

be reconstructed independently by Bhutanese side, in view of the length of the bridge, the track record and procurement situation. As far as the three bridges on the farm road are concerned, the superstructures should be constructed by Bhutanese side as the country's track record and investigative situation pose no problems. With respect to the substructure, on the other hand, the survey revealed a problem in quality control and it is considered inappropriate to have the substructure of these bridges constructed by the Bhutanese side. Therefore, the substructure construction should be covered by the grant aid program of Japan.

4-2-2 Effectiveness

(1) Quantitative Effects

1) The Two Bridges on National Highway No. 5 (Dolkhola Bridge and Jigmiling Bridge)

The load-carrying capacity of both bridges on the National Highway No. 5 (Dolkhola Bridge and Jigmiling Bridge) will be increased from 18t (at present) to 40t. Benefited by this increase of the load-carrying capacity of two bridges, it is expected that large-vehicles passing the capital city Thimphu for the central city in the southern region Gelephu will choose to take the route on National Highway No. 1 and No. 5 with a travelling distance of about 260km which is approx 120km shorter than the present route on National Highway No. 2 with a travelling distance of about 380km. As a result, the travelling time will be shortened by approx. 4 hours.

2) Three Bridges along National Highway No. 4 (Mandechhu (Reotala) Bridge, Kela Bridge and Jangbi Bridge)

The reconstruction of the bridges will boost the flow of people and commodities, conferring a benefit to about 3500 residents in the villages on the opposite bank of the rivers spanned by the three bridges. Coupled with the improvement of the farm road, it will greatly contribute to the achievement of one of the objectives of the 10th Five-Year Plan, namely to make arterial roads accessible within two hours.

(2) Qualitative Effects

1) The Two Bridges on National Highway No. 5 (Dolkhola Bridge and Jigmiling Bridge)

The reconstruction of the bridges will improve the ease of passage on National Highway No. 5 and activate the movement of people and distribution of commodities, and contribute to the development of the local economy. It will also ensure the smooth traffic of National Highways even in a time of serious disaster equivalent to Cyclone Aila. More details of qualitative effects are shown below.

- The load-carrying capacity of the bridges will be increased to a large extent, and it is expected that the traffic of large-vehicles will become activated.
- The reconstruction will increase not only the load-carrying capacity but also the width of the

bridges, and it is expected that the ease of passage and the safety on the bridges will also be improved.

- Moreover, the reconstruction of the bridges will contribute to the development projects of the areas along National Highway No. 5 and in the south, such as the construction of the Punatshangchu hydropower plant (presently under construction), industrial park, new international airport and a second east-west highway, as it will facilitate the transportation of the materials and equipment necessary for the implementation of these projects.
- 2) Three Bridges along National Highway No. 4 (Mandechhu (Reotala) Bridge, Kela Bridge and Jangbi Bridge)**

The reconstruction of the bridges will dramatically improve the traffic convenience and activate the movement of people and distribution of commodities, and contributes to the improvement of life in the area. More details of qualitative effects are shown below.

- The damage by the cyclone Aila will be restored.
- The reconstruction of the bailey suspension bridge and the bailey bridge will enable the traffic of vehicles.
- The access of the local residents to the administrative services, the medical services and the educational institutions will be retrieved.
- The access to the market will be improved.

[Appendices]

1. Member List of the Study Team
2. Study Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions (M/D)
5. List of Materials/Acquired Material
6. Other Materials/Information

Appendix 1 Member List of the Study Team

(1) During the First Field Surveys for the Preparatory Survey

Table A-1 Study Team Members (during the first field surveys)

Charge	Name	Organization
Leader	Mr. Tomoki NITTA	Manager, JICA Bhutan Office Japan International Corporation Agency
Planning Management	Mr. Hidetaka SAKABE	Assistant Resident Representative JICA Bhutan Office Japan International Corporation Agency
Chief Consultant / Road Transportation Planning	Mr. Takeo MOGAMI	INGEROSEC Corporation
Bridge Design I	Mr. Atsuyuki ISHIKAWA	INGEROSEC Corporation
Natural Conditions Survey I (geography and geological condition) / Environmental and Social Consideration	Mr. Masahiro YOSHIKAWA	INGEROSEC Corporation
Natural Conditions Survey II (meteorology and hydrology) / Road Design	Mr. Shutaro SAKANAKA	INGEROSEC Corporation
Work Experience Survey /Construction Planning/ Maintenance and Planning/Procurement Planning /Cost Estimation	Mr. Mitsuhide SAITO	INGEROSEC Corporation
Assistance to Natural Conditions Survey / Reference Documents for Preparation of Tender	Ms. Hiroko Maeta	INGEROSEC Corporation

(2) During the Second Field Surveys for the Preparatory Survey

TableA-2 Study Team Member (during the second field surveys)

Charge	Name	Organization
Leader	Mr. Ryosuke NAKATA	Deputy Director General, and Group Director for Urban and Regional Development Economic Infrastructure Department, Japan International Corporation Agency
Planning Management	Mr. Hidetaka SAKABE	Assistant Resident Representative JICA Bhutan Office Japan International Corporation Agency
Chief Consultant / Road Transportation Planning	Mr. Takeo MOGAMI	INGEROSEC Corporation
Bridge Design I	Mr. Atsuyuki ISHIKAWA	INGEROSEC Corporation

(3) During the Third Field Surveys for the Preparatory Survey for additional acquisition of information

TableA-3 Study Team Member (during the third field surveys)

Charge	Name	Organization
Chief Consultant / Road Transportation Planning	Mr. Takeo MOGAMI	INGEROSEC Corporation
Bridge Design I	Mr. Atsuyuki ISHIKAWA	INGEROSEC Corporation
Natural Conditions Survey II (meteorological and floodgate) / Road Design	Mr. Shutaro SAKANAKA	INGEROSEC Corporation
Work Experience Survey/ Construction Planning/ Maintenance and Planning/Procurement Planning/ Cost Estimation	Mr. Mitsuhide SAITO	INGEROSEC Corporation

(4) During the Outline Design Survey (Explanation of Draft Report)

TableA-4 Study Team Member (during the Outline Design Survey)

Charge	Name	Organization
Leader	Mr. Hidetaka SAKABE	Assistant Resident Representative JICA Bhutan Office Japan International Corporation Agency
Grant Aid Program	Ms. Hidemi KOHNO	Second Country Assistance Planning Division of International Cooperation Bureau in Ministry of Foreign Affairs
Project Coordinator	Ms. Mayumi MIYATA	Assistant Director Grant Aid Project Management Division 1, Financing Facilitation and Procurement Supervision Division
Chief Consultant / Road Transportation Planning	Mr. Takeo MOGAMI	INGEROSEC Corporation
Bridge Design I	Mr. Atsuyuki ISHIKAWA	INGEROSEC Corporation

Appendix 2 Survey Schedule

(1) First Field Survey for the Basic Design Study from November 9th, 2010 to December 25th, 2010.

Table A-5 Study Schedule (First Field Survey)

