

# [Appendix]



## 1. Members List of Study Team

Position	Name	Affiliation
Project Leader (The Second Field Survey)	Shuntaro KAWAHARA	Japan International Cooperation Agency (JICA) Infrastructure and Peacebuilding Department Senior Advisor
Project Leader (The Third Field Survey)	Yoshiyuki MIHOKI	Japan International Cooperation Agency (JICA) Infrastructure and Peacebuilding Department Senior Advisor
Cooperation Planning	Tatsuhito KONDO	Japan International Cooperation Agency (JICA) Infrastructure and Peacebuilding Department Team 1 Transportation and ICT Group
Team Leader / Slope Protection	Hiroaki TAUCHI	Nippon Koei Co., LTD.
Sub Team Leader / Analysis and Design of Geotechnical Structure	Hiroshi FUJISAWA	Nippon Koei Co., LTD.
Analysis and Design of Slope Protection	Tomoyuki NISHIKAWA	Nippon Koei Co., LTD.
Stability Analysis and Numerical Simulation	Yuichi NAKASHIMA	Nippon Koei Co., LTD.
Structure Investigation 1	Hiroshi OGAWA	Nippon Koei Co., LTD.
Structure Investigation 2	Hideo KATAGIRI	Nippon Koei Co., LTD. (Independent)
Natural Condition Survey	S.C. AMATYA	Nippon Koei Co., LTD. (Independent)
Environmental Social Consideration	Kenji IGARASHI	Nippon Koei Co., LTD. (Koei Research & Consulting Inc.)
Construction Plan / Procurement Condition / Cost Estimation	Jie ZHANG	Nippon Koei Co., LTD.

## 2. Study Schedule

### The First Field Survey

Position	Name	Field Survey Period (Date of Arrival~Departure)
Team Leader / Slope Protection	Hiroaki TAUCHI	16 July ~ 30 August
Sub Team Leader / Analysis and Design of Geotechnical Structure	Hiroshi FUJISAWA	3 August ~ 30 August
Analysis and Design of Slope Protection	Tomoyuki NISHIKAWA	23 July ~ 30 August
Stability Analysis and Numerical Simulation	Yuichi NAKASHIMA	15 August ~ 30 August
Structure Investigation 1	Hiroshi OGAWA	6 August ~ 24 August
Structure Investigation 2	Hideo KATAGIRI	1 August ~ 19 August
Natural Condition Survey	S.C. AMATYA	(Local resident)
Environmental Social Consideration	Kenji IGARASHI	16 July ~ 29 July
Construction Plan / Procurement Condition / Cost estimation	Jie ZHANG	23 July ~ 19 August

### The Second Field Survey

Position	Name	Field Survey Period (Date of Arrival~Departure)
Team Leader / Slope Protection	Hiroaki TAUCHI	2 November ~ 24 December
Sub Team Leader / Analysis and Design of Geotechnical Structure	Hiroshi FUJISAWA	3 November ~ 16 November
Analysis and Design of Slope Protection	Tomoyuki NISHIKAWA	1 November ~ 19 December
Natural Condition Survey	S.C. AMATYA	(Local resident)
Environmental Social Consideration	Kenji IGARASHI	26 November ~ 24 December
Construction Plan / Procurement Condition / Cost Estimation	Jie ZHANG	20 November ~ 23 December

### Explanation of the Project Summary

Position	Name	Field Survey Period (Date of Arrival~Departure)
Project Leader (The Third Field Survey)	Yoshiyuki MIHOKI	12 April ~ 23 April
Cooperation Planning	Tatsuhito KONDO	12 April ~ 23 April
Team Leader / Slope Protection	Hiroaki TAUCHI	12 April ~ 23 April
Sub Team Leader / Analysis and Design of Geotechnical Structure	Hiroshi FUJISAWA	12 April ~ 23 April



### 3. List of Parties Concerned in the Recipient Country

#### Counterparts Organization

Department of Roads: DoR	
Mr. Sigel GopalPrasad	Director General
Mr. Sanjaya Kumar Shresta	Deputy Director General
Mr. Ajay Kumar Mull	Senior Divisional Engineer
Mr. Rakesh Maharjan	Project Manager, BSBR
Mrs. Shila Shrestha	Engineer, BSBR
Mr. Shiva Raj Adhikari	GESU (DoR)

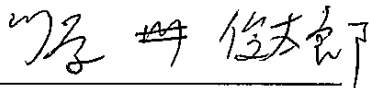
#### Japanese Concerned Organization

Embassy of Japan, Nepal	
Mr. Makoto Oyama	First Secretary
Mr. Yoshimi Sandou	Second Secretary

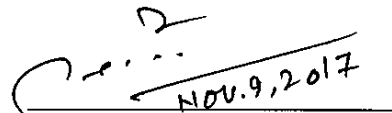
**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**the Sindhuli Road Earthquake Rehabilitation**

In response to the request from the Government of the Federal Democratic Republic of Nepal (hereinafter referred to as “Nepal”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) of the Project for the Sindhuli Road Earthquake Rehabilitation (hereinafter referred to as “the Project”) to Nepal, headed by Mr. Shuntaro KAWAHARA, Senior Advisor of JICA, from November 6 to November 11, 2017. The Team held a series of discussions with the officials of the Government of Nepal and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Kathmandu, November 9, 2017



Shuntaro KAWAHARA  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



Gopal Prasad SIGDEL  
Director General  
Department of Roads  
Ministry of Physical Infrastructure and Transport  
Nepal



## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to improve safety of transportation through rehabilitation of the sites on the Sindhuli Road damaged by the earthquakes in April and May, 2015, thereby contributing to improve social welfare and economy in Nepal.

### 2. Title of the Preparatory Survey

Both sides confirmed that the title of the Preparatory Survey is “the Preparatory Survey for the Project for the Sindhuli Road Earthquake Rehabilitation” (hereinafter referred to as “the Survey”).

### 3. Project site

Both sides confirmed that the Project sites to be rehabilitated by Japanese Grant will be selected from the 25 sites on the of the Sinduli road, which are scope of the Survey and shown in Annex 1, according to degree of risk, urgency, technical difficulty of rehabilitation work and so on.

### 4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

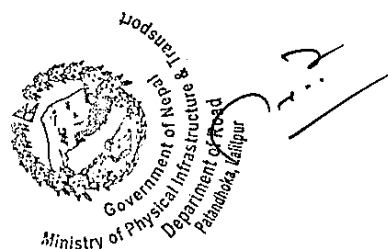
- 4-1. The Department of Roads, Ministry of Physical Infrastructure and Transport (hereinafter referred to as “DOR”) will be the executing agency for the Project. DOR shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization chart is shown in Annex 2.

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

- 5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Nepal are as follows:

- The Project sites are 5 sites (STA. 17+400, STA. 33+400 and STA. 33+800 of the Section 2, STA. 11+620 and STA. 15+520 of the Section 3) which are shown in Annex 1;
- Other 20 sites are not target of the Project;

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- DOR will determine rehabilitation designs of the 20 sites and rehabilitate them by its own budget;
- Rehabilitation method for the Project sites will be determined through the Survey based on the design policy described in Annex 3 until the end of December, 2017; and
- The Team will submit a technical report on rehabilitation methodology for the 5 sites which are target of the Project to DOR until middle of December, 2017.

5-2. JICA will assess the feasibility of the above requested items through the Survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

#### 6. Procedures and Basic Principles of Japanese Grant

6-1. The Nepal side agreed that the procedures and basic principles and basic principles of Japanese Grant as described in Annex 4 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires Nepal side to submit the Project Monitoring Report, the form of which is attached as Annex 5.

6-2. The Nepal side agreed to take the necessary measures, as described in Annex 6, for smooth implementation of the Project. The contents of the Annex 6 will be elaborated and refined during the Survey and be agreed in the mission dispatched for explanation of the draft Preparatory Survey Report.

The contents of Annex 6 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

#### 7. Schedule of the Survey

7-1. The Team will proceed with further survey in Nepal until April, 2018.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Nepal in order to explain its contents around April, 2018.

7-3. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Nepal side, JICA will finalize the Preparatory Survey Report and send it to Nepal around July, 2018.

7-4. The above schedule is tentative and subject to change.

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## 8. Environmental and Social Considerations

8-1. The Nepal side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as “B” from the following considerations:

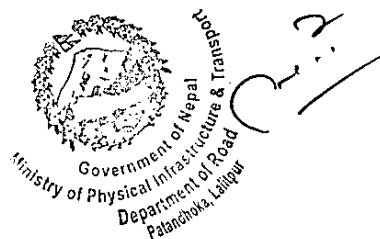
The project is not considered to be a large-scale Road project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA guidelines for environmental and social considerations (April 2010), it is not likely to have a significant adverse impact on the environment.

The Nepal side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA before the tender .

8-3. For the Project that will result in involuntary resettlement, the Nepal side confirmed to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the Nepal side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, which is consistent with JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

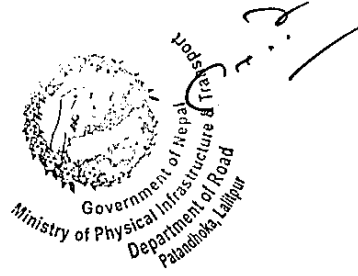
## 9. Other Relevant Issues

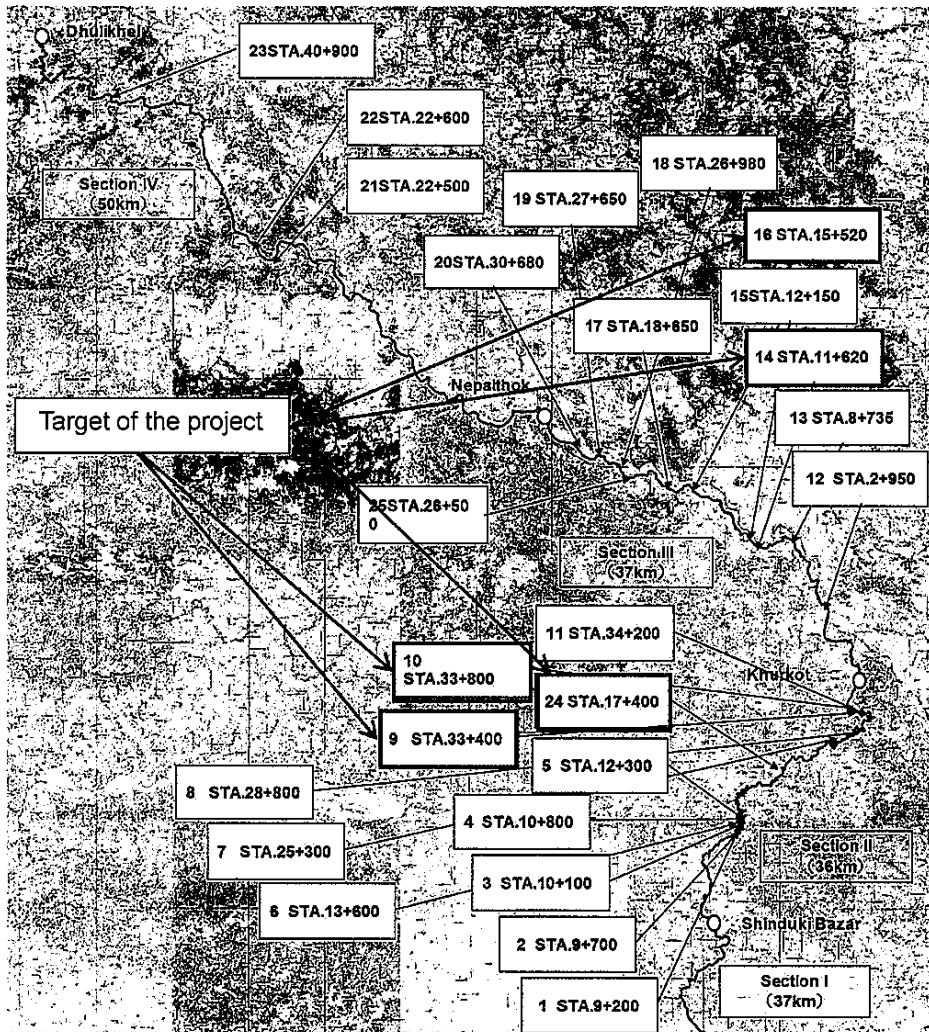
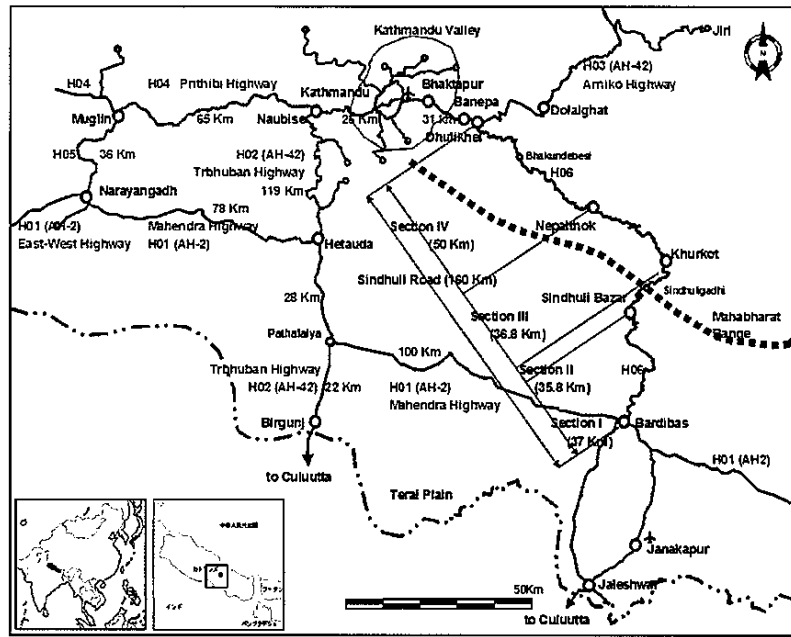
- The Team conducted the current condition survey for the 25 sites in which damages are confirmed. And the Team compiled the Interim Report which includes the result of the current condition survey and explained to DOR.
- Both side confirmed that DOR continues to monitor condition of the 25 sites and DOR will take necessary measures in case that serious progress of deformation is observed.



- Annex 1 Location map of the survey area and Target of the project
- Annex 2 Organization Chart
- Annex 3 Design policy for the 5 sites
- Annex 4 Japanese Grant
- Annex 5 Project Monitoring Report (template)
- Annex 6 Major Undertakings to be taken by the Government of Nepal

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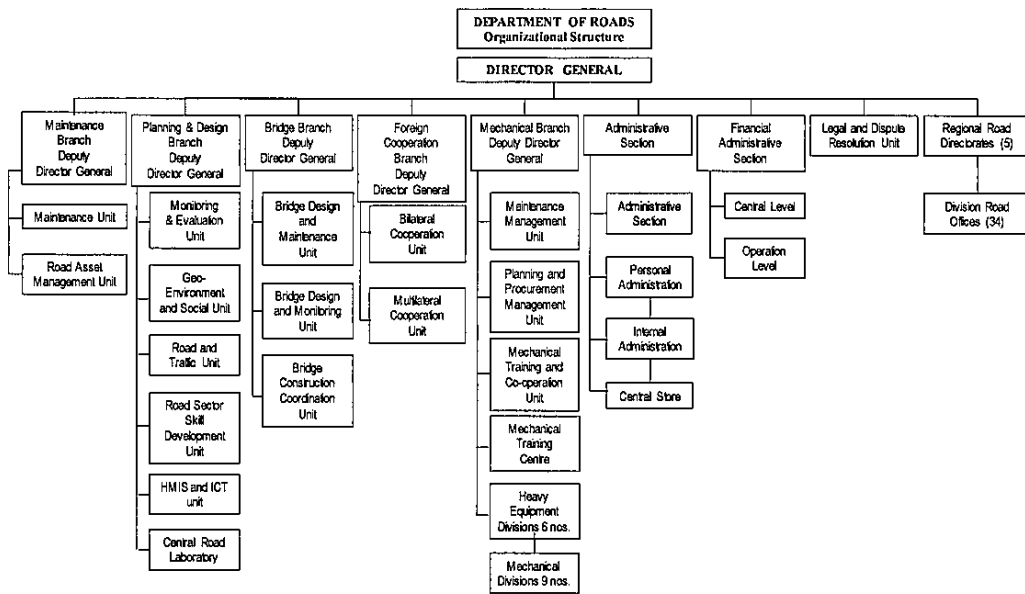


Location map of the survey area and Target of the Project

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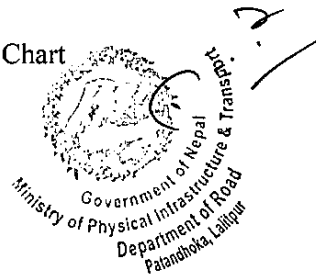


Annex 2



Organization Chart

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Annex 3

Design policy for the 5 sites

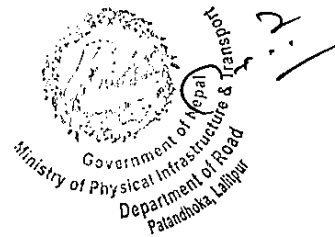
1.Slope failure (STA.17+400 on Section II):

- Sindhuli road is National Highway in Nepal. So design safety factor shall be 1.2 in accordance with Slope protection manual in Japan road association. This safety factor was adopted for Sta.17+600 on Section II.

2.Gabion wall(STA.33+400 and STA33+800 of Section II, STA11+620 and STA 15+520 of Section III):

- The structures to be rehabilitated shall be resistant to the same-scale earthquake as earthquakes in 2015.
- Safety factor of bearing resistance in stability analysis for retaining wall shall be more than 3.0.

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## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or 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. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

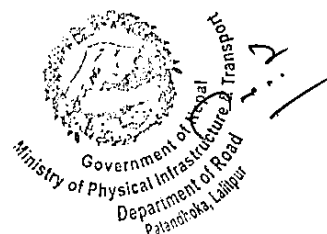
### 2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the 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

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relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant 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.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take 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 executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

#### (2) Selection of Consultants

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

#### (3) Result of the Survey

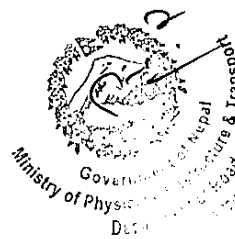
JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

### 3. Basic Principles of Project Grants

#### (1) Implementation Stage

##### 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 to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the “General Terms and Conditions for Japanese Grant (January 2016).”



2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA’s procurement guidelines as stipulated in the G/A.

4) 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 to continue to work on the Project’s implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

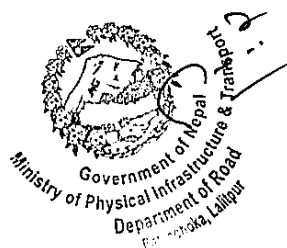
8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the “Meeting”) will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

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Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.



4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

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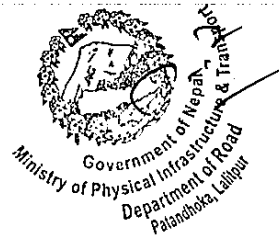
Attachment I

## PROCEDURES OF JAPANESE GRANT

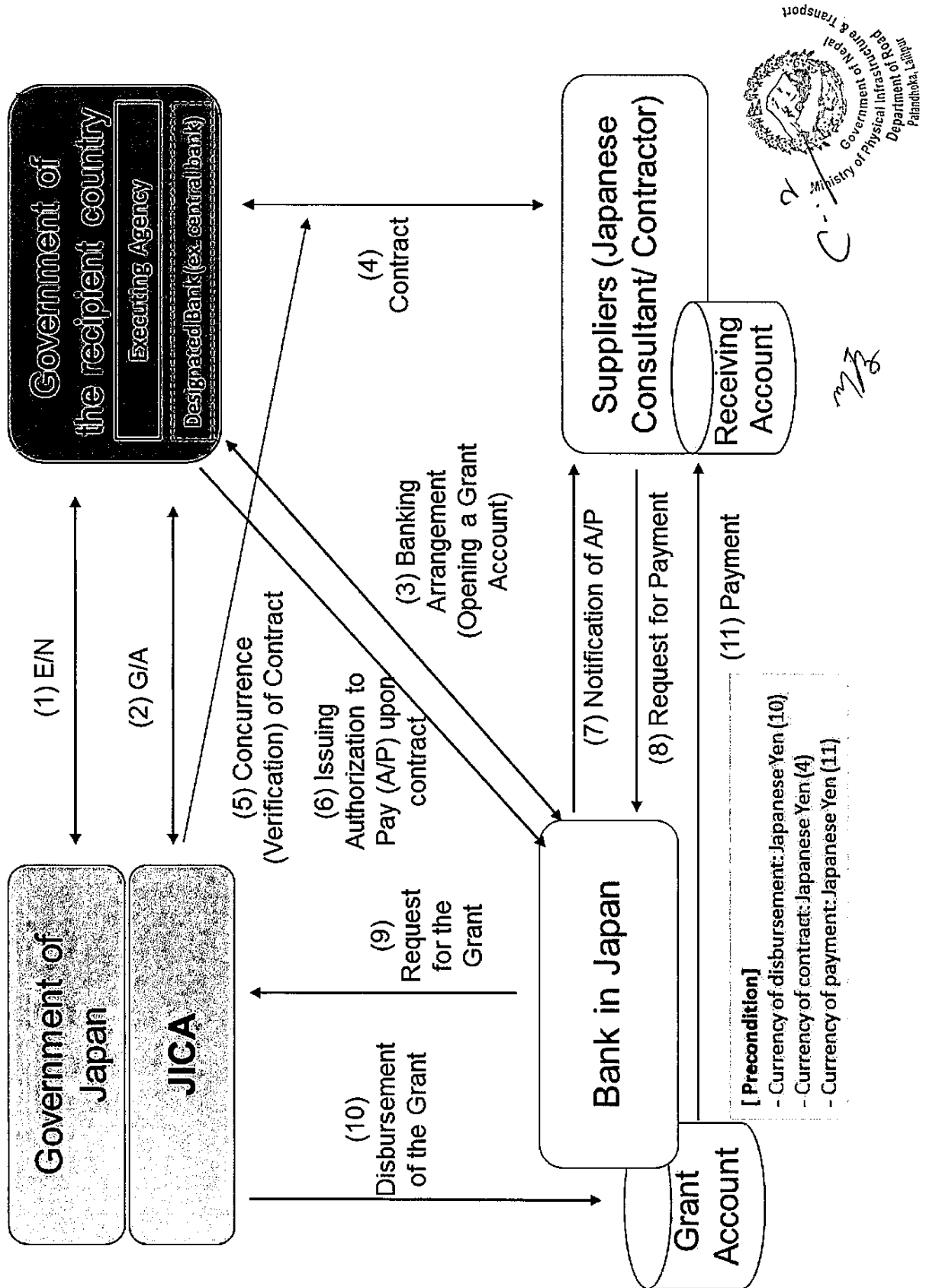
Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
4. Ex-post monitoring & evaluation	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.



# Financial Flow of Japanese Grant (A/P Type)





<p><b><u>Project Monitoring Report [FORMAT]</u></b>  <b>on</b>  <b><u>Project Name</u></b>  <b>Grant Agreement No. <u>XXXXXXX</u></b>  <b>20XX, Month</b></p>
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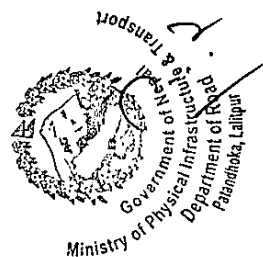
**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____ _____ Contacts <u>Address:</u> _____ <u>Phone/FAX:</u> _____ <u>Email:</u> _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____ _____ Contacts <u>Address:</u> _____ <u>Phone/FAX:</u> _____ <u>Email:</u> _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____ _____ Contacts <u>Address:</u> _____ <u>Phone/FAX:</u> _____ <u>Email:</u> _____

**General Information:**

<b>Project Title</b>	_____
<b>E/N</b>	Signed date: _____ Duration: _____
<b>G/A</b>	Signed date: _____ Duration: _____
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

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**1: Project Description**

**1-1 Project Objective**

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**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

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**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

**2: Details of the Project**

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

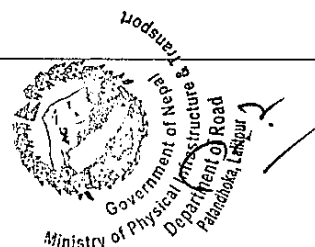
**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

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G/A NO. XXXXXXXX  
PMR prepared on DD/MM/YY

### 2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	(at the time of signing the Grant Agreement)	

Reasons for any changes of the schedule, and their effects on the project (if any)

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### 2-4 Obligations by the Recipient

#### 2-4-1 Progress of Specific Obligations

See Attachment 2.

#### 2-4-2 Activities

See Attachment 3.

#### 2-4-3 Report on RD

See Attachment 11.

### 2-5 Project Cost

#### 2-5-1 Cost borne by the Grant (Confidential until the Bidding)

Components	Cost (Million Yen)			
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1),2)</sup> (proposed in the outline design)	Actual
1.				
Total				

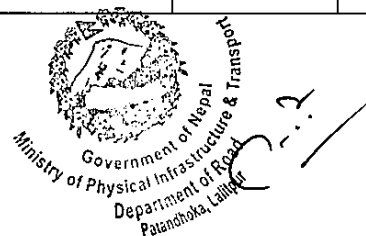
Note: 1) Date of estimation:

2) Exchange rate: 1 US Dollar = Yen

#### 2-5-2 Cost borne by the Recipient

Components	Cost (1,000 Taka)			
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1),2)</sup> (proposed in the outline design)	Actual
1.				

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- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 Executing Agency**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

<p><b>Original</b> (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):</p>
<p><b>Actual</b> (PMR)</p>

**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

**3: Operation and Maintenance (O&M)**

**3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

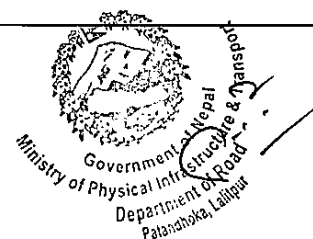
<p><b>Original</b> (at the time of outline design)</p>
<p><b>Actual</b> (PMR)</p>

**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

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Actual (PMR)

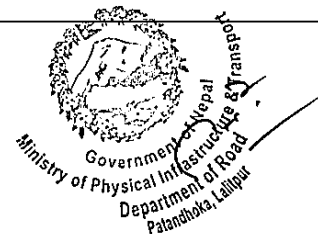
**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

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	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

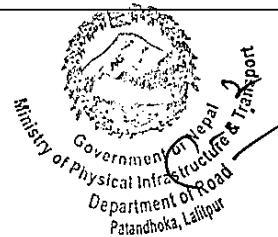
**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

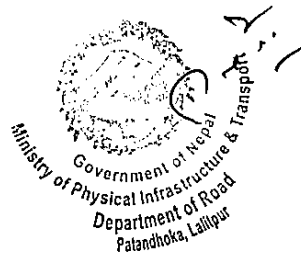
Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
  2. Specific obligations of the Recipient which will not be funded with the Grant
  3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
  5. Environmental Monitoring Form / Social Monitoring Form
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
  8. Pictures (by JPEG style by CD-R) (PMR (final) only)
  9. Equipment List (PMR (final) only)
  10. Drawing (PMR (final) only)
  11. Report on RD (After project)



Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (₹) B	Initial total Price C=AxB	1% of Contract Price D	Condition of payment Price (Decreased) E=C-D	Condition of payment Price (Increased) F=C+D
Item 1	●●t	●	●	●	●	●
Item 2	●●t	●	●	●		
Item 3						
Item 4						
Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
Item 1						
Item 2						
Item 3						
Item 4						
Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Attachment 7

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction	(A/D%)	(B/D%)	(C/D%)	
Cost others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	



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## Annex 6

## Major Undertakings to be taken by the Government of Nepal

## 1. Specific obligations of the Government of Nepal which will not be funded with the Grant

## (1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open bank account (B/A)	within 1 month after the signing of the G/A	MOF/MOPIT		
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	MOF/MOPIT		
3	To approve IEE(Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation.	Before the tender	MOPIT		
4	To secure Project site and temporary yard.	before start of the construction	MOPIT		
5	To remove and relocate the following facilities. 1) Relocation of existing electric poles and/or pole of optical fiber cable if affected. 2) Cutting trees at the project site.	before start of the construction	MOPIT		
6	To submit Project Monitoring Report (with the result of Detail Design)	before preparation of bidding documents	MOPIT		
7	To take necessary measures for candidate site	before start of the construction	MOPIT		
8	To secure and clear the following lands 1) Temporary construction yard and stock yard near the Project area 2) To secure quarry, borrow pit and disposal site near the Project area 3) To bear loyalty of the raw material from quarry and borrow pit To minimize the expansion of damages before countermeasure work started by the Grant at the following sites. 1) SN09 and SN10: To maintain the alternate traffic passing at the sites 2) SN14: To secure maintenance of the pavement 3) SN16: To wide the road to mountain side and overlay paving by asphalt, then sift the traffic line avoid the valley side passing 4)SN24: To keep monitoring and maintain pavement	before preparation of bidding documents	MOPIT		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

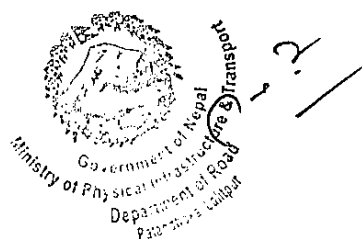
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## (2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after the signing of the contract(s)	MOF/MOPIT		
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	MOF/MOPIT		
	2) Payment commission for A/P	every payment	MOF/MOPIT		
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in recipient country	during the Project			
4	To accord Japanese nationals and/or physical persons of third countries 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 country of the Recipient and stay therein for the performance of their work	during the Project			
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project			
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project			
7	To submit Project Monitoring Report	every month	MOPIT		
	1) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)			
8	To submit a report concerning completion of the Project	within six months after completion of the Project	MOPIT		
9	To implement EMP and EMoP	during the construction	MOPIT		
10	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	MOPIT		
11	To implement RAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	MOPIT		
12	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between DOR and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for two years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)	MOPIT		

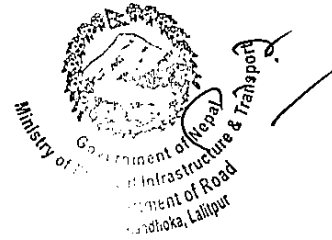
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## (3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MOPIT		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between DOR and JICA.	for three years after the Project	MOPIT		
3	To maintain and use properly and effectively the facilities constructed provided under the Grant Aid 1) Allocation of maintenance cost 2) Implement the landslide monitoring activities 3) Operation and maintenance structure 4) Routine check/Periodic inspection	After completion of the construction	MOPIT		

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2. Other obligations of the Government of Nepal funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To procure the necessary tools and equipment of the Project 1) To conduct the following transportation a) Marine(Air) transportation of the products from Japan and the third country to the recipient country b) Internal transportation form the port of disembarkation to the Project site 2) To construct the temporary facilities for road safety		/
2	To implement detailed design, bidding support and construction supervision (Consulting Service)		
	Total		

\*The Amount is provisional. This is subject to the approval of the Government of Japan.

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**Minutes of Discussions  
on the Preparatory Survey for  
the Project for  
the Sindhuli Road Earthquake Rehabilitation  
(Explanation on Draft Preparatory Survey Report)**

With reference to the minutes of discussions signed between The Department of Roads, Ministry of Physical Infrastructure and Transport (hereinafter referred to as "DoR") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on November 10, 2017 and in response to the request from the Government of the Federal Democratic Republic of Nepal (hereinafter referred to as "Nepal") dated September 14, 2016, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Report") for the Project for the Sindhuli Road Earthquake Rehabilitation (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Kathmandu, April 19, 2018

三保木 悦幸

Yoshiyuki MIHOKI  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan

Gopal Prasad Sigdel

for Gopal Prasad Sigdel  
Director General  
Department of Roads  
Ministry of Physical Infrastructure and Transport  
Nepal



## ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve safety of transportation through rehabilitation of the sites on the Sindhuli Road damaged by the earthquakes in April and May, 2015, thereby contributing to improve social welfare and economy in Nepal.

2. Title of the Preparatory Survey

Both sides agreed the title of the Project “The Project for Sindhuli Road Earthquake Rehabilitation”.

3. Project Site

Both sides confirmed that the sites of the Project are 5 sites along Sindhuli Road (Sta. 17+400, Sta. 33+440, Sta. 33+695 on Sec. II and Sta. 11+620, Sta.15+520 on Sec. III), which are shown in Annex 1.

4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

The DoR will be the executing agency. DoR shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and on time. The organization charts are shown in Annex 2.

5. Contents of the Report

After the explanation of the Report by the Team, the Nepal side agreed.

6. Cost Estimation

Both sides confirmed that the Project cost estimation described in Annex 3 was provisional and would be examined further by the Government of Japan and Nepal for its final approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

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## 7. Confidentiality of the Cost Estimation and Specifications

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

## 8. Japanese Grant Scheme

The Nepal side agreed that the procedures and basic principles of Japanese Grant as described in Annex 4, Annex 5 and Annex 6 shall be applied to the Project. In addition, the Nepal side agreed to take necessary measures according to the procedures.

## 9. Project Implementation Schedule

The Team explained to the Nepal side that the expected implementation schedule is as attached in Annex 7.

## 10. Expected outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Nepal side has responsibility to monitor the progress of the indicators and achieve the target in year 2023.

## [Quantitative Effect]

Effect Indicators	Location	Base Value (2017)	Target Value (2023)
Volume of passenger (Persons/year)	Khurkot	6,006,205	8,048,000
	Sindhuli Madi	5,847,170	7,835,000
Volume of Cargo (ton/year)	Khurkot	359,896	482,000
	Sindhuli Madi	492,042	659,000

## [Qualitative Effect]

- Mitigation of disaster risk such as earthquake
- Improve social welfare and economy
- Strengthening reliability of road network

## 11. Undertakings Taken by Nepal Side

Both sides confirmed the undertakings of the Project as described in Annex 8. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in 1. (2)-NO.6 of Annex 8, both sides confirmed that such customs duties,



internal taxes and other fiscal levies, which shall be clarified in the bid documents by DoR during the implementation stage of the Project subjected to approval from Ministry of Finance.

The Nepal side assured to take the necessary measures and coordination including allocation of the necessary budget which is preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at the Preparatory survey. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 8 will be used as an attachment of G/A.

12. Monitoring during the Implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 9. The timing of submission of the PMR is described in Annex 8.

13. Project completion

Both sides confirmed that the Project completes when all the facilities constructed and equipment procured by the grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

14. Ex-Post Evaluation

JICA will conduct ex-post evaluation three (3) years after the project completion with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability) of the Project. Result of the evaluation will be publicized. The Nepal side is required to provide necessary support for them.

15. Issues to be Considered for the Smooth Implementation of the Project

Both sides confirmed the issues to be considered and necessary measures to be taken for the smooth implementation of the Project described in Annex 8.

16. Schedule of the Study

JICA will complete the Final Report of the Preparatory Survey in accordance with the confirmed items and send it to the Nepal side around July, 2018.



17. Environmental and Social Considerations

17-1 General Issues

17-1-1 Environmental Guidelines and Environmental Category

The team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as 'the Guidelines') is applicable for the Project. The Project is categorized as B because the project is not considered to be a large-scale road project, is not located in a sensitive area, and has none of the sensitive characteristics under the Guidelines; hence, it is not likely to have a significant adverse impact on the environment.

17-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 10. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, the Nepal side shall submit the modified version to JICA in a timely manner.

17-2 Environmental Issues

17-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report is not required for the Project in the country's legal system; however, an Initial Environmental Examination (IEE) is required. Nepal side will obtain the approval of IEE until the beginning of June, 2018.

17-2-2 Environmental Management Plan

Both sides confirmed Environmental Management Plan (EMP) is as Annex 11. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP which may be updated during the detailed design stage.

17-3 Social Environment

17-3-1 Land Acquisition and Resettlement

Both sides confirmed there are no land acquisition and resettlement in the Project.

17-4 Environmental and Social Monitoring

17-4-1 Environmental Monitoring

Both sides confirmed environmental monitoring will be conducted by the Nepal side in accordance with the Environmental Monitoring Plan described in the Preparatory Study Report.

And both sides agreed that the Nepal side will submit results of

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environmental monitoring to JICA by using the Monitoring Form attached as Annex 12, as a part of PMR, on quarterly basis until the completion of the Project.

In case JICA finds that there is a need for improvement in a situation with respect to environmental considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed in accordance with the agreement between the Nepal side and JICA.

#### 17-4-2 Information Disclosure of Monitoring Results

Both sides confirmed that the Nepal side will take stipulated procedures for information disclosure in accordance with Environmental Protection Act 1997, Environmental Protection Rules 1997 (amended in 1999 and 2008), and National EIA Guidelines 1993, and disclose results of environmental and social monitoring to local stakeholders [through their website / in their field offices].

The Nepal side agreed JICA will disclose results of environmental and social monitoring to be submitted by the Nepal side as the Monitoring Form attached as Annex 12 on its website, to the extent that they are made public in Nepal. When third parties request further information, JICA disclose it, subject to approval by the Nepal side.

### 18. Other Relevant Issues

#### 18-1. Operation and Maintenance of the Facilities (Equipment)

The Team explained the importance of operation and maintenance, including landslide monitoring, of the facilities constructed by the Project considering that proper asset management impacts greatly on life-span of the facilities and its maintenance cost. The Nepal side shall secure enough staff and budgets necessary for appropriate landslide monitoring, operation and maintenance of the facilities.

#### 18-2. Safety Measures

To avoid accidents on site during the implementation of the Project, the Nepal side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel.

#### 18-3. Issuance of Work Permit and Visa

The Nepal side agreed that DoR shall facilitate with concerned agencies and assist Japanese nationals/others from third countries who are involved in the Project to obtain appropriate VISA and work permit smoothly so that they can enter and stay in Nepal without any hindrance at the Study and the Project

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implementation stage.

