Executive Summary

Punjab State Road Sector Project (PSRSP)

E.0 EXECUTIVE SUMMARY

E.1 Introduction

Keeping in view the future developments in the Punjab state importance of improving the serviceability of the vast road network of State Highway, Major District Roads, and Other District Roads in a systematic manner, the Government of Punjab (GoP) through the Punjab Roads and Bridges Development Board (PRBDB) after a Strategic Options Study (SOS) identified a programme for implementation through Punjab State Road Sector Project (PSRSP) through the loan sanctioned by the World Bank.

The PRBDB identified 1698 km of roads as priority corridors in Punjab for feasibility study. The project roads to be covered under the environmental study are:

Phase-I, Package 1: Feasibility Studies (1698 kms) & Preliminary Engineering (700 kms)
Phase-I, Package 2: DPR – Rehabilitation (254 kms)
Phase-I, Package 3: DPR – Upgradation (144 kms)
Phase-II, Technical Advisory Services

Some roads have been deleted from the original scope of work and some new roads have been added into it. The final resultant road length is 1707 kms according to TOR or 1697 kms according to actual length given by PRBDB. In Phase-I, Package-I, as part of the feasibility study, environmental screening study of the 1697 km roads (that include rehabilitation package- 241 km and upgradation package- 139 km) has been carried out.

This environmental screening report is prepared in accordance with the World Bank's guidelines on Environmental Assessment. The major objective of this screening study is to provide a picture of the existing environmental conditions along all the project roads based on available secondary information supported by field studies/ survey conducted by environment specialists, preliminary assessment of the likely environmental impacts on the environment due to the physical intervention through this project, to recommend the environmental management measures to reduce adverse impacts, if any, and to determine the scope of further detail environmental assessment, if required. The field survey was carried out from July to October 2005. The environmental screening report is prepared by M/s Consulting Engineering Services (I) Pvt. Ltd. on behalf of the PRBDB.

Scope of Work

The summary of the scope of work related to environmental screening is:

- Collection of information on existing environmental scenario from secondary sources and identification of data gaps to be filled from primary surveys.
- Primary surveys: baseline (air, water and noise) pollution monitoring at representative and sensitive locations.
- Identification of all macro-level environmental issues and all regionally or nationally recognized environmental resources & features (like stretches of roadside trees,

environmental and common property resources such as forests, large water bodies, heritage complexes and major cultural properties) within the project's influence area

- Stakeholder assessment and consultation with all communities likely to be affected, NGOs, selected Govt. agencies and other stakeholders.
- Identification of the Valued Environmental Components (VECs) in the project influence area.
- Preliminary analysis of impacts and management measures, especially on the identified VECs.
- Scoping for project Environmental Assessment (EA)
- Environmental inputs for feasibility study and preliminary project design related to alignment, road cross-sections, construction material use and mitigation & enhancement measures.
- Preparation of an Environmental Screening report.

E.2 Project Description

The 1707 km project roads have been grouped into 34 corridors on the basis of continuity. The project roads and their actual length (as given by PRBDB), chainage as per km stones, class of road and existing configuration are given in the *Table-1.* The project roads are distributed in all the 18 districts of Punjab.

Table-1 Details of Project Roads under Phase-I

Corridor/ Link No.	Name of the Link	District	Length as per TOR (km)	Length as per PWD (km)	Range of Chainage (km) as per km-Stone	Desig-nation/ Class of Road	Existing Configu-ration
A	Corridor: NH 1- Patiala						
1	NH 1- Patiala	Fathegarh Sahib/ Patiala	30	28.21	29.5-0	MDR31	2L+PS
B	Corridor: Kharar- Landran- Banur-Tepla						
1	Kharar – Landran	Rupnagar	6	6	0-6	ODR	2L
2	Landharan - Banur (NH 64)	Rupnagar	16	16	6-22	ODR	IL
3	Banur (NH 64) – Tepla	Patiala	17	17	0-17.5	ODR	IL
C	Corridor: Chandigarh- Landran-Chunni- Srihand						
1	Chandigarh – Landran	Chandigarh/ Rupnagar	3.7	3.73	9.7-14.4	SH12A	2L
2	Landran – Chunni	Rupnagar/ Fathegarh Sahib	12	9.57	14.4-26.4	SH12A	2L+PS
3	Chunni – Sirhind	Fathegarh Sahib	16	18.48	26.4-42.5	SH12A	2L+PS
D	Corridor: Rahon- Aur- Phillaur						
1	Rahon – Aur	Nawanshehar	13	11.6	35-22	JODR5	IL
2	Aur - Crossing of Mattiawara-Phagwara road with Phillaur-Aur Road	Nawanshehar	5	5	22-17	JODR5	IL
3	Crossing of Mattiawara-Phagwara with Phillaur-Aur Road – Nagar	Nawanshehar	11	11.13	17-6	JODR5	IL