No.	Date	Team Leader	Planning Management	Client Consultant Road Transportation Planning	Bridge Design I	Natural Conditions Survey (Geographic and geological condition) Environmental and Social Coordination	Natural Conditions Survey II (meteorological and hydrology) Road Design	Work Experience Survey Construction Planning Maintenance and Planning Preliminary Planning Cost Estimation	Assistance to External Consultant Survey Reference Documents for Preparation of Tender
1	11/9	T		JPN-BKK	JPN-BKK			JPN-BKK	
2	11/10	W		BKK-JPN	BKK-JPN			BKK-JPN	
3	11/11	T		Meeting with BETA Office				Meeting with BETA	
4	11/12	F							
5	11/13	S		Site Investigation at Tugasa, Saupang and Tawang Districts				Site Investigation at Tugasa, Saupang and Tawang Districts	
6	11/14	S							
7	11/15	M	JPN-BKK BKK-JPN	Visiting DoR				Visiting DoR	
8	11/16	T	Explanation of Inception Report at GNBC, DDM, DoR and DOA					Explanation of Inception Report at GNBC, DDM, DoR and DOA	
9	11/17	W			Site Investigation at Pao			Site Investigation at Pao	
10	11/18	T							
11	11/19	F	Site Investigation at Tugasa, Saupang and Tawang Districts		Preparation for Report based on analytical Survey of Collecting Data from DoR and DOA			Preparation for Report based on analytical Survey of Collecting Data from DoR and DOA	
12	11/20	S							
13	11/21	S	Internal Meeting and Preparation for Report			JPN-BKK	JPN-BKK	Internal Meeting Preparation for Report	JPN-BKK
14	11/22	M	Internal Meeting and Meeting with DDM, DoR and DOA on MID			BKK-JPN	BKK-JPN	Internal Meeting and Meeting with DDM, DoR and DOA on MID	BKK-JPN
15	11/23	T	Preparation for Report based on Analytical Survey of Collecting Data from DoR and DOA			Negotiation on Subcontractor		Preparation for Report based on analytical Survey of Collecting Data from DoR and DOA	Negotiation on Subcontractor
16	11/24	W	Signature in MID at GNBC, DDM, DoR and DOA					Signature in MID at GNBC, DDM, DoR and DOA	
17	11/25	T	FBI-BKK BKK-JPN	Preparation for Report based on Analytical Survey of Collecting Data from DoR and DOA				Preparation for Report based on analytical Survey of Collecting Data from DoR and DOA	Preparation for Report based on Analytical Survey of Collecting Data from DoR and DOA
18	11/26	F			Site Investigation at Tugasa, Saupang and Tawang Districts			Cost of Market, Procurement and Cost Estimation	
19	11/27	S							
20	11/28	S							
21	11/29	M		Explanation and Signature of Technical Note		Preparation for Report based on Analytical Survey of Collecting Data from DoR and DOA		Explanation and Signature of Technical Note	
22	11/30	T	FBI-BKK BKK-JPN	Preparation for Report based on Analytical Survey of Collecting Data from DoR and DOA				Cost of Market, Procurement and Cost Estimation	FBI-BKK BKK-JPN
23	12/1	W							
24	12/2	T			Preparation for Report based on Analytical Survey of Collecting Data from DoR and DOA				
25	12/3	F			Site Investigation at Pao	Analytical Survey of Collecting Data		Site Investigation at Pao	
26	12/4	S			Analytical Survey of Collecting Data	Preparation for Report		Analytical Survey of Collecting Data	
27	12/5	S			Preparation for Report			Preparation for Report	
28	12/6	M							
29	12/7	T			Site Investigation at Tugasa, Saupang and Tawang Districts	Site Investigation at Tugasa, Saupang and Tawang Districts	Preparation for Report based on Analytical Survey of Collecting Data from DoR and DOA	Cost of Market, Procurement and Cost Estimation	
30	12/8	W							
31	12/9	T							
32	12/10	F				Site Investigation at Pao			
33	12/11	S							
34	12/12	S							
35	12/13	M				Analytical Survey of Collecting Data	Site Investigation at Tugasa, Saupang and Tawang Districts	Analytical Survey of Collecting Data	
36	12/14	T				Preparation for Report		Preparation for Report	
37	12/15	W							
38	12/16	T							
39	12/17	F							
40	12/18	S				Analytical Survey of Collecting Data, Preparation for Report			
41	12/19	S							
42	12/20	M							
43	12/21	T				Analytical Survey of Collecting Data	FBI-BKK BKK-JPN	FBI-BKK BKK-JPN	
44	12/22	W				Preparation for Report			
45	12/23	T				Signature in DoR and DOA			
46	12/24	F				FBI-BKK BKK-JPN			
47	12/25	S				BKK-JPN			

(2) Second Field Survey for the Basic Design Study from January 17th to January 29th, 2011.

TableA-6 Study Schedule (Second Field Survey)

No	Date	Team Leader	Planning Management	Chief Consultant Road Transportation Planning	Bridge Design I
		Mr. Ryosuke NAKATA	Mr. Hidetaka SAKABE	Mr. Takeo MOGAMI	Mr. Atsuyuki ISHIKAWA
1	1 17	JPN-BKK			
2	1 18	BKK-PBH			
3	1 19				
4	1 20	Meeting with the Recipient Country			
5	1 21		JPN-BKK		
6	1 22		BKK-PBH	JPN-BKK	JPN-BKK
7	1 23			BKK-PBH	BKK-PBH
8	1 24	Internal Meeting			
9	1 25	Meeting with the Recipient Country			
10	1 26	Meeting with the Recipient Country			
11	1 27	PBH-BKK	PBH-BKK		
12	1 28	BKK-JPN	BKK-JPN	PBH-BKK	PBH-BKK
13	1 29			BKK-JPN	BKK-JPN

(3) Third Field Survey for the Basic Design Study from April 13th to April 22nd, 2011.

TableA-7 Study Schedule (Third Field Survey)

No	Date	Chief/Consultant Road Transportation Planning	Bridge Design I	Natural Conditions Survey II (meteorological and floodgate) Road Design	Work Experience Survey Construction Planning Maintenance and Planning Procurement Planning Cost
		Mr. Takeo MOGAMI	Mr. Atsuyuki ISHIKAWA	Mr. Shutaro SAKANAKA	Mr. Mitsuhide SAITO
1	4 13	JPN-BKK			
2	4 14	BKK-PBH			
3	4 15	Meeting with the Recipient Country			
4	4 16	Site Investigation at Tongsa, Sarpang and Tsirang Districts			
5	4 17				
6	4 18				
7	4 19	Meeting with the Recipient Country			
8	4 20	Meeting with the Recipient Country			
9	4 21	PBH-BKK			
10	4 22	BKK-JPN			

(4) Outline Design Study from June 1st to 10th, 2011.

TableA-8 Study Schedule (Outline Design Survey)

No	Date	Planning Management	Grant Aid Program	Project Coordinator	Chief Consultant Road Transportation Planning	Bridge Design I	
		Mr. Hidetaka SAKABE	Ms. Hidemi KOHNO	Ms. Mayumi MIYATA	Mr. Takeo MOGAMI	Mr. Atsuyuki ISHIKAWA	
1	6 1	JPN-BKK	JPN-BKK				
2	6 2	BKK-PBH	BKK-PBH		JPN-BKK	JPN-BKK	
3	6 3	Internal Meeting				BKK-PBH	BKK-PBH
4	6 4	Meeting with the Recipient Country					
5	6 5	Site Investigation					
6	6 6	Meeting with the Recipient Country					
7	6 7	Meeting with the Recipient Country					
8	6 8	PBH-DEL			PBH-DEL		
9	6 9	DEL			DEL-JPN		
10	6 10	DEL-PBH					

Appendix 3 List of Parties Concerned in the Recipient Country

TableA-9 List of Related Officials

Gross National Happiness Commission (GNHC)	
Rinchen Wangdi	Chief Program Coordinator
Sangay Chedar	Assistant Planning Officer
Kuenzanh Lham Sanhty	Program Coordinator
Department of Disaster Management, Ministry of Home and Cultural Affairs (DDM)	
Jigmi Choggal	Program officer
Namgay Wangchuk	Director
Department of Agriculture, Ministry of Agriculture (DoA)	
Chencho Norbu	Director
Tenzin	Executive Engineer
G.B.Chettri	Agriculture Specialist
Minjur Dorji	Chief Engineer
Laxman Ghalley	DoA Trongsa
Department of Roads, Ministry of Works and Human Settlement (DoR)	
Sangay Tenzing	Director General
M.N.Lamichaney	Bridge Division/Chief Engineer
Jangchuk Yeshi	Executive Engineer (Design)
Nidup Dorji	DoR Trongsa
Dorji Wangdi	DoR Sarpang/Executive Engineer
Namgay Wangchuk	DoR Sarpang/Labor Officer
Choden	Environmental Unit
Trongsa Dungkhag (Prefectural) Government	
Tashi Rabgay	Officer
Tenzin Tobgyel	Civil Engineer
Laxman Ghalay	Agricultural Officer
JICA Bhutan Office	
Tomoki Nitta	Resident Representative
Emi Doyle	Project Formulation Advisor

Appendix 4 Minutes of Discussions (M/D)

4.1 First Field Survey for the Preparatory Survey

**Minutes of Discussions
on the Preparatory Survey
on the Project for Restoration of Vital Infrastructure
Damaged by Cyclone Aila
in the Kingdom of Bhutan**

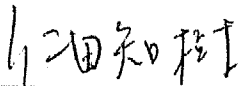
In response to a request from the Royal Government of Bhutan, the Government of Japan decided to conduct a Preparatory Survey on the Project for Restoration of Vital Infrastructure Damaged by Cyclone Aila (hereinafter referred to as "the Project") and entrusted the study to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Kingdom of Bhutan (hereinafter referred to as "Bhutan") the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Tomoki Nitta, Resident Representative of JICA Bhutan Office, and is scheduled to stay in the country November 10 to December 21, 2010.

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

In the course of discussions and field survey, both parties confirmed the main items described in the Attachment

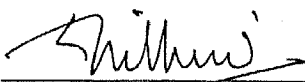
Thimphu, November 23, 2010



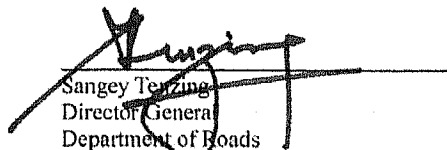
Tomoki Nitta
Leader
Preparatory Survey Team
Japan International Cooperation Agency



Namgay Wangchuk
Director
Department of Disaster Management
Ministry of Home and Cultural Affairs
The Royal Government of Bhutan



Rinchen Wangdi
Chief Program Coordinator
Development Coordination Division
GNHC Commission
The Royal Government of Bhutan



Sangey Tenzing
Director General
Department of Roads
Ministry of Works and Human Settlement
The Royal Government of Bhutan



Chencho Norbu
Director
Department of Agriculture
Ministry of Agriculture and Forest
The Royal Government of Bhutan

ATTACHMENT

I. OBJECTIVES AND ARRANGEMENTS OF THE SURVEY

1. Objectives of the Survey

The Survey has the following objectives;

- (1) To confirm the contents of the requested Project, discuss with the Bhutanese side, conduct the site survey and collect the necessary data and information for formulating the Project to meet the conditions of Japan's Cooperation.
- (2) To explain the Japan's Grant Aid scheme to the Bhutanese side.
- (3) To report the result of Study to Government of Japan.

