance centers,
iii) To provide technical knowledge and hands-on experience on design, construction, operation and maintenance of tunnel to the would-be staffs of the Project Management Unit (PMU) that will be established for smooth implementation of this project

(3) Participants

The delegation consisted of two high ranking officials from MoF and DoR and four engineers from MoPIT, and DoR. The participation from MoPIT and DoR were targeted for would-be or having higher chances to be nominated as the member of the PMU of this project. In fact, two out of the six participants are presently PMU members –Project Director and Deputy Project Director .The delegation of the third visit was led by the Finance Minister. The participants were divided into two groups. The first group consisted of high ranking officials from MoF and the second group consisted of officials from MoPIT and DoR.

(4) Program

The program of the third visit was different for participants from the MoF and MoPIT/DoR. Where participants from MoF only visited Japan, the MoPIT/DOR participants visited Vietnam on their way to Japan to observe Hai Van Tunnel, designed and constructed under the assistance of Japan. The outline of the program for respective groups is summarized in **Table 18.1-4**.

Table 18.1-5 OUTLINE OF PROGRAM

Day		(MOF) Nepal-Japan-Nepal	(MOPIT/DOR) Nepal-Vietnam-Japan-Nepal
4	**Wed**		KTM-BKK
5	**Thur**		BKK-HCM, HCM-Da Nang
6	**Fri**		Hai Van Tunnel Observation (10:00 am) & Discussions Da Nang-Hanoi JICA Hanoi Courtesy Call (4:00 pm)
7	**Sat**	KTM-HKG	Hanoi-BKK (1 PMU Official will return to KTM)
8	**Sun**	HKG-Tokyo PM: Observation (Umihotaru)	BKK-Tokyo(morning) PM: Observation (Umihotaru)
9	**Mon**	Site Observation (Tunnel Construction Site)	Site Observation (Tunnel Construction Site)
10	**Tue**	Site Observation/Courtesy Calls	Site Observation/Discussions
11	**Wed**	Site visit or Discussion	Site visit or Discussion
12	**Thur**	Courtesy Calls/Discussions	Site Observation/Discussions PM: Leave Japan for BKK
13	**Fri**	Leave Tokyo- HKG-KTM (arrive)	BKK-KTM (arrive)

(5) Expected Outcome

In addition to the outcomes similar to those expected to have been achieved during the first and the second visits, the participants are further expected to;

i) Enhance understanding in formulation and smooth proceeding of the project,
ii) Accumulate knowledge and understanding of the PMU staffs for smooth implementation of the project.
iii) Understand the importance of proper operation and maintenance of a tunnel

18.1.3 Activity Pictures

<table>
<tr><th colspan="2">FIRST VISIT (August 16 to August 21, 2014)</th></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Conducting briefing of the visit program</td><td>Explaining the process of construction using miniature models at Communication Plaza Fuji</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Orientation at construction site office</td><td>Observation of Tarutouge Tunnel Construction Site</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Observation (from inside car) of tunnel in operation</td><td>Metropolitan Expressway Traffic Control Center in Nagatacho</td></tr>
</table>

SECOND VISIT (September 17, 2014 till September 21, 2014)	
	
Explaining the process of construction using miniature models at Communication Plaza Fuji	Briefing on the Shimoshiobara Tunnel and the rules and regulations to be followed during site observation
	
Orientation at construction site office	Explanation of Shimoshiobara 2nd Tunnel Portal
	
Observation of On-going Construction Work Inside Shimoshiobara 2nd Tunnel	Metropolitan Expressway Traffic Control Center in Hakozaki

THIRD VISIT (February 5, 2015 till February 13, 2015)

Presentation and discussion with HAPACO, operation & maintenance company of Hai Van Tunnel

Observation of Hai Van Tunnel in Da Nang

Observation of control room of Hai Van Tunnel

Explanation of Asagiri Michi-no-Eki

Explaining the process of construction using miniature models at Communication Plaza Fuji

Observation of On-going Construction Work of Tarutouge Tunnel

18.2 TECHNICAL EXPLANATORY MEETING

18.2.1 Background

There are no road tunnels in Nepal till date, although there are a couple of hydro-tunnels. Therefore, it is not exaggeration to say that neither the authority responsible for development of roads nor the contractors have sufficient knowledge regarding construction of tunnels. Under such circumstances, it is considered very important to provide such knowledge to the possible extent under this survey such that the technical knowledge is transferred to the concerned authorities and companies.

18.2.2 Objective of the Meeting

The objective of the technical explanatory meeting is to;

i) Enhance understanding of the implementing agency (ies) about the importance of the project (importance of the tunnel).
ii) Share the findings and the results of the survey carried out by the Survey Team as well as interact with Japanese contractors to enhance knowledge and understanding regarding construction technology of tunnels.

18.2.3 Target Organizations

High officials from concerned ministries, management level officers and engineers from implementing agencies and other related organizations were targeted for the meeting.

18.2.4 Program

With the above background and objective, the explanatory meeting was conducted for two days on 28 and 29 January, 2015 at Everest Hotel in Baneswor, Kathmandu.The number of attendees was about 61 persons, mostly engineers from the DoR and local contractors. Also present during the program were DG and DDGs of the DoR, engineers from MoPIT, officials from RBN, representatives from the World Bank and local consultants. **Table 18.2-1** shows the program of the meeting.

Table 18.2-1 Program of Technical Explanatory Meeting

DAY1: January 28, 2015 (Wed)				
TIME	**PROGRAM/TOPICS**		**SUB-TOPICS**	**SPEAKER**
9:00 - 9:30	Registration		-	-
9:30 - 9:40	Welcome Speech		-	Representative JICA Nepal Office
9:40 - 9:50	Opening Remarks		-	MOPIT Secretary
9:50 - 10:00	Introduction of Program		1.Objective of Technical Meeting	Team Leader, JICA Study Team
10:00 - 10:25	Session-1	Nagdhunga Tunnel Construction	2. Video Presentation by Data collection survey	
10:25 - 10:55			3. Outline of Nagdhunga Tunnel Project	Team Member, JICA Study Team
10:55 - 11:10			Question / Answer	
11:10 - 12:10	*Lunch Time*			
12:10 - 15:30	Session-2	Nagdhunga Tunnel Site Observation	All participants will go to the proposed tunnel construction site for observation.	
DAY2: January 29, 2015 (Thr)				
9:00 - 9:40	Session-3	Japan's Tunnel Construcion	4.Japan's New Tunnel Technologies	Japan's Contractor (1)
9:40 - 9:55			Question / Answer	
9:55 - 10:35			5.Hai Van Pass Tunnel Construction Project	Japan's Contractor (2)
10:35 - 10:45			Question / Answer	
10:45 - 11:15	Session-4	Nepal Road Plan	6.National Road Network Plan and Major Road Project in Nepal	Project Director Nagdhunga Tunnel Construction Project
11:15 - 11:30			Question / Answer	
11:30 - 12:30	*Lunch Time*			
12:30 - 13:00	Session-5	Japan and Nepal Constractors Info. Exchange	7.Nepal Construction Industry	Past Executive Board Member Federation of Contractors' Associations of Nepal
13:00 - 13:15			Question / Answer	
13:15 - 13:45			8.Introduction of Japan's Contractor	Three Japan's contractors(Shimizu, Tekken and Ando-hazama) (10 min*3)
13:45 - 14:10	Fill-up Questionannaire		-	**JICA Study Team**
14:10 - 14:30	Wrap-up		Conclusion and Recommendations	Deputy Project Director Nagdhunga Tunnel Construction Project
14:30 - 14:45	Closing Remarks		-	Director of General, DOR

The first day consisted of two sessions followed by a field trip. A video clip highlighting the present condition and the intrinsic problems of the existing road in and around the survey objective area including effective measures was aired in Session-1. This video was prepared under the previous project "Data Collection Survey on Thankot Area Road Improvement in Nepal". The outline of the Survey was presented during Session-2. After the two sessions, all attendees were escorted to the field for observation of the site and to see the actual location where the tunnel is being planned. Question and answer session followed after each session, including the field trip.

The programs of the second day were focused on introduction of Japanese tunneling technology in regards to the construction of mountain road tunnels by Japanese construction companies. Also introduced were the present condition of the road network in Nepal and the present status of local contractors of Nepal.

18.3 MINIATURE MODEL PREPARATION

One of the components of the project is to make a miniature model of the post-construction perspective of Nagdhunga Tunnel, showing the inner and the outer portion of the tunnel including the landscape of the objective area.
Two sets of models have been prepared. Each set is composed of four models. These models including its general explanation is shown in **Table 18.3-1**. The models will be exihibited

Table 18.3-1 Types of Models and its description

No.	Model Description		Picture/Image
	Name	Dimensions/description	
1	Landscape	・ 1.1m x 0.5m ・ 3-dimension concept model of the survey area. ・ Approximate scale 1:5000 ・ 2 parts (divided along the centerline of the alignment) ・ Featuring topography with existing roads and houses	
2	Tunnel (structure)	・ 30cm x 15cm (height 15cm) ・ Cross section of tunnel ・ Featuring inner and outer structure of tunnel showing rock bolting ・ Approximate scale 1:100	
3	Tunnel (Diorama)	・ 30cm x 15cm (height 31cm) ・ Cross section of tunnel (at portal and inside tunnel) ・ Featuring inner and outer structure of tunnel showing facilities used inside tunnel ・ Scale: none	
4	Michi-no-Eki	・ 10cm x 15cm (height 5cm) ・ Featuring Michi-no-Eki and its vicinity ・ Approximate scale 1:1000	

List of Annex

Annex 9.11-1	Cost Estimation of the Electrical works for Power Supply
Annex 13.1-1	Environmental Protection Act
Annex 13.1-2	Environmental Protection Rule
Annex 13.3-1	Request for the Permission from the Ministry of Forest prior to the commencement of EIA
Annex 13.3-2	JICA EIA Checklist
Annex 15.7-1	Draft Term of Reference

Annex 9.11-1

Cost Estimation of the Electrical works for Power Supply to Tunnel Ventilation and Lighting

Item No	Description	Unit	Quantity	Ex Place Manufacture		Transportation and Insurance		Erection and Commission	Totals
				Unit Price	Subtotal	Unit	Sub-Total	Sub - Total	
	SUMMARY			US$	US$	US$	US$	US$	US$
			1	2	3= 1 x 2	4	5 = 1 x 4	6	7=3+5+6
1	**11kV ABB Italy made Vacuum Circuit Breakers (VCB)**								
1.1	at 132/11kV at NEA Matatirtha Substation	No.	2	40,000	80,000	2,000	4,000	2,400	86,400
1.2	at control east control room at tunnel portal	No.	2	20,000	40,000	1,000	2,000	1,200	43,200
1.3	to sectionize the 11kv bus at eastern control room	No.	1	20,000	40,000	1,000	1,000	1,200	42,200
	Sub - Total				**160,000**				**171,800**
2	**Other VCBs**								
2.1	VCB s, 1250A (Outgoing and incomming for west control room)		2	20,000	40,000	1,000	2,000	1,200	43,200
2.2	VCBs, 630 Amps for east and west control rooms		6	16,000	96,000	800	4,800	2,880	103,680
	Sub - Total				**136,000**				**146,880**
3	**Distribution Transformers**								
3.1	Transformers Dry Type 3 phase, 750kVA, 11/400V, 50 Hz.								
	in eastern control room	Set	2	39,540	79,080	1,977	3,954	2,372	85,406
	in western control room	Set	2	39,540	79,080	1,977	3,954	2,372	85,406
3.2	Transformers Dry Type 3 phase, 300kVA, 11/400V, 50 Hz.								
	in eastern control room	Set	1	15,816	15,816	791	791	474	17,081
	in western control room	Set	1	15,816	15,816	791	791	474	17,081
	Sub - Total				**189,792**		**9,490**		**204,975**
4	**11kV doublle circuit transmission line**								
	from Matatirtha SS after crossing the highway to the eastern control room	km							204,564
	Sub - Total				**0**				**204,564**
5	**Air Circuit Breakers (ACBs)**								
	ACBs for 750kVA ventilation transformers at east control room	Nos	2	3,218	6,435	161	322	193	6,950
	ACBs for 750kVA ventilation transformers at west control room	Nos	2	3,218	6,435	161	322	193	6,950
	ACBs for 300 kVA lighting transformers at east control room	Nos	1	2,462	2,462	123	123	74	2,659
	ACBs for 300kVA lighting transformers at west control room	Nos	1	2,462	2,462	123	123	74	2,659
	Sub - Total				**17,794**		**890**		**19,217**
6	**Aluminium Cable, HDPE Pipes and Pipe Joints (from Matathirtha SS to East Control Room)**								
6.1	**3core armoured 300 sq.meter alluminium cable to be layed in cable trench from Matatirtha SS**								
	to road crossing point for first 11kV first circuit	km	2.73	44,000	120,120	2,200	6,006		126,126
	to road crossing point for 11 kv second circuit	km	2.73	44,000	120,120	2,200	6,006		126,126
	Sub - Total				**240,240**		**12,012**		**252,252**
6.2	**HDPE Pipes 140mm 5 inches diameter 6kg/sq.cm**								
	for first11kV cable circuit buried in cable trench	km	2.73	11,000	30,030	550	1,502		31,532
	for second 11kV cable circuitburried under cable trench	km	2.73	11,000	30,030	550	1,502		31,532
	Sub - Total				**60,060**		**3,003**		**63,063**
6.3	**HDPE Pipe Joints**								
	HDPE Pipe joints for first circuit	km	2.73	1,300	3,549	65	177		3,726
	HDPE Pipe joints for second circuit	km	2.73	1,300	3,549	65	177		3,726
	Sub - Total				**7,098**		**355**		**7,453**
7	**Aluminium Cable, HDPE Pipes and Pipe Joints (from East Control Room to West Control Room)**								

