

**ROADS AND HIGHWAYS DEPARTMENT  
MINISTRY OF ROAD TRANSPORTATION AND BRIDGES  
THE PEOPLE'S REPUBLIC OF BANGLADESH**

**PREPARATORY SURVEY  
ON  
WESTERN BANGLADESH  
BRIDGES IMPROVEMENT PROJECT**

**FINAL REPORT  
VOLUME 4: APPENDIX 2**

**APRIL 2015**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**

**KATAHIRA & ENGINEERS INTERNATIONAL**

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People's Republic of Bangladesh  
Preparatory Survey on Western Bangladesh Bridges Improvement  
Project

Final Report Volume 4

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ROADS AND HIGHWAYS DEPARTMENT  
MINISTRY OF ROAD TRANSPORT AND BRIDGES  
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

PREPARATORY SURVEY

ON

WESTERN BANGLADESH BRIDGE IMPROVEMENT  
PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT STUDY

December 2014

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Prepared by

Oriental Consultants Co. Ltd.

Katahira & Engineers International



On behalf of

Roads and Highways Department (RHD)

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## **ABBREVIATIONS**

ADB	-	Asian Development Bank
ARP	-	Abbreviated Resettlement Plan
BFD	-	Bangladesh Forest Department
BBS	-	Bangladesh Bureau of Statistics
BCAS	-	Bangladesh Centre for Advance Studies
BNBC	-	Bangladesh National Building Code
BECA	-	Bangladesh Environmental Conservation Act
BECR	-	Bangladesh Environmental Conservation Rules
BUET	-	Bangladesh University of Engineering Technology
CARE	-	Cooperative American Relief Everywhere
CITES	-	Centre against Illegal Trade and Export of Species
Cox	-	Oxides of Carbon
CSC	-	Construction Supervision Consultant
DCs	-	Deputy Commissioners
DG	-	Director General
DGWT	-	Deep Ground Water Table
DoE	-	Department of Environment
EA	-	Environmental Assessment
EC	-	Executive Committee
ECC	-	Environmental Clearance Certificate
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
FAO	-	Food and Agriculture Organization
GoB	-	Government of Bangladesh
GDP	-	Gross Development Product
IEE	-	Initial Environmental Examination

IECs	-	Important Environmental Components
EMC	-	Environmental Management Committee
GDP	-	Gross Development Product
IUCN	-	International Union for Conservation of Nature
IWTA	-	Inland Water Transport Authority
JICA	-	Japan International Cooperation Agency
LGED	-	Local Government Engineering Department
MoEF	-	Ministry of Environment and Forest
NCR	-	North Central Region
NCS	-	National Conservation Strategy
NEMAP	-	National Environmental Management Action Plan
NEP	-	National Environmental Policy
NGO	-	Non-Governmental Organization
N0x	-	Nitrous Oxides
O&M	-	Operation and Management
PAPs	-	Project Affected Persons
Pb	-	Lead
PPEs	-	Personal Protection Equipment
RCC	-	Rod concrete cement
RAMSAR	-	Convention on Wetlands of International Significance
REA	-	Rapid Environmental Assessment
RHD	-	Roads and Highways Department
RoW	-	Right of Way
NCR	-	North Central Region
NWR	-	North West Region
SCR	-	South Central Region
SE	-	Site Engineer
SOx	-	Oxides of Sulphur
SRDI	-	Soil Resources Development Institute
SWR	-	South West Region
SGWT	-	Shallow Ground Water Table
SIDA	-	Swedish International Development Agency
WARPO	-	Water Resources Planning Organization
WB	-	World Bank

## EXECUTIVE SUMMARY

### A. Background of the Project

A preparatory Survey on Western Bangladesh Bridge Project (WBBIP) has been carried out and necessary materials are prepared by JICA Survey Team in order to appraise feasibility of the Project under Japanese ODA loan.

The Project is comprised of 105 candidate bridges and have been selected through the screening process. These selected bridges are located under 37 districts of the western Bangladesh area such as Barisal, Khulna, Rajshahi, Rangpur Division and Gopalganj area.

The interventions that may cause include (i) reconstruction/construction of PC/Steel bridges along the existing bridge alignment, (ii) construction of approach roads on bridges sides and (iii) enhancement activities at bridges approaches. The project sites under WBBIP are situated on North Central Region (NCR), South West Region (SWR), North West Region (NWR) and South Central Region (SCR) of Bangladesh.

The 2-lane new bridges on National Highways will be reconstructed next and parallel to 2-lane existing bridges and those are on Regional Highways and Zilla roads will be replaced by new 2-lane bridge at the same location. The new bridge specifications including bridge type, length, width and height are summarized in Table ES-1. The approach roads on both sides of the bridge will also be constructed keeping pace with the requirements. Trees will be planted on both sides of the approach roads to ensure slope protection against gully erosion and for environmental enhancement.

Rivers and Canals on which interventions may be caused, have two different scenarios. That is Rajshahi, Rangpur and Gopalganj are mostly dry or with patches of water at places of the bed and that in Khulna and Barisal division have got flow of water having Ebb-Tide effect. The following table shows the length, width and height of the Project candidate bridges determined based on preliminary design.

**Table ES-1: Total number, type and total length of the Project bridge candidates**

Rank	Bridge ID	RHD Zone	Bridge Name	Road Type	Road No	Chainage (km)	Road Name	New Bridge Type	New Bridge Width (m)	New Bridge Length (m)	New Bridge Height (m)
1	N8_178a	Barisal	Boalia Bazar Bridge	N	8	176.88	Dhaka (Jatrabari)Mawa Bhanga Barisal Patuakhali	PC-I	10.4	40	13.8
2	N509_19a	Rangpur	Sharnamoti Bridge	N	509	19.553	Barabari-Lalmonirhat-Burimary Road	PC-I	10.4	70	8.1
3	N5_119a	Rajshahi	Chanda Bridge	N	5	118.748	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	60	5.0
4	N5_127a	Rajshahi	Palgari Bridge	N	5	126.806	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	60	6.0
5	N5_176a	Rajshahi	Bhuyagali Bridge	N	5	173.833	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	80	9.8
6	N5_235a	Rangpur	Mohoshan Bridge	N	5	232.973	Dhaka-Utholi-Paturia-Bogra-Rangpur-Banglabandh Road	Steel-I	10.4	120	10.1
7	N5_120a	Rajshahi	Chanda Bridge	N	5	119.227	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	60	4.4
8	N5_128a	Rajshahi	Golihar Bridge	N	5	127.046	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	60	8.0
9	N5_158a	Rajshahi	Purbodalua Bridge	N	5	155.583	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	80	7.7
10	N5_265a	Rangpur	Bupinath Bridge	N	5	262.719	Dhaka-Paturia-Kashinathpur-Bogra-Rangpur-Banglabandh	PC-I	10.4	60	8.0
11	N5_350b	Rangpur	Barali Bridge	N	5	348.448	Dhaka -Paturia-Kashinathpur- Bogra-Rangpur-Beldanga- Banglabandh Road	Steel-I	10.4	160	13.4
12	N8_182a	Barisal	Bakerganj Steel Bridge	N	8	180.819	Dhaka (Jatrabari)MawaBhangaBarisalPatuakhali	PC-I	10.4	35	6.5
13	N7_025a	Gopalganj	Jhuldibazar Bridge	N	7	25.993	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	30	5.9
14	N7_039a	Gopalganj	Karimpur Bridge	N	7	39.64	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	65	9.8
15	N7_049a	Gopalganj	Porkilpur Bridge	N	7	49.629	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	30	6.1
16	N5_134a	Rajshahi	Nukali Bridge	N	5	132.062	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	Steel-I	10.4	50	10.0
17	N6_97a	Rajshahi	Dattapara Bridge	N	6	97.587	Kashinathpur-Dasuria-Natore-Rajshahi	PC-I	10.4	40	7.8
18	R681_10a	Rajshahi	Horisonkorpor Bridge	R	681	10.266	Ujanpara-Bijoynagar Road (Old Part)	PC-I	10.4	50	5.9
19	N5_140a	Rajshahi	Jugnidaha Bridge	N	5	138.201	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	65	8.0
20	N5_118a	Rajshahi	Punduria Bridge	N	5	117.143	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	Steel-I	10.4	130	10.1
21	N704_43a	Khulna	G.K. Bridge	N	704	44.135	Jhenaidah-Kushia-Paksey Ferry-Dasuria	PC-I	10.4	55	6.0
22	N7_248c	Khulna	Gora bridge	N	7	248.844	Daulatdia-Faridpur -Magura-Jhenaidah-Jessore -Khulna-Mongla	PC-I	10.4	30	6.0
23	N7_054a	Gopalganj	Barashia Bridge	N	7	55.168	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	90	13.2
24	N5_356a	Rangpur	-	N	5	354.204	Dhaka -Paturia-Kashinathpur- Bogra-Rangpur-Beldanga- Banglabandh Road	PC-I	10.4	30	6.8
25	N7_246a	Khulna	Balai bridge.	N	7	246.112	Daulatdia-Faridpur -Magura-Jhenaidah-Jessore -Khulna-Mongla	PC-I	10.4	60	8.2
26	N8_095a	Gopalganj	Amgram bridge	N	8	94.098	Dhaka(Jatrabari)-Mawa-Banga-Barisal- Patuakhali	PC-I	10.4	40	10.1
27	N505_2a	Rajshahi	Kazir Hat Bridge	N	505	2.47	Baderhat-Kazirhat (Latipur)	Steel-I	10.4	160	10.3
28	R548_28b	Rajshahi	Atrai Bridge	R	548	27.8	Naogaon-Atrai-Natore	Steel-I	10.4	160	16.2
29	N7_036c	Gopalganj	Kanaipur Bridge	N	7	37.369	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	40	8.9
30	N7_048a	Gopalganj	Brahmonkanda Bridge	N	7	48.48	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	30	6.5
31	N5_378a	Rangpur	Gaudangi Bridge	N	5	375.421	Dhaka-Paturia-Kashinathpur- Bogra-Rangpur- Banglabandh.	PC-I	10.4	65	5.8
32	N7_047a	Gopalganj	Bimankanda bridge	N	7	47.833	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	60	11.2
33	N5_156a	Rajshahi	Chowkidhoh Bridge	N	5	153.977	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	60	8.6
34	N5_172a	Rajshahi	Notun Dhoh Bridge	N	5	169.626	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	60	8.3
35	N5_179a	Rajshahi	Dhatia Bridge	N	5	176.746	Dhaka (Mirpur)-Paturia- Nalakhola-Bogra-Rangpur- Banglabandh	PC-I	10.4	65	7.3

ES-2

Rank	Bridge ID	RHD Zone	Bridge Name	Road Type	Road No	Chainage (km)	Road Name	New Bridge Type	New Bridge Width (m)	New Bridge Length (m)	New Bridge Height (m)
36	N5_188a	Rangpur	Ghoga Bridge	N	5	185.73	Dhaka (Mirpur)-Ulholi-Paturia- Bogra-Rangpur- Banglabandh	PC-I	10.4	60	8.6
37	N5_126a	Rajshahi	Vitapara Bridge	N	5	125.093	Dhaka (Mirpur)-Paturia- Natakholo-Bogra-Rangpur- Banglabandh	Steel-I	10.4	100	11.0
38	N518_4a	Rangpur	Khorkhori bridge	N	518	3.959	Sayedpur Town Old Section (Sutkir More-Sonapukur)	PC-I	10.4	60	7.2
39	N7_141b	Khulna	Buri Bhairab Bridge	N	7	142.096	Dauladia-Faridpur -Magura-Jhenaidah-Jessore-Khulna-Mongla	PC-I	10.4	35	7.0
40	R720_44a	Khulna	Gurakhali Bridge	R	720	43.568	Magura-Narail	PC-I	10.4	55	8.5
41	N703_Sd	Khulna	Dhopa Ghata Bridge	N	703	0.508	Jhenaidah Town Old Section	PC-I	10.4	150	9.2
42	R890_45a	Barisal	Dawrey Bridge	R	890	45.766	Bhola(Paran Talukderhat)-Burhanuddin-Lalmohon-Char Fassion-Char Manika	PC-I	10.4	65	9.6
43	N704_14a	Khulna	Barda Bridge	N	704	15.342	Jhenaidah-Kushthia-Paksey Ferry-Dasuria	PC-I	10.4	105	12.9
44	N704_33b	Khulna	Balpara Bridge	N	704	34.625	Jhenaidah-Kushthia-Paksey Ferry-Dasuria	PC-I	10.4	40	7.7
45	N5_344c	Rangpur	Kharua Vanga Bridge	N	5	342.366	Dhaka -Paturia-Kashinathpur- Bogra-Rangpur-Beldanga- Banglabandh Road	Steel-I	10.4	40	16.5
46	N5_382a	Rangpur	Ichamoti Bridge	N	5	379.45	Dhaka-Paturia-Kashinathpur- Bogra-Rangpur- Banglabandh.	PC-I	10.4	65	6.7
47	N5_360a	Rangpur	Chikli Bridge	N	5	358.013	Dhaka -Paturia-Kashinathpur- Bogra-Rangpur-Beldanga- Banglabandh Road	PC-I	10.4	60	6.7
48	Z5025_55a	Rangpur	Kakra Bridge	Z	5025	54.359	Rangpur-Badarganj-Parbatipur-Dinajpur.	Steel-I	9.8	170	8.5
49	Z5025_64a	Rangpur	Gabura Bridge.	Z	5025	63.739	Rangpur-Badarganj-Parbatipur-Dinajpur.	PC-I	9.8	90	7.1
50	Z5401_45a	Rangpur	Mathpara Bridge	Z	5401	44.585	Sirajganj-Kazipur-Dhuna-Sherpur	Steel-I	9.8	80	11.0
51	Z5072_14a	Rangpur	Bombgara Bridge	Z	5072	13.52	Dhuna-Nanglu-Baliadighi-Gabtal-Pirgachha-Mokamlala	PC-I	9.8	60	7.0
52	Z5025_60a	Rangpur	Madarganj Bridge	Z	5025	59.364	Rangpur-Badarganj-Parbatipur-Dinajpur.	PC-I	9.8	95	8.0
53	Z5472_6a	Rangpur	Raktodaho Bridge	Z	5472	6.28	Adamdighi-Santahar Sailo-Raninagar	PC-I	9.8	75	5.2
54	N5xx_Sa	Rajshahi	Pura Mukto Monch Bridge	N	5xx	0.92	Ullahpara town portion of Dhaka - Banglabandh road.	PC-I	10.4	50	8.0
55	Z5552_10a	Rangpur	Barodia Khali Bridge	Z	5552	10.295	Gaibanda-Phulchari-Vraikhali-Saghala	Steel-I	9.8	60	12.5
56	N8_152c	Barisal	Rahamatpur bridge	N	8	150.977	Dhaka (Jatrabari)MawaBhangaBarisalPatuakhali	PC-I	10.4	60	8.8
57	N8_127b	Barisal	gounagata bridge	N	8	126.358	Dhaka (Jatrabari)MawaBhangaBarisal Patuakhali	PC-I	10.4	35	6.8
58	Z8052_009d	Barisal	Gabtal Steel Bridge	Z	8052	9.88	Kachua Betagi Mirjaganj Patuakhali Lohalia Nijbot Kalaiya	PC-I	9.8	30	3.3
59	Z5015_22a	Rangpur	Bahagili Bridge	Z	5015	22.244	Taxerhat-Laldighi-Taraganj-Kishoreganj	Steel-I	9.8	200	7.1
60	Z5701_1a	Rangpur	Anandababur Pool	Z	5701	0.518	Nilphamari-Jaldhaka	PC-I	9.8	35	4.5
61	Z5701_9a	Rangpur	Duhuli Bridge	Z	5701	7.362	Nilphamari-Jaldhaka	PC-I	9.8	50	6.7
62	R545_115c	Rangpur	Mongle bari kulhibari Bridge	R	545	116.535	Bogra-Naogaon-Mohadebpur-Patnitala-Dhamoirhat-Joypurhat	Steel-I	10.4	90	10.3
63	R760_049c	Khulna	Shakdaha bridge	R	760	49.478	Khulna - Chuknagar - Sakhira road.	PC-I	10.4	50	3.3
64	N8_123a	Barisal	Souderkhal bridge	N	8	121.734	Dhaka (Jatrabari)MawaBhangaBarisal Patuakhali	PC-I	10.4	35	6.9
65	Z8701_3d	Barisal	Bottala Bridge	Z	8701	3.806	CharkhaliTushkhaliMathbariaPatharghata	PC-I	9.8	35	5.1
66	N5_260b	Rangpur	Katakhal Bridge	N	5	258.224	Dhaka-Paturia-Kashinathpur- Bogra-Rangpur-Banglabandh.	Steel-I	10.4	170	16.6
67	N704_27b	Khulna	Bitipara Bridge	N	704	28.708	Jhenaidah-Kushthia-Paksey Ferry-Dasuria	PC-I	10.4	35	5.8
68	R750_22c	Khulna	Bhangura Bridge	R	750	21.434	Jessore-Narail	PC-I	20.8	35	7.5
69	N8_129a	Barisal	Asokoti bridge	N	8	127.737	Dhaka (Jatrabari)MawaBhangaBarisal Patuakhali	PC-I	10.4	30	7.4
70	R890_16a	Barisal	Banglabazar Bridge	R	890	16.347	Bhola(Paran Talukderhat)-Burhanuddin-Lalmohon-Char Fassion-Char Manika	PC-I	10.4	50	11.7

Rank	Bridge ID	RHD Zone	Bridge Name	Road Type	Road No	Chainage (km)	Road Name	New Bridge Type	New Bridge Width (m)	New Bridge Length (m)	New Bridge Height (m)
71	R890_21a	Barisal	Box-a-ali Bridge	R	890	21.584	Bhola(Paran Talukderhat)-Burhanuddin-Lalmohon-Char Fassion-Char Manika	PC-I	10.4	30	8.4
72	R890_28a	Barisal	Borhanuddin Bridge	R	890	28.699	Bhola(Paran Talukderhat)-Burhanuddin-Lalmohon-Char Fassion-Char Manika	PC-I	10.4	40	9.9
73	R548_40a	Rajshahi	Mohis Mari Bridge	R	548	0	Naogaon-Atrai-Nalbre	PC-I	10.4	50	5.9
74	R451_1a	Rajshahi	Naiori Bridge	R	451	0.907	Nalka-Sirajganj	PC-I	10.4	60	6.9
75	R451_7a	Rajshahi	Chondi Das Bridge	R	451	6.561	Nalka-Sirajganj	Steel-I	10.4	80	10.5
76	R550_28b	Rangpur	Botoli Bridge	R	550	28.826	Mokamlala-Kalai-Joypurhat	Steel-I	10.4	80	11.7
77	R860_31a	Gopalganj	Paprail Bailey Bridge	R	860	29.6	Mostafapur-Madaripur-Shariatpur-Ibrahimpur-Harina-Chandpur	PC-I	10.4	40	7.8
78	Z8708_1c	Barisal	Afalbarir Khal Bridge	Z	8708	1.807	RajapurKathaliaAmuaBamnaPatharghata	PC-I	9.8	40	6.1
79	N5_458a	Rangpur	-	N	5	454.302	Dhaka (Mirpur)-Paturia- Natakholo-Bogra-Rangpur- Banglabandh	PC-I	10.4	35	5.6
80	N5_488a	Rangpur	Chawai Bridge	N	5	483.864	Dhaka (Mirpur)-Paturia- Natakholo-Bogra-Rangpur- Banglabandh	PC-I	10.4	70	6.2
81	Z8708_12b	Barisal	Boda Bridge	Z	8708	12.174	RajapurKathaliaAmuaBamnaPatharghata	PC-I	9.8	60	5.8
82	Z8033_017a	Barisal	Raiyer hat bridge	Z	8033	17.477	GariarparBanariparaSawrupkaliKawkhaliNaikati	PC-I	9.8	50	8.9
83	R860_34a	Gopalganj	Jajihar Bridge	R	860	32.943	Mostafapur-Madaripur-Shariatpur-Ibrahimpur-Harina-Chandpur	PC-I	10.4	50	6.2
84	R860_44c	Gopalganj	Gazipur Bridge	R	860	43.024	Mostafapur-Madaripur-Shariatpur-Ibrahimpur-Harina-Chandpur	PC-I	10.4	130	12.0
85	R860_53d	Gopalganj	Balar Bazar Bridge	R	860	52.069	Mostafapur-Madaripur-Shariatpur-Ibrahimpur-Harina-Chandpur	PC-I	10.4	100	8.6
86	N8_69a	Gopalganj	Kumar Bridge	N	8	68.726	Dhaka (Jatrabari)-Mawa-Bhanga-Barisal-Patuakhali	PC-I	10.4	120	6.1
87	Z6010_12b	Rajshahi	Faliarbil Bridge	Z	6010	12.34	Rajshahi-Halgodagari-Faliarbil-Mohonganj	PC-I	9.8	35	5.0
88	Z5008_1a	Rangpur	Cholo Dhepa bridge.	Z	5008	1.13	Birganj-Khansama-Darwani.	PC-I	9.8	55	7.5
89	Z5024_5c	Rangpur	Shampur Bridge.	Z	5024	5.67	Modhupur-Shampur	PC-I	9.8	35	5.2
90	Z5025_46a	Rangpur	Bondorer pool Bridge	Z	5025	45.643	Rangpur-Badarganj-Parbatipur-Dinajpur.	PC-I	9.8	60	6.0
91	Z5040_4a	Rangpur	Khotlapara Bridge	Z	5040	3.9	Sultanganj (Lichutala)-Madla-Bagbari-Gabtali (Pachmile)	PC-I	9.8	40	6.3
92	Z8810_13a	Barisal	Banogram Bridge	Z	8810	13.913	BakerganjPadrishipurKathaliSubidkhalBarguna	PC-I	9.8	60	7.8
93	R585_80a	Rangpur	Bhela Bridge	R	585	80.501	Gobindagnj-Goraghat-Birampur-Fulbari-Dinajpur.	PC-I	10.4	40	4.6
94	Z8033_008a	Barisal	Kaljira bridge	Z	8033	0	GariarparBanariparaSawrupkaliKawkhaliNaikati	PC-I	9.8	115	10.6
95	Z8033_019a	Barisal	Masrong bridge	Z	8033	19.103	GariarparBanariparaSawrupkaliKawkhaliNaikati	PC-I	9.8	40	5.2
96	Z8034_011a	Barisal	Padarhat bridge	Z	8034	12.418	RahamatpurBabuganjMuladiHizla	PC-I	9.8	50	5.5
97	Z8044_004a	Barisal	Talukdarhat Bailey Bridge	Z	8044	3.57	Barisal (Dinerpool)LaxmipashaDunki	PC-I	9.8	40	6.3
99	R860_35a	Gopalganj	Shajonpur Bailey Bridge	R	860	34.021	Mostafapur-Madaripur-Shariatpur-Ibrahimpur-Harina-Chandpur	PC-I	10.4	35	4.2
100	Z5041_2a	Rajshahi	Debokbazar Bridge	Z	5041	1.8	Raiganj (Bhuiyagati)-Nimgachhi-Taras Road	Steel-I	9.8	80	11.0
I	N706_14b	Khulna	Jhikorgacha Bridge	N	706	14.349	Jessore (Daratana More)-Benapole	PC-I	20.8	105	7.8
II	N5_435a	Rangpur	-	N	5	432.44	Dhaka (Mirpur)-Paturia-Natakholo-Bogra-Rangpur-Banglabandh	PC-I	10.4	40	8.3
III	N704_12c	Khulna	Chandi Pur Bridge	N	704	13.855	Jhenaidah-Kushlia-Paksey Ferry-Dasuria	PC-I	10.4	30	7.8
IV	N805_24a	Gopalganj	Garakola Bridge	N	805	24.19	Bhanga-Bhatiapara-Mollahhat	PC-I	20.8	110	7.8
V	R750_25a	Khulna	Tularampur Bridge	R	750	24.18	Jessore-Narail	PC-I	20.8	95	7.8
VI	Z7503_5a	Khulna	Hawai khali Bridge	Z	7503	5.213	Narail-Lohagara Bazar-Naragati	PC-I	20.8	30	7.8

Note: N: National Highway R: Regional Highway Z: Zilla Road

Source: JICA Survey Team

## Scope of the EIA

To prepare the EIA report, the EIA Study Team (Figure 1) was concentrated on field investigations, stakeholder consultation, primary and secondary data collection, screening of all baseline environmental parameters, environmental quality baseline monitoring, and preliminary engineering design of bridges with approach roads.

The EIA covers the general environmental profile of the Project area including physical, ecological, environmental, social, cultural and economic resources. Baseline environmental monitoring was carried out on water (surface and ground), air, noise, soil and sediment quality measurements. The EIA includes an overview of the potential environmental impacts and their severity, and proposes necessary mitigation measures and environmental management plan for each of the identified impacts.

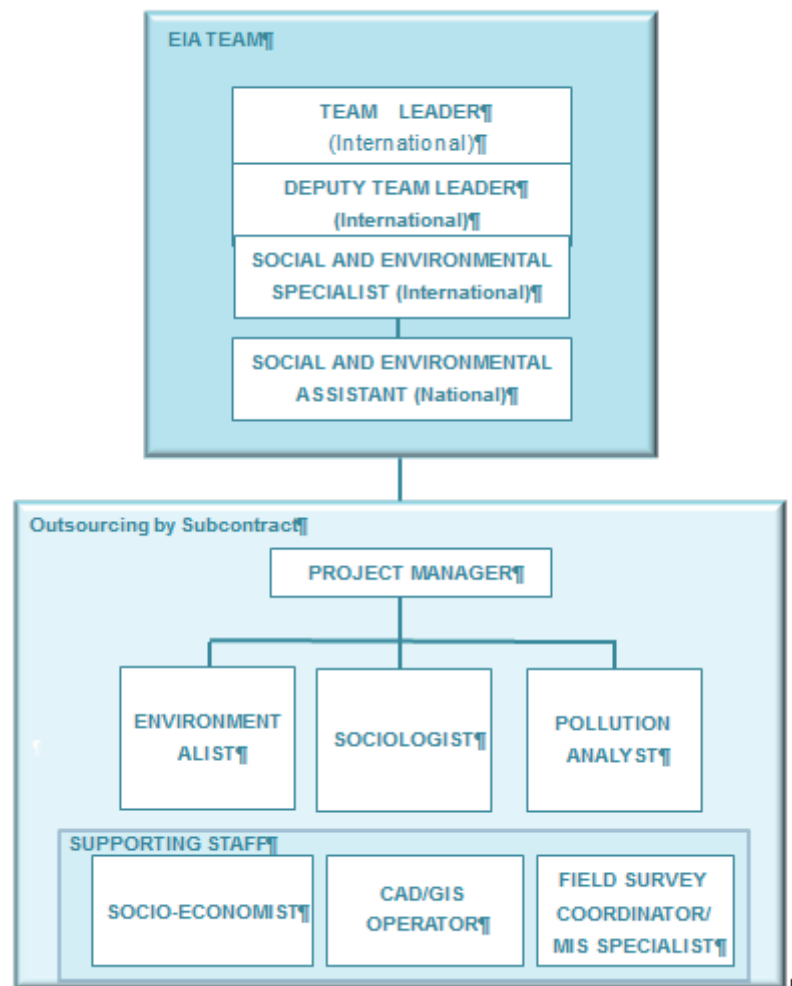


Figure 1: EIA Team Composition

## **Methodology for conducting EIA**

The methodology used for this study is based on the procedures described in Environmental Guidelines and the other relevant regulation of Bangladesh as well as “JICA Guidelines for Environmental and Social Considerations (April 2010)”. Methodology adopted for completion of the EIA study of bridges is as follows:

Scoping workshop organization with various stake holders at the beginning of the Project preparation activities; Reconnaissance survey was taken up to collect baseline information in devised formats; Analysis of collected data was carried out; Documentation of baseline conditions was done by doing on site environmental monitoring; Analysis and assessment of various alternatives was taken up; Identification and assessment of various impacts was done; Formulation of mitigation, and avoidance measures was done for identified impacts, and community consultations were carried out. The steps followed during EIA study are:

- (i) Collection of baseline data;
- (ii) Identification of environmental impacts on IECs;
- (iii) Prediction regarding potential impacts;
- (iv) Evaluation of the impacts;
- (v) Prescribing the mitigation measures;
- (vi) Monitoring program;
- (vii) Risk analysis;
- (viii) Documentation;

## **B. Legislation, Regulation and Policy**

### **GoB Requirements of legislations for EIA**

The BECA (1995), BECR (1997) enacted by the Government and EIA is obligatory during feasibility study, planning, design and implementation stages. An ECC is required from DOE to initiate project implementation activities. The EIA documents are in reality the guiding tool to implementation agencies, management tools to the stakeholders during construction and operation stages.

The BECR (1997) categorized development interventions as Green, Amber (A, B) and Red. As per JICA, the provision is made as:

- A: Remarkable Negative Impact is predicted.
- B: Negative Impact is expected to some extent.



- C: Extent of Impact is unknown. (A further examination is needed and the impact could be defined as study progresses)
- D: Impact is very small or nil and further survey is not required

The gradation in this subject document has been made as above depending on their degree of impacts on environment. The proposed upgrading of bridges involves construction reconstruction and widening of bridges on National Highways, Regional Highways and Zilla roads managed by RHD. However, the Survey team conducted EIA for all bridges as per JICA requirements.

### **C. Alternative Alignment**

The locations of new bridges have been determined in consideration of impact to existing residences, shops, cost and so on. However, National Highways have been kept under provision for widening into 4-lanes in future.

As a result of comparison, Alternative 4 (Replacement Existing Bridge) was selected from the viewpoint of the cheapest initial cost. Regarding National Highways, Alternative 3 (New Bridge Construction next to Existing Bridge) was selected in consideration of easy future widening. And Alternative 3 was selected for Regional Highways and Zilla road. The selection of alignments alternatives are shown in the following Table.

**Table ES-2: Comparison of Route Alternatives**

Item	Alternative1	Alternative2	Alternative3	Alternative4
Sketch	<p>The sketch section contains four diagrams illustrating different bridge construction alternatives. Each diagram shows a road with a bridge crossing a waterway. Alternative 1 shows a new bridge (red) being built adjacent to an existing bridge (green). Alternative 2 shows a new bridge (red) with construction for abutment and pier (red boxes) next to an existing bridge (green). Alternative 3 shows a new bridge (red) next to an existing bridge (green), with a temporary bridge (dashed lines) during construction. Alternative 4 shows a new bridge (red) replacing an existing bridge (green).</p>			
Summary	One of new bridge is constructed next to existing bridge and another bridge is constructed at the same position of existing bridge.	New bridge is constructed as 2-lane carriageway next to existing bridge. Additionally, the abutment and the pier are constructed for future widening project.	New bridge is constructed next to existing bridge.	Existing bridge is replaced by new bridge.
Temporary Bridge	Unnecessary Good	Unnecessary Good	Unnecessary Good	Necessary during construction Poor
Economic Efficiency	The initial cost is the most highest among alternatives. Poor	The initial cost is higher than Alternative 3 and 4. Poor	The initial cost is higher than Alternative 4. Good	The initial cost is the cheapest among alternatives. Good
Traffic Capacity	It is improved only in project area. Good	It is same as the existing condition. Fair	It is same as the existing condition. Fair	It is same as the existing condition. Fair
Traffic Safety	It might cause traffic conflict at the diverging point. Poor	It is same as the existing condition. Fair	It is same as the existing condition. Fair	It is same as the existing condition. Fair
Evaluation			<b>Recommended for National Road</b> - Easy for future widening.	<b>Recommended for Regional and Zilla Road</b> - The cheapest initial cost.

Source: JICA Survey Team

## **D. Policy Framework and Administrative Procedures**

### **(1) Policy Framework**

The National Conservation Strategy (NCS 1991) and National Environmental Management Action Plan (NEMAP 1995) emphasize on the inter-sector coordination and participation of public as well as the private sector in development activities. Basic guidelines of the National Environmental Policy (NEP, 1992) are:

- To ensure protection and conservation of physical, ecological and cultural resources from depletion, deterioration and degradation due to human activities;
- To identify activities that induce pollution/degradation/ deterioration of natural environmental resources;
- To ensure protection and conservation of historical/archaeological/ cultural structures/sites and relics from deterioration and degradation due to human activities;
- Protection of identities, rights, livelihood and heritages of the indigenous tribes;

The pivotal environmental safeguards are sustainable and environment friendly development, poverty reduction, women empowerment and planned employment generation. To achieve these goals emphasis should be given on avoidance, reduction and/or mitigation of impacts on environmental resources during project implementation stages and enhancement of the positive impacts to harvest optimum benefits from the development endeavors.

### **(2) Administrative Procedures**

An ECC from DOE is required before initiating the project implementation activities. An application to the DG of DOE was submitted through the local office in prescribed application form (Vide Rule 7.5) fulfilling the requirements detailed in BECR 1997 (BCAS 1999).

## **E. Land Acquisition Frameworks**

Land Acquisition Law in the Bengal was first enacted in 1824. The provisions and scopes of that law were subsequently amended and expanded in 1850, 1857, and 1863 leading to the enactment of Land Acquisition Act 1894. This Act continued enforced until partition of India through proclamation of independence in 1947. This Act however lacked the provision for payment of compensation for the acquired land and other immovable properties, as a result the requiring bodies used to overestimate the actual land requirements to cause loss to the land owners. The Acquisition of Immoveable Properties Ordinance-II 1982 was enacted to safeguard owners right regarding payment of compensation and to reduce wastage of land. Under this Ordinance the DCs or their

nominees are authorized to examine the claim for compensation taking into consideration all factors regarding entitlement of compensation and empowered to divide the compensation amount amongst all the legitimate shareholders.

The Emergency Property Acquisition Act was enacted in 1989, this Act empowered the Government authority to acquire private properties on during high floods, tidal bores, river bank erosion and other sorts of natural calamities to act swiftly to check those calamities. Hence, it is clear that the Act 1989 did not replace the Ordinance 1982, rather both the legislatures remained enforced simultaneously and applied during implementation of the Bangabandhu Multipurpose (Jamuna) Bridge Project.

The Deputy Commissioners (DCs) as Chief Executives of the district or any officer authorized by them can exercise the power conferred on the DCs regarding requisition of Immovable Properties under the Ordinance 1982 and Act 1989. The Bangabandhu Multipurpose Bridge (Land Acquisition) Act 1995 (Annexure-6) was enacted later on July 9 1995. Under provisions of this Act persons constructing structure/establishments and or modifying the land class/type that is likely to be acquired with the intention of extraction higher compensation rate will not be entitled any compensation for such structures. Land acquisition issue may not be a significantly disturbing issue during implementation of WBBIP. A comprehensive Abbreviated Resettlement Plan (ARP) has been formulated and shown in standalone report in details.

## **F. Physical Environment**

### **(1) Climate**

Bangladesh has upper humid mega-thermal climate with no water shortage at 50 cm depth at any part of the year. Maximum temperature during May-October period is 31-34<sup>0</sup>C and minimum temperature during November-February period is 11-16<sup>0</sup>C. Winter climate (November-January) is cold and dry, spring climate (February-March) is pleasant, and summer climate (March-May) is hot and dry while the monsoon season (June-September) is wet. The temperature and rainfall during the monsoon season are high. Peak temperature during April-May locally may reach up to 40<sup>0</sup>C. Bangladesh has tropical rainy climate. The mean temperature in coldest month is about 18<sup>0</sup>C and the mean rainfall in driest month remains below 6.0 mm.

## **(2) Topography**

Topography of western Bangladesh that is covered by the Meghna, Tista, Jamuna and Ganges floodplains is almost level with convex ridges and concave basin sites. Part of the North Central region in Bogra and North West region Rajshahi, Rangpur and Dinajpur is occupied by level and/or undulated terrace lands.

The undulated terrace lands of Rangpur, Dinajpur and Rajshahi districts were previously covered with dense deciduous Sal forest managed by private ownership and subsequently by the Bangladesh Forest Department (BFD). Presently the Sal forest particularly in level lands is heavily depleted and used for rain fed or irrigated paddy production. Patches of the Sal forest still occurs as remnants on undulated terrace lands of the Barind in Rangpur, Dinajpur and Rajshahi districts.

## **(3) Geology and Soils Strata**

Soils of the Barind tract are weakly structured, olive, acidic clays in the subsoil overlying an unaltered clayey substratum at variable depths. The landscape was probably colonized by pioneer vegetation.



highest specific gravity of micaceous sand recorded in the Study was 2.57g/cm<sup>3</sup>; most of the results of micaceous sand show specific gravity of around 2.4-2.5 g/cm<sup>3</sup>. Mica is a luster mineral with flat fragile structure and slippery surface and usually found in the sediments underlying Bangladesh flatland. With its fragile and slippery property, mica richly contained in micaceous sand provides much lower bearing capacity and/or skin friction than expected from SPT-N value of a layer and has caused a number of problems in construction of pile foundations in Bangladesh. Based on the experience in Bangladesh, bearing capacity and/or skin friction cannot be expected in micaceous sand.

**Table ES-3: Subsoil Investigation Results**

SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
1	N8_178a	Barisal	Barisal	Barisal	46	Silty Sand w Gravel, SM	50<	
2	N509_19a	Rangpur	Lalmonirhat	Lalmonirhat	23	Poorly Graded Sand w Gravel, SP	50 <	
3	N5_119a	Rajshahi	Pabna	Pabna-1	29	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
4	N5_127a	Rajshahi	Pabna	Ullahpara	28	Silty Sand w Gravel, SM	50 <	
5	N5_176a	Rajshahi	Serajganj	Serajganj-2	<b>No</b>	<b>Micaceous Silty Sand w Gravel, SP-SM</b>	<b>50 &lt; (28m~)</b>	<b>Micaceous sand shall not be used as a bearing layer.</b>
6	N5_235a	Rangpur	Bogra	Bogra	25	Silty Sand w Gravel, SM	50 <	
7	N5_120a	Rajshahi	Pabna	Pabna-1	27	Poorly Graded Silty Sand w Gravel, SP-SM	50 <	
8	N5_128a	Rajshahi	Serajganj	Ullahpara	31	Poorly Graded Silty Sand w Gravel, SP-SM	50 <	
9	N5_158a	Rajshahi	Serajganj	Ullahpara	24	Silty Sand w Gravel, SM	50 <	



SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
10	N5_265a	Rangpur	Gaibanda	Palashbari	22	Poorly Graded Sand w Gravel, SP	50 <	
11	N5_350b	Rangpur	Rangpur	Rangpur	22	Silty Sand w Gravel, SM	50 <	
12	N8_182a	Barisal	Barisal	Barisal	40	Silty Sand w Gravel, SM	<b>30&lt;</b>	
13	N7_025a	Gopalganj	Faridpur	Faridpur-2	38	Silty Sand w Gravel, SM	50<	
14	N7_039a	Gopalganj	Faridpur	Faridpur-1	45	Silty Sand w Gravel, SM	50<	
15	N7_049a	Gopalganj	Faridpur	Faridpur-1	33	Poorly Graded Sand w Gravel, SP	50<	
16	N5_134a	Rajshahi	Serajganj	Ullahpara	29	Poorly Graded Sand w Gravel, SP	50 <	
17	N6_97a	Rajshahi	Natore	Natore-2	<b>27</b>	<b>Poorly Graded Sand w Gravel, SP</b>	<b>50 &lt;</b>	<b>Thickness shall be confirmed during D/D.</b>
18	R681_10a	Rajshahi	Rajshahi	Rajshahi-1	<b>29</b>	<b>Silty Sand w Gravel, SM</b>	<b>50 &lt;</b>	<b>Thickness shall be confirmed during D/D.</b>
19	N5_140a	Rajshahi	Serajganj	Ullahpara	23	Poorly Graded Sand w Gravel, SP	50 <	
20	N5_118a	Rajshahi	Pabna	Pabna-1	25	Silty Sand w Gravel, SM	50<	
21	N704_43a	Khulna	Kushtia	Kushtia	30	Silty Sand w Gravel, SM	50<	
22	N7_248c	Khulna	Bagerhat	Bagerhat-2	<b>No</b>	<b>Micaceous Silty Sand w Gravel, SP-SM</b>	<b>50 &lt; (51m~)</b>	<b>Micaceous sand shall not be used as a bearing layer.</b>
23	N7_054a	Gopalganj	Faridpur	Faridpur-1	52	Silty Sand w Gravel, SM	50<	
24	N5_356a	Rangpur	Rangpur	Rangpur	24	Silty Sand w	50 <	



SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
						Gravel, SM		
25	N7_246a	Khulna	Bagerhat	Bagerhat-2	54	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
26	N8_095a	Gopalganj	Madaripur	Madaripur	36	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
27	N505_2a	Rajshahi	Pabna	Pabna-1	29	Silty Sand w Gravel, SM	50 <	
28	R548_28b	Rajshahi	Naogaon	Naogaon	<b>28</b>	<b>Silty Sand w Gravel, SM</b>	<b>50 &lt;</b>	<b>Thickness shall be confirmed during D/D.</b>
29	N7_036c	Gopalganj	Faridpur	Faridpur-1	33	Silty Sand w Gravel, SM	50<	
30	N7_048a	Gopalganj	Faridpur	Faridpur-1	34	Poorly Graded Sand w Gravel, SP	50<	
31	N5_378a	Rangpur	Dinajpur	Dinajpur	25	Silty Sand w Gravel, SM	50 <	
32	N7_047a	Gopalganj	Faridpur	Faridpur-1	36	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
33	N5_156a	Rajshahi	Serajganj	Ullahpara	28	Silty Sand w Gravel, SP-SM	50 <	
34	N5_172a	Rajshahi	Serajganj	Serajganj-2	32	Silty Sand w Gravel, SM	50 <	
35	N5_179a	Rajshahi	Serajganj	Serajganj-2	25	Silty Sand w Gravel, SM	50 <	
36	N5_188a	Rangpur	Bogra	Sherpur	21	Silty Sand w Gravel, SM	50 <	
37	N5_126a	Rajshahi	Pabna	Pabna-1	24	Poorly Graded Sand w Gravel, SP	50 <	
38	N518_4a	Rangpur	Nilphamari	Nilphamari	31	Fine Sand, SM	50 <	

SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
39	N7_141b	Khulna	Jessore	Jessore-1	38	Silty Sand w Gravel, SM	50<	
40	R720_44a	Khulna	Narail	Narail	48	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
41	N703_Sd	Khulna	Jhenaidah	Jhenaidah	30	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
42	R890_45a	Barisal	Bhola	Bhola	45	Silty Sand w Gravel, SM	50<	
43	N704_14a	Khulna	Jhenaidah	Jhenaidah	31	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
44	N704_33b	Khulna	Kushtia	Kushtia	27	Silty Sand w Gravel, SM	50<	
45	N5_344c	Rangpur	Rangpur	Rangpur	26	Silty Sand w Gravel, SM	50 <	
46	N5_382a	Rangpur	Dinajpur	Dinajpur	38	Silty Sand w Gravel, SM	50 <	
47	N5_360a	Rangpur	Rangpur	Rangpur	28	Silty Sand w Gravel, SM	50 <	
48	Z5025_55a	Rangpur	Dinajpur	Dinajpur	23	Poorly Graded Silty Sand w Gravel, SP-SM	50 <	
49	Z5025_64a	Rangpur	Dinajpur	Dinajpur	22	Silty Sand w Gravel, SM	50 <	
50	Z5401_45a	Rangpur	Bogra	Sherpur	24	Silty Sand w Gravel, SM	50 <	
51	Z5072_14a	Rangpur	Bogra	Sherpur	23	Silty Sand w Gravel, SM, Shale	50 <	
52	Z5025_60a	Rangpur	Dinajpur	Dinajpur	<b>50</b>	<b>Clay w Sand, CL or CH</b>	<b>20&lt;</b>	
53	Z5472_6a	Rangpur	Bogra	Bogra	19	Poorly Graded Silty Sand w Gravel, SP-	50 <	

SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
						SM		
54	N5xx_Sa	Rajshahi	Serajganj	Ullahpara	18	Silty Sand w Gravel, SP-SM	50 <	
55	Z5552_10a	Rangpur	Gaibanda	Gaibandha	21	Poorly Graded Silty Sand w Gravel, SP-SM	50 <	
56	N8_152c	Barisal	Barisal	Barisal1	39	Silty Sand w Gravel, SM	50<	
57	N8_127b	Barisal	Barisal	Barisal1	59	Silt w Sand, ML	50<	
58	Z8052_009d	Barisal	Patuakhali	Patuakhali	53	Silty Sand w Gravel, SM	50<	
59	Z5015_22a	Rangpur	Nilphamari	Nilphamari	23	Poorly Graded Sand w Gravel, SP	50 <	
60	Z5701_1a	Rangpur	Nilphamari	Nilphamari	26	Silty Sand w Gravel, SM	50 <	
61	Z5701_9a	Rangpur	Nilphamari	Nilphamari	18	Poorly Graded Sand w Gravel, SP	50<	
62	R545_115c	Rangpur	Joypurhat	Joypurhat	21	Poorly Graded Sand w Gravel, SP	50 <	
63	R760_049c	Khulna	Satkhira	Satkhira-1	66	Fine Sand, SM	50<	
64	N8_123a	Barisal	Barisal	Barisal1	44	Silty Sand w Gravel, SM	50<	
65	Z8701_3d	Barisal	Pirojpur	Kawkhali	37	Silty Sand w Gravel, SM	50<	
66	N5_260b	Rangpur	Gaibanda	Palashbari	28	Silty Sand w Gravel, SM	50 <	
67	N704_27b	Khulna	Kushtia	Kushtia	24	Silty Sand w Gravel, SM	50<	
68	R750_22c	Khulna	Narail	Narail	45	Poorly Graded Silty Sand w Gravel, SP-SM	50<	

SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
69	N8_129a	Barisal	Barisal	Barisal1	44	Low Plasticity Clay w Sand, CL	30<	
70	R890_16a	Barisal	Bhola	Bhola	No			<b>No appropriate bearing layer was found.</b>
71	R890_21a	Barisal	Bhola	Bhola	50	Silty Sand w Gravel, SM	50<	
72	R890_28a	Barisal	Bhola	Bhola	No			<b>No appropriate bearing layer was found.</b>
73	R548_40a	Rajshahi	Natore	Natore-1	24	Silty Sand w Gravel, SM	50 <	
74	R451_1a	Rajshahi	Serajganj	Sirajganj-2	33	Silty Sand w Gravel, SM	50 <	
75	R451_7a	Rajshahi	Serajganj	Sirajganj-2	43	Sand w Gravel, SP	50 <	
76	R550_28b	Rangpur	Joypurhat	Joypurhat	12	Silty Sand w Gravel, SM	50 <	
77	R860_31a	Gopalganj	Shariatpur	Shariatpur	41	Silty Sand w Gravel, SM	50<	
78	Z8708_1c	Barisal	Jhalokati	Jhalokati	37	Silty Sand w Gravel, SM	50<	
79	N5_458a	Rangpur	Panchagarh	Panchagarh	17	Poorly Graded Silty Sand w Gravel, SP-SM	50 <	
80	N5_488a	Rangpur	Panchagarh	Panchagarh	14	Poorly Graded Silty Sand w Gravel, SP-SM	50 <	
81	Z8708_12b	Barisal	Jhalokati	Jhalokati	36	Fine Sand, SM	50<	
82	Z8033_017a	Barisal	Barisal	Barisal1	49	Silty Sand w Gravel, SM	50<	
83	R860_34a	Gopalganj	Shariatpur	Shariatpur	31	Silty Sand w Gravel, SM	50<	

SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
84	R860_44c	Gopalganj	Shariatpur	Shariatpur	48	Silty Sand w Gravel, SM	50<	
85	R860_53d	Gopalganj	Shariatpur	Shariatpur	38	Poorly Graded Sand w Gravel, SP	50<	
86	N8_69a	Gopalganj	Madaripur	Bhanga	41	Poorly Graded Silty Sand w Gravel, SP-SM	50<	
87	Z6010_12b	Rajshahi	Rajshahi	Rajshahi-2	<b>26</b>	<b>Silty Sand w Gravel, SM</b>	<b>50 &lt;</b>	<b>Thickness shall be confirmed during D/D.</b>
88	Z5008_1a	Rangpur	Dinajpur	Dinajpur	18	Silty Sand w Gravel, SM	50 <	
89	Z5024_5c	Rangpur	Rangpur	Rangpur-1	25	Silty Sand w Gravel, SP-SM	50 <	
90	Z5025_46a	Rangpur	Dinajpur	Dinajpur	34	Fine Sand, SM	50 <	
91	Z5040_4a	Rangpur	Bogra	Sherpur	25	Sand w Gravel, SP	50 <	
92	Z8810_13a	Barisal	Barisal	Barisal1	57	Silty Sand w Gravel, SM	<b>30&lt;</b>	
93	R585_80a	Rangpur	Dinajpur	Fulbari	24	Silty Sand w Gravel, SM	50 <	
94	Z8033_008a	Barisal	Barisal	Barisal1	51	Silty Sand w Gravel, SM	50<	
95	Z8033_019a	Barisal	Barisal	Barisal1	45	Low Plasticity Clay w Sand, CL	<b>20&lt;</b>	
96	Z8034_011a	Barisal	Barisal	Barisal1	38	Silty Sand w Gravel, SM	50<	
97	Z8044_004a	Barisal	Barisal	Barisal2	39	Silty Sand w Gravel, SM	50<	
98	R760_003a	Khulna	Khulna	Khulna-2	50	Silty Sand w Gravel, SM	50<	
99	R860_35a	Gopalganj	Shariatpur	Shariatpur	34	Poorly Graded Silty Sand w Gravel, SP-	50<	

SN	Bridge Data				Bearing Layer			
	Bridge ID	Zone	Division	Sub-Division	Depth (GL-m)	Soil Type	SPT N Value	Remarks
						SM		
100	Z5041_2a	Rajshahi	Serajganj	Sirajganj-2	30	Silty Sand w Gravel, SM	50 <	
I	N706_14b	Khulna	Jessore	Jessore-1	39	Silty Sand w Gravel, SM	50<	
II	N5_435a	Rangpur	Thakurgaon	Thakurgaon	18	Poorly Graded Silty Sand w Gravel, SP-SM	50 <	
III	N704_12c	Khulna	Jhenaidah	Jhenaidah	37	Silty Sand w Gravel, SM	50<	
IV	N805_24a	Gopalganj	Gopalganj	Bhatiapara	34	Silty Sand w Gravel, SM	50<	
V	R750_25a	Khulna	Narail	Narail	37	Silty Sand w Gravel, SM	50<	
VI	Z7503_5a	Khulna	Narail	Narail	44	Silty Sand w Gravel, SM	50<	

Source: JICA Survey Team

#### (4) Geomorphology

Geomorphologically, Bangladesh has five basic landscape categories:

- Tertiary hills, which include the hills of Chittagong and the Chittagong Hill Tracts and hills in Sylhet, all marked by deeply weathered lateritic red soils;
- Pleistocene terraces which include the Barind (North Bengal), the Madhupur Tract (Tangail and Dhaka), the Lalmi Tract (Comilla) and some higher ground in Sylhet; these areas are also lateritic;
- The Flood Plain, which is the broad area mainly north and east of the Padma River, which includes the Sylhet Basin, the Faridpur Trough and the piedmont alluvial plain of north Bengal. The soils are little-weathered gray silts and clays; locally there are near-surface peats;
- The Deltaic Plain which covers the area between the Ganges and the Bay of Bengal, passing southwards into the Sundarbans—the low tidal area of Khulna and Patuakhali;

- The South Coastal Plain, the low coastal area extending from Noakhali to south of Cox's Bazar;

However, roughly 80 percent of the landmass of Bangladesh is made up of fertile alluvial low land called the Bangladesh Plain. The plain is part of the larger Plain of Bengal, which is sometimes called the Lower Gangetic Plain. Although altitudes up to 105 meters above sea level occur in the northern part of the plain, most elevations are less than 10 meters above sea level; elevations decrease in the coastal south, where the terrain is generally at sea level. With such low elevations and numerous rivers, water--and concomitant flooding--is a predominant physical feature. About 10,000 square kilometers of the total area of Bangladesh is covered with water, and larger areas are routinely flooded during the monsoon season.

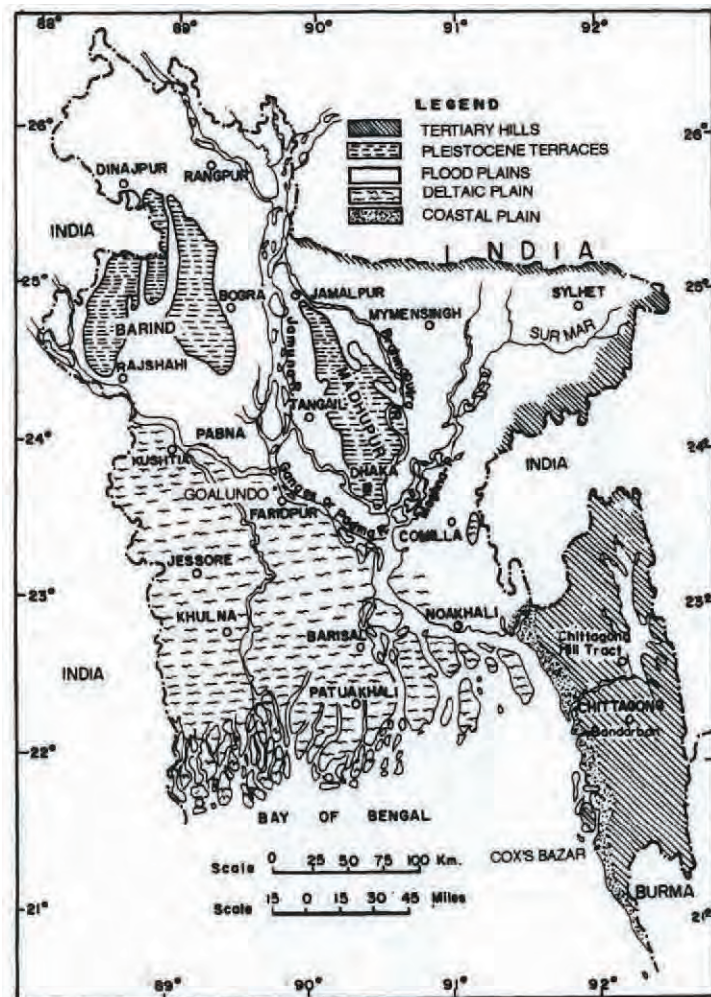


Figure 3: Geomorphological Division of Bangladesh

## **(5) Hydrology**

The landscape both of the Barind and floodplains has a southeast slope alignment and flow direction of the major rivers contribute to this assumption. The rivers in the downstream regions along flow directions either receive run-off through different tributaries or distribute run-off through many distributaries until finally shed the water to the sea. The rivers remain at spate during the monsoon due to local run-off in addition the trans-boundary rivers receive run-off from nearly 1.6 million Km<sup>2</sup> catchment in India Nepal and China. Usually 10-12 percent floodplain area in Bangladesh is flooded during monsoon in normal years. But up to 24 percent floodplain area of Bangladesh may submerge during abnormal floods peak flood levels in Padma and Jamuna coincides. This happens once in ten years or so.

The Deep Ground Water Table (DGWT) on Barind tract land fluctuates between 20 and 30 meters during the dry season and reaches near to the surface during the rainy season. Ground water table on terrace lands sinks up to 7.0 m during lean season due to draw down by deep tube wells. Further exploitation of DGW table may create imbalance between water demand and annual recharge affecting the poor people living on Barind land.

Ground water both shallow and deep in the floodplains are also being used intensively for irrigated agriculture, industrial and domestic uses throughout Bangladesh. This country though rich in ground water reserve and there exists ample opportunity for ground water recharge during monsoon and during floods but consistent and growing rate of exploitation ground water has already created a seasonal imbalance between demand and supply of water.

In addition to above, the annual highest / lowest water level and annual maximum / minimum discharge are collected at 86 gauge stations from BWDB. The design high water level necessary for proposed bridge sites are basically calculated from BDWB's historical data and are re-examined by checking the historical water level of interview survey etc. The criteria of HFL for each classification of proposed bridges is "20 year flood" for Z road and "50 year flood" for other high-standard roads, in reference to the RHD standards. The freeboard of each bridge for the clearance with bridge-girder is set to 30 cm or more at least. And, in case of a steel-girder bridge, the clearance of 3.0m for 1.1 year flood will be taken. Also, the designated clearance against SHWL will be secured if the underneath of a bridge is an official navigable waterway. Design High Water Levels (HWL) of candidate bridges are shown in Table ES-4.



**Table ES-4: Design High water Level for WBBIP Candidate Bridges**

Rank	File No.	Zone	Division	Latitude	Longitude	Bridge Name	Water Level (m, MSL)										Vertical Clearance (m, MSL)					
							1.1 yr (NHWL)	10 yr	20 yr (Design HWL)	50 yr (Design HWL)	100 yr	Applied Calculation High WaterLevel	Historical WL (by Interview)	Applied Design High Water Level	Bottom of Existing Bnd. Grder.	Necessary Freeboard	Design Bottom Level	Free-board				
1	N8_178a	Barisal	Barisal	22.57523	90.33665	Boaha Bazar Bridge	1.61	2.36	2.54	2.76	2.93	2.76	50yr	2.78	2007	2.78	Interview	4.767	1	3.08	4.77	1.99
2	N509_19a	Rangpur	Lalmoharhat	25.90944	89.36611	Sharmamoti Bridge	33.52	34.66	34.92	35.26	35.52	35.26	50yr	32.91	1988	35.26	50yr	34.352	3	35.56	35.56	0.30
3	N5_119a	Rajshahi	Pabna	24.04596	89.60433	Chanda Bridge	10.92	11.25	11.64	12.14	12.51	12.14	50yr	10.21	1988	12.14	50yr	12.547	3	12.44	12.55	0.40
4	N5_127a	Rajshahi	Pabna	24.10685	89.58131	Palgari Bridge	9.59	11.52	11.95	12.51	12.92	12.51	50yr	10.70	1988	12.51	50yr	11.918	3	12.81	12.81	0.30
5	N5_176a	Rajshahi	Serajanj	24.49098	89.50970	Bhuayagati Bridge	11.03	13.80	14.44	15.26	15.88	15.26	50yr	12.43	1988	15.26	50yr	16.592	3	15.56	16.59	1.33
6	N5_235a	Rangpur	Bogra	24.95429	89.35218	Mohoshan Bridge	15.77	17.64	18.06	18.58	19.00	18.58	50yr	18.13	1988	18.58	50yr	19.504	4	18.88	19.50	0.92
7	N5_120a	Rajshahi	Pabna	24.05006	89.60539	Chanda Bridge	9.56	11.30	11.59	12.14	12.51	12.14	50yr	10.29	1988	12.14	50yr	12.803	3	12.44	12.80	0.66
8	N5_128a	Rajshahi	Serajanj	24.10884	89.58032	Golhar Bridge	9.59	11.52	11.95	12.51	12.92	12.51	50yr	10.51	1988	12.51	50yr	12.424	3	12.81	12.81	0.30
9	N5_158a	Rajshahi	Serajanj	24.34696	89.56022	Purbodaha Bridge	10.43	12.80	13.35	14.09	14.63	14.09	50yr	11.93	1988	14.09	50yr	14.192	3	14.39	14.39	0.30
10	N5_265a	Rangpur	Gaibanda	25.20998	89.37933	Bupinath Bridge	20.02	21.87	22.36	22.90	23.58	22.90	50yr	20.00	1988	22.90	50yr	22.030	3	23.20	23.20	0.30
11	N5_350a	Rangpur	Rangpur	25.81133	89.04645	Barati Bridge	34.71	36.82	37.37	37.59	38.03	37.59	50yr	37.61	1988	37.61	Interview	38.652	1	37.91	38.65	1.04
12	N8_182a	Barisal	Barisal	22.54080	90.33331	Bakerganj Steel Bridge	1.60	2.41	2.59	2.84	3.02	2.84	50yr	2.57	2007	2.84	50yr	4.249	2	3.14	4.25	1.41
13	N7_025a	Gopalganj	Faridpur	23.60797	89.77770	Jhukibazar Bridge	4.45	7.29	7.89	8.75	9.39	8.75	50yr	7.62	1988	8.75	50yr	8.956	2	9.05	9.05	0.30
14	N7_039a	Gopalganj	Faridpur	23.53718	89.74696	Karipur Bridge	3.39	6.25	6.96	7.97	8.64	7.97	50yr	6.34	1988	7.97	50yr	10.140	3	8.27	10.14	2.17
15	N7_049a	Gopalganj	Faridpur	23.53743	89.65488	Porkatpur Bridge	5.27	7.26	7.84	8.45	9.16	8.45	50yr	7.81	1988	8.45	50yr	7.878	2	8.75	8.75	0.30
16	N5_134a	Rajshahi	Serajanj	24.15113	89.58649	Nukali Bridge	9.74	11.70	12.15	12.73	13.17	12.73	50yr	10.86	1988	12.73	50yr	12.314	4	13.03	13.03	0.30
17	N6_97a	Rajshahi	Natore	24.39912	89.03121	Dattapara Bridge	11.21	13.44	13.96	14.65	15.15	14.65	50yr	14.29	1988	14.65	50yr	15.380	2	14.95	15.38	0.73
18	R681_10a	Rajshahi	Rajshahi	24.42377	88.36178	Horisonkorpur Bridge	16.95	18.79	19.22	19.77	20.18	19.77	50yr	21.61	1998	21.61	Interview	21.072	1	21.91	21.91	0.30
19	N5_140a	Rajshahi	Serajanj	24.20225	89.58975	Jugindaha Bridge	9.91	12.05	12.53	13.09	13.57	13.09	50yr	11.45	1988	13.09	50yr	13.330	3	13.39	13.39	0.30
20	N5_118a	Rajshahi	Pabna	24.03262	89.60422	Panduria Bridge	9.59	11.21	11.58	12.06	12.47	12.06	50yr	10.36	1988	12.06	50yr	12.028	4	12.59	12.59	0.53
21	N704_43a	Khulna	Kushitia	23.88814	89.10800	G.K. Bridge	10.57	12.24	12.62	13.05	13.45	13.05	50yr	14.11	1988	14.11	Interview	13.615	1	14.41	14.41	0.30
22	N7_248c	Khulna	Bagerhat	22.55598	89.59497	Gera bridge	2.17	3.01	3.20	3.44	3.64	3.44	50yr	5.36	1988	5.36	Interview	4.547	1	5.66	5.66	0.30
23	N7_054a	Gopalganj	Faridpur	23.52929	89.60843	Barashah Bridge	5.86	7.80	8.22	8.72	9.14	8.72	50yr	8.77	1988	8.77	Interview	9.886	1	9.07	9.89	1.12
24	N5_356a	Rangpur	Rangpur	25.81108	88.98938	-	35.34	37.58	38.03	38.37	38.82	38.37	50yr	38.19	1988	38.37	50yr	39.267	2	38.67	39.27	0.89
25	N7_246a	Khulna	Bagerhat	22.57306	89.61417	Bakri bridge.	2.19	2.97	3.16	3.36	3.54	3.36	50yr	4.75	1988	4.75	Interview	7.342	1	5.05	7.34	2.59
26	N8_095a	Gopalganj	Madaripur	23.19906	90.06697	Amgram bridge	2.93	4.47	4.82	5.29	5.63	5.29	50yr	7.05	1988	7.05	Interview	7.465	1	7.35	7.47	0.42
27	N505_2a	Rajshahi	Pabna	23.88051	89.66450	Kazir Hat Bridge	8.65	10.18	10.54	11.03	11.38	11.03	50yr	11.72	1988	11.72	Interview	11.778	1	12.02	12.02	0.30
28	R548_28b	Rajshahi	Naogaon	24.61256	88.97474	Atrai Bridge	12.58	13.85	14.14	14.52	14.81	14.52	50yr	14.00	1988	14.52	50yr	17.890	4	18.84	18.84	4.32
29	N7_036c	Gopalganj	Faridpur	23.53911	89.76787	Kanaipur Bridge	3.11	6.18	7.11	7.88	8.57	7.88	50yr	6.81	1988	7.88	50yr	8.761	2	8.18	8.76	0.89
30	N7_048a	Gopalganj	Faridpur	23.53526	89.66585	Brahmonkanda Bridge	5.12	7.22	7.75	8.44	8.99	8.44	50yr	7.69	1988	8.44	50yr	8.017	2	8.74	8.74	0.30
31	N5_378a	Rangpur	Dinajpur	25.76659	88.83297	Gaudangi Bridge	37.95	39.77	40.16	40.54	40.92	40.54	50yr	39.85	1988	40.54	50yr	40.393	3	40.84	40.84	0.30
32	N7_047a	Gopalganj	Faridpur	23.53437	89.67187	Bamankanda bridge	4.94	7.12	7.67	8.48	8.99	8.48	50yr	7.68	1988	8.48	50yr	10.092	3	8.78	10.09	1.61
33	N5_156a	Rajshahi	Serajanj	24.33330	89.56192	Chowkidhoh Bridge	10.36	12.69	13.23	14.01	14.45	14.01	50yr	11.01	1988	14.01	50yr	13.822	3	14.31	14.31	0.30
34	N5_172a	Rajshahi	Serajanj	24.46282	89.53583	Notun Dhoh Bridge	10.89	13.67	14.28	15.12	15.74	15.12	50yr	13.38	1988	15.12	50yr	15.577	3	15.42	15.58	0.45
35	N5_179a	Rajshahi	Serajanj	24.51525	89.51174	Dhatia Bridge	11.13	13.93	14.61	15.43	16.22	15.43	50yr	13.51	1988	15.43	50yr	14.367	3	15.73	15.73	0.30
36	N5_188a	Rangpur	Bogra	24.57326	89.46623	Ghoga Bridge	11.34	14.26	14.93	15.82	16.47	15.82	50yr	13.08	1988	15.82	50yr	15.625	3	16.12	16.12	0.30
37	N5_126a	Rajshahi	Pabna	24.09295	89.58880	Vaapara Bridge	9.64	11.43	11.89	12.38	12.83	12.38	50yr	10.68	1988	12.38	50yr	12.784	4	12.68	12.78	0.40
38	N518_4a	Rangpur	Niphamari	25.77357	88.87754	Khorkhori bridge	37.99	39.50	40.02	40.45	41.25	40.45	50yr	39.83	1988	40.45	50yr	39.771	3	40.75	40.75	0.30
39	N7_141b	Khulna	Jessore	23.24180	89.16655	Buri Bharab Bridge	2.89	5.00	5.49	6.11	6.58	6.11	50yr	5.43	1988	6.11	50yr	6.595	2	6.41	6.60	0.48
40	R720_44a	Khulna	Narail	23.19756	89.51320	Garakhali Bridge	2.41	4.21	4.63	5.14	5.54	5.14	50yr	6.16	1971	6.16	Interview	5.106	1	6.46	6.46	0.30
41	N703_Sd	Khulna	Jhenaidah	23.54434	89.18502	Dhopa Ghata Bridge	5.03	7.04	7.50	8.04	8.53	8.04	50yr	4.28	1972	8.04	50yr	7.721	3	8.34	8.34	0.30
42	R890_45a	Barisal	Bhola	22.39444	90.75028	Dawrey Bridge	2.74	3.50	3.68	3.87	4.04	3.87	50yr	3.39	2007	3.87	50yr	4.334	3	4.17	4.33	0.46
43	N704_14a	Khulna	Jhenaidah	23.66693	89.19069	Barda Bridge	5.61	8.11	8.68	9.42	9.98	9.42	50yr	6.93	2004	9.42	50yr	9.344	3	9.72	9.72	0.30
44	N704_33b	Khulna	Kushitia	23.81508	89.10669	Balpara Bridge	9.59	10.59	11.67	11.76	12.43	11.76	50yr	11.13	1988	11.76	50yr	11.019	2	12.06	12.06	0.30
45	N5_344c	Rangpur	Rangpur	25.81161	89.10748	-	33.87	36.06	36.49	36.81	37.24	36.81	50yr	37.55	1988	37.55	Interview	38.710	1	37.85	38.71	1.16
46	N5_382a	Rangpur	Dinajpur	25.77362	88.79370	Ichamoti Bridge	38.51	39.96	40.32	40.95	41.31	40.95	50yr	41.61	1988	41.61	Interview	42.006	1	41.91	42.01	0.40
47	N5_360a	Rangpur	Rangpur	25.79629	88.95549	Chikhi Bridge	35.48	37.31	37.84	38.40	39.24	38.40	50yr	37.89	1988	38.40	50yr	37.143	3	38.70	38.70	0.30
48	Z2025_55a	Rangpur	Dinajpur	25.65236	88.76100	Kakra Bridge	34.35	35.95	36.35	36.88	37.26	36.35	20yr	35.72	1988	36.35	20yr	36.024	4	37.35	37.35	0.99
49	Z2025_64a	Rangpur	Dinajpur	25.63913	88.67052	Gabura Bridge.	33.05	34.52	34.88	35.38	35.72	34.88	20yr	35.16	1988	35.16	Interview	35.912	1	35.46	35.91	0.75
50	Z5401_45a	Rangpur	Bogra	24.67306	89																	

51	Z502_14a	Rangpur	Bogra	24.77375	89.51114	Bombgara Bridge	13.54	15.73	16.27	16.94	17.49	16.27	20yr	15.71	1988	16.27	20yr	15.478	3	16.57	16.57	0.30
52	Z5025_60a	Rangpur	Dinajpur	25.64322	88.71289	Madarganj Bridge	33.75	35.54	35.91	36.13	36.56	35.91	20yr	35.05	1988	35.91	20yr	35.614	3	36.21	36.21	0.30
53	Z5472_6a	Rangpur	Bogra	24.78607	89.00834	Raktodaho Bridge	13.65	14.91	15.20	15.58	15.86	15.20	20yr	13.32	1995	15.20	20yr	14.047	3	15.50	15.50	0.30
54	N5xc_Sa	Rajshahi	Serajganj	24.31051	89.56874	Pura Mukto Monch Bridge	10.29	12.60	13.13	13.80	14.32	13.80	50yr	13.08	1988	13.80	50yr	14.133	2	14.10	14.13	0.33
55	Z552_10a	Rangpur	Gaibanda	25.24301	89.55842	Baroda Khali Bridge	19.03	21.57	22.14	22.82	23.38	22.14	20yr	19.00	1988	22.14	20yr	21.566	4	22.44	22.44	0.30
56	N8_152c	Barisal	Barisal	22.78977	90.29966	Rahamatpur bridge	1.74	2.64	2.84	3.11	3.26	3.11	50yr	3.42	2007	3.42	Interview	6.004	1	3.72	6.00	2.58
57	N8_127b	Barisal	Barisal	22.97476	90.22227	g-sunagata bridge	1.73	3.49	3.89	4.41	4.83	4.41	50yr	3.47	2007	4.41	50yr	5.776	2	4.71	5.78	1.36
58	Z802_090a	Barisal	Patuakhali	22.36149	90.23581	Gabuala Steel Bridge	2.02	2.88	3.07	3.33	3.52	3.07	20yr	2.93	2007	3.07	20yr	2.534	2	3.37	3.37	0.30
59	Z5015_22a	Rangpur	Niphamari	25.84820	89.01941	Bahaghi Bridge	36.90	38.42	38.84	39.63	40.03	38.84	20yr	39.64	1988	39.64	Interview	39.493	1	39.94	39.94	0.30
60	Z5701_1a	Rangpur	Niphamari	25.93820	88.85464	Amandababur Pool	42.68	45.00	45.54	46.23	47.75	45.54	20yr	46.67	1988	46.67	Interview	47.561	1	46.97	47.56	0.89
61	Z5701_9a	Rangpur	Niphamari	25.95899	88.92791	Duhul Bridge	43.13	44.85	45.25	45.76	46.15	45.25	20yr	44.90	1988	45.25	20yr	45.089	2	45.55	45.55	0.30
62	R545_115c	Rangpur	Joypurhat	25.11106	88.98848	Mongle bari kuluhari Bridge	18.17	20.70	21.29	22.04	22.61	22.04	50yr	21.82	1995	22.04	50yr	22.542	4	22.34	22.54	0.50
63	R760_09a	Khulna	Satkhira	22.76601	89.13783	Shakudha bridge	2.48	3.48	3.71	4.00	4.22	4.00	50yr	2.18	2004	4.00	50yr	1.748	2	4.30	4.30	0.30
64	N8_123a	Barisal	Barisal	23.01499	90.21573	Sunderkhal bridge	1.95	3.68	4.07	4.57	4.94	4.57	50yr	4.11	1988	4.57	50yr	4.554	2	4.87	4.87	0.30
65	Z8701_3d	Barisal	Pirojpur	22.45557	89.99217	Bottala Bridge	2.05	2.47	2.58	2.67	2.77	2.58	20yr	3.02	2007	3.02	Interview	2.378	1	3.32	3.32	0.30
66	N5_260b	Rangpur	Gaibanda	25.17302	89.38917	Katakhali Bridge	19.47	21.27	21.69	22.29	22.70	22.29	50yr	21.86	1988	22.29	50yr	22.587	4	22.59	22.59	0.30
67	N704_27b	Khulna	Kushnia	23.76316	89.11935	Batipura Bridge	8.72	9.60	10.87	10.90	11.62	10.90	50yr	9.12	2007	10.90	50yr	9.522	2	11.20	11.20	0.30
68	R750_22c	Khulna	Narail	23.17611	89.41748	Bhangura Bridge	2.17	3.58	3.90	4.32	4.63	4.32	50yr	3.16	1988	4.32	50yr	4.144	2	4.62	4.62	0.30
69	N8_129a	Barisal	Barisal	22.96278	90.22483	Asokoti bridge	1.72	3.40	3.79	4.29	4.67	4.29	50yr	3.51	1988	4.29	50yr	4.676	2	4.59	4.68	0.39
70	R890_16a	Barisal	Bhola	22.59354	90.65823	Banglabazar Bridge	2.64	3.38	3.55	3.77	3.93	3.77	50yr	3.56	1988	3.77	50yr	4.294	2	4.07	4.29	0.53
71	R890_21a	Barisal	Bhola	22.55647	90.68513	Box-a-ali Bridge	2.74	3.50	3.68	3.87	4.04	3.87	50yr	1.98	1988	3.87	50yr	3.789	2	4.17	4.17	0.30
72	R890_28a	Barisal	Bhola	22.50263	90.71806	Bohamuddin Bridge	2.74	3.50	3.68	3.87	4.04	3.87	50yr	3.09	1988	3.87	50yr	3.780	2	4.17	4.17	0.30
73	R548_40a	Rajshahi	Natore	24.51393	88.95990	Mohis Mari Bridge	11.67	13.68	14.27	14.85	15.41	14.85	50yr	12.94	1988	14.85	50yr	13.417	2	15.15	15.15	0.30
74	R451_1a	Rajshahi	Serajganj	24.42991	89.60143	Naiori Bridge	11.34	13.50	13.92	14.46	14.87	14.46	50yr	12.81	1988	14.46	50yr	13.155	3	14.76	14.76	0.30
75	R451_7a	Rajshahi	Serajganj	24.44847	89.65045	Chondi Das Bridge	12.01	13.84	14.32	14.81	15.32	14.81	50yr	13.91	1988	14.81	50yr	14.041	4	15.11	15.11	0.30
76	R550_28b	Rangpur	Joypurhat	25.06914	89.09408	Botoli Bridge	16.65	18.59	19.06	19.81	20.28	19.81	50yr	19.31	1988	19.81	50yr	20.041	4	20.11	20.11	0.30
77	R860_31a	Gopalganj	Shariatpur	23.18750	90.39278	Papral Bailey Bridge	3.05	4.52	4.86	5.29	5.61	5.29	50yr	4.81	1988	5.29	50yr	5.479	2	5.59	5.59	0.30
78	Z8708_1c	Barisal	Jhalokati	22.55173	90.14478	Alibabur Khal Bridge	1.75	2.31	2.44	2.64	2.77	2.44	20yr	2.96	2007	2.96	Interview	3.028	1	3.26	3.26	0.30
79	N5_458a	Rangpur	Panchagarh	26.19750	88.55333	-	55.81	61.30	62.84	64.37	66.93	64.37	50yr	63.41	1988	64.37	50yr	63.910	2	64.67	64.67	0.30
80	N5_488a	Rangpur	Panchagarh	26.45259	88.50027	Chawai Bridge	77.43	79.45	79.91	80.52	80.97	80.52	50yr	80.86	1988	80.86	Interview	81.710	1	81.16	81.71	0.85
81	Z8708_12b	Barisal	Jhalokati	22.48093	90.15608	Boda Bridge	1.85	2.53	2.68	2.89	3.04	2.68	20yr	2.70	2007	2.70	Interview	3.846	1	3.00	3.85	1.15
82	Z8033_017a	Barisal	Barisal	22.77733	90.16790	Raiyer hat bridge	1.68	2.36	2.52	2.67	2.88	2.52	20yr	2.81	1988	2.81	Interview	4.179	1	3.11	4.18	1.37
83	R860_34a	Gopalganj	Shariatpur	23.19173	90.42214	Jajbar Bridge	3.16	4.52	4.84	5.28	5.60	5.28	50yr	4.24	1988	5.28	50yr	5.187	2	5.58	5.58	0.30
84	R860_44a	Gopalganj	Shariatpur	23.16974	90.48852	Gazipur Bridge	3.22	4.43	4.71	5.05	5.31	5.05	50yr	4.88	1988	5.05	50yr	11.061	3	5.35	11.06	6.02
85	R860_53d	Gopalganj	Shariatpur	23.19181	90.54877	Balar Bazar Bridge	3.50	4.50	4.74	5.09	5.32	5.09	50yr	5.51	1988	5.51	Interview	6.604	1	5.81	6.60	1.10
86	N8_69a	Gopalganj	Madaripur	23.38619	89.98333	Kumar Bridge	3.25	5.22	5.68	6.28	6.72	6.28	50yr	6.39	1988	6.39	Interview	12.157	1	6.69	12.16	5.77
87	Z6010_12b	Rajshahi	Rajshahi	24.44441	88.69412	Falartul Bridge	12.94	14.87	15.31	15.92	16.37	15.31	20yr	13.84	1998	15.31	20yr	15.080	2	15.61	15.61	0.30
88	Z8008_1a	Rangpur	Dinajpur	25.86823	88.66274	Choto Dhepa bridge	40.50	43.50	44.20	45.09	45.76	44.20	20yr	42.99	1988	44.20	20yr	43.085	3	44.50	44.50	0.30
89	Z5024_5c	Rangpur	Rangpur	25.69610	89.12868	Shampur Bridge	30.10	32.09	32.56	33.20	33.65	32.56	20yr	33.09	1988	33.09	Interview	33.577	1	33.39	33.58	0.49
90	Z5025_46a	Rangpur	Dinajpur	25.66036	88.84279	Bondoeer pool Bridge	34.60	37.00	37.53	38.05	38.68	37.53	20yr	36.56	1988	37.53	20yr	36.837	3	37.83	37.83	0.30
91	Z5040_4a	Rangpur	Bogra	24.79717	89.42718	Khottapara Bridge	13.49	15.79	16.32	17.01	17.52	16.32	20yr	15.73	1988	16.32	20yr	16.555	2	16.62	16.62	0.30
92	Z8810_13a	Barisal	Barisal	22.45972	90.27722	Bainogram Bridge	1.79	2.60	2.79	3.04	3.23	2.79	20yr	3.25	2007	3.25	Interview	5.787	1	3.55	5.79	2.53
93	R585_80a	Rangpur	Dinajpur	25.54303	88.83569	Bhela Bridge	29.80	32.03	32.52	32.96	33.48	32.96	50yr	32.36	1988	32.96	50yr	32.310	2	33.26	33.26	0.30
94	Z8033_008a	Barisal	Barisal	22.78109	90.25389	Kaljira bridge	1.72	2.49	2.67	2.90	3.08	2.67	20yr	4.44	2007	4.44	Interview	6.409	1	4.74	6.41	1.97
95	Z8033_019a	Barisal	Barisal	22.77402	90.15490	Masrong bridge	1.67	2.33	2.49	2.69	2.76	2.49	20yr	2.80	2007	2.80	Interview	2.687	1	3.10	3.10	0.30
96	Z8034_011a	Barisal	Barisal	22.83763	90.37638	Padarhat bridge	2.03	2.90	3.10	3.36	3.56	3.10	20yr	3.30	1988	3.30	Interview	3.883	1	3.60	3.88	0.59
97	Z8044_004a	Barisal	Barisal	22.66268	90.41371	Tahkdarhat Bailey Bridge	1.88	2.37	2.52	2.67	2.73	2.52	20yr	2.19	1988	2.52	20yr	3.602	2	2.82	3.60	1.08
99	R860_35a	Gopalganj	Shariatpur	23.19230	90.43252	Shajampur Bailey Bridge	3.20	4.51	4.82	5.26	5.57	5.26	50yr	4.77	1988	5.26	50yr	6.327	2	5.56	6.33	1.06
100	Z5041_2a	Rajshahi	Serajganj	24.48767	89.48966	Debakbazar Bridge	10.99	13.76	14.39	15.11	15.71	14.39	20yr	14.63	1988	14.63	Interview	14.259	1	14.93	14.93	0.30
101	N706_14b	Khulna	Jessore	23.10002	89.09856	Bhokorgacha Bridge	2.65	4.68	5.16	5.77	6.23	5.77	50yr	3.77	2000	5.77	50yr	4.790	3	6.07	6.07	0.30
102	N5_435a	Rangpur	Thakurgaon	26.01972	88.46917	-	48.28	49.59	49.90	50.07	50.58	50.07	50yr	52.76	1988	52.76	Interview	52.497	1	53.06	53.06	0.30
103	N704_12c	Khulna	Jhenaidah	23.65560	89.19864	Chandi Pur Bridge	5.19	7.76	8.36	9.21	9.80	9.21	50yr	6.93	?	9.21	50yr	9.834	2	9.51	9.83	0.62
104	N805_24a	Gopalganj	Gopalganj	23.28778	89.81083	Garakola Bridge	2.55	4.87	5.40	6.07	6.59	6.07	50yr	5.73	1988	6.07	50yr	8.691	3	6.37	8.69	2.62
105	R750_25a	Khulna	Narail	23.16694	89.44167	Tularampur Bridge	2.18	3.57	3.89	4.30	4.61	4.30	50yr	3.39	1971	4.30	50yr	5.704	3	4.60	5.70	1.40
106	Z7503_5a	Khulna	Narail	23.18000	89.55861	Hawai khali Bridge	2.39	4.20	4.62	5.10	5.50	5.10	50yr	6.03	1971	6.03	Interview	5.761	1	6.33	6.33	0.30

Source: JICA Survey Team

## G. Biological Environment

### (1) The floral species

The WBBIP sites do not pass through the national forests managed by BFD except the localized patches of Sal forest in the northwest region. The tree planting culture on road sides developed since the Moghul and subsequently British periods. BFD since eighties began roadside tree planting keeping in mind the economic, ecological and aesthetic objectives. Later CARE, SIDA and Proshika planted trees on roadsides with multiple objectives e.g. to generate rural employment, to boost production of timber, industrial raw material and fuel wood and for alleviation of rural poverty.

The species planted on road sides are: rain tree (*Samanea saman*), krishnachura (*Cassia fistula*), mehagony (*Swietenia macrophylla*), raj koroi (*Albizia richardiana*), auricoliformis (*Acaciaauri coliformis*), eucalyptus (*Eucalyptus Camaldulensis*) and sisoo (*Dalbarziasisoo*).

The homestead species are: mango (*Mangifera indica*), black berry (*Syzygium cumini*), jack fruit (*Artocarpus heterophyllus*), coconut (*Cocos nucifera*), betel nut (*Areca catechu*), etc.

Hijal (*Barringtonia acutangula*), mandar (*Erithrina indica*), pitali (*Trewia nudiflora*), silk cotton (*Bombax ceiba*), toddy palm (*Borassus flabellifer*) are planted in flooded land.

The aquatic floral species include: kochuripana (*Eichhornia crassipes*), khudipana (*Lemna minor*), shapla (*Nymphaea spp.*) kolmi (*Ipomea aquatic*), halencha (*Enhydra fluctuant*) and many weed species. The kochoripana, khudipan and several other floating species are treated as eutropic vegetations.

### (2) The faunal and avifaunal species

Commonly observed wildlife species are: jackal (*Vulpes bengalensis*), mongoose (*Herpestes edwarsi*), civet cat (*Viverricula indica*), otter, snake, rodents, frogs, toad, and turtles still suspected to appear at WBBIP site.

The commonly observed birds are: spotted dobe (*Streptopelia spp.*), rock pigeon (*Columba livia*), parakeet (*Psittacula krameri*), cuckoo (*Hierococcyx spp.*), koel (*Eudynamis scolopacea*), owl (*Athene brama*), drongos (*Dicrusus spp.*), common myna (*Acridotheres spp.*), crow (*Corvus spp.*), magpie robin (*Copsychus saularis*), red vented bulbul (*Pycnonotus cafer*), jungle babbler (*Turdodais striatus*), tailored bird (*Orthotomus sutorius*), heron, little egret, cattle egret, storks and several wetland bird species.

### (3) Biodiversity status

The major habitats for floral and faunal diversities in Bangladesh are the hill forests, inland upland forest, homesteads, wetlands, coastal mangrove forest, agriculture lands, etc. All the ecosystems have been disturbed since the past decades due to poor management, demographic pressure, natural calamities and deteriorated law and order situation. Consequently, diversity and population of flora and fauna declined in Bangladesh. Many wildlife species as a result is under stress and 50 of those are endangered already. Ten percent mammal, 3.0 percent avifauna and 4.0 percent reptile species are extinct in Bangladesh. The biodiversity status should be examined in DD stage.

## H. Socio-economic Environment

### (1) Water Uses

Almost 86% of the affected households use tube well water, 72% use canal water for drinking and other daily use. They use pond or canal water mainly for bathing, cloth and dish washing, etc. Sanitation condition of the project area is well. On the other hand the households living in urban area use piped water (2.57%).

**Table ES-5: Source of Drinking Water of the Households by Zone**

Zone	Rajshahi		Rangpur		Barishal		Gopalganj		Khulna		Total	
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%
Pump well	469	92.32	929	95.58	501	69.97	309	97.17	494	77.07	2,702	85.64
Piped water from utility company	14	2.76	6	0.62	8	1.12	5	1.57	48	7.49	81	2.57
Private water seller	2	0.39	3	0.31	2	0.28	0	0.00	2	0.31	9	0.29
Canal	16	3.15	17	1.75	165	23.04	4	1.26	26	4.06	228	7.23
Other	7	1.38	17	1.75	40	5.59		0.00	71	11.08	135	4.28
Grand Total	508	100.00	972	100.00	716	100.00	318	100.00	641	100.00	3,155	100.00

Source : JICA Survey Team

Like waste management majority of the household through away the waste water directly outside of the house. As majority of the households are rural dwellers they do not have facilities to through water in a planned manner. However, more than 5% household through their water in their septic tank and only 2% household use public drains for the purpose.

## (2) Socio-cultural infrastructures

The socio-cultural structures built during the Buddhists period revealed from archaeological excavations at Mohasthangarh and Paharpur. Lakes, wells, temples and stone sculptures of Radha-Krishna and different Gods and Goddess represent the Hindu period. Many sculptures of Hindu period are engraved in stone, bronze, wood and terracotta drawings on temple walls have been unveiled in the recent past from different parts of Bangladesh as well as WBBIP areas. Muslim and Mughal structures are mosques, tombs and military structures that exist in the Project areas. However, the bridges were selected to avoid the socio-cultural infrastructures.

## (3) Indigenous/ethnic communities

Based on findings of the survey, the Project will affect 3,253 PAUs of which 788 are residential and 2,367 are commercial households and rest 98 are CPRs. The impacts and their losses have been described in Chapter 3. Out of total 3,155 households 2,662 are Muslim, 477 are Hindu, 07 are Christian, 03 are Buddhist by faith and 06 are by other faith. No ethnic minority is found in the proposed project locations. Detail of households in terms of religion is shown in Table ES-6.

**Table ES-6: Affected Households by Zones and Religion**

Religion	Affected households by zone and Religion						Percentage
	Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	Total	
Islam	872	441	276	522	551	2,662	84.37
Hindu	99	65	41	111	161	477	15.12
Christian	01	00	00	05	01	07	00.22
Buddhist	00	00	01	00	02	03	00.10
Other	00	02	00	03	01	06	00.19
Total	972	508	318	641	716	3,155	100.00

Source: SES (2014) by JICA Survey Team

#### (4) Fisherman community

- I. The fisherman community in Bangladesh are engaged in marine and/or fresh water fishing, fishing may be their fulltime or part time occupation. The fisherman community in Bangladesh is struggling hard to survive, because reduced fish catch, increased cost of living, shrinking of wetland and due to conflicts with the privileged adopted the profession as interest shooters. Pollution of open water bodies due to disposal of industrial and urban wastes affected the population and diversity of fresh water fish species. **It is found from reconnaissance survey that WBBIP implementation will however not impact the fisherman communities adversely.****Environmental Quality**

#### (1) Air pollution

The air quality of different locations (105 points of bridges in the Western Bangladesh) had been assessed. The major components of air pollution are respirable suspended particulate matter, and gaseous pollutants such as: CO, CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub>.

The PM<sub>10</sub> concentration standard is 500µg/m<sup>3</sup> for industrial and mixed zone, and is 100µg/m<sup>3</sup> for sensitive zone. In this study, it has been observed that the PM<sub>10</sub> concentration of 48 sampling points (45.3% of sampling sites) is below the standard limit (<100 µg/m<sup>3</sup>) while only for 7 locations, PM<sub>10</sub> concentration exceeds the limit 500µg/m<sup>3</sup>. The highest PM<sub>10</sub> concentration was found in Dattapara Bridge (Rank 17) and Harishankarpur Bridge (Rank -8) where the value exceeds 1,000µg/m<sup>3</sup>. These two points were located in a very busy road and the sampling was performed in a sunny day (average temperature ~37<sup>0</sup>C). The minimum PM<sub>10</sub> concentration was observed in sampling point named Rayerhat Bridge (Rank-82); it was mainly because rain started in the middle of sampling. Due to the monsoon, there are several points where sampling was performed in the middle of raining or after the raining, and therefore, the lower pollutant concentration was observed. The average ratio of total suspended particulate matters (SPM) and PM<sub>10</sub> is about 3.5.

The gaseous pollutant standard limit is 0.045ppm for SO<sub>2</sub>, 4.36ppm for CO and 0.053 ppm for NO<sub>x</sub>. For most of the selected sites, the gaseous pollutant concentration was below the standard limit. Only for three sites carbon monoxide concentration was found higher than the standard limit. The average carbon dioxide concentration was about 480 ppm. There are few sites (about 5%) where carbon dioxide concentration was found comparatively higher. The higher gaseous concentration was observed in the sampling points which were located either in busy area or near to the industrial area or brick fields. The concentrations of NO<sub>x</sub> and SO<sub>2</sub> were found either in trace amount or below the detection range.

## (2) Water pollution

Surface and ground water samples near 105 bridge points in the Western Bangladesh had been collected and tested for different parameters according to the methods described earlier. Apart from few exceptions, most of the water parameters were found to be consistent and within the limit proposed by Environment Conservation Rules, (ECR), 1997 of the Government of Bangladesh. Surface water pH values were mostly within 6.5 to 8.5, the range allowed by ECR. Only 3.8% samples had pH value higher than 9 with only one sample higher than 10. All of the ground water pH readings were found to be within the range suggested by ECR. Most of the surface water samples had temperature within the range of 20-30°C; however, a significant number of samples also had higher temperature mainly because of the high ambient temperature in summer. Groundwater samples were relatively cooler than the surface water of the same location and were rarely found to be higher than 30°C.

Dissolved oxygen is one of the most important parameters that need to be higher than 5 mg/L according to ECR and other international standards. Though around 38.6% surface water samples had DO less than 5 mg/L, only 5.6% samples had DO really low (less than 3.5 mg/L). These water sources might have been contaminated with inorganic or other pollutants. Moreover, samples were collected during the months of summer when the ambient temperature was very high on most of the days causing a low level for dissolved oxygen in water. Ground water samples had lower DO, as expected, and few of them were found to be as low as ~1 mg/L.

The surface water turbidity values were found to be very scattered ranging from 3 to 750 FTU. This is because of different types and extent of sedimentation and insoluble contamination from run-off and nearby populations. Some might have been affected by waste water from different sources as well. One thing to be noted is that the turbidity values in the southern region (especially, Barishal and Patuakhali) tend to be relatively higher and that might be explained by the presence of salt in water. Turbidity is not a major concern for ground water and thus was not considered in this study. Conductivity is an important parameter for ground water and 87% samples exhibited conductivity lower than 1 ms/cm. For rest 13% of ground water samples, slightly higher conductivity was found, which might be related to the presence of higher metal ions (such as: iron).

As surface water is exposed to the atmosphere, it might retain significant amount of suspended solid. Our analysis found varying amount of total suspended solid (TSS) in surface water samples, where most of the samples (85%) had TSS lower than 0.2g/L and only few (4.7%) had TSS as high as 0.4g/L. This can be a rainy and windy weather,



populated neighborhood and many more influenced factors. Since there is no standard set for this parameter in Bangladesh (ECR, 97), it is not possible to compare the experimental values with the national standard.

Finally, biochemical oxygen demand (BOD) was analyzed for both surface and ground water samples. ECR suggested maximum value for BOD<sub>5</sub> is 6mg/L for surface water and 0.2mg/L for drinking water if supplied after disinfecting. Most of the surface water samples (76.5%) were found to be good according to ECR, 97 and remaining 23.5% water samples had BOD<sub>5</sub> higher than 6mg/L. Those water sources could have been contaminated with different types of organic pollutants such as: municipal, domestic and agricultural wastes. Only very few (1.8%) samples had relatively higher BOD<sub>5</sub> (higher than 9mg/L) and that indicates an overall good quality of surface water in that region. Ground water is supposed to be less contaminated and our analysis result also suggested the same. 46% ground water samples had BOD<sub>5</sub> higher than 3mg/L indicating presence of organic contamination to some extent. It is not uncommon for the tube wells to go under water during flood and that can introduce organic contamination in ground water. In many areas, ground water could also be contaminated with microorganisms causing a slightly higher BOD<sub>5</sub> value. This can only be confirmed with any type of coliform test. Since BOD<sub>5</sub> values of the above ground water samples exceed the standard value of drinking water BOD<sub>5</sub> (0.2mg/L, ECR, 97).

### **(3) Soil pollution**

The agricultural soils at bridges construction sites can be polluted due to accumulation of agro-chemical residues, non-essential ingredients and impurities accumulated due to application of chemical fertilizers. The solid wastes disposed from household sites, industries and commercial sites can pollute soil. The plant nutrients removed each year with crops and crop residues deplete soil fertility. Pollution of soil along the highway sides may be caused due to spillage of petroleum products, bituminous materials, and noxious chemicals and due to accumulation of heavy metals emitted from automobile engines with exhausts. Use of dredge materials for embankment construction may contain noxious metals that can pollute the agriculture lands along road alignment. Moreover, accidental spillage of petroleum derivatives and various noxious fluids and chemicals can also pollute soil along road alignments. Therefore, proper mitigation measures should be undertaken in construction stage.

### **(4) Noise and vibration**

The noise level was monitored for each selected sites. In most of the sites, the average noise level was below the standard limit (~80 dB). There were few locations located



near the bazar (market) areas or busy road where noise level exceeded the standard limit.

#### J. Activities during Implementation Stage

The impacts indicated in this Chapter are relevant to the activities under taken during the implementation stages. The measures to be undertaken to avoid, and/or minimize these impacts during the planning, design and implementation stages have also been suggested.

Long-term impacts (loss of land, loss of wetland, disturbance to ecological/archaeological and vulnerable sites, psychological stress, etc.) can though be minimized by adopting mitigation measures but scars of such impacts will persist in PAPs minds. Impacts of activities during project implementation stages are shown in the following Table ES-7.

**Table ES-7: Project activities and key environmental issues**

<b>Project Stage</b>	<b>Construction Activities</b>	<b>Key Environmental Issues</b>
Pre-construction Stage	Alignments fixing on map	<ul style="list-style-type: none"> <li>• No impact</li> </ul>
	Survey camp setting and conducting survey work	<ul style="list-style-type: none"> <li>• Psychological stress</li> <li>• Disturbance on privacy</li> </ul>
Construction Stage	Base camp and labour camps setting at work sites	<ul style="list-style-type: none"> <li>• Employment generation</li> <li>• Psychological stress</li> <li>• Social disturbance</li> </ul>
	Mobilization of construction machinery/ vehicles and plants	<ul style="list-style-type: none"> <li>• Noise and vibration/dust blowing</li> <li>• Road pavement damage/ traffic disruption</li> <li>• Psychological stress</li> <li>• Employment generation</li> </ul>
	Site clearance	<ul style="list-style-type: none"> <li>• Loss of ecological balance</li> <li>• Disturbance to services facilities</li> <li>• Demolition of domestic/industrial/commercial structures</li> <li>• Loss of livelihood</li> <li>• Pollution due to noise and dust blowing</li> <li>• Employment generation</li> </ul>

	Earth work for approach road construction	<ul style="list-style-type: none"> <li>• Land loss</li> <li>• Traffic disruption</li> <li>• Loss of landscape beauty</li> <li>• Employment generation</li> </ul>
	Stockpiling of fill materials for bypass road construction	
	Haulage and storage of construction materials	<ul style="list-style-type: none"> <li>• Loss of landscape beauty</li> <li>• Pollution due to dust blowing</li> </ul>
	Pavement construction	<ul style="list-style-type: none"> <li>• Air pollution by smoke / Asphalt mix plant operation</li> </ul>
	Construction of bridge, toll plaza and bypass road	<ul style="list-style-type: none"> <li>• Induced traffic congestion</li> <li>• Air pollution</li> <li>• Noise pollution</li> <li>• Induced road accident risk</li> </ul>
Operation Stage	Traffic management	<ul style="list-style-type: none"> <li>• Improvement of road traffic system</li> <li>• Increased risk of traffic accident</li> </ul>
	Maintenance of bridge, approach roads and side slopes	<ul style="list-style-type: none"> <li>• Temporary disruption to traffic movement</li> </ul>
	Monitoring regarding	<ul style="list-style-type: none"> <li>• Resource generation</li> <li>• Improved aesthetic beauty</li> <li>• Improved socio-economic situation</li> </ul>

#### K. Environmental Impact Identification

Identification of environmental impacts (IECs) during implementation stages was done during field visits. IECs at bridge sites that can be impacted are different at different bridge sites that have been identified and described along with the different bridges relating to interventions. The IECs identified in respect of importance are physical, ecological, socio-cultural components and pollution that can directly impact food production, livelihood, quality of life and pollution of environmental resources. Implementation stages like pre-construction, construction and operation stages involve different activities and different type of impacts on environmental components. Magnitudes of the impacts on different environmental components can be assessed comparing with the ambient conditions.

Impact identification on IECs significantly affected, is done in Bangladesh adopting the standard checklist, flow chart and matrices. New bridges that to be reconstructed and replaced under WBBIP along existing road alignment and on RHD land. Hence, under the situation minimal impact on IECs apprehended during subproject implementation stages. However, the findings have mainly been included in the EIAs prepared for the individual bridges. From this context this report is of general type that can be followed in

preparing the EIAs for individual bridges during implementation stage of the WBBIP wherever so required.

**L. Environmental Impact Scoping Matrices**

The impacts of any development endeavor particularly due to implementation of infrastructure project can be considered under different situations e.g. as per the proposed project alignment, considering alternative alignment and under no change situation. The 3rd alternative may not apply for WBBIP as the bridges already occur, hence scoping of matrices should be considered keeping in mind the remaining two situations.

It should be noted that activities associated with implementation of WBBIP will impact the IECs positively and/or negatively to different magnitudes. The matrices of environmental impacts on IECs are therefore used to identify the impacts systematically in relation to project activities and the impacts on environmental parameters maintaining rational with the cause and effect relationships.

Impacts of bridges construction on IECs during pre-construction, construction and operation stages indicted in Table ES-8 are for general considerations and may not apply for individual bridge.

**Table ES-8: Environment Pollution Impact Study**

Anti-Pollution Measures				
No.	Items of Impact	Assessed Impact		Reason of Assessment
		Before/ During Const- ruction Stage	Operation Stage	
1	Air pollution	B	D	Air pollution will be caused during construction stage due to vehicular emissions and dust blowing.
2	Water pollution	B	D	Water pollution during construction stage likely due to construction activities.
3	Soil pollution	B	D	Soil pollution during construction stage may be caused due to spilling of oil and lubricants.

4	Waste	B	D	Camp sites and construction wastes may pollute soil.
5	Noise and vibration	B	C	Noise level may increase during construction.
6	Ground subsidence	D	D	No ground subsidence likely during implementation stages.
7	Offensive odors	D	D	No offensive odor likely at any stage of project implementation.
8	Global warming/Climate change	D	D	No impact anticipated due to global warming.
<b>Natural Environment</b>				
9	Topography and geology	D	D	No impact anticipated due to implementation of the project.
10	Bottom sediment	D	D	No impact anticipated
11	Biota and ecosystem	D	D	No impact anticipated
12	Hydrology	D	D	No impact on hydrology apprehended.
13	Water use	D	D	No impact on water use apprehended due to project implementation.
14	Protected area	D	D	No protected site will be affected.
15	Involuntary resettlement	B	C	Displacement is required in pre-construction stage.
16	Local economies, such as employment, livelihood, etc.	B	D	At several bridges sites livelihoods may be affected due to removal of shops and acquisition lands.
17	Land use and utilization of local resources	D	D	Impact on land use may not be serious due to acquisition of agriculture lands at several bridge sites.
18	Social institutions and local decision-making institutions and social service facilities	B	D	Some utilities might be affected due to the new bridge construction.
19	Poor	B	C	Poor people living on

				RHD land may be affected.
20	Indigenous or ethnic minority people	D	D	No indigenous tribal people likely to be affected due to WBBIP implementation.
21	Misdistribution of benefits and damages	D	D	No impact might be anticipated.
22	Local conflicts of interest	D	D	No impact might be anticipated.
23	Gender	D	D	No negative impact on gender issues apprehended.
24	Children's right	D	D	No legal rights of children are anticipated.
25	Cultural heritage	D	D	No cultural and/or historical relics occurs at bridges sites hence will not be affected.
26	Infectious diseases such as HIV/AIDS	B	D	Influx of worker may cause the possibility of infectious diseases.
27	Landscape	D	D	No impact might be anticipated.
28	Working conditions	B	D	Insufficient safety management will cause the accidents in construction stage.
29	Social consensus	B	D	The physical construction activities might be hampered without appropriate local consensus.
<b>Others</b>				
30	Accident	B	D	In-appropriate traffic control may induce accidents.

Source: JICA Survey Team

Note: A: Remarkable Negative Impact is predicted.

B: Negative Impact is expected to some extent.

C: Extent of Impact is unknown. (A further examination is needed and the impact could be defined as study progresses)

D: Impact is very small or nil and further survey is not required

### **M. Mitigation Measures**

Surrounding environmental condition and nature of the WBBIP are very similar. Thus, Table ES-7 and Table ES-8 present the combined mitigation measures on anticipated

adverse impacts in pre-construction, construction stage and operation stages, respectively. The mitigation measures are summarized in following table.

