Public Works Department (Building & Roads) Punjab

Output and Performance Based Road Contract (OPRC)

(Asset Management Contract)

For Improvement, Rehabilitation, Resurfacing & Routine Maintenance works of Roads under

Sangrur - Mansa - Bathinda Contract Area

Environmental Management Plan

B8: Bathinda- Kot shamir-Talwandi Sabo (up to intersection with S4)

(SH 17)

September 2013

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1. INTRODUCTION

1.1 Overview

Output and Performance Based Road Contract (OPRC) for Improvement, Rehabilitation, Resurfacing & Routine for Sangrur-Mansa-Bathinda Contract Area implemented by the Punjab Roads and Bridges Development Board (PRBDB) with assistance from World Bank. The work is presently executed by Patel Infrastructure Private Limited (Patel Infra) who is the contractor. As per the contract agreement, an EMP has to be prepared and submitted to the Client for approval from PRBDB. A sample EMP has been provided with the contract document for ready reference to the Contractor. However the agreement provides flexibility and accordingly EMP for S-3 road (Barnala-Mansa) has been prepared for meeting the basic minimum requirements of ESMF as delineated in the contract agreement.

The project intends to increase the efficiency and effectiveness of road asset management and maintenance. It tries to ensure that the physical condition of the roads under contract is adequate for the needs of road users, over the entire 10 years contract period. 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

Under the Sangrur-Mansa-Bathinda Contract area project under OPRC there are six road sections which are detailed in the table below.

Table 1-1: Overview of Roads under OPRC

Road No.	Road Name	Classification (Type of Road)	Length (Km)
S1	Sangrur to Sunam	MDR-21	11.300
S2	Bhawanigarh - Sunam - Bhikhi – SH13 Intersection – Kotshamir	SH13 & SH-12A	106.130
S3	Barnala-Mansa	SH-13	7.290
S4	Mansa-Talwandi Sabo up to intersection with B8	ORR9	24.970
S5	Dhanaula-Bhikhi	MDR14	25.340
B8	**Bathinda-Kotshamir-Talwandi Sabo up to intersection with S4**	**SH17**	**28.650**
Total Length (Km)			**203.680**

5.1 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 S4-Mansa-Talwandi Sabo (up to intersection with B8- ODR 9) 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 this project road is Improvement work with widening of existing 5.5 m to 10.0 m including all required drainage, safety and intersection improvements.

Table 1-2: Overview of roads under OPRC

Road No.	Road Name	Length (Km)	Proposed work	Remark
S1	Sangrur to Sunam	11.300	• Rehabilitation • Resurfacing	-
S2	Bhawanigarh - Sunam - Bhikhi – SH13 Intersection – Kotshamir	106.130	• Improvement • Rehabilitation • Resurfacing	• 103.930 Km of Improvement • 2.200 Km of resurfacing

Road No.	Road Name	Length (Km)	Proposed work	Remark
S3	Barnala-Mansa	7.290	• Rehabilitation • Resurfacing	-
S4	Mansa-Talwandi Sabo up to intersection with B8	24.970	• Improvement • Resurfacing	• widening of existing road from 5.5 m to 10.0 m
S5	Dhanaula-Bhikhi	25.340	• Rehabilitation • Resurfacing	-
B8	**Bathinda-Kotshamir-Talwandi Sabo up to intersection with S4**	**28.650**	• **Rehabilitation** • **Resurfacing**	-
	Total Length (Km)	**203.680**		

The Output and Performance based Road Contract (OPRC) for 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 Bathinda-Kotshamir-Talwandi Sabo up to intersection with S4 is one of the roads in the OPRC project.

2. PROJECT DESCRIPTION

The project road B8- Bathinda- Kotshamir-Talwandi Sabo (upto intersection with S4): (SH 17) is 28.65 Km long and starts from Km. 0.000 at Intersection of NH 64 at Bathinda and end at intersection of S4 at Talwandi Sabo of ODR 9 at Km 28.65. The proposed length of the project road is also 28.65 Km.

2.1 Salient Features of the Project Road

- Name of Project: "Output and Performance based Road Contract (OPRC) (Road Asset Management Contract) for Improvement, Rehabilitation, Resurfacing & Routine Maintenance Works of Roads of Sangrur-Mansa-Bathinda Contract Area".
- State: Punjab
- Contract Agreement: Signed on 10th December 2012
- Client: PWD R&B, Government of Punjab
- Contractor: M/s Patel Infrastructure Pvt. Ltd.
- Contract Period: 10 Years
- Cost of Project: INR 596.36 Cr.
- Total Length of Project Road: 203.68 Km

2.2 Project Influence Area

The project district is Bathinda district in Punjab State. The district is bounded by Haryana in the South, Barnala, Moga & Faridkot districts in the North, Mansa & Barnala districts in east and Muktsar & Faridkot districts in west. The existing Right of Way (RoW) is varies from 20.13 to 30.05 m as per records and Specifications of the contract. As only rehabilitation works is proposed on this project road, the proposed RoW is also varies from 20.13 to 30.05 m and the Corridor of Impact (CoI) is thus varies from 25 to 35 m.