Corridor/ Link No.	Name of the Link	District	Length as per TOR (km)	Length as per PWD (km)	Range of Chainage (km) as per km-Stone	Desig-nation/ Class of Road	Existing Configu-ration
4	Nagar – Phillour	Jalandhar	6	6	6-0	JODR5	IL
E	Corridor: Ludhina- Dehlon-Malerkotla- Dhuri- Sangrur						
1	Ludhiana – Dehlon	Ludhiana	18	18	6-19.7	SH11	2L
2	Dehlon - Ahmedgarh (Pohir)	Ludhiana	5	5	19.7-24.8	SH11	2L
3	Ahmedgarh (Pohir) – Malerkotla	Sangrur	20	17	24.8-45	SH11	2L
4	Malerkotla – Dhuri	Sangrur	19	19	45-64	SH11	2L
5	Dhuri – Sangrur	Sangrur	14	13.29	64-77.65	SH11	2L
F	Corridor: Attari- Chabal- Tarn Taran-Fatehabad- Kapurthala						
1	Attari – Chabal	Amritsar	27	27	27-0	MDR61	IL
2	Chabal - Tarn Taran	Amritsar	14	14	13.8-0	MDR61	2L
3	Taran Taran – Fatehabad	Amritsar	18	18	1.5-18	MDR61	2L
4	Fatehbad - Junction with Sultanpur-Kapurthala road	Amritsar/ Kapurthala	13	14.38	18-31.4	MDR61	2L
5	Junction with Sultanpur- Kapurthala road – Kapurthala	Kapurthala	20	17	17.3-0	MDR61	2L
G	Corridor: Ferozpur- Zira - Kotisekhon-Dharmakot						
1	Ferozepur – Zira	Firozpur	35	35	0-34.7	SH20	2L
2	Zira – Kotisekhan	Firozpur	15	15	24-9.5	ODR	2L
3	Kotisekhan – Dharamkot	Firozpur	9	9.32	9.5-0	ODR	IL
H	Corridor: Patiala- Nabha						
1	Patiala – Nabha	Patiala	26	26	0-26	MDR32	2L
	Sub-Total (Package-2 & 3 roads)		388.7	380.71			
I	Corridor: Amritsar- Mehta-Srihargobindpur- Tanda- Bilohwal-Hoshiarpur						
1	Amritsar – Mehta	Amritsar	35	38.64	4.83-40	SH22	2L
2	Mehta – Srihargobindpur	Amritsar/ Gurdaspur	20	17.16	40-60.2	SH22	2L
3	Srihargobindpur - Tanda	Gurdaspur/ Hoshiarpur	19	19	19.1-0	SH22	2L
4	Tanda – Bilohwal	Hoshiarpur	16	15	32-17	SH22	2L
5	Bulohwal - Hoshiarpur	Hoshiarpur	12	12.9	17-4.1	SH22	2L
J	Corridor: Anandpur Sahib- Nangal						
1	Anandpur Sahib-Nangal	Rupnagar	21	20.5	39-59	SH	2L
K	Corridor: Ropar- Morinda- Sirhind-NH1						
1	Ropar – Morinda	Rupnagar	20	17.87	18.1-0	ODR	IL
2	Morinda – Sirhind	Rupnagar/ Fatehgarh Sahib	19	19.1	24.2-5	ODR	IL
3	Sirhind – NH1	Fatehgarh Sahib	5	5	5-0	ODR	2L+PS

Corridor/ Link No.	Name of the Link	District	Length as per TOR (km)	Length as per PWD (km)	Range of Chainage (km) as per km-Stone	Desig-nation/ Class of Road	Existing Configu-ration
L	Corridor: Nabha- Bhawanigarh-NH71- Sunam- Bhiki- Harisinghwala-Maur- Kotfateh- Kot shamir						
1	Nabha - Bhawanigarh	Patiala/ Sangrur	15	14.7	0-14.5	SH12A	2L
2	Bhawanigarh – NH71	Sangrur	16	16.1	2.2-67.7	SH12A	2L
3	NH71 – Sunam	Sangrur	8	8		SH12A	2L
4	Sunam – Bhiki	Sangrur/ Mansa	27	27.7		SH12A	2L
5	Bhiki - Harisinghwala	Mansa	15	13.72		SH12A	2L
6	Harisinghwala - Maur	Mansa/ Bathinda	17	17.05	67.7-84.7	SH12A	2L
7	Maur – Kotfateh	Bathinda	17	17	84.7-101.7	SH12A	2L
8	Kotfateh - Kot shamir	Bathinda	7	7	101.7-108.9	SH12A	2L
M	Corridor: Khanna- Melerkotla						
1	Khanna - Melerkotla	Ludhiana/ Sangrur	42	42.11	0-24.05/ 18.2-0	MDR33	IL
N	Corridor: Neelon- Doraha- NH95						
1	Neelon - Doraha	Ludhiana	9	9.3	0-9.2	ODR	2L
2	Doraha – NH95	Ludhiana	24	24	9.2-35.6	ODR	2L
O	Corridor: Sahnewal- Dehlon						
1	Sahnewal – Dehlon	Ludhiana	16	16.46	0-16.35	ODR	IL
P	Corridor: Sangrur – Sunam-Lehragaga- Border						
1	Sangrur- Sunam	Sangrur	12	11.5	0-11.5	MDR21	2L
2	Sunam – Lehragaga	Sangrur	27	27	0-26	MDR21	IL
3	Lehragaga - Border	Sangrur	13	14.41	26-42	MDR21	IL
Q	Corridor: Patiala- Ghuram						
1	Patiala- Junction with MDR (Sanajr-Naneola)	Patiala	27	22.98	3-24.6	SH8	2L
2	Junction with MDR (Sanajr- Naneola) - Border	Patiala	8	8	0-8.2	SH8	2L
R	Corridor: Patran- Border						
1	Patran – Border	Patiala/ Sangrur	29	30.98	124.5-155.4	SH10	IL
S	Corridor: Dakha- Raikot- Mahalkalan-Barnala- Handiaya- Harisinghwala-Mansa- Sardulgarh						
1	Dakha – Raikot	Ludhiana	23	22.84	0-22.8	SH13	2L
2	Raikot - Mahalkalan	Ludhiana/ Sangrur	13	14.74	42-75.6	SH13	IL
3	Mahalkalan - Junction with MDR	Sangrur	11	11		SH13	2L
4	Junction with MDR - Barnala	Sangrur	9	9.6		SH13	2L
5	Barnala - Handiaya	Sangrur	3	3.5	78-82	SH13	2L+PS