**Table ES-9: Mitigation measures pre-construction/during construction Stage**

Item of Impact	Magnitude of adverse impact	Mitigation Measures
Air pollution	B	<ul style="list-style-type: none"> <li>- Contractors are required to conduct daily routine equipment and machinery check-ups to ensure that these are in the optimum working conditions.</li> <li>- Regular preventive maintenance service of construction equipment and machineries will strictly comply with.</li> <li>- To reduce the dust, periodical water spray should be taken.</li> </ul>
Water pollution	B	<ul style="list-style-type: none"> <li>- Temporary coffer dam must be provided to accelerate sedimentation of turbid water and prevent a straight water flow into the present water way.</li> <li>- Temporary sanitation facilities such as portable toilets and garbage bins will be provided by the contractors to ensure that the domestic wastes to be generated by the construction personals are properly handled and not thrown into the drainage to prevent further pollution.</li> </ul>
Soil pollution	B	<ul style="list-style-type: none"> <li>- The operator of heavy equipment should pay attention to prevent fuel leakage when he feeds.</li> <li>- The contractor and consultant of supervision should monitor the manner of fuel feed.</li> </ul>
Waste	B	<ul style="list-style-type: none"> <li>- Contractors are required to facilitate proper disposal plan and manage the construction waste.</li> <li>- The consultant of supervision should monitor the waste disposal.</li> </ul>
Noise and vibration	B	<ul style="list-style-type: none"> <li>- Noise suppressors such as mufflers will be installed whenever deemed necessary to maintain the noise the noise generated by the various heavy equipment and other construction machinery within permissible limits.</li> <li>- Contractors are required to use low-noise equipped machinery whenever it is necessary.</li> </ul>

Involuntary resettlement	B	<ul style="list-style-type: none"> <li>- Conduct census survey and local stakeholder meeting.</li> <li>- Prepare ARP involving the following measures. <ul style="list-style-type: none"> <li>• PAPs must be acknowledged as an eligible for compensation.</li> <li>• Identify the eligibility of non-titled people at the census survey intended to PAPs and ensure the compensation and support.</li> <li>• Refer the previous/on-going projects by other donors, determine the requirement for social vulnerability and compensate to them.</li> <li>• Resettlement site must be prepared when PAPs need it.</li> </ul> </li> <li>- Establish external monitoring committee consists of the third party.</li> </ul>
Local economies, such as employment, livelihood etc.	B	<ul style="list-style-type: none"> <li>- Prepare ARP involving the following measure. <ul style="list-style-type: none"> <li>• Measure to restore PAPs' livelihood must be secured.</li> </ul> </li> </ul>
Social institutions, such as social infrastructure and local decision making institutions. Existing social infrastructure and services	B	<ul style="list-style-type: none"> <li>- Social utilities; such as power supply, drinking water, drainage and communication line are to be diverted before starting the construction activity.</li> </ul>
Poor people	B	<ul style="list-style-type: none"> <li>- To minimize impact on present agricultural activities, the construction schedule should be disclosed to the PAPs at the earliest possible stage.</li> <li>- The proper compensation should be given to the PAPs.</li> </ul>
Infectious diseases such as HIV/AIDS	B	<ul style="list-style-type: none"> <li>- Contactor will be required to conduct a periodical health education to his personnel.</li> </ul>
Working conditions	B	<ul style="list-style-type: none"> <li>- Construction personnel provides with the necessary safety gears such as protective hard hat and safety belt as necessary.</li> <li>- Contractor must provide temporary scaffolding, temporary landslide protection wall etc. to protect workers.</li> </ul>
Social consensus	B	<ul style="list-style-type: none"> <li>- PIU/RHD must hold local stakeholder meetings periodically, and release project information to neighbor villagers.</li> </ul>
Accident	B	<ul style="list-style-type: none"> <li>- A sound traffic management and detour plans duly approved by the local RHD must be strictly implemented.</li> <li>- Traffic enforcers and flagmen will be designated when heavy equipment/vehicle will be operated adjacent to public road.</li> </ul>

Source: JICA Survey Team

**Table ES-10: Mitigation measures in operation stage**

Item of Impact	Magnitude of adverse impact	Mitigation Measures
Noise	C	- Monitoring and review the result byRHD.
Involuntary resettlement	C	- Monitoring by external monitoring agency and confirm if issues are arisen or not.
Poor people	C	- Monitoring by external monitoring agency and confirm if issues are arisen or not.

Source: JICA Survey Team

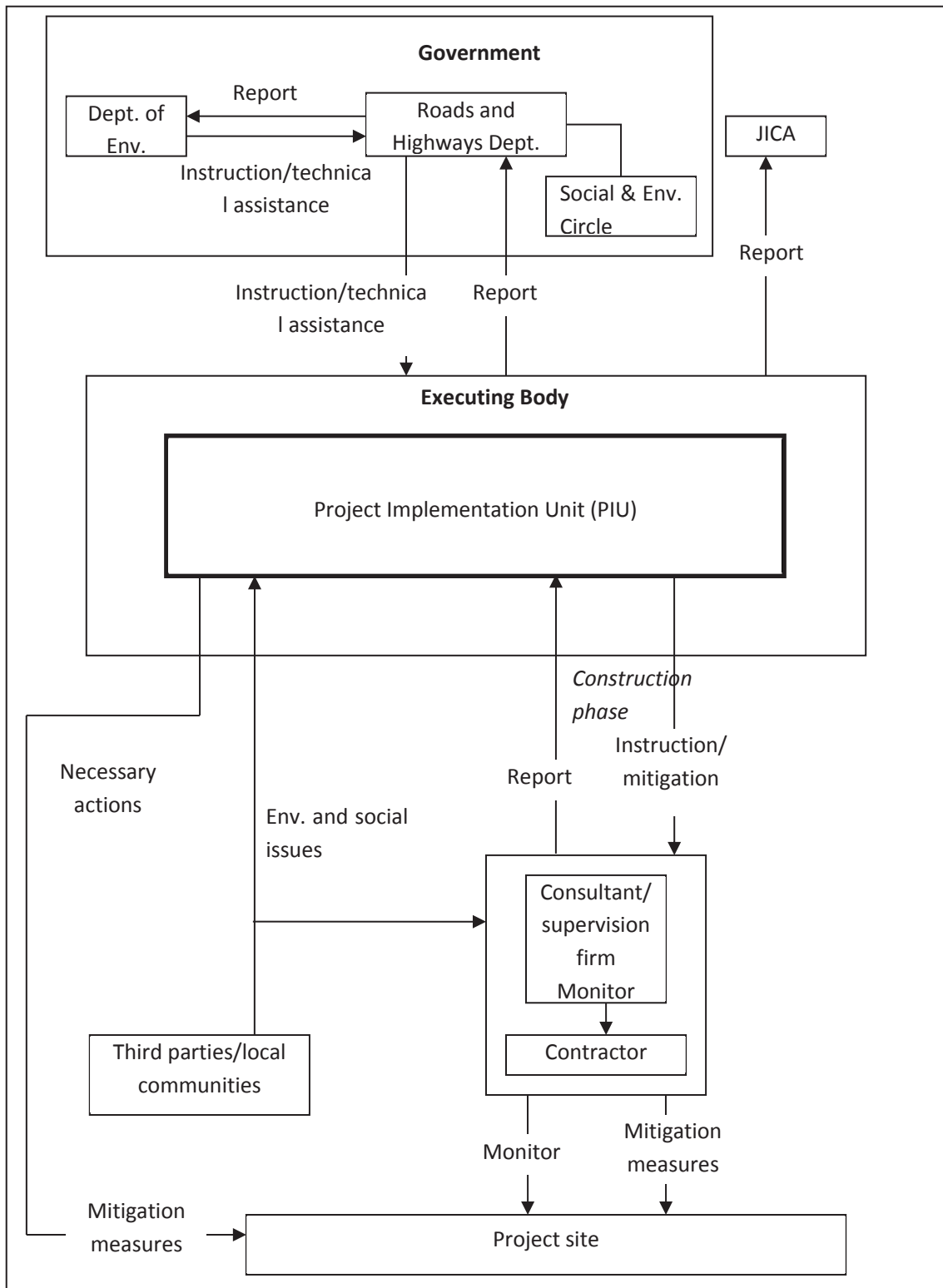
## **N. ENVIRONMENTAL MANAGEMENT PLAN**

Environmental Management Plan (EMP) includes the Institutional Framework and Environmental Monitoring Plan (EMoP).

### **(1) *Institutional Framework***

The institutional framework for environmental management and monitoring is presented in Figure 4.





**Figure 4: Institutional Framework for Environmental Management and Monitoring**

**(2) Environmental Monitoring Plan**

Environmental Monitoring Plan (EMoP) is to evaluate the extent and severity of environmental impacts against the predicted impact and the performance of environmental protection measures. The following table shows the monitoring plan during implementation phase:

**Table ES-11: Environmental Monitoring Plan**

Sl.No.	Environmental Indicator	Parameters/Units	Means of Monitoring	Frequency	Responsible agency
01.	Air/Water/Soil Quality	N/A	Inspection	Daily	Contractor/Consultant of supervision
02.	Dust Control	Spraying of water	Visual	Daily	Contractor/Consultant of supervision
03.	Noise Control	Measurement (db)	Monitoring	Daily	Contractor/Consultant of supervision
04.	Waste Management	Monitoring of collection, transportation and disposal of solid waste. Inspection of construction camp.	Inspection	Daily	Contractor/Consultant of supervision
05.	Working conditions and Accident	Monitoring Health & Safety of Workers	Inspection	Daily	Contractor/Consultant of supervision
06.	Involuntary resettlement, Poor	Monitoring by external monitoring agency	Monitoring	6 months later from resettlement	External monitoring agency/RHD

Source: JICA Survey Team

**O. Environmental Management Cost Estimated**

<p><b>Confidential</b></p>
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**Table ES-12: Probable Cost of Environmental Enhancement Works and Mitigation Measures of the Boalia Bazar Bridge**

Confidential

**P. PUBLIC CONSULTATION**

Two times stakeholder meetings were conducted at different bridges sites or some cases three times for problematic bridges identified. The discussions with the stakeholders were concentrated mostly on the positive aspects of subprojects implementation, magnitudes of socio-cultural and environmental impacts; compensation entitled by PAPs and resettlement requirements for affected persons and

families that to be dealt by RHD and other authorities. Accordingly minutes of the meeting were prepared incorporating the opinions from the stakeholder.

#### **Q. PROJECT SCHEDULE**

The implementation plan is established based on the month/year for the milestones of key events of the Project. The plan includes the stage of detailed design, tender procedure and construction work. The construction period was estimated as 3 years for North Packages and 2.5 years for South Packages.

It is assumed that International Competitive Bidding (ICB) shall be applied for procurement of Contractor and Consultant for the Project. The time required for the procurement is assumed based on the procedures for a financing scheme of Japanese-ODA Loan. The milestones for the implementation of the Project undertaken by Japanese-ODA Loan are formulated as follows:

- Loan agreement (L/A) will be signed in February, 2015.
- 10 months will be required for the selection of consultant for the detailed design, tender assistance and construction supervision.
- Period of detailed design will be 12 months.
- 17 months will be required for the procurement of contractor.
- Construction period will be 36 months.

The total implementation schedule will begin with L/A in February 2015, and the construction will be completed in February 2021.

#### **R. CONCLUSION AND RECOMMENDATION**

Implementation of the Project bridges under WBBIP may not cause any major and persistent environmental impact. The construction related impacts therefore can be dealt by the Contractor as per the Environmental Code of Practices and Environment-friendly best practices. Although IEE study did not identify significant adverse impact, but according to DOE requirement, bridges longer than 100 m need comprehensive EIA study. Prior to the implementation of WBBIP, updates of EMP will be required following the outputs to be obtained from DD stage.

However, the EIA report in its present format has been prepared based on the DOE's TOR and the additional comments made in the meeting held on December 03, 2014, whereas the Abbreviated Resettlement Plan (ARP) has also been prepared as an integral part of EIA report for formulating the socio-environmental issues undertaken in WBBIP areas. Therefore, EIA report along with ARP report should be considered for obtaining the Environmental Clearance Certificate (ECC) from the DOE, Government of Bangladesh (GOB).

## CHAPTER 1. INTRODUCTION

### 1.1 Description of the project

The RHD as per request of JICA to conduct environmental impact assessment (EIA) study at feasibility study level hired BCL to do the job. The reports will be used by engineers during design and implementation stages of 105 bridges under the WBBIP.

### 1.2 Sub-project Interventions and Locations

The interventions include (i) reconstruction/construction of RCC bridges along the existing bridges alignments, (ii) construction of approach roads on bridges sides and (iii) enhancement activities at bridges approaches. The sites of proposed bridges have been selected by the RHD. The subproject sites under WBBIP are situated on north central region (NCR), south west region (SWR), northwest region (NWR), southwest region (SWR) and south central region (SCR) of Bangladesh (WARPO 2000). Locations of the bridge are shown on Topographic map of the areas ( Figure 1.1). In all 105 bridges will be constructed, reconstructed and widened under the WBBIP.

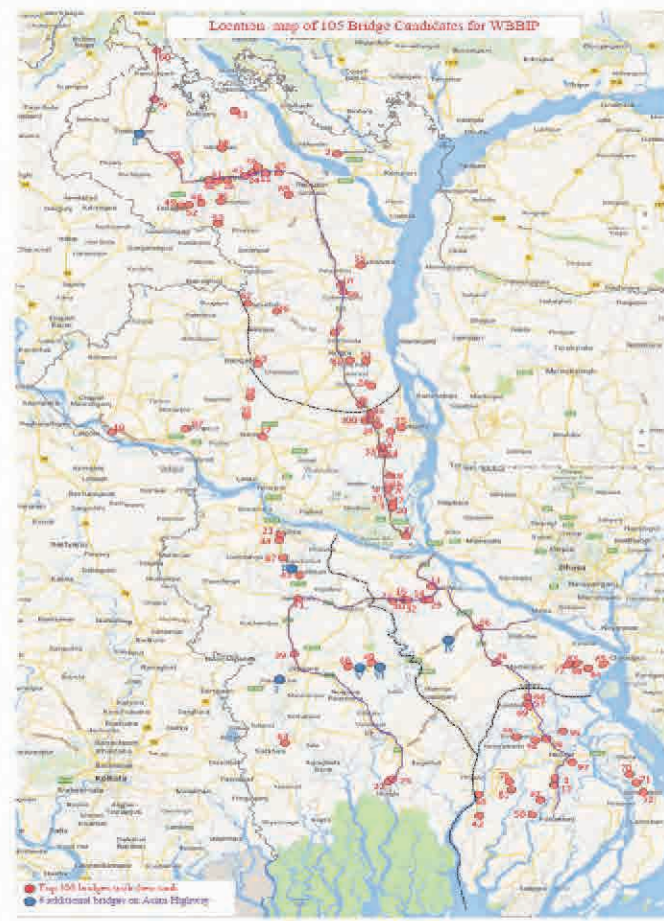


Figure 1.1 Location of Bridge site

Bridge shall be over 100 m long and 94 bridges of western Bangladesh shall be shorter than 100 m. As per the requirement of DoE, bridges shorter than 100m shall not require EIA hence no EMP will be needed for these bridges. The total number, type and total lengths (m) of each bridge types are given (Table 1.1).

**Table 1.1 Total number, type and total length (m) of the bridges under each type**

Types of Bridges	Nos.	Total length(m)
RCC Box/ Girder Bridges	62	3,215.12
Truss with Steel Beam/Steel Deck	06	472.08
Bailey with Steel Deck	35	1,867.45
PC Girder	02	161.95
<b>Total length of bridges</b>	<b>105</b>	<b>5,716.60</b>

Source: BCL

### 1.3 Project Background

The government of Bangladesh (GoB) has the expectation of raising the Gross National Income to \$ 2000/capita by 2021 from the existing income /capita of \$ 650. To achieve the target goal the GDP growth rate shall have to be raised from 6.0% to 8.0% by 2015 and 10.0% by 2020 (BB Perspective Plan). The physical infrastructures e.g. roads, railways, river ways, ports and air ways are the major factors of communication are to be developed on priority basis to achieve the projected growth rate of per capita income.

Bangladesh at present has 161, 400 km road infrastructure, 21,000 km of which is managed by RHD and remaining 140,000 km managed by LGED. There are 8,000 km flood protection embankment, 4,300 km irrigation channel and 5,000 km drainage channel in addition used for seasonal or perennial movement of transports and/or pedestrians.

The ratio between road length/land area in Bangladesh is 1.31, this ratio varies division wise as Rajshahi 1.52 for Rajshahi, 1.32 Khulna, Chittagong 0.99 for Chittagong and 1.50 for Dhaka Division (BBS 2012).

### 1.4 Importance of the Project

Bangladesh is situated in a zone where the average annual rainfall is 2.0 meters or more. Large part of the rain falls during the monsoon (July-October). The country receives in addition huge volume of run-off from 1.6 million Km<sup>2</sup> catchments outside the Bangladesh boundary during monsoon season when the local rivers are at spate. These cause floods at northeast north central and in other floodplain regions. The floodplains have an overall gentle slope from north toward south that permits run-off flow to the Bay. The country is criss-crossed by innumerable rivers and channels over which 19,000 bridges have been constructed maintaining continuity on

road infrastructures. Of the 19,000 road bridges 4,500 small and medium bridges on RHD roads are managed by RHD as routine task while large bridges e.g Jamuna Bridge, Rupsha Bridge and other bridges are managed by the Shetu Bibhagh.

One of the major functions of RHD is to identify the bridges with damaged structure due to aging affects, faulty design and the narrow, risky Bailey Bridges on highways for construction, reconstruction and improvement. RHD felt the necessity for improvement of 2-lane roads and bridges to 4-lane, and construction and reconstruction of 105 the bridges in the western Bangladesh either with internal resources and/or with donor's assistance. JICA under the WBBIP offered assistance for improvement of 106 bridges managed by RHD on highways, regional highways and district roads in western Bangladesh.

### **1.5 Objective of the Project**

Objective of the study is to prepare environmental impact assessment (EIA) report for construction of 105 bridges fulfilling all requirements of JICA and of GoB at feasibility study level.

The EIA reports and environmental assessment reports of individual bridges will be used as guideline by decision makers, design engineers and Contractor during implementation stages. The EIA document of 105 bridges has been prepared following DoE format and maintaining the information as per JICA requirements. This report meets all legal requirements of DoE, hence can be used with the application for environmental clearance certificate (ECC) from DoE.

### **1.6 Brief Description of the Subprojects sites**

As stated earlier the subprojects under WBBIP include construction, reconstruction, replacement and widening of 105 bridges of western Bangladesh. The existing RCC, Steel deck and Bailey bridges will be reconstructed and widened from 2-lane to 4-lane matching with the road width. The bridge approach roads on both sides will also be constructed keeping pace with the requirements of existing roads and highways. Trees will be planted on both sides of the approach roads to ensure slope protection against gully erosion and for environmental enhancement.

Environmental conditions particularly the ecological conditions at subproject sites for several bridges are shown (Plates 1.1,1.2.1.3, and 1.4) in this section.





**Figure 1.2 Mohasthan Bridge site**



**Figure 1.3 Chanda Bridge site**

The RHD will execute construction and shall remain responsible for maintenance of the highways, regional and inter district roads and bridges during the operation stage. The RHD is presently headed by a Chief Engineer with power and authority of Head of the Department. Additional Chief Engineers head the Technical Services Wings of RHD that include a Social and Environmental Wing. This Wing includes two Circles (Social and Environmental) in one Division (Resettlement and Environmental). The Division provide services that relate environmental issues and social management aspects of RHD activities and ensure sustainable development in compliance with the GoB requirements and of donor agencies.



**Figure 1.4 Kazirhat Bridge site**



**Figure 1.5 Naiori Bridge site**



## CHAPTER 2. ENVIRONMENTAL LEGISLATIONS

### 2.1 Policy, Legal and Administrative Frameworks

#### 2.1.1 GoB Requirements

The BECA (1995), BECR (1997) enacted by MoEF (BCAS 1999) make EIA obligatory during feasibility study, planning, design and implementation stages. An ECC is required from DoE to initiate project implementation activities. The EIA documents (REA, IEE, EIA, EMP) are in reality the guiding tool to implementation agencies, management tools to the stakeholders during construction and operation stages.

The BECR (1997) categorized development interventions as Green, Amber (A, B) and Red depending on their degree of impacts on environment. The proposed upgrading of bridges involves construction reconstruction and widening of bridges on regional, national and inter-district roads managed by RHD. The subproject activities of WBBIP fall under Categories Amber-A and B hence an EIA (DoE 1997) will be needed for bridges longer than 100 m and IEE will suffice for bridges shorter than 100 m (BCAS 1999).

#### 2.1.2 National Environmental Legislations

The Environmental Legislations enacted by MoEF and other Ministries intend conservation and proper management of natural, ecological, socio cultural resources and to keep the pollution impacts minimal keeping pace with world communities regarding conservation of nature. The GoB through enactment of legislatures strengthened MoEF and other Ministries to combat the adverse environmental impacts and to enforce all the legislatures in their intended spirits (Farooq and Rizwana 1996). The relevant Environmental legislations are given (Table 2.1).

**Table 2.1 Environment related Legislatures enacted by MoEF and other Ministries**

Environmental Legislations	Implementing Agencies	Key Features
The Environment Conservation Act, 1995 (Amendments 2000, 2002, 2010) Environment Conservation Rules, 1997 (Amendments 2000 and 2003)	Department of Environment (DoE)	-Protection of areas of major environmental concerns. -Issue of Environmental Clearance Certificate. -Enforcement of Environmental Legislations, Acts and Rules -Monitoring the compliance of environmental legislations and standards.
Environment Court Act, 2000 and (Amendments 2010)	District Environmental Court/ DoE/MoEF	-Enforcement of punitive measures as per Legislations, Acts and Rules against the offenders. -Empowers officers of the concerned Departments to enforce the BECR (1997) -The amendments (2010) empower to open environmental court in every district. -Trial for environmental pollution under BECA (1995)

Environmental Legislations	Implementing Agencies	Key Features
		can be conducted under mobile court
Bangladesh Penal Code (1860)	Civil Administration/DCs	-Prohibits all activities that pollute the water bodies like spring, reservoir, open water bodies - Prohibits activities that affect public health and create public nuisance
Bangladesh Hill Cutting Act (1986)	DoE, Civil Administration/LGED	-Prevents Hill Cutting without prior clearance from DoE and/or from other responsible authorities
Vehicle Act (1927), Motor Vehicles Ordinance (1983) Bengal Motor Vehicle Rules, (1940)	Bangladesh Road Transport Authority (BRTA)/ Police/ Civil Administration	-Road safety, licensing, monitoring and maintenance of the vehicles standard on public roads/highways -Control air pollution due to emission from engine and check noise pollution
Brick Burning Act (1989) and Amendments (1992, 2011)	MoEF /DoE and Forest Department	-To control the legal aspects regarding brick burning including imposing restriction on use of biomass in brick burning kilns
Bangladesh Environmental Policy (1992)	MoEF	- Main objectives are maintaining the ecological balance, to protect natural resources, identification of environment polluting activities and ensure environment friendly development. -This policy helps protection of natural resources (air, water and soil)
Bangladesh National Land Transport Policy (2004)	MoC/Police/ RHD	-To ensure road safety and to reduce death and injury due to road accidents
Bangladesh Environmental Management Action Plan (NEMAP) 1995	MoEF a document prepared following the bottom up mechanism and participation of people.	- NEMAP helped identification of the actions needed to arrest/reduce environmental degradation, conservation of biodiversity, habitats and natural resources. -Promote sustainable development and quality of human life
Bangladesh Water Pollution Control Ordinance (1973)	Ministry of Water	-Taking steps both at governmental and private levels toward prevention of water pollution and environmental degradation.
Bangladesh Social Forestry Rules (2004)	MoEF, and ADB (2002)	- Provisions of these rules can permits GoB to extend forestry activities on private land and vice versa entering into mutual agreement amongst both sides.
National Land use Policy (2001)	Ministry of Land	-The land policy basically identified different users of land with the intention fixing priority amongst different uses land.
National Biodiversity, Strategy and Action Plan (2004) and Amendment (2011)	MoEF	-Main intention of the plan is to conserve biodiversity, ensure unique biological heritages and restrict introduction of invasive species

Environmental Legislations	Implementing Agencies	Key Features
Acquisition and Requisition of immovable Property Ordinance (1982 Amendments 1994, 1995, 2004)	Ministry of Land	-To ensure legitimate compensation, rehabilitation for the PAPs.
Removal of Wreckage and Obstructions in inland Navigable Water Ways Rules (1973)	Bangladesh Inland Water Transport Authority (BIWTA)/Civil Administration/Police	- Removal of Wrecks and Obstructions from the Navigable Inland Waterways -Protection, maintenance development of the waterways for navigation
Water Supply and Sanitation Act, (1996)	Ministry of Local Government, Rural Development and Co-operatives (LGRD&C)	-Management and Control of water supply and sanitation particularly in urban areas
Forest Act, (1927) and Amendments (1989, 2000)	MoEF and Forest Department	-Conservation of Reserve, Protected, Rural and Unclassified State Forests, - Conservation of Forest Ecology and Wildlife natural environment throughout Bangladesh
Private Forest Ordinance (1959),	Forest Department/ MoEF	-Control movement of timber and/or other products by land or water routes from the forests owned by private individuals and/or organizations
Bangladesh Wild Life (Preservation) Act (1974), (Amendment 1998)	MoEF, FD and Bangladesh Wild Life Advisory Board	-Conservation of wildlife in Bangladesh, in protected areas like Wildlife Sanctuaries, National Parks, Eco-Parks, in Forests and elsewhere
East Bengal Protection and Conservation of Fish Act 1950(Amendment (1982)	Ministry of Fishery/ Fisheries Department, Public Health Department	-Protection and Conservation of fish in Government owned water bodies and open water bodies - Restriction on fishing during fish hatching season July 15-September 30)
Natural Water Bodies Protection Act (2000)	LGRD and C Ministry/ Civil Administration	-Conservation of natural and man-made wetlands
Solid waste management Rules (2011)	Ministry of Environment and Forest (2011)	-Intended to manage the solid wastes including the urban wastes in environment friendly manner - Introduction of 3R(reduce ,reuse and recycle) strategies
Bangladesh Social Forestry Rules(2004)	Forest Department and MoEF	-Benefits sharing of rural forests -Forestry for poverty alleviation, involvement of landless, destitute women and economically backward communities
The Land Acquisition Act, (1894) and Amendments (1993, 1994, 2004)	Revenue Department, LGRD and C, Civil Administration	-Current GoB Act & guidelines, relating land acquisition - To pay maximum compensation to the PAPs
Wetland Protection Act (2000)	MoEF	-Restriction imposed on indiscriminate filling of wetland particularly by Development Farms for residential purpose.
Water Supply and Sanitation Act (1996)	Ministry of Local Government, Rural and Development	-Development of infrastructure for sustained supply of safe water both in rural and urban residents.

Environmental Legislations	Implementing Agencies	Key Features
	Cooperative	
Biodiversity conservation Act (2011)	MoEF	Conservation of floral and faunal diversity in Bangladesh
Bangladesh Climate Change Strategy and Action Plan (2008)	MoEF	-Setting of several strategies e.g. social protection of health, disaster management, protective infrastructure development, decreased carbon release in atmosphere.

Before enactment of the mentioned environmental legislations the ecological and natural resources of Bangladesh e.g. air, water, soil, forests and wetlands had been protected under provisions of the Bangladesh Penal Code (1860).

Pollution of the natural resources, protection of public and occupational health and conservation of labor interests at work site during implementation stages not covered by the environmental legislations as best practice in Bangladesh are protected under the contractual agreement reached between RHD and Contractor.

Bangladesh also ratified and/or acceded to 22 international conventions, protocols and signed 24 treaties relating to environmental conservation and protection. In addition, the international obligations that Bangladesh ratified are (i) Law of the Sea, (ii) Montreal Protocol, (iii) CITES Convention, (iv) Framework Convention on Global Climate Change (v) RAMSAR Convention (1971), (vi) Washington Convention (1972), (vii) Rome Convention (1951), (viii) International Convention to Combat Desertification, (ix) International Convention on Climate Change (Tokyo Protocol, 1997), (x) Occupational Health Hazards due to sound Pollution and vibration (1981), etc.

## 2.2 EIA System and DoE Procedures

All development projects require clearance from the DG, DoE for initiating the implementation process. Environmental clearance certificate (ECC) from DoE is issued based on the findings of IEE that also stipulate whether an EIA be carried out by the project proponent or the IEE is enough. EIA study focuses on addressing the unresolved environmental issues in IEE report. The unresolved environmental issues may be because of inadequacy of data, lack of impact identification and/or lack of mitigation measures. The steps to be followed during EIA study are (i) collection of baseline study, (ii) identification of environmental impacts on IECs, (iii) prediction regarding potential impacts, (iv) evaluation of the impacts, (v) prescribing the

mitigation measures,(vi) monitoring program, (vii) risk analysis and (viii) documentation and communication(DoE 19970, BCAS 1999).

### **2.2.1 Environmental Clearance Certificate (ECC)**

An ECC from DoE is required before initiating the project implementation activities. An application to the DG DoE is to be submitted through the local office in prescribed application form (Vide Rule 7.5) fulfilling the requirements detailed in BECR 1997 (BCAS 1999). The requirement of an ECC from the DoE can be bypassed during implementation of WBBIP provided the Social and Environmental Circle of RHD processes the matter like that of the Environmental Circle of LGED. The LGED deals all its project related matters including evaluation of EIA reports by the Environmental Circle of LGED while copies of the EIA reports are sent to the DoE for information. The WBBIP covers a large geographic region covering many administrative areas falling under different DoE office jurisdiction. Hence, processing of the environmental clearance issue routinely as per the BECA (1997) will be cumbersome and time consuming. Moreover, bridges under WBBIP include improvement and reconstruction of existing bridges on RHD managed highways where during implementation minimal environmental impacts are anticipated, therefore the matter may be dealt by RHD itself with minimal and formal involvement of DoE.

### **2.2.2 Policy Safeguards**

The National Conservation Strategy (NCS 1991) and National Environmental Management Action Plan (NEMAP 1995) emphasize on the inter-sector coordination and participation of public as well as the private sector in development activities. Basic guidelines of the National Environmental Policy (NEP,1992) are:

- to ensure protection and conservation of physical, ecological and cultural resources from depletion, deterioration and degradation due to human activities,
- identification of activities that induce pollution/degradation/ deterioration of natural environmental resources,
- to ensure protection and conservation of historical/archaeological/ cultural structures/sites and relics from deterioration and degradation due to human activities and
- Protection of identities, rights, livelihood and heritages of the indigenous tribes.

The pivotal environmental safeguards are sustainable and environment friendly development, poverty reduction, women empowerment and planned employment generation. To achieve these goals emphasis should be given on avoidance, reduction and/or mitigation of impacts on environmental resources during project implementation stages and enhancement of the positive impacts to harvest optimum benefits from the development endeavors.

### **2.3 Harmonization of GoB and international Policies**

(a) GoB/DoE: BECR (1997) provided provisions for conservation of environment, improvement of environmental standards, mitigation and control of environmental pollutions and made EIA study obligatory before initiation of project implementation activities.

Made it obligatory obtaining a clearance certificate from DoE for implementation of development endeavors, categorized the different development endeavors (projects, industries) in respect of their EIA studies requirements. And set the environmental pollution standards for air, water, land and noise under different conditions.

(b) JICA: Made EIA study obligatory at the early stage of project planning. Considers multiple alternatives in order to avoid and/or minimize the adverse project impacts and chooses the project options with minimal environmental impacts.

(c) World Bank: The environmental safeguard policy of WB is though the best practice of local governments but the main objective of the policy is to prevent and mitigate the harm to people and the environment. WB has also categorized different development endeavors financed by it based on environmental impacts hence made EIA study obligatory for project initiation and implementation.

(d) ADB: Categorized all development endeavors based on their impacts on environment and developed elaborate environmental safeguard policies for different project categories. As per ADB categorization the projects with significant adverse impacts( Category-A) require EIA and EMP to address the adverse impacts, projects with lesser adverse impacts (Categories-B,C) require either IEE or no EIA study.

(e) Policy harmonization: However, environmental aspects due to due to implementation of any development endeavor should be harmonized during implementation stages so that the adverse environmental impacts are kept minimal and the positive impacts are enhanced. These to be done to harvest maximum benefits to the majority people from any project investment.

### **2.4 Land Acquisition Frameworks**

Land Acquisition Law in Bengal was first enacted in 1824. The provisions and scopes of that law were subsequently amended and expanded in 1850, 1857, and 1863 leading to the enactment of Land Acquisition Act 1894. This Act continued enforced until partition of India through proclamation of independence in 1947. This Act however lacked the provision for payment of compensation for the acquired land and other immovable properties, as a result the requiring bodies used to overestimate the actual land requirements to cause loss to the land owners. The Acquisition of Immoveable Properties Ordinance-II 1982 was enacted to safe guard owners right regarding payment of compensation and to reduce wastage of land. Under this Ordinance

the DCs or their nominees are authorized to examine the claim for compensation taking into consideration all factors regarding entitlement of compensation and empowered to divide the compensation amount amongst all the legitimate shareholders.

The Emergency Property Acquisition Act was enacted in 1989, this Act empowered the Government authority to acquire private properties on during high floods, tidal bores, river bank erosion and other sorts of natural calamities to act swiftly to check those calamities. Hence, it is clear that the Act 1989 did not replace the Ordinance 1982, rather both the legislatures remained enforced simultaneously and applied during implementation of the Bangabandhu Multipurpose Bridge Project.

The Deputy Commissioners (DCs) as chief executives of the district or any officer authorized by them can exercise the power conferred on the DCs regarding requisition of Immovable Properties under the Ordinance 1982 and Act 1989. The Bangabandhu Multipurpose Bridge (Land Acquisition) Act 1995 (Annexure-6) was enacted later on July 9 1995. Under provisions of this Act persons constructing structure/establishments and or modifying the land class/type that is likely to be acquired with the intention of extraction higher compensation rate will not be entitled any compensation for such structures. Land acquisition issue may not be a significantly disturbing issue during implementation of WBBIP.

## **2.5 Framework for Resettlement**

### **2.5.1 Objective of the Abbreviated Resettlement Plan (ARP)**

As per the JICA bounded guidelines for Environmental and Social Considerations require if screening for social assessment make it necessary that resettlement of some people at several bridges sites will impacts a time-bound action plan with budget provisions. A budget for resettlement is to be prepared in that case and be incorporated as integral part of the project design. However, World Bank (WB) clearly indicated the provisions for resettlement where involuntary settlement of population from project sites fewer than 200 are needed at bridges sites, an ARP may be prepared to serve the purpose. ARP according to such principal might address issues like land acquisition and resettlement following the legal framework of GoB and JICA's guidelines for Environmental and Social considerations highlighting the impacts on involuntary resettlement. The aspects of human rights of indigenous people and cover the APs under resettlement/rehabilitation program including income restoration, poverty reduction and legitimate assistance for poor and informal settlers. Hence, the ARP approach may involve (i) land acquisition and resettlement issues, (ii) mitigation of impacts to the distressed women and vulnerable groups, (iii) income generation support to the eligible members of project affected families and (iv) assistance for poverty reduction to the poorest section of people.



According to GoB policy a plan is to be prepared setting out provisions for compensation and rehabilitation to the PAPs and/or families before the project is executed. It should be a policy that implementation of projects does not affect any PAPs in a way that their

- living standards are adversely affected,
- income earning opportunities, business, occupation, work or place of residence or habitat adversely affected even temporarily,
- right, title and/or interest in ancestral houses, right to use any land, properties, premises are affected. Right on grazing land, common properties, tenancy, annual or perennial crops and trees are affected temporarily or permanently,
- social and cultural activities and relationships amongst the family clans and keens may be affected during resettlement planning process..

The objective of the ARP is to provide a strategy for providing PAUs with replacement value of land, structure, trees and other physical assets and restoration of income levels/living standards either through a compensation and rehabilitation package that ensures that PAUs are not left in a position where they are worse off with the project than without it. Thus, in accordance with JICA policy, abbreviated resettlement plan, depending on the magnitude of impacts - has been prepared for the Project.

Objectives of the project and Abbreviated Resettlement Planning have been disclosed to the affected persons through community based consultation meetings and focus group discussions in local language in two phases of stakeholders/community consultation as well as during conducting census and socioeconomic survey. Compensation and other assistances will have to be paid to APs prior to displacement or dispossession of assets. Upon approval, the final ARP will be uploaded immediately on the RHD website.

### **2.5.2 Methodology for Preparing the Abbreviated Resettlement Plan**

The Consultant conducted census & socioeconomic survey in April through June 2014 for information necessary for preparation of this ARP. The survey was also associated with stakeholders' consultation, focus group discussion and property valuation survey.

The adverse impacts include land acquisition and displacement of households and shops. The data gathered during the survey has been entered into an electronic database which identified each affected household (AH) and the way they are impacted and losses they will incur. The objective of the census and socioeconomic survey was to establish a detailed inventory of the households and physical assets to be affected by the project; develop a socioeconomic profile



of the AHs and affected persons (APs). The surveys also serve as a benchmark for monitoring and evaluation.

The surveys indicate that improvement of the 105 bridges will require acquisition of 53.35 hectare of land. In total the Project will displace 3,253 Project Affected Units (PAUs) of which 788 residential households, 2,367 Commercial & Business enterprises (CBEs) and 98 common Property Resources (CPRs) with a total population of 15,903. As per JICA guidelines the appropriate Environmental and Social Considerations are to be given on vulnerable women, children, and distressed elderly people and ethnic minorities. All concerned who are susceptible to environmental and social impacts having little/no access to decision making process re to be given due consideration. Therefore, this ARP has been prepared with due consideration to all concerned to mitigate impacts on Affected Households (AHs) toward restoration of their livelihoods at least to the pre-project level.

The ARP is to be prepared based on National Law ARIPO (GoB) and on JICA guidelines for upliftment of the affected families from environmental and social considerations. The ARP therefore establishes the provisions for resettlement of project affected households so that incomes of the affected households are restored effectively particularly the affected poor and vulnerable households get due compensation and resettlement benefits as per the legal provisions.

This ARP during discussion meetings will elaborately review all sorts of impacts that the PAPs can suffer during the implementation stages and the appropriate mitigation measures. The budget for impact mitigation can be revised from time to time reflecting the changes in AHs number and/or the losses identified at later stages due to increased volume of impacts, addition of properties and/or price escalation.

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## **CHAPTER 3. IMPORTANT ENVIRONMENTAL COMPONENTS**

### **3.1 Physical Components**

#### **3.1.1 Climate**

Bangladesh has a per humid mega-thermal climate with no water shortage at 50 cm depth (Thorntwait 1948) at any part of the year. Maximum temperature during May-October period is 31-34<sup>0</sup>C and minimum temperature during November-February period is 11-16<sup>0</sup>C. Winter climate (November-January) is cold and dry, spring climate (February-March) is pleasant, and summer climate (March-May) is hot and dry while the monsoon season (June- September) is wet. The temperature and rainfall during the monsoon season are high. Peak temperature during April-May locally may reach up to 40<sup>0</sup>C (Hassan 1999, Manalo 1975, FAO 1971). According to Kopen's (1936) classification Bangladesh has tropical rainy climate (A-type). The mean temperature in coldest month in this type of climate remains above 18<sup>0</sup>C and the mean rainfall in driest month remains below 6.0 mm. The average climatic data of Khulna, Rajshahi and Barisal stations are shown (Table 3.1). Normal activities during construction stage may be hindered due to incisive rains and high floods.

Bangladesh has virtually a homogeneous climate with slight local variations. The north east region has maximum rainfall while the northwest region has minimum rainfall. Temperature also shows little local variation from the north east region toward south west region. Occasion nocturnal rain with thunder shower observed in the south east region is due to its vicinity to the sea. The monthly rainfall and temperature of Khulna, Rajshahi and Barisal divisions are shown (Table 3.1).

**Table 3.1 Monthly rainfall (mm) and temperature (°C) for Khulna, Rajshahi, Barisal Divisions**

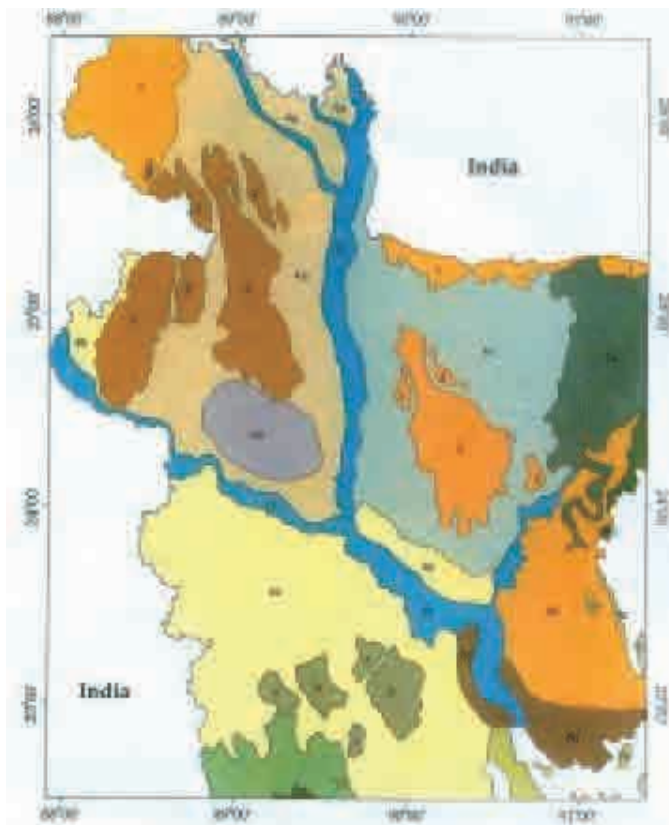
Months	Khulna		Rajshahi		Barisal	
	Temp(°C)	Rainfall(mm)	Temp(°C)	Rainfall(mm)	Temp(°C)	Rainfall(mm)
January	25.7	12	24.5	11	25.6	8
February	28.4	40	27.7	17	28.2	27
March	33.1	57	33.3	24	32.2	56
April	34.7	85	36.3	63	33.3	128
May	34.2	192	35.0	137	33.0	230
June	32.8	335	33.5	257	31.7	409
July	31.8	349	32.1	327	30.9	408
August	31.7	336	32.3	268	30.9	370
September	32.0	269	32.2	297	31.5	268
October	32.0	136	31.7	113	31.5	162
November	29.9	33	29.3	17	29.6	53
December	26.6	5	25.8	12	26.6	15
Annual average	31.2	1,852	31.2	1,543	30.4	2,134

Source: BBS 2012 (Average of 2006 and 2007)

### 3.1.2 Topography and Geology

Topography of western Bangladesh that is covered by the Meghna, Tista, Jamuna and Ganges floodplains is almost level with convex ridges and concave basin sites. Part of the North Central region in Bogra and North West region Rajshahi, Rangpur and Dinajpur is occupied by level and/or undulated terrace lands.

The undulated terrace lands of Rangpur, Dinajpur and Rajshahi districts were previously covered with dense deciduous sal forest managed by private ownership and subsequently by the Bangladesh Forest Department (BFD). Presently the sal forest particularly in level lands is heavily depleted and used for rain fed or irrigate paddy production. Patches of the sal forest still occurs as remnants on undulated terrace lands of the Barind in Rangpur, Dinajpur and Rajshahi districts (SRDI 1963-1973). Figure 3.1 shows the Teesta floodplain (Legend 4a), Meghna and Jamuna floodplains (Legend 4c) and the Ganges floodplain (Legend 4b)..

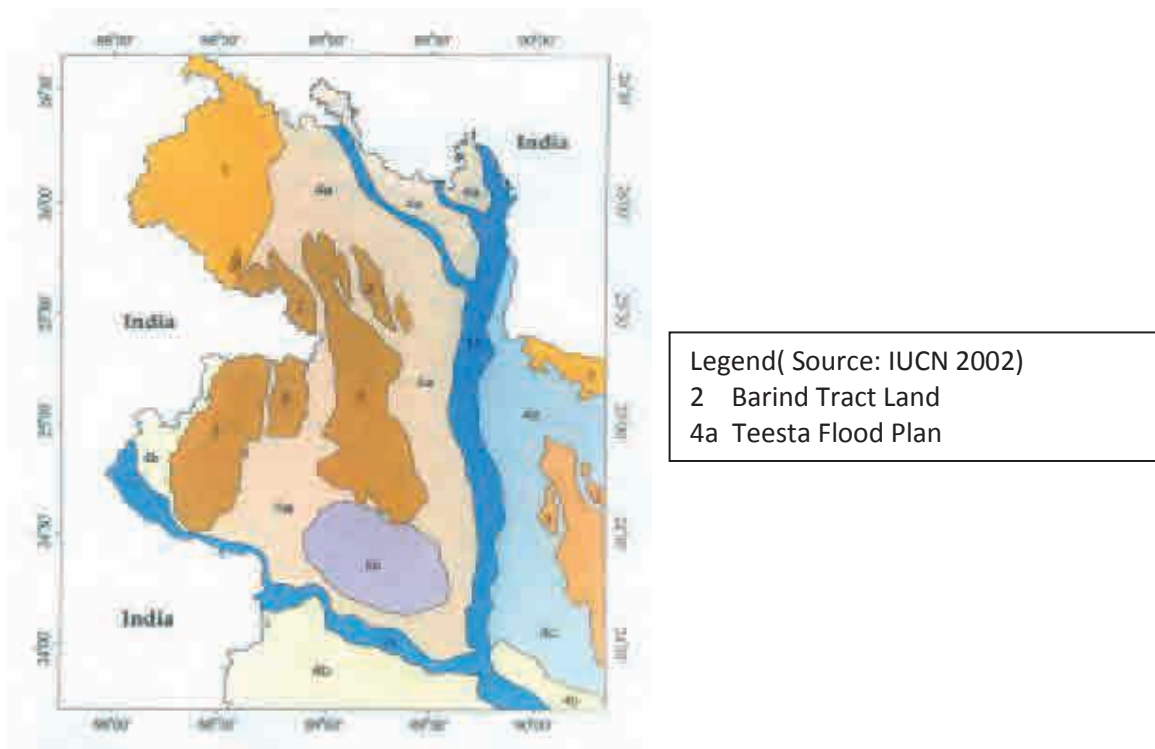


Legend (Source: IUCN 2002)  
 3 Madhupur Tract  
 4a Teesta Flood Plan  
 4b Ganges Flood Plan  
 4 c Meghna-Jamuna Flood Plans

**Figure 3.1 Meghna, Tista, Jamuna and Ganges Floodplains**

### 3.1.3 Soils and land uses

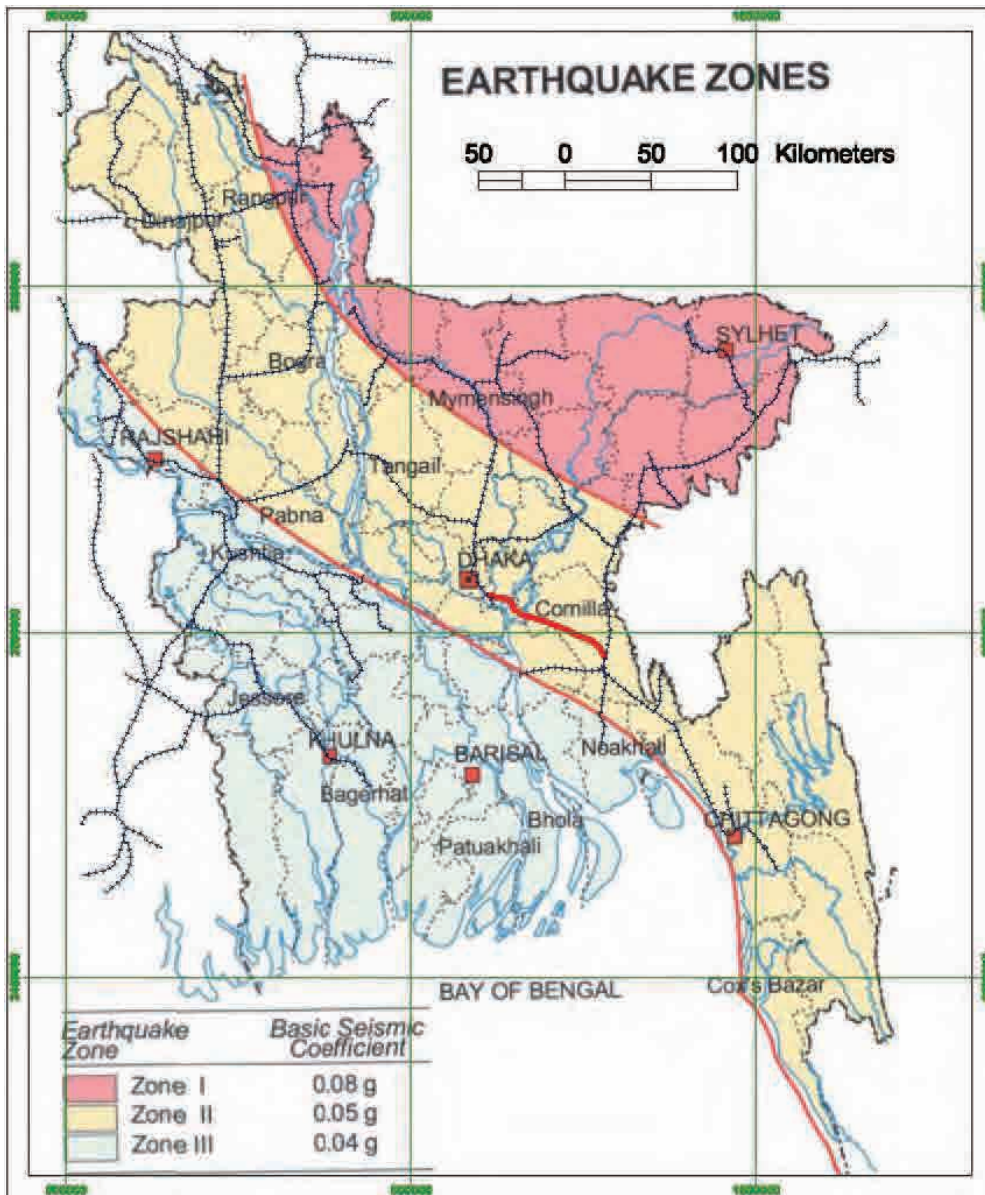
Soils of the Barind tract are weakly structured, olive, acidic clays in the subsoil overlying an unaltered clayey substratum at variable depths. The landscape was probably colonized by pioneer vegetation species (grasses and/or sedges) initially several thousand years back. The early settlers cleared the pioneer vegetation to bring the land under agricultural uses. The early settlers disliked the well-drained upland for sedentary agriculture because of shortage of water. The indigenous tribes (Santal Kool and others) on the contrary preferred to settle on undulated uplands and practiced shifting cultivation initially (SRDI 1963-1973, FAO 1999)). The Barind Tract (Legend 2) and the Tista floodplain soils (Legend 4a) are shown in Figures 3.1 and 3.2. The lands on floodplains were also initially covered by reeds, sedges and other sorts of grass varieties. The floodplain soils were either cleared for agriculture by early settlers or were brought directly under agricultural uses.



**Figure 3.2 The Barind Tract Land**

### **3.1.4 Sedimentology and seismicity**

Geologically, lands of the Barind Tract belong to the Plio-Plaiocene age and the lands in river floodplains (Jamuna, Meghna, Teesta, Ganges and of other rivers) are of recent origins. In Bangladesh, the floodplain sediments from the consideration of sedimentation patterns are classed as meander, estuarine and tidal.



**Figure 3.3 Different seismic risk zone in Bangladesh (GoB 1979)**

The floodplain sediments have been uplifted and down warped at places subsequently either due to sedimentation and/or due to tectonic activities. The vertical homogeneity of the Barind Tract sediment if treated as an indicator these sediments can probably be assumed as of Plio-Pleistocene period. This assumption could not be confirmed till date because of conspicuous absence of stratification and/or of marine fossils (animal or plant) in them. The Bangladesh National Building Code (1996) and the Seismic map of Bangladesh (GoB 1979) did sub-divide Bangladesh into three seismic zones based on the tremor intensities. The command areas of WBBIP are situated in low/ seismic risk zone (Zones-II and III). This is evident from Figure 3.3. Bangladesh is situated between the Indian and Eurasian continental land masses. Occurrence of

the Himalayan Mountain belt in the north and Mayanmarian Mountain belt in the east make Bangladesh seismically active (Morgan and McIntire 1959).

The Bangladesh Building Code (GoB 1983) and Bangladesh Geological Survey (GoB 1979) divided Bangladesh into three seismic zones. Zone-I has high seismic risk, Zone-II has medium seismic risk and Zone-III has least seismic risk. The DBR site passes through the seismic Zone-II that has seismic coefficient value (Z-Value) 0.15-0.25 Richter. The seismic factors require to be considered during design phase of the DBR upgrading program.

### **3.1.5 Hydro-geology**

The landscape both of the Barind and floodplains has a southeast slope alignment and flow direction of the major rivers contribute to this assumption. The rivers in the downstream regions along flow directions either receive run-off through different tributaries or distribute run-off through many distributories until finally shed the water to the sea. The rivers remain at spate during the monsoon due to local run-off in addition the trans-boundary rivers receive run-off from nearly 1.6 million Km<sup>2</sup> catchment in India Nepal and China. Usually 10-12 percent floodplain area in Bangladesh is flooded during monsoon in normal years. But up to 24 percent floodplain area of Bangladesh may submerge during abnormal floods peak flood levels in Padma and Jamuna coincides. This happens once in ten years or so.

The deep ground water table (DGWT) on Barind tract land fluctuates between 20 and 30 meters during the dry season and reaches near to the surface during the rainy season. Ground water table on terrace lands sinks up to 7.0 m during lean season due to draw down by deep tube wells. Further exploitation of DGW table may create imbalance between water demand and annual recharge affecting the poor people living on Barind land (WARPO 2000).

Ground water both shallow and deep in the floodplains are also being used intensively for irrigated agriculture, industrial and domestic uses throughout Bangladesh. This country though rich in ground water reserve and there exists ample opportunity for ground water recharge during monsoon and during floods but consistent and growing rate of exploitation ground water has already created a seasonal imbalance between demand and supply of water.

### **3.1.6 Landscape**

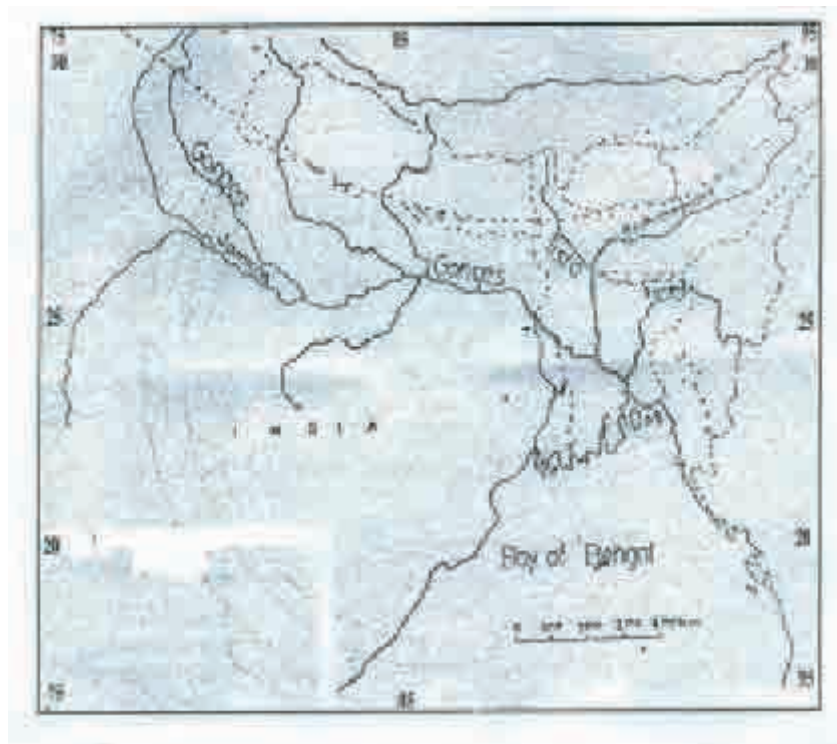
Bangladesh has the total land area of 147,470 km<sup>2</sup> of which 79.1 percent is floodplain, 12.6 percent in north, northeast and south southeast is occupied by Mio-Pliocene hills and 8.3 percent in north central and in northwest regions is Plio-Pleistocene terrace land.



### 3.1.7 Ground subsidence

Bangladesh because of location is situated in the earthquake prone region. This country jolted by over 200 quakes since past two years. No major case of ground subsidence occurred either in floodplains or elsewhere due to earth quake. The devastating earthquakes namely the Chakhar (1869), Bengal (1885), Assam (1897), Srimangal (1918), Dubrigarh (1930) had tremor intensities over 7.0 (Richter). The epicenters of all the earth quakes were outside the Bangladesh boundary. The Assam earthquake that caused large scale damage in Assam, Bengal and Bihar had tremor intensity of 8.7 Richter. But no large scale ground subsidence occurred in Bangladesh due to the Assam earth quake (Bangladesh Building Code 1996, Seismic Map of Bangladesh 1979).

The most seismically vulnerable eastern part of Indo-Bangladesh where most devastating earthquakes occurred during past one hundred years is shown in Figure 3.4.



Source: FAO 1971, Hassan MM 1999

**Figure 3.4 The most Earthquake prone Eastern region of Indo-Bangladesh**

### 3.1.8 Bottom sediments

Bangladesh was formed due to deposition of sediments transported by major rivers that had been deposited under meander, tidal and/or estuarine conditions. The floodplain sediments are therefore vertically well sorted. The sediments in bottom layers settled down earlier are therefore coarser and coarseness of sediments increases with the depth of the layer. The



coarse textured sediments occur below 100 m depth in floodplains and level terrace regions. This is evident from the borehole records of deep tube wells and from the available sporadic geotechnical study data from different bore whole sites.

The presence of harmful heavy metals like arsenic, cadmium, chromium, lead and mercury, etc are required to be tested in dredge material to confirm whether these metals exist in bottom sediments.

### **3.2 Ecological Components**

The village forests are observed on homesteads, waste and marginal lands along road and embankment sides. Total households (H/H) in Bangladesh are 25 million spreading over 85,650 villages (BBS 2007). Village forest cover in Bangladesh is 0.27 million hectare out of the 2.56 million hectare total forests area (Forestry Master Plan, 1993). The per capita forest land area was 225 m<sup>2</sup> in 1993 showing a declining trend due to over exploitation, demographic pressure and natural calamities. Tree species on homesteads include fruit, fuel wood, timber, medicinal plants, MPTS and bamboos; trees on roadsides include timber, fuel wood, fruit, aesthetic and medicinal species. Fruit trees on road sides comprise 10 percent. Huge quantity of forest produces (fuel wood, timber, raw materials for industries, building materials and fruit) are obtained from rural forest (Katebi, N.A. 1997).

#### **3.2.1 The floral species**

The WBBIP sites do not pass through the national forests managed by BFD except the localized patches of sal forest in the northwest region. The tree planting culture on road sides developed since the Moghul and subsequently British periods. BFD since eighties began roadside tree planting keeping in mind the economic, ecological and aesthetic objectives. Later CARE, SIDA and Proshika planted trees on roadsides with multiple objectives e.g. to generate rural employment, to boost production of timber, industrial raw material and fuel wood and for alleviation of rural poverty.

The species planted on road sides are: rain tree (*Samanea saman*), krishnachura (*Cassia* spp.), mehagony (*Swietenia* spp), raj koroï (*Albizia richardiana*), auricoliformis (*Acacia auricoliformis*), eucalyptus (*Eucalyptus camaldulensis*) and sisoo (*Dalbarzia sisoo*).

The homestead species are: mango (*Mangifera indica*), black berry (*Syzygium cumini*), jack fruit (*Artocarpus heterophyllus*), cocnut (*Cocos nucifera*), betel nut (*Areca catechu*), etc.

Hijal (*Barringtonia acutangula*), mandar (*Erithrina indica*), pitali (*Trewia nudiflora*), silk cotton (*Bombax ceiba*), toddy palm (*Borassus flabellifer*) are planted in flooded land.

The aquatic floral species include: kochuripana (*Eichhornia crassipes*), khudipana (*Lemna minor*), shapla (*Nymphaea* spp.) kolmi (*Ipomea aquatica*), halencha (*Enhydra fluctuans*) and many weed species. The kochuripana khudipana and several other floating species are treated as eutropic vegetations.

### 3.2.2 The faunal and avifaunal species

Commonly observed wildlife species are: jackal (*Vulpes bengalensis*), mongoose (*Herpestes edwardsi*), civet cat (*Viverricula indica*), otter, snake, rodents, frogs, toad, turtles still occur at WBBIP site (IUCN 2002).

The commonly observed birds are: spotted dove (*Streptopelia* spp.), rock pigeon (*Columba livia*), parakeet (*Psittacula krameri*), cuckoo (*Hierococcyx* spp.), koel (*Eudynamis scolopacea*), owl (*Athene brama*), drongos (*Dicrusus* spp.), common myna (*Acridotheres* spp.), crow (*Corvus* spp.), magpie robin (*Copsychus saularis*), red vented bulbul (*Pycnonotus cafer*), jungle babbler (*Turdodais striatus*), tailored bird (*Orthotomus sotorius*), heron, little egret, cattle egret, storks and several wetland bird species.

### 3.2.3 Biodiversity status

The major habitats for floral and faunal diversities in Bangladesh are the hill forests, inland upland forest, homesteads, wetlands, coastal mangrove forest, agriculture lands, etc. All the ecosystems have been disturbed since the past decades due to poor management, demographic pressure, natural calamities and deteriorated law and order situation. Consequently, diversity and population of flora and fauna declined in Bangladesh. Many wildlife species as a result is under stress and 50 of those are endangered already. Ten percent mammal, 3.0 percent avifauna and 4.0 percent reptile species are extinct in Bangladesh (IUCN 2000). Status of the resident inland vertebrates in Bangladesh as indicated in the IUCN Red Book (2000) is shown in Table 3.2.

**Table 3.2 Status of the resident inland vertebrates in Bangladesh**

Groups	Total living	Extinct	Threatened			Not threatened
			Critically endangered	Endangered	Vulnerable	
Fishes	266	0	12	28	14	146
Amphibians	22	0	0	3	5	7
Reptiles	109	1	12	24	22	12
Avifauna	388	2	19	18	4	189
Mammals	110	10	21	13	6	17

Source: IUCN 2000

### **3.2.4 Wetlands**

In Bangladesh wetlands include the fresh and tidal rivers; ponds, lakes, beels, haors, baors and pools and the seasonal and tidal floodplains. Wetland ecosystem in Bangladesh serves as the rich habitats for numerous floral and faunal species including 266 fresh water fish species. The large haors in northwest, northeast and in north central regions play pivotal roles in flood abatement, fish propagation and stocking. In addition, these habitats provide shelter to innumerable local and migratory bird species. Unfortunately, the wetlands in Bangladesh depleted due to conflict between agriculture and fisheries, poor water management, water withdrawal by upper riparian countries and watershed degradation. All these affected capture fisheries, navigation, aquatic wild lives and the bio-diversity in general (RAMSAR Convention)

The wetlands also stabilize local weather, influence ground water recharge, catch pollutants and toxicants, regulate hydro-ecological condition and maintain the soil organic matter balance.

## **3.3 Socio-cultural Components**

### **3.3.1 Water Use**

Water of open water bodies (rivers and channels) throughout Bangladesh is used extensively for navigation, capture fisheries, agriculture and for industrial uses. The people settled on river sides usually depend on water for domestic uses that include potable water collection, bathing and washing and cattle washing. Though at present most of the rural people collect their drinking water from shallow and deep tube wells sunk on homesteads or at agriculture land. Fishermen and boatmen communities living along the river banks adopted fishing and boat plying as professions. Presently many industries that developed on river adjacent sites and banks make industrial use of river water. Unfortunately wastes and effluents from many of these industries are discharged in the rivers. Part of the solid wastes from these industries and from urban/rural residences are also discharged untreated in open water bodies that pollute the river water.

Water in pond, lake, harbor are used for stocking capture fish and for captive fisheries by a section of people. Water in closed water bodies like the open water bodies are used for domestic and limited agricultural uses. The closed water bodies are extensively used for fish culture. Fish culture has presently turned as a sustainable source for supply of fish to the local markets and generated work for a large number of poor.

The seasonally flooded croplands though shallowly flooded are also used for short rotation fresh water fishes culture while shrimps and white fish species are cultured in brackish water zones. Cat fish culture in transplanted paddy fields as alley generates additional income to the farmers and play roles in biological control of insects.

The rivers are used for navigation, fisheries, industrial uses and irrigation purposes. The boatmen, fishermen and poor people use river water for domestic purposes.

### **3.3.2 Cultural Heritage**

The mentionable cultural heritages include relics of the structures constructed during the rule of different political dynasties since over two thousand years past. Oldest cultural relics are of the Buddhist period followed by the structures of Hindu period. Muslim and Mughal periods followed the Hindu period. Structures of the English period are Universities, Colleges, High court, district courts, post offices, railway track, etc. can in fact be treated as the nuclei of modern developments approaches (Hannan, M. Dr. 1995). Amongst other cultural, archeological and historical structures that are scattered everywhere in villages and townships are the mosques, temples, graveyards, cremation sites, majors, ancient feudal structures are of recent origins hence are not very important from archeological and historical considerations.

### **3.3.3 Socio-cultural infrastructures**

The socio-cultural structures built during the Buddhists period revealed from archaeological excavations at Mohasthanagarh, Paharpur, Mainamati, Munshiganj and at other places that are of over one thousand years old. Cultural advancements achieved during the Buddhist period in fine art and sculptures are observable on the terracotta drawings and stone and bronze sculptures of Lord Buddha recovered at Mohasthanagarh, Paharpur, Mainamati and at other excavation sites. Lakes, wells, temples and stone sculptures of Radha-Krishna and different Gods and Goddess represent the Hindu period. Bangladesh progressed tremendously during the reign of Pal kings in 8<sup>th</sup> century. Progress of the Pal period is well reflected in their art, sculpture and literature. Many sculptures of Hindu period are engraved in stone, bronze, wood and terracotta drawings on temple walls have been unveiled in the recent past from different parts of Bangladesh. Muslim and Mughal structures are the royal palaces, shrines, mosques, tombs and military structures that exist in Bangladesh and elsewhere in India. The modern cities, townships and infrastructures were initiated during the British rule are virtually the nucleus of modern cities all over India and Bangladesh (Dr. Hannan, M. 1995).

### **3.3.4 Indigenous/ethnic communities**

The Chakma, Khami, Kuki, Boum, Banjogi, Kiang, Lushai, Marma, Moorang, Mroo, Pankhoo, Rakhain, Tanchunga, Tipra, Kiang and Chak live in Chittagong and Chittagong Hill Tract; Khasia, Monipuri, Khami, Kiang live in Sylhet, Habiganj, Moulvibazar, and Garo, Hajong, Santhal, Kool and Kotch live in the Madhupur and Barind Tract regions (BBS 2005, 2012). The ethnic population size in Bangladesh is nearly 10 million; 0.7 million live on eastern and southeastern hilly regions and 0.3 million in other districts. The Santhal, Sakh, Hajong, Orao, Koch and Kool live in Rajshahi, Harijan and Rajbangsi tribes live in wetlands and nearly 30,000 Rakhain people

live in Patuakhali district. Many of these ethnic minority people particularly of Patuakhali and Rajshahi districts have virtually merged with the mainstream culture. The merging trend of indigenous people are steadily merging with the mainstream population at an expedited rate since past several decades due to improved road communication that induced internal movement of labor.

### 3.3.5 Health care facilities

Health care facilities in Bangladesh are provided by GoB, NGOs, private clinics and individual practitioners. In addition, service from Homeopaths and Ayurvedic practitioners are also available at low cost both at rural and urban areas. The available health care facilities in Bangladesh are shown in Table 3.3. Information on health care facilities in more detail may be available in Bangladesh. Table 3.3 shows the health care facilities developed in Bangladesh.

**Table 3.3 National Health Services facilities available in Bangladesh.**

Healthcare facilities (Total in Bangladesh)	Survey years			
	2003	2004	2005	2006
Hospitals (total)	1,384	1,676	1,676	1,683
Govt. Hospitals	672	672	672	678
Govt. Dispensaries	1,297	1,397	1,397	1,397
No of Hospital beds (total)	46,125	50,655	50,827	51,044
Registered Nurse (total)	19,500	20,000	20,097	20,129
Registered Midwives(total)	17,622	18,037	18,937	19,911
Registered Doctors(total)	36,576	40,210	41,933	44,632
Govt. Medical College(total)	13	13	13	13

Source: BBS 2007

### 3.3.6 Educational facilities

Present national literacy rate in Bangladesh is 45.3 percent of which 49.6 percent is male and 40.8 percent female. The health care rate varies from one district to another district and from one region to another region. Lowest literacy rate is in Sherpur and Jamalpur districts (31.0 percent) and highest in Dhaka district (64.3 percent). The literacy rate in Ghazipur district is 56.4 percent. The number of academic institutions in Bangladesh (Government and non-government) is shown in Table 3.4. Implementation of WBBIP bridges in no way will impact the education facilities of this country adversely.

**Table 3.4 Total number and types of academic institutions in Bangladesh**

Types of Institutions	Survey years			
	2001	2002	2003	2004
Primary schools	63,255	63,545	86,373	-
Secondary Schools	15,837	15,806	17,386	-
Colleges	2,551	2,870	2,577	-
Madrasas	7,277	7,373	7,920	-
Govt Universities	17	17	22	-
Non-govt Universities	24	41	53	-

Source: BBS 2012

### 3.3.7 Professional communities

Nearly a century back most people in Bangladesh earned their livelihoods based on eco-dependent professions e.g. wood cutter, wood craftsman, cultivator, weaver, fisherman, mate weaver, boatman, and the cultivator community. In addition there were potter, black smith, gold smith, basket maker, cattle rearer, etc. Many such professional communities have changed their professions and/or are struggling to survive because the products they produces cannot longer compete with the industrial produces in open markets, reduced demand for their produces, shortage of raw materials for cottage industry products due to eco-degradation, etc.

### 3.3.8 Fisherman community

The fisherman community in Bangladesh are engaged in marine and/or fresh water fishing, fishing may be their fulltime or part time occupation. The fisherman community in Bangladesh is struggling hard to survive, because reduced fish catch, increased cost of living, shrinking of wetland and due to conflicts with the privileged adopted the profession as interest shooters. Pollution of open water bodies due to disposal of industrial/ urban wastes affected the population and diversity of fresh water fish species.

The WBBIP implementation will however not impact the fisherman or any other professional communities adversely.

### 3.3.9 River transportation

Water vessels like country boat, steamer and motorized water transports were the major means of transportation in Bangladesh several decades back. Most of the towns and growth centers were situated on big and small river banks for convenience of river transportation. Development of river routes continued to facilitate movement of cargo ships, country boats trawlers and fishing boats. At present most of the big rivers amongst the 700 perennial rivers indicate that that the water routes are mostly used for movement of trawlers, barges, fishing boats, etc. for cargo transportation. Only few large rivers are used as classified water routes for

movement of passenger steamers and launches. Amongst the 19,000 bridges across different rivers and channels that exist in Bangladesh many are turtle backed to facilitate movement of water transports.

The situation changed since 1972, at present length of LGED road is 151,610 Km and RHD managed road is 20,878 Km. Road transportation system improved and each district, upazila town even the growth centers are connected by all-weather motor able road linkage. The district towns were connected by 4,053 Km railway track that transported 44.5 million passengers (BBS 2005, 2012).

The number of motorized road transports in Bangladesh was 36,000 in 1997, increased to 930,000 in 2006 (BBS 2012). This is due to rapid improvement of road network over the past decades. In addition, many motor bikes, auto rickshaw and Nasimon type motorized transports ply on Bangladesh roads. Innumerable unconventional road transports like rickshaw, push cart, bullock cart also ply both in urban and rural roads. The number of organize, unorganized and private transports in 2006-7 compared to 2002-3 is shown in Table 3.5.

Dependence on water transportation has drastically been reduced in Bangladesh over the past several centuries due to surface water management, flood control, withdrawal of water by upper riparian countries and due to watershed degradation in vast catchments outside Bangladesh border.

**Table 3.5 Organized and unorganized water and land transports in Bangladesh**

Transport s	Road transports		Water transports(Public)		Private
	2002-3	2006-7	2002-3	2006-7	
<b>Organized transport</b>					
Bus microbus, truck, motor car,/taxi/jeep, auto-rickshaw, others	284,000	365,000	221 mechanized river transports	530 mechanized river transports	253 mechanized river transports
Motor bike	239,884	366,031	-	-	-
<b>Unorganized transport</b>					
Rickshaw,push cart, bullock cart	1,900,000	2,195,000			boat, fishing boat, trawler

Source: BBS 2012

### 3.3.10 Road and water route accidents

Narrow width structural weakness, defective bridges due to age, risky Bailey Bridges and ill maintained road transports, lack of pedestrians’ traffic awareness and poor law and order

situation combined are the causes of high road accident rate ( 10/1,000 registered vehicles/year) to cause many deaths and grievous injuries to many pedestrians and passengers. The road accident alone costs Bangladesh \$0.35 million annually to import spare parts to repair the damaged vehicles.

Ministry of Communication in the newly enacted National Transport Policy (MoC 2004) put emphasis on movement of environmentally sound transports on national highways and other road network system. The actions suggested to achieve the goal are (i) conversion of 2-lane roads into 4-lane with divider, (ii) improvement of the defective, narrow, risk prone bridges, (iii) maintenance of road transports properly and (iv) careful driving by well-trained drivers . If the NRTP (2004) can be implemented road accident rate can probably be reduced in Bangladesh significantly.

Accidents due to sinking of river vessels caused in 2009 were over 200, out of which 10 were in Sitalakhya and two were in Meghna River. The river vessels sank due to overloading, plying of imperfect vessels, collision with other motorized or non-motorized vessels and due to defiance of storm warning signals.

#### **3.3.11 Protected areas**

There exist 34 Protected areas in Bangladesh declared by MoEF under the Bangladesh Wildlife (Preservation) Order (1973) and subsequent Amendment (2011) . Moreover, the National Parks at Kuacuta, Nawabganj, Kadigarh, Singra and Tengragiri Wildlife Sanctuary at Barguna have also been declared Protected Areas (MoEF 2010-2011). Bhawal National Park, Balda Garden and Madhabkunda Eco-park have also been declared Protected Areas ( MoEF 2010-11).

#### **3.3.12 HIV/AIDS**

Spread of HIV/AIDS in Bangladesh particularly rural areas is minimal as per results of studies conducted so far. AIDS bearing patients have rarely and sporadically been observed amongst the sex workers who live in port cities Mangla and Chittagong. The HIV/AIDS issue is not serious in Bangladesh. The cautionary measures to avoid spread of AIDS and the manner of dealing with AID patients and/or the prospective AIDS carriers in the society are given wide scale spread publicity in electronic and printed media.

#### **3.3.13 Gender equity**

Gender equity in case of recruitment of staff, payment and other facilities is to be maintained as per the GoB rules and donor agencies' requirements. Women workers' camp sites should be situated at far place from the male workers camps. Separate toilet and washing facilities with due privacy should be provided for women workers.



### **3.3.14 Children's right**

The restrictions on child labor, appointing children in jobs that might pose health hazard, accident moral lapses, should be strictly followed. The concerned authorities must be careful dealing with children's right issue so that rights of the children are not abused in any way and at any stage during WBBIP implementation.

### **3.3.15 Climate change**

Large part of the coastal regions of Bangladesh and part of SCR may be the affected due apprehended sea level rise @ 0.18 m/ 40 years that may accelerate during next 40 years. If the rate of apprehended sea level accelerates the assumed impacts on the coastal plain of Bangladesh may become serious. Bangladesh however, can do nothing to combat impacts of the global issue, because of shortage of resources and lacking of necessary technological advancement.

However, implementation of the WBBIP in no way will impact the region adversely directly or indirectly. The sea level rise issue being a global phenomenon to which Bangladesh contributed least but it will be impacted highly if at all the sea level rises at apprehended rate, hence at the stage Bangladesh can only leave the issue fate destined and alternatively can only high light its grievances to the global conscious regarding the crisis at apprehends due to climate change and consequent sea level rise.

## **3.4 Pollution**

The most serious environmental concerns Bangladesh faces presently are the pollution caused due to urbanization, eco-degradation, demographic pressure and ill planned socio- industrial and commercial structures developed here and there and over 16,000 ill managed growth centers throughout. Air and water pollution is caused due to improper management of solid wastes and effluents from rural/urban/commercial sites and industrial plants. Intensified traditionally managed chemical agriculture to increase grain production also pollutes soil, water and air throughout Bangladesh and at WBBIP sites. Dust blowing and emissions from vehicles, industries, agriculture and urban sites pollute air and water. The ambient primary data regarding pollution of air, water, soil and noise and vibration at the bridges sites have collected by the Chemical Engineering Department of BUET from WBBIP sites has been included as Appendix-I. It can be said that environmental impact at individual bridges sites may not be significant but cumulative socio-ecological impacts of the WBBIP may be significant because the proposed bridges collectively will claim lands, wetlands and require felling of trees along the RoW and bridges command areas.

### 3.4.1 Air pollution

The air quality of different locations (105 points of bridges in the Western Bangladesh) had been assessed. The major components of air pollution are respirable suspended particulate matter, and gaseous pollutants such as: CO, CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub>.

The maximum allowable limit of pollutant concentration is given in Table 3.6.

**Table 3.6 National Air Quality Standards for Bangladesh**

SI No.	Categories of Area	Suspended Particulate matters, PM <sub>10</sub> (µg/ m <sup>3</sup> )	Sulphur dioxide		Carbon Monoxide		Oxides of Nitrogen	
			µg/ m <sup>3</sup>	ppm	µg/ m <sup>3</sup>	ppm	µg/ m <sup>3</sup>	ppm
1	Industrial and mixed	500	120	0.045	5,000	4.36	100	0.053
2	Commercial and mixed	400	100	0.038	5,000	4.36	100	0.053
3	Residential and Rural	200	80	0.030	2,000	1.75	80	0.043
4	Sensitive	100	30	0.011	1,000	0.87	30	0.016

Source: Environment Conservation Rules, 1997

The PM<sub>10</sub> concentration standard is 500µg/m<sup>3</sup> for industrial and mixed zone, and is 100µg/m<sup>3</sup> for sensitive zone. In this study, it has been observed that the PM<sub>10</sub> concentration of 48 sampling points (45.3% of sampling sites) is below the standard limit (<100 µg/m<sup>3</sup>) while only for 7 locations, PM<sub>10</sub> concentration exceeds the limit 500µg/m<sup>3</sup>. The highest PM<sub>10</sub> concentration was found in Dattapara Bridge (Rank 17) and Harishankar Pur Bridge (Rank 18) where the value exceeds 1,000µg/m<sup>3</sup>. These two points were located in a very busy road and the sampling was performed in a sunny day (average temperature ~37 °C). The minimum PM<sub>10</sub> concentration was observed in sampling point named Rayerhat Bridge (Rank 82); it was mainly because rain started in the middle of sampling. Due to the monsoon, there are several points where sampling was performed in the middle of raining or after the raining, and therefore, the lower pollutant concentration was observed. The average ratio of total suspended particulate matters (SPM) and PM<sub>10</sub> is about 3.5.

The gaseous pollutant standard limit is 0.045ppm for SO<sub>2</sub>, 4.36ppm for CO and 0.053ppm for NO<sub>x</sub>. For most of the selected sites, the gaseous pollutant concentration was below the standard limit. Only for three sites carbon monoxide concentration was found higher than the standard limit. The average carbon dioxide concentration was about 480ppm. There are few sites (about 5%) where carbon dioxide concentration was found comparatively higher. The higher gaseous concentration was observed in the sampling points which were located either in

busy area or near to the industrial area or brick fields. The concentrations of NO<sub>x</sub> and SO<sub>2</sub> were found either in trace amount or below the detection range.

The ambient air pollution data at bridges sites as per measurement by the Chemical Engineering Department, BUET are shown as Appendix-I: . Primary pollution data collected from the bridges sites

### 3.4.2 Water pollution

According to Environment Conservation Rules, 1997, National Standard for inland surface water is shown in Table 3.7. Based on the application sectors, there are six different types of surface water standards mentioned in the ECR, 97. Table 3.8 shows the relevant parameters of the drinking water standard according to ECR, 97. Since there is no specific standard for groundwater, Table 3.8 has been considered for groundwater comparison during this study.

**Table 3.7 Water pollution status in different rivers at selected sites**

Best Practice based classification	Parameter			
	pH	BOD5 (mg/L)	DO (mg/L)	Total Coliform (number/100ml)
a. Source of drinking water for supply only after disinfecting:	6.5-8.5	2 or less	6 or above	50 or less
b. Water usable for recreational activity :	6.5-8.5	3 or less	5 or more	200 or less
c. Source of drinking water for supply after conventional treatment :	6.5-8.5	6 or less	6 or more	5000 or less
d. Water usable by fisheries	6.5-8.5	6 or less	5 or more	-
e. Water usable by various process and cooling industries :	6.5-8.5	10 or less	5 or more	5000 or less
f. Water usable for irrigation:	6.5-8.5	10 or less	5 or more	1000 or less

Source: Environment Conservation Rules, 1997

**Table 3.8 National Standard for drinking water**

Parameter	Unit	Standard
BOD5 at 20°C	mg/L	0.2
DO	mg/L	6
pH	-	6.5-8.5
Suspended particulate matters	mg/L	10
Total dissolved solid (TDS)	mg/L	1000
Temperature	°C	20-30
Turbidity	NTU	10

Source: Environment Conservation Rules, 1997

Surface and ground water samples near 105 points of bridges in the Western Bangladesh had been collected and tested for different parameters according to the methods described earlier. Apart from few exceptions, most of the water parameters were found to be consistent and within the limit proposed by Environment Conservation Rules, (ECR), 1997 of the Government of Bangladesh. Surface water pH values were mostly within 6.5 to 8.5, the range allowed by ECR. Only 3.8% samples had pH value higher than 9 with only one sample higher than 10. All of the ground water pH readings were found to be within the range suggested by ECR. Most of the surface water samples had temperature within the range of 20-30°C; however, a significant number of samples also had higher temperature mainly because of the high ambient temperature in summer. Groundwater samples were relatively cooler than the surface water of the same location and were rarely found to be higher than 30°C.

Dissolved oxygen is one of the most important parameters that need to be higher than 5 mg/L according to ECR and other international standards. Though around 38.6% surface water samples had DO less than 5 mg/L, only 5.6% samples had DO really low (less than 3.5 mg/L). These water sources might have been contaminated with inorganic or other pollutants. Moreover, samples were collected during the months of summer when the ambient temperature was very high on most of the days causing a low level for dissolve oxygen in water. Ground water samples had lower DO, as expected, and few of them were found to be as low as ~1 mg/L.

The surface water turbidity values were found to be very scattered ranging from 3 to 750 FTU. This is because of different types and extent of sedimentation and insoluble contamination from run-off and nearby populations. Some might have been affected by waste water from

different sources as well. One thing to be noted is that the turbidity values in the southern region (especially, Barishal and Patuakhali) tend to be relatively higher and that might be explained by the presence of salt in water. Turbidity is not a major concern for ground water and thus was not considered in this study. Conductivity is an important parameter for ground water and 87% samples exhibited conductivity lower than 1 mS/cm. For rest 13% of ground water samples, slightly higher conductivity was found, which might be related to the presence of higher metal ions (such as: iron).

As surface water is exposed to the atmosphere, it might retain significant amount of suspended solid. Our analysis found varying amount of total suspended solid (TSS) in surface water samples, where most of the samples (85%) had TSS lower than 0.2g/L and only few (4.7%) had TSS as high as 0.4g/L. This can be a rainy and windy weather, populated neighborhood and many more influenced factors. Since there is no standard set for this parameter in Bangladesh (ECR, 97), it is not possible to compare the experimental values with the national standard.

Finally, biochemical oxygen demand (BOD), a very critical parameter of water quality, was analyzed for both surface and ground water samples. ECR suggested maximum value for BOD<sub>5</sub> is 6mg/L for surface water and 0.2mg/L for drinking water if supplied after disinfecting. Most of the surface water samples (76.5%) were found to be good according to ECR, 97 and remaining 23.5% water samples had BOD<sub>5</sub> higher than 6mg/L. Those water sources could have been contaminated with different types of organic pollutants such as: municipal, domestic and agricultural wastes. Only very few (1.8%) samples had relatively higher BOD<sub>5</sub> (higher than 9mg/L) and that indicates an overall good quality of surface water in that region. Ground water is supposed to be less contaminated and our analysis result also suggested the same. 46% ground water samples had BOD<sub>5</sub> higher than 3mg/L indicating presence of organic contamination to some extent. It is not uncommon for the tube wells to go under water during flood and that can introduce organic contamination in ground water. In many areas, ground water could also be contaminated with microorganisms causing a slightly higher BOD<sub>5</sub> value. This can only be confirmed with any type of coliform test. Since BOD<sub>5</sub> values of the above ground water samples exceed the standard value of drinking water BOD<sub>5</sub> (0.2mg/L, ECR, 97), the ground water samples do not comply with ECR, 97. It is to be noted that there is no ground water standard set by the Government of Bangladesh.

The ground water in Bangladesh is polluted largely due to seepage from non-sanitary latrines and leakage of agro-chemicals (WARPO 2000). Ground water at bridges sites may be polluted due to seepage from cement concrete mixing and working sites. This can however be reversed after the project activities are completed and work camps dismantled sites are cleared properly.

### 3.4.3 Soil pollution

The agricultural soils at bridges construction sites can be polluted due to accumulation of agro-chemical residues, non-essential ingredients and impurities accumulated due to application of chemical fertilizers. The solid wastes disposed from household sites, industries and commercial sites can pollute soil. The plant nutrients removed each year with crops and crop residues deplete soil fertility. Pollution of soil along the highway sides may be caused due to spillage of petroleum products, bituminous materials, and noxious chemicals and due to accumulation of heavy metals emitted from automobile engines with exhausts. Use of dredge materials for embankment construction may contain noxious metals that can pollute the agriculture lands along road alignment. Moreover, accidental spillage of petroleum derivatives and various noxious fluids and chemicals can also pollute soil along road alignments.

### 3.4.4 Noise and vibration

The National standard for sound is set based on areas of different categories. The standards for different areas are given in Table 3.12. Areas up to a radius of 100m around hospital, educational institutions or special institutions/establishments are designated by the government as silent zone.

**Table 3.9 National Standards for Sound for different areas**

Sl. No.	Categories of Area	Standard for Day Time (6 AM to 9PM) dB	Standard for Night Time (9 PM to 6 AM) dB
1	Silent zone	45	40
2	Residential	50	40
3	Mixed area, includes both for Residential and commercial	60	50
4	Commercial	70	60
5	Industrial	75	70

Source: Environment Conservation Rules, 1997

The noise level was monitored for each selected sites. In most of the sites, the average noise level was below the standard limit (~80 dB). There were few locations located near the bazar (market) areas or busy road where noise level exceeded the standard limit.

### 3.4.5 Wastes and effluents

The solid wastes, effluents and other garbage that may be generated at subproject sites are domestic wastes, effluents at work camp/work sites and variety of materials at construction sites during the construction stage. The solid wastes generated at work camp, labor camp and construction sites due to construction activities may be handled, dumped and to be disposed in

safe and environment friendly manner at authorized dumping grounds available nearby the construction sites. Disposal of wastes and effluents from the construction sites haphazardly and at helter shelter will otherwise pollute surface water, ground water and agriculture soils around the construction site.

If no specified dumping ground is available near the construction sites, wastes in that case can be buried in deep pits around near the construction sites. All the valuable materials e.g. cellulose, glass, plastic and metals, etc. may be separated for recycle and reuses.

#### **3.4.6 Offensive odor**

Materials like the organic wastes, faecal residues, effluents and other decomposable wastes if dumped near to the work camp and/or residential sites may spread stinky and offensive odor on decomposition. This may adversely affect the work camp and residential sites creating annoyance to the work camp dwellers, passersby and locals.

## **CHAPTER 4. ACTIVITIES DURING IMPLEMENTATION STAGES**

The impacts indicated in this Chapter are relevant to the activities undertaken during the implementation stages. The measures to be undertaken to avoid, and/or minimize these impacts during the planning, design and implementation stages have also been suggested. The activities to be undertaken during project implementation stages are mentioned here. This is worth mentioning that the activities mentioned in this chapter are not project specific rather these are of general nature applied in most infrastructure development projects including the WBBIP subprojects.

### **1. Pre- construction Stages**

- Site survey and technical investigations,
- Land and properties acquisition
- Assessment of environmental losses (land, wetland and other asset, biodiversity, etc),
- Payment of compensation to PAPs,
- Preparation of subproject design

### **2. Construction Stage**

- Setting of Field office and workers camps,
- Procurement and engaging of workers,
- Site clearance ( removal of trees, residential, commercial and other structures),
- Procurement and storage of construction materials and equipment,
- Management of traffic at subproject site and site management,
- Site selection for collection of fill materials,
- Construction of bridge, toll plaza and other structures,
- Protection of road embankment slope by grass carpeting,
- Pavement of the approach roads
- Pollution control during paving activities
- Planting trees on road sides.

### **3. Operation Stage**

- Monitoring of traffic operation,
- Road maintenance and monitoring activities,
- Roadside slopes and trees management

Potential impacts due to subproject implementation stages should be evaluated based on significance, extent, effect, duration and stability.



Short-term impacts (crop loss, pollution and social disturbance) will terminate with the completion of subproject activities and/or by adopting mitigation measures.

Moderately long-term impacts (fill material collection, loss of landscape beauty, camps setting, dumping construction materials, dumping, handling and disposal of solid wastes, construction of diversion roads, etc.) will also terminate with the termination of construction activities.

Long-term impacts (loss of land, loss of wetland, disturbance to ecological/archaeological and vulnerable sites, psychological stress, etc.) can though be minimized by adopting mitigation measures but scars of such impacts will persist in PAPs minds. Impacts of activities during project implementation stages are shown in Table4.1

**Table 4.1 Project activities and key environmental issues**

<b>Project Stage</b>	<b>Construction Activities</b>	<b>Key Environmental Issues</b>
Pre-construction Stage	Alignments fixing on map	<ul style="list-style-type: none"> <li>• No impact</li> </ul>
	Survey camp setting and conducting survey work	<ul style="list-style-type: none"> <li>• Psychological stress</li> <li>• Disturbance on privacy</li> </ul>
Construction Stage	Base camp and labour camps setting at work sites	<ul style="list-style-type: none"> <li>• Employment generation</li> <li>• Psychological stress</li> <li>• Social disturbance</li> </ul>
	Mobilization of construction machinery/ vehicles and plants	<ul style="list-style-type: none"> <li>• Noise and vibration/dust blowing</li> <li>• Road pavement damage/ traffic disruption</li> <li>• Psychological stress</li> <li>• Employment generation</li> </ul>
	Site clearance	<ul style="list-style-type: none"> <li>• Loss of ecological balance</li> <li>• Disturbance to services facilities</li> <li>• Demolition of domestic/industrial/commercial structures</li> <li>• Loss of livelihood</li> <li>• Pollution due to noise and dust blowing</li> <li>• Employment generation</li> </ul>

	Earth work for approach road construction Stockpiling of fill materials for bypass road construction	<ul style="list-style-type: none"> <li>• Land loss</li> <li>• Traffic disruption</li> <li>• Loss of landscape beauty</li> <li>• Employment generation</li> </ul>
	Haulage and storage of construction materials	<ul style="list-style-type: none"> <li>• Loss of landscape beauty</li> <li>• Pollution due to dust blowing</li> </ul>
	Pavement construction	<ul style="list-style-type: none"> <li>• Air pollution by smoke / Asphalt mix plant operation</li> </ul>
	Construction of bridge, toll plaza and bypass road	<ul style="list-style-type: none"> <li>• Induced traffic congestion</li> <li>• Air pollution</li> <li>• Noise pollution</li> <li>• Induced road accident risk</li> </ul>
Operation Stage	Traffic management	<ul style="list-style-type: none"> <li>• Improvement of road traffic system</li> <li>• Increased risk of traffic accident</li> </ul>
	Maintenance of bridge, approach roads and side slopes	<ul style="list-style-type: none"> <li>• Temporary disruption to traffic movement</li> </ul>
	Monitoring regarding	<ul style="list-style-type: none"> <li>• Resource generation</li> <li>• Improved aesthetic beauty</li> <li>• Improved socio-economic situation</li> </ul>

## **CHAPTER 5. IMPACTS AND MITIGATIONS**

### **5.1 Environmental Impact Identification**

Identification of environmental impacts on IECs during implementation stages was done during field visits, discussion with local people during ARP studies and discussion with the RHD staff. IECs as bridges sites that can be impacted are different at different bridge sites that have been identified and described along with the different bridges relating to interventions. The IECs identified in respect of importance are physical, ecological, socio-cultural components and pollution that can directly impact food production, livelihood, quality of life and pollution of environmental resources. Implementation stages like pre-construction, construction and operation stages involve different activities and different type of impacts on environmental components. Magnitudes of the impacts on different environmental components can be assessed comparing with the ambient conditions.

As stated earlier environmental components may impact on the IECs to different magnitude during implementation stages and during O & M. Impact identification on IECs significantly affected, is done in Bangladesh adopting the standard checklist, flow chart and matrices. New bridges that to be reconstructed/constructed under WBBIP along existing road alignment and on RHD land. Hence, under the situation minimal impact on IECs apprehended during subproject implementation stages. However, the findings have mainly been included in the EIAs prepared for the individual bridges. From this context this report is of general type that can be followed in preparing the EIAs for individual bridges during implementation stage of the WBBIP wherever so required.

### **5.2 Environmental Impact Scoping Matrices**

The impacts of any development endeavor particularly due to implementation of infrastructure project can be considered under different situations e.g. as per the proposed project alignment, considering alternative alignment and under no change situation. The 3<sup>rd</sup> alternative may not apply for WBBIP as the bridges already occur, hence scoping of matrices should be considered keeping in mind the remaining two situations.

It should be noted that activities associated with implementation of WBBIP will impact the IECs positively and/or negatively to different magnitudes. The matrices of environmental impacts on IECs are therefore used to identify the impacts systematically in relation to project activities and the impacts on environmental parameters maintaining rational with the cause and effect relationships.

Impacts of bridges construction on IECs during pre-construction, construction and operation stages indicted in Table 5.1 are for general consideration and may not apply for individual

bridge. The impacts of individual bridge on IECs have been shown as *Appendix-II: The environmental assessment of the individual bridges sites.*

**Table 5.1 Comparison of Scoping before/after Study**

Anti-Pollution Measures						
No.	Items of Impact	Predicted Impact		Assessed Impact		Reason of Assessment
		Before/ During Const- ruction Stage	Operation Stage	Before/ During Const- ruction Stage	Operation Stage	
1	Air pollution	B	D	B	D	Air pollution will be caused during construction stage due to vehicular emissions and dust blowing.
2	Water pollution	B	D	B	D	Water pollution during construction stage likely due to construction activities.
3	Soil pollution	B	D	B	D	Soil pollution during construction stage may be caused due to spilling of oil and lubricants.
4	Waste	B	D	B	D	Camp sites and construction wastes may pollute soil.
5	Noise and vibration	B	D	B	C	Noise level may increase during construction.
6	Ground subsidence	D	D	D	D	No ground subsidence likely during implementation

						stages.
7	Offensive odors	D	D	D	D	No offensive odor likely at any stage of project implementation.
8	Global warming/Climate change	D	D	D	D	No impact anticipated due to global warming.
<b>Natural Environment</b>						
9	Topography and geology	D	D	D	D	No impact anticipated due to implementation of the project.
10	Bottom sediment	D	D	D	D	No impact anticipated
11	Biota and ecosystem	B	B	D	D	No impact anticipated
12	Hydrology	B	D	D	D	No impact on hydrology apprehended.
13	Water use	D	D	D	D	No impact on water use apprehended due to project implementation.
14	Protected area	D	D	D	D	No protected site will be affected.
<b>Social Environment</b>						
15	Involuntary resettlement	B	B	B	C	Displacement is required in pre-construction stage.
16	Local economies, such as employment, livelihood, etc.	B-/B+	D	B	D	At several bridges sites livelihoods may be affected due to removal of shops and acquisition lands.
17	Land use and utilization of local resources	D	D	D	D	Impact on land use may not be serious due to acquisition

						of agriculture lands at several bridge sites.
18	Social institutions and local decision-making institutions and social service facilities	B	D	B	D	Some utilities might be affected due to the new bridge construction.
19	Poor	B	B	B	C	Poor people living on RHD land may be affected.
20	Indigenous or ethnic minority people	D	D	D	D	No indigenous tribal people likely to be affected due to WBBIP implementation.
21	Misdistribution of benefits and damages	D	D	D	D	No impact might be anticipated.
22	Local conflicts of interest	D	D	D	D	No impact might be anticipated.
23	Gender	D	D	D	D	No negative impact on gender issues apprehended.
24	Children's right	D	D	D	D	No legal rights of children is anticipated.
25	Cultural heritage	D	D	D	D	No cultural and/or historical relics occurs at bridges sites hence will not be affected.
26	Infectious diseases such as HIV/AIDS	B	D	B	D	Influx of worker may cause the possibility of infectious diseases.
27	Landscape	D	D	D	D	No impact might

						be anticipated.
28	Working conditions	B	D	B	D	Insufficient safety management will cause the accidents in construction stage.
29	Social consensus	B	D	B	D	The physical construction activities might be hampered without appropriate local consensus.
<b>Others</b>						
30	Accident	B	D	B	D	In-appropriate traffic control may induce accidents.

Note: A: Remarkable Negative Impact is predicted.

B: Negative Impact is expected to some extent.

C: Extent of Impact is unknown. (A further examination is needed and the impact could be defined as study progresses)

D: Impact is very small or nil and further survey is not required

### 5.3 Mitigation Measures by bridges

Surrounding environmental condition and nature of the WBBIP are very similar. Thus, Table 5.2 and Table 5.3 present the combined mitigation measures on anticipated adverse impacts in pre-construction/construction stage and operation stage, respectively. The mitigation measures individual bridge on IECs have been shown as *Appendix-II: The environmental assessment of the individual bridges sites.*

**Table 5.2 Mitigation measures pre-construction/during construction Stage:**

Item of Impact	Magnitude of adverse impact	Mitigation Measures
Air pollution	B	<ul style="list-style-type: none"> <li>- Contractors are required to conduct daily routine equipment and machinery check-ups to ensure that these are in the optimum working conditions.</li> <li>- Regular preventive maintenance service of construction equipment and machineries will strictly comply with.</li> <li>- To reduce the dust, periodical water spray should be taken.</li> </ul>
Water pollution	B	<ul style="list-style-type: none"> <li>- Temporary coffer dam must be provided to accelerate sedimentation of turbid water and prevent a straight water flow into the present water way.</li> <li>- Temporary sanitation facilities such as portable toilets and garbage bins will be provided by the contractors to ensure that the domestic wastes to be generated by the construction personals are properly handled and not thrown into the drainage to prevent further pollution.</li> </ul>
Soi pollution	B	<ul style="list-style-type: none"> <li>- The operator of heavy equipment should pay attention to prevent fuel leakage when he feeds.</li> <li>- The contractor and consultant of supervision should monitor the manner of fuel feed.</li> </ul>
Waste	B	<ul style="list-style-type: none"> <li>- Contractors are required to facilitate proper disposal plan and manage the construction waste.</li> <li>- The consultant of supervision should monitor the waste disposal.</li> </ul>
Noise and vibration	B	<ul style="list-style-type: none"> <li>- Noise suppressors such as mufflers will be installed whenever deemed necessary to maintain the noise the noise generated by the various heavy equipment and other construction machinery within permissible limits.</li> <li>- Contractors are required to use low-noise equipped machinery whenever it is necessary.</li> </ul>



Involuntary resettlement	B	<ul style="list-style-type: none"> <li>- Conduct census survey and local stakeholder meeting.</li> <li>- Prepare ARP involving the following measures. <ul style="list-style-type: none"> <li>• PAPs must be acknowledged as an eligible for compensation.</li> <li>• Identify the eligibility of non-titled people at the census survey intended to PAPs and ensure the compensation and support.</li> <li>• Refer the previous/on-going projects by other donors, determine the requirement for social vulnerability and compensate to them.</li> <li>• Resettlement site must be prepared when PAPs need it.</li> </ul> </li> <li>- Establish external monitoring committee consists of the third party.</li> </ul>
Local economies, such as employment, livelihood etc.	B	<ul style="list-style-type: none"> <li>- Prepare ARP involving the following measure. <ul style="list-style-type: none"> <li>• Measure to restore PAPs' livelihood must be secured.</li> </ul> </li> </ul>
Social institutions, such as social infrastructure and local decision making institutions. Existing social infrastructure and services	B	<ul style="list-style-type: none"> <li>- Social utilities; such as power supply, drinking water, drainage and communication line are to be diverted before starting the construction activity.</li> </ul>
Poor people	B	<ul style="list-style-type: none"> <li>- To minimize impact on present agricultural activities, the construction schedule should be disclosed to the PAPs at the earliest possible stage.</li> <li>- The proper compensation should be given to the PAPs.</li> </ul>
Infectious diseases such as HIV/AIDS	B	<ul style="list-style-type: none"> <li>- Contactor will be required to conduct a periodical health education to his personnel.</li> </ul>
Working conditions	B	<ul style="list-style-type: none"> <li>- Construction personnel provides with the necessary safety gears such as protective hard hat and safety belt as necessary.</li> <li>- Contractor must provide temporary scaffolding, temporary landslide protection wall etc. to protect workers.</li> </ul>
Social consensus	B	<ul style="list-style-type: none"> <li>- RHD must hold local stakeholder meetings periodically, and release project information to neighbor villagers.</li> </ul>

Accident	B	<ul style="list-style-type: none"> <li>- A sound traffic management and detour plans duly approved by the local RHD must be strictly implemented.</li> <li>- Traffic enforcers and flagmen will be designated when heavy equipment/vehicle will be operated adjacent to public road.</li> </ul>
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**Table 5.3 Mitigation measures in operation stage:**

Item of Impact	Magnitude of adverse impact	Mitigation Measures
Noise	C	- Monitoring and review the result by RHD.
Involuntary resettlement	C	- Monitoring by external monitoring agency and confirm if issues are arisen or not.
Poor people	C	- Monitoring by external monitoring agency and confirm if issues are arisen or not.

## **CHAPTER 6. ANALYSIS OF ALTERNATIVES**

### **6.1 Alternative Alignment**

The location of new bridge shall be determined in consideration of impact to existing residences/shops, cost and so on. However, National Road shall be considered future widening project, additionally.

As a result of comparison (see Table 6.1), Alternative 4 (Replacement Existing Bridge) was selected from the viewpoint of the cheapest initial cost. Regarding National Road, Alternative 3 (New Bridge Construction next to Existing Bridge) was selected in consideration of easy future widening. And Alternative 3 was selected for Regional and Zilla road.