- 18-4. Rehabilitation of the 20 sites which are not target of the Project  
Both side confirmed that DoR will rehabilitate the 20 sites which are not target of the Project as soon as possible by its own budget.
- 18-5. Monitoring on the Project Sites  
Both side confirmed that DoR continues to monitor condition of the 25 sites and DoR will take emergency actions in case that serious progress of deformation is observed.
- 18-6. Ensuring Road Safety on the Project Sites  
The Team pointed out that the progress of Gabion Wall deformation at Sta. 15+520 on Section III, and it would pose risks to the road users. Both sides confirmed that DoR will continue to take necessary safety measures.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Project Cost Estimation

Annex 4 Japan's Grant Aid

Annex 5 Flow Chart of Japan's Grant Aid Procedures

Annex 6 Financial Flow of Japanese Grant

Annex 7 Schedule of the Project

Annex 8 Major Undertakings to be taken by Government of Nepal

Annex 9 Project Monitoring Report

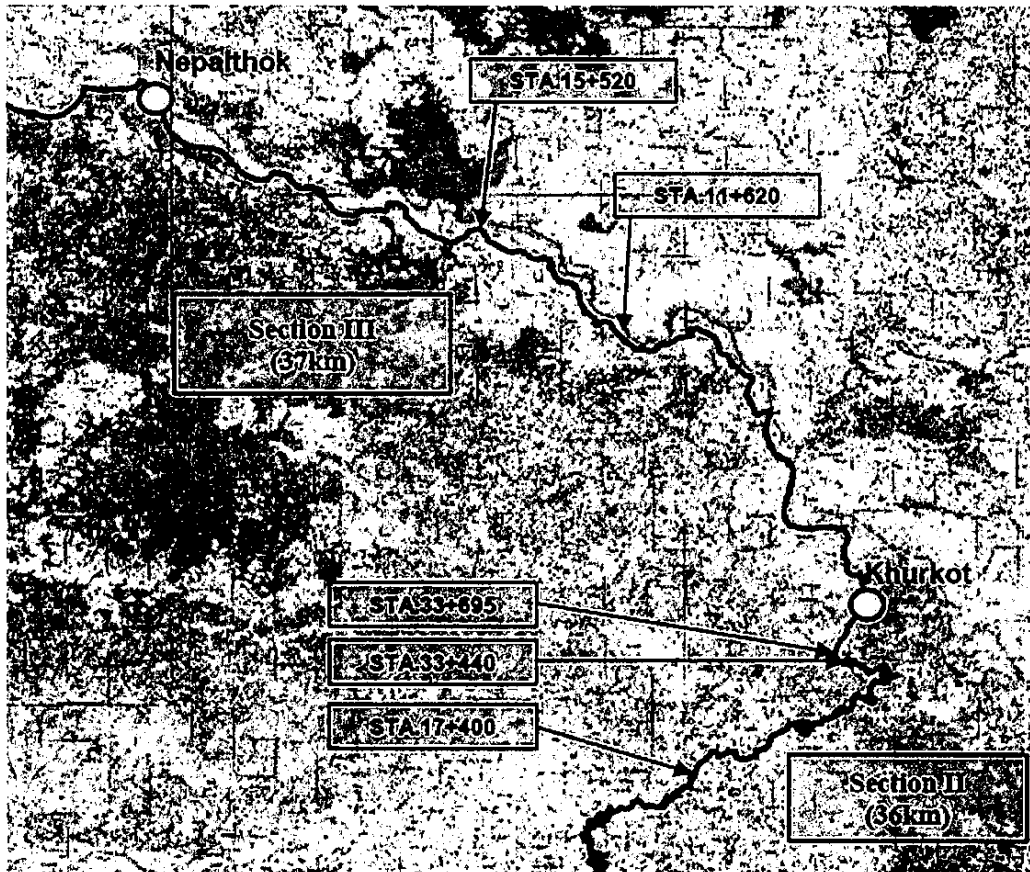
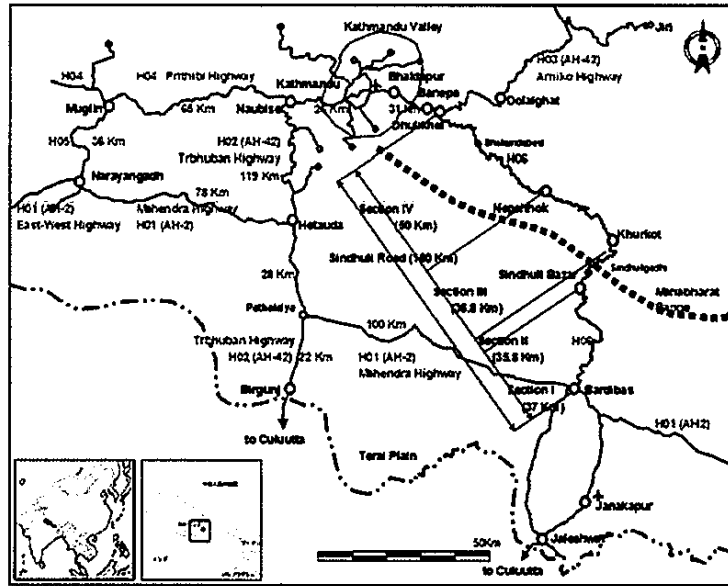
Annex 10 Environmental Check List

Annex 11 Environmental Management Plan/Environmental Monitoring

Annex 12 Environmental and Social Monitoring Form

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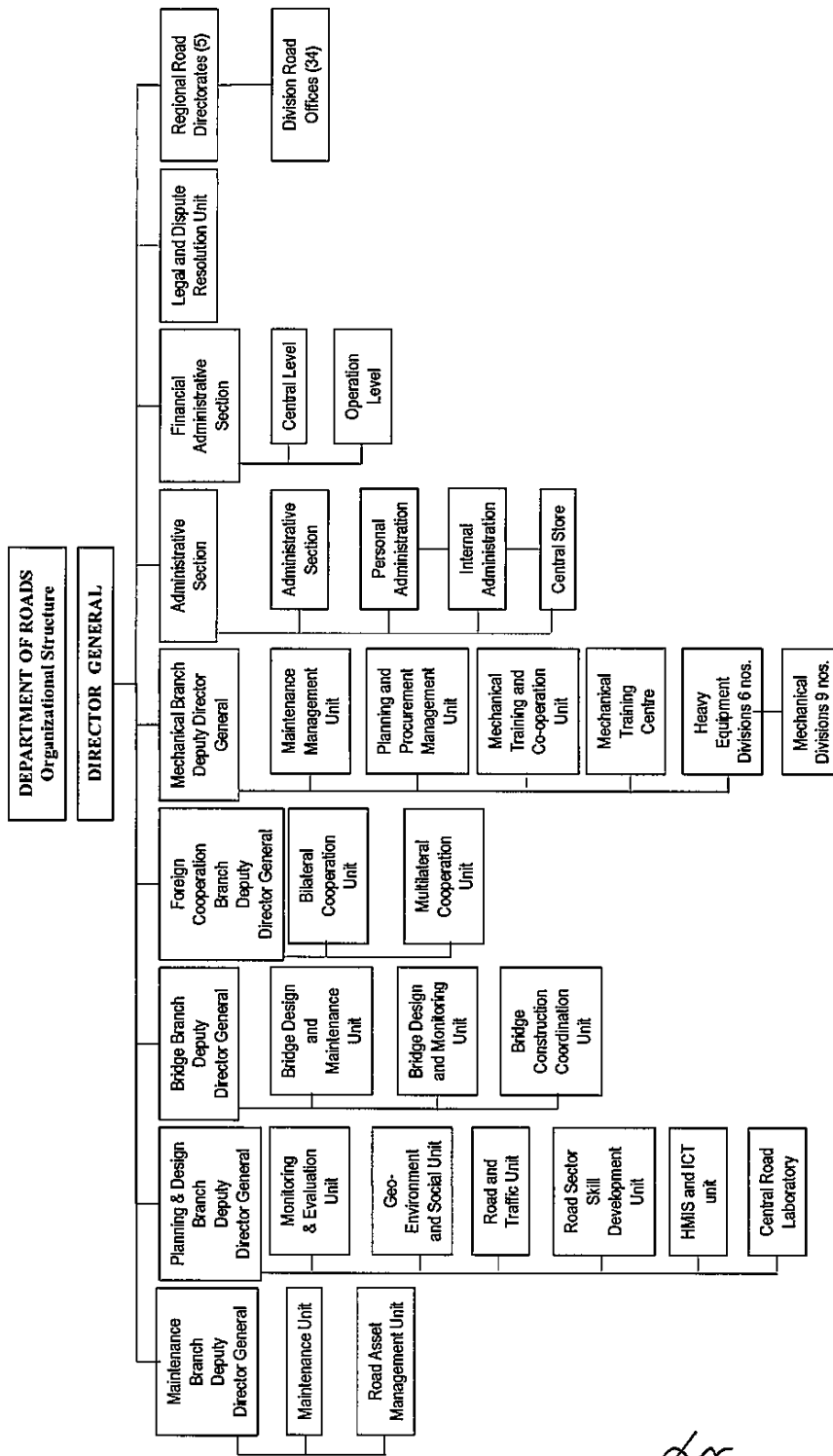


Project Site

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Annex2 Organization Chart



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Annex 3

PROJECT COST ESTIMATION

施工・調達業者契約認証まで非公表

This page is closed due to the confidentiality.

## 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.

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## Annex-4

- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a 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.

## (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



commissions paid to the Bank.

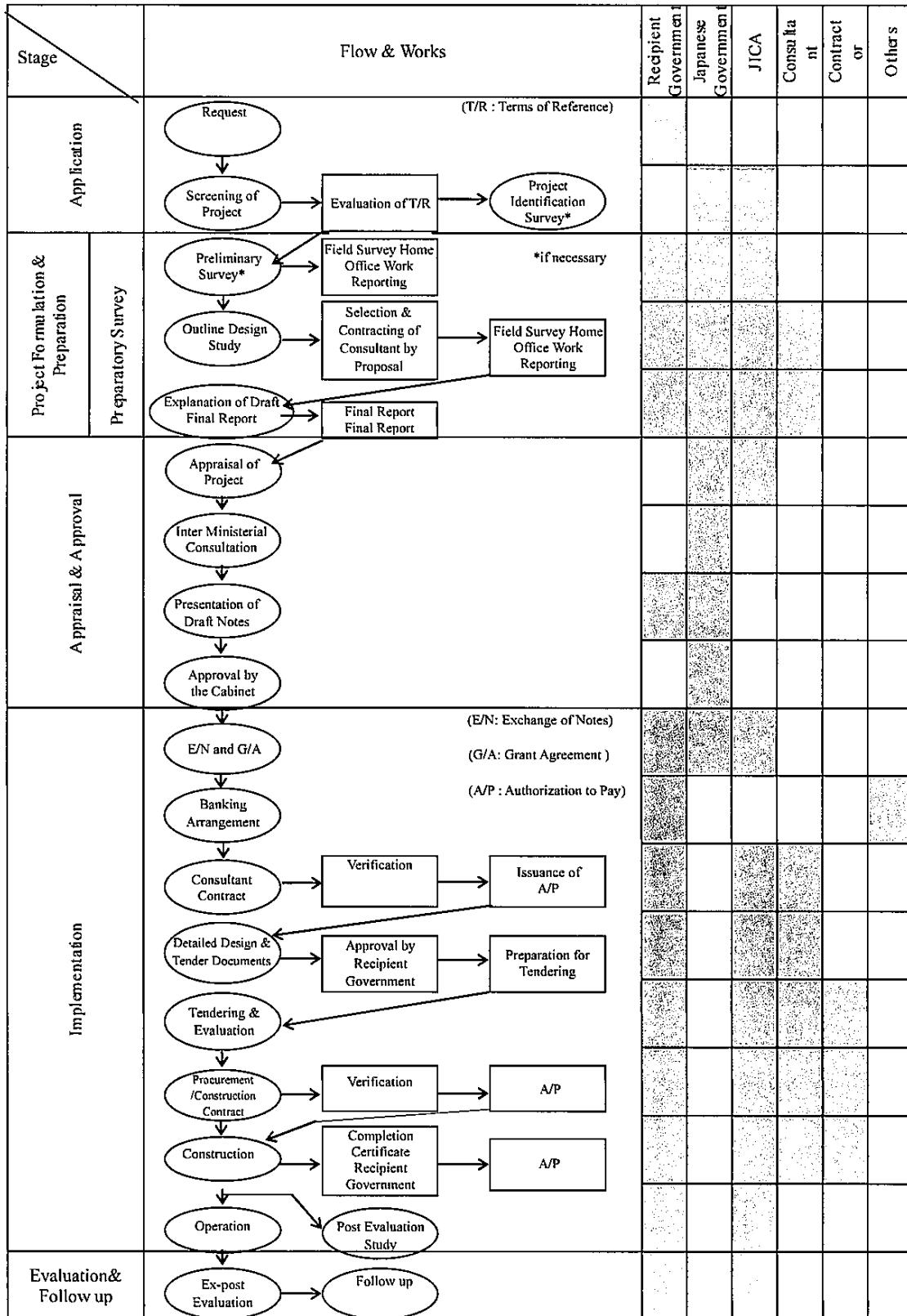
(10) Social and Environmental Considerations

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

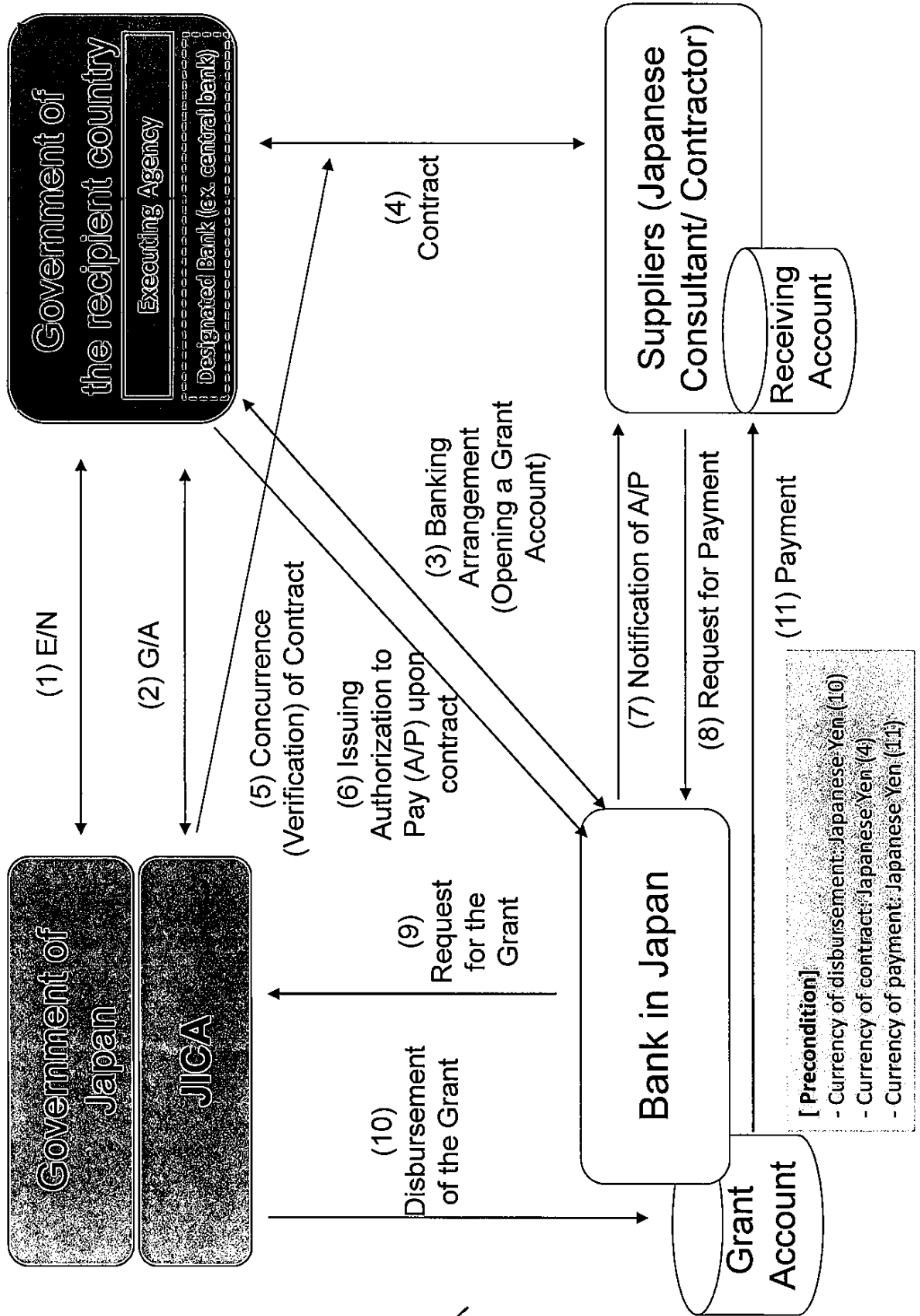


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Annex 6

Financial Flow of Japanese Grant (A/P Type)



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**Schedule of the Project**  
**Project Title: Project for the Sindhuli Road Earthquake Rehabilitation in the Federal Democratic Republic of Nepal**

Elaboration	2018												2019												2020														
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Contract	Items																																						
	Approval of Cabinet																																						
	Exchange of Notes (E/N), Grant Agreement (G/A)																																						
	Agreement of Consultant and Approval by JICA																																						
	Detailed Design																																						
	Detailed design (in Nepal)																																						
	Detailed design (in Japan)																																						
	Preparation of Bidding Documents																																						
	Approval of Bidding Documents																																						
	Notice of Bidding																																						
Explanation and Distribution of Bidding Documents																																							
Bidding work																																							
Bidding																																							
Evaluation of Bidding																																							
Agreement of Contractor and Approval by JICA																																							
Implementation Plan	Preparatory works (Transport of machines, etc.)																																						
	Sta.17+400 (Section II)																																						
	Excavation works																																						
	Crib works F500, F300																																						
	Scaffolding works																																						
	Anchor works																																						
	Rock bolts																																						
	Gabion check dams and vegetation works																																						
	High intensity net																																						
	Sta.15+520 (Section III)																																						
	H beam installation and scaffolding works																																						
	Anchor works																																						
	High intensity net																																						
	Sta.11+620 (Section III)																																						
	H beam installation and scaffolding works																																						
	Anchor works																																						
	Side ditch																																						
	Sta.33+440 (Section II)																																						
	H beam installation and scaffolding works																																						
	Anchor works																																						
Sta.33+695 (Section II)																																							
H beam installation and scaffolding works																																							
Anchor works																																							
Asphalt pavements																																							
Demobilization																																							
Construction	Rainy season																																						
	Rainy Season																																						
	Rainy Season																																						
	Rainy Season																																						
	Rainy Season																																						
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## Annex 8

## Major Undertakings to be taken by the Government of Nepal

## 1. Specific obligations of the Government of Nepal which will not be funded with the Grant

## (1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost (NRs)	Ref.
1	To take necessary safety measures on Sindhuli Road	Early May, 2018	DoR	*****	
2	To open Bank Account (Banking Arrangement (B/A))	within 1 month after the signing of the G/A	Rastra Bank DoR	1,500,000	
3	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the G/A	DOR	-	*1
4	To prepare IEE Report, submit it to MoPIT and obtain approval form MoPIT	within four month after signing of the G/A	DOR	1,000,000	
5	To secure and clear the following lands 1) Temporary construction yard and stock yard near the Project area 2) Disposal site near the Project area	Before preparation of tender document	DOR	960,000	
6	To remove utilities (power poles, electric wire, etc.)	Before preparation of tender document	DOR	-	
7	To update Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) as necessary, and implement EMP and EMoP	During the detailed design	DOR	45,000	
8	To submit the results of environmental and social monitoring on a quarterly basis as a part of PMR, by using the Monitoring Form	During the detailed design	DOR	60,000	
9	To submit Project Monitoring Report (with the result of Detailed Design)	Before preparation of tender document	DOR	24,000	

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

\*1. The estimated cost is included in the cost shown in (1)-2.

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## (2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost (NRs)	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	with 1 month after the signing of the contract(s)	DOR		
2	To bear the following commissions to a bank of Japan for the banking services based upon B/A				
	1) Advising commission of A/P	with 1 month after the signing of the contract(s)	Rastra Bank DOR		*1
	2) Payment commission for A/P	every payment	DOR		*1
3	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country and so assist the Contractor(s) with internal transportation therein	during the Project	DOR		
	1) Tax exemption and customs clearance of the products at the port of disembarkation	during the Project	DOR		
	2) To assist Contractor (s) with internal transportation from the port of disembarkation to the project site	during the Project	DOR		
4	To accord Japanese nationals and/or physical persons of third countries 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 country of the Recipient and stay therein for the performance of their work	during the Project	DOR		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project	DOR		
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for implementation of the Project	during the Project	DOR		
7	To support to obtain the related permits necessary for the implementation of the Project	during the Project	DOR		
8	To implement EMP and EMoP	during the Project	DOR		
9	To submit the results of environmental and social monitoring to JICA on a quarterly basis as a part of PMR, by using the Monitoring Form	during the Project	DOR		
10	To submit Project Monitoring Report	every month	DOR	-	
	To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)	DOR	-	
11	To conduct the afforestation program	during the Project	DOR	25,000	

\*1. The estimated cost is included in the cost shown in (1)-2.

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## (3) After the Project

NO	Items	Deadline	In charge	Estimated Cost (NRs)	Ref.
1	To implement EMP and EMoP	for a period based on EMoP	DOR	160,000	
2	To conduct landslide monitoring	for two years after the Project	DOR	240,000	
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of operation and maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	DOR	1,672,000/year	
4	To report to JICA, if any irregularities which may influence the effect of the Project are found across the Sindhuli Road such as landslides occurred.	After completion of the construction	DOR	-	

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**2. Other obligations of the Government of Nepal funded with the Grant**

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To procure the necessary tools and equipment of the Project 1) To conduct the following transportation a) Marine(Air) transportation of the products from Japan and the third country to the recipient country b) Internal transportation form the port of disembarkation to the Project site		
	2) To construct the facilities		
	3) To construct and demolish the temporary building		
2	To implement detailed design, bidding support and construction supervision		
3	To conduct soft component activities		
	Total		

\* The Amount is provisional. This is subject to the approval of the Government of Japan.

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<p><b><u>Project Monitoring Report</u></b>  <b>on</b>  <b>The Project for the Sindhuli Road Earthquake Rehabilitation</b>  <b>Grant Agreement No. <u>XXXXXXXX</u></b>          20XX, Month</p>
--

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____ Contacts                      Address: _____ Phone/FAX: _____ Email: _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____ Contacts                      Address: _____ Phone/FAX: _____ Email: _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____ Contacts                      Address: _____ Phone/FAX: _____ Email: _____

**General Information:**

<b>Project Title</b>	<b>The Project for Sindhuli Road Earthquake Rehabilitation</b>
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

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**1: Project Description****1-1 Project Objective**

The project is targeting the smooth and stable traffics on the Sindhuli Road by implementation of countermeasures against road-related sediment disaster on Sindhuli Road that is the main truck road linking Kathumandu and Terai plain area in south for mitigation the vulnerability to natural disasters. Main project components are follows;

1. Anchor Works for Slope Failure at Sta.17+400 on Sec II
2. Anchor Works for Reinforcing Gabion Wall at Sta.33+440 and Sta33+695 on Sec II, Sta.11+620 and Sta.11+520 on Sec III
3. Crib Works with Rock Bolt for Sta.17+400 on Sec II
4. High Intensity Net with Rock Bolt for Sta.17+400 on Sec II and Sta.15+520 on Sec III

**1-2 Project Rationale**

The 13th plan (2013/14 - 2015/16) of the national development plan in Nepal has set the goal of developing a safe and resilient transportation network for the social and economic development of the whole country. The 14th plan (2016/17 - 2018/19) is also extension of sustainable and secure road network expansion. In the priority investment plan (2007 - 2016), which is the basic policy of the road development of GON, the following polices is mentioned. The road maintenance management work shall be continuously carried out based on the classification of road maintenance management tasks.

This project aims to reinforce the vulnerable part of Sindhuli road against earthquakes in order to ensure safe and smooth traffic of Sindhuli Road, which is one of the important arterial roads. This content is consistent with the policy on the road sector of GON.

**1-3 Indicators for measurement of "Effectiveness"**

<b>Quantitative indicators to measure the attainment of project objectives</b>			
Indicators		Original (Yr 2017)	Target (Yr 2023)
Annual Passenger (Persons/year)	Khurkot	6,006,205	8,048,000
	Sindhuli Madi	5,847,170	7,835,000
Annual Cargo volume (ton/Year)	Khurkot	359,896	482,000
	Sindhuli Madi	492,042	659,000
<b>Qualitative indicators to measure the attainment of project objectives</b>			
Socioeconomic development			
Improve resilience against disasters			
Improve safety of road users			

**2: Details of the Project****2-1 Location**

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G/A NO. XXXXXXXX  
PMR prepared on DD/MM/YY

Components	Original (proposed in the outline design)	Actual
1.Anchor Works for Slope Failure	STA.17+400 on Sec II Sindhuli District	
2.Crib Works with Rock Bolt	STA.17+400 on Sec II Sindhuli District	
3.High Intensity Net with Rock Bolt	STA.17+400 on Sec II STA.15+520 on Sec III Sindhuli District	
4. Anchor Works for Reinforcing Gabion Wall	STA.33+440 on Sec II STA.33+695 on Sec II STA.11+620 on Sec III STA.15+520 on Sec III	

## 2-2 Scope of the work

Components	Original* (proposed in the outline design)	Actual*
1. Civil Work: Anchor Works for Slope Failure	Anchor Works: Qt= 158Ps Crib Works: A=1,270 m2	
2. Civil Work: Crib Works with Rock Bolt	Crib Works: A=1,060m2 Rock Bolt: Qt=300Ps	
3. Civil Work: High Intensity Net with Rock Bolt	High Intensity Net: A=5,300m2 Rock Bolt: Qt=3,340Ps	
4. Civil Work: Anchor Works for Reinforcing Gabion Wall	Anchor Works: Qt= 110Ps Anchor Plate: Qt= 110Ps	
5. Pavement works	Pavement works: A=1,610m2	
6. Consulting Services	Detail Design: 1 Set Construction supervision: 1 set	

Reasons for modification of scope (if any).

(PMR)

## 2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	(at the time of signing the Grant Agreement)	
Tender/Evaluation	Jan 2019		
Commencement of the construction	Mar 2019		
Completion of Project	July 2020		

Reasons for any changes of the schedule, and their effects on the project (if any)

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## 2-4 Obligations by the Recipient

### 2-4-1 Progress of Specific Obligations

See Attachment 8.

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2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant (Confidential until the Bidding)

This is closed due to the confidentiality.

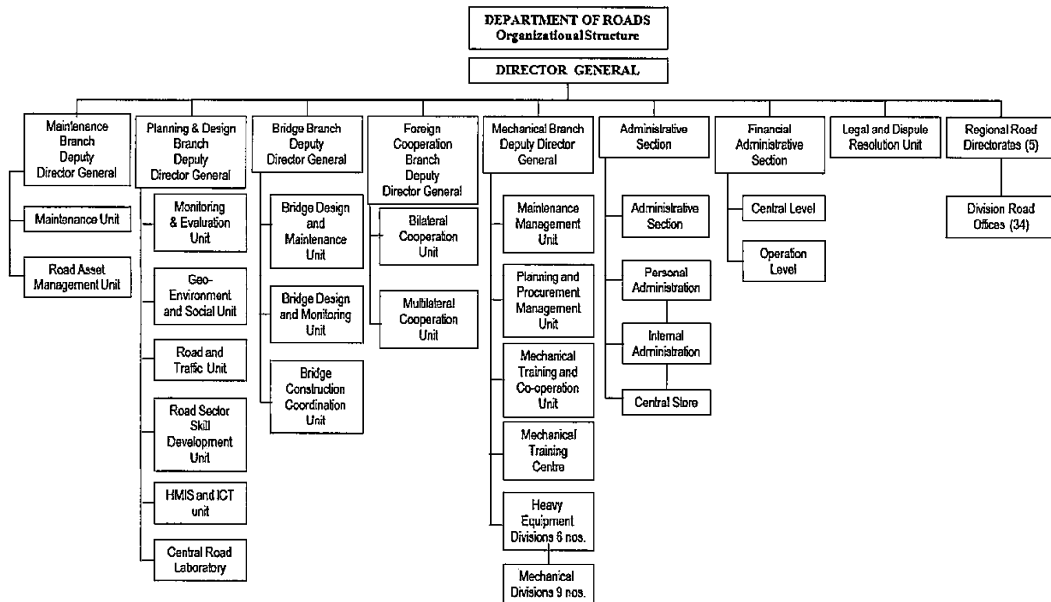
2-5-2 Cost borne by the Recipient

This is closed due to the confidentiality.

**2-6 Executing Agency**

Implementation of the project shall be responsible for DoR. The organization chart is shown below;

- DoR Organizations



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## Number of Staffs in DoR

Job Type	DoR
Engineer	634
Office Worker	1,977
Total	2,611

**Original** (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram):

human resources (number and ability of staff):

**Actual** (PMR)**2-7 Environmental and Social Impacts**

Report based on the agreed environmental checklist and monitoring form (See Attachment 6)

**3: Operation and Maintenance (O&M)****3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

**Original** (at the time of outline design)

Operation and Maintenance of the new facility shall be responsible for Fond vial.

**Actual** (PMR)**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

The annual cost of O&M is estimated as 1,672,000NRs/year.

**Actual** (PMR)

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**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. Delay of relocation of public utilities (Aerial Electric cable)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	This undertaking shall be completed before PQ notice. Thus the period for implementation is approx. 4 months after E/N & G/A. Additionally related organizations will executed the relocation. Low probability is determined considering the situation. Occurrence of the risk cause the delay of commencement of the project.
	Mitigation Measures:
	DoR shall coordinate the work implementation with the organization at appropriate timing.
	Action required during the implementation stage:
	DoR shall facilitate the implementation of the work.
2. The Delay of environmental permission of the project	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	This undertaking shall be completed before G/A. Additionally related organizations will executed environmental permission of the project. Low probability is determined considering the situation. Occurrence of the risk cause the delay of commencement of the project.
	Mitigation Measures:
	DoR shall coordinate the work implementation with the organization at appropriate timing.
	Action required during the implementation stage:
	DoR shall facilitate the implementation of the work.
3. The Delay of the tree cutting permission	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	This undertaking shall be completed before PQ notice. Thus the period for implementation is approx. 4 months after E/N & G/A. Additionally related organizations will executed the tree cutting permission. Low probability is determined considering the situation. Occurrence of the risk cause the delay of commencement of the project.
	Mitigation Measures:
	DoR shall coordinate the work implementation with the organization at appropriate timing.
	Action required during the implementation stage:
	DoR shall facilitate the implementation of the work.

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	<p><b>Mitigation Measures:</b> DoR shall coordinate the work implementation with the organization at appropriate timing.</p> <p><b>Action required during the implementation stage:</b> DoR shall facilitate the implementation of the work.</p> <p><b>Contingency Plan (if applicable):</b></p>
4. The Movement of Landslide	<p><b>Probability:</b> High/Moderate/Low</p> <p><b>Impact:</b> High/Moderate/Low</p> <p><b>Analysis of Probability and Impact:</b> If heavy rain such as hurricane Mitch before completion of the project, landslide may move. Low probability is determined considering the situation. Occurrence of the risk cause the redesign and the delay of completion of the project.</p> <p><b>Mitigation Measures:</b> DoR shall carry out the landslides monitoring continually. If landslide move, DoR shall report the situation to JICA as soon as possible.</p> <p><b>Action required during the implementation stage:</b> Landslides monitoring shall be managed by the contractor under the consultant consent.</p> <p><b>Contingency Plan (if applicable):</b></p>
5. Disturbances due to Road disaster	<p><b>Probability:</b> High/Moderate/Low</p> <p><b>Impact:</b> High/Moderate/Low</p> <p><b>Analysis of Probability and Impact:</b> If heavy rain such as hurricane Mitch, Road closer due to disaster may occur. Low probability is determined considering the situation. Occurrence of the risk cause the delay of completion of the project.</p> <p><b>Mitigation Measures:</b> DoR shall take the responsibility to secure the smooth traffic flow across the entire National Road 6 by conducting proper monitoring and maintenance activities.</p> <p><b>Action required during the implementation stage:</b> DoR shall facilitate the implementation of the work.</p> <p><b>Contingency Plan (if applicable):</b></p>
<b>Actual Situation and Countermeasures</b>	
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**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
  - Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)

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Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (₹) B	Initial total Price C=A×B	% of Contract Price D	Condition of payment Price (Decreased) E=C-D	Price (Increased) F=C+D
Item 1	●●t	●	●●	●	●	●
Item 2	●●t	●	●●	●		
Item 3						
Item 4						
Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

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(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
Item 1	○	○	○			
Item 2						
Item 3						
Item 4						
Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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(Version 6 as of 29<sup>th</sup> March 2018)

Annex 10 Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)																																																																																																																																																																																																																													
1 Permits and Explanation	(1) EIA and Environmental Permits	<p>(a) Have EIA reports been already prepared in official process?</p> <p>(b) Have EIA reports been approved by authorities of the host country's government?</p> <p>(c) Have EIA 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 country's government?</p>	(a)N (b)N (c)N (d)N	<p>(a) Based on EPR, EPA and DoR's Guidelines, an IEE study is required for the earthquake rehabilitations. However, slop protection is not required neither IEE nor EIA</p> <p>(b) A ToR for IEE including the slop protection at station of 17+400 was prepared by DoR in cooperation with JICA Survey Team.</p> <p>(c) As per the ToR for IEE, DoR has initiated actions to select a local consultant for the IEE study since Dec. 2017. The IEE study is scheduled for 15 weeks including the approval process after the selection of the local consultant as shown in the table below. Approval of IEE report is expected by the end of June 2018.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">No.</th> <th rowspan="2">Activity</th> <th colspan="15">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Desk study and review</td> <td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2</td> <td>Field study and investigation</td> <td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>3</td> <td>Interaction with stakeholders and collection of suggestions</td> <td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>4</td> <td>Analysis and prediction of impacts</td> <td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>5</td> <td>Development of mitigation and preparation of monitoring plan</td> <td></td><td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>6</td> <td>Draft report preparation</td> <td></td><td></td><td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>7</td> <td>Publication of 15 days public notice</td> <td></td><td></td><td></td><td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>8</td> <td>Comments on draft report</td> <td></td><td></td><td></td><td></td><td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>9</td> <td>Collection of recommendation from local bodies</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>10</td> <td>Preparation and submission of final report</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>11</td> <td>Approval of the final report</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>█</td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>	No.	Activity	Week															1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	Desk study and review	█															2	Field study and investigation		█														3	Interaction with stakeholders and collection of suggestions		█														4	Analysis and prediction of impacts			█													5	Development of mitigation and preparation of monitoring plan				█												6	Draft report preparation					█											7	Publication of 15 days public notice						█										8	Comments on draft report							█									9	Collection of recommendation from local bodies								█								10	Preparation and submission of final report									█							11	Approval of the final report										█						(a)Y (b)Y	<p>(d) Tree trimming and cutting are subject to the Forest Act. However, according to DoR, trees of which diameters are less than 30 cm are not subject to relevant laws and regulations of the Forest Ministry of Nepal.</p> <p>(a) A total of nine (9) Stakeholder Meetings (SHMs) were held by the DoR initiative in consideration of JICA Guidelines and schedule of DoR's IEE study. The following three stepwise approaches (phases) as DoR idea were employed for SHMs.</p> <ul style="list-style-type: none"> <li>➤ 1<sup>st</sup> Phase SHM: Major target groups of the 1<sup>st</sup> Phase SHM are representatives and teachers etc. in the Municipalities and Districts of the project stations with purposes to share the project components, SHM plan and possible impacts arouse from the project with those target groups.</li> <li>➤ 2<sup>nd</sup> Phase SHM: Major target groups of the 2<sup>nd</sup> Phase SHM are representatives and local people in the Municipalities and Districts of the project stations with purposes to share results of the 1<sup>st</sup> Phase SHM and discuss opinions and request from those local people with those target groups.</li> <li>➤ 3<sup>rd</sup> Phase SHM: Major target groups of the 3<sup>rd</sup> Phase SHM are representatives in the Municipalities and Districts of the project stations with purposes to reaffirm all results of the</li> </ul>
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(Version 6 as of 29<sup>th</sup> March 2018)

Annex 10 Environmental Checklist

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		<p style="text-align: center;"><b>Confirmation of Environmental Considerations (Reasons, Mitigation Measures)</b></p> <p><b>1<sup>st</sup> Phase and 2<sup>nd</sup> Phase SHMs with the target groups.</b> The following table shows summary of the SHMs</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Project</th> <th colspan="7">Stakeholder Meeting</th> <th>Total Number of Participant</th> </tr> <tr> <th>Section</th> <th>Station</th> <th>Phase</th> <th>Purpose of each Phase</th> <th>Main Target Group</th> <th>Date</th> <th>Start Time</th> <th>End Time</th> <th>Venue</th> <th>Target Community</th> </tr> </thead> <tbody> <tr> <td rowspan="3">III</td> <td>11+620 15+520</td> <td rowspan="3">1</td> <td rowspan="3">Explanation of project Plans, and SHMs as well as examination of possible impacts</td> <td rowspan="3">Municipality and Ward representatives and prominent figures such as school teacher</td> <td>26th Jan.</td> <td>13:00</td> <td>15:00</td> <td>Municipality Office</td> <td>Sunkoshi Rural Municipality</td> <td rowspan="3">11</td> </tr> <tr> <td>26th Jan.</td> <td>10:00</td> <td>11:00</td> <td>Municipality Office</td> <td>Golanjor Road Municipality</td> </tr> <tr> <td>25th Jan.</td> <td>13:00</td> <td>15:00</td> <td>Shree Primary School</td> <td>Dhungre Bhanjyang, Kamala Mai Municipality</td> </tr> <tr> <td rowspan="3">II</td> <td>17+400</td> <td rowspan="3">2</td> <td rowspan="3">Explanation on the 1<sup>st</sup> Meeting results and Opinion Collection from local people</td> <td rowspan="3">Municipality and Ward representatives and local people</td> <td>6th Mar.</td> <td>13:00</td> <td>15:30</td> <td>Municipality Office</td> <td>Sunkoshi Rural Municipality</td> <td rowspan="3">14</td> </tr> <tr> <td>6th Mar.</td> <td>10:00</td> <td>12:00</td> <td>Purpa Lower Secondary School, Barab</td> <td>Golanjor Rural Municipality</td> </tr> <tr> <td>5th Mar.</td> <td>13:00</td> <td>15:30</td> <td>Shree Primary School</td> <td>Dhungre Bhanjyang, Kamala Mai Municipality</td> </tr> <tr> <td rowspan="3">III</td> <td>11+620 15+520</td> <td rowspan="3">3</td> <td rowspan="3">Reaffirmation of all results of 1<sup>st</sup> and 2<sup>nd</sup> Phase SHMs</td> <td rowspan="3">Municipality and Ward representatives and prominent figures</td> <td>20th Mar.</td> <td>11:00</td> <td>12:00</td> <td>Municipality Office</td> <td>Sunkoshi Rural Municipality</td> <td rowspan="3">6</td> </tr> <tr> <td>20th Mar.</td> <td>14:00</td> <td>15:00</td> <td>Municipality Office</td> <td>Golanjor Road Municipality</td> </tr> <tr> <td>21st Mar.</td> <td>14:30</td> <td>16:00</td> <td>Municipality Office</td> <td>Kamala Mai Municipality</td> </tr> </tbody> </table>	Project		Stakeholder Meeting							Total Number of Participant	Section	Station	Phase	Purpose of each Phase	Main Target Group	Date	Start Time	End Time	Venue	Target Community	III	11+620 15+520	1	Explanation of project Plans, and SHMs as well as examination of possible impacts	Municipality and Ward representatives and prominent figures such as school teacher	26th Jan.	13:00	15:00	Municipality Office	Sunkoshi Rural Municipality	11	26th Jan.	10:00	11:00	Municipality Office	Golanjor Road Municipality	25th Jan.	13:00	15:00	Shree Primary School	Dhungre Bhanjyang, Kamala Mai Municipality	II	17+400	2	Explanation on the 1 <sup>st</sup> Meeting results and Opinion Collection from local people	Municipality and Ward representatives and local people	6th Mar.	13:00	15:30	Municipality Office	Sunkoshi Rural Municipality	14	6th Mar.	10:00	12:00	Purpa Lower Secondary School, Barab	Golanjor Rural Municipality	5th Mar.	13:00	15:30	Shree Primary School	Dhungre Bhanjyang, Kamala Mai Municipality	III	11+620 15+520	3	Reaffirmation of all results of 1 <sup>st</sup> and 2 <sup>nd</sup> Phase SHMs	Municipality and Ward representatives and prominent figures	20th Mar.	11:00	12:00	Municipality Office	Sunkoshi Rural Municipality	6	20th Mar.	14:00	15:00	Municipality Office	Golanjor Road Municipality	21st Mar.	14:30	16:00	Municipality Office	Kamala Mai Municipality	
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				<p>(b) at each SHM for the communities in the vicinity of each project site (station), some opinions and requests were not directly related to this project, but opinions and requests expressed by Stakeholders can be summarized in the following points</p> <ul style="list-style-type: none"> <li>• Priority employment of local people around the project site for the construction</li> <li>• Considerations on Safety such as traffic accident</li> <li>• Management for littering and sweeping on the road</li> <li>• Management for Noise</li> <li>• Management for appropriate rain water drainage of the road</li> <li>• Management for impacts on water resources and intakes</li> <li>• Management for social amenities such as bus stops</li> <li>• Management for cultural facilities</li> <li>• General considerations on social and environmental impacts</li> <li>• Management for impacts on forestry</li> </ul> <p>For this project, social and environmental considerations such as priority employment of surrounding residents, implementation of safety education, waste management, nighttime noise prevention through construction time management, restoration of rainwater drainage facilities, attentions on bus stops and school commuting, impacts on standing trees and forests, and</p>																																																																																		

