

## 資 料

1. 調 査 団 員 ・ 氏 名
2. 調 査 行 程
3. 関 係 者 ( 面 会 者 ) リ ス ト
4. 討 議 議 事 録 ( M / D )
5. 参 考 資 料
6. そ の 他 の 資 料 ・ 情 報

## 1. 調査団員・氏名

**団員名簿 ; LIST OF TEAM MEMBERS:**

No.	Name	Job title	Occupation	Period (arr. – dep.)
1	Mr. Ryoichi KAWABE 川辺 了一	Leader 総括	Assistant Director, Transportation and ICT Division 3, Economic Infrastructure Department, JICA JICA 経済基盤開発部 運輸交通・情 報通信第三課 調査役	Field Survey 3Sep- 10Sep
2	Mr. Masatoshi ETO 衛藤正敏	Chief Consultant Slope Countermeasures 調査団団長	Geosphere Engineering Office,Environmental Solution Division, Overseas Consulting Administration,Nippon Koei CO.,LTD 日本工営株式会社 海外事業本部環 境事業部 地圏防災室	Field Survey 1SEP - 30SEP Discussion on DOD 6 Feb-12Feb
3	Mr. Akira. OHKAWARA 大河原彰	Design of Slope Countermeasures 1 斜面对策工 1	General Manager,Geosphere Engineering Office,Environmental Solution Division, Overseas Consulting Administration,Nippon Koei CO.,LTD 日本工営株式会社 海外事業本部環 境事業部 地圏防災室 室長	Field Survey 3SEP - 30SEP
4	Mr.Hiroaki TAUCHI 田内宏明	Design of Slope Countermeasures 2 斜面对策工 2	Manager,Geosphere Engineering Office,Environmental Solution Division, Overseas Consulting Administration,Nippon Koei CO.,LTD 日本工営株式会社 海外事業本部環 境事業部 地圏防災室 課長	Field Survey 1SEP - 30SEP Discussion on DOD 6 Feb-12Feb
5	Mr.Toshimasa KOBAYASHI 小林敏政	Investigation of Natural Features 自然条件調査	Chief of Geophysical Division Geophysical Survey Department Disaster Management Division Earth System Science CO.,LTD 地球システム科学株式会社 防災マネジメント事業部 地盤・計測部 計測 G リーダー	Field Survey 4SEP - 18SEP
6	Mr. Yuzo NAKANO 中野祐三	Design of Road 道路設計	Highways and Bridges Department Infrastructure Development Division, Overseas Consulting Administration,Nippon Koei CO.,LTD 日本工営株式会社 開発事業部 道路橋梁部	Field Survey 16SEP - 30SEP
7	Mr. Tomoyuki. NISHIKAWA 西川知行	Construction Plan / Cost Estimate 施工計画積算	Geosphere Engineering Office,Environmental Solution Division, Overseas Consulting Administration,Nippon Koei CO.,LTD 日本工営株式会社 海外事業本部環 境事業部 地圏防災室	Field Survey 1SEP - 30SEP

8	Mr. Pucai YANG 楊 晋才	Environmental/Social Consideration 環境社会配慮	Geosphere Engineering Office,Environmental Solution Division, Overseas Consulting Administration,Nippon Koei CO.,LTD 日本工営株式会社 海外事業本部環境 事業部 地圏防災室	Field Survey 1SEP - 30SEP
9	Mr. Yasuo TAKEISHI 武石康夫	Asistance and Coordination/ Investigation of Natural Features 業務調整/自然条件調査 補助	2nd Engineering Department Sapporo Branch, Domestic Consulting Administration,Nippon Koei CO.,LTD 日本工営株式会社 国内事業本部 札幌支店 技術 2 部	Field Survey 3SEP - 30SEP

## 2. 調查行程

現地調査（9月1日～9月30日）

No.	Date	Day	Mr.R.KAWABE	Mr. M. ETO	Mr. P. YANG	Mr. A. OHKAWARA	Mr. H. TAUCHI	Mr. Y. TAKEISHI	Mr. T. NISHIKAWA	Mr. Y NAKANO	Mr. T. KOBAYASHI		
			Team leader	Chief Consultant Slope Countermeasures	Environmental and Social Survey	Design of Slope Countermeasures 1	Design of Slope Countermeasures 2	Asistance and Coordination/ Investigation of Natural Features	Construction Plan / Cost Estimate	Design of Road	Investigation of Natural Features		
			JICA	Nippon Koei	Nippon Koei	Nippon Koei	Nippon Koei	Nippon Koei	Nippon Koei	Nippon Koei	Nippon Koei	Earth System Science	
1	1-Sep	Thu		HND-HNG-KTM	HND-HNG-KTM		HND-HNG-KTM		HND-HNG-KTM				
2	2-Sep	Fri		Meeting with JICA Tender-contract	Meeting with JICA Tender-contract		Meeting with JICA Tender-contract		Preparation for office				
3	3-Sep	Sat	Tokyo-BKK	Meeting	Meeting	NRT-BKK-KTM	Meeting	NRT-BKK-KTM	Meeting				
4	4-Sep	Sun	BKK-KTM	Preparation, Meeting with NK other office									HND-BKK-KTM
5	5-Sep	Mon	CC to EoJ, JICA, DOR and MOPPW		Data collection and analysis	Moving to site	Moving to site	Moving to site	Data collection and analysis		Moving to site		
6	6-Sep	Tue	Site Survey SecIII Stay at the Khalte Camp		Data collection and analysis	Site Review	Borrow site	Borrow site	ditto		Field survey and analysis		
7	7-Sep	Wed	Sitesurvey SecII 15:40 Janakpur 16:05 kathmandu Buddha Air U4 506		ditto	Site Review	Field survey	Field survey	ditto		ditto		
8	8-Sep	Thu	AM: M/D Discussion with MOPPW and DOR		ditto	Field survey	ditto	ditto	ditto		ditto		
9	9-Sep	Fri	AM: Signing om M/D with MOPPW PM: Report to JICA, EoJ		ditto	ditto	ditto	ditto	ditto		ditto		
10	10-Sep	Sat	To the other mission	Moving to site	Moving to site	ditto	ditto	ditto	Moving to site		ditto		
11	11-Sep	Sun		Field Survey	Field Survey	ditto	ditto	ditto	Field Survey		ditto		
12	12-Sep	Mon		ditto	ditto	ditto	ditto	ditto	ditto		ditto		
13	13-Sep	Tue		ditto	ditto	Other site	ditto	Design and Reporting	ditto		ditto		
14	14-Sep	Wed		ditto	ditto	Other site	ditto	ditto	Moving to KTM		Reporting		
15	15-Sep	Thu		ditto	ditto	ditto	ditto	ditto	Data collection and Reporting		ditto		
16	16-Sep	Fri		Moving to KTM	Moving to KTM	Moving to KTM	Moving to KTM	Moving to KTM	ditto	HND-HNG-KTM	Moving KTM		
17	17-Sep	Sat		Reporting	Reporting	Design and Reporting	Design and Reporting	Laboratry test	ditto	Moving to site	KTM-BKK		
18	18-Sep	Sun		ditto	ditto	ditto	ditto	Laboratry test	ditto	Data collection and analysis	BKK-NRT		
19	19-Sep	Mon		ditto	ditto	ditto	ditto	Design and Reporting	ditto	ditto			
20	20-Sep	Tue		ditto	ditto	ditto	ditto	ditto	ditto	ditto			
21	21-Sep	Wed		ditto	ditto	ditto	ditto	ditto	ditto	Repoting			
22	22-Sep	Thu		ditto	ditto	ditto	Moving to site	Moving to site	Moving to site	Moving to KTM			
23	23-Sep	Fri		ditto	ditto	ditto	Moving to KTM	Moving to KTM	Moving to KTM	Repoting			
24	24-Sep	Sat		ditto	ditto	ditto	ditto	ditto	Repoting	ditto			
25	25-Sep	Sun		ditto	ditto	ditto	ditto	ditto	ditto	ditto			
26	26-Sep	Mon		ditto	Moving to KTM	ditto	ditto	ditto	ditto	ditto			
27	27-Sep	Tue		Meeting with JICA, Data analysis and Reporting									
28	28-Sep	Wed		Meeting with DOR									
29	29-Sep	Thu		KTM-BKK	KTM-HNG	KTM-BKK	KTM-HNG	KTM-BKK	KTM-HNG	KTM-HNG			
30	30-Sep	Fri		BKK-NRT	HNG-HND	BKK-NRT	HNG-HND	BKK-NRT	HNG-HND	HNG-HND			

HND :Haneda  
NRT :Narita  
HNG :Hong Kong  
KTM :Kathmandu  
BKK :Bangkok  
JICA: Japan International Cooperation Agency  
EOJ: Embassy of Japan  
MOPPW: Ministry of Physical Planning and Works  
DOR: Department of Roads

現地概要説明（平成 24 年 3 月 1 日 ～ 平成 24 年 3 月 7 日）

Date			JICA Member	Consultant Member	
			Team Leader	Chief Consultant / Slope Countermeasures	Design of Slope /Countermeasure 2
No	Date	Day	<b>Mr. T. TAKE</b>	<b>Mr. M.ETO</b>	<b>Mr. H.TAUCHI</b>
1	1 <sup>st</sup> Mar	Thu		Tokyo –Hong Kong– KTM	
2	2 <sup>nd</sup> Mar	Fri	AM:Meeting with JICA & DOR for DOD		
3	3 <sup>rd</sup> Mar	Sat		Meeting with concerned study team and collection of related infomation	
4	4 <sup>th</sup> Mar	Sun		Meeting with concerned study team and collection of related infomation	
5	5 <sup>th</sup> Mar	Mon	AM : Briefing of DOD and Signing on the MD,Report to EOJ & JICA		
6	6 <sup>th</sup> Mar	Tue		KTM- Hong Kong	
7	7 <sup>th</sup> Mar	Wed		Hong Kong-Tokyo	

Remarks:

JICA: Japan International Cooperation Agency

EOJ: Embassy of Japan

DOR: Department of Roads

### 3. 関係者（面談者）リスト



## Counterparts Organization

1	Ministry of Physical Planning and Works: MOPPW	
	Mr. Kamal Raj Pandey	Joint Secretary
2	Department of Roads: DOR	
	Mr. Indu Sharma Dhakal	Director General
	Mr. Dinker Sharma	Director General (From Jan-6-2012)
	Mr. Hari B. Shrestha	Deputy Director General
	Mr. Yogendra Kumar Rai	Deputy Director General (From Dec-1-2011)
	Mr. Bindu Shamsher Rana	Project Manager, Sindhuli Road (Until Jan-4 2012)
	Mr. Shiva Raj Adhikari	S. D. Engineer of SRCP, S. D. Engineer of FCB
	Mr. Yam Narayan Yogi	Engineer
3	Ministry of Local Development, DDC, Sindhuli	
	Mr. Dhurba Bahadur Khadka	Local Development Officer Sindhuli
	Mr. Sagar Kumar Dhakal	Program Officer Sindhuli
4	Ministry of Forest, District Forest Office, Sindhuli	
	Mr. Chudamani Khatiwoda	District Forest Officer Sindhuli
5	Department of Water Induced Disaster Prevention (DWIDP)	
	Mr. Shanmukhesh C. Amatya	Chief Engineer

## Japanese Concerned Organization

6	Embassy of JAPAN, Nepal	
	Mr. Yasuhiro NOMURA (野村康裕)	Second Secretary
7	Japan International Cooperation Agency, Nepal office : JICA Nepal	
	Mr. Mitsuyoshi KAWASAKI (河崎充良)	Chief Representative
	Mr. Toru TAKE (武徹)	Senior Representative
	Mr. Kenichiro IIZUKA (飯塚健一郎)	Representative
	Mr. Hiroshi YASHIMA (矢島弘)	Specialist

## Concerned Study Teams

8	The Project for The Shindhuli Road Construction	
	Mr. Hideo KATAGIRI (片桐 英夫)	Resident Engineer
	Mr. Hiroshi FUJISAWA (藤沢 博)	Resident Engineer
	Mr. Kei KASAHARA (笠原 慶)	Resident Engineer
9	The Project for Operation and Maintenance of The Shindhuli Road	
	Mikihiro MORI (森 幹尋)	Road Disaster Prevention Plan
	Mr. Bindu Shamsher Rana	Road Administration Expert
	Mr. Isao INUDUKA (犬塚 功)	Support for Self-reliance Road Maintenance
	Mr. Hiroyuki KATSURO (勝呂 博之)	Road Disaster Expert
	Mr. Wako Noto (能登 和幸)	Coordination/ Road Maintenance Management Support

## Private Company

10	SWACHCHHANDA NIRMAN SEWA (P) LTD.	
	Mr. Jayaram Lamichhane	Managing Director
	Mr. Kiran Krishna Joshi	Director
	Mr. N.P. Bhusal	Director
11	SHRESTHA CONSTRUCTION COMPANY	
	Mr. Pradhyunma Man Chilraka	Project Manager
12	NEPAL Singha Construction Pvt. Ltd.	
	Mr. Suresh Vaidya	Director
	Mr. Achyut Prasad Bhandari	Engineer
13	GEOCE CONSULTANTS (P) LTD.	
	Mr. Subarna Bahadur Joshi	Managing Director
	Mr. J Gauchan	Director
	Mr. Amit Maharjan	Engineer
	Mr. Chabilal Panday	Sr Survivor
	Mr. Dhurba Shrestha	Sr Survivor
14	MULT Disciplinary Consultants (P) Ltd.	
	Mr. Badan L. Nyachhyon	Managing Director

Local People

15	Primary School (Shree Prathamik Vidyalaya)	
	Mr. Narayan Karki	Principle
	Mr. Dhurba Kumar Basnet	Teacher
	Shusila Shrestha (F)	Teacher
	Babita Shresth (F)	Teacher
	Parbati Dahal (F)	Teacher
	Purnima Shrestha (F)	Teacher
16	Local People	
	Ruka Maya Thapa (F)	Landowners
	Mr. Jurga Magar	Landowners
	Reena Thapa (F)	Landowners

#### 4. 討議議事録 (M/D)

**Minutes of Discussions  
on the Preparatory Survey  
on the Project for Countermeasure Construction for the Landslides  
on Sindhuli Road (Section II)  
in Nepal**

Based on the results of the precedent Preparatory Survey conducted from May 2010 to March 2011, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with the Government of Japan, decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") on the Project for Countermeasure Construction for the Landslides on Sindhuli Road (Section II) (hereinafter referred to as "the Project").

JICA sent to Nepal the Preparatory Survey Team (hereinafter referred to as "the Team") headed by Mr. Ryoichi KAWABE, Assistant Director, Transportation and ICT Division 3, Economic Infrastructure Department, JICA, and is scheduled to stay in the country from 1<sup>st</sup> September to 29<sup>th</sup> September, 2011.

The Team held discussions with the officials concerned of the Government of Nepal and conducted a field survey at the study area.


In the course of discussions and field survey, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Outline Design Study Report.

Kathmandu, 29 September, 2011





Ryoichi KAWABE  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
(JICA)



Indu Sharma DHAKAL  
Director General  
Department of Roads (DOR)  
Ministry of Physical Planning and Works  
(MOPPW)  
The Government of Nepal

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to construct countermeasures for the landslides at sta.17+600 and sta.18+200 on the Sindhuli Road (Section II) and enhance the whole Sindhuli Road linking the northern remote areas of Sindhuli district with East-West Highway and Arniko Highway.

### 2. Project Site

The Project site is shown in Annex-1.

### 3. Responsible and Implementing Organizations

3.1 The responsible organization for executing the Project is the Ministry of Physical Planning & Works (MOPPW).

3.2 The implementing agency is the Department of Roads (DOR).

The organization charts of MOPPW and DOR are shown in Annex-2-1 and 2-2 respectively.

### 4. Items requested by the Government of Nepal

As a result of the discussions, both sides confirmed that the requested component was as below, and the construction of countermeasure at sta. 17+400 will be implemented by Nepalese side.

- Construction of countermeasures at sta.17+600 and sta.18+200 on the Sindhuli Road (Section II)

JICA will assess the appropriateness of the request and will report the findings to the Government of Japan for approval.

### 5. Japan's Grant Aid Scheme

5.1 The Nepalese side understands the Japan's Grant Aid scheme explained by the Team as described in the Annex-3.

5.2 The Nepalese side will take the necessary measures as described in Annex-4 for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

### 6. Schedule of the study

6.1 JICA will prepare the draft report and dispatch a mission to Nepal in order to explain its contents in January 2012.

6.2 When the contents of the report are accepted in principle by the Government of Nepal, JICA will complete the final report and send it to the Government of Nepal in April 2012.

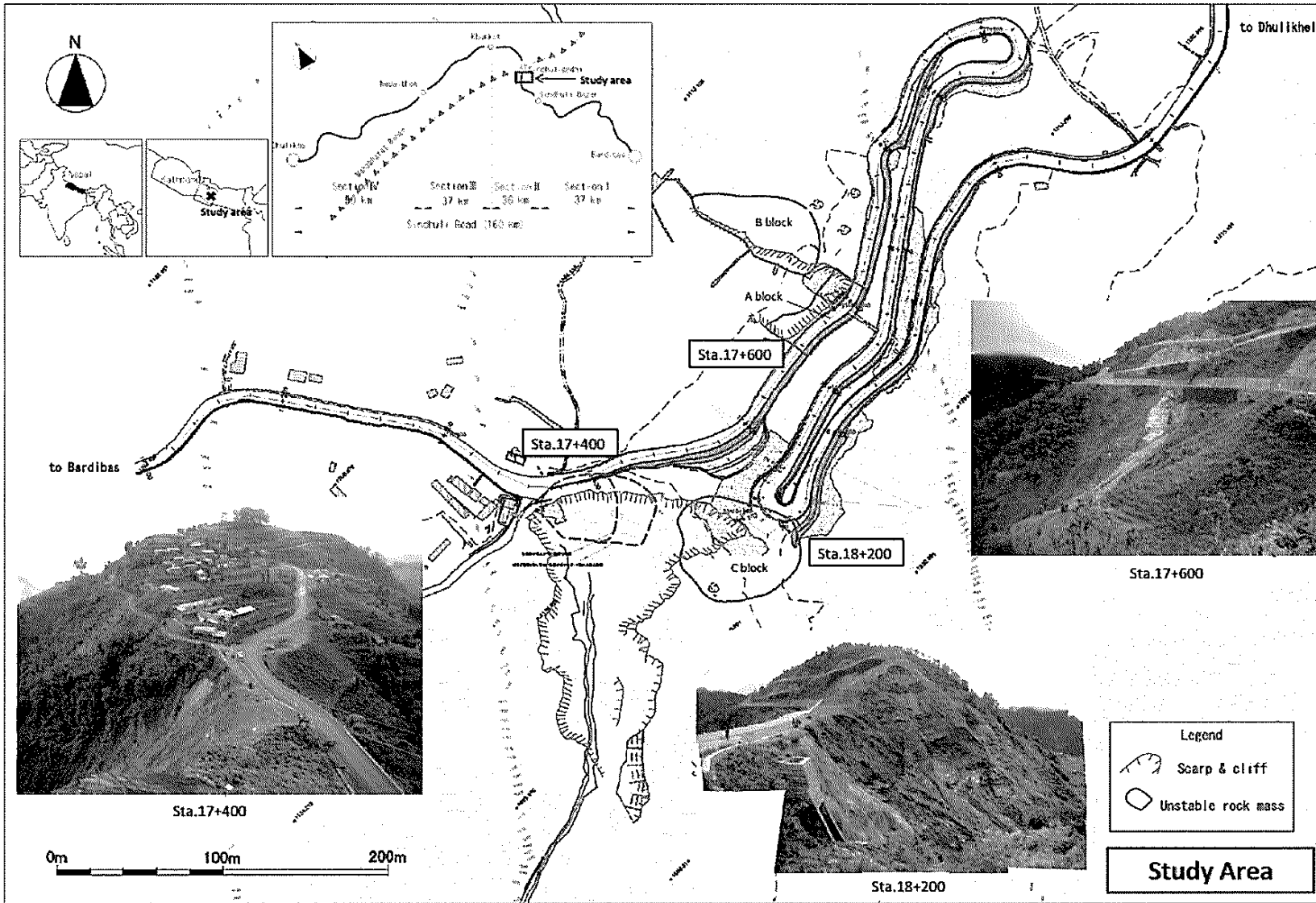


#### 7. Other Relevant Issues

- (1) The procedures necessary for the approval of IEE (Initial Environmental Examination) shall be implemented by the Nepalese side by the end of February 2012, if tree cutting is necessary on the Project as written in the precedent Preparatory Survey.
- (2) If other necessary procedures regarding environmental and social consideration are confirmed on the Survey, these shall be also implemented by the Nepalese side by the end of February 2012.
- (3) The Nepalese side will submit answers to the Questionnaires from the Team by 25th September, 2011.
- (4) The Nepalese side will provide security-related information as well as measures to ensure the safety of the Team.
- (5) The Nepalese side will furnish the Team with all available and relevant data, information and document related to the Survey.
- (6) The Nepalese side will assign counterpart personnel.