**Table 6.1 Comparison of Alternatives**

Item	Alternative1	Alternative2	Alternative3	Alternative4
Figure	<p>The figure contains four diagrams labeled Alternative 1 through Alternative 4. Each diagram shows a cross-section of a road with a bridge. Alternative 1 shows a new bridge (red hatched) being built next to an existing bridge (green hatched). Alternative 2 shows a new bridge (red hatched) with construction for abutment and pier (red rectangles) next to an existing bridge (green hatched). Alternative 3 shows a new bridge (red hatched) with a temporary bridge (grey hatched) during construction next to an existing bridge (green hatched). Alternative 4 shows a new bridge (red hatched) being built in the same position as an existing bridge (green hatched) that is to be replaced.</p>			
Summary	One of new bridge is constructed next to existing bridge and another bridge is constructed at the same position of existing bridge.	New bridge is constructed as 2-lane carriageway next to existing bridge. Additionally, the abutment and the pier are constructed for future widening project.	New bridge is constructed next to existing bridge.	Existing bridge is replaced by new bridge.
Temporary Bridge	Unnecessary Good	Unnecessary Good	Unnecessary Good	Necessary during construction Poor
Economic Efficiency	The initial cost is the most highest among alternatives. Poor	The initial cost is higher than Alternative 3 and 4. Poor	The initial cost is higher than Alternative 4. Good	The initial cost is the cheapest among alternatives. Good
Traffic Capacity	It is improved only in project area. Good	It is same as the existing condition. Fair	It is same as the existing condition. Fair	It is same as the existing condition. Fair
Traffic Safety	It might cause traffic conflict at the diverging point. Poor	It is same as the existing condition. Fair	It is same as the existing condition. Fair	It is same as the existing condition. Fair
Evaluation			<b>Recommended for National Road</b> - Easy for future widening.	<b>Recommended for Regional and Zilla Road</b> - The cheapest initial cost.

## **6.2 No Action Alternative**

All the 105 bridges under WBBIP shall be constructed or reconstructed to replace the existing bridges existing on different national, regional and zilla roads. Under the situation probably 'no action alternative' is practically not practicable.

## **CHAPTER 7. ENVIRONMENTAL MANAGEMENT PLAN**

The RHD itself or the Construction Supervision Consultant (CSC) firm hired by RHD shall remain responsible to look after all day to day activities of Contractor during implementation stages of the subprojects and ensure that all environmental provisions as per Environmental Management Plan (EMP), and/or other EIA documents are properly and timely implemented by Contractor during the implementation stages. Fully and timely compliance of the environmental provisions as per the EMP, other EIA documents and environmental Clauses is legally binding for the Contractor as per the contractual agreement.

The Environmental and Social Circle of RHD if probably equipped with necessary equipment and trained staff can probably manage supervision of the social and environmental requirements during project implementation stages. RHD Under the situation can therefore perform the functions stated below:

- Supervision and monitoring of environmental and social activities of the WBBIP subprojects done by Contractor during implementation stages,
- Monitoring the compliance of the provisions of EIA/EMP and the contractual Clauses by Contractor during implementation stages of WBBIP sub-projects.

### **7.1 Institutional framework**

Environmental Management of the WBBIP subprojects involves highly specialized multidisciplinary and multi-sector activities that may be different from mere construction of bridges and the associated components. The Environmental Circle of RHD at present may not have sufficient expertise and requisite experience to perform the job properly. Moreover, the Environmental Management of infrastructure projects is a growing discipline in Bangladesh and rather worldwide, hence it is not quite expected that RHD possesses the requisite expertise and experience and the time to supervise implementation of WBBIP and of the EIA provisions properly by Contractor during implementation stages.

RHD shall remain responsible for implementation of the environmental provisions as per EMP and other EIA documents during WBBIP implementation stages. Environmental management during implementation stages as mentioned earlier shall require services of a specialized multidisciplinary team with multi-sector backgrounds. RHD or its hired specialized consultants can monitor due fulfillment of the environmental provisions by Contractor during construction stage. The WBBIP involves low environmental impacts as the bridges will be constructed, reconstructed and/or improved along the existing road alignments and existing bridges sites. The Environmental and Social Circle of RHD may decide how and who to conduct monitoring activities during WBBIP implementation stages.

The institutional framework for environmental management and monitoring is presented in Figure 7.1.

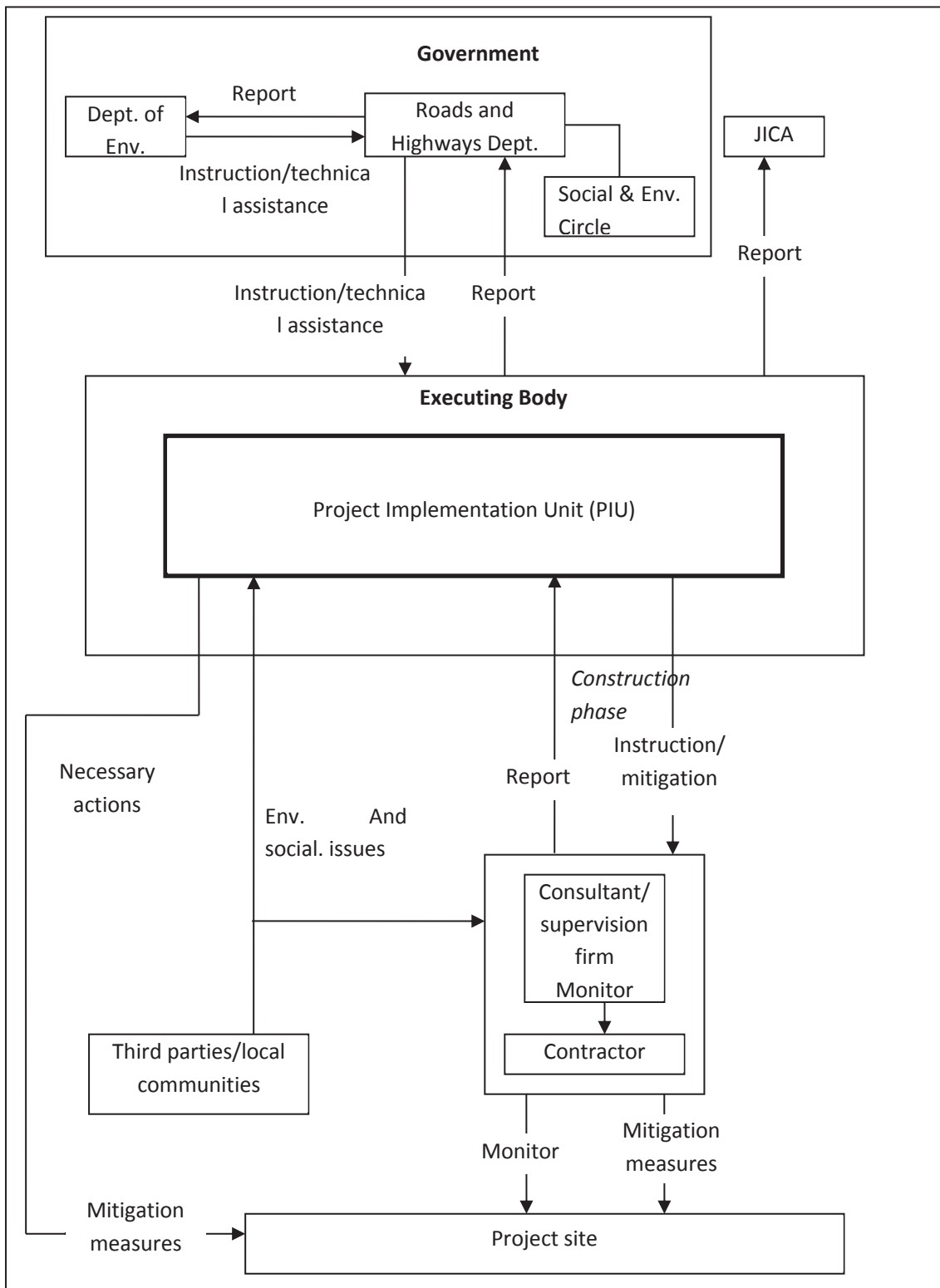


Figure 7.1 Institutional framework for environmental management and monitoring

## **7.2 Environmental Monitoring Plan**

Environmental Monitoring of a development intervention is required to be done periodically for use of the management authorities during the project implementation stages. Two approaches are followed usually during monitoring of environmental impacts. These are (i) compliance monitoring during pre-construction and construction stages and (ii) monitoring of impacts on environmental components during construction and operation stages.

### **7.2.1 Compliance monitoring**

The fulfillment of environmental provisions as per the EIA documents and EMP where applicable at WBBIP subproject sites will require monitoring during implementation stages. The issue of environmental concerns are (i) safety and security workers and pedestrian, onlookers and passengers of road transports, (ii) proper hauling, storage, handling and disposal of wastes from construction sites to the GoB authorized dumping places (if any), (iii) provisions for protection against air and noise pollution, (iv) compliance to the gender equity provisions as per regulations, (v) compliance to the labor welfare regulations, (vi) compliance to the provisions regarding public and professional health and sanitation standards and (vii) maintenance of day to day tidiness at work and work camp sites.

Required compliance monitoring during pre-construction stage are (i) to check the measures taken by Contractor to mitigate environmental impacts, (ii) inclusion of environment related provisions of EIA documents and EMP in the contract documents for compliance by Contractor and (iii) regarding payment of compensation to PAPs for the environmental damages that might have caused due to WBBIP implementation activities.

### **7.2.2 Environmental Management Implementation**

The RHD reorganized the Environmental and Social Circle under an Addl. Chief Engineer, with one Supt. Engineer and one Ex. En. and necessary supporting staff. Activities of the Circle are:

- To review the EIA documents including EMP, supervise and monitor activities of Contractor during project implementation stages. Ensure proper implementation of the environmental provisions by Contractor and other stakeholders as per the EIA documents and Clauses during implementation of RHD projects.
- To take care that all the environmental provisions and day-to-day activities at RHD executed project sites fulfill the environmental requirements regarding environment friendliness. The work camp sites, field office site and the overall environment at subproject sites is clean, tidy and environment friendly.

The subproject activities under WBBIP include construction of bridges and approach roads. Enhancement activities include tree planting on approach roads, command areas and take care



that no squatter sheds and other structures constructed on approach roads during operation stage.

The impact mitigation measures undertaken during construction stage and the enhancement activities as per EMP may continue even during the operation stage. Contractor during implementation stages shall act as key stakeholder and remain responsible regarding implementation of the environmental provisions as per EMP and contractual Clauses (if any). The RHD/ CSC during construction stage shall periodically supervise activities that may impact IECs.

The IECs affected directly due to WBBIP implementation stages particularly during the construction stage are earthwork, fill materials collection for approach construction, piling of junks, haulage and storage of construction materials, pavement work, demolition of existing structures and other related activities like pile driving, construction of super and sub-structures, etc. Impacts during construction of approach road embankments and bridges shall require instant mitigation to avoid/minimize the potential environmental hazards.

### **7.2.3 Environmental Monitoring Plan**

Environmental Monitoring Plan for this sub -project will help to evaluate the extent and severity of environmental impacts against the predicted impact and the performance of environmental protection measures. The following table has been prepared for monitoring the operation & maintenance phase activities of the sub-project:

**Table 7.1 Environmental Monitoring Plan:**

Sl.No	Environmental Indicator	Parameters/Units	Means of Monitoring	Frequency	Responsible agency
01.	Air/Water/Soil Quality	N/A	Inspection	Dairy	Contractor/Consultant of supervision
02.	Dust Control	Spraying of water	Visual	Daily	Contractor/Consultant of supervision
03.	Noise Control	Measurement (db)	Monitoring	Daily	Contractor/Consultant of supervision
04.	Waste Management	Monitoring of collection, transportation and disposal of solid waste. Inspection of construction camp.	Inspection	Daily	Contractor/Consultant of supervision
05.	Working conditions and Accident	Monitoring Health & Safety of Workers	Inspection	Daily	Contractor/Consultant of supervision
06.	Involuntary resettlement, Poor	Monitoring by external monitoring agency	Monitoring	6 months later from resettlement	External monitoring agency/RHD

#### **7.2.4 Reporting**

The Site Engineer (SE) shall report regarding compliance of the EMP and other environment related issues by concerned stakeholders to RHD in his periodic progress report for reviewed by RHD during the construction stage. Periodic one in a month report of the SE shall indicate clearly regarding the compliance of environmental provisions by Contractor. Contractor's failures to implement the environmental provisions are to be reported to RHD regularly with request for action. Incidents of contamination or pollution due to Contractor's activities whether due to negligence or otherwise are to be mentioned in periodic reports.

#### **7.2.5 Environmental Management Cost Estimated**

The costs for environmental management are involved in mitigation of the impacts during implementation stages for environmental enhancement activities e.g. planting tree saplings on roadsides, construction of public facilities, etc. The estimates for incurring the environmental costs are shown in Table 7.2 and Table 7.3.

**Confidential**

## **CHAPTER 8. PUBLIC CONSULTATION**

Several Senior Consultants named Mrs Hasina Khatun, and Messrs Md. Ekramul Huq, Md Faruque Ahmed and Shahidul Islam from BCL conducted the stakeholders meetings at different bridges sites. The discussions with the stakeholders were concentrated mostly on the positive aspects of subprojects implementation, magnitudes of socio-cultural and environmental impacts, compensation entitled by PAPs and resettlement requirements for affected persons and families that to be dealt by RHD and other authorities.

The minutes of stakeholder meeting is attached in *Annex-VI: Minutes of SHM* in ARP.

### **8.1 Summarized Stakeholders Opinions at least Affected Subproject Sites**

In general, people at subproject sites agreed to the implementation of subprojects and made comments that the subproject implementation will improve road communication system, augment economic activities and allow faster and safer movement of passengers and commodities to and from subproject sites. The mentioned opinions came mostly from the people who were are not directly affected by the project and where impacts of the subproject has tolerable environmental and socio-cultural impacts.

This represent a group of bridges that show relatively mild type of environmental and socio-cultural impacts that can be mitigated relatively easily.

### **8.2 Summarized Stakeholders Opinions at Moderately Affected Subproject Sites**

The PAPs and many amongst the locals who attended the stakeholders' meetings held at 13 bridges sites at Bhola, Jhalkathi, Faridpur sadar, Shariatpur, Madaripur, Muladi and Barisal opposed implementation of the subprojects at the sites selected by RHD. The objections were based on the high socio-cultural and ecological impacts involved to affect many people provided the bridges are constructed/reconstruction at the proposed sites. The matter can however be referred to the RHD to decide how the disputes regarding the bridges location can be resolved amicably consulting with the local people.

The bridges Ranks (23, 29, 42, 71, 78, 81, 83, 85, 86, 94, 96, 97, 99) in south central regions (SCR) pose rather serious environmental and socio-cultural impacts. Hence the participants in ARP meets raised objections to construct /reconstruct the bridges along their existing alignments.

### **8.3 Summarized Stakeholders Opinions at Seriously Affected Subproject Sites**

The stakeholders who participated in the meeting comprised of RHD officials, local elites, local businessmen, service holders, students, women representative and local working class people. All present in the discussion firmly opposed construction of a 43.0 m RCC bridge over the

Gabdigara channel because of high ecological impacts, moreover the bridge if constructed along the proposed alignment will impact an irrigation channel and considerable area of agricultural land.

The 60 percent of the PAPs who attended the meets though in general support construction of 4-lane bridges that will improve communication, but at the same time strongly oppose the ecological, socio-cultural and loss of agricultural land due to construction of bridges as per the proposed designs. Hence they plead for realignment of bridges to reduce the socio-cultural and environmental impacts.

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December 09, 2014

## EIA Report Prepared for Western Bangladesh Bridges Improvement Project

### Checklist of DOE's TOR where it is incorporated in EIA Report and ARP Report

TOR approved by DOE.		Reference to EIA Report / ARP Report
1. Environmental Impact Assessment (EIA) is prepared considering with the overall activity of the said Project in accordance with DOE's TOR and additional suggestions provided therein:		
<b>2. The EIA report has been prepared in accordance with following indicative outlines:</b>		<b>EIA Report</b>
1.	Executive Summary (ES)	As enclosed
2.	Introduction:	
	<ul style="list-style-type: none"> <li>• Background</li> <li>• Brief description</li> <li>• Scope of study</li> <li>• Methodology and limitation</li> <li>• EIA team</li> </ul>	<ul style="list-style-type: none"> <li>• Chap. 1 (Sec. 1.3, P.1-2), [also ES (Sec. A)]</li> <li>• Chap. 1 (Sec. 1.1, P. 1-1; Sec. 1.6, P. 1-3)</li> <li>• Chap. (Sec. 1.2, P.1-1; Sec.1.4, P1-1; Sec.1.5, P. 1-3)</li> <li>• ES (Subsec. of A: Methodology for conducting EIA)</li> <li>• ES (Sec. A, P. ES-5)</li> </ul>
3.	Legislative, regulation and policy consideration	
	<ul style="list-style-type: none"> <li>• Potential legal, administrative</li> <li>• Planning</li> <li>• Policy framework within which the EIA will be prepared</li> </ul>	<ul style="list-style-type: none"> <li>• Chap 2 (Sec. 2.1, P-2-1; Table 2.1), [also ES (Sec. B)]</li> <li>• Chap. 2 (Sec. 2.2, P.2-4; Subsec. 2.2.1, P.2-5)</li> <li>• Chap. 2 (Sec. 2.3, P.2-6)</li> </ul>
4a	Project activities: A list of the main project activities to be undertaken during site clearing, construction as well as operation.	Chap. 4 (Table 4.1)
4b	Project schedule: The phase and timing for development of the project	ES (Sec. Q, P. ES-39); [also ARP (Chap. 9)]



4c	Resources and utilities demand: Resources required to develop the project, such as soil and construction material and demand for utilities (water, electricity, sewerage, waste disposal and others), as well as infrastructure (road, drains, and others) to support the project.	A topographic survey has been prepared for each bridge site. However, its detailing and material sources material for construction will be surveyed during DD stage.
4d	Map and survey information: <ul style="list-style-type: none"> <li>• Location map, cadastral map showing land plots (project and adjacent area),</li> <li>• Geological map showing geological units, fault zone, and other natural features.</li> </ul>	<ul style="list-style-type: none"> <li>• Chap. 1 (Fig. 1.1)</li> <li>• Chap. 3 (Fig. 3.3, 3.4)</li> </ul>
5.	Baseline Environmental Condition should include, inter alia, following:	
	Physical Environment <ul style="list-style-type: none"> <li>• Geology and soil</li> <li>• Topology</li> <li>• Geomorphology</li> <li>• Meteorology</li> <li>• Hydrology</li> </ul>	<ul style="list-style-type: none"> <li>• Chap. 3 (Subsec. 3.1.2, 3.1.3, P.3-2); [also ES (Sec. F)]</li> <li>• Chap. 3 (Sec. 3.1.2, P. 3-2); [also ES (Sec. F)]</li> <li>• ES (Sec. F (4), P. ES-19)</li> <li>• Chap. 3 ( Subsec. 3.1.1, P. 3-1)</li> <li>• Chap. 3 (Subsec. 3.1.5, P.3-6), [also ES (Sec. F (5), Table ES-4)]</li> </ul>
	Biological Environment <ul style="list-style-type: none"> <li>• Habitats, aquatic life and fisheries, terrestrial Habitats and flora and Fauna</li> </ul>	<ul style="list-style-type: none"> <li>• Chap.3 (Sec. 3.2, P.3-8) [also ES (Sec. G, P. ES-24)]</li> </ul>
	Environment Quality <ul style="list-style-type: none"> <li>• Air, water, soil</li> <li>• Sediment quality</li> </ul>	<ul style="list-style-type: none"> <li>• Chap. 3 (Sec. 3.4), [also ES (Sec. I, P. ES-26)</li> <li>• Chap. 3 (Subsec. 3.1.4, P. 3-4), Chap. 5 (Table 5.1)</li> </ul>
6.	Socio-economic environment should include, inter alia, following:	<b>Abbreviated Resettlement Plan (ARP) Report</b>
	<ul style="list-style-type: none"> <li>• Population: Demographic profile and ethnic composition</li> </ul>	Chap. 2 Sec. 2.3.1, Table-2.3, 2.4, 2.5, 2.6. Sec. 2.3.2, Table 2.7, 2.8, 2.9. Sec. 2.3.4, Table 2.10, 2.11, 2.12, Sec. 2.3.5, Table 2.13
	<ul style="list-style-type: none"> <li>• Settlement and housing</li> </ul>	Chap.3 (Sec. 3.4, P.3-2)

	<ul style="list-style-type: none"> <li>• Traffic and transport</li> <li>• Public utilities: water supply, sanitation and solid waste</li> <li>• Economy and employment: employment structure and cultural issues in employment</li> <li>• Fisheries: fishing activities, fishing communities, commercial important species, fishing resources, commercial factors</li> </ul>	<p>Traffic volume study already conducted for bridge/road design purpose. But traffic management and traffic safety issues will be incorporated in DD stage.</p>
		<p>Chap.2 (Sec-2.3.4, Table-2.10, 2.15, 2.16 &amp; 2.17)</p>
		<p>Chap. 2 Sec. 2.1, Subsec. 2.3.2</p>
		<p><u>Refer to EIA Report</u> Chap. 3 (Subsec. 3.3.8, P. 3-13), Chap. 5 (Table 5.1)</p>
7.	<p>Identification, Prediction and Evaluation of Potential Impact</p>	<p><b>EIA Report</b></p>
	<ul style="list-style-type: none"> <li>• Identification, prediction and assessment of positive and negative impacts likely to result from the proposed project.</li> <li>• Identification and analysis of potential impacts’ – the ‘Analysis’ part shall include the analysis of relevant spatial and non-spatial data. The outcome of the analysis shall be presented with the scenarios, maps, graphics etc. for the cases of anticipated impacts on baseline. Description of the impacts of the project on air, water, land, hydrology, vegetation-man maid or natural, wildlife, socio-economic aspect shall be incorporated in detail.</li> </ul>	<ul style="list-style-type: none"> <li>• Chap. 3 (Sec.-3.1, Subsec. 3.1.1 to 3.1.8 Sec.-3.2, Subsec. 3.2.1 to 3.2.4 Sec.-3.3, Subsec. 3.3.1 to 3.3.15 Sec.-3.4, Subsec. 3.4.1 to 3.4.6)</li> <li>• Chap. 6 (Sec. 6.1, 6.2) [also refer to ARP (Chap.2)]</li> </ul>
8-15		<p><b>EIA Report</b></p>

8.	<p>Management Plan/Procedures:</p> <ul style="list-style-type: none"> <li>For each <u>significant major impact</u>, <u>proposed mitigation measures</u> will be set out for incorporation into project design or procedures, impacts which are not capable of mitigation, will be identified as residual impacts Both <u>technical and financial</u> plans shall be incorporated for proposed mitigation measures.</li> <li>An outline of the <u>Environmental Management Plan</u> shall be developed for the project. In Environmental Monitoring Plan, a detail <u>technical and financial proposal</u> shall be included for developing an in-house environmental monitoring system to be operated by the proponent's own resources (equipments and expertise).</li> </ul>	<ul style="list-style-type: none"> <li>Chap. 5 and Annex II of EIA Report (individual bridges)</li> <li>EMP (Chap. 7)</li> <li>EMoP cost (Chap 7, Table 7.2)</li> </ul>
9.	<p>Consultation with Stakeholders/Public Consultation (ensures that consultation with interested parties and the general public will take place and their views taken into account in the planning and execution of the project)</p> <p>Beneficial Impacts (summarize the benefits of the project to the Bangladesh nation, people and local community and the enhancement potentials)</p>	Chap. 8 [also ES (Sec. P)]
10.	Conclusion and Recommendations	ES (Sec. R), P. ES-40
Additional comments made by DOE in the meeting held on December 03, 2014		
11	Climate change effect in bridge design	Currently no specific and recommended guideline are available in Bangladesh, it shall be therefore studied in DD stage and incorporate the findings accordingly in the bridge design.
12	Fish migration during bridge pier construction	To be studied in DD stage. Construction schedule should be prepared in such a way that the construction of bridge pier will not make any hindrance on fish migration, if any finds out significantly.

13	Siltation effect due to bridge pier construction	Not addressed in the EIA report. However, it shall be studied details in DD stage.
14	Keeping adequate river channel width	New bridge length is longer than existing one. Therefore, new bridge construction will not make any constraint to natural river channel width.
15	EIA and mitigation measures for a critical type bridge ( as an example)	These issues are fully explained in Annex-II (The EIA Reports of the Individual Bridge Sites) for respective bridges with recommendations and budget for mitigation.

**APPENDIX 2.2**  
**ARP Report(For 105 Bridges)**

ROADS AND HIGHWAYS DEPARTMENT  
MINISTRY OF ROAD TRANSPORT AND BRIDGES  
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

PREPARATORY SURVEY  
ON  
WESTERN BANGLADESH BRIDGE IMPROVEMENT  
PROJECT

ABBREVIATED RESETTLEMENT PLAN

SEPTEMBER 2014

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Prepared by

Oriental Consultants Co. Ltd.

Katahira & Engineers International



On behalf of

Roads and Highways Department (RHD)

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## Abbreviations

AB	Acquiring Body
AC	Land Assistant Commissioner Land
ADC	Additional Deputy Commissioner
AH	Affected household
AP	Affected person
APD	Additional Project Director
ARP	Abbreviated Resettlement Plan
BBS	Bangladesh Bureau of Statistics
CBE	Commercial and Business Enterprise
CCL	Cash Compensation under Law
COI	Corridor of Impact
CMP	Current Market Price
CPR	Common Property Resources
CRO	Chief Resettlement Officer
CSC	Construction Supervision Consultant
DAE	Department of Agriculture Extension
DC	Deputy Commissioner
DCI	Direct Calorie Intake
DOF	Department of Forest
DoF	Department of Fisheries
EA	Executing Agency
EC	Entitlement Card
EP	Entitled Person
FGD	Focused Group Discussion
ft	foot / feet (3.28 ft = 1 m)
GDP	Gross Domestic Product
GOB	Government of Bangladesh
GRC	Grievance Redress Committee
ha	hectare
HIES	Household Income and Expenditure Survey
HH	Household
IA	Implementing Agency
ID Card	Identify Card
IOL	Inventory of losses
IR	Involuntary Resettlement
JVS	Joint Verification Survey
JVT	Joint Verification Team
LA	Land Acquisition
LA&R	Land Acquisition and Resettlement

LAO	Land Acquisition Officer
LAP	Land Acquisition Plan
LGI	Local Government Institution
M/m	Meter
LMS	Land Market Survey
LIRP	Livelihood and Income Restoration Program
MARV	Maximum Allowable Replacement Value
M&E	Monitoring & Evaluation
MIS	Management Information System
MOL	Ministry of Land
NGO	Non-government Organization
NRS	National Resettlement Specialist
PAH	Project Affected Household
PAU	Project Affected Unit
PIU	Project Management Unit
PD	Project Director
PIB	Public Information Brochure
PMO	Project Management Office
PPR	Project Progress Report
PPTA	Project Preparatory Technical Assistance
PRA	Participatory Rapid Appraisal
PVAT	Property Valuation Advisory Team
PWD	Public Works Department
R&R	Resettlement and Rehabilitation
RAC	Resettlement Advisory Committee
RAP	Resettlement Action Plan
RB	Requiring Body
RF	Resettlement Framework
RHD	Roads & Highways Department
RO	Resettlement Officer
RoR	Record of Rights
RU	Resettlement Unit
RV	Replacement Value
SES	Socioeconomic Survey
Sqm	Square Meter
TA	Technical Assistance
TOR	Terms of Reference
VH	Vulnerable Household
WBBIP	Western Bangladesh Bridge Improvement Project

## Glossary of Terms

**Affected Person (AP):** includes any person, affected households (AHs), firms or private institutions who, on account of changes that result from the project will have their (i) standard of living adversely affected; (ii) right, title, or interest in any house, land (including residential, commercial, agricultural, forest, and/or grazing land), water resources, or any other moveable or fixed assets acquired, possessed, restricted, or otherwise adversely affected, in full or in part, permanently or temporarily; and/or (iii) business, occupation, place of work or residence, or habitat adversely affected, with or without displacement.

**Assistance:** means support, rehabilitation and restoration measures extended in cash and/or kind over and above the compensation for lost assets.

**Awardee:** means the person with interests in land to be acquired by the project after their ownership of said land has been confirmed by the respective Deputy Commissioner's office as well as persons with interests in other assets to be acquired by the project. Compensation for acquired assets is provided to 'awardees' through notification under Section 7 of the Land Acquisition Ordinance.

**Compensation:** means payment in cash or kind for an asset to be acquired or affected by a project at replacement cost at current market value.

**Cut-off date:** means the date after which eligibility for compensation or resettlement assistance will not be considered is the cut-off date. Date of service of notice under Section 3 of Land Acquisition Ordinance is considered to be the cut-off date for recognition of legal compensation and the starting date of carrying out the census/inventory of losses is considered as the cut-off date for eligibility of resettlement benefit for the properties standing on the GoB land and not covered by DC.

**Encroachers:** mean those people who move into the project area after the cut-off date and are therefore not eligible for compensation or other rehabilitation measures provided by the project. The term also refers to those extending attached private land into public land.

**Entitlement:** means the range of measures comprising cash or kind compensation, relocation cost, income restoration assistance, transfer assistance, income substitution, and business restoration which are due to AHs, depending on the type and degree /nature of their losses, to restore their social and economic base.

**Eminent Domain:** means the regulatory authority of the Government to obtain land for public purpose/interest or use as described in the 1982 Ordinance and Land Acquisition Law.

**Household:** A household includes all persons living and eating together (sharing the same kitchen and cooking food together as a single-family unit).

**Inventory of losses:** means the pre-appraisal inventory of assets as a preliminary record of affected or lost assets.

**Non-titled:** means those who have no recognizable rights or claims to the land that they are occupying and includes people using private or public land without permission, permit or grant i.e. those people without legal title to land and/or structures occupied or used by them. ADB's policy explicitly states that such people cannot be denied resettlement assistance.

**Project:** means the Western Bangladesh Bridge Improvement Project to be implemented in 29 districts in western zones of Bangladesh to improve/reconstruct 105 RHD bridges.

**Project Affected Unit:** combines residential households (HHs), commercial and business enterprises (CBEs), common property resources (CPRs) and other affected entities as a whole.

**Project Affected Household:** includes residential households and commercial & business enterprises except CPRs.

**Relocation:** means displacement or physical moving of the APs from the affected area to a new area/site and rebuilding homes, infrastructure, provision of assets, including productive land/employment and re-establishing income, livelihoods, living and social systems

**Replacement cost:** means the value of assets to replace the loss at current market price, or its nearest equivalent, and is the amount of cash or kind needed to replace an asset in its existing condition, without deduction of transaction costs or for any material salvaged.

**Replacement Land:** means the land affected by the project that is compensated through provision of alternative land, rather than cash, of the same size and/or productive capacity as the land lost and is acceptable to the AP.

**Resettlement:** means mitigation of all the impacts associated with land acquisition including restriction of access to, or use of land, acquisition of assets, or impacts on income generation as a result of land acquisition.

**Significant impact:** means where 200 or more APs suffer a loss of 10% or more of productive assets (income generating) or physical displacement.

**Squatters:** means the same as non-titled and includes households, business and common establishments on land owned by the State. Under the project this includes land on part of the crest and slopes of canal dykes, flood control embankments, and similar areas of the drainage channels.

**Structures:** mean all buildings including primary and secondary structures of houses and ancillary buildings, commercial enterprises, living quarters, community facilities and infrastructures, shops, businesses, fences, and walls.

**Vulnerable Households:** means households that are (i) headed by single woman or woman with dependents and low incomes; (ii) headed by elderly/ disabled people without means of support; (iii) households that fall on or below the poverty line;<sup>1</sup> (iv) households of indigenous population or ethnic minority; and (v) households of low social group or caste.

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<sup>1</sup> The poverty lines (updated for 2008) for Chittagong to be cited in the RAP as per BBS report.

## Executive Summary

### **Description of the Project:**

The Government of Bangladesh with the financial loan from Japan International Cooperation Agency (JICA), has undertaken a project in order to improve the road network system in the Western part of Bangladesh aimed at poverty reduction and improvement of selected existing one-lane bridges of Roads and Highways Department (RHD). In the western region a total of 105 bridges have been selected for improvement. Many of the bridges are baily bridges and not suitable for road bridges due to lack of capability and safety function and some of them are already collapsed. To improve road safety and remove the traffic jams at the bridge sites, these bridges will be two-lane RCC (Reinforced Cement Concrete) bridges. RHD will be the implementing authority of the project.

RHD has prepared Abbreviated Resettlement Plan (ARP) that will govern adverse social impacts due to the project. The ARP is consistent with the JICA Guidelines for Environmental and Social Considerations. An ARP Implementing Agency (IA) i.e. NGO or Social Consulting Firm will be engaged by the RHD for implementation of the ARP.

The selected 105 bridges are located in five zones i.e. Rangpur zone, Rajshahi zone, Gopalganj zone, Khulna zone and Barisal zone. A total of 32 bridges are located in Rangpur zone, 23 bridges are in Rajshahi zone, 15 bridges are in Gopalganj zone, 15 bridges are in Khulna zone and 20 bridges are in Barisal zone

**Land Acquisition and Displacement:** The project work requires land acquisition and relocation of households and business enterprises from the right of way. A total of 39.96 ha of land will need to be acquired of which 18.50 ha in Rangpur zone, 8.41 ha in Rajshahi zone, 5.51 ha in Gopalganj zone, 2.70 ha in Khulna zone and 4.85 ha in Barisal zone. A total of 109,538 sqm structures have got affected of which 33,208 sqm is residential and 69,604 sqm commercial structure. Besides, about 98 community properties will be affected within the corridor of impact. Land acquisition, displacement and other impacts are shown in Table 1 below.



**Table 1 Displacement and other Impacts**

Sl. #	Type of impacts	Zones					Total
		Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	
1	Total quantity of land to be acquired (ha)	18.50	8.41	5.51	2.70	4.85	39.97
2	Total No. Households affected (No)	207	190	54	171	166	788
3	Total No. Commercial enterprises (CBEs) affected (No)	765	318	264	470	550	2,367
4	Community property (CPR) affected	43	07	08	21	19	98
5	Total Quantity of all structure affected (Sqm)	37,445	12,931	13,589	21,687	23,886	109,538
5.a	Total Quantity of Residential structure (Sqm) affected	10,778	5,902	2,437	7,674	6,417	33,208
5.b	Total Quantity of Commercial structure (Sqm) affected	24,161	6,796	10,270	12,954	15,423	69,604
6	No. of toilets affected	14	40	14	05	38	111
7	No. of tube wells affected	38	41	12	20	31	142
8	No. of wage laborers losing job	864	367	553	789	429	3,002

A total of 47,712 people have been enlisted during socioeconomic survey of the affected households and business enterprises in both areas. A total of 3,155 project affected units (PAUs) including 788 households, 2,367 commercial and business enterprise (CBEs) and 98 community properties have been affected by the intervention.

The Affected Persons (APs) and their communities have been consulted for their perception on land acquisition process, compensation process, scope and importance of participation in the project process, relocation requirements and views on alternative options. A series of stakeholder consultation meetings were held in several times with different affected communities within and surrounding the project area during selection of the bridge location, detailed design and disclosure of compensation packages. Besides, during conducting survey and preparation of the ARP 210 consultation meetings, numbers of group discussions and personal contact were held to seek opinion of the various stakeholders on the project. People's opinion have been incorporated in the ARP and reflected in the entitlement matrix. The ARP will be summarized in an information booklet in local language (Bengali) and disclosed to the affected people during implementation period after the cut-off date is established. The APs will participate in the ARP implementation process through representing in the Grievance Redress Committees (GRCs).

The affected persons will be paid compensation for their lost assets by the DC as cash compensation under law (CCL) and resettlement grants from RHD. Compensation is based on entitlements including: (i) replacement value for land (ii) replacement value for structure & trees, and (iii) other resettlement assistance as required such as structure transfer grants, business restoration grant, compensation for crops, access to cultivable lands, loss of workdays/income due to dislocation, etc. Female-headed and other vulnerable households will be eligible for

further cash assistance to help at least, restore, if not improve, their livelihoods. Compensation and entitlements have been identified based on impacts and losses, and are similar to those approved under other projects. These are presented in Table 2 below.

**Table 2 Compensation and Entitlements**

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
1	Loss of homestead, commercial, Agriculture land, pond, ditches and orchards etc.	Legal owner(s) of land	<ul style="list-style-type: none"> <li>i. Replacement value (RV) of land (Cash Compensation under Law (CCL) and additional grant to cover the current market price of land and stamp duty &amp; registration cost @ 10.5% of CMP for land) to be determined by PVAT.</li> <li>ii. Dislocation allowance @ BDT 100 per decimal for agricultural, fish pond, ditch, etc. and @ BDT 200/decimal for homestead, orchard and commercial lands.</li> <li>iii. Compensation for standing crops to actual owners/ cultivators as determined by PVAT.</li> </ul>	<ul style="list-style-type: none"> <li>a. Assessment of quantity and quality of land by Joint Verification Survey</li> <li>b. Assessment of Market Value by Land Market Survey (LMS)</li> <li>c. Assessment of Cash Compensation under Law (CCL)</li> <li>d. Updating of title of the affected persons</li> <li>e. Payment of Cash Compensation under Law (CCL)</li> <li>f. APs will be fully informed of the entitlements and procedures regarding payments</li> <li>g. Additional cash grant to be paid to cover the replacement value of land compensation based on DC's CCL .</li> <li>h. Stamp duty and registration fees will be added with current market price (CMP) for land @ 10.5% of CMP to facilitate the APs in purchasing alternative lands.</li> </ul>
2	Loss of access to cultivable land by owner cultivator/ tenant/ sharecropper	Tenants/ sharecropper/ Legal owner/ grower/ socially recognized owner/ lessee/ unauthorized occupant of land	<ul style="list-style-type: none"> <li>i. Compensation for standing crops to owner cultivator/ sharecroppers or lessees as determined by PVAT.</li> <li>ii. Owner/grower to take away the crop</li> </ul>	<ul style="list-style-type: none"> <li>a. All the individuals identified by the JVS as tenants or sharecroppers of land</li> <li>b. Compensation to be paid after taking possession of land and the legal /socially recognized owner is paid cash compensation for crop and on certification of receipt by legal/socially recognized owner</li> <li>c. Additional cash grant to cover current market value of crop compensation as prescribed by PVAT in case of private owner himself cultivating crop</li> <li>d. Crop compensation and the crop will be shared between owner and sharecropper as per terms of sharecropping in case of privately owned</li> </ul>

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
				land/socially recognized owner e. In case of dispute over verbal agreement on sharecropping, certification from the elected representative will be considered as legal document
3	Loss of Trees/ Perennials/ fish stocks	1. Person with Legal Ownership of the land 1. Socially recognized owner/ Unauthorized occupant of the trees/ fishes	i. Cash compensation at market rates for replacement of trees/ perennials/ fish stocks value ii. For fruit bearing trees- compensation for fruits @ 30% of timber value X 1 year iii. Compensation for fish stocks as determined by PVAT. iv. 5 saplings will be distributed free of cost among each affected household losing trees v. Owners will be allowed to fell and take away their trees, perennial crops/ fishes etc. free of cost without delaying the project works.	a. Assessment of loss and market value of affected trees b. Payment of CCL for trees c. Adequate compensation will be paid and the owner will be allowed to fell and take the tree free of cost d. Compensation for fruit will be paid for small, medium and large categories of trees. e. 5 saplings (2 fruit tree, 2 timber type and 1 medicinal tree) free of cost will be distributed among the tree losing households.
4	Loss of residential /commercial structure by owner(s)/ squatters	Legal Owners or squatters	i. Replacement value of structure at market price determined by PVAT. ii. Transfer grant @ Tk.12.50% of the replacement value of main structure iii. Reconstruction grant @ Tk.12.50% of the replacement value of main structure. iv. Owners to take away all salvage materials free of cost	a. Payment of CCL for the losses b. Verification of Joint Verification Survey (JVS) and other records c. APs will be fully informed about their entitlements and assisted to obtaining it.
5	Loss of access to Residential houses/ commercial structures (rented or leased)	Tenants of rented/ leased properties	i. One time cash grant for facilitating alternative housing/CBEs Tk. 3000.00 per household or entity ii. Shifting allowance per household based on family members @ Tk. 500/- per member with minimum Tk. 2,000	a. Verification of JVS and records b. Shifting allowance will be paid on relocation from project site
6	Loss of	Owner/operator	i. Business restoration grant	a. All persons recorded by the

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
	business by CBEs due to dislocation	of the business as recorded by JVS	@ Tk. 10,000 for each business unit.	JVS b. Cash grant to be paid while taking possession of land
7	Loss of Income and work days due to displacement	Employees identified by the Joint Verification Team (JVT)	i. Cash grant to the affected employees/wage earners equivalent to 30 days wage @ Tk. 300/per day ii. Preferential employment in the project construction work, if available.	a. All persons recorded by the JVS b. Cash grant to be paid while taking possession c. Involvement of the incumbents in project civil works d. Training on income generating activities such as Pisculture, livestock and poultry, horticulture, welding, mechanics, plant cultivation, social forestry, etc.
8	Poor and vulnerable households	Poor and vulnerable households as identified by JVT	i. Additional cash grant of Tk. 3,000 for affected poor women headed households and other vulnerable households ii. Training on IGA for AP/nominated by AP.	a. Identification of Vulnerable households b. Income restoration schemes for vulnerable households c. Arrange training on income generating activities
9	Loss of Common Property Resources	Affected Common Property Resources (Mosque, school, community infrastructure etc.)	i. Grant for each affected CPR for reconstruction Or Reconstruction of CPR through the project	a. Identification of the management committee of the CPRs b. Cash grant to the Management committee of CPR c. Or Reconstruction of the CPR by the project
10	Temporary impact during construction	Community / Individual	i. The contractor shall bear the cost of any impact on structure or land due to movement of machinery and in connection with collection and transportation of borrow materials. ii. All temporary use of lands outside proposed Col to be through written approval of the landowner and contractor. iii. Land will be returned to owner rehabilitated to original preferably better standard.	a. Community people should be consulted before starting of construction regarding air pollution, noise pollution and other environmental impact b. The laborers in the camp would be trained about safety measures during construction, aware of health safety, STDs, safe sex etc. The contractor shall ensure first aid box and other safety measures like condoms at construction site.

Vulnerable Project Affected Households including poor and female headed, elderly headed, the landless, share croppers, etc and wage loser from the CBEs will be given additional support for

livelihood and income restoration. Long-term income restoration and livelihood reconstruction program will be designed in the form of Livelihood and Income Restoration Program (LIRP) for rehabilitation of the poor & vulnerable PAHs. The RHD will engage an experienced NGO for implementing the LIRP. A need based survey would be conducted among the affected persons by that NGO for prioritizing training needs and accordingly held training. The RHD will develop TOR for LIRP implementing NGO.

**Cost Estimate and Budget:** The total estimated cost for implementation of the ARP includes compensation for land, structure, trees, crops, transition allowance, relocation assistance, wage income, etc. All resettlement funds including training and cash grants and service charge of ARP implementing agency will be provided by the EA (RHD) based on the financing plan agreed by the GoB. The total estimated amount is BDT- **2,755,013,374** equivalent to **USD 35,617,497** (1 \$=BDT 77.35) shown in the Table 3 below.

**Table 3 Summary of Resettlement Cost for project**

<h1>Confidential</h1>
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# 1 DESCRIPTION OF THE PROJECT

## 1.1 Background of the Project

The Government of Bangladesh with the financial loan from Japan International Cooperation Agency (JICA) has undertaken a project in order to improve the road network system in the Western part of Bangladesh. This initiative has taken with aim of becoming a middle income country by 2021 by reducing poverty and improvement of selected existing deteriorated or one-lane bridges of Roads and Highways Department (RHD). In the western region covering 5 zones (Rangpur, Rajshahi, Gopalganj, Khulna and Barisal) a total of 105 bridges have been selected for improvement of which almost all of them are unsafe for road users because of major damage on the structure (Figure 1.1). Many of the bridges are baily bridges and not suitable for road bridges due to lack of capability and safety function and some of them are already collapsed. To improve road safety and remove the traffic jams at the bridge sites, majority of these bridges will be two-lane Reinforced Cement Concrete(RCC) bridges and some of them will be weathered steel bridge. Weathered bridges will be in northern zones (Rangpur and Rajshahi), because of less airborne salt amount. RHD will be the implementing authority of the project.



Figure 1.1 Location of Bridge sub-projects under WBBIP



Out of 105 bridges, some bridges will be replaced by RCC structure at the same locations, and some bridges will be replaced with bridges at nearby locations with new approach roads to connect these bridges and few will be repaired.

This is the Abbreviated Resettlement Plan (ARP) for the project complies with the Resettlement Framework (RF) prepared based on relevant national law of the Government of Bangladesh (GOB) Acquisition and Requisition of Immovable Property Ordinance 1982 (ARIPO), amended in 1993 and 1994 and with the policy of the JICA Guidelines for Environmental and Social Considerations and World Bank OP 4.12. An ARP Implementing NGO (INGO) i.e. NGO will be engaged by the RHD for implementation of the ARP.

These bridges are already there and those are to be replaced with some improvement. It is observed that only small number people (less than 200) are to be affected at each bridge site for long term and short term due to the relevant activities. By following OP 4.12 of WB when impacts on the entire displaced population are minor or fewer than 200 people are displaced at each bridge site, an Abbreviated Resettlement Plan (ARP) needs to be prepared for the project.

The selected 105 bridges are located in five zones i.e. Rangpore zone, Rajshahizone, Gopalganj zone, Khulna zone and Barisal zone (Table 1.1). A total of 32 bridges are located in Rangpur zone (Bogra, Dinajpur, Gaibandha, Joypurhat, Lalmonirhat, Panchagarh, Rangpur and Thakurgaondistricts), 23 bridges are in Rajshahi zone (Naogaon, Natore, Pabna, Rajshahi, and Serajganjdistricts), 15 bridges are in Gopalganjzone (Faridpur, Gopalganj, Madaripur, and Shariatpurdistricts), 15 bridges are in Khulna zone (Bagerhat, Jessore, Jhenaidah, Kustia and Satkhiradistricts), and 20 bridges are in Barisal zone (Barisal, Bhola, JhalokatiPatuakhali and

Pirojpurdistricts). Only 12 bridges are more than 100m in length and rest (93) are less than 100m in length. The bridges are of different types including PC Girder Bridge, RCC Girder Bridge, RCC box Girder Bridge, Bailey with steel Deck, Truss with steel Deck and Steel Beam & RCC Slab.

**Table 1.1 Bridges to be replaced by type, length and zone in the project area**

Sl. No	Zone	Division	Bridge Type	Length Less than 100 (m)	Length Above 100 (m)	Total
A	Barisal	Barisal	PC Girder Bridge, RCC Girder Bridge, Bailey with Steel Deck,	11	1	
		Bhola	Bailey with Steel Deck,	4		
		Jhalokati	Bailey with Steel Deck,	2		
		Patuakhali	Bailey with Steel Deck,	1		
		Pirojpur	Bailey with Steel Deck,	1		
			<b>Sub-Total</b>	<b>19</b>	<b>1</b>	<b>20</b>
B	Khulna	Bagerhat	RCC Box Girder Bridge, RCC Girder Bridge	2		
		Jessore	RCC Girder Bridge,	1	1	
		Jhenaidah	RCC Girder Bridge,	2	1	
		Kushtia	RCC Girder Bridge,	3		
		Narail	RCC Girder Bridge,	4		
		Satkhira	RCC Girder Bridge,	1		
			<b>Sub-Total</b>	<b>13</b>	<b>2</b>	<b>15</b>
C	Gopalganj	Faridpur	RCC Girder Bridge,	7		
		Gopalganj	PC Girder Bridge,		1	

		Madaripur	RCC Girder Bridge,	1	1	
		Shariatpur	Bailey with Steel Deck	4	1	
			<b>Sub-Total</b>	<b>12</b>	<b>3</b>	<b>15</b>
D	Rangpur	Bogra	RCC Girder Bridge, Bailey with Steel Deck	6		
		Dinajpur	RCC Girder Bridge, Bailey with Steel Deck, Truss with Steel Deck, Steel Beam and RCC slab	7	1	
		Gaibanda	RCC Girder Bridge, Bailey with Steel Deck	2	1	
		Joypurhat	RCC Girder Bridge,	2		
		Lalmonirhat	RCC Girder Bridge, biley with Steel Deck	1		
		Nilphamari	RCC Girder Bridge, Bailey with Steel Deck	3	1	
		Panchagarh	Steel Beam and RCC Slab, RCC Girder Bridge	2		
		Rangpur	RCC Girder Bridge,	4	1	
		Thakurgaon	RCC Girder Bridge,	1		
			<b>Sub Total</b>	<b>28</b>	<b>4</b>	<b>32</b>
E	Rajshahi	Naogaon	Truss with Steel Deck		1	
		Natore	RCC Girder Bridge, Bailey with Steel Deck	2		
		Pabna	RCC Girder Bridge, Truss with Steel Deck	5	1	
		Rajshahi	Bailey with Steel Deck, RCC Girder Bridge	2		
		Serajganj	RCC Girder Bridge, Steel Beam and RCC Slab, Bailey with Steel Deck	12		
			<b>Sub-Total</b>	<b>21</b>	<b>2</b>	<b>23</b>
			<b>Total Less than 100m</b>	<b>93</b>		
			<b>Total above 100m</b>	<b>12</b>		
			<b>Grand Total (A+B+C+D+E)</b>	<b>105</b>		

The proposed interventions in project will cause adverse resettlement impacts through displacement of households, shops and businesses. The affected households (AHs) include owners of land, squatters, sharecroppers, lease holders and non-tilted users of land. Besides some trees on the RHD and private lands will need to be fell down due to the project. However, regardless of lack of title to the land, the impacts on these people will be mitigated in accordance with JICA's safeguard policies. Therefore, this abbreviate resettlement plan (ARP) has been prepared for this project, and is designed to assist project affected units (PAUs) to restore their livelihoods and socio-economic conditions to their pre-project status. A total of 3253 (PAUs) that includes Households (HHs), Commercial and Business Enterprises (CBEs) and Common Property Resources (CPRs) have been identified in 105 bridge locations.



**Some photographs of bridges**



Karimpur bridge-Rank-14, Faridpur



Porkitpur bridge-Rank-15, Faridpur



GK bridge-Rank-21, Kushtia



Gora bridge-Rank-22, Bagerhat



Ghoga bridge-Rank-36, Bogra



Sarnamoti bridge- Rank-2, Lalmonirhat



Jajihar bridge-Rank-83, Shariatpur



Bupibath bridge-Rank-10, Gaibandha



Khorkhoribridge-Rank-38, Nilphamari



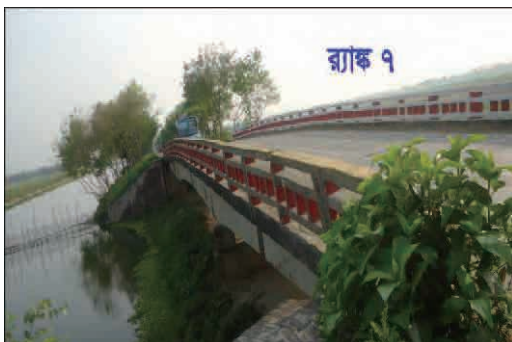
Paprail Baily bridge- Rank-77, Shariatpur



Naori Bridge-Rank-74, Sirajganj



Dhupa Ghata bridge-Rank-41, Jhenaidah



Chanda Bridge-2, Rank-7, Sirajganj



Bittipara Bridge, Rank-67, Kushtia

## **1.2 Objectives & Purpose of the Project**

### **1.2.1 Potential Impacts**

All bridges will be replaced with new bridges at adjacent locations toward downstream or upstream of present one with new approach roads to connect these bridges.

These bridges are already there and those are to be replaced with some improvements.

### **1.2.2 Objective of the Abbreviated Resettlement Plan**

The JICA's Guidelines for Environmental and Social Considerations April 2010 requires that if the screening or social assessment determines that people will experience resettlement impacts a time-bound action plan with appropriate budget provisions is to be prepared and incorporated as an integral part of project design. However, The OP 4.12 of World Bank (WB) clearly narrated that where entire involuntary displaced population is minor, or fewer than 200 people are displaced at each bridge site, an Abbreviated Resettlement Plan (ARP) may serve the purpose. By following this principle this ARP addresses both land acquisition and resettlement issues within the legal framework of the Government of Bangladesh (GOB) and JICA's Guidelines for Environmental and Social Considerations that highlights on social impacts including involuntary resettlement, respect for the human rights of indigenous people and so on and covers the APs under resettlement/rehabilitation program providing income restoration and poverty reduction assistance to the eligible APs and the poor and informal settlers on the Corridor of Impact (Col). Thus, the ARP approach incorporates (i) land acquisition and resettlement issues; (ii) impact mitigation with special attention to the women and vulnerable groups and (iii) income generation support to the eligible members of the AP families and (iv) poverty reduction assistance to the poorest section of the people.

The policy requires that a plan be prepared that sets out all of the compensation and rehabilitation support to be provided to any person, family or household who on account of the execution of the project would have his, her or their:

- Standard of living adversely affected;
- Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently;
- Right, title or interest in any house, or interest in or right to use any land including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently; or
- Social and cultural activities and relationships and other losses that may be identified during the process of resettlement planning.

The objective of the ARP is to provide a strategy for providing PAUs with replacement value of land, structure, trees and other physical assets and restoration of income levels/living standards either through a compensation and rehabilitation package that ensures that PAUs are not left in a position where they are worse off with the project than without it. Thus, in accordance with JICA policy, abbreviated resettlement plan, depending on the magnitude of impacts - has been prepared for the Project.

Objectives of the project and Abbreviated Resettlement Planning have been disclosed to the affected persons through community based consultation meetings and focus group discussions in local language in two phases of stakeholders/community consultation as well as during conducting census and socioeconomic survey. Compensation and other assistances will have



to be paid to Affected Persons (Aps) prior to displacement or dispossession of assets. Upon approval, the final ARP will be uploaded immediately on the RHD website.

### **1.2.3 Methodology for Preparing the Abbreviated Resettlement Plan**

The Consultant conducted census & socioeconomic survey in April through June 2014 for information necessary for preparation of this ARP. The survey was also associated with stakeholders' consultation, focus group discussion and property valuation survey.

The adverse impacts include land acquisition and displacement of households and shops. The data gathered during the survey has been entered into an electronic database which identified each affected household (AH) and the way they are impacted and losses they will incur. The objective of the census and socioeconomic survey was to establish a detailed inventory of the households and physical assets to be affected by the project; develop a socioeconomic profile of the AHs and affected persons (APs). The surveys also serve as a benchmark for monitoring and evaluation.

The surveys indicate that improvement of the 105 bridges will require acquisition of about 40 hectare (39.96 ha) of land. In total the Project will affect 3,253 Project Affected Units (PAUs) of which 788 residential households, 2,367 Commercial & Business enterprises (CBEs) and 98 common Property Resources (CPRs) with a total population of 15,903. According to the JICA's "Guidelines for Environmental and Social Considerations" appropriate consideration must be given to vulnerable social groups such as women, children, the elderly, the poor and ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision making process in the society. Therefore, this ARP has been prepared to mitigate the impacts on Affected Households (AHs) and restore their livelihoods and incomes to pre-project level.

This ARP has been prepared based on the National Law ARIPO (GoB) and the JICA's Guidelines for Environmental and Social Considerations. The ARP establishes the provisions for resettlement of AHs by providing income restoration assistance to the poor and vulnerable households and compensation under law and additional resettlement benefits where applicable; provides a description of socio-economic characteristics of AHs; sets out the implementation schedule; and, provides the budget and cost estimate of implementing this ARP.

This ARP will be reviewed at implementation stage and updated by the RHD if required. At that time the budget will be revised to reflect any changes in numbers of AHs or losses compared with those identified during the survey as well as adjusting for any changes in inflation.

## 2 SOCIO-ECONOMIC CHARACTERISTICS OF AFFECTED HOUSEHOLDS

### 2.1 Methodology for Census and Socioeconomic Survey

The census and a socio-economic survey was carried out in April through June 2014 to provide requisite details on the Project Affected Units (PAUs) to further assess the magnitude of likely impacts and to identify measures for mitigation of adverse impacts. The survey included (i) full census and socioeconomic survey with structured questionnaire and inventory of losses (Annex -I and II), (ii) surveys for land valuation and other assets through structured questionnaire (Annex-III); (iii) Video filming of the affected properties and (iv) community based public consultation etc. The survey identified the households, commercial and business enterprises, land owners, sharecroppers, squatters, tenants and community properties on project right of way.

The socioeconomic survey collected a wide range of data, for example, demography, age/sex distribution, education, occupation, income/poverty data, types of businesses, types and ownership status of affected structures and other assets.

### 2.2 The Project Area

The selected 105 bridges are located in five zones i.e. Rangpur zone, Rajshahi zone, Gopalganj zone, Khulna zone and Barisal zone. A total of 32 bridges are located in Rangpur zone (Bogra, Dinajpur, Gaibandha, Joypurhat, Lalmonirat, Nilphamari, Panchagarh, Rangpur and Thakurgaon districts), 23 bridges are in Rajshahi zone (Naogaon, Natore, Pabna, Rajshahi, and Serajganj districts), 15 bridges are in Gopalganj zone (Faridpur, Gopalganj, Madaripur, and Shariatpur districts), 15 bridges are in Khulna zone (Bagerhat, Jessore, Jhenaidah, Kustia, Narail and Satkhira districts), and 20 bridges are in Barisal zone (Barisal, Bhola, Jhalokati Patuakhali and Pirojpur districts). Distribution of zone wise number of bridges and project affected units are shown in the Table 2.1.

**Table 2.1 Zone wise number of bridges and project affected units**

Zone	Districts	Number of bridges	Project Affected Units (PAUs)			
			No. of HHs [Land with Resi.Stru. & Trees + Residential Structure + Rented Residential Structures + Private Trees + Others- Ponds, Fish, gate etc.)	No. of CBEs [ Land with Busi. Stru. & Trees + Business with Structure + Rented Business)	No. of CPRs	Total
Rangpur	Bogra	06	30	16	02	48
	Dinajpur	08	68	228	15	311
	Gaibandha	03	12	80	00	92
	Joypurhat	02	17	73	01	91
	Lalmonirhat	01	10	00	00	10

Zone	Districts	Number of bridges	Project Affected Units (PAUs)			
			No. of HHs [Land with Resi.Stru. & Trees + Residential Structure + Rented Residential Structures + Private Trees + Others- Ponds, Fish, gate etc.)	No. of CBEs [ Land with Busi. Stru. & Trees + Business with Structure + Rented Business)	No. of CPRs	Total
	Nilphamari	04	34	115	10	159
	Panchagarh	02	12	93	05	110
	Rangpur	05	23	114	07	144
	Thakurgaon	01	01	46	03	50
	<b>Sub-total</b>	<b>32</b>	<b>207</b>	<b>765</b>	<b>43</b>	<b>1015</b>
Rajshahi	Naogaon	01	10	94	01	105
	Natore	02	26	26	02	54
	Pabna	06	44	41	00	85
	Rajshahi	02	33	07	01	41
	Serajganj	12	77	150	03	230
	<b>Sub-total</b>	<b>23</b>	<b>190</b>	<b>318</b>	<b>07</b>	<b>515</b>
Gopalganj	Faridpur	07	29	85	01	115
	Gopalganj	01	06	00	00	06
	Madaripur	02	06	111	03	120
	Shariatpur	05	13	68	04	85
	<b>Sub-total</b>	<b>15</b>	<b>54</b>	<b>264</b>	<b>08</b>	<b>326</b>
Khulna	Bagerhat	02	22	45	00	67
	Jessore	02	43	208	10	261
	Jhenaidah	03	38	70	02	110
	Kustia	03	35	62	03	100
	Narail	04	33	85	04	122
	Satkhira	01	00	00	00	01
	<b>Sub-total</b>	<b>15</b>	<b>171</b>	<b>470</b>	<b>19</b>	<b>660</b>
Barisal	Barisal	12	116	462	15	593
	Bhola,	04	18	44	04	66
	Jhalokati	02	14	39	01	54
	Patuakhali	01	09	04	01	14
	Pirojpur	01	09	01	00	10
	<b>Sub-total</b>	<b>20</b>	<b>166</b>	<b>550</b>	<b>21</b>	<b>737</b>
<b>Total</b>		<b>105</b>	<b>788</b>	<b>2,367</b>	<b>98</b>	<b>3,253</b>

Source: Census & Socioeconomic survey, June 2014

Out of the total 3,253 affected units, 2,367 commercial enterprises, 788 residential households and 98 community properties identified on the Corridor of Impact (CoI). Out of 788 households 545 households are going to lose their housing structure, 190 households are going to lose their trees and 53 households are going to lose their other properties like ponds, gate and other minor infrastructures. Most of the affected units are located on the private land and some are on the RHD land. Community properties are mainly located on RHD land. A total of 109,538 square meter different categories of structures are getting affected by the interventions. Zone wise impacts are shown in the Table 2.2.

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**Table 2.2 Distribution of Impacts by Zones**

Sl. #	Loss type	Zones					Total
		Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	
1	Total number of bridges	32	23	15	15	20	105
2	Total quantity of land (ha) affected	18.50	8.41	5.51	2.70	4.85	39.97
3	Total Project Affected Units (PAUs)	1,015	515	326	660	737	3,253
4	Total Households affected [Land with Resi. Stru.&Trees+Residential Structure+Rented Resident Structure+ Private Trees+Others-Ponds, Fish, Gate]	207	190	54	171	166	788
5	Total commerce and business enterprises (CBEs) affected [Land with Busi. Stru. & Tree+ Business with Structure + Rented Business]	765	318	264	470	550	2,367
6	Total community property (CPR) affected	43	07	08	21	19	98
7	Total number of structures affected	1,030	494	349	724	766	3,363
7a	Total quantity of all structure (sqm) affected	37,445	12,931	13,589	21,687	23,886	109,538
7.b	Total quantity of residential structure (sqm) affected	10,778	5,902	2,437	7,674	6,417	33,208
7.c	Total quantity of commercial structure (sqm) affected	24,161	6,796	10,270	12,954	15,423	69,604
7.d	Total quantity of CPR structures (sqm) affected	2,506	233	882	1,059	2,046	6,726
8	Total no. of toilets affected	14	40	14	05	38	111
9	Total no. of tube wells affected	38	41	12	20	31	142
10	Total no. of trees on private land affected	15,825	8,692	3,830	7,081	9,350	44,778
11	No of trees on government land affected	2,500	2,502	1,852	818	1,776	9,448

Source: Census & Socioeconomic survey, June 2014



## 2.3 Profile of Affected Households

### 2.3.1 Population

A total of 15,903 people have been identified to be affected by this project by losing residential structure, commercial structure, trees, ponds and other minor infrastructures. Community properties (98) have not been considered in calculating population. A total of 545 households (Land with Resi. Stru. & Trees + Residential Structure + Rented Residential Structure) will be displaced from their residence. On the other hand 2,367 household ( Land with Busi.Stru. & Trees + Business with Structure + Rental Business) will lose their commercial structure, 190 household will lose their trees and 53 household will lose their ponds or other minor structures like gates, drains, walls etc. Average household size of the project area is 5.0 which is much higher than the national average (4.5). Out of the total affected population, 8,378 (52.68%) male and 7,525 (47.32%) female. In the project area 336 people are found as old or sick and 47 people are found as physically handicapped. A list of project affected households is enclosed in *Annex-I* and list common property resources (CPRs) in *Annex-II*. Zone wise number of affected male and female population is shown in the Table 2.3 .

**Table 2.3 Number of male and female population by zone**

Zone	Total HH	Population				Total population
		Male	Percentage (%)	Female	Percentage (%)	
Rangpur	972	2,591	53.07	2,291	46.93	4,882
Rajshahi	508	1,324	52.69	1,189	47.31	2,513
Gopalganj	318	833	54.09	707	45.91	1,540
Khulna	641	1,738	51.77	1,619	48.27	3,357
Barisal	716	1,892	52.40	1,719	47.60	3,611
Total	3,155	8,378	52.68	7,525	47.32	15,903

Source: Census & Socioeconomic survey, June 2014

Among the affected households 3,074 are male headed and 81 are female headed households (Table 2.4). In total less than 3 percent of the heads are female headed.

**Table 2.4 Affected Household Heads by Zone and Gender**

Religion	Affected Household Heads by zone						Percentage
	Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	Total	
Male	941(96.8%)	490(96.5%)	313(98.4%)	625(97.5)	705(98.5%)	3074	97.43
Female	31(3.2%)	18(3.5%)	05(1.6%)	16(2.5)	11(1.5%)	81	2.57
Total	972(100%)	508(100%)	318(100%)	641(100%)	716(100%)	3155	100

Source: Census & Socioeconomic survey, June 2014

Average household size is 5 which is much higher than the national average of 4.5. About one quarter (24.60%) of the households are composed of four members and 22.28% households are composed of 5 members . On the other hand about 34% households have more than five members in the household (Table 2.5).

**Table 2.5 Households Size of the Affected f Household by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	45	4.63	06	1.18	09	2.83	28	4.37	16	2.23	104	3.30
2	42	4.32	26	5.12	09	2.83	24	3.74	30	4.19	131	4.15
3	112	11.52	72	14.17	39	12.26	59	9.20	94	13.13	376	11.92
4	239	24.59	136	26.77	86	27.04	144	22.46	171	23.88	776	24.60
5	203	20.88	121	23.82	72	22.64	155	24.18	152	21.23	703	22.28
More than 5	331	34.05	147	28.94	103	32.39	231	36.04	253	35.34	1065	33.76
Total	972	100.00	508	100.00	318	100.00	641	100.00	716	100.00	3,155	100.00

Majority of the households are headed by population within the age group of 31 to 50. About one fifth heads are within the range of 20-30. It is remarkable that head of about 14% households are more than 60 years of age. Table 2.6 shows the age of head of the affected households in the project area.

**Table 2.6 Affected head of households by age group by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<20	15	1.54	05	0.98	02	0.63	05	0.78	10	1.40	37	1.17
20-30	189	19.44	126	24.80	69	21.70	107	16.69	148	20.67	639	20.25
31-40	280	28.81	137	26.97	98	30.82	183	28.55	205	28.63	903	28.62
41-50	248	25.51	115	22.64	69	21.70	177	27.61	176	24.58	785	24.88
51-59	109	11.21	58	11.42	44	13.84	73	11.39	72	10.06	356	11.28
60+above	131	13.48	67	13.19	36	11.32	96	14.98	105	14.66	435	13.79
Total	972	100.00	508	100.00	318	100.00	641	100.00	716	100.00	3,155	100.00

### 2.3.2 Ethnicity, Religion and Gender

Based on findings of the survey, the Project will affect 3,253 PAUs of which 788 are residential and 2,367 are commercial households and rest 98 are CPRs. The impacts and their losses have been described in Chapter 3. Out of total 3,155 households 2,662 are Muslim, 477 are Hindu, 07 are Christian, 03 are Buddhist by faith and 06 are by other faith. No ethnic minority is found in the proposed project locations. Detail of households in terms of religion is shown in Table 2.7

**Table 2.7 Affected Households by Zones and Religion**

Religion	Affected households by zone and Religion						Percentage
	Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	Total	
Islam	872	441	276	522	551	2,662	84.37
Hindu	99	65	41	111	161	477	15.12
Christian	01	00	00	05	01	07	00.22
Buddhist	00	00	01	00	02	03	00.10
Other	00	02	00	03	01	06	00.19
Total	972	508	318	641	716	3,155	100.00

Source: Census & Socioeconomic survey, June 2014

### 2.3.3 Level of education

One of the significant changes takes place in education sector. Despite many problems, people are moving forward towards education. Only 15% household heads are illiterate and about 30% have completed the secondary school and more than 12% of them are graduates (Table 2.8). However, level of education is low among the female head of the households as compared to the male heads.

**Table 2.8 Level of education of the Head of the households in percentage by zone**

Level of Education	Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	Total
Illiterate	18.72	23.03	11.94	10.76	11.03	15.37
Can sign only	15.13	15.35	19.81	20.24	15.36	14.71
Primary Level	17.80	19.69	14.47	25.59	18.99	19.62
Secondary Level	12.65	15.94	31.45	17.00	22.35	19.16
SSC	18.32	13.59	15.72	14.98	17.60	16.42
HSC	02.67	02.17	05.35	00.68	02.24	02.35
Graduate	14.71	10.23	1.26	10.75	12.43	12.37
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Census & Socioeconomic survey, June 2014

The numbers of school going children are increasing. Today, almost all the young children are going to school, girl children are more advance in this regard as the GOB is providing facilities to them. Only 14.14% of the total population found illiterate. The highest percentage goes to can sign only. More than 14 % people have secondary education whereas about 20% completed primary level and 14% completed SSC level. Only 10.35% completed graduation. The detail scenario is given in the Table 2.9.

**Table 2.9 Level of education of the Affected Population (7 years and above) by zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%
Illiterate	730	16.80	498	22.31	175	12.75	317	10.37	301	09.26	2,021	14.17
Can sign only	887	20.41	453	20.30	326	23.74	569	18.61	684	21.04	2,919	20.47
Primary level	818	18.82	418	18.73	260	18.94	683	22.34	649	19.96	2,828	19.83
Secondary level	602	13.85	379	16.98	355	25.86	471	15.41	674	20.73	2,481	17.40
SSC level	686	15.78	237	10.62	166	12.09	475	15.54	483	14.86	2,047	14.36
HSC level	122	2.81	89	3.99	71	5.17	55	1.80	150	4.61	487	3.42
Graduate	501	11.53	158	7.08	20	1.46	487	15.93	310	9.54	1,476	10.35

Source: Census & Socioeconomic survey, June 2014

### 2.3.4 Age and Occupation

The largest proportion of population is in age group 19-34 followed by age group of 5-18 and 35 - 49 irrespective of male and female population in all the zones. Population within the age group 51-60 and above 60 is found almost similar in all zones. The Table 2.10 shown in detail.

**Table 2.10 Age Distribution of Affected Population in Percentage**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%
0-4	340	06.96	179	07.12	116	07.53	202	06.02	217	6.01	1,054	06.63
5-18	1,408	28.83	657	26.14	409	26.56	858	25.56	994	27.53	4,326	27.20
19-34	1,416	29.00	792	31.52	466	30.26	964	28.72	1,020	28.25	4,658	29.29
35-49	932	19.09	454	18.07	271	17.60	674	20.08	668	18.50	2,999	18.86
50-59	395	08.09	215	08.56	145	09.42	295	08.79	315	08.72	1,365	08.58
60+above	392	8.03	216	8.60	133	8.64	364	10.84	397	10.99	1,502	9.44
Total	4,883	100.00	2,513	100.00	1,540	100.00	3,357	100.00	3,611	100.00	15,904	100.00

Source: Census & Socioeconomic survey June 2014

Most of the bridges under this project are located nearer to the locality or business center where people usually gather. This is why people who are living around the bridges have moved to business and some small shops are established around the bridges on government land. It is found that about 68% household head are involved in business. Whereas considering family members 53% male and 1% female are doing business. A total of 7.73% of the household heads are involved in agriculture and 1.74% are aged/retired and have no specific income source. About 8% household heads are labors with special skill. Among them 7.4% of the male members and 0.50% female members of the households are of this category. Principal occupation of the head of the households is shown in Table 2.11.

**Table 2.11 Principal Occupation Head of the Households by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%
Farming/live stock	85	8.74	71	13.98	24	7.55	39	6.08	25	3.49	244	7.73
Business	673	69.24	279	54.92	249	78.30	438	68.33	494	68.99	2,133	67.61
Service	32	3.29	39	7.68	7	2.20	38	5.93	46	6.42	162	5.13
Labor	12	1.23	22	4.33	3	0.94	9	1.40	7	0.98	53	1.68
Labor with Special skill	67	6.89	41	8.07	11	3.46	53	8.27	79	11.03	251	7.96
Rickshaw/Vanpooler	17	1.75	18	3.54	3	0.94	8	1.25	17	2.37	63	2.00
Domestic Work	19	1.95	9	1.77	10	3.14	6	0.94	7	0.98	51	1.62
Teacher/Doctor/Lawyer/Contractor	17	1.75	14	2.76	0	0.00	18	2.81	16	2.23	65	2.06
Driver	2	0.21	4	0.79	1	0.31	2	0.31	4	0.56	13	0.41
Retired/Old age/Jobless	15	1.54	7	1.38	3	0.94	19	2.96	11	1.54	55	1.74
Others	33	3.40	4	0.79	7	2.20	11	1.72	10	1.40	65	2.06
Total	972	100.00	508	100.00	318	100.00	641	100.00	716	100.00	3,155	100.00

Source: Census & Socioeconomic survey June 2014

Principal occupation of the population (10 years and above) of the affected households is domestic work followed by business. Most of the female population identified themselves involved in domestic work. In other words majority of the male members are involved with business. By following BBS data all the population of more than 10 years old is being considered here. As a result more than one fifth of them are found as student. It reflects that almost all the school going children are going to school. Only 3 % population are found involved in agriculture. More than 9% population is found to be old and retired (Table 2.12).

**Table 2.12 Principal Occupation of the Population (10 Years and above) by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Farming/livestock	145	3.57	105	5.00	43	3.35	71	02.49	42	01.37	406	03.04
Business	1,027	25.30	400	19.07	344	26.79	633	22.20	651	21.30	3,055	22.89
Service	126	3.10	74	03.53	29	02.26	103	03.61	134	04.38	466	03.49
Labor	60	01.48	55	02.62	04	00.31	53	01.86	29	00.95	201	01.51
Labor with Special skill	68	1.68	63	03.00	16	01.25	53	01.86	106	03.47	306	02.29
Rickshaw/Vanpooler	23	0.57	39	01.86	9	00.70	11	00.39	20	00.65	102	00.76
Domestic Work	1,201	29.59	651	31.03	358	27.88	893	31.32	879	28.76	3,982	29.83
Student	843	20.77	414	19.73	255	19.86	632	22.17	698	22.84	2,842	21.29
Teacher/Doctor/Lawyer/Contractor	18	00.44	15	00.71	1	0.08	21	00.74	12	00.39	67	00.50
Driver	19	00.47	5	00.24	0	00.00	13	00.46	15	00.49	52	00.39
Retired/Old age/Jobless	275	06.78	152	07.24	116	09.03	313	10.98	395	12.93	1,251	09.37
Others	254	06.26	125	5.96	109	08.49	55	01.93	75	02.45	618	04.63
Total	4,059	100	2,098	100	1,284	100	2,851	100	3,056	100	13,348	100

Source: Census & Socioeconomic survey June 2014

### 2.3.5 Income and Poverty Dimensions

Poverty in Bangladesh is measured through per capita income or through Direct Calorie Intake (DCI) where persons having DCI of less than 2,122 kcal are considered to be living in poverty while a person having DCI of less than 1,805 kcal is considered to be 'hard core poverty'. As per Statistical Year Book of Bangladesh 2010 average household size is 4.50 and 40.94% households earn maximum BDT 60,000 per year. Based on the census socioeconomic survey (April - June 2014) indicating yearly income and expenditure of the project affected households it is found that about 6.27% households earn less than Tk 60,000 per year (Table 2.13). Considering the economic condition of the project area, scope of work and level of income, these 6.27% affected households may be considered as hardcore poor and yearly income of the households within the range of BDT 60,001-1,20,000 is poor, more than BDT 1,20,000 is non poor. The hardcore poor will get special assistance under the policy of ARP and may get special attention for IGA training and other assistance under income and livelihood restoration program (ILRP). A list of vulnerable households earning up to BDT 60,000/year is enclosed in *Annex-III*.

**Table 2.13 Poverty Level and Annual income of head of the households by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<15000	04	0.41	02	0.39	01	0.31	00	0.00	01	0.14	08	0.25
15001-30,000	07	0.72	06	1.18	01	0.31	01	0.16	03	0.42	18	0.57
30,001-45,000	21	2.16	04	0.79	03	0.94	06	0.94	04	0.56	38	1.20
45,001-60,000	62	6.38	28	5.51	12	3.77	16	2.50	16	2.23	134	4.25
60,001-80,000	59	6.07	21	4.13	04	1.26	17	2.65	22	3.07	123	3.90
80,001-100,000	100	10.29	45	8.86	13	4.09	41	6.40	45	6.28	244	7.73
100,001-120,000	196	20.16	116	22.83	57	17.92	111	17.32	152	21.23	632	20.03
120,001-135,000	16	1.65	03	0.59	01	0.31	07	1.09	02	0.28	29	0.92
135,001-150,000	67	6.89	23	4.53	13	4.09	46	7.18	45	6.28	194	6.15
150,001-165,000	13	1.34	06	1.18	03	0.94	06	0.94	04	0.56	32	1.01
165,001-180,000	129	13.27	62	12.20	49	15.41	85	13.26	122	17.04	447	14.17
>=180,001	298	30.66	192	37.80	161	50.63	305	47.58	300	41.90	1,256	39.81
Total	972	100.00	508	100.00	318	100.00	641	100.00	716	100.00	3,155	100.00

Source: Census & Socioeconomic survey June 2014

## 2.4 Gender Impacts and Mitigation Measures

Women can be particularly impacted during resettlement, and especially relocation, as they are predominantly responsible for maintaining the cohesion of the family unit as well as being extensively involved in household chores in addition to participating in economic activities. Preparation of food, organizing shelter, arranging sanitation and water facilities and schooling of children are common areas where women play important roles in Bangladeshi households.

The census & SES was designed, undertaken and analyzed in a way to adequately identify gender differences and gender specific impacts. Based on the information provided in the census and SES, only 81 (2.57% of the total) households headed by female have been identified. Heads of these households will be eligible for training and other income generating activities. They will be preferentially employed in project civil work.

These female headed households will be disproportionately affected by resettlement due to traditional roles and responsibilities combined with lack of empowerment. Female APs will require additional support and assistance by income generation activities under LIRP. These female APs or representative of the family as nominated by the head will receive training on Income generating Activities (IGA) through LIRP. Participation of women in decision making is slowly increasing and the projects of various NGOs have played an important role in this improvement. Micro-credit aimed at female beneficiaries is also making a positive impact of poor households.

Considering the disproportionate impact on women and since legal ownership (in terms of title) does not reflect gender equity (i.e. women's names are not generally recorded on the title), sufficient measures will be taken to ensure women's rights are protected during the resettlement process. The measures included in the ARP to address gender impacts are:

- Identification of the socio-economic condition, needs, and priorities of women, and monitor and evaluate the impact of land acquisition and resettlement on women separately;
- Identification of the female headed households to be affected and setting of entitlement criteria to recognize female-headed households;
- Provision of such entitlements that women are not disadvantaged by the process of land acquisition and resettlement;
- Preferential employment of affected women in civil construction including road slope turfing, tree plantation, watering and some other similar types of works.
- Female and vulnerable APs will form Labor Contracting Society to bargain with the Contractor
- Separate labor shed with toilets will have to provide for female laborers at construction sites.
- Hiring of female staff in the ARP implementing agency to assist female-headed AHs and women during resettlement activities, including planning and implementation of income restoration programs; and
- Involvement of women's groups in resettlement planning, management, and operations and in job creation and income generation.

## 2.5 Water and Sanitation

Health and sanitation status of the affected households seems to be good. In the project area 96% households own toilet inside the household property with septic tank. Only 2% household use open space for the purpose (Table 2.14). Sanitation condition is better in Gopalganj followed by Khulna and Barisal. On the other hand it is comparatively poor in Rajshahi.

**Table 2.14 Type of Toilet Facilities of the Households by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Own toilet inside household property Septic tank	932	95.88	458	90.16	314	98.74	626	97.66	694	96.93	3,024	95.85
Public toilet	04	0.41	04	0.79	03	0.94	02	0.31	02	0.28	15	0.48
In the field/open space	26	2.67	25	4.92	01	0.31	08	1.25	03	0.42	63	2.00
In the canal	05	0.51	07	1.38	00	0.00	03	0.47	04	0.56	19	0.60
Other	05	0.51	14	2.76	00	0.00	02	0.31	13	1.82	34	1.08
Total	972	100.00	508	100.00	318	100.00	641	100.00	716	100.00	3,155	100.00

Source: Census & Socioeconomic survey June 2014

Almost all the project affected households are living in rural areas. As a result garbage management practice has not been developed among them. On the other hand there is no arrangement to manage the garbage like collection by an organized institution. The Table 2.15 reflects the facts by showing that about 74% of the household throw the garbage any where and thrown in canal by 10% of the households. Only 4% households through the garbage in bean and those are collected by government garbage collector. These households are from urban area and have the garbage management system.



**Table 2.15 Management of Household Garbage by Head and by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Through the government garbage collector	33	3.40	21	4.13	02	0.63	70	10.92	04	0.56	130	4.12
Burn it	31	3.19	40	7.87	29	9.12	08	1.25	24	3.35	132	4.18
Throw anywhere	800	82.30	258	50.79	284	89.31	526	82.06	456	63.69	2,324	73.66
Throw In the canal	82	8.44	145	28.54	03	0.94	11	1.72	79	11.03	320	10.14
Other	26	2.67	44	8.66	00	0.00	26	4.06	153	21.37	249	7.89
Total	972	100.00	508	100.00	318	100.00	641	100.00	716	100.00	3,155	100.00

Source: Census & Socioeconomic survey June 2014

Almost 86% of the affected households use tube well water, 72% use canal water for drinking and other daily use (Table 2.16). They use pond or canal water mainly for bathing, cloth and dish washing, etc. Sanitation condition of the project area is well. On the other hand the households living in urban area use piped water (2.57%).

**Table 2.16 Source of Drinking Water of the Households by Zone**

Zone	Rajshahi		Rangpur		Barishal		Gopalganj		Khulna		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Where get	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pump well	469	92.32	929	95.58	501	69.97	309	97.17	494	77.07	2,702	85.64
Piped water from utility company	14	2.76	6	0.62	8	1.12	5	1.57	48	7.49	81	2.57
Private water seller	2	0.39	3	0.31	2	0.28	0	0.00	2	0.31	9	0.29
Canal	16	3.15	17	1.75	165	23.04	4	1.26	26	4.06	228	7.23
Other	7	1.38	17	1.75	40	5.59		0.00	71	11.08	135	4.28
Grand Total	508	100.00	972	100.00	716	100.00	318	100.00	641	100.00	3,155	100.00

Like waste management majority of the household through away the waste water directly outside of the house. As majority of the households are rural dwellers they do not have facilities to through water in a planned manner. However, more than 5% household through their water in their septic tank and only 2% household use public drains for the purpose (Table 2.17).

**Table 2.17 Management of Waste Water of the Households by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%
Septic tank	52	5.35	21	4.13	6	1.89	55	8.58	26	3.63	160	5.07
Public drainage	21	2.16	13	2.56	1	0.31	36	5.62	2	0.28	73	2.31
Directly outside the house	874	89.92	307	60.43	311	97.80	475	74.10	311	43.44	2,278	72.20
Other	25	2.57	167	32.87	0	0.00	75	11.70	377	52.65	644	20.41
Total	972	100.00	508	100.00	318	100.00	641	100.00	716	100.00	<b>3,155</b>	100.00

## **3 LAND ACQUISITION AND RESETTLEMENT IMPACTS**

### **3.1 Minimizing Land Acquisition and Displacement**

RHD has undertaken efforts to minimize and/or avoid land acquisition and resettlement impacts. Out of 105 bridges 98 bridges will require land acquisition with a total quantity of 39.96 hectare. Only few bridges will be reconstructed /improved within the RHD land. Some squatter households and business enterprises will need to be relocated for the project.

### **3.2 Scope of Land Acquisition**

A total of 39.96 ha land will be required to be acquired to implement the project. All of these lands are privately owned. Out of the total private land 18.50 ha in Rangpur zone, 8.41 ha in Rajshahi zone, 5.51 ha in Gopalganj zone, 2.70 ha in Khulna zone and 4.85 ha in Barisal zone. In addition to this acquired land some government owned land including khash and RHD land will be used to construct these bridges.

### **3.3 Displacement and Other Impacts**

In addition to land acquisition, the works will require to affect 788 households 2,367 commercial/business premises and 98 community properties. Out of 788 households 545 of them will be displaced due to loss of residential structure (Land with Res. Stru. & Trees+Residential Structure+ Rented Residential Structure), 190 households are going to lose trees and 53 households are going to lose some other infrastructures like pond, gate, drains etc. About 2,725 people will be displaced due to loss of homesteads. A total of 109,538 sq.m structure will need to be relocated of which 69,604 sq.m commercial and 33,208 sq.m residential structure. Beside some secondary structure i.e.111 toilets and 142 tube wells will need to be relocated due to the project. A total of 3,002 wage laborers from non-farm sector will lose their livelihood due to the project (Table 3.1). In total 3002 wage labors are going to lose their wage income from the affected CBEs (Businesses).

**Table 3.1 Displacement and other Impacts**

Sl. #	Type of impacts	Zones					Total
		Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	
1	Total quantity of land to be acquired (ha)	18.50	8.41	5.51	2.70	4.85	39.97
2	Total No. Households affected (No) [Land with Resi. Stru.&Trees+Residential Structure+Rented Resident Structure+ Private Trees+Others-Ponds, Fish, Gate]	207	190	54	171	166	788
3	Total No. Commercial enterprises (CBEs) affected (No) [Land with Busi. Stru. & Tree+ Business with Structure + Rented Business]	765	318	264	470	550	2,367
4	Community property (CPR) affected	43	07	08	21	19	98
5	Total Quantity of all structure (Sqm) affected	37,445	12,931	13,589	21,687	23,886	109,538
5.a	Total Quantity of Residential structure (Sqm) affected	10,778	5,902	2,437	7,674	6,417	33,208
5.b	Total Quantity of Commercial structure (Sqm) affected	24,161	6,796	10,270	12,954	15,423	69,604
5.c	Total quantity of CPR structures (sqm) affected	2,506	233	882	1,059	2,046	6,726
6	No. of toilets affected	14	40	14	05	38	111
7	No. of tube wells affected	38	41	12	20	31	142
8	No. of wage laborers losing job	864	367	553	789	429	3,002

Source: Census & Socioeconomic survey June 2014

### 3.4 Asset Inventory and Assessment of Losses

#### 3.4.1 Affected Households & Business Enterprises

Households and business structures will be physically displaced by the Project. All the households and shops both titled and non-titled are included in the ARP as impacts that are to be mitigated through compensation and resettlement assistance. The households and business premises will be encouraged for self relocation and adequate compensation and other resettlement benefits will be paid to them for losses.

#### 3.4.2 Physical Structures Affected

A total 105 bridges are to be improved/reconstructed under the project of which 07 bridge will not need any land acquisition. A total of 788 households, 2367 business enterprises and 98 community properties are getting affected by the project. A total of 109,538 sqm different categories of structure have been affected of which 33,208 sqm residential, 69,604,sqm commercial and 6,726,sqm CPR structures. Out of the total affected structure, 39,426 sqm is tin made, 33,543 sqm semi-pucca, 30,355 sqm pucca, 4,809 sqm katcha 1,045 sqm thatched 10 sqm tripal and 350 sqm polithin (Table 3.2).

**Table 3.2 Quantity of All Affected Structure (sqm) by type and by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pucca	8,243	22.01	1,503	11.62	1,659	12.21	12,332	56.86	6,618	27.71	30,355	27.71
Samipucca	18,574	49.60	3,880	30.01	3,134	23.06	4,527	20.87	3,428	14.35	33,543	30.62
Tin	8,393	22.41	6,161	47.65	8,535	62.81	3,419	15.77	12,918	54.08	39,426	35.99
Katcha	2,045	5.46	1,211	9.37	51	0.38	936	4.32	566	2.37	4,809	4.39
Thatchad Structure	190	0.51	166	1.28	210	1.55	473	2.18	6	0.03	1,045	0.95
Tripal Structure		0.00	10	0.08		0.00	0	0.00	0	0.00	10	0.01
Polithin		0.00		0.00		0.00	0	0.00	350	1.47	350	0.32
Total	37,445	100.00	12,931	100.00	13,589	100.00	21,687	100.00	23,886	100.00	109,538	100.00

Source: Census & Socioeconomic survey June 2014

Besides, 142 tube wells, 94 sanitary latrine (Pucca), 04 slab latrines and 17 katcha latrine have been affected by the interventions. Detail of the affected structures is shown in the Table 3.3.

**Table 3.3 Affected Secondary Structures**

Type of affected structure	Rangpur	Rajshahi	Gopalganj	Khulna	Barisal	Total
Latrine (Pucca) No.	14	31	13	00	36	94
Latrine (Ring slab) No.	02	00	00	01	01	04
Latrine (Katcha) No.	00	09	01	05	02	17
Tube well No.	38	41	12	20	31	142

Source: Census & Socioeconomic survey June 2014

### 3.4.3 Trees and Crops Affected

The project will also require removal of 44,778 trees of various sizes and categories from privately owned land, both fruit bearing and timber type, from the private land. Out of these, 23,556 big, 11,386 medium, 7,264 small and 2,572 sapling. Timber trees are more in number in all the zones.

Besides about 99 species of trees with a total quantity of 9,448 (Rangpur zone 2,500, Rajshahi 2,520, Gopalganj 1852, Khulna 1,776 and Barisal 818) on RHD land will need to be fell down due to the project. Except Rangpur all the zones have timber trees more in number than that of fruit trees. The affected households will get 5 saplings each for social afforestation. Details of trees on private and government land with types and species are shown in the Table 3.4, Table 3.5, Table 3.6 and Table 3.7.

**Table 3.4 Affected Trees on private land**

Zone	Types of Trees	Category wise no. of affected trees				Total
		Big	Medium	Small	Sapling	
Rangpur	Fruit Tree	3,114	691	601	128	4,534
	Timber	6,280	2,123	2,406	482	11,291
Rajshahi	Fruit Tree	2,013	657	191	102	2,963
	Timber	2,067	2,685	726	251	5,729
Gopalganj	Fruit Tree	233	469	224	55	981
	Timber	1,129	1,028	587	105	2,849
Khulna	Fruit Tree	2,616	861	668	291	4,436
	Timber	3,167	467	723	557	4,914
Barisal	Fruit Tree	2,220	1,308	507	265	4,300
	Timber	717	1,097	631	336	2,781
<b>Total</b>		<b>23,556</b>	<b>11,386</b>	<b>7,264</b>	<b>2,572</b>	<b>44,778</b>

Source: Census & Socioeconomic survey June 2014

**Table 3.5 Affected Trees on RHD/Government land**

Zone	Types of Trees	Category wise no. of affected trees				Total
		Big	Medium	Small	Sapling	
Rangpur	Fruit Tree	791	101	84	04	980
	Timber	526	248	495	251	1,520
Rajshahi	Fruit Tree	145	215	258	50	668
	Timber	143	1,342	315	34	1,834
Gopalganj	Fruit Tree	181	69	17	00	267
	Timber	772	496	247	70	1,585
Khulna	Fruit Tree	73	171	115	52	411
	Timber	215	262	829	59	1,365
Barisal	Fruit Tree	46	58	65	29	198
	Timber	127	194	264	35	620
<b>Total</b>		<b>3,019</b>	<b>3,156</b>	<b>2,689</b>	<b>554</b>	<b>9,448</b>

Source: Census & Socioeconomic survey June 2014

**Table 3.6 List of Affected Trees on Private land by Tree Name**

Tree Name	Big	Medium	Small	Saplings	Total
Acacia /Babla	1	2	4	3	10
Akasmani	93	64	182	159	498
Amoloki	0	2	0	0	2
Amra	41	45	38	7	131
Arjun	2	6	3	0	11
Arsus	5	0	0	0	5
Ashfol	9	10	4	15	38
Badam	2	12	2	0	16
Bakul	1	0	1	0	2
Bamboo	12,028	4,904	2,490	290	19,712
Banana	6,324	1,225	504	157	8,210
Banyan/Botgach	10	5	11	0	26
Batter/Pita	13	0	5	0	18
Belgium	0	1	1	0	2
Berry/Jam	28	37	34	28	127

Tree Name	Big	Medium	Small	Saplings	Total
Bettle Nut trees/Supari	1,802	813	228	118	2,961
Bori (Kul)	49	18	13	3	83
Cambul trees	54	181	69	1	305
Chalta	2	4	1	2	9
Chamon	2	3	0	0	5
Coconut	386	199	89	73	747
Cotton Tree/Tula	3	0	1	0	4
Custard apple/Ata	4	21	23	6	54
Dalim	4	5	3	1	13
Debdaru	12	11	32	19	74
Dembura	3	8	5	0	16
Deoua	0	1	1	0	2
Douya	0	2	0	0	2
Electropul	22	0	0	0	22
Epilepil	0	1	49	136	186
Figs/Dumur	23	17	3	1	44
Gab	22	33	40	0	95
Gainaji	1	0	0	0	1
Gambura	2	1	0	0	3
Gamma	2	2	3	0	7
Goti	0	0	15	40	55
Guava	45	55	145	9	254
Harataki	0	1	2	0	3
Horseradish/Sajina	231	60	47	6	344
Jackfruit	466	434	286	112	1,298
Jambura	36	21	5	3	65
Jamrul	10	11	28	1	50
Jarul	1	0	0	0	1
Jharul	0	3	0	0	3
Jiapat	0	0	2	0	2
Jibali	1	3	3	0	7
Jibon	5	1	0	0	6
Jiga	126	55	16	4	201
Jigna	1	41	2	0	44
Joist plant/Kori	8	0	5	0	13
Kajla	0	0	1	0	1
Kambadi	1	0	0	0	1
Kamini	1	21	0	0	22
Khai	1	0	1	0	2
Khil Koro	0	4	0	0	4
Khoksa	2	0	1	0	3
Kodbel	2	2	11	2	17
Kormocha	0	0	1	0	1
Koro	284	277	138	61	760
Krishnochura	6	2	3	0	11
Lambo	4	11	1	2	18
Latakana	0	1	3	0	4

Tree Name	Big	Medium	Small	Saplings	Total
Lemon	24	35	27	14	100
Litchi	129	127	160	1	417
Madar	8	25	17	0	50
Mango	400	515	426	166	1,507
Mehaguni	403	830	943	542	2,718
Neem	78	120	236	58	492
Olive	6	5	11	6	28
Orange	0	0	1	0	1
Pakhu	0	1	2	0	3
Pakor	1	3	5	0	9
Palmyra/Tal	27	115	9	9	160
Papaya	89	139	15	27	270
Papra	0	1	0	0	1
Payaa	2	7	1	2	12
Pepolti	0	4	1	0	5
Persimmon/Khejur	54	36	34	66	190
Pithali	9	0	4	0	13
Pitraj	4	8	19	10	41
Plum	0	2	0	0	2
Pomegranate	3	1	2	0	6
Rayana	4	20	2	0	26
Readychamol	12	11	16	20	59
Safeda	3	2	9	1	15
Saiton	1	0	0	0	1
Shara	5	0	0	0	5
Shimul	22	12	22	3	59
Shishu	5	14	32	3	54
Sonali	4	1	0	0	5
Sormali	0	0	1	0	1
Soti	0	500	4	0	504
Teak trees/Segun	1	4	1	3	9
Tejpata	2	1	1	0	4
Tetul (Tartar)	5	10	7	0	22
Trot/ Kadom	29	32	20	14	95
Ucaliptus	32	143	659	360	1,194
Wood	1	4	1	0	6
Wooden Apple (Bel)	12	22	21	8	63
<b>Total</b>	<b>23,556</b>	<b>11,386</b>	<b>7,264</b>	<b>2,572</b>	<b>44,778</b>

Source: Census & Socioeconomic Survey June 2014



**Table 3.7 List of Affected Trees on Government Land by Tree Name**

Tree Name	Big	Medium	Small	Saplings	Total
Acacia /Babla	37	203	85	6	331
Akasmani	174	378	573	270	1,395
Amra	3	11	21	4	39
Arjun	24	10	49	1	84
Asaka	4	0	0	0	4
Bamboo	331	83	59	0	473
Banana	850	125	3	7	985
Banyan/Botgach	31	23	8	2	64
Batter/Pita	2	10	0	0	12
Belgium	0	1	0	0	1
Berry/Jam	7	4	11	0	22
Bettle Nut trees/Sup	5	4	0	10	19
Bhenna	0	0	5	0	5
Bori (Kul)	32	10	9	1	52
Cambul trees	10	14	6	3	33
Chara arjana	5	0	0	0	5
Coconut	33	13	1	2	49
Cotton Tree/Tula	2	0	0	7	9
Custard apple/Ata	8	13	25	0	46
Debdaru	1	37	13	0	51
Dembura	0	58	0	0	58
Electropul	16	0	0	0	16
Epilepil	3	79	17	1	100
Figs/Dumur	7	20	0	0	27
Gamma	22	23	55	2	102
Guava	6	8	41	0	55
Horseradish/Sajina	23	9	20	0	52
Jackfruit	32	120	72	21	245
Jambura	0	0	4	0	4
Jarul	0	2	23	2	27
Jiga	2	6	60	0	68
Khai	10	10	0	0	20
Khil Koroj	34	75	12	0	121
Kodbel	0	6	3	0	9
Koroj	451	463	197	42	1153
Krishnochura	6	1	0	0	7
Lemon	0	0	0	13	13
Litchi	22	73	4	0	99
Lotapeople	0	2	2	0	4
Mango	27	125	114	3	269
Mehaguni	218	323	358	32	931
Neem	64	144	145	29	382
Olive	0	0	2	0	2
Pakhu	1	0	0	0	1
Pakor	0	47	20	4	71
Palmyra/Tal	86	56	94	40	276

Tree Name	Big	Medium	Small	Saplings	Total
Payaa	2	123	27	2	154
Pepolti	0	9	0	0	9
Persimmon/Khejur	66	26	100	26	218
Plum	1	0	0	0	1
Readychamol	0	2	0	0	2
Saiton	1	0	1	0	2
Shimul	17	22	37	6	82
Shishu	53	192	248	1	494
Teak trees/Segun	1	0	0	0	1
Tetul (Tartar)	30	0	0	0	30
Trot/ Kadom	11	12	11	0	34
Ucaliptus	241	167	139	46	593
Wood	3	3	0	0	6
Wooden Apple (Bel)	4	11	15	1	31
<b>Total</b>	<b>3,019</b>	<b>3,156</b>	<b>2,689</b>	<b>584</b>	<b>9,448</b>

Source: Census & Socioeconomic survey June 2014

### 3.4.4 Common Property Resources

There are 98 common property resources in five zones of the project and are getting affected. Out of these 43 in Rangpur zone, 7 in Rajshahi zone, 8 in Gopalganj zone, 19 in Khulna zone and 21 in Barisal zone. The common properties are mostly government and private offices, School and colleges, mosques, club or community societies, pedestrian shed etc. built beside the bridge where people usually gather. Affected Common Property Resources are shown by Zone in Table 3.8.

**Table 3.8 Affected CPRs by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mosque	04	9.30	00	0.00	02	25.00	04	21.05	03	14.29	13	13.27
School/College	06	13.95	03	42.86	01	12.50	01	5.26	07	33.33	18	18.37
Samity/Club/Community	05	11.63	01	14.29	02	25.00	00	0.00	02	9.52	10	10.20
Madrasha	01	2.33	01	14.29	00	0.00	00	0.00	01	4.76	03	3.06
Temple	00	0.00	00	0.00	00	0.00	01	5.26	01	4.76	02	2.04
Graveyard	00	0.00	00	0.00	00	0.00	02	10.53	00	0.00	02	2.04
Office	14	32.56	01	14.29	03	37.50	10	52.63	03	14.29	31	31.63
Others (Police Box, Bus stand)	13	30.23	01	14.29	00	0.00	01	5.26	04	19.05	19	19.39
<b>Total</b>	<b>43</b>	<b>100.00</b>	<b>07</b>	<b>100.00</b>	<b>08</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>21</b>	<b>100.00</b>	<b>98</b>	<b>100.00</b>

Source: Census & Socioeconomic survey June 2014

### 3.5 Significance of Impact

In terms of significance of impact, an estimated 788 households, 2,367 commercial/business premises and 98 community properties will be impacted. About 2,725 people will be displaced due to loss of homesteads. A total of 547 households and CBEs are losing land with other

properties of which 223 households losing land with residential structure and trees, 81 are losing land with business structure and tree, 190 are losing land and trees and 53 are losing land with other infrastructures like pond, gate, drains etc. A lot of business enterprises and residential households are affected on the government land. The AHs experiencing significant impacts are shown in Table 3.9.

**Table 3.9 AHs Experiencing Significant Impacts**

<b>Zone</b>	<b>Rangpur</b>	<b>Rajshahi</b>	<b>Gopalganj</b>	<b>Khulna</b>	<b>Barisal</b>	<b>Total</b>
<b>Type of Losses</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
Land with Resi. Stru & Tree	44	71	31	23	54	<b>223</b>
Resident Structure	100	65	07	90	46	<b>308</b>
Rented Resident Structure	00	00	04	00	10	<b>14</b>
Land with Busi. Stru & Tree	29	16	03	03	30	<b>81</b>
Business with Structure	585	146	71	218	206	<b>1,226</b>
Rented Business	151	156	190	249	314	<b>1,060</b>
Land and Tree	42	53	07	44	44	<b>190</b>
Other –Pond,Gate, drains etc.	21	01	05	14	12	<b>53</b>
<b>Total</b>	<b>972</b>	<b>508</b>	<b>318</b>	<b>641</b>	<b>716</b>	<b>3,155</b>

Source: Census & Socioeconomic survey June 2014

### **3.6 Special Measures for Vulnerable Groups**

Vulnerable groups to be affected by the project include (i) Poor female headed households without elderly support (ii) female EPs who are poor or otherwise disadvantaged; (iii) households living below poverty line (iv) elderly headed households (v) household with disable member; Special assistance will be required to support these vulnerable AHs including additional subsistence and relocation assistance, opportunity for skill training and income restoration, employment opportunity in civil work.

### **3.7 Employment Loss of Wage Earners**

In total 3002 people are going to lose their income as wage earners in the business and commercial enterprises affected by the project. Highest numbers are from Rangpur zone followed by Khulna and Gopalganj zones. Lowest number is found in Rajshahi zone. These wage losers will be provided 30 days wage loss as resettlement assistance to recover their losses within the stipulated time. As these areas are suburban in nature, it is expected that they will get another job in the vicinity within very short time.



**Figure 3.1 Distribution of the Wage Losers by Zone**

### **3.8 Business Loss of Business Enterprises**

Thirteen category or type businesses have been identified to be affected by this project. In total 2,513 businesses are going to be affected by this project. It is to be mention here that some of the affected person owns more than one CBEs. More than one third (34%) are small mobile kiosk followed by market stall. About 18% of the business losers are identified as others including vegetable shops and other vendors, mostly temporary sellers. Highest number of business losers are from Rangpur zone followed by Khulna and Barisal zone (Table 3.10).

**Table 3.10 Type of Business Loss by Zone**

Zone	Rangpur		Rajshahi		Gopalganj		Khulna		Barisal		Total	
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%
Small mobile Kiosk	375	45.73	75	21.25	15	5.45	44	7.80	348	69.46	857	34.10
Market Stall	163	19.88	121	34.28	14	5.09	216	38.30	59	11.78	573	22.80
Restaurant./Guest	54	6.59	07	1.98	13	4.73	28	4.96	13	2.59	115	4.58
Other Service (Barber, Tailor, Boucher)	44	5.37	21	5.95	23	8.36	43	7.62	15	2.99	146	5.81
Retail-Garage/Vehicle store Repair	25	3.05	17	4.82	25	9.09	20	3.55	09	1.80	96	3.82
Rod ,Cement	11	1.34	28	7.93	14	5.09	14	2.48	11	2.20	78	3.10
Tea Stall	08	0.98	02	0.57	16	5.82	11	1.95	00	0.00	37	1.47
Pharmacy	11	1.34	13	3.68	3	1.09	24	4.26	02	0.40	53	2.11
Fruits	2	0.24	0	0.00	7	2.55	11	1.95	0	0.00	20	0.80
Furniture	12	1.46	7	1.98	14	5.09	14	2.48	3	0.60	50	1.99
Hardware	6	0.73	7	1.98	1	0.36	9	1.60	0	0.00	23	0.92
Workshop	4	0.49	2	0.57	12	4.36	5	0.89	2	0.40	25	0.99
Others	105	12.80	53	15.01	118	42.91	125	22.16	39	7.78	440	17.51
Total	820	100.00	353	100.00	275	100.00	564	100.00	501	100.00	2513	100.00

Source: Census and Socioeconomic Survey June 2014

### 3.9 Bridge-wise Detail

Summary of census and socioeconomic survey is presented in **Annex-V**.