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	setting up of vegetation method and etc. have been planned in the JICA Survey. Namely it can be evaluated that this project has been planned so as to adequately reflect those opinions from Stakeholders.
	(1) Air Quality	(a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken? (b) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	(a) N (b) N	(a) Comparisons in Technical, Financial and Environmental & Social and other aspects have been made as a project alternative study for each project station. After all, the most suitable plan considering environmental and social impacts at each station has been selected. (a) The project is rehabilitation and reinforcement of the damaged five Stations of Sindhuli Road by which road traffic will be normalized (restored to original state). Therefore, no significant impact on ambient air quality is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others") (b) Along each project station of Sindhuli Road, there is no industrial area at all.
2 Pollution Control	(2) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? (c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?	(a) N (b) N (c) N	(a) There is no large-scale excavation or embankment plan in this project. Soil from drilling is planned to be laid in ROW of each station. At the slope protection site, vegetation method is planned to prevent erosion. Therefore, there is no impact as to soil runoff. (b) Drainage facilities (cross drainage, cascade shape drainage and etc.) on the road have been properly planned and installed by the Sindhuli Road Construction Project, and are continuously used after this project. In addition, since this project is a construction to restore the original state before the earthquake disaster, it is not predicted that surface runoff will contaminate surrounding water sources, such as groundwater. (c) The project does not have any plans to construct facilities such as parking areas/service areas (Impacts during construction phase, see "(1) at 5. Others")
	(3) Wastes	(a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations?	(a) N	(a) The project does not have any plans to construct facilities such as parking areas/service areas. The project is rehabilitation and reinforcement of the damaged five Stations of Sindhuli Road. Therefore, no significant impact on wastes is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others")
	(4) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) N	(a) The project is rehabilitation and reinforcement of the five damaged Stations of Sindhuli Road by which road traffic will be normalized (restored to original state). Therefore, no significant impact on Noise and Vibration is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others")
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project is planned to be implemented in each ROW at the five damaged stations of the existing Sindhuli road. There are no such protected areas in and around each ROW at all.
	(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?	(a) N (b) N (c) N (d) N (e) N	(a) The project is planned to be implemented in each ROW at the five damaged stations of the existing Sindhuli road. There are no primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats) in and around each ROW at all. (b) There are no habitats of protected habitats of endangered species designated by laws of Nepal and international treaties around the project site. Aquilla Helaca (birds: a kind of eagle)

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		<p>international treaties and conventions?</p> <p>(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?</p> <p>(d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?</p> <p>(e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered?</p> <p>(f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?</p>	(Y)N	<p>classified as IUCN category of VU (vulnerable) around Section 17 + 400 is listed in the IEE survey for landslide measures (Section II) (2012). However, the bird in the IEE can be considered as sighting information of the surrounding people.</p> <p>(c) Impacts on ecosystem are not occurred at all by the project within the ROW of existing road.</p> <p>(d) Because of the rehabilitation project in ROW of the existing road, there is no occurrence of disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock.</p> <p>The Sindhuli Road Construction Project Section III Phase 3 states that the "the possibility of the presence of rare animals and plants in this project area is extremely low" as impact on animals and habitats, as same in the Basic Design Study. Also, JICA survey confirmed facts that animals around the road observed during the 2nd phase construction of Section III were primarily goat of livestock, and local workers were also aware of the existence of goats and stopped construction when goats passing through the construction site, and there were no acts that disrupted the passage. On the other hand, road safety education for local workers, drivers, operators, neighboring children and related persons are planned to be implemented at the time of construction of the project.</p> <p>(e) The project does not have any plant to installation of new roads. Therefore, there is no possibilities that the project causes impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas. In addition, because of the rehabilitation project on existing roads, there is no fear that ecosystems are disturbed due to introduction of exotic (non-native invasive) species and pests.</p> <p>(f) The project does not any plant to construct roads at undeveloped areas. Therefore, such negative impacts not be occurred at all.</p>
(3) Hydrology		(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	(a)N	(a) Topographical modification is very limited and existing drainage facilities are planned to be repaired by the project. Therefore, no significant impact on hydrology is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others.")
(4) Topography and Geology		<p>(a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed?</p> <p>(b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides?</p> <p>(c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?</p>	(a)N (b)N (c)N	<p>(a) Station at 17+400 is the slope protection to prevent landslides of the slope.</p> <p>(b) No large-scale excavation and/or earth filling are planned in the project. In addition, JICA survey technically confirmed that new landslide and collapse will not be occurred in the earthworks to be implemented in the project.</p> <p>(c) In the Sindhuli Road Construction Project, the soil balance was planned at 1: 1, and no surplus soil was generated on site. In this project as well, most of the excavated soil is planned to be used for vegetation method and the remaining soil is planned to be leveled on each ROW. Therefore, there will be no soil runoff from embankment, cuts, soil dumps, and earth and sand collection sites. As mentioned, to prevent soil runoff, vegetation method is planned in the project.</p>

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4 Social Environment	(1) Resettlement	<p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Are the compensations going to be paid prior to the resettlement?</p> <p>(e) Are the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p>	<p>(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N</p>	<p>(a) Since this project is a rehabilitation project to be carried out with in the ROW of existing Sindhuli Road land acquisitions and involuntary resettlements by the project are not occurred at all. In addition, no illegal occupation or use of irregular inhabitants in the ROW of each station subject to the project have been confirmed in the filed survey.</p> <p>(b) No resettlement is occurred in the project, therefore, such plans on compensation and resettlement assistance are not necessary to be prepared</p> <p>(c) No resettlement is occurred in the project, therefore, such plans on compensation with full replacement costs, restoration of livelihoods and living standards are not necessary to be prepared.</p> <p>(d) No resettlement is occurred in the project, therefore, such compensations are not necessary to be paid.</p> <p>(e) No resettlement is occurred in the project, therefore, such compensation policies are not necessary to be prepared.</p> <p>(f) No resettlement is occurred in the project, therefore, such a resettlement plan paying particular attention to vulnerable groups or people is not necessary to be prepared.</p> <p>(g) No resettlement is occurred in the project, therefore, such agreements are not necessary to be obtained.</p> <p>(h) No resettlement is occurred in the project, therefore, such an organization framework is not necessary to be established.</p> <p>(i) No resettlement is occurred in the project, therefore, such monitoring plans are not necessary to be prepared.</p> <p>(j) No resettlement is occurred in the project, therefore, such a grievance redress mechanism with regard to resentment is not necessary to be established.</p>

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Annex 10 Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(2) Living and Livelihood	(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?	(a)N (b)N (c)N (d)N (e)N (f)N	(a) The project does not have a plan to installation of new roads. (b) The project is rehabilitation and reinforcement of the five damaged Stations of Sindhuli Road. Thus, there is no such impacts on society around the stations by the project. (Impacts during construction phase, see "(1) at 5. Others") (c) Because this project is rehabilitation of existing roads, there is no population inflow from other areas after the project implementation. (Impacts during construction phase, see "(1) at 5. Others") (d) The project is rehabilitation and reinforcement of the five damaged Stations of Sindhuli Road. Thus, there is no such impacts on society around the stations by the project. (Impacts during construction phase, see "(1) at 5. Others") (e) One footpath on the slope located below Station 17+400, which is used by surrounding community, is planned to be protected, controlled and restored to original state by the Project. (Impacts during construction phase, see "(1) at 5. Others") (f) No such structures are planned to be constructed by the rehabilitation project.
		(c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?	(a)N	(a) The Project it to rehabilitate damaged stations in the ROW of the existing Sindhuli road. No local archeological, historical, cultural, and religious heritage are not existed in the ROW.
		(d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)?	(a)N	(a) The Project is rehabilitation at the five damaged Stations of existing Sindhuli road. Therefore, there is no possibility of negative impact on Landscape at all.
		(e) Is there any possibility that roads will impede the movement of inhabitants?	(a)N (b)N	(a) The Project it to rehabilitate damaged stations in the ROW of the existing Sindhuli road. There are no impacts on the culture and lifestyle of ethnic minorities and indigenous peoples. (b) The Project it to rehabilitate damaged stations in the ROW of the existing Sindhuli road. There are no negative impact on ethnic minorities and indigenous peoples at all.
		(f) Is there any possibility that structures associated with roads (such as bridges) will cause a 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	
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a)N	
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected?	(a)N (b)N	

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Annex 10 Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?</p> <p>(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?</p> <p>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>(d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>	<p>(a) Y (b) Y (c) Y (d) Y</p>	<p>(a) Working conditions and safety are properly managed in compliance with (New) "Labour Act 2074 (2017)", "Labour Rule 2050 (1993)" and "Environmental and Social Management Framework, 2007 DoR which are applied to the project. Such clauses are planned to be written in tender documents for the project.</p> <p>(b) industrial accident prevention are properly managed in compliance with (New) "Labour Act 2074 (2017)", "Labour Rule 2050 (1993)" and "Environmental and Social Management Framework, 2007 DoR which are applied to the project. Such clauses are planned to be written in tender documents for the project.</p> <p>(c) Especially, the Chapter XII - Provisions Relating to OHS of "Labour Act 2074 (2017)" clearly stipulates the Construction Workers Safety and Occupational Health and Safety (OHS) by which preparation of PPE (Personal Protective Equipment), and safety and health for workers and others are regulated. Such clauses are planned to be written in tender documents for the project.</p> <p>(d) Safety education and sanitation education for workers and labors including security guards, and surrounding residents are planned to be implemented in the project.</p>
5 Others	(1) Impacts during Construction	<p>(a) Are adequate measures considered to reduce impacts 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 impacts?</p> <p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p>	<p>(a) Y (b) Y (c) Y</p>	<p>In general, the Project will be carried out by the relevant laws, regulations and guidelines of Nepal</p> <p>(a)-1 Air Quality - Exhaust Gas: Countermeasure [Utilization of well-maintained construction vehicles and equipment, daily visual inspection of exhaust gases of those vehicles and equipment] - Dust: Countermeasure [Daily visual inspection of dust diffusions on-site and necessary water spraying (during dry season only) ]</p> <p>(a)-2 Water Quality - Human Waste: Countermeasure [Sanitation facilities are subject to (New) "Labour Act 2074 (2017)", "Labour Rule 2050 (1993)" and "Environmental and Social Management Framework, 2007 DoR". Leaching pit and/or septic tank methods as temporary sanitation facilities shall be established a minimum safe distance recommended by WHO (at least 30 m from the nearest water source and 2 m from the groundwater table). - River Water usage: the nearby source of Sunkoshi River (one of the major river systems in Nepal of which basin area is about 3,400 km<sup>2</sup> in total, and average annual flow is about 22 x 109 m<sup>3</sup>) is planned to be used for the construction. Therefore, negative impact on such a large river is not predicted by the temporally usage of the river water for the Project.</p> <p>(a)-3 Wastes - Surplus soil and construction debris : Countermeasure[Management by back-filling] - Domestic Solid Waste : Countermeasure[Domestic solid waste in the construction phase is disposed of by contractor(s) on weekly basis in accordance with "Solid Waste Management Act 2068 (2011)" and "Environmental and Social Management Framework, 2007 DoR.]</p>

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Annex 10 Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)																								
				<p>- Waste oil (from hydraulic systems and etc.): Countermeasure [Collection and treatment by contractor(s) using wastes collection companies]</p> <p>(a)-4 Soil Contamination</p> <p>- Spilled Oil and Fuel (from Construction vehicles and Equipment): Countermeasure [Periodical inspection of such trucks and equipment. Stopping lane and load and unload position management. Spilled oil and fuel management as waste.]</p> <p>(a)-5 Noise and Vibration</p> <p>- Noise: Countermeasure [Utilization of well-maintained construction vehicles and equipment. Daily visual inspection of silencers of those vehicles and equipment]</p> <p>- Vibration: Countermeasure [Use of equipment with low vibration level such as a "Rotary Percussion"]</p> <p>(b) The Project of rehabilitation and reinforcement is planned to be implemented in ROW at the five damaged stations of the existing Sindhuli road. Therefore, such negative impacts not be occurred at all.</p> <p>(c)-1 STDs such as HIV/AIDS of workers (See Simple prediction of HIA in the table below): Countermeasure [Health and sanitation education to Workers and surrounding people]</p> <table border="1"> <thead> <tr> <th>Station</th> <th>Total Labor Force (persons)</th> <th>Construction Period (months)</th> <th>Simple Prediction (persons)</th> </tr> </thead> <tbody> <tr> <td>33+440</td> <td>768</td> <td>4</td> <td>1.54</td> </tr> <tr> <td>33+695</td> <td>576</td> <td>3</td> <td>1.15</td> </tr> <tr> <td>11+620</td> <td>576</td> <td>3</td> <td>1.15</td> </tr> <tr> <td>15+520</td> <td>1,664</td> <td>8</td> <td>3.33</td> </tr> <tr> <td>17+400</td> <td>6,720</td> <td>14</td> <td>13.44</td> </tr> </tbody> </table> <p>(c)-2 Road Traffic</p> <p>- Traffic restriction: Countermeasure [Traffic management of On-way traffic at each station (Depending on station, construction method and construction schedule, Two-way traffic may be adopted) ]</p> <p>- Traffic Congestion (Inputs of construction vehicles and heavy equipment are limited by which rapid increase in the traffic volume is not considered): Countermeasure [Appropriate control of such vehicles and equipment.]</p> <p>- Footpaths in each ROW of the five stations (used as shortcuts by surrounding local people): Countermeasure [Instruction and education on the safety to workers, temporary interruption of the work while using footpaths by people, temporary diversions of footpaths, set up of warning signboards]</p> <p>(c)-3 Temporary employment: As a positive impact, there may have a possibility to employ surrounding local people at the five stations as security guards and/or sweepers during the construction phase. Child laborers (under 16 years old) and gender issues are regulated by the</p>	Station	Total Labor Force (persons)	Construction Period (months)	Simple Prediction (persons)	33+440	768	4	1.54	33+695	576	3	1.15	11+620	576	3	1.15	15+520	1,664	8	3.33	17+400	6,720	14	13.44
Station	Total Labor Force (persons)	Construction Period (months)	Simple Prediction (persons)																									
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Annex 10 Environmental Checklist

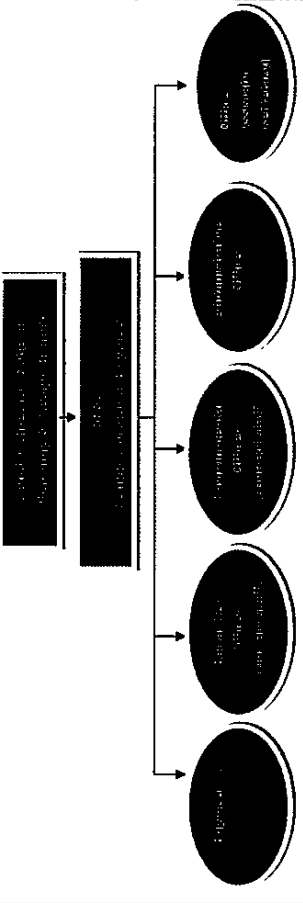
Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)												
		<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) 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) N (b) N (c) Y (d) N</p>	<p>Labour Act, Labour Rules and relevant guidelines of DoR. In cases where women labors are recruited, toilet facilities for exclusively women use are planned to be set up.</p> <p>(a) IEE for the project will be prepared by DoR after the JICA Survey. However, environmental monitoring is regulated by EPA and EPR as well as DoR relevant guidelines on environmental protection. Therefore, an Environmental Monitoring plan may be requested for the approval of IEE report with supplemental conditions. In addition the IEE report is required to be attached to tender documents for projects by the relevant regulations. The requirement on the environmental monitoring are one of the bidding conditions of bidders (contractors).</p> <p>(b) As mentioned above, in cases where environmental monitoring is requested as supplementary conditions for the IEE approval, monitoring items, methods and frequencies are specified in accordance with relevant clauses of EPA and EPR.</p> <p>In addition, based on the JICA Guidelines, the JICA Survey conducted an IEE level study for the project which has been classified as "Category B" by JICA. The JICA Survey Team has prepared a Draft Environmental Monitoring Plan. In general, for JICA grand aid projects, submission of environmental monitoring report to be submitted by project proponents to JICA as one of the conditions of the grant is required for three years</p> <p>(c) DoR has introduced an ICT based grievance redress mechanism (GRM) for DoR called "Grievance Redress System (GRS) as shown in the table below.</p>												
	(2) Monitoring			<table border="1"> <thead> <tr> <th>Web-site GRM function</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1. Responsive Layout</td> <td>Users can also use this system on your mobile as it is compatible with mobile browser or any other smart devices like ipad, think pad etc.</td> </tr> <tr> <td>2. Support Dual language</td> <td>This system is available both in English and Nepali Language</td> </tr> <tr> <td>3. Support Multiple File Uploading</td> <td>This system supports multiple file uploads</td> </tr> <tr> <td>4. Email &amp; SMS Notifications</td> <td>The system will send the notification on user Email and SMS if the email or mobile number is provided.</td> </tr> <tr> <td>5. Easy to Use</td> <td>The system is designed in a very simple way reducing the tedious work for user. Use of short form, maximum use of select and check option, passed message on tool tips over every links and fields to give the information in more clear way etc.</td> </tr> </tbody> </table> <p>Source: Grievance Redress System (GRS) PUBLIC USER'S MANUAL 2013, DoR, MoPIT</p> <p>GESU of DOR has deployed officials of an environmental officer and s social development officer as shown below.</p>	Web-site GRM function	Description	1. Responsive Layout	Users can also use this system on your mobile as it is compatible with mobile browser or any other smart devices like ipad, think pad etc.	2. Support Dual language	This system is available both in English and Nepali Language	3. Support Multiple File Uploading	This system supports multiple file uploads	4. Email & SMS Notifications	The system will send the notification on user Email and SMS if the email or mobile number is provided.	5. Easy to Use	The system is designed in a very simple way reducing the tedious work for user. Use of short form, maximum use of select and check option, passed message on tool tips over every links and fields to give the information in more clear way etc.
Web-site GRM function	Description															
1. Responsive Layout	Users can also use this system on your mobile as it is compatible with mobile browser or any other smart devices like ipad, think pad etc.															
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Annex 10 Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
				
6 Note	Reference to Checklist of Other Sectors	<p>(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).</p> <p>(b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).</p> <p>(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p>	(a) N (b) N	<p>(a) Not applicable for the rehabilitation and reinforcement project.</p> <p>(b) Not applicable for the rehabilitation and reinforcement project.</p>
	Note on Using Environmental Checklist		(a) N	(a) Not applicable for the rehabilitation and reinforcement project.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

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## Environmental Management Plan/Environmental Monitoring

## Under Construction

Environment al Item	Monitoring Item	Specifica- tion	Location	Frequency	Responsible Organization
Air Pollution	<ul style="list-style-type: none"> <li>Implementation of visual inspection on exist gas.</li> <li>Implementation of Instruction to drivers.</li> </ul>	Visual inspection	Constructio n site	Daily	Contractors
	<ul style="list-style-type: none"> <li>Visual inspection on soil dust diffusions in dry season for water spraying.</li> </ul>	Visual inspection	Constructio n site	Daily (Dry Season only)	
	<ul style="list-style-type: none"> <li>Implementation of interviews with surrounding local people.</li> </ul>	Interview	Nearest Community	Twice/ month	
Water Quality	<ul style="list-style-type: none"> <li>Visual inspection of back (sewage) water leakage (overflow), bad odor, emergence of vector flies and de-sludge activities) for the on-site toilets.</li> </ul>	Visual inspection	Constructio n site	Daily	Contractors
	<ul style="list-style-type: none"> <li>Implementation of interviews with surrounding local people.</li> </ul>	Interview	Nearest Community	Twice/ month	
Wastes	<ul style="list-style-type: none"> <li>Waste composition, quantity, transportation and treatment methods</li> </ul>	Compliance with waste managemen t rules	Constructio n site	Once/ month	Contractors
	<ul style="list-style-type: none"> <li>Implementation of interviews with surrounding local people.</li> </ul>	Interview	Nearest Community	Once/ month	
Soil Contamination	<ul style="list-style-type: none"> <li>Visual inspection of leakage conditions of oil and fuel leakages (from Engine, hydraulic power units and fuel tanks) of dump trucks, other trucks and heavy equipment</li> </ul>	Visual inspection	Constructio n site	Daily	Contractors
	<ul style="list-style-type: none"> <li>Implementation of interviews with surrounding local people.</li> </ul>	Interview	Nearest Community	Twice/ month	
Noise and Vibration	<ul style="list-style-type: none"> <li>Visual inspection (common sensation) of silencer conditions of dump trucks, other trucks and heavy equipment</li> </ul>	Visual inspection	Constructio n site	Daily	Contractors
	<ul style="list-style-type: none"> <li>Implementation of interviews with surrounding local people.</li> </ul>	Interview	Nearest Community	Twice/ mon th	
Living and Livelihood	<ul style="list-style-type: none"> <li>Construction Management</li> </ul>	Compliance with constructio n and safety regulations	Constructio n site	Daily	Contractors
Social Infrastructure and Services	<ul style="list-style-type: none"> <li>Implementation of construction vehicle management plans</li> <li>Implementation of commercial area road traffic controls (time restriction) at Station 17+400</li> </ul>	Vehicle and heavy equipment operation managemen t	Constructio n site	Daily	Contractors
	<ul style="list-style-type: none"> <li>Implementation of meetings with communities</li> </ul>	Discussion with the residents	Constructio n site and surrounding communitie s	Where necessary	DoR/ Contractors

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Environmental Item	Monitoring Item	Specification	Location	Frequency	Responsible Organization
Gender Issue	<ul style="list-style-type: none"> <li>Confirmation of tender document and contract clauses on gender issues.</li> <li>Implementation of periodical inspection</li> </ul>	Tender document and Contract Management Inspection	DoR and Construction site	At the tendering and contracts	DoR
	<ul style="list-style-type: none"> <li>Implementation of instruction and education on gender issues to labors</li> <li>Confirmation of construction of appropriate toilet facilities for women (if women are employed).</li> </ul>	Education to Labor Setting up toilet for Women	Construction site	Twice/Year	DoR/ Contractors
Rights of Child	<ul style="list-style-type: none"> <li>Confirmation of tender document and contract clauses on prohibition of employment of child labor.</li> </ul>	Tender document and Contract Management Inspection	DoR	At the tendering and contracts	DoR
	<ul style="list-style-type: none"> <li>Implementation of periodical inspection</li> </ul>	Inspection	Construction site	Twice/Year	
Risk of infectious diseases such as HIV/AIDS	<ul style="list-style-type: none"> <li>Implementation of Health and Sanitation education on STD.</li> </ul>	Health and hygiene education	Construction site and surrounding communities	Once/ year	DoR/ Contractors
Working Conditions/ Work Safety	<ul style="list-style-type: none"> <li>Implementation of visual inspection on utilization of PPE by workers/labors</li> </ul>	Visual inspection	Construction site	Daily	Contractors
Accidents	<ul style="list-style-type: none"> <li>Implementation of Meeting on Traffic safety education</li> </ul>	Traffic Safety Education	Construction site and surrounding communities	Once/ Two Months	DoR/ Contractors

#### Operation (After Completion)

Environmental Item	Monitoring Item	Specification	Location	Frequency	Responsible Organization
Air Quality	<ul style="list-style-type: none"> <li>Implementation of Monitoring of Air Quality</li> <li>Implementation of interviews with surrounding local people.</li> </ul>	Monitoring Interview	Construction site surrounding communities	Twice/Year	DoR
Water Quality	<ul style="list-style-type: none"> <li>Implementation of visual inspection</li> <li>Implementation of interviews with surrounding local people.</li> </ul>	Visual inspection Interview	Surrounding communities	Twice/Year	DoR
Noise and Vibration	<ul style="list-style-type: none"> <li>Implementation of Noise Vibration test</li> <li>Implementation of interviews with surrounding local people.</li> </ul>	Monitoring Interview	Construction site Surrounding communities	Twice/Year	DoR
Living and Livelihood	<ul style="list-style-type: none"> <li>Implementation of observation on Commuting and Public Bus Services around Station 17 +400</li> <li>Implementation of interviews with surrounding local people.</li> </ul>	Observation Interview	Construction site Surrounding communities	Twice/Year	DoR

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## Environmental and Social monitoring form

### 1. Construction for Rehabilitation Phase

The latest results of the below monitoring items shall be submitted to the JICA as part of the Quarterly Progress Report throughout the construction phase.

#### 1.1 Air Pollution

##### - Exhaust Gases

Station	Date (Day, Month, Year)	Type of Construction Vehicles/ Equipment	Fleet/Registration Number	Exhaust Gases Discharge Conditions				Frequency
				Items	Yes	No	If Yes, Measures Taken	
				Black Smoke				Daily
				White Smoke				
				Bad Odor				
				Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones as well as necessary instruction and education on exhaust gases to drivers and operators.

##### - Soil Dust (Dry Season only)

Station	Date (Day, Month, Year)	Location Construction Site including access roads	Dust and dried sandy soil stirred up by construction activities				Frequency
			Items	Yes	No	If Yes, Measures Taken (such as water supplying)	
			Dusts				Daily
			Dried Sandy Soil				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

##### - Interviews with Surrounding Local People

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Opinion and Request				Frequency
			Items	Yes	No	If Yes, Measures Taken (such as water supplying)	
			Dusts				Twice/Month
			Dried Sandy Soil				
			Bad Odor				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

#### 1.2 Water Quality

##### - On-site toilets

Station	Date (Day, Month, Year)	On-site Toilet Number	Sewerage water Conditions				Frequency
			Items	Yes	No	If Yes, Measures Taken	
			Black(sewage)water leakage				Daily
			Bad odor				
			Emergency of Flies				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

##### - Interviews with Surrounding Local People

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Water Sources used by Interviewee daily				Frequency
			Items	Yes	No	If Yes, Measures Taken	
			Abnormal change of turbidity				Twice/Month
			Bad Odor				
			Bad Taste				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

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**1.3 Wastes**

**- Construction wastes and debris**

Station	Waste Composition	Waste Quantity (ton/month)	Transportation, Disposal/Treatment Methods (Specify: ex. Registered Service Provider, Officially final disposal site, registered treatment facility (or company))				Frequency
			Transport	Disposal	Treatment	Remarks	
	Construction Debris					Once/ Month	
	Surplus Soil						
	Toxic and chemical Waste (if any)						
	Other (specify )						
	Excavated and Surplus soil management*		Back filling	Vegetation Method	Others (if any)		Remarks

\* Excavated and Surplus soil utilization is planned to be managed by back-filling and setting up vegetation method on site”  
Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Condition of Solid Waste				Frequency
			Items	Yes	No	If Yes, Measures Taken	
			Littering			Once/Month	
			Illegal Dumping				
			Bad Odor				
			Emergency of Flies				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**1.4 Soil Contamination**

**- Oil and Fuel leakage (spill)**

Station	Date (Day, Month, Year)	Type of Construction Vehicles/Equipment	Fleet/ Registration Number	Oil/Fuel Leakage Conditions				Frequency
				Items	Yes	No	If Yes, Measures Taken	
				Engine oil			Daily	
				Hydric power unit oil				
				Fuel				
				Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.  
If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Oil and Fuel leakage				Frequency
			Items	Yes	No	If Yes, Measures Taken	
			Emergency of Oil film on soil and surface water			Twice/Month	
			Bad Odor				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**1.5 Noise and Vibration**

**- Noise from Construction Vehicles and Equipment**

Station	Visual Inspection Date (Day, Month, Year)	Type of Construction Vehicles/ Equipment	Fleet/ Registration Number	Condition of Silencer equipped with construction vehicles/Equipment				Frequency
				Items	Yes	No	If Yes, Measures Taken	
				Properly Equipped			Daily	
				Damaged				
				Large noise discharge				
				Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.  
If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

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**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Noise and Vibration				Frequency Twice/Month
			Items	Yes	No	If Yes, Measures Taken	
			Nuisance level from construction vehicles for daily life				
			Nuisance level from construction equipment for daily life				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**1.7 Living and Livelihood**

**- Construction Management at Station 17+400**

Station	Date (Day, Month, Year)	Construction Management for commercial and school activities			Frequency Daily
		Commercial Activities	School Commuting	Others	
17+400					

Please specify Construction Management for commercial and school activities such as construction Vehicle usage time restriction, parking managements and others

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Living and Livelihood				Frequency Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Any issues on living and livelihood caused by the rehabilitation project				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

**1.8 Social Infrastructure and Services**

**- Road Traffic**

Station	Date (Day, Month, Year)	Construction Vehicle Management Traffic Control (Specify the details)				Frequency Daily
		One or Both -way Traffic Control	Avoidance of Rush Hour	Time Restriction	Others (Specify)	

Log Book: to be prepared and recorded by contractor(s) which is submitted to CMWSSB monthly.

**- Commercial Area Road Traffic Control at Station 17+400**

Station	Date (Day, Month, Year)	Management Traffic Control (Specify the details)				Frequency Daily
		One or Both -way Traffic Control	Avoidance of Rush Hour	Time Restriction	Others (Specify)	
17+400						

**- Meeting with surrounding Communities and Public Bus Service Companies at Station 17+400**

Station	Date (Day, Month, Year)	Community/ Companies	Meeting Venue	Number of Participants	Agenda	Opinions Requests	Countermeasures	Frequency
17+400				Community ( )				Before construction and where necessary
				Officials ( )				
				Others (Specify )				
				Total ( )				

Participant list and meeting minutes shall be attached

**1.9 Gender Issues**

**- Tender Documents and Contacts for the Project**

Station	Date (Day, Month, Year)	Conditions of Tender Documents and Contacts				Frequency At the time of Tender
		Items	Yes	No	If Yes, Measures Taken	

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		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Gender issues in Tender Documents to be followed by bidders				documents and Contracts
		Confirmation of bidder's policy on gender issues to be written in proposals				
		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Gender issues in Contracts				
		Confirmation of contractor's policy on gender issues to be written in Inception Report				
		Others (Specify )				

This monitoring is to be done by DoR responsibility and is submitted to JICA

#### - Periodical Inspection

Station	Date	Inspection on Gender Issues				Frequency
	(Day, Month, Year)	Items	Yes	No	If Yes, Measures Taken	Twice/Year
		Inappropriate and incomplete sub-contracts (such as discrimination against women, male-female divide on wage and labor time) clauses set up by contractors on gender for construction labors.				
		Implementation of the Contractor's policy on Gender issues				
		Others (Specify )				

This monitoring is to be done by DoR responsibility and is submitted to JICA

#### - Instruction and Education on Gender Issues to Workers and labors

Station	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Worker/Labor ( )		Twice/Year
					Others (Specify )		
					Total ( )		

To be held by Contractor(s). Participant list and educational materials shall be attached

#### - Construction of Toilets for Gender-segregated (Women) labors

Station	Date	Location	Conditions of Noise and Vibration			Frequency	
	(Day, Month, Year)		Items	Yes	No	If "No", Measures Taken	Twice/Year
			Setting up women's toilets				
			Appropriate management of such toilets (such as instruction and sign boards of Gender-desegregated toilet and cleansing)				
			Others (Specify )				

This monitoring is to be done by DoR responsibility and is submitted to JICA

### 1.9 Rights of Child

#### - Tender Documents and Contacts for the Project

Station	Date	Conditions of Tender Documents and Contacts				Frequency
	(Day, Month, Year)	Items	Yes	No	If Yes, Measures Taken	At the time of Tender documents and Contracts
		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Rights of Child (Child labor) in Tender Documents to be followed by bidders				
		Confirmation of bidder's policy on Rights of Child (Child labor) issues to be written in proposals				
		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Rights of Child (Child labor) in Contracts				
		Confirmation of contractor's policy on Rights of Child (Child labor) to be written in Inception Report				
		Others (Specify )				

This monitoring is to be done by DoR responsibility and is submitted to JICA

#### - Periodical Inspection

Station	Date	Inspection on Gender Issues				Frequency
	(Day, Month, Year)	Items	Yes	No	If Yes, Measures Taken	Twice/Year
		Inappropriate and incomplete sub-contracts (such as child labor prohibitions) clauses set up by contractors on Rights of Child (Child labor) for construction labors.				
		Implementation of the Contractor's policy on Gender issues				
		Others (Specify )				

This monitoring is to be done by DoR responsibility and is submitted to JICA

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**1.10 Risks of Infectious diseases such as HIV/AIDS**

**- Health and Sanitation Education**

Station	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Community ( )		Once/year
					Worker/Labor ( )		
					Others (Specify )		
					Total ( )		

Participant list and educational materials shall be attached

**1.11 Working Conditions/Work safety for the Construction**

**- Personnel Protective Equipment (PPE)**

Station	Date	Monitoring Item	If any problems, measures taken	Frequency
	(Day, Month, Year)	PPE: such as Helmet, Gloves, Masks, shoes, safe belts and etc. (specify ).)		Daily

Log Book: to be prepared and recorded by contractor(s) which is submitted to DoR monthly.

**1.12 Accidents**

**- Meetings with surrounding Communities for Traffic Safety**

Station	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Community ( )		Once/Two Month
					Worker/Labor ( )		
					Others (Specify )		
					Total ( )		

Participant list and educational materials shall be attached

**2. Post-Rehabilitation Phase (Operation Phase)**

The latest results of the below monitoring items shall be submitted to JICA on biannual basis for the first three years of operation (after the Rehabilitation).

