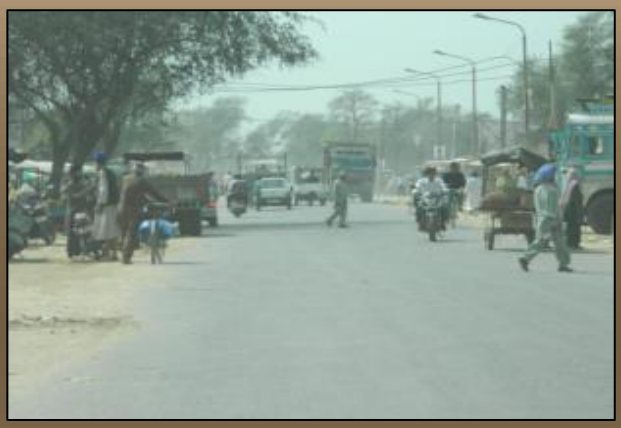
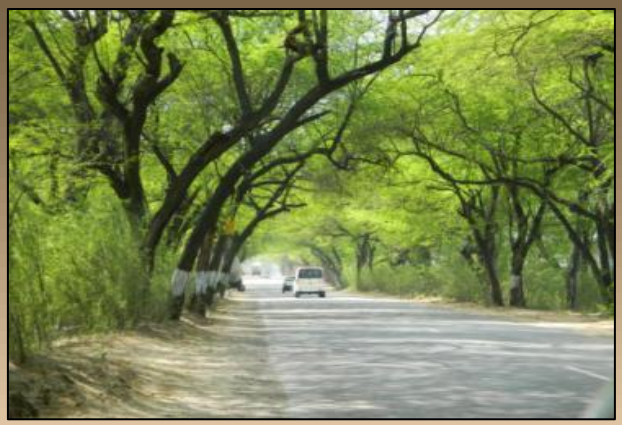
Public Works Department (Building & Roads) Punjab

OPRC for Improvement, Rehabilitation, Resurfacing & Routine Maintenance Works of Roads of Sangrur-Mansa-Batinda Contract Area





Environmental Screening Report

S2: Bhawanigarh - Sunam - Bhikhi – SH13 Intersection - Kot Shamir (SH 12 A)

May 2013

Patel Infrastructure Private Limited
Camp: Sangrur, Punjab

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1 INTRODUCTION

1.1 About OPRC

Output and Performance based Road Contract is designed to increase the efficiency and effectiveness of road asset management and maintenance. It ensures that the physical condition of the roads under contract is adequate for the needs of road users, over the entire period of the contract which is normally several years. The OPRC as a model for road asset management is similar to Design, Build, Maintain, Operate and Transfer (DBMOT) model of contracts which addresses the issue of inadequate incentives. Minimum road conditions and Service Levels are defined through output and performance measures, and these are used under the OPRC to define and measure the desired performance of the Contractor. In the OPRC, the defined performance measures are thus the accepted minimum thresholds for the quality levels of the roads for which the Contractor is responsible and covers all aspects of the contract

1.2 Project Background

The Output and Performance based Road Contract (OPRC) for Improvement, Rehabilitation, Resurfacing & Routine Maintenance works has been undertaken by the PWD R&B, Govt. of Punjab for project roads in Sangrur-Mansa-Bathinda Contract Area. The area under contract falls in the jurisdiction of the Sangrur, Mansa & Bathinda districts in Punjab. The project road of S2 Bhawanigarh – Suman – Bhikhi – SH 13 Intersection – Kot Shamir SH 13 is one of the roads in the OPRC project.

The interventions proposed by OPRC for the Roads of Sangrur-Mansa-Bathinda Contract Area are

- Improvement Works including widening of 128.900 Km
- Rehabilitation works including the treatment across the full width of pavement, including shoulders, over a continuous length of at least 100 meters for a total 74.780 Km
- Resurfacing works which shall cover the entire 203.680 km length over the entire duration of the contract period

The intervention proposed for the project road is improvement works including widening and rehabilitation of the existing 4 lane carriageway in urban areas.

1.3 Scope of Work

As defined in the Section VI Specifications – Environmental & Social Management, an ESMF Framework for the OPRC Project has already been prepared. The specifications lay down the requirement of Environmental Screening along with baseline data collection and mapping. It is also required to study the interventions proposed and the legal clearances that it attracts followed by Environmental & Social Impact Assessment which shall also formulate the EMP.

This report deals with environmental screening as envisaged for the project. The primary baseline data are being generated for air, water, noise & soil. A reconnaissance survey was conducted by the environmental team which has identified sensitive receptors in the project road.

1.4 Environmental Screening

Environmental screening study has been carried out to identify critical issues and areas that would be studied in detail for impact assessment, mitigation measures and management plan. Findings of the screening are presented in this report. Further details will be taken up during subsequent stages of the project preparation, if required. This report has been prepared based mainly on field survey and collection of secondary data.

In the screening stage, existing environmental set-up of the study corridor in general i.e., the Corridor of Impact (CoI) and the existing Right of Way (RoW) in particular were studied and is described in subsequent sections. The entire study was carried out within existing policy, legal and administrative framework considering the applicable environmental legislation, regulations and guidelines. The environmental screening report covers the following:

- Project Description
- Need & benefit of the project
- Legal Framework
- Baseline Environment
- Probable Environmental Impact

- Mitigation Measures

1.4.1 Methodology Adopted

Screening process consisted of the following types of activities:

1.4.1.1 Study of Background information

Study of Project Documents: the project documents are being studied to have the understanding of the project objectives, its main components, its boundaries etc.

Study of Laws and regulations: Laws and regulations enacted by Government of India and Punjab state relevant to road construction and environment were studied.

Study of Guidelines, Standards etc.: Various documents and publications of the Ministry of Environment and Forest (MoEF) and Indian Road Congress were studied for screening exercise.

1.4.1.2 Field Visit

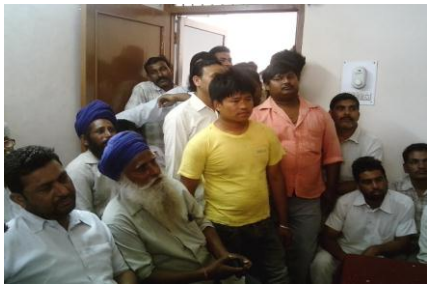
A team of environmental and social experts jointly carried out field visit of the project road. Important environmental components including, water bodies, forests, public utilities, community resources, cultural sites etc. along the corridor of impact zone were identified. Discussions with local people and administrators were also held to obtain their opinion about the project.

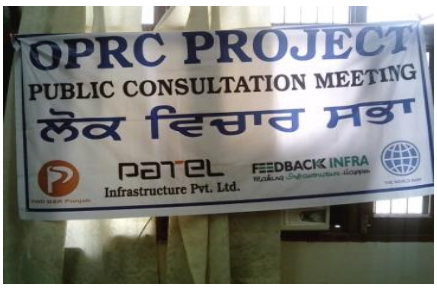
Table 1-1: Important Environmental Components

Sl. No.	Environmental Attributes	Environmental Components
1	Topography	Terrain
2	Land use	Agriculture, settlements, forest; industrial areas etc.
3	Water resources	Rivers, canals and ponds within COI
4	Forests & Wild Life	• Designated Protected Areas like Biosphere Reserves, National Parks and Sanctuaries etc.) within 10 Km from the proposed project location boundary • Presence of RF, PF other forests within COI
	Road side Plantations	Green Tunnels, Strip Plantation
5	Settlements	Towns and villages abutting the road corridor
6	Sensitive Receptors	Sensitive receptors such as educational and health facilities
7	Drinking water sources	Wells, hand pumps, community water points / taps etc.)
8	Religious Structures	Temples, shrines, mosque, church, gurudwara etc.
10	Cultural Properties	Protected / unprotected archaeological monuments)
11	Common Property Resources	Seating areas of the community; cremation / burial grounds etc.