2. Outline of the Survey

(1) Area

The area of the survey is shown in Annex-1.

(2) Contents and Flow

The Team explained the contents and the flow of the survey to the Bhutanese side, and reached a mutual understanding.

3. Roles of the Implementing Agencies

- 3-1. Department of Disaster Management, Ministry of Home and Cultural Affairs has responsibilities for the monitoring of the Project.
- 3-2. Department of Roads, Ministry of Works and Human Settlement has responsibilities for implementing the bridges and access roads on the national highways and feeder roads.
- 3-3. Department of Agriculture, Ministry of Agriculture and Forests has responsibilities for implementing the bridges on the farm roads and access roads to the bridge sites.

4. The Candidate Bridges for the Project

4-1. The Candidate Bridges

(1) Exclusion from the candidates

The Bhutanese side explained to the Team that "③Naja/Geling Haa Chhu Suspension Bridge" in Paro was improved by Gewog Administration and "(21)Chanche Bridge" in Tsirang had already completed design works and would commence the procurement procedures for reconstruction. Therefore both sides confirmed that these bridges should be excluded from the Project.

(2) Final Confirmation of the Candidate Bridges

As the result of the discussions, both sides confirmed that the seven (7) bridges as mentioned below are confirmed as the candidate bridges for the Project, which are also shown in Annex-1.

- 1) Paro: ⑤Tshendona Bridge towards Kichu Laxhang.
- 2) Trongsa: ⑨Mangdechhu Bridge, ⑩Dzongkhachulum Bridge, ⑪Kela Bridge, ⑫Jangbi Bridge.
- 3) Sarpang: ⑬Dokhola Bridge, ⑭Jigmiling Bridge.

4-2. The Direction of the Project Formulation

Both sides confirmed that the direction of the Project formulation should be discussed and examined through the further survey not only on the site survey in Bhutan and but also on the internal discussions in Japan after the Team would leave Bhutan.

5. Construction of the Farm Roads

Regarding to the farm roads, which are connected to Mangdechhu Bridge, Kela Bridge or Jangbi Bridge, both sides confirmed the followings;

5-1. Plans of the Construction

The Bhutanese side should confirm the latest plan for the construction of the farm roads, including the budgetary allocation, and report them to JICA Bhutan Office by the end of November, 2010.

5-2. Implementation by the Bhutanese sides

Both sides confirmed that the Bhutanese side would construct/improve the farm roads to be connected to the above-mentioned bridges at the Bhutanese expenses in a timely manner, in case the bridges are selected as components of the Project.

6. Schedule of the Survey

6-1. Consultant members of the Team will proceed to further studies in Bhutan until December 21, 2010.

6-2. JICA will prepare a explanation summary of the Project in English, and dispatch a Team to the Bhutan around February, 2011, for explanation of its contents.


7. Necessary Arrangements for the Survey by the Bhutanese side

7-1. Regarding to the Environmental and Social Considerations, the Bhutanese side will conduct an Initial Environmental Examination (IEE) level survey together with the Team.

7-2. Bhutanese side shall provide necessary numbers of counterpart personnel to the Team during the period of their studies in Bhutan.

7-3 Bhutanese side shall submit answers to the Questionnaire, which the Team handed to the Bhutanese side, by December 6, 2010.

Tan



II. JAPAN'S GRANT AID SCHEME

1. Japan's Grant Aid Scheme

- 1-1. The Bhutanese side understands the Japan's Grant Aid Scheme explained by the Team.
- 1-2. Bhutanese side will take the necessary measures, as described in Annex-2, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

2. The JICA Guidelines for Environmental and Social Considerations

- 2-1. The Team explained the outline of the JICA Guidelines for Environmental and Social Considerations dated April 2004 (hereinafter referred to as "the JICA Guidelines"), and the Bhutanese side agreed to take the JICA Guidelines into consideration.
- 2-2. The Bhutanese side agreed to obtain basic agreement from the Project Affected Persons (PAPs) including land owners regarding the Project, and to arrange the budget allocation for land acquisition, resettlement and compensation for PAPs before the approval of the Project by the Government of Japan, in case any PAPs would be identified at the Project sites.

3. Operation & Maintenance

Bhutanese side shall secure enough budget and personnel necessary for the operation and maintenance of the bridges improved by the Project, including the periodical maintenance work after the completion of the Project.

END

ANNEX-1: The Area of the Survey

ANNEX-2: Major Undertakings to be taken by Each Government

Tom

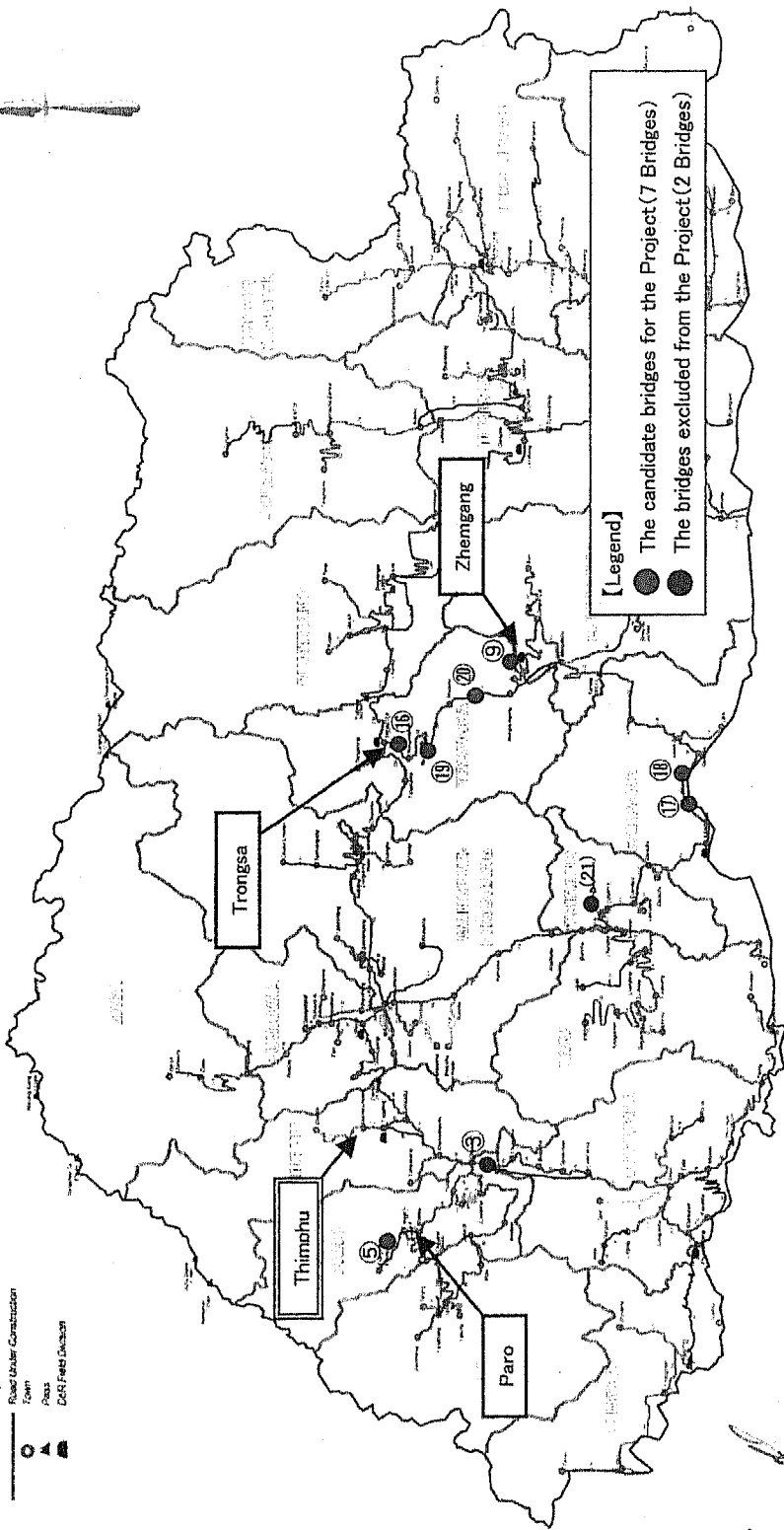
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BHUTAN ROAD NETWORK

Drawn by: Karma Tenzin
Executive Engineer (Design)
S. & A. Engineering Services
Department of Roads, MdWRS, Thimphu

International Boundary
 District Boundary
 Highway
 District Road
 Feeder Road
 Other Roads
 Proposed Road in 5th Plan
 Road Under Construction
 Town
 Pass
 DOR Field Division



[Legend]
 ● The candidate bridges for the Project (7 Bridges)
 ● The bridges excluded from the Project (2 Bridges)

Source - Department of Roads

Last Update: 2/07/2007

Tan

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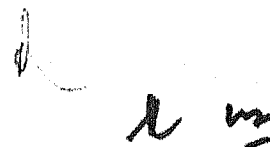
Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Country
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	Relocation, improvement and/or repair of existing utilities (power lines, telecommunication lines, water lines, etc.), if necessary.		●
4	To bear the following commission to the Japanese bank for the banking services based upon the B/A		
	1) Advising commission of A/P or BDA		●
	2) Payment commission		●
5	To ensure prompt unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
6	To accord those, whose services may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into Bhutan and stay therein for the performance of their works, within the authority of Bhutan.		●
7	To exempt from customs duties, internal taxes and other fiscal levies which may be imposed in Bhutanese with respect to the supply of the products and services under the verified contracts, within the authority of Bhutan.		●
8	To maintain and use properly and effectively the facilities constructed and equipment provided under the Japan's Grant		●
9	To bear all the expenses, other than those to be borne by the Japan's Grant, necessary for construction of the facilities		●