**2.1 Air Pollution**

**- Air Quality Test**

Station	Date	Parameter	Value (µg/m³)	NAAQS (µg/m³)	Frequency
	(Day, Month, Year)	TSP			Twice/Year
		PM <sub>10</sub>			
		SO <sub>2</sub>			
		NO <sub>2</sub>			

NAAQS: National Ambient Air Quality Standards for Nepal

**- Interviews with Surrounding Local People**

Station	Date	Location	Opinion and Request				Frequency
			Items	Yes	No	If Yes, Measures Taken (such as water supplying)	
	(Day, Month, Year)	Community around the Construction Site	Dusts				Twice/Yearly
			Dried Sandy Soil				
			Bad Odor				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

**2.2 Water Quality**

**- Visual Inspection**

Station	Date	Location	Sewerage water Conditions				Frequency
			Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)	The Nearest well and/or surface water (pond, stream and river)	Abnormal change of turbidity				Twice/Year
			Bad odor				
			Abnormal change water color				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

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**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Water Sources used by Interviewee daily				Frequency Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Abnormal change of turbidity				
			Bad Odor				
			Bad Taste				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**2.3 Noise and Vibration**

**- Noise and Vibration Test**

Station	Date (Day, Month, Year)	Parameter	Value	NASQS	Reference international standard	Instrument and measuring methods and procedure	Frequency Twice/Year
		Traffic Noise	dB (Leq (A))				
		Traffic Vibration	dB	-			

NASQS: National Ambient Sound Quality Standard of Nepal

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Noise and Vibration				Frequency Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Nuisance level from traffic vehicles for daily life				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

**2.4 Traffic Flow**

**- Observation of Traffic Flow**

Station	Date (Day, Month, Year)	Number of Vehicles/hour					If any problems, measures taken	Frequency Twice/year
		Track/Dump	Bus	Passenger Car	Motor cycle	Other		

**2.5 Living and Livelihood**

**- Observation on Commercial, School Commuting and Bus Services at Station 17+400**

Station	Date (Day, Month, Year)	Stations				Frequency Twice/year
		Commercial Activities	School Commuting	But stop operation	Others (Specify)	
17+400						

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Living and Livelihood				Frequency Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Any issues on living and livelihood caused by the rehabilitation project				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

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## Appendix 5 Other relevant Data

### 5.1 Results of natural condition survey

### 5.2 Documents of environmental and social considerations

#### 5.2.1 International convention, agreement, treaty and protocol in environment field

#### 5.2.2 Terms of reference for IEE

#### 5.2.3 Documents of stakeholder meeting

#### 5.2.4 Environmental and social monitoring form

#### 5.2.5 Environmental checklist

### 5.3 2D seismic response analysis

**BOREHOLE NO. BV-1**

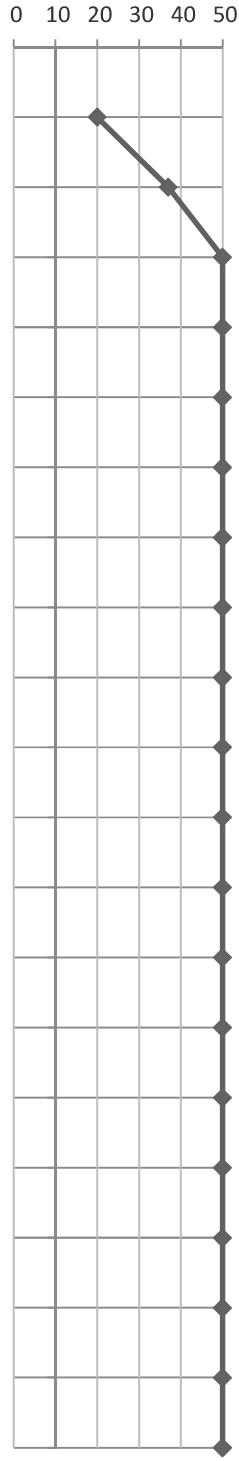
Total Depth, m : **20**

PROJECT : Preparatory Survey for Sindhuli Road Earthquake Rehabilitation Project

LOCATION : Sindhuli

CHAINAGE: 17+400, Section 2

Soil Description	Symbol	Depth, m	Sample No. & Type	No. of blows			N-Value	G. W. T.	N-Value SPT CPT
				10 cm	10 cm	10 cm			
Concrete									
GL- 0.5-3.0m: Highly weathered sandy mica schist		- 1	** SPT	9	7	13	20		
		- 2	** SPT	15	20	17	37		
		- 3	** SPT	23	50/6		>50		
		- 4	** SPT	23	50/6		>50		
		- 5	** SPT	29	31	40	>50		
GL- 3.0-10.0m: Highly to moderately weathered sandy mica schist		- 6	** SPT	25	50/4		>50		
		- 7	** SPT	33	30	31	>50		
		- 8	** SPT	22	50/6		>50		
		- 9	** SPT	32	50/6		>50		
		- 10	** SPT	14	22	50/6	>50		
		- 11	** SPT	22	50/4		>50		
		- 12	** SPT	15	50/9		>50		
		- 13	** SPT	22	50/5		>50		
		- 14	** SPT	21	50/5		>50		
GL- 10.0-20.0m: Moderately to slightly weathered sandy mica schist		- 15	** SPT	21	20	24	>50		
		- 16	** SPT	22	50/4		>50		
		- 17	** SPT	50/3			>50		
		- 18	** SPT	50/5			>50		
		- 19	** SPT	50/3			>50		
		- 20	** SPT	50/7			>50		
<b>End Depth</b>		20 m							
<b>Types of Soil</b>		<b>N Value</b>							
Granular Soil	Compactness	<b>0 to 4</b>	<b>4 to 10</b>	<b>10 to 30</b>	<b>30 to 50</b>	<b>&gt; 50</b>			
		Very Loose	Loose	Med. Dense	Dense	Very Dense			
Cohesive Soil	Consistency	<b>0 to 2</b>	<b>2 to 4</b>	<b>4 to 8</b>	<b>8 to 16</b>	<b>16 to 32</b>	<b>&gt; 32</b>		
		Very Soft A5-1	Soft	Med. Soft	Stiff	Very Stiff	Hard		



**BOREHOLE NO. BV-2**

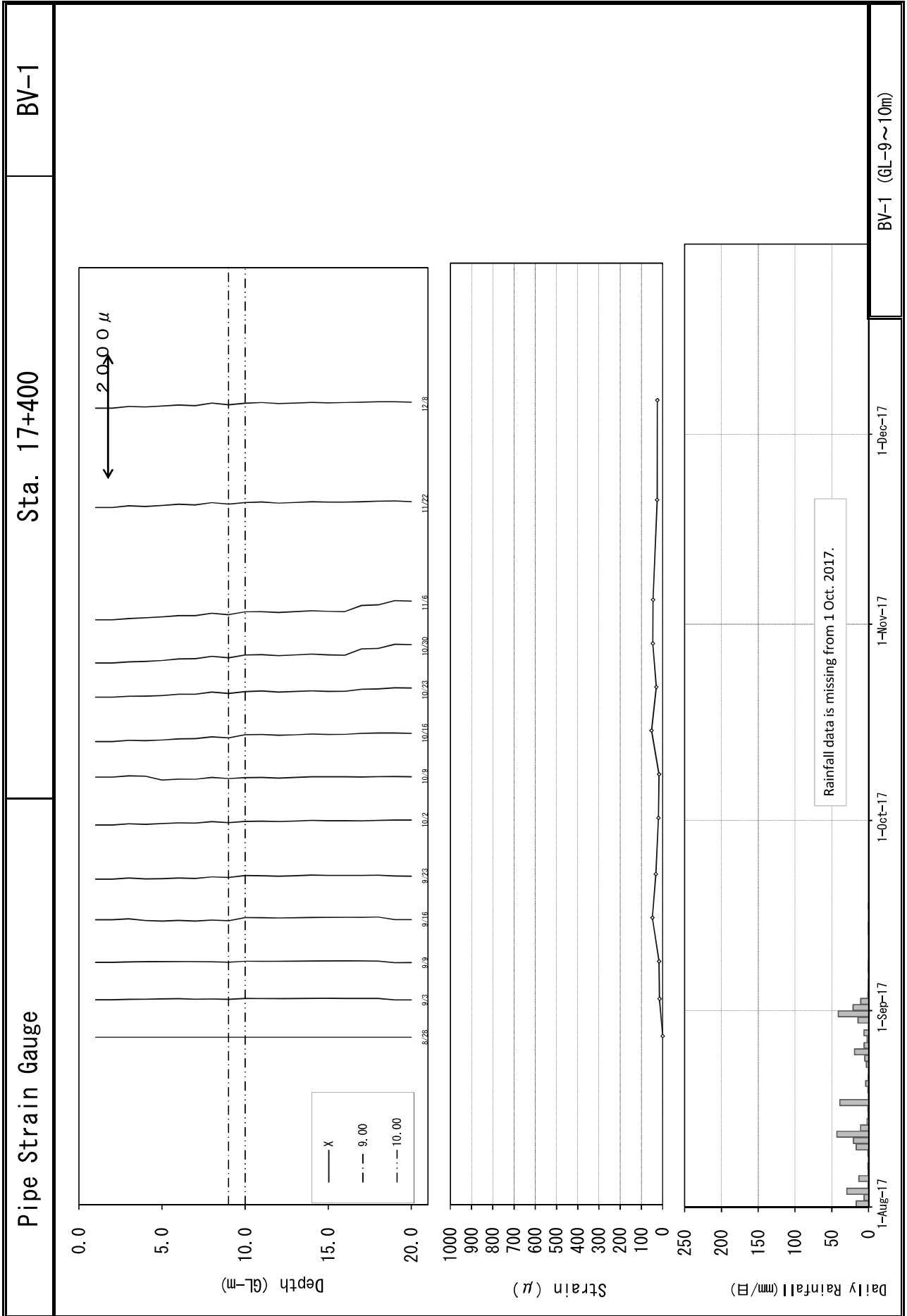
Total Depth, m : **10**

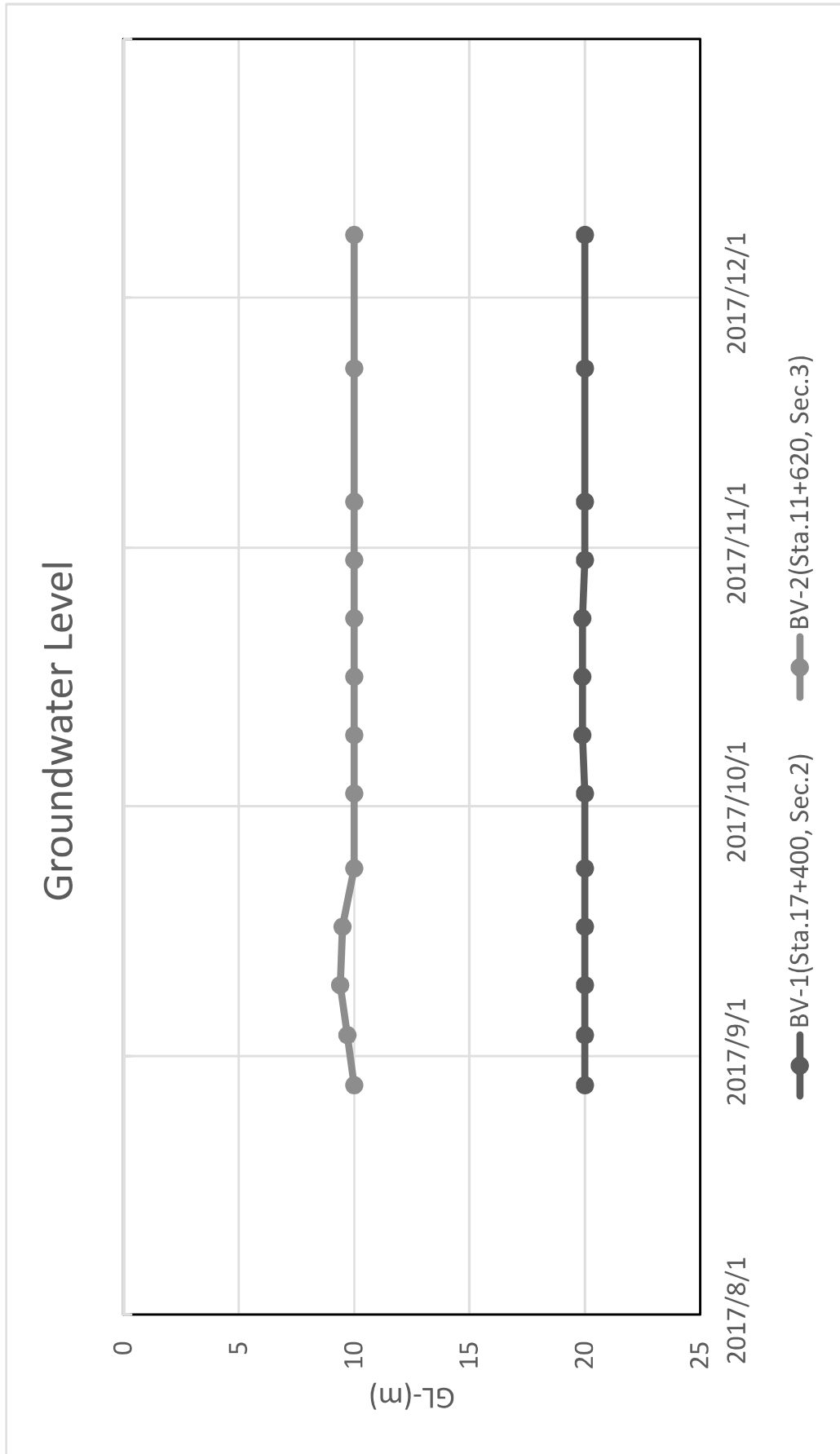
PROJECT : Preparatory Survey for Sindhuli Road Earthquake Rehabilitation Project

LOCATION : Sindhuli

CHAINAGE: 11+620, Section 3

Soil Description	Symbol	Depth, m	Sample No. & Type	No. of blows			N-Value	G. W. T.	N-Value SPT CPT	***
				10 cm	10 cm	10 cm				
Reddish hard top soil with gravels										
GL- 1.0-2.5m: Greyish very dense sand with boulders		- 1	** SPT	30	50/6		>50			
GL- 2.5-5.0m: Highly weathered phyllite		- 2	CPT	18	36	50/4	>50			
GL- 5.0-10.0m: Moderately weathered phyllite (Green Schist) Shape of core sample is breccia to short columnar rod shape		- 3	CPT	50/5			>50			
		- 4	CPT	15	50/6		>50			
		- 5	CPT	50/4			>50			
		- 6	CPT	50/6			>50			
		- 7	CPT	35	50/8		>50			
		- 8	CPT	50/4	50/3		>50			
		- 9	CPT	50/6			>50			
		- 10	CPT	50/4			>50			
<b>End Depth</b>		10 m								
<b>Types of Soil</b>		<b>N Value</b>								
Granular Soil	Compactness	0 to 4	4 to 10	10 to 30	30 to 50	> 50				
		Very Loose	Loose	Med. Dense	Dense	Very Dense				
Cohesive Soil	Consistency	0 to 2	2 to 4	4 to 8	8 to 16	16 to 32	> 32			
		Very Soft	Soft	Med. Soft	Stiff	Very Stiff	Hard			





## International Convention, Agreement, Treaty and Protocol in Environment Field

International Convention, Agreement, Treaty and Protocol	Joining year of Nepal
Plant Protection Convention 1951	2006 (Adherence)
Plant Protection Agreement for Asia and Pacific Region 1956	1965 (Adherence)
Convention on the High Seas 1958	1962 (Ratification)
Treaty Banning Nuclear Weapon tests in the Atmosphere, in Outer Space and Under Water 1963	1964 (Ratification)
Treaty of Principals Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and Other Celestial Bodies 1969	1967 (Ratification)
Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea Bed and the Ocean Floor and in the Subsoil Thereof, 1971	1971 (Ratification)
Convention on Wetland of International Importance Especially as Waterfowl Habitat (Ramsar Convention) 1971	1988 (Entry into Force)
Convention Concerning the Protection of the world Cultural and Natural Heritage 1972	1978 (Acceptance)
Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) 1973	1975 (Entry into Force)
United Nations Convention on the Law of the Sea 1982	1998 (Ratification)
International Tropical Timber Agreement 1983	1990 (Accession)
Vienna Convention for the Protection of the Ozone Layer 1985	1994 (Accession)
Montreal Protocol on Substances that Deplete the Ozone Layer 1987	1994 (Accession)
Agreement on the Network of Aquaculture Centres in Asia and the Pacific 1988	1990 (Ratification)
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal 1989	1996 (Accession)
London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer 1990	1994 (Accession)
Convention on Biological Diversity 1992	1993 (Ratification)
United Nations Framework Convention on Climate Change 1992	1994 (Ratiocination)
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa 1994	1996 (Ratification)
Kyoto Protocol to the United Nations Framework Convention on Climate Change 1997	2005 (Accession)
Stockholm Conventions on Persistent Organic Pollutants 2004	2006 (Ratification)
Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade 2004	2008 (Entry into Force)
ILO Convention on Indigenous and Tribal Peoples' Rights 1989	2007 (Rustication)

**Draft**

**Terms of Reference (ToR)**  
for  
Initial Environmental Examination (IEE)  
of  
The Project for the Sindhuli Road  
Earthquake Rehabilitation

Submitted to:  
Ministry of Physical Infrastructure and Transport (MoPIT)  
Government of Nepal (GoN)

Proponent:  
Banepa – Sinduuli – Bardibas Road Project  
Department of Roads (DoR)

Telephone No: +977-1-4481604  
Fax No: +977-1-4462008

December, 2017

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## ABBREVIATIONS

ADB	Asian Development Bank
DDC	District Development Committee
DoR	Department of Roads
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
ESD	Environment Screening Document
EMP	Environmental Management Plan
E/N	Exchange of Notes (E/N)
GESU	Geo-Environment & Social Unit
G/N	Grant Agreement
GoN	Government of Nepal
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
GoJ	Government of Japan
Km	Kilometer
LB	Local Bodies
LDO	Local Development Officer
MoD	Minutes of Discussion
MoPIT	Ministry of Physical Infrastructure and Transport
RES	Rapid Environmental Screening
ToR	Terms of Reference
WB	World Bank
ZoI	Zone of Influence

## 1. NAME AND ADDRESS OF THE PROPONENT

The Department of Roads (DoR) is the implementation agency of the Project and the proponent of the Initial Environmental Examination (IEE) study for the Project for the Sindhuli Road Earthquake Rehabilitation. The Ministry of Physical Infrastructure and Transport (MoPIT) is the concerned authority for the approval of IEE study report.

### Address of the Proponent

The Department of Roads,  
 Telephone No: +977-1-4481604  
 Fax No: +977-1-4462008

## 2. INTRODUCTION

### 2.1 General Introduction

The Government of Japan (GoJ) has provided a Grant Aid – non-reimbursable fund to Government of Nepal (GoN) to procure the facilities, equipment and engineering services for the economic and social development of GoN. The Japan International Cooperation Agency (JICA) is the executing agency of the Grant Aid for the Sindhuli Road Earthquake Rehabilitation Project. The objectives of the Project are as follows.

- Permanent rehabilitation of four Sections of Banepa – Sindhuli – Bardibas Road (hereinafter referred to as “the Sindhuli Road”) of Sta. 15+520 (Section III), Sta. 11+620 (Section III), Sta. 33+695 (Section II) and Sta. 33+440 (Section II) where were heavily damaged road sections by the major Earthquake on April 25, 2015 and a major aftershock on May 12, 2015 in Nepal,
- Construction of countermeasures of landslide at Sta. 17+400 (Section II) on the Sindhuli Road, and
- Enhance linking of northern remote areas of Sindhuli District with East-West Highway and Arniko Highway through Sindhuli Road.

Ministry of Physical Infrastructures and Transport (MoPIT) under Government of Nepal (GoN) is the responsible organization for executing the Project and DoR is the implementation agency. The Preparatory Survey for the Project is being undertaken at present by JICA to provide a set of basic documents necessary for the appraisal of the Project. After the Project is approved by the Cabinet of Japan, the Exchange of Notes (E/N) will be signed between the GoJ and the GoN to make a pledge for assistance, which is followed by the conclusion of the Grant Agreement (G/A) between JICA and the GoN. The G/A will define the necessary articles for implementing the Project, including procurement and payment conditions, role and responsibility of the GoN etc.

During implementation of the Grant Aid Project, the GoN is required to undertake necessary measures for environmental and social considerations. Further, according to JICA Guidelines for

Environmental and Social Considerations, ESC (April, 2010), an IEE level study is required for the smooth implementation of the Project.

This Terms of Reference (ToR) is prepared to conduct an IEE study for the implementation of the Project.

## 2.2 Background of the Project

The Sindhuli Road, which is classified as the National Highway No.6, is one of the most important strategic roads to link Kathmandu Valley with the Eastern Terai.

The Sindhuli Road had been constructed section by section approach (Table 1) since November 1996 through Japanese Grant Aid and completed in March 2015.

**Table 1 Banepa – Sindhuli – Bardibas Road (Sindhuli 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>
<b>Total</b>		<b>158</b>	-	-

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

Though the construction was completed successfully in March 2015, the Sindhuli Road was damaged in more than 24 places by the major Earthquake of April 25, 2015 and its major aftershock of May 12, 2015 in Nepal. These damages caused by earthquake were restored immediately by enforcement of “Urgent recovery work” of Pilot Project 2 under the JICA Technical Cooperation Program and the Road became passable soon.

However, this urgent recovery work was done as the temporary work aiming at an opening of the traffic but not total recovery of the Sindhuli Road. In the event of similar earthquake that may occur in the future, the traffic on the Sindhuli Road may be stopped for a long term unless an appropriate permanent measure for resisting the earthquake is taken timely.

In order to maintain the sustainability of the Sindhuli Road, the early enforcement of the permanent countermeasures against an earthquake is indispensable. If without proper countermeasure, those damages will induce more severe problems.

For this reason, the Government of Nepal (GON) has requested officially to the Government of Japan (GOJ) for the Project of Sindhuli Road Earthquake Rehabilitation.

## 2.3 Description of the Project

The Project incorporates permanent rehabilitation of four Stations comprising of Sta. 15+520 (Section III), Sta. 11+620 (Section III), Sta. 33+695 (Section II) and Sta. 33+440 (Section II) as well as the construction of countermeasures for the landslides at Sta. 17+400 (Section II) on the

Sindhuli Road as shown below (See Figure 1 and Figure 2).

The project locations (Stations) and outline of damages are summarized in Table 2 (5 prominent sites out of 24 sites identified).

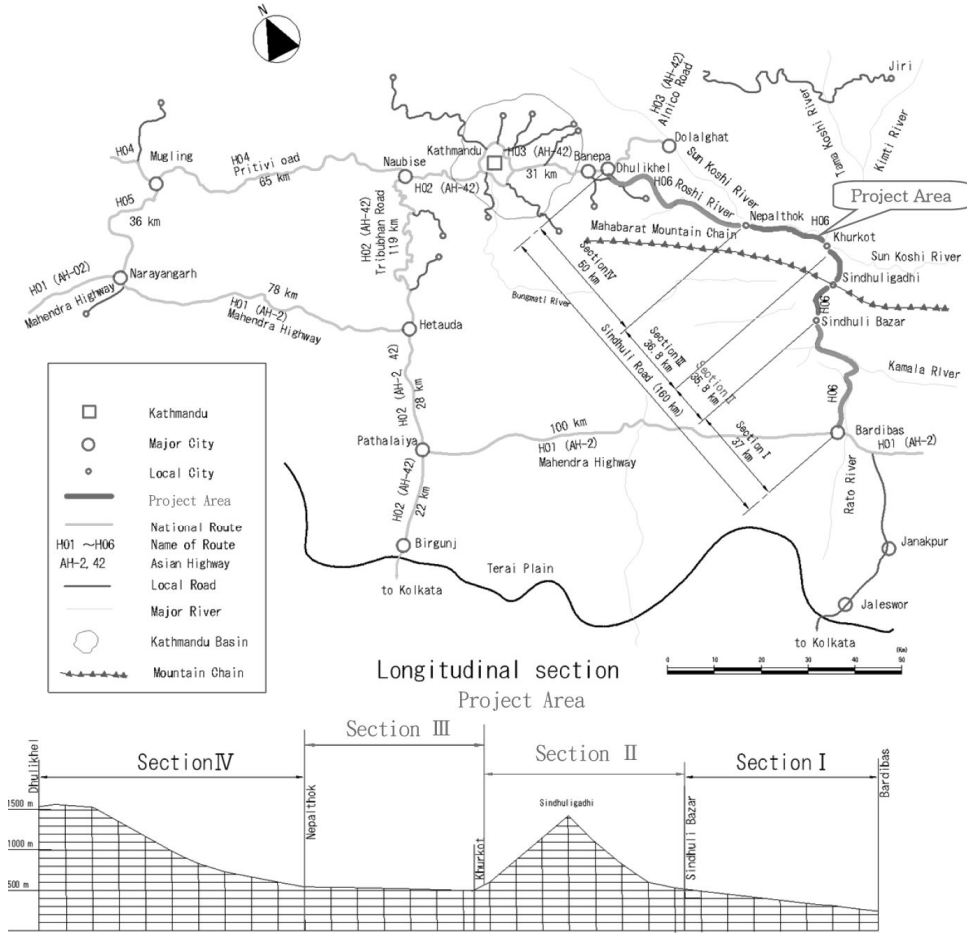
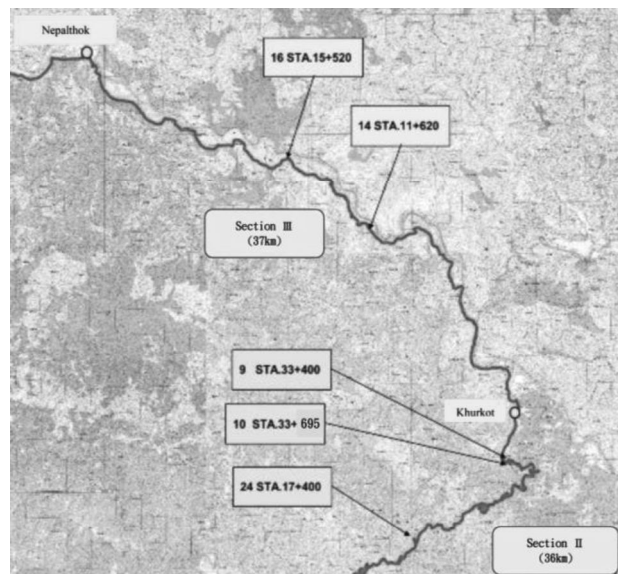


Figure 1 Project Area Map



**Figure 2 Project Station Map****Table 2 Outline of the Project Location (station) and Damage**

SN.	Sec.	Road Station (Sta.)		Structure	Alignment	Outline of Damage	
		Center	Deformed			Surface	Structure/Slope
9	II	33+440	33+430 - 33+460 (L=30.0m)	Valley side gabion wall H=6.5m V/H1:0.1	Outer curve	Settlement of road surface, wide opening crack	Deformation of gabion wall
10	II	33+695	33+680 - 33+710 (L=30.0m)	Valley side gabion wall H=7.0m V/H1:0.1	Outer curve	Wide opening crack appeared at road cantor	Slightly heavy deformation of gabion wall
14	III	11+620	11+580 - 11+660 (L=80.0m)	Valley side gabion wall H=6.0m V/H1:0.1	Outer curve	Crack on road and settlement	Deformation of gabion wall
16	III	15+520	15+500 - 15+560 (L=60.0m)	Valley side gabion wall H=6.0m V/H1:0.1	Narrow outer curve	Crack on road and settlement	Deformation of gabion and erosion at the front of base
24	II	17+400	17+360 - 17+450 (L=90.0m)	Valley side Stone pitching	Narrow curve	Pot hole appeared in 2017/8	Progress of Slope failure and erosion

The objective of the Project is to implement the permanent countermeasures for the above-mentioned damaged sites in order to keep sustainable traffic function of the road. The proposed countermeasures of the Project are summarized and shown below in Table 3 and Figure 3 – 7 respectively.

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

SN.	Sec.	Sta.	Actions by DoR	Countermeasures by Project	Remarks
9	II	33+440	Damaged area of the road has been protected by alternative traffic pass	Anchoring method	Traffic control, Permanent countermeasure by Japan grand aid
10	II	33+695	Damaged area of the road has been protected by alternative traffic pass	Anchoring method	Traffic control, Permanent countermeasure by Japan grand aid
14	III	11+620	Buttress wall has been constructed by DOR	Anchoring method	Permanent countermeasure by Japan grand aid
16	III	15+520	Widening of the road to mountain side and overlay will be done by DOR	Anchoring method	Permanent countermeasure by Japan grand aid
24	II	17+400	In 2013, temporary slope protection by masonry had done by DOR	Concrete flame with ground anchor work	Permanent countermeasure by Japan grand aid

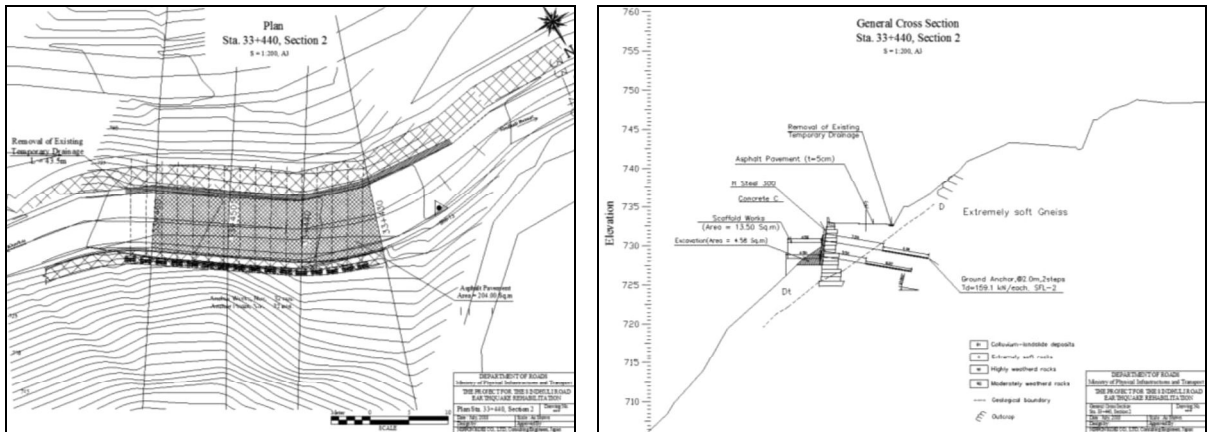


Figure 3 General Plan and Cross Section of the Proposed Countermeasures (Sta. 33+440)

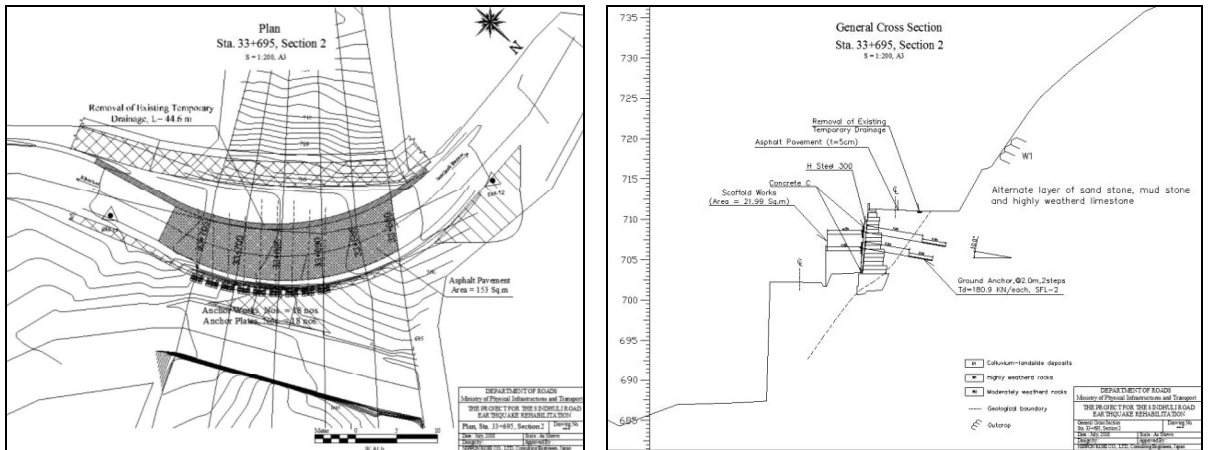


Figure 4 General Plan and Cross Section of the Proposed Countermeasures (Sta. 33+695)

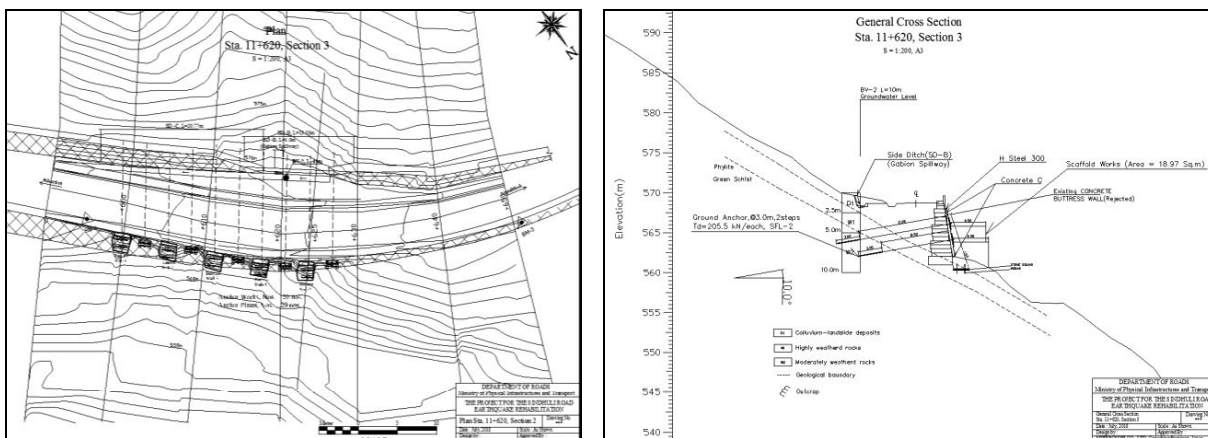


Figure 5 General Plan and Cross Section of the Proposed Countermeasures (Sta. 11+620)

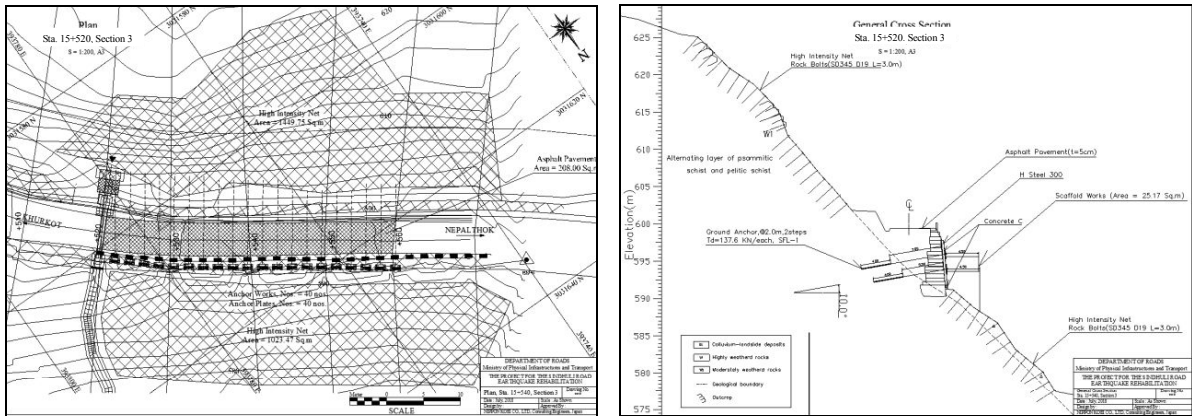


Figure 6 General Plan and Cross Section of the Proposed Countermeasures (Sta. 15+520)

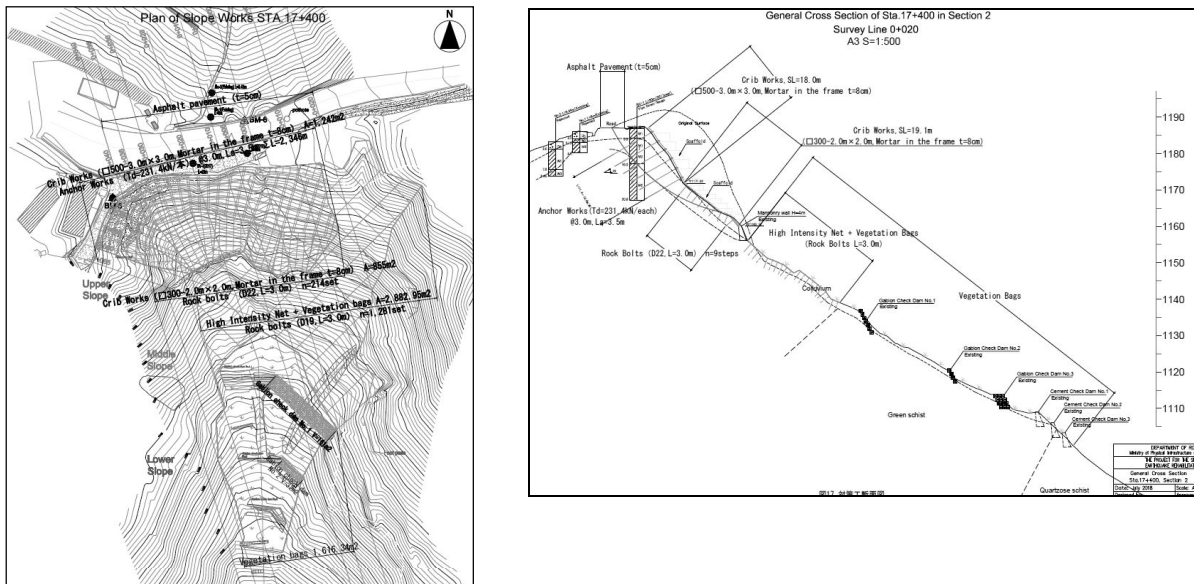


Figure 7 General Plan and Cross Section of the Proposed Countermeasures (Sta. 17+400)

2.4 Objectives

The objectives of the proposed IEE study include:

- To identify the major issues that may arise due to the project implementation on physical, socio-economic and cultural environment of the project area,
- To provide information on the general environmental setting of the Project area as baseline data,
- To recommend practical and site specific environmental mitigation and enhancement measures, prepare and implement environmental monitoring plan for the implementation of the Project, and
- To make sure that the IEE is sufficient for the implementation of the Project.

## 2.5 Relevancy of the Project

The Project is to implement the proposed permanent countermeasures for the five damaged sites in order to secure the permanent operation of the Sindhuli 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.

An IEE of the Project is necessary in order to assess the environmental consequences of the proposed countermeasure construction activities and suggest appropriate, practical and site specific mitigation and enhancement measures according to the JICA for Environmental and Social Considerations and the Minutes of Discussion (MoD) on the Project. In addition, because deforestation of national forest land will be associated with the implementation of the Project, an IEE study is a legal requirement according to Environmental Protection Act, 1996 (EPA, 1996) and Environmental Protection Rules, 1997 (EPR, 1997). Preparation of IEE report by DoR and approval of IEE report by MoPIT according to Nepali legal provision is considered sufficient by the JICA Guidelines for Environmental and Social Considerations.

## 3 REVIEW OF RELEVANT LAWS, RULES AND GUIDELINES

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

- Environment Protection Act, 1996
- Environment Protection Rules, 1997 (amended in 1999 and 2008)
- National Environmental Impact Assessment Guidelines, 1993
- Policy Document – Environmental Assessment in the Road Sector of Nepal, 2000 (DoR)
- Environmental Management Guidelines, 1997 (DoR)
- Environmental & Social Management Framework 2007 (DoR)
- Bio-Engineering Information (Rate Analysis Norms) 1999 (GEU/DoR)
- Reference Manual for Environmental and Social Aspects of Integrated Road Development, 2003 (DoR)
- Interim Guidelines for Enhancing Poverty Reduction Impact of Road Projects (Draft) 2007 (GUSE/DOR)
- Labour Act, 2048 (18rules, 2049), 1992
- Child Labour Act, 2001
- Forest Act, 1993
- Forest Rules, 1995
- Soil and Watershed Conservation Act, 1982
- National Parks and Wildlife Conservation Act, 1973



- Solid Waste (Management & Resource Mobilization) Act, 1987
- Public Road Act, 2031 BS
- Public Road Management and Land Acquisition Directives 2002 (DoR)
- The National Transportation Policy, 2001 (DoR)
- Local Self Governance Act, 1999 and Local Self Governance Rules, 2000
- Land Acquisition Act, 1977
- Explosive Material Act, 2018 BS

In addition, some relevant policies and guidelines by international donor agencies shall also be reviewed, as listed below:

- JICA Guidelines for Environmental and Social Considerations, 2010 (JICA)
- Environmental Assessment (OP 4.01) (WB)
- Forestry (OP 4.36) (WB)
- Environmental Assessment Guidelines, 2003 (ADB)

#### **4. PROCEDURES TO BE ADOPTED WHILE PRERPAEING THE REPORT**

The IEE approach, methodology and procedure should generally follow the provisions of the EPA, 1996 and EPR, 1997 (amended in 1999 and 2008). The following approach and methodology will be adopted during the IEE report preparation.

##### **4.1 Desk Review**

The following steps will be followed during the desk review:

- Collection and review of secondary sources of information from various sources
- Initial interaction and consultation with the local community and district level stakeholders
- Delineation of geographical boundary of the influence area on the topographical map
- Preparation of project specific checklist

##### **4.2 Public Consultation and Information Disclosure**

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

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

- Publication of notice - a 15 days public notice will be published in a national level daily newspaper seeking written opinion from concerned Local Bodies, LB (Rural Municipalities and Municipalities in accordance to the recent restructuring of VDCs and Municipalities), 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 LB will also be obtained.
- IEE team will also carryout interaction with local communities and related stakeholders (3 times in 3 locations as per the DoR's Stakeholder Meeting Plan for the Project) and will also collect the public concerns and suggestions.

### **4.3 Field Work**

The IEE team will inspect the project areas and its surroundings including probable environmental impact locations, such as landslide countermeasure executing areas and their surrounding, access roads, quarry sites and so on, and make necessary measurements, and discuss expected environmental issues with the local stakeholders.

The information collection will be made covering physical, biological, socio-economic and cultural aspects of the environment.

## **5. ALTERNATIVE STUDY FOR THE PROJECT**

Alternative analysis has been considered as an integral part of IEE study, which involves an alternative way of achieving the objectives of the Project. The aim of alternative analysis is to attain a development option, which maximizes the benefits while minimizing the unwanted impacts.

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

- No action option
- Project alternatives
- Alternative design and construction approach
- Alternative schedule and process
- Alternative resources, and
- Any other alternatives

## **6. REQUIREMENT OF THE IEE STUDY**

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

## 6.1 Time Schedule

The IEE report will be completed within fifteen (15) weeks after the approval of ToR. The completed IEE report will be necessarily approved by MoPIT by the end of June 2018 for the smooth implementation of the Project. An indicative time frame for conducting IEE is given in Table 4 below:

**Table 4 Proposed Work Schedule for Conducting IEE Study**

No.	Activity	Week															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	Desk study and review	■															
2	Field study and investigation		■	■	■												
3	Interaction with stakeholders and collection of suggestions		■	■													
4	Analysis and prediction of impacts				■	■	■										
5	Development of mitigation and preparation of monitoring plan					■	■	■									
6	Draft report preparation							■	■								
7	Publication of 15 days public notice								■	■	■						
8	Comments on draft report										■	■					
9	Collection of recommendation from local bodies											■	■				
10	Preparation and submission of final report												■	■			
11	Approval of the final report														■	■	■

## 6.2 Estimated Budget and Study Team

The IEE study of the Project need expert inputs from the following sectors:

### - Team Leader/Environmentalist

The Team Leader will take the overall responsibility of the assignment in accordance with the TOR and also for the conduction and coordination of all professional inputs. He/she will be responsible for coordination with the Department of Roads. He/ she will prepare a site specific Environmental Management Action Plan. The Team Leader should have minimum a Graduate degree in Environmental Science/Environmental Engineering/Environmental Management or other subjects related to Environmental Study recognized by government of Nepal and preferably a Master's Degree in the subject. He/she should have minimum 6 years of

specific experience in the field Environmental Assessment.

- Highway Engineer

Highway Engineer will have the overall responsibility for verifying the road elements like geometric design, curve improvement, grade improvement, design of side drains, design of bio engineering work, traffic count, axle load survey, road safety measures etc. He/She shall be responsible for the alternative analysis as mentioned in Environment Protection Regulation's schedules related to ToR and the Report. The Highway Engineer should have minimum a Graduate degree in Civil Engineering and preferably a Master's Degree in Highway/ Transportation Engineering. He/she should have minimum 4 years of specific experience in the field of detailed survey and design/ construction supervision of road works.

- Geologist

Geologist will have the overall responsibility for geotechnical assessment of the alignment and the slope stability analysis. He/she will identify the landslide prone areas along the alignment and propose the protective measures. He/she will be responsible for providing the geotechnical data of the alignment as required by other key staffs. The Geologist should have minimum a Graduate degree in Geology and preferably a Master's Degree in Geology/Geo-technical Engineering. He/she should have minimum 4 years of specific experience in road works.