2.3 Project Proponent

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

2.4 Contractor

The Contractor for the project road is M/s Patel Infrastructure Pvt. Ltd. (Patel)

2.5 Need for the Project

- Provide easy access to commuters from Bathinda to Talwandi sabo (Intersection with S4 at ODR 9 to intersection of NH 64 of Bathinda –Jai Singhwala section).
- The road links NH 64 (Bathinda – Jai Singhwala section) with ODR 9 (Mansa - Talwandi Sabo section).
- Caters to the traffic growth pegged at 7.20% for Car, 4.00% for 2W, 3.20% for Bus, 5.77% for LCV, 2.61% for 2AT, 5.90 for 3AT & 7.76% for MAV Beyond 2022.

2.6 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 Bathinda, Kotshamir, Talwandi sabo and beyond.

2.7 Existing Features

2.7.1 Alignment

- The project highway presently is an intermediate lane carriageway for 28.65 Km
- Earthen shoulder of 1.0 to 1.5 m width is observed on both sides along the project, paved shoulder is non existent
- The entire project road is of Flexible pavement
- Average embankment height varies from 0.5 m to 1.0 m
- There are approximately 15 left hand and 18 right hand Horizontal curves

Table 2-1: Existing Cross Section details

Carriageway Width (m)	Earthen Shoulder Width (m)	Embankment Height (m)
10-14.5	1.0	0.5 – 1.0

2.7.2 Right of way

The present right of way along the project stretch is varies from 20.13 to 30.05 m.

2.7.3 Road inventory

The road has 5 major intersections & 68 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
5	68	1	3	-	-	-	23	9	-	-

Source: Primary Road Inventory Survey

2.7.4 Traffic

The project road section had been divided into 1 homogenous section. The traffic was counted in 1 location all along the project road. The average daily traffic along the project road is 4231 PCUs. The traffic is mainly mixed traffic.

2.8 Proposed Features

2.8.1 Alignment Proposal

- The length of the project road is 28.65 m
- Rehabilitation work across the full width 10 m, 14 m and 14.5 m carriage way with 1-1.5 m hard shoulder in settlement areas and 1m earthen shoulder on both sides in rural areas
- 3 Typical Cross Sections (C1 ,C2 & D) for rehabilitation of the project road has been proposed as per Specifications and Contract Works of the project
- Both side directional cross-fall of 2.5% proposed for the pavement and paved shoulders. For earthen shoulders it will be minimum 3.0%

2.8.2 Right of Way

- Proposed RoW is varies in general from 20.13m to 30.05 m.
- No Land acquisition is proposed

2.8.3 Pavement

- Flexible pavements are proposed for all throughout the road

2.8.4 Geometric Design Aspects

- No improvement in geometrics is proposed. Only rehabilitation of the carriageway is proposed

2.8.5 Bypasses and Realignments

- The project doesn't proposes any bypasses and realignments.

2.8.6 Service roads

- No Service roads are proposed in the project road

2.8.7 Cross Drainage Structures

- The project road has proposed 32 culverts, 3 minor bridges and 1 major bridge

Table 2-3: Proposed Cross Drainage Structures

Major bridges	Minor bridges	Box / Slab Culverts	Pipe Culverts	Total
1	3	23	9	**36**

- Other Structures
- No underpasses, overpasses & flyovers proposed

Drainage

- Drains have been provided on both the sides for the entire length of the road
- The length of unlined drains is 3.635 Km while lined drains is 5.510 Km.

2.8.8 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.

2.8.9 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 AND ADMINISTRATRATIVE FRAMEWORK

The Governments of India and Punjab and the funding agency have formulated a host of policy guidelines; acts and regulations aimed at protection and enhancement of environmental resources. For the purpose of enforcing the various acts and regulations, the Govt. of India and Punjab have a well-established Institutional set up. The main government agencies who uphold the implementation of the various environmental legislations are:

- Ministry of Environment and Forests, Government of India (MoEF), New Delhi formulates and regulates all country level legislations besides giving prior environmental clearances for Category A projects, wild life clearances and forest diversion clearances
- State Level Environmental Impact Assessment Authority (SEIAA), Punjab, gives prior environmental clearances to category B projects
- Central Pollution Control Board (CPCB) monitors and implements pollution related legislations
- Punjab Pollution Control Board (PPCB) monitors and implements pollution related legislations in the state besides giving No Objection Certificate (NOC) for establishing and operating plants under Air and Water Acts and rules
- MoEF and Punjab State Department of Forests give permission for forest diversion and felling of trees

3.1 Relevant Environmental Legislations

The Central and State Level Environmental Laws and Regulations pertaining to the Project that has been framed by the Government of India or State Government of Punjab are provided in Table 3-1.