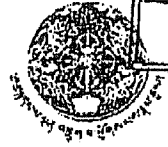
(B/A: Banking Arrangement, A/P: Authorization to Pay, BDA: Blanket Disbursement Authorization)

Tan





འབྲུག་རྒྱལ་ཁབ་ཀྱི་འཕུལ་རྒྱུ་ལྷན་ཁག་གི་
 འཕུལ་རྒྱུ་ལྷན་ཁག་གི་འཕུལ་རྒྱུ་ལྷན་ཁག་གི་
 འཕུལ་རྒྱུ་ལྷན་ཁག་གི་འཕུལ་རྒྱུ་ལྷན་ཁག་གི་



RR	VC1	VC2	VC3
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DEPARTMENT OF AGRICULTURE
 MINISTRY OF AGRICULTURE AND FORESTS
 GOVERNMENT OF BHUTAN
 TRASHICHIHODZONG, THIMPHU

DoA/Engg-29/ 71.

02 February 2011

Dasho Dzongdags
 Dzongkhag Administration
 Trongsa

Subject: Farm Road Bridges under Cyclone Aila Project

Dear Dashos

We are pleased to inform you that following bridges under your Dzongkhag have been selected under the Project for Restoration of Vital Infrastructure Damaged by Cyclone Aila, supported by JICA: Mangdechhu (Reotala), Kela, and Jangbi. Please note the following points:

1. The access to these bridge sites should be ready by October 2011. Since there should be adequate space for trucks, etc to maneuver while construction, the Dzongkhag should ensure that the access is improved and well maintained. If required budget for this activity should be included for the next financial year.
2. Design, supervision, and construction of substructures and appurtenant works are covered by the project. However, the super-structures are not included in the project but shall be budgeted and procured by the DOR, in consultation with the Dzongkhag.
3. In addition, land securing and clearance for temporary yard and securing sites for disposal of wastes, shall also be coordinated by the DOR together with the Dzongkhag.
4. The process for environmental clearance for the bridges construction has already started and is with the Dzongkhag. It should ensure that Environmental Clearance approval for all three sites is ready by March 2011.

Lastly, the consulting team for JICA will continue to carry out design, cost estimation and construction plans. We request Dzongkhag to provide them with all necessary support during this process.

Yours sincerely,

 Chencho Norbu
 Director

- Copy:
1. Director General, DOR, MoWHS, for kind information
 2. Director, Department of Disaster Management, MoH&CA, for kind information
 3. Chief Program Coordinator, Development and Coordination Division, GNHC, for kind information
 4. Resident representative, JICA Bhutan, for kind information

Department of Agriculture PABX: 322228, 331316; Fax No. 323362; Director: 322805; Chief Agriculture Officer: 321291; Chief Engineer: 329122; Chief Horticulture Officer: 336946; Horticulture Division PABX: 323183, 323184 Fax No: 323583

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08 FEB 2011

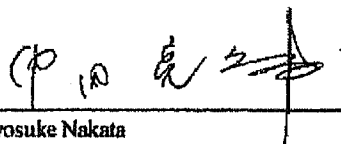
**Minutes of Discussions
on the Preparatory Survey
on the Project for Restoration of Vital Infrastructure
Damaged by Cyclone Aila
in the Kingdom of Bhutan
(Second Field Survey)**

In November 2010, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Project for Restoration of Vital Infrastructure Damaged by Cyclone Aila (hereinafter referred to as "the Project") to the Kingdom of Bhutan (hereinafter referred to as "Bhutan") and had discussions, conducted field survey and technical examination of the results in Japan.

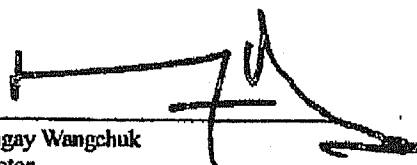
In order to explain and to consult with the concerned officials of the Royal Government of Bhutan (hereinafter referred to as "the RGoB") on the progress of the Preparatory Survey, JICA sent to Bhutan the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Ryosuke Nakata, Deputy Director General, Economic Infrastructure Department, JICA, from January 22 to 28, 2011.

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

Thimphu, January 26, 2011



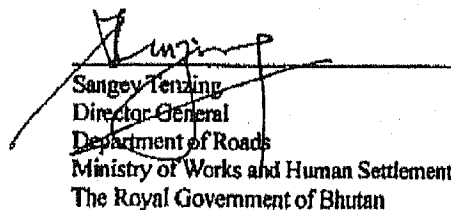
Ryosuke Nakata
Leader
Preparatory Survey Team
Japan International Cooperation Agency



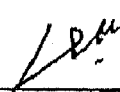
Namgay Wangchuk
Director
Department of Disaster Management
Ministry of Home and Cultural Affairs
The Royal Government of Bhutan



Rinchen Wangdi
Chief Program Coordinator
Development Coordination Division
GNHC Commission
The Royal Government of Bhutan



Sangey Tenzing
Director General
Department of Roads
Ministry of Works and Human Settlement
The Royal Government of Bhutan



Chencho Norbu
Director
Department of Agriculture
Ministry of Agriculture and Forest
The Royal Government of Bhutan

ATTACHMENT

1. Progress and future plan

The Team explained the progress of the Preparatory Survey to the Bhutanese side as follows, and the Bhutanese side understood its contents as below;

1-1. Interim Results

(1) Candidate bridges

The bridges shown as follows are selected as the candidate bridges and proceed to the outline design.

⑨Mangdechu Bridge, ⑰Dokkhola Bridge, ⑱Jigmiling Bridge, ⑲Kela Bridge, ⑳Jangbi Bridge.

(2) Components

a) for ⑰Dokkhola Bridge and ⑱Jigmiling Bridge,

Design, supervision and construction of whole bridges are covered by the Project.

b) for ⑨Mangdechu Bridge, ⑲Kela Bridge and ⑳Jangbi Bridge,

Design, supervision and construction of sub-structures and appurtenant works are covered by the Project (super-structures are not included and should be covered by the Bhutanese side).

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

(3) Undertakings to be taken by the Bhutanese side

Both sides confirmed that the Bhutanese side should implement the following items as the undertakings of the Project.

a) To construct farm roads as mentioned in the Minutes of Discussions signed by both parties on November 23, 2010.

b) To procure and install the super-structure for ⑨Mangdechu Bridge, ⑲Kela Bridge and ⑳Jangbi Bridge in a timely manner.

c) Removal of the existing structures and/or its exterior within the Project sites.

d) Relocation and/or removal of existing utilities (power lines, water pipes, etc.) from the Project site.

e) Securing and clearance of the land for temporary yard of the Project.

f) Necessary arrangement for the tax exemption of imported materials, equipment and vehicles for the Project.

g) Securing of site(s) for disposal of waste.

1-2. Future Plan of the Survey

(1) The Team continues to carry out design, cost estimation, and make construction plan of the Project based on the above-mentioned preconditions.

(2) JICA will prepare a draft report in English, and dispatch a mission in order to explain its contents around the end of March 2011.

(3) JICA will prepare and submit a final report in English to the RGOB around May 2011.

2. Project Organization

Both sides confirmed that the DoR will be a focal agency for the implementation of the Project as shown in Annex-1. The Bhutanese side will conclude internal understandings among DoR, DoA, DDM and GNHC with the signing of MOU by the middle of February 2011, and submit a copy of MOU to JICA Bhutan Office by the end of February, 2011.

3. Environmental and Social Considerations

Both sides confirmed that the Bhutanese side should complete the necessary procedures for the Environment Clearance Certificate (ECC) for the Project by the end of March, 2011.

JICA

4. Budget Allocation

Regarding the budget allocation for the Project, the Bhutanese side explained as follows;

(1) For improvement of the farm roads

DoA will make budget provision in FY2011/12 and implement works before October 2011.