Annex 9.11-1

Cost Estimation of the Electrical works for Power Supply to Tunnel Ventilation and Lighting

Item No	Description	Unit	Quantity	Ex Place Manufacture		Transportation and Insurance		Erection and Commission	Totals
				Unit Price	Subtotal	Unit	Sub-Total	Sub - Total	
	SUMMARY			US$	US$	US$	US$	US$	US$
			1	2	3= 1 x 2	4	5 = 1 x 4	6	7=3+5+6
7.1	**3core armoured 240 sq.meter alluminium cable to be layed in cable trench from east control room to west control room through cable duct burried under the tunnel**	km	2.35	40,000	94,000	2,000	4,700		98,700
7.2	**HDPE Pipe for 140mm 5 inches diameter 6kg/sq.cm**								
	for above 11kV cable circuit burried under cable trench	km	2.35	11,000	25,850	550	1,293		27,143
7.3	**HDPE Pipe joints for second circuit**	km	2.35	1,300	5,460	100	273		5,733
	Sub - Total				**125,310**		**6,266**		**131,576**
8	**Civil works of cable trench (from Matathirtha SS to Highway Crossing)**								
	Precast RCC Channel with Cover and Sand Filling	km	2.73	37,201	101,558				101,558
	Warning tapes	km	2.73	2,135	5,830				5,830
	Sub - Total				**107,388**				**107,388**
9	**11kV Cabling works on cable racks installed on left side wall of the tunnel for supply of Power to west control room from east control room . from East Control Room to West Control Room.**								
	Cable along Tunnel Wall in Utility Duct	km	2.35						30,030
	Sub - Total								**30,030**
10	**Others (conti. 12%)**								160,000
	Total Costs							USD	**1,499,198**

Annex 13.1.1

EPA Amendment

(Gazette- Section 58, No. 44, Part 5)

Date-16th February, 2009 AD (2065/11/05)

The GON has established the following Environment Protection Council under the **Rule 14** of EPA, 2053 to provide policy guidance and suggestion and also to have cooperation between different agencies.

1. Establishment of Environment Protection Council: (1) Following will be the members in the Environment Protection Council:-

a)	Prime Minister	Chairman
b)	Minister, Ministry of Science, Technology and Environment	Vice Chairman
c)	Minister, Ministry of Finance	Member
d)	Minister, Ministry of Foreign Affaires	Member
e)	Minister, Ministry of Home	Member
f)	Minister, Ministry of Water Resource	Member
g)	Minister, Ministry of Local Development	Member
h)	Minister, Ministry of Health and Population	Member
i)	Minister, Ministry of Industry	Member
j)	Minister, Ministry of Forest and Soil Conservation	Member
k)	Minister, Ministry of Land Reform and Management	Member
l)	Vice Chairman, National Planning Commission	Member
m)	Chairman, Constitutional Committee (Environmental) Parliament	Member
n)	Secretary, Prime Minister, Office of Ministry Council	Member
o)	Seven Nominated persons including two women who had remarkable contribution in the field of environment	Member
p)	One representative from Political Parties of Constituent Assembly	Member
q)	Secretary, Ministry of Science, Technology and Environment	Member

2. The tenure of the members mentioned in section (o) will be two years maximum.
3. Meeting of the Environment Protection Council:
   (a) Meeting of the Environment Protection Council will be carried out minimum once a year.
   (b) Subjects related to Environmental Policies will be put forwarded in the meeting of Environment Protection Council.
   (c) Other work procedure regarding meeting of Environment Protection Council will be as determined by the council itself.
4. Dissolve: The Environment Protection Council established under the Ministry of Population and Environment with the announcement dated 1997 September, 8th (2054/5/23) in gazette-Section 47, Sub-number 24(Ga), Part 4 has been dissolved.

Annex 13.1-2

EPR AMMENDMENT

Schedule -2

(Relating to EPR SECTION 3)

Proposals Requiring Environmental Impact Assessment

Amendments 2010 October 4

A. Forest Sector:

1. Plantation of indigenous plants of a single species in a single block covering an Ares of more than 500 hectares in the Terai and more than 100 hectors in the hills.
2. Plantation of such imported species of plants as are deemed suitable for the purposes, following their test, in the concerned place, more than 100 hectares in the Tarai and more than 50 hectares in the Hills.
3. Handover of forests with as area of more than 200 hectares in the Terai and more than 50 hectares in the hill as leasehold forests.
4. Clear felling or rehabilitation of forests with an area of more than 30 hectares.
5. Rosin and turpentine, rubber, plywood and veneer, catechu, and timber-based matches, pulp and paper industries to be established within one Km. inside the forest area which depend on forests for their raw material and use processing techniques and cardamom and medium and large tea industries which use large quantities of firewood.
6. Commercial and industrial processing of medicinal herbs and aromatic plants which emit garbage and pollution.
7. Establishment of hotels, resorts, safaris with the capacity of 50 beds, or the construction of medium and large scale educational institution ,hospital and Industries of other construction activities inside forest areas, national parks, sanctuaries, conservation areas, buffer zones and environment conservation Zones.

Formulation of Watershed Management Plan of Protected Areas.

8. Collection of forest related products including NTFPs and roots of more than 50 ton per species per year in different period of time from a forest of a district or from different forest areas in a single time if the exact extraction amount is not mentioned in forest or protection area management plan.
9. Collection of forest related products such as tree bark of more than 100 ton per species per year in different period of time from a forest of a district or from different forest areas in a single time if the exact extraction amount is not mentioned in forest or protection area management plan.
10. Collection of more than 100 ton of root and bark form a district in single time or from time to time from a forest or forest area in a single or in many seasons if the exact extraction amount is not mentioned in forest or protection area management plan except for Salcid, Rittha, Amala, Tendupat, Bhorla and Tejpat.
11. Collection and export of forest related products more than 50 ton per year of processed extracts of

a species permitted as per prevalent laws from a forest or many forest areas in a single time or in different period of time in a single or in many seasons. Establishment of different invasive species of wildlife.

12. Proposal implementing through other organization instead of forest related government agencies clearing more than 5 hectares of forest.
13. Handover of more than 500 hectares of forest to a single community for its management.

B. Industrial Sector:

1. Establishment of breweries and wineries equipped with boiling and fermentation facilities with a production capacity of more than Fifty Hundred Thousand liter per day.
2. Production of primary chemicals such as corrosive, acid and alkali etc. (except citric Tartaric, acetic, acid.) with a production capacity of more than One Hundred metric tons per day.
3. Processing of hides more than 10,000 sq. ft. Per day.
4. Establishment of mineral based industries with a investment of more than Rs. Fifty millions fixed capital.
5. Production of petro chemical and processing (diesel, kerosene, lubricant plastics, Synthetic rubbers etc.)
6. Production of 50 ton per day of ferrous and non ferries metals (except resoling, re-melting and fabrication) by the process of primary smelting.
7. Establishment of industry producing more than Three Thousand metric ton of rude sugar and sugar per day.
8. Establishment of cement industries with a production capacity of more than Thirty metric tons per hour based on line stone and with a production capacity of more than Fifty metric tons per hour based on clinker.
9. Establishment of lime industries having production capacity of more than 500 metric tons per day.
10. Production of asbestos.
11. Establishment of radioactive emission (nuclear and automatic processing) industries.
12. Formulation of 50 metric tons of primary compound (Bulk drugs) for medicine daily.
13. Production of extremely hazardous Substances such as Isocyanine, mercury compound etc.
14. Production of ammunitions and explosives including gunpowder except than the production made by Nepal Army or Nepal police forever or to be established by them.
15. Establishment of industries of pulp or paper with a production capacity of more than One Hundred metric tons per day.
16. Establishment of brick and tiles industries with a production capacity of more than Twenty million pieces per year.
17. Chemical processing of bone, horn with 50 metric tons per day.
18. Establishment of sawmill with the use capacity of more than Fifty Thousand cubic feet of wood per year.

C. Mining Sector:

1. Relocation or resettlement of permanent residence of more than 100 people for the purpose of mine excavation.

2. Underground Mines:

a. Excavation of radioactive minerals in any scale.

b. Underground excavation of other minerals of 200 ton daily and surface excavation of 400 ton daily.

c. Underground extraction of non-metal minerals of 200 ton daily and 400 ton of surface excavation.

d. Extraction of simple construction related stones, decorative stones, sand, gravel and industrial soil of more than 300 cubic meters per day.

e. Underground excavation of 200 ton per day and surface excavation of 400 ton per day for the production of coal and crude coal.

f. Production of more than One Hundred Thousand cubic meter Biogenic natural gas per day.

g. Activities related to extraction of petroleum products and its processing.

h. Extraction of sand, gravel and soil at the rate of more than 250 cubic meters per day from the surface of river and revolute.

D. Road Sector:

1. Construction of the following roads:

(a) National highways.

(b) Main feeder roads.

2. Construction of more than 50 Km. long ropeway.

3. Construction of more than 5 Km. long cable car routes.

E. Housing, Building and Urban Development Sector:

1. Construction of Residential, Commercial and their Combination as a Built up Area or Floor Area in more than Ten Thousand Sq. Meter area.

2. Construction of Cinema Hall, Theater, Community Hall, Stadium, Concert Hall, Sport Complex with the capacity of entry and exit of more than 2000 people.

3. Development of Apartment in more than 4 hectare area or with a capacity of 50 households.

4. Operation of Land Development Project in more than 100 hectare.

5. Construction of 16 Storey building or more than 50 meter in height.

F. Water resources and Energy sector:

1. Operation of electricity generation project with a capacity of more than 50 mw.

2. Under Electricity Generation:

a. Operation of project that generates more than 1 mw electricity from coal and nuclear plant.

b. Operation of project that generates 5 mw of electricity from mineral oil or gas.

3. Under the new systems of irrigation:

(a) Irrigating more than 2000 hectares in the Tarai and inner Terai.

(b) Irrigating more than 500 hectares in the hill valleys.

(c) Irrigating more than 200 hectares in the hill areas with a steep gradient and Mountain areas.

4. Any water resources development activity which displaces more than One Hundred people with permanent residence.

5. Construction of multipurpose reservoirs.

6. Inter-basin water transfer and use from one watershed area to another.

F1.

a. Operation of electricity generation project from solar energy with a capacity of more than 10 mw.

b. Operation of electricity generation project from wind energy with a capacity of more than 10 mw.

c. Operation of electricity generation project from biomass energy with a capacity of more than 2 mw.

G. Tourism Sector:

1. Establishment and operation of hotels with more than One Hundred beds.

2. Establishment and development of new airports.

H. Drinking water:

1. Collection of rain-water in an area of more than Two Thousand hectares and use of water sources (springs/wetlands) located within the same area.

2. Surface water sources with more than 1cs. safe yield, and the use of its entire part during the dry season.

3. Recharging of more than Fifty percent of the total aquifer for the development of underground water sources.

4. Displacement of more than One Hundred persons for the operation of water supply scheme.

5. Settlement of more than Five hundred persons on the upper reaches of water sources.

6. Supply of drinking water to a population of more than Fifty Thousand.

7. Supply of drinking water to a population of more than One Hundred Thousand upon connecting of new sources.

8. Over mining of biologically or chemically polluted point and non-point sources or underground water sources that may be affected by them.

9. Operation of multi-purpose projects relating to sources of drinking water which consumes the sources at the rate of more than 25 liters per second.

I. Waste Management:

1. Waste management activities to the undertaken with the objective of providing services to a population of more than Ten Thousand.

2. Following activities relating to waste emitted from houses and residential areas: -

(a) Filling of land with more than Five Thousand tons of waste per year.

(b) Activities relating of transfer station and resources recovery areas spread over an area of more than Ten hectares.

(c) Selecting, picking, disposing and recycling wastes through chemical, mechanical or biological techniques' in an area spread over more than Ten hectares.

(d) Activity relating to compost plans spread over an area of more than Ten hectors.

(e) Burying of waste emitted from an urban area with a population of at least Ten Thousand.

3. Following construction activities relating to hazardous waste of the following nature in any scale:-

(a) Construction of waste plant.

(b) Construction of waste recovery plant.

(c) Constructing of a site for filling accumulating or burying waste.

(d) Construction of a site to store the waste.

(e) Construction of a waste treatment facility.

4. Following activities relating to lethal waste:-

(a) Emission and management of any radioactive Substance with a half age exceeding Twenty Five years.

(b) Emission and management of any lethal chemical with Fifty lethal dose.

(c) Final disposal management of biological lethal Substances emitted from Health Center, Hospital, or Nursing Home with at least Twenty Five beds.

(d) Any activating relating to One hectors or more of land and energy for the purpose of incinerating or recycling any lethal Substance

J. Agriculture Sector:

1. Clearing of forest covering more than One hector in the Hills and Five hector in the Terai and using it for agricultural proposes.