Figure 1-1: Photographs of Consultations with Project Manager

Figure 1-2: Photographs of Community Consultations





1.4.1.3 Collection of Secondary Data

Data collection from the secondary sources has been done from various authentic and published sources. Following are some important information available from secondary sources.

- Project objectives, technical information on existing road features from Contract Document
- Inventory of road features like water bodies, community structures, environmentally sensitive locations areas, congested locations etc. from physical surveys
- Climatic condition & meteorological data from government websites &district groundwater brochure of CGWB & primary data collection
- Geology, seismicity, soil and topography from government websites & district groundwater brochure of CGWB
- Land Use from Google Earth and observation during surveys
- Drainage pattern from district groundwater brochure of CPCB & field observation
- Borrow areas, quarries and other construction material source from Contractor's sources

1.4.1.4 Generation of Primary Data

Field study / monitoring are being carried out to generate and collect primary data in the study corridor, which involves:

- Water quality monitoring at identified ground water and surface water locations
- Air quality monitoring at identified locations
- Ambient noise level monitoring at identified locations
- Enumeration of roadside trees by Contractor

2 PROJECT DESCRIPTION

2.1 Project Road

The project road S2 is a combination of Bhawanigarh – Suman – Bhikhi – SH 13 intersection - Kot Shamir section of SH12A. The project road S2 is 106.130 Km long and starts from Bhawanigarh and ends at Kot Shamir with SH 17. The proposed length of the project road is also 106.130 Km.

2.1.1 Project Influence Area

The project districts are Sangrur, Mansa & Bhatinda districts in Punjab State. The neighbouring districts / states are Haryana & Rajasthan in the South, Muktsar district in the west, Patiala district in east & Moga, Ludhiana, Faridkot & Fatehgarh Sahib districts in north. The existing & proposed Right of Way (RoW) varies from 35.2-45.72m as per records and Specifications of the contract. The Corridor of Impact (CoI) thus also varies from 50-60m. The project area as per MoEF guidelines is 500 m on either side of the project corridor i.e., a total of 1 Km.

2.2 Project Proponent

The project proponent is PWD R&B, Government of Punjab

2.3 Contractor

The Contractor for the project is Patel Infrastructure Pvt. Ltd. (Patel)

2.4 Need for the Project

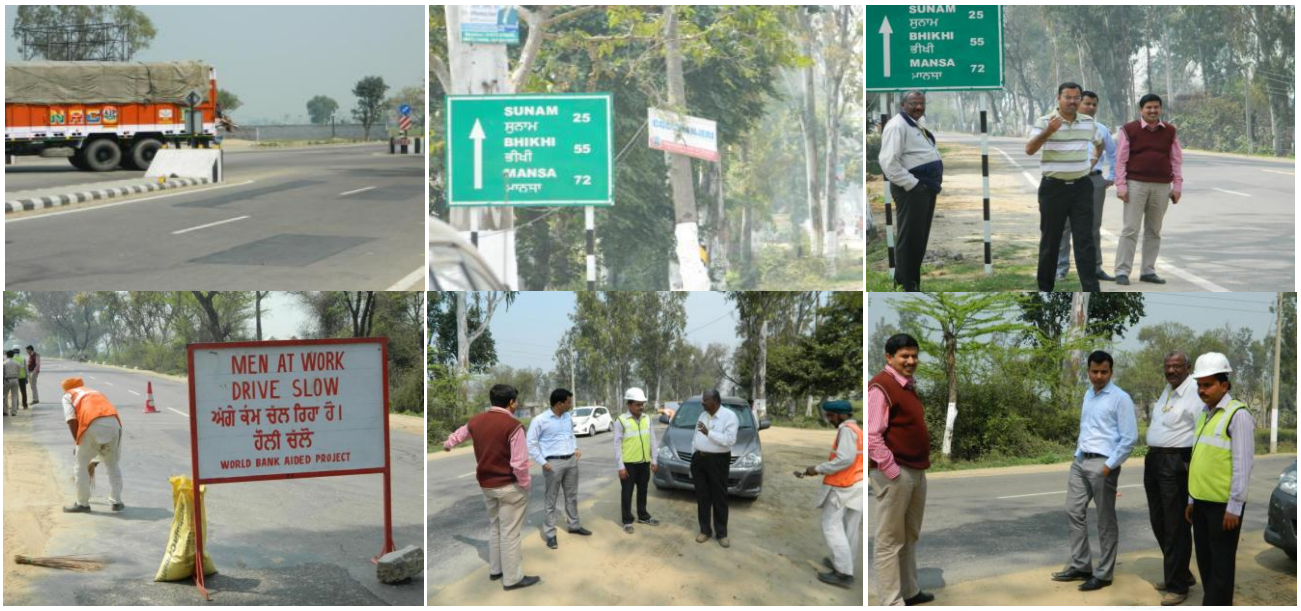
- Provide easy access to commuters from Bhawanigarh to Kot Shamir via Suman, Bhikhi, Cheema Mandi, Mansa & Maur Mandi
- The road links NH 7 with SH17
- Caters to the traffic growth pegged at 7.20% for Car, 4.00% for 2W, 3.20% for Bus, 5.77% for LCV, 2.44% for 2AT, 6.48% for 3AT & 6.53% for MAV Beyond 2022