(2) For procurement and installation of super-structure for the 3 bridges on the farm roads

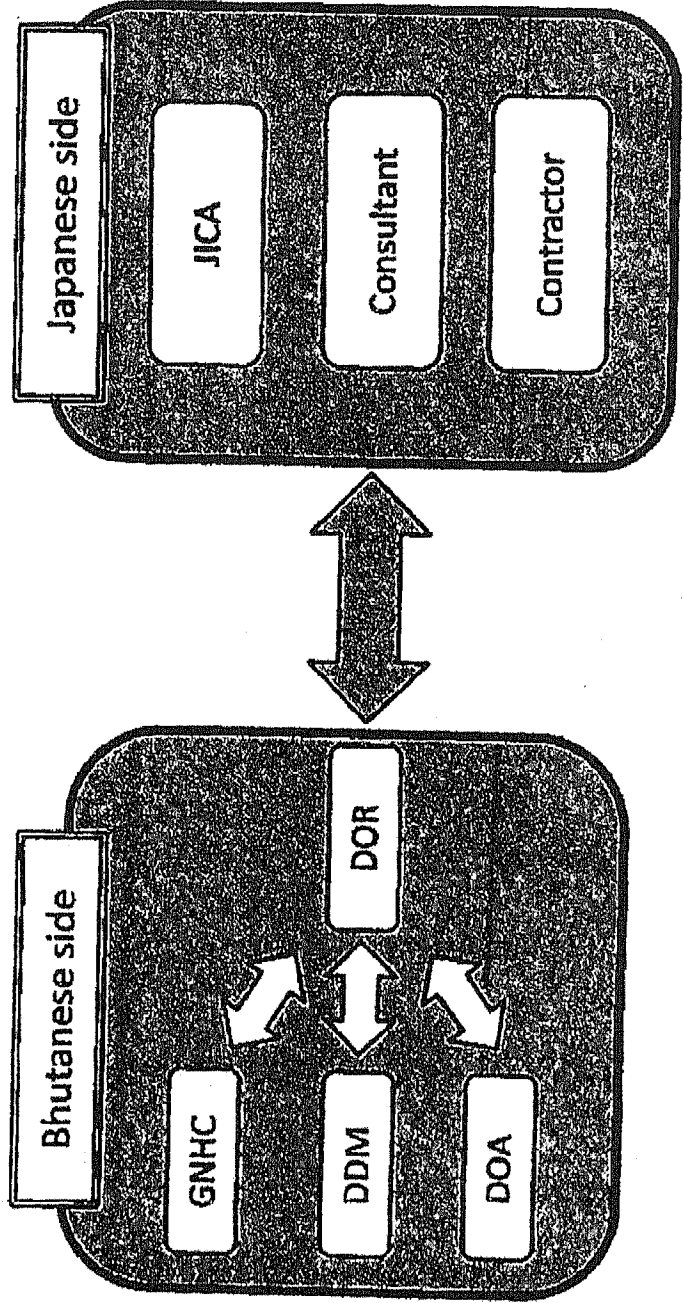
DoR will submit budget proposal in FY2011/12 and procure the bridge parts within FY2011/12.

END

Annex: Project Implementing Organization

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■ Project Implementing Organization



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**Minutes of Discussions
on Outline Design Survey
on the Project for Restoration and Improvement of Vital Infrastructure for cyclone disaster
in the Kingdom of Bhutan
(Explanation of Draft Report)**

From November to December 2010, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Outline Design Survey Team on the Project for Restoration and Improvement of Vital Infrastructure for cyclone disaster (hereinafter referred to as "the Project") to the Kingdom of Bhutan (hereinafter referred to as "Bhutan"), and through discussions, field survey and technical examination of the results in Japan, JICA prepared a draft report of the Survey.

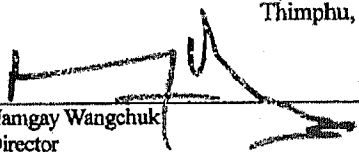
In order to explain and to consult with the concerned officials of the Royal Government of Bhutan (hereinafter referred to as "the RGOB") on the contents of the draft report, JICA sent to Bhutan the survey team for explanation of draft report (hereinafter referred to as "the Team"), which is headed by Mr. Hidetaka Sakabe, Assistant Resident Representative, JICA Bhutan Office, from June 2 to June 8, 2011.

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

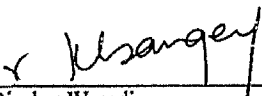
Thimphu, June 7, 2011



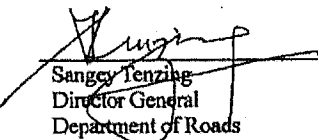
Hidetaka Sakabe
Leader
Draft Report Explanation Team
Japan International Cooperation Agency



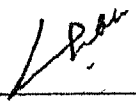
Namgay Wangchuk
Director
Department of Disaster Management
Ministry of Home and Cultural Affairs



Rinchen Wangdi
Chief Program Coordinator
Development Coordination Division
GNH Commission



Sanggye Tenzing
Director General
Department of Roads
Ministry of Works and Human Settlement



Chencho Norbu
Director
Department of Agriculture
Ministry of Agriculture and Forest

ATTACHMENT

1. Components of the Draft Report

The Bhutanese side agreed and accepted in principle the contents of the draft report of the Survey explained by the Team. Main components of the project are described in clause 7 below.

2. Project Title

The Team proposed title of the project be changed as "the Project for Restoration and Improvement of Vital Infrastructure for cyclone disaster", and the Bhutanese side agreed.

3. Cost Estimation

The Team explained to the Bhutanese side the estimated project cost as attached in Annex 1. Both sides confirmed that this estimation was provisional and would be examined further by the Government of Japan for its cabinet approval. Furthermore, both sides confirmed that this project cost estimate is confidential, and should never be duplicated or disclosed to any third parties before the signing of all the agreement(s), contract(s) and effectuation for the Project.

4. Japan's Grant Aid Scheme

The Bhutanese side has shown a full re-confirmation of the Japan's Grant Aid scheme and the necessary measures to be taken by the Bhutanese side which has already been explained by the Japanese side, and agreed by both sides on November 23, 2010.

5. Schedule of the Survey

JICA will complete the Final Report in English, in accordance with the confirmed items and send it to the Bhutanese side around the beginning of August, 2011.

6. Project Organization

DoR, as a focal agency in coordinating related organizations in this Project, explained the result of meeting held 1st February 2011, which clearly showed the agreement among the RGoB stakeholders. DoR further confirmed that all the arrangements to any related matter will be done through DoR for both technical and administrative matters.

7. Project Components.

The Team explained to the Bhutanese side the main components as Annex 2, and the Bhutanese side agreed the contents, including the undertakings by the Bhutanese side.

8. Undertakings of the Bhutanese side

The team explained the detailed undertakings to be borne by the Bhutanese side as Annex 3, including the matter already agreed by both sides. In response to this, the Bhutanese side confirmed to secure and allocate necessary budget and staff for smooth execution of those undertakings.

As for the installation of superstructure for Kela, Jangbi and Reotala bridges, the Bhutanese side further explained that the installation will be completed within three months after the completion of sub-structures with due quality.

9. Environmental and Social Consideration

Both sides agreed the necessity of monitoring environmental affect so that possible negative impact would be mitigated. The basic idea for monitoring is given as Annex 4. However, this will be further refined by DoR and contractor upon discussion.



2



Annex;

- 1 Project cost to be borne by Japan's Grant Aid
- 2 Project Components
- 3 Undertakings of the Bhutanese side
- 4 Environmental monitoring format
- 5 Schedule for Improvement of Bridge Access Roads and Construction of Farm Roads

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This page is not disclosed due to confidentiality.

Main Project Components

Two bridges on National Highway No. 5

Bridge name	Dolkhola Bridge	Jigmiling Bridge
Bridge structure	2-span PC joining simple post-tensioned T-girder bridge	
Bridge length	70.0m	
Span length	35.0m	
Girder height	2.1m×4 main girders	
Width	7.0m (2 lanes)	
Foundation structure	Spread foundation (Abutments A1 and A2 and Pier P1)	
Main material	PC main girder concrete ($\sigma_c=30\text{N/mm}^2$) RC concrete ($\sigma_c=21\text{N/mm}^2$)	
Method to erect superstructure	Erection girder method	
Notes	Responsibilities of the Bhutanese side: Removal • Bridge superstructure • Bridge abutment on both riverbanks • Existing revetment on the right bank • Embankment at the access road on the right bank	Responsibilities of the Bhutanese side: Removal • Bridge superstructure • Bridge abutment on the right bank • Removal of bridge pier

Three bridges on farm roads along National Highway No. 4

Bridge name	Mandechhu (Reotala) Bridge	Kela Bridge	Jangbi Bridge
Bridge structure	Bailey suspension bridge	Bailey bridge	
Bridge length	103.7m(340FT)	49.5328m(163FT)	
Span length	97.5m(320FT)	48.768m (160FT)	
Width	3.277m (one lane)	3.277m (one lane)	
Foundation structure	Spread foundation (Abutments A1 and A2)	Spread foundation (Abutments A1 and A2)	
Main material	Steel for beams of Bailey bridge Concrete ($\sigma_c=21\text{N/mm}^2$ (Abutment))	Steel for beams of Bailey bridge Concrete ($\sigma_c=18\text{N/mm}^2$ (Abutment))	
Method to erect superstructure	Cable erection/vertical suspension method	Launching method with a support in the middle	
Notes	The construction is to be handed over to the Bhutanese side after the substructure and revetment works in the scope of the works of the Japanese side have been completed. Material procurement and construction of the superstructure should be carried out by the Bhutanese side.	The construction is to be handed over to the Bhutanese side after the substructure works in the scope of the works of the Japanese side have been completed. Material procurement and construction of the superstructure should be carried out by the Bhutanese side.	