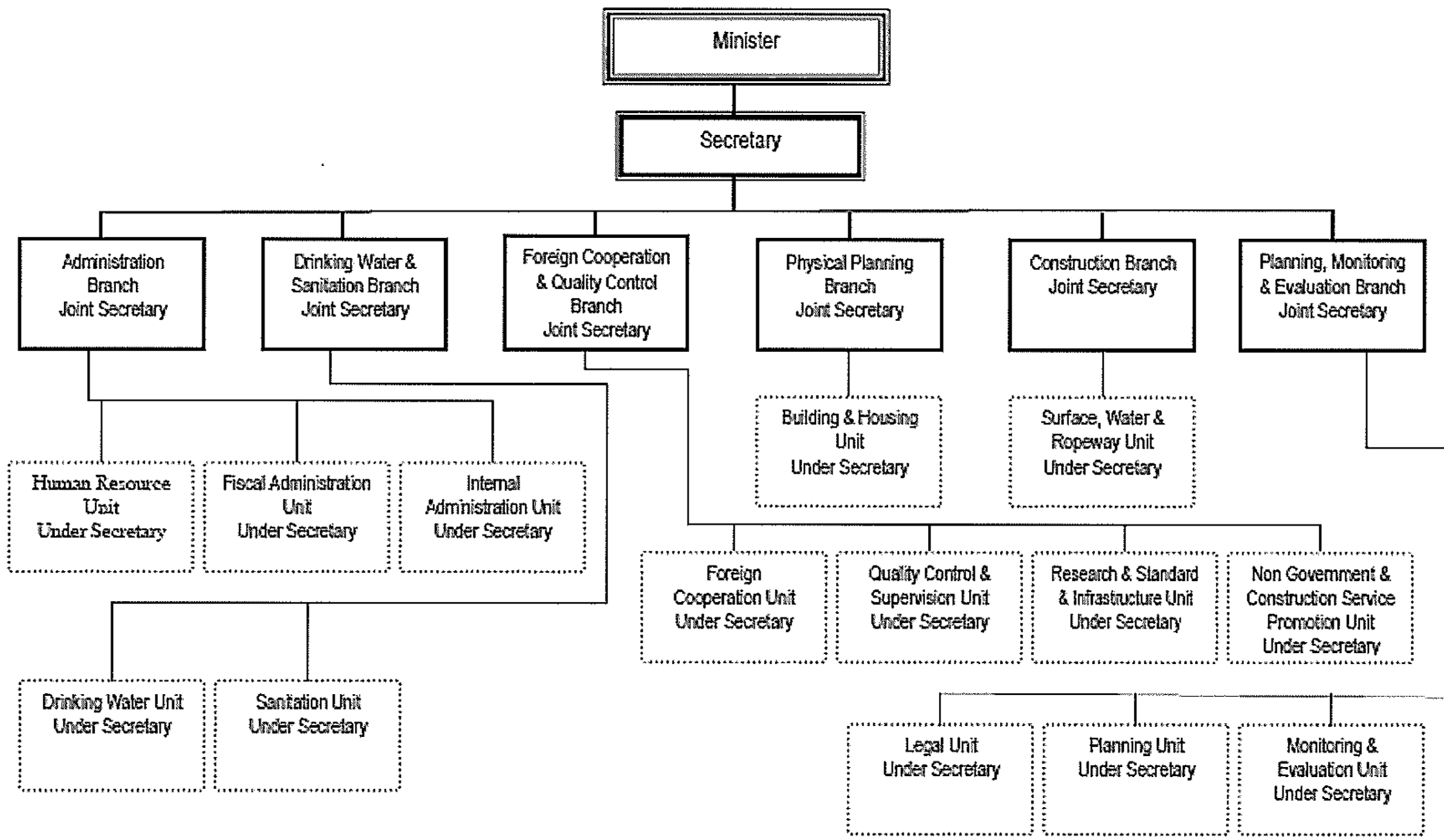
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**Ministry of Physical Planning & Works  
Organization Chart**



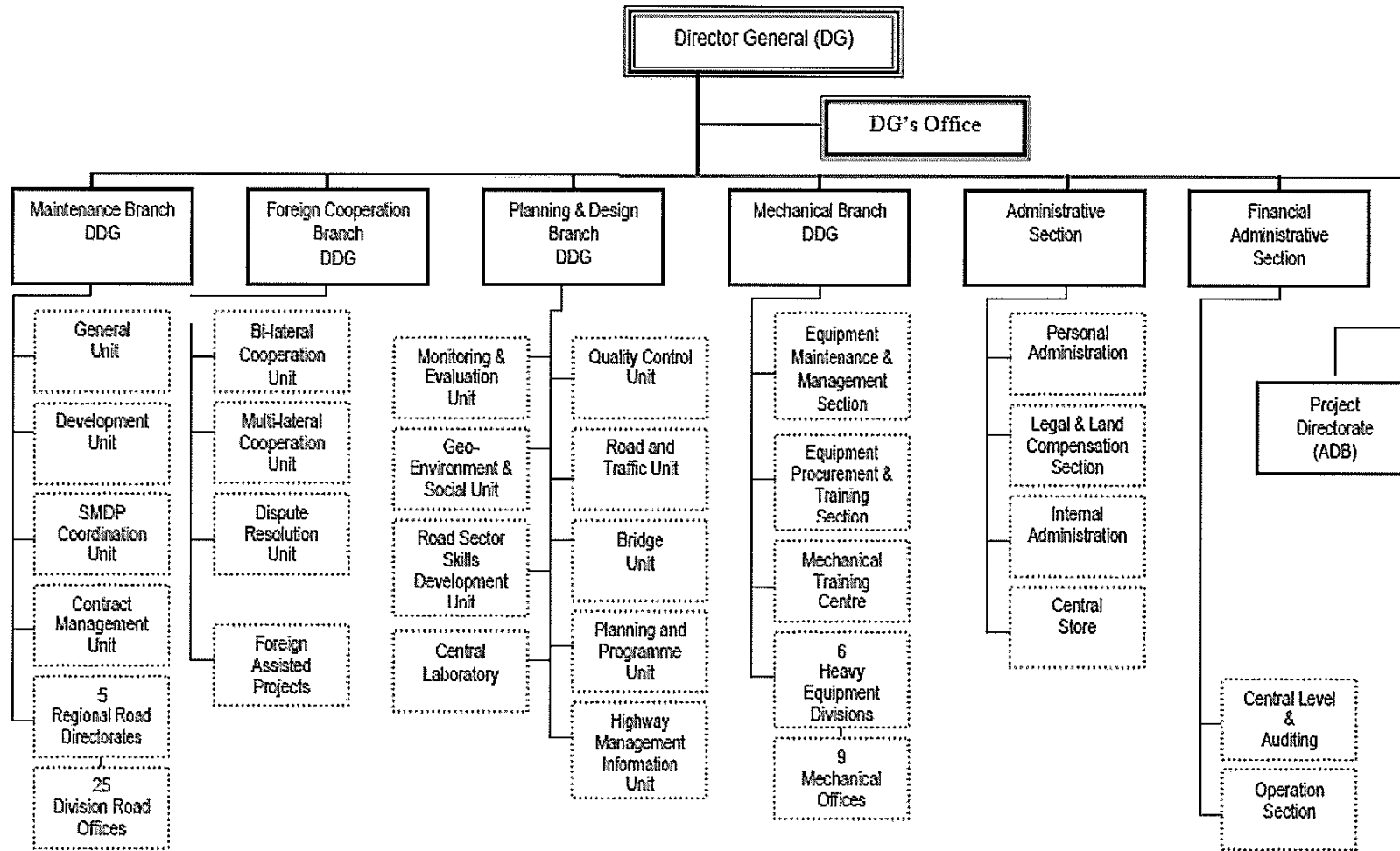
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**Department of Roads  
Organization Chart Including all Offices**



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## JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as “the GOJ”) is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

### 1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures:

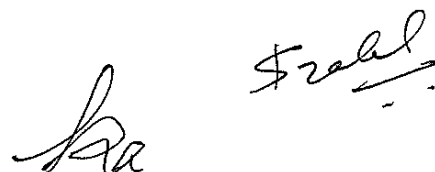
- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal & Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as “the G/A”)
  - Agreement concluded between JICA and a recipient country
- Implementation
  - Implementation of the Project on the basis of the G/A

### 2. Preparatory Survey

#### (1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a



technical, financial, social and economic point of view.

- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

#### (3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

### 3. Japan's Grant Aid Scheme

#### (1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

#### (2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

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(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex 4.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment

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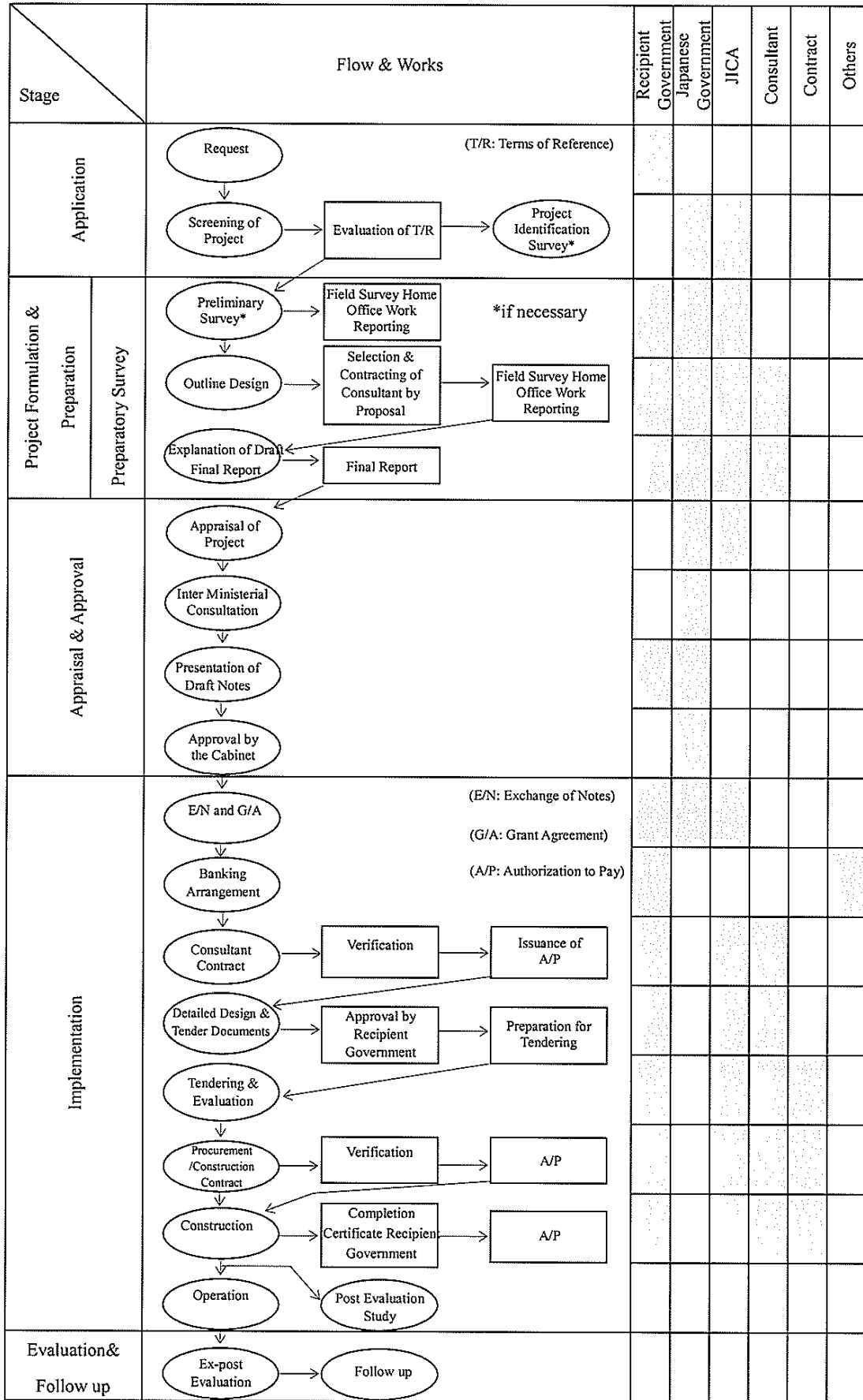
commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

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## FLOW CHART OF JAPAN'S GRANT AID PROCEDURES

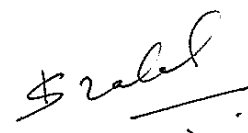


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## Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure lots of land necessary for the implementation of the Project and to clear the sites;		•
2	To ensure prompt customs clearance of the products and to assist internal transportation of the products in the recipient country		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	•	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		•
	3) Internal transportation from the port of disembarkation to the project site	•	
3	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services [ be exempted] / [be borne by the Authority without using the Grant]		•
4	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•
5	To ensure that the Facilities be maintained and used properly and effectively for the implementation of the Project		•
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		•
7	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		•
	2) Payment commission		•
8	To give due environmental and social consideration in the implementation of the Project.		•

(B/A : Banking Arrangement, A/P : Authorization to pay)






**Minutes of Discussions**  
**on the Preparatory Survey**  
**on the Project for Countermeasure Construction for the Landslides**  
**on Sindhuli Road (Section II)**  
**in Nepal**


In September 2011, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Teams on the Project for Countermeasure Construction for the Landslides on Sindhuli Road (Section II) (hereinafter referred to as "the Project") to Nepal, and through discussions, field surveys and technical examination of the results of the surveys in Japan, JICA prepared a Draft Final Report of the Outline Design.

In order to explain and to consult with the concerned officials of the Government of Nepal on the component of the Draft Final Report, JICA sent Nepal the Preparatory Survey Team for Draft Final Report Explanation (hereinafter referred to as "the Team"), which is headed by Mr. Toru Take, Senior Representative of JICA Nepal Office, from March 1<sup>st</sup> to March 6<sup>th</sup>, 2012.

And as a result of discussion, both sides confirmed the main items described on the attached sheets.

Kathmandu, 5 March, 2012

  
  
\_\_\_\_\_  
Toru TAKE  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
(JICA)

  
\_\_\_\_\_  
Dinker SHARMA  
Director General  
Department of Roads (DOR)  
Ministry of Physical Planning and Works  
(MOPPW)  
Government of Nepal



## ATTACHMENT

### 1. Title of the Project

The project title at the implementation stage of the Project was agreed as “the Project for Countermeasure Construction for the Landslides on Sindhuli Road (Section II)”.

### 2. Project Components

After the explanation of the contents of Draft Final Report by the Team, the Nepalese side agreed in principle to the project components.

### 3. Japan's Grant Aid Scheme

The Nepalese side understood the Japan's Grant Aid scheme and the necessary measures to be taken by the recipient country as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both sides on September 9<sup>th</sup>, 2011.

### 4. Schedule of the Study

JICA will complete the final report and send it to the Government of Nepal by the end of March, 2012.

### 5. Project Cost

The Nepalese side was informed that the Project cost should not exceed the upper limit of amount agreed on in E/N and G/A and understood that the Project Cost Estimate attached as Annex-1 is not final and is subject to change by the result of examination through revision of the Outline Design.

### 6. Environment and Social Considerations

#### (1) Completion of IEE approval procedures

The Nepalese side explained the IEE study report will be submitted to Ministry of Physical Planning and Works (MOPPW) from Department of Roads by the end of May and the approval by MOPPW will be obtained within one month from the submission of the report.

#### (2) Environmental check list and monitoring form

Both sides agreed on the contents of environmental check list as shown in Annex-2. And both sides agreed to monitor the procedures in accordance with the monitoring form as shown in Annex-3.

## 7. Proper Maintenance of the Project Area

### (1) Operation and Maintenance Cost

#### 1) Project Sections

The Team explained the necessary cost for operation and maintenance of the project sections after the completion of the Project as shown in Article 3, Annex-1. The Nepalese side confirmed the cost and explained that it would be covered from annual road maintenance budget.

#### 2) Entire Sindhuli Road

The Team also explained the necessary cost for operation and maintenance of the entire Sindhuli Road as shown in Chapter 5 of the Draft Final Report. The Nepalese side confirmed the cost and explained that it would be covered from annual road maintenance budget as well.

### (2) Technical Cooperation Project for the Operation and Maintenance of Sindhuli Road

Both sides confirmed that the Nepalese side operates and maintains the whole Sindhuli road by making full use of the fruits of “the Technical Cooperation Project for the Operation and Maintenance of Sindhuli Road” which has been launched since December 2011.

## 8. Other issues

### (1) Confidentiality of the Project

The Nepalese side agreed that all the information related to the Project such as detailed drawings, specifications, and the result of cost estimate shall not be released to a third party before conclusion of all the contract(s) for the Project, because they are confidential documents that contain information related to the tender.

### (2) Countermeasure Construction for the landslide at sta. 17+400

Both sides confirmed that the Nepalese side shall complete the countermeasure construction for the landslide at sta. 17+400 by itself before the completion of the countermeasure construction at sta. 17+600 and sta. 18+200, which is expected in December 2014.

### <List of Annex>

Annex-1	Project Cost Estimate (Confidential)
Annex-2	Environmental Check List
Annex-3	Monitoring Form

## Project Cost Estimate

施工・調達業者契約認証まで非公表

**Annex 2**

**Environmental Check List(1) Permits and Public Explanation**

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) IEE and Environmental Permits	<p>(a) Have IEE reports been already prepared in the official process?</p> <p>(b) Have IEE reports been approved by the authorities of the Nepalese government?</p> <p>(c) Have IEE reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?</p> <p>(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host Nepalese government?</p>	<p>(a) N (b) N (c) N (d) N</p>	<p>(a) IEE is being carried out by DoR which will be completed in April 2012</p> <p>(b) IEE reports will be submitted to MoPPW in April for approval.</p> <p>(c) It is expected that the report will be unconditionally approved.</p> <p>(d) Required environmental permits will be obtained in accordance to the laws, regulations of Nepal and IEE recommendation.</p>
(2) Explanation to the Local Stakeholders	<p>(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?</p> <p>(b) Have the comments from the stakeholders (such as local residents) been reflected in the project design?</p>	<p>(a) N (b) N</p>	<p>(a) Contents of the project will be explained to the local stakeholders in the process of IEE.</p> <p>(b) Comments and requirements from the stakeholders will be introduced to the project design and execution.</p>
(3) Examination of Alternatives	<p>(a) Have alternative plans of the project been examined with social and environmental considerations?</p>	<p>(a) Y</p>	<p>Alternative plan has been studied in the preparatory study implemented by JICA.</p>

**Environmental Check List(2) Pollution Control**

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) Air Quality	<p>(a) Is there a possibility that air pollutants emitted from project-related sources such as vehicle traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken?</p> <p>(b) If air quality already exceeds the country's standards near the route, is there a possibility that the project will make air pollution worse?</p>	<p>(a) Y (b) N</p>	<p>(a) Dust and gas are anticipated during construction.</p> <p>(b) Existing air quality is clean and good. Periodical watering around the project area will be carried out to reduce blowing of dust.</p>
(2) Water Quality	<p>(a) Is there a possibility that soil runoff from bare lands resulting from earthmoving activities, such as cutting and filling, will cause water quality degradation in the</p>	<p>(a) Y (b) Y</p>	<p>(a) Petroleum and hydraulic fluid spills from heavy equipment might occur and cause water pollution during construction.</p> <p>(b) Petroleum and hydraulic fluid</p>

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	downstream water areas?		spills from heavy equipment will be minimized by careful construction management.
	(b) Is there a possibility that the project will contaminate water sources such as well water?		
(3) Noise and Vibration	(a) Do noise and vibrations from the vehicle comply with the country's standards?  (b) Do low frequency sound from the vehicle comply with the country's standards?	(a) Y (b) Y	(a) Noise and vibration generated by heavy machines and equipment are expected to comply with the Nepalese Standards.  (b) Low frequency sound from machines/equipment is expected to comply with the Nepalese Standards.

### Environmental Check List(3) Natural Environment

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(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	No issues on protected area.
(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats, e.g., coral reefs, mangroves, or tidal flats?  (b) Does the project site 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) Are adequate protection measures taken to prevent impacts such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?  (d) Is there a possibility that the installation of access 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?	(a) N (b) N (c) N (d) N	(a) and (b) No issues on ecosystem in the project site.  (c) Adequate protection measures will be taken in the construction stage to prevent impacts such as disruption of migration routes, habitat fragmentation, and traffic accidents of wildlife and livestock.  (d) There is no possibility that installation of access roads will cause impacts such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems. Access road will be constructed in a farmland of millet which will be given reasonable compensation by DoR and restored after completion of the project.
(3) Hydrology	(a) Is there a possibility that the alteration of topographic features and installation of structures such as tunnels will adversely affect surface water and groundwater	(a) N	No issues on hydrology in the project area.