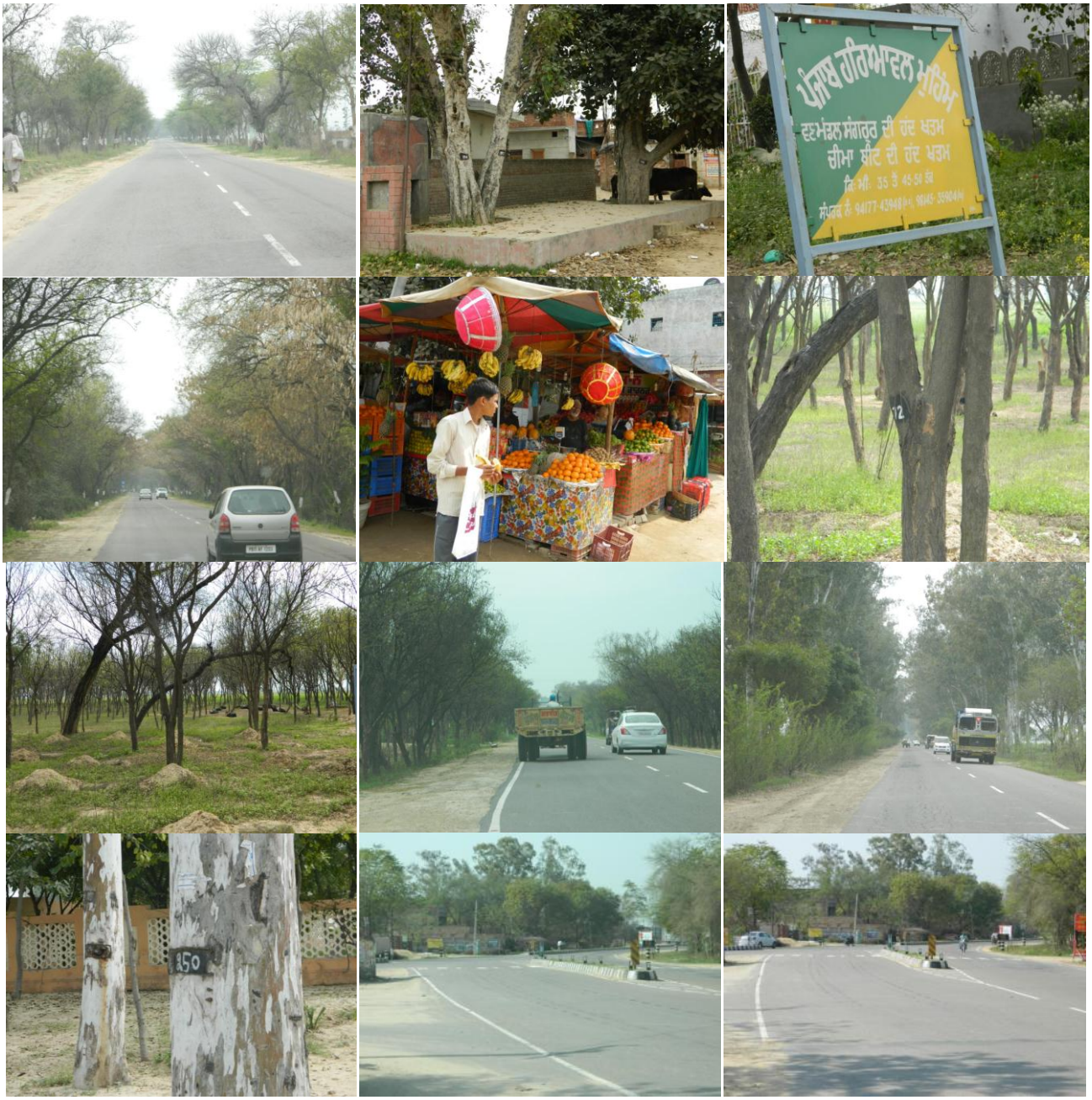
2.5 Expected Benefits

The major benefits of the project are:

- Project Road would bring about all-round development activities in the region, such as movement of people and goods, agriculture, commerce, education, health and social welfare, or even maintenance of law and order and security
- The proposed road is beneficial to travellers commuting between Bhawanigarh - Kot Shamir and thus provides ease of connectivity though other roads to major settlements of Sangrur, Barnala, Bathinda & Kot Shamir besides connecting directly the settlements of Suman, Bhikhi, Cheema Mandi, Mansa, Maur Mandi with Bhawanigarh & Kot Shamir

Figure 2-1: Photographs of Project Road





2.6 Existing Features

2.6.1 Alignment

- The project highway presently is 2 lane road for 103.860 Km and 4 lane divided carriageway for 2.2 Km
- Earthen shoulder of 0.5 to 1.0m width is observed on both sides along the project, paved shoulder is almost non existent
- The entire project road is of Flexible pavement
- Average embankment height varies from 0.5 m to 1.5 m

Table 2-1: Existing Cross Section details

Carriageway Width (m)	Earthen Shoulder Width (m)	Embankment Height (m)
7 & 14	0.5-1. 2	0.5 – 1.5

2.6.1.1 Right of way

The existing Right of Way (RoW) varies from 35.2-45.72m as per records and Specifications of the contract

2.6.1.2 Road inventory

The road has 8 major & 78 minor intersections. The road inventory details are given in Engineering Report.

Table 2-2: Existing Road Inventory

Major Intersection	Minor intersection	Major bridges	Minor bridges	PUP	Level Crossing	Flyovers	Culverts		ROB / RUB	
							Box / slab	Pipe	ROB	RUB
8	78	1	7	-	1	-	116	61	1	-

Source: Primary Road Inventory Survey

2.6.1.3 Traffic

The project road section had been divided into 1 homogenous section. The traffic was counted in 3 locations all along the project road. The average daily traffic along the project road is 9688, 9816 & 11823 PCUs at the three locations. The traffic is mainly mixed traffic.

2.7 Proposed Features

2.7.1 Alignment Proposal

- The length of the project road is 106.130 Km
- 2 lane configuration of 3.50m carriage way with 1.5m hard shoulder and 1m earthen shoulder except in urban / semi urban areas where covered drains & footpath are proposed
- 3 Typical Cross Sections (B1, B2, B3) for widening of to 2 lanes with paved shoulder status and 1 TCS - D for rehabilitation of the existing 4 lane road has been proposed as per Specifications and Contract Works of the project
- Both side minimum directional cross-fall of 2.5% proposed for the pavement, 3% for paved shoulders & 4% for earthen shoulders

2.7.2 Right of Way

- The proposed Right of Way (RoW) varies from 35.2-45.72m
- Presently no Land acquisition is proposed, however to improve the existing geometrical deficiencies as pre relevant IRC codes some minor LA might be required at a couple of places

2.7.3 Pavement

- Flexible pavements are proposed for all throughout the road

2.7.4 Geometric Design Aspects

- Minor improvements in geometrics is proposed along with widening of the existing road to 2 lane with paved shoulder status
- Design speed at urban is minimum 60kmph and in rural is minimum 80 & maximum 100 Kmph
- Rehabilitation of the existing 4 lane carriageway in urban areas are also proposed

2.7.5 Bypasses and Realignments

- The project doesn't proposes any bypasses and rehabilitations

2.7.6 Service roads

- No Service roads are proposed in the project road

2.7.7 Cross Drainage Structures

- The project road shall have the same CD structures as per existing which is given below

Table 2-3: Proposed Cross Drainage Structures

Major bridges	Minor bridges	Box / Slab Culverts	Pipe Culverts	Total
1	7	116	61	**185**

2.7.8 Other Structures

- No underpasses, overpasses & flyovers proposed

2.7.9 Drainage

- Drains have been provided on both the sides for the entire length of the road
- The length of unlined drains is drains is 92.190 Km while lined drains is 13.940 Km

2.7.10 Design of Intersections

All junctions have been studied thoroughly with respect to traffic volume and geometric design. The important junctions leading to settlements have been identified and proper junction layouts (including road marking, and traffic signs) shall be applied as per IRC-SP: 41-1994.

2.7.11 Traffic Control and Road Safety Features

Traffic control devices and road safety features, including Traffic Signs, Road Markings, Road lighting & Crash Barriers are proposed and designed as per relevant IRC codes and standards.

3 LEGAL FRAMEWORK

This section elaborates on the various clearance requirements for the project from the State Government and MoEF, GoI.

3.1 Environmental legislations and their implications / application

The Government of India has formulated various policy guidelines; acts and regulations aimed at protection and enhancement of environmental resources. The following table surmise the existing legislations pertaining to the project, the various clearances required for the project and the status as on date.