- Social-economist/Gender Issue specialist

The Sociologist will collect the social and economical data of the project area in order to identify the socio-economic baseline information. On the basis of these data, he/she will be responsible for preparation of issues, identify and predict the respective impacts, propose appropriate mitigation measures, and monitoring mechanism etc. The Sociologist should have minimum a Graduate degree in Sociology and preferably a Master's degree in the field. He/she should have minimum 4 years of specific experience in road works.

Adequate number of support staffs must be included, such as:

- Technical Assistance (Physico-Chemical)
- Technical Assistance (Biological)
- Technical Assistance (Socio-Economic)
- Account/Admin Staff
- Computer Operator
- Runner/Peon

Note: The above key staff composition and estimated total key staff person-month is client's suggestion. Consultants are advised to propose their own staff composition and staff input requirements for efficient performance of their job as per the Terms of Reference. However, minimum key professional staff to be provided by the consultant should not be less than the numbers mentioned above.

### **Technology Transfer**

The client may depute supervising Engineer as per provision in Bill of Quantities to benefit from the know-how transfer, for close supervision and monitoring and to work as a liaison personnel between Client and the Consultant. Over the period of deputation, field (daily) allowance for this supervising Engineer shall be paid fully by the consultant as per rate in the BoQ. 15 % overhead charge of the consultant is included in the Billing Rates of the field (daily) allowance for supervising Engineers. No other Deduction shall be made from the quoted billing rates of the Supervising Engineer. The consultant shall follow the standard payment practices.

In case the supervising Engineers are not deputed during execution period, the consultant shall not be entitled to claim the amount quoted in BoQ for supervising Engineer. The item related to field allowance specified for Supervising Engineer in the BoQ shall not be paid in such case.ist

The IEE study will be done by selected local environmental consultants under the supervision of the Geo-Environment & Social Unit (GESU) at the DoR.

The required consultant cost for the IEE study is estimated to be RNs. And the breakdown is given in Appendix 1.

### **7. ENVIRONMENTAL BASELINE**

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

### **8. ANALYSIS AND INTERPRETATION**

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

### **9. 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 rehabilitation and construction of the Project. The impacts of the activities shall be on bio-physical, socio-economic and cultural resources in a defined immediate zone of influence (ZoI) (about 5 km from the project site). The impacts shall be classified in terms of extent (site specific, local and regional), magnitude (low, medium and high) and duration (short term and medium term) as well as reversible, irreversible, severe, moderate

and significant. The likely impacts shall be assessed covering both adverse and beneficial ones. The methodology adopted for impact identification and prediction will be checklists and matrix method. The likely impacts of the project implementation are described in the following sections.

### **9.1 Beneficial Impacts**

Beneficial impacts due to the rehabilitation and construction of the project shall be assessed by the study team in terms of impacts on physical, biological, socioeconomic and cultural systems of the project area. The impacts shall also be assessed in the category of extent, duration and magnitude. Based on the identification and prediction of the impacts, the suitable enhance measures to maximize the project benefits shall be explored and designed.

### **9.2 Adverse Impacts**

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

The following impact issues will be considered:

#### **(1) Physical environment**

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

- Slope instability and soil erosion due to various activities including slope cutting, spoil disposal, concentrated flows due to water diversions and inappropriate drain outfalls.
- Quarrying site operation.
- Impacts on water resources (irrigation, drinking water and other water bodies) and drainage pattern.
- Degradation of air quality (particularly dust) and increase in vibration/noise and its impact to the local people.
- Change in land use including development or expansion of roadside settlements.
- Impact of road safety

#### **(2) Biological environment**

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

- Loss or degradation of forests and vegetation. This includes all forest areas including state or

community or leasehold or religious or private forest.

- Impact on wildlife including birds due to loss or degradation of habitat, increased hunting and other form of human pressure.
- Impacts on the local ecology and ecological balance/functions.

### **(3) Socio-economic and cultural environment**

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

- Loss or degradation of farmland and productivity directly or indirectly (such as due to occupation of land, disposal of spoils, diversion of water/ drain waters, or disruption of hydrology, natural drainage, quarrying, burrow pits etc.).
- Loss or degradation of private properties such as houses, farm sheds, and other structures, crops and fodder/ fruit trees.
- Impact on community infrastructure such as irrigation, water supply, schools, health post, power transmission line and mobile telephone originating equipment.
- Impacts on cultural, religious and archeological sites.
- Impacts on social structures, employment opportunities, economy, cultural values.
- Impacts on health and sanitation.
- Gender issues.

## **10. MITIGATION MEASURES**

The IEE study will propose site-specific mitigation measures to minimize/mitigate/avoid the adverse impacts due to the implementation of the Project. The mitigation measures will be selected based upon appropriateness and cost analysis and these will be suggested for pre-construction and construction phases of the Project. Mitigation measures will be proposed for the impacts on physical, biological, socio-economic and cultural environment.

## **11. ENVIRONMENTAL MONITORING PLAN**

The study will identify the key environmental monitoring indicators with respect to activities, methods and responsibilities in order to monitor the environmental condition and adoption of suitable mitigation measures during construction and operation period.

## **12. IEE REPORT FORMAT**

This format will be in line with provision made in the Schedule 5 of EPR, 1997 (amended in 1999 and 2008) and should be adapted to project specific situation.

The IEE report will contain the following sections:

**A. Cover page with name of the proposal and proponent and address**

**B. Executive Summary that includes:**

- a. Objective of the Project
- b. Impacts on land use
- c. Adverse Impacts on environment, effects on people's livelihood, and population pressure
- d. Loss or degradation of local properties and assets
- e. Main mitigation measures
- f. Conclusions and recommendations

If the IEE report is prepared in English, executive summary will be given in Nepali also.

**C. Table of content**

**D. List of Abbreviation (acronyms)**

**E. Introduction**

This section should describe the project in simple terms and concisely, without missing relevant points but avoiding unnecessary details. The project description should provide following information:

- a. Background
- b. Name of the proponent
- c. Description of project
- d. Objective of IEE
- e. Methodology adopted for IEE study

**F. Review of related policy, legislations, standards, guidelines and institutions**

During the study relevant policies, legislations and guidelines should be reviewed and their salient features should be mentioned in this section. Similarly related institutions should be consulted.

**G. Existing Environmental condition**

Baseline information on the existing physical, biological as well as socio-economic and cultural resources of the proposed sub-projects is described here. Environmental features such as sensitive areas, population and settlements, forests should be shown in a map

**H. Project Alternative Study**

This section summarizes the alternatives by environmental comparison. This may include the following sub-headings.

- a. Project alternative
- b. Alternative design and construction approach
- c. Alternative schedule and process
- d. Alternate resources
- e. Any other alternatives

**I. Identification and Assessment of Impacts and Mitigation Measures**

This section contains the process, findings and conclusions of analysis and interpretations. The criteria for significance assessment should be summarized with the results of assessment. This



may be presented and discussed in the following:

- a. **Physical and Chemical Impacts:** such as land, air, water, noise, infrastructure impacts and other factors
- b. **Biological Impacts:** such as flora, and fauna, population, and natural habitats and ecosystems
- c. **Socio-economic-cultural impacts:** such as agricultural land, human health, social, cultural and religious values, implications of physical and biological impacts and other relevant socio-cultural-economic impacts.

This section also summarizes the recommended mitigation measures including basis for selection and cost if possible.

#### **J. Environmental Monitoring Plan**

This section summarizes the recommended monitoring parameters/indicators, activities, methods and responsibilities.

#### **K. Conclusion and Recommendations**

This section should clearly indicate whether IEE report is sufficient or further assessment is needed. Likewise, it should also be recommended that what aspects should be covered if further environmental assessment is needed.

#### **L. Miscellaneous**

Reference materials should be mentioned here if used during IEE report preparation in standard format.

#### **M. Annex**

- a. ToR of IEE
- b. Summary of consultations and meetings
- c. Deed of inquiry
- d. Notices published and pasted
- e. Recommendations from the concerned LB (VDCs or DDC)
- f. Photographs, Maps, Drawings, Checklists, Questionnaires
- g. List of persons and institutions consulted

The Consultant should submit at least 10 (Ten) copies of the draft Report to MoPIT and after review and approval shall submit 10 (Ten) copies of Final IEE reports, for each road, to the DOR. For the P (I) projects, consultant shall submit the final Report within six month from the date of signing.

#### **Electronic Copies:**

The Consultant should submit 2 (Two) copies of electronic copies in word format (read and write), for each road, in the Compact Disc (CD), which shall include TOR and IEE Reports, annexes and photographs.

#### **Presentation of the prepared documents:**

The idea behind this presentation is the active participation and feedbacks from the GESU/DOR

officers, the project staffs & Consultants and other stakeholders of the project. Hence, the Consultant should organize such presentations on the IEE Report with presence of all the team members involved in IEE. The Consultant shall present IEE Report in the specified format and defend to the GESU/DOR team prior to the submission to Ministry of Physical Infrastructure and Transport (MoPIT). The Consultant shall submit at least 10 (Ten) copies of Reports after incorporating comments and suggestions from the GESU/DOR. These Draft Documents shall be presented, by the consultant, to expert Review Team of MoPIT with presence of all the team members involved in IEE. The consultant shall incorporate comments and suggestion from expert Review team and submit final Report. Upon approval of the final report; the Consultant is required to submit 10 (Ten) copies each of the approved TOR and IEE Report to the GESU/DOR.



Attendance list (6th Mar. 2018) of SHM Phase 2 for Sta. 11+620 & Sta. 15+520

आगत तिथि 2018/19/123 गति एवं सुतडोमी जाउंयतिष्ठ आ वरुको सडक पुननिर्माण एवं कृषमा सुरोक्षरवालाको वीरुवा नरुको बँडक निम्न प्रहानुआको उपस्थिति आ सुभागत प्रमो।

उपस्थिते

क्र.सं.	नाम एवं	ठेगाना	संलग्न
१	उपरोडा द.काल	सु.गा.पा. १/१५ अचल	उपरोडा
२	उपरोडा द.काल	सु.गा.पा. १/१५ अचल	उपरोडा
३	लोक बाबा	सु.गा.पा. १/१५ अचल	लोक बाबा
४	सुभाकुमार द.काल	" " ५	सुभाकुमार
५	मिल न सर -	" " ५	मिल न सर
६	वाहुवायु प.द.काल	" " ५	वाहुवायु
७	विभागा प्रिन्सिपल (इसाकुर्स)	सु.गा.पा. १/१५ अचल	विभागा प्रिन्सिपल
८	विभागा प्रिन्सिपल	" " "	विभागा प्रिन्सिपल
९	सुभाकुमार द.काल	JICA study team	सुभाकुमार
१०	विभागा प्रिन्सिपल	SODSBR project	विभागा प्रिन्सिपल
११	सुभाकुमार द.काल	" "	सुभाकुमार
१२	अमिल द.काल	सु.गा.पा. १/१५ अचल	अमिल
१३	सुभाकुमार द.काल	सु.गा.पा. १/१५ अचल	सुभाकुमार
१४	सुभाकुमार द.काल	सु.गा.पा. १/१५ अचल	सुभाकुमार

कुलफलको सुभागा का सुदस्य मिला धापा नै सुदकमा सुधरनाको मोलिम बडेको। पुल्का

Attendance list (20th Mar. 2018) of SHM Phase 3 for Sta. 11+620 & Sta. 15+520

आज मिति २०६४ साल चैत्र २० गते अंगलवार यह सुनकोशी गाँव पालिङमा सुनकोशी गाउँपालिका अर्न्तगत चर्चे शुक्रपल्ले शक्ति पुञ्जको सङ्घ पुर्ननिर्माण को लागि कान्तावलीमा प्रभाव बुलाउन सम्बन्धी तेश्रो चर्चाको दस्तावेज तिन गढानुआको उपस्थितिमा सञ्चाल भयो।

उपस्थिति

क्र.सं.	नाम थर	पद	वसतलेत
१.	दिवसिंह सुकान	उपाध्यक्ष	दोडा...
२.	जोषी सुन्दर निरमल	सुनकोशी विकास समिति	सुनकोशी
३.	जोषी राज बिक्रम	सुनकोशी विकास समिति	सुनकोशी
४.	जोषी आकाश	सु.सं.सं.सि.सं.सं.सं.	सुनकोशी
५.	रमेश प. जोषी	सुनकोशी विकास समिति, JST	सुनकोशी
६.	विमला जोषी	सुनकोशी विकास समिति	सुनकोशी









Attendance list (26<sup>th</sup> Jan 2018) of SHM Phase 1 for Sta. 33+440 & Sta.33+695ATTENDANCE LISTName of Meeting: STAKEHOLDERS MEETING  
PREPARATORY SURVEY FOR THE PROJECT FOR THE SINDHULI ROAD EARTHQUAKE REHABILITATION

Date/Time: JANUARY 26 2018 10:00 Hrs

Venue: ~~BARAHACHHODI~~ GOLANJHOR RURAL MUNICIPALITY  
SINDHULI

S. No	Name	Organization	Position	Signature
22	ਪ੍ਰਭਾਕਰ ਸਿੰਘ ਗਿੱਲ	ਗੋਲਾਜ਼ੋਰ ਸਰਕਾਰ	ਓਐਚਏ	
23	ਦੇਵੇਂਦਰ ਸਿੰਘ	- 11 -	ਲਿਫਟਿੰਗ ਮੈਕੈਨਿਕ	
24	ਮਿਲਿੰਦ ਸੇਠ	SOSBR, DOR	Engineer	
25	ਮਿੰਨਾ ਕੌਰ	-	-	
26	ਮੁਕਤ ਬਿਰਕਤ	SOSBR, DOR	Sub-Engr.	
27	ਰਮੇਸ਼ ਖੱਲਾ ਅੰਡਰਲਾਈਟ	JST, N K	Engineer	
28	ਰਮੇਸ਼ ਕਾਮਰਾਜ	SOSBR, DOR	sub-eng	
29	ਮਾਨਿਸ਼ ਕੁਮਾਰ	ਗੋਲਾਜ਼ੋਰ ਸਰਕਾਰ	ਮਾ-ਸੀ	
30	ਗੋਪ ਕਰ ਦੇਵਗੋਇ	ਗੋਲਾਜ਼ੋਰ - 6	ਮੈਂਬਰ	
31				

Attendance list (6th Mar. 2018) of SHM Phase 2 for Sta. 33+440 & Sta.33+695

आज मिति २०६८/११/१३ गते मंगलवार यस श्री पुरुष म.म. वि. बापडा  
 मा निम्न महासभाको उपस्थितिमा जिल्लाको नागरिकता कडा १.६ अन्तर्गत  
 वि.वि. (जमातीको शुक्रप ले इति पुन्याको सडक पुर्ननिर्माण को लागि बापडा  
 चारको इलाका कार्यक्रम सम्पन्न भयो)

उपस्थिते

क्र	नाम धर	ठेगाना	संख्या
१)	श्रीम नहाडा देवकोटा	गौकोटपोस्ट - ७	१
२)	राम बसु बराम	"	१
३)	धन बहादुर थापा	"	१
४)	बसुन्धरा देवी शर्मा	"	१
५)	रविन्द्र बहादुर शर्मा	"	१
६)	श्री प्रदिप कुमार शर्मा	शुक्रपले ३३३३३३	१
७)	नारायण राज शर्मा	गौकोटपोस्ट ७ बापडा	१
८)	श्रीधर शर्मा	"	१
९)	रोहिणी शर्मा	"	१
१०)	नेवरा शर्मा	"	१
११)	श्रीधर शर्मा	"	१
१२)	कुशीका शर्मा	"	१
१३)	श्रीधर शर्मा	गौकोटपोस्ट ७ बापडा	१
१४)	श्रीधर शर्मा	गौकोटपोस्ट ७ बापडा	१
१५)	श्रीधर शर्मा	गौकोटपोस्ट ७ बापडा	१
१६)	श्रीधर शर्मा	गौकोटपोस्ट ७ बापडा	१
१७)	श्रीधर शर्मा	गौकोटपोस्ट ७ बापडा	१

सडक इलाका कार्यक्रम मा आफ्नो विचार व्यक्त गर्नुहुने भएमा सडक  
 श्री प्रदिप कुमार ले सडक सडकको मा स्थानीय निवासी र नागरिक समाज ले पल

Attendance list (20th Mar. 2018) of SHM Phase 3 for Sta. 33+440 & Sta.33+695

आज दिनांक 20/03/2018 को सय जौलजमेर गाउँपालिका कार्यालयमा जौलजमेर गाउँपालिका अन्तर्गत पर्ने सिप्ली. सुर्खेत खण्डको शुक्रवाते प्रति भएको सडक पुर्ननिर्माण को लागि IEC (कार्यवाहीपत्र प्रभाव मुल्योक्त) -सम्बन्धी तर्जुमा चला को हलफल सित्र प्रदानभावको उपस्थितिमा सम्पन्न भयो।

उपस्थिति

सि.नं.	नाम थर	पद	सिना
१	श्री प्रहल बहादुर कार्की	गाउँपालिका अध्यक्ष	सुर्खेत
२	श्री रोम बहादुर बस्नेत	वडा अध्यक्ष वडा नं.६	सुर्खेत
३	" मिश्र -बहादुर चौदराला	JICA Study Team	सुर्खेत
४	" रमेश आचार्य	स.प.स.सि.सं.स.का.	सुर्खेत
५	" विजया चौदराला	Trainer	सुर्खेत

Minutes of Meeting (26<sup>th</sup> Jan 2018) of SHM Phase 1 for Sta. 33+440 & Sta.33+695

उज मिति २०६५/१०/१२ गते बुधवार श्री जिल्ला नगर गाउँपालिकाको कार्यालयमा गाउँपालिका कार्यलय सभेत बसेको छलफलमा निम्न वक्ताहरूको छलफल गरियो।

उपस्थित:-

१) पुष्प बराल कारी	जिल्ला नगर गाउँपालिका अध्यक्ष
२) ईश्वर शिपिरे	" " प्रमुख प्र.प.
३) सिला श्रेष्ठ	स.प.प. वि.सं. ४-भा.
४) सजना नेम्ड	" "
५) रमेश उपचार्य	" "
६) रमेश शर्मा कोराली	Tech study team
७) सजना कोराली	
८) कामेश्वर वस्नेत	स.प.प. वि.सं. ४-भा.
९) रोम बहादुर उज्वेल	सहायक प्रमुख - ६

प्रस्ताव नं १.- नगर संकुल नजिक ३४-३५ कि.मि.मा भूखेत कार्य सम्पन्न।

उपरोक्त विषयमा छलफल गर्दा गाउँपालिका अध्यक्ष श्री पुष्प बराल कारी ले उक्त स्थानमा कार्य गर्ने कुनै समस्या पर्ने तथा अन्य आवश्यक अवस्थाहरू सम्बन्धमा गाउँपालिका को इने सुझाव दिनुपर्ने। साथै उक्त कार्यमा आवश्यक पर्ने प्रतयमि सौप र मोजमलाको अभावमा सम्बन्धमा लागे अवसर दिनुपर्ने सुझाव समेत दिनुपर्ने।

*(Signatures)*



Minutes of Meeting (20th Mar. 2018) of SHM Phase 3 for Sta. 33+440 & Sta.33+695

आज मिति २०६४।१३।६ गते यस जिल्लाको गाउँपालिका कार्यालयमा जिल्लाको गाउँपालिका अन्तर्गत पर्ने सिन्धुली, कुर्सेर खण्डको शुरुवात भएकै भएको सडक पुर्ननिर्माण को लागि I ६६ (कालिकाखोपे प्रभाव मुल्यांकन) -सम्बन्धी तर्जो चलाउने कलफल निम्न महानुभावको उपस्थितिमा सम्पन्न भयो।

**उपस्थिति**

सि. नं.	नाम भर	पद	संस्था
१	श्री पुरुष बहादुर काजी	गाउँपालिका अध्यक्ष	सिन्धुली
२	श्री रामबहादुर बस्नेत	वडाअध्यक्ष वडा नं-६	सिन्धुली
३	श्री रमेश बहादुर कोइराला	JICA Study Team	जापान
४	श्री रमेश आचार्य	स.प.प.सि.सि.सि.का.	सिन्धुली
५	श्री रमेश कोइराला	Trainer	सिन्धुली

**निष्कर्ष**

कलफल का प्रमत्त ९ सिद्धो जलको कलफलको क्रममा स्थानिय तहवार प्राप्त शुभाव र स्थानियको कलफलको सकेसम्म तिमीमा समग्रमा सम्बोधन होस् व सो क्रममा गाउँपालिका वाट आवश्यक सरप्लान सदैव रहने प्रतिवद्धता व्यक्त गर्नुभयो। गाउँपालिका अध्यक्ष सहित छी सम्पूर्ण गाउँपालिका क्षेत्र वि.पि. अन्तर्गतको लोके सुधार न राश्री हुने कार्यमा सदैव सहयोगी हुने प्रतिवद्धता व्यक्त सहितको गाउँपालिका वडाअध्यक्ष को स्थिति।

*(Signatures)*

Attendance list (25<sup>th</sup> Jan 2018) of SHM Phase 1 for Sta. 17+400

**ATTENDANCE LIST**

Name of Meeting: STAKEHOLDERS MEETING  
PREPARATORY SURVEY FOR THE PROJECT FOR THE SINDHULI ROAD EARTHQUAKE REHABILITATION

Date/Time: JANUARY 25 2018 13:00 Hrs

Venue: PRIMARY SCHOOL OF DHUNGRE-BHANJYANG,  
KAMALAMAI-SINDHULI

S. No	Name	Organization	Position	Signature
1	रमेश खत्री	कामला मसुदा कार्यालय	प्रमुख	
2	धुव ख्यार वस्नेत	कामला मसुदा-२	पु.अ.	
3	नवलराज विष्ट	कं. नं. पी. २ सिन्धुली	व.स.क.	
4	दीपेश खाल	कमला मसुदा कार्यालय	माल प्रमुख व सहायक सचिव	
5	समान, पु. कार्यालय	क. नं. पी. २		
6	कामला मसुदा कार्यालय	कं. नं. पी. २	सचिव	
7	दिनेश शर्मा	BICODCEL, KTM	Officer	
8	जयसोबो खत्री	डा. वि. इंजीनियरिंग	वि.स.क.	
9	सुदामा शौले	"	"	
10	कृष्ण बहादुर मगर	क. नं. पी. २		
11	दुर्गा बहादुर मगर	क. नं. पी. २		
12	गणेश बहादुर शर्मन्	"		
13	सुनिल कलाल मगर	"		
14	शुभम लेखक	सु.स.स. मिन. मसुदा कार्यालय		
15	रमेश आचार्य	" " "		
16	रमेश कुमार शर्मा	कामला मसुदा कार्यालय		
17	अ.स. कुमाल पाणी	क. नं. पी. २ कार्यालय		
18	मीना शर्मा	SOSAR, DOR	engineer	
19				





Attendance list (21st Mar. 2018) of SHM Phase 3 for Sta. 17+400

आज मिति २०६४ साल चैत्र ६ गते बुधवार यस कालामाई नगरपालिका  
 प्रशासन पर्चे (इन्जिनियरिङ्ग वा इन्जिनियरिङ्ग प्रोफेसरेण को लागि १६ (षोडश)  
 प्रमाण सुल्लोडन) को तैयारी चलाइ को कालफल निम्न मरानुभावको उपस्थितिमा यस  
 कालामाई नगरपालिका कार्यलयमा सम्पन्न भयो।

उपस्थिति

क्र.सं.	नाम अरु	पद	हस्ताक्षर
१.	श्री श्यामराज खत्री	प्रमुख, ड.न.पा.	
२.	श्री नंदराज शिखर	वडाध्यक्ष क.न.पा.२	
३.	श्री दिपेन्द्र बराल	क.न.पा.	
४.	श्री लक्ष्मण प्रसाद दाहाल	क.न.पा.५	
५.	श्री डीपकिट कुजेल	क.न.पा.१३	
६.	श्री रमेश शम्शेर	ड.सं.सु.सि.दि.सि.पा.	
७.	श्री श्रेया प्रसाद कोडाला	वाइसकाउन्सिलर	
८.	श्रीमती विजया कोडाला	विकारि	

Attendance list (25<sup>th</sup> Jan 2018) of SHM Phase 1 for Sta. 17+400

**ATTENDANCE LIST**

Name of Meeting: STAKEHOLDERS MEETING  
PREPARATORY SURVEY FOR THE PROJECT FOR THE SINDHULI ROAD EARTHQUAKE REHABILITATION

Date/Time: JANUARY 25 2018 13:00 Hrs

Venue: PRIMARY SCHOOL OF DHUNGRE-BHANJYANG,  
KAMALAMAI-SINDHULI

S. No	Name	Organization	Position	Signature
1	रजनी खत्री	कामला मसुदा कार्यालय	प्रमुख	
2	ध्रुव ख्यार वसंत	कामला मसुदा-२	पु.अ.	
3	नवलज विडुथ	कं. नं. पी. २ सिहावा	क.स.क.	
4	दीपेश खाल	कमलामाई नगरपालिका	मा. प्रमुख वी.सु.सि.स.स.स.स.	
5	सुभाष ५० कामेष्की	क. नं. पी. २		
6	राजेश्वर १०० हरिनाथ	क. नं. पी. २	सि.स.स.	
7	दिनेश शेरपाणा	BICODAC, KTM	Topic	
8	जयसो कोरना	डा. वि. कुंजमलगाडी	वि.स.स.	
9	सुदामा शौले	"	"	
10	कृष्ण बहादुर मगर	क. नं. पी. २		
11	दुकु बहादुर मगर	क. नं. पी. २		
12	गणेश बहादुर शर्मदान	"		
13	सुनिल कलाल मगर	"		
14	शुभाष लेखन	सु.स.स.स.स.स.स.स.स.		
15	रमेश आचार्य	" " "		
16	रमेश प्रसाद कोडुना	जमाका २-२२		
17	अ.स.स.स.स.स.स.स.स.	क. नं. पी. २		
18	मीना कोड	SOSAR, DOR	engineer	
19				

Attendance list (5th Mar. 2018) of SHM Phase 2 for Sta. 17+400

थीटाज तिथि २०१८।११।२१ ताते शेतावप वाप आ सांगवप कुठ्यायसावा  
 मा सिम प्रदातुआप हंडकी उपधिनित कुलासत न.पी. कालेजत दुसरेअव्याड  
 स्थित वरिसे निगमण कार्म पुनरवी Environmental अक्षर पुनरवी कोसोचि  
 को इलफल वनपल आये।  
 उपस्थित

१)	श्री. प्रमोद पिसु	वडा अस्सत कु. न. पी. २	
२)	श्री. प्रमोद सुभाकरित	प्र. नं. श्री. सा. सि. दुसरेअव्याड	
३)	.. अमिताभ कोल	कु. न. पी. २	
४)	" सुवीज देहाल		
५)	" विनोद कुमा लाटा अगा	" "	
६)	" राजन ए. अक्षिकारी	" "	
७)	" विनोद कुमा अण अगा	" "	
८)	" कसम पाठ अगा	" "	
९)	" गंगा का सुनेकान	" "	
१०)	" पुष्पा का अगा अगा	" "	
११)	" सुनी का अगा अगा	" "	
१२)	" यदम अहाड अगा	" "	
१३)	" जय का हाडा अगा	" "	
१४)	" कळ का अगा	" "	
१५)	" ना का अगा अगा	" "	
१६)	" भीला अक्ष	SDS BR. DOB Minshabhan	
१७)	" सुनी अक्ष	कु. न. पी. २	
१८)	" वरिसे अक्ष	SDS BR Minshabhan	
१९)	" कसम अक्ष	कु. न. पी. २	

२०) उपस्थित नसताना इलाजत कु. न. पी. २ का श्री विनोद कु. पाठा अगाते दुसरे अक्षयाडु भा  
 वडळ तिपोषाक, इतम वडळकु कलनेड को पोषीले हलो अति पुनरवी दुसरेअव्याड.  
 व सीपोकेले वीधमा हलो पहिले इतपल अडे आचजावत मरिने वरळ अक्षी. विना (अपळ  
 नले अरामे। वि. पि. राजकीय मगिड अर (पाणे वडळ को धुमेधा वा वचित हुनु फेळो इना  
 कोपोकेले अरेने सडळ आचअमळ अरुडो अगा वळकुअरुडो। मरुं काणे वरामेव अतय पाराए  
 ले वरिसे को सुहाप वरअरुडो व काणे अराणे आचमिकता अरुडो विचार आच मरुं  
 वरामेको लागी वेजजायेना आचमिकता विनुपने उलोके अठ थियो। कोसे अरम अलफल  
 सटअले दुडे वरामेव अरुडो वर अलाते पाणे को सुहाप व वडळ ने लोपोकेले कोलोको  
 आचमिकता अरेके विचार आच अरुडो। इलफल के अरुडो कु. न. पी. २ वरुसारीटे

Attendance list (21st Mar. 2018) of SHM Phase 3 for Sta. 17+400

आज मिति २०७४ साल चैत्र ६ गते बुधवार यह कालामाई नगरपालिका  
 प्रशासन पर्चे (इन्जिनियरिङ्ग वा इन्जिनियरिङ्ग प्रोजेक्टको लागि १६ (षोडश)  
 प्रमाण बुल्डिङ्ग) को तैयारी चलाई रहने कालामाई नगरपालिकाको उपस्थितिमा यह  
 कालामाई नगरपालिका कार्यलयमा सम्पन्न भयो।

उपस्थिति

क्र.सं.	नाम र उर	पद	हस्ताक्षर
१.	श्री श्यामराज खत्री	प्रमुख, ड.न.पा.	
२.	श्री नवीरज शिवा	वडाध्यक्ष क.न.पा.२	
३.	श्री दिपेन्द्र बराल	क.न.पा.	
४.	श्री लक्ष्मण प्रसाद दाहाल	क.न.पा.६	
५.	श्री डी.वि.कुमार	क.न.पा.१३	
६.	श्री रमेश शर्मा	ड.न.पा.सि.सि.पा.	
७.	श्री श्रेया प्रसाद कोडाला	वाडाका सचिवी	
८.	श्रीमती वि.सु.कोडाला	वाडाका सचिवी	

Minutes of Meeting (25<sup>th</sup> Jan 2018) of SHM Phase 1 for Sta. 17+400

आज तिथि 2018 साल माघ ११ गते श्री आर्थिक विद्यालय द्वारा आयोजित  
 आ वरीष्ठ स्वामिय समीक्षा/कार्य एक दिन की आर्थिक बैठक (Stake-  
 -Holder Meeting) की लागि निम्न वरीष्ठिमा हलफल सम्पन्न भयो।

उपस्थिति :-

१) श्री खड्ग खत्री, नगरप्रमुख कञ्चनमाई न.पा.	
२) श्री सुब कुमार बस्नेत प्र.पा. श्री आ.वि. हुँडा भद्रमाई	
३) श्री नवराज पौड्या, वडा अध्यक्ष कञ्चनमाई न.पा.-२	
४) श्री पिपेडा कटाल कञ्चनमाई न.पा. नग(पुर्व) वीरगञ्ज	
५) राजन प्रसाद अधिकारी कञ्चनमाई न.पा. ३	
६) राजन प्रसाद कटाल क.न.पा. ४, विराट	
७) विजना कौटाल काठमाडौं	
८) पार्वती कटाल क.न.पा. २ विराट	
९) सुजिता गौरी " "	
१०) कञ्ज कटाल मगा " "	
११) हर्ष कटाल मगा " "	
१२) रंगा कटाल कुर्कोट " "	
१३) सुनील कटाल मगा " "	
१४) सुजना नेल्ड कु.प.पु.वि.क.क.का	
१५) रमेश उपमाथे " " "	
१६) रमेश उपमाथे JICA Study Team	
१७) अर्जुन कुमार शर्मा क.न.पा. २	
१८) शिवा शर्मा कु.प.पु.वि.क.क.का	

प्रस्ताव नं. १

बैठो बैठकबाट को कार्य गर्ने कानून नियम तथा स्वामीको हक  
 सम्बन्धीमा :-

१) उपरोक्त सम्बन्धीमा हलफल गर्दा श्री हर्ष कटाल (सुब/सुनील)  
 को Access Record को अधिकारको रैको जानकारी गराउनुको  
 साथै को सम्बन्धीमा पहिले पात्रे म्या आर्पोना रोज Access Record  
 सम्बन्धी सम्झौता भएको श्री सुब कुमार बस्नेत ले जराउनु भयो।

२) नया प्रकृत श्री खड्ग खत्री द्वारा आर्पोना को कार्य गर्ने लैगाने  
 उपकरण तथा निर्माण सामग्री लैगाने प्रयोग हुने कानून सम्बन्धी  
 पात्रे कानूनको प्रयोग गर्न सक्ने गरी गर्ने सुझाव दिनुभयो।

३) वडा अध्यक्ष श्री नवराज पौड्या द्वारा स्वामिय सम्झौताको रैको  
 सम्बन्धीमा कानूनको प्रयोग हुने कानून सम्बन्धीमा

सम्बन्धीमा विज्ञान हुने कालका निर्माण गठुपरी सुझाव दिनुभयो।

सुब कुमार बस्नेत  
 सुनील कटाल  
 सुजिता गौरी  
 सुजना नेल्ड  
 रमेश उपमाथे  
 अर्जुन कुमार शर्मा  
 शिवा शर्मा



Minutes of Meeting (21st Mar. 2018) of SHM Phase 3 for Sta. 17+400

आज मिति २०१८ साल चैत्र ६ गते शुक्रवार गते कञ्चनगढ नगरपालिका  
 अन्तर्गत पर्ने पुर्वनिर्माण वा अनुसन्धान गर्न पूर्वनिर्माण को लागि १६ (षडशत)  
 प्रमाण (कुलियाङ्कन) को तैयारी पत्रको कलफल निम्न महानुभावको उपस्थितिमा गरि  
 कञ्चनगढ नगरपालिका कार्यलयमा सम्पन्न भयो।

उपस्थिति

सि. सं.	नाम अरु	पद	दस्तावेज
१.	श्री बसन्त खत्री	प्रमुख, क.स.पा.	श्री
२.	श्री नवराज सिद्ध	बडासहायक क.स.पा.	
३.	श्री दिपिका बराल	क.स.पा.	
४.	श्री लक्ष्मण प्रसाद दाहाल	क.स.पा.	सहायक
५.	श्री श्रीकृष्ण सुवेदी	क.स.पा.	सहायक
६.	श्री रञ्जित शम्शेर	क.स.पा.	सहायक
७.	श्री शेषा प्रसाद कोइराला	जाइका सहायक	सहायक
८.	श्रीमति विजयाना कोइराला	लिकोइका	सहायक

निर्णय

सडक पुर्वनिर्माण कार्य अगाडि बढाउनु पर्ने गरि नगर प्रमुख र क.स.पा.  
 प्रमुख मिलेर कार्य गर्दै सम्बन्धित आयाजसुत मात्र २० नपै पैल मागे, सम्बन्धी  
 र अन्त अद्वारा को नौजसुतमा खास दिनुपर्ने र सम्बन्धी निर्माण ला आबस्य  
 सरयोजी को लागि आफ्नै एक प्रतिकृति दिने बाबुदा राख्ने गैरुह (फाउण्डेसन) को।

*(Signatures)*

## Environmental and Social monitoring form

### 1. Construction for Rehabilitation Phase

The latest results of the below monitoring items shall be submitted to the JICA as part of the Quarterly Progress Report throughout the construction phase.

#### 1.1 Air Pollution

##### - Exhaust Gases

Station	Date	Type of Construction Vehicles/ Equipment	Fleet/Registration Number	Exhaust Gases Discharge Conditions				Frequency
				Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)			Black Smoke				Daily
				White Smoke				
				Bad Odor				
				Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones as well as necessary instruction and education on exhaust gases to drivers and operators.

##### - Soil Dust (Dry Season only)

Station	Date	Location	Dust and dried sandy soil stirred up by construction activities				Frequency
			Items	Yes	No	If Yes, Measures Taken (such as water supplying)	
	(Day, Month, Year)	Construction Site including access roads	Dusts				Daily
			Dried Sandy Soil				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

##### - Interviews with Surrounding Local People

Station	Date	Location	Opinion and Request				Frequency
			Items	Yes	No	If Yes, Measures Taken (such as water supplying)	
	(Day, Month, Year)	Community around the Construction Site	Dusts				Twice/Month
			Dried Sandy Soil				
			Bad Odor				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

#### 1.2 Water Quality

##### - On-site toilets

Station	Date	On-site Toilet Number	Sewerage water Conditions				Frequency
			Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)		Black(sewage)water leakage				Daily
			Bad odor				
			Emergency of Flies				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

##### - Interviews with Surrounding Local People

Station	Date	Location	Conditions of Water Sources used by Interviewee daily				Frequency
			Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)	Community around the Construction Site	Abnormal change of turbidity				Twice/Month
			Bad Odor				
			Bad Taste				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.



**1.3 Wastes**

**- Construction wastes and debris**

Station	Waste Composition	Waste Quantity (ton/month)	Transportation, Disposal/Treatment Methods (Specify: ex. Registered Service Provider, Officially final disposal site, registered treatment facility (or company))				Frequency
			Transport	Disposal	Treatment	Remarks	
	Construction Debris					Once/ Month	
	Surplus Soil						
	Toxic and chemical Waste (if any)						
	Other (specify )						
	Excavated and Surplus soil management*		Back filling	Vegetation Method	Others (if any)	Remarks	

\* Excavated and Surplus soil utilization is planned to be managed by back-filling and setting up vegetation method on site?  
Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**- Interviews with Surrounding Local People**

Station	Date	Location	Condition of Solid Waste				Frequency
			Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)	Community around the Construction Site	Littering			Once/Month	
			Illegal Dumping				
			Bad Odor				
			Emergency of Flies				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**1.4 Soil Contamination**

**- Oil and Fuel leakage (spill)**

Station	Date	Type of Construction Vehicles/Equipment	Fleet/Registration Number	Oil/Fuel Leakage Conditions				Frequency
				Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)			Engine oil			Daily	
				Hydric power unit oil				
				Fuel				
				Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.  
If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

**- Interviews with Surrounding Local People**

Station	Date	Location	Conditions of Oil and Fuel leakage				Frequency
			Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)	Community around the Construction Site	Emergency of Oil film on soil and surface water			Twice/Month	
			Bad Odor				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**1.5 Noise and Vibration**

**- Noise from Construction Vehicles and Equipment**

Station	Visual Inspection Date	Type of Construction Vehicles/Equipment	Fleet/Registration Number	Condition of Silencer equipped with construction vehicles/Equipment				Frequency
				Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)			Properly Equipped			Daily	
				Damaged				
				Large noise discharge				
				Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.  
If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

**- Interviews with Surrounding Local People**

Station	Date  (Day, Month, Year)	Location  Community around the Construction Site	Conditions of Noise and Vibration				Frequency  Twice/Month
			Items	Yes	No	If Yes, Measures Taken	
			Nuisance level from construction vehicles for daily life				
			Nuisance level from construction equipment for daily life				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**1.7 Living and Livelihood**

**- Construction Management at Station 17+400**

Station	Date  (Day, Month, Year)	Construction Management for commercial and school activities			Frequency  Daily
		Commercial Activities	School Commuting	Others	
17+400					

Please specify Construction Management for commercial and school activities such as construction Vehicle usage time restriction, parking managements and others

**- Interviews with Surrounding Local People**

Station	Date  (Day, Month, Year)	Location  Community around the Construction Site	Conditions of Living and Livelihood				Frequency  Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Any issues on living and livelihood caused by the rehabilitation project				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

**1.8 Social Infrastructure and Services**

**- Road Traffic**

Station	Date  (Day, Month, Year)	Construction Vehicle Management				Frequency  Daily
		Traffic Control (Specify the details)				
		One or Both -way Traffic Control	Avoidance of Rush Hour	Time Restriction	Others (Specify)	

Log Book: to be prepared and recorded by contractor(s) which is submitted to CMWSSB monthly.