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	flows?		
(4) Topography and Geology	<p>(a) Are there unstable slopes that may cause landslides or slope failure? Are adequate measures considered to prevent landslide or slope failure where needed?</p> <p>(b) Is there a possibility that civil works such as cutting and filling will cause slope failures or landslides?</p> <p>(c) Is there a possibility that soil runoff will result from cut and fill area?</p>	<p>(a) Y</p> <p>(b) N</p> <p>(c) Y</p>	<p>(a) Many unstable slopes are developing in the project site which will be stabilized by the countermeasures implemented in the project.</p> <p>(b) Safe construction is planned, and cutting and filling works will be implemented safely by careful construction management.</p> <p>(c) Some amount of soil runoff during construction stage will be minimized by careful construction.</p>

#### Environmental Check List(4) Social Environment

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) Resettlement	<p>(a) Is involuntary resettlement being caused by project implementation? If yes, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is there land use and use of local resources? Is there adequate explanation on land use to landowners and will reasonable compensation be given?</p>	<p>(a) N</p> <p>(b) Y</p>	<p>(a) No involuntary resettlement is caused by the project.</p> <p>(b) Private field will be used for temporary road which will be given reasonable compensation. After completion of the project, the used land will be restored.</p>
(2) Living and Livelihood	<p>(a) Is there a possibility that the project will affect the existing means of transportation and the associated workers?</p> <p>(b) 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?</p> <p>(c) Is there any possibility that the project will adversely affect the living conditions of the inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>(d) 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?</p> <p>(e) Is there any possibility that the project will adversely affect road traffic in the surrounding areas, e.g., increase of traffic congestion</p>	<p>(a) Y</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p> <p>(e) Y</p> <p>(f) Y</p> <p>(g) N</p>	<p>(a) Traffic regulation during construction will disturb the traffic which will be minimized by careful construction management.</p> <p>(b) There is no significant impact on land use and local sources.</p> <p>(c) There is no possibility that the project will adversely affect the living conditions of the inhabitants</p> <p>(d) Advance safety and healthcare directive and management are carried out.</p> <p>(e) Traffic regulation during construction will disturb the traffic, which will be minimized by careful construction management.</p> <p>(f) Same as above.</p> <p>(g) There is no possibility that facilities generated by the project will cause sun shading and radio interference.</p>

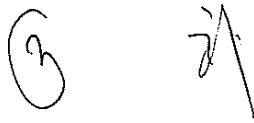
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	and traffic accidents?		
	(f) Is there any possibility that the project will disturb the movement of inhabitants?		
	(g) Is there any possibility that the facilities generated by the project will cause sun shading and radio interference?		
(3) Heritage	(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) There is no heritage in the project area.
(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Cut and fill slope will be treated by suitable vegetation and protection work.
(5) Ethnic Minorities and Indigenous People	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous people?  (b) Are all of the rights of ethnic minorities and indigenous people, in relation to land and resources, respected?	(a) Y (b) Y	(a) and (b) No issues on ethnic minorities and indigenous people.
(6) Working Conditions	(a) Does the project observe Nepalese labor laws and regulations?  (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?  (c) Are intangible measures being planned and implemented for individuals involved in the project such as the establishment of a safety and health program, safety training (including traffic safety and public health) for workers, etc.?  (d) Are appropriate measures taken to ensure that security guards involved in the project will not violate safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a) The project will be implemented observing Nepalese labor laws and regulations strictly.  (b) The project will be implemented under advanced safety management.  (c) Advanced safety management plan will be established which will be strictly applied during project implementation.  (d) Security management plan will be established which involves local police.

### Environmental Check List(5) Others

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction, e.g., noise,	(a) Y (b) Y (c) Y	(a), (b), (c),  Adequate measures and



	<p>vibrations, turbid water, dust, exhaust gases, and wastes?</p> <p>(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce the impacts?</p> <p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce the impacts?</p>		<p>considerations will be taken for any kind of environmental impact such as pollution to natural and social environment.</p>
(2) Monitoring	<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) What are the items, methods and frequencies of the monitoring program?</p> <p>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>(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?</p>	<p>(a) Y (b) Y (c) Y (d) Y</p>	<p>(a) An Environmental Monitoring Unit (EMU) will be established by DoR which will be responsible for the execution of the monitoring program.</p> <p>(b) Major items of monitoring include "permit and public explanation", "pollution control", and "social environment"</p> <p>(c) DoR will establish an EMU.</p> <p>(d) The monitoring program by DoR will include the monitoring method and the regulations to be followed.</p>

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## Annex 3

### Monitoring Form

As environmental review indicates the need for monitoring the items shown below, the Ministry of Public Works should undertake monitoring for necessary items and report to JICA monthly.

#### 1 Permit and Public Explanation

**Table 1.1 Monitoring on Permit and Public Explanation**

Monitoring Item	Date	Monitoring Result
Implementation of IEE		
Approval of IEE		
Explanation of project		

#### 2 Pollution Control

##### 2.1 Air Quality

**Table 2.1 Monitoring on Air Quality**

Monitoring Item	Date	Monitoring Result
Visual observation on air quality		

##### 2.2 Water Quality

**Table 2.2 Monitoring on Water Quality**

Measurement Item	Unit	Measured Value	Nepalese Standard	Remarks
PH	mg/L			
BOD	mg/L			
SS	mg/L			
DO	mg/L			
Bacillus Coli	MPN/100 mL			

##### 2.3 Noise/Vibration (measurement point: the nearest house from the site)

**Table 2.3 Monitoring on Noise/Vibration**

Measurement Item	Unit	Measured Value	Nepalese Standard	Remarks
Noise level	mg/L	dB		
Vibration level	mg/L	dB		

#### 3. Natural Environment

- No issues on natural environment-

#### 4. Social Environment

**Table 1.1 Monitoring on Permit and Public Explanation**

Monitoring Item	Date	Monitoring Result
Agreement on private lands		
Compliance on labor laws		

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Compliance on safety system  
Compliance on health program  
Situation of security guard

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## 5. 參考資料





## 6. その他の資料・情報

- 6.1 既存道路プロジェクト(Section II)での EIA 調査報告書のレビュー
- 6.2 Preliminary Environmental and Social Consideration Study in The Preparatory Survey on The Project for Countermeasures for Landslides on Sindhuli Road (Section II)
- 6.3 TERMS OF REFERENCE of Initial Environmental Examination Study Countermeasures Construction of Landslides for Sindhuli Road (Section II)
- 6.4 環境関連写真
- 6.5 施工状況写真(Section II)
- 6.6 物理探査結果
- 6.7 土質試験結果
- 6.8 観測データレビュー結果
- 6.9 安定計算書、構造計算書
- 6.10 概略設計図面集

6.1

既存道路プロジェクト (Section II) での  
EIA 調査報告書のレビュー

## 既存道路プロジェクト (Section II) での EIA 調査報告書のレビュー

### 1. 調査案件情報

調査案件名：BANEP-SINDHULI-BARDIBAS ROAD PROJECT

ENVIROMENTAL IMPACT ASSESSMENT Section II, Sinduli Bazar-Khurkot Road

発注者：GOVERNMENT OF NEPAL, MINISTRY OF WORKS AND TRANSPORT,  
DEPARTMENT OF ROADS

受注者：GEOCE Consultants (P) Ltd.

報告書提出年月：1999 年 10 月

### 2. 報告書構成

表-1 調査報告書の構成

	要旨	JICA ガイドライン適合
第1章 プロジェクト概要	1.1 背景 1.2 調査目的 1.3 道路プロジェクト 1.4 方法論 1.5 実施限界	JICA ガイドライン適合
第2章 現在の環境状況	2.1 物理的特性 2.2 生態学的特性 2.3 社会経済的条件	JICA ガイドライン適合
第3章 影響の定量的評価および緩和策	3.1 有益な影響 3.2 有益性の拡大策 3.3 望ましくない影響 3.4 緩和策	JICA ガイドライン適合
第4章 代替案の分析	4.1 プロジェクトを実施しない案 4.2 代替案の分析	JICA ガイドライン適合
第5章 環境管理計画	5.1 序文 5.2 緩和策 5.3 環境モニタリング 5.4 環境監査のための枠組み 5.5 プロジェクト管理 5.6 地盤環境部署 GEU の位置づけ	JICA ガイドライン適合
第6章 政策、法制、行政	6.1 関連政策 6.2 関連法制 6.3 環境ガイドライン 6.4 関連行政	JICA ガイドライン適合
第7章 結論および提言	—	—
付録	—	公聴会議事録を含む

### 3. 実施内容

#### ①プロジェクト概要

本調査は 1997 年に制定された環境保護規定に基づき、延長 39km のシンズリ道路第二工区（シンズリ〜クルコット区間）の建設に対して EIA（Environmental Impact Assessment）を実施したものである。実施目的は第二工区工事による環境への影響を定量的に評価し、環境



管理計画を含む緩和策を提言するなど、政策決定者に当該プロジェクトによる環境問題や関連する調査費用の情報を提供することを目的としている。

実施方法は以下のとおりである。

- ・ 文献調査およびフィールド調査による物理的・生物的・社会的・経済的パラメータの取得
- ・ 様々な法制度、1997年環境管理ガイドラインを含めた環境ガイドラインのレビュー様々な地図の解読
- ・ アンケートおよびチェックリストを用いた現地の情報収集
- ・ 1ヶ月間のフィールド調査（森林1.2ha内の樹木の数、12の20×50m<sup>2</sup>サンプル区画内の樹木の周囲の長さや高さなどの測定）
- ・ 経済的・社会的情報を取得するための19のグループ協議
- ・ 情報分析および環境ガイドラインに基づく影響検討

## ②現在の環境状況

当該地の環境の現況について調査結果を以下のようにまとめることができる。

### ア) 物理的特性

- ・ 第二工区はシンズリバザールの北部（標高500m）からスタートし、シンズリガディ（標高1400m）までが上り道であり、その後クルコットまで下り道である。地質は中新世から更新世のシワリク帯、古生代から先カンブリアのヌワコートグループ、先カンブリアのビムペジグループとして三つに分けられる。
- ・ 当該工区は破碎帯や断層を通過するため地すべりや斜面崩壊発生の可能性は否定できない。また、計画路線沿いに8つの地すべり帯が確認された。
- ・ 1955年～1995年の過去40年の平均降雨量は2645mmであり、平均最高気温は28.3℃、平均最低気温は16℃である。また、平均相対湿度は86%である。
- ・ 土地利用状況としては、森林51.6%、耕地30.8%、既設道路10.8%、低木&草地3.8%、河川敷3%である。
- ・ 第二工区内にグローヌ川とアンデリ川の二つの季節河川が存在する。
- ・ 当該地には環境汚染の問題はない。空気は極めて新鮮であり、自然の音しかなく、本工事によって大気汚染および騒音の問題が発生する可能性がある。

### イ) 生態学的特性

- ・ 第二工区の延長38.8kmのうち、合計で20kmの区間は「5.6kmのコミュニティ森林」を含む森林域である。12のサンプル区画内の調査結果によると、50%以上の樹木はサラノキ科であり、基底面積として464ft<sup>2</sup>/haであることにに対し、マツが247ft<sup>2</sup>/ha、ツバキ科が239ft<sup>2</sup>/haである。（法律で保護されている植生はサラノキ科のみ）

- ・ 当該工区周辺には野生動物としてゴールル（シカ的一种）、猿、ジャッカル（イヌ属）、ヤマアラシ、シカ、ヒョウがまばらに分布する。（ヒョウはワシントン条約にて保護される野生動物に含まれる）
- ・ 鳥類としてはタカ、フクロウ、カラス、エナガ、野鶏などが確認されている。
- ・ 生態学的に慎重に扱うべき領域、例えば国立公園や野生動物保護域などは第2工区内に含まれていない。

#### ウ) 社会・経済的に条件

- ・ 第二工区の路線沿いに住んでいる人口は約9千人であり、そのうちの60%は労働人口である。識字率は約58%であり、ネパール全国の平均値を上回る。
- ・ 医療および公衆衛生のレベルは比較低い。
- ・ 住居数の約64%だけ水道（蛇口数217本）からの飲み水を入手することができ、住居数の52%は48箇所の井戸を利用している。
- ・ クルコット村で一日に2時間（夕方）しか電気の供給がなく、その他の村では電気の供給はない。電気通信施設はシンズリバザールにしか存在しない。
- ・ 当該工区内に16の水利組合および6の森林組合が形成されている。
- ・ 農業が地域の主な職業であり、畜産や商業なども生計手段である。

### ③影響の定量的評価および緩和策

第二工区の工事による環境への影響評価および緩和策の検討結果を表-2に示す。

#### ④代替案の分析

道路建設を実施しない場合と実施した場合の5つの工事方法の内部収益率(IRR)について、1988年のJICA FS調査結果をレビューしている。

#### ⑤環境管理計画

必要とされる環境モニタリング項目は以下のとおりである。

##### ア) 物理的環境

大気汚染（TSP、PM10の測定）、水質汚染、騒音、廃棄物（建設発生土）の容量、自然斜面のかく乱、斜面对策の実施状況、適切な排水施設の設置

##### イ) 生物的環境

森林域の損失、伐採された樹木量、薪を使用する木造家屋・茶屋・食堂の数、薪商業、木材や薪の倉庫、建設従事者が調理で薪やガスを使用する状況、薬草商業、現場整地後の森林状況

## ウ) 社会的環境

建設従業員の数、女性従業員の数、必要とされる地元の熟練あるいは準熟練労働者数、現場周辺で営業している店、作業キャンプおよび労働者キャンプ内の医療および公衆衛生施設、地元学校における建設従業員の子供達の就学状況、従業員達の公共水道から飲み水の取得状況、水道、灌漑用施設、電柱などの地元インフラへのダメージ、ダメージを受けた家屋、土地、その他の資産への補償状況、日用品の価格、事故の種類と数、救急医療サービス、従業員および周辺住民の安全への意識

## ⑥ 政策、法制、行政

### ア) 政策

ネパール政府は道路建設を含む社会資本整備を高い優先度としている。また、近年における環境問題の浮上に対し、特に山岳地の道路建設においては環境面の考慮を社会的位置づける政策を打ち出している。1997年の森林政策の改正は森林保護および適切な使用を重視している。

第6企画期からネパール政府は開発の企画管理の際に環境面でも連携して進める考えを示し、この企画でEIAの実施を導入した。第9計画期においても一般参加型の環境アセスの必要性を詳細に説明している。ネパール政府は国土保全戦略、森林セクターの基本計画、農業の長期計画の実現についても進めている。

### イ) 法制

公共道路法（1974）3条：道路から一定の距離内に永続的な構造物の建設を禁ずる法令

公共道路法（1974）14および15条：DORが公共道路の建設、維持管理を実施する際、土地やその他の資産を補償の上、一時的に取得できる法律

公共道路法（1974）16条：DORは道路両側に植物を植え、その管理を地方団体（VDCや地方自治体）へ引き渡せる法令

公共道路法（1974）17条：道路建設中にDORが採石場や土砂取り場を運営できる法律

森林法(1992) 20条：ネパール政府が国有林の管理について計画・実施を行う法律

森林法(1992) 21条：作業計画書に指示している内容以外で国有林内のいかなる活動を禁ずる法律

森林法(1992) 27条：地域（コミュニティ）森林において深刻な環境影響を起こした場合や合意している作業計画書の条件に従わない場合に当該森林を取り戻す法律

森林法(1992) 68条：ネパール政府は国家の重要なプロジェクトを実施する際、やむを得ない場合、環境への深刻な影響がなければ森林の一部を提供できる法律

森林規定（1995）規定3：国有林内の土壌保全および環境保護

森林規定（1995）規定12：13種類の植物の保護のため伐採、運搬、輸出を禁止

森林規定（1995）規定32：コミュニティ森林の使用団体に限り、作業計画書内容範囲で森

林生産物の収集、配布、売買を許可する

森林法(1993) 22条：国有林の森林生産物は政府が所有する。コミュニティ森林を取り戻す場合あるいは道路建設に提供する場合は当該森林の生産物を使用団体に引き渡す

環境保護法 EPA (1996)：MOPE (Ministry of Population and Environment) が EIA レポートを承認する

環境保護規定 EPR (1997)、改定版 (1999)：MOPE 承認のために 10 部の EIA レポートの提出を要請する。工事関係機関は EIA レポートを入手して 30 日以内に意見および提言と一緒に MOPE へ承認依頼を行う。MOPE は一般からの意見および提言を求めるため、EIA レポートを 30 日間公開する。MOPE は EIA レポートを正式に受理してから 60 日以内に承認しなければならない (1999 年改定版では 90 日以内へ変更)。工事関係機関は環境モニタリングを実施し、MOPE は環境監査を実施する。1999 年改定版では MOPE の環境監査は工事が終了し、サービスを開始して 2 年後に行われる。

土地買収法 (1977)：ネパール政府は事業実施のために土地買収法を適用できる。

国際条約：ネパールはいくつかの環境関連の条約に加盟している。(PPAAP、CBD、CITES、Ramasr、ITTA、ANAC、FCC、CCD)

#### ウ) 環境ガイドライン

- ・ National EIA Guidelines 1993、EIA Guidelines for Forest Sector 1995
- ・ EIA 1993 枠組みの下、EIA Guidelines (Road Sector)が草案され、DOR が道路プロジェクトの環境調査のために EMG (Environmental Management Guidelines) を発行

#### エ) 関係機関

- ・ Ministry of Works and Transport←政策決定機関, Department of Road←技術部門, Geo-Environmental Unit←環境モニタリング実施機関
- ・ Ministry of Forest and Soil Conservation←プロジェクト内の森林関連の決定機関
- ・ Ministry of Population and Environment←EIA 承認機関
- ・ District Development Committee, Village Development Committee←土地買収やプロジェクトへの地元理解、伐採等の過程において手助けとなる地方自治体