Table 3-1: Relevant Environmental Laws & Regulations

Sl. No.	Law / Regulation / Guidelines	Relevance	Applicable Yes / No	Reason for Application	Implementing / Responsible Agency
1	The Environmental (Protection) Act. 1986, and the Environmental (Protection) Rules, 1987-2002 (various amendments)	Umbrella Act. Protection and improvement of the environment. Establishes the standards for emission of noise in the atmosphere.	Yes	All environmental notifications, rules and schedules are issued under the act	MoEF, State Department of Environment & Forest, CPCB and SPCB
2	The EIA Notification, 14th September 2006 & subsequent amendments	Identifies expansion of National highways greater than 30 Km involving additional ROW greater than 20m involving Land Acquisition and all new state highway projects & SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas (item 7 (f) of schedule) as one of the projects requiring prior clearance.	No	Project road is neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas	MoEF / SEIAA
3	Notification for use of Fly ash, 3rd November 2009	Reuse fly ash discharged from Thermal Power Station to minimise land use for dispersal and minimise borrow area material. The onus shall lie with the implementing authority to use fly ash from Thermal Power station located in 100 Km radius of road unless it is not feasible as per IRC	Yes	Utilisation of borrow earth material & presence of Thermal Power Plant	MoEF, SPCB
4	The Water (Prevention and Control of Pollution) Act, 1974	Central and State Pollution Control Board to establish/enforce water quality and effluent standards, monitor water quality, prosecute offenders, and issue licenses for construction/operation of certain facilities.	Yes	Consent required for not polluting ground and surface water during construction	State Pollution Control Board
5	The Air (Prevention and Control of Pollution) Act. 1981	Empowers SPCB to set and monitor air quality standards and to prosecute offenders, excluding vehicular air and noise emission.	Yes	Consent required for establishing and operation of plants and crushers	State Pollution Control Board
6	Noise Pollution (Regulation And Control) Act, 1990	Standards for noise emission for various land uses	Yes	Construction machineries and vehicles to conform to the standards for construction	State Pollution Control Board
7	Forest (Conservation) Act, 1980	Conservation and definition of forest areas. Diversion of forest land follows the process as laid by the act	Yes	Diversion of Protected forest land	State Forest Department, MoEF
8	Coastal Regulatory Zone Notification,	Protect and manage coastal areas	No	The project area is not within	MoEF, State Department of

Sl. No.	Law / Regulation / Guidelines	Relevance	Applicable Yes / No	Reason for Application	Implementing / Responsible Agency
	1991			designated coastal zone	Environment
9	Wild Life Protection Act, 1972	Protection of wild life in sanctuaries and National Park	No	No sanctuaries / national park along the project road	State Forest Department, MoEF
10	Ancient Monuments and Archaeological sites and Remains Act 1958	To protect and conserve cultural and historical remains found.	No	No Archaeological monument along the project road	Archaeological Survey of India, State Dept. of Archaeology
11	The Motor Vehicle Act. 1988	Empowers State Transport Authority to enforce standards for vehicular pollution. From August 1997 the "Pollution Under Control Certificate is issued to reduce vehicular emissions.	Yes	All vehicles used for construction will need to comply with the provisions of this act.	State Motor Vehicles Department
12	The Explosives Act (& Rules) 1884 (1983)	Sets out the regulations as to regards the use of explosives and precautionary measures while blasting & quarrying.	No	No new quarrying operation to be started by the concessionaire / contractor	Chief Controller of Explosives
13	Public Liability And Insurance Act,1991	Protection to the general public from accidents due to hazardous materials	Yes	Hazardous materials like Bitumen shall be used for road construction	State Pollution Control Board
14	Hazardous Wastes (Management and Handling) Rules, 1989	Protection to the general public against improper handling and disposal of hazardous wastes	Yes	Hazardous wastes shall be generated due to activities like of maintenance and repair work on vehicles	State Pollution Control Board
15	Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996	Protection against chemical accident while handling any hazardous chemicals resulting	Yes	Handling of hazardous (flammable, toxic and explosive) chemicals during road construction	District & Local Crisis Group headed by the DM and SDM
16	Mines and Minerals (Regulation and Development) Act, 1957 as amended in 1972	Permission of Mining of aggregates and sand from river bed & aggregates	No	No mining of sand or aggregates. These materials shall be procured from approved agencies	State Department of Mining
17	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) BOCW Act, 1996	Employing Labour / workers	Yes	Employment of labourers	District Labour Commissioner

3.2 Environmental Categorisation

This project doesn't falls either under Category 'A' or 'B' project as far Prior Environmental Clearance is concerned, as this project doesn't satisfies all the criteria laid under the purview of the EIA Notification of September 2006 and its subsequent amendments. The project road is neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas.

Hence Prior Environmental Clearance is not required from State Environmental Impact Assessment Authority or MoEF. Thus a formal EIA is also not required as per the EIA Notification of September 2006 and its subsequent amendments.

3.3 World Bank Operational Policies

The Operational Policies of the Bank, both triggered and not triggered, the details and the applicability to the project road are provided in the table below. The World Bank environment assessment (EA) requirements are based on a three-part classification system such as Category A, Category B and Category C as defined by the World Bank OP 4.01. A project designated as Category A, requires a full environmental assessment (EA). Category B projects require a lesser level of environmental investigation & Category C projects require no environmental analysis However, emphasis of the World Bank is in the integration of mitigation measures into the project design and mainstreaming environment in all stages of project planning, implementation and operation. ***The project diverts protected forest land & shall have some environmental impacts as per screening. The project can be classified as Category B project and hence requires environmental analysis.***

Table 3-2: World Bank Safeguard Policies

Sl. No.	Safeguard Policy	Subject Category	Triggered	Triggered By	Mitigation Measures	Documentation
1.	OP 4.01	Environment Assessment	No	Some impacts on environmental and social components	Mitigation measures to be incorporated	EMP shall be prepared
2.	OP 4.04	Natural Habitats	No	No sanctuaries / national parks within the project area	Not Applicable	Not Applicable
3.	OP 4.09	Pest Management	No	Not applicable	Not applicable	Not Applicable
4.	OP 4.11	Physical Cultural Resources	No	Risk to cultural properties	Not Applicable	Not Applicable
5.	OP 4.36	Forestry	Yes	Diversion of forest land	To be carried out as per Forest (conservation) Act, 1980	Not Applicable
6.	OP 4.37	Safety of Dams	No	Not Applicable	Not Applicable	Not Applicable
7.	OP 7.50	International Waterways	No	Not Applicable	Not Applicable	Not Applicable
8.	OP 7.60	Disputed Area	No	Not Applicable	Not Applicable	Not Applicable

3.4 Environmental Permits / Approvals Required

The summary table showing time requirements for agency responsible for obtaining clearance, and a stage at which clearance will be required is given below:

Table 3-3: Summary of Clearances & NOCs Applicable

Sl. No	Type of clearance	Statutory Authority	Applicability	Project stage	Time required
1	Forest Clearance	State Department of Environment and Forest and MoEF	Diversion of Protected Forest land	Pre construction	6-9 months
2	Tree felling permission	State Department of Environment and Forest	Felling of trees	Pre construction	1-2 months
3	NOC And Consents Under Air, Water, EP Acts & Noise rules of SPCB	State Pollution Control Board	For establishing plants	Construction (Prior to work initiation)	2-3 months
4	NOC And Consents Under Air, Water, EP Acts & Noise rules of SPCB	State Pollution Control Board	For operating Hot mix plants, Crushers and batching plants	Construction (Prior to work initiation)	1-2 months
5	Permission to store Hazardous Materials	State Pollution Control Board	Storage and Transportation of Hazardous Materials and Explosives	Construction (Prior to work initiation)	2-3 months
6	PUC certificate for use of vehicles for construction	Department of Transport	For all construction vehicles	Construction (Prior to work initiation)	1-2 months
7	NOC for water extraction for construction and allied works	Ground Water Authority	Ground water extraction	Construction (Prior to work initiation)	2-3 months

Table 3-4: Summary of Clearances & NOCs Not Applicable

Sl. No	Type of clearance	Statutory Authority	Reason
1	Prior Environmental Clearance	MoEF / SEIAA	Not a category A / B project
2	Permission for Activities near archaeological protected area	Archaeological survey of India / the state department of Archaeology	No Archaeological structures in the project road
3	Diversion of Sanctuary land / Permission for road construction	Chief Wild Life Warden	Project road doesn't passes within 10 Km of any sanctuary

4 BASELINE ENVIRONMENT

4.1 Physical Environment

4.1.1 Climate and Meteorology

The climate of the project districts are on the whole dry and is characterised by a short monsoon, a hot summer and a bracing cold winter. The year may be divided into four seasons. The cold season from November to March is followed by the hot season lasting up to the end of June. The period from July to mid-September constitutes the rainy season, of south-west monsoon, the second half of September and October may be termed the post-monsoon or transition period.

- **Temperature**

Temperature starts rising from middle of February and from about the beginning of March increase rapidly till June which is generally the hottest month. The mean daily maximums temperature during June is around 40^{o}C) and the mean daily minimum is around 27^{o}C. The heat is intense in summer. On individual days, the day temperature may occasionally exceed 47^{o}C - 48^{o}C. Scorching dust laden winds which blow during the hot season. Afternoon thunder showers also occur occasionally. With the onset of monsoon by the end of or the beginning of July, there is a drop in the day temperatures but nights continue to be as warm as in June. Due to increased humidity in the monsoon the weather is oppressive in between the rains. At the end of rainy season, by the middle of September, there is a decrease in temperature, the drop in the night temperatures being more rapid. After October, both day and night temperatures decrease rapidly. January is usually the coldest month with the mean daily maximum temperature at about 20^{o}C and the mean daily minimum at about 7^{o}C. In winter, particularly in January and February, cold waves in the wake of passing western disturbances affect the district and the minimum temperature occasionally drops down below the freezing point of water. On such occasions frosts are likely in the districts.

- **Humidity**

During the south-west monsoon, season July to September the relative humidity is high, being 75 to 80 per cent in the mornings and about 55 to 65 per cent in the afternoons. High humidity of more than 70 per cent also prevails during the winter months, December to February. It is comparatively drier during rest of the year. April and May are the driest period of the year when in the afternoons the relative humidity is 25 per cent or less.

- **Rainfall**

Situated far away from the Himalayas, the districts get meagre rainfall. The average rainfall is 410mm in Bathinda district & 590mm in Sangrur district, the maximum (about 73%) falling in the months of July to September, July being the wettest month. The rainfall in the district increases from south-west towards the northeast and varies from about 490mm to 670mm. There is some rain, mostly in the form of thundershowers, during the pre-monsoon month of June. Some rain is also received with passing western disturbances during winter. The variation in the annual rainfall from year to year is large. On an average, there are 27 rainy days (i.e. days with rainfall of 2.5 mrn or more) in a year in the district.

- **Winds**

Winds are generally light but do gain some strength during the late summer and early part of the monsoon season. In the south-west monsoon season winds from easterly and southeasterly directions are more common with north-westerlies blowing on some days. In the post-monsoon and winter seasons, the predominant wind direction is north-westerly. In the summer, winds are generally from north-westerly direction but on some day they blow from south-east.

4.1.2 Topography

The project road is situated in Malwa region which is the area south of River Sutlej. The topography of Punjab can be divided into the upper portion of the sub-Shivalik area and the rest of Punjab (where the project road is located).