Major Undertakings taken by the RGOB

As in E/N and G/A	Specifically in this project	In charge	Timing	Agreed
to secure of land necessary for the implementation of the Project and to clear the sites	Since the project sites are national land, no need for securing site	N/A	-	-
	Removal of existing structures and/or its exterior within the Project sites	DoR Trongsa Dzongkhag	Upon Completion	M/M, 1st Feb.2011
	Relocation and /or removal of existing utilities (power lines, water pipes etc)from the Project site	DoR/MoWHS	Before commencement of the work	M/M, 1st Feb.2011
	Securing and Clearance of land for temporary yard of the Project	DoR Trongsa Dzongkhag	Before commencement of the work	M/M, 1st Feb.2011
to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project	Securing Site for Waste Disposal	DoR Trongsa Dzongkhag	During Project	M/M, 1st Feb.2011
to ensure prompt customs clearance and to assist internal transportation of the Products	-	DoR/MoWHS	During Project	M/M, 1st Feb.2011
to ensure that customs duties, internal taxes and other fiscal levies which may be imposed with respect to the purchase of the Products and the Services be exempted	-	DoR/MoWHS	During Project	M/M, 1st Feb.2011
to accord Japanese nationals whose services may be required in connection with the supply of the Products and the Services such facilities as may be necessary	-	DoR/MoWHS	During Project	M/M, 23rd Nov,2010
to ensure that [the facilities [constructed/ rehabilitated] under the Grant be maintained and used properly and effectively for the implementation of the Project;	-Yearly Maintenance -Periodical (5-year interval) Maintenance *Detailed in Draft Report, p.45	DoR/MoWHS Trongsa Dzongkhag	After Completion	M/M, 23rd Nov,2010
to bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project; and	Improvement of access roads to three bridge sites (Kela, Jangbi, Reotala)	DoA/MoAF Trongsa Dzongkhag	Before P/Q notice (Annex 5)	M/M, 1st Feb.2011
	Construction of Farm Road	DoA/MoAF Trongsa Dzongkhag	As provided in Annex 5	-
	To Procure & Install Superstructure for Reotala, Kela & Jangbi bridge in a timely manner	DoR/MoWHS	Three months after the completion of Sub-Structure	M/M, 1st Feb.2011
to give due environmental and social consideration in the implementation of the Project.	Environmental Clearance has been already issued	DoR/MoWHS	Already Done	M/D Jan. 26, 2011
	Monitoring of the Environmental effect caused by the Project	DoR/MoWHS	During Project	-

Environmental Monitoring (Provisional)

Environmental parameter	Target bridge	Key point	Countermeasures	Monitoring measures		
				Before construction	During construction	After opening to traffic
Soil erosion	All bridges	Determine an appropriate construction period, consider construction methods and countermeasures to avoid soil erosion caused by rainfall during the substructure work at the construction stage.	Adopt appropriate construction methods to prevent soil erosion	Confirmation of the construction method and plan	Visual inspection	—
Water pollution	All bridges	Determine an appropriate construction period, study construction methods and water quality conservation measures to prevent pollution of the river water at the construction stage.	Adopt appropriate construction methods to prevent the outflow of wastewater from the construction site.	Confirmation of the construction method and plan	Visual inspection	—
Solid waste	All bridges	Study the method of reuse, recycling and final disposal of the solid wastes resulting from the demolishing of the existing bridge at the stage of construction.	Request that the Bhutanese side makes sure that no waste material is left at the site when the existing bridge is removed. Ensure that solid waste from the construction work is disposed of at the designated disposal site.	Confirmation of the construction plan	Visual inspection	Confirmed during the after-opening inspection.
Accident	All bridges	Conduct studies to set an appropriate construction period to prevent accidents caused by natural and man-made disasters during construction.	Develop and implement an appropriate construction plan to avoid accidents.	Confirmation of the construction plan	Confirmation of Monthly Progress Reports	—
Dust emission	All bridges	Study an appropriate construction method and countermeasures to control the dust emission at the stage of construction.	Adopt an appropriate construction method and sprinkling water on the construction access road during construction.	Confirmation of the construction plan	Visual inspection	—

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Schedule for Improvement of Bridge Access Roads and Construction of Farm Roads

Farm Road	Activity	2011												2012											
		May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec				
Nabji-Korphu Farm Road	Improvement of access to mangdechhu bridge**																								
Farm Road	Construction of Nabji-Korphu farm road from the bridge to Nabji																								
Kela Farm Road	Improvement of access to Kela bridge																								
	Construction of Farm Road from the bridge to Kela																								
Jangbi Farm Road	Improvement of access to Jangbi bridge																								
	Construction of farm road from bridge to Jangbi																								

** Construction of gabion walls and filling for the approach road of left bank should be done during the sub-structure construction

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Appendix 5 List of Reference Materials/Acquired Materials


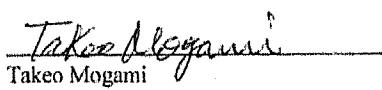
TableA-10 List of Collected Materials

No.	Description	Type	Original/ Copy	Issued by	Year
1	Annual Information Bulletin 2009	Document	Original	Ministry of Works and Human Settlement (MoWHS)	2009
2	Annual Information Bulletin 2008	Document	Original	Ministry of Works and Human Settlement (MoWHS)	2008
3	Statistical Yearbook of Bhutan 2009	Document	Original	National Statistics Bureau	2009
4	Statistical Yearbook of Bhutan 2007	Document	Original	National Statistics Bureau	2007
5	BHUTAN SCHEDULE OF RATES 2009	Document	Copy	Ministry of Works and Human Settlement (MoWHS)	2009
6	Environmental Assessment Act, 2000	Document	Copy	National Environment Commission	2000
7	FOREST AND NATURE CONSERVATION ACT OF BHUTAN, 1995	Document	Copy	Department of Forestry, Ministry of Agriculture	1995
8	National Accounts Statistics 2000-2008	Document	Copy	National Statistics Bureau	2008
9	GUIDELINE ON Proper Construction Practices for Non Engineered Buildings	Document	Copy	Ministry of Works and Human Settlement (MoWHS)	2009
10	NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK	Document	Copy	Ministry of Home and Cultural Affairs	—
11	National Recovery and Re-construction Plan	Document	Copy	Ministry of Home and Cultural Affairs	2009
12	GUIDANCE NOTE & FORMATS for the reparation of BoQ and estimates for FARM ROADS	Document	Copy	Ministry of Agriculture (MoA)	2009
13	TECHNICAL GUIDELINES for the constructions of FARM ROADS May 2009	Document	Copy	Ministry of Agriculture (MoA)	2009
14	TECHNICAL SPECIFICATION & STANDARD DRAWINGS for the construction of FARM ROADS May 2009	Document	Copy	Ministry of Agriculture (MoA)	2009
15	THE BIODIVERSITY ACT OF BHUTAN, WATER SHEEP YEAR 2003	Document	Copy	Ministry of Agriculture (MoA)	2003
16	Garden Reach Portable STEEL BRIDGE	Document	Original	Garden Reach Shipbuilders & Engineers Ltd	—
17	Guidelines on use of Standard Work Items for Common Road Works	Document	Original	Ministry of Works and Human Settlement (MoWHS)	2010
18	Guidelines on Road Classification System and Delineation of Construction and Maintenance Responsibilities 2009	Document	Original	Ministry of Works and Human Settlement (MoWHS)	2009
19	Bridge Inventory as of November 2010	Document	Original	Ministry of Works and Human Settlement (MoWHS)	2010
20	SPECIFICATIONS FOR BUILDING & ROAD WORKS 2007	Document	Copy	Ministry of Works and Human Settlement (MoWHS)	2007
21	SPECIFICATIONS FOR BUILDING & ROAD WORKS 2009	Document	Copy	Ministry of Works and Human Settlement (MoWHS)	2009
22	Regulation for the Environmental Clearance of Projects	Document	Copy	National Environment Commission	2001
23	Bidding Document for Procurement of Works	Document	Copy	Ministry of Works and Human Settlement (MoWHS)	2009
24	Rules and Regulations for Lease of Government Reserved Forest Land & Government Land	Document	Copy	Ministry of Works and Human Settlement (MoWHS)	2009
25	LAND COMPENSATION RATE 2009	Document	Original	Ministry of Finance	2009
26	LABOUR & MATERIAL COEFFICIENTS 2009	Document	Copy	Ministry of Works and Human Settlement (MoWHS)	2009

Appendix 6 Other Materials/Information

6-1 Technical Notes

The Technical Note submitted to the Department of Disaster Management, Ministry of Home and Culture Affairs, the Department of Roads, Ministry of Human Settlement and the Department of Agriculture, Ministry of Agriculture and Forest is shown hereunder.