## **4 LEGAL AND POLICY FRAMEWORK**

### **4.1 Purposes and Objectives of Land Acquisition and Resettlement**

The project includes construction/improvement of bridge and approach roads needing acquisition of 39.96 hectares of private land. The acquisition of land will eventually displace households and commercial premises both titled and non-titled. The Abbreviated Resettlement Plan (ARP) covers compensation and assistance for resettlement and rehabilitation of APs. Thus, the ARP approach incorporates (i) land acquisition and resettlement issues; (ii) impact mitigation with special attention to the women and vulnerable groups and (iii) income generating support to the members of the AHs to include them in the poverty reduction and livelihood enhancement program.

The main principles of the ARP are to (i) minimize negative impacts in consultation with the design engineers and the APs; (ii) closely consult the affected persons on ARP policy, needs assessment, poverty and rehabilitation issues; (iii) carry out resettlement activities to improve or at least restore the pre-project living standards of the affected persons; (iv) provide compensation for affected property at market price prior to relocation and mainstream the poor and vulnerable APs with the poverty reduction and social development program for rehabilitation and livelihood regeneration.

### **4.2 Legal Framework for Land Acquisition**

The current legislations governing land acquisition for Bangladesh is the Acquisition and Requisition of Immovable Property Ordinance 1982 (ARIPO) and subsequent amendments during 1993 - 1994. The Ordinance requires that compensation be paid for (i) land and assets permanently acquired (including standing crops, fisheries, trees, houses); and (ii) any other damages caused by such acquisition. The Deputy Commissioner (DC) determines the market price of assets based on the approved procedure and in addition to that pays an additional 50 percent (as premium) on the assessed value as the market price established by Land Acquisition Officer (LAO) which remains much below the replacement value. The 1994 amendment made provisions for payment of crop compensation to tenant cultivators. The Ordinance, however, does not cover project-affected persons without titles or ownership record, such as informal settler/squatters, occupiers, and informal tenants and lease-holders (without document) and does not ensure replacement value of the property acquired. The act has no provision of resettlement assistance and transitional allowances for restoration of livelihoods of the non-titled affected persons. The Acquisition and Requisition of Immovable Property Ordinance (ARIPO, 1982) with its subsequent amendments will be applied for this project.

The Deputy Commissioner (DC) processes land acquisition under the Ordinance and pays compensation to the legal owners of the acquired land. The Ministry of Lands (MOL) is authorized to deal with land acquisition through the DCs. Khas (government owned) lands should be acquired first when a project acquires both khas and private land. If a project acquires only khas, the land will be transferred through an inter-ministerial meeting following the preparation of acquisition proposal submitted to DC/MOL.

The land owner has to establish ownership by producing a record-of-rights in order to be eligible for compensation under the law. The record of rights prepared under Section 143 or 144 of the State Acquisition and Tenancy Act 1950 (revised 1994) are not always updated and as a result legal land owners have to face difficulties in trying to “prove” ownership. The APs must also produce rent receipt or receipt of land development tax, but this does not assist in some

situations as a person is exempted from payment of rent if the area of land is less than 25 bighas (3.37 ha).

The Government of Bangladesh has prepared a draft national policy on involuntary resettlement funded by ADB but yet to be enacted, which is consistent with the general policy of the Government that the rights of those displaced by development project shall be fully respected, and persons being displaced shall be treated with dignity and assisted in such a way that safeguards their welfare and livelihoods irrespective of title, gender, and ethnicity.

The Policy on involuntary resettlement recognizes that:

- i.) All those displaced involuntarily by either project or non-project impacts like erosion and eviction must be resettled and rehabilitated in a productive and sustainable manner.
- ii.) People who are resettled must be able, through their own efforts and/or with support as may be required, to restore or improve upon their level of living.
- iii.) Cash compensation shall be paid in development project at replacement value to those displaced from land and dispossessed of other assets acquired based on established prior ownership and/or user rights. In addition to cash compensation and resettlement, a benefit sharing may be considered where feasible.
- iv.) Cultural and customary rights of people affected by project are to be protected, particularly those belonging to adibasis (indigenous people) and ethnic minorities.
- v.) Gender equality and equity in all stages and processes of resettlement and rehabilitation will be fully respected.
- vi.) Affected persons will be informed and consulted in a transparent manner, including formal disclosure of project impacts and mitigation measures.
- vii.) Vulnerable groups, including landless, adibasis, poor women headed households, physically challenged people, elderly and those falling below the nationally defined poverty line (by the government) displaced by project or non-project impacts, are entitled to additional benefits and assistance in a manner that addresses their specific needs related to socio-economic vulnerability.
- viii.) Similarly, affected persons and/or businesses on government leased land will be eligible for compensation for loss of access to land and sites.

The draft Policy was submitted to the Government in November 2007. It has been approved by the Ministry of Land on 1 January 2008 and is placed before the Cabinet later in February 2008. After cabinet approval, the Government will undertake further work towards legislative changes to safeguard resettlement rights by law.

### **4.3 JICA's Guidelines for Environmental and Social Considerations**

The resettlement policy of JICA is almost similar to other donor's policy on involuntary resettlement. The JICA Guidelines for Environmental and Social Considerations (April 2010) on the other hand, recognize & address the R&R impacts of all the affected persons irrespective of their titles and requires for the preparation of ARP in every instance where involuntary resettlement occurs. The JICA policy requirements are:

- i.) Avoid or minimize impacts where possible;
- ii.) Consultation with the local stakeholders people or group (including illegal dwellers), local NGOs, etc. who have views about cooperation projects.

- iii.) Payments of compensation for acquired assets at the replacement value;
- iv.) Ensure that no one is worse off as a result of resettlement and would maintain their at least original standard of living.
- v.) Resettlement assistance to affected persons, including non-titled persons; and
- vi.) Special attention to vulnerable people/groups and ethnic minorities.

#### 4.4 Gap and Gap Filling Measures

The land acquisition law of Bangladesh, the Acquisition and Requisition of Immovable Property Ordinance (ARIPO) 1982 with subsequent amendments during 1993 – 1994 is followed for acquisition and requisition of properties required for the development project in Bangladesh, which is not consistent with the Government’s commitment to reducing poverty. There are some gaps in the land acquisition law of Bangladesh and The JICA Guidelines for Environmental and Social Considerations (GESC, April 2010). Here is the comparative analysis between the GoB laws (ARIPO) related to land acquisition, compensation and involuntary resettlement and JICA’s requirements as prescribed in the GESC 2010. The Table 4.1 describes details.

**Table 4.1 Comparison between the Government of Bangladesh and JICA Guidelines for Environment and Social Consideration - Land Acquisition and Resettlement**

Sl. No.	JICA’s GESC (2010)	GOB’s Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA’s Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
1	Involuntary resettlement should be avoided wherever possible.	Not specified	The 1982 ordinance legislated nothing, while the JICA Guidelines require to avoid/minimize resettlement/loss of livelihood	Like other donor funded projects in Bangladesh the approach of avoiding involuntary resettlement has already been taken care during preparing this project. This will be further practiced during design and implementation stages.
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken.	Not specified for non-titled people	There is no provisions for compensation to the non-titled residents in Bangladesh ordinance, while JICA guidelines acknowledge all affected persons whether legally residing or not, eligible for compensation	Compensations are proposed even if non-titled affected people providing: <ul style="list-style-type: none"> <li>- Compensation for structures, trees</li> <li>- Structure transfer assistance</li> <li>- Structure reconstruction assistance</li> <li>- Moving assistance for residential house owner</li> <li>- Tenant moving allowance</li> </ul>
3	People who must be settled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard	Not specific for keeping living standard of affected people same or above pre-project levels.	There is no provisions for maintaining living standard of affected people at same or above pre-project levels in Bangladesh ordinance, while JICA guidelines require that no one is worse off as a result of resettlement and would	Assistances were proposed in the form of: <ul style="list-style-type: none"> <li>- Grant for business loss</li> <li>- Compensation for loss of plant and fish-stock</li> <li>- Grant for loss of wage employment</li> <li>- Rental fee loss for displaced rented house owner</li> </ul>



Sl. No.	JICA's GESC (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
	of living, income opportunities and production levels to pre0project levels.		maintain their living level at least original levels	<ul style="list-style-type: none"> <li>- One time moving assistance for tenant business owner</li> <li>- Introduction of micro-credit</li> <li>- Provision of job training</li> <li>- Provision of priority employment etc.</li> </ul>
4	Compensation must be based on the full replacement cost as much as possible	Compensation is made based on the pre-determined government prices as are usually quite cheaper than market price	Compensation is made based on the pre-determined government prices that are usually lower than replacement cost	The resettlement plan addresses all these issues and spells out a mechanism to fix the replacement cost by having an independent evaluator (committee) who will be responsible for deciding the replacement costs.
5	Compensation and other kinds of assistance must be provided prior to displacement	Payment is made on predetermined time, regardless before or after the construction starts	Compensations and other assistances are made regardless before or after construction, while JICA Guidelines requires to make it prior to relocation	The resettlement plan addresses all these issues and spells out a mechanism for all the compensation will be paid prior to possession of the acquired land / prior to displacement
6	For projects that entails large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public.	There is no provision for the formulation of ARP and public hearing. Deputy Commissioner contacts to land owner through land Acquisition Officer (LO), and if landowner has no objection, confirm operation for compensation amount etc. will be proceeded.	There is no provision for preparation of resettlement action plan that describes all features of resettlement requirements and ready to disclose to public.	The Abbreviated Resettlement Plan (ARP) prepared for this project with all features of resettlement requirements and mechanism of disclosure to the public is integral part of ARP. This will be further practiced during design and implementation stages.
7	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance.	The 1982 Ordinance have provisions to notify only the owners of property to be acquired	There is no provision in the law for consulting the stakeholders but the land allocation committees at district, division and central government level.	The ARP/resettlement plan for the project has been prepared following a consultation process which involves all stakeholders (affected persons, government department/line agencies, local community, NGORP, etc.), and the consultation will be a continuous process at all stages of the project development such as project formulation, feasibility study, design, implementation, and post-implementation, including the monitoring phase.
8	When consultation held, explanation must be given in a form,	There is no provisions	Requirements of JICA Guidelines are not specifically mentioned in	The resettlement plan for the project has been prepared following a consultation

Sl. No.	JICA's GESC (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
	manner, and language that are understandable to the affected people		the Bangladesh laws and rules	process with all stakeholders in local language and by following participatory process with question and explanation on the components of the ARP through participation of all the stakeholders representing different groups and the consultation will be a continuous process at all stages of the project development such as project formulation, feasibility study, design, implementation, and post-implementation, including the monitoring phase.
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans	There is no provision for the monitoring related activities with the participation of affected people	There is no provisions in Bangladesh ordinances, while JICA Guidelines recommend a participation of affected people in planning, implementation and monitoring of ARP	The resettlement plan for the project has been prepared following a consultation process with all stakeholders and the consultation will be a continuous process at all stages of the project development such as project formulation, feasibility study, design, implementation, and post-implementation, including the monitoring phase.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities	Increase AP have objection to compensation amount, the AP should protest and entrust the matter to the Arbitrator. If AP has to appeal against Arbitrator's decision, then AP should file a law suit to the court and wait for the sentence.	The laws of Bangladesh states appeal to Arbitrator and court case, while JICA guidelines recommend establishing appropriate grievance redress mechanism for amicable settlement to minimize legal confrontation.	The resettlement plan prepared for this project has made a provision of setting up of grievance redress mechanism accessible for all the affected people including non-titled affected people.
11	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socio-economic survey), preferably at the project identification stage, to prevent a	No such an activity required	There is no provision in Bangladesh ordinances, while JICA Guidelines recommend identification of affected people there in least possible time preferably at the project identification stage.	This ARP has been prepared based on the data collected through conducting a census, socioeconomic survey for the displaced persons and making inventory of losses. Video filming has also been done for the affected properties.

Sl. No.	JICA's GESC (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
	subsequent influx of encroachers of others who wish to take advantage of such benefit.			
12	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under la), the PAPs who do not have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying	There is no provision.	Requirements of JICA guidelines are not specifically mentioned in the Bangladesh laws and rules.	The resettlement plan ensures the compensation and assistance to all affected persons, whether physically displaced or economically displaced, irrespective of their legal status. The end of the census survey will be considered as the cut-off date, and affected persons listed before the cut-off date will be eligible for assistance.
13	Preference should be given to land –based resettlement strategies for displaced persons whose livelihoods are land-based.	There is no provision.	Requirements of JICA Guidelines are not specifically mentioned in the Bangladesh laws and rules.	Though this option may be a difficult proposition given the lack of government lands and the difficulties associated with the acquisition of private lands, the resettlement plan proposes land-for-land compensation as its priority, if feasible. Attempt will be made to find alternate land for the loss of land, in case it is available and if it is feasible, looking at the concurrence of host community and land value.
14	Provide support for the transition period (between displacement and livelihood restoration)	There is no provision for support for the transition period.	There is no provision in Bangladesh ordinances, while JICA Guidelines require providing support for the transition period.	Following are provided in the ARP: - Moving assistance for residential house owners - Tenant moving allowance
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc.	There is no provision for either acknowledgment of or compensation to vulnerable groups	There is no provision in Bangladesh ordinances, while JICA Guidelines require providing special attention to vulnerable people and groups.	Vulnerable allowances were proposed to widowed, old, disabled and poor house head families such as : - Special Assistance for Vulnerable households
16	For project that entails land acquisition or involuntary resettlement of fewer than 200 people, abbreviated	There is no provision	Requirements of JICA Guidelines are not specifically mentioned in the Bangladesh laws and rules	ARP has been prepared since the displaced people are estimated fewer than 200 at each project bridge.

Sl. No.	JICA's GESG (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
	resettlement plan is to be prepared			

JICA = Japan International Cooperation Agency, ARIPO = Acquisition and Requisition of Immovable Property Ordinance 1982, GESG = Guidelines for Environmental and Social Consideration

#### 4.5 Types of Losses and Impact Category

The types of losses due to undertaking of the project include (i) loss of land (homestead, commercial, agricultural and pond); (ii) residential/ commercial and community structures; (iii) loss of trees and crops; (iv) loss of work days/incomes due to dislocation and relocation of households and businesses, (v) loss of access to land and premises for residence, cropping and trading.

The following categories of APs are likely to be impacted during implementation of the project:

- i.) APs whose land is affected– APs whose land is being used for agricultural, residential or commercial purposes and is affected either in part or in total and the effects are either temporary or permanent;
- ii.) APs whose structures are affected– APs whose structures (including ancillary and secondary structures) are being used for residential, commercial or worship purposes which are affected in part or in total and the effects are either temporary or permanent;
- iii.) APs with other assets affected– APs who have other assets, such as crops or trees, affected either temporarily or permanently;
- iv.) APs losing access to vested and non-resident property– APs who are enjoying access to vested and non-resident property, both owned and purchased, will be losing their rights to cultivate and use those lands, when acquired.
- v.) APs losing income or livelihoods– APs whose tenancy right, business, source of income or livelihood (including employees of affected businesses) is affected in part or in total, and affected either temporarily or permanently;
- vi.) Vulnerable APs– APs included in any of the above categories who are defined as vulnerable.

#### 4.6 Principles, Legal and Policy Commitments

The ARP has the following specific principles based on the government provisions and JICA's Guidelines for Environmental and Social Considerations:

- a) The land acquisition and resettlement impacts on persons affected by the project would be avoided or minimized as much as possible through alternate design options;
- b) Where the negative impacts are unavoidable, the persons affected by the project and vulnerable groups will be identified and assisted in improving or regaining their standard of living.

- c) Information related to the preparation and implementation of resettlement plan will be disclosed to all stakeholders and people's participation will be ensured in planning and implementation. The resettlement plan will be disclosed to the APs in local language;
- d) Land acquisition for the project would be done as per the Acquisition and Requisition of Immovable Property Ordinance 1982 and subsequent amendments during 1993-1994. Additional support would be extended for meeting the replacement value of the property. The affected persons who does not own land or other properties, but have economic interests or lose their livelihoods will be assisted as per the broad principles described in this document.
- e) Before taking possession of the acquired lands and properties, compensation and Resettlement and Rehabilitation (R&R) assistance will be paid in accordance with the provisions described in this document;
- f) An entitlement matrix for different categories of people affected by the project has been prepared. People moving in the project area after the cut-off date will not be entitled to any assistance. In case of land acquisition the date of notification under section 3 for acquisition will be treated as cut-off date. For non-titleholders such as informal settlers / squatters and encroachers the date of census survey or a similar designated date declared by the executing agency will be considered as cut-off date.
- g) Appropriate grievance redress mechanism will be established to ensure speedy resolution of disputes.
- h) All activities related to resettlement planning, implementation, and monitoring would ensure the involvement of women and other vulnerable groups.
- i) Consultations with the APs will continue during the implementation of resettlement and rehabilitation works.
- j) (j). There should be a clause in the contract agreement that the construction contractor will compensate any loss or damage in connection with collection and transportation of burrow-materials.

In accordance with the resettlement principles suggested for the project, all affected households and persons will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights on lost assets, scope of the impacts including socio-economic vulnerability of the affected persons and measures to support livelihood restoration if livelihood impacts are envisaged. The affected persons will be entitled to (i) compensation for the loss of land, crops/ trees at their replacement value; (ii) compensation for structures (residential/ commercial) and other immovable assets at their replacement value; (iii) assistance for loss of business/ wage income; (iv) assistance for shifting and reconstruction of affected structures. This will ensure that persons affected by land acquisition; whether titled or non-titled will be eligible for appropriate compensation/resettlement benefit. Persons having no legal title but using the land under acquisition if vacated for the project purpose would be provided with compensation and resettlement benefit for structures and shifting/reconstruction allowance. Households having customary rights to land and physical property like the owners and users of vested and non-resident property, lessees of homestead, commercial and agricultural land, sharecroppers, renters of land and structure, etc. are also covered under the resettlement action plan. The ARP also includes opportunities for occupational skill development training for income generation activities for the APs, especially for poor households. The people involuntarily displaced from homes, assets, or income sources as well as non-titled people affected by the project will receive priority access to these income restoration measures. The resettlement activities of the project will be carried out in consultation

with the APs and all efforts will be made to minimize disruption during project implementation. APs will be encouraged for self-relocation and their preferences will be taken into account in the selection of alternative relocation sites.

## **4.7 Eligibility Policy and Entitlement Matrix**

### **4.7.1 Eligibility Criteria**

All APs will be entitled to compensation and resettlement assistance based on severity (significance) of impacts. Nevertheless, eligibility to receive compensation and other assistance will be limited by the cut-off date. The cut-off date for compensation under law (Ordinance II of 1982 and its 1994 amendments) is considered for those identified on the project right of way land proposed for acquisition at the time of serving notice under Section 3 or joint verification by DC whichever is earlier. The cut-off date of eligibility for resettlement assistance under this ARP is the commencement date of the disclose of entitlements and consultation meeting with the stakeholders which is the 5<sup>th</sup> August 2014 for Rangpur and Rajshahi zones and 20<sup>th</sup> August 2014 for Gopalganj, Khulna and Barisal zones for the APs staying on public lands. The absence of legal title will not bar APs from compensation and assistance, as specified in the entitlement matrix (Table 4.2).

Structures located on non-titled land or GOB land, if displaced, will be entitled for compensation under the Project. Vulnerable APs or AHs will qualify for additional assistance to facilitate their relocation and restoration of their livelihoods.

Non-vulnerable households with structures affected will be entitled to compensation for structures and assistance for shifting and reconstruction of the same. Any structure not directly used by a non-vulnerable household i.e. rented out for income will also not qualify for additional resettlement assistance.

### **4.7.2 Compensation and Entitlement Policy**

An Entitlement Matrix has been prepared on the basis of census and socioeconomic survey conducted in 11<sup>th</sup> April 2014 to 30<sup>th</sup> June 2014. It identifies the categories of impact based on the census & SES and shows the entitlements for each type of loss. The matrix describes the units of entitlements for compensating the lost assets, and various resettlement benefits. Cash Compensation under law (CCL) for lost assets (land, tree, structure & other physical establishments) will be accorded to the owners through the DCs as per market value assessed through legal procedure. The resettlement benefit for indirect losses and difference between replacement value and the CCL will be paid by RHD through ARP Implementing Agency.

The compensation and entitlement matrix is presented in Table 4.2.



**Table 4.2 Compensation and Entitlement Matrix**

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
1	Loss of homestead, commercial, Agriculture land, pond, ditches and orchards etc.	Legal owner(s) of land	<ul style="list-style-type: none"> <li>i. Replacement value (RV) of land (Cash Compensation under Law (CCL) and additional grant to cover the current market price of land and stamp duty &amp; registration cost @ 10.5% of CMP for land) to be determined by PVAT.</li> <li>ii. Dislocation allowance @ BDT 100 per decimal for agricultural, fish pond, ditch, etc. and @ BDT 200/decimal for homestead, orchard and commercial lands.</li> <li>iii. Compensation for standing crops to actual owners/ cultivators as determined by PVAT.</li> </ul>	<ul style="list-style-type: none"> <li>a. Assessment of quantity and quality of land by Joint Verification Survey</li> <li>b. Assessment of Market Value by Land Market Survey (LMS)</li> <li>c. Assessment of Cash Compensation under Law (CCL)</li> <li>d. Updating of title of the affected persons</li> <li>e. Payment of Cash Compensation under Law (CCL)</li> <li>f. APs will be fully informed of the entitlements and procedures regarding payments</li> <li>g. Additional cash grant to be paid to cover the replacement value of land compensation based on DC's CCL .</li> <li>h. Stamp duty and registration fees will be added with current market price (CMP) for land @ 10.5% of CMP to facilitate the APs in purchasing alternative lands.</li> </ul>
2	Loss of access to cultivable land by owner cultivator/ tenant/ sharecropper	Tenants/ sharecropper/ Legal owner/ grower/ socially recognized owner/ lessee/ unauthorized occupant of land	<ul style="list-style-type: none"> <li>i. Compensation for standing crops to owner cultivator/ sharecroppers or lessees as determined by PVAT.</li> <li>ii. Owner/grower to take away the crop</li> </ul>	<ul style="list-style-type: none"> <li>a. All the individuals identified by the JVS as tenants or sharecroppers of land</li> <li>b. Compensation to be paid after taking possession of land and the legal /socially recognized owner is paid cash compensation for crop and on certification of receipt by legal/socially recognized owner</li> <li>c. Additional cash grant to cover current market value of crop compensation as prescribed by PVAT in case of private owner himself cultivating crop</li> <li>d. Crop compensation and the crop will be shared between owner and sharecropper as per terms of sharecropping in case of privately owned</li> </ul>

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
				land/socially recognized owner e. In case of dispute over verbal agreement on sharecropping, certification from the elected representative will be considered as legal document
3	Loss of Trees/ Perennials/ fish stocks	1. Person with Legal Ownership of the land 2. Socially recognized owner/ Unauthorized occupant of the trees/ fishes	i. Cash compensation at market rates for replacement of trees/ perennials/ fish stocks value ii. For fruit bearing trees- compensation for fruits @ 30% of timber value X 1 year iii. Compensation for fish stocks as determined by PVAT. iv. 5 saplings will be distributed free of cost among each affected household losing trees v. Owners will be allowed to fell and take away their trees, perennial crops/ fishes etc. free of cost without delaying the project works.	a. Assessment of loss and market value of affected trees b. Payment of CCL for trees c. Adequate compensation will be paid and the owner will be allowed to fell and take the tree free of cost d. Compensation for fruit will be paid for small, medium and large categories of trees. e. 5 saplings (2 fruit tree, 2 timber type and 1 medicinal tree) free of cost will be distributed among the tree losing households.
4	Loss of residential /commercial structure by owner(s)/ squatters	Legal Owners or squatters	i. Replacement value of structure at market price determined by PVAT. ii. Transfer grant @ Tk.12.50% of the replacement value of main structure iii. Reconstruction grant @ Tk.12.50% of the replacement value of main structure. iv. Owners to take away all salvage materials free of cost	a. Payment of CCL for the losses b. Verification of Joint Verification Survey (JVS) and other records c. APs will be fully informed about their entitlements and assisted to obtaining it.
5	Loss of access to Residential houses/ commercial structures (rented or leased)	Tenants of rented/ leased properties	i. One time cash grant for facilitating alternative housing/CBEs Tk. 3000.00 per household or entity ii. Shifting allowance per household based on family members @ Tk. 500/- per member with minimum Tk. 2000	a. Verification of JVS and records b. Shifting allowance will be paid on relocation from project site



Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
6	Loss of business by CBEs due to dislocation	Owner/operator of the business as recorded by JVS	i. Business restoration grant @ Tk. 10,000 for each business unit.	a. All persons recorded by the JVS b. Cash grant to be paid while taking possession of land
7	Loss of Income and work days due to displacement	Employees identified by the Joint Verification Team (JVT)	i. Cash grant to the affected employees/wage earners equivalent to 30 days wage @ Tk. 300/per day ii. Preferential employment in the project construction work, if available.	a. All persons recorded by the JVS b. Cash grant to be paid while taking possession c. Involvement of the incumbents in project civil works d. Training on income generating activities such as Psiculture, livestock and poultry, horticulture, welding, mechanics, plant cultivation, social forestry, etc.
8	Poor and vulnerable households	Poor and vulnerable households as identified by JVT	i. Additional cash grant of Tk. 3000for affected poor women headed households and other vulnerable households ii. Training on IGA for AP/ nominated by AP.	a. Identification of Vulnerable households b. Income restoration schemes for vulnerable households c. Arrange training on income generating activities
9	Loss of Common Property Resources	Affected Common Property Resources (Mosque, school, community infrastructure etc.)	i. Grant for each affected CPR for reconstruction Or Reconstruction of CPR through the project	a. Identification of the management committee of the CPRs b. Cash grant to the Management committee of CPR c. Or Reconstruction of the CPR by the project
10	Temporary impact during construction	Community / Individual	i. The contractor shall bear the cost of any impact on structure or land due to movement of machinery and in connection with collection and transportation of borrow materials. ii. All temporary use of lands outside proposed Col to be through written approval of the landowner and contractor. iii. Land will be returned to owner rehabilitated to original preferably better standard.	a. Community people should be consulted before starting of construction regarding air pollution, noise pollution and other environmental impact b. The laborers in the camp would be trained about safety measures during construction, aware of health safety, STDs, safe sex etc. The contractor shall ensure first aid box and other safety measures like condoms at construction site.

## **4.8 Compensation and Resettlement Assistancess**

RHD will ensure that the land and property (structure, tree, crops and non-structure assets) to be acquired for the project interest will be compensated at their full replacement cost determined by a legally constituted body like the Property Valuation Advisory Team (PVAT) as per the resettlement Plan. The principle for determining valuation and compensation for assets, incomes and livelihoods targets resettlement assistance for substituting and restoration of loss of income and workdays by the relocated households, especially the vulnerable households.

### **4.8.1 Compensation Payment Procedure to Title Holder:**

- a) Upon obtaining administrative approval of the Land Acquisition Proposal from the Ministry of Land (MoL) the DC serves notice under section 3 of the Acquisition and Requisition of the Immovable Property Ordinance 1982 (Amended in 1993 and 1994 ) to the recorded owner of the affected property for public appraisal.
- b) Acquiring Body (DC) and Requiring Body (here RHD) representatives conduct joint verification of the affected property within 3 days of serving notice u/s-3.
- c) After that the DC serves notice u/s 6 for entertaining claims (appeals) from the potential affected persons.
- d) On the basis of joint verification survey data DC writes letter to Public Works Department (PWD) with information of affected structures, list of trees to the Forest Department and type of crops to the Agriculture Department for valuation as per government rule.
- e) DC also collects recorded land price of lands of similar description from the concerned Sub-register's office for last 12 months from the date of notice under section 3.
- f) After receiving rates from the PWD, Forest and Agriculture Department the DC prepares estimates and send it to the RB for placement of fund within 60 days.
- g) The DC prepares award for compensation in the name of recorded owner.
- h) Upon placement of fund, the DC serves notice u/s 7 to the APs for receiving cash compensation under law (CCL) within 15 days from the date of issuing notice u/s
- i) The affected people are notified to produce record of rights to the property with updated tax receipt of land, declaration on Tk. 150 (now Tk. 300) non-judicial stamp, photograph etc before Land Acquisition section of DC office.
- j) Upon fulfillment of the criteria of the DC office i.e. requisite papers and document, the LA section disburse CCL in the office or field level issuing prior notice to the entitled persons (EPs).
- k) Local Government Institutions representative identifies the affected people during receiving CCL.
- l) As per Land Acquisition Law, DC pays compensation to the legal owners of the properties for land, structure, trees and crops.
- m) After receiving CCL from the LA office and obtaining clearance from the Treasury Section of the DC the entitled person (EP) deposits the CCL to his own bank account.
- n) One copy of the CCL will be submitted to the implementing agency (IA) (NGO or Social Consulting Firm) office for additional payment of compensation as per ARP policy
- o) The IA will create ID number for the CCL holder and prepare EP & Entitlement Card (EC) for payment

- p) The IA will prepare ID cards with photograph of the EPs
- q) The ID card will be jointly signed by the RHD and IA representative and photograph will be attested by the concerned UP Chairman/Member.
- r) The IA will disburse Account Payee Cheque in public place or office the UP Chairman

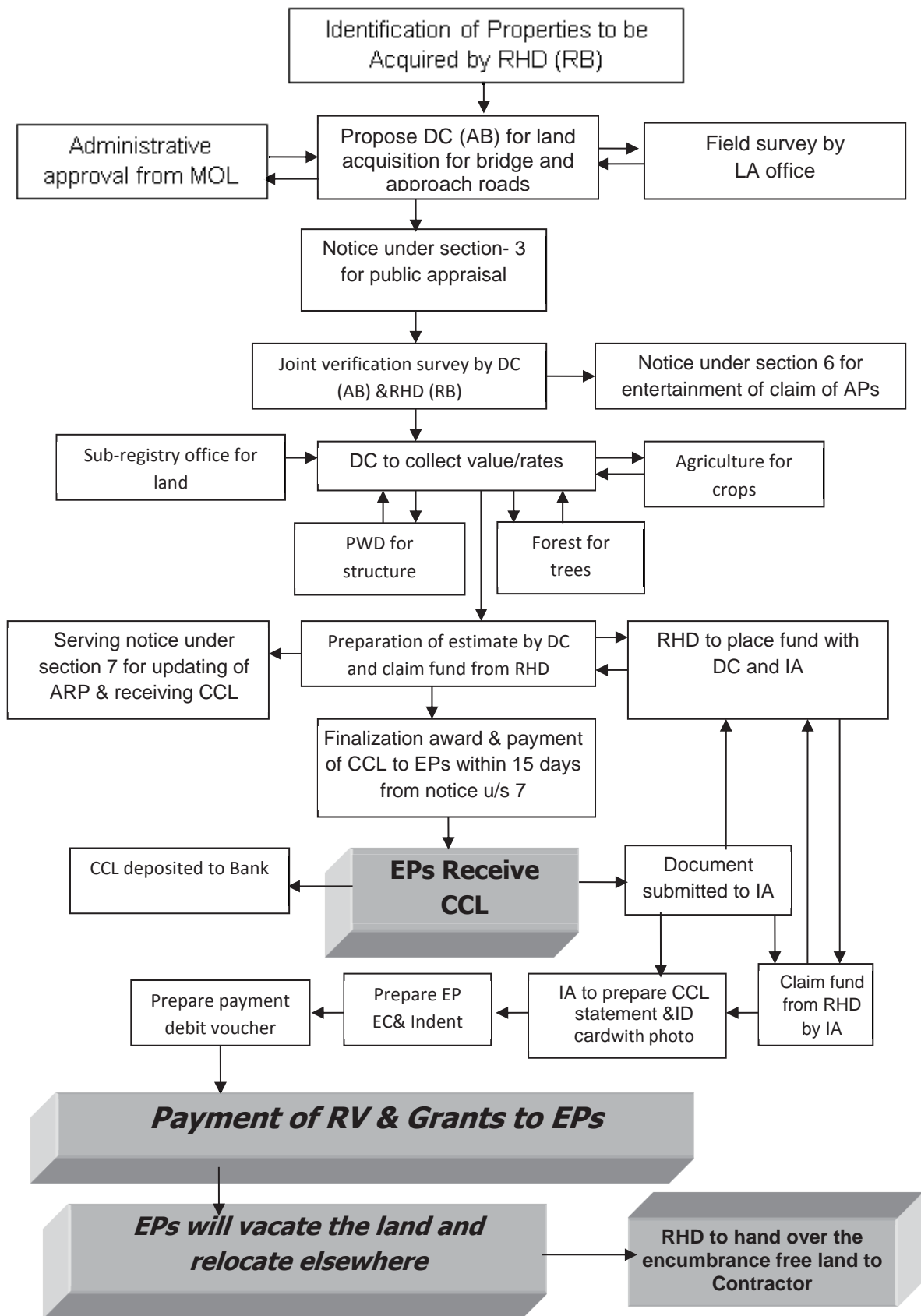


Figure 4.1 Compensation Mechanism for Legal Title Holder

#### **4.8.2 Compensation Payment Procedure to Non-Title Holder:**

The non-titled holder means having no legal ownership of the affected property but socially recognized and enlisted during census, SES and or Joint verification survey on the Col. The Acquisition and Requisition of Immovable Property Ordinance 1982 has no provision to compensate these types of affected people. The JICA's policy of involuntary resettlement prescribes to address these people without having legal title to the property.

As per tripartite joint verification survey by the Joint Verification Team (JVT) the list of affected persons will be prepared by the IA and then the following steps would be taken-

- a) Individual Identity number will be created by IA against the name of all entitled persons (EPs)
- b) Photography of the affected people for preparation of ID cards
- c) The IA will prepare entitle persons file and entitlement card for each of the EPs.
- d) The IA will assist the EPs opening Bank Account in the name of EPs
- e) The tenants of the house or commercial premises and employees will collect documents in favor of their tenancy or identification from the owner of the structure/employer which will be attested by the concerned UP Chairman
- f) The IA will create ID number for each of the EP and ID card with photograph
- g) The IA will prepare Entitled Persons file and Entitlement Card (EP file & EC) based on category and quantity of losses
- h) The IA will prepare indent and submit to RHD enclosing EP&EC
- i) The ID card will be jointly signed by the RHD and IA representative and photograph will be attested by the concerned UP Chairman//Ward Councilor.
- j) The IA will arrange disbursement of Cheque (Account payee) in public place or office of the UP Chairman and representative from the RHD will hand over cheque to EPs.

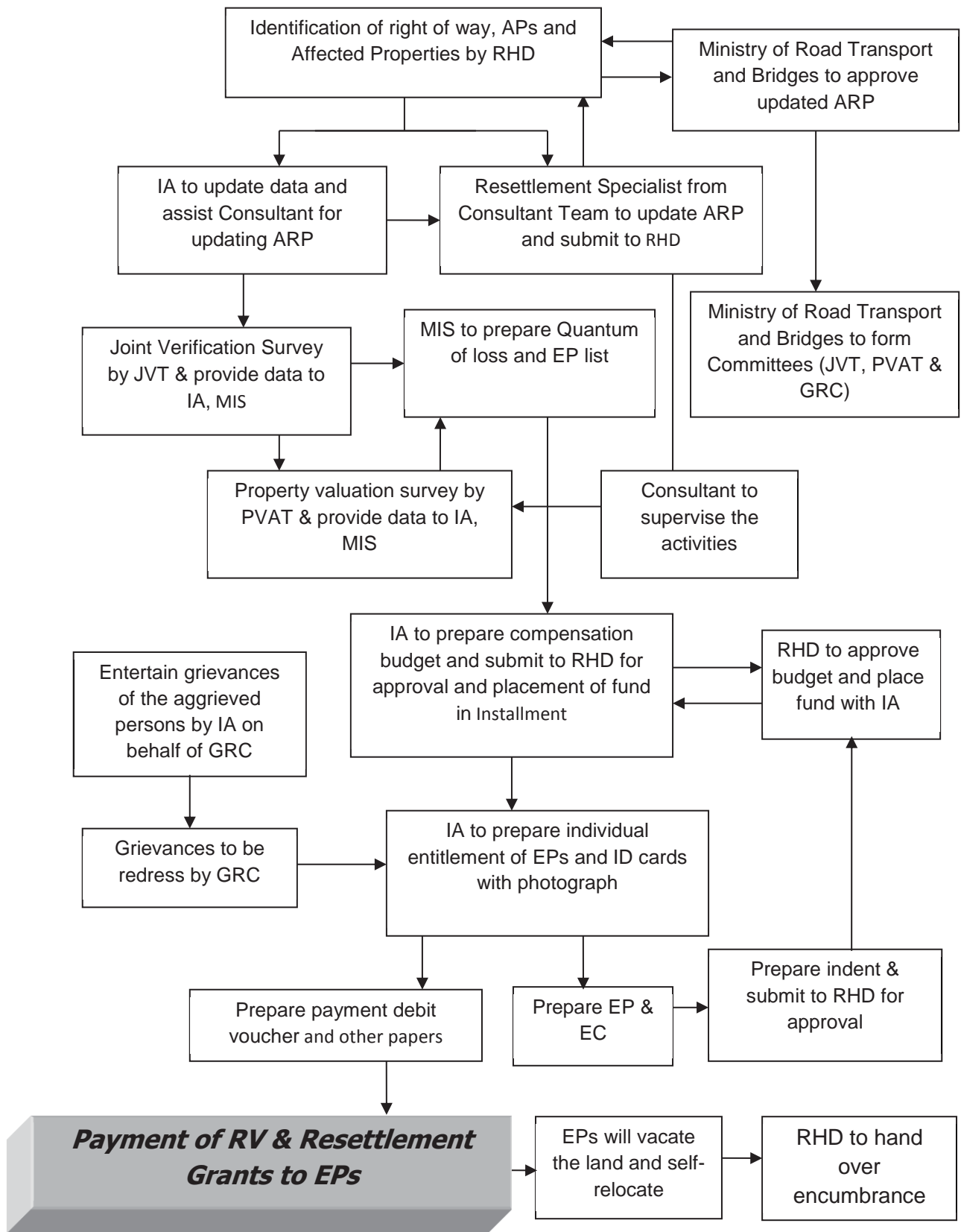


Figure 4.2 Compensation Mechanism for Non-title Holder

#### **4.8.3 Assistance from Relevant Government Departments**

The District Land Acquisition office takes help of relevant departments for determination of prices of land and other properties. Normally, the Public Works Department, the Forest Department, Sub-Registrar's Office, etc. are consulted. Land price from the Sub-Registrar's Offices for preceding one year from the date of serving notice under section 3 is considered for valuation of land. But in most cases, the price remains far below the market rate. To ensure that the APs can replace the lost property, the transacted price, recorded price, existing price and expected prices are averaged to reach at Replacement Value (RV). For valuation of affected property, a legal body called Property Valuation Advisory Team (PVAT), with representatives from acquiring body (AB) DC, requiring body (RB) here RHD, and Implementing Agency will be formed by Ministry of Road Transport and Bridges.

PVAT will have representatives from the RHD as the convener, representative from the implementing agency as the member secretary and representatives from the DC as member. A land and property valuation survey by the implementing agency based on the price recorded from formal and informal sources will determine the Replacement Value (RV) of land and structure and be recommended by PVAT to Ministry of Road Transport and Bridges through Project Director. RHD will pay the difference between RV and CCL. Stamp duty and land registration fees will be paid to the AP, if replacement land is purchased within one year from the date of receiving full compensation for land. Further, the implementing agency will assist in all possible ways, including finding land for purchasing replacement land, etc. After issuance of notice under section 3 by the DC and census cut-off date for non-title holders or a similar designated date declared by RHD, joint verification of the acquired properties will be carried-out by the requiring and acquiring bodies. The Joint Verification Team records the quality and quantity of the affected properties and identifies the structure owner on the spot. A representative of the Implementing agency will also be present in the JVT as a member of the team. The Implementing Agency will computerize the Joint Verification data to be used for payment of compensation/resettlement benefits. A Terms of Reference for ARP Implementing Agency (IA) (NGO or Social Consulting Firm) is enclosed in *Annex-IV*.

After payment of compensation, APs would be allowed to take away the materials salvaged from their dismantled houses, shops or CPRs and no charges will be levied upon them for the same. A notice to that effect will be issued by RHD intimating that APs can take away the materials. Payment of compensation will be made at least 1 month prior to the actual possession of the acquired lands and removal of the structures from the COI so that they have sufficient time to dismantle and remove all salvageable material for rebuilding of houses and re-establishment of businesses. Further, all compensation and assistance will be paid to all APs prior to displacement or dispossession of assets or 1 month before commencement of civil works whichever comes first. The possession will be handed over to the contractor after payment of compensation/assistance to the APs is completed.

## **5 CONSULTATION, PARTICIPATION AND DISCLOSURE**

### **5.1 Project Stakeholders**

The primary stakeholders of the project include the Affected household (AHs), CBE owners, agriculture farmers as well as community people. Other stakeholders include Roads & Highways Department (RHD), under the Ministry of Road Transport and Bridges as the EA and other government agencies such as Power Development Board (PDB), Rural Electrification Board (REB), Forest Department, etc.

This ARP has been prepared based on the findings of consultation meetings and the participatory census and SES. The Requiring Body, here RHD will acquire land for the project through the DC offices Barisal, Jhalokathi, Patuakhali, Pirojpur, Bagerhat, Jessore, Jhainadah, Kushtia, Narail, Satkhira, Faridpur, Gopalganj, Madaripur, Shariatpur, Bogra, Dinajpur, Gaibandha, Joypurhat, Lalmonirhat, Nilphamari, Panchagarh, Rangpur, Thakurgaon, Naogaon, Natore, Pabna, Rajshahi and Serajganj districts. The other stakeholders include the businessmen groups like contractors, sub-contractors and suppliers during the construction period. The local government representatives will also be benefited in gaining peoples support as a result of local development. The local NGOs working in the area will also find their wider scope for poverty reduction activities. An Implementing NGO (INGO) will be engaged to implement the ARP by the RHD during project implementation period.

### **5.2 Disclosure and Public Consultation**

Goals and objectives of the project have been disclosed to the affected people and other stakeholders through community based stakeholders' consultation meetings and focus group discussion. Objective of consultation meetings and focus group discussions were to disclose the information about the project to the stakeholders as well as get feedback and suggestion from the stakeholders through participation. The feedback and suggestions have been incorporated in the project design for improvement of the project and smooth implementation through participation.

1 Information on disclosure:

- a) Dialogue with local people through public meetings and discussed about goals and objective of the project and for specific bridge
- b) Information and consultation meetings (ICM) in the locality about the project as well as planned activities about the specific bridge
- c) Disclosure of the project components and other related issues, more specifically about the specific bridge in the locality among stakeholders of all levels through conducting public meeting
- d) Focus group discussion with local stakeholders with primary focus with the project affected people (directly or indirectly affected people irrespective of gender and social status)
- e) Disclosure of the Land Acquisition and Resettlement Issues among the potential affected persons



## 2 Consultation:

- a) Consultation of resettlement and rehabilitation issues, mechanism of compensation, participation of the affected households in implementation of ARP with all level stakeholders and gather feedback on potential risks and probable mitigation measures
- b) Encourage all level stakeholders to participate in the consultation by receiving views of representatives from different groups including directly and indirectly affected households, structure owners, agriculture land losers, owners and employees of CBEs, committee members of CPRs, fishermen, local traders, women and vulnerable groups etc.

### 5.3 Stakeholders Meeting

Stakeholders meetings were conducted in two stages or phases. At the initial stage, in every bridge location the consultants disclosed about the goal, objective, different component of the project as a whole and narrated the tentative design of the proposed bridge of that particular location, where stakeholders meetings were conducted. Consultants also narrated the potential land acquisition status in that specific area. Feedback of the consultation meetings were incorporated and considered to finalize the project and bridge locations. After finalization of the bridge locations second phase of consultation took place in selected bridge locations. The Consultants disclosed the entitlements of the affected households and other stakeholders as designed in the ARP based on GoB policy and JICA guideline. The consultants also declared the cut-off date as the commencement date of second phase SCMs for eligibility of receiving resettlement benefits for the non-titled affected peoples. The consultants also disclosed the procedure of receiving the compensation, mechanism of participation of the stakeholders in the process of compensation as well as grievance redresses process.

Minute of stakeholder meeting is presented in [Annex-VI](#).

#### 5.3.1 Meetings Phase I

In the initial stage of the project in April 2014 the local potential affected persons of each bridge location along with local community leaders and other stakeholders like RHD representatives, local government representatives were consulted through consultation meetings and personal contact. Stakeholders were informed about the meeting time and location ahead of time through personal contact and over telephone. Local people were also called by announcing in person and well as instantly through using hand microphone.

The consultants narrated the goal and objective of the project. Different components of the projects with proposed design of the bridge with location were also discussed. Consultants also narrated the potential land acquisition status in that specific area. GoB policy including JICA policy on land acquisition and compensation were discussed in the meeting. The opinion of the different levels stakeholders regarding the project was considered during selection of the bridge with location for improvement. Detail community level stakeholders consultation meetings were conducted in each bridge location (in total 105) and opinion of the stakeholders are recorded and incorporated in finalization of the project (detail stakeholder meeting in each bridge location is presented in Appendix A).

Stakeholders of the majority bridge area expressed their positive view regarding replacement of the bridge provided the affected people should get appropriate compensation according to the present market price. However, during the initial level of discussion the stakeholders of 28 bridges expressed their strong resentment about the proposed plan of construction of new bridge beside the existing one. Most of these bridges are passing through markets or densely populated area. Almost all of the stakeholders of these bridges expressed their opinion









regarding the design of the bridge. They proposed many options like widening of the bridge should be on both side not only on one side; bridge should be on the other side than it is designed; bridge should be short in length than it is designed etc. Many of them expressed social issues like bridge is passing through private land, they are not in favor of giving up the land as previous experience of compensation receiving from government is not pleasant, some of the proposed bridge will affect mosque, school, graveyard, telephone tower etc.

The inputs from the stakeholders meetings have been used to finalize the project developed measures and principles for mitigation of loss on APs. Summary of consultation meetings with affected people and other stakeholders are described in Table 5.1.

**Table 5.1 Stakeholders Consultation (Issues and out-come) Phase I**

Sl. No.	Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Outcome of the discussion
1	During conducting survey from the 12to 22 April2014 in Rangpur and Rajshahi zone and - 7 to 27 May 2014 in Barisal, Khulna and Gopalganj zone.	A total of 105 stakeholders meetings were held in 105 bridge locations. People attended the meeting including farmer, homestead owner, service holder, shop owner, community leader, RHD representative, Local government representatives (Chairman, member) etc. <i>People were consulted through Consultation meetings.</i>	Issue based discussion was held on community people's perception, attitude, needs and aspiration from the project. Following issues were discussed along with their raised issues: <ul style="list-style-type: none"> <li>- Knowledge of people about the project</li> <li>- Attitude of the people towards the project</li> <li>- Major problems relating to the project,</li> <li>- Proposed suggestion to minimize the problem</li> <li>- Identification of alternate location/alignment of the proposed bridge</li> <li>- Potential benefit of the project for the locality,</li> <li>- Need of the project, specifically the proposed bridge for that area</li> <li>- Relocation of houses and other establishments</li> <li>- JICA's Guidelines for Environmental and Social Considerations</li> <li>- Gender issues, especially the local practice/attitude about women working in construction site.</li> </ul>	<ul style="list-style-type: none"> <li>a. The bridges need to be replaced by wider bridges and with good material to reduce very frequent accidents;</li> <li>b. Well-constructed bridges are required for better communication and transportation of the commodities;</li> <li>c. Proper compensation for land, crops, business enterprises, etc. to be paid;</li> <li>d. Land used for existing bridge need to be utilised for the proposed one instead of totally a new one. This way land acquisition can be reduced;</li> <li>e. Local people should be employed during construction of the new bridge irrespective of gender;</li> <li>f. Construction of new bridge on one side should not be done. Existing bridge should be widened on both side;</li> <li>g. Proposed Bridge location should be on the other side;</li> <li>h. Try to build the bridge on RHD land rather than on private land</li> <li>f. Facilities for using river water will be kept undisturbed for the community</li> </ul>

**Some photographs of consultation meetings.**

			
<b>Naori bridge, 74</b> <b>Sirajganj</b>	<b>Anandobabur Pool, 60</b> <b>Nilphamari</b>	<b>Kanaipur bridge, 29</b> <b>Faridpur</b>	<b>Dhopaghata br., 41</b> <b>Jhenaidah</b>
			
<b>Ichamoti bridge 46</b> <b>Dinajpur</b>	<b>Mohishmari bridge, 73</b> <b>Natore</b>	<b>Garakola bridge, I</b> <b>Gopalganj</b>	<b>Bakerganj Steel bri, 12</b> <b>Barisal</b>

**5.3.2 Meetings Phase II**

After selection of the bridge locations and completion of the detailed design, community level stakeholders consultations were held in all bridge sites. A total of 105 stakeholders consultation meetings (Barisal zone 20, Khulna zone 15, Gopalganj zone 15, Rangpur zone 32 and Rajshahi zone 23) were held for the period from August 5 2014 to August 30 2014 covering affected communities in all bridge locations. Stakeholders were informed about the meeting time and location ahead of time through personal contact and over telephone. Local people were also called by announcing in person and well as instantly through using hand microphone.

Process of land acquisition, DC's payment procedure, JICA's policy on involuntary resettlement, entitlements of the affected PAUs and vulnerable people, cut-off-date for listing property and probable resettlement benefits, etc. were discussed in the meetings.

The ARP design, compensation, relocation options, benefits and adverse social impacts were discussed with the affected persons and their community. Stakeholders were asked for their views on the project overall as well as more specific discussion about their perception on land acquisition process, compensation process, relocation requirements, and views on alternative options. Women and other vulnerable groups were also consulted concerning the specific project impacts and their livelihood aspects. Detail stakeholder meeting in each bridge location is presented in Appendix A.

The inputs from the stakeholders meetings have been used to develop measures and principles for mitigation of loss on APs. Summary of consultation meetings with affected people and other stakeholders are described in Table 5.2.





**Table 5.2 Stakeholders Meeting (Issues and out-come) Phase II**

Sl. No.	Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Out come of the discussion
1	During conducting survey from the 5 to16August 2014 in Rangpur and Rajshahi zone and 20 to30 August 2014 in Barisal, Khulna and Gopalganj zone.	A total of 105 stakeholders meetings were held in 105 bridge locations. People attended the meeting including farmer, homestead owner, service holder, shop owner, community leader, RHD representative, Local government representative Chairman/Member etc. <i>People were consulted through Consultation, Group Discussion and personal contact.</i>	Issue based discussion was held on community people's perception, attitude, needs and aspiration from the project. Following issues were discussed along with their raised issues: - Impact (positive and negative) of the project & mitigation measures against negative impact, - Policy of compensation and resettlement grants for land, crops, houses and shops on private and public lands, -Discloser of the compensation packages for different kinds of losses. Additional assistance for the vulnerable and others were also discussed, - People's preference on mode of compensation payment - Relocation of houses and other establishments - JICA's Guidelines for Environmental and Social Considerations - Cut-off date for listing affected properties i.e. commencement date of 2 <sup>nd</sup> phase stakeholders consultation meeting (5 <sup>th</sup> August 2014 for Rangpur and RajshahiZone and 20 th August 2014 for Barisal, Khulna and Gopalganj zone) for indirect EPs and notice under section	a. Entitlements of the affected people and cut-off-date for listing of the lost properties are known to the people b. Land price should be fixed on open market rate and compensation should be paid at their door step before displacement; c. Proper compensation for land, crops, business enterprises, etc. to be paid d. People will be encouraged for self relocation for living within the kin groups with mutual support. e. Vulnerable APs will be preferentially employed in the civil construction of the project on the basis of their qualification and eligibility irrespective of gender. f. Facilities for using river water will be kept undisturbed for the community g. Training on some income generating activities should be provided to the poor. h. People know their right and responsibilities at the initial stage of the project by FGD, consultation, information campaign, etc.



Sl. No.	Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Out come of the discussion
			<ul style="list-style-type: none"> <li>3 is for land owners.</li> <li>- Training and cash grant for vulnerable households, etc.</li> <li>- Gender issues, especially the scope of work for women in project civil work.</li> </ul>	

**Some photographs of consultation meetings-Phase ii**

			
<b>Palgari bridge- 04</b>	<b>Chikli bridge-47</b>	<b>GK bridge-21</b>	<b>Balai bridge-25</b>
<b>Pabna</b>	<b>Rangpur</b>	<b>Kushtia</b>	<b>Bagerhat</b>
			
<b>Harisankarpur-18</b>	<b>Mathpara bridge-50</b>	<b>Boksheali bridge-72</b>	<b>Gazipur bridge-84</b>
<b>Rajshahi</b>	<b>Bogra</b>	<b>Bhola</b>	<b>Shariatpur</b>

The Minutes of Meeting with local stakeholder is enclosed in [Annex-IV](#).

#### **5.4 Mechanism for Stakeholders' Participation**

During the preparation of the ARP, APs and their communities have been informed, closely consulted three times, during bridge identification and selection, during conducting socio-economic survey and during disclosure of ARP entitlements, other options and declaration of cut-off dates and encouraged to participate in the discussion and project preparation. This process will be continued during detail design, implementation and monitoring of the ARP. Consultation and communication with APs and other stakeholders during design stage of the project will be an integral part of the process of gathering additional data.

Consultation is a continuous process and will also be carried out during updating of the ARP, as well as during implementation and monitoring. During the implementation stage, union based Resettlement Advisory Committees (RACs) will be formed to seek cooperation from various stakeholders in the decision-making and implementation of the ARP. Through public consultations, the APs will be informed that they have a right to grievance redress from the RHD. The APs can call upon the support of ARP Implementing Agency (IA)(NGO or Social Consulting Firm) to assist them in presenting their grievances to the GRCs. The GRCs will review grievances involving all resettlement benefits, relocation and other assistance. Union based grievance redress committees (GRCs) will be formed and the grievances will be redressed within a month from the date of lodging the complaints. The GRC as well as the JVT and PVAT will be formed by the Ministry of Road Transport and Bridges and activated during land acquisition process to allow APs sufficient time to lodge complaints and safeguard their recognized interests.

The areas for participation of the primary stakeholders include: (i) identify alternatives to avoid or minimize resettlement; (ii) assist in inventory and assessment of losses; (iii) assist developing alternative options for relocation and income restoration; (iv) identify relocation sites for displaced households and businesses; (v) provide inputs for entitlement provisions; and (vi) identify likely conflict areas with re-settlers.

#### **5.5 Disclosure of the ARP**

Project design, impact and policies for mitigation of adverse social and environmental impacts have already been disclosed to the affected community through consultation meetings. This information will be disclosed to the corridor of impact (COI) area people particularly the affected persons in other different forms. An information booklet will be designed in Bengali and after getting approval of the government, will be distributed among the affected persons during ARP implementation as the primary tool for disclosure. Disclosures will also be continued using the following other instruments:

- Community workshops;
- Information brochures;
- Information in focal points at district, upazila and union levels;
- Information pamphlets;
- Personal contact; and
- Village level meetings.

In case of change in Project design thereby entailing change in resettlement impacts, this ARP will be updated. The updated ARP will be disclosed to the APs, endorsed by the EA. The updated ARP will be submitted to Co-financier for approval prior to award of civil works contracts for the Project.

## **5.6 Strategy for Community Consultation and Participation during implementation**

RHD will continue the consultation process during the implementation of the ARP. Resettlement-related brochures, leaflets and other communications materials in the local language (*Bangla*) will be published for distribution among the affected households. Further steps will be taken to (i) keep the affected people informed about additional land acquisition plan, compensation policies and payments, resettlement plan, schedules and process, and (ii) ensure that project-affected persons are involved in making decisions concerning their relocation and implementation of the ARP. The consultation and participation will be instrumented through individual contacts, FGDs, open meetings and workshops. The larger goal of this plan is to ensure that adequate and timely information is made available to the project affected people and communities and sufficient opportunities are provided to them to voice their opinions and concerns and participate in influencing upcoming project decisions. In sum, consultation will remain a hallmark in the project implementation processes. The consultation meetings, issues discussed and outcomes and subsequent follow-up actions will be recorded for future verification.

The main themes and scope of the ARP will be disclosed in detail to the affected community, after it has been approved and translated into Bangla. The ARP's provisions will be further explained to APs in group discussions, personal contact and community level meetings during implementation of the ARP. An English version will be uploaded to RHD's website.

This ARP will be summarized in an information booklet in local language (Bengla) and disclosed to APs during implementation of the ARP after it has been reviewed and approved/endorsed.

The Implementing Agency (IA)(NGO or Social Consulting Firm) engaged to assist RHD in implementation this ARP, will update, publish and distribute the booklet explaining the impact of the project, compensation policies for APs, resettlement options/strategies for households and shops, and tentative implementation schedule of the project. Further steps will be taken to (i) keep the affected persons informed about land acquisition plan, compensation policy and payments, and (ii) ensure that APs will be involved in making decisions concerning relocation and implementation of the ARP.

## **5.7 Eligibility of Cut-off Date**

Service of notice under Section 3 of the Acquisition and Requisition of Immovable Property Ordinance 1982 will follow as the cut-off date for legal owners of property to be acquired. First round consultation meeting, the census & socio-economic survey has been conducted in April 2014 to June 2014. Second round consultation meetings were held from August 5 2014 to August 30 2014. During the second round consultation meeting disclosures of the entitlements have been done and cut-off dates for eligibility of compensation have been declared during these meetings. The commencement dates of second round consultation meeting is 5<sup>th</sup> August 2014 for Rangpur and Rajshah zones and 20<sup>th</sup> August 2014 for Gopalganj, Khulna and Barisal zones are the cut-off dates for establishing eligibility for resettlement assistance by all the APs staying on the others/public lands (Uthulies/Squatters) of the project. During implementation of the project, the RHD will issue ID card to the entitled persons after joint verification done by JVT with all details of their entitlements as per ARP.

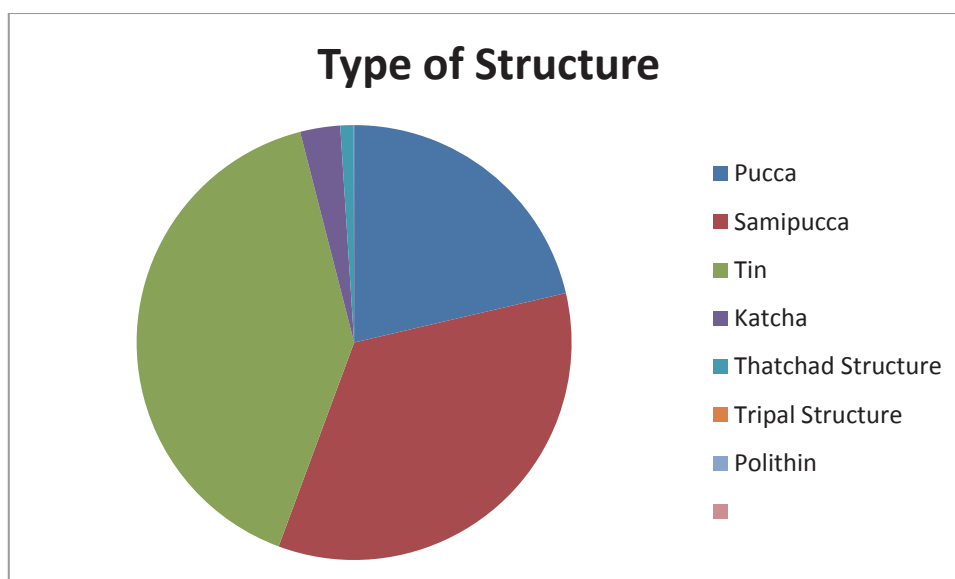


## 6 RELOCATION RESETTLEMENT AND INCOME RESTORATION

### 6.1 Scope of Displacement and Relocation

According to the census & SES data, implementation of the project will require to affect 788 households living on RHD or their own land. Out of that 545 households are going to be displaced for intervention of this project. Besides, 2,367 commercial/business premises and 98 common property resources will need to be relocated for the proposed Corridor of Impact (Col) of the bridges. About 2,725 people will be displaced due to loss of housing structure. The affected households and other entities are encouraged for self-relocation. The project may provide some civic amenities to the EPs if they relocate in cluster manner. It is mentionable that there are about 9,448 trees standing on the RHD/government land and 44,778 trees of different species and sizes are enlisted within the private land within the Col. About 3,363 structures are going to be affected with total structure quantity of 109,538 sqm. Among the CBEs most of them are small business with temporary sheds made of CI sheet (40%) followed by semi-pucca (34%) and pucca (21%) structures and only 2% are katcha made of wood/bamboo. Figure 6.1 shows the type of structure used by the business enterprises.

**Figure 6.1 Type of structures used by the affected Business enterprises**



### 6.2 Relocation of housing and other establishment

The project is taking land for construction/improvement of the 105 bridges in the western Bangladesh for facilitating easy communication and poverty reduction. A total 545 households will need to be relocated due to the project with structures amounting total quantity of 33,208 sqm. The project will therefore encourage "self-relocation" by affected households selecting replacement homestead land in the vicinity of their own. The objective is to minimize social disruption in the resettlement process and allow people to remain together within kin groups for mutual support.

### 6.2.1 Site Selection

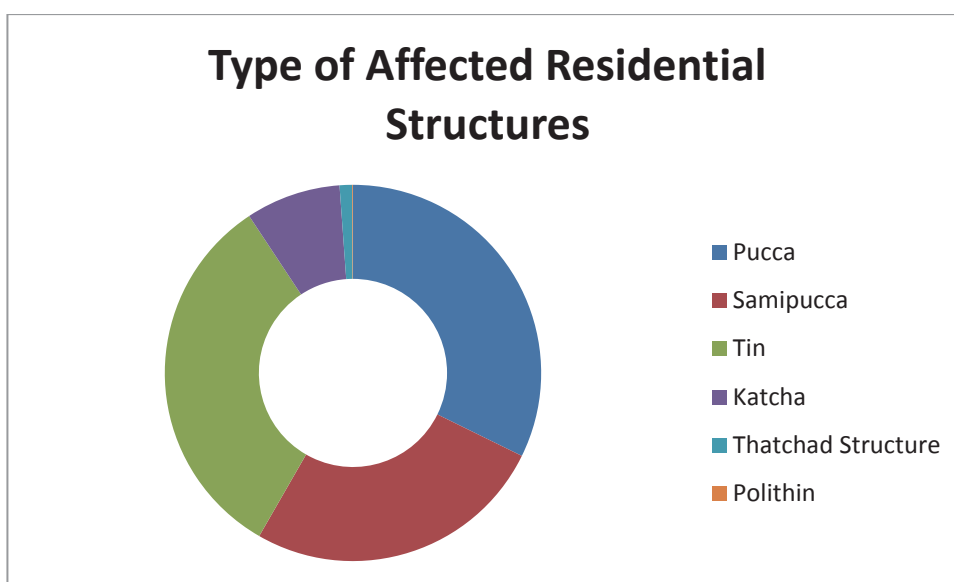
Minimal social disruption is the main objective of the project. There will be 105 bridges in different location of the western zone of the country. In each location affected households will be small in number. People will be encouraged for self- relocation with appropriate assistance. As a result project will not develop any site for relocation of the affected households. The project might provide some infrastructure facilities if the APs are relocated in cluster manner.

If possible, the project authority may request concern authority for allocation of khash land for relocation of the affected households in cluster manner.

### 6.2.2 Housing infrastructure

It is observed that among the affected residential infrastructures majority of them are tin made followed by pucca and semi-pucca structures. Only few of these are tin and thatched structure. Figure 6.2 illustrates the type of residential structures going to be affected. The structure losers are going to receive compensation for the affected structure according to current market price as well as assistance for relocation and rebuild the structure by the AP on his/her own chosen location.

**Figure 6.2 Type of Affected Residential structures**



### 6.2.3 Changing School

It is understood from the socio-economic survey and consultation meetings that the affected households will move within the vicinity of their earlier location. They prefer to remain with the kin group and continue their earlier occupation. As these households are not moving very far but within vicinity, it is understood that the children can continue their education in same school. Project will not trigger any situation which might need to change their school.

### 6.3 AP Preference for Relocation

During the census survey as well as in public consultation and FGDs, the relocation choices of the affected persons were asked. The households to be relocated are homestead loser prefer to remain in the adjoining area of the project location to continue their present occupation. Almost

all are demanding financial assistance from the project during relocation. Therefore the APs are encouraged for self-relocation to get mutual support of the kin groups.

All the affected CBEs owners prefer assistance as cash grant so that they can buy/shift their business in new location and continue their livelihood.

#### **6.4 Replacement of Agricultural Land**

There are AHs that will lose private land, agriculture and non-agriculture land. The project will not arrange any alternate land for loss of land but will encourage the APs to buy alternate land. The AHs will not get any replacement land but will be paid cash compensation at replacement cost at current market value of the land. The stamp duty and registration cost for purchasing a replacement land will be handed over with the replacement cost of the land. In case of agriculture land DC will compensate for lost crops and trees at the rate estimated by the Department of Agriculture Extension (DAE) and the Department of Forest (DOF) and confirmed through consultation and market appraisal.

#### **6.5 Income and Livelihood Restoration Strategy**

Mitigation of loss of assets and livelihood is the main focus of the resettlement plan. Additional measures will be taken to provide appropriate support to the livelihood restoration aspects of AHs. According to the known impacts, AHs will be relocated and will lose income from wages and business operation during the re-establishment period. Other AHs will lose access to agricultural and commercial land, adequate compensation will be awarded to these AHs before relocation. In addition, vulnerable APs will receive other support and also get preference for employment in civil construction works.

In compliance with the ARP, the updated ARP will identify resources, in addition to compensation, for income restoration assistance. This will be through linking resettlement activities with a Livelihood and Income Restoration Program (LIRP). Social Development fund is being allocated in the budget to organize and provide livelihood restoration training for the vulnerable household head or any household member nominated by the head.

The ARP includes the following categories of AHs for income restoration and livelihood support:

- a) Vulnerable households to be relocated from the project Corridor of Impact (CoI). Eligible members of such family will be identified during planning the LIRP.
- b) Vulnerable households having no adult male members to shoulder household responsibility (women headed households). The women heading the household will preferably be the eligible member.
- c) Vulnerable households of the employees and daily wage earners of the diminished businesses or their nominated representatives.
- d) Vulnerable households losing access to agriculture land including sharecropper, and leaseholders.
- e) Vulnerable households losing access to commercial land including business proprietorship.
- f) Vulnerable households losing more than 10% of their agricultural income due to acquisition of agricultural land.

For additional support to usual income restoration assistance as mentioned above, the ARP Implementing Agency (IA) will specifically undertake assessment of needs and skill base of vulnerable APs of age between 15 to 60 years. The IA (NGO or Social Consulting Firm) will

recommend the eligible members of affected vulnerable households with their relevant profile to the LIRP implementing organization through RHD. The short-term livelihood regeneration assistance under the ARP and long-term income generation program under the LIRP will be organized as follows:

**Table 6.1 Livelihood Restoration Options**

1. Eligible members of poor households to be relocated from the project right of way.	1.1 Short-term: Compensation for structure, shifting allowance, reconstruction assistance, cash assistance for loss of workdays due to relocation, and priority in employment in construction. 1.2 Long-term: Needs and capacity identification, human development and skill training, institutional support under the LIRP.
2. Eligible members from poor female headed households having no adult male members to shoulder household responsibility.	2.1 Short-term: In addition to support as 1.1, additional subsistence allowance. 2.2 Long-term: As 1.2 above.
3. Poor and vulnerable employees of affected businesses.	3.1 Short-term: Subsistence for loss of income and employment. 3.2 Long-term: As 1.2 above.
4. Eligible members of poor households losing access to agriculture land including sharecropper, and leaseholders.	4.1 Short-term: Compensation for crops. 4.2 Long-term: As 1.2 above.
5. Eligible members of poor households losing access to commercial land including business proprietorship.	5.1 Short-term: Compensation for loss of business income, shifting and reconstruction assistance. 5.2 Long-term: As per need, livelihood and income generating training and employment in construction.
6. Eligible members of poor households losing more than 10% of their agricultural land.	6.1 Short-term: Compensation for crops, replacement value of land, assistance for land purchase, and employment in construction. 6.2 Long-term: As 1.2 above.

**6.6 Capital Support**

Funds for income restoration programs become a major constraint to the project affected people utilizing their skill obtained/enhanced through IGA training. Capital support for potential income generation activities to the trained and efficient target group people will therefore be provided from any source i.e. local level NGO, banks, etc. arranged by the development project in the form of grant/credit.

## **6.7 Employment in Construction**

Local people whose livelihood is impacted by the project will get preference in jobs associated with the project construction. Female affected people will form labor contracting society (LCS) with the help of RHD through the Implementing Agency (IA) and be deployed by the Contractor in road slope turving, watering, tree plantation etc. or any other suitable works. Affected persons will get preferential employment in project civil works based on their eligibility. The jobs, in the semi-skilled and unskilled category, shall be offered to the APs in preference to the other. A clause should be incorporated in the contract documents requiring contractors to give employment, if available, to project affected people having EP ID cards in preference to other persons.

## **6.8 Re-Establishment of Common Property Resources**

Different kind of common property resources like mosque, school, madrasa, graveyards, clubs, local samities are going to be affected by this project. Many of them will be affected partially or fully. For repairing or re-establishment of these CPRs the community people will be consulted. The management committee of these CPRs will be consulted to identify the mechanism of repair or re-establishment of the CPRs. The management committee can be given a financial support to re-establish the CPR in their desired location under their own management or project can re-establish the CPR with cooperation from the community in their preferred location.

## **7 IMPLEMENTATION ARRANGEMENTS**

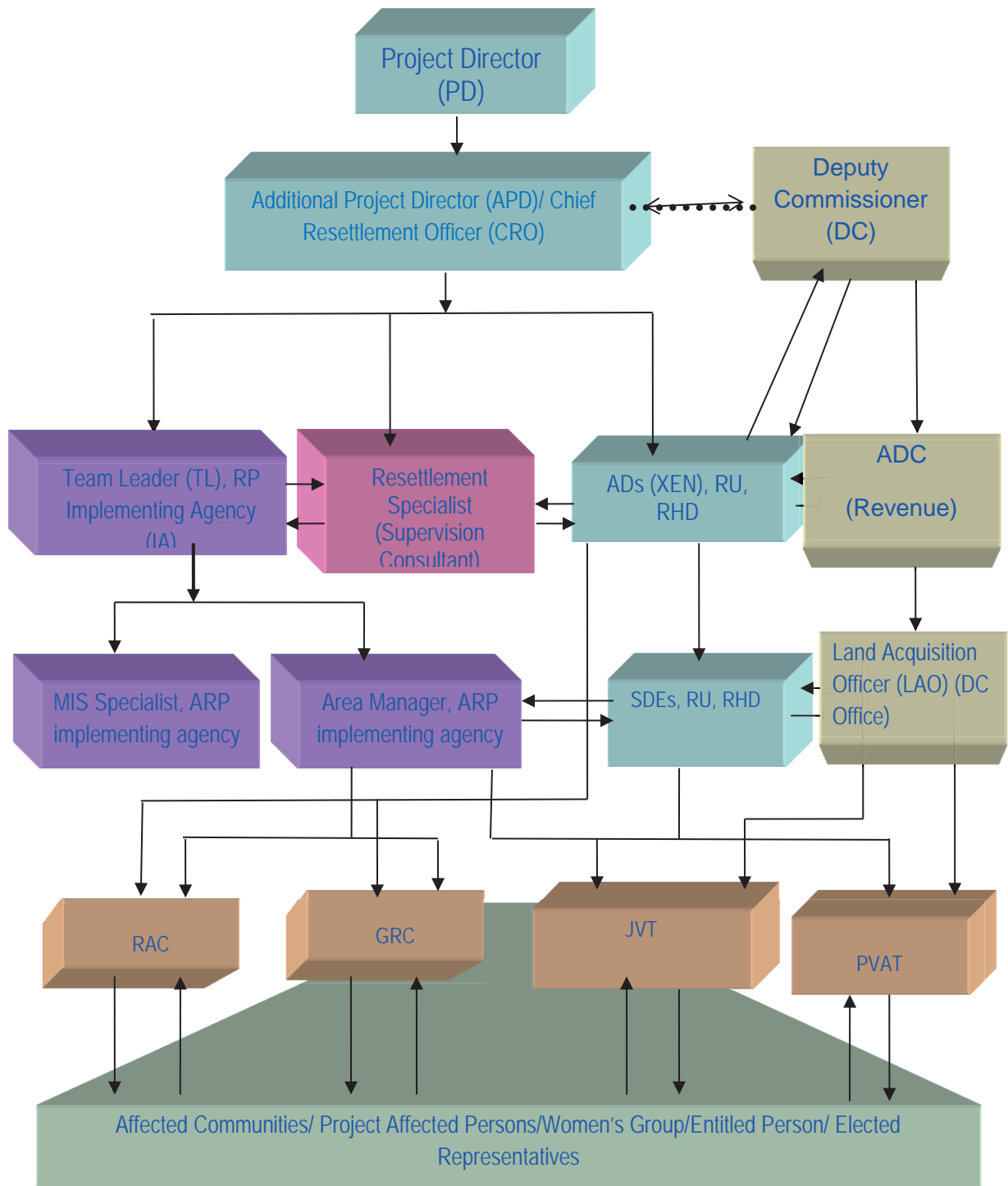
### **7.1 Roads & Highways Department (RHD)**

Roads & Highways Department will establish, for the Project, a Project Implementation Unit (PIU) headed by a Project Director (PD), at the project office that will be responsible for the overall execution of the Project. The PIU will consist of two units namely Engineering Service Unit (ESU) and Resettlement Unit (RU) for total implementation of the project. The PD will work on deputation from RHD at the level of Superintendent Engineer or Additional Chief Engineer. The project will be overseeing by the PD, RHD. One implementation committee will be formed to provide overall guidelines and cooperation for project implementation and keep liaison with various stakeholders including JICA, different government organizations and other relevant agencies.

The PD will recruit and appoint an experienced NGO or Social Consulting Firm which will be called as Implementing Agency (IA) as required for implementation of resettlement activities. RHD will implement the ARP through setting a Resettlement Unit (RU) within the PIU. The RU, under the overall responsibility of the Additional Project Director (DPD) / Chief Resettlement Officer (CRO), will undertake day-to-day activities with the appointed Implementing Agency (IA) and Resettlement Specialist/ Supervision Consultants.

The appointed Implementing Agency (IA) will open field offices, carry out information campaign and involve affected persons including women in the implementation process from the very beginning. The Implementing Agency (IA) will collect, collate, computerize and process data for identification of eligible persons correctly for resettlement benefits and assess their entitlements as per ARP policy. However, the RU will affect the payments after necessary scrutiny. The Additional Project Director/Chief Resettlement Officer (RU) in charge of the land acquisition and resettlement management will report to the Project Director. He/she will work in close coordination with the respective field-based offices and Implementing Agency (IA) on the day-to-day activities of the resettlement implementation.

The DPD/CRO through the field officials and staffs, LA Office and the Implementing Agency (IA) will execute and monitor the progress of the LA and ARP implementation work. He/she will ensure coordination between the relevant departments, Implementing Agency (IA), the GRC, RAC, PVAT and the Project affected people (APs). Apart from the GRC, Joint Verification Team (JVT) for quantification of affected properties and Property Valuation Advisory Team (PVAT) will be formed by the Ministry of Road Transport and Bridges for valuation of affected property and resolution of disputes. The composition and formation of committees and mechanisms for quantification and valuation of properties and grievance resolution will be constituted through government gazette. People's participation will be ensured through recruiting their representatives in these committees. The mechanism of implementation and organization/position involved in the implementation process is shown in Figure 7.1.



**Figure 7.1 ARP implementation organogram**

## **7.2 Responsibilities of Resettlement Unit Officials**

CRO will be the head of RU and coordinate all land acquisition and resettlement issues with two Assistant Directors (AD) RU, IA, Consultant, DC office, Contractors and all stakeholders with assistance from other RU officials and staffs including five Sub Divisional Engineers (SDE), one SDE for each zone. CRO will come from RHD on deputation of the position of at the level of Superintendent Engineer/Additional Chief Engineer. AD1 will be responsible for the region covered Rangpur and Rajshahi zones and AD2 will be responsible for the region covered Gopalganj, Khulna and Barisal zones.

Two ADs will be responsible for all land related issues and all kinds of resettlement issues (compensation, relocation, and rehabilitation etc.) for all the EPs for their respective regions of the project. ADs will keep close liaison with DC office, will be the chairperson of GRC and RAC to be formed for this assigned area. ADs will maintain close liaison with CRO, IA, Consultant, Contractor and other stake holders of the project. ADs will come from RHD on deputation of the position of Executive Engineer.

ADs will make compensation; approve indents made by IA for payment to EPs with consultation of CRO. The payment will be done through SDEs in respective zones. Cheques for the EPs will be signed by ADs of the respective regions. IA will assist SDE in preparation of payment Debit Voucher and other required papers. SDE will keep close liaison with the Area Managers of the IA and the EPs in the field level and assist ADs in all relevant issues for smooth implementation of the Land Acquisition and Resettlement program. SDEs will be the convener of JVT and PVAT to be formed for this assigned area. SDEs will come from RHD on deputation of the position of Sub Divisional Engineer.

Institutional Responsibilities in Resettlement Process is shown in Table 7.1.

## **7.3 Functional Description**

### **7.3.1 Role of Deputy Project Director (DPD)/Chief Resettlement Officer (CRO)**

The DPD/CRO for land acquisition, resettlement and rehabilitation will perform the following activities (Table 7.1).

- Implement the resettlement program according to and in agreements with the JICA.
- Formulate necessary policy, administrative and financial decisions and actions necessary for the successful implementation of the program in consultation with GoB.
- Timely release of funds to the DC and the Resettlement Unit (RU) necessary to implement the Land Acquisition and Resettlement program according to the approved implementation schedule.
- Delegate responsibility and powers to the other resettlement officers as required for smooth implementation of the ARP.
- Prepare Terms of Reference for a “Post-Resettlement Survey”, select and appoint an appropriate agency to execute these survey(s).
- Propose RHD any remedial action based on the Post-Resettlement Survey.
- Pay additional grant for replacement land purchase, house/business establishment construction grant, and dismantling and removal assistance and all other assistances in cash or kind stipulated under the resettlement policy to all the eligible PAPs.



- Update Land Market Survey to determine the replacement cost of land in and around the project area and accordingly recommend Replacement Value (RV) for replacement land purchase.
- Negotiate with Contractors for arranging employment for PAPs in project construction works.
- Study and monitor unforeseen adverse effects during and after construction and take necessary mitigation measures.
- Liaise with other government and non-government agencies in the country on matters of mutual interest related to resettlement, etc.

### **7.3.2 Role of Assistant Directors (ADs): Resettlement**

Ads, RU will basically be the field level implementing officers of the Resettlement Unit. He/She will be responsible for the overall implementation of all field level activities related to resettlement (Table 7.1). This would include:

- Keep liaison with LAO for timely compensation of CCL.
- Issue ID Cards to all eligible Entitled Persons (EPs).
- Will attend and chair the meetings of GRC /RAC in different zones of respective regions of the project area.
- Arrange and provide all necessary assistance to EPs for purchase of replacement land.
- Ensure that all structure-losing HHs are evacuated and relocated on time and are provided with transportation assistance in cash.
- Ensure timely entries of the losses identified and benefit accrued into the Entitlement Cards manifesting the benefits given to PAPs.
- In consultation with DC and local leaders, organize meetings in host area villages to persuade and encourage the host population to provide replacement lands to PAPs.
- Provide various cash grants planned under the ARP to entitled persons, and ensure that transfer of these grants are made according to the system described in ARP.
- Liaise with the IA for the implementation of information campaign, IGA Training, and other activities delegated to them.
- Keep close contact and liaison with CRO, DC, IA and Consultants and submission of monthly/quarterly field progress report.
- Perform effective management and timely implementation of the directives.
- Participate in all the activities and meetings of the Resettlement Committees.
- Issue the Cheque to EPs.
- Keep all records in electronic data base.

**Table 7.1 Institutional Responsibilities in Resettlement Process**

<b>Related Activities and Responsibilities</b>	<b>Responsibility</b>
<b>A. Preparation of Updated ARP</b>	
Preparation of land acquisition plans	RHD/Eng Firm
LA process and land acquisition	DC/RHD
Recruitment of National Resettlement Specialist (NRS)	RHD
Recruitment of Implementing Agency	RHD
Design and reproduction of ARP Information Brochures	RHD/NRS
Disclosure and public consultations	RHD/IA
Selection of members for resettlement advisory bodies	RHD/IA
Carry out joint verification survey	JVT
Market survey on prices of lands, structure, crops and trees.	PVAT
Establishment of unit prices	PVAT/RHD
Assessing AHs to be relocated and any vulnerable APs	IA/RHD/NRS
Determination of entitlements and consultations with individual APs	RHD/IA
Consultation of ARP to EA, APs and stakeholders	NRS/RHD
Concurrence on ARP	RHD
Approval of developed ARP	RHD
<b>B. ARP Implementation</b>	
Mobilization of GRC	RHD/IA
Establishment of internal monitoring	Ministry of Road Transport and Bridges/DC/RHD
Budget approval for compensation and resettlement	RHD
Release of funds for compensation	RHD
Filing and resolution of complaints of APs,	RHD/GRCs/IA
Assess needs,	RHD/IA/APs
Consultation with APs on schedule of clearing the lands	RHD/IA
Clearing of lands	APs
Confirmation of "No Objection" for the award of civil works contract	RHD
Relocation and livelihood restoration assistance	IA/RHD/LIRP
<b>C. Monitoring and Evaluation</b>	
Internal monitoring	RHD/NRS/IA
Independent external monitoring and evaluation	RHD

## **7.4 Other Agencies Involved in the Process**

### **7.4.1 Deputy Commissioner**

The DC has the power to acquire land and to assess compensation of property thus acquired. The 1982 Ordinance provides the power to the DC, who conducts the acquisition through the Land Acquisition Officer (LAO) of concerned districts. The LAO (or his/her officers) along with

RU/RHD and IA staff will conduct joint physical verification of property on the land in accordance with the Land Acquisition Proposal (LAP) to be submitted by RU/RHD as soon as the detailed design and alignments for the project interventions will be available.

The DC office is responsible for the entire acquisition process from notification to affected households to award of compensation to owners of property and payments of compensation. Upon fulfillment of criteria of the LA office (i.e. necessary documents to make payment) the LA officials will prepare cheque and disburse to the EPs in the concern Union office in presence of the UP Chairman issuing prior notice to the concern EPs. RHD and IA officials shall liaise with concerned DC offices to complete the land acquisition process in a timely fashion. However, the LAO will prepare estimates of LA and request placement of fund from the RHD. RHD will place fund with DC within 60 days time limit from the date of claiming fund from DC.

#### **7.4.2 Project Supervision Consultant**

There will be provision for National Resettlement Specialist (NRS) as part of the Consultants supervising the implementation of the Project. He/She will be involved for full period of ARP implementation. The resettlement specialist will provide technical support to RU and supervise & review the field activities of the ARP Implementing Agency in collaboration with the Resettlement Unit of RHD.

#### **7.4.3 Implementing Agencies**

RHD will engage an experienced Implementing Agency (IA) for implementation of the ARP in the field level in coordination with the DC, RHD and consultants. The Implementing Agency (IA) will be engaged to assist the supervision consultant for updating of ARP during detailed design phase and will be continuing for implementation of the ARP. RHD, the EA will contract out clearly defined tasks of the ARP implementing agency in detailed Terms of Reference such as consultation /public information campaign for rapport building, issuance of ID cards to EPs, payment of eligible benefits to affected households/ individuals, institutional development, skill training/management training, community awareness and empowerment, etc. The IA will initially create ID number for each affected person as identified during Joint Verification survey by JVT for both title and non-title holder. If the entitled person (EP) is not included in joint survey report but awarded newly based on ownership documents of the property by DC during CCL payment, the IA will create new ID for them. The ID card will be prepared for EPs as identified by the DC and/or Joint Verification Survey (JVS) by the implementing agency and issued with joint signature of the SDE of RU and Area Manager of the Implementing Agency. Photograph of the EPs will be attested by the concerned UP Chairman and pasted on the ID card or digital photo will be attached in the ID card and concerned Chairman will sign on it. The ID card will comprise information on name, father's/husband's name, mother's name, age, education, identifiable marks, detail address, details of quantity of losses etc. The sample of ID card will be prepared by IA and approved by EA.

The Implementing Agency (IA) will assist the APs in preparing record of rights to the property and receive compensation under law (CCL) from DC office. They will form focus group with the affected people based on homogeneity and/or nearness and hold meetings on regular basis to let them know their right and entitlements as prescribed in the ARP, updating of record of rights (RoR), opening of bank account, process of receiving cash compensation under law (CCL) from DC office and additional payments/ grants from RHD through IA etc.

The implementing agency will form Union based resettlement advisory committee (RAC) to involve the local communities and APs in the implementation process.

Implementing Agency will have to establish an MIS section in their central office for record keeping of the APs, creating individual ID number of the entitled persons, preparing entitled person's (EP) file based on quantity of losses and entitlement card (EC) based of loss type and budget.

Upon fulfillment of criteria i.e. necessary documents to make additional payment/grants to the EPs the IA will prepare payment debit voucher & other documents and disburse account payee cheque to the EPs. The payment debit voucher will be jointly signed by the concerned SDE, IA representative and UP Chairman. Prior notice will be issued to the concerned EPs on relevant issues. The consultants updating the ARP during detail design stage will also prepare and attach detailed Terms of Reference for ARP implementing Agency.

#### **7.4.4 Ministry of Road Transport and Bridges**

The Ministry of Road Transport and Bridges, through a gazette notification, will form various committees/teams for implementation of the ARP at the field level. The implementing Agency will work as member secretary of all the committees/teams involving representatives from DC, RHD, Local Government Institutes (LGI) and APs. These committees/teams will ensure stakeholders' participation and uphold the interest of the vulnerable APs. The powers and jurisdictions of the committees will be clearly defined in the gazette notification.

#### **7.4.5 Joint Verification Team**

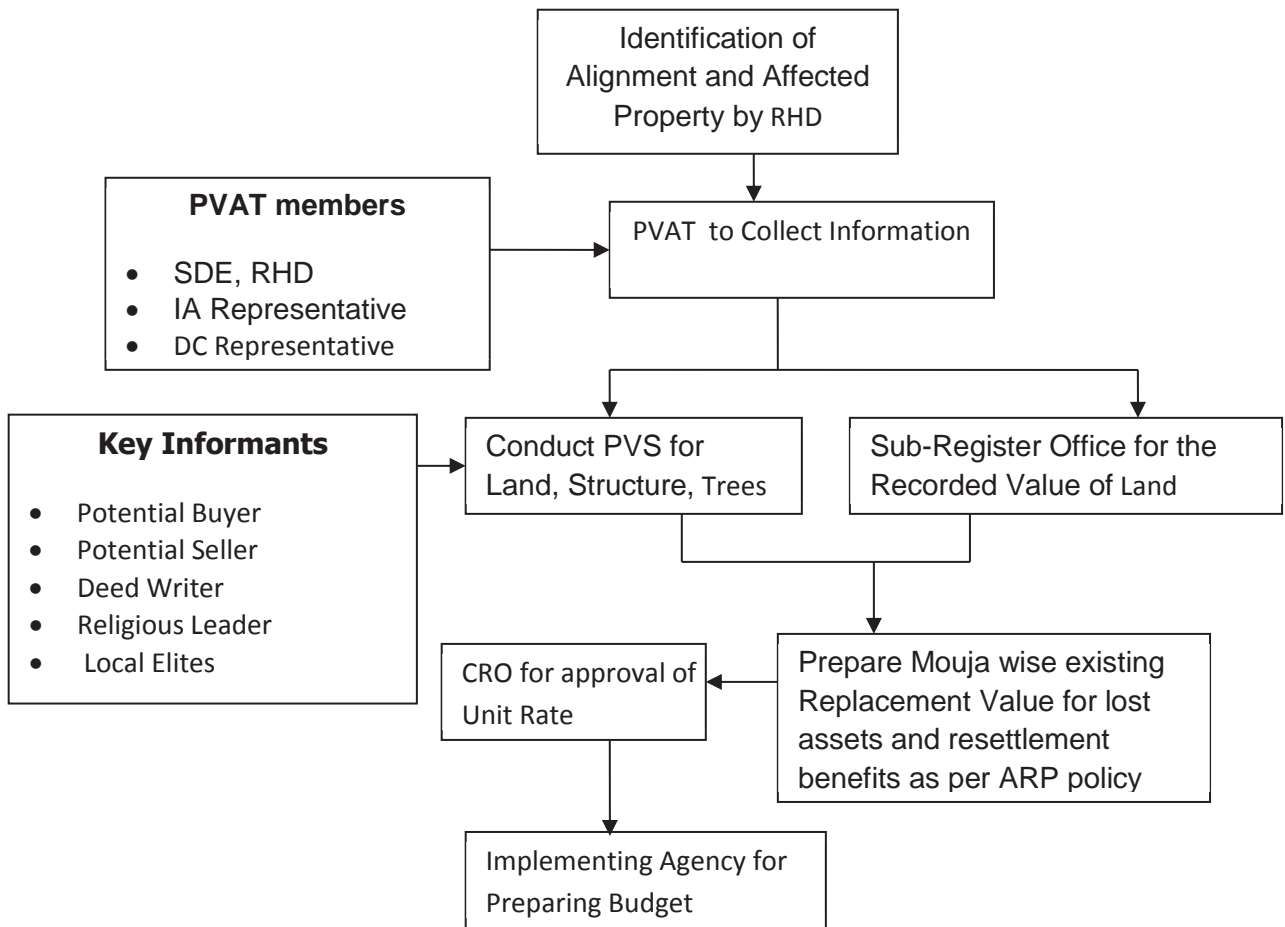
The Ministry of Road Transport and Bridges will form a Joint Verification Team (JVT), for the project through a gazette notification to compare and review the physical verification data conducted by Implementing Agency with the DCs' assessment of loss of physical assets and their owners. The scope and responsibility of the JVT will be clearly defined in the gazette. The implementing Agency will process the entitlements of the project-affected persons using the JVT data as one of the determinants. The JVT will be a three-member body and be comprised as:

- Sub-Divisional Engineer or equivalent, RHD - Convener
- LAO or his/her designated representative of concerned district – Member;
- Area Manager, ARP Implementing Agency – Member secretary;

#### **7.4.6 Property Valuation Advisory Team**

A Property Valuation Advisory Team (PVAT) will be formed by the Ministry of Road Transport and Bridges through a gazette notification for the project. The PVAT will review the assessment of the implementing agency on the market price of land and other property affected by the project at their replacement cost. The scope and responsibility of the PVAT will clearly be defined in the gazette. The Implementing agency will process the entitlements of the project-affected persons using the PVAT data as one of the determinants. The PVAT will be comprised as:

- Sub-Divisional Engineer or equivalent, RHD - Convener
- LAO or his/her designated representative of concerned district – Member
- Area Manager, ARP Implementing Agency – Member secretary;



**Figure 7.2 Procedure of Determining Valuation of Property**

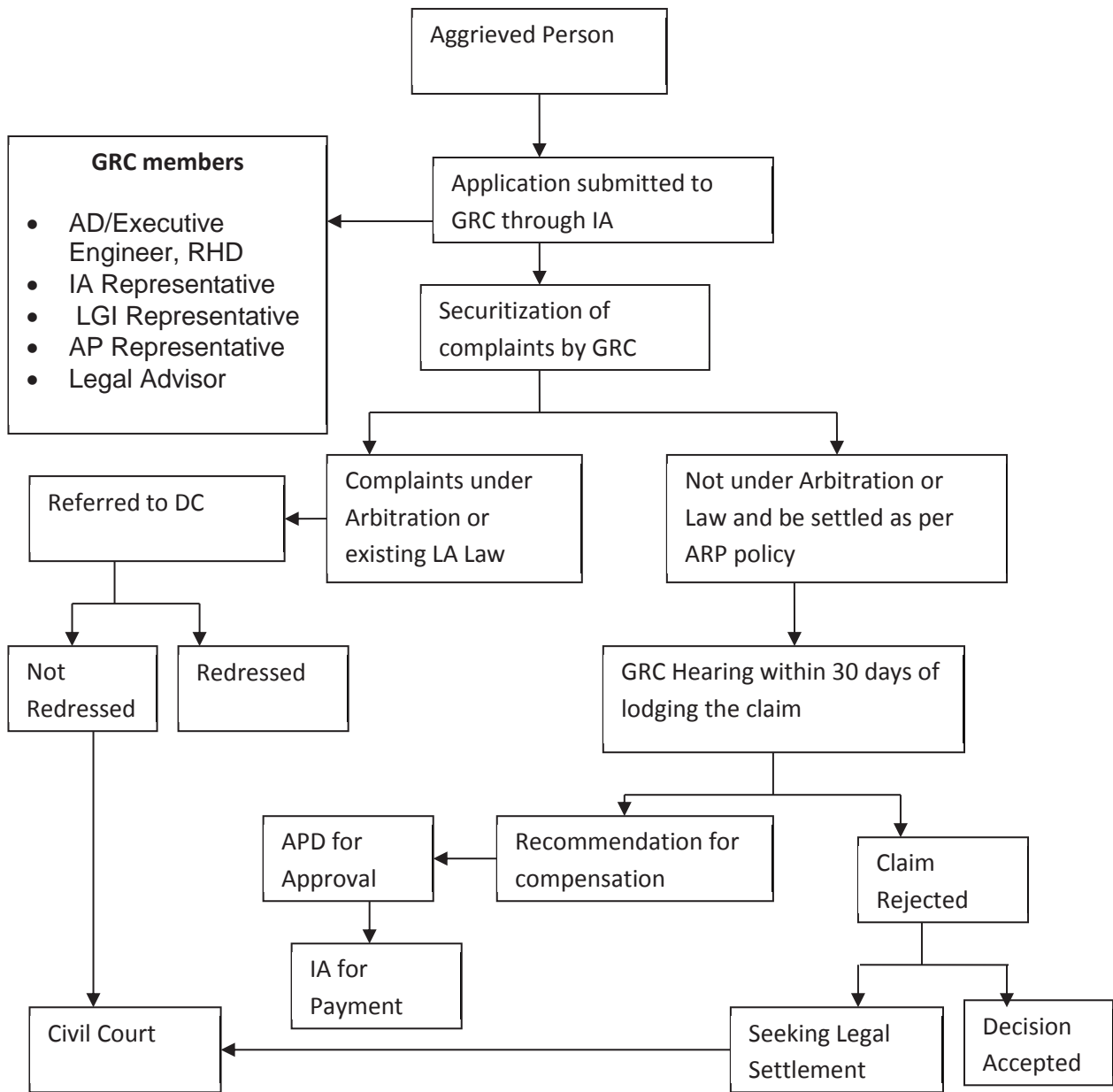
#### 7.4.7 Grievance Redress Committees

GRCs will be formed at Union level for any grievances involving resettlement benefits, relocation, and other assistance. A gazette notification on the formation and scope of the GRCs will be required from the Ministry of Road Transport and Bridges. The GRC for each Ward will be comprised as

- Executive Engineer, RHD - Convener
- Area Manager, ARP Implementing Agency, member secretary.
- UP Chairman - member.
- One representative of APs – member
- One UP member (female)- Member

**Table 7.2 Grievance Redress Procedures**

Step 1	The Implementing Agency informs DPs/APs about their losses and entitlements If satisfied, the DP/AP claims resettlement payments to the EA. If confused,
Step 2	The DP/AP approaches the IA field level officials for clarification. The IA will clarify the DPs/APs about their losses & entitlements as per ARP.  If resolved, the DP/AP claims resettlement payments to the EA. If not resolved,
Step 3	The DP/AP approaches to the GRC. IA staff assists the DPs/APs producing the complaints and organize hearing in 15-21 days of receiving the complaints.
Step 4	GRC to scrutinize applications, cases referred to DC through EA if beyond their mandate as per scope of work
Step 5	If within the mandate, GRC sessions held with aggrieved DPs/APs, minutes recorded.  If resolved, the Project Director approves. If not resolved,
Step 6	The DP/AP may accept GRC decision, if not, he/she may file a case to the court of law for settlement.
Step 7	The GRC minutes, approved by the Project Director, received at Conveners' office back. The approved verdict is communicated to the complainant DP/AP in writing. The DP/AP then claims resettlement payments to EA



**Figure 7.3 Grievance Redress Mechanism**

#### 7.4.8 Resettlement Advisory Committee (RAC)

The implementing Agency will form Union based RAC at project level to involve the local communities and APs in the implementation process. The RACs will be comprised of XEN, RHD as the convener/chair, Area Manager, implementing agency as member secretary, UP Chairman, Female UP member and APs representatives (2) including at least one female AP in the respective area as selected by Implementing Agency in consultation with the concerned UP Chairman. The committees will seek local inputs from the affected people and communities in the implementation process and assist the implementing agency in all matters related to

resettlement. The RACs will ensure local participation in the implementation of the resettlement plan.

#### **7.4.9 Women Groups in Resettlement Process**

The ARP implementation will ensure a gender sensitive approach in planning, management and operations of land acquisition and resettlement. Separate groups of women affected persons will be formed and operated by the implementing agency. Feedback from the female APs and female headed AHs will be obtained through these female focused groups for planning relocation and resettlement. The female members of the households will get special considerations in getting job opportunities in civil construction.

The female staff engaged by implementing agency will identify needs of female APs for income restoration approaches and implementation of the income restoration component of the ARP. Women were consulted during social appraisal and will be further consulted during the review of the ARP after the detailed design and in the process of implementation.

#### **7.5 Appointment of Implementing Agency (Non - Government Organization (NGO) or Social Consulting Firm)**

RHD will appoint an experienced Implementing Agency through standard procurement system. The IA can be a Non-Government Organization (NGO) or Social Consulting Firm. This IA will be appointed for implementation of the ARP in the field level in coordination with DC, RHD and National Resettlement Consultant (NRS). The EA will contract out clearly defined tasks of the ARP with details Terms of Reference. A TOR is attached in [Annex-VII](#) of this document for the implementing agency.

#### **7.6 Community (Stakeholders) Participation in ARP Implementation**

During the implementation of the ARP, APs and their communities will be informed, closely consulted, and encouraged to participate in the process. This process will be continued until completion of the implementation of ARP as well as in monitoring stage.

During the implementation stage, Union based Resettlement Advisory Committees (RACs) will be formed to seek cooperation from various stakeholders in the decision-making and implementation of the ARP. Through public consultations, the APs will be informed that they have a right to grievance redress from the RHD. The APs can call upon the support of ARP Implementing Agency (IA) to assist them in presenting their grievances to the GRCs. The GRCs will review grievances involving all resettlement benefits, relocation and other assistance. Union based grievance redress committees (GRCs) will be formed and the grievances will be redressed within a month from the date of lodging the complaints. The GRC as well as the JVT and PVAT will be formed by the Ministry of Road transport and Bridges and activated during land acquisition process to allow APs sufficient time to lodge complaints and safeguard their recognized interests. Host area villagers will be the part of ARP implementation by joining the meetings organized the ADs in consultation with the DC to persuade and encourage the host population to provide replacement lands to PAPs.

The areas for participation of the primary stakeholders include: (i) identify alternatives to avoid or minimize resettlement; (ii) assist in inventory and cross check in assessment of losses; (iii) assist developing alternative options for relocation and income restoration; (iv) provide inputs for entitlement provisions; and (v) identify likely conflict areas with re-settlers; (vi) Identify livelihood restoration options and participate in the concern training.



## 8 RESETTLEMENT AND COMPENSATION COSTS AND BUDGET

### 8.1 Budgeting and Financial Planning

All resettlement funds will be provided by the EA based on the financing plan agreed by the Government of Bangladesh and JICA. Land acquisition, compensation, relocation and rehabilitation of income and livelihood will be considered as an integral component of project costs. The rehabilitation and training to the potential affected persons will be provided under the LIRP based on vulnerability and needs assessed through a special census and consultation exercise.

The estimate for land acquisition by the DC will be prepared by his/her LA section and placed to the RHD for transfer of the fund to the account of the DC. The additional benefits as per the policy will be paid by the EA through Implementing Agency (IA). However, the Implementing Agency (IA) will assess the quantity of losses and the eligible persons for resettlement benefits and produce a resettlement budget to RHD for approval and periodic release.

The RU of RHD will ensure that the land acquisition and resettlement budgets are delivered on time to the DC and the Implementing Agency (IA) account for payment of compensation for land, structure, trees and crops and other assets on privately owned land and resettlement grants. The RU will also ensure that the ARP should be submitted to RHD for approval, and that fund for compensation and entitlement under the ARP are fully provided to APs prior to the award of the civil work contract.

The ARP budgets for compensation for land, structures, other assets, crops and trees, and special assistance will be calculated using the market rates reflecting replacement cost at the time of dispossession. The costs for relocation and special assistance will be consistent with the resettlement policy. Other costs involving project disclosure, public consultations and focus group discussions, have been included in the ARP budget under 'Operation cost for IA' head. On the other hand training on IGA will be organized under Livelihood and Income Restoration Program (LIRP). Budget has been allocated for the purpose. There is also a budget allocation for 5% as contingency.

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**USD 6,765,682 (1 \$=BDT 77.35)**

## **8.2 Assessment of Unit Value for Compensation**

For preparation of an indicative budget as integral part of the Abbreviated Resettlement Plan, the methodologies followed for assessing unit compensation values and grants of different items is as follows:

- Land has been valued at replacement cost based on current market price determined by collection of data from interviewing land owners and mouja rates collected from Sub-register office.
- Houses/buildings have been valued at replacement cost based on cost of materials, type of construction, labor, and transport and other construction costs. Experience and best practices from other development project have been applied in this regard.
- Trees have been valued based on age and girth category (a. large b. medium c. small and d. sapling) separately for timber and fruit bearing trees. Experience and best practices from other development project have been applied in this regard.
- Banana groves have been valued as one time crop of each grown up tree (large and medium) and small or plant at the market rates.
- Fruits will be valued for grown up trees (large and medium) as 30% of the timber value X one year.
- Transfer grant for structures has been calculated @ 12.50% of the structure value.
- Reconstruction grant for structures has been calculated @ 12.50% of the structure value.
- Crop value has been determined on the basis of current market price of paddy per mound (about 40 Kg) and gross production.
- Additional cash grant for vulnerable household's particularly very poor will be paid @ BDT 3,000/per persons
- Poor female EPs heading the household will get one time additional assistance of Tk 3000 each
- EPs will be allowed to take salvage materials free of cost

The valuation survey registered recent current crop and tree sales at markets and was based on AP and community consultation (including relevant local government agencies). The conclusion of the survey is that in most cases the actual transaction values are higher than the values officially documented and registered.

## **8.3 Approval of the Resettlement Budget**

Land acquisition and resettlement budget included in the ARP will need to be approved by the Ministry of Road Transport and Bridges. Upon approval of land acquisition by Ministry of Land, the DC will prepare estimates for compensation including service charge and produce that to the RHD for placement of fund within 60 days.

The rates for compensation and cash entitlements for rehabilitation as well as allowances payable to AHs will be adjusted annually, based on the actual annual inflation rate. RHD will determine the annual inflation rates to be applied to all cash entitlements in each year.