2. Urbanization plan in cultivable lands.

3. Establishment of Plant for Toxic Pesticide (only those which are listed).

K. Health:

1. Operation of hospitals or nursing homes with more than Hundred beds, or medical profession (study and teaching also).

L. If any proposal is to be implemented in the following areas;

1. Historical, Cultural and archeological sites.
2. National Parks, wild life sanctuaries and conservation areas.
3. Areas with main sources of public water supply.

L.1. Operation of any plan, project or programme relating to any developmental work physical activity or change in land use except the proposals mentioned in Clause (a) to Clause (K) and those below the standards of such proposals as well as the proposals below the standards of those mentioned in schedule -1 with a cost of more than Two Hundred Fifty millions.

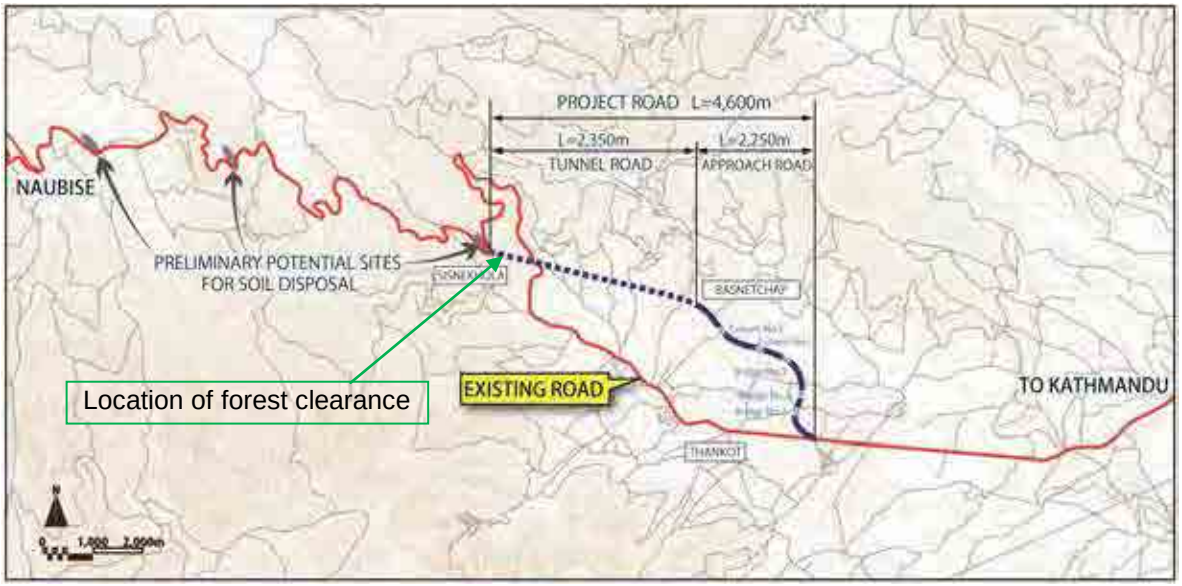
Annex 13.3-1

Date : Thursday, June 26, 2014

Request for the Permission from the Ministry of Forest prior to the commencement of EIA.

1. Name of the Project

The Naghdunga Tunnel Construction Project



Project Location Map

General Location and Size of Tunnel Portal and Potential Yard Site

2. Name of the Proponent and Address

Geo-Environmental and Social Unit,
Department of Roads,
Ministry of Physical Infrastructure and Transport
Babarmahal, Kathmandu
Contact : 01-426-2996

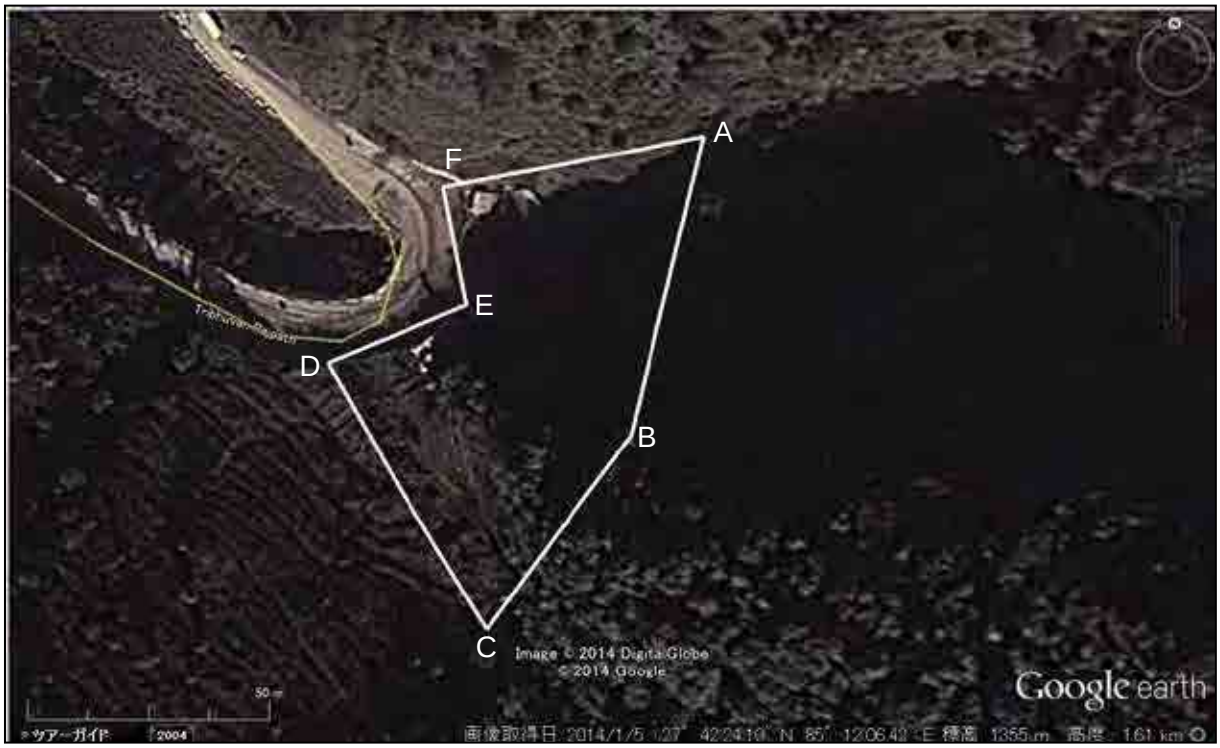
JICA Contractor Consultant
CTI Engineering International Co., Ltd.
Tachibana Annex Building
2-25-14 Kameido Koto-ku, Tokyo 136-0071, Japan
Project Office : Rama House, Summit Hotel, Lalitpur, Kathmandu, Nepal
Telephone : 1-552-1810/552-4694 (Ms. Sandya)
Contact : Mr. Robinson Shrestha, Mobile : 981 326 5203 (Project general)
Ms. Ide Kakiko, Mobile : 981 326 5202 (EIA)

(Local consulting firm as the project counterpart to be procured within one month)

3. Four Direction area and alignment coordinate (GPS Points) of the directly affected Forest Area.

A) Northern most and Eastern most point: 27.42’26.11” N 85.12’07.12” E
C) Southern most point: 27.42’22.04” N, 85.12’05.31” E
D) Western most point: 27.42’24.37” N, 85.12’03.64” E

Aerial Photo of the Directly Affected Forest Area



Close-up Photo of the Clearance Area

Coordination of the Boundary of the Clearance Area

Point	Latitude	Longitude
A	N 27.42'26.11"	E 85.12'07.12"
B	N 27.42'23.63"	E 85.12'06.48"
C	N 27.42'22.04"	E 85.12'05.31"
D	N 27.42'24.37"	E 85.12'03.64"
E	N 27.42'24.72"	E 85.12'04.99"
F	N 27.42'25.71"	E 85.12'04.85"

4. Name and Address of the project implemented place.

   Ward 9, Baad Bhanjyan VDC, Kathmandu District

5. Type of Forest Conservation Area according to Forest Act (1993) (first ammendment 1999) and National Park and Wild Life Conservation Act (1972).

   Community Forest

6. Main Flora and Fauna

Flora :

The vegetation is ***Schima wallichii*** - ***Castanopsis indica*** - ***Castanopsis tribuloides*** forest, mainly consisted of oak trees and camellia trees. The major associates are ***Engelhardtia spicata, Acer oblongum, Pyrus pashia, Eurya acuminata, Myrica esculenta*** etc.

Pinus roxburghii and ***Alnus nepalensis*** are the most common tree species.

Fauna : (To be surveyed in the EIA process)

7. Estimated Area of the Forest to be Affected (ha.)

Area to be affected by the Project : Approximately 2 ha
(Tentative. To be determined within one month)

8. Sensitive area according to forest, plant resources, diversity and soil conservation; if any.

None.

9. Other issues if any.

None.

End.