表-2 道路建設による影響の定量的評価および緩和策

道路建設による有益な影響							
工程	予測される影響	環境への影響				影響の拡大策	実施者
		性質	規模	範囲	期間		
建設段階	雇用の創出	直接	大	地域	短期	地元住民を雇用する	プロジェクト
	建設工事による経済の活性化	間接	中	地域	短期	地元商品使用を促進する	プロジェクト
	森林伐採による木材や薪の供給量増加	直接	中	地域	短期	建設に木材を活用し、薪の需要を増大させる	プロジェクト
	技術スキルの向上	間接	小	地域	長期	技術向上のために訓練プログラムを開催する	プロジェクト
運営段階	運搬施設の向上、経済の活性化、製品開発促進、都市地域の拡大、地価の上昇、収入活動の増加	間接	中	地域	長期	地元住民へ農作物や園芸作物多様化の促進、環境に調和した都市域の開発、地価の調整	VDC
	土壌浸食や土壌損失の軽減、生物資源の管理	直接	小	地域	長期	地すべり地帯における植生法の実施、コミュニティを通じた土壌保全および周辺森林の管理の促進	VDC
望ましくない影響(建設段階)							
工程	予測される影響	環境への影響				影響緩和策	実施者
		性質	規模	範囲	期間		
現場整地	土地利用の変化	直接	大	現場周辺	長期	伐採は道路幅だけに限定させる、代替植林を実施する	プロジェクト/DFO
	30.1万丸 <sup>3</sup> の木材相当の20haの森林域の損失	直接	大	現場周辺	長期	適切な補償を提供する	プロジェクト
	耕作地88haの損失	直接	小	現場周辺	長期	適切な補償を提供する	プロジェクト
	かんきつ園を含む農作物の損失	直接	小	現場周辺	長期	適切な補償を提供する	DoR
	路線沿い325棟の家屋の損失(全壊)	直接	小	現場周辺	長期	適切な補償を提供する	プロジェクト(DFOと協議の上)
	野生生物の生息地の分裂、野生生物行動への影響	間接	中	地域	長期	緩和策は投じないものの、森林の入り口にノークラクション看板をたてる	プロジェクト(DFOと協議の上)
掘削土工	侵食・地すべり・斜面崩壊の増加、排水施設・送電線、灌漑&飲料施設へのダメージ	直接	大	現場周辺	長期	道路斜面安定対策として植生法を適用する	プロジェクト
	斜面崩壊の増加、地すべりの促進	直接	大	現場周辺	短期	植生法・排水等による斜面保護策の提供	プロジェクト
	大量の建設廃棄物の発生	直接	大	現場周辺	短期	出来る限りバランスの取れた掘削深度の設計、廃棄物は決定された場所に捨てる	プロジェクト
	路線沿いの送電線、灌漑&飲料施設のような社会資本へのダメージ	直接	大	現場周辺	長期	影響された施設の再配置、送電線についてはNEAと協議の上	プロジェクト
	無計画な廃棄物処分による植生の破壊	直接	中	地域	短期	廃棄物は決められた場所に捨てる	プロジェクト
排水施設	景観悪化による美的価値の低下	直接	中	地域	長期	緑化に配慮した開発	プロジェクト
	集中排水を行うため下流側への影響が懸念される	直接	大	現場周辺	長期	放水口は自然水路まで導くべき	プロジェクト
採石場と土砂取り場の運営	採石場として河床を推奨。無計画的な採石は河道を変化させ、結果的に川岸侵食や土砂流出をもたらす	直接	大	現場周辺	長期	不測のダメージを与えないように予算も投じて、きちんとした採石運営を計画する	プロジェクト
	重機の使用による大気汚染、騒音	直接	小	現場周辺	短期	重機と車の洗車	プロジェクト
採石と土砂取り	ほこり、排気ガス、騒音	直接	大	地域	短期	ほこりを取る、車両の維持管理、ノークラクション看板をたてる	プロジェクト
作業キャンプ	木材や薪への圧迫	直接	中	現場周辺	短期	整地の時に出た木材を活用する、労働者とその家族の立ち入りを規制する	プロジェクト
	健康と公衆衛生環境の悪化	直接	小	現場周辺	短期	健康チェック施設や公衆衛生環境を確保する	プロジェクト
労働者キャンプ	木材や薪への圧迫	直接	中	現場周辺	短期	整地の時に出た木材を活用する、労働者とその家族の立ち入りを規制する	プロジェクト
	健康と公衆衛生環境の悪化	直接	小	現場周辺	短期	健康チェック施設や公衆衛生環境を確保する	プロジェクト
建設財備蓄	公共飲料施設への圧迫、労働者の子供たちの就学のため地元学校を圧迫	直接	中	現場周辺	短期	追加の飲料施設を提供する、労働者の子供たちが就学する学校の部屋の増設や備品の費用を提供する	プロジェクト
	有害物の放出	間接	小	現場周辺	短期	放出されないようにする、有害物を安全に捨てる	プロジェクト
望ましくない影響(運営段階)							
工程	予測される影響	環境への影響				影響緩和策	実施者
		性質	規模	範囲	期間		
車両通行	ほこり、排気ガス、騒音	直接	中	地域	長期	道路使用者に対し、時間帯の使用および車の維持管理の教育を促進する、集落および森林域にはノークラクションの看板をたてる	プロジェクト
	振動による斜面崩壊や地すべり	間接	小	現場周辺	長期	小型乗用車の使用を促進する、定期的な維持管理を確保する、植生法による道路斜面の安定性を確保する	プロジェクト
	路線沿いにおける集落の増加・不法占拠、道路側への水の排出	直接	中	地域	長期	道路沿いにおける集落の増加および水の排出を規制する	プロジェクト/地元当局
	急斜面および湾曲部による事故の増加	間接	小	現場周辺	短期	維持管理された車の使用や交通安全看板をたてることを促進する	プロジェクト/道路使用者
	道路維持管理時の森林生産物の需要の増加、道路アクセスによる森林生産物の不法収集	直接	小	現場周辺	中期	森林パトロールを増やし、森林生産物の売買を規制するためにヒラバニで検問所を設ける	DFO
	野生生物の生息地の分裂および交通騒音による野生生物の行動への影響	間接	小	現場周辺	短期	森林域において強力なクラクション使用を禁止、運転手に野生生物の移動を阻害しないように教育をする	プロジェクト/地元当局
	地元荷物運搬人の解雇、商業競争、社会・文化の乱れ	間接	小	地域	短期	地元住民にスキルアップの訓練を与える	プロジェクト/地元当局
道路維持管理	維持管理作業に関わる労働者によって森林生産物の需要の増加	間接	小	地域	短期	地元労働者を動員する	プロジェクト

6.2

*Preliminary Environmental and Social  
Consideration Study in The Preparatory  
Survey on The Project for  
Countermeasures for Landslides on  
Sindhuli Road (Section II)*

# **Preliminary Environmental and Social Consideration Study in The Preparatory Survey on The Project for Countermeasures for Landslides on Sindhuli Road (Section II)**

## **1 TITLE OF THE PROJECT AND RELEVANT PROJECT REPORT**

### (1) Title of the Project

The Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II)

### (2) Responsible and Implementing Organization of the Project

The implementing agency for the project is the Department of Roads (DoR) and the responsible organization is the Ministry of Physical Planning and Works (MoPPW).

### (3) Relevant Project Report

- The preparatory survey on The Project for Countermeasure Construction for Landslides on Sindhuli Road (Section II), Main Report, March 2011, JICA.
- Environmental Impact Assessment (EIA) for Section II, Sindhuli Bazar – Khurkot Road under the Banepa – Sindhuli – Bardibas Road Project, Final Report, October 1999, GEOCE Consultants (P) Ltd.

## **2 ENVIRONMENTAL CATEGORIZATION AND BASIS**

The environmental category of the project was determined as Category B according to JICA Guidelines for Environmental and Social Considerations (April, 2010), based on the following reasons:

- The project aims to construct countermeasures for landslides within Sindhuli Bazar – Khurkot Road (Section II), and to rehabilitate the national highways. Accordingly, no significant negative impact would be expected from the construction activities of the project.
- The locations for the implementation of the countermeasure construction involve two sites, with a total road section length of about 250 m. In addition, the proposed countermeasures are planned to be completed within two years.
- The proposed countermeasures against landslides are permanent works with high stability, such as anchors and reinforced earth walls.

## **3 OUTLINE OF THE PROJECT**

### (1) Banepa – Sindhuli – Bardibas Road Project

The Banepa – Sindhuli – Bardibas Road, which is classified as a national highway, is one of the most important strategic roads linking Kathmandu Valley and eastern Terai. The road has been constructed by means of a section by section approach since November 1996 as shown in Table 1 through a grant assistance from the Government of Japan. The Banepa – Sindhuli – Bardibas Road is planned to be completely constructed and fully opened in 2014.

**Table 1 Banepa – Sindhuli – Bardibas Road (total length of 158 m)**

Section	Name of Road	Length (km)	Status	Remarks
I	Bardibas – Sindhuli Bazaar	37	Constructed	No EA <sup>1)</sup>
II	Sindhuli Bazaar – Khurkot	39	Constructed	EIA <sup>2)</sup>
III	Khurkot – Nepalthok	32	Under construction	EIA <sup>2)</sup>
IV	Nepalthok - Dhulikhel	50	Constructed	No EA <sup>1)</sup>

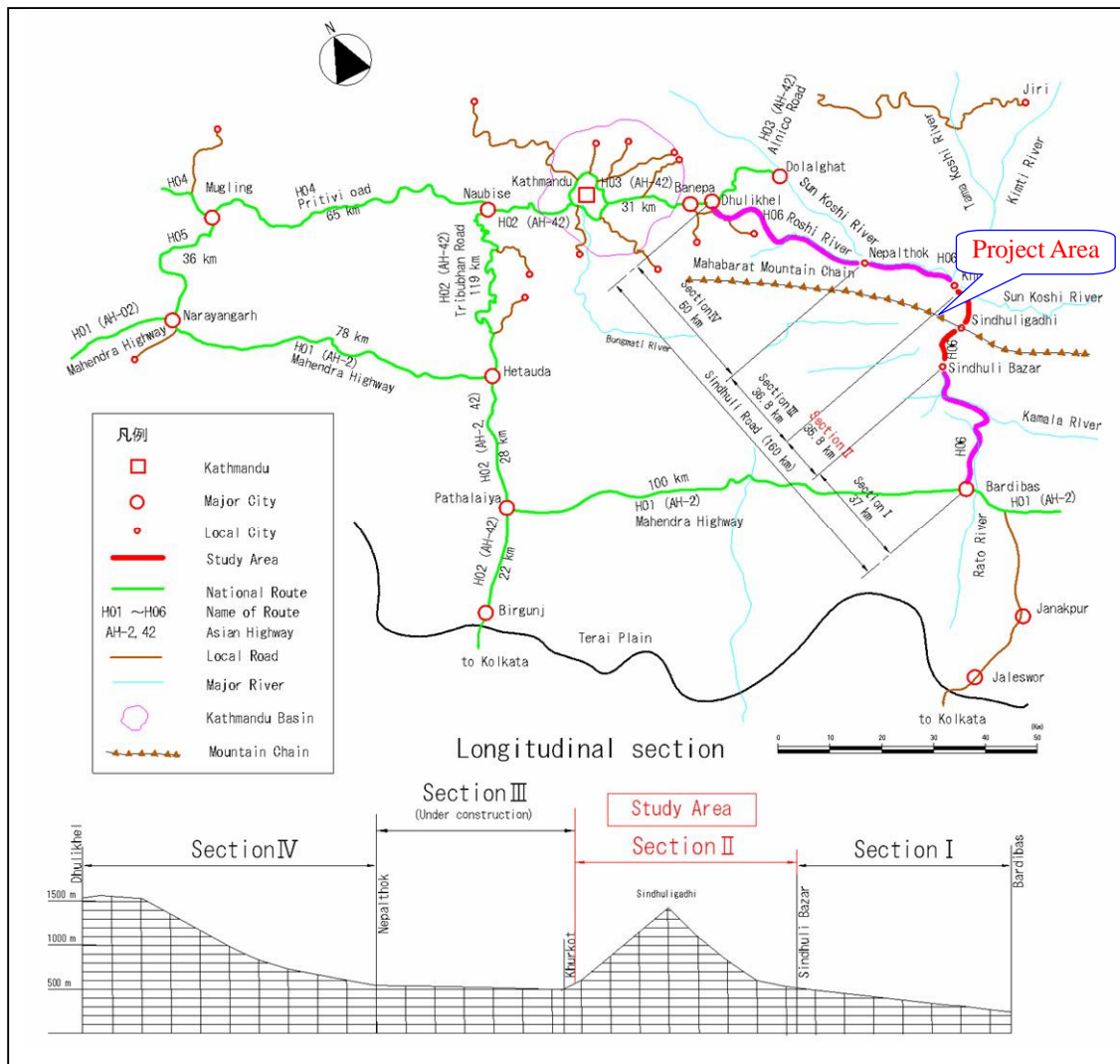
Notes: 1) No environmental assessment, such as EIA and IEE, was legally required at the period of the project implementation

2) EIA - Environmental Impact Assessment for the road project was completed and approved.

Source: JICA Study Team

(2) Location of the Project

The project involves construction of countermeasures against landslides at Sta. 17+600 and Sta. 18+200 within the Sindhuli Bazaar – Khurkot Section, Section II of the Banepa – Sindhuli – Bardibas Road as shown in Figure 1. The project's location is summarized in Table 2.



Source: JICA Study Team

**Figure 1 Location of the Project Site**



**Table 2 Outline of the Project Location**

Section	Site	Section Length (m)	Damaged Area (m <sup>2</sup> )
II	Sta. 17+600	80	80 × 100 = 8,000
	Sta. 18+200	170	50 × 50 = 2,500
Total		250	10,500

Source: JICA Study Team

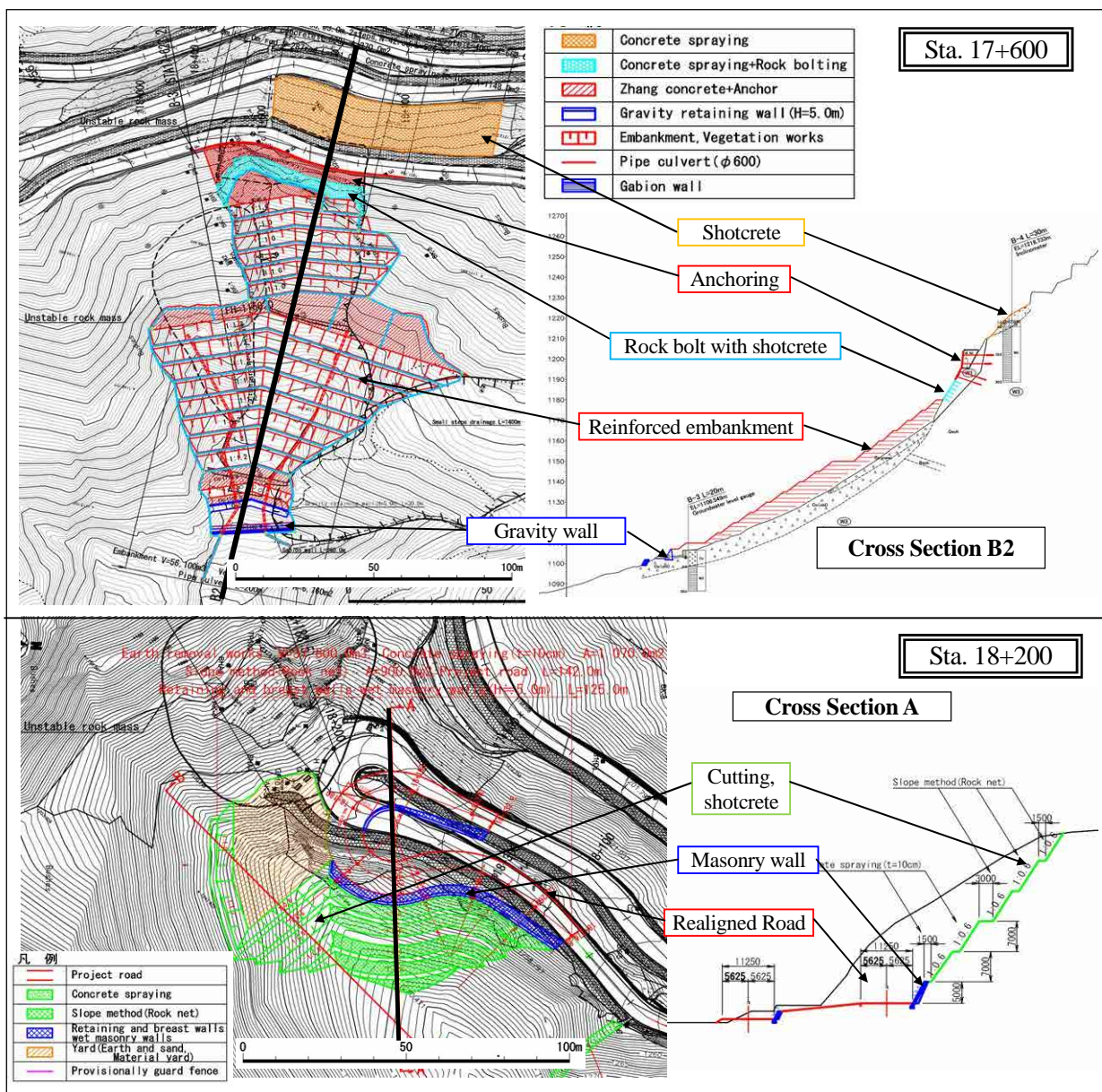
### (3) Objectives and Components of the Project

The objective of the project is to implement the permanent countermeasures for the two abovementioned damaged sites in order to keep the sustainable traffic function of the road.

The project components include the following:

- Road realignment, and subsequent excavation and slope protection work construction at Sta. 18+200
- Installation of anchor against landslide at Sta. 17+600
- Construction of reinforced earth wall and related works to stabilize landslide at Sta. 17+600

The proposed countermeasures of the project are shown in Figure 2 and summarized in Table 3.



Source: JICA Study Team

Figure 2 General Plan and Section of the Proposed Countermeasures

Table 3 Outline of the Countermeasures Proposed for the Project

Site/Section	Countermeasures	Remarks
Sta. 17+600	<ul style="list-style-type: none"> <li>Anchor works</li> <li>Crib works</li> <li>Reinforced earth wall</li> <li>Sheet sodding (bioengineering works)</li> <li>Shotcrete</li> </ul>	
Sta. 18+200	<ul style="list-style-type: none"> <li>Road realignment towards the mountainside</li> <li>Earth removal works (excavation),</li> <li>Shotcrete</li> <li>Masonry retaining wall</li> <li>Vegetation (bioengineering works)</li> </ul>	Construction spoils due to excavation of road realignment will be used as embankment material of the reinforced earth wall at Sta. 17+600.

Source: JICA Study Team

## 4 PRESENT ENVIRONMENTAL CONDITIONS OF THE PROJECT AREA

The present environmental conditions are based on the review of the previous EIA for Section II, Sindhuli Bazar – Khurkot Road under the Banepa – Sindhuli – Bardibas Road Project, conducted by GEOCE Consultants (P) Ltd in October 1999, as well as a brief site visit conducted by the JICA Study Team during the survey.

### (1) Topography and Geology

The project area is located in the northwest slope of Mahabarat Mountain Range that has been formed by successive tertiary geotectonic movement. The geology of the project site consists of precambrian schistose rocks. Schistose rocks are generally hard and less to slightly fractured at outcrop. However, they are locally very intensely fractured and sheared. The fractured and sheared rocks or zones, which are presumably due to Mahabarat Thrust, are highly susceptible to landslides.

### (2) Climate and Rainfall

The project site has a seasonable climate with average annual maximum and minimum temperatures of 28°C and 16°C, respectively. The highest temperature is 27°C in April and the lowest temperature is 19°C in January. The annual rainfall around the project site generally exceeds 1,000 mm. Rainfall is concentrated, and more than 90% of the annual rainfall occurs during the monsoon months beginning from May to October. The months between November and April are dry and any rainfall is sporadic.

**Table 4 Monthly Rainfall at the Project Site**

Month \ Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Accumulation (mm/year)
2003	-	-	-	-	-	-	457.5	291	328.5	44.5	0	0	1121.5
2004	0	0	0	36	105.5	207.5	764	216.5	264	129.5	0	0	1723.0
2005	0	0	0	0	56	86.5	362.5	746	239.5	142	0	0	1632.5
2006	0	0	0	0	323.5	556.5	281.5	243	534.5	26.5	0	0	1965.5
2007	0	0	0	59.5	190.5	546	796	465	540	217.5	0	0	2814.5
2008	0	0	0	14	205	554.5	540.5	475	339.5	138	0	0	2266.5
2009	0	0	0	15	120	87	352.5	295.5	0	0	0	0	870.0
2010	0	0	0	0	0	15.5	439.5	478	377	74.5	1.5	0	1386.0
2011	4.5	18.5	39	117.5	201	328	166.5	145	2.5	-	-	-	1022.5
max	4.5	18.5	39.0	117.5	323.5	556.5	796.0	746.0	540.0	217.5	1.5	0.0	2,815
min	0	0	0	0	0	15.5	166.5	145	0	0	0	0	870
mean	1.0	2.0	5.0	30.0	150.0	298.0	462.0	373.0	292.0	97.0	0.0	0.0	1,710

Source: JICA Study Team

### (3) Land Use

Project site is surrounded by denuded land and limited cultivated area as shown in Figure 3. Inhabited area is situated in the western part of the project site along the road. Rice, maize wheat, millet and potato are generally found in the cultivated field. Mainly, shorea robusta, and schima wallichii are the trees found in the forest area.

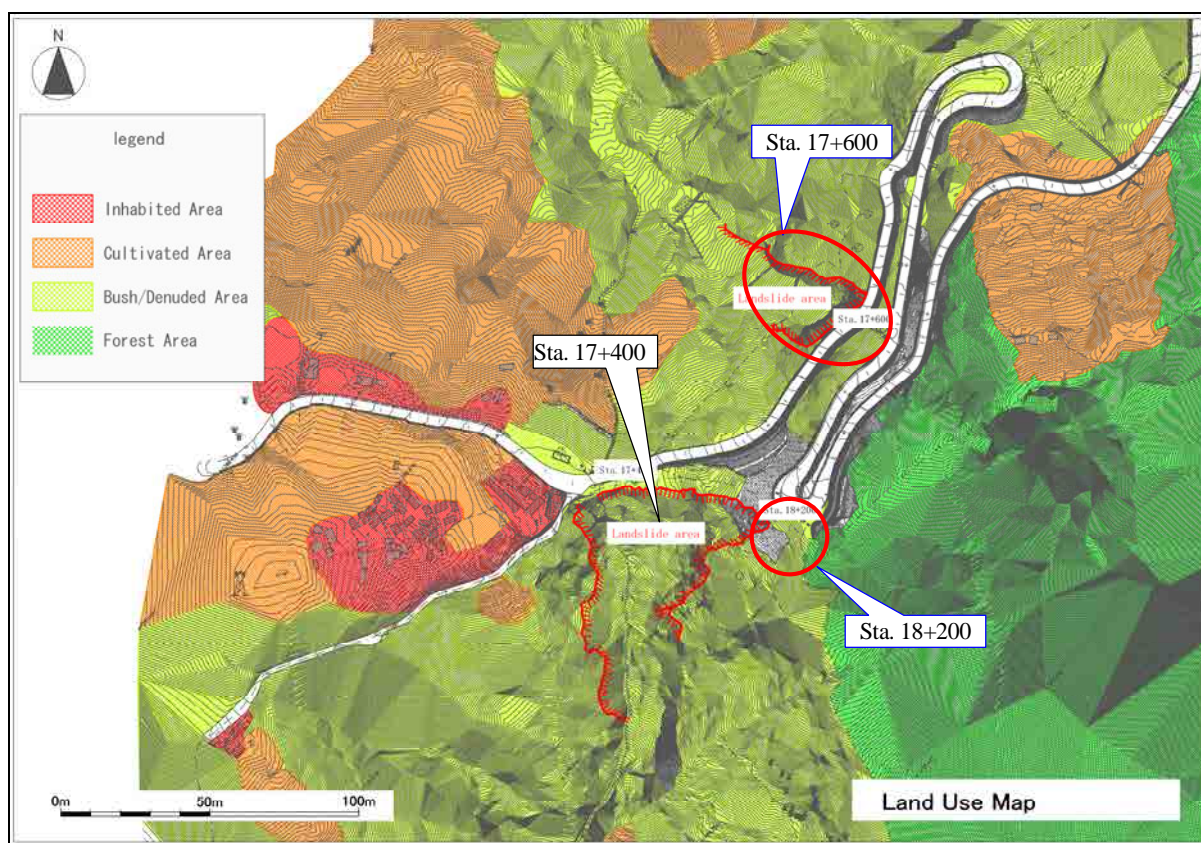


Figure 3 Land Use Map Around the Project Site (Source: JICA Study Team)

**Table 5 Major Crops in Bhadrakali VDC**

Yields for Various Crop Types (t/ha)									
Rice		Maize		Wheat		Millet		Potato	
Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield
220	638	442	974.4	137	343.6	250	384	24	192

Source: District Agriculture Department 2009

#### (4) Vegetation and Forest Type

The project site lies in the tropical to sub-tropical region within the sub-humid bio-climate zone. This area consists of mixed forest of shorea robusta and schima wallichii. VDC consists both community forest and national forest.