The ARP implementing Agency (AI) will assist RU, (RHD) to prepare resettlement budgets covering all eligible loss and entitlements confirmed through joint verification and determination of replacement market price of land and property by PVAT.

#### **8.4 Management of Compensation and Flow of Awards**

The RHD does not have any set codified rules for payment of grants to APs for resettlement of affected persons. Under the circumstances, a detail administrative guideline (payment modality) will be required to implement the ARP at the field level. Both the RHD and the ARP implementing agency (IA) will follow the administrative guideline after its approval from the Project Director. The consultants (resettlement specialists) will prepare the guidelines and the DPD/CRO at RU (RHD) will concur it for adopting. The modality should include definition of various resettlement terms, the entitlements, detail procedure for identification of eligible persons for resettlement entitlements of the ARP, and assess loss and entitlement of individual APs, process of payments, effecting their disbursement and documentation.

The RU with requisition of payments under annual assessment from the DPD/CRO, will place fund with the IA account in installment as per requisition made by the IA. The administrative guidelines will contain details of the management aspects and monitoring mechanism. The SDE, RHD and authorized representative from IA will sign the vouchers. Payment will be made and records maintained as per approved ARP administrative guidelines.

Compensation under law for land acquisition will be paid to the legal owners of land and property by the concerned Deputy Commissioner's LA section. DC will prepare individual cheques accompanied with receiving copies of payment and undertaking note.

The IA will collect CCL copy from the DC office and prepare statement, entitled person's file, entitlement card, indent and other necessary documents for making payment of resettlement benefit. In case of non-titled holder the IA will prepare all necessary documents based on the joint verification survey data and arrange payment of resettlement benefit to the EPs. For both the cases resettlement benefits will be paid by RHD through the IA.



## 9 ARP IMPLEMENTATION SCHEDULE

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## 10 MONITORING AND EVALUATION

### 10.1 Monitoring and Evaluation

RHD as the EA, through the RU, will establish a monitoring system involving the DPD/CRO, consultants and the ARP Implementing Agency (IA) for collection, analysis, reporting and use of information about the progress of resettlement, based on the ARP. These stakeholders will be made responsible to monitor the progress of all aspects of land acquisition/ resettlement and income generation. The EA will report to the JICA on land acquisition, resettlement and income regeneration by APs in the quarterly reports, including identification of significant issues. Besides, an annual report stipulating all efforts and outcome will be sought by the RHD. An ARP implementation monitoring format is enclosed in *Annex-IX*.

The ARP implementation monitoring will be done both internally and externally to provide feedback to RU (RHD) and to assess the effectiveness. Mid-term reviews of the resettlement activities drawing upon monitoring and evaluation reports and other relevant data to identify any action needed to improve resettlement performance or respond to the changing circumstances. Evaluation of the resettlement activities will be resorted to during and after implementation of the ARP to assess whether the resettlement objectives were appropriate and whether they were met, specifically, whether livelihoods and living standards have been restored or enhanced. The evaluation will also assess resettlement efficiency, effectiveness, impact and sustainability, drawing lessons as a guide to future resettlement planning.

### 10.2 Internal Monitoring

Internal monitoring will be undertaken by the RU through SDE with assistance from the NRS and IA. The IA will gather information on ARP implementation covering relevant activities as per schedule. All activities listed will be illustrated in Gantt Charts showing the target dates for completing resettlement activities. Internal monitoring reports on ARP implementation will be included in the quarterly Project Progress Report (PPR) to be prepared by RU, RHD. The report of RU will contain: (i) accomplishment to-date, (ii) objectives attained and not attained during the period, (iii) challenges encountered, and (iv) targets for the next quarter. The internal monitoring report will then be integrated by the RU with the overall PPR submitted to RHD. The NRS will assist PIU preparing the overall PPR for RHD. However, the NRS will monitor the activities of IA and report to DPD/CRO, RU on a monthly basis. Table 10.1 shows the potential monitoring indicators that will be reported.

**Table 10.1 Potential Monitoring Indicators**

Monitoring Issues	Monitoring Indicators
Budget and Timeframe	<ul style="list-style-type: none"> <li>• Have all land acquisition and resettlement staff been appointed and mobilized for field and office work on schedule?</li> <li>• Have capacity building and training activities been completed on schedule?</li> <li>• Are resettlement implementation activities being achieved against agreed implementation plan?</li> <li>• Are funds for resettlement being allocated to resettlement agencies on time?</li> <li>• Have resettlement offices received the scheduled funds?</li> <li>• Have funds been disbursed according to ARP?</li> <li>• Has all land been acquired and occupied in time for project implementation?</li> </ul>
Delivery of AP Entitlements	<ul style="list-style-type: none"> <li>• Have all APs received entitlements according to numbers and categories of loss set out in the entitlement matrix?</li> <li>• How many affected households have received land titles?</li> <li>• How many affected households relocated and built their new structure at new location?</li> <li>• Are income and livelihood restoration activities being implemented as planned?</li> <li>• Have affected businesses received entitlements?</li> <li>• Have the APs losing their eroded land received proper compensation?</li> <li>• Have the squatters, encroachers of RHD or government land, displaced due to the project, been compensated?</li> <li>• Have the community structures are compensated and rebuilt at new site?</li> </ul>
Consultation, Grievances and Special Issues	<ul style="list-style-type: none"> <li>• Have resettlement information brochures/leaflets been prepared and distributed?</li> <li>• Have consultations taken place as scheduled including meetings, groups, community activities?</li> <li>• Have any APs used the grievance redress procedures? What were the outcomes?</li> <li>• Have conflicts been resolved?</li> </ul>
Benefit Monitoring	<ul style="list-style-type: none"> <li>• What changes have occurred in patterns of occupation compared to the pre-project situation?</li> <li>• What changes have occurred in income and expenditure</li> </ul>

Monitoring Issues	Monitoring Indicators
	<p>patterns compared to pre-project situation?</p> <ul style="list-style-type: none"> <li>• Have APs income kept pace with these changes?</li> <li>• What changes have occurred for vulnerable groups?</li> </ul>

### 10.3 External Monitoring and Evaluation

External monitoring which involves social impact evaluation will be assigned to an independent External Monitoring Agency hired by RHD.

The RHD will engage individual/firm to conduct a one-time social impact evaluation, at least six months following the completion of resettlement. It will use appropriate investigative and analytical techniques in assessing the post-project socio-economic conditions of the APs in relation to the baseline socio-economic data generated before undertaking of the resettlement implementation.

The evaluation will describe any outstanding future issues that are required to bring the resettlement into compliance with JICA's Guidelines for Environmental and Social Considerations and Government policies, and further mitigation measures needed to meet the needs of any APs or families perceiving themselves to be worse off as the result of resettlement. It will include lessons learned from the evaluation that may be useful in developing future policies on involuntary resettlement of APs in Bangladesh.

The Resettlement Specialist within the project consultants will conduct periodic review and supervision mission during the implementation stage. In addition to regular review missions, RHD will undertake a comprehensive mid-term review of the ARP implementation. A post-evaluation of ARP activities will be carried out by RHD to assess the resettlement impact in terms of adequacy and deficiency in planning and R&R operations following the social impact evaluation.

ToR for EMC is presented in *Annex-VIII*.

### 10.4 Reporting Requirements

During the implementation phase, the Project Director will prepare quarterly report on the progress of resettlement activities and forward copies to the GoB. A format for resettlement implementation monitoring will be devised for quarterly monitoring and data collection by the field officials (sample at chart 10.2). The Resettlement Specialist of the Project Supervision Consultants and Supervision Missions every six months during the implementation stage will conduct review and report to RHD and the JICA on the progress of all aspects of land acquisition and resettlement activities. A post-resettlement impact evaluation will be carried out by the RHD to assess whether adverse impacts of the projects have been mitigated adequately and APs have been able to restore and/or improve their pre-project standard of living as a result of resettlement and development.

## **10.5 Conclusion and Recommendations:**

### **10.5.1 Conclusion**

The project will require a total of 53.35 hectare land of which mostly agriculture and a small quantity is vita/ homestead category. A total of 788 households and 2,367 commercial enterprises and 98 community properties got affected by this project. The project is located in western region of Bangladesh covering 29 districts. Some of the bridges are located in semi urban area where land price is very high. Compensation budget for land has been prepared based on the average rate collected from the local people. The project affected persons will get compensation for lost assets at replacement cost and other resettlement benefit. Policy matrix of ARP has kept provision for livelihood and income restoration grant for vulnerable households along with preferential employment in civil construction and distribution of 5 saplings among the displaced households for ensuring social afforestation. The resettlement plan will be implemented in 25 months time period starting from January 2016. Roles of different government and local bodies in proper implementation of the project are described in the ARP. Grievance redress committee will resolve claims of the aggrieved persons related to resettlement. The sample of quarterly report is presented in the following Table 10.2 and ARP Implementation Monitoring Format is attached in *Annex-IX*.

**Table 10.2 A Model Format for ARP implementation Monitoring – Quarterly Report**

Component	Unit Total	Completed%	Cumulative Achievement Total	Completed%	Progress During Reporting Month			Status & Remarks
					Target	Achievement	%	
<b>Resettlement Preparation</b>								
Distribution of Brochures								
Identification of AHs/CBEs								
Issuance of ID cards								
Consultation Meetings								
Formation of PVAT/RAC/GRC								
<b>Payment of Compensation</b>								
Compensation for land								
Compensation for tree/crop/fish								
Res/Commercial structure								
Payment for rent/leaseholder								
Shifting/relocation costs								
<b>Social Development Activities</b>								
Grant for loss of wages								
Loss of business grant								
Business restoration grant								
Payment for indirect impact								
LIRP activities								

### 10.5.2 Recommendation

For smooth execution of the project following steps are recommended

- i.) The ARP implementing agency is to be deployed before serving notice under section 3 by DC, so that they can jointly verify the affected properties in time.
- ii.) A clause should be incorporated in the bid documents with the civil contactors that the vulnerable entitled persons will get preferential employment in civil work.
- iii.) The other local agencies such as Union Parishad, Upazila and District administration should be initially informed about their roles and responsibilities in implementation of the ARP. For this a seminar may be arranged with local government bodies in the initial stage of ARP implementation.
- iv.) The vulnerable EPs should get special attention under livelihood and income restoration program.

- v.) The affected households may be encouraged for self-relocation. If possible, the project authority may request concern authority for allocation of khash land for relocation of the affected households in cluster manner

**APPENDIX 2.3**  
**EIA Report(For EZbridge)**



ROADS AND HIGHWAYS DEPARTMENT  
MINISTRY OF ROAD TRANSPORT AND BRIDGES (MORTB)  
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

PREPARATORY SURVEY

ON

WESTERN BANGLADESH BRIDGE IMPROVEMENT PROJECT

ENVIRONMENTAL IMPACT ASSESSEMENT (EIA) STUDY

FOR

EZ BRIDGE

FEBRUARY 2015

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Prepared by

Oriental Consultants Global Co., Ltd.

Katahira & Engineers International



On behalf of

Roads and Highways Department (RHD)

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#### **ABREVIATIONS**

ADB	-	Asian Development Bank
ARP	-	Abbreviated Resettlement Plan
BFD	-	Bangladesh Forest Department
BBS	-	Bangladesh Bureau of Statistics
BCAS	-	Bangladesh Centre for Advance Studies
BNBC	-	Bangladesh National Building Code
BECA	-	Bangladesh Environmental Conservation Act
BECR	-	Bangladesh Environmental Conservation Rules
BUET	-	Bangladesh University of Engineering Technology
CARE	-	Cooperative American Relief Everywhere
CITES	-	Centre against Illegal Trade and Export of Species
Cox	-	Oxides of Carbon
CSC	-	Construction Supervision Consultant

DCs	-	Deputy Commissioners
DG	-	Director General
DGWT	-	Deep Ground Water Table
DoE	-	Department of Environment
EA	-	Environmental Assessment
EC	-	Executive Committee
ECC	-	Environmental Clearance Certificate
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
FAO	-	Food and Agriculture Organization
GoB	-	Government of Bangladesh
GDP	-	Gross Development Product
IEE	-	Initial Environmental Examination
IECs	-	Important Environmental Components
EMC	-	Environmental Management Committee
GDP	-	Gross Development Product
IUCN	-	International Union for Conservation of Nature
IWTA	-	Inland Water Transport Authority
JICA	-	Japan International Cooperation Agency
LGED	-	Local Government Engineering Department
MoEF	-	Ministry of Environment and Forest
NCR	-	North Central Region
NCS	-	National Conservation Strategy
NEMAP	-	National Environmental Management Action Plan
NEP	-	National Environmental Policy
NGO	-	Non-Governmental Organization
N0x	-	Nitrous Oxides
O&M	-	Operation and Management
PAPs	-	Project Affected Persons
Pb	-	Lead
PPEs	-	Personal Protection Equipment
RCC	-	Rod concrete cement
RAMSAR	-	Convention on Wetlands of International Significance
REA	-	Rapid Environmental Assessment
RHD	-	Roads and Highways Department
RoW	-	Right of Way
NCR	-	North Central Region
NWR	-	North West Region
SCR	-	South Central Region
SE	-	Site Engineer
SOx	-	Oxides of Sulphur
SRDI	-	Soil Resources Development Institute
SWR	-	South West Region
SGWT	-	Shallow Ground Water Table
SIDA	-	Swedish International Development Agency
WARPO	-	Water Resources Planning Organization
WB	-	World Bank

## EXECUTIVE SUMMARY

Bangladesh comprises of 1,43,999 km<sup>2</sup> total area of which 79.1 percent is level floodplain, 8.3 percent is level and undulated terrace land and remaining 12.6 percent is steeply dissected hilly land. The floodplains consist of the Teesta, Jamuna, Meghna Ganges and of other rivers that are chopped by innumerable rivers and creeks. The flood plains are subject to seasonal, tidal and intermittent flash flooding.

Land communication in Bangladesh was poor until the sixties, therefore the major mode of commodity transportation and movement of passengers from river and sea ports were by rail and river transports that were also not quite satisfactory. In practice people at the time had to depend on steamers, engine boats and country boats for internal transportation of commodities and movement of passengers.

The GoB since the sixties diverted attention on development of land communication on priority basis compared to development of rail and water communication system. The donor agencies like ADB and WB and several other countries and donor agencies extended support to the GoB efforts for development of road communication system. Consequently, at present transportation of both cargo and passenger in Bangladesh account for 80.0 percent by road surpassing the combined water, rail and air transportation capacities. There are 19,000 large, medium and small bridges in Bangladesh road system. Amongst these bridges RHD manages nearly 4,500 that occur on 21,000 km national and regional highways and inter district roads. As per the information available from RHD source nearly 1,000 bridges are unsafe due to aging damages and require repair and/or reconstruction. Another 1,000 bridges are unsafe due to structural damages and faults and 1,000 prefabricated Bailey Bridges are dangerously risky for movement of vehicular transports.

Therefore, the routine activities of RHD involve conducting survey of bridges to find out the aging damaged bridges, damaged bridge structures, risky Bailey Bridges and narrow bridges on RHD managed roads and highways for repair, reconstruction and/or improvement either using GoB resources or to explore availability of assistance from donor agencies.

The proposed EZ Bridge is to be constructed under the JICA assistance across the Sitalakhya River along with the bridge approach road from Tongi-Bhairab road. The EZ Bridge project includes construction of a 4,200m bridge approach road from the Tongi-Bhairab road toward southeast from the 18.5 Km point. The EZ Bridge will be constructed over Sitalakhya River at Som Natun Bazar meeting point 14.0 Km upstream of Kanchan Bridge and 6.0 Km downstream of Bhairab Bridge. The bridge approach road on southeast of Sitalakhya River will be connected with the Dhaka- Sylhet highway (N2) via A K Khan Industrial Park.

RHD as the executing agency will remain responsible to prepare bridge design, supervise bridge construction and monitor activities of Contractor during implementation stages either by own staff or by hired international consulting firm. JICA Study Team conducted environmental studies (EIA, IEE, EMP) by subcontracting for the EZ Bridge (Kaliganj) and for the bridge approaches including access road. The environmental study of EZ Bridge and of the bridge approach/access road shall have to follow JICA guidelines and meet requirements of DoE. Accordingly, an EIA for the EZ Bridge has been prepared.

## CHAPTER 1. INTRODUCTION

### 1.1 Description of the Project

The proposed EZ Bridge across Sitalakhya River at 6.0 Km downstream from the Bhairab Bridge and 14.0 Km upstream from the Kanchan Bridge will be a 2 lane RCC bridge of 835 m length having 10.40m width. 4,195 m long bridge approach road will be constructed. Trees will be planted on road and approach road sides to help protect the road slopes from gully erosion due to monsoon rains, enhance highway environment, improve scenic beauty and generate national resources.

### 1.2 Sub-project Interventions and Locations

The interventions of the EZ Bridge shall include construction of 4,195 m bridge approach road, northeast from Tongi-Bhairab road. The bridge site and bridge approach road alignment have been selected by RHD preferably considering large number of probable alternative sites. The EZ Bridge site is situated on the north central hydrological region (NCR, WARPO 2000). The alignment of bridge approach road down to bridge site will involve acquisition of 12.49 hectare of residential /agriculture lands.

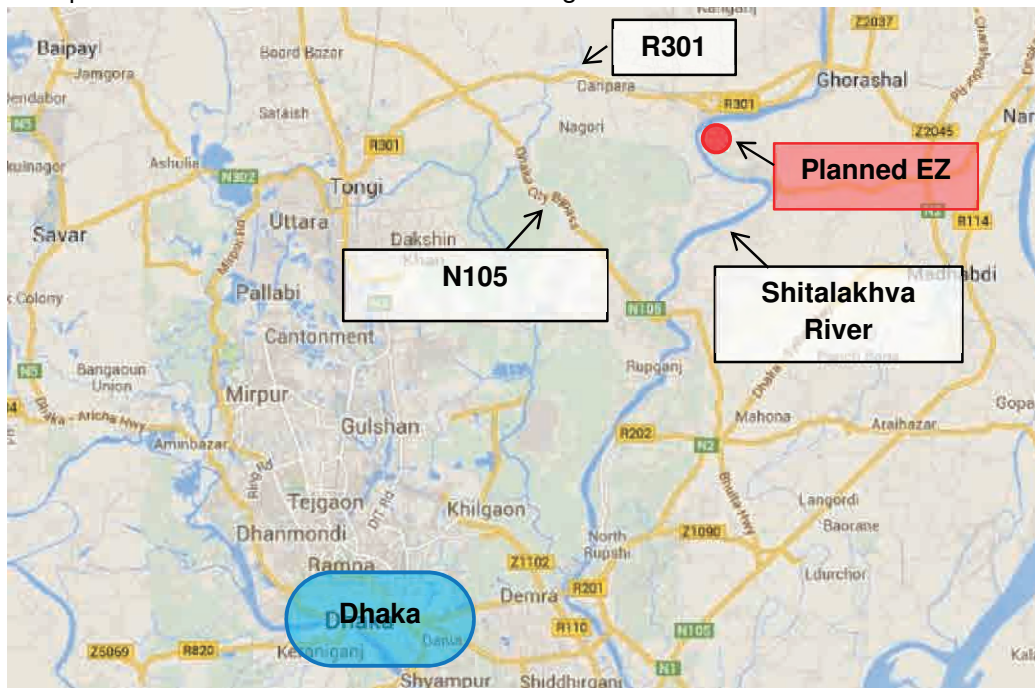


Figure 1.1 Alignment of Bridge approach Road down to EZ Bridge Site

### 1.3 Project Background

The government of Bangladesh (GoB) has the expectation of raising the Gross National Income to \$ 2000/capita by 2021 from the existing income /capita of \$ 650. To achieve the target goal the GDP growth rate shall have to be raised from 6.0% to 8.0% by 2015 and 10.0% by 2020 (BB Perspective Plan). The physical infrastructures e.g. roads, railways, river ways, ports and air ways are the major factors of communication are to be developed on priority basis to achieve the projected growth rate of per capita income.

Bangladesh at present has 161,400 km road infrastructure, 21,000 km of which is managed by RHD and remaining 140,000 km managed by LGED. There are 8,000 km flood protection embankment, 4,300 km irrigation channel and 5,000 km drainage channel in addition used for seasonal or perennial movement of transports and pedestrians either seasonally or perennially.

The ratio between road length/land area in Bangladesh is 1.31, this ratio varies division wise as 1.52 for Rajshahi, 1.32 Khulna, Chittagong 0.99 and 1.50 for Dhaka Division (BBS 2012). This is quite low compared to road requirement for existing population density per unit area.

#### **1.4 Importance of the Project**

Bangladesh is situated in a high average rainfall zone of 1,600 – 2,000 mm in the west part, 2,000 – 4,000 mm in southeast part and 2,500 – 5,000 mm in northeast part. Large fraction of the high annual precipitation falls between July and October. Bangladesh in addition receives large volume of runoff from the 1.6 million Km<sup>2</sup> catchments occurring in India, Nepal and China. The runoff that arrives from catchments reaches Bangladesh during the monsoon when the local rivers are at spate. This causes flood inundating 12.0 to 24.0 percent floodplains and low lying areas. Large bridges like the Jamuna, Mukterpur Bridge (Sixth China-Bangladesh Friendship) over river Dhaleswari and others are managed by Bangladesh Bridge Authority (BBA) while other bridges are managed by RHD and LGED.

The EZ Bridge across the Sitalakhya River is to be constructed on moderately high terrace lands on both sides, hence is subjected either too shallow rain water flooding or is not flooded at all except during high flooding. The north central region is inundated during high flood years that cause once in ten years at downstream site of Gualundo ghat. The high flood is caused when the flood peaks in Jamuna and Ganges incidentally converge.

JICA extended financial and technical support for construction of EZ Bridge across the Sitalakhya River along with 4.2 Km bridge approach road on northeast side of Tongi-Bhairab. The EZ Bridge and the bridge approach road if constructed will help establishment of road connection between the Tongi-Bhairab road and Dhaka-Sylhet highway (N2) via A K Khan Industrial Park.

#### **1.5 Objective of the Project**

The objectives of Environmental Impact Assessment (EIA) study for the EZ Bridge site is to assess adverse impacts, enhance mitigation measures that may be encountered for the construction of the bridge and serve the GoB requirement fulfilling JICA's Guidelines. This study at the same time will help the planners, design engineers during design and feasibility studies and work as guideline for the Contractor during project implementation stages.

This document shall fulfill the DoE requirements and meet the JICA's Guidelines. It can therefore be included with the application for obtaining the Environmental Clearance Certificate (ECC) from DoE.

The objective of EZ Bridge construction on Tongi-Bhairab road, a 4.2 km bridge approach road and a bridge over the Sitalakhya River 14 Km upstream from the Kanchan Bridge and 6.0 Km down-stream from the Bhairab Bridge is to establish road link with existing road corridors and with A K Khan Industrial Park on the north side of Sitalakhya River. The



existing 2 lane Tongi-Bhairab road shall have to be upgraded into 2 lane road to support the projected traffic loads on National Highway systems (N1, N2, N3, N4,) and the Dhaka Bypass Road.

## CHAPTER 2. ENVIRONMENTAL LEGISLATIONS

### 2.1 Policy, Legal and Administrative Frameworks

#### 2.1.1 GoB Requirements

The BECA (1995), BECR (1997) enacted by MoEF (BCAS 1999) make EIA obligatory during feasibility study, planning, design and implementation stages. An ECC is required from DoE to initiate project implementation activities. The EIA documents (REA, IEE, EIA, EMP) are in reality the guiding tool to implementation agencies, management tools to the stakeholders during construction and operation stages.

The BECR (1997) categorized development interventions as Green, Amber (A, B) and Red depending on their degree of impacts on environment. The proposed upgrading of bridges involves construction reconstruction and widening of bridges on regional, national and inter-district roads managed by RHD. The subproject activities of WBBIP fall under Categories Amber- A and B hence an EIA (DoE 1997) will be needed for bridges longer than 100m and IEE will suffice for bridges shorter than 100 m (BCAS 1999).

#### 2.1.2 National Environmental Legislations

The Environmental Legislations enacted by MoEF and other Ministries intend conservation and proper management of natural, ecological, socio cultural resources and to keep the pollution impacts minimal keeping pace with world communities regarding conservation of nature. The GoB through enactment of legislatures strengthened MoEF and other Ministries to combat the adverse environmental impacts and to enforce all the legislatures in their intended spirits (Farooq and Rizwana 1996). The relevant Environmental legislations are given (Table 2.1).

**Table 2.1 Environment related Legislatures enacted by MoEF and other Ministries**

Environmental Legislations	Implementing Agencies	Key Features
The Environment Conservation Act, 1995 (Amendments 2000, 2002, 2010) Environment Conservation Rules, 1997 (Amendments 2000 and 2003)	Department of Environment (DoE)	<ul style="list-style-type: none"> <li>- Protection of areas of major environmental concerns.</li> <li>- Issue of Environmental Clearance Certificate.</li> <li>- Enforcement of Environmental Legislations, Acts and Rules</li> <li>- Monitoring the compliance of environmental legislations and standards.</li> </ul>
Environment Court Act, 2000 and (Amendments 2010)	District Environmental Court/ DoE/MoEF	<ul style="list-style-type: none"> <li>- Enforcement of punitive measures as per Legislations, Acts and Rules against the offenders.</li> <li>- Empowers officers of the concerned Departments to enforce the BECR (1997)</li> <li>- The amendments (2010) empower to open environmental court in every district.</li> <li>- Trial for environmental pollution under BECA (1995) Can be conducted under mobile court</li> </ul>
Bangladesh Penal Code (1860)	Civil Administration/DCs	<ul style="list-style-type: none"> <li>- Prohibits all activities that pollute the water bodies like spring, reservoir, open water bodies</li> <li>- Prohibits activities that affect public health and create public nuisance</li> </ul>

<b>Environmental Legislations</b>	<b>Implementing Agencies</b>	<b>Key Features</b>
Bangladesh Hill Cutting Act (1986)	DoE, Civil Administration/LGED	- Prevents Hill Cutting without prior clearance from DoE and/or from other responsible authorities
Vehicle Act (1927), Motor Vehicles Ordinance (1983) Bengal Motor Vehicle Rules, (1940)	Bangladesh Road Transport Authority (BRTA)/ Police/ Civil Administration	- Road safety, licensing, monitoring and maintenance of the vehicles standard on public roads/highways - Control air pollution due to emission from engine and check noise pollution
Brick Burning Act(1989) and Amendments (1992, 2011)	MoEF /DoE and Forest Department	- To control the legal aspects regarding brick burning including imposing restriction on use of biomass in brick burning kilns
Bangladesh Environmental Policy (1992)	MoEF	- Main objectives are maintaining the ecological balance, to protect natural resources, identification of environment polluting activities and ensure environment friendly development. - This policy helps protection of natural resources (air, water and soil)
Bangladesh National Land Transport Policy (2004)	MoC/Police/ RHD	- To ensure road safety and to reduce death and injury due to road accidents
Bangladesh Environmental Management Action Plan (NEMAP) 1995	MoEF a document prepared following the bottom up mechanism and participation of people.	- NEMAP helped identification of the actions needed to arrest/reduce environmental degradation, conservation of biodiversity, habitats and natural resources. - Promote sustainable development and quality of human life
Bangladesh Water Pollution Control Ordinance (1973)	Ministry of Water	- Taking steps both at governmental and private levels toward prevention of water pollution and environmental degradation.
Bangladesh Social Forestry Rules (2004)	MoEF, and ADB (2002)	- Provisions of these rules can permits GoB to extend forestry activities on private land and vice versa entering into mutual agreement amongst both sides.
National Land use Policy (2001)	Ministry of Land	- The land policy basically identified different users of land with the intention fixing priority amongst different uses land.
National Biodiversity, Strategy and Action Plan (2004) and Amendment (2011)	MoEF	- Main intention of the plan is to conserve biodiversity, ensure unique biological heritages and restrict introduction of invasive species
Acquisition and Requisition of immovable Property Ordinance (1982 Amendments 1994, 1995, 2004)	Ministry of Land	- To ensure legitimate compensation, rehabilitation for the PAPs.
Removal of Wreckage and Obstructions in inland Navigable Water Ways Rules (1973)	Bangladesh Inland Water Transport Authority (BIWTA)/Civil Administration/Police	- Removal of Wrecks and Obstructions from the Navigable Inland Waterways - Protection, maintenance development of the waterways for navigation
Water Supply and Sanitation Act, (1996)	Ministry of Local Government, Rural Development and Co-operatives (LGRD&C)	- Management and Control of water supply and sanitation particularly in urban areas

<b>Environmental Legislations</b>	<b>Implementing Agencies</b>	<b>Key Features</b>
Forest Act, (1927) and Amendments (1989, 2000)	MoEF and Forest Department	- Conservation of Reserve, Protected, Rural and Unclassified State Forests, - Conservation of Forest Ecology and Wildlife natural environment throughout Bangladesh
Private Forest Ordinance (1959),	Forest Department/ MoEF	- Control movement of timber and/or other products by land or water routes from the forests owned by private individuals and/or organizations
Bangladesh Wild Life (Preservation) Act (1974), (Amendment 1998)	MoEF, FD and Bangladesh Wild Life Advisory Board	- Conservation of wildlife in Bangladesh, in protected areas like Wildlife Sanctuaries, National Parks, Eco-Parks, in Forests and elsewhere
East Bengal Protection and Conservation of Fish Act 1950(Amendment (1982)	Ministry of Fishery/ Fisheries Department, Public Health Department	- Protection and Conservation of fish in Government owned water bodies and open water bodies - Restriction on fishing during fish hatching season July 15-September 30)
Natural Water Bodies Protection Act (2000)	LGRD and C Ministry/ Civil Administration	- Conservation of natural and man-made wetlands
Solid waste management Rules (2011)	Ministry of Environment and Forest (2011)	- Intended to manage the solid wastes including the urban wastes in environment friendly manner - Introduction of 3R(reduce ,reuse and recycle) strategies
Bangladesh Social Forestry Rules(2004)	Forest Department and MoEF	- Benefits sharing of rural forests - Forestry for poverty alleviation, involvement of landless, destitute women and economically backward communities
The Land Acquisition Act, (1894) and Amendments (1993, 1994, 2004)	Revenue Department, LGRD and C, Civil Administration	- Current GoB Act & guidelines, relating land acquisition - To pay maximum compensation to the PAPs
Wetland Protection Act (2000)	MoEF	- Restriction imposed on indiscriminate filling of wetland particularly by Development Farms for residential purpose.
Water Supply and Sanitation Act (1996)	Ministry of Local Government, Rural Development and Cooperative	- Development of infrastructure for sustained supply of safe water both in rural and urban residents.
Biodiversity conservation Act (2011)	MoEF	- Conservation of floral and faunal diversity in Bangladesh
Bangladesh Climate Change Strategy and Action Plan (2008)	MoEF	- Setting of several strategies e.g. social protection of health, disaster management, protective infrastructure development, decreased carbon release in atmosphere.

Before enactment of the mentioned environmental legislations the ecological and natural resources of Bangladesh e.g. air, water, soil, forests and wetlands had been protected under provisions of the Bangladesh Penal Code (1860).

Pollution of the natural resources, protection of public and occupational health and conservation of labor interests at work site during implementation stages not covered by the

environmental legislations as best practice in Bangladesh are protected under the contractual agreement reached between RHD and Contractor.

Bangladesh also ratified and/or acceded to 22 international conventions, protocols and signed 24 treaties relating to environmental conservation and protection. In addition, the international obligations that Bangladesh ratified are (i) Law of the Sea, (ii) Montreal Protocol, (iii) CITES Convention, (iv) Framework Convention on Global Climate Change (v) RAMSAR Convention(1971), (vi) Washington Convention (1972), (vii) Rome Convention (1951), (viii) International Convention to Combat Desertification, (ix) International Convention on Climate Change (Tokyo Protocol, 1997), (x) Occupational Health Hazards due to sound Pollution and vibration (1981), etc.

## **2.2 EIA System and DoE Procedures**

All development projects require clearance from the DG, DoE for initiating the implementation process. Environmental clearance certificate (ECC) from DoE is issued based on the findings of IEE that also stipulate whether an EIA be carried out by the project proponent or the IEE is enough. EIA study focuses on addressing the unresolved environmental issues in IEE report. The unresolved environmental issues may be because of inadequacy of data, lack of impact identification and/or lack of mitigation measures. The steps to be followed during EIA study are (i) collection of baseline study, (ii) identification of environmental impacts on IECs,(iii) prediction regarding potential impacts,(iv) evaluation of the impacts, (v) prescribing the mitigation measures,(vi) monitoring program, (vii) risk analysis and (viii) documentation and communication(DoE 1997, BCAS 1999).

The JICA requirements incorporate an EIA process based on four part environmental classification system. Projects under JICA system are screened for the impacts falling under the following categories:

- Category-A : Apprehended serious impacts,
- Category-B : Apprehended some impacts,
- Category- C: Impacts are unknown hence requires further examination and
- Category- D: No significant impacts apprehended.

### **2.2.1 Environmental Clearance Certificate (ECC)**

An ECC from DoE is required before initiating the project implementation activities. An application to the DG DoE is to be submitted through the local office in prescribed application form (Vide Rule 7.5) fulfilling the requirements detailed in BECR 1997 (BCAS 1999). The requirement of an ECC from the DoE can be bypassed during implementation of WBBIP provided the Social and Environmental Circle of RHD processes the matter like that of the Environmental Circle of LGED. The LGED deals all its project related matters including evaluation of EIA reports by the Environmental Circle of LGED while copies of the EIA reports are sent to the DoE for information. The WBBIP covers a large geographic region covering many administrative areas falling under different DoE office jurisdiction. Hence, processing of the environmental clearance issue routinely as per the BECA (1997) will be cumbersome and time consuming. Moreover, bridges under WBBIP include improvement and reconstruction of existing bridges on RHD managed highways where during implementation minimal environmental impacts are anticipated, therefore the matter may be dealt by RHD itself with minimal and formal involvement of DoE.

## 2.2.2 Policy Safeguards

The National Conservation Strategy (NCS 1991) and National Environmental Management Action Plan (NEMAP 1995) emphasize on the inter-sector coordination and participation of public as well as the private sector in development activities. Basic guidelines of the National Environmental Policy (NEP,1992) are:

- to ensure protection and conservation of physical, ecological and cultural resources from depletion, deterioration and degradation due to human activities,
- identification of activities that induce pollution/degradation/ deterioration of natural environmental resources,
- to ensure protection and conservation of historical/archaeological/ cultural structures/sites and relics from deterioration and degradation due to human activities and
- Protection of identities, rights, livelihood and heritages of the indigenous tribes.

The pivotal environmental safeguards are sustainable and environment friendly development, poverty reduction, women empowerment and planned employment generation. To achieve these goals emphasis should be given on avoidance, reduction and/or mitigation of impacts on environmental resources during project implementation stages and enhancement of the positive impacts to harvest optimum benefits from the development endeavors.

## 2.2.3 Harmonization of GoB and international Policies

GoB/DoE: BECR (1997) provided provisions for conservation of environment, improvement of environmental standards, mitigation and control of environmental pollutions and made EIA study obligatory before initiation of project implementation activities. Made it obligatory obtaining a clearance certificate from DoE for implementation of development endeavors, categorized the different development endeavors (projects, industries) in respect of their EIA studies requirements. And set the environmental pollution standards for air, water, land and noise under different conditions.

JICA: Made EIA study obligatory at the early stage of project planning. Considers multiple alternatives in order to avoid and/or minimize the adverse project impacts and chooses the project options with minimal environmental impacts.

World Bank: The environmental safeguard policy of WB is though the best practice of local governments but the main objective of the policy is to prevent and mitigate the harm to people and the environment. WB has also categorized different development endeavors financed by it based on environmental impacts hence made EIA study obligatory for project initiation and implementation.

ADB: Categorized all development endeavors based on their impacts on environment and developed elaborate environmental safeguard policies for different project categories. As per ADB categorization the

projects with significant adverse impacts( Category-A) require EIA and EMP to address the adverse impacts, projects with lesser adverse impacts (Categories-B,C) require either IEE or no EIA study.

Policy harmonization: However, environmental aspects due to due to implementation of any development endeavor should be harmonized during implementation stages so that the adverse environmental impacts are kept minimal and the positive impacts are enhanced. These to be done to harvest maximum benefits to the majority people from any project investment.

### **2.3 Land Acquisition Frameworks**

Land Acquisition Law in Bengal was first enacted in 1824. The provisions and scopes of that law were subsequently amended and expanded in 1850, 1857, and 1863 leading to the enactment of Land Acquisition Act 1894. This Act continued enforced until partition of India through proclamation of independence in 1947. This Act however lacked the provision for payment of compensation for the acquired land and other immovable properties, as a result the requiring bodies used to overestimate the actual land requirements to cause loss to the land owners. The Acquisition of Immoveable Properties Ordinance-II 1982 was enacted to safe guard owners right regarding payment of compensation and to reduce wastage of land. Under this Ordinance the DCs or their nominees are authorized to examine the claim for compensation taking into consideration all factors regarding entitlement of compensation and empowered to divide the compensation amount amongst all the legitimate shareholders.

The Emergency Property Acquisition Act was enacted in 1989, this Act empowered the Government authority to acquire private properties on during high floods, tidal bores, river bank erosion and other sorts of natural calamities to act swiftly to check those calamities. Hence, it is clear that the Act 1989 did not replace the Ordinance 1982, rather both the legislatures remained enforced simultaneously and applied during implementation of the Bangabandhu Multipurpose Bridge Project.

The Deputy Commissioners (DCs) as chief executives of the district or any officer authorized by them can exercise the power conferred on the DCs regarding requisition of Immoveable Properties under the Ordinance 1982 and Act 1989. The Bangabandhu Multipurpose Bridge (Land Acquisition) Act 1995 was enacted later on July 9, 1995. Under provisions of this Act persons constructing structure/establishments and or modifying the land class/type that is likely to be acquired with the intention of extraction higher compensation rate will not be entitled any compensation for such structures. Land acquisition issue may not be a significantly disturbing issue during implementation of WBBIP.

### **2.4 Framework for Resettlement**

#### **2.4.1 Objective of the Abbreviated Resettlement Plan (ARP)**

As per the JICA bounded guidelines for Environmental and Social Considerations require if screening for social assessment make it necessary that resettlement of some people at bridges sites will impacts a time-bound action plan with budget provisions. A budget for resettlement is to be prepared in that case and be incorporated as integral part of the project design. However, World Bank (WB) clearly indicated the provisions for resettlement where involuntary settlement of population from project sites fewer than 200 are needed at bridges sites, an ARP may be prepared to serve the purpose. ARP according to such principal might

address issues like land acquisition and resettlement following the legal framework of GoB and JICA's guidelines for Environmental and Social considerations highlighting the impacts on involuntary resettlement. The aspects of human rights of indigenous people and cover the APs under resettlement/rehabilitation program including income restoration, poverty reduction and legitimate assistance for poor and informal settlers. Hence, the ARP approach may involve (i) land acquisition and resettlement issues, (ii) mitigation of impacts to the distressed women and vulnerable groups, (iii) income generation support to the eligible members of project affected families and (iv) assistance for poverty reduction to the poorest section of people.

According to GoB policy a plan is to be prepared setting out provisions for compensation and rehabilitation to the PAPs and/or families before the project is executed. It should be a policy that implementation of projects does not affect any PAPs in a way that their

- living standards are adversely affected,
- income earning opportunities, business, occupation, work or place of residence or habitat adversely affected even temporarily,
- right, title and/or interest in ancestral houses, right to use any land, properties, premises are affected. Right on grazing land, common properties, tenancy, annual or perennial crops and trees are affected temporarily or permanently,
- social and cultural activities and relationships amongst the family clans and keens may be affected during resettlement planning process.

The objective of the ARP is to provide a strategy for providing PAUs with replacement value of land, structure, trees and other physical assets and restoration of income levels/living standards either through a compensation and rehabilitation package that ensures that PAUs are not left in a position where they are worse off with the project than without it. Thus, in accordance with JICA policy, abbreviated resettlement plan, depending on the magnitude of impacts - has been prepared for the Project.

Objectives of the project and Abbreviated Resettlement Planning have been disclosed to the affected persons through community based consultation meetings and focus group discussions in local language in two phases of stakeholders/community consultation as well as during conducting census and socioeconomic survey. Compensation and other assistances will have to be paid to APs prior to displacement or dispossession of assets. Upon approval, the final ARP will be uploaded immediately on the RHD website.

#### **2.4.2 Methodology for Preparing the Abbreviated Resettlement Plan**

The Consultant conducted census & socioeconomic survey in April through June 2014 for information necessary for preparation of this ARP. The survey was also associated with stakeholders' consultation, focus group discussion and property valuation survey.

The adverse impacts include land acquisition and displacement of households and shops. The data gathered during the survey has been entered into an electronic database which identified each affected household (AH) and the way they are impacted and losses they will incur. The objective of the census and socioeconomic survey was to establish a detailed inventory of the households and physical assets to be affected by the project; develop a



socioeconomic profile of the AHs and affected persons (APs). The surveys also serve as a benchmark for monitoring and evaluation.

The surveys indicate that construction of the EZ Bridge will require acquisition of 12.49 hectare of land. In total the Project will displace 39 Project Affected Units (PAUs) of which 39 residential households with a total population of 190 only. As per JICA's Guidelines the appropriate Environmental and Social Considerations are to be given on vulnerable women, children, and distressed elderly people and ethnic minorities. All concerned who are susceptible to environmental and social impacts having little/no access to decision making process are to be given due consideration. Therefore, this ARP has been prepared with due consideration to all concerned to mitigate impacts on Affected Households (AHs) toward restoration of their livelihoods at least to the pre-project level.

The ARP has been prepared based on National Law ARIPO (GoB) and on JICA guidelines for the benefits of affected families susceptible to environmental and social impacts due to implementation of the EZ Bridge project. The ARP therefore establishes the provisions for resettlement of PAPs so that the affected households can restore a living at least to their pre-project levels. The affected poor and vulnerable households should get due financial compensations and if required the resettlement benefits as per legal provisions.

This ARP during discussion meetings will elaborately review all sorts of impacts that the PAPs can suffer during the implementation stages and the appropriate mitigation measures. The budget for impact mitigation can be revised from time to time reflecting the changes in AHs number and/or the losses identified at later stages due to increased volume of impacts, addition of properties and/or price escalation.

## **CHAPTER 3. IMPORTANT ENVIRONMENTAL COMPONENTS**

### **3.1 Physical Components**

#### **3.1.1 Climate**

Bangladesh has a per humid mega-thermal climate with no water shortage at 50 cm depth (Thorntwait 1948) at any part of the year. Maximum temperature during May-October period is 31-34<sup>0</sup> C and minimum temperature during November-February period is 11-16<sup>0</sup>C. Winter climate (November-January) is cold and dry, spring climate (February-March) is pleasant, and summer climate (March-May) is hot and dry while the monsoon season (June-September) is wet. The temperature and rainfall during the monsoon season are high. Peak temperature during April-May locally may reach up to 40<sup>0</sup>C (Hassan 1999, Manalo 1975, FAO 1971). According to Kopen's (1936) classification Bangladesh has tropical rainy climate (A-type). The mean temperature in coldest month in this type of climate remains above 18<sup>0</sup>C and the mean rainfall in driest month remains below 6.0 mm. The average climatic data of Khulna, Rajshahi and Barisal stations are shown (Table 3.1). Normal activities during construction stage may be hindered due to incisive rains and high floods.

Bangladesh has virtually a homogeneous climate with slight local variations. The north east region has maximum rainfall while the northwest region has minimum rainfall. Temperature also shows little local variation from the north east region toward south west region. Occasion nocturnal rain with thunder shower observed in the south east region is due to its vicinity to the sea. The monthly rainfall and temperature of Khulna, Rajshahi and Barisal divisions are shown (Table 3.1).

**Table 3.1 Monthly Rainfall (mm) and Temperature (°C) in Dhaka Divisions**

Months	Dhaka	
	Tem(°C)	Rainfall (mm)
January	28.5	0
February	33.35	15
March	37.6	5.5
April	36.5	172
May	37.15	185
June	35.45	477
July	35.2	542
August	35.55	336
September	35.30	421
October	35.15	190.5
November	32.2	58
December	29.15	0
Annual average	34.25	200.16

Source: BBS 2012 (Average of 2006 and 2007)

Climate of a region depends on geographic location, elevation and vicinity to sea or large water bodies. Implementation of EZ Bridge will not affect the climatic factors hence will have no impact on climate at project site or in Bangladesh. However, the climatic elements along EZ Bridge alignment may be monitored during operation stage to record the local weather conditions.

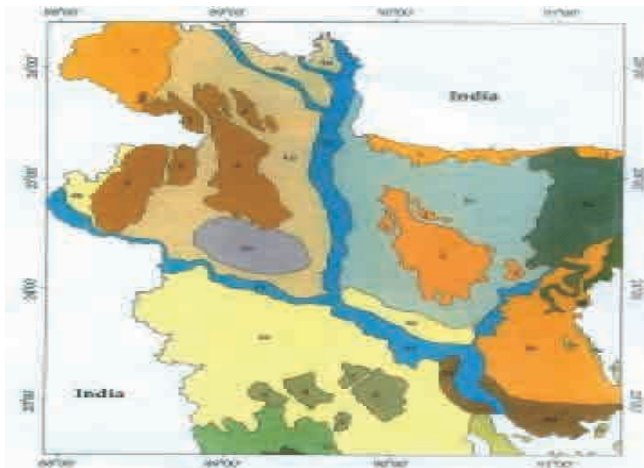
### **3.1.2 Topography and Geology**

Topography of Madhupur Tract at EZ Bridge command area is situated on contrasting relief features. At EZ Bridge site the relief of command area is more or less level medium uplands.

The command area of EZ Bridge occurs on level terrace land with shallow drainage valleys (bydes). The localized saucer shaped seepage areas occur at places where run-off from adjoining highlands. Water from the Nagda beel is shedded to the Shitalakhya River at Ghorasal and to the Turag River at Tongi. The uplands of Madhupur Tract extend north toward Mymensingh via Gazipur forming vast highland tract amongst the Gazipur, Mymensingh and Tangail districts. This upland is presently covered by BFD managed depleted deciduous sal forests. The level terrace lands slope toward southeast (SRDI 1963) forming vast shallowly flooded land mass.

The fine clay underneath the Bhawal-Madhupur tracts called Geruzen Clay occur at variable depths whereas the red clay mantle of the Madhupur tract, Barind tract and Mainamati tract comprise the erosion products from the Gondoana land that floated in Sea of Tethys during the Mio-Plicene period. This vast land mass that extended from northwest toward southeast broke into pieces due to tectonic activities (FAO 1971) forming the Barind, Bhawal-Madhupur and Mainamati tracts.

The level terrace land covering the EZ Bridge command area passes over either through irrigated and/or rain fed paddy lands.



Legend (Source: IUCN 2002)  
 3 Madhupur Tract  
 4a Teesta Flood Plan  
 4b Ganges Flood Plan  
 4 c Meghna-Jamuna Flood Plans

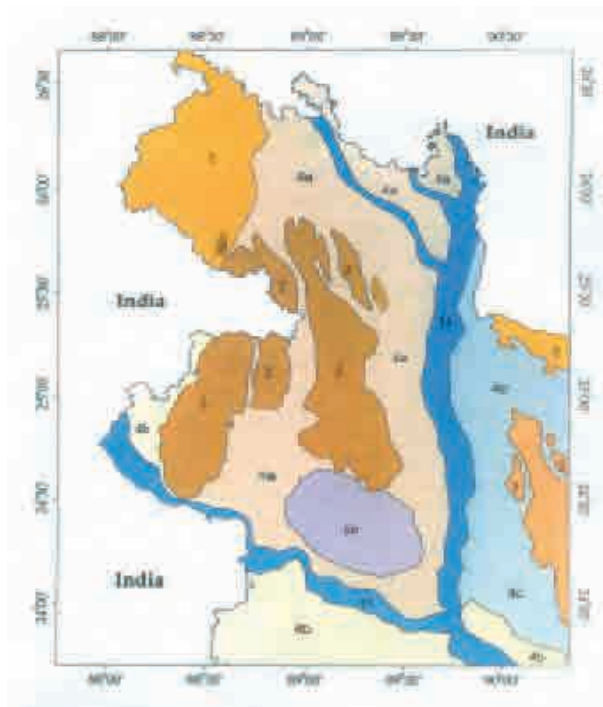
**Figure 3.1 Meghna, Tista, Jamuna and Ganges Floodplains**

Large scale land filling for road embankment construction will impact surface drainage because of change in local relief condition. Moreover, land filling for construction of A K Khan industrial Park on the northeast bank of Shitalakhya River may induce local flood level unless the storm water discharge management done properly. However, construction of the EZ Bridge and the bridge approach road may not otherwise have serious impact on local drainage condition.

**3.1.3 Soils and land uses**

Soils of the Barind tract are weakly structured, olive, acidic clays in the subsoil overlying an unaltered clayey substratum at variable depths. The landscape was probably colonized by pioneer vegetation species (grasses and/or sedges) initially several thousand years back. The early settlers cleared the pioneer vegetation to bring the land under agricultural uses. The early settlers disliked the well-drained upland for sedentary agriculture because of shortage of water. The indigenous tribes (Santal Kool and others) on the contrary preferred to settle on undulated uplands and practiced shifting cultivation initially (SRDI 1963-1973, FAO 1999). The Barind Tract (Legend 2) and the Teesta floodplain soils (Legend 4a) are shown in Figures 3.1 and 3.2.

The lands on floodplains were also initially covered by reeds, sedges and other sorts of grass varieties. The floodplain soils were either cleared for agriculture by early settlers or were brought directly under agricultural uses.



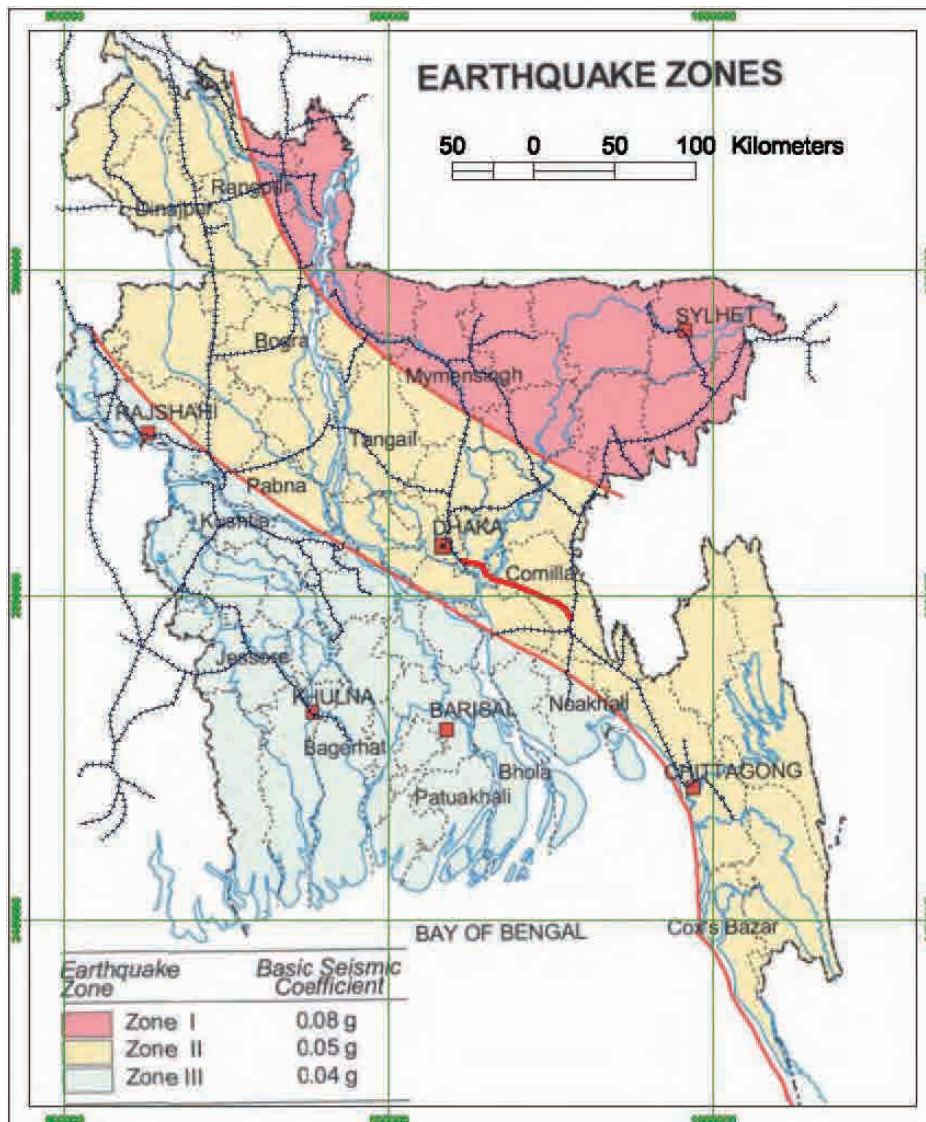
Legend( Source: IUCN 2002)  
 2 Barind Tract Land  
 4a Teesta Flood Plan

**Figure 3.2 The Barind Tract Land**

Implementation of the EZ Bridge project will not affect soil qualitatively hence will not have impact on land uses directly and/or indirectly. However, acquisition of 12.59 hectare lands for the project will have direct impact on few PAPs and cumulative impact on food production.

**3.1.4 Sedimentology and seismicity**

Geologically, lands of the Barind Tract belong to the Plio-Plaiistocene age and the lands in river floodplains (Jamuna, Meghna, Teesta, Ganges and of other rivers) are of recent origins. In Bangladesh, the floodplain sediments from the consideration of sedimentation patterns are classed as meander, estuarine and tidal.



**Figure 3.3 Different Seismic Risk Zone in Bangladesh (GoB 1979)**

The floodplain sediments have been uplifted and down warped at places subsequently either due to sedimentation and/or due to tectonic activities. The vertical homogeneity of the Barind Tract sediment if treated as an indicator these sediments can probably be assumed as of Plio-Pleistocene period. This assumption could not be confirmed till date because of conspicuous absence of stratification and/or of marine fossils (animal or plant) in them. The Bangladesh National Building Code (1996) and the Seismic map of Bangladesh (GoB 1979) did sub-divide Bangladesh into three seismic zones based on the tremor intensities. The command areas of WBBIP are situated in low/ seismic risk zone (Zones-II and III). This is evident from Figure 3.3. Bangladesh is situated between the Indian and Eurasian continental land masses. Occurrence of the Himalayan Mountain belt in the north and Mayanmariian Mountain belt in the east make Bangladesh seismically active (Morgan and McIntire 1959).

The Bangladesh Building Code (GoB 1983) and Bangladesh Geological Survey (GoB 1979) divided Bangladesh into three seismic zones. Zone-I has high seismic risk, Zone-II has medium seismic risk and Zone-III has least seismic risk. The DBR site passes through the

seismic Zone-II that has seismic coefficient value (Z-Value) 0.15-0.25 Richter. The seismic factors require to be considered during design phase of the DBR upgrading program.

### **3.1.5 Hydro-geology**

The landscape both of the Barind and floodplains has a southeast slope alignment and flow direction of the major rivers contribute to this assumption. The rivers in the downstream regions along flow directions either receive run-off through different tributaries or distribute run-off through many distributaries until finally shed the water to the sea. The rivers remain at spate during the monsoon due to local run-off in addition the trans-boundary rivers receive run-off from nearly 1.6 million Km<sup>2</sup> catchment in India Nepal and China. Usually 10-12 percent floodplain area in Bangladesh is flooded during monsoon in normal years. But up to 24 percent floodplain area of Bangladesh may submerge during abnormal floods peak flood levels in Padma and Jamuna coincides. This happens once in ten years or so.

The deep ground water table (DGWT) on Barind tract land fluctuates between 20 and 30 meters during the dry season and reaches near to the surface during the rainy season. Ground water table on terrace lands sinks up to 7.0 m during lean season due to draw down by deep tube wells. Further exploitation of DGW table may create imbalance between water demand and annual recharge affecting the poor people living on Barind land (WARPO 2000).

Ground water both shallow and deep in the floodplains are also being used intensively for irrigated agriculture, industrial and domestic uses throughout Bangladesh. This country though rich in ground water reserve and there exists ample opportunity for ground water recharge during monsoon and during floods but consistent and growing rate of exploitation ground water has already created a seasonal imbalance between demand and supply of water.

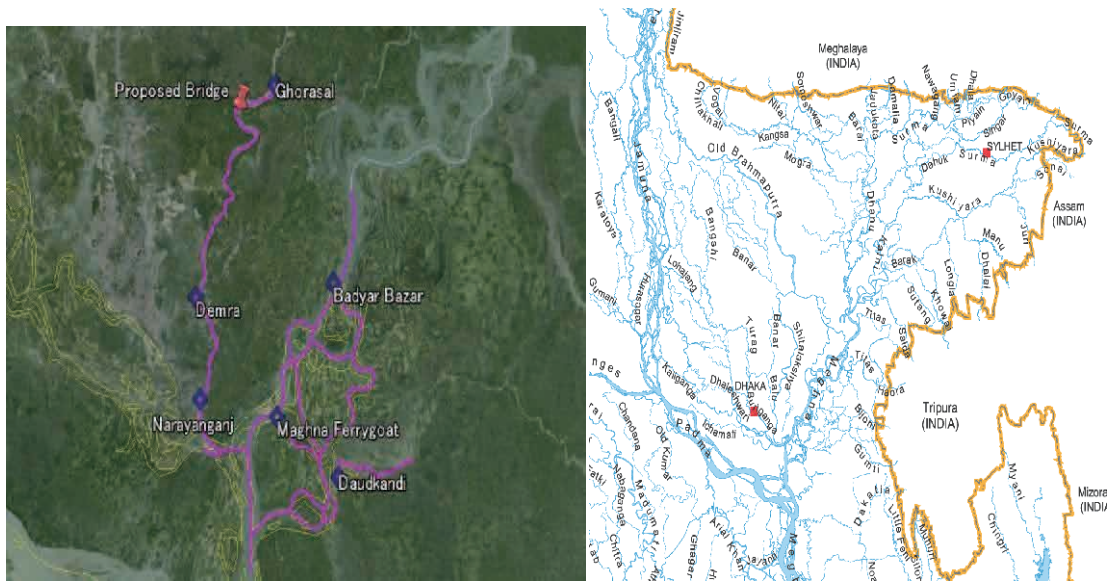
The ground water table at EZ Bridge command area sinks down to 7.0 m due to draw down of tube well irrigation.. Further exploitation of DGW table will widen the gap between demand and annual recharge of ground water. This will affect the people in Madhupur tract and at project command area (WARPO 2000).

### **3.1.6 River and Characteristics of River Flow**

The river Lakhya, also known as Shitalakhya River, originates from Old Brahmaputra River and it is a part of the Old Bhahmmaputra-Lakhya-Meghna river system. The Lakhya River flows towards south and joins the lower Daleswari near Munshiganj and the combined flow meets with Meghna River near Gazaria.

The Lakhya River is a well-defined channel and passes through the erosion resistance soils of the Madhupur Tract without a river-morphology of the meandering and braiding river. The length of the river from its riverhead up to the confluence with the Dhaleswari is about 112 km. The peak discharge of the river during high-flood, ranges from 660 to 2740 m<sup>3</sup>/sec at Demra station. The highest recorded water level at Demra was 7.11 m PWD during 1998 flood which is about 1.0m higher than the natural ground level. The maximum depth of river around the proposed bridge locations ranges from 15 to 20 m from the existing bank level. Existing river course of Lakhya River and proposed bridge location are shown below:





Source: JICA Survey Team

**Figure 3.4 Location of Gauging Station**

**Table 3.2 Collected Hydrological Data at Related Gauging Stations in Lakhya River & Lakhya River and Meghna Riverine System**

No.	Name	Station ID (WMO)	Latitude	Longitude	Distance from Proposed Bridge	Collected Item / Period of Record				SHWL SLWL (statistic)	Bathymetric Survey Drawings	Remarks
						Daily High/Low Tide	Annual Maximum Water Level	Daily Mean Discharge	Annual Maximum Discharge			
1	Narayanganj	SW180	90.5240	23.6602	28km to downstream	1971.4-2012.9	1981-2012	-	-	○	○	Daily mean discharge has many missing data.
2	Demra (Lakhya)	SW179	90.5101	23.7217	28km to downstream	1971.4-2012.9	1968-2012	(1997.6-2006.6)	1966-2012			
3	Demra (Bahu)	SW7.5	90.5018	23.7232	28km to downstream	-	-	-	1994-2012			
4	Ghorasal	SW178	90.6199	23.9384	8.1km to upstream	-	-	-	-			
5	Lakhpur	SW177	90.6534	24.0397	37.2km to upstream	-	1983-2012	-	-			

Source: BWDB, BIWTA

### 3.1.7 Landscape

Bangladesh has the total land area of 147,470 km<sup>2</sup> of which 79.1 percent is floodplain, 12.6 percent in north, northeast and south southeast is occupied by Mio-Pliocene hills and 8.3 percent in north central and in northwest regions is Plio-Pleistocene terrace land.

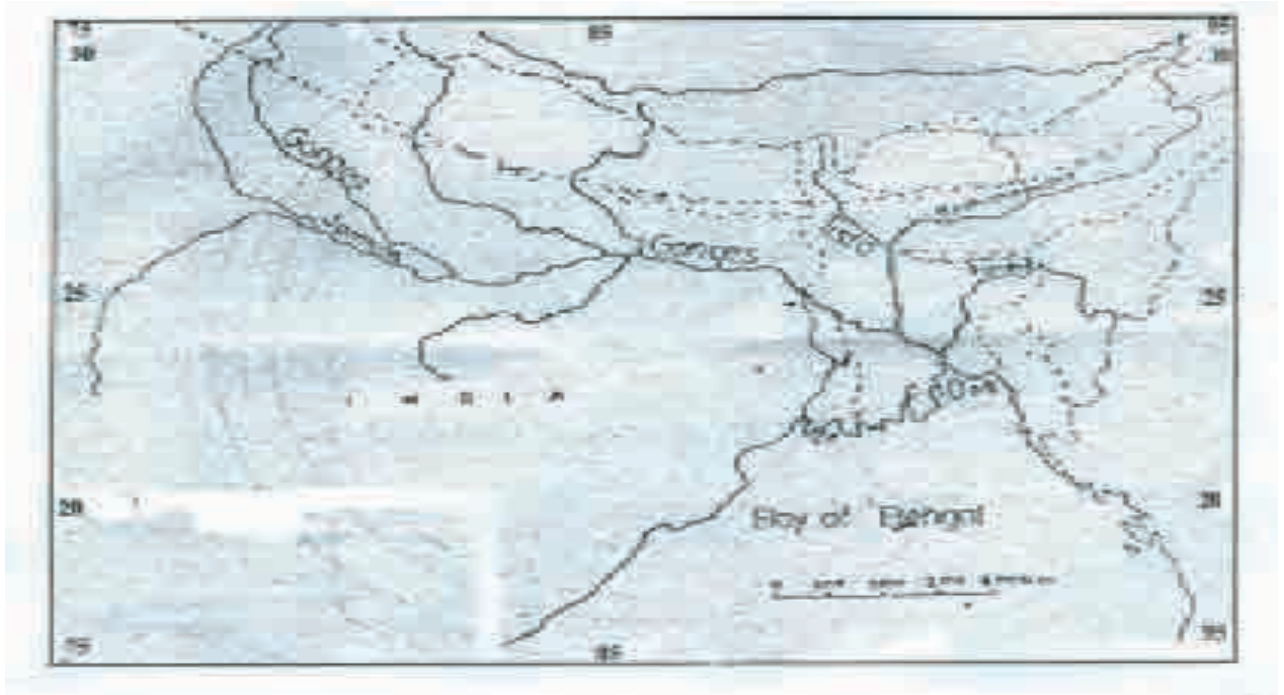
### 3.1.8 Ground Subsidence

Bangladesh because of location is situated in the earthquake prone region. This country jolted by over 200 quakes since past two years. No major case of ground subsidence occurred either in floodplains or elsewhere due to earth quake. The devastating earthquakes namely the Chakhar (1869), Bengal (1885), Assam (1897), Srimangal (1918), Dubrigarh (1930) had tremor intensities over 7.0 (Richter). The epicenters of all the earth quakes were outside the Bangladesh boundary. The Assam earthquake that caused large scale damage in Assam, Bengal and Bihar had tremor intensity of 8.7 Richter. But no large scale ground



subsidence occurred in Bangladesh due to the Assam earth quake (Bangladesh Building Code 1996, Seismic Map of Bangladesh 1979).

The most seismically vulnerable eastern part of Indo-Bangladesh where most devastating earthquakes occurred during past one hundred years is shown in Figure 3.4.



Source: FAO 1971

**Figure 3.5 The most Earthquake prone Eastern Region of Indo-Bangladesh**

### **3.1.9 Bottom sediments**

Bangladesh was formed due to deposition of sediments transported by major rivers that had been deposited under meander, tidal and/or estuarine conditions. The floodplain sediments are therefore vertically well sorted. The sediments in bottom layers settled down earlier are therefore coarser and coarseness of sediments increases with the depth of the layer. The coarse textured sediments occur below 100 m depth in floodplains and level terrace regions. This is evident from the borehole records of deep tube wells and from the available sporadic geotechnical study data from different bore whole sites.

The presence of harmful heavy metals like arsenic, cadmium, chromium, lead and mercury, etc. are required to be tested in dredge material to confirm whether these metals exist in bottom sediments.

### **3.2 Ecological Components**

The village forests are observed on homesteads, waste and marginal lands along road and embankment sides. Total households (H/H) in Bangladesh are 25 million spreading over 85,650 villages (BBS 2007). Village forest cover in Bangladesh is 0.27 million hectare out of the 2.56 million hectare total forests area (Forestry Master Plan, 1993). The per capita forest land area was 225 m<sup>2</sup> in 1993 showing a declining trend due to over exploitation, demographic pressure and natural calamities. Tree species on homesteads include fruit, fuel

wood, timber, medicinal plants, MPTS and bamboos; trees on roadsides include timber, fuel wood, fruit, aesthetic and medicinal species. Fruit trees on road sides comprise 10 percent. Huge quantity of forest produces (fuel wood, timber, raw materials for industries, building materials and fruit) are obtained from rural forest (Katebi, N.A. 1997).

### **3.2.1 The floral Species**

The WBBIP sites do not pass through the national forests managed by BFD except the localized patches of sal forest in the northwest region. The tree planting culture on road sides developed since the Moghul and subsequently British periods. BFD since eighties began roadside tree planting keeping in mind the economic, ecological and aesthetic objectives. Later CARE, SIDA and Proshika planted trees on roadsides with multiple objectives e.g. to generate rural employment, to boost production of timber, industrial raw material and fuel wood and for alleviation of rural poverty.

The species planted on road sides are: rain tree (*Samanea saman*), krishnachura (*Cassia* spp.), mahogany (*Swietenia* spp.), raj kori (*Albizia richardiana*), auriculiformis (*Acacia auriculiformis*), eucalyptus (*Eucalyptus camaldulensis*) and sisoo (*Dalbergia sisoo*).

The homestead species are: mango (*Mangifera indica*), black berry (*Syzygium cumini*), jack fruit (*Artocarpus heterophyllus*), coconut (*Cocos nucifera*), betel nut (*Areca catechu*), etc.

Hijal (*Barringtonia acutangula*), mandar (*Erithrina indica*), pitali (*Trewia nudiflora*), silk cotton (*Bombax ceiba*), toddy palm (*Borassus flabellifer*) are planted in flooded land.

The aquatic floral species include: kochuripana (*Eichhornia crassipes*), khudipana (*Lemna minor*), shapla (*Nymphaea* spp.) kolmi (*Ipomea aquatica*), halencha (*Enhydra fluctuans*) and many weed species. The kochoripanakhudipan and several other floating species are treated as eutropic vegetations.

### **3.2.2 The Faunal and Avifaunal Species**

Commonly observed wildlife species are: jackal (*Vulpes bengalensis*), mongoose (*Herpestes edwardsi*), civet cat (*Viverricula indica*), otter, snake, rodents, frogs, toad, turtles still occur at WBBIP site (IUCN 2002).

The commonly observed birds are: spotted dove (*Streptopelia* spp.), rock pigeon (*Columba livia*), parakeet (*Psittacula krameri*), cuckoo (*Hierococcyx* spp.), koel (*Eudynamis scolopacea*), owl (*Athene brama*), drongos (*Dicrurus* spp.), common myna (*Acridotheres* spp.), crow (*Corvus* spp.), magpie robin (*Copsychus saularis*), red vented bulbul (*Pycnonotus cafer*), jungle babbler (*Turdodais striatus*), tailored bird (*Orthotomus sutorius*), heron, little egret, cattle egret, storks and several wetland bird species.

### **3.2.3 Biodiversity status**

The major habitats for floral and faunal diversities in Bangladesh are the hill forests, inland upland forest, homesteads, wetlands, coastal mangrove forest, agriculture lands, etc. All the ecosystems have been disturbed since the past decades due to poor management, demographic pressure, natural calamities and deteriorated law and order situation. Consequently, diversity and population of flora and fauna declined in Bangladesh. Many wildlife species as a result is under stress and 50 of those are endangered already. Ten percent mammal, 3.0 percent avifauna and 4.0 percent reptile species are extinct in

Bangladesh (IUCN 2000). Status of the resident inland vertebrates in Bangladesh as indicated in the IUCN Red Book (2000) is shown in Table 3.3.

**Table 3.3 Status of the resident Inland Vertebrates in Bangladesh**

Groups	Total living	Extinct	Threatened			Not threatened
			Critically endangered	Endangered	Vulnerable	
Fishes	266	0	12	28	14	146
Amphibians	22	0	0	3	5	7
Reptiles	109	1	12	24	22	12
Avifauna	388	2	19	18	4	189
Mammals	110	10	21	13	6	17

Source: IUCN 2000

### 3.2.4 Wetlands

In Bangladesh wetlands include the fresh and tidal rivers; ponds, lakes, beels, haors, baors and pools and the seasonal and tidal floodplains. Wetland ecosystem in Bangladesh serves as the rich habitats for numerous floral and faunal species including 266 fresh water fish species. The large haors in northwest, northeast and in north central regions play pivotal roles in flood abatement, fish propagation and stocking. In addition, these habitats provide shelter to innumerable local and migratory bird species. Unfortunately, the wetlands in Bangladesh depleted due to conflict between agriculture and fisheries, poor water management, water withdrawal by upper riparian countries and watershed degradation. All these affected capture fisheries, navigation, aquatic wild lives and the bio-diversity in general (RAMSAR Convention)

The wetlands also stabilize local weather, influence ground water recharge, catch pollutants and toxicants, regulate hydro-ecological condition and maintain the soil organic matter balance.

## 3.3 Socio-cultural Components

### 3.3.1 Water Use

Water of open water bodies (rivers and channels) throughout Bangladesh is used extensively for navigation, capture fisheries, agriculture and for industrial uses. The people settled on river sides usually depend on water for domestic uses that include potable water collection, bathing and washing and cattle washing. Though at present most of the rural people collect their drinking water from shallow and deep tube wells sunk on homesteads or at agriculture land. Fishermen and boatmen communities living along the river banks adopted fishing and boat plying as professions. Presently many industries that developed on river adjacent sites and banks make industrial use of river water. Unfortunately wastes and effluents from many of these industries are discharged in the rivers. Part of the solid wastes from these industries and from urban/rural residences are also discharged untreated in open water bodies that pollute the river water.

Water in pond, lake, harbor are used for stocking capture fish and for captive fisheries by a section of people. Water in closed water bodies like the open water bodies are used for domestic and limited agricultural uses. The closed water bodies are extensively used for fish

culture. Fish culture has presently turned as a sustainable source for supply of fish to the local markets and generated work for a large number of poor.

The seasonally flooded croplands though shallowly flooded are also used for short rotation fresh water fishes culture while shrimps and white fish species are cultured in brackish water zones. Cat fish culture in transplanted paddy fields as alley generates additional income to the farmers and play roles in biological control of insects.

The rivers are used for navigation, fisheries, industrial uses and irrigation purposes. The boatmen, fishermen and poor people use river water for domestic purposes.

Water available in the Sitalakhya River is used for household utilities, navigation, capture fisheries, agriculture and industries. People on river banks use river water for domestic uses, bathing, washing and for cleaning domestic animals. The Sitalakhya River according to IWTA is a classified navigation route, many industries grew on the banks, many fishermen depend on Sitalakhya to earn livelihood and water is used for agriculture practice.

### **3.3.2 Socio-cultural Infrastructures**

The socio-cultural structures built during the Buddhists period revealed from archaeological excavations at Mohasthangarh, Paharpur, Mainamati, Munshiganj and at other places that are of over one thousand years old. Cultural advancements achieved during the Buddhist period in fine art and sculptures are observable on the terracotta drawings and stone and bronze sculptures of Lord Buddha recovered at Mohasthangarh, Paharpur, Mainamati and at other excavation sites. Lakes, wells, temples and stone sculptures of Radha-Krishna and different Gods and Goddess represent the Hindu period. Bangladesh progressed tremendously during the reign of Pal kings in 8<sup>th</sup> century. Progress of the Pal period is well reflected in their art, sculpture and literature. Many sculptures of Hindu period are engraved in stone, bronze, wood and terracotta drawings on temple walls have been unveiled in the recent past from different parts of Bangladesh. Muslim and Mughal structures are the royal palaces, shrines, mosques, tombs and military structures that exist in Bangladesh and elsewhere in India. The modern cities, townships and infrastructures were initiated during the British rule are virtually the nucleus of modern cities all over India and Bangladesh (Dr. Hannan, M. 1995).

The few cultural heritages that occur at EZ Bridge command area are mosques, graveyards, eidgah, temple, cremation place, etc. The structures of common interests include the academic and/or religious institutions, play grounds, post offices, public toilet, dispensary, etc. (Hannan, M. Dr. 1995). Not many such structures likely to be affected by the EZ Bridge and its bridge approach road.

### **3.3.3 Indigenous/Ethnic Communities**

The Chakma, Khami, Kuki, Boum, Banjogi, Kiang, Lushai, Marma, Moorang, Mroo, Pankhoo, Rakhain, Tanchunga, Tipra, Kiang and Chak live in Chittagong and Chittagong Hill Tract; Khasia, Monipuri, Khami, Kiang live in Sylhet, Habiganj, Moulvibazar, and Garo, Hajong, Santhal, Kool and Kotch live in the Madhupur and Barind Tract regions (BBS 2005, 2012). The ethnic population size in Bangladesh is nearly 10 million; 0.7 million live on eastern and southeastern hilly regions and 0.3 million in other districts. The Santhal, Sakh, Hajong, Orao, Koch and Kool live in Rajshahi, Harijan and Rajbangsi tribes live in wetlands and nearly 30,000 Rakhain people live in Patuakhali district. Many of these ethnic minority

people particularly of Patuakhali and Rajshahi districts have virtually merged with the mainstream culture. The merging trend of indigenous people are steadily merging with the mainstream population at an expedited rate since past several decades due to improved road communication that induced internal movement of labor.

Presently no indigenous people live at EZ Bridge site and in the command area. The Garo tribe people live in sal forests of Mymensing, Tringail and Madhupur tract region. The Garo tribe people will not be disturbed by due to implementation of EZ Bridge project. These people are rapidly merging with the main stream population due to communication improvement, intrusion of main stream people in sal forest vicinity, increased literacy rate and due to the influence of Christian churches.

### 3.3.4 Health-care Facilities

Health care facilities in Bangladesh are provided by GoB, NGOs, private clinics and individual practitioners. In addition, service from Homeopaths and Ayurvedic practitioners are also available at low cost both at rural and urban areas. The available health care facilities in Bangladesh are shown in Table 3.3. Information on health care facilities in more detail may be Health care services in Bangladesh are provided at EZ Bridge site by GoB, NGOs, private concerns and individual medical practitioners. The rural doctors, Homeopaths and Ayurvedic practitioners are available at every growth centers and developed villages.

Like elsewhere in Bangladesh healthcare services are available at EZ Bridge command area at growth centers, Upazilla towns and district towns. The rural health care facilities improved in Bangladesh since liberation of the country (1972) due to interventions and efforts GoB, NGOs and private organizations. The available national health services facilities are shown in Table 3.4.

**Table 3.4 National Health Services facilities available in Bangladesh.**

Healthcare facilities (Total in Bangladesh)	Survey years			
	2003	2004	2005	2006
Hospitals (total)	1,384	1,676	1,676	1,683
Govt. Hospitals	672	672	672	678
Govt. Dispensaries	1,297	1,397	1397	1,397
No of Hospital beds (total)	46,125	50,655	50,827	51,044
Registered Nurse (total)	19,500	20,000	20,097	20,129
Registered Midwives(total)	17,622	18,037	18,937	19,911
Registered Doctors(total)	36,576	40,210	41,933	44,632
Govt. Medical College(total)	13	13	13	13

Source: BBS 2007

### 3.3.5 Educational Facilities

Present national literacy rate in Bangladesh is 45.3 percent of which 49.6 percent is male and 40.8 percent female. The health care rate varies from one district to another district and from one region to another region. Lowest literacy rate is in Sherpur and Jamalpur districts (31.0 percent) and highest in Dhaka district (64.3 percent).

The literacy rate in Gazipur district is 56.4 percent. The Gazipur district has the literacy rate of 56.4 percent at resent. The different types of academic institutions in Bangladesh (BBS2007) are shown in Table 3.5. Implementation of the EZ Bridge and the bridge

approach road will impact rather positively on educational facilities and consequent literacy rate at bridge command area. This will be because of improved road network, increased economic activities and change of attitude amongst the rural people due to rapid urbanization.

During SHM meeting at EZ Bridge command area, it was found that most participants had least complain regarding the direct or indirect benefits of EZ Bridge. The proposed approach road if implemented will not affect any of the existing educational institutes.

**Table 3.5 Total Number and Types of academic Institutions in Bangladesh**

Types of Institutions	Survey years			
	2001	2002	2003	2004
Primary schools	63,255	63,545	86,373	-
Secondary Schools	15,837	15,806	17,386	-
Colleges	2,551	2,870	2,577	-
Madrasas	7,277	7,373	7,920	-
Govt. Universities	17	17	22	-
Non-govt. Universities	24	41	53	-

Source: BBS 2012

### 3.3.6 Professional Communities

Nearly a century back most people in Bangladesh earned their livelihoods based on eco-dependent professions e.g. wood cutter, wood craftsman, cultivator, weaver, fisherman, mate weaver, boatman, and the cultivator community. In addition there were potter, black smith, gold smith, basket maker, cattle rearer, etc. Many such professional communities have changed their professions and/or are struggling to survive because the products they produces cannot longer compete with the industrial produces in open markets, reduced demand for their produces, shortage of raw materials for cottage industry products due to eco-degradation, etc.

### 3.3.7 Fisherman Community

The fisherman community in Bangladesh are engaged in marine and/or fresh water fishing, fishing may be their fulltime or part time occupation. The fisherman community in Bangladesh is struggling hard to survive, because reduced fish catch, increased cost of living, shrinking of wetland and due to conflicts with the privileged adopted the profession as interest shooters. Pollution of open water bodies due to disposal of industrial/ urban wastes affected the population and diversity of fresh water fish species.

Many of the eco-dependent professionals and craftsmen under the situation became heard hit due to rapid urbanization pace, competition with industrial products, introduction of synthetic products and increased cost of production. The boatmen community is heavily affected over the past decades due to road communication improvement, water management, flood control and introduction of mechanized water transports. The situation is not the same at EZ Bridge command area because the bridge command area is located on high and medium high lands.

The implementation of the EZ Bridge will however not impact the fisherman or any other professional communities adversely.

### **3.3.8 River Transportation**

Water vessels like country boat, steamer and motorized water transports were the major means of transportation in Bangladesh several decades back. Most of the towns and growth centers were situated on big and small river banks for convenience of river transportation. Development of river routes continued to facilitate movement of cargo ships, country boats trawlers and fishing boats. At present most of the big rivers amongst the 700 perennial rivers indicate that that the water routes are mostly used for movement of trawlers, barges, fishing boats, etc. for cargo transportation. Only few large rivers are used as classified water routes for movement of passenger steamers and launches. Amongst the 19,000 bridges across different rivers and channels that exist in Bangladesh many are turtle backed to facilitate movement of water transports.

The situation changed since 1972, at present length of LGED road is 151,610 Km and RHD managed road is 20,878 Km. Road transportation system improved and each district, upazila town even the growth centers are connected by all-weather motor able road linkage. The district towns were connected by 4,053 Km railway track that transported 44.5 million passengers (BBS 2005, 2012).

The number of motorized road transports in Bangladesh was 36,000 in 1997, increased to 930,000 in 2006 (BBS 2012). This is due to rapid improvement of road network over the past decades. In addition, many motor bikes, auto rickshaw and Nasimon type motorized transports ply on Bangladesh roads. Innumerable unconventional road transports like rickshaw, push cart, bullock cart also ply both in urban and rural roads. The number of organize, unorganized and private transports in 2006-7 compared to 2002-3 is shown in Table 3.6. Dependence on water transportation has drastically been reduced in Bangladesh over the past several centuries due to surface water management, flood control, withdrawal of water by upper riparian countries and due to watershed degradation in vast catchments outside Bangladesh border.

The urbanization rate at EZ Bridge command area is rapid hence many roads needed to be constructed to commensurate the increased load of road traffic. Moreover, the impacts of A K Khan Industrial Park, Dhaka Bypass Road and National highways (N2, N3, N4) will be significant at the site. The EZ Bridge command area is getting rapidly urbanized hence requirements for service roads and highways will be high to commensurate the future traffic load. Hence, cumulative impacts of EZ Bridge, the bridge approach road and associated service roads will be significant at the command area.

**Table 3.6 Organized and unorganized Water and Land Transports in Bangladesh**

Transport s	Road transports		Water transports(Public)		Private
Organized transport					
	2002-3	2006-7	2002-3	2006-7	
Bus microbus, truck, motor car,/taxi/jeep, auto-rickshaw, others	284,000	365,000	221 mechanized river transports	530 mechanized river transports	253 mechanized river transports
Motor bike	239,884	366,031	-	-	-
Unorganized transport					
Rickshaw, push cart, bullock cart.	1,900,000	2,195,000			boat, fishing boat, trawler

Source: BBS 2012

### 3.3.9 Road and Water Route Accidents

Narrow width structural weakness, defective bridges due to age, risky Bailey Bridges and ill maintained road transports, lack of pedestrians' traffic awareness and poor law and order situation combined are the causes of high road accident rate (10/1,000 registered vehicles/year) to cause many deaths and grievous injuries to many pedestrians and passengers. The road accident alone costs Bangladesh \$0.35 million annually to import spare parts to repair the damaged vehicles.

Ministry of Communication in the newly enacted National Transport Policy (MoC2004) put emphasis on movement of environmentally sound transports on national highways and other road network system. The actions suggested to achieve the goal are (i) conversion of 2-lane roads into 4-lane with divider, (ii) improvement of the defective, narrow, risk prone bridges, (iii) maintenance of road transports properly and (iv) careful driving by well-trained drivers .If the NRTP (2004) can be implemented road accident rate can probably be reduced in Bangladesh significantly.

Accidents due to sinking of river vessels caused in 2009 were over 200, out of which 10 were in Sitalakhya and two were in Meghna River. The river vessels sank due to overloading, plying of imperfect vessels, collision with other motorized or non-motorized vessels and due to defiance of storm warning signals.

### 3.3.10 Protected Areas

There exist 34 Protected areas in Bangladesh declared by MoEF under the Bangladesh Wildlife (Preservation) Order (1973)and subsequent Amendment (2011) . Moreover, the National Parks at Kuacuta, Nawabganj, Kadigarh, Singra and Tengragiri Wildlife Sanctuary at Barguna have also been declared Protected Areas (MoEF 2010-2011). Bhawal National Park, Balda Garden and Madhabkunda Eco-park have also been declared Protected Areas (MoEF 2010-11).

### 3.3.11 HIV/AIDS

Spread of HIV/AIDS in Bangladesh particularly rural areas is minimal as per results of studies conducted so far. AIDS bearing patients have rarely and sporadically been observed amongst the sex workers who live in port cities Mongla and Chittagong. The HIV/AIDS issue is not serious in Bangladesh. The cautionary measures to avoid spread of AIDS and the



manner of dealing with AID patients and/or the prospective AIDS carriers in the society are given wide scale spread publicity in electronic and printed media.

### **3.3.12 Gender Equity**

Gender equity in case of recruitment of staff, payment and other facilities is to be maintained as per the GoB rules and donor agencies' requirements. Women workers' camp sites should be situated at far place from the male workers camps. Separate toilet and washing facilities with due privacy should be provided for women workers.

### **3.3.13 Children's Rights**

The restrictions on child labor, appointing children in jobs that might pose health hazard, accident moral lapses, should be strictly followed. The concerned authorities must be careful dealing with children's right issue so that rights of the children are not abused in any way and at any stage during WBBIP implementation.

### **3.3.14 Climate Change**

Large part of the coastal regions of Bangladesh and part of SCR may be the affected due apprehended sea level rise @ 0.18 m/ 40 years that may accelerate during next 40 years. If the rate of apprehended sea level accelerates the assumed impacts on the coastal plain of Bangladesh may become serious. Bangladesh however, can do nothing to combat impacts of the global issue, because of shortage of resources and lacking of necessary technological advancement.

However, implementation of the Project in no way will impact the region adversely directly or indirectly. The sea level rise issue being a global phenomenon to which Bangladesh contributed least but it will be impacted highly if at all the sea level rises at apprehended rate, hence at the stage Bangladesh can only leave the issue fate destined and alternatively can only high light its grievances to the global conscious regarding the crisis at apprehends due to climate change and consequent sea level rise. The EZ Bridge command area occur at deep inland and on nearly 10 m above PWD level, hence no serious impact anticipated due to its implementation.

## **3.4 Pollution**

The most serious environmental concerns Bangladesh faces presently are the pollution caused due to urbanization, eco-degradation, demographic pressure and ill planned socio-industrial and commercial structures developed here and there and over 16,000 ill managed growth centers throughout. Air and water pollution is caused due to improper management of solid wastes and effluents from rural/urban/commercial sites and industrial plants. Intensified traditionally managed chemical agriculture to increase grain production also pollutes soil, water and air throughout Bangladesh including EZ sites. Dust blowing and emissions from vehicles, industries, agriculture and urban sites pollute air and water. The ambient primary data regarding pollution of air, water, soil and noise and vibration at the bridge sites have been collected by the Chemical Engineering Department of BUET. It can be said that environmental impact at individual bridge like EZ Bridge sites may not be significant.

Impacts of EZ Bridge and of the bridge approach road sites on IECs may be significant particularly on the ecological components during construction stage of 4,200m bridge

approach road and 200m long bridge. This will involve felling of 13,159 trees (sapling, small .medium, large, bamboos and banana) from the homesteads, road sides and from block plantations. The impacts on wetland ecology due to filling of 5/6 ponds may adversely affect few people. The impacts due to loss of agriculture land, ancestral homes, socio-cultural structures due to construction of 4,195 m approach bridge road may be significant. Felling of tress along the bridge approach road alignment may affect personal economy and the local ecology adversely.

### 3.4.1 Air Pollution

The air quality of EZ Bridge locations had been assessed. The major components of air pollution are respirable suspended particulate matter, and gaseous pollutants such as: CO, CO<sub>2</sub>, NOx and SO<sub>2</sub>. The maximum allowable limit of pollutant concentration is given in Table 3.7.

**Table 3.7 National Air Quality Standards for Bangladesh**

Sl No.	Categories of Area	Suspended Particulate matters, PM <sub>10</sub> (µg/ m <sup>3</sup> )	SO <sub>2</sub>		Carbon Monoxide		Oxides of Nitrogen	
			µg/m <sup>3</sup>	ppm	µg/m <sup>3</sup>	ppm	µg/m <sup>3</sup>	ppm
1	Industrial and mixed	500	120	0.045	5,000	4.36	100	0.053
2	Commercial and	400	100	0.038	5,000	4.36	100	0.053
3	Residential and Rural	200	80	0.030	2,000	1.75	80	0.043
4	Sensitive	100	30	0.011	1,000	0.87	30	0.016

Source: Environment Conservation Rules, 1997

The PM<sub>10</sub> concentration standard is 500µg/m<sup>3</sup> for industrial and mixed zone, and is 100µg/m<sup>3</sup> for sensitive zone. In this study, it has been observed that the PM<sub>10</sub> concentration at EZ Bridge sites is much below the standard limit of Industrial and mixed/ Commercial and mixed and also below than Residential & rural standard. But only exceeds the limit of National standard category of Sensitive area. The National gaseous pollutant standard limit is 0.045ppm for SO<sub>2</sub>, 4.36ppm for CO and 0.053ppm for NOx. For the EZ bridge sites, the gaseous pollutant concentration was below the standard limit. The average carbon dioxide concentration was about 480ppm. But at bridge site it was found to be 530ppm, which is a bit higher due to the brick field near vicinity of the bridge site. The higher gaseous concentration was observed in the sampling points which were located either in busy area or near to the industrial area or brick fields. The concentrations of NOx and SO<sub>2</sub> were found either in trace amount or below the detection range.

Air pollution due to dust blowing, emissions from construction related vehicles, machineries and operation of construction plants particularly during the construction stage of EZ Bridge may be significant. Movement of construction related vehicles, operation of machineries and plants may be the cause of increased noise pollution at construction sites. Movement of increased number road transports during the operation stage will cause increased noise pollution and even road accident during operation stage.

The ambient air pollution data at bridge sites as per measurement by the Chemical Engineering Department, BUET is shown below in Table 3.8.

**Table 3.8 Air Pollution Data at EZ Bridge Site**

Date of Sampling	Location	Air Pollution Parameter	Results	Remarks
25-08-14	Kaliganj	Avg. Temperature (C <sup>0</sup> )	32.3	
		PM <sup>10</sup> (Micro gm/m <sup>3</sup> ) at STP	122	
		SPM(Micro gm/m <sup>3</sup> ) at STP	230	
		NO <sub>x</sub> (ppm)	0.020	
		SO <sub>2</sub> (ppm)	0.066	
		CO <sub>2</sub> (ppm)	530	
		CO (ppm)	1.000	

Source: BUET 2014

### 3.4.2 Water Pollution

According to Environment Conservation Rules, 1997, National Standard for inland surface water is shown in Table 3.9. Based on the application sectors, there are six different types of surface water standards mentioned in the ECR, 97. Table 3.10 shows the relevant parameters of the drinking water standard according to ECR, 97. Since there is no specific standard for groundwater, Table 3.11 has been considered for groundwater comparison during this study.

**Table 3.9 Water Pollution Status at EZ Bridge Site**

Best Practice based classification	Parameter			
	pH	BOD <sub>5</sub> (mg/L)	DO (mg/L)	Total Coliform (number/100ml)
a. Source of drinking water for supply only after disinfecting:	6.5-8.5	2orless	6orab ove	50orless
b. Water usable for recreational activity:	6.5-8.5	3orless	5ormore	200orless
c. Source of drinking water for supply after conventional treatment:	6.5-8.5	6orless	6ormore	5000orless
d. Water usable by fisheries	6.5-8.5	6orless	5ormore	-
e. Water usable by various process and cooling industries:	6.5-8.5	10orless	5ormore	5000orless
f. Water usable for irrigation:	6.5-8.5	10orless	5ormore	1000orless

Source: Environment Conservation Rules, 1997

**Table 3.10 National Standard for Drinking Water**

Parameter	Unit	Standard
BOD <sub>5</sub> at20°C	mg/L	0.2
DO	mg/L	6
pH	-	6.5-8.5
Suspended particulate matters	mg/L	10
Total dissolved solid(TDS)	mg/L	1000
Temperature	°C	20-30
Turbidity	NTU	10

Source: Environment Conservation Rules, 1997

**Table 3.11 Water Pollution Status of Sitalakhya River at EZ Bridge Site**

Date of Sampling	Parameters	Surface Water	Ground Water	Remarks
25-08-14	Temperature (C <sup>0</sup> )	32.30	31.1	N/A not applicable
	DO(mg/L)	3.60	2.47	
	BOD <sub>5</sub> (mg/L)	2.70	0.92	
	SS (mg/L)	0.194	N/A	
	Turbidity (FAU)	173	NA	
	pH	7.2	6.8	
	Conductivity(mS/cm)	N/A	1.094	

Source : BUET 2014

Surface and ground water samples near points of the proposed EZ Bridge had been collected and tested for different parameters according to the methods described earlier. Apart from few exceptions, most of the water parameters were found to be consistent and within the limit proposed by Environment Conservation Rules, (ECR), 1997 of the Government of Bangladesh. Surface water pH values were mostly within 6.5 to 8.5, the range allowed by ECR. The ground water pH reading was found to be within the range suggested by ECR. The surface water sample had temperature within the range of 30°C-32.3°C; a bit higher temperature mainly because of the high ambient temperature in summer. Groundwater samples were relatively cooler than the surface water.

Dissolved oxygen is one of the most important parameters that need to be higher than 5 mg/L according to ECR and other international standards. Surface water samples had DO less than 5 mg/L. The water sources might have been contaminated with inorganic or other pollutants. Moreover, samples were collected during the months of summer when the ambient temperature was very high on most of the days causing a low level for dissolve oxygen in water. Ground water samples had lower DO, as expected.

The surface water turbidity value was found to be 173 FTU. This is because of different types and extent of sedimentation and insoluble contamination from run-off and nearby populations. Some might have been affected by waste water from different sources as well

Turbidity is not a major concern for ground water and thus was not considered in this study. Conductivity is an important parameter for ground water and exhibited conductivity higher than 1 mS/cm, which might be related to the presence of higher metal ions (such as: iron).

As surface water is exposed to the atmosphere, it might retain significant amount of suspended solid. This can be a rainy and windy weather, populated neighborhood and many more influenced factors. Since there is no standard set for this parameter in Bangladesh (ECR, 97), it is not possible to compare the experimental values with the national standard.

Finally, biochemical oxygen demand (BOD), a very critical parameter of water quality, was analyzed for both surface and ground water samples. ECR suggested maximum value for BOD5 is 6mg/L for surface water and 0.2mg/L for drinking water if supplied after disinfecting. The surface water sample was found to be good according to ECR, 97

Ground water is supposed to be less contaminated and our analysis result also suggested the water sample had BOD5 0.92mg/L indicating presence quality drinking water. It is not uncommon for the tube wells to go under water during flood and that can introduce organic contamination in ground water. In many areas, ground water could also be contaminated with microorganisms causing a slightly higher BOD5 value. This can only be confirmed with any type of coliform test. It is to be noted that there is no ground water standard set by the Government of Bangladesh.

The ground water in Bangladesh is polluted largely due to seepage from non-sanitary latrines and leakage of agro-chemicals (WARPO 2000). Ground water at bridges sites may be polluted due to seepage from cement concrete mixing and working sites. This can however be reversed after the project activities are completed and work camps dismantled sites are cleared properly.

### **3.4.3 Soil Pollution**

The agricultural soils at bridges construction sites can be polluted due to accumulation of agro-chemical residues, non-essential ingredients and impurities accumulated due to application of chemical fertilizers. The solid wastes disposed from household sites, industries and commercial sites can pollute soil. The plant nutrients removed each year with crops and crop residues deplete soil fertility. Pollution of soil along the highway sides may be caused due to spillage of petroleum products, bituminous materials, and noxious chemicals and due to accumulation of heavy metals emitted from automobile engines with exhausts. Use of dredge materials for embankment construction may contain noxious metals that can pollute the agriculture lands along road alignment. Moreover, accidental spillage of petroleum derivatives and various noxious fluids and chemicals can also pollute soil along road alignments.

### **3.4.4 Noise and Vibration**

The National standard for sound is set based on areas of different categories. The standards for different areas are given in Table 3.12. Areas up to a radius of 100m around hospital, educational institutions or special institutions/establishments are designated by the government as silent zone.

**Table 3.12 National Standards for Sound for different Areas**

Sl. No.	Categories of Area	Standard for Day Time (6AMto9PM) dB	Standard for Night Time (9PM to6AM) dB
1	Silent zone	45	40
2	Residential	50	40
3	Mixed area, includes both for Residential and commercial	60	50
4	Commercial	70	60
5	Industrial	75	70

Source: Environment Conservation Rules, 1997

The noise level was monitored for each selected sites. In most of the sites, the average noise level was below the standard limit (~80 dB).

**Table 3.13 Noise Level at EZ Bridge Site**

Date of Sampling	Time	Average Noise Level count (dB)	Total Vehicle for 10 minutes
25-08-14	9.00 AM	63	7
	10.00 AM	62	9
	11.00 AM	62	6
	12.00 PM	62	10
	1.00 PM	63	9
	2.00 PM	64	14
	3.00 PM	66	12
	4.00 PM	66	9

Source: BUET 2014

Noise and vibration pollution at EZ Bridge area will though increase temporarily during construction stage due to movement of heavy transports, operation of construction related machineries and plants unless due mitigation measures adapted but it will die down with the completion of bridge construction activities..

### 3.4.5 Wastes and Effluents

The solid wastes, effluents and other garbage that may be generated at subproject sites are domestic wastes, effluents at work camp/work sites and variety of materials at construction sites during the construction stage. The solid wastes generated at work camp, labor camp and construction sites due to construction activities may be handled, dumped and to be disposed in safe and environment friendly manner at authorized dumping grounds available nearby the construction sites. Disposal of wastes and effluents from the construction sites haphazardly and at helter shelter will otherwise pollute surface water, ground water and agriculture soils around the construction site.

If no specified dumping ground is available near the construction sites, wastes in that case can be buried in deep pits around near the construction sites. All the valuable materials e.g. cellulose, glass, plastic and metals, etc. may be separated for recycle and reuses.

### **3.4.6 Offensive Odour**

Materials like the organic wastes, fecal residues, effluents and other decomposable wastes if dumped near to the work camp and/or residential sites may spread stinky and offensive odor on decomposition. This may adversely affect the work camp and residential sites creating annoyance to the work camp dwellers, passersby and locals.

## **CHAPTER 4. ACTIVITIES DURING IMPLEMENTATION STAGES**

The impacts indicated in this Chapter are relevant to the activities under taken during the implementation stages. The measures to be undertaken to avoid, and/or minimize these impacts during the planning, design and implementation stages have also been suggested. The activities to be undertaken during project implementation stages are mentioned here. This is worth mention that the activities mentioned in this chapter are not project specific rather these are of general nature applied in most infrastructure development projects including the WBBIP subprojects.

### **1. Pre- construction Stages**

- Site survey and technical investigations,
- Land and properties acquisition
- Assessment of environmental losses (land, wetland and other asset, biodiversity, etc.),
- Payment of compensation to PAPs,
- Preparation of subproject design

### **2. Construction Stage**

- Setting of Field office and workers camps,
- Procurement and engaging of workers,
- Site clearance ( removal of trees, residential, commercial and other structures),
- Procurement and storage of construction materials and equipment,
- Management of traffic at subproject site and site management,
- Site selection for collection of fill materials,
- Construction of bridge, toll plaza and other structures,
- Protection of road embankment slope by grass carpeting,
- Pavement of the approach roads
- Pollution control during paving activities
- Planting trees on road sides.

### **3. Operation Stage**

- Monitoring of traffic operation,
- Road maintenance and monitoring activities,
- Roadside slopes and trees management

Potential impacts due to subproject implementation stages should be evaluated based on significance, extent, effect, duration and stability. Short-term impacts (crop loss, pollution and social disturbance) will terminate with the completion of subproject activities and/or by adopting mitigation measures. Moderately long-term impacts (fill material collection, loss of landscape beauty, camps setting, dumping construction materials, dumping, handling and disposal of solid wastes, construction of diversion roads, etc.) will also terminate with the termination of Construction activities. Long-term impacts (loss of land, loss of wetland,



disturbance to ecological/archaeological and vulnerable sites, psychological stress, etc.) can though be minimized by adopting mitigation measures but scars of such impacts will persist in PAPs minds. Impacts of activities during project implementation stages are shown in Table 4.1

**Table 4.1 Project Activities and Key Environmental Issues**

<b>Project Stage</b>	<b>Construction Activities</b>	<b>Key Environmental Issues</b>
Pre-construction Stage	Alignments fixing on map	<ul style="list-style-type: none"> <li>• No impact</li> </ul>
	Survey camp setting and conducting survey work	<ul style="list-style-type: none"> <li>• Psychological stress</li> <li>• Disturbance on privacy</li> </ul>
Construction Stage	Base camp and labour camps setting at work sites	<ul style="list-style-type: none"> <li>• Employment generation</li> <li>• Psychological stress</li> <li>• Social disturbance</li> </ul>
	Mobilization of construction machinery/ vehicles and plants	<ul style="list-style-type: none"> <li>• Noise and vibration/dust blowing</li> <li>• Road pavement damage/ traffic disruption</li> <li>• Psychological stress</li> <li>• Employment generation</li> </ul>
	Site clearance	<ul style="list-style-type: none"> <li>• Loss of ecological balance</li> <li>• Disturbance to services facilities</li> <li>• Demolition of domestic/industrial/commercial structures</li> <li>• Loss of livelihood</li> <li>• Pollution due to noise and dust blowing</li> <li>• Employment generation</li> </ul>
	Earth work for approach road construction	<ul style="list-style-type: none"> <li>• Land loss</li> <li>• Traffic disruption</li> <li>• Loss of landscape beauty</li> </ul>
	Stockpiling of fill materials for bypass road construction	<ul style="list-style-type: none"> <li>• Employment generation</li> </ul>
	Haulage and storage of construction materials	<ul style="list-style-type: none"> <li>• Loss of landscape beauty</li> <li>• Pollution due to dust blowing</li> </ul>
	Pavement construction	<ul style="list-style-type: none"> <li>• Air pollution by smoke / Asphalt mix plant operation</li> </ul>
Operation Stage	Construction of bridge, toll plaza and bypass road	<ul style="list-style-type: none"> <li>• Induced traffic congestion</li> <li>• Air pollution</li> <li>• Noise pollution</li> <li>• Induced road accident risk</li> </ul>
	Traffic management	<ul style="list-style-type: none"> <li>• Improvement of road traffic system</li> <li>• Increased risk of traffic accident</li> </ul>
	Maintenance of bridge, approach roads and side slopes	<ul style="list-style-type: none"> <li>• Temporary disruption to traffic movement</li> </ul>
Operation Stage	Monitoring regarding	<ul style="list-style-type: none"> <li>• Resource generation</li> <li>• Improved aesthetic beauty</li> <li>• Improved socio-economic situation</li> </ul>

## **CHAPTER 5. IMPACTS AND MITIGATIONS**

### **5.1 Environmental Impact Identification**

**The impacts of EZ Bridge**, the bridge approach road and approach roads on IECs during implementation stages have been identified during field visits, discussion with locals, ARP meets and from discussion with the RHD staff. The IECs at EZ Bridge site and along the bridge approach road alignment were identified, described and assessed considering the significance of interventions. The priority IECs are physical, ecological, sociocultural and pollution that has direct impact on food production, livelihood, living quality and pollution. The EZ Bridge and its other components during implementation stages involve different activities and related impact types on IECs. The impacts magnitudes on IECs have been assessed in respect of ambient conditions at EZ Bridge site and in the command areas.

**The impact magnitudes** on IECs during implementation stages and O & M are different. Assessment of the impacts may affect the IECs differently and significantly. This was done adopting standard checklist, flow chart and matrices. The EZ Bridge is to be constructed over the Sitalakhya River along with a bridge approach road alignment selected by the RHD. This may require acquisition of 12.49 hectare private lands and several hectare of RHD lands. Hence, the anticipated impact the project on IECs during implementation of bridge and bridge approach road will be significant. The impacts of the project on IECs therefore have been included in the EIA prepared for the EZ Bridge. From this context the EIA report is rather project specific.