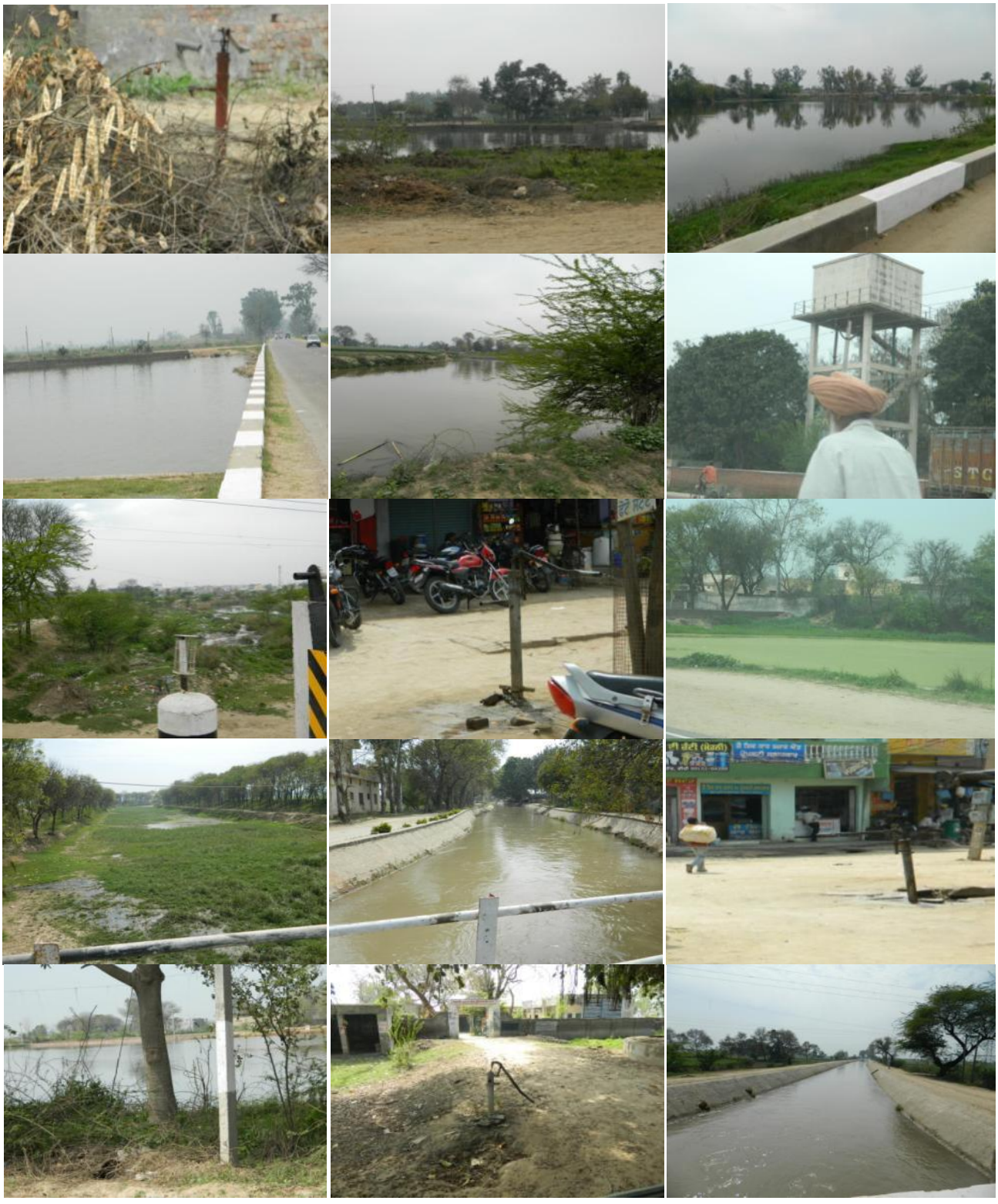
4.1.3 Air Quality

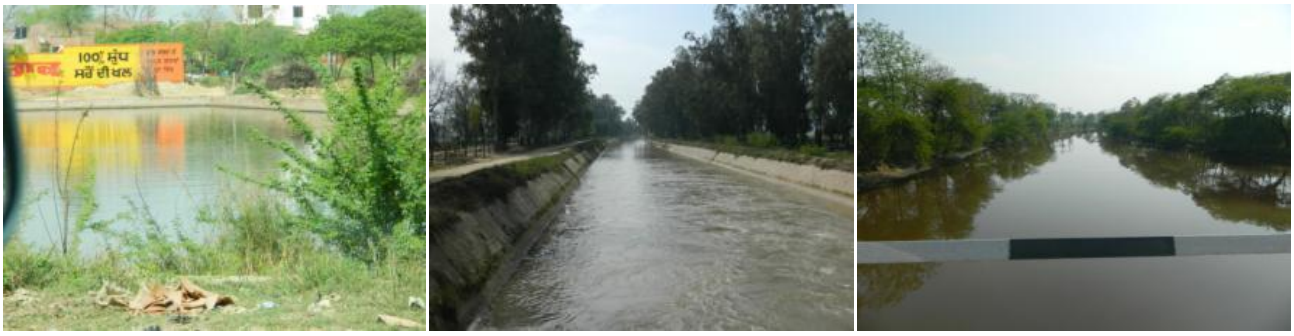
Monitoring of air quality will establish the exact scenario and will also help to assess the potential impact of the project on them. To establish the baseline air quality scenario representative ambient air quality-monitoring stations have been established within the study corridor. Sampling and analysis of air samples are being be conducted as per established standard methods and procedure.

4.1.4 Water Availability and Quality

There are a total of 21 water resources including 2 OHT, 7 ponds, 7 canals, 2 nalas and 1 river along the project corridor. All the blocks in the project area falls under over exploited zones as per Ground Water Information Booklet, CGWB. The post monsoon ground water table varies from 9.95-24.52 mbgl in Sangrur, 3.89 to 12.36 mbgl in Mansa & 4.17m-16.76mbgl in Bathinda. For generating data on surface water quality as well as ground water quality parameters and drawing up the baseline scenario in the study corridor, representative surface water and ground water quality monitoring stations shall be selected for the purpose of assessing the quality of surface and ground water. Samples collected shall be analysed for physical, chemical and bacteriological parameters as per established standard methods and procedures.

Figure 4-1: Photographs of Some Water Bodies and Resources





4.1.5 Noise Quality

Ambient noise level monitoring using suitable sound level meter are being be carried out to assess the background noise levels and characterise the noise environment in the study corridor.

4.1.6 Drainage conditions

Presently drains are almost existent along the project corridor. There is no issue of drainage except at a few places where choking and overflowing of drain water are reported.

4.1.7 Soil Monitoring

To assess the impacts of the developmental activities of the project on the soil in the area, the physiochemical characteristics of soils within the study corridor is presently being examined by obtaining soil samples from selected areas and analysing the same for establishing the baseline data.

4.2 Biological Environment

4.2.1 Protected Natural & Wildlife Habitats

The project road doesn't falls within 10 Km radius of any Protected Natural Habitats (Biosphere Reserves, National Parks and Sanctuaries). Further there are no Wildlife Habitats (outside designated protected areas) including bird habitats, aquatic habitats, as relevant in the project area.

4.2.2 Forest Area

The Forest Department has declared the entire avenue plantation area along the project road as protected forest as per information made available. The proposed project shall divert protected forest land as per as per Forest (conservation) Act, 1980. The project proponent has already obtained Stage I clearance for the area required in 1st year of work. For the other areas, application has already been made by the project proponent.

4.2.2.1 Flora

The dominant flora along the project road are *Albizzia procera*, *Prosopsis julifera, Dalbergia* sissoo, *Terminalia arjuna*, *Eucalyptus* sp., *Azadirachta indica, Pongomia pinnata, Acacia nilotica, Ficus bengalhensis, &* A number of giant trees (mainly Ficus species) are present along the corridor. These trees are though present mainly near the settlements. Some trees might become potential traffic safety hazard since the road is proposed for widening. Care though shall be taken during the construction to avoid felling of these giant trees and mitigation measures shall be devised.

Avenue plantation is present almost all throughout the road and the presence of green tunnel is quite common for quite a length. The green tunnels are caused mainly by tree species such as *Acacia nilotica*, *Eucalyptus* sp, *& Prosopsis julifera*. ***No vulnerable, threatened, endangered species of flora and fauna are reported***

Figure 4-2: Photographs of Some Giant Trees

4.3 Socio-economic Environment

4.3.1 Settlement

There are a total of 22 settlements varying in size and populations along the project corridor.