**Table 6 Forest Area in Sindhuli District**

SN	Types	Area (ha)
1	Well-stocked forest	1875
2	Moderately stocked forest	120629
3	Poorly stocked forest	36273
4	Forest and shrub land	1414
<i>Total Area</i>		<i>160191</i>

Source: DDC Profile 2008

**Table 7 Community Forest in Bhadrakali VDC**

VDC	Number of Community Forests	User Groups	Area of Community Forest (ha)
Bhadrakali	8	976	1203.55

Source: DDC Profile 2008

(5) Population and Ethnicity

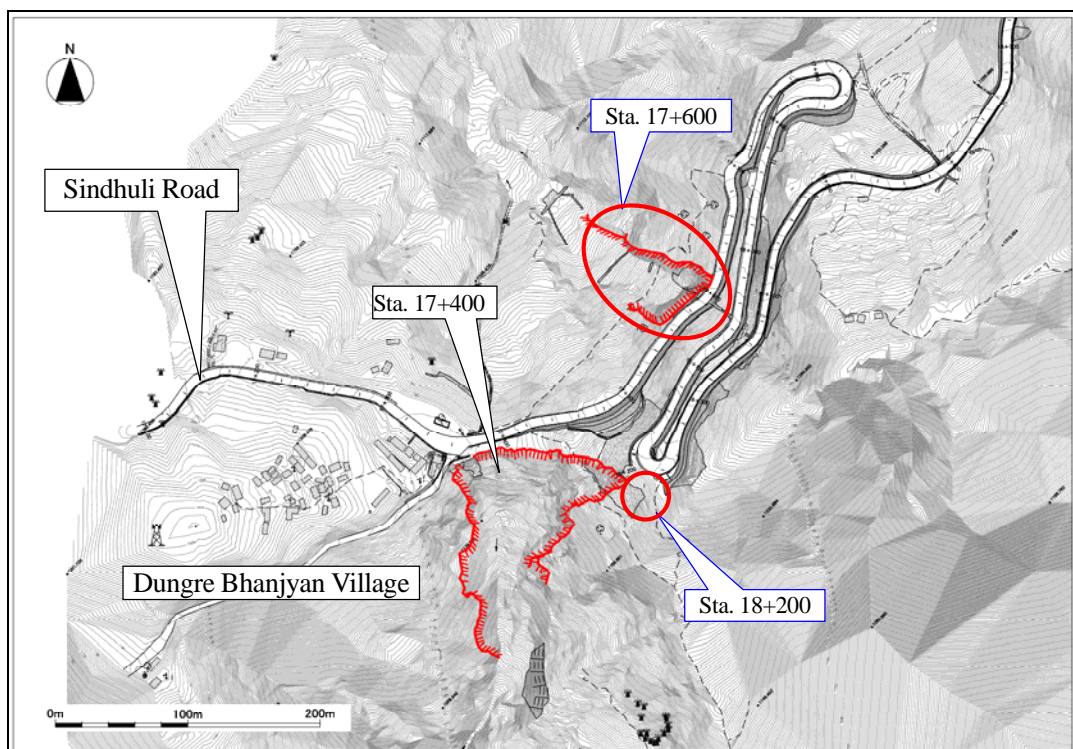
The project site is located in Dungere Bhanjyan Village of Bhadrakali VDC in Sindhuli District of Janakapur Zone. The proposed project sites fall in the territory of Bhadrakali VDC and the demographic information of VDC is shown in Table 8.

**Table 8 Demography of Bhadrakali VDC**

VDC	Ward	Household	Female	Male	Total
Bhadrakali	1	110	301	309	610
	2	116	379	366	745
	3	88	298	257	555
	4	176	489	522	1011
	5	77	257	230	487
	6	50	164	180	344
	7	42	173	165	338
	8	104	309	330	639
	9	88	272	263	535
<i>Total</i>		851	2,642	2,622	5,264

Source: CBS 2009

The Dungere Bhanjyan Village where the project area lies consists of only 25 households with a total population of 181. They are living by subsistence farming and only four households are engaged in small-scale store and trading business.



**Figure 4 Distribution of House and Population Around the Project Site**

**Table 9 Household and Population Around the Project Site**

Ward No.	Household	Population		
		Total	Male	Female
1	18	132	62	70
2	7	49	25	24

<i>Total</i>	<i>25</i>	<i>181</i>	<i>87</i>	<i>94</i>
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Source: JICA Study Team 2010

Sindhuli District is one of the multi-caste as well as multilingual parts of Nepal. There are altogether 74 identified castes and ethnic groups. Among them, Kshetri, Bahun, Tamang and Magar have great numbers. Minorities like Thamis, Hayus, Raji, Meche, Dura, Bhoobi and Pahari also exist in the district.

**Table 10 Ethnic Composition of the Bhadrakali VDC**

Ethnic Group									
Tamang	Chhetri	Brahman	Gurung	Magar	Newar	Tharu	Dalit	Sunuwar	Other
2,047	516	219	5	773	468	2	440	116	5

Source: CBS 2001

### (6) Occupation and Income

The environmental characteristics and their manifestation have largely shaped the socio-economic characteristics of Sindhuli District. The microclimatic variability is manifested by the climatic niche existing in the mountains making specific areas suitable for specific activities like cultivation, manufacturing, establishment of tourist centers, etc.

**Table 11 Economically Active Population in Bhadrakali VDC Excluding Agriculture**

Occupation	Number	Occupation	Number
Manufacture	2	Transport	2
Business	14	Services	8
Others	10	<b>Total</b>	<b>36</b>

Source: CBS 2001

### (7) Education Profile

Education often yields higher earnings, opens career opportunities, improves health, widens social circles, and increases political activity. Education, therefore, is one of the major indicators of social development. The status of education in any society is its responsiveness towards modern civilization. Hence, the study of educational status in a society is a major area of social science.

Although the country has a 54% literacy rate, Sindhuli District has to persevere hard to catch up with the national figure. According to the census of 2001, the district's literacy rate shows a meager figure of 39.28%. Female literacy rate is 26.04% while male literacy rate is 52.53%.

**Table 12 Literacy Status (Population of Six Years Old and Over) in Bhadrakali VDC**

Total			Can't Read and Write			Can Read Only			Can Read and Write			Not Stated		
Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
3876	1939	1936	1739	591	1148	409	251	158	1706	1089	617	22	9	13

Source: CBS 2001

**Table 13 Total Number of Schools by Grades and Levels in Bhadrakali VDC**

Total		
Primary (1-5)	Lower Secondary (6-8)	Secondary (9-10)
10	2	1

**Table 14 Primary Level's Total School Student Enrollment by Grades in Bhadrakali VDC**

Grades 1 to 5		
Girls	Boys	Total
937	487	1,811

Source: School Level Educational Statistics of Nepal (Flash Report I 2004 (2061))

**(8) Drinking Water and Sanitation**

Water is an indispensable element of life, which therefore, has turned out to be a major indicator of social and economic development. Poverty is prevalent mostly in areas with shortages of water. Water-related issues such as access to drinking water and sanitation are closely linked with poverty and are strongly advocated to be prioritized in national policies. The issues of safe drinking water and proper sanitation facilities are key areas of development as they are closely associated with human health, which may lead to prosperity.

**Table 15 Drinking Water Status and Sanitation of Bhadrakali VDC**

Particular			
Total No. of Households	826		
Households using pipe (%)	62.8	No. of households using unsafe well water	228
No. of households using hand pump	0	No. of households using river water	68
No. of households using safe well water	11	No. of households with toilet	164

Source: CBS 2009

## **5 REVIEW OF ENVIRONMENTAL REGULATIONS AND GUIDELINES AND RELEVANT ORGANIZATIONS**

**(1) JICA Guidelines Requirements**

The JICA Guidelines for Environmental and Social Considerations (April 2010) classify projects into the following four categories:

- **Category A:** Proposed projects are classified as Category A if they are likely to have significant adverse impacts on the environment and society. Projects with complicated or unprecedented impacts that are difficult to assess, or projects with a wide range of impacts or irreversible impacts, are also classified as Category A. The project proponents must submit EIA report for Category A projects. For projects that will result in large-scale involuntary resettlement, a resettlement action plan (RAP) also must be submitted. For projects that will require measures for indigenous people, an indigenous people plan (IPP) must be submitted as well. EIA and other reports need to be submitted through the project proponent for JICA environmental reviews.
- **Category B:** Proposed projects are classified as Category B if their potential adverse impacts on the environment and society are less adverse than those of Category A projects. These impacts are generally site-specific, few if any are irreversible, and in most cases, normal mitigation measures can be designed more readily. The project proponent is in principle required to submit an initial environment examination (IEE) report for JICA environmental reviews.
- **Category C:** Proposed projects are classified as Category C if they are likely to have minimal or little adverse impact on the environment and society.
- **Category FI:** Proposed projects are classified as Category FI if they satisfy all of the following requirements:

a) JICA's funding of projects is provided to a financial intermediary or executing agency; b) the selection and appraisal of the sub-projects are substantially undertaken by such an institution only after JICA's approval of the funding and therefore the sub-projects cannot be specified prior to JICA's approval of funding; and c) those sub-projects are expected to have a potential impact on the environment.

## (2) Requirements for the ADB Guidelines

Similar to the JICA guidelines, the Asian Development Bank (ADB) Environmental Assessment Guidelines (2003) classify projects into the following three categories:

- **Category A:** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An EIA level study including an environmental management plan (EMP) is required.
- **Category B:** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An IEE level study including an EMP is required.
- **Category C:** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. An EIA or IEE study is not required, although environmental implications need to be reviewed.

## (3) Nepalese Procedures and Requirements for Environmental Assessment

The main and fundamental Nepalese laws and regulations for environmental assessment (EA) are as follows: Environmental Protection Act, 1996 (EPA), Environmental Protection Rules, 1997 (EPR) as well as its amendments in 1999 and 2008.

As per the requirements by the Government of Nepal (GoN), an EA is required under the EPA. Moreover, assessment and reporting requirements are set out under the EPR.

Schedule 1 of Section 2 of the EPR gives the details of projects which require varying levels of study, such as IEE and EIA, as shown in Table 16 in the road sector with comparison of the requirements prescribed by the World Bank (WB).

**Table 16 Legal Criteria for Selecting an IEE or EIA in the Road Sector Together with Comparison of Requirements Prescribed by the WB.**

Type of Project	Type of EA Required	EA Category as per WB
1) Construction of national highways	EIA	A
2) Construction of major feeder roads	EIA	A
3) Construction of minor feeder roads	IEE	B
4) Construction of district roads	IEE	B
5) Construction of urban roads	IEE	B
6) Construction of rural roads	IEE	B
7) Construction of 1 to 5 km long ropeways	IEE	B
8) Construction of more than 5 km long ropeways	EIA	A
9) Construction of 1 to 5 km long cable car	IEE	B
10) Construction of more than 5 km long cable car	EIA	A



Type of Project	Type of EA Required	EA Category as per WB
11) Construction of major bridges	IEE	B
12) Construction of minor or medium bridges	Exempted	C
13) Construction of tunnels	IEE	B
<b>14) Routine, recurrent, periodic, and emergency maintenance</b>	<b>Exempted</b>	<b>C</b>
15) Upgrading, rehabilitation and reconstruction of national highways and feeder roads	IEE	B
<b>16) Any project which requires deforestation, clearance felling or rehabilitation of national forest of an area up to 5 ha</b>	<b>IEE</b>	<b>B</b>
17) Project which requires deforestation, clearance, felling or rehabilitation of national forest of an area more than 5 ha	EIA	A
18) Project which is to be constructed within a sensitive area*	EIA	A
19) Project with investment cost ranging from Rs.10 million up to Rs.100 million	IEE	B
20) Project with investment cost of over Rs.100 million	EIA	A
21) Project which involves the extraction of boulders, gravel, sand or soil from national forest area	IEE	B
22) Project which involves the extraction of boulders, gravel, sand or soil from riverbed with volume of over 50 t or 50 m <sup>3</sup> per day	EIA	A
23) Project which involves the extraction of boulders, gravel, sand or soil from riverbed with volume of less than 50 t or 50 m <sup>3</sup> per day	IEE	
24) Project which involves the extraction of construction materials from medium to large quarries	EIA	
25) Stone crushing plants	IEE	
26) Mechanical workshops with area of over 3 ha	EIA	

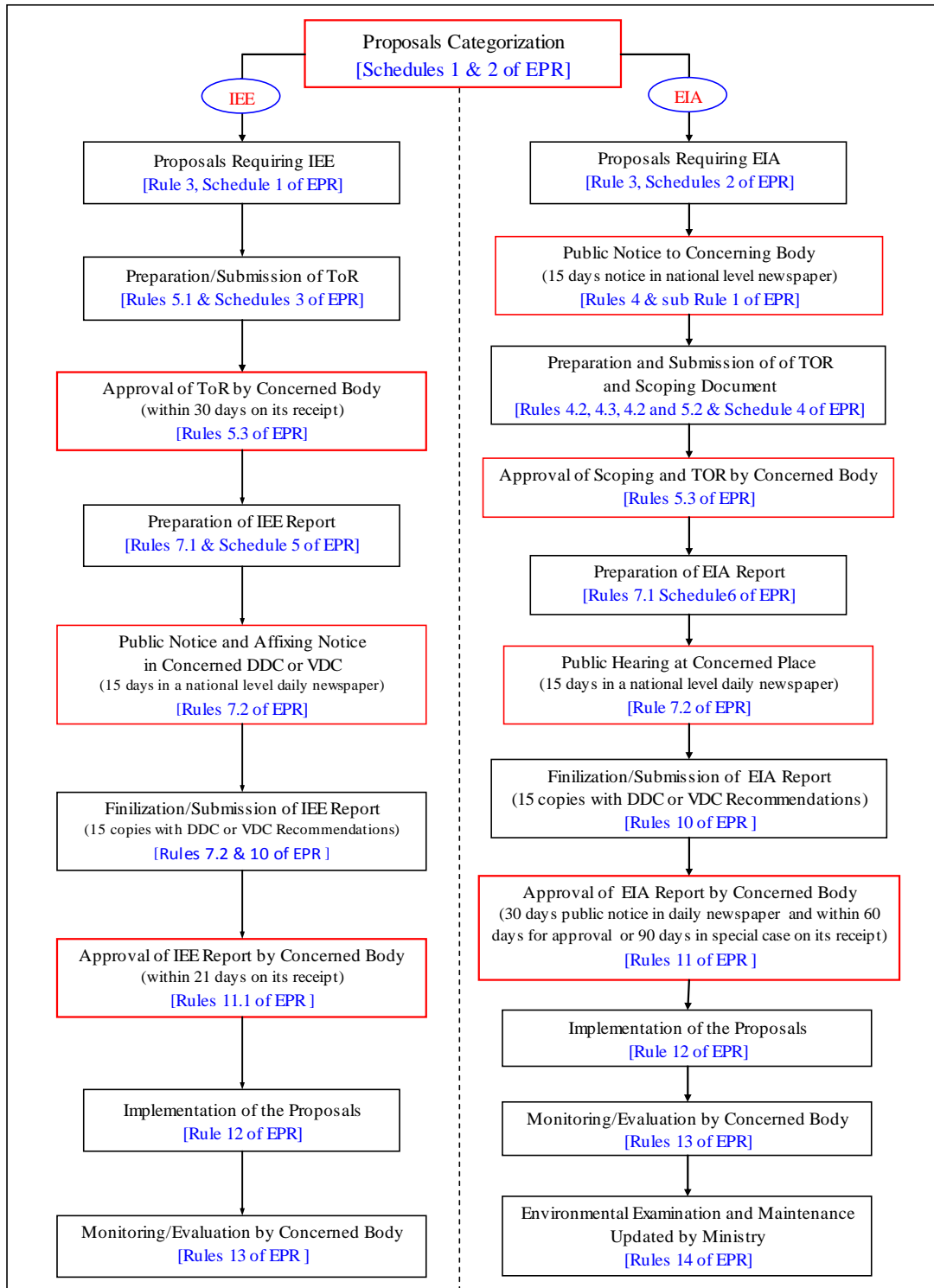
Source: Modified from EPR 1997 and Environmental and Social Management Framework (April, 2007) and Environmental Assessment in the Road Sector of Nepal, GESU/DoR (January, 2000)

Note: Sensitive areas include: Historical, cultural and archaeological areas; Ecologically sensitive and wetland area; National park, wildlife sanctuaries and conservation area; Semi-arid, mountainous and Himalayan regions; Flood-prone and other dangerous areas; Residential areas, school and hospital areas; and Areas that are main sources of public water supply.

All road development projects require the conduct of either an IEE or EIA study, depending on road classes, road length and project costs as shown Table 16.

The project is a construction of countermeasure against landslide for Sindhuli Road or just rehabilitation of national highways. According to Table 16 above, the project falls in the category of IEE. Furthermore, from the reviews of requirements by the abovementioned international agencies, the project also needs to conduct an EA at the IEE level.

For projects requiring an IEE study, the proponent should start by preparing the terms of reference (ToR) following the format specified in Schedule 3 of EPR and submit it to the concerned ministry through the concerned department. Figure 5 shows the overall IEE/EIA approval process in accordance with EPR 1997 and its amendments in 1999 and 2008.



Note: EPR = Environmental Protection Rules, 1997 and its amendment in 1999 and 2008

**Figure 5 Steps for IEE/EIA Study and Approval in Nepal**

#### (4) Relevant Environmental Organizations and Their Tasks

In Nepal, the Ministry of Environment (MoE) is in charge of environmental control and management for all sector agencies. The MoE has the responsibility to provide adequate environmental and social safeguards in the design and implementation of the strategic road network (SRN). In the case of an EIA study, the approval of the ToR for EIA and the EIA report lies with the MoE.

On the other hand, the concerned ministry has overall responsibility for environmental monitoring of the projects implemented under it. For projects requiring an IEE, the proponent shall prepare the ToR for IEE study and submit it to the concerned ministry through the concerned department. The ministry has the responsibility for the environmental monitoring and final approval of the ToR and IEE report.

The proponent of the project is the DoR under the MoPPW. Accordingly, the DoR will prepare the ToR for the IEE study and IEE report, and submit them to the MoPPW through the Geo-Environment and Social Unit (GESU). The MoPPW will be responsible for the approval of ToR and IEE reports for the project.

## **6 INTERVIEWS WITH PROJECT-AFFECTED COMMUNITY AND RELATED DDC/OFFICERS**

Stakeholder meetings have been planned to be held during the IEE study in order to discuss some environmental issues with local stakeholders and related organizations. The JICA Study Team visited the project site and interviewed some members of the project-affected community and DDC. The interview focused mainly on local opinions and concerns about the project as summarized below:

- Local community has no objection to the project.
- Construction activities will need temporary use of approximately 9,000 m<sup>2</sup> of farmland for access road, material/equipment piling and worker camps. Interview with some landowners show that they have no objection to the use of their land with reasonable compensation and recovery after the construction activity.
- A primary school (65 students) is close to the project site. The principal and teachers require minimizing noise pollution during school hours and strengthening safety measures for children, especially during commuting time to school and back to their houses.