**- Commercial Area Road Traffic Control at Station 17+400**

Station	Date  (Day, Month, Year)	Management				Frequency  Daily
		Traffic Control (Specify the details)				
		One or Both -way Traffic Control	Avoidance of Rush Hour	Time Restriction	Others (Specify)	
17+400						

**- Meeting with surrounding Communities and Public Bus Service Companies at Station 17+400**

Station	Date  (Day, Month, Year)	Community/ Companies	Meeting Venue	Number of Participants	Agenda	Opinions Requests	Countermeasures	Frequency
17+400				Community ( )				Before construction and where necessary
				Officials ( )				
				Others (Specify )				
				Total ( )				

Participant list and meeting minutes shall be attached

**1.9 Gender Issues**

**- Tender Documents and Contacts for the Project**

Station	Date  (Day, Month, Year)	Conditions of Tender Documents and Contacts				Frequency  At the time of Tender
		Items	Yes	No	If Yes, Measures Taken	

## 5.2.4 Environmental and Social Monitoring Form

		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Gender issues in Tender Documents to be followed by bidders				documents and Contracts
		Confirmation of bidder's policy on gender issues to be written in proposals				
		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Gender issues in Contracts				
		Confirmation of contractor's policy on gender issues to be written in Inception Report				
		Others (Specify )				

This monitoring is to be done by DoR responsibility and is submitted to JICA

### - Periodical Inspection

Station	Date	Inspection on Gender Issues			Frequency
	(Day, Month, Year)	Items	Yes	No	If Yes, Measures Taken
		Inappropriate and incomplete sub-contracts (such as discrimination against women, male-female divide on wage and labor time) clauses set up by contractors on gender for construction labors.			
		Implementation of the Contractor's policy on Gender issues			
		Others (Specify )			

This monitoring is to be done by DoR responsibility and is submitted to JICA

### - Instruction and Education on Gender Issues to Workers and labors

Station	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Worker/Labor ( )		Twice/Year
					Others (Specify )		
					Total ( )		

To be held by Contractor(s). Participant list and educational materials shall be attached

### - Construction of Toilets for Gender-segregated (Women) labors

Station	Date	Location	Conditions of Noise and Vibration			Frequency
	(Day, Month, Year)		Items	Yes	No	If "No", Measures Taken
			Setting up women's toilets			
			Appropriate management of such toilets (such as instruction and sign boards of Gender-desegregated toilet and cleansing)			
			Others (Specify )			

This monitoring is to be done by DoR responsibility and is submitted to JICA

## 1.9 Rights of Child

### - Tender Documents and Contacts for the Project

Station	Date	Conditions of Tender Documents and Contacts			Frequency
	(Day, Month, Year)	Items	Yes	No	If Yes, Measures Taken
		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Rights of Child (Child labor) in Tender Documents to be followed by bidders			
		Confirmation of bidder's policy on Rights of Child (Child labor) issues to be written in proposals			
		Written description of relevant laws and regulations of Nepal as well as DoR's relevant guidelines on Rights of Child (Child labor) in Contracts			
		Confirmation of contractor's policy on Rights of Child (Child labor) to be written in Inception Report			
		Others (Specify )			

This monitoring is to be done by DoR responsibility and is submitted to JICA

### - Periodical Inspection

Station	Date	Inspection on Gender Issues			Frequency
	(Day, Month, Year)	Items	Yes	No	If Yes, Measures Taken
		Inappropriate and incomplete sub-contracts (such as child labor prohibitions) clauses set up by contractors on Rights of Child (Child labor) for construction labors.			
		Implementation of the Contractor's policy on Gender issues			
		Others (Specify )			

This monitoring is to be done by DoR responsibility and is submitted to JICA

**1.10 Risks of Infectious diseases such as HIV/AIDS****- Health and Sanitation Education**

Station	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Community ( )		Once/year
					Worker/Labor ( )		
					Others (Specify )		
					Total ( )		

Participant list and educational materials shall be attached

**1.11 Working Conditions/Work safety for the Construction****- Personnel Protective Equipment (PPE)**

Station	Date	Monitoring Item	If any problems, measures taken	Frequency
	(Day, Month, Year)	PPE: such as Helmet, Gloves, Masks, shoes, safe belts and etc. (specify ).		Daily

Log Book: to be prepared and recorded by contractor(s) which is submitted to DoR monthly.

**1.12 Accidents****- Meetings with surrounding Communities for Traffic Safety**

Station	Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
	(Day, Month, Year)				Community ( )		Once/Two Month
					Worker/Labor ( )		
					Others (Specify )		
					Total ( )		

Participant list and educational materials shall be attached

**2. Post-Rehabilitation Phase (Operation Phase)**

The latest results of the below monitoring items shall be submitted to JICA on biannual basis for the first three years of operation (after the Rehabilitation).

**2.1 Air Pollution****- Air Quality Test**

Station	Date	Parameter	Value ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	Frequency
	(Day, Month, Year)	TSP			Twice/Year
		PM <sub>10</sub>			
		SO <sub>2</sub>			
		NO <sub>2</sub>			

NAAQS: National Ambient Air Quality Standards for Nepal

**- Interviews with Surrounding Local People**

Station	Date	Location	Opinion and Request				Frequency
			Items	Yes	No	If Yes, Measures Taken (such as water supplying)	
	(Day, Month, Year)	Community around the Construction Site	Dusts				Twice/Yearly
			Dried Sandy Soil				
			Bad Odor				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

**2.2 Water Quality****- Visual Inspection**

Station	Date	Location	Sewerage water Conditions				Frequency
			Items	Yes	No	If Yes, Measures Taken	
	(Day, Month, Year)	The Nearest well and/or surface water (pond, stream and river)	Abnormal change of turbidity				Twice/Year
			Bad odor				
			Abnormal change water color				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Water Sources used by Interviewee daily				Frequency Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Abnormal change of turbidity				
			Bad Odor				
			Bad Taste				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR monthly.

**2.3 Noise and Vibration**

**- Noise and Vibration Test**

Station	Date (Day, Month, Year)	Parameter	Value	NASQS	Reference international standard	Instrument and measuring methods and procedure	Frequency
		Traffic Noise	dB (Leq (A))				Twice/Year
		Traffic Vibration	dB	-			

NASQS: National Ambient Sound Quality Standard of Nepal

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Noise and Vibration				Frequency Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Nuisance level from traffic vehicles for daily life				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

**2.4 Traffic Flow**

**- Observation of Traffic Flow**

Station	Date (Day, Month, Year)	Number of Vehicles/hour					If any problems, measures taken	Frequency Twice/year
		Track/Dump	Bus	Passenger Car	Motor cycle	Other		

**2.5 Living and Livelihood**

**- Observation on Commercial, School Commuting and Bus Services at Station 17+400**

Station	Date (Day, Month, Year)	Stations				Frequency Twice/year
		Commercial Activities	School Commuting	But stop operation	Others (Specify)	
17+400						

**- Interviews with Surrounding Local People**

Station	Date (Day, Month, Year)	Location Community around the Construction Site	Conditions of Living and Livelihood				Frequency Twice/Year
			Items	Yes	No	If Yes, Measures Taken	
			Any issues on living and livelihood caused by the rehabilitation project				
			Others (Specify )				

Log Book: to be prepared and recorded by contractor(s) which is submitted to GESU at DoR.

Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)																																																																																																																																																																																																																												
1 Permits and Explanation	(1) EIA and Environmental Permits	<p>(a) Have EIA reports been already prepared in official process?</p> <p>(b) Have EIA reports been approved by authorities of the host country's government?</p> <p>(c) Have EIA 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 country's government?</p>	<p>(a) N</p> <p>(b) N</p> <p>(c) N</p> <p>(d) N</p>	<p>(a) Based on EPR, EPA and DoR's Guidelines, an IEE study is required for the earthquake rehabilitations. However, stop protection is not required neither IEE nor EIA</p> <p>(b) A ToR for IEE including the stop protection at station of 17+400 was prepared by DoR in cooperation with JICA Survey Team.</p> <p>(c) As per the ToR for IEE, DoR has initiated actions to select a local consultant for the IEE study since Dec. 2017. The IEE study is scheduled for 15 weeks including the approval process after the selection of the local consultant as shown in the table below. Approval of IEE report is expected by the end of June 2018.</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th rowspan="2">No.</th> <th rowspan="2">Activity</th> <th colspan="15">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Desk study and review</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2</td> <td>Field study and investigation</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>3</td> <td>Interaction with stakeholders and collection of suggestions</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>4</td> <td>Analysis and prediction of impacts</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>5</td> <td>Development of mitigation and preparation of monitoring plan</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>6</td> <td>Draft report preparation</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>7</td> <td>Publication of 15 days public notice</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>8</td> <td>Comments on draft report</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>9</td> <td>Collection of recommendation from local bodies</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>10</td> <td>Preparation and submission of final report</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>11</td> <td>Approval of the final report</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>	No.	Activity	Week															1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	Desk study and review																2	Field study and investigation																3	Interaction with stakeholders and collection of suggestions																4	Analysis and prediction of impacts																5	Development of mitigation and preparation of monitoring plan																6	Draft report preparation																7	Publication of 15 days public notice																8	Comments on draft report																9	Collection of recommendation from local bodies																10	Preparation and submission of final report																11	Approval of the final report																<p>(d) Tree trimming and cutting are subject to the Forest Act. However, according to DoR, trees of which diameters are less than 30 cm are not subject to relevant laws and regulations of the Forest Ministry of Nepal.</p> <p>(a) A total of nine (9) Stakeholder Meetings (SHMs) were held by the DoR initiative in consideration of JICA Guidelines and schedule of DoR's IEE study. The following three stepwise approaches (phases) as DoR idea were employed for SHMs.</p> <p>➤ 1<sup>st</sup> Phase SHM: Major target groups of the 1<sup>st</sup> Phase SHM are representatives and teachers etc. in the Municipalities and Districts of the project stations with purposes to share the project components, SHM plan and possible impacts arouse from the project with those target groups.</p> <p>➤ 2<sup>nd</sup> Phase SHM: Major target groups of the 2<sup>nd</sup> Phase SHM are representatives and local people in the Municipalities and Districts of the project stations with purposes to share results of the 1<sup>st</sup> Phase SHM and discuss opinions and request from those local people with those target groups.</p> <p>➤ 3<sup>rd</sup> Phase SHM: Major target groups of the 3<sup>rd</sup> Phase SHM are representatives in the Municipalities and Districts of the project stations with purposes to reaffirm all results of the 1<sup>st</sup> Phase and 2<sup>nd</sup> Phase SHMs with the target groups.</p>
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	(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 comment from the stakeholders (such as local residents) been reflected to the project design?</p>	<p>(a) Y</p> <p>(b) Y</p>																																																																																																																																																																																																																													

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Office	Kamala Mai Municipality,	8	<p>(b) at each SHM for the communities in the vicinity of each project site (station), some opinions and requests were not directly related to this project, but opinions and requests expressed by Stakeholders can be summarized in the following points</p> <ul style="list-style-type: none"> <li>• Priority employment of local people around the project site for the construction</li> <li>• Considerations on Safety such as traffic accident</li> <li>• Management for littering and sweeping on the road</li> <li>• Management for Noise</li> <li>• Management for appropriate rain water drainage of the road</li> <li>• Management for impacts on water resources and intakes</li> <li>• Management for social amenities such as bus stops</li> <li>• Management for cultural facilities</li> <li>• General considerations on social and environmental impacts</li> <li>• Management for impacts on forestry</li> </ul> <p>For this project, social and environmental considerations such as priority employment of surrounding residents, implementation of safety education, waste management, nighttime noise prevention through construction time management, restoration of rainwater drainage facilities, attentions on bus stops and school commuting, impacts on standing trees and forests, and setting up of vegetation method and etc. have been planned in the JICA Survey. 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Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

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2 Pollution Control	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?  (a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken?  (b) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse?	(a) Y  (a) N (b) N	evaluated that this project has been planned so as to adequately reflect those opinions from Stakeholders.  (a) Comparisons in Technical, Financial and Environmental & Social and other aspects have been made as a project alternative study for each project station. After all, the most suitable plan considering environmental and social impacts at each station has been selected.  (a) The project is rehabilitation and reinforcement of the damaged five Stations of Sindhuli Road by which road traffic will be normalized (restored to original state). Therefore, no significant impact on ambient air quality is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others")  (b) Along each project station of Sindhuli Road, there is no industrial area at all.
	(1) Air Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas?  (b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater?  (c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?  (a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations?	(a) N (b) N (c) N  (a) N	(a) There is no large-scale excavation or embankment plan in this project. Soil from drilling is planned to be laid in ROW of each station. At the slope protection site, vegetation method is planned to prevent erosion. Therefore, there is no impact as to soil runoff.  (b) Drainage facilities (cross drainage, cascade shape drainage and etc.) on the road have been properly planned and installed by the Sindhuli Road Construction Project, and are continuously used after this project. In addition, since this project is a construction to restore the original state before the earthquake disaster, it is not predicted that surface runoff will contaminate surrounding water sources, such as groundwater.  (c) The project does not have any plans to construct facilities such as parking areas/service areas (Impacts during construction phase, see "(1) at 5. Others")  (a) The project does not have any plans to construct facilities such as parking areas/service areas. The project is rehabilitation and reinforcement of the damaged five Stations of Sindhuli Road. Therefore, no significant impact on wastes is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others")
3 Natural Environment	(3) Wastes	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) N	(a) The project is rehabilitation and reinforcement of the five damaged Stations of Sindhuli Road by which road traffic will be normalized (restored to original state). Therefore, no significant impact on Noise and Vibration is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others")
	(4) Noise and Vibration	(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) 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?	(a) N  (a) N  (a) N  (a) N (b) N (c) N (d) N (e) N (f) N	(a) The project is planned to be implemented in each ROW at the five damaged stations of the existing Sindhuli road. There are no such protected areas in and around each ROW at all.  (a) The project is planned to be implemented in each ROW at the five damaged stations of the existing Sindhuli road. There are no primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats) in and around each ROW at all.  (b) There are no habitats of protected habitats of endangered species designated by laws of Nepal and international treaties around the project site. Aquilla Helaca (birds: a kind of eagle) classified as IUCN category of VU (vulnerable) around Section 17 + 400 is listed in the IEE survey for



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		<p>(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?</p> <p>(d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?</p> <p>(e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered?</p> <p>(f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?</p>		<p>landslide measures (Section II) (2012). However, the bird in the IEE can be considered as sighting information of the surrounding people.</p> <p>(c) Impacts on ecosystem are not occurred at all by the project within the ROW of existing road.</p> <p>(d) Because of the rehabilitation project in ROW of the existing road, there is no occurrence of disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock.</p> <p>The Sindhuli Road Construction Project Section III Phase 3 states that the "the possibility of the presence of rare animals and plants in this project area is extremely low" as impact on animals and habitats, as same in the Basic Design Study. Also, JICA survey confirmed facts that animals around the road observed during the 2nd phase construction of Section III were primarily goat of livestock, and local workers were also aware of the existence of goats and stopped construction when goats passing through the construction site, and there were no acts that disrupted the passage. On the other hand, road safety education for local workers, drivers, operators, neighboring children and related persons are planned to be implemented at the time of construction of the project.</p> <p>(e) The project does not have any plant to installation of new roads. Therefore, there is no possibilities that the project causes impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas. In addition, because of the rehabilitation project on existing roads, there is no fear that ecosystems are disturbed due to introduction of exotic (non-native invasive) species and pests.</p> <p>(f) The project does not any plant to construct roads at undeveloped areas. Therefore, such negative impacts not be occurred at all.</p>
	(3) Hydrology	<p>(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?</p> <p>(a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed?</p> <p>(b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides?</p> <p>(c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?</p>	(a)N (a)N (b)N (c)N	<p>(a) Topographical modification is very limited and existing drainage facilities are planned to be repaired by the project. Therefore, no significant impact on hydrology is predicted by the project. (Impacts during construction phase, see "(1) at 5. Others")</p> <p>(a) Station at 17+400 is the slope protection to prevent landslides of the slope.</p> <p>(b) No large-scale excavation and/or earth filling are planned in the project. In addition, JICA survey technically confirmed that new landslide and collapse will not be occurred in the earthworks to be implemented in the project.</p> <p>(c) In the Sindhuli Road Construction Project, the soil balance was planned at 1: 1, and no surplus soil was generated on site. In this project as well, most of the excavated soil is planned to be used for vegetation method and the remaining soil is planned to be leveled on each ROW. Therefore, there will be no soil runoff from embankment, cuts, soil dumps, and earth and sand collection sites. As mentioned, to prevent soil runoff, vegetation method is planned in the project.</p>
	(4) Topography and Geology			

Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	<p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Are the compensations going to be paid prior to the resettlement?</p> <p>(e) Are the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p>	<p>(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N</p>	<p>(a) Since this project is a rehabilitation project to be carried out with in the ROW of existing Sindhuli Road land acquisitions and involuntary resettlements by the project are not occurred at all. In addition, no illegal occupation or use of irregular inhabitants in the ROW of each station subject to the project have been confirmed in the filed survey.</p> <p>(b) No resettlement is occurred in the project, therefore, such plans on compensation and resettlement assistance are not necessary to be prepared</p> <p>(c) No resettlement is occurred in the project, therefore, such plans on compensation with full replacement costs, restoration of livelihoods and living standards are not necessary to be prepared.</p> <p>(d) No resettlement is occurred in the project, therefore, such compensations are not necessary to be paid.</p> <p>(e) No resettlement is occurred in the project, therefore, such compensation policies are not necessary to be prepared.</p> <p>(f) No resettlement is occurred in the project, therefore, such a resettlement plan paying particular attention to vulnerable groups or people is not necessary to be prepared.</p> <p>(g) No resettlement is occurred in the project, therefore, such agreements are not necessary to be obtained.</p> <p>(h) No resettlement is occurred in the project, therefore, such an organization framework is not necessary to be established.</p> <p>(i) No resettlement is occurred in the project, therefore, such monitoring plans are not necessary to be prepared.</p> <p>(j) No resettlement is occurred in the project, therefore, such a grievance redress mechanism with regard to resentment is not necessary to be established.</p>

Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(2) Living and Livelihood	(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?	(a)N (b)N (c)N (d)N (e)N (f)N	(a) The project does not have a plan to installation of new roads. (b) The project is rehabilitation and reinforcement of the five damaged Stations of Sindhuli Road. Thus, there is no such impacts on society around the stations by the project. (Impacts during construction phase, see “(1) at 5. Others”) (c) Because this project is rehabilitation of existing roads, there is no population inflow from other areas after the project implementation. (Impacts during construction phase, see “(1) at 5. Others”) (d) The project is rehabilitation and reinforcement of the five damaged Stations of Sindhuli Road. Thus, there is no such impacts of diseases on society around the stations by the project. (Impacts during construction phase, see “(1) at 5. Others”) (e) One footpath on the slope located below Station 17-400, which is used by surrounding community, is planned to be protected, controlled and restored to original state by the Project. (Impacts during construction phase, see “(1) at 5. Others”) (f) No such structures are planned to be constructed by the rehabilitation project.
		(d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)?	(a)N	(a) The Project it to rehabilitate damaged stations in the ROW of the existing Sindhuli road. No local archeological, historical, cultural, and religious heritage are not existed in the ROW.
		(e) Is there any possibility that roads will impede the movement of inhabitants?	(a)N	(a) The Project is rehabilitation at the five damaged Stations of existing Sindhuli road. Therefore, there is no possibility of negative impact on Landscape at all.
		(f) Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?	(a)N (b)N	(a) The Project it to rehabilitate damaged stations in the ROW of the existing Sindhuli road. There are no impacts on the culture and lifestyle of ethnic minorities and indigenous peoples. (b) The Project it to rehabilitate damaged stations in the ROW of the existing Sindhuli road. There are no negative impact on ethnic minorities and indigenous peoples at all.
		(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a)N	(a) The Project is rehabilitation at the five damaged Stations of existing Sindhuli road. Therefore, there is no possibility of negative impact on Landscape at all.

Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(6) Working Conditions	<p>(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?</p> <p>(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?</p> <p>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>(d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p>	<p>(a) Working conditions and safety are properly managed in compliance with (New) "Labour Act 2074 (2017)", "Labour Rule 2050 (1993)" and "Environmental and Social Management Framework, 2007 DoR which are applied to the project. Such clauses are planned to be written in tender documents for the project.</p> <p>(b) industrial accident prevention are properly managed in compliance with (New) "Labour Act 2074 (2017)", "Labour Rule 2050 (1993)" and "Environmental and Social Management Framework, 2007 DoR which are applied to the project. Such clauses are planned to be written in tender documents for the project.</p> <p>(c) Especially, the Chapter XII - Provisions Relating to OHS of "Labour Act 2074 (2017)" clearly stipulates the Construction Workers Safety and Occupational Health and Safety (OHS) by which preparation of PPE (Personal Protective Equipment), and safety and health for workers and others are regulated. Such clauses are planned to be written in tender documents for the project.</p> <p>(d) Safety education and sanitation education for workers and labors including security guards, and surrounding residents are planned to be implemented in the project.</p>
5 Others	(1) Impacts during Construction	<p>(a) Are adequate measures considered to reduce impacts 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 impacts?</p> <p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p>	<p>In general, the Project will be carried out by the relevant laws, regulations and guidelines of Nepal</p> <p>(a)-1 Air Quality</p> <p>- Exhaust Gas: Countermeasure 【Utilization of well-maintained construction vehicles and equipment, daily visual inspection of exhaust gases of those vehicles and equipment】</p> <p>- Dust: Countermeasure 【Daily visual inspection of dust diffusions on-site and necessary water spraying (during dry season only) 】</p> <p>(a)-2 Water Quality</p> <p>- Human Waste: Countermeasure 【Sanitation facilities are subject to (New) "Labour Act 2074 (2017)", "Labour Rule 2050 (1993)" and "Environmental and Social Management Framework, 2007 DoR". Leaching pit and/or septic tank methods as temporary sanitation facilities shall be established a minimum safe distance recommended by WHO (at least 30 m from the nearest water source and 2 m from the groundwater table).</p> <p>- River Water usage: the nearby source of Sunkoshi River (one of the major river systems in Nepal of which basin area is about 3,400 km<sup>2</sup> in total, and average annual flow is about 22 × 109 m<sup>3</sup>) is planned to be used for the construction. Therefore, negative impact on such a large river is not predicted by the temporally usage of the river water for the Project.</p> <p>(a)-3 Wastes</p> <p>- Surplus soil and construction debris : Countermeasure【Management by back-filling】</p> <p>- Domestic Solid Waste : Countermeasure【Domestic solid waste in the construction phase is disposed of by contractor(s) on weekly basis in accordance with "Solid Waste Management Act 2068 (2011)" and "Environmental and Social Management Framework, 2007 DoR.】</p>

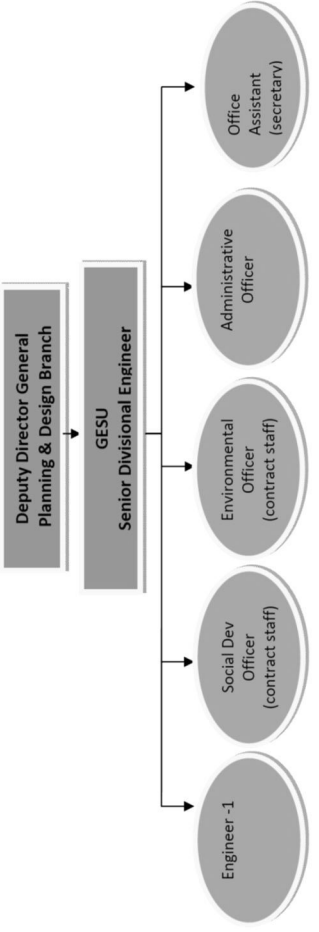
Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)																								
				<p>- Waste oil (from hydraulic systems and etc.): Countermeasure【Collection and treatment by contractor(s) using wastes collection companies】</p> <p>(a)-4 Soil Contamination</p> <p>- Spilled Oil and Fuel (from Construction vehicles and Equipment): Countermeasure【Periodical inspection of such trucks and equipment. Stopping lane and load and unload position management. Spilled oil and fuel management as waste.】</p> <p>(a)-5 Noise and Vibration</p> <p>- Noise: Countermeasure 【Utilization of well-maintained construction vehicles and equipment. Daily visual inspection of silencers of those vehicles and equipment】</p> <p>- Vibration: Countermeasure 【Use of equipment with low vibration level such as a “Rotary Percussion”】</p> <p>(b) The Project of rehabilitation and reinforcement is planned to be implemented in ROW at the five damaged stations of the existing Sindhuli road. Therefore, such negative impacts not be occurred at all.</p> <p>(c)-1 STDs such as HIV/AIDS of workers (See Simple prediction of HIA in the table below): Countermeasure 【Health and sanitation education to Workers and surrounding people】</p> <table border="1"> <thead> <tr> <th>Station</th> <th>Total Labor Force (persons)</th> <th>Construction Period (month)</th> <th>Simple Prediction (persons)</th> </tr> </thead> <tbody> <tr> <td>33+440</td> <td>768</td> <td>4</td> <td>1.54</td> </tr> <tr> <td>33+695</td> <td>576</td> <td>3</td> <td>1.15</td> </tr> <tr> <td>11+620</td> <td>576</td> <td>3</td> <td>1.15</td> </tr> <tr> <td>15+520</td> <td>1,664</td> <td>8</td> <td>3.33</td> </tr> <tr> <td>17+400</td> <td>6,720</td> <td>14</td> <td>13.44</td> </tr> </tbody> </table> <p>(c)-2 Road Traffic</p> <p>- Traffic restriction: Countermeasure 【Traffic management of On-way traffic at each station (Depending on station, construction method and construction schedule, Two-way traffic may be adopted) 】</p> <p>- Traffic Congestion (Inputs of construction vehicles and heavy equipment are limited by which rapid increase in the traffic volume is not considered): Countermeasure 【Appropriate control of such vehicles and equipment】</p> <p>- Footpaths in each ROW of the five stations (used as shortcuts by surrounding local people): Countermeasure 【Instruction and education on the safety to workers, temporary interruption of the work while using footpaths by people, temporary diversions of footpaths, set up of warning signboards】</p> <p>(c)-3 Temporary employment: As a positive impact, there may have a possibility to employ surrounding local people at the five stations as security guards and/or sweepers during the construction phase. Child laborers (under 16 years old) and gender issues are regulated by the</p>	Station	Total Labor Force (persons)	Construction Period (month)	Simple Prediction (persons)	33+440	768	4	1.54	33+695	576	3	1.15	11+620	576	3	1.15	15+520	1,664	8	3.33	17+400	6,720	14	13.44
Station	Total Labor Force (persons)	Construction Period (month)	Simple Prediction (persons)																									
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Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)												
		<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) N (b) N (c) Y (d) N</p>	<p>Labour Act, Labour Rules and relevant guidelines of DoR. In cases where women labors are recruited, toilet facilities for exclusively women use are planned to be set up.</p> <p>(a) IEE for the project will be prepared by DoR after the JICA Survey. However, environmental monitoring is regulated by EPA and EPR as well as DoR relevant guidelines on environmental protection. Therefore, an Environmental Monitoring plan may be requested for the approval of IEE report with supplemental conditions. In addition the IEE report is required to be attached to tender documents for projects by the relevant regulations. The requirement on the environmental monitoring are one of the bidding conditions of bidders (contractors).</p> <p>(b) As mentioned above, in cases where environmental monitoring is requested as supplementary conditions for the IEE approval, monitoring items, methods and frequencies are specified in accordance with relevant clauses of EPA and EPR.</p> <p>In addition, based on the JICA Guidelines, the JICA Survey conducted an IEE level study for the project which has been classified as "Category B" by JICA. The JICA Survey Team has prepared a Draft Environmental Monitoring Plan. In general, for JICA grant aid projects, submission of environmental monitoring report to be submitted by project proponents to JICA as one of the conditions of the grant is required for three years</p> <p>(c) DoR has introduced an ICT based grievance redress mechanism (GRM) for DoR called "Grievance Redress System (GRS) as shown in the table below.</p> <table border="1"> <thead> <tr> <th>Web-site GRM function</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1. Responsive Layout</td> <td>Users can also use this system on your mobile as it is compatible with mobile browser or any other smart devices like ipad, think pad etc.</td> </tr> <tr> <td>2. Support Dual language</td> <td>This system is available both in English and Nepali Language</td> </tr> <tr> <td>3. Support Multiple File Uploading</td> <td>This system supports multiple file uploads</td> </tr> <tr> <td>4. Email &amp; SMS Notifications</td> <td>The system will send the notification on user Email and SMS if the email or mobile number is provided.</td> </tr> <tr> <td>5. Easy to Use</td> <td>The system is designed in a very simple way reducing the tedious work for user. Use of short form, maximum use of select and check option, passed message on tool tips over every links and fields to give the information in more clear way etc.</td> </tr> </tbody> </table> <p>Source: Grievance Redress System (GRS) PUBLIC USER'S MANUAL 2013, DoR, MoPIT</p> <p>GESU of DOR has deployed officials of an environmental officer and s social development officer as shown below.</p>	Web-site GRM function	Description	1. Responsive Layout	Users can also use this system on your mobile as it is compatible with mobile browser or any other smart devices like ipad, think pad etc.	2. Support Dual language	This system is available both in English and Nepali Language	3. Support Multiple File Uploading	This system supports multiple file uploads	4. Email & SMS Notifications	The system will send the notification on user Email and SMS if the email or mobile number is provided.	5. Easy to Use	The system is designed in a very simple way reducing the tedious work for user. Use of short form, maximum use of select and check option, passed message on tool tips over every links and fields to give the information in more clear way etc.
Web-site GRM function	Description															
1. Responsive Layout	Users can also use this system on your mobile as it is compatible with mobile browser or any other smart devices like ipad, think pad etc.															
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5. Easy to Use	The system is designed in a very simple way reducing the tedious work for user. Use of short form, maximum use of select and check option, passed message on tool tips over every links and fields to give the information in more clear way etc.															
	(2) Monitoring															

Environmental Checklist: 7. Roads (Version 6 as of 29<sup>th</sup> March 2018)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
				
6 Note	Reference to Checklist of Other Sectors	<p>(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).</p> <p>(b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).</p>	(a)N (b)N	<p>(a) Not applicable for the rehabilitation and reinforcement project.</p> <p>(b) Not applicable for the rehabilitation and reinforcement project.</p>
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a)N	(a) Not applicable for the rehabilitation and reinforcement project.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.  
 In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).  
 2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

## 2D SEISMIC RESPONSE ANALYSIS

### 1.1 2D SEISMIC RESPONSE ANALYSIS

#### 1.1.1 GENERAL

Two-dimensional seismic response analysis was carried out to confirm the validity of the estimated damage mechanism, prioritization, evaluation of countermeasure design and evaluation of design load.

#### 1.1.2 ANALYSIS METHOD

The analyses were executed using the Distinct Element Method (DEM). The software is “UDEC Ver.6.0/Itasca Consulting Group”. DEM can simulate the dynamic earth pressure of backfill, dynamic behavior of Gabion retaining wall and slope. In addition, UDEC can install countermeasure such as ground anchors as cable elements.

#### 1.1.3 ANALYSIS SECTION

According to the detailed inspection of earthquake-induced damage locations, such as Sta.33+440, Section II and Sta.15+520, Section III, the analysis section was selected as typical section with Gabion retaining wall which was 1:0.1 inclination and 7 meters in height. Schematic view of the analysis section is shown in Figure 1.1.1.

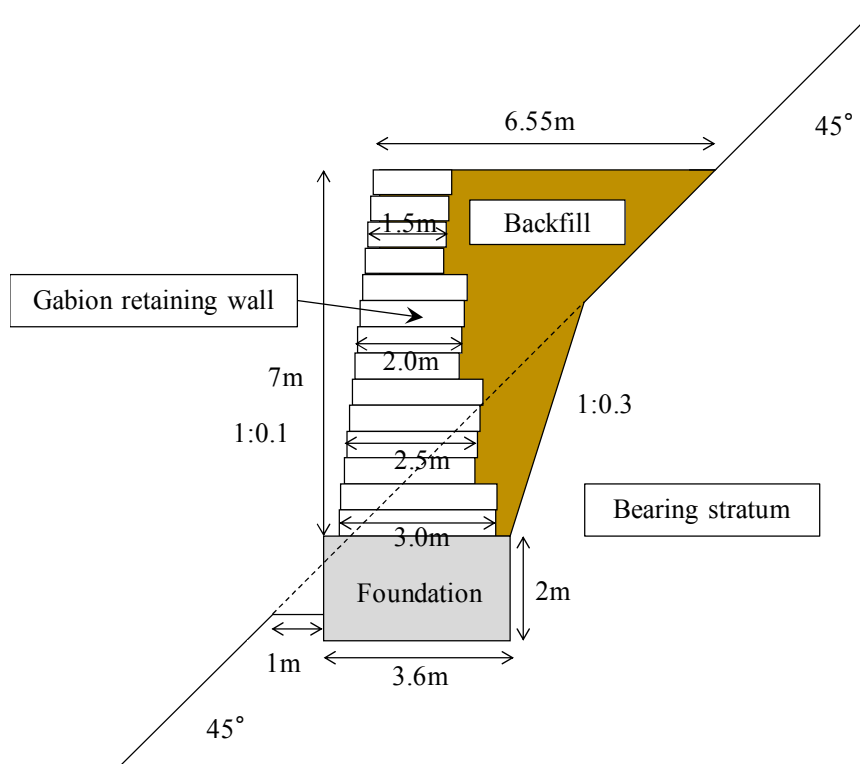
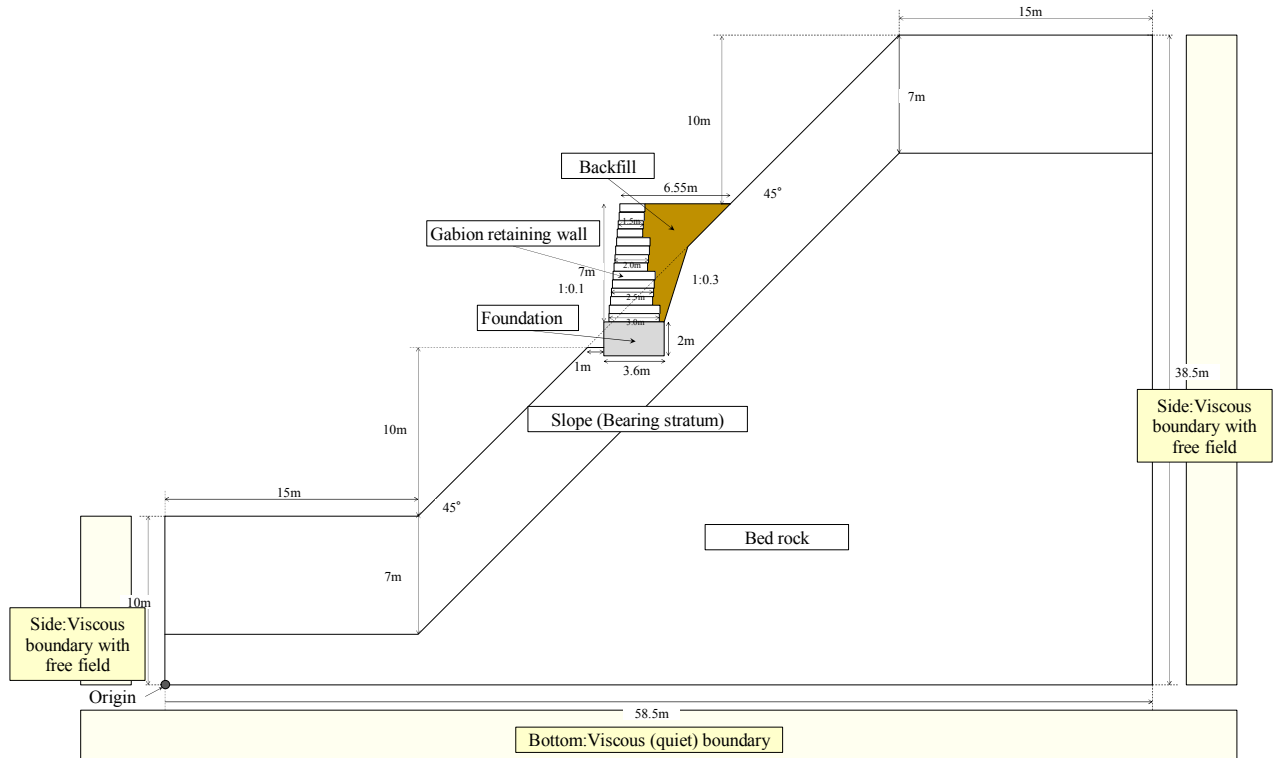


Figure 1.1.1 Schematic View of the Analysis Section



### 1.1.4 ANALYSIS MODEL AND BOUNDARY CONDITIONS

According to the analysis section, 2D analysis model was prepared. Figure 1.1.2 shows 2D analysis model.



**Figure 1.1.2 2D Analysis Model**

To avoid the influence by reflecting wave at the boundary, the bottom of the model was set as viscous boundary. Also, the side of the model was set as viscous boundary with free field.

Input motion was applied to the bottom boundary.

### 1.1.5 MECHANICAL PROPERTIES

Mechanical properties are shown in Table 1.1.1. Mechanical properties of backfill, Gabion retaining wall and slope were estimated using design values, general values and the test results by Gabion manufacture. Table 1.1.2 shows setting basis of physical properties.

**Table 1.1.1 Mechanical Properties**

No.	Part name	Unit weight $\gamma$ [kN/m <sup>3</sup> ]	Elastic modulus $E$ [kN/m <sup>2</sup> ]	Poisson's ratio $\nu$	Cohesion $c$ [kN/m <sup>2</sup> ]	Internal friction angle $\phi$ [degree]
1	Gabion retaining wall	18	$7.8 \times 10^2$	0.30	- (Elastic)	- (Elastic)
2	Backfill	20	$1.9 \times 10^4$	0.35	0(10)*	35
3	Foundation	23	$2.2 \times 10^7$	0.20	- (Elastic)	- (Elastic)
4	Slope (Bearing stratum)	20	$2.12 \times 10^5$	0.30	100	37
5	Bed rock	20	$1.91 \times 10^6$	0.30	- (Elastic)	- (Elastic)

\* Cohesion was set to 10 kN/m<sup>2</sup> in case the calculation did not converge.