Table 3-1: Relevant Environmental Laws & Regulations

Sl. No.	Law / Regulation / Guidelines	Relevance	Applicable for the Project	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. All environmental notifications, rules and schedules are issued under the act	Yes	MoEF, State Department of Environment & Forest, CPCB and SPCB	MoEF, State Department of Environment, CPCB and SPCB
2	The EIA Notification, 14th September 2006 and 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 an ODR and 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	No	No utilisation of borrow earth material	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	Yes	Consent required for establishing and operation of plants	State Pollution Control Board

Sl. No.	Law / Regulation / Guidelines	Relevance	Applicable for the Project	Reason for Application	Implementing / Responsible Agency
		vehicular air and noise emission.		and crushers	
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	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
9	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
10	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
11	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 PATEL INFRA	Chief Controller of Explosives
12	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
13	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
14	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
15	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
16	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

The summary of clearances and NOC's required for the Project are given in Table-3-2 of this EMP Plan. The summary table showing time requirements for agency responsible for obtaining clearance, and a stage at which clearance will be required.

Table 3-2: Summary of Clearances & NOCs Applicable

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

Table 3-3: 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	Forest Clearance	State Department of Environment and Forest and MoEF	No diversion of forest land

Apart from the above following approvals from the Project Manager cum Executive Engineer are also required to be complied:

- Approval for Traffic Management Plan
- Approval for Safety & Health Plan

4. SUMMARY OF ENVIRONMENTAL IMPACTS

The works for Improvement and rehabilitation package are to be confined to the existing formation width. Hence, the environmental impacts shall affect the surround area. Thus the in depth of analysis for this scope of work is conducted to find out the causes. No significant adverse impacts are anticipated in the project road. The various environmental impacts envisaged for the project are summarised below:

4.1 Land

No land acquisition is involved during the improvement for the project road and hence there shall be almost very less impact on the land. However change in existing land use due to improvement of road condition might be happen.

4.2 Water Resources

Since the works shall be within the existing ROW, there will be no loss of water source in the project and hence no permanent impact on water quantity would occur. Any accidental loss of a roadside water source shall be compensated. There are a total of 29 Hand pumps, 18 water bodies (8 ponds, 8 canals and 2 drainages) along the project corridor. The project area falls under over exploited zones as per CGWB. The pre monsoon ground water table varies from 3.67m-15.86mbgl and the post monsoon ground water table varies from 4.17m-16.76mbgl in Bathinda district. All the blocks in the project area falls under over exploited zones as per Ground Water Information Booklet, CGWB. Use of ground water for construction purpose shall be avoided and if required necessary permission shall be taken from Central Ground Water Board.

4.3 Air Quality

Presently the land use is predominantly agricultural and thus a lot of dust occurs. Since due to Rehabilitation and Resurfacing works, generation of dust can be observed due to plying of heavy traffic such as trucks and other combustion engine vehicles in road., the degradation of air quality shall be localised to the construction zone and therefore, air quality impacts are likely to be significant and necessary mitigation measures shall be proposed.

4.4 Noise

There shall be minimal and temporary increase in the ambient noise levels due to the movement of construction vehicles and equipment during improved works. Necessary prevention measures shall be proposed to minimise the noise pollution. There are a total of 7 educational institutes (4 schools, 2 colleges and 1 university) along the project corridor. These receptors are outside the ROW

4.5 Biological Environment

4.5.1 Protected Natural & Wildlife Habitats

The project road does not fall within 10 Km radius of any Protected Natural Habitats (Biosphere Reserves, National Parks and Sanctuaries).

4.5.2 Forest Area

The entire avenue plantation area along the project road has been declared protected forest as per information made available by the Contractor. The proposed project shall not require any land from the forest department.

4.5.3 Flora

The loss of flora for the road is not ruled out since some trees need to be felled as these trees might be potential safety hazard or might be affected due to widening of the existing pavement/shoulders. Trees, vegetations and grasses might be removed due to improvement and rehabilitation work at both side of proposed road.

The dominant flora along the project road is *Pongomia pinnata, Acacia nilotica, Ficus benghalensis, Terminalia arjuna & Eucalyptus* sp. There are some trees along the project road which might be needed to fell as these can cause safety hazard. ***No vulnerable, threatened, endangered species of flora and fauna are reported.***

4.5.4 Fauna

No impacts on fauna are anticipated for the project except loss of habitats where the trees are felled or trimmed.