## **7 ENVIRONMENTAL IMPACT IDENTIFICATION AND ASSESSMENT**

Preliminary environmental impact identification and assessment is summarized as follows (Refer to Appendix 1: Environmental Check List):

### (1) Activities due to the Implementation of the Project

Expected activities due to project implementation are shown in Table 17.

**Table 17 Activities Due to Project Implementation**

<b>Stage</b>	<b>Activity</b>	<b>Remarks</b>
Planning	1) Land acquisition	

	2) Change of plan for use of lands and local resources	
Construction	1) Engineering works for earthmoving, cutting and filling	
	2) Installation of anchor and related structures	
	3) Bioengineering works (plant and vegetation)	
	4) Installation of stockpiling and worker's camps, etc.	
	5) Operation of construction equipment, machines and vehicles	
Operation	Not eligible	

## (2) Scoping of Possible Adverse Environmental Impacts

The adverse environmental and social impacts due to project implementation are identified, predicted and evaluated with rating for 31 items of social environment, natural environment and environmental pollution according to the scoping procedure of the JICA Guidelines for Environmental and Social Considerations as well as in consideration of the project features. The result of environmental scoping is summarized in Table 18.

**Table 18 Scoping of Potential Adverse Environmental Impacts (During Planning/Construction)**

No.	Potential Impact	Rating	Description of Impact
<b>Pollution</b>			
1	Air pollution	B-	Dusts and gases are anticipated during construction.
2	Water pollution	B-	Petroleum and hydraulic fluid spills from heavy equipment might occur and cause water pollution.
3	Spoils and waste	B-	Excavation materials will be used as fill material and the other wastes will be disposed of at the designated place.
4	Soil contamination	C-	Petroleum and hydraulic fluid spills and leaks from heavy equipment might cause soil contamination on farmlands.
5	Noise and vibration	B-	Noise and vibration will be expected due to the use of machines and equipment for the construction activity.
6	Ground subsidence	D	No ground subsidence effect is expected at the project area.
7	Offensive odor	D	No offensive odor effect is expected at the project area.
8	Bottom sediment	D	No bottom sediment effect is expected at the project area.
<b>Natural Environment</b>			
9	Topography/geology	B-	Small-scale topographical reformation or alteration will be required due to realignment and subsequent excavation.
10	Slope stability	A+	The landslides will be stabilized, and all excavation slopes will be protected with appropriate structures.
11	Soil erosion	C-	Excavation/embankment works might cause soil erosion.
12	Hydrological situation	D	No hydrological situation effect is anticipated at the proposed construction site (material source from riverbed).
13	Groundwater	D	Adverse impacts might be very small due to anchor installation.
14	Nature preserve	D	No natural preserves exist within the project area.
15	Ecosystem	D	No ecosystems exist within the project area.
<b>Socio-economic Environment</b>			
16	Involuntary resettlement	D	No involuntary resettlements are expected.
17	Poor people and groups	D	No poor people exist at the project area.
18	Ethnic and indigenous people	D	Ethnic people exist at the project area. However, adverse impacts of the project to the ethnic people may be expected to be very minimal.
19	Local economy such as employment and livelihood	C-	Construction activity might create some temporary traffic blockage and affect economic activities.
20	Land use and utilization of local resources	B-	Private lands will be temporarily used for the access road, stockpiling, and workers' camp.
21	Use of and right for water	C-	Some natural springs at the project area are the major source of drinking water for local people. No water right exists at the project area.

No.	Potential Impact	Rating	Description of Impact
22	Existing social infrastructure and services	C-	The removal of existing water supply pipe will be required. The restriction and control of existing traffic may be temporarily anticipated.
23	Maldistribution of benefit and damage	D	Adverse impacts may be very small.
24	Local conflict of interest	D	No local conflict of interest exists at the project area.
25	Cultural heritage	D	Bhadrakali Temple at Sta. 17+000 is close to the project area, but the adverse impacts to the temple may be expected to be very small.
26	Landscape	D	Adverse impacts may be minimal due to small-scale earthwork.
27	Labor environment	C-	Defective management of safety and health for workers may be expected during construction activity.
28	Sanitation	D	No sanitation problem exists at the project area.
29	Hazards (risks)	C-	Rockfall may be expected to occur around the upper slope.
<b>Others</b>			
30	Accidents	B-	Construction activity and temporary traffic blockage may cause traffic accidents.
31	Global warming	D	Adverse impacts may be small.
<b>Overall Rating</b>		<b>B-</b>	It is necessary to give landowners compensation and recovery prior to construction. Moreover, mitigation measures against traffic safety, noise, dust and vibration should be taken.

Rating: A+/- = Significant positive/negative impact is expected, B+/- = Positive/negative impact is expected to some extent, C+/- = Extent of positive/negative impact is unknown or may be small at this stage, and D = No impact is expected.

As a result, one item is categorized as A+, seven items are categorized as B-, and seven items as C-. The others are categorized as D. Accordingly, the implementation of the project will be expected to contribute positive environmental effects considerably but to some extent cause negative environmental impacts.

## 8 MITIGATION MEASURES

The following assumed items were recommended and discussed concerning avoidance and mitigation measures.

**Table 19 Mitigation Measures**

No.	Potential Impact	Rating	Conceivable Mitigation Measures
<b>Pollution</b>			
1	Air pollution	B-	<u>A. Construction Stage:</u> a) Periodical watering around the implementation area will be carried out to prevent blowing of dust.
2	Water pollution	B-	<u>A. Construction Stage:</u> a) Provision by proper construction plan and management.
3	Spoils and waste	B-	<u>A. Plan and Design Stage:</u> a) Excavated material is planned to be reused for filling purpose. <u>B. Construction Stage:</u> a) The wastes will be disposed off at the dedicated places.
4	Soil contamination	C-	<u>A. Construction Stage:</u> a) Provision by suitable planning and management of project implementation.
5	Noise and vibration	B-	<u>A. Plan and Design Stage:</u> a) Machines/equipment of adequate capacity and low noise/vibration are planned to be used for each activity. <u>B. Construction Stage:</u> a) Installation of soundproof wall, and b) Limiting the operation time during holidays, local event festivals, etc.
<b>Natural Environment</b>			

No.	Potential Impact	Rating	Conceivable Mitigation Measures
6	Topography/geology	B-	<u>A. Plan and Design Stage:</u> a) Cutting and filling slopes are planned/designed to minimize the changes in topography, and b) Only approved material and sources will be used for embankment and crushed aggregate.
7	Soil erosion	C-	<u>A. Plan and Design Stage:</u> a) Proper slope protection works are provided. <u>B. Construction Stage:</u> a) Limiting and controlling progress of earthworks during rainfalls.
<b>Socio-economic Environment</b>			
8	Local economy such as employment and livelihood	C-	<u>A. Construction Stage:</u> a) At the beginning of project implementation, provide adequate information to bus companies and relevant local organizations, b) Provide adequate compensation for landowners, and c) Give local residents a chance to participate in the construction work.
9	Land use and utilization of local resources	B-	<u>A. Plan and Design Stage:</u> a) Prepare construction plan to limit the use of private lands. <u>B. Construction Stage:</u> a) Provide adequate compensation for landowners, and b) Restore to the original status after construction.
10	Use of and right for water	C-	<u>A. Construction Stage:</u> a) Periodical check for amount of water use, and b) Proper compensation to local community.
11	Existing social infrastructure and services	C-	<u>A. Construction Stage:</u> a) Move the water supply pipe at the beginning of project implementation.
12	Labor environment	C-	<u>A. Construction Stage:</u> a) Provide proper construction plan and management to consider the health, safety, and security of the workers for the implementation of the project.
13	Hazards (risks)	C-	<u>A. Construction Stage:</u> a) Periodical inspection of upper slopes, b) Helmet use, and c) Installation of rockfall protection net, if necessary.
<b>Others</b>			
14	Accidents	B-	<u>A. Construction Stage:</u> a) Construction work signs and traffic controller will be provided accordingly, and b) Consideration to the primary school nearby should be given.

Rating: B- = Negative impact is expected to some extent, C- = Extent of negative impact is unknown or may be small at this stage.

## 9 ENVIRONMENTAL MONITORING (DURING CONSTRUCTION PHASE)

Environmental monitoring will be implemented to provide a basis for logical comparison of the predicted and actual impacts due to project implementation, to further identify any unpredicted impacts, and to implement necessary measures to minimize the environmental impacts of the project.

The GESU under the DoR has integrated environmental aspects in the road development and maintenance project. The GESU will be responsible for the implementation of the environmental monitoring of the project. The monitoring plan is tentatively proposed and given in the following table. Moreover, monitoring result shall be reported in the prescribed format which will be prepared by GESU (Refer to Appendix 2 Monitoring Form) .

**Table 20 Monitoring Plan**

No.	Potential Impact	Rating	Monitoring			
			Parameter	Frequency	Method	Responsibility
<b>Pollution</b>						
1	Air pollution	B-	Dust, odors	Once a month	Observation	GESU
2	Water pollution	B-	pH, turbidity	Once a month	Measuring	GESU

No.	Potential Impact	Rating	Monitoring			
			Parameter	Frequency	Method	Responsibility
					and inspection	
3	Spoils and waste	B-	Construction spoil, waste, etc.	Once a month	Drawings and inspection	GESU/Project
4	Soil contamination	C-	Dust, hazardous materials and oils	Once a month	Inspection and hearing	GESU
5	Noise and vibration	B-	Sound source	Once a month	Observation and hearing	GESU/Project
<b>Natural Environment</b>						
6	Topography/geology	B-	Land alteration	Once a month	Drawings and observation	GESU
7	Soil erosion	C-	Collapse and soil loss	Once a month	Drawings and observation	GESU
<b>Socio-economic Environment</b>						
8	Local economy such as employment and livelihood	C-	Compensation, and traffic blockage	Once in six months	Hearing	GESU
9	Land use and utilization of local resources	B-	Land use area	Once a month	Drawings and observation	GESU
10	Use of and right for water	C-	Natural springs	Once a month	Hearing	GESU
11	Existing social infrastructure and services	C-	Shifting of water supply pipe	Once a month	Hearing and inspection	GESU
12	Labor environment	C-	Holidays and insurance	Once a month	Hearing	GESU
13	Hazards (risks)	C-	Rockfall and slope collapse	Once a month	Inspection	GESU/Project
<b>Others</b>						
14	Accidents	B-	Accidents by vehicle and due to construction	Once a month	Hearing and inspection	GESU/Project

Rating: B- = Negative impact is expected to some extent, C- = Extent of negative impact is unknown or may be small at this stage.

## Appendix 1 Environmental Check List

### Environmental Check List(1) Permits and Public Explanation

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) IEE and Environmental Permits	(a) Have IEE reports been already prepared in the official process?  (b) Have IEE reports been approved by the authorities of the Nepalese government?  (c) Have IEE reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?  (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host Nepalese government?	(a) N (b) N (c) N (d) N	(a) IEE is being carried out by DoR which will be completed in April 2012  (b) IEE reports will be submitted to MoPPW in April for approval.  (c) It is expected that the report will be unconditionally approved.  (d) Required environmental permits will be obtained in accordance to the laws, regulations of Nepal and IEE recommendation.
(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?  (b) Have the comments from the stakeholders (such as local residents) been reflected in the project design?	(a) N (b) N	(a) Contents of the project will be explained to the local stakeholders in the process of IEE.  (b) Comments and requirements from the stakeholders will be introduced to the project design and execution.
(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	Alternative plan has been studied in the preparatory study implemented by JICA.

### Environmental Check List(2) Pollution Control

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) Air Quality	(a) Is there a possibility that air pollutants emitted from project-related sources such as vehicle traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken?  (b) If air quality already exceeds the country's standards near the route, is there a possibility that the project will make air pollution worse?	(a) Y (b) N	(a) Dust and gas are anticipated during construction.  (b) Existing air quality is clean and good. Periodical watering around the project area will be carried out to reduce blowing of dust.
(2) Water Quality	(a) Is there a possibility that soil runoff from bare lands resulting from earthmoving activities, such as cutting and filling, will cause water	(a) Y (b) Y	(a) Petroleum and hydraulic fluid spills from heavy equipment might occur and cause water pollution during construction.



	quality degradation in the downstream water areas?  (b) Is there a possibility that the project will contaminate water sources such as well water?		(b) Petroleum and hydraulic fluid spills from heavy equipment will be minimized by careful construction management.
(3) Noise and Vibration	(a) Do noise and vibrations from the vehicle comply with the country's standards?  (b) Do low frequency sound from the vehicle comply with the country's standards?	(a) Y (b) Y	(a) Noise and vibration generated by heavy machines and equipment are expected to comply with the Nepalese Standards.  (b) Low frequency sound from machines/equipment is expected to comply with the Nepalese Standards.

### Environmental Check List(3) Natural Environment

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(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	No issues on protected area.
(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats, e.g., coral reefs, mangroves, or tidal flats?  (b) Does the project site 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) Are adequate protection measures taken to prevent impacts such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?  (d) Is there a possibility that the installation of access 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?	(a) N (b) N (c) N (d) N	(a) and (b) No issues on ecosystem in the project site.  (c) Adequate protection measures will be taken in the construction stage to prevent impacts such as disruption of migration routes, habitat fragmentation, and traffic accidents of wildlife and livestock.  (d) There is no possibility that installation of access roads will cause impacts such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems. Access road will be constructed in a farmland of millet which will be given reasonable compensation by DoR and restored after completion of the project.
(3) Hydrology	(a) Is there a possibility that the alteration of topographic features and installation of structures such as tunnels will adversely affect	(a) N	No issues on hydrology in the project area.

	surface water and groundwater flows?		
(4) Topography and Geology	<p>(a) Are there unstable slopes that may cause landslides or slope failure? Are adequate measures considered to prevent landslide or slope failure where needed?</p> <p>(b) Is there a possibility that civil works such as cutting and filling will cause slope failures or landslides?</p> <p>(c) Is there a possibility that soil runoff will result from cut and fill area?</p>	<p>(a) Y</p> <p>(b) N</p> <p>(c) Y</p>	<p>(a) Many unstable slopes are developing in the project site which will be stabilized by the countermeasures implemented in the project.</p> <p>(b) Safe construction is planned, and cutting and filling works will be implemented safely by careful construction management.</p> <p>(c) Some amount of soil runoff during construction stage will be minimized by careful construction.</p>

#### Environmental Check List(4) Social Environment

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) Resettlement	<p>(a) Is involuntary resettlement being caused by project implementation? If yes, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is there land use and use of local resources? Is there adequate explanation on land use to landowners and will reasonable compensation be given?</p>	<p>(a) N</p> <p>(b) Y</p>	<p>(a) No involuntary resettlement is caused by the project.</p> <p>(b) Private field will be used for temporary road which will be given reasonable compensation. After completion of the project, the used land will be restored.</p>
(2) Living and Livelihood	<p>(a) Is there a possibility that the project will affect the existing means of transportation and the associated workers?</p> <p>(b) 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?</p> <p>(c) Is there any possibility that the project will adversely affect the living conditions of the inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>(d) 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?</p> <p>(e) Is there any possibility that the project will adversely affect road traffic in the surrounding areas,</p>	<p>(a) Y</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p> <p>(e) Y</p> <p>(f) Y</p> <p>(g) N</p>	<p>(a) Traffic regulation during construction will disturb the traffic which will be minimized by careful construction management.</p> <p>(b) There is no significant impact on land use and local sources.</p> <p>(c) There is no possibility that the project will adversely affect the living conditions of the inhabitants</p> <p>(d) Advance safety and healthcare directive and management are carried out.</p> <p>(e) Traffic regulation during construction will disturb the traffic, which will be minimized by careful construction management.</p> <p>(f) Same as above.</p> <p>(g) There is no possibility that facilities generated by the project will cause sun shading and radio interference.</p>

	e.g., increase of traffic congestion and traffic accidents?  (f) Is there any possibility that the project will disturb the movement of inhabitants?  (g) Is there any possibility that the facilities generated by the project will cause sun shading and radio interference?		
(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) There is no heritage in the project area.
(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Cut and fill slope will be treated by suitable vegetation and protection work.
(5) Ethnic Minorities and Indigenous People	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous people?  (b) Are all of the rights of ethnic minorities and indigenous people, in relation to land and resources, respected?	(a) Y (b) Y	(a) and (b) No issues on ethnic minorities and indigenous people.
(6) Working Conditions	(a) Does the project observe Nepalese labor laws and regulations?  (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?  (c) Are intangible measures being planned and implemented for individuals involved in the project such as the establishment of a safety and health program, safety training (including traffic safety and public health) for workers, etc.?  (d) Are appropriate measures taken to ensure that security guards involved in the project will not violate safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a) The project will be implemented observing Nepalese labor laws and regulations strictly.  (b) The project will be implemented under advanced safety management.  (c) Advanced safety management plan will be established which will be strictly applied during project implementation.  (d) Security management plan will be established which involves local police.

#### Environmental Check List(5) Others

Environmental Item	Main Check Items	Yes: Y No: N	Methods of Environmental Considerations
(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts	(a) Y (b) Y	(a), (b), (c),

	<p>during construction, e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes?</p> <p>(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce the impacts?</p> <p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce the impacts?</p>	(c) Y	Adequate measures and considerations will be taken for any kind of environmental impact such as pollution to natural and social environment.
(2) Monitoring	<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) What are the items, methods and frequencies of the monitoring program?</p> <p>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>(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?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p>	<p>(a) An Environmental Monitoring Unit (EMU) will be established by DoR which will be responsible for the execution of the monitoring program.</p> <p>(b) Major items of monitoring include “permit and public explanation”, “pollution control”, and “social environment”</p> <p>(c) DoR will establish an EMU.</p> <p>(d) The monitoring program by DoR will include the monitoring method and the regulations to be followed.</p>

## Appendix 2 Monitoring Form (Example)

### Monitoring Form

As environmental review indicates the need for monitoring the items shown below, the Ministry of Public Works should undertake monitoring for necessary items and report to JICA monthly.

#### 1 Permit and Public Explanation

Table 1.1 Monitoring on Permit and Public Explanation

Monitoring Item	Date	Monitoring Result
Implementation of IEE		
Approval of IEE		
Explanation of project		

#### 2 Pollution Control

##### 2.1 Air Quality

Table 2.1 Monitoring on Air Quality

Monitoring Item	Date	Monitoring Result
Visual observation on air quality		

##### 2.2 Water Quality

Table 2.2 Monitoring on Water Quality

Measurement Item	Unit	Measured Value	Nepalese Standard	Remarks
PH	mg/L			
BOD	mg/L			
SS	mg/L			
DO	mg/L			
Bacillus Coli	MPN/100 mL			

##### 2.3 Noise/Vibration (measurement point: the nearest house from the site)

Table 2.3 Monitoring on Noise/Vibration

Measurement Item	Unit	Measured Value	Nepalese Standard	Remarks
Noise level	mg/L	dB		
Vibration level	mg/L	dB		

#### 3. Natural Environment

- No issues on natural environment-

#### 4. Social Environment

Table 1.1 Monitoring on Permit and Public Explanation

Monitoring Item	Date	Monitoring Result
Agreement on private lands		
Compliance on labor laws		

Compliance on safety system		
Compliance on health program		
Situation of security guard		

6.3

*TERMS OF REFERENCE of Initial  
Environmental Examination Study  
Countermeasures Construction of  
Landsides for Sindhuli Road  
(Section II)*

**Government of Nepal  
Ministry of Physical Planning and Works  
Departments of Roads  
Banepa-Sindhuli-Bardibas Road Project**

**TERMS OF REFERENCE  
of  
Initial Environmental Examination Study**

**Countermeasures Construction of Landsides for  
Sindhuli Road (Section II)**

**September, 2011**

**Proponent:  
Banepa-Sindhuli-Bardibas Road Project  
Department of Roads  
Thapathalli, Kathmandu  
Nepal**



## 1 NAME AND ADDRESS OF THE INDIVIDUAL OF INSTITUTION PREPARING THE REPORT (PROPONENT)

### 1.1 NAME OF PROPOSAL

The Department of Roads (DoR) is the implementation agency of the Project and the proponent of the Initial Environmental Examination (IEE) study for Countermeasure Construction for The Landslide on Sindhuli Road (Section II). The Ministry of Physical Planning and Works (MoPPW) is the concerned authority for the approval of IEE study report.

Name of the Proposal is

***'Initial Environmental Examination of The Project for Countermeasures Construction for Landslide on Sindhuli Roads (Section)***

### 1.2 NAME AND ADDRESS OF THE PROPONENT

The Proponent is the Banepa Sindhuli Bardibas Road Project of Department of Roads. The Department of Roads (DoR) is the leading agency for road development under Ministry of Physical Planning and Works (MoPPW) and is responsible for translating government policies for the road sub-sector into the provision of services. The services it provides include planning, design, construction and maintenance of the Strategic Road Network, and provisions to ensure a reasonable level of safety for all road users. The name and address of Proponent is presented hereunder.