**Table 1.1.2 Setting Basis of Mechanical Properties**

No.	Part name	Setting basis	
1	Gabion retaining wall	Unit weight	Design value
		Elastic modulus	The test results by Gabion manufacture
		Shear strength	Assuming elastic material
2	Backfill	Unit weight	Design value
		Elastic modulus	From design value of shear strength, calculate the N value by the empirical formula $\phi = 15 + \sqrt{15N}$ , then calculate the deformation modulus $E_p = 700N$
		Poisson's ratio	General value of soil
		Shear strength	Assuming elastic material
3	Foundation	Unit weight	General value of concrete
		Elastic modulus	General value of concrete (Reference: Standard Specification for Concrete Structures, Japan Society of Civil Engineers)
		Poisson's ratio	General value of concrete (Reference: Standard Specification for Concrete Structures, Japan Society of Civil Engineers)
		Shear strength	Assuming elastic material
4	Slope (Bearing stratum)	Unit weight	Design value
		Elastic modulus	Based on the results of seismic refraction survey at the Section II, S-wave velocity was estimated at 200m/s
		Poisson's ratio	General value of soil
		Shear strength	Design value
5	Bed rock	Unit weight	Same as Slope
		Elastic modulus	Based on the results of seismic refraction survey at the Section II, S-wave velocity was estimated at 600m/s
		Poisson's ratio	General value of soil
		Shear strength	Assuming elastic material

### 1.1.6 INPUT MOTION

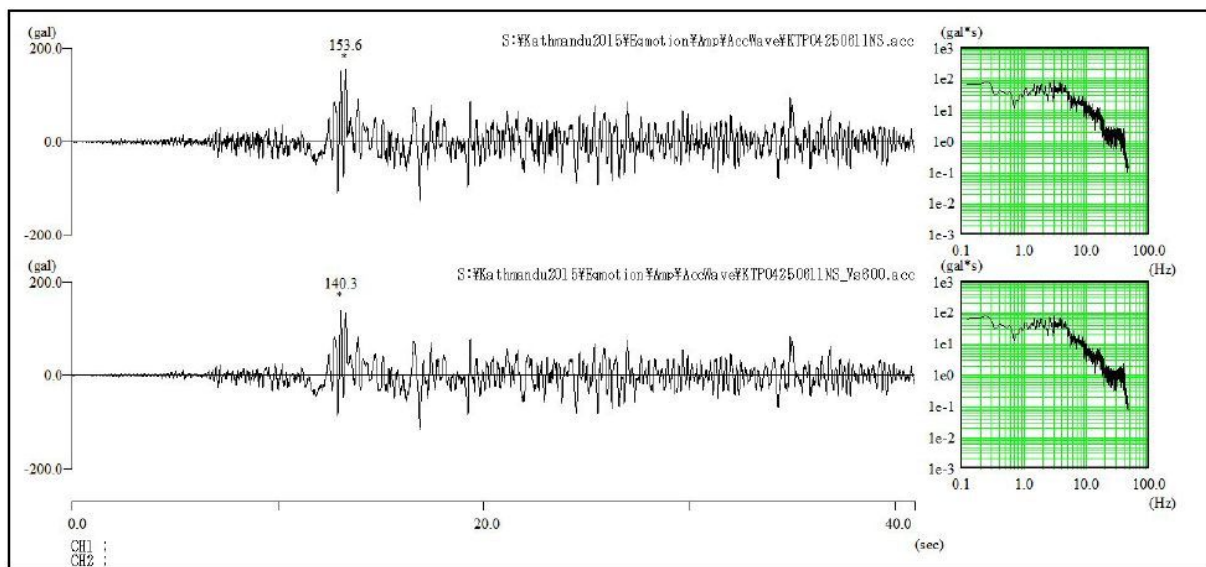
It is desirable that input motion for seismic response analysis is adopted the observed wave nearby Sindhuli Road and the site topography and geological features similar to the areas where this analysis is performed.

However, Gorkha Earthquake's seismic wave were recorded at only few stations around the Kathmandu valley. Stations are KATNP (Kanti Path, Kathmandu), KTP (Kirtipur Municipality Office), TVU (Central Department of Geology, Tribhuvan University, Kirtipur), PTN (Pulchowk Campus, Institute of Engineering, Tribhuvan University, Patan), and THM (University Grants Commission Office, Sanothimi, Bhaktapur). Among these stations, KTP station is rock site, and the other station are soil site. The underground S-wave velocity of the KTP station is observed around 500m/s by Hokkaido University.

Considering the topography and geological features of Sindhuli Road, the recorded wave at KTP was used as the input seismic motion. The KTP wave was also adopted in Nepal's earthquake disaster risk assessment project: "Project for Assessment of Earthquake Disaster Risk for the Kathmandu Valley".

The input wave at the base of the model needed to be estimated from the wave measured on the surface. Deconvolution analysis was performed by that project to estimate the input wave at the bed rock, and it was used for this analysis. The estimated input wave is referred to as the "deconvoluted wave" in Table 1.1.3.

Figure 1.1.3 shows the recorded wave and the deconvoluted wave (input motion for this analysis).



Source: JICA Project Team "Project for Assessment of Earthquake Disaster Risk for the Kathmandu Valley"

**Figure 1.1.3 Input Motion: Upper: Recorded Wave, Lower: Deconvoluted Wave**

### 1.1.7 ANALYSIS CASES

Analysis cases are shown in Table 1.1.3. Considering the uncertainty of physical properties and input seismic motion, the analysis cases were executed with parameters as magnitude of earthquake motion, Elastic modulus of gabion retaining wall, shear strengths of backfilled soil.

**Table 1.1.3 Analysis Cases**

Analysis case	Elastic modulus of Gabion retaining wall	Input seismic motion	Note
Case1	780 kN/m <sup>2</sup>	Deconvoluted KTP wave	—
Case2		Deconvoluted KTP wave × 1.5	—
Case3		Deconvoluted KTP wave × 2.0	—
Case4	2.2×10 <sup>7</sup> kN/m <sup>2</sup> Correspond to concrete	Deconvoluted KTP wave	Shear strengths of backfill c=0 kN/m <sup>2</sup> φ=35°
Case5		Deconvoluted KTP wave × 1.5	
Case6		Deconvoluted KTP wave × 2.0	

1.1.8 ANALYSIS RESULTS

According to the analysis results, estimated displacements volume of Gabion retaining wall and backfill varies depending on the analysis cases.

The results of each case are shown in Figure 1.1.4 to Figure 1.1.15.

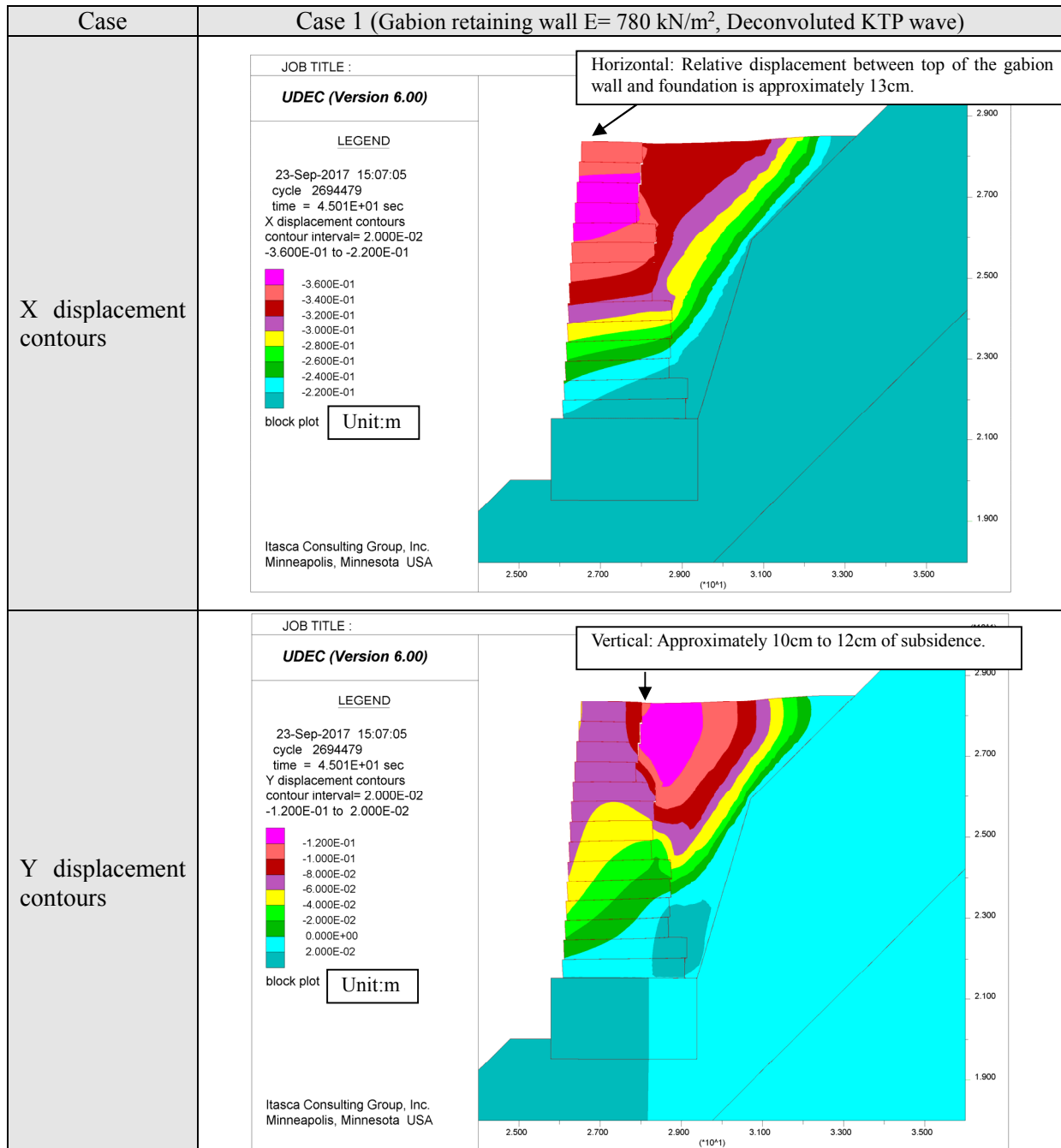


Figure 1.1.4 Analysis Result – Case 1:  
 Deformation Diagram After Earthquake and Displacement Contours

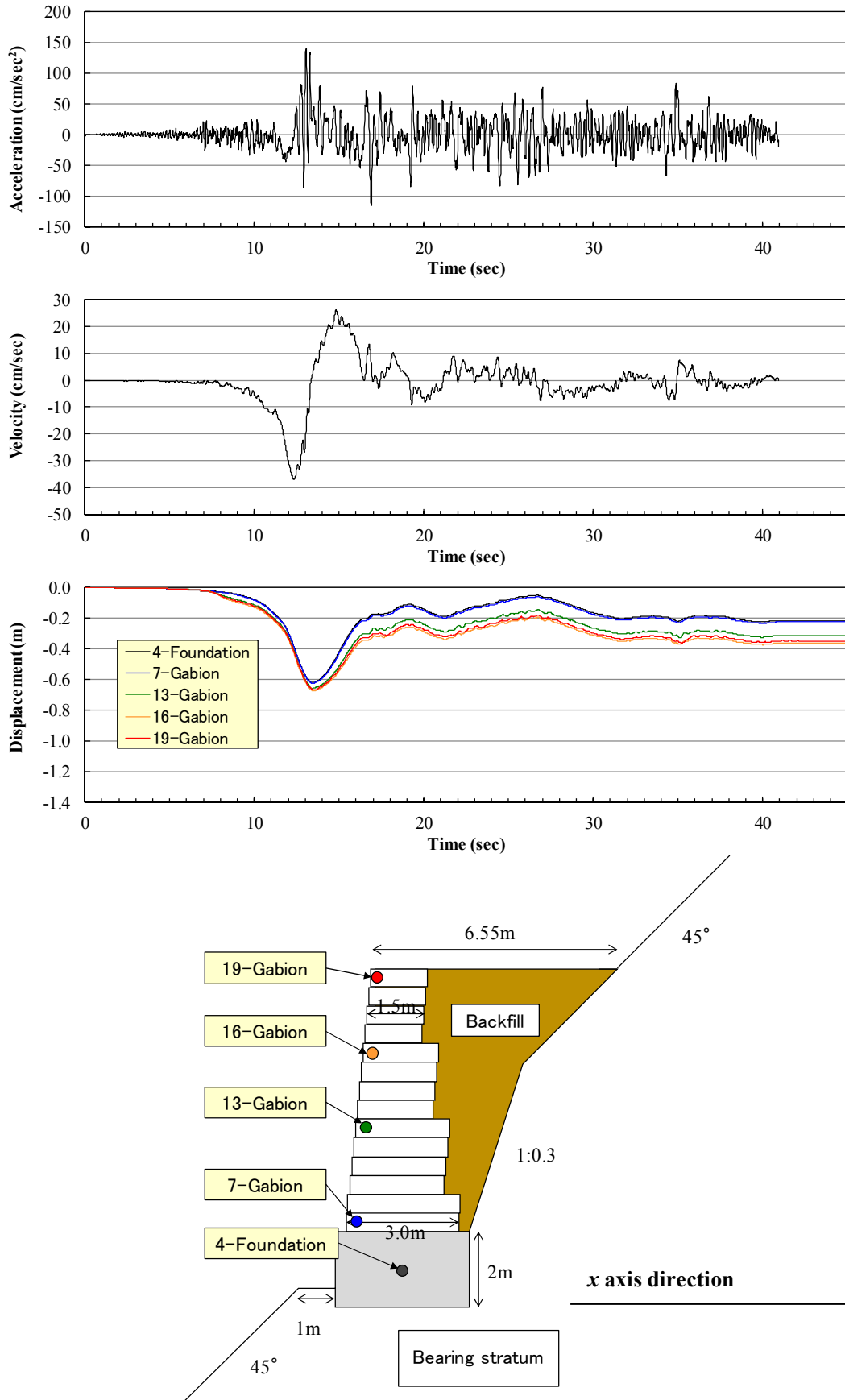
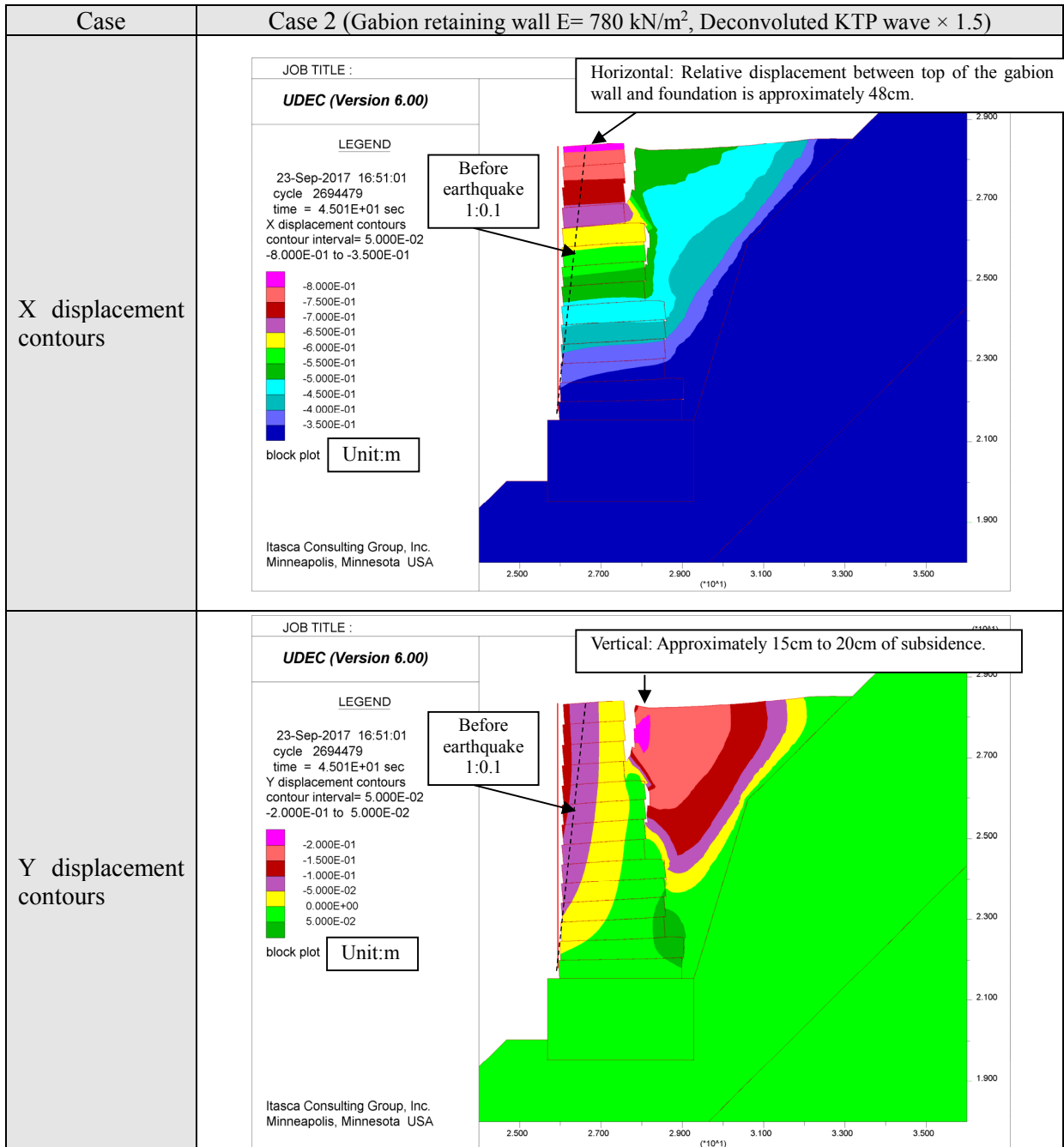


Figure 1.1.5 Analysis Result – Case 1: Time Series of Input Motion, Velocity, and X-Displacement

As a typical case, the results of Case 2 are shown in Figure 1.1.6 and Figure 1.1.7. In the case 2, the tendencies of displacements of the gabion retaining wall and settlement of the backfilled soil are relatively similar to the damage state of the site such as Sta.33+440, Section II and Sta.15+520, Section III. At around 13 seconds when the input acceleration represents the maximum value, the displacement in the valley direction became the maximum. The displacements of the upper part of Gabion was irrecoverable and the gabion blocks remained nearly vertical after the earthquake.



**Figure 1.1.6 Analysis Result – Case 2:  
Deformation Diagram After Earthquake and Displacement Contours**

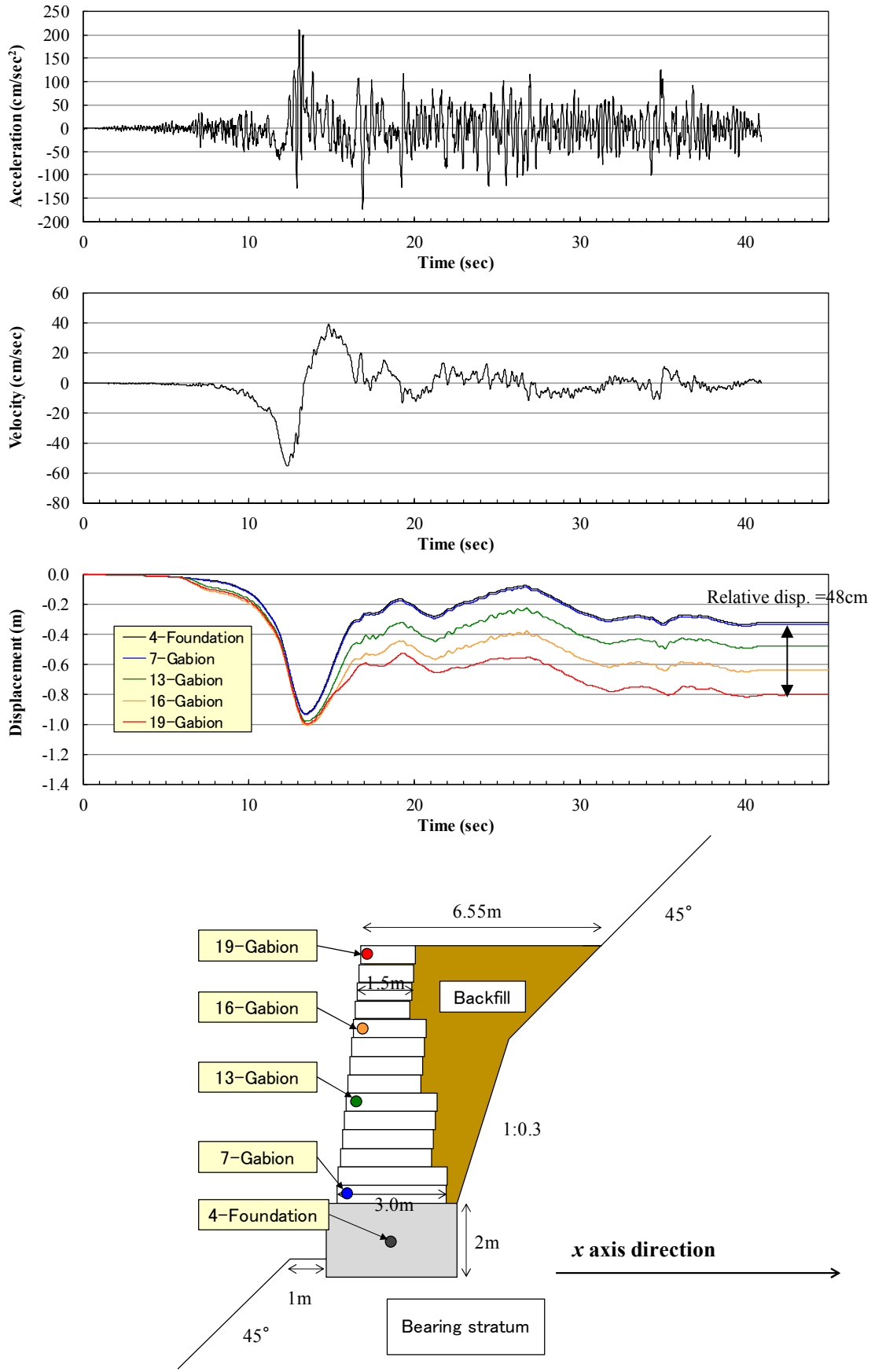
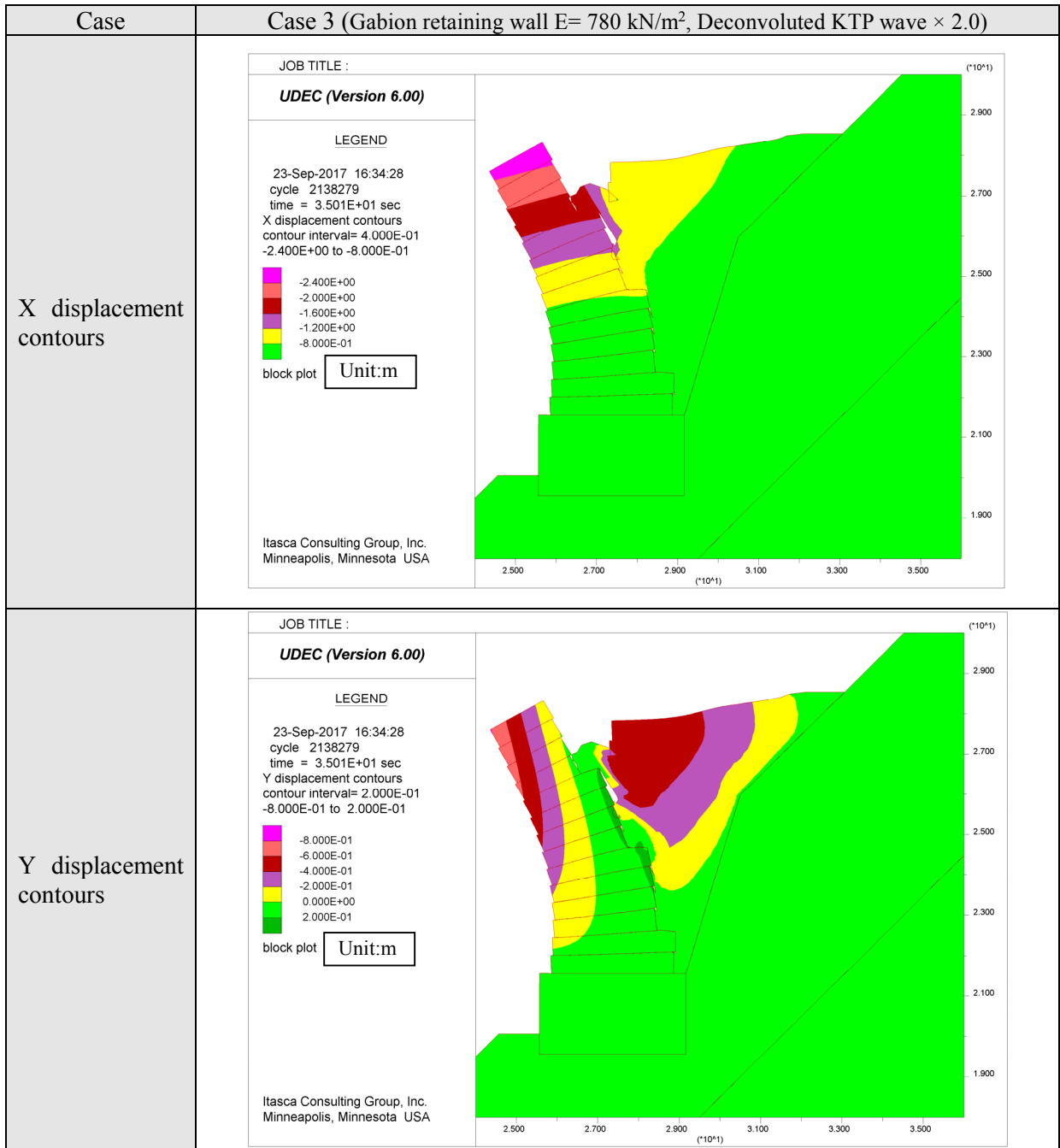


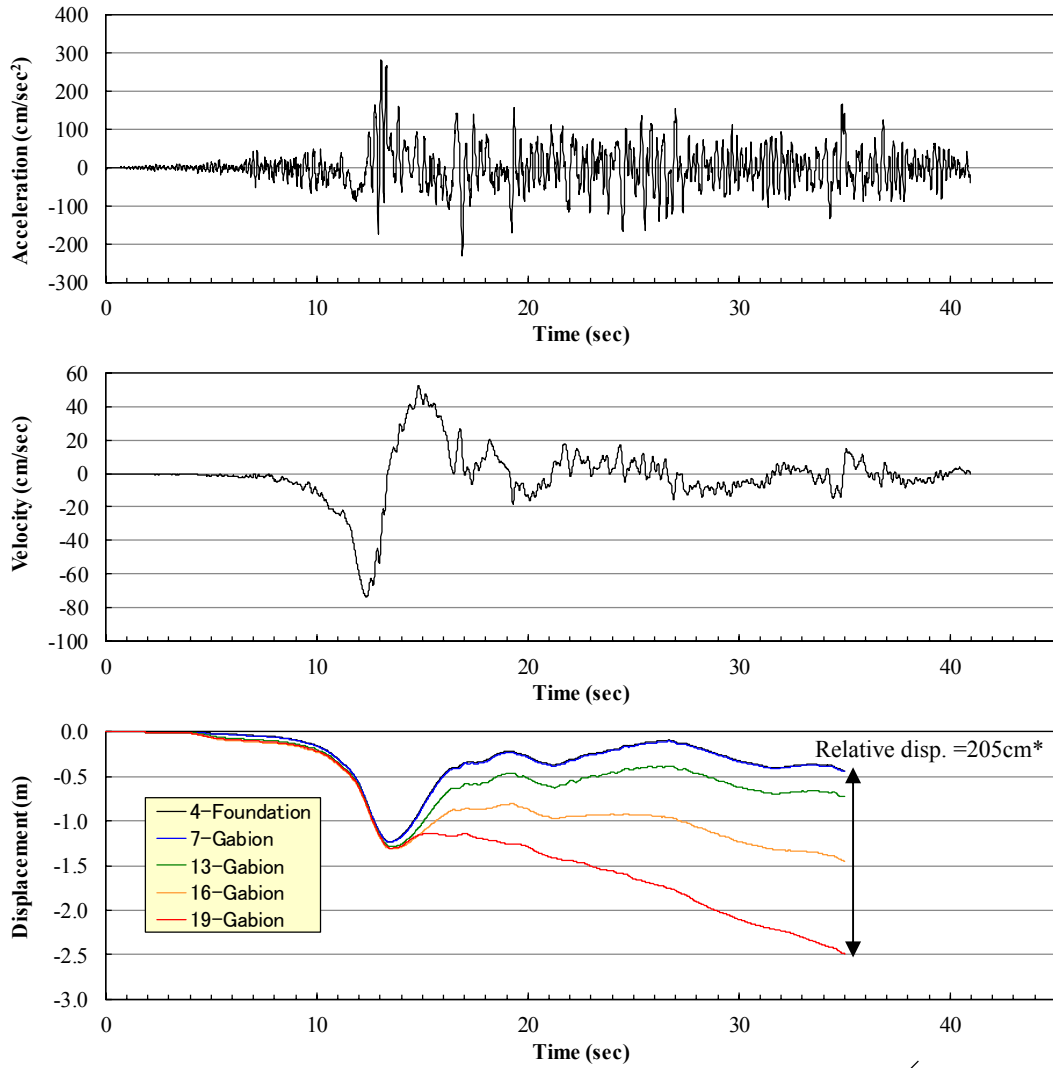
Figure 1.1.7 Analysis Result – Case 2: Time Series of Input Motion, Velocity, and X-Displacement





\* Case 3 did not converge. The diagram is described at thirty-five second.

**Figure 1.1.8 Analysis Result – Case 3:  
Deformation Diagram After Earthquake and Displacement Contours**



\* Case 3 did not converge. The displacement is described until thirty-five second.

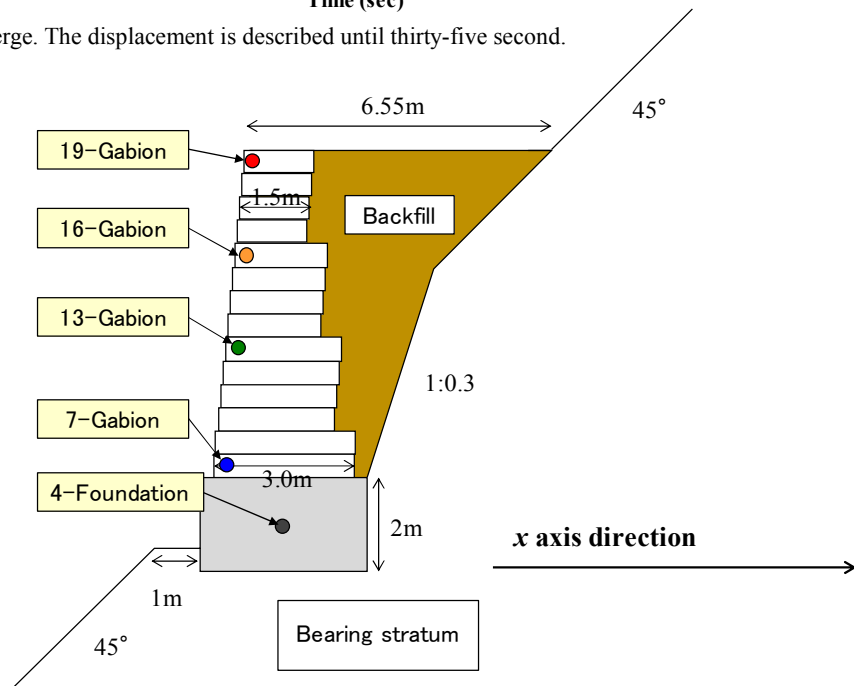
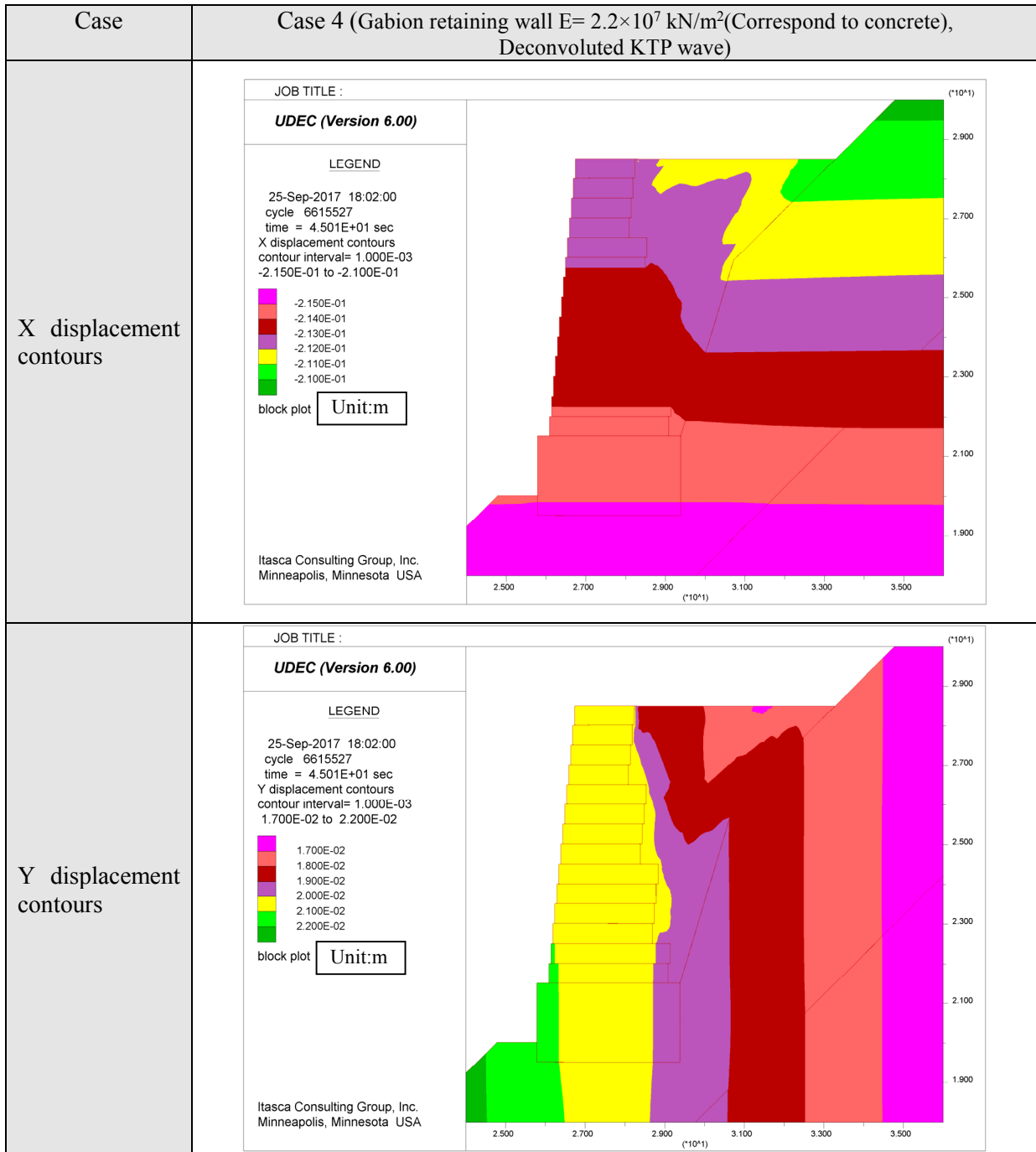


Figure 1.1.9 Analysis Result – Case 3: Time Series of Input Motion, Velocity, and X-Displacement



**Figure 1.1.10 Analysis Result – Case 4:  
Deformation Diagram After Earthquake and Displacement Contours**

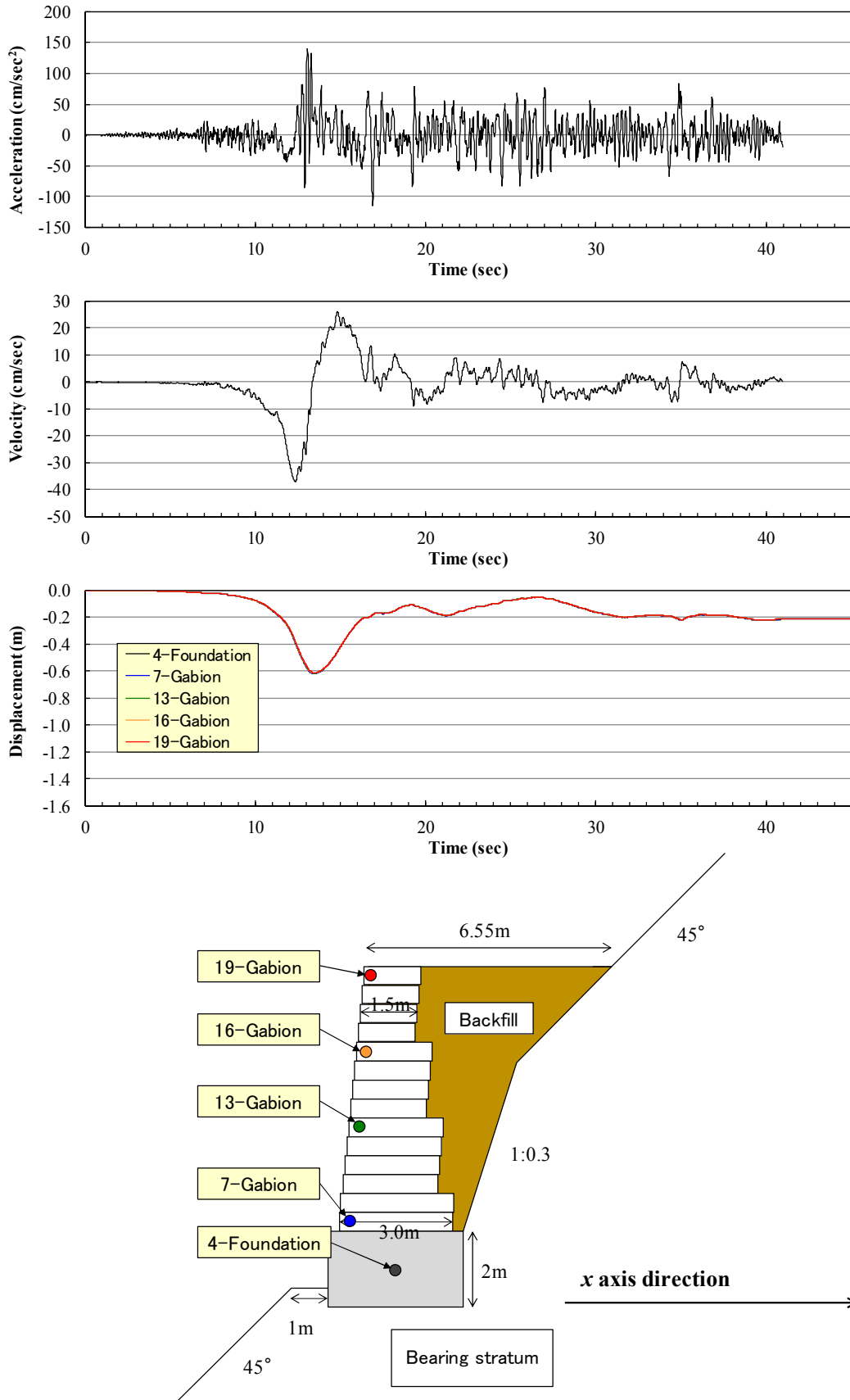
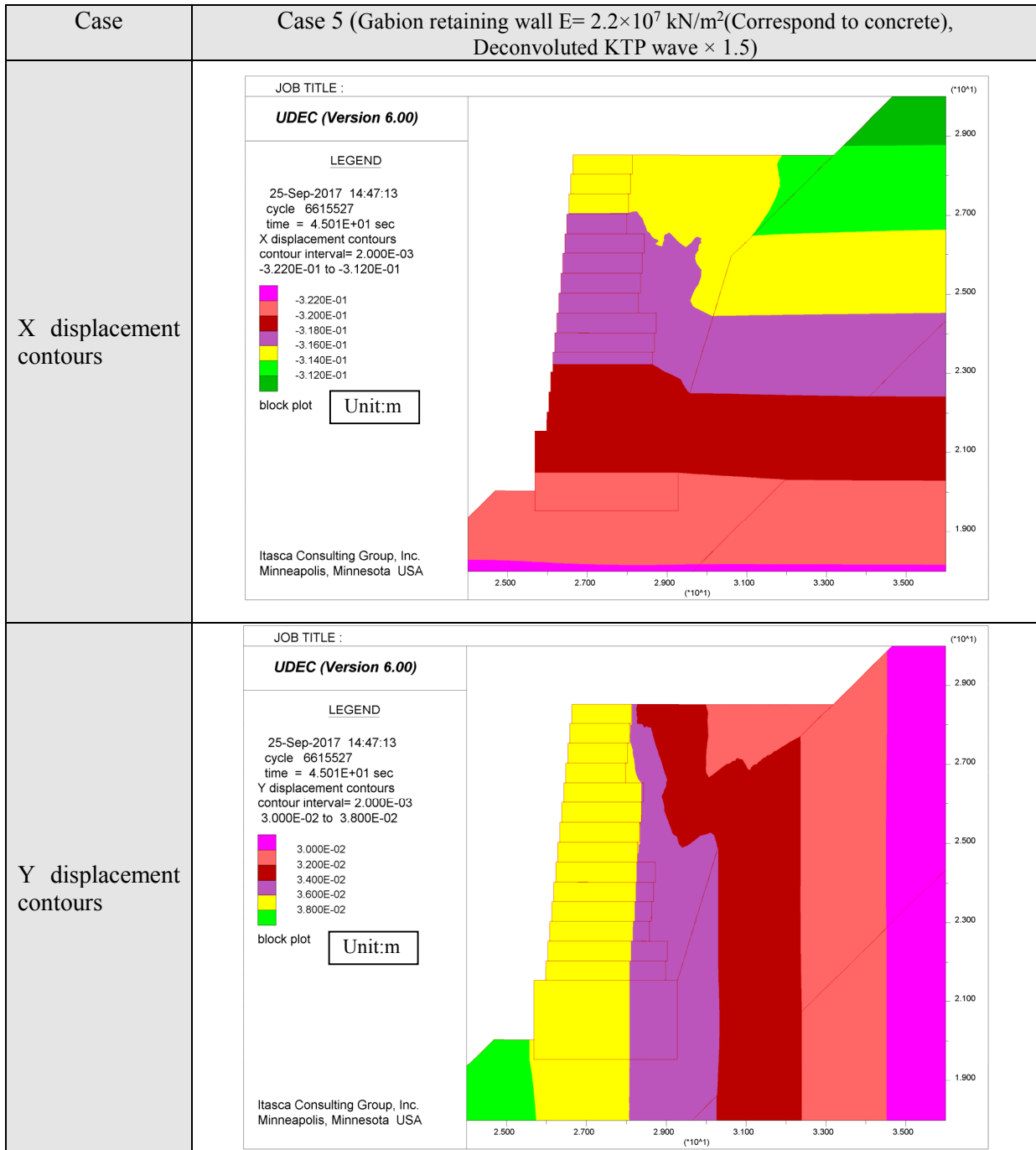