Annex 13.3-2

JICA EIA CHECKLIST

3-2-1. Environmental Checklist for the Project

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process?	(a) N	(a) EIA study for MOSTE approval was started June 2014. Scoping Document and EIA TOR approval by MOSTE is expected on Oct. 31.
		(b) Have EIA reports been approved by authorities of the host country's government?	(b) N	(b) Not yet. TOR for EIA study is under review by MOSTE as of November 2014.
		(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?	(c) N	(c) Not yet approved.
		(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(d) N	(d) EIA commencement approval related to national forest clearance is expected from MOFSC by the end of November 2014.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders?	(a) Y	(a) During the preparation of the Scoping Document, 2 public consultations were conducted with attendances of VDC secretaries, health workers, local residents, etc. and project information was disclosed. After the consultations, the letters from VDC secretaries were collected stating basic understanding of the Project and specific concerns from each secretary. Prior to the commencement of the Census Survey, additional 2 consultations were conducted with attendances of property owners to be surveyed. Smaller meetings with PAPs were conducted during the preliminary Census work to provide further detail of the project to all the PAPs.
		(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(b) N	(b) Based on local procedure, official direct contacts with the Project Affected Persons will be able to start after the MOSTE approval of the EIA study TOR. In the preliminary Public Consultations, comments are taken, but their requests, such as conservation of river flow and irrigation canals, are already taken into the project design.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Information Collection Study examined 3 alignment alternatives. In this Survey, alternatives for following 3 issues/locations were studied : 1) East end of the Approach Road, 2) East Portal, 3) Tunnel alignment. In the study of 1) East end of the Approach Road and 2) East Portal, avoidance and minimization of involuntary resettlement was taken into consideration. In the study of 3) Tunnel alignment, to secure the structure stability as well as to minimize the impact on groundwater were the main points of decision.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken?	(a) Y	(a) Since the east Approach Road is planned in the farming area, with the traffic on the Road, the ambient air quality shall be changed. The future air quality can be expected to be the similar level on the existing highway. In this EIA study, measurement of the air quality on the existing highway is proposed. It will be found whether the existing condition complies with the local air quality standards. Based on the results of those air quality measurement, mitigating measures may be proposed.
		(b) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	(b) N/A	(b) No industrial area exists in the Project Area.
	(2) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas?	(a) Y	(a) The rivers and tributaries in the Project Area are small, and soil runoff from the bare lands resulting from earthmoving activities during construction, when an intensive heavy rain event occurs, may cause high turbidity of the water. The similar muddy runoff is already occurring from many brick factories located in the Project Area.
		(b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater?	(b) N	(b) Surface runoff from roads less likely contaminate water sources, such as groundwater since surface runoff would be infiltrated by roadside vegetation and agriculture field.
		(c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will not comply with the country's ambient water quality standards?	(c) N	(c) Effluents from construction facilities shall be collected into ditches and treated at the waste water treatment facilities at East and West Portals. There is no ambient water quality standards in Nepal. Only standards for effluents and drinking water are available.
	(3) Wastes	(a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations?	(a) Y	(a) Private waste collection contractor shall be hired and the wastes shall be disposed at the official disposal site. Necessary approval procedure to bring the wastes to the disposal site is under survey.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) N	(a) Baseline noise condition measured at 3 locations on the Alignment surpasses the noise guideline for mixed use area. Additional impacts from construction vehicles and machines will be negligible.
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not located in protected areas designated by the country's laws or international treaties and conventions.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?	(a) N	(a) The project site does not encompass primeval forests, tropical rain forests, or other ecologically valuable habitats, such as alpine meadows or Important Bird Areas.
		(b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?	(b) N	(b) The project site does not encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions.
		(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?	(c) N/A	(c) No significant ecological resources are located in the Project Area.
		(d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?	(d) Y	(d) Box culverts and bridges will be provided for livestock and animals as well as people to cross the east Approach Road on embankment.
		(e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered?	(e) Y	(e) 0.25 ha of a Community Forest, where local residents are harvesting non-timber forest products, shall be cleared to construct the West Portal. The forest type and existing condition, however, are the most common in the area. The impacts of clearance on flora, fauna, and local resource use, will be minimal.
	(3) Hydrology	(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	(a)Y	(a) The tunnel is located to run through sandstone below the aquifer to minimize the impacts on surface and ground water flows. During the construction phase and operation phase, however, there is possibility of reducing the water resource currently used by local residents and businesses.
	(4) Topography and Geology	(a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed?	(a) N	(a) Soft ground is not observed.
		(b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides?	(b) N	(b) The east Approach Road, and East and West Portals require cutting and filling, thus cutting and embankment slope is properly designed to prevent failure.
		(c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	(c) N/Y	(c) Cut and fill areas and soil disposal sites are designed to prevent soil runoff.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?	(a) Y	(a) Involuntary resettlement and loss of lands are expected. The east Approach Road alignment was decided to minimize the number of structures to be resettled. For loss of lands, replacement cost compensation will be made.
		(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?	(b) Y	(b) During the preparation of the Scoping Document, 2 public consultations were conducted with attendances of VDC secretaries, health workers, local residents, etc. and project information was disclosed. After the consultations, the letters from VDC secretaries were collected stating basic understanding of the Project and specific concerns from each secretary. Prior to the commencement of the Census Survey, additional 2 consultations were conducted with attendances of property owners to be surveyed. Final explanation on compensation and resettlement assistance prior to resettlement shall be held in the Detailed Design Phase.
		(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards, developed based on socioeconomic studies on resettlement?	(c) N	(c) Not yet developed. After obtaining the approval of TOR, RAP, and Vulnerable Community Development Plan (assistance plan for marginalized and under privileged groups), if necessary, will be prepared based on the DOR guideline (ESMF) ,World Bank's safeguards policy O.P.4.12 and JICA guidelines.
		(d) Are the compensations going to be paid prior to the resettlement?	(d) Y	(d) As described in the DOR guideline (ESMF) 7.10 (v).
		(e) Are the compensation policies prepared in document?	(e) N/Y	(e) The Project specific compensation policy shall be prepared as the Resettlement Action Plan, which is not yet prepared. General compensation policies are published as the Environmental and Social Management Framework (ESMF), 2007, by GESU, DOR, which is applied to all MOPIT project.
		(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?	(f) Y	(f) ESMF requires to prepare the Vulnerable Community Development Plan for special attention and assistances to socially vulnerable people such as people of below poverty line, women, youth, and elderly people, Dalit groups.
		(g) Are agreements with the affected people obtained prior to resettlement?	(g) N/Y	(g) Based on local procedure, official direct contacts, including population census and asset survey, with the Project Affected Persons will be able to start after the MOSTE approval of the EIA study TOR. ESMF requires that agreements with the affected people to be obtained prior to resettlement.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?	(h) N/Y	(h) RAP is under preparation and not yet approved. The standard organizational framework is established to properly implement resettlement according to the ESMF. Many WB and ADB assisted projects are implemented accordingly.
		(i) Are any plans developed to monitor the impacts of resettlement?	(i) N/Y	(i) RAP is under preparation and not yet approved. In many WB and ADB assisted projects, external and internal monitoring are planned and implemented accordingly based on the ESMF.
		(j) Is the grievance redress mechanism established?	(j) Y	(j) DOR has regular grievance redress mechanism through their web-site as well as at the Division Offices. In many WB and ADB assisted projects, more local grievance redress mechanism are planned and implemented accordingly based on the ESMF.
	(2) Living and Livelihood	(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?	(a) N	(a)The Project is to provide a bypass to the existing highway, and will not affect the existing means of transportation and the associated workers. Since the Project Area is located in the Kathmandu Valley, urbanization of the land use is already obvious in the area, and shall be accelerated by the Project.
		(b) Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary?	(b) N	(b) In this stage of the Project, the Project Affected Persons are mainly those who would lose houses or business structures, farming lots/income from farming, and those who will receive less traffic customers on existing highway.
		(c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?	(c) Y	(c) Spreads of communicable and infectious diseases, such as diarrhea by project workers when the living environment is not kept in sanitary condition. Control of sanitary environment at houses and work places shall be the responsibility of the Contractor. In Nepal situation, female who were victim of human trafficking are found with high percentage of infection with HIV virus. Also, drug users and male Terai workers who worked in India are often found with the virus. Although there is no statistical evidence of spreading sexually transmitted diseases by construction workers or immigrants in Nepal available so far, education program regarding such issues shall be developed by the project proponent and contractor.
		(d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)?	(d) N	(d) The Project shall reduce traffic congestions on the existing highway.
		(e) Is there any possibility that roads will impede the movement of inhabitants?	(e) N	(e) Foot paths and over bridges shall be provided at existing roads and major corridors.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(f) Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?	(f) Y	(f) Road embankment may cause shading to northerly neighboring farming land.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) The Project will not affect such facilities, nor accessibility to those.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) The Project is located in the suburb of Kathmandu metropolitan area, and will not produce significant change in local landscape.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?	(a) N/Y	(a) No specific community, or concentrated residential area, of ethnic minorities and indigenous people was identified. For people who belong to minorities and marginalized group, VCDP shall provide specific assistance according to their necessities.
		(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected?	(b) N/Y	(b) No specific community, or concentrated residential area, of ethnic minorities and indigenous people was identified. For people who belong to minorities and marginalized group, VCDP shall provide specific assistance according to their necessities.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?	(a) N	(a) Not violating. The project proponent follows the Labour Act, 2048 (1992), Labour Rules, 2050 (1993), and The Child Labour (Prohibition and Regulation) Act, 1999.
		(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?	(b) Y	(b) The contractor is required to establish and implement safety measures at construction sites.
		(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?	(c) Y	(c) The contractor is required to establish and implement safety measures at construction sites.
		(d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(d) Y	(d) The contractor is responsible for the design and implementation of the safety measures.
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?	(a) Y	(a) Mitigation measures will be proposed in the EIA Report and DOR will be mandated to comply the environmental protection and mitigation measures by MOSTE.
		(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?	(b) N/A	(b) No significant ecological resources are located in the Project Area.
		(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(c) Y	(c) Monitoring role of VDCs shall be clearly stated in the EIA Report and DOR will be mandated to respond to the grievances and complaints to reduce impacts.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?	(a) Y	(a) The monitoring program for the environmental items that are considered to have potential impacts will be carried out by DOR through out construction and operation phases as stated in the EIA report.
		(b) What are the items, methods and frequencies of the monitoring program?	(b) To be decided	(b) All will be described in the EIA report and will be approved by MOSTE.
		(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?	(c) Y	(c) Monitoring and evaluation framework is established in ESMF 7.6. Although Chapter 7 of ESMF is titled 'Resettlement Policy Framework,' the same framework is applied for environmental monitoring by DOR. Budget for the monitoring activities are coordinated in each project.
		(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(d) Y	(d) The ESMF 7.6.2 requires quarterly reports of Internal Monitoring. Also, External Monitoring agency hired by the Project Implementing Units will conduct bi-annual review of EMP and RAP implementation. Both reports will be sent to the finding agency.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	(a) N/A	(a) Main check items in the Forestry Projects checklist were examined. Since the area of tree clearance in the Project is small, the items are not applicable to the Project.
		(b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).	(b) Y	(b) Main check items in the Power Transmission and Distribution Lines checklist were the same with the Road checklist.
	Note on Using Environmental Checklist	(a) The impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N/A	

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

Annex 15.7-1

(DRAFT) TERMS OF REFERENCE FOR DETAILED DESIGN, TENDER ASSISTANCE, CONSTRUCTION SUPERVISION AND CAPACITY DEVELOPMENT FOR TUNNEL OPERATION AND MAINTENANCE OF THE NAGDHUNGA TUNNEL CONSTRUCTION PROJECT

CHAPTER 1. BACKGROUND

- The Government of Nepal has received a loan from the Japan International Cooperation Agency (hereinafter referred to as "JICA") to finance the **Nagdhunga Tunnel Construction Project** of which objectives are as follows;
  - "By constructing a tunnel at Nagdhunga Pass where the most serious transport bottleneck of the nation's transport network" the Project is to achieve
    - To drastically improve transport efficiency of the route connecting the Capital City of Kathmandu.
    - To enhance traffic safety.
    - To contribute to the economic development of the country.

- The Project comprises of the following components;
  - Tunnel Construction, 2.45 km long, 2 lanes(lane width 3.5m), 2.5m shoulder on eastbound direction and 0.5m wide space both sides for drainage facility (total width 10.5m), internal area and excavation area (standard section) is 79.7m2 and 89.16m2 respectively, number of jet fans (JFX-1250) 28 units
  - Approach Section Construction, L = 2.60 km, 2 lanes (lane width 3.5m), 2.0m shoulder
  - Bridge Construction, two locations, RC bridges 20m (1-span) and 35m (2-span),2-lanes each 3.5m wide, 0.25m wide shoulder 1.0m wide pedestrian deck at both sides.
  - Construction of Toll Facility
    - West side: 3 booths, 3-lanes each 3.0m wide, information sign and pavement markings,
    - East side: 2 booths, 2-lanes each 3.0m wide, information sign and pavement markings
  - Construction of Tunnel Management Office(Control Office)
    - West side: area 390 m^2 one story building with 2 parking lots
    - East side: area 300 m^2, one story building with 10 parking lots
  - Disposal Area Development at the West Portal
    - 2 story Plaza area 442 m^2, toilet 78 m^2, restaurant 194 m^2, management office and information center 16 m^2, and shops 135 m^2
  - Construction of Transmission Line, L = 4.14 km

- The Government of Nepal intends to use part of the proceeds of the loan for eligible payments for consulting services for which this TOR is issued.

- The Project is expected to be completed by June 2021.

- Location of the Project: The boundary between Kathmandu District and Dhading District.

- Executing Agency : Department of Roads

- Technical information : Available relevant basic data and studies, technical standard or specifications to be used, such as;
  - Data Collection Survey on Thankot Area Road Improvement in Nepal, JICA, 2014
  - Preparatory Survey for Nagdhunga Tunnel Construction in Nepal, JICA, 2015

CHAPTER 2. OBJECTIVES OF CONSULTING SERVICES

The Consulting Services shall be provided by an international consulting firm (hereinafter referred to as "the Consultant") in association with the national consultants in compliance with the Guidelines for the Employment of Consultant under Japanese ODA Loans, April 2012. The objectives of the consulting services is to achieve the efficient and proper preparation and implementation of the Project through the following works;

a) Detailed Design
b) Tender Assistance
c) Construction Supervision
d) Capacity Development for Tunnel Operation and Maintenance
e) Technology Transfer

CHAPTER 3. SCOPE OF CONSULTING SERVICES

(1) Detailed Design

The consultant shall

(a) Review and verify all available primary and secondary data collected during the JICA's preparatory survey of the project;
(b) Carry out all the required engineering surveys and investigations such as geotechnical and material survey, topographical survey as attached in Annex1.All surveys and investigations shall be accurate and plotted for review of DOR.
(c) Prepare detailed work plan, progress reports and implementation schedule for the Project to ensure effective monitoring and timely project outputs, and regularly update the same; and
(d) Prepare the detailed design of the Project in sufficient detail to ensure clarity and understanding by the DOR, contractors and other relevant stakeholders. All the design should be in conformity with the Nepal Standards, or with the appropriate international standards. The detailed design will, as a minimum, include construction drawings, detailed cost estimates, necessary calculations to determine and justify the engineering details for the Project, associated contract documentation to include detailed specifications, bill of quantities (BOQ), implementation schedule for the Project. Such detailed specifications will contain those in relation to i) quality control of plant materials and workmanship, ii) safety, and iii) protection of the environment. The detailed design shall be prepared in close consultation with, and to meet the requirements of DOR and will be incorporated into the detailed design report to be submitted for approval of DOR.
(e) Prepare practical and cost-effective pavement and retaining structure designs on the basis of condition surveys, projected traffic levels, pavement structure studies, and axle load considerations, as determined from the above activities and previous studies.
(f) Assess the requirement for slope protection measures adjacent to the road, and design the most cost-effective remedial works. Verify and refine climate change adaptation options selected in the feasibility study.
(g) Investigate, test, and define sources and estimated quantities of construction materials and prepare the material sources map with indicative properties its applicability (i.e. for sub-grade, for sub-base etc) and estimated quantities.
(h) Investigate, test, and define sources and estimated quantities of construction materials and prepare the material sources map with indicative properties, its applicability (i.e. for sub-grade, for sub-base, etc) and estimated quantities
(i) Identify existing public utility on/along the project site and prepare its protection/relocation plan, and assist the Employer in obtaining agreement of the owners of these utilities on such protection/relocation plan.

(j) Assist DOR in obtaining necessary permissions, including selected borrow pits and quarry sites, from relevant authorities in accordance with the planned implementation schedule.

(k) Detailed Design of Tunnel: All available geological information and data shall be evaluated and the geological profile shall be prepared.

Main Tunnel Design

- Typical tunnel cross section shall be selected in due consideration of traffic function. Tunnel cross section should be as smaller as possible, provided that traffic function of the tunnel is not affected.
- Tunnel section shall be divided into an appropriate number of segments based on the geological conditions.
- Tunneling excavation pattern for each segment shall be determined including appropriate auxiliary method.
- An appropriate auxiliary method shall be selected to prevent lowering of groundwater level.
- Chemical injection from the surface will be required at the eastern portal area in order to minimize the lowering ground water level. Additional borings should be planned and necessary measures shall be designed to prevent from lowering groundwater level at the said area.
- Monitoring of groundwater level shall be undertaken not only at the design stage but also during the tender assistance and the construction supervision stages.
- For each segment, number and length of rock bolts, thickness of shotcrete, size of steel arch frame, thickness of lining, need of invert, etc. shall be determined.
- All kinds of equipment necessary for tunneling shall be identified.
- Prevision of ventilation for safe operation of the tunnel shall be considered.
- In due consideration of safety during the operation stage, safety measure in case of fire incident and other emergency cases, emergency escape measures shall be studied and incorporated in the design.