***Banepa Sindhuli Bardibas Road Project***

*Department of Roads*

*Thapathalli, Kathmandu, Nepal*

Telephone Number: 4250680

## 2 INTRODUCTION OF THE PROPOSAL

### 2.1 GENERAL INTRODUCTION

#### 2.1.1 Background of the Proposal

The Banepa – Sindhuli – Bardibas Road, which is classified as the National Highway, is one of the most important strategic roads to link Kathmandu Valley with the eastern Terai. The road has been constructed section by section approach (Table 1) since November 1996 through grant assistance from the GoJ. The Banepa – Sindhuuli – Bardibas Road is planned to be completely constructed and fully opened in 2014. A location map of the Banepa Sindhuli Bardibas Road Project is presented in Figure 1.

**Table 1 : Banepa – Sindhuuli – Bardibas Road**

Section	Name of Road	Length (Km)	Status	Remarks
I	Bardibas – Sindhuli Bazaar	37	Completed	No EA <sup>1)</sup>
II	Sindhuli Bazaar – Khurkot	39	Completed	EIA <sup>2)</sup>
III	Khurkot – Nepalthok	32	Under construction	EIA <sup>2)</sup>
IV	Nepalthok - Dhulikhel	50	Completed	No EA <sup>1)</sup>
Total		158		

Notes: 1) No environmental assessment, either EIA or IEE was legally required at the time of the project implementation, 2) EIA = Environmental Impact Assessment for the road project was completed and approved.

To improve the current traffic situation and strengthen the road maintenance system for the Banepa – Sindhuuli – Bardibas Road, the GoN requested the GoJ to grant technical assistance project. Accordingly, JICA implemented an inspection on the completed I, II, IV sections of the Banepa – Sindhuuli – Bardibas Road in August 2009 and identified the many potential landslides along the road. Of these potential landslides, the landslides at Sta. 17+ 600 and Sta. 18+200 in Section II were thought to be most serious and hazardous. Stabilization works for these landslides need further Grant Aid from GoJ. The proposed counter measure is for these two sections only.

Figure 1: Location Map of the Project Road

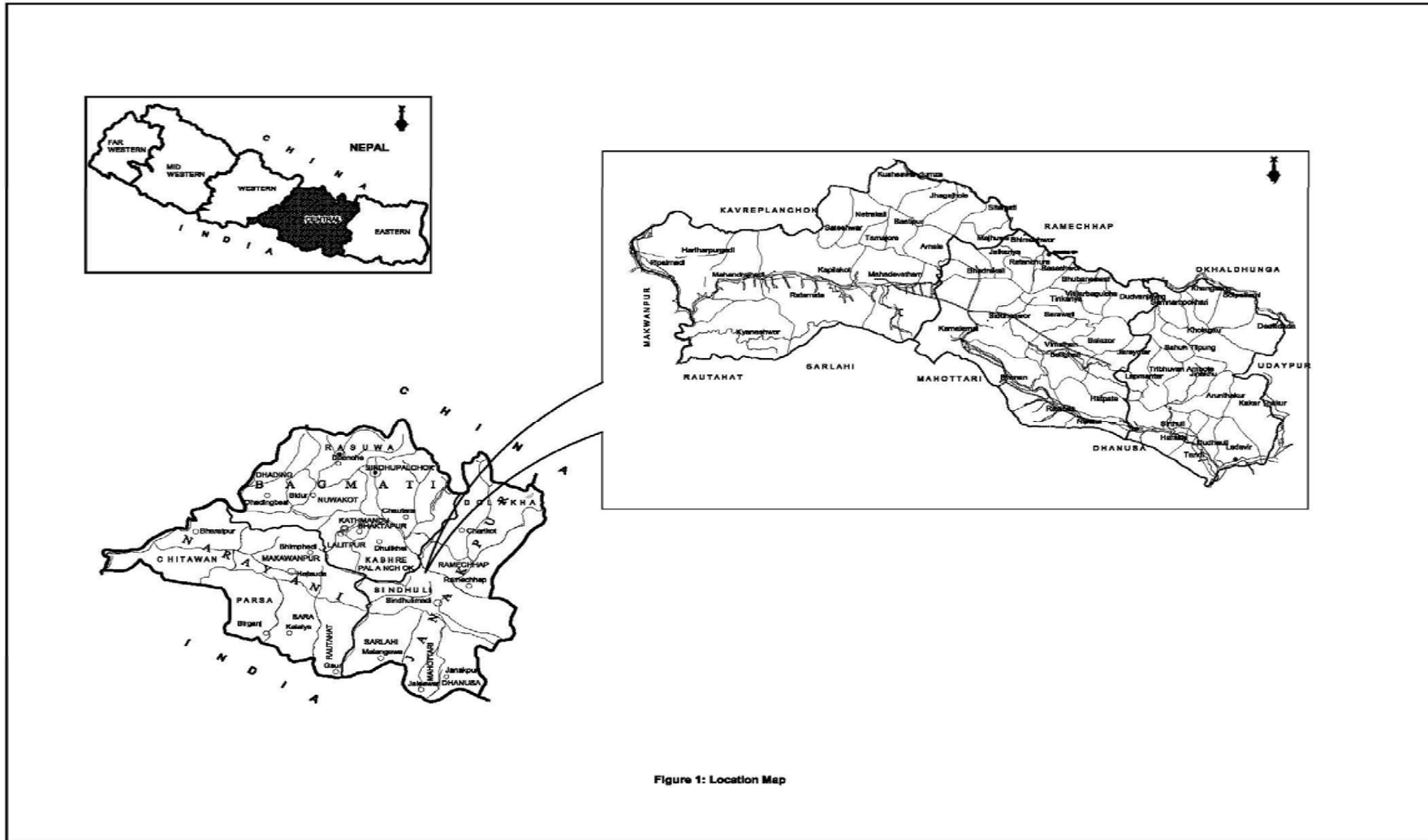


Figure 1: Location Map

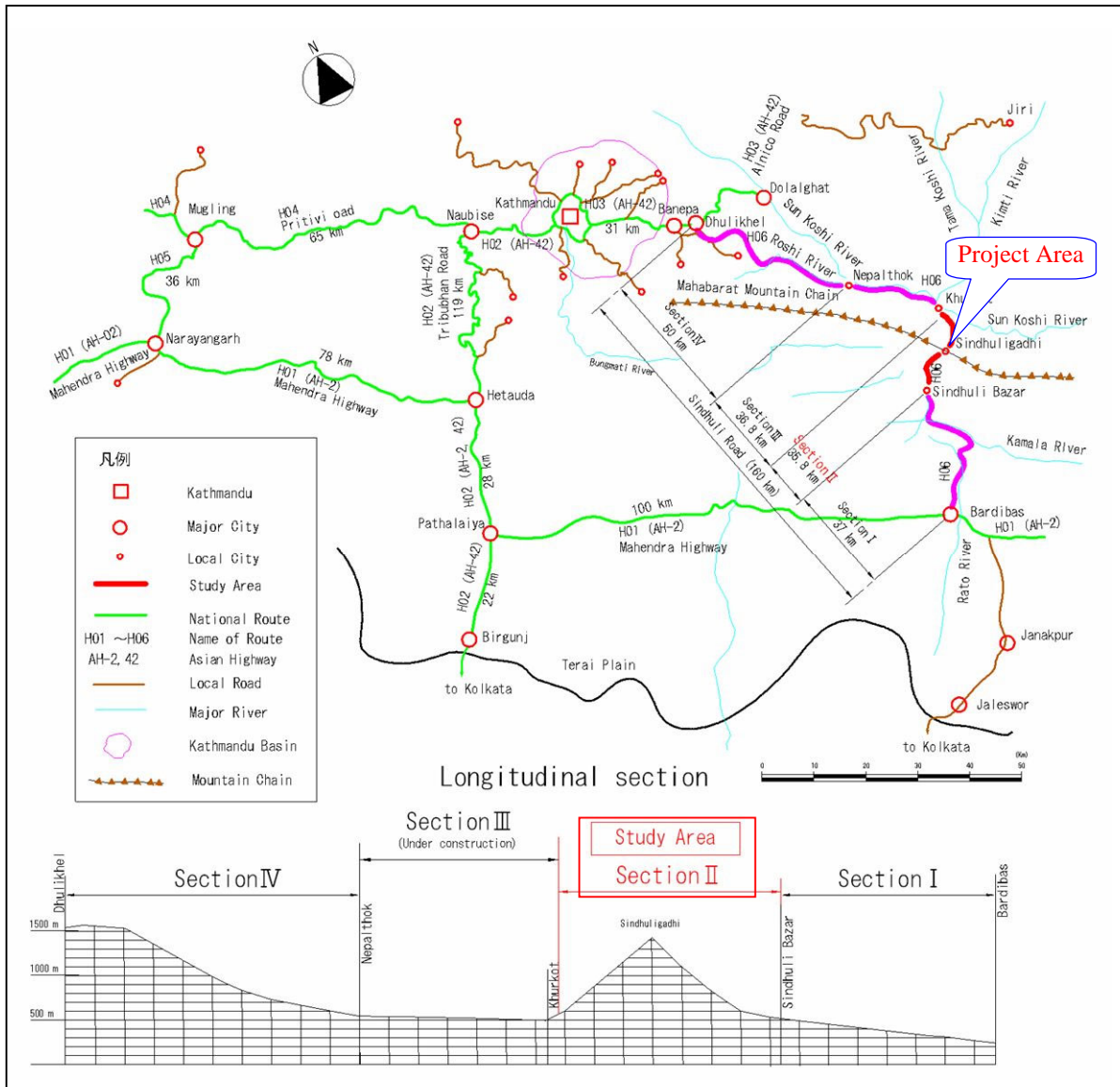
### 2.1.2 Project Description

The Project is a construction of countermeasures against landslides at Sta. 17+600 and Sta. 18+200 within the Sindhuli Bazaar – Khurkot section, Section II of the Banepa – Sindhuuli – Bardibas Road (Figure 2). The project location is summarized in Table 2. The project area is located in Bhadrakali VDC of the Sindhuli district.

**Table 2 : Outline of the Project Location**

Section	Site	Section length (m)	Damaged area (m <sup>2</sup> )
II	Sta. 17+600	80	80x100=8,000
	Sta. 18+200	50	50x50=2,500
Total		130	10,500

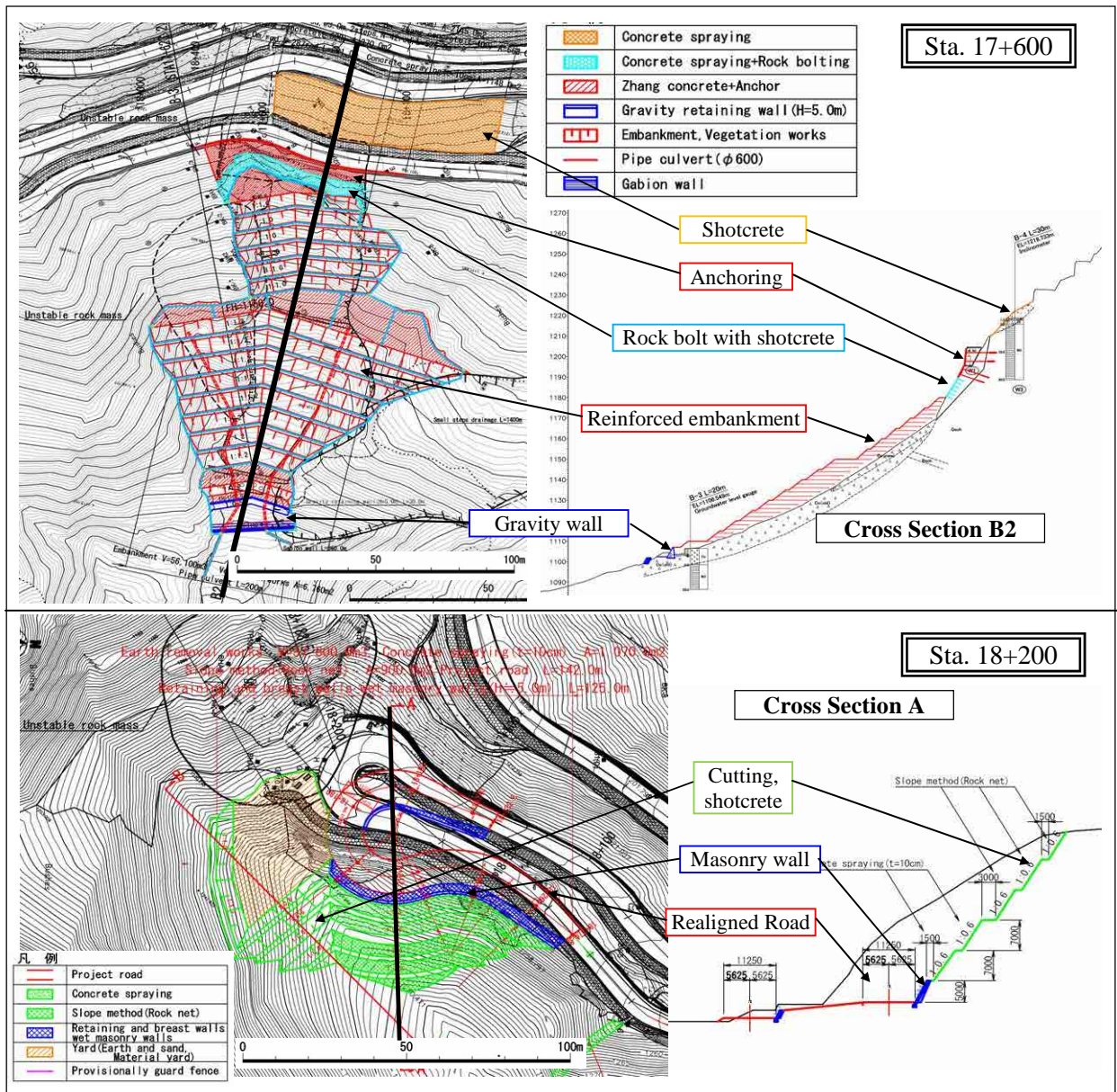
The objective of the Project is to implement the permanent countermeasures for the above-mentioned two damaged sites in order to keep sustainable traffic function of the road. The proposed countermeasures of the Project are shown in Figure 3 and summarized in Table 3.



**Figure 2 : Location of the Project Site**

**Table 3 : Outline of the Countermeasures Proposed for the Project**

Site/Section	Countermeasures	Remarks
Sta. 17+600	<ul style="list-style-type: none"> <li>• Check dam</li> <li>• Gravity-type retaining wall</li> <li>• Reinforced embankment</li> <li>• Gabion wall</li> <li>• Sheet sodding (Bioengineering work)</li> <li>• Shotcrete</li> <li>• Anchor works</li> </ul>	
Sta. 18+200	<ul style="list-style-type: none"> <li>• Road realignment toward mountain side</li> <li>• Earth removal works (excavation),</li> <li>• Shotcrete</li> <li>• Masonry retaining wall</li> <li>• Vegetation (Bioengineering work)</li> </ul>	Construction spoil due to excavation of road realignment will be used as embankment material of the reinforced embankment at Sta. 18+200.



**Figure 3 : General Plan and Section of the Proposed Countermeasures**

### 2.1.3 Salient Features

<b>Project</b>	:	The Preparatory Survey on the Project for Countermeasure Construction for the Landslides on Sindhuli Road (Section II)
<b>Development Region</b>	:	Central Development Region
<b>Zone</b>	:	Janakpur
<b>District</b>	:	Sindhuli
<b>VDC/Municipality</b>	:	Bhadrakali Village Development committee
<b>Total Length</b>	:	17+400 to 18+200

In general basic feature of proposed Preventive Maintenance will be as follows

Section	Outline of countermeasure
17+400	<ul style="list-style-type: none"> <li>• Check dam, Gravity-type wall and Planting cuttings</li> <li>• Gabion wall and Masonry retaining wall (upper side)</li> <li>• Guard fence</li> </ul>
17+600	<ul style="list-style-type: none"> <li>• Check dam and Gravity-type retaining wall</li> <li>• Reinforced counterweight fill, Gabion wall and Sheet sodding works for slope protection</li> <li>• Shotcrete and Anchor works</li> </ul>
18+200	<ul style="list-style-type: none"> <li>• Earth removal work, shotcrete, Masonry retaining wall and Planting cuttings</li> <li>• Road realignment to mountainside</li> </ul>

No of lanes	:	1 (Single Lane Road)
Design speed	:	20 kmph
Formation width	:	4.75 m (Exceptional 4m)
Cross fall	:	4 per cent (Gravel), 2.5 per cent (Double Surface Treatment)
Minimum curvature	:	15 m
Widening on curves	:	To be widened by adequate width for semi-trailer
Min. vertical curve Radius:	:	300m
Maximum grade	:	10 per cent
Limit length of Maximum grade:	:	300 m (Recover section (4%, 150 m) will be followed)

## 2.2 ENVIRONMENTAL SETTING OF THE PROPOSAL AREA

### 2.2.1 Physical Environment

#### (i) Land use and Topography

The land area in the district is categorized into three different types; High Mountain, Mid Mountain and Siwalik. The details on agricultural land (cultivated and uncultivated), pastures, forests and others type of land are shown in the table below.

Physical Condition	Agriculture		Non-Agriculture			
	Cultivated	Uncultivated	Pasture	Forest	Others	Total
High Mountain	0	0	0	70	0	70
Mid Mountain	17,116	13,349	1,110	62,043	1,409	95,027
Siwalik	22,369	6,012	304	116,017	7,910	152,612
Total	39,485	19,361	1414	178,130	9,319	247,709

Total cultivated land in Sindhuli district is 39,484 Ha and the forest area covers 178,130 Ha of the total district area. The total land area of the district is 247,709 Ha.

The topography of the project area of both sites is not very steep. It is about 45° hill slope facing south direction. But due unstable condition of the hill slope and land slide has occurred. Land use of the project area is degraded hill slope with scanty vegetation.

#### (ii) Geology

The project area is located in the northwest slope of Mahabarat Mountain Range that has been formed by successive geo-tectonic movement in Tertiary. The geology of the project site consists of Pre-Cambrian schistose rocks. The schistose rocks are generally hard, less to slightly fractured at outcrop but locally very intensely fractured and sheared. The fractured and sheared rocks or zones, which are presumably due to Mahabarat Thrust, are highly susceptible to landslides.

(iii) *Climatic condition*

Sindhuli district does have a moderate type climate in comparison to any other of the tarai district air temperature. The maximum temperature recorded during summer months (April-July) is approx. 33-35 degrees and during winter months (Nov-Jan) is 20.5-22 degrees. The highest rain recorded in the district is approx. 573-580 mm in July and 0.00 mm in February. The humidity level is very high and it varies between 75%-90% during summer.

(iv) *Air, Water and Noise*

The project area does not have any source of pollution industry of the establishment that would deteriorate the air quality, water quality or noise pollution. The noise and air pollution could be from the vehicles that will be plying on the road. In other words, the project area is pristine from the environmental condition.

## 2.2.2 Biological Environment

The project area is located in mid-hills (sub-tropical and temperate) ecological zone. Some the common vegetation that are found in the land slide area of subtropical and temperate zone are utis (*Alnus nepalensis*), Banmara (*Eupatorium adenophorum*), Dhayaro (*Wodifordi floribunda*), Gholgaru (*Credegus erenulata*), Sisnu (*Ortica dioica*), Nigalo (*Arundinecia sp.*), Asuro (*Adhatoda vasica*), Chilaune (*Shima Wallichii*), titepati (*Artimisia vulgaris*). The project area will also have similar vegetation which will be detailed out in the IEE report.

Jackle (*Canis aureus*), Common Langur (*Presbytis entellus*), Jungle cat (*Felis chaus*), Common monkey (*Macaca mulata*), Sloth Bear (*Melursus ursinus*), Porcupine (*Hystrix indica*), are commonly found in the forest area of the project area vicinity. Leopard (*Panthera pardus*) and Barking Beer (*Muntiacus vaginalis*) are occasionally seen species whereas Rabbit (*Ochotona sp.*), Squirrel (*Callousciurus pygerythrus*), Rat (*Rattus rattus*), Mongoose (*Herpestes edwardisii*), were found in both forest as well as private lands

## 2.2.3 Socio-economic and Cultural Environment

The description of existing Socio-economic and Cultural Environment of Sindhuli District is presented hereunder. The data are based on the record of District Profile of Nepal 2007/2008 of the intensive study and research center.

(i) *Demographic Pattern*

Sindhuli district has a total population of 333,816 (as per 2009 projection census) with 166,156 Male and 167,660 Female. The total Household in the district is 58,166 with an average household size of 7 people. The project area is located in **Bhadrakali** VDC. It has a total population of 5,477 with male 2,673 and female 2803. Total number of HH in bhadrakali VDC is 888 with an average HH size of 6.17.