4.6 Socio-economic Environment

4.6.1 Settlement

There are a total of 9 settlements varying in size and populations along the project corridor.

4.6.2 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.

4.6.3 Cultural / Religious resources

There are no archaeological heritage, local built heritage and art forms along the project road. There are 7 gurudwaras, 2 dargah, 1 Dharmshala & 1 Ashram along the project road.

The Rehabilitation and Resurfacing works shall be confined to the existing ROW only. Thus, it is safely assumed that no private or community asset will be impacted during the execution of the project. Care shall be taken that activities are carried out in such a way so that no community or private assets or structures are impacted. There shall be no land acquisition and the traffic movement will be within the constricted width available. Any public utility like electricity lines, telephone lines or water pipelines which are likely to be impacted shall be replaced before the start of work. Some squatters might be affected and the compensation and mitigation shall be as the social screening.

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

Table 4-1: General Impacts on Environment in B-8 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	Contamination of land	-	Contamination of land	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 & widening work	-	-	-	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	Dust nuisance	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	-	-

5. MITIGATION AND MANAGEMENT OF IMPACTS

The anticipated impacts, even though limited, will be mitigated following the guidance provided this chapter. The guidance in this chapter is in line with the sample EMP provided in the contract document, Social & Environmental Codes of Practice and the codes and Specifications of IRC and MoRT&H.

It is expected that the construction stage activities will broadly follow the sequence of Table 5-2. During the post-construction stage, demobilisation and operation shall follow the Patel Infra's plan. Since most of the activities that have noticeable adverse environmental impacts are to occur during construction period, the focus of this plan is mainly during the same period.

As part of the Good Environmental Practices, all affirmative actions are deliberated. Based on project specific & generic mitigation and enhancement measures are proposed. These mitigation and enhancement measures shall lead to generating goodwill among the various stakeholders and road users and go a long way in making the project success.

5.1 Environmental Enhancement

It is planned to enhance the environment in 3 areas:

- Enhancement of 8 water bodies at Km 15+730 LHS at Kotshamir, Km 20+800 LHS at Jeewan Singhwala, Km. 25+410 LHS at Bhagi Wandar, Km. 26+500 LHS at Bhagi Wander, Km. 27+000 LHS at Bhagi Wander , Km. 27+200 RHS at Bhagi Wander, Km. 27+750 LHS at Bhagi Wander, Km. 36+340 LHS at Nawan pind as per design, drawings and direction of the Environmental Specialist
- Enhancement of 11 cultural properties including seating arrangements where ever guided by the Project Manager.
- Enhancement of boundary walls of Civil Hospital, Bhagi Wander at Km. 27+000 RHS, Mount Litera School at Km. 12+900 LHS, Government secondary school at 15+340 LHS, Sudesh Vatika convent school at Km. 26+200 LHS, Sri D. S. S. School at Km. 30+300 RHS, Guru Govind Singh College at Km. 32+900 RHS, Guru Govind Singh Poly. College at 36+360 RHS, Guru Kashi Univ. at Km. 36+400 RHS 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 .

5.2 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 the staff of 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 and applicable for proposed road. Enhancement measures are also proposed in order to provide good environmental practices and improve the aesthetics. The detailed EMP for the B-8 road is given in Table No. 5.2.

5.3 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 5-1: 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	0.076
1.2	Environmental Enhancements	Enhancement of 2 water bodies at locations and chainages as per design, drawings and direction of the Environmental Engineer / Environmental Specialist of the Engineer.	0.200
1.3		Enhancement of cultural properties including seating arrangements.	0.110

Item No.	Component	Description	Cost in Crores
1.4		Enhancement of boundary walls of 1 schools 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	0.080
	Total Mitigation / Enhancement Cost		**0.466**
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	0.016
2.1.2	Water	Sampling, monitoring & analysis of water Quality as per Standard Procedures at as per direction by Environmental Specialist as per CPCB guidelines	0.013
2.1.3	Noise	Monitoring Noise level as per directions of Environmental Specialist as per CPCB guidelines	0.008
2.1.4	Transportation Cost	Transportation cost for monitoring	0.003
	Total Monitoring Cost		**0.04**
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		**0.588**
	Contingency @ 5% on Total Environmental Cost		**0.029**
	Grand Total		**0.617**