Corridor/ Link No.	Name of the Link	District	Length as per TOR (km)	Length as per PWD (km)	Range of Chainage (km) as per km-Stone	Desig-nation/ Class of Road	Existing Configu-ration
6	Handiaya - Harisinghwala	Sangrur/ Mansa	38	38.2	82-120	SH13	IL
7	Harisinghwala - Mansa	Mansa	7	7.3	120-127	SH13	2L+PS
8	Mansa - Sardulgarh	Mansa	35	44.67	127-162	SH13	IL
T	Corridor: Border- Sitoganno- Malout-Mukatsar						
1	Border – Sitoganno	Firozpur	15	17.37	40.6-25.75	SH16	2L
2	Sitoganno - Malout	Firozpur/ Muktsar	22	19.7	21-0	SH16	2L
3	Malout – Mukatsar	Mukatsar	30	29.05	29.65-0	SH16	2L
U	Corridor: Abohar- Mukatsar-Kotkapura						
1	Abohar - Junction with Fazilka-Malout road	Firozpur/ Muktsar	19	19	48-28.2	MDR61	IL
2	Junction with Fazilka-Malout road - Mukatsar	Muktsar	29	29	28.2-0	MDR61	IL
3	Muktsar - Kotkapura	Muktsar/ Faridkot	32	32	32-0	SH16	2L
V	Corridor: Kotkapura- Jaitu- Goniana						
1	Kotkapura - Jaitu - Goniana	Faridkot/ Bathinda	29	30.11	0-30.25	ODR	IL
W	Corridor: Jaitu- Bajakhana- Bhagta-Salabatpura- Bhadaur- Pakhoke						
1	Jaitu - Bajakhana - Bhagta - Salabatpura to distt. Boundary	Faridkot/ Bathinda	39	38.65	9.5-58.2/ 0-29.2	MDR43	IL
2	From Distt. Boundary - Bhadaur – Pakhoke	Bathinda/ Sangrur	18	18	29.2-11.79	MDR43	IL
X	Corridor: Ferozepur- Mallanwala-Makhu- Kotisekhan- Moga						
1	Ferozepur - Mallanwala	Firozpur	24	22.35	0-11.2/ 28-17	ODR9	IL
2	Mallanwala - Makhu	Firozpur	17	17.2	17-0	ODR10	SL/IL
3	Makhu - Kotisekhan	Firozpur	25	23.61	75.45-38.6	SH19	2L
4	Kotisekhan – Moga	Firozpur/ Moga	15	15	15-0	SH19	2L
Y	Corridor: Taran Taran- Jandiala						
1	Taran Taran – Jandiala	Amritsar	15	14.87	15-0	ODR	2L
Z	Corridor: Batala- Mehta- Beas						
1	Batala – Mehta	Amritsar	17	18.95	0-16	SH66	2L
2	Mehta – Beas	Amritsar/ Gurdaspur	18	18.32	16-34.3	SH66	2L
AA	Corridor: Jalandhar- Kapurthala						
1	Jalandhar – Kapurthala	Jalandhar/ Kapurthala	19	13.8	13-0.6	MDR52	2L
AB	Corridor: Bathinda- Talwandi Sabo						
1	Bathinda - Talwandi Sabo	Bathinda	30	24.63	5.3-31.5	SH17	2L

Corridor/ Link No.	Name of the Link	District	Length as per TOR (km)	Length as per PWD (km)	Range of Chainage (km) as per km-Stone	Desig-nation/ Class of Road	Existing Configu-ration
AC	Corridor: Amritsar- Fatehgarh Churian- Dera Baba Nanank- Gurdaspur						
1	Amritsar – Fatehgarh Churian - Dera Baba Nanank - Gurdaspur	Amritsar/ Gurdaspur	79.3	79.3	3.25-81.88	MDR64/ MDR68	IL/2L
AD	Corridor: NH64- Bhikhi- Budhlada- Ratia						
1	NH64 - Bhikhi - Budhlada – Ratia	Sangrur/ Mansa	59	59.5	0-25.8/ 0-33.75	ODR/ MDR20	IL
AE	Corridor: Firozpur- Faridkot						
1	Firozpur – Faridkot	Firozpur/ Faridkot	30	30.27	31.22-0.95	SH15	2L
AF	Corridor: Kapurthala- Nakodar- Phillaur						
1	Kapurthala – Nakodar – Phillaur	Kapurthala/ Jalandhar	65	66.97	14.5-78.82	MDR48	IL
AG	Corridor: Jagroan- Rajkot						
1	Jagroan – Rajkot	Ludhiana	26	22.2	0-23.5	MDR51	IL
AH	Corridor: Nawanshehar- Aur						
1	Nawanshehar – Aur	Nawanshahar	11	11.4	0-11.8	JODR9	IL
	Sub-Total		1318.3	1316.28			
	Grand Total		1707	1696.99			

E.3 Environmental Screening

3.1 Definition of Project Influence Area

For identification of impacts of road improvement on the sensitive & nationally/ regionally important environmental features like eco-sensitive areas (reserve forests, national parks, sanctuaries, bio-sphere reserves, sacred groves, protected areas, wetlands, major rivers etc.), cultural heritage & archaeological sites, as well as for defining general environmental setup like topography, climate, air, water & noise quality etc. the project influence area (or the study corridor) has been defined as the area falling within 7 km on either side of the project roads. However, for the roadside features like roadside religious structures, educational institutions, medical amenities, water bodies, roadside trees etc. on which impacts of road improvement are generally confined within few meters of the ROW, the project influence area has been taken as 100 m on either side of the project road.

3.2 Environmental Aspects Studied During Screening

Environmental screening of 1703 km of roads was undertaken to determine the roads which has no major environmental issues and which roads will require further environmental analysis including the analysis of alternative alignment if appropriate, to resolve such issues.

Emphasis has been given on collection and analysis of available secondary information supplemented by appropriate site surveys to fulfill the data gaps & stakeholder consultation on sensitive and/or critical natural habitats (e.g. national parks, reserves, wildlife sanctuaries, sacred groves, protected areas, forests, wetlands etc.), major river & waterways, cultural heritage sites and any other potentially sensitive areas. During screening the following aspects have been covered:

- Sensitive natural habitats (National Parks, Sanctuaries, Wetlands, Protected & Reserved Forests)
- Surface water resources (rivers, canals, ponds etc.)
- Ground water conditions
- Water use. availability of water & water quality
- Water logging, flooding & drainage issues (area/road-side)
- Preservation & management of soil resources (erosion, embankment height etc.)
- Loss of trees for upgradation
- Material sources- earth (borrow area) & aggregates (quarry), environment friendly construction material, e.g. fly ash from power plant
- Management and disposal of debris and bitumen
- Baseline pollution (air, noise, soil & water)
- Pre-dominant land use
- Sensitive community properties (religious/ cultural property, water sources etc.)
- Cultural heritage sites
- Safety related issues & accident due to roadside trees in particular area
- Collection/ compilation of information on baseline conditions from primary & secondary sources
- Detail recording spot consultation with stakeholders consisting of name, occupation and opinion of the participants
- Fill-in data gaps
- Location specific design recommendation (if required)
- Identification of VECs
- Framing management measures for avoidance & mitigation of potential adverse environmental impacts
- Identification of roads with no major environmental issues
- Identification of roads for which detailed assessment is required

3.3 Identified VECs & their Distance from Project Roads

In Punjab there is no national parks or tiger reserve. In the following VECs has been found within the project influence area of the project roads *(Table-2):*

- Wildlife sanctuaries & wetlands
- Religious & cultural heritage places
- Major rivers