	Engineering Consultant	(2)
To		(3)
The Director		(4)
Department of Disaster Management (DDM)		(5)
Ministry of Home and Cultural Affairs (MoHCA)		(6)
		(7)
The Director General		(8)
Department of Roads (DoR)		(9)
Ministry of Works and Human Settlement (MoWHS)		(10)
		(11)
The Director		(12)
Department of Agriculture (DoA)		(13)
Ministry of Agriculture (MoA)		(14)
		(15)
Subject: Submission of Technical Note on the Preparatory Survey on the Project for Restoration of Vital Infrastructure Damaged by Cyclone Aila in the Kingdom of Bhutan		(16)
		(17)
	29 th November, 2010	(18)
Dear Sirs,		(19)
		(20)
We are pleased to submit the Technical Note which indicates the key design value to be used for the Preparatory Survey for the captioned project by the Japan International Cooperation Agency (JICA) as Japanese Grant Aid Project.		(21)
		(22)
The values on the Technical Note follow the result of discussion by the Survey Team, MoHCA, MoWHS and MoA technical representatives. Thus the principal design specification and basic design concept have been confirmed and agreed at DoR head quarter on 29 th November, 2010.		(23)
		(24)
Please kindly confirm the attached Technical Note and references.		(25)
		(26)
Very truly yours,		(27)
		(28)
		(29)
	Takeo Mogami	(30)
	Project Manager	(31)
	The Preparatory Survey for Restoration of Vital Infrastructure Damaged by Cyclone Aila in the Kingdom of Bhutan	(32)
		(33)
		(34)
	INGÉROSEC Corporation	
	Shinjuku i-Land Tower 43F 6-5-1 Nishi-Shinjuku Shinjuku-ku TOKYO	
	163-13443 JAPAN	
	Tel : +81-3-5324-0211 Fax: +81-3-5324-0215	
	http://www.ingerosec.com e-mail : ingerosec@ingerosec.com	

Technical Note

29th November, 2010

Subject : Technical Note of key items to be designated by The Preparatory Survey on the Project for Restoration of Vital Infrastructure Damaged by Cyclone Aila in the Kingdom of Bhutan

The JICA Survey Team proposes the following principal specification for the design and basic design concept of captioned project.

1. Design Specification : National Highway

1-1 Road Design Specification

Principle Items			Notes
Design speed	Approach Road	20km/hr	
	Main Road	60km/hr	
Minimum Curve Radius	Approach Road	15m	
	Main Road	120m	
Carriage Width (The distance between each wheel guard)		7m	In accordance with the carriage width of Primary National Highway (PNH)
Pavement lateral grade		2%	
Maximum Longitudinal Grade	20km/hr	8%	
	60km/hr	7%	

1-2 Bridge Design Specification

Principle Items			Notes
Design Standard	Standard Specification and Code of Practice for Road Bridges, The Indian Road Congress (IRC), Japanese Standard		
Road Class	National Highway		
Design Load	Single lane IRC 70R (wheeled) or Double lane IRC Class A (whichever is critical)		
Seismic Coefficient	Kh=0.22 Kv=0.0		Zone V (Same to Assam)
Concrete Strength	Substructure	21N/mm ²	
	Superstructure	30N/mm ²	Post tensioning Pre-stress Concrete
	Slab	24N/mm ²	
Pavement	Asphalt	t=60mm	

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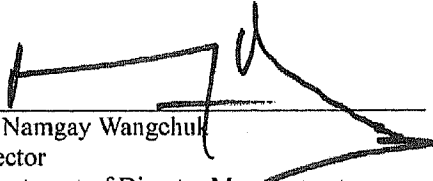
2. Design Specification : Farm Road

2-1 Bridge Design Specification


Principle Items			Notes
Design Standard	Substructure	Standard Specification of Bhutan or Japan Standard	
	Superstructure	Standard Specification of Bailey Bridge	
Road Class		Farm Road	
Carriage Width		3.277m	
Design Load		IRC 24R	24t (18t ; actual loading capacity, in the case of reusing materials of existing bailey bridges.)
Seismic Coefficient		Kh=0.22 Kv=0.0	Zone V (Same to Assam)
Concrete Strength	Substructure	21N/mm ²	

Note: Construction of farm roads shall be done by Bhutanese side.

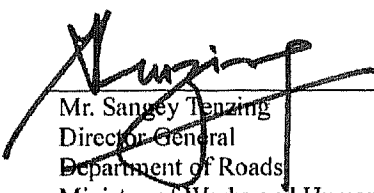
*Attachment: Basic Design Concept



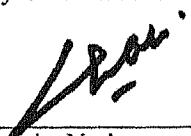
Mr. Namgay Wangchuk
Director
Department of Disaster Management
Ministry of Home and Culture Affairs
The Royal Government of Bhutan



Mr. Takeo Mogami
Chief Consultant of JICA Survey Team



Mr. Sangey Tenzing
Director General
Department of Roads
Ministry of Works and Human Settlement
The Royal Government of Bhutan



Mr. Chencho Norbu
Director
Department of Agriculture
Ministry of Agriculture and Forest
The Royal Government of Bhutan

Basic Design Concept
for
the Project for Restoration of Vital Infrastructure
Damaged by Cyclone Aila
In the Kingdom of Bhutan

Note:

1. This Basic Design Concept is based on the precondition that the motorable farm roads to the bridge sites shall be constructed and completed by Bhutanese side in a timely manner.
(Reference is made to 5. Construction of the Farm Roads of Minutes of Discussions signed on November 23, 2010)
2. The concept drawings contained in this Basic Design Concept are given only to present the image of Basic Design Concept, and do not necessarily present the scope to be borne by Japanese side.
3. This Basic Design Concept is subject to be amended, but limited to fine adjustment, according to the results of the geotechnical survey and the topographic survey that are to be implemented after the direction of the Project formulation will be discussed and examined.
(Reference is made to 4-2. The Direction of the Project Formulation of Minutes of Discussions signed on November 23, 2010)





Basic Design Concept (1/4)

No.5 Tshendona bridge	
Road classification	Jurisdiction
Farm Road	Existing Bridge Type
Existing Size L=30m	DoA
Beneficiary	Suspension Bridge

4@30m(100FT)=120m(400FT)

Future Planned Bridge Specifications	
Bridge Length	L=120m(400FT)
Bridge Type	Bailey Bridge
Carriage Width	W=3.277m
Truck Load	IRC 24R(24ton) / 18R(18ton)
Foundation Type	Spread foundation (T-type)

No.9 Mangdechhu bridge	
Road classification	Jurisdiction
Farm Road	Existing Bridge Type
Existing Size L=70m	DoA
Beneficiary 210HH (3,000inhabitants)	Bailey Bridge

97.5m(320FT)

67.0m

97.5m(320FT)

Future Planned Bridge Specifications	
Bridge Length	L=97.5m(320FT)
Bridge Type	Bailey Suspension Bridge
Carriage Width	W=3.277m
Truck Load	IRC 24R(24ton) / 18R(18ton)
Foundation Type	Spread foundation (T-type) Caisson type pile

Basic Design Concept (2/4)

<p>No.16 Dzongkhachulum bridge</p>	
Road classification	National Rd No.4
Existing Size	L=23m
Beneficiary	3 dzongkhags
Jurisdiction	DoR
Existing Bridge Type	Truss Bridge

Future Planned Bridge Specifications	
Bridge Length	L=70m
Bridge Type	Langer arch Bridge
Carriage Width	W=7.0m
Truck Load	IRC 70R(70ton) or ClassA(40ton)
Foundation Type	Spread foundation (T-type)

2

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2

Basic Design Concept (3/4)

No.17 Dolkhola bridge	Jurisdiction DoR
Road classification National Rd No.5	Existing Bridge Type Bailey Bridge
Existing Size L=40m	
Beneficiary 5 dzongkhags	

Future Planned Bridge Specifications.	
Bridge Length	L=70m
Bridge Type	Prestressed Concrete Bridge
Carriage Width	W=7.0m
Truck Load	IRC 70R(70ton) or ClassA(40ton)
Foundation Type	Spread foundation (T-type)

No.18 Jigmiling bridge	Jurisdiction DoR
Road classification National Rd No.5	Existing Bridge Type Bailey Bridge
Existing Size L=64m	
Beneficiary 5 dzongkhags	

Future Planned Bridge Specifications.	
Bridge Length	L=70m
Bridge Type	Prestressed Concrete Bridge
Carriage Width	W=7.0m
Truck Load	IRC 70R(70ton) or ClassA(40ton)
Foundation Type	Spread foundation (T-type)

Basic Design Concept (4/4)

Road Classification : Farm Road	Jurisdiction : DoA	DoA
Existing Size : L=45m	Existing Bridge Type : Suspension Bridge	
Beneficiary : 2 villages, 57HH		

48m(160ft)

Future Planned Bridge Specifications	
Bridge Length	L=48m(160ft)
Bridge Type	Bailey Bridge
Carriage Width	W=3.277m
Truck Load	IRC 24R(24ton) / 18R(18ton)
Foundation Type	Spread foundation (T-type)

Road Classification : Farm Road	Jurisdiction : DoA	DoA
Existing Size : L=53m	Existing Bridge Type : Suspension Bridge	
Beneficiary : 5 villages, 64HH		

48m(160ft)

Future Planned Bridge Specifications	
Bridge Length	L=48m(160ft)
Bridge Type	Bailey Bridge
Carriage Width	W=3.277m
Truck Load	IRC 24R(24ton) / 18R(18ton)
Foundation Type	Spread foundation (T-type)

Jan 2021

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6-2 Environmental Clearance



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13. Copy of this EC must be maintained at site at all times during construction of the bridge for environment management and monitoring references.

14. In case of non-completion of the activity within the given period, the EC must be renewed one month prior to the date of its expiry.

Any violation of the terms and conditions is a violation of Article 7 of EA Act 2000 which will result in revocation of the EC without any liability on the part of this office and compliance under the provision of Article 40-43, EA Act 2000 will commence.

This Clearance is valid till 30th December 2013.