### **5.2 Environmental Impact Scoping Matrices**

The impacts of a development endeavor particularly during implementation of infrastructure projects are screened under the proposed project alignment, probable alternative alignments and under no project situations. The 3<sup>rd</sup> alternative deserve consideration in case of EZ Bridge and bridge approach road construction as these are in fact new structures to be constructed facing local objections, hence scoping of matrices are to be screened scrupulously in case of EZ Bridge project.

The construction of EZ Bridge, the bridge approach road and associated other activities shall impact the IECs positively and/or negatively and in variable magnitudes. The matrices of impacts on IECs therefore are used to identify the impacts systematically relating the project activities and environmental parameters maintaining rationale between the causes and effects. The environmental impact assessment for implementation of EZ Bridge and construction of bridge approach road can be done as:

- A: Remarkable Positive/Serious Negative Impact is predicted.
- B: Positive/Negative Impact is expected to some extent.
- C: Extent of Impact is unknown. (A further examination is needed and the impact could be defined as study progresses)
- D: Impact is very small or nil and further survey is not required

**Table 5.1 Comparison of Scoping before/after Study**

Anti-Pollution Measures						
No.	Items of Impact	Predicted Impact		Assessed Impact		Reason of Assessment
		Before/ During Const- ruction Stage	Operation Stage	Before/ During Const- ruction Stage	Operation Stage	
1	Air pollution	B	D	B	D	Air pollution will be caused during construction stage due to vehicular emissions and dust blowing.
2	Water pollution	B	D	B	D	Water pollution during construction stage likely due to construction activities.
3	Soil pollution	B	D	B	D	Soil pollution during construction stage may be caused due to spilling of oil and lubricants.
4	Waste	B	D	B	D	Camp sites and construction wastes may pollute soil.
5	Noise and vibration	B	D	B	B	Noise level may increase during construction and operation stage.
6	Ground subsidence	D	D	D	D	No ground subsidence likely during implementation stages.
7	Offensive odors	D	D	D	D	No offensive odor likely at any stage of project implementation.
8	Global warming/Climate change	D	D	D	D	No impact anticipated due to global warming.
Natural Environment						
9	Topography and geology	D	D	D	D	No impact anticipated due to implementation of the project.
10	Bottom sediment	D	D	D	D	No impact anticipated

11	Biota and ecosystem	C	C	D	D	No impact anticipated
12	Hydrology	B	C	D	D	No impact on hydrology apprehended.
13	Water use	C	C	D	D	No impact on water use apprehended due to project implementation.
14	Protected area	D	D	D	D	No protected site will be affected.
<b>Social Environment</b>						
15	Involuntary resettlement	A	N/A	B	D	Displacement is required in pre-construction stage.
16	Local economies, such as employment, livelihood, etc.	B-/B+	C	B	D	At several bridges sites livelihoods may be affected due to removal of shops and acquisition lands.
17	Land use and utilization of local resources	D	D	D	D	Impact on land use may not be serious due to acquisition of agriculture lands at several bridge sites.
18	Social institutions and local decision-making institutions and social service facilities	C	B+	B	D	Some utilities might be affected due to the new bridge construction.
19	Poor	A	A	B	D	Poor people living on RHD land may be affected.
20	Indigenous or ethnic minority people	C	C	D	D	No indigenous tribal people likely to be affected due to WBBIP implementation.
21	Misdistribution of benefits and damages	D	D	D	D	No impact might be anticipated.
22	Local conflicts of interest	D	D	D	D	No impact might be anticipated.
23	Gender	A	A	D	D	No negative impact on gender issues apprehended.
24	Children's right	C	C	D	D	No legal rights of

						children is anticipated.
25	Cultural heritage	C	C	D	D	No cultural and/or historical relics occurs at bridges sites hence will not be affected.
26	Infectious diseases such as HIV/AIDS	B	D	B	D	Influx of worker may cause the possibility of infectious diseases.
27	Landscape	D	D	D	D	No impact might be anticipated.
28	Working conditions	B	D	B	D	Insufficient safety management will cause the accidents in construction stage.
29	Social consensus	A	D	B	D	The physical construction activities might be hampered without appropriate local consensus.
<b>Others</b>						
30	Accident	B	D	B	B	In-appropriate traffic control and increase of traffic may induce accidents.

### 5.3 Mitigation Measures

Following Table 5.2 presents mitigation measures while in pre-construction and construction stages and Table 5.3 in operation stage, respectively.

**Table 5.2 Mitigation Measures pre-Construction/during Construction Stage**

Item of Impact	Magnitude of adverse impact	Mitigation Measures
Air pollution	B	<ul style="list-style-type: none"> <li>- Contractors are required to conduct daily routine equipment and machinery check-ups to ensure that these are in the optimum working conditions.</li> <li>- Regular preventive maintenance service of construction equipment and machineries will strictly comply with.</li> <li>- To reduce the dust, periodical water spray should be taken.</li> </ul>
Water pollution	B	<ul style="list-style-type: none"> <li>- Temporary coffer dam must be provided to accelerate sedimentation of turbid water and prevent a straight water flow into the present water way.</li> <li>- Temporary sanitation facilities such as portable toilets and garbage bins will be provided by the contractors to ensure that the domestic wastes to be generated by the construction personals are properly handled and not thrown into the drainage to prevent further pollution.</li> </ul>
Soil pollution	B	<ul style="list-style-type: none"> <li>- The operator of heavy equipment should pay attention to prevent fuel leakage when he feeds.</li> <li>- The contractor and consultant of supervision should monitor the manner of fuel feed.</li> </ul>
Waste	B	<ul style="list-style-type: none"> <li>- Contractors are required to facilitate proper disposal plan and manage the construction waste.</li> <li>- The consultant of supervision should monitor the waste disposal.</li> </ul>
Noise and vibration	B	<ul style="list-style-type: none"> <li>- Noise suppressors such as mufflers will be installed whenever deemed necessary to maintain the noise the noise generated by the various heavy equipment and other construction machinery within permissible limits.</li> <li>- Contractors are required to use low-noise equipped machinery whenever it is necessary.</li> </ul>
Involuntary resettlement	B	<ul style="list-style-type: none"> <li>- Conduct census survey and local stakeholder meeting.</li> <li>- Prepare ARP involving the following measures.               <ul style="list-style-type: none"> <li>• PAPs must be acknowledged as an eligible for compensation.</li> <li>• Identify the eligibility of non-titled people at the census survey intended to PAPs and ensure the compensation and support.</li> <li>• Refer the previous/on-going projects by other donors, determine the requirement for social vulnerability and compensate to them.</li> <li>• Resettlement site must be prepared when PAPs need it.</li> </ul> </li> <li>- Establish external monitoring committee consists of the third party.</li> </ul>
Local economies, such as employment, livelihood etc.	B	<ul style="list-style-type: none"> <li>- Prepare ARP involving the following measure.               <ul style="list-style-type: none"> <li>• Measure to restore PAPs' livelihood must be secured.</li> </ul> </li> </ul>
Social institutions, such as social infrastructure and local decision making institutions. Existing social infrastructure and services	B	<ul style="list-style-type: none"> <li>- Social utilities; such as power supply, drinking water, drainage and communication line are to be diverted before starting the construction activity.</li> </ul>

Poor people	B	<ul style="list-style-type: none"> <li>- To minimize impact on present agricultural activities, the construction schedule should be disclosed to the PAPs at the earliest possible stage.</li> <li>- The proper compensation should be given to the PAPs.</li> </ul>
Infectious diseases such as HIV/AIDS	B	<ul style="list-style-type: none"> <li>- Contactor will be required to conduct a periodical health education to his personnel.</li> </ul>
Working conditions	B	<ul style="list-style-type: none"> <li>- Construction personnel provides with the necessary safety gears such as protective hard hat and safety belt as necessary.</li> <li>- Contractor must provide temporary scaffolding, temporary landslide protection wall etc. to protect workers.</li> </ul>
Social consensus	B	<ul style="list-style-type: none"> <li>- RHD must hold local stakeholder meetings periodically, and release project information to neighbor villagers.</li> </ul>
Accident	B	<ul style="list-style-type: none"> <li>- A sound traffic management and detour plans duly approved by the local RHD must be strictly implemented.</li> <li>- Traffic enforcers and flagmen will be designated when heavy equipment/vehicle will be operated adjacent to public road.</li> </ul>

**Table 5.3 Mitigation Measures in Operation Stage:**

Item of Impact	Magnitude of adverse impact	Mitigation Measures
Noise	B	<ul style="list-style-type: none"> <li>- Monitoring and review the result by RHD.</li> </ul>
Accident	B	<ul style="list-style-type: none"> <li>- Provide hump where school/hospital/market exist.</li> </ul>



## **CHAPTER 6. ANALYSIS OF ALTERNATIVES**

### **6.1 Route Alternatives**

The location of new bridge shall be determined in consideration of impact to existing residences/shops, cost and so on. Following eight route alternatives for the EZ Bridge and Road was planned. The map of alternatives is shown in Figure 6.1.

#### Alt 1-1

New bridge (L=1,050m) is constructed at the north side of planned EZ, and access road (L=2,100m) is constructed by the widening of R302 (Kaliganj Bazar).

#### Alt 1-2

New bridge (L=1,050m) is constructed at the north side of planned EZ, and new access road (L=2,100m) connecting R301 is constructed.

#### Alt 2

New bridge (L=835m) is constructed at the south side of planned EZ, and new access road (L=4,195m) connecting R301 is constructed.

#### Alt 3-1

New bridge (L=835m) is constructed at the south side of planned EZ, and new access road (L=6,900m) connecting N105 is constructed.

#### Alt 3-2

New bridge (L=835m) is constructed at the south side of planned EZ, and new access road (L=8,700m) connecting N105 is constructed.

#### Alt 4

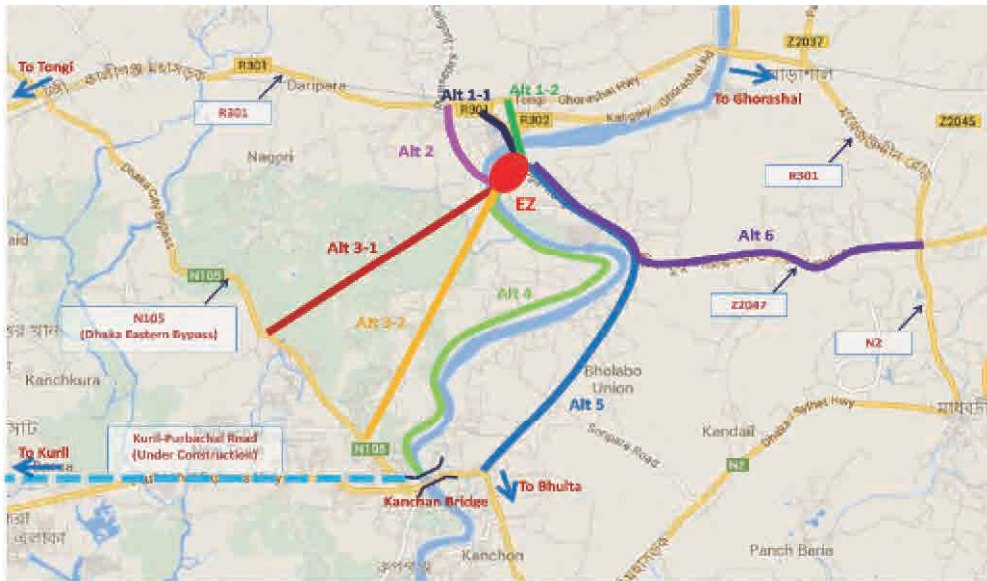
New bridge (L=835m) is constructed at the south side of planned EZ, and access road (L=12,800m) is constructed by the widening of Kaliganji Road.

#### Alt 5

No bridge is constructed, and new access road (L=12,000m) connecting Kuril-Purbachal Road (under construction) is constructed.

#### Alt 6

No bridge is constructed, and access road (L=11,500m) is constructed by the widening of Danga-Kaliganj Road.



Source: JICA Survey Team

**Figure 6.1 Alternatives of the EZ Bridge and Road**

## 6.2 Route Evaluation

Eight route alternatives were evaluated as shown in Table 6.1. As a result, “ALT- 2” was selected as the most appropriate route for the EZ Bridge and Road from the following points of view.

- Cheaper construction cost
- Cheaper land acquisition and resettlement cost
- Minimal affected house number (No affected building, shop and others)
- Present accessibility is poor, but it can be connected to national highway in the future.

**Table 6.1 Route Evaluation of the EZ Bridge and Road**

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## **CHAPTER 7. ENVIRONMENTAL MANAGEMENT PLAN**

The EMP (Environmental Management Plan) is intended to define the process and outputs necessary to address the potential negative impacts of the physical works to be carried out. The EMP clearly describes how the potential environmental impacts of all sub-projects will be managed during preparation, implementation and, in the post-implementation periods.

The management plan is sometimes known as an "action plan." The EMP may be presented as two or three separate plans covering mitigation, monitoring, and institutional aspects, depending on client's requirements. For projects involving rehabilitation, upgrading, expansion, or privatization of existing facilities, remediation of existing environmental problems may be more important than mitigation and monitoring of expected impacts.

The RHD itself or the Construction Supervision Consultant (CSC) firm hired by RHD shall remain responsible to look after all day to day activities of Contractor during implementation stages of the subprojects and ensure that all environmental provisions as per Environmental Management Plan (EMP), and/or other EIA documents are properly and timely implemented by Contractor during the implementation stages. Fully and timely compliance of the environmental provisions as per the EMP, other EIA documents and environmental Clauses is legally binding for the Contractor as per the contractual agreement.

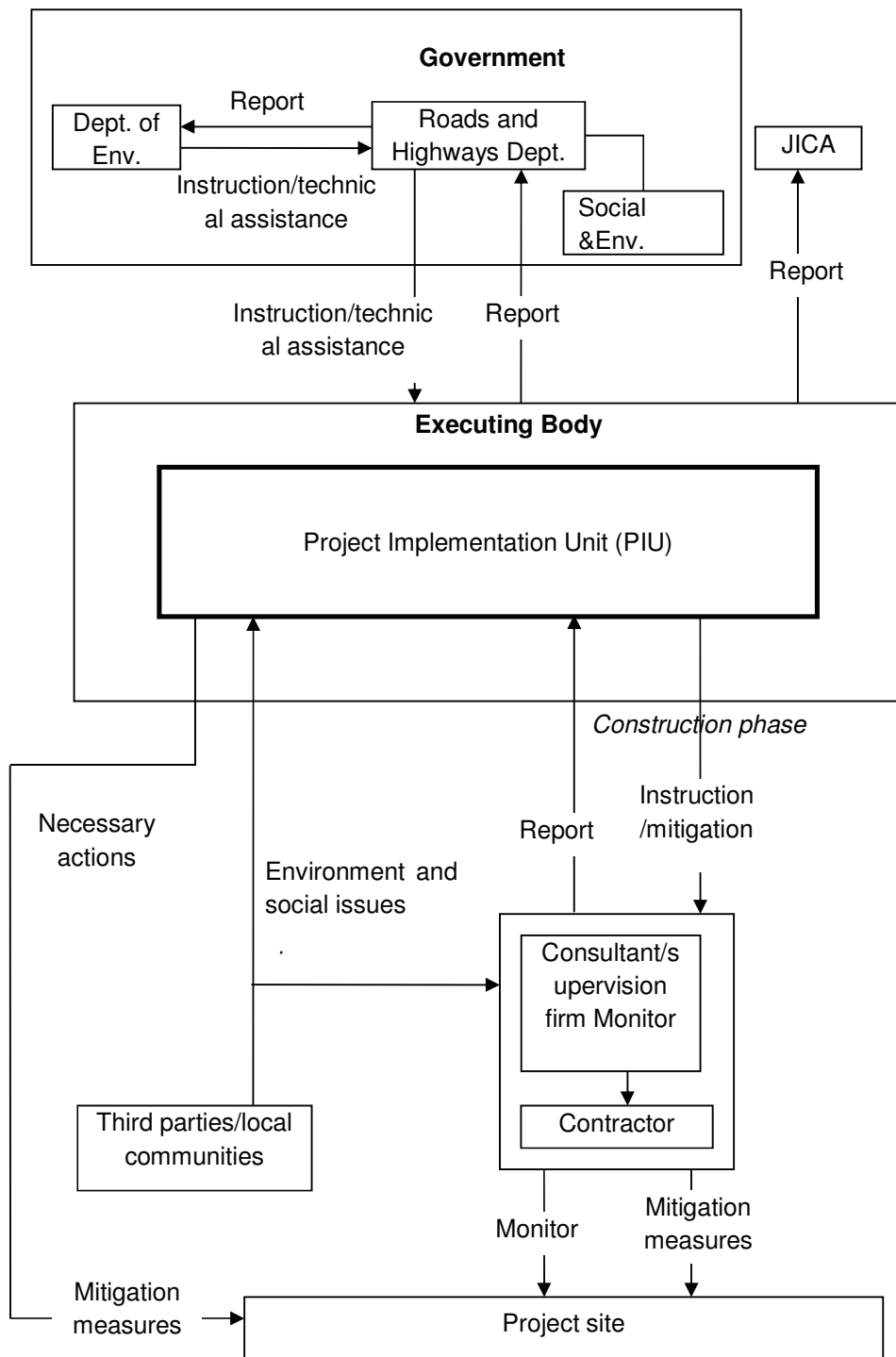
- Supervision and monitoring of environmental and social activities of the project done by Contractor during implementation stages,
- Monitoring the compliance of the provisions of EIA/EMP and the contractual Clauses by Contractor during implementation stages of the projects.

### **7.1 Institutional framework**

Environmental Management of the project involves highly specialized multidisciplinary and multi-sector activities that may be different from mere construction of the bridge and the associated components. The Environmental Circle of RHD at present may not have sufficient expertise and requisite experience to perform the job properly. Moreover, the Environmental Management of infrastructure projects is a growing discipline in Bangladesh and rather worldwide, hence it is not quite expected that RHD possesses the requisite expertise and experience and the time to supervise implementation of the EIA provisions properly by Contractor during implementation stages.

RHD shall remain responsible for implementation of the environmental provisions as per EMP and other EIA documents during implementation stages. Environmental management during implementation stages as mentioned earlier shall require services of a specialized multidisciplinary team with multi-sector backgrounds. RHD or its hired specialized consultants can monitor due fulfillment of the environmental provisions by Contractor during construction stage. The project involves low environmental impacts, the Environmental and Social Circle of RHD may decide how and who to conduct monitoring activities during bridge implementation stages.

The institutional framework for environmental management and monitoring is presented in Figure 7.1.



**Figure 7.1 Institutional Framework for Environmental Management and Monitoring**

## 7.2 Environmental Monitoring Plan

Environmental Monitoring of a development intervention is required to be done periodically for use of the management authorities during the project implementation stages. Two approaches are followed usually during monitoring of environmental impacts. These are (i) compliance monitoring during pre-construction and construction stages and (ii) monitoring of impacts on environmental components during construction and operation stages.

### **7.2.1 Compliance monitoring**

The fulfillment of environmental provisions as per the EIA documents and EMP where applicable at subproject sites, will require monitoring during implementation stages. The issue of environmental concerns are (i) safety and security workers and pedestrian, onlookers and passengers of road transports, (ii) proper hauling, storage, handling and disposal of wastes from construction sites to the GoB authorized dumping places (if any), (iii) provisions for protection against air and noise pollution, (iv) compliance to the gender equity provisions as per regulations, (v) compliance to the labor welfare regulations, (vi) compliance to the provisions regarding public and professional health and sanitation standards and (vii) maintenance of day to day tidiness at work and work camp sites.

Required compliance monitoring during pre-construction stage are (i) to check the measures taken by Contractor to mitigate environmental impacts, (ii) inclusion of environment related provisions of EIA documents and EMP in the contract documents for compliance by Contractor and (iii) regarding payment of compensation to PAPs for the environmental damages that might have caused due to WBBIP implementation activities.

### **7.2.2 Environmental Management Implementation**

The RHD reorganized the Environmental and Social Circle under an Addl. Chief Engineer, with one Superintendent Engineer and one Executive Engineer. and necessary supporting staff. Activities of the Circle are:

- To review the EIA documents including EMP, supervise and monitor activities of Contractor during project implementation stages. Ensure proper implementation of the environmental provisions by Contractor and other stakeholders as per the EIA documents and Clauses during implementation of RHD projects.
- To take care that all the environmental provisions and day-to-day activities at RHD executed project sites fulfill the environmental requirements regarding environment friendliness. The work camp sites, field office site and the overall environment at subproject sites is clean, tidy and environment friendly.

The subproject activities include construction of bridge and approach roads. Enhancement activities include tree planting on approach roads, command areas and take care that no squatter sheds and other structures constructed on approach roads during operation stage.

The impact mitigation measures undertaken during construction stage and the enhancement activities as per EMP may continue even during the operation stage. Contractor during implementation stages shall act as key stakeholder and remain responsible regarding implementation of the environmental provisions as per EMP and contractual Clauses (if any). The RHD/ CSC during construction stage shall periodically supervise activities that may impact IECs.

The IECs affected directly due to WBBIP implementation stages particularly during the construction stage are earthwork, fill materials collection for approach construction, piling of junks, haulage and storage of construction materials, pavement work, demolition of existing structures and other related activities like pile driving, construction of super and sub-structures, etc. Impacts during construction of approach road embankments and bridges shall require instant mitigation to avoid/minimize the potential environmental hazards.

### 7.2.3 Environmental Monitoring Plan

Environmental Monitoring Plan for this sub-project will help to evaluate the extent and severity of environmental impacts against the predicted impact and the performance of environmental protection measures. The following Table 7.1 has been prepared for monitoring the operation & maintenance phase activities of the sub-project:

**Table 7.1 Environmental Monitoring Plan**

Sl. no.	Environmental Indicator	Parameters/Units	Means of Monitoring	Frequency	Responsible agency
01.	Air/Water/Soil Quality	N/A	Inspection	Dairy	Contractor/Consultant of supervision
02.	Dust Control	Spraying of water	Visual	Daily	Contractor/Consultant of supervision
03.	Noise Control	Measurement (db)	Monitoring	Daily	Contractor/Consultant of supervision
04.	Waste Management	Monitoring of collection, transportation and disposal of solid waste. Inspection of construction camp.	Inspection	Daily	Contractor/Consultant of supervision
05.	Working conditions and Accident	Monitoring Health & Safety of Workers	Inspection	Daily	Contractor/Consultant of supervision
06.	Involuntary resettlement, Poor	Monitoring by external monitoring agency	Monitoring	6 months later from resettlement	External monitoring agency/RHD

### 7.2.4 Reporting

The Site Engineer (SE) shall report regarding compliance of the EMP and other environment related issues by concerned stakeholders to RHD in his periodic progress report for reviewed by RHD during the construction stage. Periodic one in a month report of the SE shall indicate clearly regarding the compliance of environmental provisions by Contractor. Contractor's failures to implement the environmental provisions are to be reported to RHD regularly with request for action. Incidents of contamination or pollution due to Contractor's activities whether due to negligence or otherwise are to be mentioned in periodic reports.

### 7.2.5 Environmental Management Cost Estimated

The costs for environmental management are involved in mitigation of the impacts during implementation stages for environmental enhancement activities e.g. planting tree saplings on roadsides, construction of public facilities, etc. The estimates for incurring the environmental costs are shown in Table 7.2 and Table 7.3.



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## **CHAPTER 8. PUBLIC CONSULTATION**

1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> round stakeholder meetings were arranged at different sites (South Chowari, Teura and Alua Bazar) of the EZ Bridge. The discussions with the stakeholders were concentrated mostly on the positive aspects of subprojects implementation, magnitudes of socio-cultural and environmental impacts, compensation entitled by PAPs and resettlement requirements for affected persons and families that to be dealt by RHD and other authorities. The minutes of stakeholder meetings are attached in *Appendix-1*.

### **8.1 Summarized Opinion of PAPs at 1<sup>st</sup> SHM on 01-07-14**

In general, people at EZ Bridge site agreed to accept implementation of the bridge and bridge approach road and made comments that the project implementation will improve road communication system, augment economic activities and allow faster and safer movement of passengers and commodities to and from subproject sites. The mentioned opinions came mostly from the people who were are not directly affected by the project and where impacts of the subproject has tolerable environmental and socio-cultural impacts.

The EZ Bridge shows relatively mild type of environmental impact compared to the socio-cultural impacts that are relatively tedious to mitigate.

### **8.2 Summarized Opinion of PAPs at 2<sup>nd</sup> SHMs on 02-08-14**

The PAPs and many amongst the locals who attended the 2<sup>nd</sup> stakeholders' meetings held at south Chowari, Teura and Alua Bazar opposed implementation of the bridge approach road alignment selected. Their objections were because of the involved social, agricultural and ecological impacts to affect homesteads of a large section of people their cultivable lands and large number of trees provided the bridge approach road is constructed/reconstruction along the proposed alignment. The matter can however be referred to the RHD for its decision how peoples' disapproval regarding the proposed bridge site and of the bridge approach road can be resolved amicably consulting with the local people.

Hence the participants in ARP meet raised objections to construct the bridges along their existing alignments.

### **8.3 Summarized Opinion of PAPs at 3<sup>rd</sup> SHMs on 24-11-14**

Their demand was same as of 2<sup>nd</sup> round meeting; (a) they want the bridge, (b) the existing embankment road should be widened to build the approach/access road, (c) they will not allow road to be built by acquiring new lands inflicting damage to the lands and properties of the people and (d) if the authorities decide against their proposal they will oppose vehemently and organize agitations.

Thus, PAPs do not agree with the construction of proposed bridge.

### **8.4 Summarized Opinion of PAPs at 4<sup>th</sup> SHMs on 06-02-15**

The 4th Round SHM was held at the request of the RHD in order to assess if there had been any change in the observations and demands of the stakeholders since the last SHMs held on 24 Nov 2014.

The State Minister for Women and Children Affairs of the GoB, Ms Meher Afroze Chumki had agreed to attend and chair the meeting.

As a result, both Government of Bangladesh and APs/Stakeholders agreed that (a) Compensation is a replacement cost based on a market price, (b) Payment will be made to avoid Middlemen/Agency, (c) Compensation package should be circulated before acquisition, (d) Suitable land area to build house for displaced people will be considered.

With adequate and proper handling of the acquisition/resettlement process, the APs/stakeholders unanimously consented in favor of the project and the road alignment.

### **8.5 Conclusion**

The proposed project has been planned to establish improved road linkage and the A.K. Khan Industrial Park that is developing on the northeast side of Shitalakhya River as Economic Zone (EZ). Due compensation to be given to the land owners, share croppers, affected vulnerable people and other affected groups as per rules would facilitate construction of the bridge approach road and the bridge.

Thus, the propose project has accepted by local stakeholders on 6<sup>th</sup> February, 2015 at 4<sup>th</sup> round SHM.

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## **Appendix-1**

### Minutes of Stakeholder Meetings

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Name of the Bridge: Kaliganj Bridge, Dhaka-Tongi-Pubail-Kaliganj-Gajipur Road

### **1<sup>st</sup> round Stakeholder Meetings at Site**

The stakeholder meetings (SHMs) for Kaliganj Bridge were conducted at 3 (three) places of 3 (three) different wards of Tumulia Union within Kaliganj Upazila under Gazipur District on the 9<sup>th</sup> of July, 2014 with the potentially affected people of the proposed bridge area at South Chowari Khola, Ward No.3, Teury, Ward No.6 and Alua Market.

The corridor of impact (COI) area is largely agricultural and provided irrigation facility makes available to produce 3 (three) crops a year. There are several large ponds privately owned where fish is cultured. 39 (thirty nine) households will be affected and a large number of trees surrounding the households and located along the local narrow LGED/katcha/foot roads will be affected, too. Due very close to Dhaka market, it brings large revenue for the land owners. They said that it is precious for them and they would not part with their lands at any cost.

#### **Stakeholder Meetings:**

The subject consultation meetings were held at the places mentioned above and following senior Consultants of BCL conducted the meeting

1. Md. Ekramul Huq, Sr. Environmentalist, BCL
2. Md. Faruque Ahmed, Survey Coordinator & MIS Specialist, BCL.
3. Md. Omar Faruque, Supervisor.

#### **List of Stakeholders attended:**

Stakeholders comprised of local elites, farmers, small business groups, service holders, students, women representatives and labor participated as listed hereunder.

At (a) Teury, Ward No.6, about 16 stakeholders were present;

(b) Alua Bazar, about 15 stakeholders were present and,

(c) South Chowari Khola, Ward No.3, about 18 stakeholders were present.

#### **Disclosure of the following facts were made to the Stakeholders:**

The proposed project is to provide new bridge that would be beneficial to local people in particular. And the whole country in general will be economically benefitted due to the increased movement of traffic and transportation of resources. Besides, the bridge and the approach road have been planned to connect Dhaka with a proposed Economic Zone (EZ) where will be developed across the river Sitalakhya. It will foster the economic boon for the country then increase exports, foreign exchange earnings and create large scale of employment opportunity.

- Land owners will be paid replacement value of lost land, structures and other resettlement assistance before displacement;
- Farmers including sharecroppers and lease holders will be entitled to crop compensation if it is damaged due to the project.
- Affected vulnerable people will be entitled to engage in preferential employment during construction of the project.

- Training on income generating activities may be provided to the poor and vulnerable affected persons (APs), if necessary

**Social Impact:**

It was informed as follows:

- Good number of trees will be cut.
- 39 households (HHs) will be affected.
- Considerable quantity of private agricultural land and 5-6 ponds will be affected.
- No social impediment for women if they want to work during the construction of the bridge and the approach road.

**SH and PAPs Opinion:**

- A. The stakeholders presented in the meetings were very much unhappy and spoke strongly against the project and proposed road alignment, and they resolved to resist it to the last. However, they were persuaded to calm down and ventilated their views so that their grievances and sentiments could be conveyed to the authorities. Finally, they listened and the meetings were held peacefully.
- B. People wanted wide and four-lane bridge but not at the currently proposed site. They spoke in favour of the bridge which will be provided at any of the following alternative sites.
  - (1) Near the existing bridge (Kanchan Bridge) or use the existing one, and the road connecting the bridge should be developed / started from the “Bottola” point “or
  - (2) Starting point of the road should be at “Bottola” and the road should directly meet “Gudara ghat” point where a new bridge will be constructed.

**Observation:** It was observed that people not affected were very much interested in the bridge as proposed. But the actual APs were very much against the proposed alignment.

**Environmental impacts:**

**Overview of the Location:** The Bridge location is almost flat with some undulations, natural khals

**Atmosphere and Climate:** The project location has a humid climate with variations of temperatures in between summer and winter seasons.

**Water Quality:** Water quality of tube-well of the HHs along-side the bridge and within the Col is drinkable and with less iron and available at an average depth of 18m to 22m.

**Air Quality:** Clean Air, almost no pollution

**Noise:** As no motorized vehicles except only rickshaws and some battery operated 3 wheelers operate in the area, noise level is normal.



**Wild life:** There is no other species of wild life other than fox, snake, mongoose etc. other than popular ones.

**Plantation:** There has been large number of trees mostly belong to individuals within homesteads and proposed COI.

Photographs of the meeting:

1<sup>st</sup> SHM-SHM-Teury



2<sup>nd</sup> SHM-Alua bazaar



3<sup>rd</sup> SHM-Chowari khola



Western Bangladesh Bridge Improvement Project  
(WBBIP)

Date: 09/07/14

1st Participants of Public Consultations

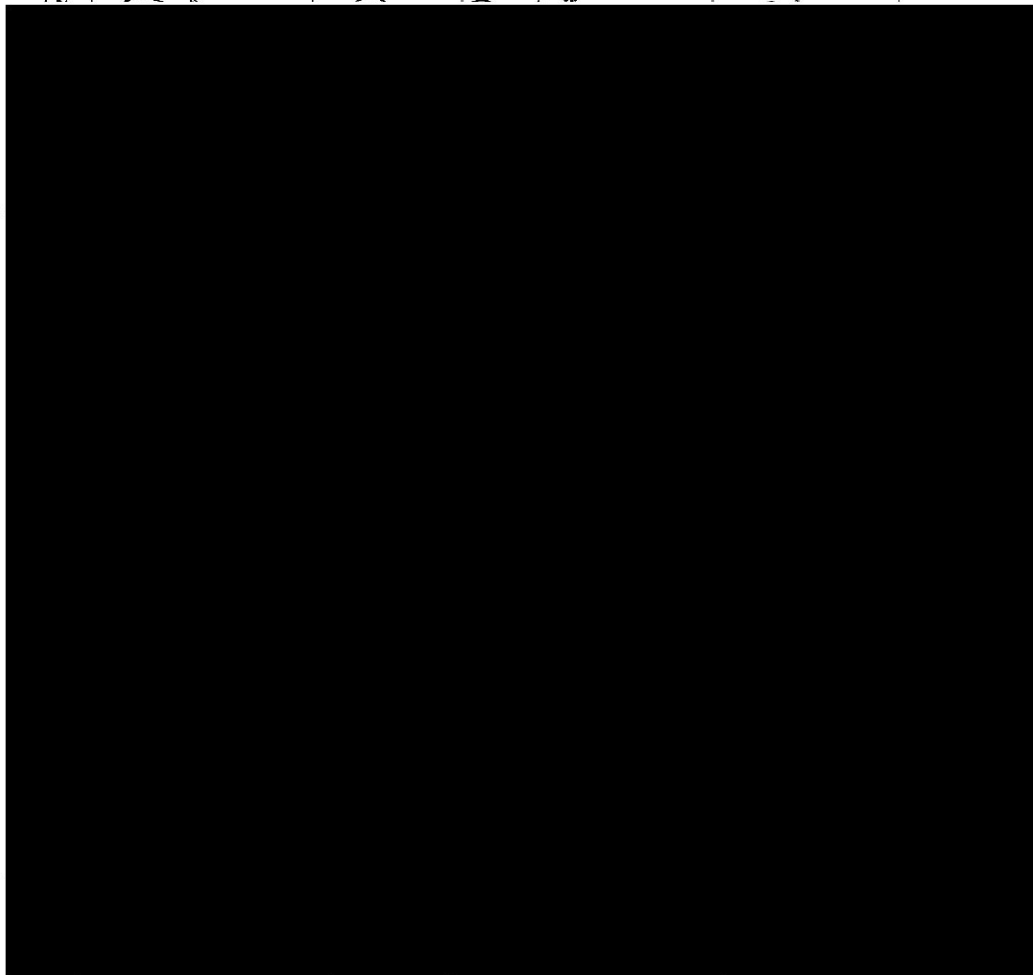
Road Name: Kaliganj bridge

Bridge LRP: \_\_\_\_\_ Km \_\_\_\_\_ Length \_\_\_\_\_ m...Rank \_\_\_\_\_

Meeting / Bridge Location (Village Tury Union Komal Upazila Kaliganj)

District: Gazipur Zone: Dhaka

Sl	Name	Profession	Address and Telephone no.	Signature
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Western Bangladesh Bridge Improvement Project  
(WBBIP)

Date: 7.7.14

1st Participants of Public Consultations

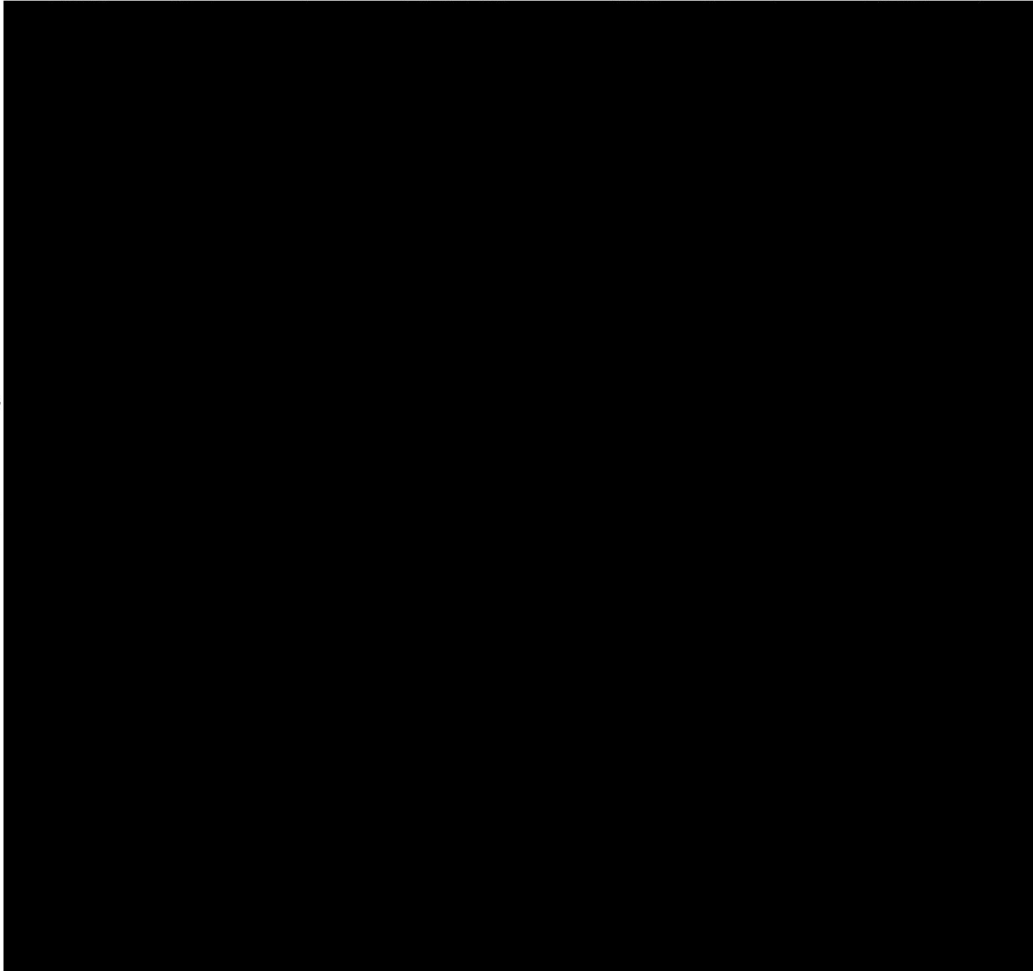
Road Name: Kaligani bridge

Bridge LRP: \_\_\_\_\_ Km \_\_\_\_\_ Length \_\_\_\_\_ m... Rank \_\_\_\_\_

Meeting Bridge Location (Village: Ahmatbar Union: Sambli Upazila: Kaliganj)

District: Coxipur Zone: Bhaka

Sl No.	Name	Profession	Address and Telephone no. if any	Signature
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Western Bangladeshi Bridge Improvement Project  
(WBBIP)

Date: 09/07/14

1st Participants of Public Consultations

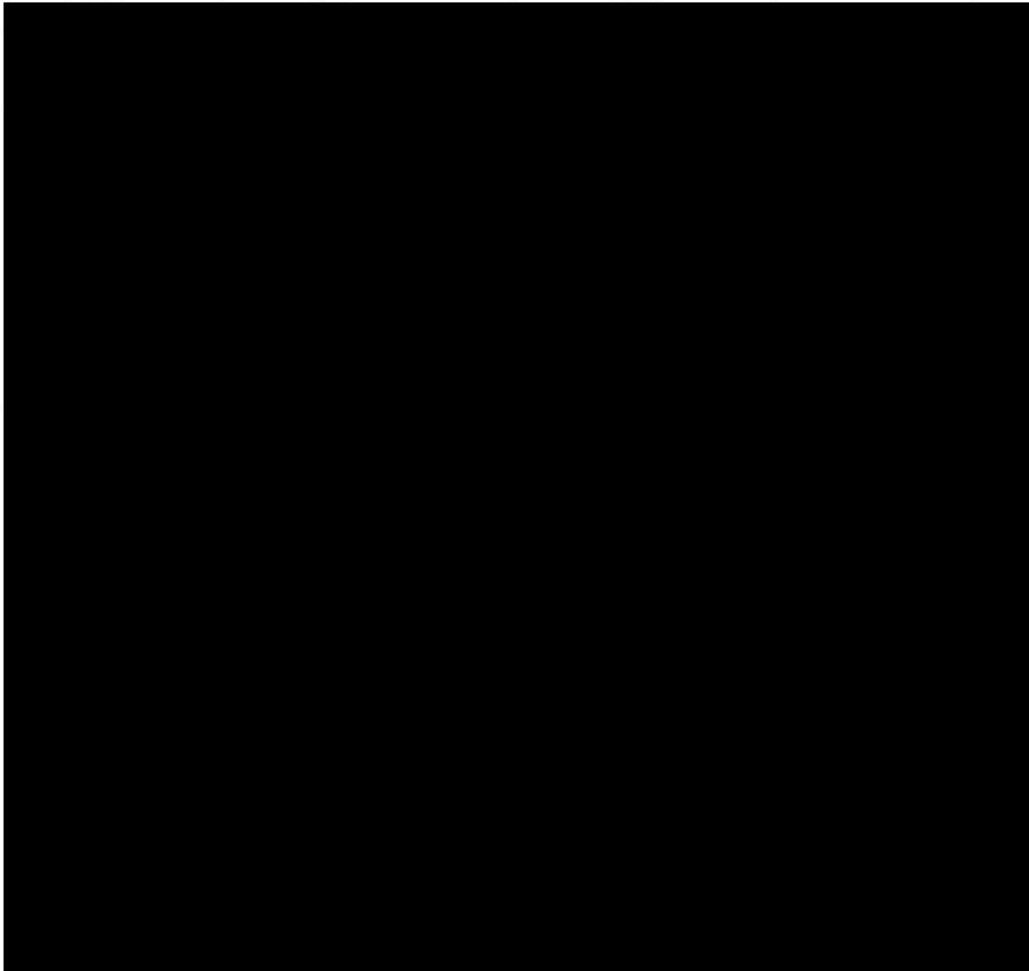
Road Name: Kaliganj bridge

Bridge LRP: \_\_\_\_\_ Km \_\_\_\_\_ Length \_\_\_\_\_ m...Rank \_\_\_\_\_

Meeting / Bridge Location (Village S. CHARIAHOLA Union TOMOLIA Upazila KALI GONJ)

District: GAZIPUR Zone: Dhaka

Sl No.	Name	Profession	Address and Telephone no. if any	Signature
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## **2<sup>nd</sup> round Stakeholder Meetings at Site**

It was held on 19<sup>th</sup> of August, 2014 and followings attended:

1. Mr Hiroki Sakai, OC
2. Mr Prasenjit Kumar Ghosh, OC
3. Mr Rezaul Karim Chowdhury, BCL
4. Dr. Mir M Hassan, BCL
5. Dr. Hafiza Khatun, BCL
6. Mr Ekramul Huq, BCL
7. Mr Md Faruque Ahmed, BCL
8. 4 Field Surveyors of BCL

OCL had requested JICA, RHD, BEZA to send representatives who attend the meetings. BCL also tried to bring RHD officials into the meeting, but none of them turned up.

The meetings disclosed the followings:

1. The road alignment
2. Compensation package and resettlement benefits
3. A cut-off date

3 meetings were held where the 1<sup>st</sup> round SHMs were held before i.e. (a) Teury, (b) Alua Bazar (Hannan Market) and (c) Chowari Khola. The lists of attendees are enclosed.

### **At Teury**

The PAPs mostly belong to poorer of the community those attended. An elderly AP Md. Hanif was persuaded to preside though he agreed with reluctance. The PAPs were very upset and shouted against the proposal construing that construction of the road would force displacement from their ancestral lands and homes. They had the impression that the project would render them to become destitute.

The Consultants disclosed the cut-off date and the compensation package under the backdrop of huge noise raised by the PAPs, and they were unwilling to listen. They said that they would not want any money as compensation; instead, they wanted land for land as it is not available to purchase the lands in the area. Compensation without considering a spiralling escalation of land price would not allow them to find and buy replacement lands. They unequivocally expressed their view to resist the project by raising hands. When asked to show hands in favour of the bridge, none was seen.

They suggested that the road could be constructed over the flood protection embankment (Beribundh) along the river where owned by Govt. This was recorded.

One gentleman said that the proposed COI might go over an age-old graveyard which might have been used to bury the dead for generations. He requested to realign the road to avoid the graveyard. PAPs were found sentimental on this issue.

### **At Alua Bazar (Hannan Market)**

The meeting was presided over by Mr. Hannan who is a local elite and opinion maker and he said that he would lose most of the lands and structures, but he was in favour of the road and the bridge. He was quite happy with the compensation package declared but was apprehensive about getting it properly.

He and the attending PAPs said that appropriate measures must be ensured so that the PAPs would get the replacement value of all losses without corruption and hindrance.

The stakeholders were informed that 19 August 2014 was the cut-off date and were requested not to raise any new structures in the proposed alignment.

### **At South Chowarikhola**

Mr Shahjahan who is a local elite and an opinion maker was requested to preside. He said that he did not want to preside, and spent the most of the time to talk and argue. The Consultants reconfirmed the alignment, disclosed the compensation package and declared the cut-off date (19.08.2014). The stakeholders (most of them are land losers only) expressed their dissatisfaction about the proposed alignment and they were not willing to listen about the acquisition and compensations. Instead, they proposed to widen the existing road to Kaliganj. Mr. Ghosh explained that widening of the existing road would require displacement of large number of shops which would result significant impacts. The PAPs said that those are small shops and easily be relocated to the both sides as the lands belong to RHD.

The list of stakeholders attending are enclosed.

1<sup>st</sup> SHM-Teury



2<sup>nd</sup> SHM-Alua bazaar



3<sup>rd</sup> SHM-Chowari khola

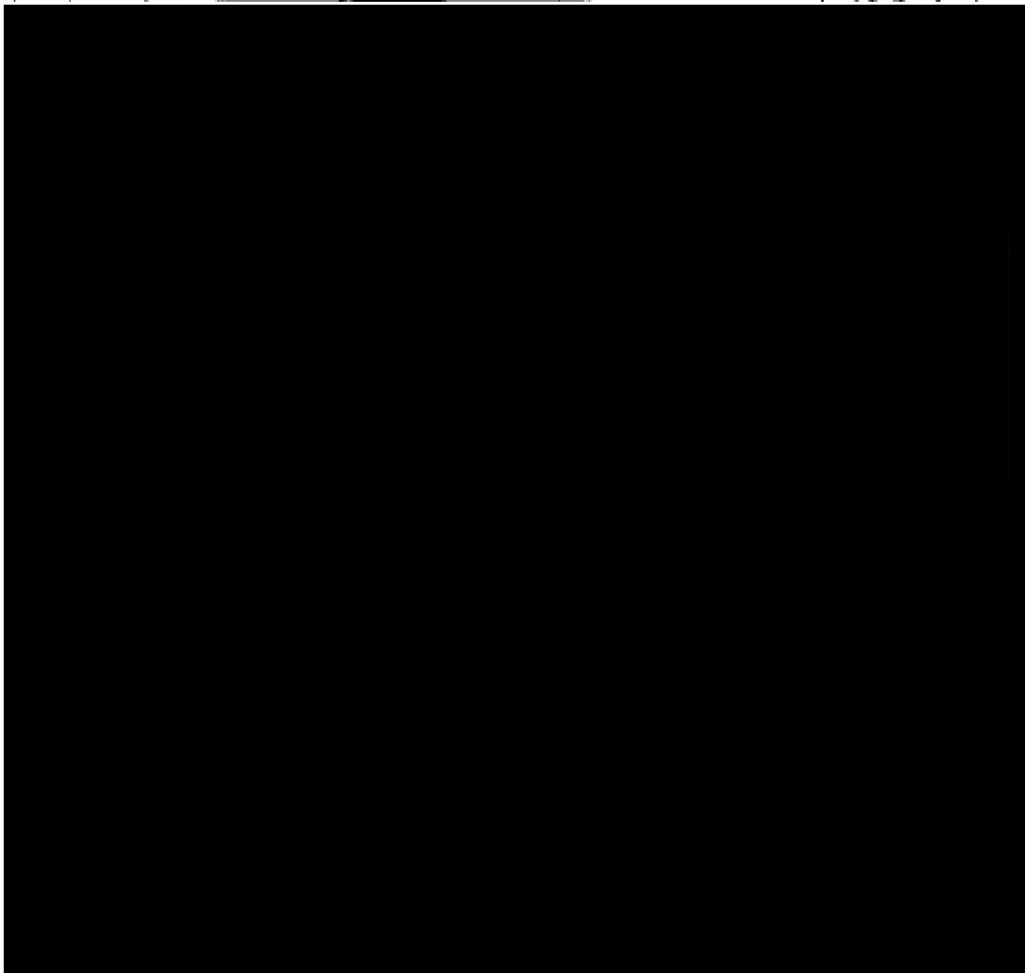


## KALIGANJ BRIDGE

### List of Participants to the 2<sup>nd</sup> Round Local SHM

Date: 19.8.14 Time: 11.30 AM Venue: Tewary?  
Bridge Name: Kaliganj Bridge Rank: \_\_\_\_\_  
Division: Gazipur Zone: Dhaka

Sl No.	Name	Profession	Address and Contact No.	Signature
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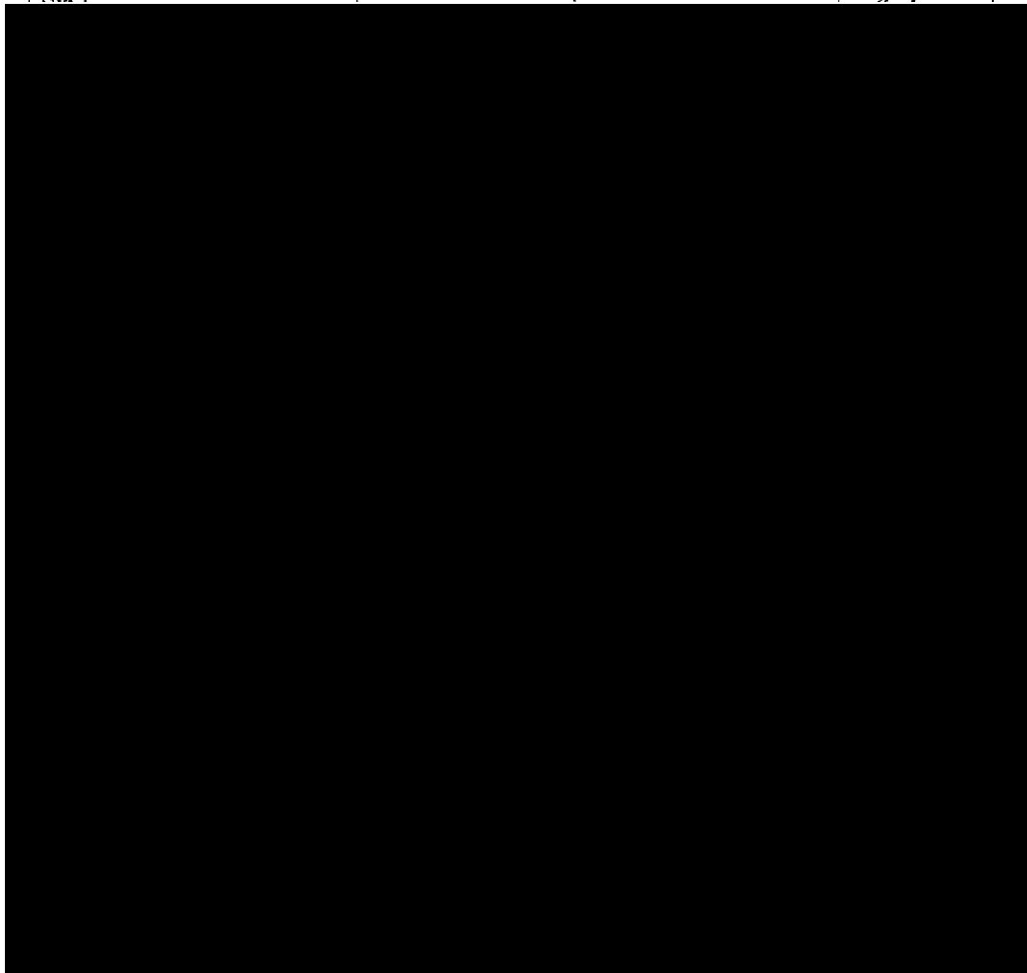


## KALIGANJ BRIDGE

### List of Participants to the 2<sup>nd</sup> Round Local SHM

Date: 17.8.14 Time: 12.45 PM Venue: Alia Bazar  
Bridge Name: Kaliganj Bridge Rank: \_\_\_\_\_  
Division: Gazipur Zone: Dhaka

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## KALIGANJ BRIDGE

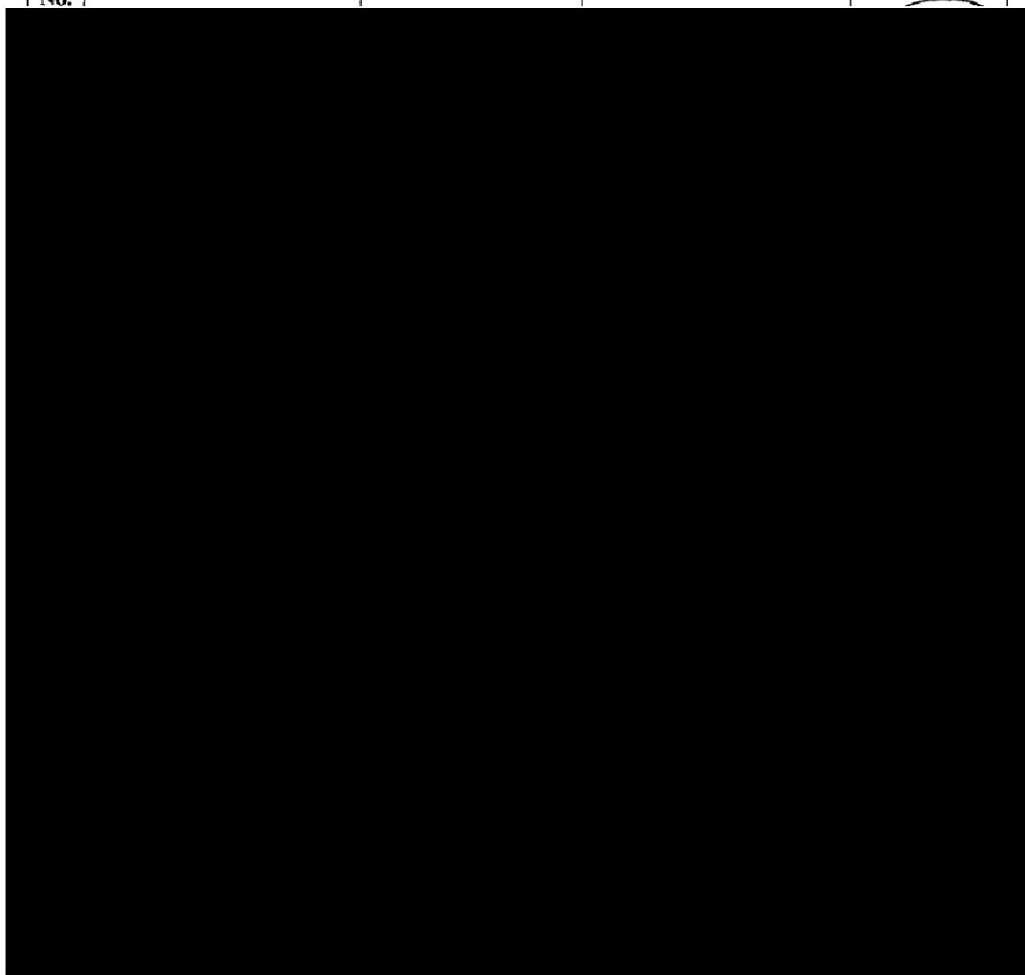
### List of Participants to the 2<sup>nd</sup> Round Local SHM

Date: 19.8.14 Time: 2.30 PM Venue: Chuarikola

Bridge Name: Kaliganj Bridge Rank:

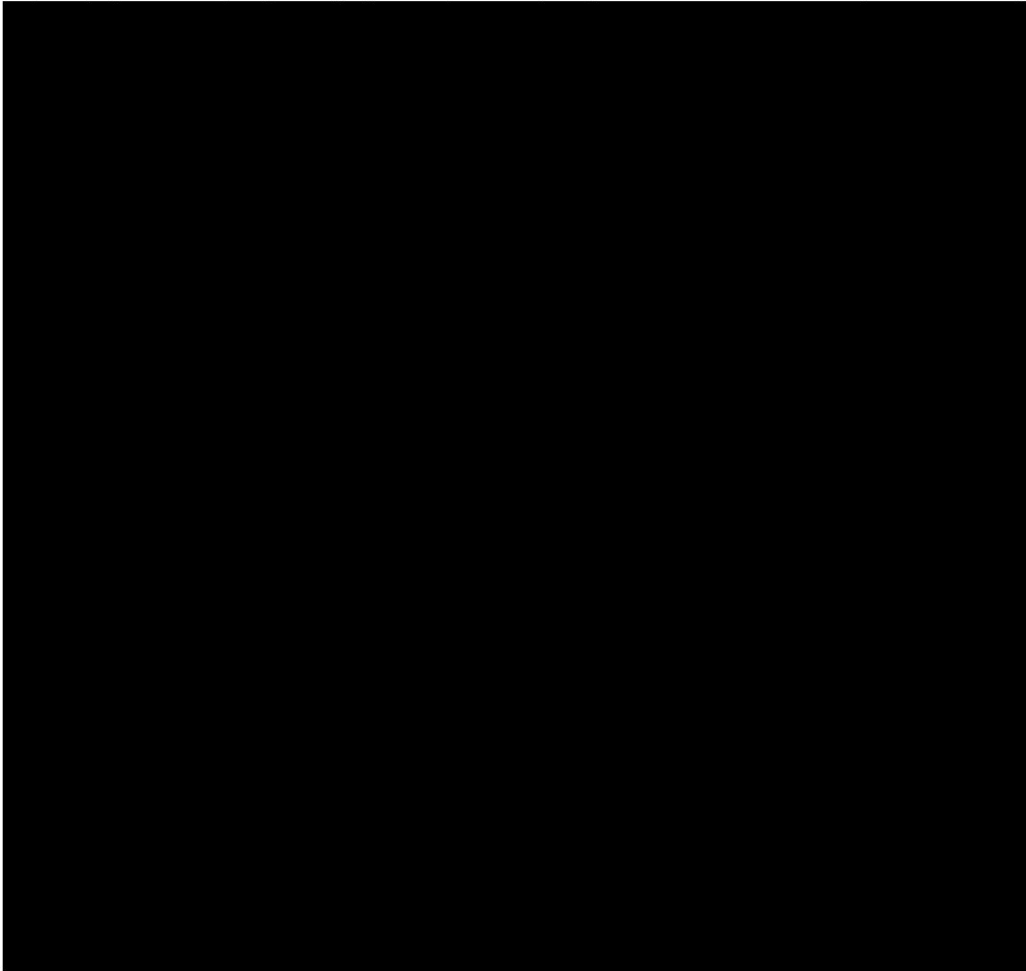
Division: Gazipur Zone: Dhaka

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Chitazikhola

Sl No.	Name	Profession	Address and Contact No.	Signature
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### **3<sup>rd</sup> round Stakeholder Meetings at Site**

On 24 Nov. 2014 three Stakeholders Meetings were held in the Kaliganj Bridge and approach areas.

#### **Locations of the Meetings**

1. Bangabandhu Bazar in South Shome Village in Tumulia Union at 10AM. The Bridge will land at this location in the Kaliganj side.
2. Hannan Market (In this location the APs and stakeholders of both Aluabazar and Teuri were invited to attend in one meeting, the distance between Aluabazar and Teuri is about 400m) at 12 Noon. The Hannan Market is in Alua Village also under Tumulia Union.
3. South Chowarikhola is in Village Chowarikhola, also under Tumulia Union at 3 PM.

#### **How the APs and Stakeholders were informed and invited to attend**

The APs and stakeholders were informed and requested to attend (a) by personal contacts and (b) by announcement using microphone, the previous day and in the morning of 24<sup>th</sup> Nov. This time, on invitation from RHD, the Executive Engineers of Gazipur and Narsingdi attended and the Executive Engineer of Ghazipur presided the meetings in all 3 SHMs. Additionally the following dignitaries and elites of the project impacted areas also attended.

- i) The Upazila Nirbahi Officer (UNO) of Kaliganj
- ii) Upazila Chairman of Palash Upazila of Narsingdi district
- iii) Chairmen and Members of the adjoining Union Parishads of Kaliganj and Palash
- iv) Political leaders of local Awami League and BNP along with their party affiliates and
- v) A AGM of A K Khan Group

The Stakeholder/APs actively participated in all the discussions in the three meetings. However the Executive Engineer of Narsingdi RHD and the Upazila Chairman of the Palash and Danga Unions had left after the first meeting at Bangbandhu bazaar site.

### **Participation of Stakeholders**

All the 3 meetings were attended by about 50-100 people but there were some minors present who were not listed. About 62 persons attended at Bangabandhu Bazar, 40 persons attended at Hannan Market and about 80 persons attended at South Chowarikhola meetings but participants of South Chowarikhola meeting initially opposed to enter/sign their names but later on request from Mr Abu Bakkar Mia, Chairman of Tumulia Union, some signed but many refrained.

**Because the discussions and AP/Stakeholders reactions had been same or similar hence only one report is prepared for the 3 meetings.**

### **Discussion and decisions arrived at**

The Chair of the meetings, Executive Engineer of Ghazipur RHD opened the discussions with a written text in which the project, its impacts and compensation packages and resettlement issues were briefly elaborated. At this the APs and stakeholders shouted in one voice that they have heard this several times before and they want to hear something new. The other dignitaries present spoke in favour of the bridge but assertively said against inflicting any damage to the lands and properties of the people.

The stakeholders present started to talk all at a time to a chaotic situation then the Tumulia Upazila Chairman tried to cool down the stakeholders present with a proposal that **“they want the bridge but the approach (access) road should be built by widening the existing road on the right flood protection embankment”**. Although a few households and mostly small shops will be affected on this alignment but he said that since that road is build on acquired land of RHD/BWDB it should not be difficult to evacuate the unauthorized installations and they will help the authorities in the process. No new lands will need to be acquired.

The people present unanimously supported the proposal and said that **“this should be the only option”**. They will not agree to any other proposal and if anything different is imposed on them they will oppose it and will go for public agitation.

One of the stakeholders questioned, who is A K Khan. It is a private group and why they should be sufferer to establish desires of a private group. The Upazila Chairman of Palash and the UNO of Kaliganj both said that it is a govt project and the people of both Palash and Kaliganj will be evenly benefited if the project is implemented. The young men of both the Upazilas will get jobs and due to the improvement of road communication, products of the EZ will quickly reach Dhaka and exported, and the country will be immensely benefited. In the future due to improved and better road, industries will grow on this side (Kaliganj side) to the economic benefit of the people of Kaliganj also. The people calmed down.

But the unanimous decision was that, they want the bridge but the road should be built by widening the existing embankment road along the river.

Meetings at the Hannan Market and South Chowarikhola were quite brief because the popular demand was same (a) they want the bridge, (b) the existing embankment road should be widened to build the approach/access road, (c) they will not allow road to be built by acquiring new lands inflicting damage to the lands and properties of the people and (d) if the authorities decide against their proposal they will oppose vehemently and organize agitations. The Chairman of Tumulia Union Mr A Bakkar Mia told the meetings that he had talks with the Minister from Kaliganj area who also corroborated with their demands. She was visiting Thailand and on her return they will deliberate with her and present a memorandum to the authorities. All the meetings ended with vote of thanks to the Chair.

The alignment of the approach road proposed by the stakeholders is attached.

### **Conclusion**

Thus, PAPs do not agree with the construction of proposed bridge.

The lists of stakeholders present area appended. Incidentally the stakeholders of South Chowarikhola refused to sign the list. The Upazila Chairman requested them to sign and some of the APs signed but not all.

**Some Photographs of the Meetings**



Bangabandhu Bazar-1



Bangabandhu Bazar-2



Hannan Market-1



Hannan Market-2



South Chowarikhola-1



South Chowarikhola-2

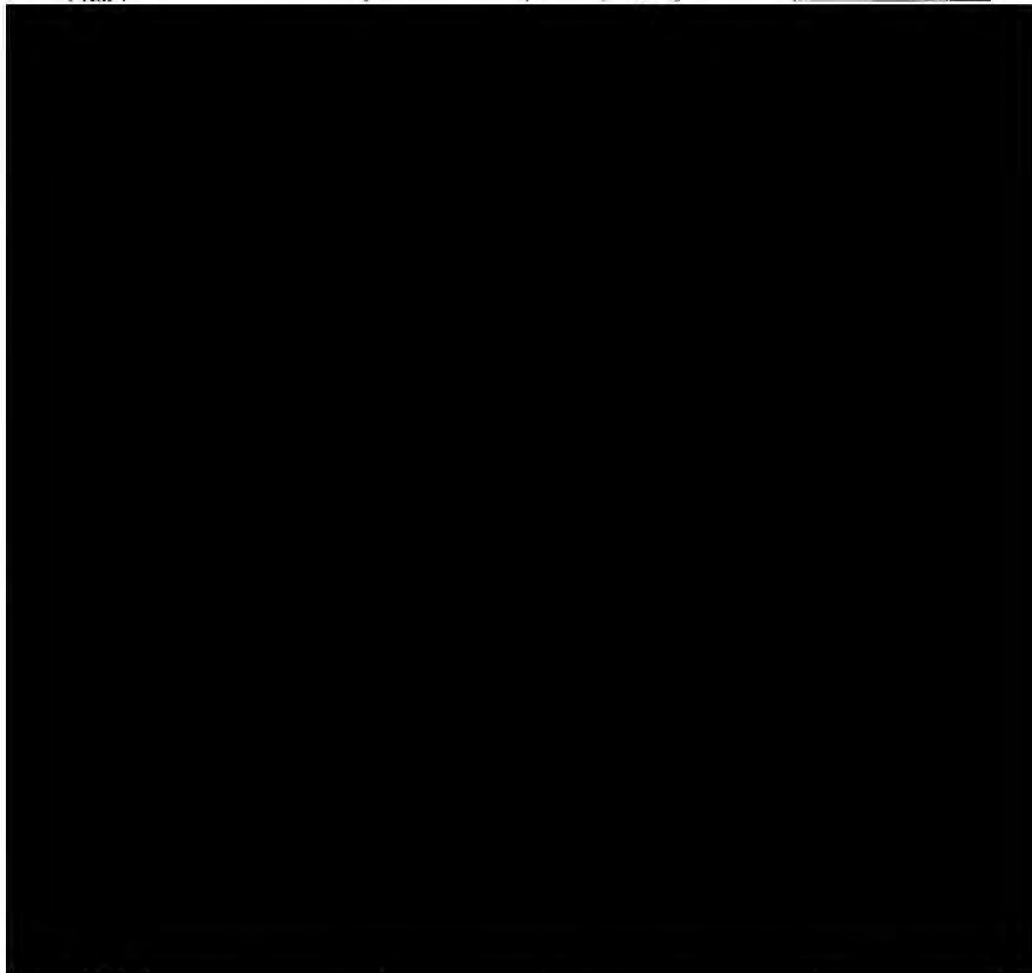
**Western Bangladesh Bridge Improvement Project  
(WBBIP)**

Date: 26.11.14

**Participants of Public Consultations  
at Bangabandhu Bazar**

Road Name: Kaliganj  
 Bridge LRP: South Dhaka Length Bangabandhu Bazar m. Rank   
 Bridge Location (Village) South Shom Union Tamukhazipazila Kaliganj  
 District: Cox's Bazar Zone: Dhaka

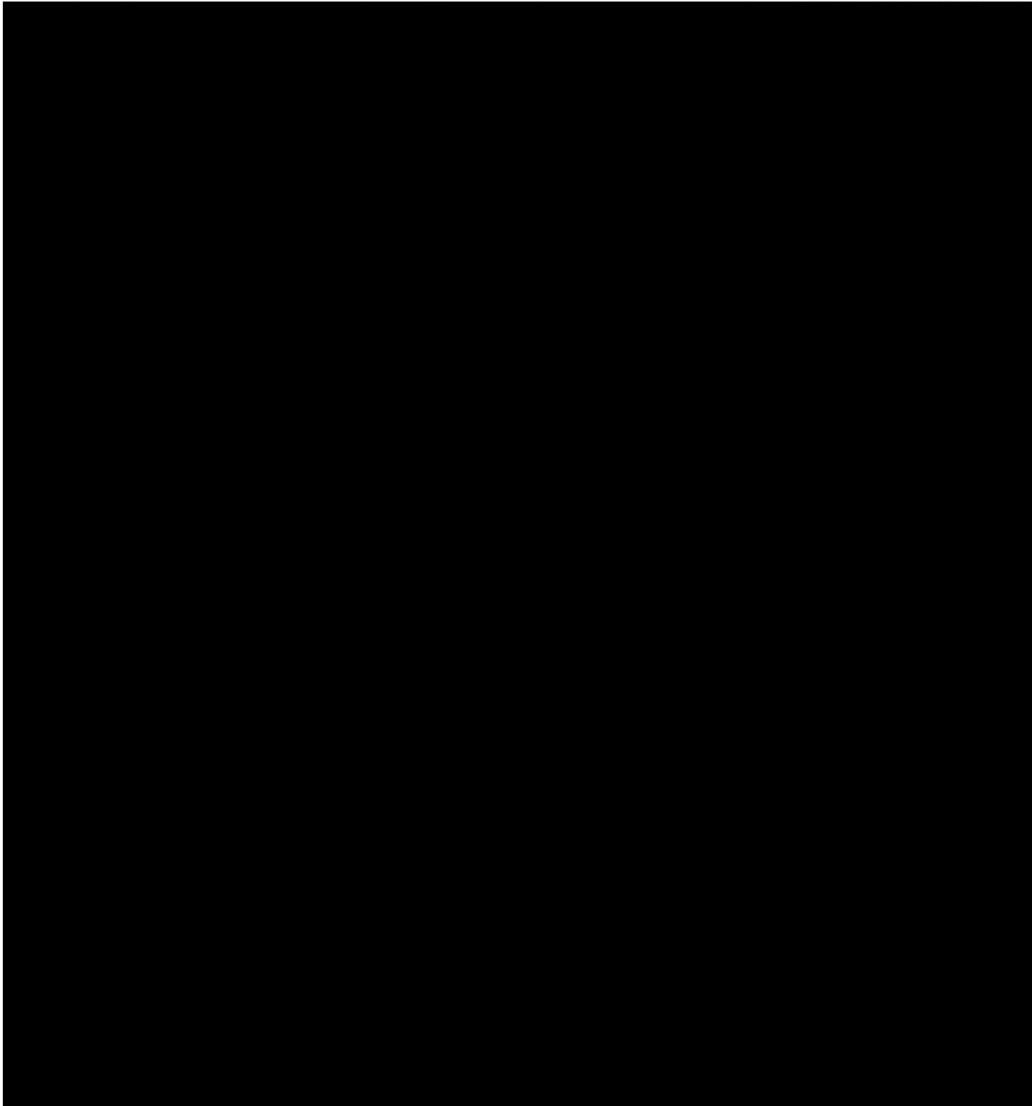
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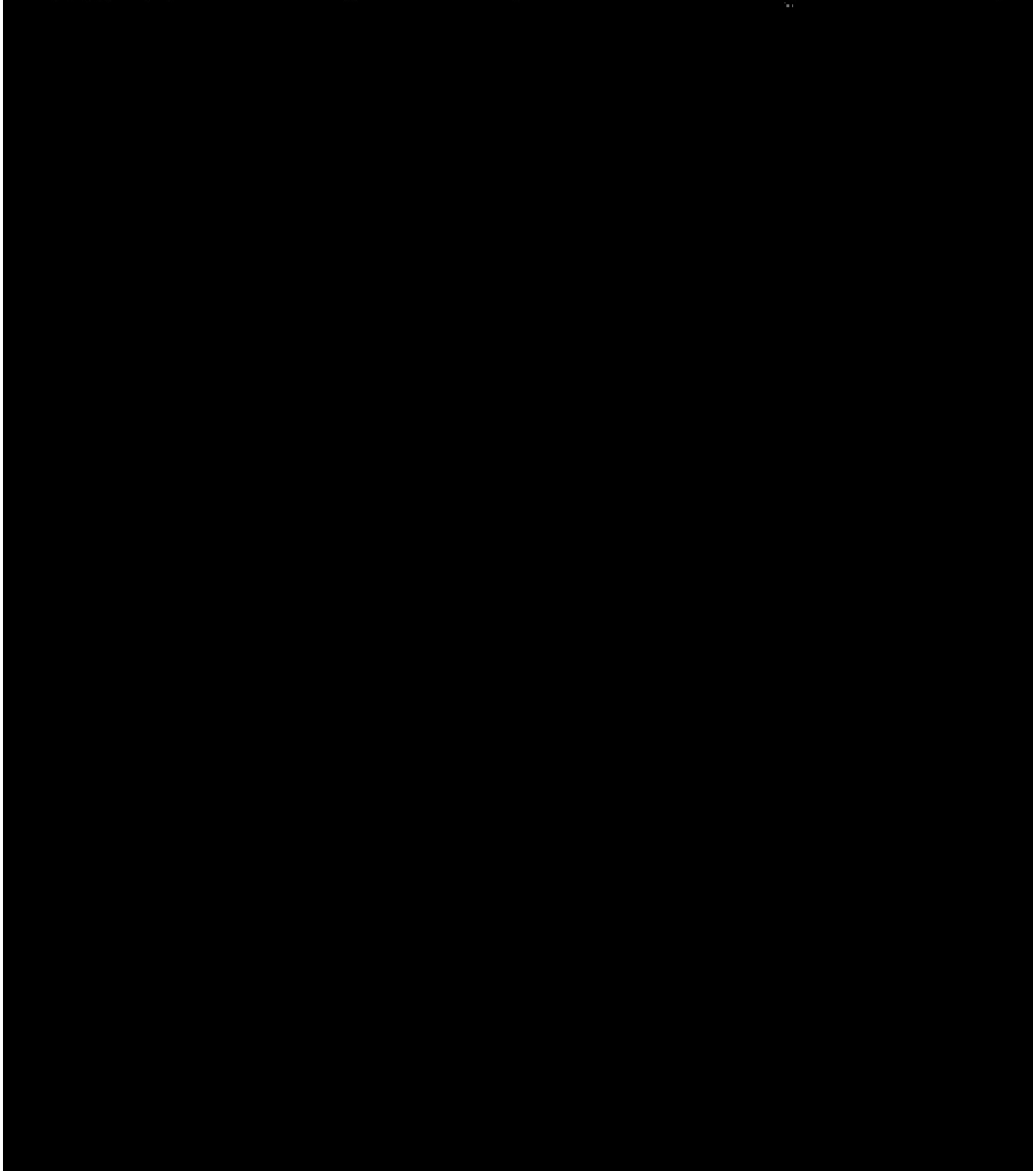


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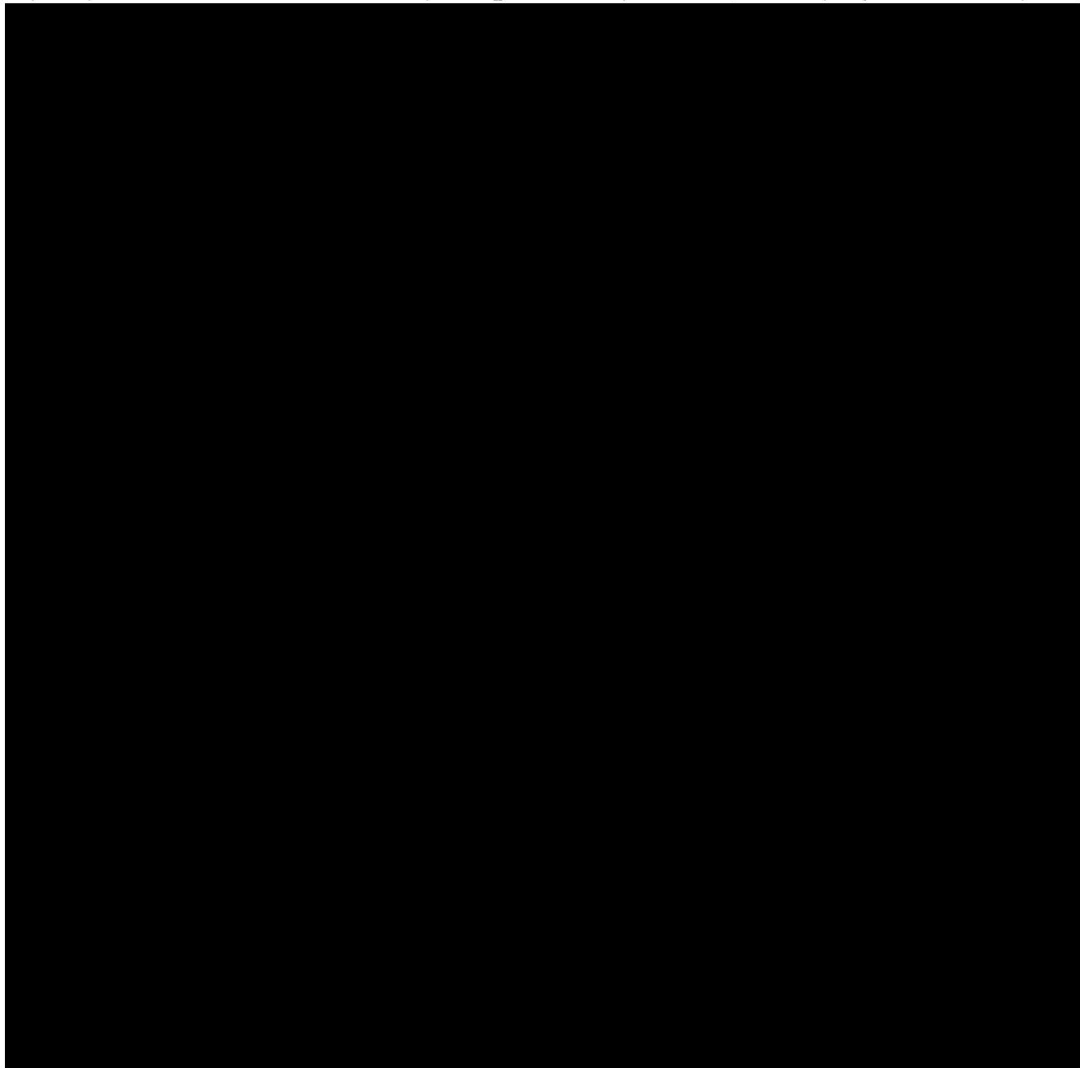
Western Bangladesh Bridges Improvement Project  
(WBBIP)

Date: 24.11.14.

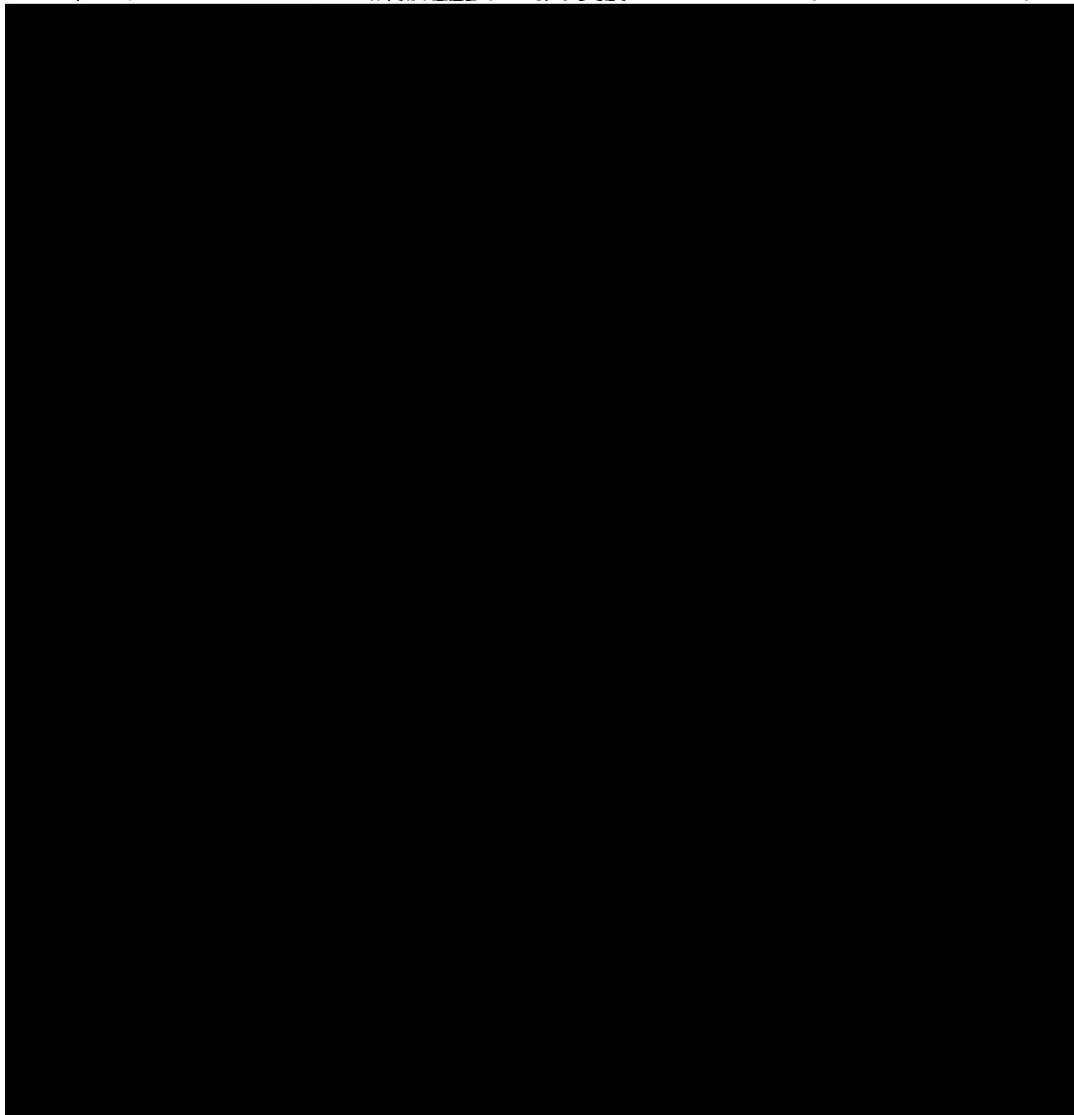
Participants of Public Consultations  
at Alua (Hannan Market)

Bridge  
Road Name: Kaliganj  
Bridge LRP: \_\_\_\_\_ Km: \_\_\_\_\_ Length: \_\_\_\_\_ m., Rank \_\_\_\_\_  
Bridge Location: (Village: Alua Union: Tamulia Upazila: Kaliganj  
District: Gazipur Zone: (Hannan market)  
Dhaka).

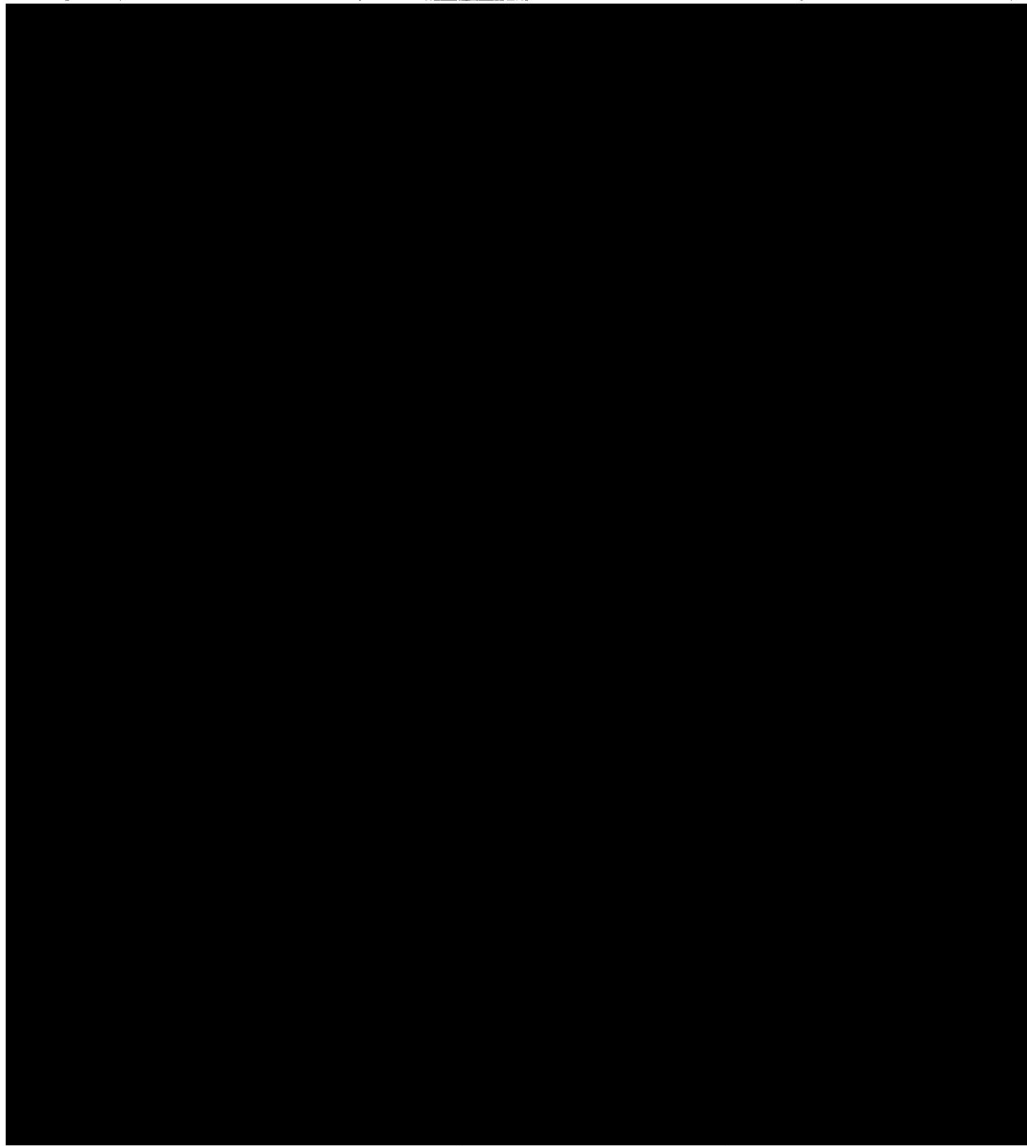
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Western Bangladesh Bridges Improvement Project  
(WBBIP)

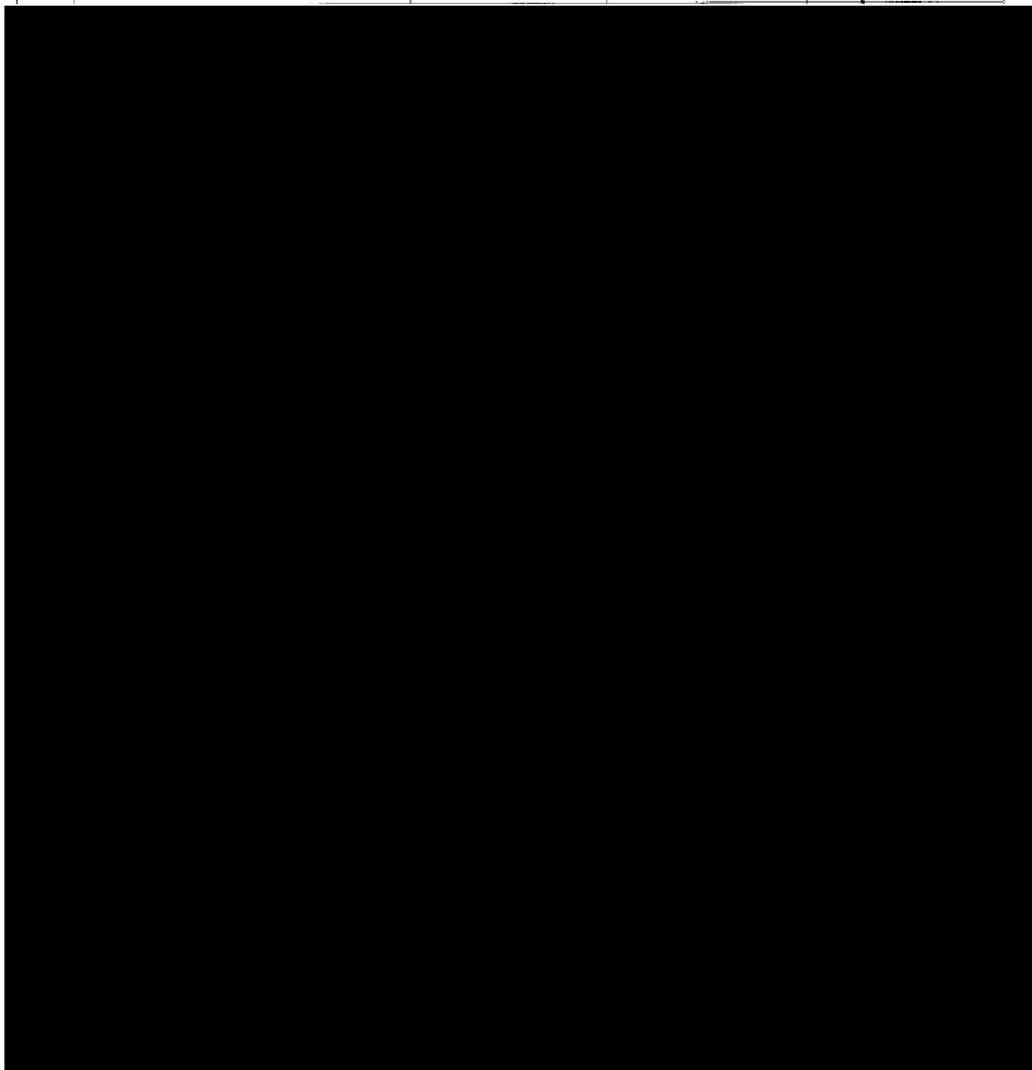
Date: 21.11.14

Participants of Public Consultations  
at South Chowarikhola

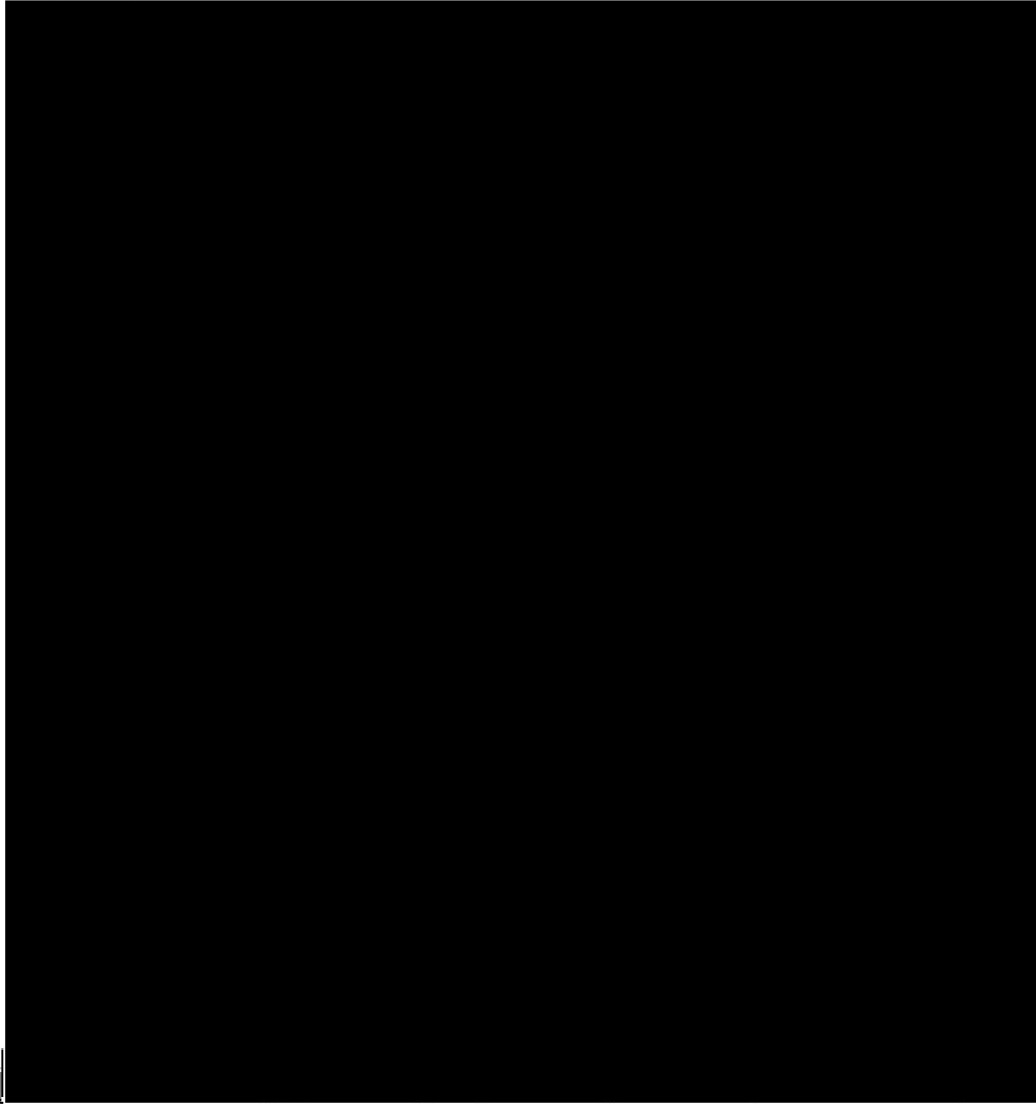
Bridge

Road Name: Kaliganj  
Bridge LRP: \_\_\_\_\_ Km: \_\_\_\_\_ Length: - m... Rank -  
Bridge Location: (Village: Chuarikhola Union: Tamdia Upazila: Kaliganj  
District: Gazipur Zone: Thaka).

Sl. No.	Name	Profession	Address and Telephone No. if any	Signature
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#### **4<sup>th</sup> round Stakeholder Meetings at Site**

On 06 Feb 2015 the 4<sup>th</sup> Round SHM was held at the request of the Client in order to assess if there had been any change in the observations and demands of the stakeholders since the last SHMs held on 24 Nov 2014.

It was planned to hold the meetings in all the 3 locations where earlier SHMs were held but due various constraints the meetings organized on 28 Jan and 02 Feb could not be held. Subsequently a slot of comparatively less disturbance was identified to hold the meeting(s) and on 06 Feb this was organized. The day was a Friday and about 2-3 hours at noon time is not available for work due to Jumma prayer congregation. Moreover the RHD informed that the State Minister for Women and Children Affairs of the GoB, Ms Meher Afroze Chumki had agreed to attend and chair the meeting.

#### **Locations of the Meeting(s)**

The meeting was organized considering the following local consent to the project:

1. Chowarikhola under Tumulia Union. It may be mentioned here that the stakeholders of this area were seriously against the access road alignment through their area, lands and homesteads.
2. Bangabandhu Bazar also under Tumulia Union. At this location the resistance was less and the stakeholders of this area expressed to consider an alternative alignment along the Sitalakhya flood control embankment.
3. No meeting was considered/organized at Hannan Market (Alua Bazar) also within the Tumulia Union. In previous meetings held at this location, the resistance was almost none. The lands mostly belonged to one person and he was willing to part his lands for the greater interest of the country.

As is evident from the above all the affected lands and structures are in the Tumulia Union, the APs and stakeholders belonged to the said Union.

There was no resistance for the construction of the bridge.

#### **How the APs and Stakeholders were informed and invited to attend**

As discussed above the stakeholders/APs were informed and invited on 26-27 Jan and on 01 Feb about the meetings, but those meetings scheduled for 28 Jan and 02 Feb could not be held and was rescheduled for 06 Feb for which miking, personal contacts were done on 05 Feb whole day and 06 Feb morning.

Extensive campaign through personal contacts, miking and meeting the Upazila Chairman at Dhaka who resides in Dhaka. Since the numbers of meetings were reduced, the APs of the Hannan Market (Alua Bazar) and Bangabandhu Bazar were requested to attend the meeting at Chowarikhola, some came but many did not respond.

The SHM at Chowarikhola was attended by

- vi) The Hon'ble State Minister for Women and Children Affairs (She also is a resident of the Tumulia Union)
- vii) Mr Sabuj Uddin Khan, Executive Engineer, RHD, Ghazipur
- viii) Mr Abul Quashem, Sub-Divisional Engineer, RHD, Ghazipur
- ix) Mr Moazzem Hoq, Upazila Chairman, Kaliganj and AP
- x) Mr Abu Bakar Mia, Union Parishad Chairman, Kaliganj Upazila Mohila (Women) Awami League
- xi) Ms Sharmili Dashi Mili, Vice Chairman, Kaliganj Upazila
- xii) Mr Mainul Islam, General Secretary, Kaliganj Thana Juboleague
- xiii) Mr Kazi Salahuddin, Awami League Leader, Tumulia Union
- xiv) Mr Yunus Ali, President, Ward # 3, Tumulia Union
- xv) Mr Jahangir Ahmed, Member, Tumulia Union and AP
- xvi) Mr Mahfuzur Rahman, Vice President, Alua Union Jubo League

Besides the above dignitaries and local elites and opinion makers about 40 APs attended.

Villagewise distribution of attending APs are as below:

- Chowarikhola - 18 and some others
- Shome village (Bangabandhu Bazar area) - 3 and several others
- Alua Bazar/Teuri - 2 and several others

Note: Several others mean they are APs but absentee landowners (they live elsewhere).

Additionally 5 Consultants Team member including M/s Prosenjit Kumar Ghosh and Ashraful Alam Sarkar attended and participated in the proceedings.

The list of participants and some representative photographs are enclosed at the end of the report.

### **The Meeting**

The Hon'ble State Minister presided over the meeting. The Executive Engineer anchored the proceedings.

### **Discussion and decisions taken**

The Chairperson welcomed the audience, described in brief the purpose of the meeting and how the benefits accrued from the project would benefit the APs, the area and the country at large and requested them to listen and give their valuable and favourable opinions.

She then requested the Consultants to describe the compensation package and Mr Rezaul Karim Chowdhury narrated the compensation package. The package was described several times in past meetings and the brief of the package was repeated. In sum the package described is as follows:

- Alternative routes for the bridge and the access road had been considered including the route suggested by the stakeholders in the SHM of 24 Nov 2014. The route proposed by the RHD has the minimum impacts and that the 24 Nov'14 SHM suggested route would impact over 100 HHs/commercial structures as against 39 in the Consultants proposed one.
- The lands and properties affected/acquired will be compensated at replacement value. The replacement value will consist of market value to be determined by a joint market survey and the registration cost and any taxes as may be applicable.
- The APs losing structures will be allowed to take away all salvageable materials free of cost and assistance will be allowed as reconstruction grant.
- APs losing trees, etc will be compensated at market price and will be allowed to take away the felled trees.
- APs will be assisted in the resettlement process like finding land, development of land for house construction purpose, etc.
- And that the acquisition, compensation payment and resettlement process will be closely monitored by appropriate legally formed bodies to ensure that the socio-economic status of the APs would improve, if not, then that will remain as it is/was during pre-project condition and in no way the APs will be impoverished due to the project.

#### **Questions from APs and Consultants' responses**

Q.1. The people of the project area are poor and mostly engaged in agriculture due to the benefits of the polder. They grow 3 crops and being close to Dhaka market they have access the Dhaka market which brings them better prices. They appeared reluctant to let their lands and properties to be acquired but in the greater interest of the country they will agree to the acquisitions if property compensated. They quoted some existing market values of land at Tk. 50,000 per decimal for low/agricultural croplands and Tk. 66,000 for high (suitable for house construction) lands.

Ans: The APs will be compensated at replacement values of all lands and properties acquired. The market price will be determined by joint market survey, the Joint Market Survey team will also include members from the APs and stakeholders. The replacement value will constitute market value plus registration cost plus taxes if any.

Q.2. In the past when lands were acquired for different purposes and other projects the APs did not get proper compensations and that there had been problems of middlemen in getting whatever compensation was provided by Govt. and thereby losing fair compensation. They wanted that this time they will not accept presence of middlemen in the process. They expressed that JICA should pay the compensations.

Ans: The compensation amounts will be decided by the Joint Market Survey Team (which will also include representatives from the APs/stakeholders and the Acquiring Body will arrange for opening of bank accounts of the APs and the payment will be made only thorough bank transactions to avoid involvement of Middlemen/Agents. *The answer to the demands of APs for receiving compensations from/through JICA was not provided because this is the responsibility of the GoB and if answered, there would have been confusions. Such a situation was avoided.*

Q.3. (The Upazila Chairman) demanded that compensation should be paid at double the market price of land and properties.

Ans: The compensation will be paid at replacement value.

Q.4. APs voiced that land is not available for purchase in the area and asked if land will be provided by Govt.

Ans: It is known that land is scarce, Govt./Project will assist APs in finding suitable land for construction/reconstruction of houses for resettlement. Identifying suitable land area to build a resettlement/cluster village to accommodate poor/destitute APs may also be considered.

Q.5. During acquisition if some marginal quantity of land fall outside acquisition and be of no use (for other purposes) to the owner, what will happen for those situations.

Ans: The entire land will be acquired in such a situation.

Q.6. The UP Chairman advised that the land/asset prices to be determined mouza and land type wise.

Ans: Agreed.

Q.7. The Upazila Chairman opined that compensation package should be circulated before acquisition.

Ans: Agreed, the lands and properties to be acquired will be documented and compensation package will be attached and circulated/displayed in prominent/conspicuous locations. The APs will be asked to vacate their lands/properties after the compensations have been received.

Q.8. A lady (destitute and heads the family) was crying and expressed that she has only a piece of land on which a shanti stands where she lives with two minor children. She works in others houses as housemaid and somehow manages the family. She is on the RoW of acquisition, what will happen to her and the family.

Ans: She should describe her status when a land acquisition survey team comes to assess the losses. She/her family will be appropriately and properly compensated and resettled. Her incomes will be restored.

Q.9. Do you plan to acquire land as borrow pit to collect earth for the road embankment.

Ans: The Executive Engineer answered this question stating that land (embankment) will be filled by dredging the Sitalakhya river. No additional land will be acquired.

Q.10. Two proposal came up from the APs -  
(a) Widening of the Dhaka-Kaliganj Road and (b) Constructing a bypass to avoid a railway level crossing near Nimtoli.

Ans: As these were outside the scope of the project, they were not discussed.

### **Summary outcome of the SHM**

**With adequate and proper handling of the acquisition/resettlement process the APs/Stakeholders unanimously consented in favour of the project and the road alignment.**

### **Address of the Chairman**

The Chairperson and her entourage advocated in favour of the project as well as the appropriate resettlement of the APs and other stakeholders.

The Chairperson appreciated the attitude of the APs/stakeholders and assured them that all help, assistance and efforts will be channelized to resettle them so that their socio-economic status improves and none impoverished. She also offered that jobs in the project development will go to capable and skilled wards of the APs as far as possible.

At the end the Executive Engineer, RHD, declared the meeting closed and thanked everybody for their support for the project.

He also advised that as the Minister will not be available and that it was Jumma day and people had been eager to go to mosques, there was no need to hold the second meeting.