Table-2 Distance of the Eco-sensitive Areas from the Nearest Project Road

SN	Name of Sanctuary	District	Nearest Link	Dist. (km) from Nearest Link
	Wildlife Sanctuaries:			
1	Bir Moti Bagh	Patiala	Patiala – Junction with MDR (Sanajr-Naneola)	10
2	Bir Bhunerheri	Patiala	Junction with MDR (Sanajr-Naneola) – Border	15
3	Bir Gurdialpura	Patiala	Patran – Border	15
4	Bir Dosanjh	Patiala	Patiala – Nabha Nabha – Bhawanigarh	3 3
5	Bir Mehas	Patiala	Patiala – Nabha Nabha – Bhawanigarh	3 0.3
6	Bir Bhadson	Patiala	NH1 – Patiala	32
7	Bir Aishwan	Sangrur	Dhuri – Sangrur, Sangrur – Sunam Bhawanigarh – NH71, NH71 – Sunam Sunam – Biki, Sunam - Lehragagga	4 5 10
8	Abohar	Firozpur	Abohar – Junction with Fazilka – Malout road	10
9	Harike	Amritsar, Firozpur & Kapurthala	Mallanwalla - Makhu, Makhu – Kotisekhan	8
10	Takhni-Rehmapur	Hoshiarpur	Bilohwal – Hoshiarpur	15
11	Jhajjar-Bacholi	Rupnagar	Anandpur Sahib – Nangal	5
	Ramsar Sites:			
1	Harike Lake	Amritsar, Firozpur & Kapurthala	Mallanwalla - Makhu, Makhu – Kotisekhan	8
2	Ropar Wetland	Rupnagar	Ropar – Morinda	4
3	Kanjli Lake	Kapurthala	Sultanpur-Kapurthala road Jn– Kapurthala, Jalandhar – Kapurthala, Kapurthala – Nakodar Mehta – Beas	15 10
	State Wetlands:			
1	Keshopur Miani Jheel	Gurdaspur	Amritsar – Dera Baba Nanak – Gurdaspur	20
2	Chhawrian Banghar Chhamb	Gurdaspur	Amritsar – Dera Baba Nanak – Gurdaspur	15
3	Jastarwal Jheel	Amritsar	Amritsar – Dera Baba Nanak – Gurdaspur	25
4	Dholbaha Reservoir	Hoshiarpur	Bilohwal – Hoshiarpur	30
5	Mand Barthala	Nawan Shehar	Rahon – Aur Nawashahar-Aur	4 10
6	Hussani Wala Wetland	Firozpur	Firozpur – Zira, Firozpur – Mallanwala, Firozpur – Faridkot	15
7	Nangal Lake	Rupnagar	Anandpur Sahib – Nangal	3
8	Ranjit Sagar Dam	Gurdaspur	Amritsar – Dera Baba Nanak – Gurdaspur	25

3.4 Corridor Wise Roadside Features

Corridor wise number of salient environmental features like schools/colleges, hospitals, temples/Gurdwaras, canal/ river/ drain crossings, ponds, tubewells etc. are given in **Table-3**.

Table-3 Corridor Wise Number of Various Roadside Features

SN	Corridor Name	Length (km)	School/ College	Hos-pital	Temple/ Gurd-wara	Canal/ River Cross	Pond	Hand-pumps in ROW	Trees per km
1	NH 1- Patiala	28.21	4	2	9	0	0	8	531
2	Kharar- Landran- Banur- Tepla	39	6	0	3	0	0	9	572
3	Chandigarh- Landran- Chunni- Srihand	31.78	5	5	11	2	2	10	463
4	Rahon- Aur- Phillaur	33.73	10	0	18	0	0	4	342
5	Ludhina- Dehlon- Malerkotla- Dhuri-Sangrur	72.29	16	2	31	9	8	8	385
6	Attari- Chabal- Tarn Taran- Fatehabad-Kapurthala	90.38	17	0	15	22	18	26	405
7	Ferozpur- Zira - Kotisekhon- Dharmakot	59.32	7	2	7	11	6	11	489
8	Patiala- Nabha	26	3	1	8	6	0	5	577
9	Amritsar- Mehta- Srihargobindpur- Tanda-Bilohwal- Hoshiarpur	102.7	27	17	27	90	8	209	394
10	Anandpur Sahib- Nangal	20.5	6	4	10	17	0	38	240
11	Ropar- Morinda- Sirhind- NH1	41.97	13	11	17	5	4	15	469
12	Nabha- Bhawanigarh- NH71- Sunam-Bhiki- Harisinghwala- Maur- Kotfateh- Kot shamir	121.27	26	3	36	3	15	75	1072
13	Khanna- Melerkotla	42.11	8	2	15	0	2	27	419
14	Neelon- Doraha- NH95	33.3	4	2	9	3	2	24	444
15	Sahnewal- Dehlon	16.46	2	3	6	14	0	37	360
16	Sangrur – Sunam- Lehragaga- Border	52.91	12	2	9	23	8	17	473
17	Patiala- Ghuram	30.98	8	1	17	3	2	21	502
18	Patran- Border	30.98	12	12	9	3	11	6	444
19	Dakha- Raikot- Mahalkalan- Barnala-Handiaya- Harisinghwala- Mansa-Sardulgarh	151.85	34	9	25	78	5	148	341
20	Border- Sitoganno- Malout- Mukatsar	66.12	10	1	18	16	1	28	429
21	Abohar- Mukatsar- Kotkapura	80	18	9	19	14	4	38	200
22	Kotkapura- Jaitu- Goniana	30.11	8	1	7	17	3	14	327
23	Jaitu- Bajakhana- Bhagta- Salabatpura-Bhadaur- Pakhoke	56.65	11	3	10	1	3	16	671
24	Ferozepur- Mallanwala- Makhu-Kotisekhan- Moga	78.16	20	1	20	13	4	47	617
25	Taran Taran- Jandiala	14.87	5	2	7	1	2	7	72
26	Batala- Mehta- Beas	37.27	14	3	7	15	3	74	361
27	Jalandhar- Kapurthala	13.8	6	6	8	0	0	2	538
28	Bathinda- Talwandi Sabo	24.63	6	3	12	5	8	18	744
29	Amritsar- Fatehgarh Churian- Dera Baba Nanank- Gurdaspur	79.3	24	8	24	102	9	109	203
30	NH64- Bhikhi- Budhlada- Ratia	59.5	9	7	14	13	9	94	376
31	Firozpur- Faridkot	30.27	12	1	10	7	4	19	659
32	Kapurthala- Nakodar- Phillaur	66.97	6	1	23	0	0	30	354
33	Jagroan- Rajkot	22.2	7	4	7	3	5	33	192
34	Nawanshehar- Aur	11.4	3	1	5	3	0	38	154
	Total	1696.99	379	129	473	499	146	1265	-

3.5 Findings of Environmental Screening

- There is no environmental constraint that critically affect the rehabilitation & upgradation of the roads.