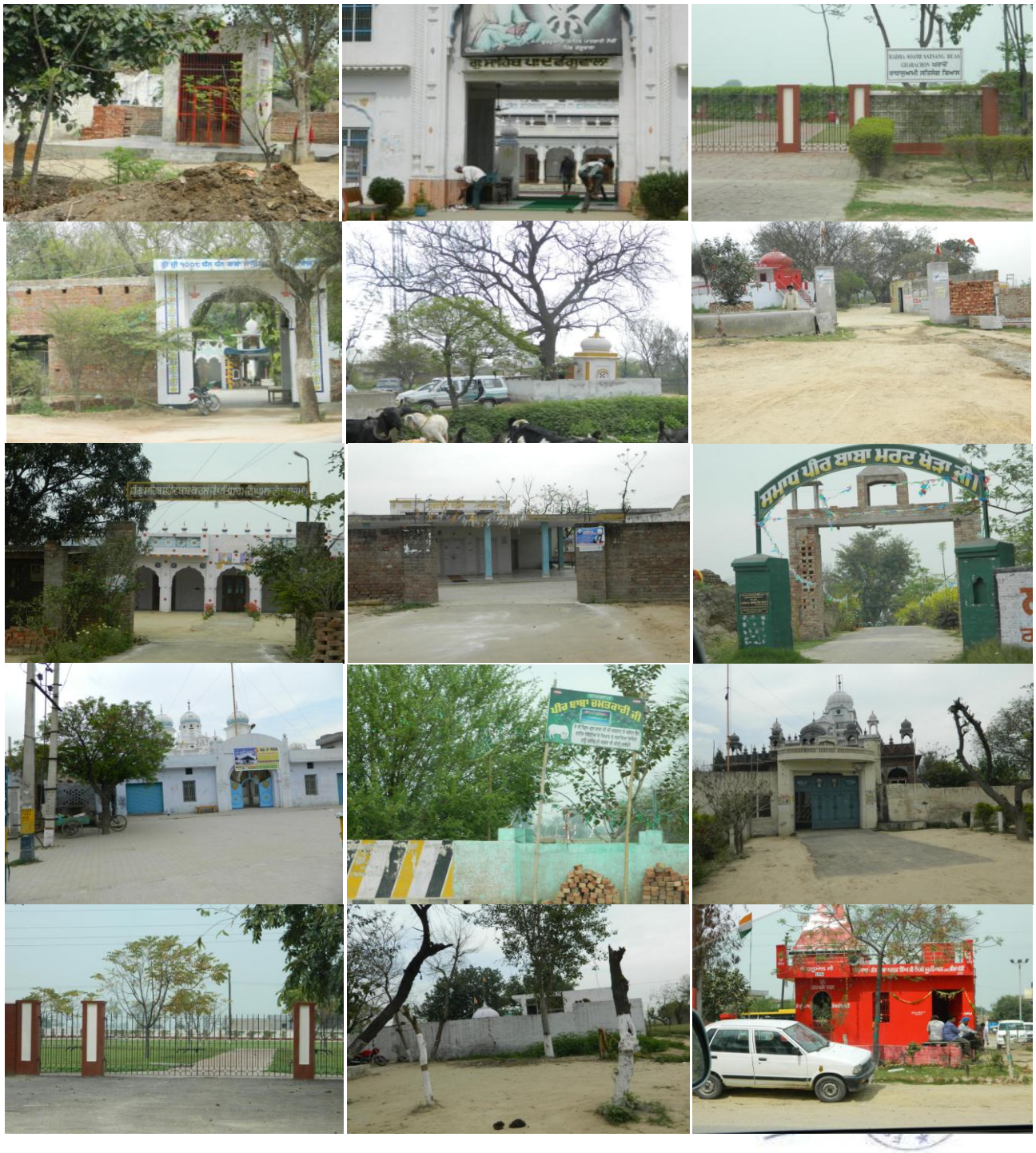
4.3.2 Land-use

The highway passes through plain terrain along the entire stretch. The abutting land use along the project road are forest land, barren & revenue, agricultural and settlement lands.

4.3.3 Cultural / Religious resources

There are no archaeological heritage, local built heritage and art forms along the project road. There are 19 temples, 8 Gurudwara & 4 mazar / tomb / Samadhi, 4 Radha Soami Satsang Beas properties & 1 burning ghat along the project road.

Figure 4-3: Photographs of Some Cultural / Religious Resources



4.3.4 Noise Sensitive Receptors

There are approximately 30 educational institutes (1 college, 1 institute, 1 ITI, 1 polytechnic, 1 medical college, 2 Girls colleges, 22 schools & 1 school & college complex) along the project corridor. There are 6 health centre / hospital along the project road. These receptors are outside the ROW

Figure 4-4: Photographs of Some Sensitive Receptors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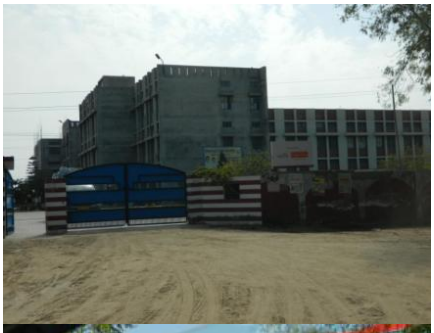

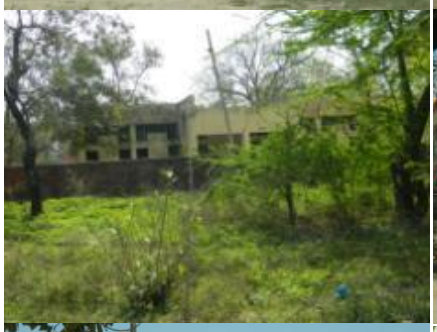

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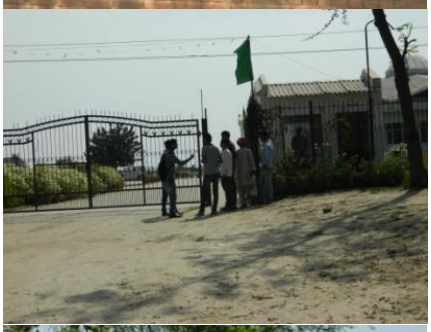

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5 POTENTIAL ENVIRONMENTAL IMPACTS

This section provides the potential impacts likely on the various environmental components along the project corridor based on the field visits and the primary surveys. Most of the impacts on the various environmental components shall be perceived during construction and operation phase. The key environmental, health, safety and social issues that were identified to have a major impact due to the various proposed interventions are as below:

- Air quality
- Water pollution, drinking water sources, water scarcity in non-monsoon months and construction water requirements
- Roadside trees, tree plantation
- Employment opportunity during civil works

The table below shows the general impact on the environmental components due to the project.

Table 5-1: General Impacts on Environment in S2 Road

Env. Component Affected	Construction Phase				Road Operation	Indirect effects of Operation or Induced Development
	Project Activity					
	Removal of trees and Vegetation	Earth works	Laying of Pavement	Vehicle & Machine Operation	Vehicle operation	-
Air	Air pollution, Hotter, drier microclimate	Dust generation	Asphalt odour	Dust pollution		Air pollution due to increase in vehicle
Land	Erosion and loss of top soil	Erosion and loss of top soil, disposal of earth material	-	Contamination by fuel & lubricants compaction	Spill from accidents	-
Water	Siltation	Alteration of drainage	-	Contamination by fuel & lubricants compaction	Spill Contamination by fuel & lubricants &	Increased contamination of ground water
Noise	Noise pollution					
Flora	Felling of trees & trimming of branches of some trees that might cause safety hazard or affected due to raising of embankment	-	-	-	Impact of pollution on vegetation	-
Fauna	Disturbance due to habitat loss	Disturbance	-	Disturbance	Collision with traffic	Distorted habitat
Agricultural land	-	Loss of standing crops	-	-	-	Conversion of agricultural land into other land use
People and community	Loss of shade and community trees, loss of fuel wood and fodder, loss of income	-	Noise & air pollution	Odour and dust	Noise pollution, Risk of accidents	Induced pollution
Cultural assets	Displacement of structures from Row	Loss of sacred trees (if any)	-	Noise vibration may cause structural damage	Damage from vibration and air pollution	-
Labour's health & safety	Increase of stagnant water and diseases			Asphalt odour and dust	-	-

6 MITIGATION AND ENHANCEMENT MEASURES

6.1 General

The negative impacts of road projects can be reduced or minimised only if proper safeguards are put in place during the design and construction stage itself. These can include reducing pollutant discharge from the harmful activities at source or protecting the sensitive receptor. An effective mitigation strategy will utilise a combination of both options to arrive at practically implementable measures. Conscious efforts shall be worked out to minimise any adverse impacts on the various environmental and social components. Where the impacts on various environmental components shall be unavoidable, suitable mitigation designs shall be worked out.