Table 5-2: Environmental Management Plan

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
Pre-Construction Phase					
P.1	Clearances and approvals	For construction works	Secure the following clearances & NOCs prior to start of construction activity: **Type of Clearance** — **Applicability** NOC and consents under Air, Water & Environment Act and noise rules from SPCB — For establishment of construction camp NOC and consents under Air, Water & Environment Act and noise rules from SPCB — For operating construction plant, crusher, batching plant etc. Explosive License from Chief Controller of Explosives — For storing fuel oil, lubricants, diesel etc. Quarry Lease Deed and Quarry License from State Department of Mines — Quarry operation (for new quarry) Labour license from labour commissioner office — Engagement of Labour	M/s Patel Infra	PRBDB, Project Manager
P.2	Ecologically sensitive areas (protected forests, reserve forests etc.)	Plantation along project road declared as protected forest	• No diversion of forest land involved • Tree felling (few numbers) to be carried out after obtaining prior permission from the District Forest Officer	PRBDB	PRBDB, Project Manager, Forest Dept.
P.3	Clearance of Encroachment / squatters	ROW	Advance notice shall be given to the encroachers & squatters present, who need to be relocated as per RAP. All R&R activities will be completed prior to initiation of civil works.	PRBDB	PRBDB
P.4	Tree Cutting	ROW	• Few trees to be felled as they pose potential safety hazard • Tree felling only after obtaining clearances from the Forest Dept • Felling of only those trees which are absolutely must • Stacking, transport and storage of the wood will be done as per Punjab State forest guidelines.	Patel Infra and the PRBDB	PRBDB
P.5	Relocation of Community Utilities & Common Property Resources	Along the Project Road	All community utilities and properties i.e., hand pumps, open wells, water supply lines, sewer lines, telephone cables, buildings and health centres will be relocated before construction starts on the project road. All possible measures are to be taken to minimise inconvenience to public.	PRBDB, other Agencies and M/s Patel Infra	Project Manager
P.6	Relocation of affected Cultural & Religious Properties	Along the Project Road	• Religious property resources such as shrines, temples and mosques will be preferably relocated beyond the RoW if affected • Cultural properties affected to be relocated as per social screening and Public Consultation. LRC will finalise the details of such relocation work.	PRBDB, M/s Patel Infra	Project Manager
P.7	Implementation Information Meeting and Disclosure of Information	Project road	• Organise implementation information meeting in the vicinity of project site for general public to consult and inform people about plans covering overall construction schedule, safety, use of local resources, traffic safety	M/s Patel Infra	Project Manager

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			and management plan of debris disposal, drainage protection, pollution • Locally relevant information such as Traffic Management Plan, Environment Management Measures proposed by Patel Infra, Enhancement Details, Enhancement Drawings, List of Common Property Resources, Complaints and Suggestion Book, Name & Address of the contact person, typical design cross–sections, etc. shall be disclosed by M/s Patel Infra through Project Manager		
P.8	Procurement of Crushers, Hot-mix plants & Batching Plants, other Construction Vehicles, Equipment and Machinery	For construction works	• No crushers shall be set for the OPRC project • HMP and camp site are being set at Khayala village for the entire project. • Specifications of hot mix plants and batching plants, other construction vehicles, equipment and machinery to be procured will comply to the relevant Bureau of Indian Standard (BIS) norms and with the requirements of the relevant current emission control legislations	M/s Patel Intra	PRBDB , Project Manager
P.9	Setting up of Hot mix Plants, Crushers & Batching Plant	For construction works	Hot mix plants, crushers and batching plants shall be located at least 1000m away from the nearest habitation. Patel Infra shall obtain NOCs / Consent to Establishment & Operate the plants from the Punjab State Pollution Control Board (PSPCB) and submit a copy to the Project Manager.	M/s Patel Intra	PRBDB , Project Manager, Punjab PCB
Construction /Maintenance Phase					
C. 1	Air Pollution	Construction plants, equipment and vehicles	All vehicles used at project road shall have of valid Pollution under Control (PUC) Certificates displayed as per the requirement of the Motor Vehicles Department for the duration of the Contract. For **Construction plant** following will be maintained: • 1.5 km away from settlement, school, hospital on downwind directions • 1.5 km from any archaeological site • 1.5 km from ecologically sensitive areas i.e. forest, national park, sanctuary • 1.5 Km from rivers, streams and lakes 500 m from ponds • 500 m from National Highway, 250 m from State Highway, 100 m from District roads and other roads • away from agricultural land with preference to barren land • Obtaining Consent-for-Establishment (CFE) and Obtaining Consent-for-Operation (CFO) under Air and Water Acts from the Punjab Pollution Control (PPCB). • Ensure adequate stack height for HMP as stipulated in CFE, • Install emission control devices such as bag house filters, cyclone separators, water scrubbers etc. • Greenbelt along the periphery of plant site.	M/s Patel Infra	PRBDB, Project Manager, Appropriate Regulatory Authorities
C.2	Water Pollution	Dust during earth works or from spoil dumps	• To maintain adequate moisture at surface of any earthwork layer completed or non-completed to avoid dust emission.	M/s Patel Infra	PRBDB, project manager,