- Though for upgradation roadside trees on one side and on both sides have to be felled depending on the scale of widening, the impact is not critical as the trees have only timber value and of no cultural importance, and the felling of such trees will be compensated by replantation.

- None of the roads is passing through eco-sensitive areas like reserve forests and sanctuaries. Though there are some wildlife sanctuaries in the state they are far away (min 300 m and maximum 32 km) from the project roads and therefore will not be affected by the road improvement programme.

- The roadside schools, hospitals & temples are mostly outside the ROW and will not be affected for rehabilitation or upgradation without land acquisition. They will be affected only in case of upgradation like 4-Laning where additional land acquisition is required.

E.4 Stakeholder Assessment & Consultation

After a systematic analysis the following major groups of stakeholders have been identified related to this project:

- Local people that include local residents, shopkeepers, farmers & businessmen
- Local bodies like Village Panchayats, Municipalities, Gurdwara Committees etc.
- Selected govt. agencies e.g.
  - Public Work Department (PWD)
  - State Forest Department
  - State Irrigation Department
  - State Agricultural Department
  - State Tourism Department
  - State Archeological Department
  - Punjab State Electricity Board
  - State Transport Department
  - Railways
- Project affected persons (PAPs) i.e. peoples likely to be affected e.g. owners of the roadside houses, shops & other establishments like schools, colleges, hospitals, temples etc.
- Local NGOs

The consultation process established for the project has employed a range of formal and informal discussions, in-depth interviews, focus group discussions, on-site consultations and meetings.

The enactment of the participation and consultations with the primary stakeholders was done at local or village level in areas where problems were noted.

Stakeholders consultation has been conducted in various stretches of the road in rural and urban areas. The issues were discussed with the local community which included the farmers, shopkeepers, traders, local residents and project affected persons. Concerned governmental departments were also consulted regarding the area of impact due to the project. Some NGOs were consulted.

During public discussions some demands have been raised by the public which is addressed by the project however some issue cannot be addressed by the project. The issues are provided in *Table-4*.

Table-4 Issues to be Addressed in Project Design

Issues to for Consideration in the Project	Stage of Consideration
• Road side structures to be demolished for the project shall be compensated by the project.	RAP
• Religious structures falling in the ROW shall be relocated after community consensus.	EMP
• Tree plantation shall be carried along the road.	EMP
• Compensatory plantation shall be carried out in consultation with Forest Dept.	EMP
• Forest Clearance shall be obtained from the Forest Department prior to tree felling.	Pre-construction
• Construction work shall be carried during day times only in settlement areas to avoid noise pollution and noise barriers shall be installed at sensitive locations.	EMP
• Water shall be sprinkled at construction site to avoid dust pollution.	EMP
• Traffic management shall be strictly followed to avoid inconvenience and accident at the construction site. Flags and proper signage shall be provided at construction site.	Construction Management
• Proper drainage shall be provided along the roads to prevent flooding and water logging.	Design
• Bitumen waste shall be recycled and reused. Camp site solid waste shall be disposed as per local rule.	Construction Management
• Workers camp shall be located away from Sanctuary and Reserve Forest area to avoid any disturbance to the ecosystem.	Construction Management
• Water for construction shall be taken from canal after approval from Irrigation Dept.	Construction Management
• Borrow material shall be extracted from identified site only after the approval from the owner.	EMP
• Fly ash shall be used for construction work for high road embankment falling within 100 km of the coal based thermal power plant.	EMP
• Road side water bodies shall be protected from getting polluted. Silt fencing shall be provided during construction near water bodies.	EMP
• Cultural and Archeological site shall be protected. No harm shall be done to any such property.	Construction Management
• Transmission lines shall be shifted in consultation with Punjab State Electricity Board.	Construction Management
• Enhancement of public places shall be conducted.	Construction Management

Issues to for Consideration in the Project	Stage of Consideration
• Pedestrian & vehicular underpasses shall be provided for 4-Lane	Design
• At some places like Mallanwala, Mali, Fategarh Churian, Janer, Mohalna etc people have demanded for bus stop. Further study is required in DPR stage to take final decision.	Design
• People in semi-urban and industrial areas like Kurali, Shika chowk Barnala, Mallanwada, Bellerkhanpur etc. have demanded for truck terminals. Further study is required in DPR stage to take final decision. This issue shall be given special attention in the project design in DPR stage.	Design
• It was demanded by the public that roadside drain outlet should not be opened at agricultural field. This issue is critical and drains shall be connected to natural drain/ nala wherever feasible.	Design
• The people have demanded for construction of flyover at Kedara Jatla and Sirhind which apparently looks unjustified justified from the traffic view point. Instead of flyover, the junction should be redesigned & improved. Further study is suggested in DPR stage to check whether flyovers are really required.	Design
• Flooding problem for the roads which are get normally flooded is to be solved. This is to be given special attention in the project design in DPR stage.	Design

E.5 Preliminary Analysis of Impacts & Management Measures

An preliminary analysis of the potential environmental impacts of the road improvement during construction and operation phase along with recommended management measures is presented in matrix format in *Table-5.*

Table-5 Environmental Impacts and Management Measures

Area	Impacts	Management Measures
Construction	Phase:	
Topography & geology	• Disfiguration & change in existing profile of the land due to borrow pits & construction of new bypass. • Disturbance on geological setting due to quarrying. • Uncontrolled digging of borrow pits resulting in water accumulation & breeding of vector disease.	• Borrow pits will be allowed at only at pre-identified locations. • Borrow pits will be restricted to 1 m depth followed by resurfacing of pits. • Road building materials will be procured from approved and licensed quarries only. • Suitable seismic design of the bridge structures will be adopted to mitigate the earthquake impacts.
Soil	• Disruption & loss of productive top soil from agricultural fields due to borrow pits which may reduce crop yield. • Loosening of top soil & loss of vegetative cover along the road due to excavation & back filling	• Fly ash available within 100 km distance of the project road will be utilized for road embankment to save soil. • Adequate measures like adequate drainage, embankment consolidation & slope stabilization will be taken along the road to avoid soil erosion. • Top soils (15 cm) of borrow pit sites will be