(ii) *Ethnicity/Caste*

We have a mix ethnic group of people residing in Sindhuli district. Namely, Tamang, Chhettri, Magar, Dalit, Bahun, Newar, Danuwara, Majhi, Sunuwar, Rai, Gharti/Bhujel, Thakuri, Sanyasi, Tharu and others. The majority of ethnic group of people seen are mostly Tamang, Chhettri, Dalits and Newar whereas the minority ethnic group are Rai, Thakuri, Danuwar and Tharu. Looking at the project affected VDC, the majority of the ethnic groups of Bhadrakali VDC is Tamang (2047) followed by Magar (773) and then chhetri (516), the minority Ethnic groups are Sunuwar (116) and Bahun (219).

(iii) *Religious Population*

190,098 of the total population i.e. 68.56% in this district are Hindus followed by Buddhist and Kirat with 28.09% and 2.14% respectively. Islam, Jain Christian and Sikh are the minority religious population with less than 1% in Sindhuli district.

(iv) *Literacy Rate*

The literacy rate in Sindhuli district is 60%. Good but not higher in average to national literary rate of the country. The literacy rate of the **Bhadrakali** VDC is 44% lower than the national literacy rate.

(v) *Education Status*

There are total 227 pre-primary schools, 502 primary schools, 114 lower secondary schools and 60 secondary schools with an average student teacher ratio of 60.97. There are 33 Higher Secondary Schools (30 Community, 2 Private and 1 Campus).

(vi) *Language*

Despite of mix ethnic group and their own mother tongue, majority (53.83%) of the Sindhuli residence speaks Nepali language and secondly 24.41% Tamang languages. Manjhi, Maithali, Newari and Bantawa are the least commonly spoken language in Sindhuli district with only 1.01%, 1.15%, 1.93% and 1.31% respectively.

(vii) *Health Service*

There are 3 private sector and NGO/INGO Health services in Sindhuli district but the major health facilities in the district are provided by 1 Government Hospital, 3 PHCC/HC, 10 HP, 42 SHP, 195 PHC Outreach Clinic, 205 EPI Clinic and 495 FCHV.

(viii) *Water Supply and Sanitation*

There are 21 numbers of project related to water supply and sanitation project in the district. Total 1,254 households are benefited and 7836 beneficiaries from the project. There are total 223 water points and 939 household latrines.

(ix) *Communication and Transportation*

.Most of the VDCs and Municipalities in Sindhuli district has an access to telephone service but only one (kamalamai N.P) VDC is benefitted from Electricity Use. In respect to transportation, Sindhuli district has no airport service but is facilitated with total 89 types and category of road (BT-26, GR-25, ER-38; NH-52, FRN-37). Total 3,144 population are influenced per km road in the district.

(x) *Energy*

Total 4,911 consumers are benefiting from the electricity and other sources of energy (grid and isolated hydro-power - 3,343 and alternative energy - 1,568); only 9% of the total households are equipped with metered connection of total 54,551 households in the district. Total 3,568 biogas plants are available in the district for other source of energy.

## 2.3 RELEVANCY OF THE PROPOSAL

### 2.3.1 Rationality for Conducting IEE Study

The Project is to implement the proposed permanent countermeasures for the two severe landslide-damaged sites in order to secure the timely open of the Banepa – Sinduli – Bardibas Road, an important national highway linking Kathmandu Valley with the eastern Terai. The implementation of the Project will also provide short term employment opportunity by engaging the rural poor people around the project area.

As per the **Rule 3** and **Schedule 1** of Environmental Protection Rule, 1997 (first amendment, 1999) (**EPR**) of the Government of Nepal (GON), an Initial Environmental Examination (IEE) is mandatory to be carried out for the upgrading and rehabilitation works of highways and feeder roads. The project area do not fall in any national park, conservation area or wildlife reserve areas, hence it does not require Environmental Impact Assessment level of study. Preparation of IEE report by DoR and approval of IEE report by MoPPW according to Nepali legal provision is considered sufficient by JICA Guidelines for Environmental and Social Considerations

### 2.3.2 Objectives of the IEE Study

The main objective is to carry out an IEE Study of The Countermeasures Construction for Sindhuli Road Project (Section III) in accordance with Environment Protection Rule, 1997 (first amended, 1999).

The IEE Study will include followings:

- Collect baseline data on physical, biological, socio-economic and culture resources of the area
- Identify positive and negative impacts of the project
- Suggest further enhancement measures for positive impacts
- Suggest mitigation measures for the adverse impacts
- Develop Environmental Management Action Plan
- Develop a practical Monitoring Plan
- Prepare IEE Report as per EPR and National EIA Guidelines 1993, Environment and Social Management Framework , 2007 etc

## 3 PROCEDURE TO BE ADOPTED WHILE PREPARING THE REPORT

The IEE Study will be carried out in accordance with the EPR of GON. The National Environmental Impact Assessment Guidelines (1993); Environmental Management Guidelines of the DOR, 1997; Policy on Environmental Assessment of Road Sector, A Policy document of DOR, January 2000; Guide to Road Slope Protection Works, 2003; and Reference Manual on Environmental, Social Aspects on Integrated Road Development, 2003 and Environmental and Social Management Framework, 2007 will also be referred in the Study. The study will also follow the Environmental Guideline of JICA 2010. The IEE study should adopt the methodologies in general as presented in following sub-sections:

### 3.1 DESK STUDY

The reports and documents relevant to the Project will be reviewed to the extent possible and available. Number of checklist for focus group discussion and data collection on physical, biological and socio-economic environment of the project area will be developed. The topographic maps of the project area map will be studied in detail. The geographic boundary of the influence area will be delineated tentatively on the topographical map. It will be served as the base map to present the information collected during the field survey.

### 3.2 FIELD STUDY

The field study shall be carried out to collect the baseline information on physical, biological, socio-economic and cultural environment of the project area.

A walkthrough survey of the proposed sites shall be carried out to gather information on the physical, biological and socio-cultural environment. Focus group discussion shall be held in the settlement areas to generate the socio-economic characteristics of the area.

In order to cross-check the local information, local officials, particularly Village Development Committees, District Development Committees, district offices of forest, soil conservation, land revenue, agriculture, CBS, NGOs/CBOs etc. shall be contacted to solicit site specific information. The baseline information data shall include but not limited to the followings as presented in following sub-sections.



### **3.2.1 Physical Environment**

Topographical data, climatic data, meteorological data (air temperature, precipitation), geological and land stability information, land use pattern, water, air and noise quality data and other information concerning physical resources of the project area/district shall be collected. All these as well as other relevant information can be derived from available topographical map, GIS maps, site observation, consultation with local communities etc.

### **3.2.2 Biological Environment**

Information on the flora and fauna, protected, rare and endangered species, sensitive habitats and species of commercial importance in the project area shall be collected.

Documentation on (i) wildlife in the project site including mammals, birds, reptiles and amphibians and (ii) the habitat for sensitive species of birds and mammals known in the study area.

Number of trees to be cleared if any for implementation of the project shall be recorded by counting method. Documentation of vegetation status, forested area, distribution of endangered plants, medicinal plants, non-timber forest product (NTFP), regionally scarce plants and plants with other cultural values shall be made.

### **3.2.3 Socio-economic and Cultural Environment**

Information on socio-economic and cultural features of the project area including population, ethnicity/caste, employment facilities and education, health and sanitation condition will be collected. Similarly, data description of settlement pattern, migration, religion and religious sites, land holding size, crop production and cropping pattern (agriculture), sources of energy and energy consumption, infrastructure and development activities in project area will be collected. Documentation of families to be directly affected by the project will be listed out.

## **3.3 DATA PROCESSING**

Primary and secondary data shall be processed through commonly used method. Available maps shall be interpreted. Physical, Biological information shall be tabulated to the extent possible. Socio-economic and cultural information shall be cross checked and analyzed. Standard conversion tables shall be used to convert local units into metric systems. Socio-economic information shall be processed using computer- spread sheet, tabulated and presented in the test as appropriate.

## **3.4 IDENTIFICATION, PREDICTION AND EVALUATION OF IMPACTS**

The identification and prediction of impacts shall be carried out by considering the proposed project actions/activities in terms of construction and operation stages of the project. The impacts of the activities on biophysical, social, economic, and cultural resources in a defined Zone of Influence (Zoi) shall be analyzed. The impacts shall be classified in terms of extent (site specific, local, and regional), magnitude (low, medium, and high) and duration (short term, medium term and long term) as well as nature (reversible, irreversible), Level (low, moderate, and significant). The likely impact shall be assessed covering both adverse and beneficial ones. The methodology adopted for impact identification and prediction shall be standard checklists and matrix methods. A suggested format for checklist for environmental parameters used in IEE is given in Chapter-3 Environmental Assessment of Part-11 Public Works Directives of the GON. This format shall be modified depending on the project activities and included into the IEE Report.

## **3.5 PUBLIC NOTICE, PUBLIC CONSULTATION AND INFORMATION DISCLOSURES**

The role of public consultation and participation is to ensure the quality, comprehensiveness, effectiveness of IEE as well as to ensure that the public view's are adequately taken into consideration in the decision making process. It is done during the preparation of an IEE.

In order to ensure the public involvement, the following procedures will be followed during IEE report preparation:

- Publication of notice - a 15 days public notice will be published in a national level daily newspaper seeking written opinion from concerned VDC, school, health posts and related local organizations. A copy of the public notice will be affixed in the above-mentioned organizations and deed of enquiry will be collected.
- Recommendation letter from concerned VDC will also be obtained.
- IEE team will also carryout interaction with local communities and related stakeholders and will also collect the public concerns and suggestions.

## **4 POLICIES, LAW, RULES AND MANUALS TO BE TAKEN INTO ACCOUNT WHILE PREPARING THE REPORT**

Limiting within the scope of the works, following policies, legislation (with amendments) and guidelines and appropriate information shall be incorporated into the IEE report. They are as presented hereunder:

### **4.1 CONSTITUTION**

- Interim constitution 2063 and its amendments

### **4.2 REVIEW OF POLICIES**

- Three years Interim Development Plan, 2064
- Public Works Directives, 2059 (2002)
- 20 Year Road Master Plan
- Environmental Assessment in the Road Sector of Nepal: A Policy Document, GESU/DoR, 2056 (2000)
- Forest Policy, 2049 (1992)
- Nepal Biodiversity Strategy 2059 (2002)

### **4.3 REVIEW OF ACTS AND RULES**

- Environment Protection Act, 2053 (1997)
- Environmental Protection Rules, 2954 (1997) (amendment 1999, 2008)
- Local Self Governance Act, 1998 (2055)
- Local Self-Governance Regulation, 2000 (2057)
- Forest Act, 1992 (2049),
- Forest Rules, 1994 (2051),
- Land Acquisition Act, 1997 (2054),
- Plant Protection Act, 2030 (1973)
- Soil and Watershed Conservation Act, 2039, (1982)
- Labor Act, 2049 (1992)
- Child Labour Prohibition and Regulation Act, 2058 (2001)
- Public Road Act, 2031 (1974)
- Solid Waste (management and Resource Mobilization) Rule, 2047 (1990)
- Ancient Monument Protection Act, 2018 (1961)

### **4.4 REVIEW OF GUIDELINES AND MANUALS**

- National EIA Guidelines, 1993 (2050),
- Environmental Management Guidelines (Road), 1998 (2054),
- Forest Produce Collection, Sale and Distribution Guidelines, 2001 (2057),
- Community Forest Guidelines, 2002 (2058), and
- Community Forest Inventory Guidelines, 2006 (2062).
- Public Road Management and Land Acquisition Directives, DoR, 2058 (2002).
- Reference Manual for Environmental and Social Aspects of Integrated Road Development, DoR, 2059 (2003).
- Environmental and Social Management framework, DOR , 2064 (2007).

- Priority Investment Plan, DoR, 2063 (2006)
- Interim Guidelines for Enhancing Poverty Reduction Impacts of Road Projects, August, 2064 (2007)
- JICA Environmental Guideline, 2010

## 5 PREPARATION OF THE REPORT

### 5.1 TIME

In general, the time-frame for IEE Study is four months and a tentative schedule is given in Table 4.

**Table 4: Proposed IEE Study Schedule**

SI	Activities	Sept				October				November				December				January				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1	Preparation of TOR	█																				
2	Approval of TOR		█	█	█																	
3	Field study and investigation					█	█															
4	Interaction with stakeholders and collection suggestions					█																
5	Analysis and prediction of impacts							█	█	█												
6	Development of mitigation and enhancement measures, preparation of monitoring plan and EMAP									█	█	█										
7	Draft report preparation													█	█							
8	Publication of 15 days public notice																				█	
9	Comments on Draft IEE Report																				█	
10	Collection of recommendation from the local bodies																				█	
11	Submission of Final IEE report																				█	
12	Approval of IEE Report																					█

### 5.2 ESTIMATED BUDGET

The total budget for the study has been estimated to be NRs. 1,000,000.00

### 5.3 THE STUDY TEAM

The study will be carried out by the following professional staff:

- Team Leader/Environmentalist
- Ecologist/Forester
- Socio-economist/Sociologist
- Geologist
- Road Engineer

## 6 DELETED BY FIRST AMENDMENT, GON, 1999)

## 7 SPECIFIC IMPACT/ISSUES OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT

The project activities during construction and in subsequent operation and maintenance stages may create a number of adverse and beneficial impacts on environment due to the interaction between project actions and local environment. The likely adverse and beneficial impacts during construction and subsequent operation and maintenance stages in terms of socio-economic, social, cultural, physical, chemical and biological aspects due to the project actions, as stated in the following sub-sections, shall be identified, predicted and evaluated.

The likely impacts of the proposed road construction and operation under the proposal that shall be assessed by the study are described in the following sub-sections. The analysis shall be quantified and tabulated.

### 7.1 SOCIAL AND ECONOMIC ENVIRONMENT

#### 7.1.1 Beneficial Impacts

- (a) *Construction stage*
- employment and income to local communities from working in the project
  - enterprises development and commercialization by setting up temporary food and tea stalls, provision shops for the construction workers
  - Skill improvement
- (b) *Operation and maintenance stage*
- Increase in value of land
  - Ease in the transportation facility for people
  - Comfort on travelling
  - Travel time saving

#### 7.1.2 Adverse Impacts

The following social and economic issues shall be assessed during IEE study.

- (a) *Construction Stage*
- possible loss of private properties including agricultural production if any;
  - possible impact on public property and infrastructures such as electric poles telephone lines canals etc;
  - occupational health and safety issues;
  - pressure on social service facilities by influx of construction workers from outside area;
  - possible conflict with locals by the construction labours
  - possible impact on cultural and religious important sites
  - possible incidence of HIV/AIDs and airborne diseases
- (b) *Operation and Maintenance Stage*
- displacement of poor and vulnerable communities;
  - road safety and accidents;

### 7.2 CULTURAL AND PHYSICAL ENVIRONMENT

#### 7.2.1 Beneficial Impact

##### (i) *Operation and Maintenance Stage*

- Physical Environment
  - Reduction in road blockage
  - Reduction in road accidents
  - Issue of road stability
  - Improved road side drainage facilities will regulate the surface run off there by check the soil erosion

- Improve in the environmental pollution (air, noise, sound) due to improvement in the road surface
- Improvement in the riding quality of road surface

### 7.2.2 Adverse Impact

The cultural and physical issues that shall be assessed during the IEE study shall include followings:

#### (ii) Construction Stage

- Cultural Environment
  - damage to ancient monuments, temples, religious chautaries, burial sites and cemeteries, and other cultural properties
  - cultural conflicts due to in-migration of people from outside the area
- Physical Environment
  - issues due to quarrying materials and borrow pit operation
  - Possible impacts on natural drainage
  - issues on slope instability
  - issues of disposal
  - issues originating from air, noise and water pollution

#### (iii) Operation and Maintenance Stage

- Physical Environment
  - issues of slope instability by operation of road
  - possible impact on natural drainage
  - issue of erosion at the downstream agriculture land, gully formation etc. by the cross-drainage outfalls

## 7.3 CHEMICAL ENVIRONMENT

### 7.3.1 Adverse Impacts

#### (i) Construction Stage

The chemical related issues concerning environmental protection shall be assessed during the IEE study, and may include followings:

- use of bitumen and their storage, heating, spreading etc.
- use of fuel, lubricants, oil, acids and other chemicals for construction (vehicle, plants and equipment) and their storage

#### (ii) Operation and Maintenance Stage

- Spillage of fuel, lubricants, oil from the vehicles.

## 7.4 BIOLOGICAL ENVIRONMENT

### 7.4.1 Adverse Impact

With regard to biological aspects, the IEE study shall focus on the following issues during the construction stage operation and maintenance stage:

#### (i) Construction Stage

- Clearance of trees and loss of flora and fauna;
- Use of forest product by the construction workers and construction activities including bitumen heating;
- Impact on bio-diversity and natural habitat;

- (ii) **Operation and Maintenance Stage**
- Impact on growth of the natural forest;
  - Possible extraction of firewood and timber;

## 8 ALTERNATIVES FOR THE IMPLEMENTATION OF THE PROPOSAL

The Proposed Project being design of the counter measures for the slope instability and land slide problems, the alternative analysis of the project location and shall focus on the following issues:

- (i) No project option,
- (ii) Alternative design and construction approach
- (iii) Alternative technology
- (iv) Alternative time schedule and process
- (v) Alternative resources and
- (vi) Any other alternatives

The alternative analysis should also consider the acceptability of risks likely to emerge during the implementation of the proposal, and other issues of topical interest. Likely impacts of each alternative should be assessed and compared in terms of adverse environmental impacts and benefits, and the environmentally sound alternative should be recommended.

## 9 MATTERS CONCERNING THE PREVENTION OF THE IMPACT OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT (MITIGATION MEASURES)

Two types of mitigation measures will be included in the IEE Report. They are benefit augmentation/enhancement measures and adverse impacts mitigation measures. The IEE report shall also include corrective, preventive and compensatory measures. The mitigation measures should be included for both construction and operational stages. The Environmental Management Action Plan (EMAP) shall be an integral part of the IEE report. Mitigation measures can also be presented in the interaction matrix. Suggested mitigation measures should be pragmatic.

## 10 MATTERS TO BE MONITORED WHILE IMPLEMENTATION OF THE PROPOSAL (ENVIRONMENTAL MANAGEMENT PLAN)

Based on the potential environmental impacts (both positive and negative), an Environmental Management Action Plan (EMAP) covering the pre-construction, construction and post-construction stages of the road project is to be prepared and reported in the IEE Report. The monitoring plan should categorize the type of monitoring, such as compliance monitoring and impact monitoring. Monitoring parameters and/or indicators shall be identified not only for construction and operational stages but also sub-categorized in terms of physical environment, biological environment, socioeconomic and cultural environment. They shall be well documented in the main IEE report. It shall also include schedule of monitoring methods, location and responsible agency for monitoring. The plan shall include required manpower for the purpose of the monitoring. Responsibility of monitoring including estimated cost for environmental monitoring shall be included in the main report.

## 11 OTHER NECESSARY MATTERS

The other necessary matters to be included in the IEE Report shall be the relevant information, reference list, annexes, maps, photographs, tables and charts, and questionnaires to be mentioned at the time of carrying out baseline survey. Also included will be the details of public consultation, public notice, muchulka of pasting public notice, recommendation letters from concerned VDCs and municipalities etc. Table of vegetation within the RoW and Road Construction Width should also be given. Also geological hazard map shall be included in the appendix of the IEE report.

The Report Format for IEE Study shall follow **Schedule 5** of **EPR**. All requirements indicated in Schedule 5 of the EPR will be included and addressed in the IEE report. The conclusions and the recommendations of the Study shall be drawn and presented at the end of the report.

### **References**

- 1) DDC (2058), District Profile of Bajura District Development Office,
- 2) Environment Protection Rule, 2054 (First Revision, 2055)
- 3) ISRCS (Informal Sector Research and Study Centre) 2004, District Development Profile of Nepal, Kathmandu
- 4) Central Bureau of Statistics, Thapathali, Kathmandu, District Profile, Ashadh, 2061.
- 5) Government of Nepal, Environment Protection Act, 1996
- 6) Government of Nepal, Environment Protection Rule, 1997 (first amendment, 1999)
- 7) Department of Roads, MPPW, GON, Kathmandu, Reference Manual for Environmental and Social Aspects of Integrated Road Development, 2003
- 8) Terms of Reference for Initial Environmental Examination of Upgrading Widening of Roads Package 4 Rani-Biratnagar Itahari Dharan Road
- 9) Terms of Reference for Initial Environmental Examination (IEE) Study and Environmental Management Action Plan (EMAP) for Upgrading of Ekadigad – Barjugad Section of , Sanfebagar – Martadi Road