Design of Tunnel Facilities inside and outside Tunnel

- All tunnel facilities necessary for safe and sound operation and maintenance of a tunnel shall be identified and designed.
- Traffic compositions, emission of gases from vehicles, etc. shall be properly evaluated to determine necessary facilities inside and outside tunnel.
- It is planned that tolls from tunnel users will be collected to raise tunnel O&M fund. Toll collection facilities shall be designed.
- The Tunnel Management Office building and facilities for the office shall be designed.
- To achieve uninterrupted electricity supply for tunnel O&M, the dedicated line shall be connected from the nearest sub-station.
- All other necessary facilities shall be designed including equipment and facilities for tunnel O&M.

(l) Toll Facility Design: Toll facilities design includes toll plaza, toll booth, toll island, toll operating building, toll collection system, traffic control system, over-loaded truck control system and all other facilities necessary for the operation and maintenance stage. These shall be designed in accordance with the established design criteria and standards.

(m) Design of Tunnel Management Office Building and Facilities: In order to assure safe and efficient operation and maintenance of a tunnel, Tunnel management Office is organized and managed by DOR. Office buildings including traffic control center and necessary facilities shall be designed.

(n) Disposal Area Development: Disposal area of excavated material from a tunnel is planned at the valley of West Portal. Utilizing a flat land made by disposal material from a tunnel, "Michino-Eki" or a rest/service area composing of a rest room, fast food restaurant, small shops selling local products is planned. Appropriate "Michino-Eki" shall be designed.

(o) Design of Transmission Line: In order to assure a 24-hour uninterrupted power supply for tunnel O&M, a designated distribution line shall be required. A back-up power supply system shall also be required in case of unexpected interruption of power supply. The design of distribution line and provision of the back-up system shall be undertaken in close coordination with Nepal Electricity Authority.

(p) Preparation of Construction Execution Plan: The construction execution plan shall be prepared covering, among others, construction procedures, construction schedule, location and size of construction camp and equipment motor pool/workshop, safety measures, methods to mitigate environmental impacts, possible dumping sites of solid wastes and unsuitable materials, materials sources, material haulage routes and traffic control measures along the transport routes and environmental monitoring systems based on approved EIA.

A mass diagram of inflow of construction materials and outflow of construction waste and disposal materials shall be planned by the Consultant.

The Consultant shall prepare the Traffic Management Plan during construction to avoid or at least mitigate traffic congestion, traffic accidents, traffic disturbance to school children, commuters, local business, etc. The Traffic Management Plan shall be specified in the special provisions of the contract.

(q) Parcellary Survey: Prior to the start of Parcellary Survey, the Consultant shall undertake the Stakeholders Consultation Meetings on the Conduct of the Parcellary Survey.Parcellary Survey shall be undertaken in close coordination with the DOR. Parcellary survey shall cover, among other, the following:

Documents to be Prepared (Output):

- Location of the Project
- Parcellary Survey Plan
- Subdivision Plans
- Index map of the entire project area showing the affected lots
- Land data matrix consisting of a list affected lots complete with lot and block numbers and the following:
  - Name of Registered Owners/Claimants
  - Total area of property
  - Area affected
  - Notation weather the property is mortgaged or if it is litigation or if it has incurred any encumbrances
- Lot data computation showing delineation of affected area relative to the entire property
- Design road alignment (centerline) with stationing and ROW limits
- Subdivision Plan (Suitable Scale) for each affected lot (to be compiled with technical description of the lot)
- Name, license number, date and place of issue, signature, and seal of the Geodetic Engineer

(r) Preparation of Inventory of All Affected Assets and Valuation of Affected Assets and Compensation: The Consultant shall prepare inventory of all affected assets, i.e. land, structures, trees, improvement, etc. The Consultant shall identify all affected assets and estimate its value for compensations. In the process, compensation packages for each affected families shall be prepared based on hearings with relevant public agencies and locals of the project area. This compensation package shall be used as a base document for the compensation determination committee during actual negotiation.

(s) Preparation of Final Resettlement Action Plan (RAP): The preliminary RAP was prepared in May, 2012. Based on the parcellary survey results and the inventory of all affected assets and valuation of affected assets and compensations, the final RAP shall be prepared based on the World Bank Involuntary Resettlement Policy, OP/BP 4.12, and JICA's Environmental and Social Consideration. In the course of preparation of the final RAP, necessary stakeholders meetings, socio-economic survey and PAPs interview survey shall be undertaken. The draft final RAP shall be submitted to JICA for their review and comments before approval by DOR.

(2) Tender Assistance

- Assistance in the Bidding Procedure

The consultant shall:

(a) prepare bidding documents and relevant documents, including qualification and the bid evaluation criteria, with one-stage and two-envelop procedures, in accordance with the latest version of Standard Bidding Documents under Japanese ODA Loans for Procurement of Works together with all relevant specifications, drawings and other documents;

(b) Prepare bidding documents which includes i) clauses stating that the Contractor is to comply with the requirement of the Environmental Management Plan (EMP) and JICA Guidelines for environmental and social considerations (April 2010) (JICA Environmental Guidelines), ii) the specification clearly stipulating the safety requirements in accordance with the laws and regulations in the country of the Borrower, relevant international standards (including guidelines of international organization), if any, and also in consideration of "the Guidance for the Management of Safety for Construction Works in Japanese ODA Projects of JICA," iii) the requirement to furnish a safety plan to meet the safety requirements, iv) the requirement for the personnel for key positions to include an accident prevention officer, and v) the requirement to submit method statements of safety to (name of Executing Agency) and the consultant at the construction stage.

(c) Assist DOR in issuing bid invitation, conducting pre-bid conferences, issuing addendum/corrigendum, and clarifications to the bidders' queries.

(d) Evaluate the bids in accordance with the criteria set forth in the bidding documents. In such evaluation, the Consultant shall carefully confirm that the bidders' submissions in their technical proposal including, but not limited to, site organization, mobilization schedule, method statement, construction schedule, safety plan, have been prepared in harmony each other and will meet such requirements set forth in applicable laws and regulations, the specifications and other parts of the bidding documents;

(e) Prepare bid evaluation reports for approval of the bid evaluation committee;

(f) Assist DOR in contract negotiation by preparing agenda and facilitating negotiations including preparation of minutes of negotiation meeting; and

(g) Prepare a draft and final contract agreement.

(3) Construction Supervision

The Consultant shall perform his duties during the contract implementation period of the contracts to be executed by the Employer and the Contractor. FIDIC MDB Harmonized Edition (2010) complemented with the Specific Provisions as included in the Standard Bidding Documents under Japanese ODA Loans for Procurement of Works will be applied to the civil works of the Project. In this context, the Consultant shall perform

(a) Act as the Engineer to execute construction supervision and contract administration services in accordance with the power and authority to be delegated by the Employer;
(b) Provide assistance to the Employer concerning variations and claims which are to be ordered/issued at the initiative of the Employer. Advise the Employer on resolution of any dispute with the Contractor;
(c) Issue instructions, approvals and notices as appropriate;
(d) Provide recommendation to the Employer for acceptance of the Contractor's performance security, advance payment security and required insurances;
(e) Provide commencement order to the Contractor;
(f) Assess adequacy of all inputs such as materials, labor and equipment provided by the Contractor;
(g) Check and approve the Contractor's method of work, including site organization, program of performance, quality assurance system, safety plan, method statements of safety, and environmental monitoring plan so that the requirements set forth in the applicable laws and regulations, the specifications or other parts of the contract are to be duly respected;
(h) Regularly monitor physical and financial progress, and take appropriate action to expedite progress if necessary, so that the time for completion set forth in the contract will be duly respected by the Contractor;
(i) Explain and/or adjust ambiguities and/or discrepancies in the Contract Documents and issue any necessary clarifications or instructions. Issue further drawings and give instructions to the Contractor for any works which may not be sufficiently detailed in the contract documents, if any;
(j) Review and approve the Contractor's working drawings, shop drawings and drawings for temporary works. Also review and approve, if any, design prepared by the Contractor for any part of the permanent works;
(k) Liaise with the appropriate authorities to ensure that all the affected utility services are promptly relocated;
(l) Carry out field inspections on the Contractor's setting out of the works in relation to original points, lines and levels of reference specified in the contract;
(m) Organize, as necessary, management meetings with the Contractor to review the arrangements for future work. Prepare and deliver minutes of such meetings to the Employer and the Contractor;
(n) Supervise the works so that all the contractual requirements are met by the Contractor, including those in relation to i) quality of the works, ii) safety and iii) protection of the environment. Confirm that an accident prevention officer proposed by the Contractor is duly assigned at the project site;Require the contractors to take appropriate rededied if any questions are recognized regarding the sfety measures;
(o) Supervise field tests, sampling and laboratory test to be carried out by the Contractor;
(p) Inspect the construction method, equipment to be used, workmanship at the site, and attend shop inspection and manufacturing tests in accordance with the specifications;
(q) Survey and measure the work output performed by the Contractor verify statements submitted by the Contractor and issue payment certificates such as interim payment certificates and final payment certificate as specified in the contract;
(r) Coordinate the works among different contractors employed for the Project;
(s) Modify the designs, technical specifications and drawings, relevant calculations and cost estimates as may be necessary in accordance with the actual site conditions, and issue variation orders (including

necessary actions in relation to the works performed by other contractors working for other projects, if any);

(t) Carry out timely reporting to the Employer for any inconsistency in executing the works and suggesting appropriate corrective measures to be applied;

(u) Inspect, verify and fairly determine claims issued by the parties to the contract (i.e. the Employer and Contractor) in accordance with the civil works contract;

(v) Perform the inspection of the works, including Test on Completion, and to issue certificates such as the Taking-Over Certificate, Performance Certificate as specified in the contract;

(w) Supervise commissioning and carry out tests during the commissioning, if applicable;

(x) Provide periodic and/or continuous inspection services during defects notification period and if any defects are noted, instruct the Contractor to rectify;

(y) Prepare as-build drawings for the parts of the works constructed in accordance with the design provided by the Employer. Check and certify as-built drawings for the parts of the works designed by the Contractor, if any; and

(z) Prepare an operation and maintenance manual for the works constructed in the Project.

The Consultant shall particularly observe and supervise the following in connection with the tunnel construction;

- Geological conditions shall be carefully monitored based on information obtained by the advance boring, actual excavation, water leakage conditions, deformation of arch dimensions, etc., in order to assure safe construction of a tunnel.
- If unexpected geological conditions are observed, instruct the contractor to submit remedial measures and when these are justifiable, prepare change order.
- Water level of wells located within 200m each side of the tunnel center line or a total width of 400m shall be measured two (2) times a month during construction. If unusual decrease of water level of wells is observed, causes shall be evaluated and proper countermeasures shall be proposed. Such water level measurement shall be carried out during the detailed design and tender assistance stages.
- Excavated material from a tunnel shall be properly disposed at the designated disposal area. The Consultant shall monitor the disposed material is properly managed.
- Check that the facilities provided both inside and outside the tunnel such as jet fans, lights, communication facilities, cameras, traffic signals etc., operate (work) property.
- The Consultant shall prepare the capacity development program in considering with operation and maintenance of a tunnel.
- The Consultant shall prepare video coverage of tunnel construction process for reference of tunnel construction.

(4) Facilitation of Implementation of Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP) and Resettlement Action Plan (RAP)

The Consultant shall:

(a) Update EMP as appropriate; incorporate necessary technical specifications with design and contract documentation;
(b) Assist DOR in dissemination and explanation of additionally confirmed and identified environmental issues to public including holding public consultations;
(c) During the preparation of bidding documents, clearly identify environmental responsibilities as explained in the EIA and EMP;
(d) Assist DOR to review the Construction Contractor's Environmental Program to be prepared by the contractor in accordance with EMP, relevant plans and JICA Environmental Guidelines and to make recommendations to DOR regarding any necessary amendments for its approval
(e) Assist (name of Executing Agency) to implement the measures identified in the EMP
(f) Monitor the effectiveness of EMP and negative impacts on environment caused by the construction works and provide technical advice, including a feasible solution, so that DOR can improve situation when necessary;
(g) Assist DOR in monitoring the compliance with conditions stated in the Approved EIA and the requirements under EMP and JICA Environmental Guidelines;
(h) Assist DOR in preparation of the answer to the request from JICA's advisory committee for environmental and social considerations if necessary
(i) Assist DOR in the capacity building of DOR staff on environmental management through on-the-job training on environmental assessment techniques, mitigation measure planning, supervision and monitoring, and reporting.
(j) Update and/or prepare RAP as necessary based on detailed design in accordance with the agreed resettlement framework, including entitlement matrix and compensation plan; coordinate with various agencies in preparing the procedures for timely land acquisition and disbursement of compensation to project affected persons (PAPs);
(k) Assist DOR in identifying the eligible PAPs, and in preparation/updating of the list of eligible PAPs and 'Payment Statement' for individual eligible PAPs. The places where each eligible PAPs will relocate to are necessary to be recorded so that DOR could implement monitoring on income and living conditions of resettled persons;
(l) Assist DOR in conducting social assessment during early stage of the detailed design stage and review the existing income restoration plan and special assistance plan for vulnerable PAPs and revise/update the contents of the plans if necessary based on priorities identified with support of relevant government agencies and Non-Governmental Organizations (NGOs). The following contents should be included in the plans;
    (i) Skills Training
    (ii) Project related Job Opportunities
    (iii) Provision of social welfare grant
    (iv) Provision of Agricultural Extension Services
    (v) Provision of the special allowance to vulnerable PAPs
(m) Assist DOR to implement the measures identified in the revised RAP.
(n) Monitor land acquisition and compensation activities being undertaken by DOR, and report the results in monthly progress reports;
(o) Assist in procurement of Implementation NGO (INGO) and external monitoring agency (EMA).
(p) Assist DOR in facilitating stakeholder's participation (including focus group discussions for vulnerable PAPs) and providing feedback their comments on RAP;
(q) Assist DOR in establishment of grievance redress mechanism including formation of Grievance Redress Committee;
(r) Assist DOR to ensure that the PAPs are fully aware of the grievance redress procedure and the

process of bringing their complaints, investigate the veracity of the complaints, and recommends actions/measures to settle them amicably, fairly and transparently before they go to the redress committee or the courts of law;

(s) Provide technical services with grievance redress committee for keeping and updating records when necessary.