Area	Impacts	Management Measures
	which will lead to enhanced soil erosion.	conserved and restored after excavation is over. • Accidental spillage of lubricants/oil and molten asphalt will be avoided by adherence to good practices.
Land use	• Loss of agricultural land resources due to land acquisition for the road. • Generation of solid waste in the form of construction spoils from construction sites. • Changes in existing land use pattern of the ROW for construction of the road. • Generation of bituminous waste due to scarifying of damaged pavement	• Earth material generated from excavation of roadways & drainage will be reused during site development. • Construction debris will be disposed of in suitable pre-identified dumping areas. • Dumping areas will be biologically reclaimed. • Construction camp will be provided to avoid indiscriminate settlement of construction workers. • Regular inspection of construction site will be carried out to ensure regular removal of construction debris. • Scarified bitumen will be recycled for use below Subgrade under pavement or below GSB under shoulder.
Drainage	• Change in drainage pattern of the land. • Increased incidence and duration of floods due to obstruction of natural drainage courses by the road embankment. • Chances of filling of existing drainage courses during earth filling.	• Adequate longitudinal drainage facilities will be provided along the road to facilitate its long life, and to avoid soil erosion & land degradation. • Adequate cross drainage works & structures will be provided for smooth passage of runoff to avoid flooding. • Filling of existing drainage courses will be strictly avoided. • Suitable drainage at construction site & camp will be provided to avoid water stagnation, soil erosion & mosquito breeding.
Water bodies	• Loss of water resources due to complete or partial filling up of few ponds/water bodies along the road.	• Filling of water bodies along the road alignment will be minimized by providing retaining walls.
Water use	• Impact on the local water sources due to use of construction water.	• Minimum use of existing water sources for construction will be ensured to minimize likely impacts on other users.
Water quality	• Increase of sediment load in the run off from construction sites and increase in turbidity in receiving streams/water bodies. • Water pollution due to sewage from construction camps.	• Sediment traps will be provided to reduce sediment load in construction wastewater. • Proper sanitation facilities will be provided in construction camp to prevent health related problems. • All the construction activities will be carried out during dry seasons only.
Air quality	• Deterioration of air quality due to fugitive dusts emission from construction activities like excavation, backfilling & concreting, and hauling & dumping of earth materials & construction spoils, and	• Construction materials will be stored in enclosed spaces to prevent fugitive emissions. • Truck carrying soil, sand and stone will be duly covered to avoid spilling. • Adequate dust suppression measures such as regular water sprinkling on haul & unpaved roads particularly near habitation will be undertaken to control fugitive

Area	Impacts	Management Measures
	vehicular movement along unpaved roads. • Deterioration of air quality due to gaseous emissions from construction equipment & vehicular traffic. • Deterioration of air quality due to emission from asphalt and hot mix plants.	dust. • Stringent construction material handling/overhauling procedures will be followed. • Low emission construction equipment & vehicles will be used. • It will be ensured that all construction equipment & vehicles are in good working condition, properly tuned & maintained to keep emissions within permissible limits. • Asphalt and hot mix plants will be located at least 500 m away from inhabited areas and 300 m from the road.
Noise level	• Increase in noise level due to construction activities like operation of construction equipment & vehicular traffic.	• Construction camp and temporary labour sheds will be located away from the immediate vicinity of the construction sites and major road traffic. • Protective gears such as ear plugs etc. will be provided to construction personnel exposed to high noise levels as preventive measure. • Low noise construction equipment will be used. • It will be ensured that all construction equipment & vehicles are in good working condition, properly lubricated & maintained to keep noise within permissible limits. • Stationary construction equipment will be placed sufficiently away from inhabited areas and silence zones. • Construction activities carried out near residential area will be scheduled to the day time only so that minimum disturbances are caused to people.
Floral & fauna	• Loss of flora & loss of habitat of avian fauna due to felling of trees along the ROW. • Short term disturbance to avian fauna.	• Action plan for tree felling will be prepared to avoid uncontrolled & indiscriminate tree felling. • Appropriate compensatory plantation will be initiated to compensate the vegetation loss due to felling of trees. • Median hedge will be developed to enhance the aesthetic look & reduce headlight glare. • Preferential plantation of flowering trees with less timber & fruit value will be carried out. Fruit bearing trees will not be planted to avoid entry of people into the access controlled highway for collecting fruits. • Cooking fuel will be provided to construction workers to avoid cutting/felling of trees for fuel wood.
Amenities & cultural properties	• Partial or total effect on roadside educational, medical & other amenities, and religious & cultural properties like temples	• Affected tube wells, temples & mosques will be suitably relocated. • Compensation will be given for other affected amenities like schools, colleges, hospitals, banks,

Area	Impacts	Management Measures
	& mosques due to additional land acquisition.	post-offices & markets.
Rehabilitation & resettlement	• Acquisition of agricultural land which is the source of sustenance of those families. • Demolition of houses & other structures within ROW resulting in displacement of people.	• Adequate & equitable compensation, rehabilitation & resettlement measures for PAPs will be implemented to avoid social conflicts.
Employment & trading opportunities		• Most of the construction labourers will be recruited from local areas (especially PAPs) to alleviate social tension of migration. • Some of the construction materials like stone chips & sand will be procured locally.
Construction camp	• Influx of construction work-force & supplier who are likely to construct temporary tents in the vicinity. • Likely sanitation & health hazards & other impacts on the surrounding environment due to inflow of construction labourers.	• Temporary construction camps with adequate potable water supply, sanitation & primary health facilities and fuel for cooking will be provided to accommodate construction workers. • It will be ensured that the construction workers are provided fuel for cooking to avoid cutting of trees from the adjoining areas. • Domestic as well as the sanitary wastes from construction camps will be cleared regularly and disposed as per local practice stipulated by local administration (Municipalities, Panchayats etc.).
Occupational health & safety	• Health & safety related problems to construction workers due to inadequate health & safety measures.	• Adequate safety measures complying to the occupational safety manuals will be adopted to prevent accidents/hazards to the construction workers • Periodic health check-up of construction workers will be done.
Road safety	• Increase on incidence of road accidents due to disruptions caused in existing traffic movements.	• Proper traffic diversion and management will be ensured during construction at the interactions and construction areas. • Reduction of speed through construction zones.
Operation	Phase:	
Land use & Encroachment	• Change of land use by squatter/ encroachment within ROW and induced development outside the ROW.	• Planning agencies and Collector/ Revenue Officer will be made involved for controlled development and prohibiting squatter/ encroachment within ROW.
Drainage	• Filthy environment due to improper maintenance of drainage.	• Drainage system will be properly maintained.
Water quality	• Chances of contamination of water bodies from road surface run off containing oil spills due to traffic movement &	• Contingent actions will be taken for speedy cleaning up of oil spills, fuel and toxic chemicals in the event of accidents.