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			• Stockpiling spoil at designated areas and at least 5 m away from traffic lane.		Regulatory Authorities
		Storage of maintenance materials	• Proper stockpiling and sprinkling of water as necessary	M/s Patel Infra	PRBDB, project manager, Regulatory Authorities
		Clearing of waterways of cross drainage works including bridges and clearing of longitudinal side drains	• Clearance of waterway will be undertaken before onset of monsoon i.e. early in the month of June. Debris generated due to clearing of longitudinal side drains and waterways of cross drainage will be stored above high flood level and away from waterway, and reused on embankment slope or disposed at designated areas.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.3	Noise Pollution and Vibration	Construction vehicles	Avoiding cleaning / washing of construction vehicle in any water body	M/s Patel Infra	Project Manager
		Construction camp and workers' camp (not applicable for the project road)	• Minimum distance of 1.5 km from river, stream and lake and 500 m from ponds. • Locate facilities in areas not affected by flooding and clear of any natural or storm water courses. • The ground should have gentle slope to allow free drainage of the site. • The camp must have impervious flooring to prevent seepage of any leaked oil & grease into the ground. The area should be covered with a roof to prevent the entry of rainwater. • Degreasing can also be carried out using mechanical spray type degreaser, with complete recycle using an enclosure with nozzles and two sieves, coarse above and fine below, may be used. A separate vehicle washing ramp shall be constructed adjacent to the workshop for washing vehicles, including truck mounted concrete mixers, if any.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
		Throughout Project Corridor, Construction Vehicles, Plants and Equipment	**Site Controls:** All vehicles and equipment will be fitted with silencers and/or mufflers which will be serviced regularly to maintain them in good working condition and conforming to the standard of 75dB (A) at 1m from surface of enclosure. Noise standard at processing sites, eg. Aggregate crushing plants, batching plant, hot mix plant will be strictly monitored to prevent exceeding of noise standards. **Scheduling of Project Activities:** Operations will be scheduled to coincide with period when people would least likely to be affected. Construction activities generating noise level more than 75 dB (A) will be avoided between 10 P.M. and 6 A.M. near residential areas. • **Protection devices:** (ear plugs or ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			• Construction equipment and machinery will be fitted with silencers and maintained properly. • Source-control through proper maintenance of all equipment. • Use of properly designed engine enclosures and intake silencers. • Vehicles and equipment used will confirm to the prescribed noise pollution norms. • Movements of heavy construction vehicles and equipment near public properties will be restricted.		
C.4	Land Pollution	Spillage from plant and equipment at construction camps (not applicable for the project road)	• Providing impervious platform and oil and grease trap for collection of spillage from construction equipment vehicle maintenance platform. • Collection oil and lubes drips in container during repairing construction equipment vehicles. • Providing impervious platform and collection tank for spillage of liquid fuel and lubes at storage area. • Providing bulk bituminous storage tank instead of drums for storage of bitumen and bitumen emulsion. • Providing impervious base at bitumen and emulsion storage area and regular clearing of any bitumen spillage for controlled disposal and Reusing of bitumen spillage if any. • Disposing non-usable bitumen spills in a deep trench providing clay lining of 300 mm at the bottom and filled with soil at the top (for at least 0.5 m) to encourage vegetation growth. • All the waste oil collected, from skimming of the oil trap as well as from the drip pans, or the mechanical degreaser shall be stored in accordance with the Environment Protection (Storage and Disposal of Hazardous Wastes) Rules, 1989.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.5	Borrow Areas	Domestic solid waste and liquid waste generated at camps (not applicable for the project road)	• Collecting kitchen waste at separate bins and disposing of in a pit at designated area. • Collecting plastics in separate bins and disposing in deep trench at designated area/s covering with soil	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
		Borrow area used for project road	• Finalizing borrow areas for borrowing earth and all logistic arrangements as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the Patel Infra. • Patel Infra will not start borrowing of earth from any borrow area until the formal agreement is signed between landowner and Patel Infra and the copy of agreement shall be submitted to the Project Manager. • Planning of haul roads for accessing borrow areas will be undertaken during this stage. The haul roads shall be routed to avoid agricultural areas as far as possible and will use the existing village roads wherever	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			available.		
C.6	Quarry	Establishment of Quarry site if required	• No quarrying activity is envisaged for the project. However if required, Patel Infra will procure all necessary permissions for procurement of material from the Mining Department, District Administration and State Pollution Control Board and shall submit a copy of the approval and the rehabilitation plan to PRBDB through the Monitoring Consultant. • M/s Patel Infra will also work out haul road network and report these details to the Project Manager who will inspect and in turn report to PRBDB before approval.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.7	Arrangement for Construction Water	Construction camp (not applicable for the project road) and Project road	• The M/s Patel Infra will use ground / surface water as a source of water for the construction and where necessary set up own bore well facility for construction work. • To avoid disruption/disturbance to other water users, the Patel Infra will extract water from fixed locations and consult with the Project Manager before finalising the locations. • The Patel Infra will provide a list of locations and type of sources from where water for construction will be extracted. • The Patel Infra will need to comply with the requirements of the State Ground Water Department for the extraction and seek their approval for doing so and submit copies of the permission to the Project Manager and the PRBDB.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.8	Sand	Riverbeds	• The sand will be procured from identified approved sand mines or vendors • The M/s Patel Infra will obtain copy of the Lease agreement of the supplier and submit this to the Project Manager before procuring the sand.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.9	Clearing and Grubbing	Within ROW	• Vegetation will be removed, if required before commencement of construction. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimised. • Only ground cover/shrubs that impinge on the permanent work or necessary temporary work will be removed. • The Patel Infra under any circumstances will not cut or damage trees outside of the construction zone. Trees identified for removal will be cut only after receiving clearance from the forest departmentand after that the receipt of PRBDB's written confirmation in this regard. • Vegetation only with girth of over 30 cm will be considered as trees.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.10	Disposal of debris from dismantling structures and excavation of the existing road surface and pavements	Within ROW	Debris generated due to the excavation of the existing road will be suitably reused in the proposed construction, subjected to the suitability of the materials and approval from the Project Manager as follows: • The sub-grade of the existing pavement may be used as embankment fill material.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			• The existing sub base material may be recycled as sub base of any haul road or access road. • The existing bitumen surface may be utilised for the paving of access roads and paving works in construction sites and campus, temporary traffic diversions, haulage routes etc. • The Patel Infra shall identify disposal sites report to the Project Manager. This location will be checked on site and accordingly approved prior to any disposal of waste materials. • All arrangement for transportation during construction including provision, maintenance, dismantling and clearing debris, will be considered incidental to the works and will be planned and implemented by the Patel Infra. • Debris generated from other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area. No debris will be staged on the road or culvert/bridges locations.		
C.11	Drainage	Within ROW	• The Patel Infra shall ensure that no construction materials like earth, stone, or similar is disposed off in a manner that may block the flow of water of any water course and cross drainage channels. • The Patel Infra will take all necessary measures to prevent any blockage to the water flow. In addition to the design requirements, Patel Infra will take all required measures as directed by the Project Manager to prevent temporary or permanent flooding of any site or any adjacent area.	Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.12	Siltation of Water Bodies and Degradation of Water Quality	Borrowing of earth for embankment construction	• The Patel Infra will not excavate beds of any stream/canals/ any other water body for borrowing earth for embankment construction. • If required Patel Infra will construct silt fencing at the base of the embankment construction where these are adjacent to water bodies and around the stockpiles at the construction sites close to water bodies. The fencing will be provided prior to commencement of earthwork and maintained in an effective state until the stabilisation of the embankment slopes has occurred. • The Patel Infra will ensure that construction materials containing fine particles are stored in a suitable enclosure such that sediment-laden water does not drain into any nearby watercourse.	Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C.13	Planning for Traffic Diversions and Detours	Project road	• Any temporary traffic diversions need to be constructed after approval from the Employer and under the supervision of the Project Manager. • Detailed Traffic Control Plans will be prepared by the Patel Infra and approved by the Project Manager seven days prior to commencement of works on any section of road. The traffic control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, safety measures for night time traffic and precaution for transportation of	Patel Infra	Project Manager, Traffic Police