(5) Technology Transfer

The Consultant shall carry out the technology transfer as an important aspect as well as tunnel planning and tunnel structure during design. The Consultant shall provide the opportunity to the DOR officers and staffs to be involved in the working team of the Consultant during the design, contract administration and supervision works for their capacity building wherever possible. If requested by DOR, the Consultant shall brief and demonstrate the survey and design procedure, the construction supervision and contract management process and procedures. The Consultant shall assist DOR and its staff to build their capacity as a part of on the job training under the Project.

(6) Capacity Development of Tunnel O&M

The Consultant shall prepare the capacity development program for tunnel operation and maintenance (O&M) for the staff of the newly established Tunnel Management Office (TMO). The consultant shall assist DOR in implementing the capacity development program. The TMO consists of five (5) sections (administrative, maintenance, traffic control/surveillance/information provision, action team for emergency case and vehicle control section).

The capacity development program shall cover among others the following;

(a) Legal Aspects in relation to Tunnel O&M

- Cracking down on vehicles violating traffic rules (coordination with traffic police)
- Handling traffic accidents (coordination with traffic police)
- Firefighting (coordination with Fire Department of LGUs)
- Controlling hazardous (tankers carrying inflammable material), overloaded and oversized vehicles (coordination with Land Transportation Department and Police Department)

Terms of reference of TMO and coordination requirement with other agencies

(b) Inspection and Maintenance Work

- Responsibilities of the Maintenance Section and coordination with other sections.
- Inspection frequency
- What to inspect and how to record findings of inspection
- Preparation of Inspection and Maintenance Manual
- Traffic Control/Management during maintenance work

(c) Traffic Monitoring and Information Provision

- Responsibilities of Patrol Teams and Traffic Control Center
- What kinds of equipment installed and functions of each equipment
- What to be monitored by Traffic Control Center and Patrol Teams
- What information to be collected and what information to be provided to tunnel users
- What actions to be made when some irregularities are found
- What to be coordinated with other sections/teams and traffic police/fire department of LGUs/hospitals
- What communication systems to be established with other sections, traffic police, concerned LGUs and hospitals

(d) Actions to be taken during emergencies

- What to be done and how to do these during emergencies (traffic accident, fire incident, vehicle breakdown, obstacles dropped from vehicles and parked/stopped vehicles.
- Coordination required with other sections, traffic police and LGUs

(e) Safety Driving Campaign to Drivers

- Safety driving Campaign inside a tunnel for private car drivers, bus drivers and truck drivers.

(f) Drills for Emergency Cases

- Drills for emergency cases to be undertaken prior to opening of a tunnel.

(g) Training in Japan

- Actual practices in Japan will be experienced for proposed staff to be assigned to the Tunnel Management Office.

CHAPTER 4. EXPECTED TIME SCHEDULE

The total duration of consulting services will be 76 months followed by 12 months of defects liability period. The tentative implementation schedule expected is as shown in Table 4.1.

Table 4.1 Implementation Schedule Expected

Key Activities	Date	Duration in Months
Commencement of Consulting Services	March 2016	12
Completion of detailed design, preparation of drawings and tender documents	February 2017	
Tender process including prequalification	November 2016 to December 2017	14
Commencement of Civil Works	January 2018	42
End of Civil Works	June 2021	
Capacity Development for Tunnel O&M	July 2020 to June 2022	24
Defect Liability Period	July 2021 to June 2022	12
Termination of Consulting Services	June 2022	-

CHAPTER 5. STAFFING

Twenty eight (28) of Professional (A) consultants and twenty eight (28) of Professional (B) consultants will be engaged, over 76 month' duration of consulting services, for a total of 238 man-months for Professional (A) and 540 man-months for Professional (B) consultants. Total consulting input is 778 man-months. A detailed schedule of consulting services and a distribution of man-months is shown in Attachment 1.

(1) Phase wise input in months

The Consultant Team for the design, tender assistance, construction supervision and other miscellaneous consulting services consist of following key personnel together with supporting staff. The allocation of person-month for the respective phases of consulting services is as shown in Table 5.1.

Table 5.1 Allocation of Man-months

Designation	No.	Phase wise input in Months					Total Input in Months
		Detailed Design	Tender Assistance	Construction Supervision	Defect Liability Period	Capacity Development for Tunnel O&M	
Professional A							
Project Manager	1	12	7	36	3		58
Team Leader(C/D)	1					11	11
Sr. Highway Engineer	1	4	-	-	-	-	4
Sr. Structural Engineer	1	5	-	-	-	-	5
Tunnel Planner	1	6	-	-	-	-	6
Tunnel Engineer	1	4	3	24	-	-	31
Tunnel Engineer (Electrical)	1	3	-	-	-	-	3
Tunnel Engineer (Electronics)	1	3	-	-	-	-	3
Tunnel Engineer (O&M)	1	3	-	-	-	-	3
Geologist	1	5	-	-	-	-	5
Document Specialist	1	3	3	-	-	-	6
Specification Writer	1	4	4	-	-	-	8
Sr. Cost Estimator	1	5	3	-	-	-	8
Resident Engineer	1	-	-	37	-	-	37
Sr. Material Engineer	1	-	-	16	-	-	16
Tunnel Maintenance (Civil) Specialist	1	-	-	-	-	7	7
Tunnel Maintenance (Facilities) Specialist	1	-	-	-	-	7	7
Traffic Monitoring Specialist	1	-	-	-	-	9	9
Emergency Action Specialist	1	-	-	-	-	8	8
Safety Campaign Specialist	1	-	-	-	-	2	2

Designation	No.	Phase wise input in Months					Total Input in Months
		Detailed Design	Tender Assistance	Construction Supervision	Defect Liability Period	Capacity Development for Tunnel O&M	
Coordinator for Training in Japan	1	-	-	-	-	1	1
Sub-Total		**57**	**20**	**113**	**3**	**45**	**238**
Professional B							
Deputy Project Manager	1	12	14	42	3	-	71
Highway Engineer	1	5	-	18	-	-	23
Structural Engineer	1	6	-	18	-	-	24
Drainage Engineer	1	3	-	-	-	-	3
Geologist	1	5	-	-	-	-	5
Geodetic Engineer	1	11	-	-	-	-	11
Specification Writer	1	4	7	-	-	-	11
Cost Estimator	2	8	3	-	-	-	11
RAP Specialist	1	9	-	-	-	-	9
Asset Assessor	1	10	-	-	-	-	10
Asst. Resident Engineer	2	-	-	73	-	-	73
Material Engineer	2	-	-	73	-	-	73
Quantity Engineer	2	-	-	73	-	-	73
Surveyor	1	-	-	42	-	-	42
Laboratory Technician	1	-	-	42	-	-	42
Environmental Monitoring Specialist	1	-	-	42	-	-	42
Chief Coordinator	1	-	-	-	-	13	13
Safety Campaign Assistant	2	-	-	-	-	4	4
Sub-total		**73**	**24**	**423**	**3**	**17**	**540**

(2) Qualification of Key Team Members

The qualification of key team members is shown in Table 5.2.

Table 5.2 Qualification of key Team Member

Designation	Qualification
Professional-A	
Detailed Design	
Project Manager	• Education: Bachelor of Science • More than 20 years of experience in road or bridge or tunnel projects. • Experience of working as Project Manager or Deputy Project Manager on more than 3 projects. • Experience of working as Project Manager or Deputy Project Manager for more than five years • Experience of working on more than 2 tunnel projects. • Experience of working on more than 2 projects outside the home country.
Sr. Highway Engineer	• Education: Bachelor of Science • More than 15 years of experience in road projects. • Working experience as Sr. Highway Engineer on more than 5 road projects. • Experience of working on more than 2 projects outside the home country.
Sr. Structural Engineer	• Education: Bachelor of Science • 15 years of experience in bridge projects. • Experience working as Sr. Structural Engineer on more than 5 bridge projects. • Experience of working on more than 2 projects outside the home country.
Tunnel Planner	• Education: Bachelor of Science • More than 12 years of experience in tunnel projects. • Working experience in determining portal locations, alignment, tunnel cross section, tunneling methods, and auxiliary tunneling methods on more than 5 mountain tunnel projects.
Tunnel Engineer	• Education: Bachelor of Science • More than 5 years of experience in Tunnel Projects. • Experience of working on more than 5 mountain tunnel projects with experience in the design of tunnel portal, tunnel cross sections, and auxiliary tunneling method.
Tunnel Engineer (Electrical)	• Education: Bachelor of Science • Has design experience of electrical facilities and electric distribution lines for more than 5 projects.
Tunnel Engineer (Electronics)	• Education: Bachelor of Science • More than 5 years of experience in traffic control system, particularly information collection and provision system and corresponding communication system.
Tunnel Engineer (O&M)	• Education: Bachelor of Science • More than 5 years of experience in tunnel O&M.
Geologist	• Education: Bachelor of Science • More than 10 years of experience as a geologist. • Experience of more than 5 projects for which geological investigations and assessment of geological conditions were undertaken.
Document Specialist	• Education: Bachelor of Science or Bachelor of Arts • More than 5 years of experience as a Document Specialist or Procurement Specialist.

Designation	Qualification
	• Experience working as Document Specialist or Procurement Specialist on more than 3 road/bridge or tunnel projects.
Specification Writer	• Education: Bachelor of Science or Bachelor of Arts • More than 5 years of experience as a Specification Writer. • Experience of specification preparation for more than 3 road/bridge or tunnel projects.
Sr. Cost Estimator	• Education: Bachelor of Science • More than 5 years of experience as a cost estimator. • Experience in conducting cost estimate on more than 3 road/bridge projects. • Experience in conducting cost estimate on more than 2 tunnel projects for which cost estimate was prepared.
Tender Assistance	
Project Manager	• E Education: Bachelor of Science • More than 20 years of experience in road or bridge or tunnel projects. • Experience of working as Project Manager or Deputy Project Manager on more than 3 projects. • Experience of working as Project Manager or Deputy Project Manager for more than five years • Experience of working on more than 2 tunnel projects. • Experience of working on more than 2 projects outside the home country.
Tunnel Engineer	• Education: Bachelor of Science • More than 5 years of experience in tunnel design. • Experience of design on more than 5 mountain tunnel projects.
Document Specialist	• Education: Bachelor of Science or Bachelor of Arts • More than 5 years of experience as a Document Specialist or Procurement Specialist. • Experience as Document Specialist or Procurement Specialist for more than 3 road/bridge and/or tunnel projects.
Specification Writer	• Education: Bachelor of Science or Bachelor of Arts. • More than 5 years of experience as a Specification Writer. • Experience in preparing specification for more than 3 road/bridge and/or tunnel projects.
Sr. Cost Estimator	• Education: Bachelor of Science • More than 5 year of experience as a Cost Estimator. • Experience in conducting cost estimate for more than 3 road/bridge projects. • Experience in conducting cost estimate for more than 2 tunnel projects.
Construction Supervision	
Project Manager	• Education: Bachelor of Science • More than 20 years of experience in road or bridge or tunnel projects. • Experience of working as Project Manager or Deputy Project Manager on more than 3 projects. • Experience of working as Project Manager or Deputy Project Manager for more than five years • Experience of working on more than 2 tunnel projects. • Experience of working on more than 2 projects outside the home country.
Tunnel Engineer	• Education: Bachelor of Science • More than 12 years of experience in tunnel construction supervision and/or tunnel construction management. • Experience working as construction supervision or construction management on more than 3 mountain tunnel construction projects.