Area	Impacts	Management Measures
	accidents.	
Air quality	• Air pollution due to vehicular emission from road traffic.	• Vehicular emission will be controlled through enforcement of laws and public awareness. • Truck parking lay-byes and bus bays will be provided at required locations to facilitate smooth traffic flow. • Regular monitoring of air quality at specified locations will be conducted.
Noise level	• Noise pollution due to traffic noise.	• Vehicular noise & use of horns will be controlled through enforcement of laws and public awareness. • Road signs prohibiting the use of horns will be placed at residential areas, sensitive locations & silence zones. • Regular monitoring of noise level at specified locations will be conducted.
Flora & fauna	• Illegal felling of road side plantation. • Effect on aquatic fauna in case of accidental spill of oil, fuel & toxic chemicals into water bodies.	• Plantation along the ROW will be maintained properly and protected from illegal felling. • Contingent actions will be taken in the event accidental spill of oil, fuel & toxic chemicals.
Access	• Significant severance problem on pedestrian & cattle crossing and cross traffic due to widening, partially access control & increase in traffic speed.	• To avoid this severance problem all the measures like junctions improvement, service roads, underpasses & overpasses, median cuts etc. have been considered with utmost care which will facilitate to segregate local traffic & through traffic and also safe pedestrian movement. • Intersection & approach of existing major cross roads will be upgraded. • Service roads & underpasses will be provided for congested areas, local roads, major roadside public places & cattle/animal crossings to facilitate smooth traffic & pedestrian movement to avoid accidents. • Pedestrian facilities at urban stretches will be provided. • Truck lay-byes and bus bays will be provided at suggested suitable locations.
Road safety	• Impacts on human health due to accidents. • Damage of road due to wear & tear.	• Adequate traffic safety measures e.g. crash barriers & pedestrian railings will be provided wherever required. • Proper & adequate road signs, road markings, kerb paintings and road furniture like overhead gantry signs, roadway delineators etc. will be provided. • Adequate illumination will be provided at interchange locations for safe and efficient traffic operations specially during night and inclement weather. • Periodical inspection of the road will be conducted to

Area	Impacts	Management Measures
		detect anomalies in pavement. • Emergency telephone communication system, highway patrolling, crane and ambulance facilities will be provided.

E.6 Scoping for Project Environmental Assessment (Ea)

- For rehabilitation no widening & land acquisition is required. Therefore, for rehabilitation none of the roadside schools, hospitals, temples and ponds will be affected and no tree has to be felled. Practically there will be no environmental impact, and therefore, no EA is required. Only an environmental impact & mitigation checklist and a Generic EMP is required.

- For upgradation to 4-Lane additional land acquisition is required and therefore some of the roadside schools, hospitals, temples, ponds & tubewells will be affected at the side of widening and roadside trees at both sides have to be felled. In other upgradation cases like Widening from Intermediate Lane to 2-Lane or Widening from Single Lane to Intermediate Lane, no additional land acquisition is required, and therefore, none of the roadside schools, hospitals, temples and ponds will be affected. However, roadside trees which are within 3.5 from the edge of the carriageway have to be felled. Therefore, in case of upgradation full EA & EMP is required.

Table-6 Summary of Scoping

Issues/Criteria	Matching Improvement Proposal	Level of Further EA
• No land acquisition • No effect on roadside temples, schools, hospitals etc. • No tree felling • General construction impacts like dust, noise etc.	Rehabilitation where no RF/ sanctuary exists within 7 km	• No EA • Checklist of environmental impacts & mitigation measures • Generic EMP
	Rehabilitation with RF/ sanctuary within 7 km	• Limited EA • Generic EMP
• No land acquisition • No effect on roadside temples, schools, hospitals etc. • Limited tree felling on one side • RF/sanctuary within 7 km	Upgradation without land acquisition e.g.: • Intermediate to 2-Lane • Single to Intermediate Lane	• Full EA • Full EMP
• Additional land acquisition • Tree felling on both sides • Acquisition of roadside temples, schools, hospitals etc.	Upgradation involving land acquisition e.g.: • 4-Laning • New Bypass • Major Realignment.	
• Maintenance- General impacts like air pollution, noise etc. during maintenance overlaying	Maintenance of Roads	• No EA • No EMP • Checklist of environmental impacts & mitigation measures

Note: None of the roads passes through or outskirts reserve forests or sanctuary.

E.7 Environmental Inputs to Project Design

7.1 Location Specific Design Recommendations

Bypass:

Bypass is recommended at the following places:

- At Gill on Ludhiana- Dehlon- Pohir- Malerkotla- Dhuri- Sangrur Corridor
- At Pohir on Ludhiana- Dehlon- Pohir- Malerkotla- Dhuri- Sangrur Corridor
- At Jaitu on Kotkapura- Jaitu- Goniana Corridor

Pedestrian Footpaths/Walkways in Front of Schools & Gurdwaras:

A number of Gurdwaras & schools/ colleges have been found which are located just outside the ROW and their main gate opens directly into the road. It is also found that school children walks on the road pavement due to non-availability of paved footpath. Therefore it is recommended to develop paved footpath/walkway in front of major schools/colleges & Gurdwaras for safe movement of pedestrian.

7.2 Utilization of Fly Ash for Road Embankment

There exists 4 coal based Thermal Power Plants (TPP) in the State of Punjab namely:

1) Guru Govind Singh TPP at Ropar- located about 15 km north of Ropar town
2) Guru Nanak Dev TPP at Bhatinda- located about 10 km west of Bhatinda town
3) Guru Har Govind Singh TPP at Lehra Mohabbat (2x210 MW) - located 23 km east of Bhatinda
4) GVK Govindwal Sahib Power Project (2x250 MW) in Govindwal Sahib town in Amritsar district.

Therefore, as per provisions of the MOEF Notification on fly ash, ash available from the above TPPs shall be utilised for the construction of high embankments for the project roads falling within 100 km radius of these TPPs provided it is technically suitable & available in sufficient quantity.

7.3 Solid Waste Management

- Scarified bitumen will be recycled for use below Subgrade under pavement or below GSB under shoulder.
- Earth material generated from excavation of roadways & drainage will be reused during embankment & site development.
- The small amount of construction debris will be disposed of in suitable pre-identified dumping areas in tune with the local condition to avoid land degradation & water logging due to indiscriminate dumping.