6.2 Construction Related Activities

Most of the direct impacts of a road project occur during the construction stage. This stage is also important since the people living near the sites are inconvenienced without the collateral benefits of a functional road. Moreover, construction related activities are confined within an identifiable boundary and so is the affected population. It is also the stage of the project when Patel Infra, can exercise maximum control to ensure that the environmental impacts are minimised. Good engineering practices and Corporate Social Responsibility like employing local population, self help groups & NGOs for various work activities shall not only ensure taking care of the environmental concerns but also engage the community and create goodwill with the early in the project.

6.3 Land Acquisition- Mitigation Measures

No land acquisition is proposed at present. However in some secluded sections land acquisition might be involved to improve the deficiency in the curves as per IRC codes. Land if thus acquired shall be as per the process defined by Govt. of Punjab. All rehabilitation and compensation shall be based on the Resettlement Action Plan prepared for the project

6.4 Safety

The project takes care of safety measures for road users including pedestrians as per IRC guidelines. Advance warning signboards, flagmen are proposed during the construction period. Care shall be taken during construction with habitation areas and especially near the Schools and hospitals. All the signboards giving caution and barricades for diverting the traffic shall be as per IRC & PWD R&B specifications. Some trees might need to be felled / branches trimmed (besides those earmarked for felling due to the improvement works) since these might become potential safety hazards due to their existing locations or due to rising of embankment height. However care shall be taken to save as many trees as possible from felling.

6.5 Environmental Enhancement

It is planned to enhance the environment in 3 areas:

- Enhancement of 10 water bodies at Km 9.050 & Km 9.750 both on LHS at Gharacho, Km 17.450 on LHS at Maila, Km 19.100 at RHS, on Km 42.675 Bir Kalan, Km 46.730 at Dhaipi on RHS, Km 59.500 Kotra on RHS, Km 64.340 on LHS, Km 69.600 on RHS, Km 72.500 at Baini Bagha on RHS as per design, drawings and direction of the Environmental Specialist
- Enhancement of cultural properties including seating arrangements where ever guided by the Project Manager
- Enhancement of boundary walls of Schools and hospitals by planting of creepers on the exterior wall and planting of 1 row of flowering, shade, medicinal, ornamental & fruit bearing trees inside the boundary at a distance of 3m c/c and as per directions of the Environmental Specialist

6.6 Environmental Management Plan

Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible. The impacts generated during construction and operational phase of the roads along with management plan for these impacts has been discussed in Environmental Management Plan. Environmental management considerations in the form of EMP have been designed for project activities based on sample EMP and the Codes of practices. The EMP shall provide guidelines & help Patel Infra in implementing and incorporating environmental management practices to reduce negative environmental impacts of the project. The plan outlines existing and potential problems that may impact the environment and recommends corrective measures where required. Enhancement measures are also proposed in order to provide good environmental practices and improve the aesthetics. The EMP for the project road is being submitted separately.

6.7 Environmental Budget

The environmental budget for the various environmental management measures proposed in the EMP is detailed in table below. The rates adopted for the budget has been worked out on the basis of market rates.

Table 6-1: Environmental Budget

Item No.	Component	Description	Cost in Crores
1	**Mitigation / Enhancement Cost**		
1.1	**Construction Stage**		
1.1	Air	Dust Management with sprinkling of water, covers for vehicles transporting construction material	0.318
1.2	Noise	Extension of the existing compound walls at govt. & pvt. school using brick masonry work including excavation, leveling, plastering, coping etc. up to a height of total 2.5 m above ground level complete in all respect as per Technical Specifications and as per the direction of the Engineer.	1.485
1.3	Environmental Enhancements	Enhancement of 10 water bodies at locations and chainages as per design, drawings and direction of the Environmental Engineer / Environmental Specialist of the Engineer.	0.300
1.4		Enhancement of cultural properties including seating arrangements.	0.100
1.5		Enhancement of boundary walls of schools & health centers by planting of creepers on the exterior wall and planting of 1 row of flowering, shade, medicinal, ornamental & fruit bearing trees inside the boundary at a distance of 3m c/c and as per directions of the Engineer	0.100
	Total Mitigation / Enhancement Cost		**2.303**
2	**Monitoring Cost**		
2.1.1	Air	Sampling, monitoring & analysis of ambient Air Quality and gaseous pollutants as per CPCB Standard Procedures at as per direction by Environmental Specialist as per CPCB guidelines	0.065
	Water	Sampling, monitoring & analysis of water Quality as per Standard Procedures at as per direction by Environmental Specialist as per CPCB guidelines	0.002
2.1.3	Noise	Monitoring Noise level as per directions of Environmental Specialist as per CPCB guidelines	0.002
2.1.4	Transportation Cost	Transportation cost for monitoring	0.003
	Total Monitoring Cost		**0.072**
3	**Miscellaneous Cost**		
3.1	Training	Training	0.025
3.2	Advocacy and Policy Making	Holding meetings for policy planning and subsequent review meetings with Revenue Department, Forest Department, local representatives, NGOs, etc. regarding development controls.	0.014
3.3	Administrative Charges including logistics	Maintenance of vehicle with the Environment Cell, Data processing, administrative support, stationery etc.	0.042
3.4	Miscellaneous Items	Digital Camera for the Environment Cell	0.001
	Total Miscellaneous Cost		**0.082**
	Total Cost		**2.457**
	Contingency @ 5% on Total Environmental Cost		**0.012**
	Grand Total		**2.58**

7 CONCLUSION

The screening process has primarily tried to focus on the potential impacts due to the proposed project and to propose mitigation measures through an appropriate EMP for the project. Based on the findings during the screening study the following can be safely deduced:

- The project is a neither a new state highway nor a SH expansion projects in hilly terrain (above 1000 MSL) and or ecological sensitive areas. Thus the project doesn't qualify as a category A / B project as per EIA notification of Sept 2006 and its subsequent amendments. ***Hence no Prior Environmental Clearance is required***
- The OPRC intervention in the project involves widening of the existing road. However the widening is involved in the existing ROW which has been declared as protected forest. ***Thus no Land Acquisitions involved. However due to design deficiencies in short patches minor LA might be involved at later stages.*** These LA if required shall be as per procedure laid down by the Govt. of Punjab and RAP
- Similarly, the avenue plantations along the project road have been declared as protected forest land whose land is required for the improvement works. ***Thus Forest Clearance is required for diversion of forest land. However Stage I Forest Clearance for areas involved in 1st Year Work has already been obtained. The Project Proponent has already applied for forest clearance for the other stretches also***
- However a few trees needed to be felled as these are potential safety hazard. ***Permissions to be obtained from Forest Authorities before felling.***
- The project doesn't falls within 10 Km of any Biosphere Reserve, National Park or Wild Life Sanctuary. ***Thus no Wild life Clearance / Permission required***
- No presence and impact on Archaeological features. ***Thus no archaeological clearances / permissions to be obtained***
- Based on the above conclusions and the screening study, it is found that the project is an improvement project with no land acquisition, tree felling and forest and shall have minimal or no adverse environmental impacts. ***Thus the project falls under Category B as per Operation Policy 4.01 of World bank and Environmental analysis is required beyond environmental screening for the project***
- Environmental considerations in the form of EMP designed for project activities based on sample EMP and the Codes of practices. Separate EMP for the project road to be submitted
- Some squatters shall be affected due to the project and their rehabilitation shall be taken up as per Social Screening