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			hazardous materials and arrangement of flagmen. • The Patel Infra will provide specific measures for safety of pedestrians, school children's (close to project road) and workers at night as part of traffic control pans and ensure that the diversion/detours are always maintained in usable condition, particularly during the monsoon to avoid disruption to traffic flow. • The Patel Infra will also inform local community of changes to traffic routes, conditions and pedestrian access arrangements with assistance from the LRC and the PRBDB. The temporary traffic detours will be kept free of dust by sprinkling of water at a sufficient frequency and as required under specific conditions (depending on weather conditions, construction in the settlement areas and volume of traffic). **Safety of Children Entering or Exiting Schools** • Where the work site is within 500m of a school entrance, the Patel Infra will shall provide a specific traffic management plan that clearly demonstrates the extra steps to mitigate risk for school children passing through the work site.		
C.14	Accidents	Project road	The Patel Infra will provide, erect and maintain barricades, including sign boards, road marking, traffic lights for night traffic and flagmen as required by the Project Manager	M/s Patel Infra	Project Manager, Traffic Police
C. 15	Public Health and Safety	Project road	Debris generated will be disposed to the satisfaction of Project Manager. Monitoring of air, water, noise and land during construction and operational phase.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C. 16	Risk from Operations	Project road	• M/s Patel Infra shall comply with all the precautions as required for the safety of the workmen as per the International Labour Organisation (ILO) Convention No. 62 as far as those are applicable to this contract. • M/s Patel Infra shall supply all necessary safety appliances such as safety goggles, helmets, masks, etc., to the workers and staff. • M/s Patel Infra shall comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • Minimise significant hazards, where elimination and isolation are both impractical • No child labour shall be utilized in the project	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C. 17	Risk caused by Force' Majure	Project road	• All reasonable precaution will be taken to prevent danger of the workers and the public from fire, flood, drowning, etc. • All necessary steps will be taken for prompt first aid treatment of all injuries likely to be sustained during the course of work.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C. 18	First Aid	Project road,	• At every workplace, a readily available first aid unit including an adequate	M/s Patel Infra	PRBDB, Project