Designation	Qualification
Resident Engineer	• Education: Bachelor of Science • More than 12 years of experience in road/bridge and/or tunnel construction projects. • Experience working as Deputy Project Manager or Resident Engineer on more than 5 road/bridge and/or tunnel construction projects. • Experience working on more than 2 construction projects outside the home country.
Sr. Material Engineer	• Education: Bachelor of Science • More than 12 years of experience in road/bridge and/or tunnel construction projects. • Experience working on more than 5 road/bridge and/or tunnel construction projects. • Experience working on more than 2 construction projects outside of the home country.
Capacity Development for Tunnel O&M	
Team Leader	• Education: Bachelor of Science • More than 8 years of experience in road/bridge and/or tunnel Operation and Maintenance. • Experience in preparing Guidelines or Manuals for road/bridge and/or tunnel operation and maintenance. • Experience in training new employees and/or subcontractors on road/bridge and/or tunnel operation and maintenance.
Tunnel Maintenance (Civil) Specialist	• Education: Bachelor of Science • More than 5 years of experience in maintenance of road/bridge and/or tunnel. • Experience in preparing Guidelines or Manuals for road/bridge and/or tunnel maintenance.
Tunnel Maintenance (Facilities) Specialist	• Education: Bachelor of Science • More than 5 years of experience in maintenance of tunnel facilities. • Experience in preparing Guidelines or Manuals for tunnel facilities.
Traffic Monitoring Specialist	• Education: Bachelor of Science • More than 5 years of experience in traffic monitoring of roads and/or tunnels. • Experience in working in a traffic control center.
Emergency Action Specialist	• Education: Bachelor of Science • More than 5 years of experience in a traffic control center and/or emergency action team. • Experience in drills for emergency action.
Safety Campaign Specialist	• Education: Bachelor of Science or Bachelor of Arts • Experience in staff campaign activities.
Professional-B	
Detailed Design Stage	
Deputy Project Manager	• Education: Bachelor of Science • More than 15 years experience in road or bridge projects. • Has experience of more than 3 projects worked as Project Manager or Deputy Project Manager during the detailed design stage
Highway Engineer	• Education: Bachelor of Science • More than 15 years experience in road or bridge projects. • Has experience of more than 5 road projects worked as Highway Engineer during the detailed design stage.
RAP Specialist	• Education: Bachelor of Science, or Bachelor of Arts • More than 5 years experience in environmental and social consideration

Designation	Qualification
	surveys/studies. • Has experience of more than 3 road projects worked as RAP Specialist.
Asset Assessor	• Education: Bachelor of Science, or Bachelor of Arts • More than 5 years experience in land and home/structure valuation.
Tender Assistance Stage	
Deputy Project Manager	• Education: Bachelor of Science • Has more than 10 years experience in road or bridge projects. • Has experience of more than 3 projects during tender assistance stage.
Specification Writer	• Education: Bachelor of Science, or Bachelor of Arts • Has experience of more than 3 road/bridge projects worked as specification writer.
Construction Supervision Stage	
Deputy Project Manager	• Education: Bachelor of Science • More than 15 years experience in road or bridge projects • Has experience of more than 3 projects worked as Project Manager or Deputy Project Manager during construction supervision stage
Assistant Resident Engineer	• Education: Bachelor of Science • More than 10 years experience in road or bridge projects. • Has experience of more than 3 projects worked as Project Manager or Deputy Team Manager or Resident Engineer during construction supervision stage
Material Engineer	• Education: Bachelor of Science • More than 10 years experience in road or bridge projects. • Has experience of more than 5 projects worked as Sr. Material Engineer or Material Engineer
Quantity Engineer	• Education: Bachelor of Science • More than 10 years experience in road or bridge projects. • Has experience of more than 5 projects worked as Quantity Engineer
Capacity Development for Tunnel O&M	
Chief Coordinator	• Education: Bachelor of Science or Bachelor of Arts • Experience in project coordinate activities.
Safety Campaign Assistant	• Education: Bachelor of Science or Bachelor of Arts • Experience in staff campaign activities.

(3) Scope of works for the respective personnel

Detailed information on the major tasks and duties each member of the detailed design team, the tender assistance team and the construction supervision team shall perform is provided in Table 5.3.

Table 5.3 Major Tasks and Duties of each member

Position	Major Tasks and Duties
Professional-A	
Detailed Design	
Project Manager	• Responsible for establishment of overall policies and directions for the detailed design. • Responsible for management of design schedule and quality of work and output. • Shall attend meetings with DOR, MOPIT and other concerned agencies including LGUs. • Responsible for overall management of the detailed design. • Responsible for all reports to be submitted. • Responsible for reporting to JICA.
Sr. Highway Engineer	• Responsible for establishment of design criteria, selection of tunnel and approach road alignment in coordination with Tunnel Planner, re-alignment of the existing road at the West Portal, intersection design, pavement design, slope protection design, drainage design, tunnel excavation material disposal area design and all other design of works related to the Approach Road. • Responsible for disposal area development planning and design. • Responsible for quantity estimate. • Responsible for determining the specification for material to be used for the approach road. Material specification related roads. • Responsible for the preparation of reports related to the approach roads.
Sr. Structural Engineer	• Responsible for establishment of design criteria for structure, comparative study of structural types and selection of optimum type of structure, design of selected type of structure and all other works related to structural design. • Responsible for quantity estimate of all structures. • Responsible for selection of material specification related to structures. • Responsible for preparation of reports related to structures.
Tunnel Planner	• Responsible for selection of portal locations and tunnel alignment. • Responsible for selection of standard tunnel cross sections. • Responsible for selection of tunneling methods by assessing geological information and data and corresponding auxiliary methods. • Responsible for selection of necessary facilities for safe operation of the tunnel inside and outside of the tunnel. • Responsible for selection of equipment and materials necessary for tunnel construction. • Responsible for preparation of reports related to tunnel planning and design.
Tunnel Engineer	• Responsible for tunnel design based on the decision of Tunnel Planner. • Responsible for preparation of detailed drawings of details of a tunnel. • Responsible for quantity estimate related to tunnel construction. • Assist the Tunnel Planner for preparation of reports.
Tunnel Engineer (Electrical)	• Responsible for design of all tunnel facilities required inside and outside the tunnel except those to be done by the Tunnel Engineer (Communication). • Responsible for quantity estimate of tunnel facilities and preparation of their specifications.

Position	Major Tasks and Duties
	• Responsible for report preparation related this works.
Tunnel Engineer (Electronics)	• Responsible for the design of communication- related facilities. • Responsible for quantity estimate of communication- related facilities and preparation of their specifications. • Responsible for report preparation related to his work.
Tunnel Engineer (O&M)	• Responsible for selection of equipment and tools necessary for tunnel maintenance and operation. • Responsible for estimate of necessary Tunnel Management Office space and layout. • Responsible for estimate of annual tunnel operation and maintenance cost. • Responsible for preparation of reports related to his work.
Geologist	• Undertake topographical/geological survey, and if necessary, obtain latest aerial photographs to identify fault lines, landslide areas, etc. • Responsible for preparing geological investigation plan and assessment of its results. • Responsible for preparation of geological profile and plan which is a vital input for tunneling plan. • Responsible for close coordinate with Tunnel Planner. • Responsible for preparation of reports related to his work.
Document Specialist	• Responsible for preparing the overall schedule for tendering. • Prepare PQ documents, PQ evaluation criteria and tender documents and tender evaluation criteria. • Responsible for conducting the tender process on stipulated time and take necessary measures to see that the process proceeds on time.
Specification Writer	• Responsible for preparation of specification for construction and materials of tunnel, road, bridge, dedicated transmission lines and its related facilities and all other components of the project. • Shall keep close coordination with the engineers of the design team.
Sr. Cost Estimator	• Responsible for estimating cost for construction with breakdown of foreign, local and tax components. • Shall keep close coordination with engineers of the Design Team.
Tender Assistance	
Project Manager	• Responsible for establishment of policies for tendering. • Responsible for monitoring of tender schedule. • Attend meetings with DOR, MOPIT and other concerned agencies as well as tender related meetings. • Responsible for answering questions/inquiries from bidders and preparation of amendments of tender documents, if required. • Responsible for finalization of all reports to be submitted. • Responsible for communicating with JICA.
Tunnel Engineer	• Responsible for answering technical-related questions/inquiries from bidders and preparation of amendments of tender documents, if required. • Assist DOR for evaluation of technical proposal.
Document Specialist	• Responsible for answering questions/inquiries from bidders and preparation of amendments and/or additions of tender documents, if required. • Assist DOR for evaluation of PQ documents and bid documents submitted by bidders.
Specification Writer	• Responsible for answering questions/inquiries related to specifications from bidders and preparation of amendment and/or additions of specifications, if required.

Position	Major Tasks and Duties
Sr. Cost Estimator	• Responsible for updating of cost estimate, if required and cost estimate if items modified and/or added. • Assist DOR for evaluation of bid prices.
Construction Supervision	
Project Manager	• Shall act as the "Engineer" of the project. • Responsible for the overall implementation and management of construction supervision. • Shall assess the progress of, quality of, safety of, environment condition of construction work, • Shall attend important meetings with DOR, MOPIT, Contractor, and other concerned agencies including LGUs. • Shall certify the monthly progress billings of the Contractor. • Shall check the change orders submitted by the Contractor and take necessary procedure. • Shall listen to claims from the Contractor and take necessary measures. • Responsible for reporting to and consulting with JICA.
Resident Engineer	• Responsible for supervising the work of the Contractor. • Shall assess the progress of, quality of, accomplishment of, workmanship of, and all others of contractor's work. • If any problems are observed, report to the Project Manager and recommend possible solutions. • Shall attend all important meetings with DOR, MOPIT, Contractor and other concerned agencies including LGUs. • Shall prepare draft monthly progress report and submit it to the Project Manager.
Tunnel Engineer	• Shall assess geological conditions, water leakage condition and other conditions which may affect safe construction of the tunnel and if safety of tunneling is judged to be a problem, come up with possible remedial measures. • Shall assess Contractor's proposal with regards to modification of tunneling method, materials, and other modifications, necessary recommendations shall be reported to the Resident Engineer and the Project Manager.
Sr. Material Engineer	• Responsible for establishment of quality control policies and directions. • Prepare quality control guidelines for the project and educate all members of the construction supervision team members. • Responsible for the assessment of modification of quality and specification submitted by the Contractor. • Responsible for the compilation of materials test results.
Capacity Development for Tunnel O & M	
Team Leader	• Responsible for establishment of capacity development (CD) policies and directions. • Responsible for establishment of CD program. Clear targets for each program shall be established. • Responsible for managing the CD team members. • Shall make close coordination with DOR and JICA. • Responsible for finalization of all manuals and/or guidelines for Tunnel O&M.
Tunnel Maintenance (Civil) Specialist	• Responsible for CD on maintenance of civil work component of a tunnel. • Responsible for preparation of program and curriculum for maintenance of civil work component of a tunnel. • Responsible for preparation of manual or guideline on maintenance of civil work component of a tunnel.
Tunnel	• Responsible for CD on maintenance and operation of tunnel facilities inside and

Position	Major Tasks and Duties
Maintenance (Facilities) Specialist	outside a tunnel. • Responsible for preparation of program and curriculum for operation and maintenance of tunnel facilities. • Responsible for preparation of manual or guideline on O&M of tunnel facilities.
Traffic Monitoring Specialist	• Responsible for CD on traffic monitoring which comprises of traffic observation, traffic information collection and information provision to tunnel users. • Responsible for preparation of program and curriculum for traffic monitoring. • Responsible for preparation of manual or guidelines for traffic monitoring inside a tunnel.
Emergency Action Specialist	• Responsible for CD on actions to be taken during an emergency. • Responsible for preparation of program and curriculum for actions to be taken during an emergency. • Responsible for preparation of manual or guidelines for emergency cases.
Safety Campaign Specialist	• Responsible for CD on safety campaign. • Responsible for preparation of materials for safety campaign and implementation of safety campaign. • Responsible for preparation of materials needed for safety campaign.
Professional-B	
Detailed Design Stage	
Deputy Project Manager	• Assist the Project Manager in every aspect of the Project • Shall attend all important meetings with DOR, MOPIT and other concerned agencies. • Responsible for management of domestic personnel.
Highway Engineer	• Assist the Sr. Highway Engineer for design of road component of the project. • Shall supervise CAD work and quantity estimate.
RAP Specialist	• Shall be responsible for preparation of Final RAP. • Shall constantly report to the Deputy Project Manager with regard to his progress, problems and other necessary things.
Asset Assessor	• Shall be responsible for preparation of cost estimate of affected land, houses, structures and other things affected by the Project.
Tender Assistance Stage	
Deputy Project Manager	• Assist the Project Manager in every aspect of the Project. • Shall attend all important meetings with DOR, MOPIT and other concerned agencies. • Responsible for management of domestic personnel.
Specification Writer	• Shall assist the Document Specialist and Sr. Specification Writer. • Shall prepare draft amendments, addendum, etc., and submit to Document Specialist or Sr. Specification Writer for their review.
Construction Supervision Stage	
Deputy Project Manager	• Shall assist the Project Manager in every aspect of the Project. • Shall attend all important meetings with DOR, MOPIT and other related agencies as well as contractor.
Assistant Resident Engineer	• Assist the Resident Engineer in every aspect of the Project. • Make assessment of daily accomplishment, expected problems and existing problems and report them to the Deputy Project Manager, Resident Engineer and Project Manager.
Material Engineer	• Responsible for material testing, evaluation and recommendations on test results and/or modification of materials. • Responsible for reporting to the Sr. Material Engineer.
Quantity	• Responsible for quantity estimate of accomplished work.

Position	Major Tasks and Duties
Engineer	• Responsible for reporting to the Resident Engineer.
Capacity Development for Tunnel O & M	
Chief Coordinator	• Shall assist the Project Manager and other Specialists in every aspect of the Project. • Shall coordinate with DOR, RBN, MOPIT and other related agencies.
Safety Campaign Assistant	• Shall assist for Safety Campaign Specialist. • Shall assist for preparation of materials for safety campaign and implementation of safety campaign.