(Lhaden Pema)

Chief Planning Officer

C:C:

1. The Hon'ble Secretary, MoWHS for kind information.
2. Head, EA Section, NEC, Thimphu for kind information
3. The Chief Engineer, I&DD, DoR, Thimphu for information.
4. The Chief Engineer, Bridge Division, DoR, Thimphu for information.
5. The Dy. Chief Env. Officer, PPD, MoWHS for information.



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MoWHS/PPD/Env/01/2010-11/290

Feb 10, 2011

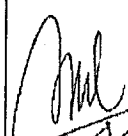
To
The Director General
Department of Roads, MoWHS
Thimphu

Subject: Environmental Clearance for Re-construction of Jigmeliag and Dhorkhola Bridges on the Gaylephu-Sarpang National Highway

This is with reference to the letter No. DoR/BD/CE(B)/31/2010-2011/399 dated 1st February 2011 for the issuance of the environmental clearance for the Re-construction of Jigmeliag and Dhorkhola Bridges at Gaylephu-Sarpang National Highway. In this regard, the Environmental Unit under the Policy and Planning Division, MoWHS would like to issue the Environmental Clearance (EC) for the above mentioned works with the following terms and conditions:

1. The EC is valid for the construction of the above mentioned bridges only;
2. Indiscriminate dumping of excavated/waste materials into the river is an offense and is liable to penalty. It should be properly disposed in an appropriate disposal site;
3. The proponent shall ensure that proper care be taken to monitor the dust emissions from the project area;
4. Downstream affects should be monitored at all times to ensure that no damage is caused due to the project activity;
5. The waterways must be protected from any obstruction during and after the construction;
6. The implementation of the activity shall not affect the public and any religious/historic site;
7. Aesthetic value must be preserved/enhanced by reclaiming the disturbed area with re-vegetation of grasses or trees in consultation with the Department of Forest;
8. The applicant shall ensure that safety signs are posted at the strategic locations within project site;
9. Blasting must be carried out as per the rules and regulations of the Ministry of Home and Cultural Affairs. Ensure that proper warning signals are given prior to blasting.
10. The holder shall ensure that Occupational Health and Safety measures are strictly observed at all times. Safety gears should be provided to the workers and visitors coming in contact with the machines or having to execute manual work;
11. The applicant should ensure that first aid-kit is available at the site and proper health records file are maintained and health check up facilities provided to all the employees;
12. Any disputes arising due to the project are the responsibility of the Project Proponent;

Po Box 791, Opposite to UNDP Building, Thimphu : Bhutan


13/2/2011



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MoWHS/PPD/Env/01/2010-11/335

Apr 08, 2011

To
The Director General
Department of Roads
Thimphu

Subject: **Environmental Clearance for Replacement of Bailey Suspension Bridge over Mangdechhu River (Korphu)**

Dear Sir,

This is with reference to the letter No. DoR/BD/CE(B)/31/2010-2011/520 dated 6th April 2011 for the issuance of the environmental clearance for the Replacement of Bailey Suspension Bridge over Mangdechhu River (Korphu) at Trongsa. In this regard, the Environmental Unit under the Policy and Planning Division, MoWHS would like to issue the Environmental Clearance (EC) for the above mentioned works with the following terms and conditions:

1. The EC is valid for the construction of the above mentioned bridge only;
2. Indiscriminate dumping of excavated/waste materials into the river is an offense and is liable to penalty. It should be properly disposed in an appropriate disposal site;
3. The proponent shall ensure that proper care be taken to monitor the dust emissions from the project area;
4. Downstream affects should be monitored at all times to ensure that no damage is caused due to the project activity;
5. The waterways must be protected and maintained at all times without any disturbance to the ecosystem of the river during and after the construction;
6. The implementation of the activity shall not affect the public and any religious/historic site;
7. Aesthetic value must be preserved/enhanced by reclaiming the disturbed area with re-vegetation of grasses or trees in consultation with the Department of Forest;
8. The applicant shall ensure that safety signs are posted at the strategic locations within project site;
9. If required, Blasting must be carried out as per the rules and regulations of the Ministry of Home and Cultural Affairs. Ensure that proper warning signals are given prior to blasting.
10. The holder shall ensure that Occupational Health and Safety measures are strictly observed at all times. Safety gears should be provided to the workers and visitors coming in contact with the machines or having to execute manual work;
11. The applicant should ensure that first aid-kit is available at the site and proper health records file are



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maintained and health check up facilities provided to all the employees;

12. Any disputes arising due to the project are the responsibility of the Project Proponent;

13. Copy of this EC must be maintained at site at all times during construction of the bridge for environment management and monitoring references.

14. In case of non-completion of the activity within the given period, the EC must be renewed one month prior to the date of its expiry.

Any violation of the terms and conditions is a violation of Article 7 of EA Act 2000 which will result in revocation of the EC without any liability on the part of this office and compliance under the provision of Article 40-43, EA Act 2000 will commence.

This Clearance is valid till 30th December 2012.

Yours Sincerely,

(Lhaden Pema)

Chief Planning Officer

1. The Head, EA Section, NEC, Thimphu for kind information
2. The Chief Engineer, I&DD, DoR, Thimphu for information.
3. The Chief Engineer, Bridge Division, DoR, Thimphu for information.
4. The Env. Officer, Dzongkhag Administration, Trongsa for follow-up and information.



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MoWHS/PPD/Env/01/2010-11/334

Apr 08, 2011

To
The Director General
Department of Roads
Thimphu

Subject: Environmental Clearance for Replacement of Bailey Suspension Bridge over Mangdechhu River (Jangbi)

Dear Sir,

This is with reference to the letter No. DoR/BD/CE(B)/31/2010-2011/520 dated 6th April 2011 for the issuance of the environmental clearance for the Replacement of Bailey Suspension Bridge over Mangdechhu River (Jangbi) at Trongsa. In this regard, the Environmental Unit under the Policy and Planning Division, MoWHS would like to issue the Environmental Clearance (EC) for the above mentioned works with the following terms and conditions:

1. The EC is valid for the construction of the above mentioned bridge only;
2. Indiscriminate dumping of excavated/waste materials into the river is an offense and is liable to penalty. It should be properly disposed in an appropriate disposal site;
3. The proponent shall ensure that proper care be taken to monitor the dust emissions from the project area;
4. Downstream affects should be monitored at all times to ensure that no damage is caused due to the project activity;
5. The waterways must be protected and maintained at all times without any disturbance to the ecosystem of the river during and after the construction;
6. The implementation of the activity shall not affect the public and any religious/historic site;
7. Aesthetic value must be preserved/enhanced by reclaiming the disturbed area with re-vegetation of grasses or trees in consultation with the Department of Forest;
8. The applicant shall ensure that safety signs are posted at the strategic locations within project site;
9. If required, Blasting must be carried out as per the rules and regulations of the Ministry of Home and Cultural Affairs. Ensure that proper warning signals are given prior to blasting.
10. The holder shall ensure that Occupational Health and Safety measures are strictly observed at all times. Safety gears should be provided to the workers and visitors coming in contact with the machines or having to execute manual work;
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maintained and health check up facilities provided to all the employees;

12. Any disputes arising due to the project are the responsibility of the Project Proponent;
13. Copy of this EC must be maintained at site at all times during construction of the bridge for environment management and monitoring references.
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Any violation of the terms and conditions is a violation of Article 7 of EA Act 2000 which will result in revocation of the EC without any liability on the part of this office and compliance under the provision of Article 40-43, EA Act 2000 will commence.

This Clearance is valid till 30th December 2012.

Yours Sincerely

(Chalden Pema)

Chief Planning Officer

1. The Head, EA Section, NEC, Thimphu for kind information
2. The Chief Engineer, I&DD, DoR, Thimphu for information.
3. The Chief Engineer, Bridge Division, DoR, Thimphu for information.
4. The Env. Officer, Dzongkhag Administration, Trongsa for follow-up and information.



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MoWHS/PPD/Env/01/2010-11/336

Apr 08, 2011

To
The Director General
Department of Roads
Thimphu

Subject: Environmental Clearance for Replacement of Bailey Suspension Bridge over Mangdechhu River (Kela)

Dear Sir,

This is with reference to the letter No. DoR/BD/CE(B)/31/2010-2011/520 dated 6th April 2011 for the issuance of the environmental clearance for the Replacement of Bailey Suspension Bridge over Mangdechhu River (Kela) at Trongsa. In this regard, the Environmental Unit under the Policy and Planning Division, MoWHS would like to issue the Environmental Clearance (EC) for the above mentioned works with the following terms and conditions:

1. The EC is valid for the construction of the above mentioned bridge only;
2. Indiscriminate dumping of excavated/waste materials into the river is an offense and is liable to penalty. It should be properly disposed in an appropriate disposal site;
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maintained and health check up facilities provided to all the employees;

12. Any disputes arising due to the project are the responsibility of the Project Proponent;

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This Clearance is valid till 30th December 2012.

Yours Sincerely,

(Lhaden Pema)

Chief Planning Officer

1. The Head, EA Section, NEC, Thimphu for kind information
2. The Chief Engineer, I&DD, DoR, Thimphu for information.
3. The Chief Engineer, Bridge Division, DoR, Thimphu for information.
4. The Env. Officer, Dzongkhag Administration, Trongsa for follow-up and information