Figure 1.1.11 Analysis Result – Case 4: Time Series of Input Motion, Velocity, and X-Displacement



**Figure 1.1.12 Analysis Result – Case 5:  
Deformation Diagram After Earthquake and Displacement Contours**

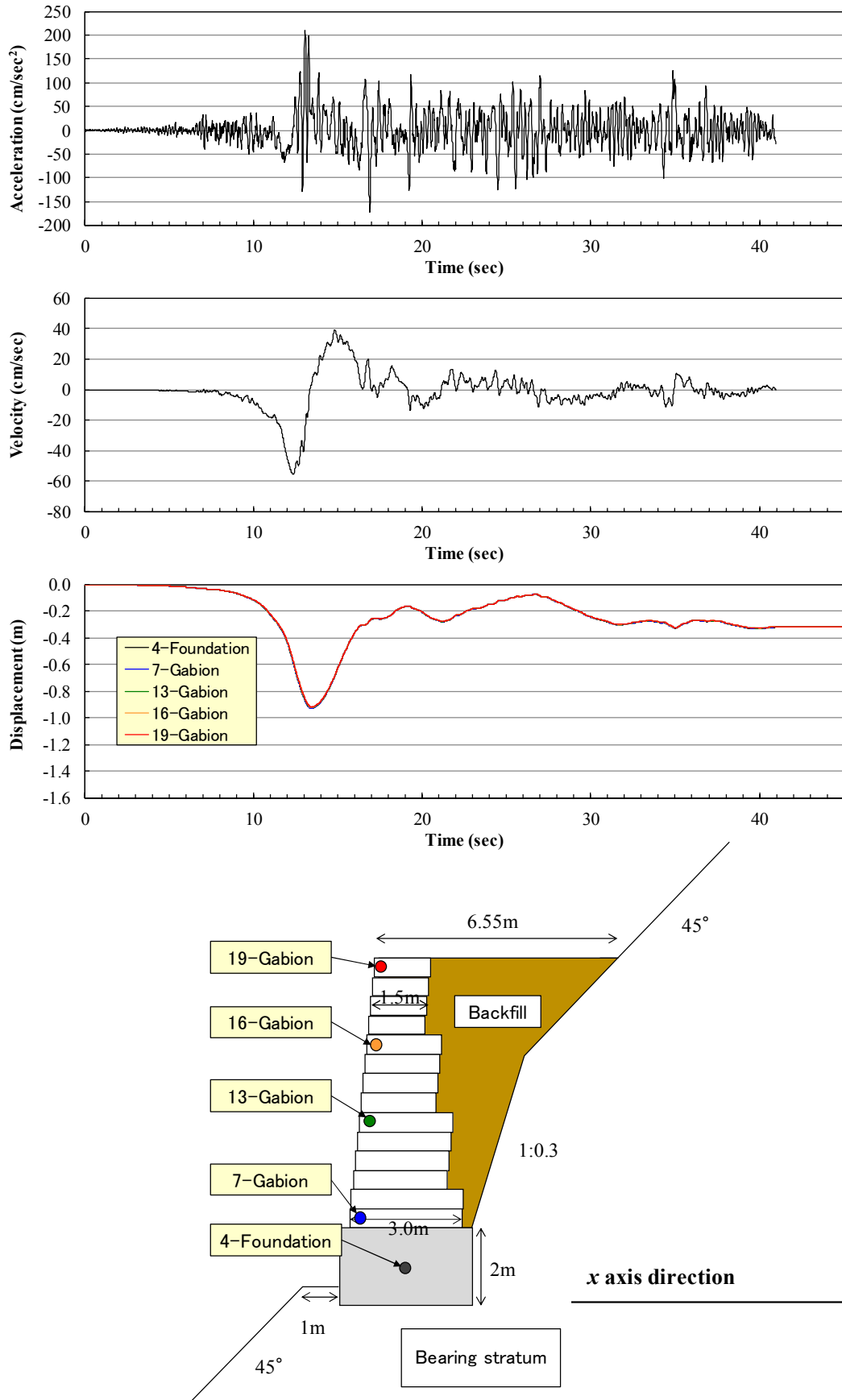
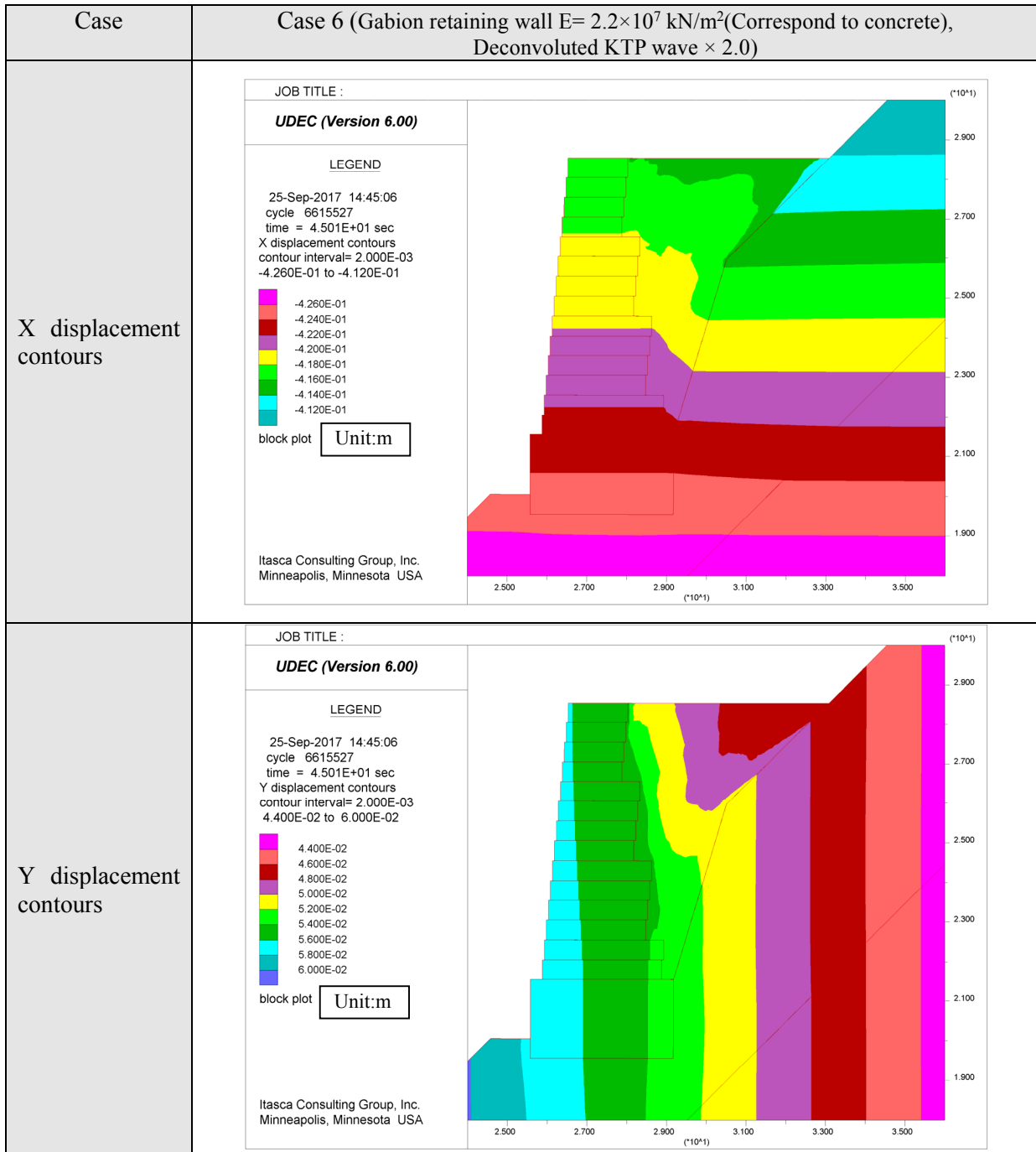


Figure 1.1.13 Analysis Result – Case 5: Time Series of Input Motion, Velocity, and X-Displacement



**Figure 1.1.14 Analysis Result – Case 6:  
Deformation Diagram After Earthquake and Displacement Contours**

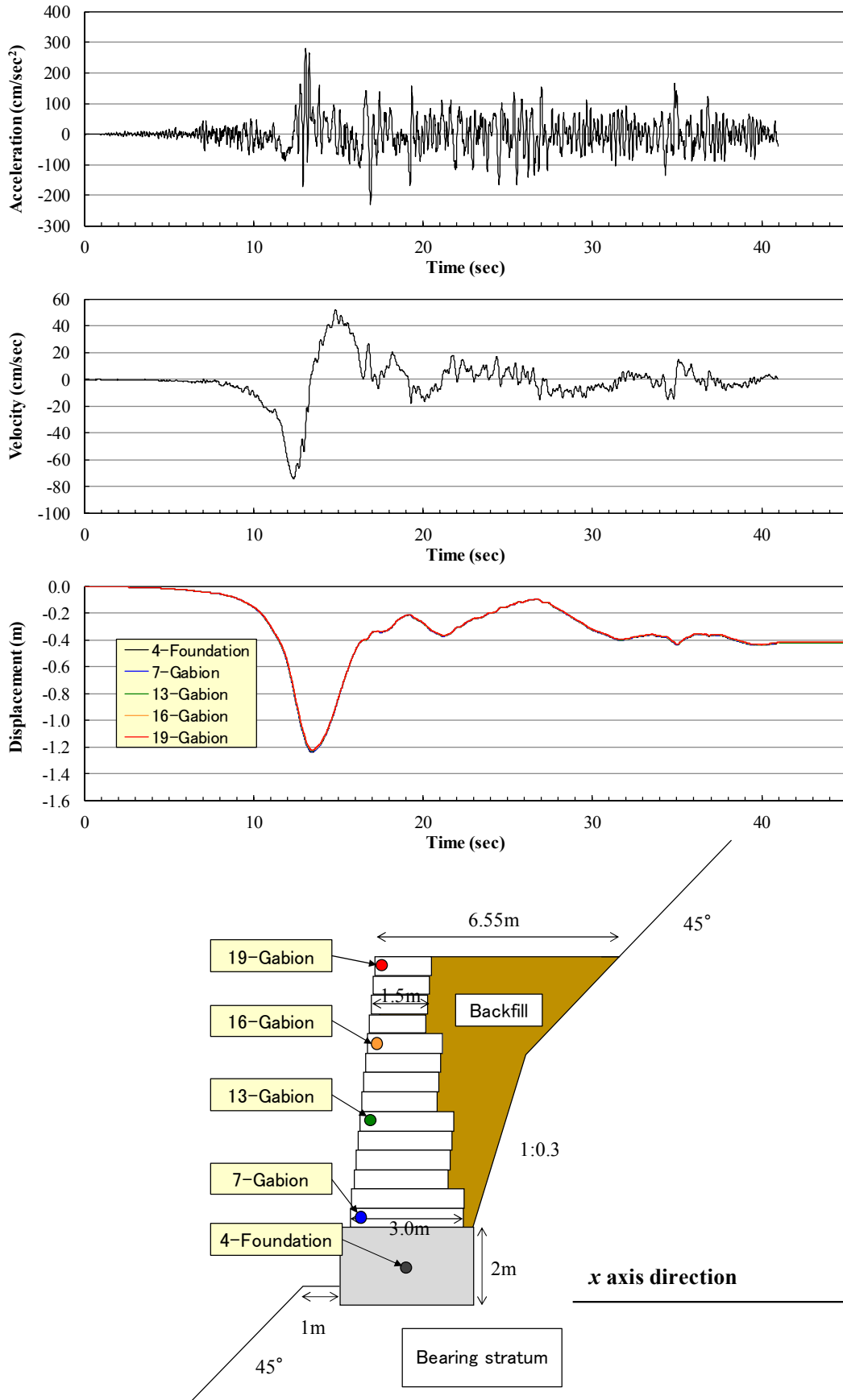


Figure 1.1.15 Analysis Result – Case 6: Time Series of Input Motion, Velocity, and X-Displacement



Estimated relative displacement between top of the gabion and Foundation are tabulated in Table 1.1.4.

**Table 1.1.4 Relative Displacement Between Top of the Gabion and Foundation**

Analysis case	Elastic modulus of Gabion retaining wall	Input seismic motion	Relative displacement between top of the gabion and Foundation
Case 1	780 kN/m <sup>2</sup>	Deconvoluted KTP wave	13 cm
Case 2		Deconvoluted KTP wave × 1.5	48 cm
Case 3		Deconvoluted KTP wave × 2.0	205 cm*
Case 4	2.2×10 <sup>7</sup> kN/m <sup>2</sup> Correspond to concrete	Deconvoluted KTP wave	0 cm
Case 5		Deconvoluted KTP wave × 1.5	0 cm
Case 6		Deconvoluted KTP wave × 2.0	-1 cm

\* Case 3 did not converge. The value is described the relative displacement at thirty-five second.

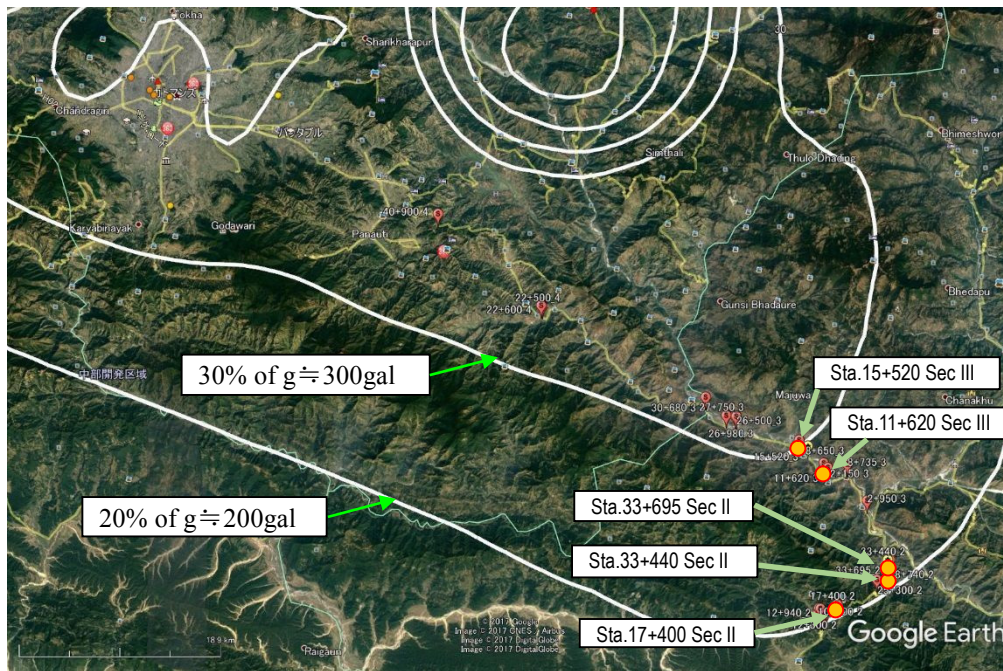
The analysis results are summarized as below;

- According to the results of case series of Case 1 to 3, in case that the magnification of input seismic motion is 1.5 times of deconvoluted KTP wave, relative displacement between top of gabion wall and foundation was around 50cm. The gabion wall stood almost straight.
- In case that the deformation modulus of gabion was set to corresponding concrete value (Case 4 to 6), relative displacement between top of gabion and Foundation was almost zero. It indicates that the permanent displacement might have been caused by flexibility of gabion retaining wall.

### 1.1.9 DISCUSSION

According to the analysis results, in case that the magnification of input seismic motion is 1.5 times (maximum acceleration 211gal) of deconvoluted KTP wave, the gabion wall deformed almost straight, and the settlement of the backfilled soil were relatively similar to the damage state of the site.

USGS has released the estimated maximum acceleration contour of the Gorkha Earthquake by shakemap. Figure 1.1.6 shows a plot of this contour and 24 points to consider on Google Earth.



Source: JICA Survey Team based on <https://earthquake.usgs.gov/earthquakes/eventpage/us20002926#shakemap>

**Figure 1.1.16 Estimated Maximum Acceleration Contour of the Gorkha Earthquake by USGS and Point of Consideration**

According to this figure, it is estimated that the estimated maximum acceleration at the target location during the Gorkha Earthquake was around 200 gal to 300 gal, and it was consistent with analysis results.

In Sindhuli Road, the seismic coefficient is designed according to the standard (IS: 1893-1984) of India, with horizontal design seismic intensity  $k_h = 0.1$  (100 gal). According to these results, in the Gorkha Earthquake, it is estimated that the earthquake motion of about 200 gal exceeding the design seismic intensity has arrived. It seems that the Gabion retaining wall was partially deformed due to this earthquake motion.

## 1.2 VALIDATION OF GROUND ANCHORS BY 2D SEISMIC RESPONSE ANALYSIS

### 1.2.1 GENERAL

Two-dimensional seismic response analysis by the model installed the ground anchors was carried out to confirm the effectiveness of countermeasure. It was estimated that the input motion was same scale as Case 2 (1.5 times (maximum acceleration 211gal) of deconvoluted KTP wave).

As a result of the analysis, it was confirmed that the relative displacement between top of gabion wall and foundation was restrained within 10cm in case of installing the ground anchors.

### 1.2.2 ANALYSIS CASES

Analysis cases are shown in Table 1.2.1. According to the results of “1.1 2D SEISMIC RESPONSE ANALYSIS”, in the Gorkha Earthquake at around Sindhuli Road, it was estimated that the earthquake motion was same scale as Case 2 (1.5 times (maximum acceleration 211gal) of deconvoluted KTP wave). Therefore, initial state of the analysis was set to the final state of the Case 2. Case 2-A1 is the case without ground anchors. Case 2-A2 is the case installing ground anchors. Input motion was 1.5 times of deconvoluted KTP wave again, the same as Case 2.

**Table 1.2.1 Analysis Cases for Validation of Ground Anchors**

Analysis case	Deformation modulus of Gabion retaining wall	Input seismic motion (Secondary)	Ground anchors
Case 2-A1	780 kN/m <sup>2</sup>	Deconvoluted KTP wave × 1.5	None
Case 2-A2			SFL-1, @2.0m, 2steps

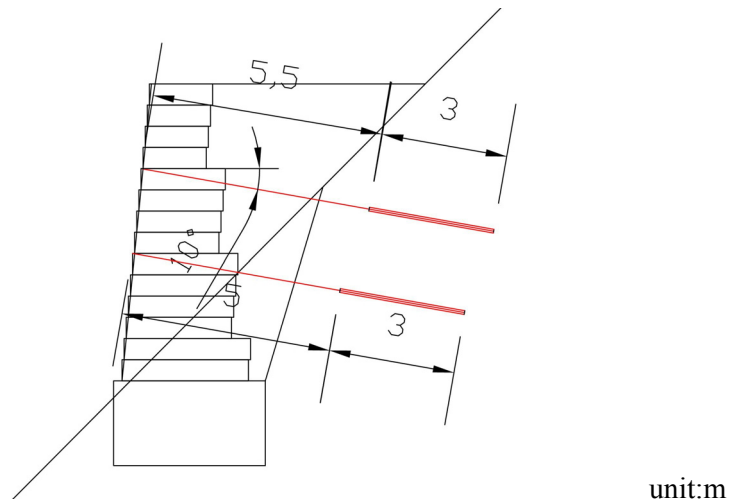
### 1.2.3 MECHANICAL PROPERTIES OF GROUND ANCHORS

Mechanical properties of ground anchors are shown in Table 1.2.1. Bearing plates were modeled as beam elements. Initial load of anchor was set to the 50% of allowable design load ( $0.6T_{us}$ ).

**Table 1.2.2 Mechanical Properties of Ground Anchors**

Area of tendon unit	Young's modulus	Unit weight of tendon unit	Ultimate Strength $T_{us}$	Yield Strength $T_{ys}$	Allowable Design Load	
					Ordinary $0.6T_{us}$	Earthquake $0.9T_{ys}$
138.7 mm <sup>2</sup>	200 kN/mm <sup>2</sup>	1.101 kg/m	261 kN	222 kN	156.6 kN	199.8 kN
Steps	Horizontal interval					
2	2.0 m					

Arrangement of the ground anchors is shown in Figure 1.2.1.



**Figure 1.2.1 Schematic View of Arrangement of the Ground Anchors**

1.2.4 ANALYSIS RESULTS

The results of Case 2-A1 are shown in Figure 1.2.2 and Figure 1.2.3. The gabion retaining wall kept the form of an upstanding wall after the first earthquake, at the final state of Case 2. In case the ground anchors were not installed, the gabion inclined further in the valley direction after second earthquake. Relative displacement between top of gabion wall and foundation was increased 48cm to 94cm, deformation of gabion wall became overhang. It is estimated that the gabion wall is unstable.

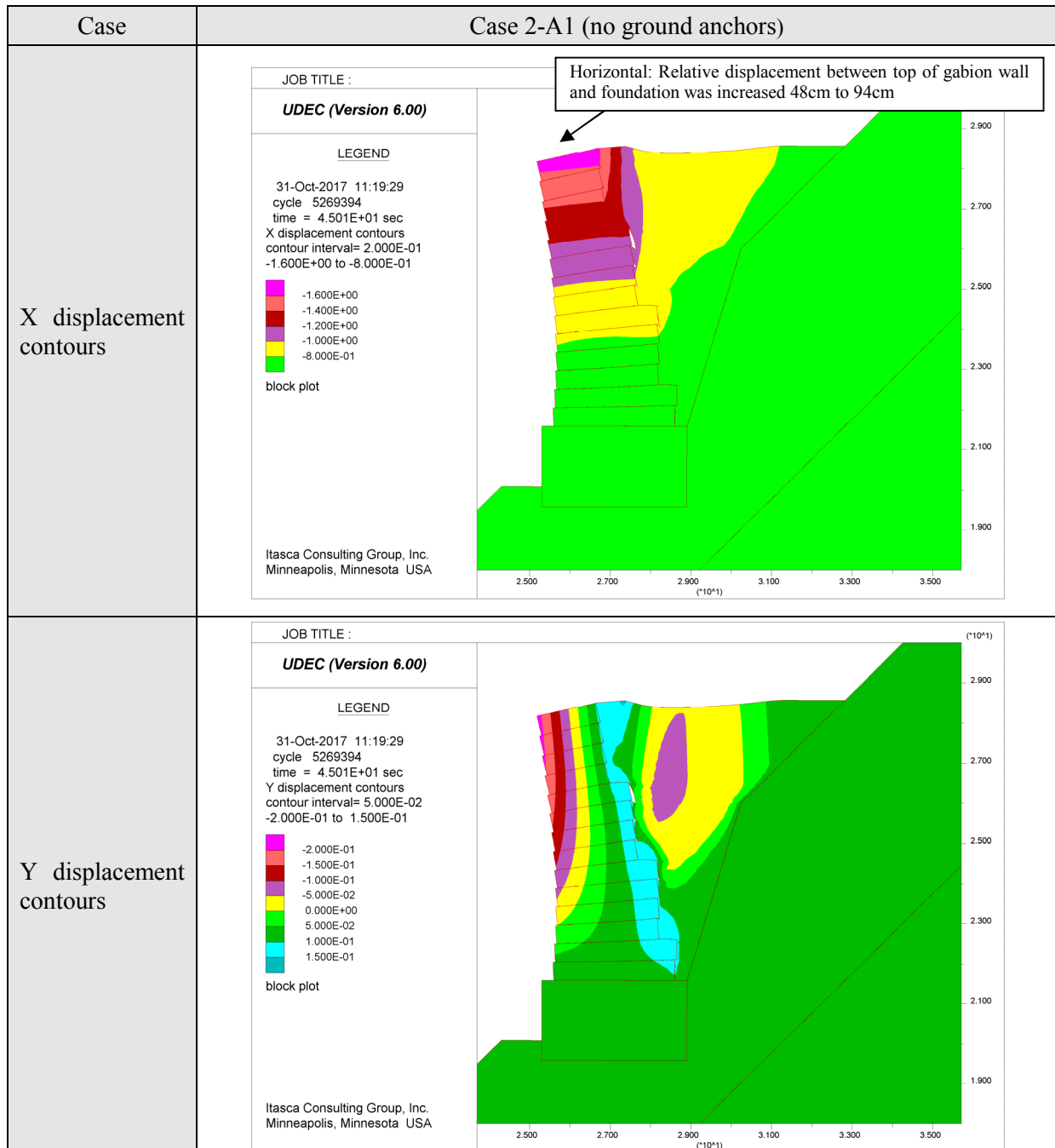


Figure 1.2.2 Analysis Result – Case 2-A1:  
 Deformation Diagram After Earthquake and Displacement Contours

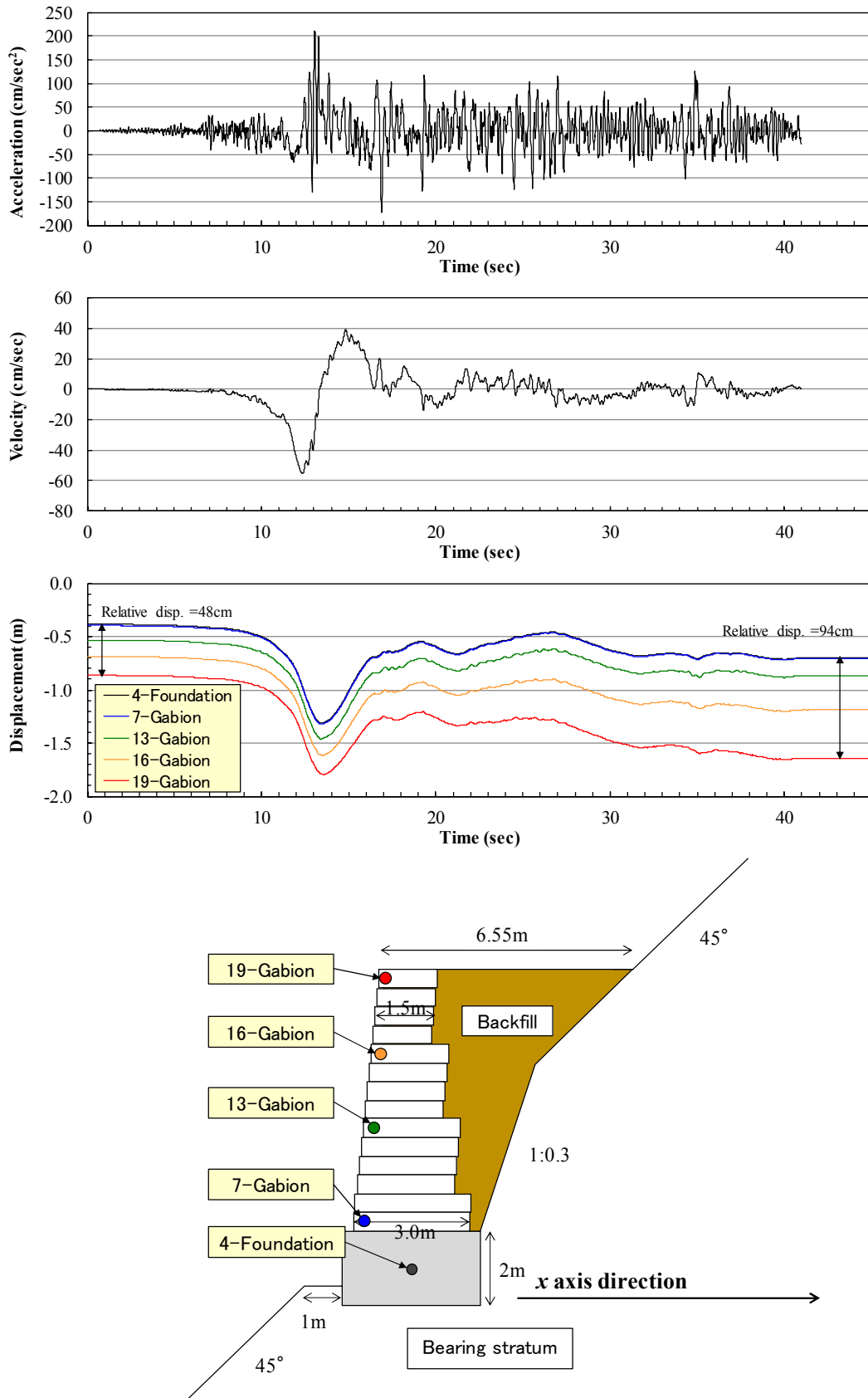
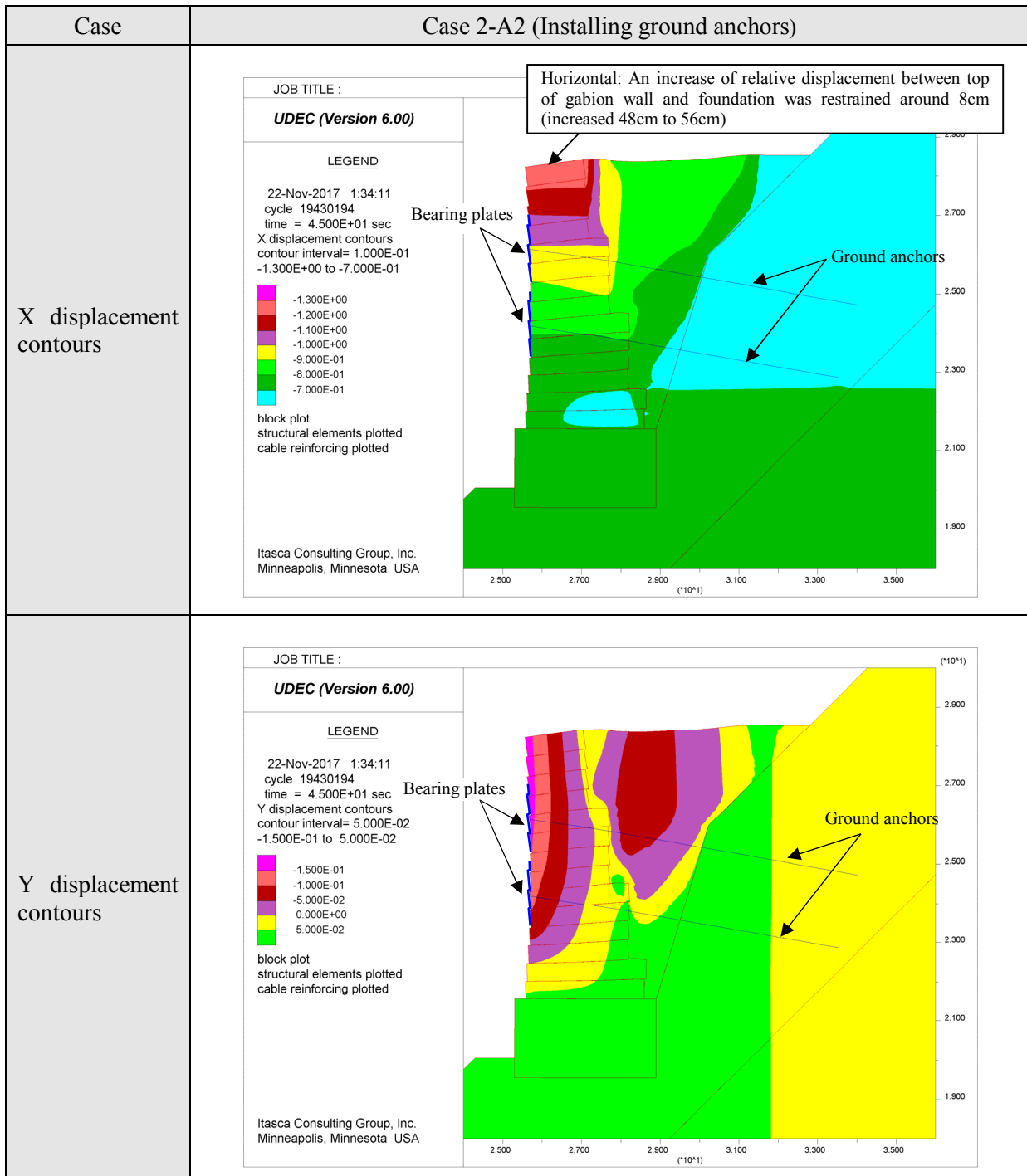
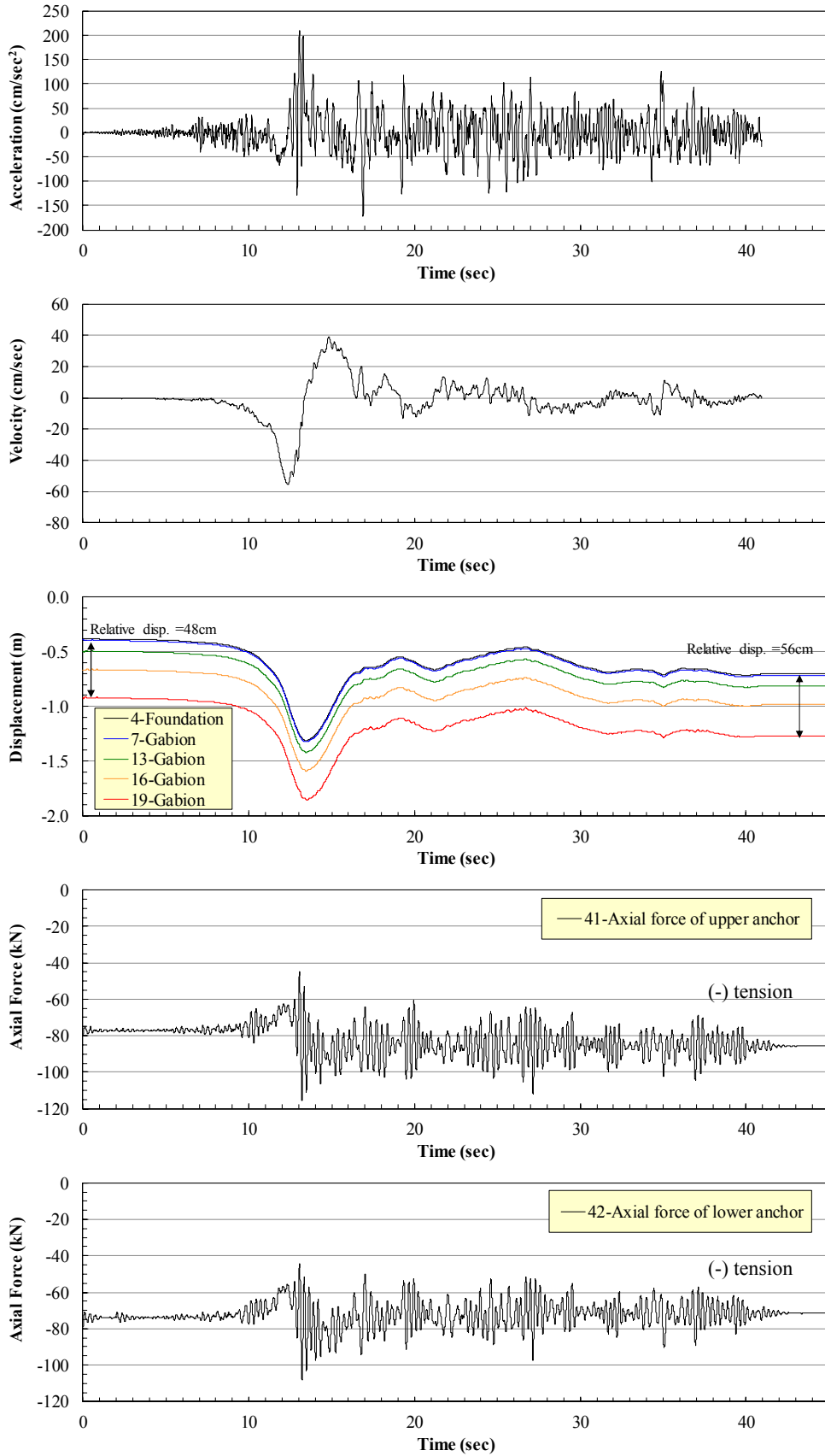


Figure 1.2.3 Analysis Result – Case 2 A-1: Time Series of Input Motion, Velocity, and X-Displacement

The results of Case 2-A2 are shown in Figure 1.2.4 and Figure 1.2.5. In case the ground anchors were installed, an increase of relative displacement between top of gabion wall and foundation was restrained around 8cm (increased 48cm to 56cm). Axial force of anchor fluctuated correspond to the input earthquake, but it never exceeded the allowable design load.



**Figure 1.2.4 Analysis Result – Case 2-A2:  
Deformation Diagram After Earthquake and Displacement Contours**



**Figure 1.2.5 Analysis Result – Case 2 A-2:**  
**Time Series of Input Motion, Velocity, X-Displacement, and Axial Force of Anchors**



### 1.2.5 CONCLUSIONS

As a result of the analysis, in case the ground anchors were not installed, it was estimated that the gabion wall will be unstable when the earthquake which magnitude is same to Gorkha Earthquake will occur again. Also, it was confirmed that the relative displacement between top of gabion wall and foundation was restrained within 10cm in case of installing the ground anchors.

**Table 1.2.3 Relative Displacement Between Top of the Gabion and Foundation**

Analysis case	Input seismic motion (Secondary)	Ground anchors	Relative displacement between top of the gabion and Foundation, before second earthquake	Relative displacement between top of the gabion and Foundation, after second earthquake
Case 2-A1	Deconvoluted KTP wave $\times 1.5$	None	48 cm	94 cm
Case 2-A2		SFL-1, @2.0m, 2steps	48 cm	56 cm