Some Photographs of the Meetings







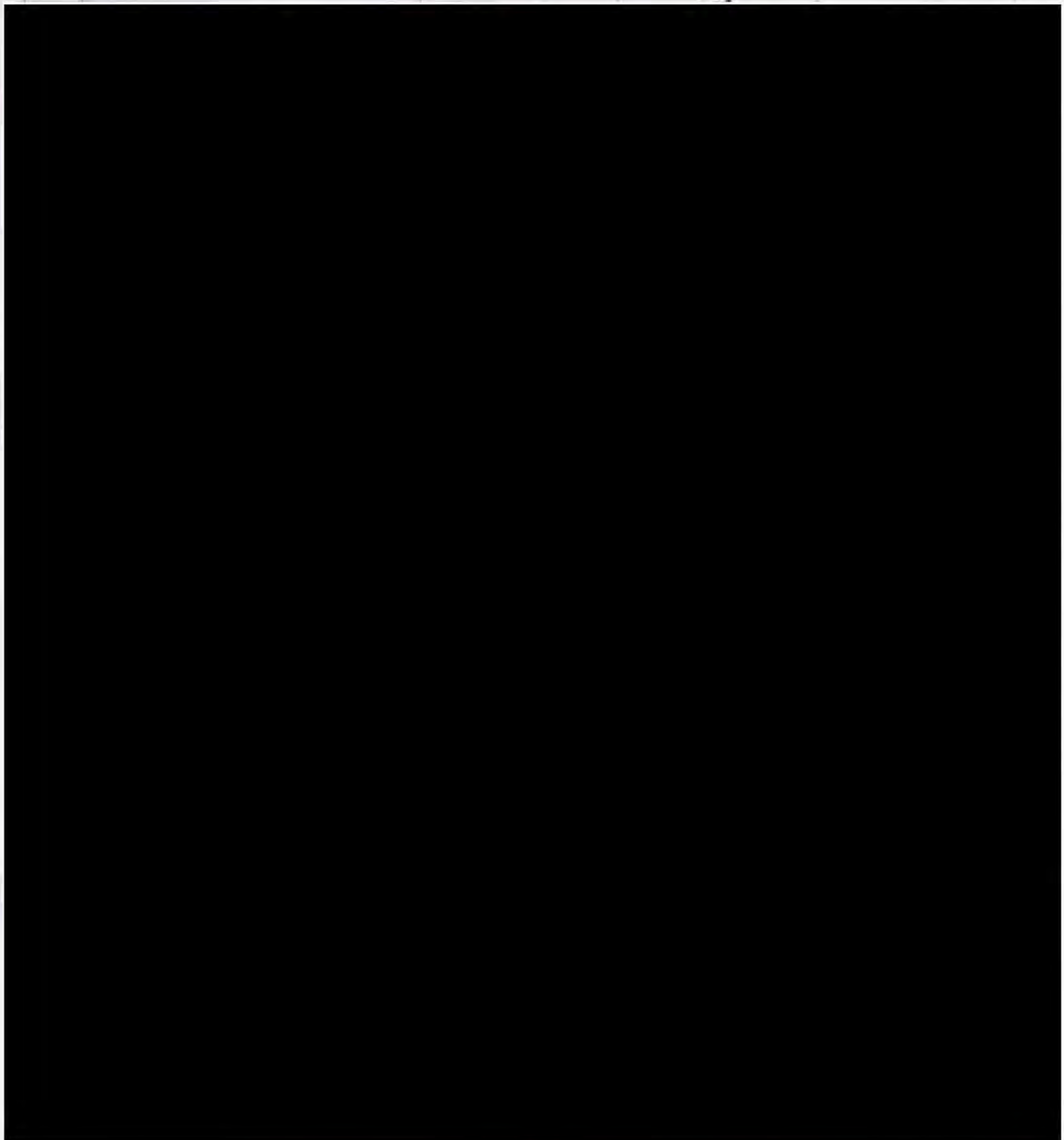
Western Bangladesh Bridges Improvement Project  
(WBBIP)

Date: 6.02.15

Participants of Public Consultations

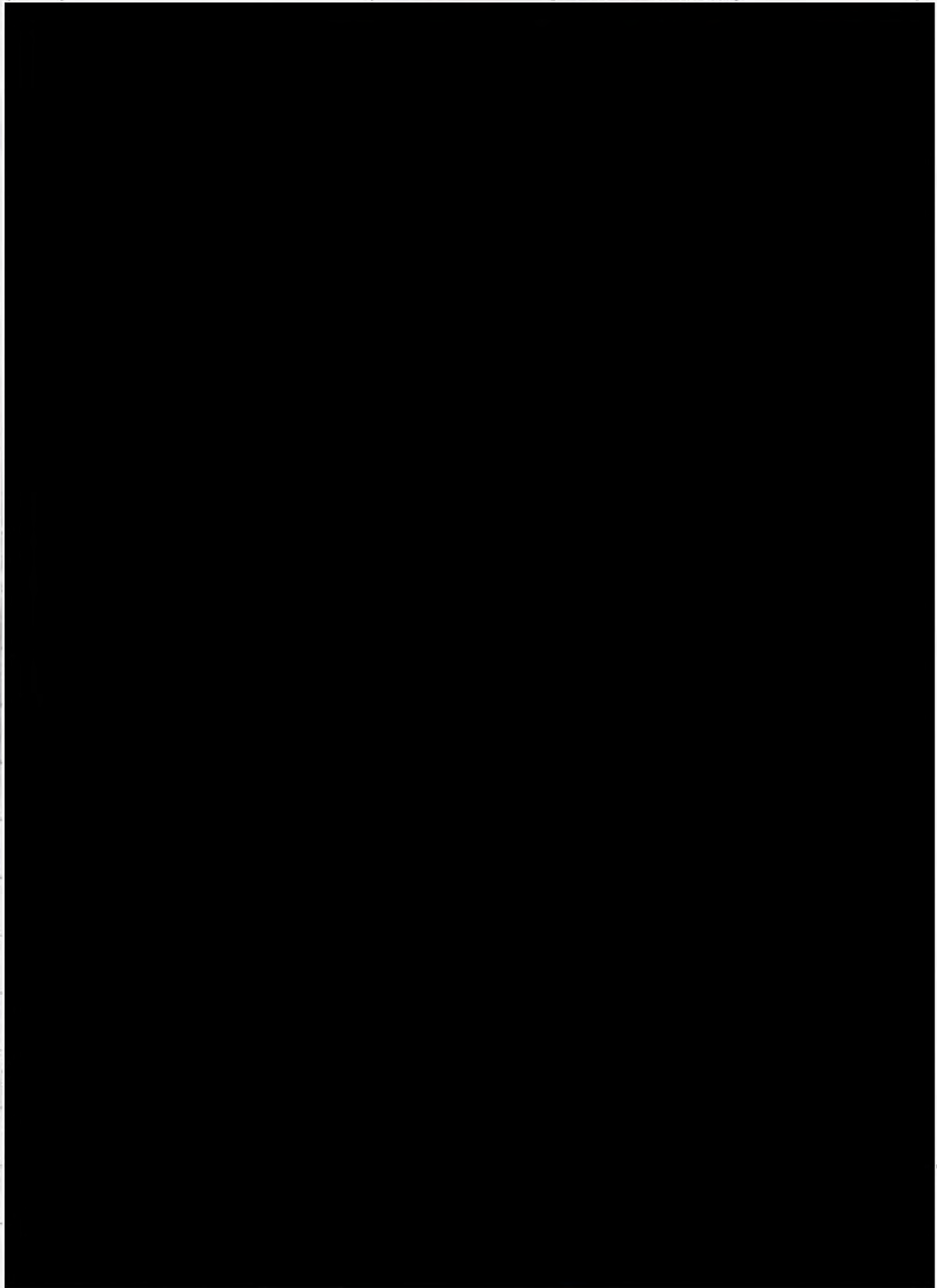
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Bridge LRP: \_\_\_\_\_ Km Length \_\_\_\_\_ m. Rank \_\_\_\_\_  
Bridge Location: (Village: Banglanu Union / Charokhola Upazila: Kaligonj)  
District: Gazipur Zone: Dhaka

Sl. No.	Name	Profession	Address and Telephone No. if any	Signature
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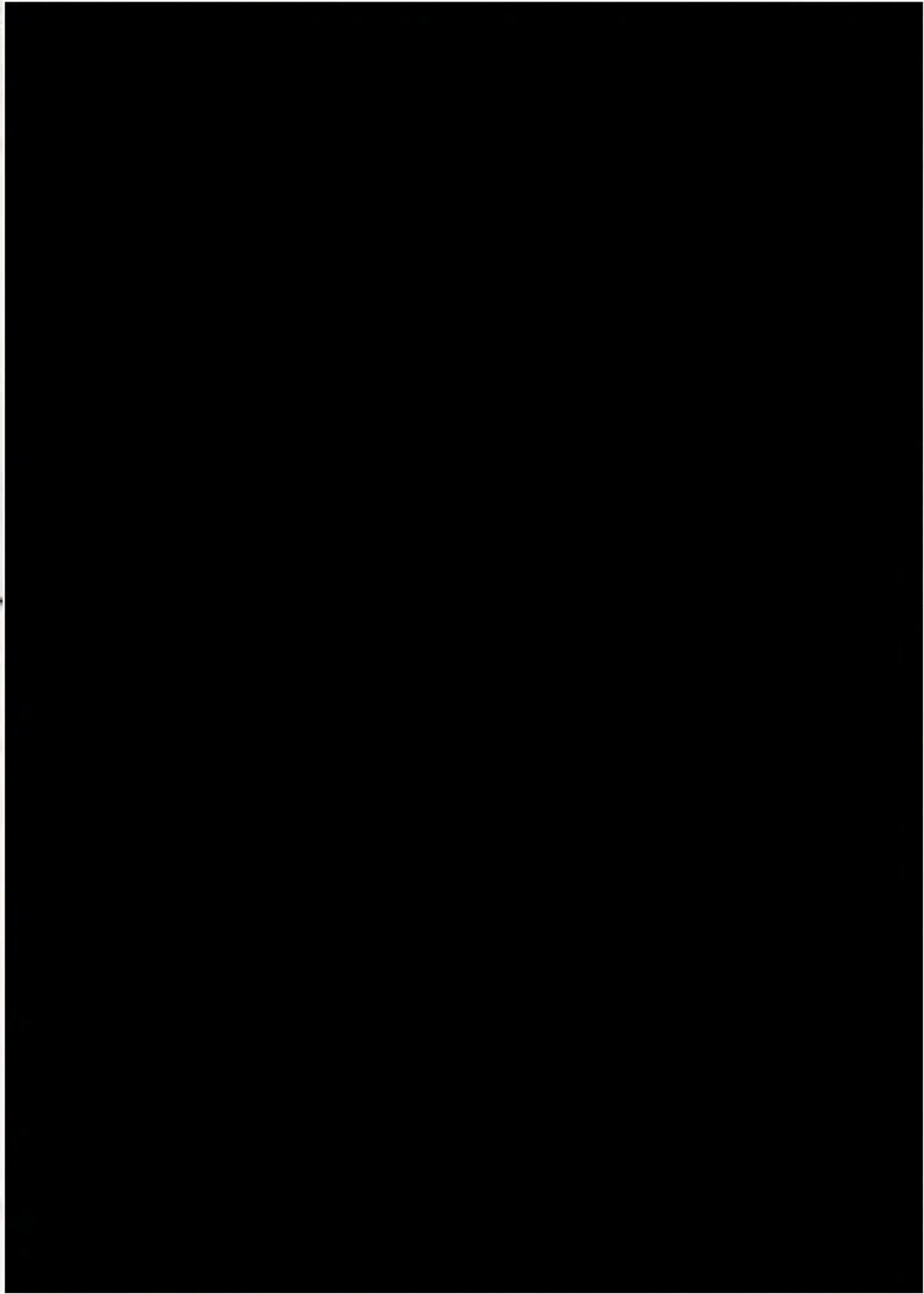




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**APPENDIX 2.4**  
**ARP Report(For EZ Bridge)**

ROADS AND HIGHWAYS DEPARTMENT  
MINISTRY OF ROAD TRANSPORT AND BRIDGES (MORTB)  
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

PREPARATORY SURVEY

ON

WESTERN BANGLADESH BRIDGE IMPROVEMENT PROJECT

ABBREVIATED RESETTLEMENT PLAN (ARP)

FOR

EZ BRIDGE

FEBRUARY 2015

---

Prepared by

Oriental Consultants Global Co., Ltd.

Katahira & Engineers International



On behalf of

Roads and Highways Department (RHD)

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## **Abbreviations**

AB	Acquiring Body
AC Land	Assistant Commissioner Land
ADC	Additional Deputy Commissioner
AH	Affected household
AP	Affected person
APD	Additional Project Director
ARP	Abbreviated Resettlement Plan
BBS	Bangladesh Bureau of Statistics



CBE	Commercial and Business Enterprise
CCL	Cash Compensation under Law
COI	Corridor of Impact
CMP	Current Market Price
CPR	Common Property Resources
CRO	Chief Resettlement Officer
CSC	Construction Supervision Consultant
DAE	Department of Agriculture Extension
DC	Deputy Commissioner
DCI	Direct Calorie Intake
DOF	Department of Forest
DoF	Department of Fisheries
EA	Executing Agency
EC	Entitlement Card
EP	Entitled Person
FGD	Focused Group Discussion
ft	foot / feet (3.28 ft = 1 m)
GDP	Gross Domestic Product
GOB	Government of Bangladesh
GRC	Grievance Redress Committee
ha	hectare
HIES	Household Income and Expenditure Survey
HH	Household
IA	Implementing Agency
ID Card	Identify Card
IOL	Inventory of losses
IR	Involuntary Resettlement
JVS	Joint Verification Survey
JVT	Joint Verification Team
LA	Land Acquisition
LA&R	Land Acquisition and Resettlement
LAO	Land Acquisition Officer
LAP	Land Acquisition Plan
LGI	Local Government Institution
M/m	Meter
LMS	Land Market Survey
LIRP	Livelihood and Income Restoration Program
MARV	Maximum Allowable Replacement Value
M&E	Monitoring & Evaluation
MIS	Management Information System
MOL	Ministry of Land
MOC	Ministry of Communications
NGO	Non-government Organization
NRS	National Resettlement Specialist

PAH	Project Affected Household
PAU	Project Affected Unit
PMU	Project Management Unit
PD	Project Director
PIB	Public Information Brochure
PMO	Project Management Office
PPR	Project Progress Report
PPTA	Project Preparatory Technical Assistance
PRA	Participatory Rapid Appraisal
PVAT	Property Valuation Advisory Team
PWD	Public Works Department
R&R	Resettlement and Rehabilitation
RAC	Resettlement Advisory Committee
RAP	Resettlement Action Plan
RB	Requiring Body
RF	Resettlement Framework
RHD	Roads & Highways Department
RO	Resettlement Officer
RoR	Record of Rights
RU	Resettlement Unit
RV	Replacement Value
SCF	Social Consulting Firm
SES	Socioeconomic Survey
SEZ	Special Economic Zone
Sqm	Square Meter
TA	Technical Assistance
TOR	Terms of Reference
VH	Vulnerable Household

## Glossary of Terms

**Affected Person (AP):** includes any person, affected households (AHs), firms or private institutions who, on account of changes that result from the project will have their (i) standard of living adversely affected; (ii) right, title, or interest in any house, land (including residential, commercial, agricultural, forest, and/or grazing land), water resources, or any other moveable or fixed assets acquired, possessed, restricted, or otherwise adversely affected, in full or in part, permanently or temporarily; and/or (iii) business, occupation, place of work or residence, or habitat adversely affected, with or without displacement.

**Assistance:** means support, rehabilitation and restoration measures extended in cash and/or kind over and above the compensation for lost assets.

**Awardee:** means the person with interests in land to be acquired by the project after their ownership of said land has been confirmed by the respective Deputy Commissioner's office as well as persons with interests in other assets to be acquired by the project. Compensation for acquired assets is provided to 'awardees' through notification under Section 7 of the Land Acquisition Ordinance.

**Compensation:** means payment in cash or kind for an asset to be acquired or affected by a project at replacement cost at current market value.

**Cut-off date:** means the date after which eligibility for compensation or resettlement assistance will not be considered is the cut-off date. Date of service of notice under Section 3 of Land Acquisition Ordinance is considered to be the cut-off date for recognition of legal compensation and the starting date of carrying out the census/inventory of losses is considered as the cut-off date for eligibility of resettlement benefit for the properties standing on the GoB land and not covered by DC.

**Encroachers:** mean those people who move into the project area after the cut-off date and are therefore not eligible for compensation or other rehabilitation measures provided by the project. The term also refers to those extending attached private land into public land.

**Entitlement:** means the range of measures comprising cash or kind compensation, relocation cost, income restoration assistance, transfer assistance, income substitution, and business restoration which are due to AHs, depending on the type and degree /nature of their losses, to restore their social and economic base.

**Eminent Domain:** means the regulatory authority of the Government to obtain land for public purpose/interest or use as described in the 1982 Ordinance and Land Acquisition Law.

**Household:** A household includes all persons living and eating together (sharing the same kitchen and cooking food together as a single-family unit).

**Inventory of losses:** means the pre-appraisal inventory of assets as a preliminary record of affected or lost assets.

**Non-titled:** means those who have no recognizable rights or claims to the land that they are occupying and includes people using private or public land without permission, permit or grant i.e. those people without legal title to land and/or structures occupied or used by them. ADB's policy explicitly states that such people cannot be denied resettlement assistance.

**Project:** means the Western Bangladesh Bridge Improvement Project to be implemented in 29 districts in western zones of Bangladesh to improve/reconstruct 105 RHD bridges.

**Project Affected Unit:** combines residential households (HHs), commercial and business enterprises (CBEs), common property resources (CPRs) and other affected entities as a whole.

**Project Affected Household:** includes residential households and commercial & business enterprises except CPRs.

**Relocation:** means displacement or physical moving of the APs from the affected area to a new area/site and rebuilding homes, infrastructure, provision of assets, including productive land/employment and re-establishing income, livelihoods, living and social systems

**Replacement cost:** means the value of assets to replace the loss at current market price, or its nearest equivalent, and is the amount of cash or kind needed to replace an asset in its existing condition, without deduction of transaction costs or for any material salvaged.

**Replacement Land:** means the land affected by the project that is compensated through provision of alternative land, rather than cash, of the same size and/or productive capacity as the land lost and is acceptable to the AP.

**Resettlement:** means mitigation of all the impacts associated with land acquisition including restriction of access to, or use of land, acquisition of assets, or impacts on income generation as a result of land acquisition.

**Significant impact:** means where 200 or more APs suffer a loss of 10% or more of productive assets (income generating) or physical displacement.

**Squatters:** means the same as non-titled and includes households, business and common establishments on land owned by the State. Under the project this includes land on part of the crest and slopes of canal dykes, flood control embankments, and similar areas of the drainage channels.

**Structures:** mean all buildings including primary and secondary structures of houses and ancillary buildings, commercial enterprises, living quarters, community facilities and infrastructures, shops, businesses, fences, and walls.

**Vulnerable Households:** means households that are (i) headed by single woman or woman with dependents and low incomes; (ii) headed by elderly/ disabled people without means of support; (iii) households that fall on or below the poverty line;<sup>1</sup>(iv) households of indigenous population or ethnic minority; and (v) households of low social group or caste.

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<sup>1</sup> The poverty lines (updated for 2008) for Chittagong to be cited in the RAP as per BBS report.

## Executive Summary

### Description of the Project:

The Government of Bangladesh with the financial loan from Japan International Cooperation Agency (JICA) has undertaken a project named EZ Bridge Project in order to improve the communication road network with planned Economic Zone (EZ) in Polash Upazilla of Narshingdi district and road network system of the country. The EZ Bridge will be constructed across the river Sitalakhya by connecting Gazipur and Narshingdi districts in the central part of Bangladesh. This initiative has taken with aim of becoming a middle income country by 2021 by reducing poverty and improvement of road communication system by connecting the important economic potential areas with rest of the country. The EZ Bridge project includes construction of a 835 m long bridge with approach bridge roads of total 4,195 m and a transect road connecting Tongi- Kaliganj regional highway. RHD will be the implementing authority of the project.

RHD has prepared Abbreviated Resettlement Plan (ARP) that will govern adverse social impacts due to the project. The ARP is consistent with the JICA Guidelines for Environmental and Social Considerations. An ARP Implementing Agency (IA) i.e. NGO or Social Consulting Firm will be engaged by the RHD for implementation of the ARP.

**Land Acquisition and Displacement:** The project work requires land acquisition and relocation of households from the right of way. A total of 12.49 ha of land will need to be acquired for construction of bridge itself, bridge approach roads and bridge access road. Total number of affected household is 39. A total of 3,709 sq. m structures have got affected of which all are residential structures. A total of 190 people have been enlisted during socioeconomic survey of the affected households. Land acquisition, displacement and other impacts are shown in Table 1 below.

**Table 1 Displacement and other Impacts**

Sl. no.	Loss type	No/Total
1	Total quantity of land (Hectare) affected	12.49
2	Total number of Households (Land with Structure) affected	39
3	Total number of population affected	190
4	Total number of structures affected	81
5	Total quantity of structure (Sq. m) affected	3,709
6	Total no. of toilets affected	36
7	Total no. of tube wells affected	34
8	Total no. of trees on private land affected	12,259

The Affected Persons (APs) and their communities have been consulted for their perception on land acquisition process, compensation process, scope and importance of participation in the project process, relocation requirements and views on alternative options. A series of stakeholder consultation meetings were held two times with affected communities within and surrounding the project area during selection of the bridge location, detailed design and disclosure of compensation packages. Besides, during conducting survey and preparation of the ARP, 04 consultation meetings, numbers of group discussions and personal contact

were held to seek opinion of the various stakeholders on the project. Cut-off date for enlisting the impacts on non-titled land has been declared in the project area. People's opinion have been incorporated in the ARP and reflected in the entitlement matrix. The ARP will be summarized in an information booklet in local language (Bengali) and disclosed to the affected people during implementation period. The APs will participate in the ARP implementation process through representing in the Grievance Redress Committees (GRCs). The affected persons will be paid compensation for their lost assets by the DC as Cash Compensation under Law (CCL) and resettlement grants from RHD. Compensation is based on entitlements including: (i) replacement value for land (ii) replacement value for structure & trees, and (iii) other resettlement assistance as required such as structure transfer grants, compensation for crops, access to cultivable lands, loss of workdays/income due to dislocation, etc. Female-headed and other vulnerable households will be eligible for further cash assistance to help at least, restore, if not improve, their livelihoods. Compensation and entitlements have been identified based on impacts and losses, and are similar to those approved under other projects. These are presented in Table 2 below.

**Table2 Compensation and Entitlements**

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
1	Loss of homestead, commercial, Agriculture land, pond, ditches and orchards etc.	Legal owner(s) of land	<ul style="list-style-type: none"> <li>i. Replacement value (RV) of land (Cash Compensation under Law (CCL) and additional grant to cover the current market price of land and stamp duty &amp; registration cost @ 10.5% of CMP for land) to be determined by PVAT.</li> <li>ii. Dislocation allowance @ BDT 100 per decimal for agricultural, fish pond, ditch, etc. and @ BDT 200/decimal for homestead, orchard and commercial lands.</li> <li>iii. Compensation for standing crops to actual owners/ cultivators as determined by PVAT.</li> </ul>	<ul style="list-style-type: none"> <li>a. Assessment of quantity and quality of land by Joint Verification Survey</li> <li>b. Assessment of Market Value by Land Market Survey (LMS)</li> <li>c. Assessment of Cash Compensation under Law (CCL)</li> <li>d. Updating of title of the affected persons</li> <li>e. Payment of Cash Compensation under Law (CCL)</li> <li>f. APs will be fully informed of the entitlements and procedures regarding payments</li> <li>g. Additional cash grant to be paid to cover the replacement value of land compensation based on DC's CCL .</li> <li>h. Stamp duty and registration fees will be added with current market price (CMP) for land @ 10.5% of CMP to facilitate the APs in purchasing alternative lands.</li> </ul>
2	Loss of access to cultivable land by owner	Tenants/ sharecropper/ Legal owner/	<ul style="list-style-type: none"> <li>i. Compensation for standing crops to owner cultivator/</li> </ul>	<ul style="list-style-type: none"> <li>a. All the individuals identified by the JVS as tenants or</li> </ul>

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
	cultivator/ tenant/ sharecropper	grower/ socially recognized owner/ lessee/ unauthorized occupant of land	<ul style="list-style-type: none"> <li>i. share croppers or lessees as determined by PVAT.</li> <li>ii. Owner/grower to take away the crop</li> </ul>	<ul style="list-style-type: none"> <li>b. sharecroppers of land</li> <li>b. Compensation to be paid after taking possession of land and the legal /socially recognized owner is paid cash compensation for crop and on certification of receipt by legal/socially recognized owner</li> <li>c. Additional cash grant to cover current market value of crop compensation as prescribed by PVAT in case of private owner himself cultivating crop</li> <li>d. Crop compensation and the crop will be shared between owner and sharecropper as per terms of sharecropping in case of privately owned land/socially recognized owner</li> <li>e. In case of dispute over verbal agreement on sharecropping, certification from the elected representative will be considered as legal document</li> </ul>
3	Loss of Trees/ Perennials/ fish stocks	<ul style="list-style-type: none"> <li>1. Person with Legal Ownership of the land</li> <li>2. Socially recognized owner/ Unauthorized occupant of the trees/ fishes</li> </ul>	<ul style="list-style-type: none"> <li>i. Cash compensation at market rates for replacement of trees/ perennials/ fish stocks value</li> <li>ii. For fruit bearing trees- compensation for fruits @ 30% of timber value X 1 year</li> <li>iii. Compensation for fish stocks as determined by PVAT.</li> <li>iv. saplings will be distributed free of cost among each affected household losing trees</li> <li>v. Owners will be allowed to fell and take away their trees, perennial</li> </ul>	<ul style="list-style-type: none"> <li>a. Assessment of loss and market value of affected trees</li> <li>b. Payment of CCL for trees</li> <li>c. Adequate compensation will be paid and the owner will be allowed to fell and take the tree free of cost</li> <li>d. Compensation for fruit will be paid for small, medium and large categories of trees.</li> <li>e. 5 saplings (2 fruit tree, 2 timber type and 1 medicinal tree) free of cost will be distributed among the tree losing households.</li> </ul>

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
			crops/ fishes etc. free of cost without delaying the project works.	
4	Loss of residential /commercial structure by owner(s)/ squatters	Legal Owners or squatters	<ul style="list-style-type: none"> <li>i. Replacement value of structure at market price determined by PVAT.</li> <li>ii. Transfer grant @ Tk.12.50% of the replacement value of main structure</li> <li>iii. Reconstruction grant @ Tk.12.50% of the replacement value of main structure.</li> <li>iv. Owners to take away all salvage materials free of cost</li> </ul>	<ul style="list-style-type: none"> <li>a. Payment of CCL for the losses</li> <li>b. Verification of Joint Verification Survey (JVS) and other records</li> <li>c. APs will be fully informed about their entitlements and assisted to obtaining it.</li> </ul>
5	Loss of access to Residential houses/ commercial structures (rented or leased)	Tenants of rented/ leased properties	<ul style="list-style-type: none"> <li>i. One time cash grant for facilitating alternative housing/CBEs Tk. 3000.00 per household or entity</li> <li>ii. Shifting allowance per household based on family members @ Tk. 500/- per member with minimum Tk. 2000</li> </ul>	<ul style="list-style-type: none"> <li>a. Verification of JVS and records</li> <li>b. Shifting allowance will be paid on relocation from project site</li> </ul>
6	Loss of business by CBEs due to dislocation	Owner/operator of the business as recorded by JVS	<ul style="list-style-type: none"> <li>i. Business restoration grant @ Tk. 10,000 for each business unit.</li> </ul>	<ul style="list-style-type: none"> <li>a. All persons recorded by the JVS</li> <li>b. cash grant to be paid while taking possession of land</li> </ul>
7	Loss of Income and work days due to displacement	Employees identified by the Joint Verification Team (JVT)	<ul style="list-style-type: none"> <li>i. Cash grant to the affected employees/wage earners equivalent to 30 days wage @ Tk. 300/per day</li> <li>ii. Preferential employment in the project construction work, if available.</li> </ul>	<ul style="list-style-type: none"> <li>a. All persons recorded by the JVS</li> <li>b. Cash grant to be paid while taking possession</li> <li>c. Involvement of the incumbents in project civil works</li> <li>d. Training on income generating activities such as Pisciculture, livestock and poultry, horticulture, welding, mechanics, plant cultivation, social forestry, etc.</li> </ul>



Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
8	Poor and vulnerable households	Poor and vulnerable households as identified by JVT	<ul style="list-style-type: none"> <li>i. Additional cash grant of Tk. 3000 for affected poor women headed households and other vulnerable households</li> <li>ii. Training on IGA for AP/ nominated by AP.</li> </ul>	<ul style="list-style-type: none"> <li>a. Identification of Vulnerable households</li> <li>b. Income restoration schemes for vulnerable households</li> <li>c. Arrange training on income generating activities</li> </ul>
9	Loss of Common Property Resources	Affected Common Property Resources (Mosque, school, community infrastructure etc.)	<ul style="list-style-type: none"> <li>i. Grant for each affected CPR for reconstruction</li> <li>ii. Or</li> <li>iii. Reconstruction of CPR through the project</li> </ul>	<ul style="list-style-type: none"> <li>d. Identification of the management committee of the CPRs</li> <li>e. Cash grant to the Management committee of CPR</li> <li>f. Or Reconstruction of the CPR by the project</li> </ul>
10	Temporary impact during construction	Community / Individual	<ul style="list-style-type: none"> <li>i. The contractor shall bear the cost of any impact on structure or land due to movement of machinery and in connection with collection and transportation of borrow materials.</li> <li>ii. All temporary use of lands outside proposed Col to be through written approval of the landowner and contractor.</li> <li>iii. Land will be returned to owner rehabilitated to original preferably better standard.</li> </ul>	<ul style="list-style-type: none"> <li>g. Community people should be consulted before starting of construction regarding air pollution, noise pollution and other environmental impact</li> <li>h. The laborers in the camp would be trained about safety measures during construction, aware of health safety, STDs, safe sex etc. The contractor shall ensure first aid box and other safety measures like condoms at construction site.</li> </ul>

Vulnerable Project Affected Households including poor and female headed, elderly headed, the landless, share croppers, etc. will be given additional support for livelihood and income restoration. Long-term income restoration and livelihood reconstruction program will be designed in the form of Livelihood and Income Restoration Program (LIRP) for rehabilitation of the poor & vulnerable PAHs. The RHD will engage an experienced NGO or Social Consulting Firm for implementing the LIRP. A need based survey would be conducted among the affected persons by that NGO/SCF for prioritizing training needs and accordingly held training. The RHD will develop TOR for LIRP implementing NGO.

**Cost Estimate and Budget:** The total estimated cost for implementation of the ARP includes compensation for land, structure, trees, crops, transition allowance, relocation assistance, etc. All resettlement funds including training and cash grants and service charge of ARP implementing agency will be provided by the EA (RHD) based on the financing plan

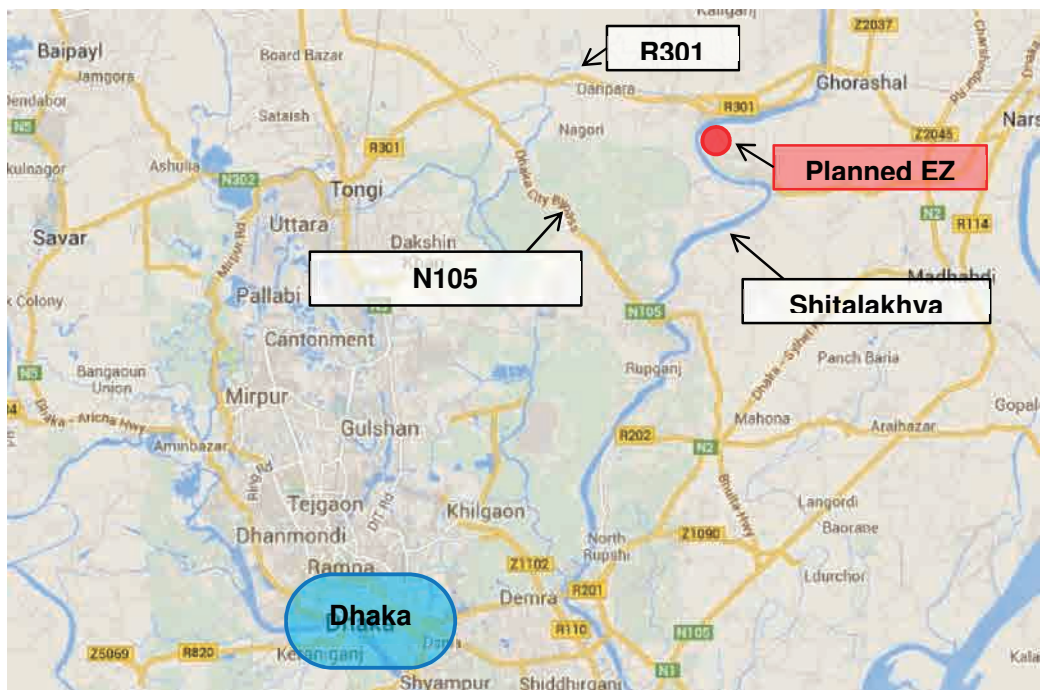
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# 1 DESCRIPTION OF THE PROJECT

## 1.1 Background of the Project

The Government of Bangladesh with the financial loan from Japan International Cooperation Agency (JICA) has undertaken a project named Economic Zone (EZ) Bridge Project in order to improve the communication road network with planned Special Economic Zone (SEZ) in Polash Upazilla of Narshingdi district and road network system of the country. The EZ Bridge will be constructed across the river Sitalakhya by connecting Gazipur and Narshingdi districts in the central part of Bangladesh. This initiative has taken with aim of becoming a middle income country by 2021 by reducing poverty and improvement of road communication system by connecting the important economic potential areas with rest of the country. The EZ Bridge project includes construction of a 835 m long bridge with approach bridge roads of total 4,195 m and a transect road connecting Tongi- Kaliganj regional highway. The EZ Bridge will be constructed over Shitalakhya River at Som Natun Bazar meeting point 14.0 Km up Stream of Kanchan Bridge and 6.0 Km downstream of Bhairab Bridge. The bridge will be connected with the Dhaka- Sylhet highway (N2) via A K Khan Industrial Park, a privately developed industrial park in Polash Upazilla of Narsingdi district. RHD will be the implementing authority of the project.

The location map of planned EZ in Narsingdi is shown in Figure 1.1.



Source: JICA Survey Team

**Figure 1.1 Location Map of Planned EZ in Narsingdi**

It is observed that only small number people (less than 200) are to be affected at bridge site and along the proposed roads for long term and short term due to the relevant activities. By following OP 4.12 of WB when impacts on the entire displaced population are minor or fewer than 200 people are displaced at bridge site, an Abbreviated Resettlement Plan (ARP) needs to be prepared for the project.

This is the Abbreviated Resettlement Plan (ARP) for the project complies with the Resettlement Framework (RF) prepared based on relevant national law of the Government

of Bangladesh (GOB) Acquisition and Requisition of Immovable Property Ordinance 1982 (ARIPO), amended in 1993 and 1994 and with the policy of the JICA Guidelines for Environmental and Social Considerations and World Bank OP 4.12. An ARP Implementing NGO (INGO) or a Social Consulting Firm (SCF) i.e. NGO or SCF will be engaged by the RHD for implementation of the ARP.

The proposed interventions in the project area to construct the bridge, approach roads and transect road will cause adverse resettlement impacts through displacement of households. The Affected Households (AHs) include owners of land, share croppers and lease holders of land. Besides some trees on the private lands will need to be fell down due to the project. However, the impacts on these people will be mitigated in accordance with Donor's safeguard policies. Therefore, this abbreviated resettlement plan (ARP) has been prepared for this project, and is designed to assist project affected units (PAUs) to restore their livelihoods and socio-economic conditions to their pre-project status. A total of 39 (PAUs) covering only Households (HHs) have been identified in the Corridor of Impact (COI) of this project including the approach roads and transect road connecting the bridge and Tongji – Kaliganj regional highways.

## **1.2 Objectives & Purpose of the Project**

### **1.2.1 Potential Impacts**

The bridge with a length of 835 m and a width of 10.40m will be constructed with bridge approach roads with a total length of 4,195 m and width of 12.10m on two ends of the bridge and also a transect road to connect the bridge with the national highway.

This EZ Bridge will be a new bridge across the river Shitalakhya at the downstream of Bhairab Bridge and upstream of Kanchan Bridge.

### **1.2.2 Objective of the Abbreviated Resettlement Plan**

The JICA's Guidelines for Environmental and Social Considerations April 2010 requires that if the screening or social assessment determines that people will experience resettlement impacts a time-bound action plan with appropriate budget provisions is to be prepared and incorporated as an integral part of project design. However, The OP 4.12 of World Bank (WB) clearly narrated that where entire involuntary displaced population is minor, or fewer than 200 people are displaced from COI area of the project, an Abbreviated Resettlement Plan (ARP) may serve the purpose. By following this principle this ARP addresses both land acquisition and resettlement issues within the legal framework of the Government of Bangladesh (GOB) and JICA's Guidelines for Environmental and Social Considerations that highlights on social impacts including involuntary resettlement, respect for the human rights of indigenous people and so on and covers the APs under resettlement/rehabilitation program providing income restoration and poverty reduction assistance to the eligible APs and the poor and informal settlers on the Corridor of Impact (COI). Thus, the ARP approach incorporates (i) land acquisition and resettlement issues; (ii) impact mitigation with special attention to the women and vulnerable groups and (iii) income generation support to the eligible members of the AP families and (iv) poverty reduction assistance to the poorest section of the people.

The policy requires that a plan be prepared that sets out all of the compensation and rehabilitation support to be provided to any person, family or household who on account of the execution of the project would have his, her or their:

- Standard of living adversely affected;
- Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently;
- Right, title or interest in any house, or interest in or right to use any land including premises, agricultural and grazing land, commercial properties, tenancy, or right in

- annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently; or
- Social and cultural activities and relationships and other losses that may be identified during the process of resettlement planning.

The objective of the ARP is to provide a strategy for providing PAUs with replacement value of land, structure, trees and other physical assets and restoration of income levels/living standards either through a compensation and rehabilitation package that ensures that PAUs are not left in a position where they are worse off with the project than without it. Thus, in accordance with JICA policy, abbreviated resettlement plan, depending on the magnitude of impacts - has been prepared for the Project.

Objectives of the project and Abbreviated Resettlement Planning have been disclosed to the affected persons through community based consultation meetings and focus group discussions in local language in two phases of stakeholders/community consultation as well as during conducting census and socioeconomic survey. Compensation and other assistances will have to be paid to Affected Persons (APs) prior to displacement or dispossession of assets. Upon approval, the final ARP will be uploaded immediately on the RHD website.

### **1.2.3 Methodology for Preparing the Abbreviated Resettlement Plan**

The Consultant conducted census & socioeconomic survey during 7 to 10 July 2014 for information necessary for preparation of this ARP. The survey was also associated with stakeholders' consultation, focus group discussion and property valuation survey.

The adverse impacts include land acquisition and displacement of households. The data gathered during the survey has been entered into an electronic database which identified each affected household (AH) and the way they are impacted and losses they will incur. The objective of the census and socioeconomic survey was to establish a detailed inventory of the households and physical assets to be affected by the project; develop a socioeconomic profile of the AHs and affected persons (APs). The surveys also serve as a benchmark for monitoring and evaluation.

The surveys indicate that construction of bridge, approach bridge roads and transect road will require acquisition of about 12.49 hectare of land. In total the Project will affect 39 Project Affected Units (PAUs), all the PAUs are residential households with a total population of 190. According to the JICA's "Guidelines for Environmental and Social Considerations" appropriate consideration must be given to vulnerable social groups such as women, children, the elderly, the poor and ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision making process in the society. Therefore, this ARP has been prepared to mitigate the impacts on Affected Households (AHs) and restore their livelihoods and incomes to pre-project level.

This ARP has been prepared based on the National Law ARIPO (GoB) and the JICA's Guidelines for Environmental and Social Considerations. The ARP establishes the provisions for resettlement of AHs by providing income restoration assistance to the poor and vulnerable households and compensation under law and additional resettlement benefits where applicable; provides a description of socio-economic characteristics of AHs; sets out the implementation schedule; and provides the budget and cost estimate of implementing this ARP.

This ARP will be reviewed at implementation stage and updated by the RHD if required. At that time the budget will be revised to reflect any changes in numbers of AHs or losses compared with those identified during the survey as well as adjusting for any changes in inflation.

## 2 SOCIO-ECONOMIC CHARACTERISTICS OF AFFECTED HOUSEHOLDS

### 2.1 Methodology for Census and Socioeconomic Survey

The census and a socio-economic survey was carried out during 7 to 10 July 2014 to provide requisite details on the Project Affected Units (PAUs) to further assess the magnitude of likely impacts and to identify measures for mitigation of adverse impacts. The survey included (i) full census and socioeconomic survey with structured questionnaire and inventory of losses (Annex 1 and 2), (ii) surveys for land valuation and other assets through structured questionnaire (Annex 3); (iii) Video filming of the affected properties and (iv) community based public consultation etc. The survey identified the households who would lose land, structures and trees on project Corridor of Impact (COI).

The socioeconomic survey collected a wide range of data, for example, demography, age/sex distribution, education, occupation, income/poverty data, types and ownership status of affected structures and other assets.

### 2.2 The Project Area

The EZ Bridge is to be constructed across the river Shitalakhya connecting two districts Gazipur and Narshingdi through two Upazillas namely Kaliganj and Polash. The project comprised of bridge itself, two bridge approach roads at two end of the bridge and one intersect road in Kaliganj Upazilla connecting the bridge with Kaliganj–Tongi regional highway in Gazipur district. Distribution of Upazilla wise number of project affected households are shown in the Table 2.1.

**Table 2.1 Upazilla wise Project Affected Households**

Project	District	Upazilla	No of HHs (Land with structure and trees)	Total
EZ Bridge	Gazipur	Kaliganj	20	20
	Narshingdi	Polash	19	19
	<b>Sub-total</b>	<b>Sub-total</b>	<b>39</b>	<b>39</b>

Source: Census & Socioeconomic survey, July 2014

Out of the total 39 affected units in other wards residential households identified on the Corridor of Impact (Col). All the affected households are losing land, structures and trees. A total of 3,709 square meter different categories of structures are getting affected by the interventions. The impacts of this project are shown in the Table 2.2.

**Table 2.2 Distribution of Impacts of the Project**

Sl. no.	Loss type	No/Total
1	Total quantity of land (Hectare) affected	12.49
2	Total number of Households (Land with Structure) affected	39
3	Total number of structures affected	81
4	Total quantity of structure (sq.m) affected	3,709
5	Total no. of toilets affected	36
6	Total no. of tube wells affected	34
7	Total no. of trees on private land affected	12,259

Source: Census & Socioeconomic survey, July 2014

## 2.3 Profile of Affected Households

### 2.3.1 Population

A total of 190 people have been identified to be affected by this project by losing land, residential structure and trees. Average household size of the project area is 5.0 which is much higher than the national average (4.5). Out of the total affected population, 97 (51.05%) male and 93 (48.95%) are female. One disable person is found in the project area. In the project area no ethnic minority community or people are found. A list of project affected households is enclosed in **Annex-I**. Upazilla wise number of affected male and female population is shown in the Table 2.3.

**Table 2.3 Population of the Affected Households by Upazilla**

District	Gazipur		Narsingdi		Total	
Upazilla	Kaliganj		Polash			
Gender	No.	%	No.	%	No.	%
Male	57	54.81	40	46.51	97	51.05
Female	47	45.19	46	53.49	93	48.95
<b>Total</b>	<b>104</b>	<b>100.00</b>	<b>86</b>	<b>100.00</b>	<b>190</b>	<b>100.00</b>

Source: Census & Socioeconomic survey, July 2014

Among the affected households 36 are male headed and 3 are female headed households. Young population comprised a very high percentage of population. More than 35% population is from the age group of 0-18 years of age. Next big group is of the age group of 19-34. On the other hand more than 12% people are of the age of 60 and above. Distribution of households by age group is shown in Table 2.4.

**Table 2.4 Affected Population of Households by Age group by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Age Group	No.	%	No.	%	No.	%
0-4	9	8.65	11	12.79	20	10.53
5-18	21	20.19	27	31.40	48	25.26
19-34	36	34.62	30	34.88	66	34.74
35-49	15	14.42	9	10.47	24	12.63
50-59	6	5.77	2	2.33	8	4.21
60+above	17	16.35	7	8.14	24	12.63
<b>Total</b>	<b>104</b>	<b>100.00</b>	<b>86</b>	<b>100.00</b>	<b>190</b>	<b>100.00</b>

Source: Census & Socioeconomic survey, July 2014

Average household size is 5 which is much higher than the national average of 4.5. More than one quarter (25.64%) of the households are composed of four and five members, 20.51% households are composed of 3 members. On the other hand about 26% households have more than five members in the household (Table 2.5).

**Table 2.5 Households Size of the Affected Household by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Household Size	No.	%	No.	%	No.	%
1	0	0.00	0	0.00	0	0.00
2	0	0.00	1	5.26	1	2.56
3	4	20.00	4	21.05	8	20.51
4	6	30.00	4	21.05	10	25.64
5	3	15.00	7	36.84	10	25.64
More than 5	7	35.00	3	15.79	10	25.64
<b>Total</b>	<b>20</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>

Source: Census & Socioeconomic survey, July 2014

High percentage (33.33%) of the households is headed by population of 60 years old or above. About one fourth heads are within the range of 20-30. It is remarkable that no household has been identified in the project area headed by a person less than 20 years of age. Table 2.6 shows the age of head of the affected households in the project area.

**Table 2.6 Affected head of households by age group by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Age Group	No.	%	No.	%	No.	%
<20	0	0.00	0	0.00	0	0.00
20-30	1	5.00	9	47.37	10	25.64
31-40	5	25.00	4	21.05	9	23.08
41-50	6	30.00	1	5.26	7	17.95
51-59	0	0.00	0	0.00	0	0.00
60+above	8	40.00	5	26.32	13	33.33
Total	20	100.00	19	100.00	39	100.00

Source: Census & Socioeconomic survey, July 2014

### 2.3.2 Ethnicity, Religion and Gender

Based on findings of the survey, the Project will affect 39 PAUs, in other words 39 households. The impacts and their losses have been described in Chapter 3. Out of total 39 households 38 are Muslim and one is Christian faith. The survey could not identify any household with any other religious believe. No ethnic minority is found in the proposed project locations. Detail of households in terms of religion is shown in Table 2.7



**Table 2.7 Affected Households by Upazilla and Religion**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Status of Religion	No.	%	No.	%	No.	%
Islam	19	95.00	19	100.00	38	97.44
Christian	1	5.00	0	0.00	1	2.56
<b>Total</b>	<b>20</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>

Source: Census & Socioeconomic survey, July 2014

### 2.3.3 Level of Education

One of the significant changes takes place in education sector. Despite many problems, people are moving forward towards education. Only 5% household heads are illiterate and about 36% have completed the secondary school level of education and more than 10% of them have completed the higher secondary level and none of the household head in the project area are graduate (Table 2.8). However, level of education is low among the female head of the households as compared to the male heads.

**Table 2.8 Level of Education of the Head of the Households by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Level of Education	No.	%	No.	%	No.	%
Illiterate	2	10.00	0	0.00	2	5.13
Can sign only	4	20.00	6	31.58	10	25.64
Primary Level	1	5.00	5	26.32	6	15.38
Secondary Level	9	45.00	5	26.32	14	35.90
SSC	1	5.00	2	10.53	3	7.69
HSC	3	15.00	1	5.26	4	10.26
<b>Total</b>	<b>20</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>

Source: Census & Socioeconomic survey, July 2014

The numbers of school going children are increasing. Today, almost all the young children are going to school, girl children are more advance in this regard as the GOB is providing facilities to them. Only 6.13% of the total population found illiterate. The highest percentage goes to secondary level. More than 25 % people can sign only and 11% have secondary school certificate level of education whereas about 17% completed primary level and only 6.14% completed SSC level. None of them have graduation degree The detail scenario is given in the Table 2.9.

**Table 2.9 Level of Education of the Affected Population (7 years and above) by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Level of Education	No.	%	No.	%	No.	%
Illiterate	7	7.61	3	4.23	10	6.13
Can sign only	24	26.09	18	25.35	42	25.77
Primary	12	13.04	15	21.13	27	16.56
Secondary Level	29	31.52	27	38.03	56	34.36
SSC	6	6.52	4	5.63	10	6.14
HSC	14	15.22	4	5.63	18	11.04
<b>Total</b>	<b>92</b>	<b>100.00</b>	<b>71</b>	<b>100.00</b>	<b>163</b>	<b>100.00</b>

Source: Census & Socioeconomic survey, July 2014

### 2.3.4 Occupation

The project area is located predominantly in the rural area but nearer to small urban areas like Upazilla headquarters. This is why people who are living around the proposed bridge and along the proposed roads are principally involved with agriculture activities including farming and livestock rearing. About half of the household heads are involved with farming or livestock rearing. However, 23.08% heads are involved with business, about 8% are involved with service in the nearby Upazilla head quarter or in Dhaka city. More than 10% heads have identified as involved in domestic work. Almost all of them are women. Principal occupation of the head of the households is shown in Table 2.10.

**Table 2.10 Principal Occupation Head of the Households by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Principal Occupation	No.	%	No.	%	No.	%
Farming/livestock	9	45.00	10	52.63	19	48.72
Business	4	20.00	5	26.32	9	23.08
Service	2	10.00	1	5.26	3	7.69
Labor	0	0.00	1	5.26	1	2.56
Labor with Special skill	1	5.00	1	5.26	2	5.13
Rickshaw/Vanpooler	1	5.00	0	0.00	1	2.56
Domestic Work	3	15.00	1	5.26	4	10.26
<b>Total</b>	<b>20</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>

Source: Census & Socioeconomic survey July 2014

Principal occupation of the population (10 years and above) of the affected households is domestic work followed by farming or livestock rearing. Most of the female population identified themselves involved in domestic work. In other words majority of the male members are involved with farming or livestock rearing. By following BBS data all the population of more than 10 years old is being considered here. As a result more 15.44% of them are found as student. It reflects that almost all the school going children are going to

school. Professional job (imam, reporter, kazi) seems to be performed by 13.42% of the people. About 9% people are involved with business and only about 2% populations are found earning their livelihood as labor or rickshaw pulling. More than 5% are involved with services (Table 2.11). Their working places are in the Upazilla head quarter or Dhaka city.

**Table 2.11 Principal Occupation of the Population (10 Years and above) by Zone**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Principal Occupation	No.	%	No.	%	No.	%
Farming/livestock	15	17.24	10	16.13	25	16.78
Business	4	4.60	9	14.52	13	8.72
Service	6	6.90	2	3.23	8	5.37
Labor	0	0.00	1	1.61	1	0.67
Labor with Special skill	1	1.15	1	1.61	2	1.34
Rickshaw/Vanpooler	1	1.15	0	0.00	1	0.67
Domestic Work	30	34.48	24	38.71	54	36.24
Student	16	18.39	7	11.29	23	15.44
Retired/Old age /Jobless	1	1.15	1	1.61	2	1.34
Others (imam, Reporter, Kazi)	13	14.94	7	11.29	20	13.42
<b>Total</b>	<b>87</b>	<b>100.00</b>	<b>62</b>	<b>100.00</b>	<b>149</b>	<b>100.00</b>

Source: Census & Socioeconomic survey July 2014

### 2.3.5 Income and Poverty Dimensions

Poverty in Bangladesh is measured through per capita income or through Direct Calorie Intake (DCI) where persons having DCI of less than 2,122 kcal are considered to be living in poverty while a person having DCI of less than 1,805 kcal is considered to be 'hard core poverty'. As per Statistical Year Book of Bangladesh 2010 average household size is 4.50 and 40.94% households earn maximum BDT 60,000 per year. Based on the census and socioeconomic survey (July 2014) indicating yearly income and expenditure of the project affected households it is found that about 5.12% households earn up to Tk 60,000 per year (Table 2.12). Considering the economic condition of the project area, scope of work and level of income, these 5.12% affected households may be considered as hardcore poor and yearly income of the households within the range of BDT 60,001-1,20,000 is poor, more than BDT 1,20,000 is non-poor. The hard core poor will get special assistance under the policy of ARP and may get special attention for IGA training and other assistance under income and livelihood restoration program (ILRP). A list of vulnerable households earning up to BDT 60,000/year is enclosed in **Annex-II**.

**Table 2.12 Poverty Level and Annual Income of Head of the Households by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Income	No.	%	No.	%	No.	%
30,001-45,000	1	5.00	0	0.00	1	2.56
45,001-60,000	1	5.00	0	0.00	1	2.56
60,001-80,000	0	0.00	0	0.00	0	0.00
80,001-100,000	0	0.00	0	0.00	0	0.00
100,001-120,000	10	50.00	9	47.37	19	48.72
120,001-135,000	0	0.00	2	10.53	2	5.13
135,001-150,000	0	0.00	2	10.53	2	5.13
150,001-165,000	0	0.00	1	5.26	1	2.56
165,001-180,000	1	5.00	2	10.53	3	7.69
>=180.001	7	35.00	3	15.79	10	25.64
<b>Total</b>	<b>20</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>

Source: Census & Socioeconomic survey July 2014

## 2.4 Gender Impacts and Mitigation Measures

Women can be particularly impacted during resettlement, and especially relocation, as they are predominantly responsible for maintaining the cohesion of the family unit as well as being extensively involved in household chores in addition to participating in economic activities. Preparation of food, organizing shelter, arranging sanitation and water facilities and schooling of children are common areas where women play important roles in Bangladeshi households.

The census & SES was designed, undertaken and analyzed in a way to adequately identify gender differences and gender specific impacts. Based on the information provided in the census and SES, only 3 (7.69% of the total) households headed by female have been identified. Heads of these households will be eligible for training and other income generating activities. They will be preferentially employed in project civil work.

These female headed households will be disproportionately affected by resettlement due to traditional roles and responsibilities combined with lack of empowerment. Female APs will require additional support and assistance by income generation activities under LIRP. These female APs or representative of the family as nominated by the head will receive training on Income generating Activities (IGA) through LIRP. Participation of women in decision making is slowly increasing and the projects of various NGOs have played an important role in this improvement. Micro-credit aimed at female beneficiaries is also making a positive impact of poor households.

Considering the disproportionate impact on women and since legal ownership (in terms of title) does not reflect gender equity (i.e. women's names are not generally recorded on the title), sufficient measures will be taken to ensure women's rights are protected during the resettlement process. The measures included in the ARP to address gender impacts are:

- Identification of the socio-economic condition, needs, and priorities of women, and monitor and evaluate the impact of land acquisition and resettlement on women separately;
- Identification of the female headed households to be affected and setting of entitlement criteria to recognize female-headed households;

- Provision of such entitlements that women are not disadvantaged by the process of land acquisition and resettlement;
- Preferential employment of affected women in civil construction including road slope turbing, tree plantation, watering and some other similar types of works.
- Female and vulnerable APs will form Labor Contracting Society to bargain with the Contractor
- Separate labor shed with toilets will have to provide for female laborers at construction sites.
- Hiring of female staff in the ARP implementing agency to assist female-headed AHs and women during resettlement activities, including planning and implementation of income restoration programs; and
- Involvement of women's groups in resettlement planning, management, and operations and in job creation and income generation.

## 2.5 Water and Sanitation

Health and sanitation status of the affected households seems to be good. In the project area all the households own toilet inside the household property with septic tank.

All the project affected households are living in rural areas. As a result garbage management practice has not been developed among them. On the other hand there is no arrangement to manage the garbage like collection by an organized institution. The Table 2.13 reflects the facts by showing that about 98% of the household throw the garbage anywhere. Only about 3% household burn the garbage.

**Table 2.13 Management of Household Garbage by Head and by Upazilla**

District	Gazipur		Narsingdi		Total	
Thana	Kaliganj		Polash			
Occurred Type	No.	%	No.	%	No.	%
Burn it	1	5.00	0	0.00	1	2.56
Throw anywhere	19	95.00	19	100.00	38	97.44
<b>Total</b>	<b>20</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>

Source: Census & Socioeconomic survey July 2014

All the affected households use tube well water for all purposes. All the households own individual tube wells. Sanitation condition of the project area is well.

Like waste management majority of the household through away the waste water directly outside of the house. All the households are rural dwellers they do not have facilities to through water in a planned manner. However, about 3% household through their water in their septic tank (Table 2.14).

**Table 2.14 Management of Waste Water of the Households by Upazilla**

<b>District</b>	<b>Gazipur</b>		<b>Narsingdi</b>		<b>Total</b>	
<b>Thana</b>	<b>Kaliganj</b>		<b>Polash</b>			
<b>Where Through</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>
Septic tank	0	0.00	1	5.26	1	2.56
Directly outside the house	20	100.00	18	94.74	38	97.44
<b>Total</b>	<b>20</b>	<b>100.00</b>	<b>19</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>

### 3 LAND ACQUISITION AND RESETTLEMENT IMPACTS

#### 3.1 Minimizing Land Acquisition and Displacement

RHD has undertaken efforts to minimize and/or avoid land acquisition and resettlement impacts. This project will require land acquisition with a total quantity of 12.49 hectare for all the components including bridge itself, bridge approach road sections and bridge access road section.

#### 3.2 Scope of Land Acquisition

A total of 12.49 ha land will be required to be acquired to implement the project. It is 1.38 ha for bridge approach road sections at the two ends of the bridge and 11.11 ha for the bridge access road section. All of these lands are privately owned.

#### 3.3 Displacement and Other Impacts

In addition to land acquisition, the project works will require to affect 39 households. All the affected households will be displaced due to loss of residential structure. They will lose land with residential structure and trees. 190 people will be displaced due to loss of homesteads. A total of 3,709 sq.m structure will need to be relocated. Beside some secondary structure i.e.36 toilets and 34 tube wells will need to be relocated due to the project.

**Table 3.1 Displacement and other Impacts**

SI No	Type of Impact	No./ha/sq. m
1	Total quantity of Land to be Acquired (ha)	12.49
2	Total number of Households Affected (No)	39
3	Total Quantity of all structure (sq. m) affected	3,709
4	No. of toilets affected	36
5	No. of tube wells affected	34

Source: Census & Socioeconomic survey July 2014

#### 3.4 Asset Inventory and Assessment of Losses

##### 3.4.1 Affected Households

Household structures will be physically displaced by the Project. All the households are included in the ARP as impacts that are to be mitigated through compensation and resettlement assistance. The households will be encouraged for self- relocation and adequate compensation and other resettlement benefits will be paid to them for losses.

##### 3.4.2 Physical Structures Affected

The project will need land acquisition. A total of 39 households are getting affected by the project. A total of 3,709 sq. m different categories of structure have been affected. Out of the total affected structure, 1,437 sq. m is tin made, 1,288 sq. m semi-pucca, 682 sq. m pucca and 302 sq. m katcha (Table 3.2).

**Table 3.2 Quantity of All Affected Structure (sqm) by type and by Upazilla**

District	Gazipur		Narsingdi		Total	
Upazilla	Kaliganj		Polash			
Type of Structure	sq. m	%	sq. m	%	sq. m.	%
Pucca	596	23.59	86	7.27	682	18.39
Sami pucca	1110	43.94	178	15.05	1288	34.73
Tin	640	25.34	797	67.37	1437	38.74
Katcha	180	7.13	122	10.31	302	8.14
<b>Total</b>	<b>2526</b>	<b>100.00</b>	<b>1183</b>	<b>100.00</b>	<b>3709</b>	<b>100.00</b>

Source: Census & Socioeconomic survey July 2014

Besides, 34 tube wells and 36 sanitary latrines (Pucca) have been affected by the interventions. Detail of the affected structures is shown in the Table 3.3.

**Table 3.3 Affected Secondary Structures**

District	Gazipur	Narsingdi	Total
Upazilla	Kaliganj	Polash	
Type of secondary structure	No.	No.	No.
Tube well	18	16	34
Latrine (Pucca)	20	16	36

Source: Census & Socioeconomic survey July 2014

### 3.4.3 Trees and Crops Affected

The project will also require removal of 12,259 trees of various sizes and categories from privately owned land, both fruit bearing and timber type, from the private land. Out of these, 9181 big, 1812 medium, 924 small and 342 sapling. Fruit trees are more in number in both the Upazillas.

Besides about 60 species of trees with a total quantity of 12,259 on privately owned land will need to be fell down due to the project. The affected households will get 5 saplings each for social afforestation. Details of trees on private and government land with types and species are shown in the Table 3.4 and Table 3.5.

**Table 3.4 Affected Trees on Private Land**

Upazilla	Types of Trees	Category wise no. of affected trees				Total
		Big	Medium	Small	Sapling	
Kaliganj	Fruit Tree	3,333	628	260	275	4,496
	Timber	1,486	255	170	37	1,948
Polash	Fruit Tree	2,042	752	442	10	3,246
	Timber	2,320	177	52	20	2,569
<b>Total</b>		<b>9,181</b>	<b>1,812</b>	<b>924</b>	<b>342</b>	<b>12,259</b>

Source: Census & Socioeconomic survey July 2014



**Table 3.5 List of Affected Trees on private Land by Tree Name**

<b>Name of Tree</b>	<b>Sapling</b>	<b>Small</b>	<b>Medium</b>	<b>Big</b>	<b>Total</b>
Palmyra/Tal	0	0	0	57	57
Batter/Pita	10	0	0	2	12
Papaya	0	10	10	30	50
Custard apple/Ata	0	0	0	4	4
Bamboo	0	0	110	3,010	3,120
Koroi	5	17	66	342	430
Guava	0	0	72	214	286
Shiml	0	0	0	14	14
Mehaguni	30	125	145	159	459
Lemon	0	10	32	148	190
Coconut	5	17	76	217	315
Figs/Dumur	0	0	20	12	32
Berry/Jam	0	10	63	164	237
Jackfruit	80	115	205	350	750
Mango	40	226	257	379	902
Neem	0	15	47	32	94
Wooden Apple (Bel)	0	0	1	11	12
Trot/ Kadom	0	30	4	22	56
Banana	0	200	254	2,930	3,384
Litchi	0	10	16	11	37
Dalim	0	0	0	7	7
Persimmon/Khejur	0	0	0	31	31
Shishu	0	0	0	10	10
Bori (Kul)	0	10	30	26	66
Akasmani	0	0	3	23	26
Bettle Nut trees/Sup	160	60	335	709	1,264
Wood	0	10	0	20	30
Latakana	0	0	0	3	3
Jamrul	0	0	0	2	2
Jambura	0	12	19	26	57
Krishnochura	0	0	2	1	3
Olive	0	0	0	5	5
Amra	0	0	5	14	19
Rayana	0	5	20	5	30
Epilepil	0	0	0	5	5
Jiga	0	20	0	60	80
Bakul	0	0	0	2	2
Shara	0	0	0	4	4
Tetul (Tartar)	0	0	0	10	10
Chalta	0	0	0	2	2
Teak trees/Segun	0	0	0	4	4
Gab	0	0	5	25	30
Deoua	0	5	0	4	9
Kormocha	0	7	5	7	19
Douya	0	10	0	2	12
Chamon	2	0	0	2	4
Kamranga	0	0	0	10	10
Plum	0	0	0	8	8

Name of Tree	Sapling	Small	Medium	Big	Total
Amoloki	0	0	0	2	2
Sonali	0	0	0	5	5
Kerra	0	0	0	8	8
Kapila	5	0	0	14	19
Chandon	0	0	0	3	3
Mehedi	0	0	0	9	9
Noting	5	0	10	5	20
<b>Total</b>	<b>342</b>	<b>924</b>	<b>1,812</b>	<b>9,181</b>	<b>12,259</b>

Source: Census & Socioeconomic Survey July, 2014

### 3.4.4 Common Property Resources

The project will not affect any common property resources in the corridor of impact area.

### 3.5 Significance of Impact

In terms of significance of impact, an estimated 39 residential households will be impacted. About 190 people will be displaced due to loss of land and homesteads. All the affected households will lose trees.

### 3.6 Special Measures for Vulnerable Groups

Vulnerable groups to be affected by the project include (i) Poor female headed households without elderly support (ii) female EPs who are poor or otherwise disadvantaged; (iii) households living below poverty line (iv) elderly headed households (v) household with disable member; Special assistance will be required to support these vulnerable AHs including additional subsistence and relocation assistance, opportunity for skill training and income restoration, employment opportunity in civil work.

### 3.7 Employment Loss of Wage Earners

No Business enterprises have been identified in the project impact area. As a result project is not generating any loss of wage income. However, some sharecropper might lose the access to the land for cultivation through sharecropping. These sharecroppers are local and do not have any permanent arrangement with the land owners and usually do sharecropping with more than one land owners. They also have the opportunity to go for sharecropping with other land owners immediately. As a result employment loss for the project is not visible in the project area. However, during implementation if any wage losers are identified measures will be undertaken to assist them. The wage losers will be provided 30 days wage loss as resettlement assistance to recover their losses within the stipulated time. It is expected that they will get another job in the vicinity within very short time.

### 3.8 Business Loss of Business Enterprises

The project area rural in nature and COI mostly covers village with residential structures and covered with homestead forest. No commercial enterprises have been identified by the census or socio economic survey. So has not generated any business loss in the project area.

## **4 LEGAL AND POLICY FRAMEWORK**

### **4.1 Purposes and Objectives of Land Acquisition and Resettlement**

The project includes construction of bridge, bridge approach roads and bridge access needing acquisition of 12.49 hectares of private land. The acquisition of land will eventually displace households. The Abbreviated Resettlement Plan (ARP) covers compensation and assistance for resettlement and rehabilitation of APs. Thus, the ARP approach incorporates (i) land acquisition and resettlement issues; (ii) impact mitigation with special attention to the women and vulnerable groups and (iii) income generating support to the members of the AHs to include them in the poverty reduction and livelihood enhancement program.

The main principles of the ARP are to (i) minimize negative impacts in consultation with the design engineers and the APs; (ii) closely consult the affected persons on ARP policy, needs assessment, poverty and rehabilitation issues; (iii) carry out resettlement activities to improve or at least restore the pre-project living standards of the affected persons; (iv) provide compensation for affected property at market price prior to relocation and mainstream the poor and vulnerable APs with the poverty reduction and social development program for rehabilitation and livelihood regeneration.

### **4.2 Legal Framework for Land Acquisition**

The current legislations governing land acquisition for Bangladesh is the Acquisition and Requisition of Immovable Property Ordinance 1982 (ARIPO) and subsequent amendments during 1993 - 1994. The Ordinance requires that compensation be paid for (i) land and assets permanently acquired (including standing crops, fisheries, trees, houses); and (ii) any other damages caused by such acquisition. The Deputy Commissioner (DC) determines the market price of assets based on the approved procedure and in addition to that pays an additional 50 percent (as premium) on the assessed value as the market price established by Land Acquisition Officer (LAO) which remains much below than the replacement value. The 1994 amendment made provisions for payment of crop compensation to tenant cultivators. The Ordinance, however, does not cover project-affected persons without titles or ownership record, such as informal settler/squatters, occupiers, and informal tenants and lease-holders (without document) and does not ensure replacement value of the property acquired. The act has no provision of resettlement assistance and transitional allowances for restoration of livelihoods of the non-titled affected persons. The Acquisition and Requisition of Immovable Property Ordinance (ARIPO, 1982) with its subsequent amendments will be applied for this project.

The Deputy Commissioner (DC) processes land acquisition under the Ordinance and pays compensation to the legal owners of the acquired land. The Ministry of Lands (MOL) is authorized to deal with land acquisition through the DCs. Khas (government owned) lands should be acquired first when a project acquires both khas and private land. If a project acquires only khas, the land will be transferred through an inter-ministerial meeting following the preparation of acquisition proposal submitted to DC/MOL.

The land owner has to establish ownership by producing a record-of-rights in order to be eligible for compensation under the law. The record of rights prepared under Section 143 or 144 of the State Acquisition and Tenancy Act 1950 (revised 1994) are not always updated and as a result legal land owners have to face difficulties in trying to “prove” ownership. The APs must also produce rent receipt or receipt of land development tax, but this does not assist in some situations as a person is exempted from payment of rent if the area of land is less than 25 bighas (3.37 ha).

The Government of Bangladesh has prepared a draft national policy on involuntary resettlement funded by ADB but yet to be enacted, which is consistent with the general policy of the Government that the rights of those displaced by development project shall be fully respected, and persons being displaced shall be treated with dignity and assisted in

such a way that safeguards their welfare and livelihoods irrespective of title, gender, and ethnicity.

The Policy on involuntary resettlement recognizes that:

- i.) All those displaced involuntarily by either project or non-project impacts like erosion and eviction must be resettled and rehabilitated in a productive and sustainable manner.
- ii.) People who are resettled must be able, through their own efforts and/or with support as may be required, to restore or improve upon their level of living.
- iii.) Cash compensation shall be paid in development project at replacement value to those displaced from land and dispossessed of other assets acquired based on established prior ownership and/or user rights. In addition to cash compensation and resettlement, a benefit sharing may be considered where feasible.
- iv.) Cultural and customary rights of people affected by project are to be protected, particularly those belonging to adibasis (indigenous people) and ethnic minorities.
- v.) Gender equality and equity in all stages and processes of resettlement and rehabilitation will be fully respected.
- vi.) Affected persons will be informed and consulted in a transparent manner, including formal disclosure of project impacts and mitigation measures.
- vii.) Vulnerable groups, including landless, adibasis, poor women headed households, physically challenged people, elderly and those falling below the nationally defined poverty line (by the government) displaced by project or non-project impacts, are entitled to additional benefits and assistance in a manner that addresses their specific needs related to socio-economic vulnerability.
- viii.) Similarly, affected persons and/or businesses on government leased land will be eligible for compensation for loss of access to land and sites.

The draft Policy was submitted to the Government in November 2007. It has been approved by the Ministry of Land on 1 January 2008 and is placed before the Cabinet later in February 2008. After cabinet approval, the Government will undertake further work towards legislative changes to safeguard resettlement rights by law.

#### **4.3 JICA's Guidelines for Environmental and Social Considerations**

The resettlement policy of JICA is almost similar to other donor's policy on involuntary resettlement. The JICA Guidelines for Environmental and Social Considerations (April 2010) on the other hand, recognize & address the R&R impacts of all the affected persons irrespective of their titles and requires for the preparation of ARP in every instance where involuntary resettlement occurs. The JICA policy requirements are:

- i.) Avoid or minimize impacts where possible;
- ii.) Consultation with the local stakeholders people or group (including illegal dwellers), local NGOs, etc. who have views about cooperation projects.
- iii.) Payments of compensation for acquired assets at the replacement value;
- iv.) Ensure that no one is worse off as a result of resettlement and would maintain their at least original standard of living.
- v.) Resettlement assistance to affected persons, including non-titled persons; and
- vi.) Special attention to vulnerable people/groups and ethnic minorities.

#### **4.4 Gap and Gap Filling Measures**

The land acquisition law of Bangladesh, the Acquisition and Requisition of Immovable Property Ordinance (ARIPO) 1982 with subsequent amendments during 1993 – 1994 is followed for acquisition and requisition of properties required for the development project in Bangladesh, which is not consistent with the Government's commitment to reducing poverty. There are some gaps in the land acquisition law of Bangladesh and The JICA Guidelines for

Environmental and Social Considerations (GESOC, April 2010). Here is the comparative analysis between the GoB laws (ARIPO) related to land acquisition, compensation and involuntary resettlement and JICA's requirements as prescribed in the GESOC 2010. The Table 4.1 describes details.

**Table 4.1 Comparison between the Government of Bangladesh and JICA Guidelines for Environment and Social Consideration - Land Acquisition and Resettlement**

Sl. No.	JICA's GESOC (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
1	Involuntary resettlement should be avoided wherever possible.	Not specified	The 1982 ordinance legislated nothing, while the JICA Guidelines require to avoid/minimize resettlement/loss of livelihood	Like other donor funded projects in Bangladesh the approach of avoiding involuntary resettlement has already been taken care during preparing this project. This will be further practiced during design and implementation stages.
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken.	Not specified for non-titled people	There is no provisions for compensation to the non-titled residents in Bangladesh ordinance, while JICA guidelines acknowledge all affected persons whether legally residing or not, eligible for compensation	Compensations are proposed even if non-titled affected people providing: <ul style="list-style-type: none"> <li>- Compensation for structures, trees</li> <li>- Structure transfer assistance</li> <li>- Structure reconstruction assistance</li> <li>- Moving assistance for residential house owner</li> <li>- Tenant moving allowance</li> </ul>
3	People who must be settled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.	Not specific for keeping living standard of affected people same or above pre-project levels.	There is no provisions for maintaining living standard of affected people at same or above pre-project levels in Bangladesh ordinance, while JICA guidelines require that no one is worse off as a result of resettlement and would maintain their living level at least original levels	Assistances were proposed in the form of: <ul style="list-style-type: none"> <li>- Grant for business loss</li> <li>- Compensation for loss of plant and fish-stock</li> <li>- Grant for loss of wage employment</li> <li>- Rental fee loss for displaced rented house owner</li> <li>- One time moving assistance for tenant business owner</li> <li>- Introduction of micro-credit</li> <li>- Provision of job training</li> <li>- Provision of priority employment etc.</li> </ul>
4	Compensation must be based on the full replacement cost as much as possible	Compensation is made based on the pre-determined government prices as are usually quite cheaper than market price	Compensation is made based on the pre-determined government prices that are usually lower than replacement cost	The resettlement plan addresses all these issues and spells out a mechanism to fix the replacement cost by having an independent evaluator (committee) who will be responsible for deciding the replacement

Sl. No.	JICA's GESC (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
				costs.
5	Compensation and other kinds of assistance must be provided prior to displacement	Payment is made on predetermined time, regardless before or after the construction starts	Compensations and other assistances are made regardless before or after construction, while JICA Guidelines requires to make it prior to relocation	The resettlement plan addresses all these issues and spells out a mechanism for all the compensation will be paid prior to possession of the acquired land / prior to displacement
6	For projects that entails large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public.	There is no provision for the formulation of ARP and public hearing. Deputy Commissioner contacts to land owner through land Acquisition Officer (LO), and if landowner has no objection, confirm operation for compensation amount etc. will be proceeded.	There is no provision for preparation of resettlement action plan that describes all features of resettlement requirements and ready to disclose to public.	The Abbreviated Resettlement Plan (ARP) prepared for this project with all features of resettlement requirements and mechanism of disclosure to the public is integral part of ARP. This will be further practiced during design and implementation stages.
7	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance.	The 1982 Ordinance have provisions to notify only the owners of property to be acquired	There is no provision in the law for consulting the stakeholders but the land allocation committees at district, division and central government level.	The ARP/resettlement plan for the project has been prepared following a consultation process which involves all stakeholders (affected persons, government department/line agencies, local community, NGORP, etc.), and the consultation will be a continuous process at all stages of the project development such as project formulation, feasibility study, design, implementation, and post-implementation, including the monitoring phase.
8	When consultation held, explanation must be given in a form, manner, and language that are understandable to the affected people	There is no provisions	Requirements of JICA Guidelines are not specifically mentioned in the Bangladesh laws and rules	The resettlement plan for the project has been prepared following a consultation process with all stakeholders in local language and by following participatory process with question and explanation on the components of the ARP through participation of all the stakeholders representing different groups and the consultation will be a continuous process at all stages of the project development such as project formulation, feasibility study, design, implementation, and post-implementation, including the monitoring phase.
9	Appropriate	There is no provision	There is no provisions	The resettlement plan for

Sl. No.	JICA's GESC (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
	participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans	for the monitoring related activities with the participation of affected people	in Bangladesh ordinances, while JICA Guidelines recommend a participation of affected people in planning, implementation and monitoring of ARP	the project has been prepared following a consultation process with all stakeholders and the consultation will be a continuous process at all stages of the project development such as project formulation, feasibility study, design, implementation, and post-implementation, including the monitoring phase.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities	Increase AP have objection to compensation amount, the AP should protest and entrust the matter to the Arbitrator. If AP has to appeal against Arbitrator's decision, then AP should file a law suit to the court and wait for the sentence.	The laws of Bangladesh states appeal to Arbitrator and court case, while JICA guidelines recommend establishing appropriate grievance redress mechanism for amicable settlement to minimize legal confrontation.	The resettlement plan prepared for this project has made a provision of setting up of grievance redress mechanism accessible for all the affected people including non-titled affected people.
11	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socio-economic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advantage of such benefit.	No such an activity required	There is no provision in Bangladesh ordinances, while JICA Guidelines recommend identification of affected people there in least possible time preferably at the project identification stage.	This ARP has been prepared based on the data collected through conducting a census, socioeconomic survey for the displaced persons and making inventory of losses. Video filming has also been done for the affected properties.
12	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under la), the PAPs who do not have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they	There is no provision.	Requirements of JICA guidelines are not specifically mentioned in the Bangladesh laws and rules.	The resettlement plan ensures the compensation and assistance to all affected persons, whether physically displaced or economically displaced, irrespective of their legal status. The end of the census survey will be considered as the cut-off date, and affected persons listed before the cut-off date will be eligible for assistance.

Sl. No.	JICA's GESC (2010)	GOB's Acquisition and Requisition of Immovable Property Ordinance (ARIPO) of 1982	Gaps Between ARIPO and JICA's Policies and Action Taken to Bridge the Gap	Proposed Gap Filling Measures
	are occupying			
13	Preference should be given to land –based resettlement strategies for displaced persons whose livelihoods are land-based.	There is no provision.	Requirements of JICA Guidelines are not specifically mentioned in the Bangladesh laws and rules.	Though this option may be a difficult proposition given the lack of government lands and the difficulties associated with the acquisition of private lands, the resettlement plan proposes land-for-land compensation as its priority, if feasible. Attempt will be made to find alternate land for the loss of land, in case it is available and if it is feasible, looking at the concurrence of host community and land value.
14	Provide support for the transition period (between displacement and livelihood restoration)	There is no provision for support for the transition period.	There is no provision in Bangladesh ordinances, while JICA Guidelines require providing support for the transition period.	Following are provided in the ARP: <ul style="list-style-type: none"> <li>- Moving assistance for residential house owners</li> <li>- Tenant moving allowance</li> </ul>
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc.	There is no provision for either acknowledgment of or compensation to vulnerable groups	There is no provision in Bangladesh ordinances, while JICA Guidelines require providing special attention to vulnerable people and groups.	Vulnerable allowances were proposed to widowed, old, disabled and poor house head families such as : <ul style="list-style-type: none"> <li>- Special Assistance for Vulnerable households</li> </ul>
16	For project that entails land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared	There is no provision	Requirements of JICA Guidelines are not specifically mentioned in the Bangladesh laws and rules	ARP has been prepared since the displaced people are estimated fewer than 200 at each project bridge.

JICA = Japan International Cooperation Agency, ARIPO = Acquisition and Requisition of Immovable Property Ordinance 1982, GESC = Guidelines for Environmental and Social Consideration

#### 4.5 Types of Losses and Impact Category

The types of losses due to undertaking of the project include (i) loss of land (homestead, commercial, agricultural and pond); (ii) residential/ commercial and community structures; (iii) loss of trees and crops; (iv) loss of work days/incomes due to dislocation and relocation of households and businesses, (v) loss of access to land and premises for residence, cropping and trading.

The following categories of APs are likely to be impacted during implementation of the project:



- i.) APs whose land is affected—APs whose land is being used for agricultural, residential or commercial purposes and is affected either in part or in total and the effects are either temporary or permanent;
- ii.) APs whose structures are affected—APs whose structures (including ancillary and secondary structures) are being used for residential, commercial or worship purposes which are affected in part or in total and the effects are either temporary or permanent;
- iii.) APs with other assets affected—APs who have other assets, such as crops or trees, affected either temporarily or permanently;
- iv.) APs losing access to vested and non-resident property—APs who are enjoying access to vested and non-resident property, both owned and purchased, will be losing their rights to cultivate and use those lands, when acquired.
- v.) APs losing income or livelihoods—APs whose tenancy right, business, source of income or livelihood (including employees of affected businesses) is affected in part or in total, and affected either temporarily or permanently;
- vi.) Vulnerable APs— APs included in any of the above categories who are defined as vulnerable.

#### **4.6 Principles, Legal and Policy Commitments**

The ARP has the following specific principles based on the government provisions and JICA's Guidelines for Environmental and Social Considerations:

- a) The land acquisition and resettlement impacts on persons affected by the project would be avoided or minimized as much as possible through alternate design options;
- b) Where the negative impacts are unavoidable, the persons affected by the project and vulnerable groups will be identified and assisted in improving or regaining their standard of living.
- c) Information related to the preparation and implementation of resettlement plan will be disclosed to all stakeholders and people's participation will be ensured in planning and implementation. The resettlement plan will be disclosed to the APs in local language;
- d) Land acquisition for the project would be done as per the Acquisition and Requisition of Immovable Property Ordinance 1982 and subsequent amendments during 1993-1994. Additional support would be extended for meeting the replacement value of the property. The affected persons who does not own land or other properties, but have economic interests or lose their livelihoods will be assisted as per the broad principles described in this document.
- e) Before taking possession of the acquired lands and properties, compensation and Resettlement and Rehabilitation (R&R) assistance will be paid in accordance with the provisions described in this document;
- f) An entitlement matrix for different categories of people affected by the project has been prepared. People moving in the project area after the cut-off date will not be entitled to any assistance. In case of land acquisition the date of notification under section 3 for acquisition will be treated as cut-off date. For non-titleholders such as informal settlers / squatters and encroachers the date of census survey or a similar designated date declared by the executing agency will be considered as cut-off date.
- g) Appropriate grievance redress mechanism will be established to ensure speedy resolution of disputes.
- h) All activities related to resettlement planning, implementation, and monitoring would ensure the involvement of women and other vulnerable groups.
- i) Consultations with the APs will continue during the implementation of resettlement and rehabilitation works.

- j) There should be a clause in the contract agreement that the construction contractor will compensate any loss or damage in connection with collection and transportation of burrow-materials.

In accordance with the resettlement principles suggested for the project, all affected households and persons will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights on lost assets, scope of the impacts including socio-economic vulnerability of the affected persons and measures to support livelihood restoration if livelihood impacts are envisaged. The affected persons will be entitled to (i) compensation for the loss of land, crops/ trees at their replacement value; (ii) compensation for structures (residential/ commercial) and other immovable assets at their replacement value; (iii) assistance for loss of business/ wage income; (iv) assistance for shifting and reconstruction of affected structures. This will ensure that persons affected by land acquisition; whether titled or non-titled will be eligible for appropriate compensation/resettlement benefit. Persons having no legal title but using the land under acquisition if vacated for the project purpose would be provided with compensation and resettlement benefit for structures and shifting/reconstruction allowance. Households having customary rights to land and physical property like the owners and users of vested and non-resident property, lessees of homestead, commercial and agricultural land, sharecroppers, renters of land and structure, etc. are also covered under the resettlement action plan. The ARP also includes opportunities for occupational skill development training for income generation activities for the APs, especially for poor households. The people involuntarily displaced from homes, assets, or income sources as well as non-titled people affected by the project will receive priority access to these income restoration measures. The resettlement activities of the project will be carried out in consultation with the APs and all efforts will be made to minimize disruption during project implementation. APs will be encouraged for self-relocation and their preferences will be taken into account in the selection of alternative relocation sites.

#### **4.7 Eligibility Policy and Entitlement Matrix**

##### **4.7.1 Eligibility Criteria**

All APs will be entitled to compensation and resettlement assistance based on severity (significance) of impacts. Nevertheless, eligibility to receive compensation and other assistance will be limited by the cut-off date. The cut-off date for compensation under law (Ordinance II of 1982 and its 1994 amendments) is considered for those identified on the project right of way land proposed for acquisition at the time of serving notice under Section 3 or joint verification by DC whichever is earlier. The cut-off date of eligibility for resettlement assistance under this ARP is the commencement date of the disclose of entitlements and consultation meeting with the stakeholders which was held on 9<sup>th</sup> July 2014 and 19<sup>th</sup> August 2014 for the APs staying on public lands. The absence of legal title will not bar APs from compensation and assistance, as specified in the entitlement matrix (Table 4.2).

Structures located on non-titled land or GOB land, if displaced, will be entitled for compensation under the Project. Vulnerable APs or AHs will qualify for additional assistance to facilitate them relocation and restoration of their livelihoods.

Non-vulnerable households with structures affected will be entitled to compensation for structures and assistance for shifting and reconstruction of the same. Any structure not directly used by a non-vulnerable household i.e. rented out for income will also not qualify for additional resettlement assistance.

##### **4.7.2 Compensation and Entitlement Policy**

An Entitlement Matrix has been prepared on the basis of census and socioeconomic survey conducted during 7 to 10 July 2014. It identifies the categories of impact based on the census & SES and shows the entitlements for each type of loss. The matrix describes the

units of entitlements for compensating the lost assets, and various resettlement benefits. Cash Compensation under law (CCL) for lost assets (land, tree, structure & other physical establishments) will be accorded to the owners through the DCs as per market value assessed through legal procedure. The resettlement benefit for indirect losses and difference between replacement value and the CCL will be paid by RHD through ARP Implementing Agency.

The compensation and entitlement matrix is presented in Table 4.2.

**Table 4.2 Compensation and Entitlement Matrix**

<b>Item No.</b>	<b>Type of loss</b>	<b>Entitled Persons (Beneficiaries)</b>	<b>Entitlement (Compensation Package)</b>	<b>Implementation issues/Guidelines</b>
1	Loss of homestead, commercial, Agriculture land, pond, ditches and orchards etc.	Legal owner(s) of land	<ul style="list-style-type: none"> <li>i. Replacement value (RV) of land (Cash Compensation under Law (CCL) and additional grant to cover the current market price of land and stamp duty &amp; registration cost @ 10.5% of CMP for land) to be determined by PVAT.</li> <li>ii. Dislocation allowance @ BDT 100 per decimal for agricultural, fish pond, ditch, etc. and @ BDT 200/decimal for homestead, orchard and commercial lands.</li> <li>iii. Compensation for standing crops to actual owners/ cultivators as determined by PVAT.</li> </ul>	<ul style="list-style-type: none"> <li>a. Assessment of quantity and quality of land by Joint Verification Survey</li> <li>b. Assessment of Market Value by Land Market Survey (LMS)</li> <li>c. Assessment of Cash Compensation under Law (CCL)</li> <li>d. Updating of title of the affected persons</li> <li>e. Payment of Cash Compensation under Law (CCL)</li> <li>f. APs will be fully informed of the entitlements and procedures regarding payments</li> <li>g. Additional cash grant to be paid to cover the replacement value of land compensation based on DC's CCL .</li> <li>h. Stamp duty and registration fees will be added with current market price (CMP) for land @ 10.5% of CMP to facilitate the APs in purchasing alternative lands.</li> </ul>
2	Loss of access to cultivable land by owner cultivator/ tenant/ sharecropper	Tenants/ sharecropper/ Legal owner/ grower/ socially recognized owner/ lessee/ unauthorized occupant of land	<ul style="list-style-type: none"> <li>i. Compensation for standing crops to owner cultivator/ sharecroppers or lessees as determined by PVAT.</li> <li>ii. Owner/grower to take away the crop</li> </ul>	<ul style="list-style-type: none"> <li>a. All the individuals identified by the JVS as tenants or sharecroppers of land</li> <li>b. Compensation to be paid after taking possession of land and the legal /socially recognized owner is paid cash compensation for crop and on certification of receipt by legal/socially</li> </ul>

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
				<p>recognized owner</p> <p>c. Additional cash grant to cover current market value of crop compensation as prescribed by PVAT in case of private owner himself cultivating crop</p> <p>d. Crop compensation and the crop will be shared between owner and sharecropper as per terms of sharecropping in case of privately owned land/socially recognized owner</p> <p>e. In case of dispute over verbal agreement on sharecropping, certification from the elected representative will be considered as legal document</p>
3	Loss of Trees/ Perennials/ fish stocks	<p>1. Person with Legal Ownership of the land</p> <p>3. Socially recognized owner/ Unauthorized occupant of the trees/ fishes</p>	<p>i. Cash compensation at market rates for replacement of trees/ perennials/ fish stocks value</p> <p>ii. For fruit bearing trees- compensation for fruits @ 30% of timber value X 1 year</p> <p>iii. Compensation for fish stocks as determined by PVAT.</p> <p>iv. saplings will be distributed free of cost among each affected household losing trees</p> <p>v. Owners will be allowed to fell and take away their trees, perennial crops/ fishes etc. free of cost without delaying the project works.</p>	<p>a. Assessment of loss and market value of affected trees</p> <p>b. Payment of CCL for trees</p> <p>c. Adequate compensation will be paid and the owner will be allowed to fell and take the tree free of cost</p> <p>d. Compensation for fruit will paid for small, medium and large categories of trees.</p> <p>e. 5 saplings (2 fruit tree, 2 timber type and 1 medicinal tree) free of cost will be distributed among the tree losing households.</p>
4	Loss of residential /commercial structure by owner(s)/	Legal Owners or squatters	<p>i. Replacement value of structure at market price determined by PVAT.</p> <p>ii. Transfer grant @</p>	<p>a. Payment of CCL for the losses</p> <p>b. Verification of Joint Verification Survey (JVS) and other records</p>

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
	squatters		<ul style="list-style-type: none"> <li>iii. Tk.12.50% of the replacement value of main structure</li> <li>iv. Reconstruction grant @ Tk.12.50% of the replacement value of main structure.</li> <li>iv. Owners to take away all salvage materials free of cost</li> </ul>	<ul style="list-style-type: none"> <li>c. APs will be fully informed about their entitlements and assisted to obtaining it.</li> </ul>
5	Loss of access to Residential houses/ commercial structures (rented or leased)	Tenants of rented/ leased properties	<ul style="list-style-type: none"> <li>i. One time cash grant for facilitating alternative housing/CBEs Tk. 3000.00 per household or entity</li> <li>ii. Shifting allowance per household based on family members @ Tk. 500/- per member with minimum Tk. 2000</li> </ul>	<ul style="list-style-type: none"> <li>a. Verification of JVS and records</li> <li>b. Shifting allowance will be paid on relocation from project site</li> </ul>
6	Loss of business by CBEs due to dislocation	Owner/operator of the business as recorded by JVS	<ul style="list-style-type: none"> <li>i. Business restoration grant @ Tk. 10,000 for each business unit.</li> </ul>	<ul style="list-style-type: none"> <li>a. All persons recorded by the JVS</li> <li>b. cash grant to be paid while taking possession of land</li> </ul>
7	Loss of Income and work days due to displacement	Employees identified by the Joint Verification Team (JVT)	<ul style="list-style-type: none"> <li>i. Cash grant to the affected employees/wage earners equivalent to 30 days wage @ Tk. 300/per day</li> <li>ii. Preferential employment in the project construction work, if available.</li> </ul>	<ul style="list-style-type: none"> <li>a. All persons recorded by the JVS</li> <li>b. Cash grant to be paid while taking possession</li> <li>c. Involvement of the incumbents in project civil works</li> <li>d. Training on income generating activities such as Pisciculture, livestock and poultry, horticulture, welding, mechanics, plant cultivation, social forestry, etc.</li> </ul>
8	Poor and vulnerable households	Poor and vulnerable households as identified by JVT	<ul style="list-style-type: none"> <li>i. Additional cash grant of Tk. 3000for affected poor women headed households and other vulnerable households</li> <li>ii. Training on IGA for AP/ nominated by AP.</li> </ul>	<ul style="list-style-type: none"> <li>a. Identification of Vulnerable households</li> <li>b. Income restoration schemes for vulnerable households</li> <li>c. Arrange training on income generating activities</li> </ul>
9	Loss of Common Property Resources	Affected Common Property Resources	<ul style="list-style-type: none"> <li>i. Grant for each affected CPR for reconstruction</li> <li>ii. Or</li> </ul>	<ul style="list-style-type: none"> <li>a. Identification of the management committee of the CPRs</li> <li>b. Cash grant to the</li> </ul>

Item No.	Type of loss	Entitled Persons (Beneficiaries)	Entitlement (Compensation Package)	Implementation issues/Guidelines
		(Mosque, school, community infrastructure etc.)	iii. Reconstruction of CPR through the project	Management committee of CPR c. Or Reconstruction of the CPR by the project
10	Temporary impact during construction	Community / Individual	i. The contractor shall bear the cost of any impact on structure or land due to movement of machinery and in connection with collection and transportation of borrow materials. ii. All temporary use of lands outside proposed Col to be through written approval of the landowner and contractor. iii. Land will be returned to owner rehabilitated to original preferably better standard.	a. Community people should be consulted before starting of construction regarding air pollution, noise pollution and other environmental impact b. The laborers in the camp would be trained about safety measures during construction, aware of health safety, STDs, safe sex etc. The contractor shall ensure first aid box and other safety measures like condoms at construction site.

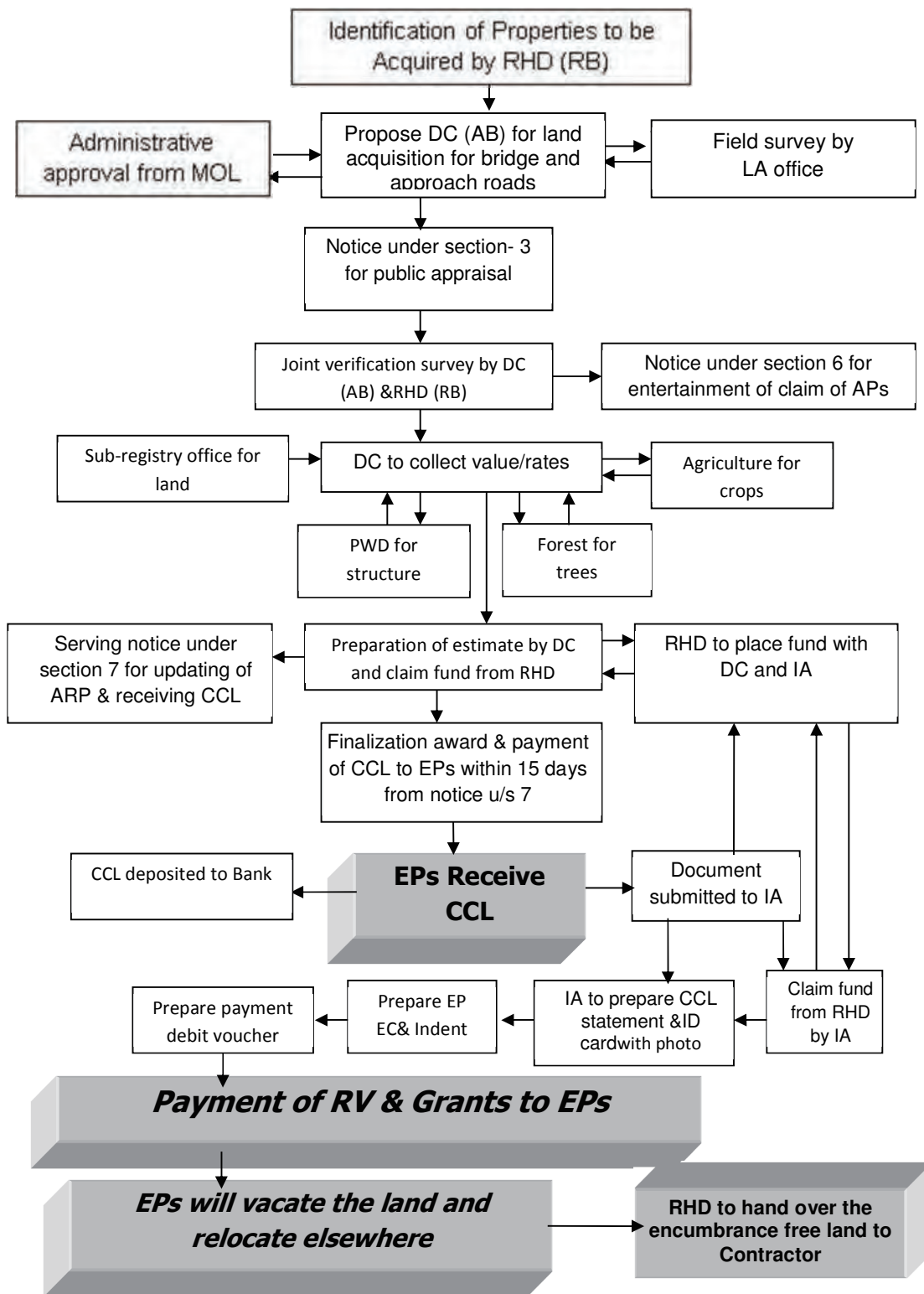
#### 4.8 Compensation and Resettlement Assurances

RHD will ensure that the land and property (structure, tree, crops and non-structure assets) to be acquired for the project interest will be compensated at their full replacement cost determined by a legally constituted body like the Property Valuation Advisory Team (PVAT) as per the resettlement Plan. The principle for determining valuation and compensation for assets, incomes and livelihoods targets resettlement assistance for substituting and restoration of loss of income and workdays by the relocated households, especially the vulnerable households.

##### 4.8.1 Compensation Payment Procedure to Title Holder:

- a) Upon obtaining administrative approval of the Land Acquisition Proposal from the Ministry of Land (MoL) the DC serves notice under section 3 of the Acquisition and Requisition of the Immovable Property Ordinance 1982 (Amended in 1993 and 1994 ) to the recorded owner of the affected property for public appraisal.
- b) Acquiring Body (DC) and Requiring Body (here RHD) representatives conduct joint verification of the affected property within 3 days of serving notice u/s-3.
- c) After that the DC serves notice u/s 6 for entertaining claims (appeals) from the potential affected persons.
- d) On the basis of joint verification survey data DC writes letter to Public Works Department (PWD) with information of affected structures, list of trees to the Forest Department and type of crops to the Agriculture Department for valuation as per government rule.

- e) DC also collects recorded land price of lands of similar description from the concerned Sub-register's office for last 12 months from the date of notice under section 3.
- f) After receiving rates from the PWD, Forest and Agriculture Department the DC prepares estimates and send it to the RB for placement of fund within 60 days.
- g) The DC prepares award for compensation in the name of recorded owner.
- h) Upon placement of fund, the DC serves notice u/s 7 to the APs for receiving cash compensation under law (CCL) within 15 days from the date of issuing notice u/s
- i) The affected people are notified to produce record of rights to the property with updated tax receipt of land, declaration on Tk. 150 (now Tk. 300) non-judicial stamp, photograph etc. before Land Acquisition section of DC office.
- j) Upon fulfillment of the criteria of the DC office i.e. requisite papers and document, the LA section disburse CCL in the office or field level issuing prior notice to the entitled persons (EPs).
- k) Local Government Institutions representative identifies the affected people during receiving CCL.
- l) As per Land Acquisition Law, DC pays compensation to the legal owners of the properties for land, structure, trees and crops.
- m) After receiving CCL from the LA office and obtaining clearance from the Treasury Section of the DC the entitled person (EP) deposits the CCL to his own bank account.
- n) One copy of the CCL will be submitted to the implementing agency (IA) (NGO or Social Consulting Firm) office for additional payment of compensation as per ARP policy
- o) The IA will create ID number for the CCL holder and prepare EP & Entitlement Card (EC) for payment
- p) The IA will prepare ID cards with photograph of the EPs
- q) The ID card will be jointly signed by the RHD and IA representative and photograph will be attested by the concerned UP Chairman/Member.
- r) The IA will disburse Account Payee Cheque in public place or office the UP Chairman



Source: Census & Socioeconomic survey July 2014

**Figure 4.1 Compensation Mechanism for Legal Title Holder**

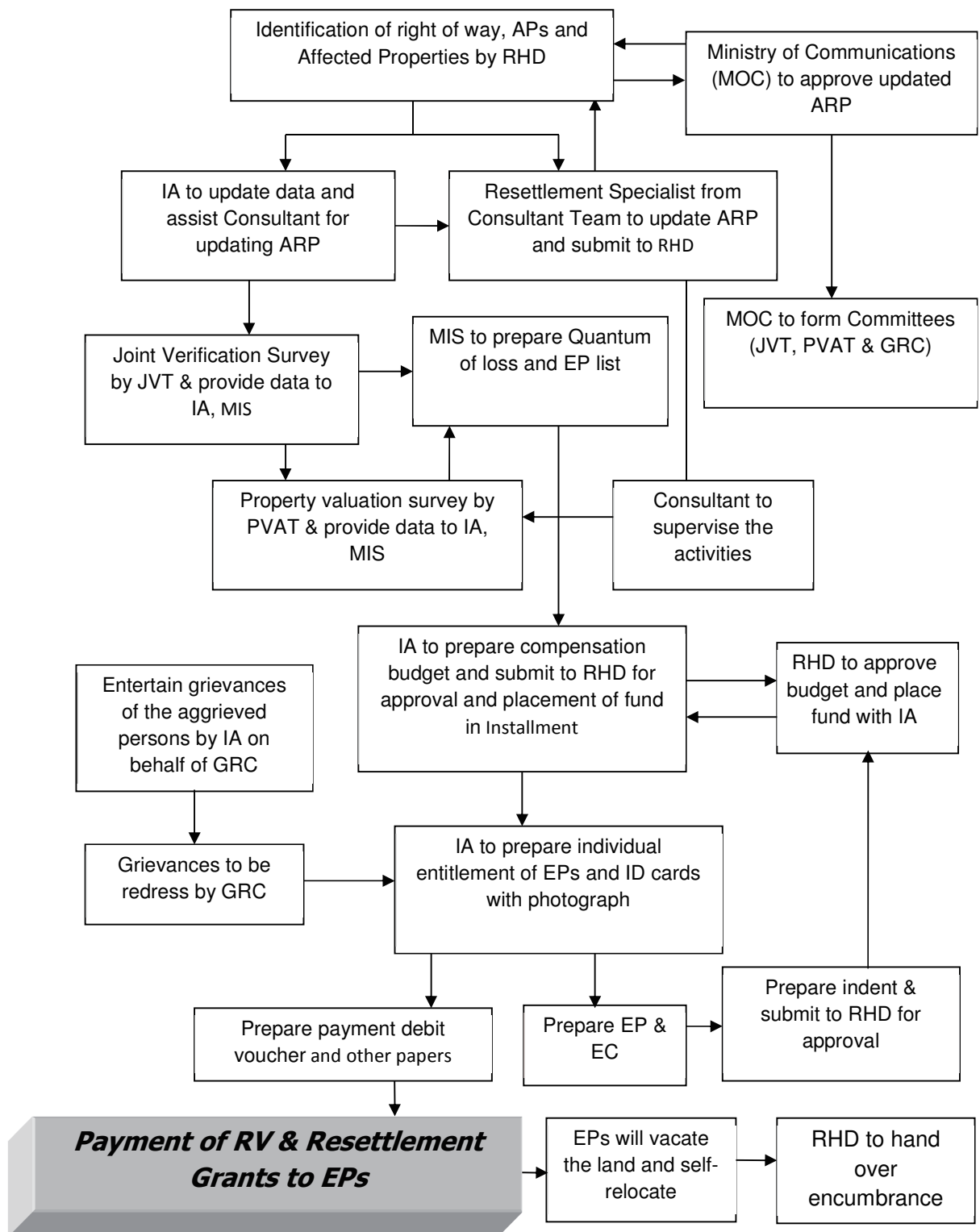


#### **4.8.2 Compensation Payment Procedure to Non-Title Holder:**

The non-titled holder means having no legal ownership of the affected property but socially recognized and enlisted during census, SES and or Joint verification survey on the Col. The Acquisition and Requisition of Immovable Property Ordinance 1982 has no provision to compensate these types of affected people. The Donors policy of involuntary resettlement prescribes to address these people without having legal title to the property.