CHAPTER 6. REPORTING

Within the scope of consulting service, the Consultant shall prepare and submit reports and documents to DOR as shown below. The Consultant shall provide electronic copy of each of these reports.

Contents to be included in each report are as follows;

(1) Detailed Design and Tender Assistance Stage

(a) Monthly Progress Report
By the tenth (10^{th}) day of each month, the Consultant shall submit fifteen (15) copies of a monthly progress report in the accepted form describing briefly and concisely all activities and progress for the previous month. Problems encountered or anticipated shall be clearly stated, together with the actions to be taken or recommendations on remedial measures for correction. It will also indicate the work to be performed during the coming month.

(b) Inception Report
After 1^{st} month from the commencement of the project, fifteen (15) copies of Inception Report shall be submitted compiling the methodologies, schedule, organization, etc.

(c) Design Criteria and Standards Report
Before the end of the 3^{rd} month after commencement of the project, ten (10) copies of report compiling design criteria and standards shall be submitted.

(d) Cost Estimate Report
Before the end of the 11^{th} month after commencement of the project, five (5) copies of Cost Estimate Report shall be submitted.

(e) Detailed Design Report
Before the end of the 12^{th} month after commencement of the project, ten (10) copies of the Detailed Design Report shall be
Submitted.

(f) Pre-qualification Document
Before the end of the 9^{th} month after commencement of the project, fifteen (15) copies of Pre-qualification Documents shall be submitted.

(g) Tender Document
Before the end of the 12^{th} month, fifteen (15) copies of Tender Document shall be submitted.

(h) Assessment Evaluation Document
Before the end of the 10^{th} month after commencement of the project, ten (10) copies of Appraisal Report shall be submitted.

(i) RAP Report
Before the end of the 11^{th} month after commencement of the project, ten (10) copies of RAP Report shall be submitted.

(j) Land Acquisition and Resettlement Monitoring Report
During the land acquisition and resettlement period, ten (10) copies of monthly monitoring report shall be submitted.

All plans, reports (except the Monthly Progress Reports) and other relevant documents must be accompanied by a back-up electronic files in a stable media storage the number of which will be agreed upon before preparation/submission.

(2) Construction Supervision Stage

(a) Monthly Progress Report
By the 10^{th} day of each month, the Consultant shall submit ten (10) copies of a monthly progress report in the accepted form describing briefly and concisely all activities and progress

for the previous month. Problems encountered or anticipated shall be clearly stated, together with actions to be taken or recommendations on remedial measures for correction. It will also indicate the work to be performed during the coming month.

(b) Environmental and Resettlement Monitoring Report

In every three (3) months, or quarterly, ten (10) copies of Environmental and Resettlement Monitoring Report shall be submitted.

(c) As-built Drawing

Within one (1) month after completion of construction, one (1) size(A0 or above) original as-built drawing and three (3) printed copies showing the final details of the project completed together with all data, records, material tests results, field books, etc. shall be submitted.

(d) Service Completion Report

Service completion report shall be submitted after completion of all services stipulated in the contract, giving a summary of whole period of the services. This report shall be referred to the issuance of the Statement of Performance for the final payment.

(3) Capacity Development Stage

(a) Monthly Progress Report

By the tenth (10^{th}) day of each month, the Consultant shall submit fifteen (15) copies of a monthly progress report.

(b) Inception Report

Before the end of the 1^{st} month, fifteen (15) copies of Inception Report shall be submitted compiled with the Capacity Development Program (contents, methodologies and schedule, organization, etc.).

(c) Tunnel Operation and Maintenance Manuals

Before the end of the 10^{th} month after commencement of capacity development (by 2 months prior to completion of construction), fifteen (15) copies of manuals comprising of the following shall be submitted;

a) Civil Work Component Maintenance Manual
b) Tunnel Facility Component Maintenance Manual
c) Traffic Monitoring and Information Collection/Provision Manual
d) Emergency Case Action Manual
e) Safety Driving Campaign Guidebook

(d) Capacity Development Evaluation Report

Before the end of the 23^{th} month after commencement of capacity development, fifteen (15) copies of reports compiled with the Operation and Maintenance Monitoring results, Capacity Development Evaluation.

CHAPTER 7. OBLIGATIONS OF THE EXECUTING AGENCY

A certain range of arrangements and services will be provided by the Executing Agency to the Consultant for smooth implementation of the Consulting Services. In this context, the Executing Agency will:

(a) Report and data

Make available to the Consultant existing reports and data related to the Project; Preparatory Survey for Nagdhunga Tunnel Construction in Nepal, JICA, 2015;

(b) Office space

Provide an office space in the Headquarters of the DOR with necessary equipment, furniture and utility. However, the Consultant's requirement for office space, including necessary equipment, furniture and utilities, should be clearly stated in the proposal with its rental cost for the case where DOR would be unable to provide such facilities;

(c) Cooperation and counterpart staff

Appoint counterpart officials, agent and representative as may be necessary for effective implementation of the Consulting Services;

(d) Assistance and exemption

Use its best efforts to ensure that the assistance and exemption, as described in the Standard Request for Proposal issued by JICA, will be provided to the Consultant, in relation to

- work permit and such other documents;
- entry and exit visas, residence permits, exchange permits and such other documents
- clearance through customs;
- instructions and information to officials, agent and representatives of the DOR;
- exemption from any requirement for registration to practice their profession;
- Privilege pursuant to the applicable law in Nepal.

[Annex 1]

Topographic Survey and Geotechnical and Material Survey

1. Topographic Survey

Survey Team	Unit	Quantity	Basis of Quantity Estimate
Establishment of horizontal/vertical control monuments	Each	5	• At 1km interval
Centerline staking out survey at 20 m interval	Km	5.05	• Project road length
Profile Survey along Centerline at 20m interval	Km	5.05	• Project road length
Cross Section Survey at 20m interval (30 x 2 = 60 m width)	Km	5.05	• Project road length
Topographic Survey	Ha.	30.3	• 5.05km x 60m
Intersecting Road Survey	No. of Road	5	• 600m per one intersecting road
Bridge Site Survey/River survey	No. of River	4	• 1,000m for each river

2. Geological Survey for Tunnel Section

Survey Team	Unit	Quantity	Basis of Quantity Estimate
Boring with SPT and/or core drilling and corresponding laboratory tests	L.M.	400	• 5 boreholes x 80 m
Elastic Wave Exploration	L.M.	2,450	• Tunnel length

3. Bridge Site Geotechnical Investigation

Survey Team	Unit	Quantity	Basis of Quantity Estimate
Borings with SPT and corresponding laboratory tests	L.M.	100	• 2 bridge site x 2 borings x 25m per borehole

4. Soils and Material Survey

Survey Team		Unit	Quantity	Basis of Quantity Estimate
Soils Survey	Test Pitting and corresponding laboratory tests	No.	6	• Every 500m excluding tunnel section
	Auger Boring	No.	6	• Every 500m excluding tunnel section
Material Survey	Test Pitting of borrow material sources and corresponding laboratory tests	No.	6	• 2 sources and 3 pits per source
	Test Pitting of sand and gravel sources including corresponding laboratory tests	No.	9	• 3 sources and 3 pits per source

[Attachment 1]

Nagdhunga Tunnel Construction Project
Detailed Design Stage Including Document Preparation (12 months)

	Position	1	2	3	4	5	6	7	8	9	10	11	12	Total	
														Foreign	Local
Foreign	1 – Project Manager	1	1	1	1	1	1	1	1	1	1	1	1	12.00	
	1 – Sr. Highway Engineer	1				1	1	1						4.00	
	1 – Sr. Structural Engineer	1				1	1	1	1					5.00	
	1 – Tunnel Planner (Planning)	1	1			1	1	1	1					6.00	
	1 – Tunnel Engineer					1	1	1	1					4.00	
	1 – Tunnel Engineer (Electrical)						1	1	1					3.00	
	1 – Tunnel Engineer (Electronics)						1	1	1					3.00	
	1 – Tunnel Engineer (O & M)										1	1	1	3.00	
	1 – Geologist	1	1	1	1	1								5.00	
	1 – Document Specialist								1	1	1			3.00	
	1 – Specification Writer									1	1	1	1	4.00	
	1 – Sr. Cost Estimator								1	1	1	1	1	5.00	
	Sub-total													**57.00**	
Local Key Staff	1 – Deputy Project Manager	1	1	1	1	1	1	1	1	1	1	1	1		12.00
	1 – Highway Engineer	1				1	1	1	1						5.00
	1 – Structural Engineer	1				1	1	1	1	1					6.00
	1 – Drainage Engineer					1	1	1							3.00
	1 – Geologist	1	1	1	1	1									5.00
	1 – Geodetic Engineer	1	1	1		1	1	1	1	1	1	1	1		11.00
	1 – Specification Writer									1	1	1	1		4.00
	2 – Cost Estimator									2	2	2	2		8.00
	1 – RAP Specialist	1	1	1		1	1	1		1	1	1			9.00
	1 – Asset Assessor	1	1	1	1	1	1	1	1	1	1				10.00
	Sub-total														**73.00**
Local Support Staff	1 – Admin. Officer	1	1	1	1	1	1	1	1	1	1	1	1		12.00
	1 – Secretary/Encoder	1	1	1	1	1	1	1	1	1	1	1	1		12.00
	1 – Janitor	1	1	1	1	1	1	1	1	1	1	1	1		12.00
	3 – Jr. Civil Engineer	1	1	1	1	3	3	3	3	3	3	1	1		24.00
	6 – CAD Operator	2	2	2	2	6	6	6	6	6	2	2	2		44.00
	Sub-total														**104.00**
TOTAL														**57.00**	**177.00**

Nagdhunga Tunnel Construction Project
Tender Assistance Stage (14 months)

	Detailed Design	10	11	12	1										Total	
	Tender Assistance	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Foreign	Local
Foreign	1 – Project Manager					1	1			1	1	1		1	1	7.00	
	1 – Tunnel Engineer	1	1					1								3.00	
	1 – Document Specialist	1							1						1	3.00	
	1 – Specification Writer						1	1						1	1	4.00	
	1 – Sr. Cost Estimator		1					1							1	3.00	
	Sub-total															**20.00**	
Local Key Staff	1 – Deputy Project Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1		14.00
	1 – Specification Writer	1	1				1	1	1					1	1		7.00
	1 – Cost Estimator		1						1					1			3.00
	Sub-total																**24.00**
Local Support Staff	1 – Admin. Officer	1	1	1	1	1	1	1	1	1	1	1	1	1	1		14.00
	1 – Secretary/Encoder	1	1	1	1	1	1	1	1	1	1	1	1	1	1		14.00
	1 – Janitor	1	1	1	1	1	1	1	1	1	1	1	1	1	1		14.00
	1 – CAD Operator	1	1	1	1	1	1	1	1	1	1	1	1	1	1		14.00
	Sub-total																**56.00**
TOTAL																**20.00**	**80.00**

Nagdhunga Tunnel Construction Project
Construction Supervision Stage Including Defect Liability Period Services (54months)

	Position	Assignment Schedule																																									Defect Liability			Total	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	49	53	54	Foreign	Local
Foreign	1 – Project Manager	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1	39.00	
	1 – Resident Engineer	1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1	1	1	1				37.00	
	1 – Tunnel Engineer					1	1	1				1	1	1				1	1	1			1	1	1		1	1	1		1	1	1		1	1	1		1	1	1							24.00	
	1 – Sr. Material Engineer				1	1				1	1				1	1				1	1				1	1				1	1				1	1				1	1								16.00	
	Sub-total																																														**116.00**	
Local Key Staff	1 – Deputy Project Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		45.00
	2 – Asst. Resident Engineer	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1					73.00
	1 – Highway Engineer																								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					18.00
	1 – Structural Engineer																								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					18.00
	2 – Material Engineer	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1					73.00
	2 – Quantity Engineer	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1					73.00
	1 – Surveyor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					42.00
	1 – Laboratory Technician	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					42.00
	1 – Environmental Monitoring Specialis	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					42.00
	Sub-total																																														**426.00**
Local Support Staff	1 – Admin. Officer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					42.00
	1 – Secretary/Encoder	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					42.00
	1 – Janitor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					42.00
	4 – Inspector	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4					168.00
	2 – CAD Operator	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					84.00
	Sub-total																																														**378.00**
TOTAL																																														**116.00**	**804.00**

Nagdhunga Tunnel Construction Project
Capacity Development for Tunnel O&M

	Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Man-months	
																										Foreign	Local
Foreign	Team Leader																									9+2 = 11	
	Tunnel Maintenance (Civil) Specialist																									5+2 = 7	
	Tunnel Maintenance (Facilities) Specialist																									5+2 = 7	
	Traffic Monitoring Specialist																									7+2 = 9	
	Emergency Action Specialist																									5+3 = 8	
	Safety Campaign Specialist																									1+1 = 2	
	Coordinator for Training in Japan																									0+1 = 1	
	Sub-total																									**32+13= 45**	
Local Key Sta	Chief Coordinator																										13.00
	2 – Safety Campaign Assistant																										4.00
	Sub-total																										**17.00**
Local Support Staf	Chief Administrator																										11.00
	Encoder/Secretary																										9.00
	CAD Operator																										9.00
	Sub-total																										**29.00**
TOTAL																										**32+13= 45**	**46.00**