7.4 Source of Quarry Materials

There are some existing quarries in Punjab namely Mirthal, Kumari Devi, Bharatgarh, Mubarikpur, Pathankot, Zirakpur etc. most of which are located around the border of the Punjab with Himachal Pradesh. The quarry materials required for construction & maintenance of the roads of Punjab is brought from these existing quarries. The quarry materials requirement of this project may also be fulfilled from these existing quarries. However, the availability and suitability of quarry materials has be investigated in detail during the preparation of DPR.

7.5 Opportunities for Enhancement Measures

There are some opportunities to develop of enhancement measures along with the improvement of the roads. They are:

- Guard railing & landscaping in front of Gurdwaras, schools & hospitals
- Landscaping at road round-abouts, intersections & interchanges, and flyovers & ROBs
- Landscaping at bus stands
- Landscaping at bus & truck terminals
- Enhancement measures like retaining wall & landscaping for roadside ponds

7.6 Issues to be Investigated in Detail During Detail EA

The following aspects need detail investigation/ study during the detail design & preparation of Detailed Project Report (DPR) of the roads:

- Drainage, water logging & roadside drains
- Location for disposal of solid wastes
- Utilization of fly ash
- Impacts on the VECs
- Availability, suitability & source of construction water
- Availability, suitability & source of quarry & borrow Materials
- Public Consultation for consensus for relocation of temple & community properties
- Accident prone areas & safety measures
- Pedestrian & cattle movement & safety measures
- Safety measures & access for roadside schools, temples, hospitals & other large community places
- Pedestrian facilities (traffic lights, subways, footbridge etc)
- Location of Hot Mix Plant (HMP) and other construction plant
- Location of noise barriers in front silence zones like schools, hospitals, temples & courts

E.8 Environmental Management Framework

8.1 Statutory Clearances Required & Responsibilities

The road improvement works will not require Environmental Clearance from the MoEF, Govt. of India as:

(a) land acquisition is nil in most cases or less than 20 m at few cases
(b) it does not passes through any ecologically sensitive areas, and
(c) cost of the new small bypasses will be less than Rs. 100 crores

As road side trees in Punjab is declared as protected forests, forest clearance is required from the State Forest Department prior to felling of roadside trees for widening / upgradation of roads.

Apart from Forest Clearance for felling roadside trees, other permissions like No Objection Certificate (NOC) from the State Pollution Control Board, permission for water to be used for construction, and permission for sand mining is required. The project would need total statutory clearances from Government of India and Government of Punjab of the over all project work, detail of which are described in *Table-7.*

Table-7 Statutory Clearances Required to be Obtained by Project Proponent

Sl. No.	Clearance Required for	Statute Under which Clearance is Required	Statutory Authority
1	Forest clearance for felling of trees from ROW of existing roads	Forest Conservation Act, 1980	Punjab State Forest Department
2	No objection certificate for the overall activities	EIA Notification, 1994 issued under EP Act, 1986	Punjab State Pollution Control Board
3	Permission for withdrawal of groundwater for construction	EP Act, 1986	Central Ground Water Board
4	Permission for sand mining from river bed	EP Act, 1986	Punjab Irrigation Department

Apart from the clearances for the overall project work, the contractor has to obtain required clearances for operating his equipment and carrying out construction work. The Clearance/ No Objection Certificates (NOC) which have to be collected by the contractor after mobilization but before starting the construction work are listed in *Table-8.*

Table-8 Clearances Required to be Obtained by Contractor

Sl. No.	Construction Activity for which Clearance Required	Statutory Authority	Statute Under which Clearance is Required
1	Hot mix plants, Crushers and Batch plants	Punjab State Pollution Control Board	Air (Prevention and Control of Pollution) Act, 1981 and The Noise Pollution (Regulation and Control) Rules, 2000
2	Storage, handling and transport of hazardous materials	Punjab State Pollution Control Board	Hazardous Waste (Management and Handling) Rules, 1989 & Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989
3	Location and layout of workers camp, & equipment and storage	Punjab State Pollution Control Board	EP Act, 1986 Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989

Sl. No.	Construction Activity for which Clearance Required	Statutory Authority	Statute Under which Clearance is Required
	yards		
4	Quarries (in case of opening of new quarries)	Department of Mining, Govt. of Punjab	Environment (Protection) Act, 1986
5	Discharges from labour camp	Punjab State Pollution Control Board	Water (Prevention and Control of Pollution) Act, 1974
6	Disposal of bituminous wastes, if any	Intimate local civic body to use local solid waste disposal site	Hazardous Waste (Management &and Handling) Rules, 1989

8.2 Environmental Monitoring Plan

The summary of environmental monitoring programmer during construction and operation stages are presented in *Table-9.*

Table-E9 Summary of Environmental Monitoring Programme

Component	Stage	Frequency of Monitoring
Air	Construction	3 times a year during construction period
	Operation	3 times a year for every 3 years
Water	Construction	4 times a year during construction period
	Operation	2 times a year for every 3 years
Noise	Construction	4 times a year during construction period
	Operation	Once a year for every 3 years
Soil	Construction	Once a year during construction period
	Operation	Once a year for every 3 years

Note: Monitoring in Operation Phase will be conducted every 3 years for 15 years.

8.3 Institutional/Implementation Arrangements

The PRBDB is responsible for the effective implementation of all the management measures suggested in EMP. And for this the organizational capacity of the PRBDB in environmental sector is to be streamlined & strengthened. To effectively oversee the project preparation and to ensure its timely implementation Contract Implementation Units (CIUs) of PRBDB are to be formed.

The entire state would be divided into 4 CIUs (this is under finalization by PRBDB). Each CIU, headed by an Officer of the rank of Executive Engineer, will be responsible for implementation of projects under its jurisdiction. An Environmental Management Plan Implementation Unit (EMPIU) will be established within CIU where an Officer (preferably in the rank of Asst. Engineer) would be responsible for monitoring the implementation of the EMP with the assistance of the Environmental Specialist of the Construction Supervision Consultant (SC) and the Contractor. The EMPUI of CIU will assist the CIU & PD and will interact with State Pollution Control Board (SPCB), State Forest Dept., NGO & various Committees for addressal of environmental issues. In the PRBDB Head Office there will be an Environmental Officer within

the Project Management Information System Unit (PMISU) who will assist the Project Director in environmental matters and interact with the CIUs and its EMPIU.

8.4 Training

A training programme needs to be worked out incorporating the project needs as well as the intermediate-term capacity building needs of the PRBDB. The programme should consist of a number of training modules specific to target groups. The training would cover the basic principles and postulates of environmental assessment, mitigation plans and programmes implementation techniques, monitoring and management methods and tools. Looking into the potential requirements of each of the target groups, several training modules had been suggested.