As per tripartite joint verification survey by the Joint Verification Team (JVT) the list of affected persons (if any) will be prepared by the IA and then the following steps would be taken-

- a) Individual Identity number will be created by IA against the name of all entitled persons (EPs)
- b) Photography of the affected people for preparation of ID cards
- c) The IA will prepare entitle persons file and entitlement card for each of the EPs.
- d) The IA will assist the EPs opening Bank Account in the name of EPs
- e) The tenants of the house or commercial premises and employees will collect documents in favor of their tenancy or identification from the owner of the structure/employer which will be attested by the concerned UP Chairman
- f) The IA will create ID number for each of the EP and ID card with photograph
- g) The IA will prepare Entitled Persons file and Entitlement Card (EP file & EC) based on category and quantity of losses
- h) The IA will prepare indent and submit to RHD enclosing EP&EC
- i) The ID card will be jointly signed by the RHD and IA representative and photograph will be attested by the concerned UP Chairman//Ward Councilor.
- j) The IA will arrange disbursement of Cheque (Account payee) in public place or office of the UP Chairman and representative from the RHD will hand over Cheque to EPs.



Source: Census & Socioeconomic survey July 2014

**Figure 4.2 Compensation Mechanism for Non-title Holder**

### 4.8.3 Assistance from Relevant Government Departments

The District Land Acquisition office takes help of relevant departments for determination of prices of land and other properties. Normally, the Public Works Department, the Forest

Department, Sub-Registrar's Office, etc. are consulted. Land price from the Sub-Registrar's Offices for preceding one year from the date of serving notice under section 3 is considered for valuation of land. But in most cases, the price remains far below the market rate. To ensure that the APs can replace the lost property, the transacted price, recorded price, existing price and expected prices are averaged to reach at Replacement Value (RV). For valuation of affected property, a legal body called Property Valuation Advisory Team (PVAT), with representatives from acquiring body (AB) DC, requiring body (RB) here RHD, and Implementing Agency will be formed by Ministry of Communications (MOC).

PVAT will have representatives from the RHD as the convener, representative from the implementing agency as the member secretary and representatives from the DC as member. A land and property valuation survey by the implementing agency based on the price recorded from formal and informal sources will determine the Replacement Value (RV) of land and structure and be recommended by PVAT to MOC through Project Director. RHD will pay the difference between RV and CCL. Stamp duty and land registration fees will be paid to the AP, if replacement land is purchased within one year from the date of receiving full compensation for land. Further, the implementing agency will assist in all possible ways, including finding land for purchasing replacement land, etc. After issuance of notice under section 3 by the DC and census cut-off date for non-title holders or a similar designated date declared by RHD, joint verification of the acquired properties will be carried-out by the requiring and acquiring bodies. The Joint Verification Team records the quality and quantity of the affected properties and identifies the structure owner on the spot. A representative of the Implementing agency will also be present in the JVT as a member of the team. The Implementing Agency will computerize the Joint Verification data to be used for payment of compensation/resettlement benefits. A Terms of Reference for ARP Implementing Agency (IA) (NGO or Social Consulting Firm) is enclosed in [Annex-III](#).

After payment of compensation, APs would be allowed to take away the materials salvaged from their dismantled houses, shops or CPRs (if any) and no charges will be levied upon them for the same. A notice to that effect will be issued by RHD intimating that APs can take away the materials. Payment of compensation will be made at least 1 month prior to the actual possession of the acquired lands and removal of the structures from the COI so that they have sufficient time to dismantle and remove all salvageable material for rebuilding of houses and re-establishment of businesses. Further, all compensation and assistance will be paid to all APs prior to displacement or dispossession of assets or 1 month before commencement of civil works whichever comes first. The possession will be handed over to the contractor after payment of compensation/assistance to the APs is completed.

## **5 CONSULTATION, PARTICIPATION AND DISCLOSURE**

### **5.1 Project Stakeholders**

The primary stakeholders of the project include the Affected Household (AHs), agriculture farmers as well as community people. Other stakeholders include Roads & Highways Department (RHD), under the Ministry of Communications (MOC) as the EA and other government agencies such as Power Development Board (PDB), Rural Electrification Board (REB), Forest Department, etc.

This ARP has been prepared based on the findings of consultation meetings and the participatory census and SES. The Requiring Body, here RHD will acquire land for the project through the DC offices of Gazipur and Narsingdi districts. The other stakeholders include the businessmen groups like contractors, sub-contractors and suppliers during the construction period. The local government representatives will also be benefited in gaining peoples support as a result of local development. The local NGOs working in the area will also find their wider scope for poverty reduction activities. An Implementing NGO (INGO) or a Social Consulting Firm (SCF) will be engaged to implement the ARP by the RHD during project implementation period.

### **5.2 Disclosure and Public Consultation**

Goals and objectives of the project have been disclosed to the affected people and other stakeholders through community based stakeholders' consultation meetings and focus group discussion. Objective of consultation meetings and focus group discussions were to disclose the information about the project to the stakeholders as well as get feedback and suggestion from the stakeholders through participation. The feedback and suggestions have been incorporated in the project design for improvement of the project and smooth implementation through participation.

#### 1) Information on disclosure:

- a) Dialogue with local people through public meetings and discussed about goals and objective of the project
- b) Information and consultation meetings (ICM) in the locality about the project as well as planned activities
- c) Disclosure of the project components and other related issues, more specifically about each component of the project in the locality among stakeholders of all levels through conducting public meeting
- d) Focus group discussion with local stakeholders with primary focus with the project affected people (directly or indirectly affected people irrespective of gender and social status)
- e) Disclosure of the Land Acquisition and Resettlement Issues among the potential affected persons

#### 2) Consultation:

- a) Consultation of resettlement and rehabilitation issues, mechanism of compensation, participation of the affected households in implementation of ARP with all level stakeholders and gather feedback on potential risks and probable mitigation measures
- b) Encourage all level stakeholders to participate in the consultation by receiving views of representatives from different groups including directly and indirectly affected households, structure owners, agriculture land losers, fishermen, local traders, women and vulnerable groups etc.

### **5.3 Stakeholders Meeting**

Stakeholders meetings were conducted in two stages or phases. At the initial stage, in the project area the consultants disclosed about the goal, objective, different components of the project as a whole and narrated the tentative design of the proposed bridge, bridge approach roads and bridge access road. Consultants also narrated the potential land acquisition status in that specific area. Feedback of the consultation meetings were incorporated and considered to finalize the project. After finalization of the project second phase of consultation took place in the project area. The Consultants disclosed the entitlements of the affected households and other stakeholders as designed in the ARP based on GoB policy and JICA's Guidelines. The consultants also declared the cut-off date as the commencement date of second phase SCMs for eligibility of receiving resettlement benefits for the non-titled affected peoples (if any). The consultants also disclosed the procedure of receiving the compensation, mechanism of participation of the stakeholders in the process of compensation as well as grievance redresses process.

#### **5.3.1 Meetings Phase I**

In the initial stage of the project in July 2014 the local potential affected persons of the project area along with local community leaders and other stakeholders like RHD representatives, local government representatives were consulted through consultation meetings and personal contract. Stakeholders were informed about the meeting time and location ahead of time through personal contact and over telephone. Local people were also called by announcing in person and well as instantly through using hand microphone.

The consultants narrated the goal and objective of the project. Different components of the projects with proposed design of the bridge and roads were also discussed. Consultants also narrated the potential land acquisition status in the project area. GoB policy, Donors' policy including JICA policy on land acquisition and compensation were discussed in the meeting. The opinion of the different levels stakeholders regarding the project was considered during selection of the project area for improvement. Detail community level stakeholders consultation meetings were conducted in three locations and opinion of the stakeholders are recorded and incorporated in finalization of the project.

Stakeholders of the project area expressed their positive view regarding construction of the bridge provided the affected people should get appropriate compensation according to the present market price. However, during the initial level of discussion the stakeholders of expressed their strong resentment about the proposed plan of construction of new bridge in this location as well as proposed alignment of the access road. They proposed many options like shifting of the bridge location near the existing road network; bridge should be connected through existing road; existing road can be widened instead of acquiring new land to construct new access road etc. Many of them expressed social issues like bridge and roads are passing through private land, they are not in favor of giving up the land as previous experience of compensation receiving from government is not pleasant the proposed bridge will affect graveyard.

The inputs from the stakeholders meetings have been used to finalize the project, developed measures and principles for mitigation of loss on APs. Summary of consultation meetings with affected people and other stakeholders are described in Table 5.1.

**Table 5.1 Stakeholders Consultation (Issues and out-come) Phase I**

Sl. No.	Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Outcome of the discussion
1	9 July 2014, during conducting census and survey from 7 to 10 July 2014.	A total of three stakeholders meetings were held in the project area. People attended the meeting including farmer, homestead owner, service holder, community leader, RHD representative, Local government representatives (Chairman, member) etc. <i>People were consulted through Consultation meetings.</i>	Issue based discussion was held on community people's perception, attitude, needs and aspiration from the project. Following issues were discussed along with their raised issues: <ul style="list-style-type: none"> <li>- Knowledge of people about the project</li> <li>- Attitude of the people towards the project</li> <li>- Major problems relating to the project,</li> <li>- Proposed suggestion to minimize the problem</li> <li>- Identification of alternate location/alignment of the proposed bridge</li> <li>- Potential benefit of the project for the locality,</li> <li>- Need of the project, specifically the proposed bridge for that area</li> <li>- Relocation of houses and other establishments</li> <li>- JICA's Guidelines for Environmental and Social Considerations</li> <li>- Gender issues, especially the local practice/attitude about women working in construction site.</li> </ul>	<ul style="list-style-type: none"> <li>a. The bridge location should be downstream than that of the present location, near Kanchan bridge or Kanchan bridge can be used for the purpose instead of building new one;</li> <li>b. Wide and four lane bridge is required for better communication and transportation of the commodities;</li> <li>c. New bridge at proposed location can be constructed but existing road network through widening can be used instead of proposed new access road. This way land acquisition can be reduced.</li> <li>d. Proper compensation for land, crops, fishes etc. to be paid;</li> <li>e. Local people should be employed during construction of the new bridge irrespective of gender;</li> <li>h. Try to build the bridge and road on government khas land rather than on private land</li> <li>f. Facilities for using river water will be kept undisturbed for the community</li> </ul>

1<sup>st</sup> SHM-Chowari khola



2<sup>nd</sup> SHM-Teury



3<sup>rd</sup> SHM-Alua bazaar



Figure 5.1 Some photographs of consultation meetings.

### 5.3.2 Meetings Phase II

After finalization of the project location and completion of the detailed design, community level stakeholders consultations were held in the project site. A total of three stakeholders consultation meetings (Teury, Alua Bazar (Hannan Market) and Chowari Khola) were held on 19 August 2014. Stakeholders were informed about the meeting time and location ahead of time through personal contact and over telephone. Local people were also called by announcing in person and well as instantly through using hand microphone.

Process of land acquisition, DC's payment procedure, donors policy on involuntary resettlement, entitlements of the affected PAUs/HHs and vulnerable people, cut-off-date for listing property and probable resettlement benefits, etc. were discussed in the meetings.

The ARP design, compensation, relocation options, benefits and adverse social impacts were discussed with the affected persons and their community. Stakeholders were asked for their views on the project overall as well as more specific discussion about their perception on land acquisition process, compensation process, relocation requirements, and views on alternative options. Women and other vulnerable groups were also consulted concerning the specific project impacts and their livelihood aspects.

The inputs from the stakeholders meetings have been used to develop measures and principles for mitigation of loss on APs. Summary of consultation meetings with affected people and other stakeholders are described in Table 5.2.

Table 5.2 Stakeholders Meeting (Issues and out-come) Phase II

Sl. No.	Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Outcome of the discussion
1	On 19 August 2014	A total of three stakeholders meetings were held in three locations in the project area. People attended the meeting including farmer, homestead owner, service holder, community leader, RHD	Issue based discussion was held on community people's perception, attitude, needs and aspiration from the project. Following issues were discussed along with their raised issues: - Impact (positive and negative) of the project & mitigation measures against negative impact,	a. Entitlements of the affected people and cut-off-date for listing of the lost properties are known to the people b. Land price should be fixed on open market rate and compensation should be paid at their door step before displacement; c. Proper compensation

Sl. No.	Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Outcome of the discussion
		<p>representative, Local government representative Chairman/Member etc.  <i>People were consulted through Consultation, Group Discussion and personal contact.</i></p>	<ul style="list-style-type: none"> <li>- Policy of compensation and resettlement grants for land, crops, houses on private,</li> <li>-Discloser of the compensation packages for different kinds of losses. Additional assistance for the vulnerable and others were also discussed,</li> <li>- People's preference on mode of compensation payment</li> <li>- Relocation of houses and other establishments</li> <li>- JICA's Guidelines for Environmental and Social Considerations</li> <li>- Cut-off date for listing affected properties i.e. date of 2<sup>nd</sup> phase stakeholders consultation meeting (19 August 2014) for indirect EPs and notice under section 3 is for land owners.</li> <li>- Training and cash grant for vulnerable households, etc.</li> <li>- Gender issues, especially the scope of work for women in project civil work.</li> </ul>	<p>for land, crops, trees etc. to be paid  d. People will be encouraged for self-relocation for living within the kin groups with mutual support.  e. Access road could follow the existing road by widening it instead of acquiring private land  f. Access road can be constructed by following the flood protection embankment along the river on government land rather than private land  g. One very old graveyard is going to be affected, they do not want that  h. The affected household wants alternate land rather compensation money, it would be difficult to get alternate land in the locality and cost would be too high and beyond their buying capacity  i. Vulnerable APs will be preferentially employed in the civil construction of the project on the basis of their qualification and eligibility irrespective of gender.  j. Facilities for using river water will be kept undisturbed for the community  g. Training on some income generating activities should be provided to the poor.  h. People know their right and responsibilities at the</p>



Sl. No.	Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Outcome of the discussion
				initial stage of the project by FGD, consultation, information campaign, etc.

1<sup>st</sup> SHM-Chowari khola

2<sup>nd</sup> SHM-Teury

3<sup>rd</sup> SHM-Alua bazaar



Figure 5.2 Some photographs of consultation meetings-Phase II

### 5.3.3 Meetings Phase III

A total of three stakeholders consultation meetings (Bangabandhu Bazar, Hannan Market and Chowari Khola) were held on 24 November 2014.

Summary of consultation meetings with affected people and other stakeholders are described in Table 5.3.

**Table 5.3 Stakeholders Meeting (Issues and out-come) Phase III**

Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Outcome of the discussion
24 November 2014	A total of three stakeholders meetings were held in three locations in the project area. People attended the meeting including farmer, homestead owner, service holder, community leader, RHD representative, Local government representative Chairman/Member etc.	<ul style="list-style-type: none"> <li>- Impact (positive and negative) of the project &amp; mitigation measures against negative impact,</li> <li>- Policy of compensation and resettlement grants for land, crops, houses on private,</li> <li>-Discloser of the compensation packages for different kinds of losses. Additional assistance for the vulnerable and others were also discussed.</li> </ul>	<ul style="list-style-type: none"> <li>a. Local people want the bridge</li> <li>b. They proposed that the existing embankment road should be widened to build the approach/access road</li> <li>c. They will not allow road to be built by acquiring new lands inflicting damage to the lands and properties of the people and;</li> <li>d. If the authorities decide against their proposal they will oppose vehemently and organize agitations.</li> </ul>

**5.3.4 Meetings Phase IV**

One stakeholder consultation meeting was held on 06 February, 2015.

Summary of consultation meetings with affected people and other stakeholders are described in Table 5.4.

**Table 5.4 Stakeholders Meeting (Issues and out-come) Phase IV**

Dates of holding meetings	Type of Participants & Methodology	Issues Discussed	Outcome of the discussion
06 February 2015	Meeting was held in the Tumulia Union where locates in the project area. People attended the meeting including farmer, homestead owner, service holder, community leader, State Minister, RHD representative, Local government representative Chairman, Member of Tumukia Union etc.	<ul style="list-style-type: none"> <li>- Alternative routes for bridge and access</li> <li>- Discloser of the compensation packages for different kinds of losses.</li> <li>- Methods of restoration the livelihoods</li> <li>- Methods of land acquisition and resettlement monitoring</li> </ul>	<ul style="list-style-type: none"> <li>a. Compensation is a replacement cost based on a market price</li> <li>b. Payment will be made to avoid Middlemen/Agency</li> <li>c. Compensation package should be circulated before acquisition</li> <li>d. Suitable land area to build house for displaced people will be considered</li> </ul>

Thus, APs have agreed with the EZ Bridge and access road construction.

#### **5.4 Mechanism for Stakeholders' Participation**

During the preparation of the ARP, APs and their communities have been informed, closely consulted three times, during bridge identification and selection, during conducting socio-economic survey and during disclosure of ARP entitlements, other options and declaration of cut-off dates and encouraged to participate in the discussion and project preparation. This process will be continued during detail design, implementation and monitoring of the ARP. Consultation and communication with APs and other stakeholders during design stage of the project will be an integral part of the process of gathering additional data.

Consultation is a continuous process and will also be carried out during updating of the ARP, as well as during implementation and monitoring. During the implementation stage, Resettlement Advisory Committees (RACs) will be formed to seek cooperation from various stakeholders in the decision-making and implementation of the ARP. Through public consultations, the APs will be informed that they have a right to grievance redress from the RHD. The APs can call upon the support of ARP Implementing Agency (IA)(NGO or Social Consulting Firm) to assist them in presenting their grievances to the GRCs. The GRCs will review grievances involving all resettlement benefits, relocation and other assistance. Two grievance redress committees (GRCs) will be formed at union level in two Upazillas at two end of bridge and the grievances will be redressed within a month from the date of lodging the complaints. The GRC as well as the JVT and PVAT will be formed by the Ministry of Communications and activated during land acquisition process to allow APs sufficient time to lodge complaints and safeguard their recognized interests.

The areas for participation of the primary stakeholders include: (i) identify alternatives to avoid or minimize resettlement; (ii) assist in inventory and assessment of losses; (iii) assist developing alternative options for relocation and income restoration; (iv) identify relocation sites for displaced households; (v) provide inputs for entitlement provisions; and (vi) identify likely conflict areas with resettlers.

#### **5.5 Disclosure of the ARP**

Project design, impact and policies for mitigation of adverse social and environmental impacts have already been disclosed to the affected community through consultation meetings. This information will be disclosed to the corridor of impact (COI) area people particularly the affected persons in other different forms. An information booklet will be designed in *Bengali* and after getting approval of the government, will be distributed among the affected persons during ARP implementation as the primary tool for disclosure. Disclosures will also be continued using the following other instruments:

- Community workshops;
- Information brochures;
- Information in focal points at district, Upazilla and union levels;
- Information pamphlets;
- Personal contact; and
- Village level meetings.

In case of change in Project design thereby entailing change in resettlement impacts, this ARP will be updated. The updated ARP will be disclosed to the APs, endorsed by the EA. The updated ARP will be submitted to Co-financier for approval prior to award of civil works contracts for the Project.

#### **5.6 Strategy for Community Consultation and Participation during implementation**

RHD will continue the consultation process during the implementation of the ARP. Resettlement-related brochures, leaflets and other communications materials in the local language (*Bangla*) will be published for distribution among the affected households. Further steps will be taken to (i) keep the affected people informed about additional land acquisition

plan, compensation policies and payments, resettlement plan, schedules and process, and (ii) ensure that project-affected persons are involved in making decisions concerning their relocation and implementation of the ARP. The consultation and participation will be instrumented through individual contacts, FGDs, open meetings and workshops. The larger goal of this plan is to ensure that adequate and timely information is made available to the project affected people and communities and sufficient opportunities are provided to them to voice their opinions and concerns and participate in influencing upcoming project decisions. In sum, consultation will remain a hallmark in the project implementation processes. The consultation meetings, issues discussed and outcomes and subsequent follow-up actions will be recorded for future verification.

The main themes and scope of the ARP will be disclosed in detail to the affected community, after it has been approved and translated into Bangla. The ARP's provisions will be further explained to APs in group discussions, personal contact and community level meetings during implementation of the ARP. An English version will be uploaded to RHD's website.

This ARP will be summarized in an information booklet in local language (Bengali) and disclosed to APs during implementation of the ARP after it has been reviewed and approved/endorsed.

The Implementing Agency (IA)(NGO or Social Consulting Firm) engaged to assist RHD in implementation this ARP, will update, publish and distribute the booklet explaining the impact of the project, compensation policies for APs, resettlement options/strategies for households, and tentative implementation schedule of the project. Further steps will be taken to (i) keep the affected persons informed about land acquisition plan, compensation policy and payments, and (ii) ensure that APs will be involved in making decisions concerning relocation and implementation of the ARP.

#### **5.7 Eligibility of Cut-off Date**

Service of notice under Section 3 of the Acquisition and Requisition of Immovable Property Ordinance 1982 will follow as the cut-off date for legal owners of property to be acquired. First round consultation meeting, the census & socio-economic survey has been conducted during 7 to 10 July 2014. Second round consultation meetings were held on 19 August 2014. During the second round consultation meeting disclosures of the entitlements have been done and cut-off dates for eligibility of compensation have been declared during these meetings. The date of second round consultation meeting is 19 August 2014, is the cut-off date for establishing eligibility for resettlement assistance by all the APs staying on the others/public lands (Uthulies/Squatters) (if any) of the project. During implementation of the project, the RHD will issue ID card to the entitled persons after joint verification done by JVT with all details of their entitlements as per ARP.

## 6 RELOCATION RESETTLEMENT AND INCOME RESTORATION

### 6.1 Scope of Displacement and Relocation

According to the census & SES data, implementation of the project will require to affect 39 households living on their own land. All these households are going to be displaced for intervention of this project. The affected households are encouraged for self- relocation. The project may provide some civic amenities to the EPs if they relocate in cluster manner. It is mentionable that there are about 12,259 trees of different species and sizes are enlisted within the private land within the Col. Total 81 structures are going to be affected with total structure quantity of 3,709 sq. m. Among the affected housing structures most of them are made of CI sheet (38.74%) followed by semi-pucca (34.73%) and pucca (18.39%) structures and only 8.14% are katcha made of wood/bamboo. Figure 6.1 shows the type of structure used by the households.

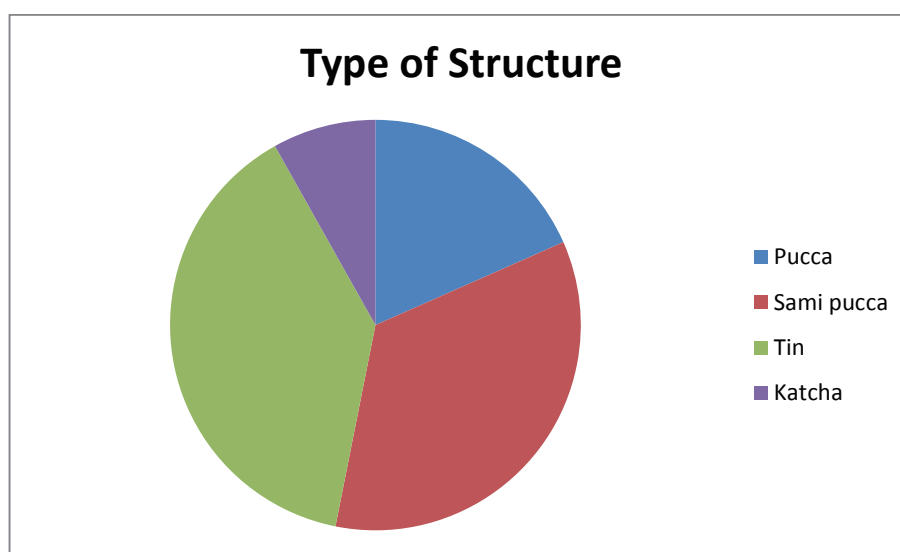


Figure 6.1 Type of structures used by the affected Households

### 6.2 Relocation of Housing and other Establishment

The project is taking land for construction bridge and bridge approach and bridge access roads for facilitating easy communication between Special Economic Zone (SEZ) and national highways and poverty reduction. A total 39 households will need to be relocated due to the project with structures amounting total quantity of 3,709 sq. m. The project will therefore encourage "self-relocation" by affected households selecting replacement homestead land in the vicinity of their own. The objective is to minimize social disruption in the resettlement process and allow people to remain together within kin groups for mutual support.

#### 6.2.1 Site Selection

Minimal social disruption is the main objective of the project. The affected households are small in number. People will be encouraged for self- relocation with appropriate assistance. As a result project will not develop any site for relocation of the affected households. The project might provide some infrastructure facilities if the APs are relocated in cluster manner.

If possible, the project authority may request concern authority for allocation of khas land for relocation of the affected households in cluster manner.

### **6.2.2 Housing infrastructure**

It is observed that among the affected residential infrastructures majority of them are tin made followed by semi-pucca and pucca structures. Only few of these are katcha structure. Figure 6.1 illustrates the type of residential structures going to be affected. The structure losers are going to receive compensation for the affected structure according to current market price as well as assistance for relocation and rebuild the structure by the AP on his/her own chosen location.

### **6.2.3 Changing School**

It is understood from the socio-economic survey and consultation meetings that the affected households will move within the vicinity of their earlier location. They prefer to remain with the kin group and continue their earlier occupation. As these households are not moving very far but within vicinity, it is understood that the children can continue their education in same school. Project will not trigger any situation which might need to change their school.

### **6.3 AP Preference for Relocation**

During the census survey as well as in public consultation and FGDs, the relocation choices of the affected persons were asked. The households to be relocated are homestead loser prefer to remain in the adjoining area of the project location to continue their present occupation. Almost all are demanding financial assistance from the project during relocation. Therefore the APs are encouraged for self-relocation to get mutual support of the kin groups.

### **6.4 Replacement of Agricultural Land**

There are AHs that will lose private land, agriculture and non-agriculture land. The project will not arrange any alternate land for loss of land but will encourage the APs to buy alternate land. The AHs will not get any replacement land but will be paid cash compensation at replacement cost at current market value of the land. The stamp duty and registration cost for purchasing a replacement land will be handed over with the replacement cost of the land. In case of agriculture land DC will compensate for lost crops and trees at the rate estimated by the Department of Agriculture Extension (DAE) and the Department of Forest (DOF) and confirmed through consultation and market appraisal.

### **6.5 Income and Livelihood Restoration Strategy**

Mitigation of loss of assets and livelihood is the main focus of the resettlement plan. Additional measures will be taken to provide appropriate support to the livelihood restoration aspects of AHs. AHs will lose access to agricultural land, adequate compensation will be awarded to these AHs before relocation. In addition, vulnerable APs will receive other support and also get preference for employment in civil construction works.

In compliance with the ARP, the updated ARP will identify resources, in addition to compensation, for income restoration assistance. This will be through linking resettlement activities with a Livelihood and Income Restoration Program (LIRP). Social Development fund is being allocated in the budget to organize and provide livelihood restoration training for the vulnerable household head or any household member nominated by the head.

The ARP includes the following categories of AHs for income restoration and livelihood support:

- i.) Vulnerable households to be relocated from the project Corridor of Impact (Col). Eligible members of such family will be identified during planning the LIRP.
- ii.) Vulnerable households having no adult male members to shoulder household responsibility (women headed households). The women heading the household will preferably be the eligible member.

- iii.) Vulnerable households losing access to agriculture land including sharecropper, and leaseholders.
- iv.) Vulnerable households losing more than 10% of their agricultural income due to acquisition of agricultural land.

For additional support to usual income restoration assistance as mentioned above, the ARP Implementing Agency (IA) will specifically undertake assessment of needs and skill base of vulnerable APs of age between 15 to 60 years. The IA (NGO or Social Consulting Firm) will recommend the eligible members of affected vulnerable households with their relevant profile to the LIRP implementing organization through RHD. The short-term livelihood regeneration assistance under the ARP and long-term income generation program under the LIRP will be organized as follows:

**Table 6.1 Livelihood Restoration Options**

1. Eligible members of poor households to be relocated from the project right of way.	1.1 Short-term: Compensation for structure, shifting allowance, reconstruction assistance, cash assistance for loss of workdays due to relocation, and priority in employment in construction.  1.2 Long-term: Needs and capacity identification, human development and skill training, institutional support under the LIRP.
2. Eligible members from poor female headed households having no adult male members to shoulder household responsibility.	2.1 Short-term: In addition to support as 1.1, additional subsistence allowance.  2.2 Long-term: As 1.2 above.
3. Eligible members of poor households losing access to agriculture land including sharecropper, and leaseholders.	3.1 Short-term: Compensation for crops.  3.2 Long-term: As 1.2 above.
4. Eligible members of poor households losing more than 10% of their agricultural land.	4.1 Short-term: Compensation for crops, replacement value of land, assistance for land purchase, and employment in construction.  4.2 Long-term: As 1.2 above.

### 6.6 Capital Support

Funds for income restoration programs become a major constraint to the project affected people utilizing their skill obtained/enhanced through IGA training. Capital support for potential income generation activities to the trained and efficient target group people will therefore be provided from any source i.e. local level NGO, banks, etc. arranged by the development project in the form of grant/credit.

### 6.7 Employment in Construction

Local people whose livelihood is impacted by the project will get preference in jobs associated with the project construction. Female affected people will form labor contracting society (LCS) with the help of RHD through the Implementing Agency (IA) and be deployed by the Contractor in road slope turfing, watering, tree plantation etc. or any other suitable works. Affected persons will get preferential employment in project civil works based on their

eligibility. The jobs, in the semi-skilled and unskilled category, shall be offered to the APs in preference to the other. A clause should be incorporated in the contract documents requiring contractors to give employment, if available, to project affected people having EP ID cards in preference to other persons.

#### **6.8 Re-Establishment of Common Property Resources**

According to the census and socio economic survey the project is not going to affect any common property resources. However, any CRP identified to be affected during implementation of the project will be repaired or reconstructed. For repairing or re-establishment of the affected CPRs the community people will be consulted. The management committee of these CPRs will be consulted to identify the mechanism of repair or re-establishment of the CPRs. The management committee can be given a financial support to re-establish the CPR in their desired location under their own management or project can re-establish the CPR with cooperation from the community in their preferred location.



## **7 IMPLEMENTATION ARRANGEMENTS**

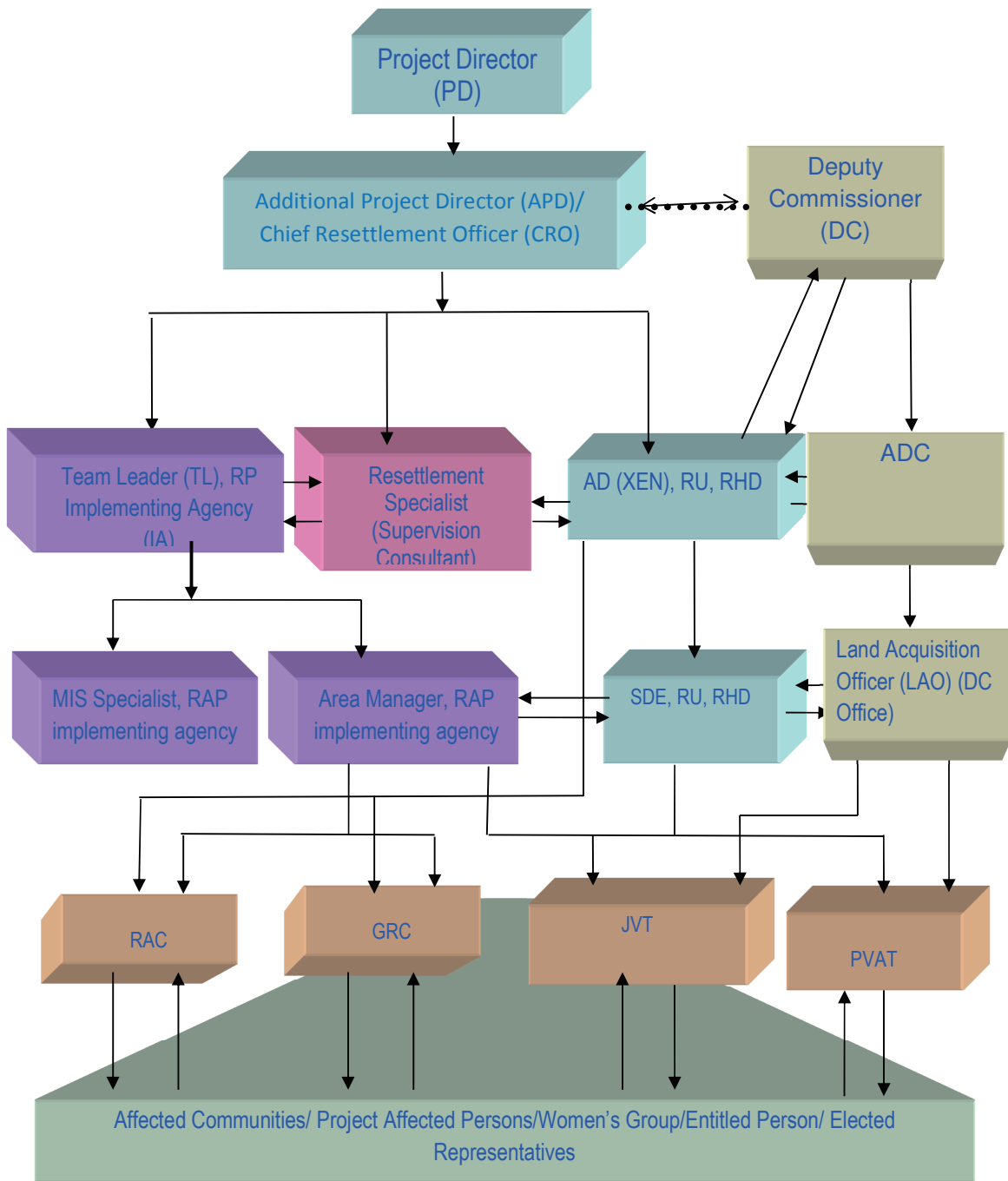
### **7.1 Roads & Highways Department (RHD)**

Roads & Highways Department will establish, for the Project, a Project Management Unit (PMU) headed by a Project Director (PD), at the project office that will be responsible for the overall execution of the Project. The PMU will consist of three units namely Engineering Service Unit (ESU), Environmental Management Unit (EMU) and Resettlement Unit (RU) for total implementation of the project. The PD will work on deputation from RHD at the level of Superintendent Engineer or Additional Chief Engineer. The project will be overseen by the PD, RHD. One implementation committee will be formed to provide overall guidelines and cooperation for project implementation and keep liaison with various stakeholders including Donor, different government organizations and other relevant agencies.

The PD will recruit and appoint an experienced NGO or Social Consulting Firm which will be called as Implementing Agency (IA) as required for implementation of resettlement activities. RHD will implement the ARP through setting a Resettlement Unit (RU) within the PMU. The RU, under the overall responsibility of the Additional Project Director (DPD) / Chief Resettlement Officer (CRO), will undertake day-to-day activities with the appointed Implementing Agency (IA) and Resettlement Specialist/ Supervision Consultants.

The appointed Implementing Agency (IA) will open field office, carry out information campaign and involve affected persons including women in the implementation process from the very beginning. The Implementing Agency (IA) will collect, collate, computerize and process data for identification of eligible persons correctly for resettlement benefits and assess their entitlements as per ARP policy. However, the RU will affect the payments after necessary scrutiny. The Additional Project Director/Chief Resettlement Officer (RU) in charge of the land acquisition and resettlement management will report to the Project Director. He/she will work in close coordination with the respective field-based offices and Implementing Agency (IA) on the day-to-day activities of the resettlement implementation.

The DPD/CRO through the field officials and staffs, LA Office and the Implementing Agency (IA) will execute and monitor the progress of the LA and ARP implementation work. He/she will ensure coordination between the relevant departments, Implementing Agency (IA), the GRC, RAC, PVAT and the Project affected people (APs). Apart from the GRC, Joint Verification Team (JVT) for quantification of affected properties and Property Valuation Advisory Team (PVAT) will be formed by the Ministry of Communications for valuation of affected property and resolution of disputes. The composition and formation of committees and mechanisms for quantification and valuation of properties and grievance resolution will be constituted through government gazette. People's participation will be ensured through recruiting their representatives in these committees. The mechanism of implementation and organization/position involved in the implementation process is shown in Figure 7.1.



**Figure 7.1 ARP Implementation Organogram**

**7.2 Responsibilities of Resettlement Unit Officials**

CRO will be the head of RU and coordinate all land acquisition and resettlement issues with Assistant Director (AD) RU, IA, Consultant, DC office, Contractors and all stakeholders with assistance from other RU officials and staffs including two Sub Divisional Engineers (SDE). CRO will come from RHD on deputation of the position of at the level of Superintendent Engineer/Additional Chief Engineer.

AD will be responsible for all land related issues and all kinds of resettlement issues (compensation, relocation, and rehabilitation etc.) for all the EPs of the project. AD will keep close liaison with DC office, will be the chairperson of GRC and RAC to be formed for the project area. AD will maintain close liaison with CRO, IA, Consultant, Contractor and other stake holders of the project. AD will come from RHD on deputation of the position of Executive Engineer.

AD will make compensation; approve indents made by IA for payment to EPs with consultation of CRO. The payment will be done through SDE in the project area. Cheques for the EPs will be signed by AD. IA will assist SDE in preparation of payment Debit Voucher and other required papers. SDE will keep close liaison with the Area Managers of the IA and the EPs in the field level and assist AD in all relevant issues for smooth implementation of the Land Acquisition and Resettlement program. SDE will be the convener of JVT and PVAT to be formed for this assigned area. SDE will come from RHD on deputation of the position of Sub Divisional Engineer.

Institutional Responsibilities in Resettlement Process is shown in Table 7.1.

### **7.3 Functional Description**

#### **7.3.1 Role of Deputy Project Director (DPD)/Chief Resettlement Officer (CRO)**

The DPD/CRO for land acquisition, resettlement and rehabilitation will perform the following activities (Table 7.1).

- Implement the resettlement program according to and in agreements with the Donor.
- Formulate necessary policy, administrative and financial decisions and actions necessary for the successful implementation of the program in consultation with GoB.
- Timely release of funds to the DC and the Resettlement Unit (RU) necessary to implement the Land Acquisition and Resettlement program according to the approved implementation schedule.
- Delegate responsibility and powers to the other resettlement officers as required for smooth implementation of the ARP.
- Prepare Terms of Reference for a "Post-Resettlement Survey", select and appoint an appropriate agency to execute these survey(s).
- Propose RHD any remedial action based on the Post-Resettlement Survey.
- Pay additional grant for replacement land purchase, house/business establishment construction grant, and dismantling and removal assistance and all other assistances in cash or kind stipulated under the resettlement policy to all the eligible PAPs.
- Update Land Market Survey to determine the replacement cost of land in and around the project area and accordingly recommend Replacement Value (RV) for replacement land purchase.
- Negotiate with Contractors for arranging employment for PAPs in project construction works.
- Study and monitor unforeseen adverse effects during and after construction and take necessary mitigation measures.
- Liaise with other government and non-government agencies in the country on matters of mutual interest related to resettlement, etc.

#### **7.3.2 Role of Assistant Director (AD): Resettlement**

AD, RU will basically be the field level implementing officer of the Resettlement Unit. He/She will be responsible for the overall implementation of all field level activities related to resettlement (Table 7.1). This would include:

- Keep liaison with LAO for timely compensation of CCL.
- Issue ID Cards to all eligible Entitled Persons (EPs).
- Will attend and chair the meetings of GRC /RAC in all the unions of two Upazilla on two sides of the river of the project area.

- Arrange and provide all necessary assistance to EPs for purchase of replacement land.
- Ensure that all structure-losing HHs are evacuated and relocated on time and are provided with transportation assistance in cash.
- Ensure timely entries of the losses identified and benefit accrued into the Entitlement Cards manifesting the benefits given to PAPs.
- In consultation with DC and local leaders, organize meetings in host area villages to persuade and encourage the host population to provide replacement lands to PAPs.
- Provide various cash grants planned under the ARP to entitled persons, and ensure that transfer of these grants are made according to the system described in ARP.
- Liaise with the IA for the implementation of information campaign, IGA Training, and other activities delegated to them.
- Keep close contact and liaison with CRO, DC, IA and Consultants and submission of monthly/quarterly field progress report.
- Perform effective management and timely implementation of the directives.
- Participate in all the activities and meetings of the Resettlement Committees.
- Issue the Cheque to EPs.
- Keep all records in electronic data base.

**Table 7.1 Institutional Responsibilities in Resettlement Process**

<b>Related Activities and Responsibilities</b>	<b>Responsibility</b>
<b>A. Preparation of Updated ARP</b>	
Preparation of land acquisition plans	RHD/Eng Firm
LA process and land acquisition	DC/RHD
Recruitment of National Resettlement Specialist (NRS)	RHD/Donor
Recruitment of Implementing Agency	RHD
Design and reproduction of ARP Information Brochures	RHD/NRS
Disclosure and public consultations	RHD/IA
Selection of members for resettlement advisory bodies	RHD/IA
Carry out joint verification survey	JVT
Market survey on prices of lands, structure, crops and trees.	PVAT
Establishment of unit prices	PVAT/RHD
Assessing AHs to be relocated and any vulnerable APs	IA/RHD/NRS
Determination of entitlements and consultations with individual APs	RHD/IA
Consultation of ARP to EA, APs and stakeholders	NRS/RHD
Concurrence on ARP	RHD
Approval of ARP	RHD
<b>B. ARP Implementation</b>	
Mobilization of GRC	RHD/IA
Establishment of internal monitoring	MOC/DC/RHD
Budget approval for compensation and resettlement	RHD
Release of funds for compensation	RHD
Filing and resolution of complaints of APs,	RHD/GRCs/IA
Assess needs,	RHD/IA/APs
Consultation with APs on schedule of clearing the lands	RHD/IA
Clearing of lands	APs
Confirmation of "No Objection" for the award of civil works contract	RHD
Relocation and livelihood restoration assistance	IA/RHD/LIRP
<b>C. Monitoring and Evaluation</b>	
Internal monitoring	RHD/NRS/IA
Independent external monitoring and evaluation	RHD

## **7.4 Other Agencies Involved in the Process**

### **7.4.1 Deputy Commissioner**

The DC has the power to acquire land and to assess compensation of property thus acquired. The 1982 Ordinance provides the power to the DC, who conducts the acquisition through the Land Acquisition Officer (LAO) of concerned districts. The LAO (or his/her officers) along with RU/RHD and IA staff will conduct joint physical verification of property on the land in accordance with the Land Acquisition Proposal (LAP) to be submitted by RU/RHD as soon as the detailed design and alignments for the project interventions will be available.

The DC office is responsible for the entire acquisition process from notification to affected households to award of compensation to owners of property and payments of compensation. Upon fulfillment of criteria of the LA office (i.e. necessary documents to make payment) the LA officials will prepare Cheque and disburse to the EPs in the concern Union office in presence of the UP Chairman issuing prior notice to the concern EPs. RHD and IA officials shall liaise with concerned DC offices to complete the land acquisition process in a timely fashion. However, the LAO will prepare estimates of LA and request placement of fund from the RHD. RHD will place fund with DC within 60 days' time limit from the date of claiming fund from DC.

### **7.4.2 Project Supervision Consultant**

There will be provision for National Resettlement Specialist (NRS) as part of the Consultants supervising the implementation of the Project. He/She will be involved for full period of ARP implementation. The resettlement specialist will provide technical support to RU and supervise & review the field activities of the ARP Implementing Agency in collaboration with the Resettlement Unit of RHD.

### **7.4.3 Implementing Agencies**

RHD will engage an experienced Implementing Agency (IA) for implementation of the ARP in the field level in coordination with the DC, RHD and consultants. The Implementing Agency (IA) will be engaged to assist the supervision consultant for updating of ARP during detailed design phase and will be continuing for implementation of the ARP. RHD, the EA will contract out clearly defined tasks of the ARP implementing agency in detailed Terms of Reference such as consultation /public information campaign for rapport building, issuance of ID cards to EPs, payment of eligible benefits to affected households/ individuals, institutional development, skill training/management training, community awareness and empowerment, etc. The IA will initially create ID number for each affected person as identified during Joint Verification survey by JVT for both title and non-title holder. If the entitled person (EP) is not included in joint survey report but awarded newly based on ownership documents of the property by DC during CCL payment, the IA will create new ID for them. The ID card will be prepared for EPs as identified by the DC and/or Joint Verification Survey (JVS) by the implementing agency and issued with joint signature of the SDE of RU and Area Manager of the Implementing Agency. Photograph of the EPs will be attested by the concerned UP Chairman and pasted on the ID card or digital photo will be attached in the ID card and concerned Chairman will sign on it. The ID card will comprise information on name, father's/husband's name, mother's name, age, education, identifiable marks, detail address, details of quantity of losses etc. The sample of ID card will be prepared by IA and approved by EA.

The Implementing Agency (IA) will assist the APs in preparing record of rights to the property and receive Compensation under Law (CCL) from DC office. They will form focus group with the affected people based on homogeneity and/or nearness and hold meetings on regular basis to let them know their right and entitlements as prescribed in the ARP, updating of record of rights (RoR), opening of bank account, process of receiving cash

Compensation under Law (CCL) from DC office and additional payments/ grants from RHD through IA etc.

The implementing agency will form Union based Resettlement Advisory Committee (RAC) to involve the local communities and APs in the implementation process.

Implementing Agency will have to establish an MIS section in their central office for record keeping of the APs, creating individual ID number of the entitled persons, preparing entitled person's (EP) file based on quantity of losses and entitlement card (EC) based of loss type and budget.

Upon fulfillment of criteria i.e. necessary documents to make additional payment/grants to the EPs the IA will prepare payment debit voucher & other documents and disburse account payee Cheque to the EPs. The payment debit voucher will be jointly signed by the SDE, IA representative and UP Chairman. Prior notice will be issued to the concerned EPs on relevant issues. The consultants updating the ARP during detail design stage will also prepare and attach detailed Terms of Reference for ARP implementing Agency.

#### **7.4.4 Ministry of Communications (MOC)**

The Ministry of Communications, through a gazette notification, will form various committees/teams for implementation of the ARP at the field level. The implementing Agency will work as member secretary of all the committees/teams involving representatives from DC, RHD, Local Government Institutes (LGI) and APs. These committees/teams will ensure stakeholders' participation and uphold the interest of the vulnerable APs. The powers and jurisdictions of the committees will be clearly defined in the gazette notification.

#### **7.4.5 Joint Verification Team**

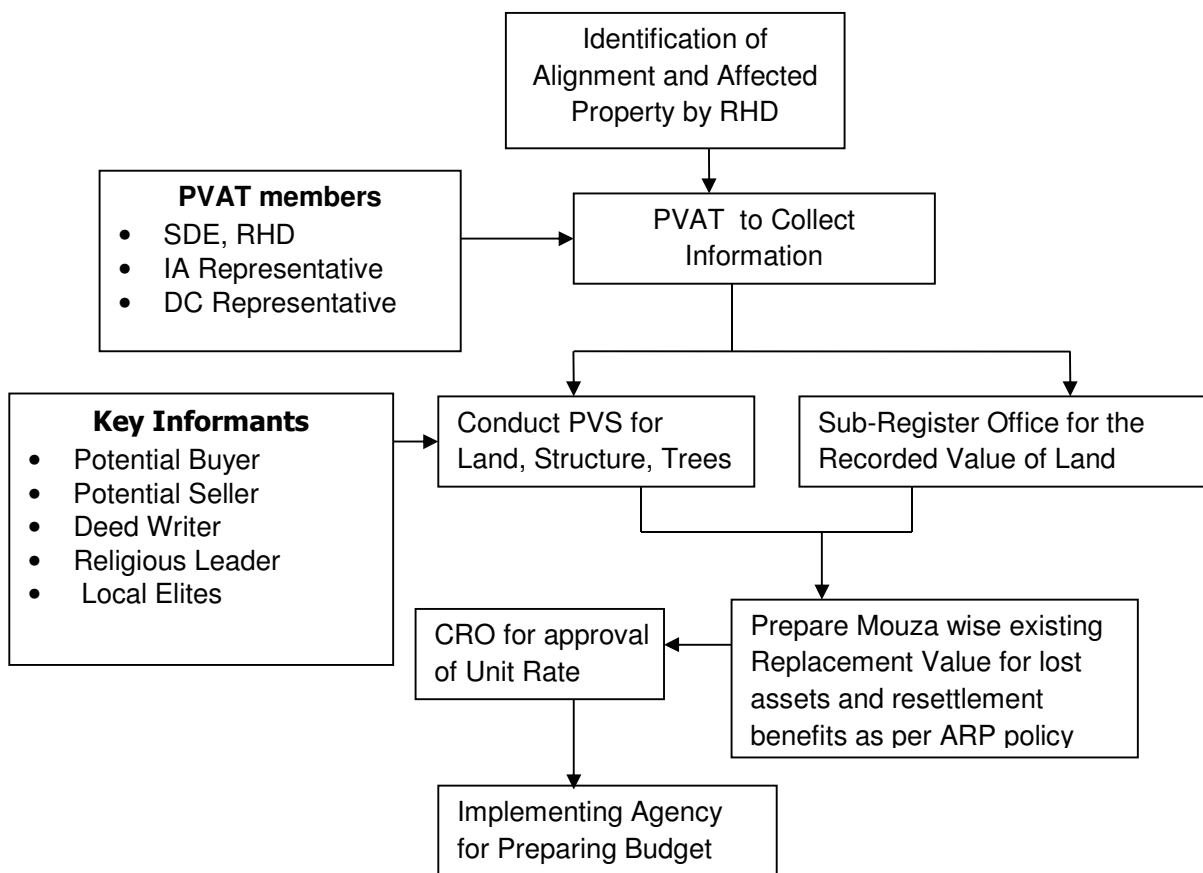
The MOC will form a Joint Verification Team (JVT), for the project through a gazette notification to compare and review the physical verification data conducted by Implementing Agency with the DCs' assessment of loss of physical assets and their owners. The scope and responsibility of the JVT will be clearly defined in the gazette. The implementing Agency will process the entitlements of the project-affected persons using the JVT data as one of the determinants. The JVT will be a three-member body and be comprised as:

- Sub-Divisional Engineer or equivalent, RHD - Convener
- LAO or his/her designated representative of concerned district – Member;
- Area Manager, ARP Implementing Agency – Member secretary;

#### **7.4.6 Property Valuation Advisory Team**

A Property Valuation Advisory Team (PVAT) will be formed by the MOC through a gazette notification for the project. The PVAT will review the assessment of the implementing agency on the market price of land and other property affected by the project at their replacement cost. The scope and responsibility of the PVAT will clearly be defined in the gazette. The Implementing agency will process the entitlements of the project-affected persons using the PVAT data as one of the determinants. The PVAT will be comprised as:

- Sub-Divisional Engineer or equivalent, RHD - Convener
- LAO or his/her designated representative of concerned district – Member
- Area Manager, ARP Implementing Agency – Member secretary;



**Figure 7.2 Procedure of Determining Valuation of Property**

#### 7.4.7 Grievance Redress Committees

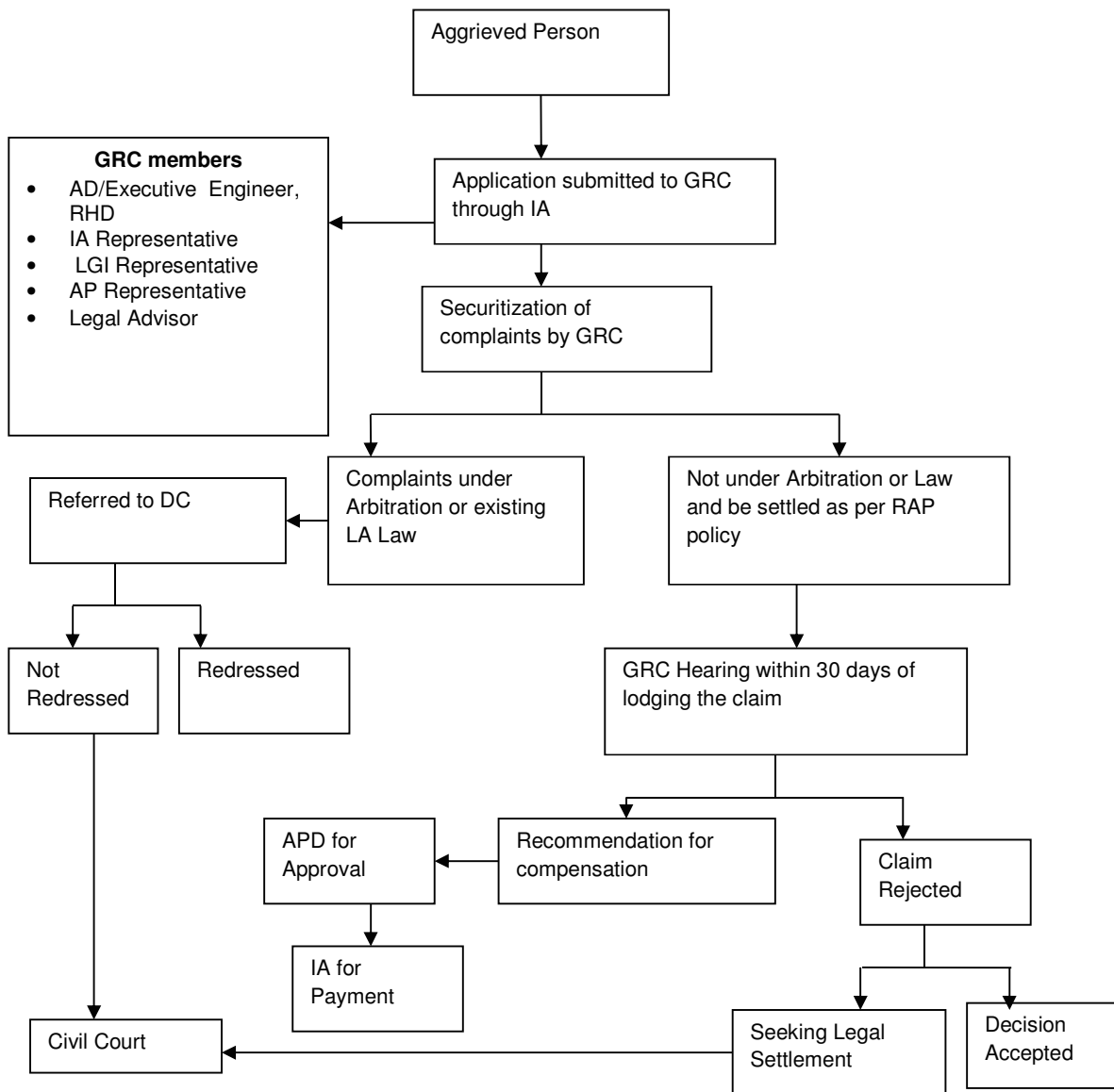
GRCs will be formed at Union level for any grievances involving resettlement benefits, relocation, and other assistance. A gazette notification on the formation and scope of the GRCs will be required from the MOC. The GRC for each Ward will be comprised as

- Executive Engineer, RHD - Convener
- Area Manager, ARP Implementing Agency, member secretary.
- UP Chairman - member.
- One representative of APs – member
- One UP member (female)- Member

**Table 7.2 Grievance Redress Procedures**

Step 1	The Implementing Agency informs DPs/APs about their losses and entitlements If satisfied, the DP/AP claims resettlement payments to the EA. If confused,
Step 2	The DP/AP approaches the IA field level officials for clarification. The IA will clarify the DPs/APs about their losses & entitlements as per ARP.  If resolved, the DP/AP claims resettlement payments to the EA. If not resolved,
Step 3	The DP/AP approaches to the GRC. IA staff assists the DPs/APs producing the complaints and organize hearing in 15-21 days of receiving the complaints.
Step 4	GRC to scrutinize applications, cases referred to DC through EA if beyond their mandate as per scope of work
Step 5	If within the mandate, GRC sessions held with aggrieved DPs/APs, minutes recorded.  If resolved, the Project Director approves. If not resolved,
Step 6	The DP/AP may accept GRC decision, if not, he/she may file a case to the court of law for settlement.
Step 7	The GRC minutes, approved by the Project Director, received at Conveners' office back. The approved verdict is communicated to the complainant DP/AP in writing. The DP/AP then claims resettlement payments to EA





**Figure 7.3 Grievance Redress Mechanism**

#### **7.4.8 Resettlement Advisory Committee (RAC)**

The implementing Agency will form Union based RAC at project level to involve the local communities and APs in the implementation process. The RACs will be comprised of AD/XEN, RHD as the convener/chair, Area Manager, implementing agency as member secretary, UP Chairman, Female UP member and APs representatives (2) including at least one female AP in the respective area as selected by Implementing Agency in consultation with the concerned UP Chairman. The committees will seek local inputs from the affected people and communities in the implementation process and assist the implementing agency in all matters related to resettlement. The RACs will ensure local participation in the implementation of the resettlement plan.

#### **7.4.9 Women Groups in Resettlement Process**

The ARP implementation will ensure a gender sensitive approach in planning, management and operations of land acquisition and resettlement. Separate groups of women affected persons will be formed and operated by the implementing agency. Feedback from the female APs and female headed AHs will be obtained through these female focused groups for planning relocation and resettlement. The female members of the households will get special considerations in getting job opportunities in civil construction.

The female staff engaged by implementing agency will identify needs of female APs for income restoration approaches and implementation of the income restoration component of the ARP. Women were consulted during social appraisal and will be further consulted during the review of the ARP after the detailed design and in the process of implementation.

#### **7.5 Appointment of Implementing Agency (Non - Government Organization (NGO) or Social Consulting Firm)**

RHD will appoint an experienced Implementing Agency through standard procurement system. The IA can be a Non-Government Organization (NGO) or Social Consulting Firm. This IA will be appointed for implementation of the ARP in the field level in coordination with DC, RHD and National Resettlement Consultant (NRS). The EA will contract out clearly defined tasks of the ARP with details Terms of Reference. A TOR is attached in **Annex III** of this document for the implementing agency.

#### **7.6 Community (Stakeholders) Participation in ARP Implementation**

During the implementation of the ARP, APs and their communities will be informed, closely consulted, and encouraged to participate in the process. This process will be continued until completion of the implementation of ARP as well as in monitoring stage.

During the implementation stage, Union based Resettlement Advisory Committees (RACs) will be formed to seek cooperation from various stakeholders in the decision-making and implementation of the ARP. Through public consultations, the APs will be informed that they have a right to grievance redress from the RHD. The APs can call upon the support of ARP Implementing Agency (IA) to assist them in presenting their grievances to the GRCs. The GRCs will review grievances involving all resettlement benefits, relocation and other assistance. Union based grievance redress committees (GRCs) will be formed and the grievances will be redressed within a month from the date of lodging the complaints. The GRC as well as the JVT and PVAT will be formed by the Ministry of Communication and activated during land acquisition process to allow APs sufficient time to lodge complaints and safeguard their recognized interests. Host area villagers will be the part of ARP implementation by joining the meetings organized the AD in consultation with the DC to persuade and encourage the host population to provide replacement lands to PAPs.

The areas for participation of the primary stakeholders include: (i) identify alternatives to avoid or minimize resettlement; (ii) assist in inventory and cross check in assessment of losses; (iii) assist developing alternative options for relocation and income restoration; (iv) provide inputs for entitlement provisions; and (v) identify likely conflict areas with resettlers; (vi) Identify livelihood restoration options and participate in the concern training.

## **8 RESETTLEMENT AND COMPENSATION COSTS AND BUDGET**

### **8.1 Budgeting and Financial Planning**

All resettlement funds will be provided by the EA based on the financing plan agreed by the Government of Bangladesh and JICA. Land acquisition, compensation, relocation and rehabilitation of income and livelihood will be considered as an integral component of project costs. The rehabilitation and training to the potential affected persons will be provided under the LIRP based on vulnerability and needs assessed through a special census and consultation exercise.

The estimate for land acquisition by the DC will be prepared by his/her LA section and placed to the RHD for transfer of the fund to the account of the DC. The additional benefits as per the policy will be paid by the EA through Implementing Agency (IA). However, the Implementing Agency (IA) will assess the quantity of losses and the eligible persons for resettlement benefits and produce a resettlement budget to RHD for approval and periodic release.

The RU of RHD will ensure that the land acquisition and resettlement budgets are delivered on time to the DC and the Implementing Agency (IA) account for payment of compensation for land, structure, trees and crops and other assets on privately owned land and resettlement grants. The RU will also ensure that the ARP should be submitted to JICA for approval, and that fund for compensation and entitlement under the ARP are fully provided to APs prior to the award of the civil work contract.

The ARP budgets for compensation for land, structures, other assets, crops and trees, and special assistance will be calculated using the market rates reflecting replacement cost at the time of dispossession. The costs for relocation and special assistance will be consistent with the resettlement policy. Other costs involving project disclosure, public consultations and focus group discussions, have been included in the ARP budget under 'Operation cost for IA' head. On the other hand training on IGA will be organized under Livelihood and Income Restoration Program (LIRP). Budget has been allocated for the purpose. There is also a budget allocation for 5% as contingency.

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## **8.2 Assessment of Unit Value for Compensation**

For preparation of an indicative budget as integral part of the Abbreviated Resettlement Plan, the methodologies followed for assessing unit compensation values and grants of different items is as follows:

- Land has been valued at replacement cost based on current market price determined by collection of data from interviewing land owners and mouza rates collected from Sub-register office.
- Houses/buildings have been valued at replacement cost based on cost of materials, type of construction, labor, and transport and other construction costs. Experience and best practices from other development project have been applied in this regard.
- Trees have been valued based on age and girth category (a. large b. medium c. small and d. sapling) separately for timber and fruit bearing trees. Experience and best practices from other development project have been applied in this regard.
- Banana groves have been valued as one time crop of each grown up tree (large and medium) and small or plant at the market rates.
- Fruits will be valued for grown up trees (large and medium) as 30% of the timber value X one year.
- Transfer grant for structures has been calculated @ 12.50% of the structure value.
- Reconstruction grant for structures has been calculated @ 12.50% of the structure value.

- Crop value has been determined on the basis of current market price of paddy per mound (about 40 Kg) and gross production.
- Additional cash grant for vulnerable household's particularly very poor will be paid @ BDT 3,000/per persons
- Poor female EPs heading the household will get one time additional assistance of Tk 3000 each
- EPs will be allowed to take salvage materials free of cost

The valuation survey registered recent current crop and tree sales at markets and was based on AP and community consultation (including relevant local government agencies). The conclusion of the survey is that in most cases the actual transaction values are higher than the values officially documented and registered.

### **8.3 Approval of the Resettlement Budget**

Land acquisition and resettlement budget included in the ARP will need to be approved by the Ministry of Communications. Upon approval of land acquisition by Ministry of Land, the DC will prepare estimates for compensation including service charge and produce that to the RHD for placement of fund within 60 days.

The rates for compensation and cash entitlements for rehabilitation as well as allowances payable to AHs will be adjusted annually, based on the actual annual inflation rate. RHD will determine the annual inflation rates to be applied to all cash entitlements in each year.

The ARP implementing Agency (AI) will assist RU, (RHD) to prepare resettlement budgets covering all eligible loss and entitlements confirmed through joint verification and determination of replacement market price of land and property by PVAT.

### **8.4 Management of Compensation and Flow of Awards**

The RHD does not have any set codified rules for payment of grants to APs for resettlement of affected persons. Under the circumstances, a detail administrative guideline (payment modality) will be required to implement the ARP at the field level. Both the RHD and the ARP implementing agency (IA) will follow the administrative guideline after its approval from the Project Director. The consultants (resettlement specialists) will prepare the guidelines and the DPD/CRO at RU (RHD) will concur it for adopting. The modality should include definition of various resettlement terms, the entitlements, detail procedure for identification of eligible persons for resettlement entitlements of the ARP, and assess loss and entitlement of individual APs, process of payments, effecting their disbursement and documentation.

The RU with requisition of payments under annual assessment from the DPD/CRO, will place fund with the IA account in installment as per requisition made by the IA. The administrative guidelines will contain details of the management aspects and monitoring mechanism. The SDE, RHD and authorized representative from IA will sign the vouchers. Payment will be made and records maintained as per approved ARP administrative guidelines.

Compensation under law for land acquisition will be paid to the legal owners of land and property by the concerned Deputy Commissioner's LA section. DC will prepare individual cheques accompanied with receiving copies of payment and undertaking note.

The IA will collect CCL copy from the DC office and prepare statement, entitled person's file, entitlement card, indent and other necessary documents for making payment of resettlement benefit. In case of non-titled holder the IA will prepare all necessary documents based on the joint verification survey data and arrange payment of resettlement benefit to the EPs. For both the cases resettlement benefits will be paid by RHD through the IA.

## **9 ARP IMPLEMENTATION SCHEDULE**

A time-bound implementation schedule for the ARP has been prepared in accordance with the project construction schedule. The overall schedule of implementation is based on the principle that people affected by the project are paid their due resettlement benefits prior to displacement. The Implementing Agency (IA) will assist the APs in the process of relocation and resettlement. Individual entitlements on household basis will be processed by the IA. Each EP will receive an ID card and an entitlement card. The ID card will be issued to the EPs as identified by the DC and/or Joint Verification Survey (JVS) with joint signature of the RHD and IA representatives. Photograph of the EPs will be attested by the concerned UP Chairman and pasted on the ID card.

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## **10 MONITORING AND EVALUATION**

### **10.1 Monitoring and Evaluation**

RHD as the EA, through the RU, will establish a monitoring system involving the DPD/CRO, consultants and the ARP Implementing Agency (IA) for collection, analysis, reporting and use of information about the progress of resettlement, based on the ARP. These stakeholders will be made responsible to monitor the progress of all aspects of land acquisition/ resettlement and income generation. The EA will report to the Donor on land acquisition, resettlement and income regeneration by APs in the quarterly reports, including identification of significant issues. Besides, an annual report stipulating all efforts and outcome will be sought by the Donor from the RHD. An ARP implementation monitoring format is enclosed in **Annex-V**.

The ARP implementation monitoring will be done both internally and externally to provide feedback to RU (RHD) and to assess the effectiveness. Mid-term reviews of the resettlement activities drawing upon monitoring and evaluation reports and other relevant data to identify any action needed to improve resettlement performance or respond to the changing circumstances. Evaluation of the resettlement activities will be resorted to during and after implementation of the ARP to assess whether the resettlement objectives were appropriate and whether they were met, specifically, whether livelihoods and living standards have been restored or enhanced. The evaluation will also assess resettlement efficiency, effectiveness, impact and sustainability, drawing lessons as a guide to future resettlement planning.

### **10.2 Internal Monitoring**

Internal monitoring will be undertaken by the RU through SDE with assistance from the NRS and IA. The IA will gather information on ARP implementation covering relevant activities as per schedule. All activities listed will be illustrated in Gantt Charts showing the target dates for completing resettlement activities. Internal monitoring reports on ARP implementation will be included in the quarterly Project Progress Report (PPR) to be prepared by RU, RHD. The report of RU will contain: (i) accomplishment to-date, (ii) objectives attained and not attained during the period, (iii) challenges encountered, and (iv) targets for the next quarter. The internal monitoring report will then be integrated by the RU with the overall PPR submitted to Donor. The NRS will assist PMU preparing the overall PPR for Donor. However, the NRS will monitor the activities of IA and report to DPD/CRO, RU on a monthly basis. Table 10.1 shows the potential monitoring indicators that will be reported.



**Table 10.1 Potential Monitoring Indicators**

Monitoring Issues	Monitoring Indicators
Budget and Timeframe	<ul style="list-style-type: none"> <li>• Have all land acquisition and resettlement staff been appointed and mobilized for field and office work on schedule?</li> <li>• Have capacity building and training activities been completed on schedule?</li> <li>• Are resettlement implementation activities being achieved against agreed implementation plan?</li> <li>• Are funds for resettlement being allocated to resettlement agencies on time?</li> <li>• Have resettlement offices received the scheduled funds?</li> <li>• Have funds been disbursed according to ARP?</li> <li>• Has all land been acquired and occupied in time for project implementation?</li> </ul>
Delivery of AP Entitlements	<ul style="list-style-type: none"> <li>• Have all APs received entitlements according to numbers and categories of loss set out in the entitlement matrix?</li> <li>• How many affected households have received land titles?</li> <li>• How many affected households relocated and built their new structure at new location?</li> <li>• Are income and livelihood restoration activities being implemented as planned?</li> <li>• Have affected businesses received entitlements?</li> <li>• Have the APs losing their eroded land received proper compensation?</li> <li>• Have the squatters, encroachers of RHD or government land, displaced due to the project, been compensated?</li> <li>• Have the community structures are compensated and rebuilt at new site?</li> </ul>
Consultation, Grievances and Special Issues	<ul style="list-style-type: none"> <li>• Have resettlement information brochures/leaflets been prepared and distributed?</li> <li>• Have consultations taken place as scheduled including meetings, groups, community activities?</li> <li>• Have any APs used the grievance redress procedures? What were the outcomes?</li> <li>• Have conflicts been resolved?</li> </ul>
Benefit Monitoring	<ul style="list-style-type: none"> <li>• What changes have occurred in patterns of occupation compared to the pre-project situation?</li> <li>• What changes have occurred in income and expenditure patterns compared to pre-project situation?</li> <li>• Have APs income kept pace with these changes?</li> <li>• What changes have occurred for vulnerable groups?</li> </ul>

### **10.3 External Monitoring and Evaluation**

External monitoring which involves social impact evaluation will be assigned to an independent External Monitoring Agency hired by RHD..

#### **10.3.1 Social Impact Evaluation**

The Donor will engage individual/firm to conduct a one-time social impact evaluation, at least six months following the completion of resettlement. It will use appropriate investigative and analytical techniques in assessing the post-project socio-economic conditions of the APs in relation to the baseline socio-economic data generated before undertaking of the resettlement implementation. The Tor for external monitoring agency is presented in **Annex-IV**.

The evaluation will describe any outstanding future issues that are required to bring the resettlement into compliance with JICA's Guidelines for Environmental and Social Considerations and Government policies, and further mitigation measures needed to meet the needs of any APs or families perceiving themselves to be worse off as the result of resettlement. It will include lessons learned from the evaluation that may be useful in developing future policies on involuntary resettlement of APs in Bangladesh.

The Resettlement Specialist within the project consultants will conduct periodic review and supervision mission during the implementation stage. In addition to regular review missions, JICA will undertake a comprehensive mid-term review of the ARP implementation. A post-evaluation of ARP activities will be carried out by JICA to assess the resettlement impact in terms of adequacy and deficiency in planning and R&R operations following the social impact evaluation.

### **10.4 Reporting Requirements**

During the implementation phase, the Project Director will prepare quarterly report on the progress of resettlement activities and forward copies to the GoB and the donors. A format for resettlement implementation monitoring will be devised for quarterly monitoring and data collection by the field officials (sample at Table 10.2). The Resettlement Specialist of the Project Supervision Consultants and Supervision Missions every six months during the implementation stage will conduct review and report to RHD and the donors on the progress of all aspects of land acquisition and resettlement activities. A post-resettlement impact evaluation will be carried out by the donor to assess whether adverse impacts of the projects have been mitigated adequately and APs have been able to restore and/or improve their pre-project standard of living as a result of resettlement and development.

### **10.5 Conclusion and Recommendations**

#### **10.5.1 Conclusion**

The project will require a total of 12.49 hectare land of which mostly agriculture and a small quantity is vita/ homestead category. A total of 39 households got affected by this project. The project is located in the central part of Bangladesh covering two districts namely Gazipur and Narshingdi. Compensation budget for land has been prepared based on the average rate collected from the local people. The project affected persons will get compensation for lost assets at replacement cost and other resettlement benefit. Policy matrix of ARP has kept provision for livelihood and income restoration grant for vulnerable households along with preferential employment in civil construction and distribution of 5 saplings among the displaced households for ensuring social afforestation. The resettlement plan will be implemented in 20 months' time period starting from January 2016. Roles of different government and local bodies in proper implementation of the project are described in the ARP. Grievance redress committee will resolve claims of the aggrieved persons related to resettlement.

### **10.5.2 Recommendations:**

For smooth execution of the project following steps are recommended

- i.) The ARP implementing agency is to be deployed before serving notice under section 3 by DC, so that they can jointly verify the affected properties in time.
- ii.) A clause should be incorporated in the bid documents with the civil contactors that the vulnerable entitled persons will get preferential employment in civil work.
- iii.) The other local agencies such as Union Parishad, Upazilla and District administration should be initially informed about their roles and responsibilities in implementation of the ARP. For this a seminar may be arranged with local government bodies in the initial stage of ARP implementation.
- iv.) The vulnerable EPs should get special attention under livelihood and income restoration program.
- v.) The affected households may be encouraged for self-relocation. If possible, the project authority may request concern authority for allocation of khas land for relocation of the affected households in cluster manner.

**Table 10.2 A model format for ARP implementation Monitoring – Quarterly Report**

Component	Unit Total	Completed%	Cumulative Achievement Total	Completed%	Progress During Reporting Month		Status & Remarks
					Target	Achievement (%)	
<b>Resettlement Preparation</b>							
Distribution of Brochures							
Identification of AHS/CBEs							
Issuance of ID cards							
Consultation Meetings							
Formation of PVAT/RAC/GRC							
<b>Payment of Compensation</b>							
Compensation for land							
Compensation for tree/crop/fish							
Res/Commercial structure							
Payment for rent/leaseholder							
Shifting/relocation costs							
<b>Social Development Activities</b>							
Grant for loss of wages							
Loss of business grant							
Business restoration grant							
Payment for indirect impact							
LIRP activities							

**APPENDIX 2.5**  
**Form of Monitoring**

## Form of Monitoring *(for reference only)*

The latest results of the below monitoring items shall be submitted to the PIU by Contractor as a part of Monthly Progress Report throughout the construction stage.

### 1. Response/Actions to Comments and Guidance from Governmental Agencies and Public

Monitoring Item	Person in charge	Frequency	Monitoring Result during Report Period	Confirmation by PIU (frequency)
Number and contents of formal comments made by the public	Site manager of contractor	Daily	To be filled by site manager	Local engineer (as soon as possible on necessity)
Number of contents of responses from Government agencies	Site manager of contractor	Daily	To be filled by site manager	Local engineer (as soon as possible on necessity)

### 2. Pollution

Item	Place/area to be monitored	Way of monitoring	Inspector	Frequency	Monitoring result and countermeasures	Confirmation by PIU (frequency)
Exhaust gas	Work site	Visual inspection on color of gas	Safety officer of contractor	Daily	To be filled by safety officer	Local engineer (monthly)
Water	River in work site	Visual inspection of water; such as turbidity, oil film	Safety officer of contractor	Daily	To be filled by safety officer	Local engineer (monthly)
Soil	Fuel supply depot at site	Odor at fuel supply site	Safety officer of contractor	Daily	To be filled by safety officer	Local engineer (monthly)
Dust	Work site	Operating conditions	Safety officer of contractor	Daily	To be filled by safety officer	Local engineer

		of water sprinkle vehicle	contractor		officer	(monthly)
Waste	Work site, contractor's office and worker camp	Visual inspection on garbage, toilet	Safety officer of contractor	Daily	To be filled by safety officer	Local engineer (monthly)

### 3. Noise

Item	Unit	Measured Value (Mean)	Bangladesh Standards in daytime	Place to be monitored	Frequency	Monitoring result and countermeasures	Confirmation by PIU (frequency)
Noise level	dB		School: 45 dB Residential: 50 dB Mixed residential and commercial: 60 dB Commercial: 70 dB Industrial: 75 dB	Nearest structures as described previously	Daily when equipment works	To be filled by safety officer	Local engineer (monthly)

4. Working Conditions and Accident

Inspected place/area	Way of monitoring	Inspector	Frequency	Monitoring result and countermeasures	Confirmation by PIU (frequency)
Work site	Visual inspection on workers hard hat/safety belt, scaffolding, traffic safety etc..	Safety officer of contractor	Daily		Local engineer (monthly)



**APPENDIX 2.6**  
**TOR for IA for ARP Implementation**

## **TOR for RAP implementing Agency**

Government of the People's Republic of Bangladesh

Roads and Highways Department (RHD)

EZ Bridge Project

TERMS OF REFERENCE FOR ARP IMPLEMENTING NGO (INGO)

### 1. Introduction

The Government of Bangladesh with the financial loan from Japan International Cooperation Agency (JICA) has undertaken a project named EZ Bridge Project in order to improve the communication road network with planned Special Economic Zone (SEZ) in Polashupazila of Narshingdi district and road network system of the country. The EZ Bridge will be constructed across the river Sitalakhya by connecting Gazipur and Narshingdi districts in the central part of Bangladesh. This initiative has taken with aim of becoming a middle income country by 2021 by reducing poverty and improvement of road communication system by connecting the important economic potential areas with rest of the country. The EZ Bridge project includes construction of a 835 m long bridge with approach bridge roads of total 4,195 m and a transect road connecting Tongi- EZ road. The EZ Bridge will be constructed over Sitalakhya River at SomNatun Bazar meeting point 14.0 Km up Stream of Kanchan Bridge and 6.0 Km downstream of Bhairab Bridge. The bridge will be connected with the Dhaka- Sylhet highway (N2) via A K Khan Industrial Park, a privately developed industrial park in Polashupazila of Narsingdi district. RHD will be the implementing authority of the project.

This is the Abbreviated Resettlement Plan (ARP) for the project complies with the Resettlement Framework (RF) prepared based on relevant national law (Government of Bangladesh (GOB) Acquisition and Requisition of Immovable Property Ordinance 1982 (ARIPO), amended in 1993 and 1994) and with the policy of the JICA Guidelines for Environmental and Social Considerations and World Bank OP 4.12. An ARP Implementing Agency (IA) i.e. NGO or Social Consulting Firm will be engaged by the RHD for implementation of the ARP.

### 2. Description of the Project

The EZ bridge is going to connect Gazipur an Narshingdi districts by constructing the bridge across the river Shitalakhaya. The bridge access road is going to connect the bridge with Tongi - EZ highway. The bridge is going to be connected with Dhaka Sylhet highway through privately developed AK Kham industrial park in Polashupazila of Narshingdi district.

### 3. SCOPE OF WORK- GENERAL

The general scope of work shall include i) dissemination of information as described in the policy framework regarding ARP implementation procedure; ii) conducting public consultations, iii) assisting Project Directors and his/her staff in implementation of Abbreviated Resettlement Plan and iv) maintain close co-ordination with National Resettlement Specialist (NRS)& RHD (Executing Agency) staff. Displacement and other impacts due to the project are shown in the table below-

Displacement and other impacts

Sl No	Loss type	No/Total
1	Total quantity of land (Hectare) affected	12.49
2	Total number of Households (Land with Structure) affected	39
3	Total number of population affected	190
4	Total number of structures affected	81
5	Total quantity of structure (Sqm) affected	3,709
6	Total no. of toilets affected	36
7	Total no. of tube wells affected	34
8	Total no. of trees on private land affected	12,259

A list of the affected households with demographic and socioeconomic information will be provided to the implanting agency (IA) by RHD.

Key implementation issues in the delivery of the tasks includes: (i) consultation and stakeholder participation; (ii) dissemination of relevant information; (iii) assisting executing agency (RHD) in payment of compensation and other resettlement grants (iv) assisting affected persons (APs) in the process of resettlement.

### 4. SCOPE OF WORK- SPECIFIC TASKS

Information Campaign: The consultant will design, plan and implement an information campaign in the affected areas to facilitate the implementation of ARP. The campaign would include measures such as distribution of information booklets, leaflets, notices and other materials among the APs, carrying out community meetings, public announcements and any other measures necessary to provide information to all APs in the project area. The consultant will assist the APs during pre and post relocation period. The IA staff will also assist APs, where necessary, in preparing grievance redress cases for consideration by the GRCs. Assistance to

RHD in payment of Resettlement Benefits to APs. The selected Implementing agency will be responsible to assist RHD in processing entitlements for the APs and making payment of resettlement benefits to them. The IA will compile and process data and develop & operate a menu driven computerized Management Information System (MIS) for preparation of entitled persons file and entitlement card for EPs.

Identification of Entitled Persons: Consult census/survey data and prepare final list of affected households, commercial business enterprises and community establishment now staying within the ROW from the list.

Assistance to APs during relocation: The IA will assist the APs during pre and post relocation period in close coordination with Resettlement Advisory Committee (RAC) and RHD

Assistance to RHD in Payment of Resettlement Benefits to APs: The selected Agency will assist RHD in processing entitlements for the APs and making payment of resettlement benefits to them. The Agency will compile and process data and develop & operate a menu driven computerized Management Information System (MIS). The IA will prepare Entitled Person (EP) files with type and quantity wise losses and Entitlement Card (EC) mentioning amount of compensation/benefits for each of the EPs and prepare Indent mentioning category wise amount of compensation /benefits. The indent would be approved by the Project Director before making payment. The IA will prepare payment debit voucher on behalf of RHD and assist RHD in preparing Measurement Book. The debit voucher will be signed jointly by IA and EA representative and the cheque will be signed by IA and be issued in public place in presence of LGI representatives. The RHD will place fund with Implementing Agency for making payment and the IA will submit vouchers with other documents on regular basis to the Project Director after making payment.

## 5. ARP Implementation Schedule and Tasks

The implementation of the ARP is scheduled to start from August 2016 and expected to be completed in July 2018. The IA will be deployed for a period of 16 (sixteen) months and will be responsible to implement all resettlement activities stated in the TOR. The Project Director, in consultation with the National Resettlement Specialist (NRS) of the CSC will provide time schedule as per the requirement of the resettlement program. The Implementing Agency will assist RHD but not necessarily limited to the following:

Information Campaign and ARP Disclosure: The IA will carry out consultation regarding policies and options and collection of legal documents required to claim compensation. Property owners require being advised/helped to gather all required documents. The affected people will be made aware of the GRC procedures for disputes over claims.

Disbursement of Compensation: Payment of compensation to titled and non-titled owners will be processed and paid by RHD through implementing agency with assistance from NRS of the CSC. The Resettlement Specialist will supervise and monitor the process and the IA will keep record of the payments and report to the RHD on monthly basis.

Notice for Encumbrance Free: Written notice will be given to individual affected persons at completion of payment of all compensation/entitlement from RHD. The RHD will keep records of issuance date of notice for making ROW encumbrance free signed by both RHD and EPs.

Taking-over and handing-over sites: The IA will assist RHD take-over acquired land from DC office and then hand-over to contractors. Contractors will move into sites the day following expiration of the encumbrance free notice.

#### 6. Major Activities to be performed by Implementing Agency

The selected Agency will assist RHD in implementing successfully all stipulations agreed in the ARP in their entirety, fairly and transparently. In this context, the major functions to be performed by the Implementing Agency are:

##### A: Information dissemination and feedback:

(i) Ensure dissemination of the project and resettlement policy related information to the project-affected persons and others (community groups, local administration, etc.) that might be considered instrumental in the effective and transparent implementation of the ARP. Even though the ARP recommends some dissemination mechanisms, the IA can suggest more in the process of its implementation and would gather information and disseminate it upward to the project authority.

(ii) During implementation of the project, extensive consultation and collaboration with key stakeholders on a continued basis is planned. The selected IA will be required to assist RHD in organizing such consultation programs and facilitate consultation with local government representatives, local leaders, etc.

##### B. Assisting APs in resettlement process:

(i) The main purpose is to make the APs and entitled persons (EPs) aware of the project goals, importance, GRC procedures, compensation entitlement and receiving procedures, etc. Some of the major activities are: (a) Inform the EPs about the documents required for claiming compensation from DC office & resettlement benefit from RHD (b) checking with the APs to make sure that they have all the required documents to claim compensation from DC and RHD (c) whether or not there are usufruct rights of others on the properties within ROW and informing the people with such rights about the compensation policies.

(ii) Inform the AP households, especially the vulnerable ones, about the “compensation in cash and/or kind” option stipulated in the ARP and ensure fulfillment of the choices made by them.

(iii) Counseling and helping the households, whose previous incomes have been seriously affected, to find alternative source of income.

##### C. Grievances redress procedure

The selected IA will play vital role in the grievance redress process. The most important preconditions for doing this with maximum effectiveness are that the IA operatives will build personal rapport and confidence with the APs and will be fully aware of all socioeconomic problems/issues arising from the project. Among other things, the IA will:

(i) Ensure that the APs are fully aware of the grievance redress procedure and the process of bringing their complaints to the grievance redress committees (GRCs).

(ii) Assist the APs in any usual manner (e.g., preparing applications, accompanying them to the hearing and explaining the grievance to the GRCs and the like) to bring the complaints to the committee.

(iii) Impartially investigate the veracity of the complaints and try to settle them amicably, fairly and transparently before they go to the redress committee or the courts of law.

(iv) For more focused work in this area, the IA will prepare a list of problem cases in implementation of ARP. In doing so, the IA will pay special attention to the problems and needs of the vulnerable APs and recommend to the RHD with probable mitigation measures.

#### D. Information management

The selected IA will collect computerized Census and SES data related to the pre-acquisition condition of the AP households and the nature and magnitude of all categories of losses as well as the compensation thereof determined by RHD. All essential information will have to be generated by using one or more menu-driven MIS. Among other things, the IA will:

(i) Collect CCL from the DC office and prepare statement for assessing additional payment on the basis of quantity of affected properties and ARP PVAC rate.

(ii) Collect and computerize all information related to different types of payments and additional supports provided to the entitled person (EP) and update the EP file and EC.

(iii) Prepare 'entitlement card' for the individual EPs as per their types of losses and the amount of compensation due for each type of loss from legal title and the amount of additional compensation/resettlement benefits if any, to be paid by RHD through IA.

(iv) Record and maintain details of the issues/disputes causing delay in the disbursement/receipt of compensation and the persons involved in them, including the cases brought to the courts of law, if there is any.

(v) Document information on the cases, with reasons, brought to and resolved by the GRC, with decisions going in favor of or against the complainants.

(vi) Collect and maintain relocation information on the homestead losers by categories of EP households such as legal owners, squatters, tenants and others.

#### E. Progress reports

The ARP requires that all APs are paid the stipulated compensations/entitlements before they are evicted from the properties and/or construction work begins. The selected IA will provide RHD weekly report on the progress in ARP implementation, including any issue that might be hindering progress, separately for each bridge. The report will be brief consisting of both quantitative and qualitative information on:

(i) The IA in its report should reflect the status of total number of EPs identified by DC for compensation and progress of payment in a particular period and resettlement benefits paid against DC's payment and other benefits as per ARP policy by zones and EP categories.

(ii) Number of focus groups formed and meeting held with the affected persons with issues discussed.

(iii) Number of vulnerable affected households male headed and female headed have received cheques and be deployed in project civil works according to their eligibility.

(iv) Number of cases received by the Grievance Redress Committee indicating the types of grievance made in favor of or against the complainants.

(v) Any other issues that are relevant to implementing the policies stipulated in the ARP.

## 7. Staff requirements

The IA is free to determine the number of members to be working in the team. A bar chart shall indicate the proposed timing of their input. The team members shall meet the following criteria:

(i) The Team Leader (Resettlement Specialist) is the spokesman for the Implementing Agency. He/she shall hold Masters in Social Science or any other relevant field and have at least 10 years of relevant experience in implementation of RAP, report writing etc. He shall have conducted at least 5 trainings/ workshops in Resettlement Issues, and must be fluent in English.

(ii) The Deputy Team Leader (Resettlement Expert) will assist Team Leader in RAP Implementation process. He/she shall hold Masters in Social Science or any other relevant field and have at least 10 years of relevant experience in implementation of RAP. He/she shall have conducted at least 5 trainings/ workshops in Resettlement Issues, and must be fluent in English.

(iii) MIS specialist shall hold a degree in Statistics, Mathematics or Computer Science having more than 10 years of relevant experience in Resettlement tools (EP/EC), and be fluent in English.

(iv) Gender and livelihood development specialist will have at least masters in any discipline with 7 years experience in the relevant field.

(v) Area Manager shall hold Masters in Social Science and have at least 5 years of relevant experience in implementation of RAP. He shall have conducted at least 3 trainings/ workshops in Resettlement Issues, and must be fluent in English.

(vi) Enumerators shall be graduates with at least two years relevant experience

G. Implementing Agency selection criteria:

The Implementing Agency should have registration with concern Authorities and experience in implementation of Resettlement Action Plan. The IA will be selected through quality and cost based selection method.

H. Implementation arrangements

The Implementing Agency has to keep office near the concerned locality (more than one in each zone) during the time of implementation of the RAP in order to ease contact with the APs, the cost of which will be specified in the budget.

The IA will make its own transport arrangements, which will be reflected in the budget.

The Project Director

Western Bangladesh Bridges Improvement Project (WBBIP)

Roads and Highways Department (RHD)

Sarak Bhaban, Ramna, Dhaka



**APPENDIX 2.7**  
**TOR for External Monitoring Consultant**

## Terms of Reference for External Monitoring Agency (EMA)

### A. Project Background

The Government of Bangladesh with the financial loan from Japan International Cooperation Agency (JICA) has undertaken a project named Economic Zone (EZ) Bridge Project in order to improve the communication road network with planned Special Economic Zone (SEZ) in Polash upazila of Narshingdi district and road network system of the country. The EZ Bridge will be constructed across the river Sitalakhya by connecting Gazipur and Narshingdi districts in the central part of Bangladesh. The EZ Bridge project includes construction of a 835 m long bridge with approach bridge roads of total 4,195 m and a transect road connecting Tongi- Kaliganj road.

RHD has prepared Abbreviated Resettlement Plan (ARP) that will govern adverse social impacts due to the project. The ARP is consistent with the JICA Guidelines for Environmental and Social Considerations. An ARP Implementing Agency (IA) i.e. NGO or Social Consulting Firm will be engaged by the RHD for implementation of the ARP.

The location map of planned EZ in Narsingdi is shown in Figure 1-1.

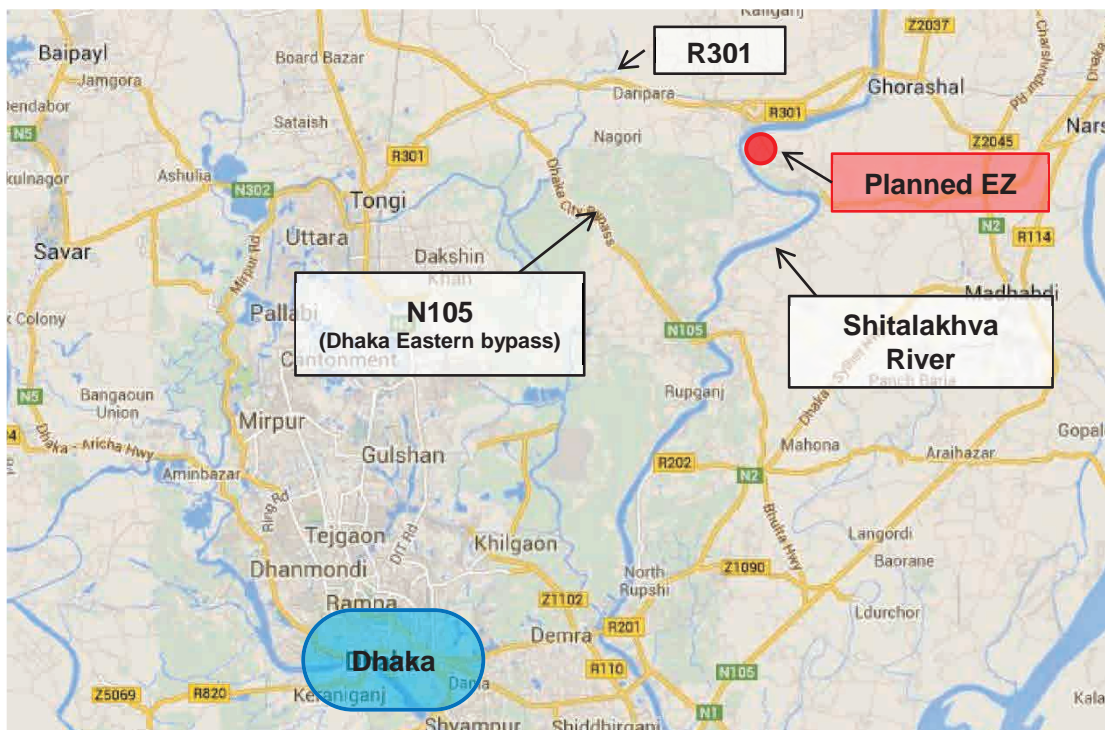


Figure-1: Location of the Project

## **B. Key Objective of External Monitoring**

**Monitoring** involves the collection and analysis of data on resettlement activities with the applying accruing information. Monitoring allows project participants to keep track of resettlement activities, to determine whether resettlement objectives are being achieved, and to make whatever changes are necessary to improve resettlement performance.

**Evaluation** is an assessment of resettlement performance and results in light of stated the objectives. Evaluation for purposes of the ARP is proposed to include a participatory component allowing the project participants to comment on their experience of the project. To be successful, monitoring and evaluation begins with clear resettlement design followed by identification and elaboration of appropriate criteria and indicators.

### **Indicators and Means for Verification**

Indicators form the key elements of any monitoring and evaluation system. Indicators also make possible the comparison of inputs with the completion of outputs and achievement of objectives and goals, thus providing the basis for performance evaluation. Four categories of indicators have been formulated to facilitate monitoring of Progress, Outputs, Effects, Impacts and Compliance in implementing the resettlement.

### **Effect Monitoring**

This will be used to measure the extent to which the immediate objectives have been achieved and give an idea of the results emanating from implementing the ARP e.g., percentage of APs now accessing better housing or improved livelihoods on account of being successfully resettled.

### **Impact Monitoring**

This is the process through which, assessment of the overall achievement of the resettlement goal will be made. Specifically, this is the system that will generate data to gauge success towards implementation of this ARP in terms of impact of the resettlement on the APs. The basis for impact monitoring is the baseline social-economic survey data against which the wellbeing of APs will be compared.

The Independent External Monitoring Agency (EMA) will review implementation process as per set policies in the ARP and assess the achievement of resettlement

objectives, the changes in living standards and livelihoods, restoration of the economic and social base of the affected people, the effectiveness, impact and sustainability of entitlements, the need for further mitigation measures if any, and to learn strategic lessons for future policy formulation and planning.

### **Scope of Work**

The scope of work of the Independent EMA will include the following tasks:

- (1) To review and verify the progress in land acquisition/resettlement implementation of the Project and whether they have been followed as provided in the ARP.
- (2) Provide a summary of whether involuntary resettlement was implemented (a) in accordance with the ARP, and (b) in accordance with the stated policy.
- (3) Verify expenditure & adequacy of budget for resettlement activities.
- (4) Describe any outstanding actions that are required to bring the resettlement activities in line with ARP. Describe further mitigation measures needed to meet the needs of any affected person or families judged and/or perceiving themselves to be worse off as a result of the Project. Provide a timetable and define budget requirements for these supplementary mitigation measures.
- (5) Describe any lessons learned that might be useful in developing the new national resettlement policy and legal/institutional framework for involuntary resettlement.
- (6) To Identify, quantify, and qualify the types of conflicts and grievances reported and resolved and assess whether the consultation and participation procedures followed in accordance with the ARP.
- (7) To identify the strengths and weaknesses of the land acquisition/resettlement objectives and approaches, implementation strategies.
- (8) Identification of the categories of impacts and evaluation of the quality and timeliness of delivering entitlements (compensation and rehabilitation measures) for each category and how the entitlements were used and their impact and adequacy to meet the specified objectives of the plans. The quality and timeliness of delivering entitlements, and the sufficiency of entitlements as per approved policy.
- (9) To review the quality and suitability of the relocation sites from the perspective of the both affected and host communities.
- (10) Review results of internal monitoring and verify claims through sampling check at the field level to assess whether land acquisition/resettlement objectives have been generally met. Involve the affected people and community groups in assessing the impact of land acquisition for monitoring and evaluation purposes.

- (11) To monitor and assess the adequacy and effectiveness of the consultative process with affected APs, particularly those vulnerable, including the adequacy and effectiveness of grievance procedures and legal redress available to the affected parties, and dissemination of information about these.

### **C. Methodology and Approach**

The general approach to be used is to monitor activities and evaluate impacts ensuring participation of all stakeholders especially women and vulnerable groups. Monitoring tools should include both quantitative and qualitative methods. The external monitor should reach out to cover:

- (1) 100% APs who had property, assets, incomes and activities severely affected by Project works and had to relocate either to resettlement sites or who chose to self-relocate, or whose source of income was severely affected.
- (2) 10% of persons who had property, assets, incomes and activities marginally affected by project works and did not have to relocate;
- (3) 10% of those affected by off-site project activities by contractors and sub-contractors including employment, use of land for contractor's camps, pollution, public health etc.;

### **D. Other Stakeholders and their Responsibility**

#### **1. Roads and Highways Department (RHD):**

Roads & Highways Department will establish, for the Project, a Project Implementation Unit (PIU) headed by a Project Director (PD), at the project office that will be responsible for the overall execution of the Project. The PIU will consist of two units namely Engineering Service Unit (ESU) and Resettlement Unit (RU) for total implementation of the project. The PD will work on deputation from RHD at the level of Superintendent Engineer or Additional Chief Engineer. The project will be overseen by the PD, RHD. One implementation committee will be formed to provide overall guidelines and cooperation for project implementation and keep liaison with various stakeholders including Donor, different government organizations and other relevant agencies.

- (1) Acquire, hold, manage and dispose of land and other property to private sector developers, to carry out the planning, engineering, design, construction, marketing, sales and other operations under the regulations of master plan

- (2) Execute works in connection with the utilization of infrastructure such as supply and discharge of water, electricity, transportation and other services and amenities and generally to do anything necessary or expedient for purposes of such development and for purposes incidental thereto, provided that save as provided in this Act, nothing contained in this Act shall be construed as authorizing the disregard by the Authority of any law for the time being in force.
- (3) Lead, monitor and evaluate the implementation of the project.

**2. Implementing Agency (IA):**

RHD will engage an experienced Implementing Agency (IA) for implementation of the ARP in the field level in coordination with the DC, RHD and consultants. The Implementing Agency (IA) will be engaged to assist the supervision consultant for updating of ARP during detailed design phase and will be continuing for implementation of the ARP. The tasks of the IA are to:

- (1) Verify results of internal monitoring;
- (2) Assess whether resettlement objectives have been met; specifically, whether
- (3) Livelihoods and living standards have been restored or enhanced;
- (4) Assess resettlement efficiency, effectiveness, impact and sustainability, drawing
- (5) Lessons as a guide to future resettlement policy making and planning; and
- (6) Ascertain whether the resettlement entitlements were appropriate to meeting the objectives, and whether the objectives were suited to AP conditions.
- (7) Undertake any other assessment relevant to the resettlement process.

**E. Team Composition of the Independent External Monitoring Agency**

**Table-1 Team composition and qualifications**

<b>Position/expertise</b>	<b>Qualification and experience</b>
1.TeamLeader/ Resettlement Expert	Masters in social science with 10 years working background in planning, implementation and monitoring of involuntary resettlement for infrastructure projects. Experience in institutional capacity analysis and implementation arrangement for preparation and implementation of resettlement plans, and knowledge in latest social safeguard policies of the international development financing institutions in Afghanistan
2. Social Impact	Masters in social science with 5 years working

Specialist/Anthropology	experience in social impact assessment including census and socio-economic surveys, stakeholders' consultation, and analysing social impacts to identify mitigation measures in compliance with social safeguard policies of the international development financing institutions and national legislations. Experience of preparing resettlement framework and action plans and implementation of plans for externally financed projects is essential.
3. Data Analyst	Graduate with working experience and knowledge of software, preferably relational, those are most commonly used in Afghanistan; demonstrated ability to design and implement automated MIS(s) for monitoring progress, comparing targets with achieved progress and the procedural steps

## **F. Time Frame and Reporting**

External monitoring of the ARP will be undertaken alongside that of other project components. EMA will take place as follows:

### **Post Project Monitoring:**

In order to determine final impacts of the resettlement activity, a final evaluation cum an impact assessment will be undertaken 6 months after conclusion of resettlement to evaluate whether the intended objectives were realised. For this, suitable baseline indicators related to income, assets, land ownership, expenditure pattern of key activities, housing conditions, access to basic amenities, demographic characteristics, indebtedness, etc. will be applied.

The monitoring reports should be submitted to RHD. An evaluation report at the end of the project should be submitted to the RHD and concerned parties with critical analysis of the achievement of the program and performance of RHD and IA.

The external monitors will provide monitoring and evaluation report covering the following aspects:

- Whether the resettlement activities have been completed as planned and budgeted;
- The extent to which the specific objectives and the expected outcomes/results have been achieved and the factors affecting their achievement or non-achievement;

- The extent to which the overall objective of the Resettlement Plan, pre project or improved social and economic status, livelihood status, have been achieved and the reasons for achievement / non achievement;
- Major areas of improvement and key risk factors;
- Major lessons learnt; and
- Recommendations.

Formats for collection and presentation of monitoring data will be designed in consultation with RHD, consultant's resettlement specialist.



## **G. Qualification of the Independent External Monitoring Agency**

The I-EMA will have at least 5 years of experience in resettlement policy analysis and implementation of resettlement plans. Further, work experience and familiarity with all aspects of resettlement operations would be desirable. NGOs, Consulting Firms or University Departments (consultant organization) having requisite capacity and experience as follows can qualify for services of and external monitor for the project.

NGOs, Consulting firms duly registered with GOB agencies or a department of any recognized university is eligible.

The applicant should have prior experience in social surveys in land based infrastructure projects and preparation of resettlement plans (RP, ARP/RAP, LARP) as per guidelines on involuntary resettlement of any of the JICA, ADB, World Bank and DAC-OECD.

The applicant should have extensive experience in implementation and monitoring of resettlement plans, including the preparation of implementation tools.

The applicant should be able to produce evidences of monitoring using tools such as computerized Management Information System with set criteria for measuring achievement.

The applicant should have adequate manpower with capacity and expertise in the field of planning, implementation and monitoring of involuntary resettlement projects as per donor's guidelines.

The applicant should not have involved in resettlement planning, as they have a vested interest in reporting smooth implementation. However, having the same agency conduct the work with a brief statement of the approach, methodology, and relevant information concerning previous experience on monitoring of resettlement implementation and preparation of reports. The profile of consultant agency, along with full signed CVs of the team to be engaged, must be submitted along with the proposal.

## **H. Budget and Logistics**

Consultants should quote for respective time inputs and other deliverables within in the framework of a Quality Cost based selection criteria.

**Table-2 Criteria for Independent External Monitoring Agency**

<b>Criteria for monitoring</b>	<b>Indicators for monitoring</b>
Basic Information on AP Households	Location
	Composition and structure, ages, educational and skill levels and gender of household head
	Ethnic group
	Access to health, education, utilities and other social services
	Housing type
	Land and other resource owning and using patterns
	Occupations and employment patterns , income sources and levels
	Agricultural production data (for rural households)
	Participation in neighbourhood or community groups and access to cultural sites and events
	Value of all assets forming entitlements and resettlement entitlements
Livelihood Restoration Programme	Were house compensation payments made free of depreciation, fees or transfer costs to the AP?
	Have perceptions of “community” been restored?
	Have APs achieved replacement of key social and cultural elements?
	Were compensation payments free of deductions for depreciation, fees or transfer costs to the AP?
	Were compensation payments sufficient to replace lost assets?
	Did income substitution allow for re-establishment of enterprises and production?
	Have enterprises affected received sufficient assistance to re-establish themselves?
	Have vulnerable groups been provided income earning opportunities? Are these effective and sustainable?
	Do jobs provided restore pre-project income levels and living standards?
	Levels of

Satisfaction	entitlements? Do APs know their entitlements?
	Do they know if these have been met?
	How do APs assess the extent to which their own living standards and livelihoods have been restored?
	How much do APs know about grievance procedures and conflict resolution procedures?
Effectiveness of Resettlement Planning	Were the APs and their assets correctly enumerated?
	Was the time frame and budget sufficient to meet objectives?
	How did resettlement implementers deal with unforeseen problems?
	Were there unintended environmental impacts?
Other Impacts	Were there unintended impacts on employment or incomes?

End