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
		construction site etc.	supply of sterilised dressing material and appliances will be provided as per the Factory Act. • Workplaces, remote and far away from regular hospitals will have indoor heath units with one bed for every 250 workers. Suitable transport will be provided to facilitate take injured or ill person(s) to the nearest applicable hospital. At every workplace and construction camp, equipment and nursing staff shall be provided.		Manager, Regulatory Authorities
C. 19	Safety Measures During Construction	Project road, construction site etc.	• All relevant provisions of the Factories Act, 1948 and The Building and other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996 will be adhered at site. • Adequate safety measures for workers during handling of materials at site will be taken up. • The register will include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C. 20	Hygiene	Camp site (not applicable for the project road)	• All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. • Latrines shall be provided with septic tank for the workers and labours inside the camps. • Garbage bins must be provided in the camps and regularly emptied and the garbage disposed off in a hygienic manner. • Adequate health care is to be provided for the work force. Unless otherwise arranged for by the local sanitary authority, the local medical health or municipal authorities. • On completion of the works, all such temporary structures shall be cleared away, all rubbish burnt, septic tank and other disposal pits filled in and effectively sealed off and the outline site left clean and tidy, at the Concessionaire's expense, to the entire satisfaction of Project Manager	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C. 21	Transmission of Diseases and HIV/ AIDS prevention and control	Workers / labourers Camp along the project	• M/s Patel infra will create awareness among workers to prevent transmission of diseases between the local inhabitants and the labourers engaged for the works, including sexually transmitted diseases. • Patel Infra will engage a professional agency for implementing the guidelines laid down in the policy and communicate to OPRC project • M/s Patel Infra shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.	M/s Patel Infra	PRBDB, Project Manager, Regulatory Authorities
C. 22	Prevention of Mosquito Breeding	Workers / labourers Camp along the project	Measures shall be taken to prevent breeding at site. The measures to be taken shall include: • Empty cans, oil drums, packing and other receptacles, which may retain	M/s Patel Infra	PRBDB, Project Manager, Regulatory

Sl. No.	Environmental Issue	Location / sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			water shall be deposited at a central collection point and shall be removed from the site regularly. • Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding. • Patel Infra equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained. • Water storage tanks shall be provided. • Posters in Hindi, Punjabi and English which draw attention to the dangers of permitting mosquito breeding shall be displayed prominently on the site. • Patel Infra at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides		Authorities

6. OUTCOME OF SCREENING REPORT

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 an existing State Highway and 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 has rehabilitation work and doesn't involve widening of the existing road. ***Thus no Land Acquisitions involved.***
- *No Diversion of Forest Land is involved in this project*. ***Thus Forest Clearance is not required for diversion of forest land***

  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 road does not fall within 10 Km radius of any Protected Natural Habitats (Biosphere Reserves, National Parks and Sanctuaries). ***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 a rehabilitation project with no land acquisition and negligible tree felling and shall have minimal or no adverse environmental impacts. ***Thus the project falls under Category C as per Operation Policy 4.01 of World bank and as per WB guidelines no further EA action 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.
- Some squatters shall be affected due to the project and their rehabilitation shall be taken up as per Social Screening.

7. IMPLEMENTATION ARRANGEMENT

The institutional arrangement has been presented herewith defined roles and responsibilities. The responsibility of implementing the mitigation measures lies with Patel Infra and all the construction activities being taken up by M/s Patel Infra. The PMC M/s Feedback Infra shall monitor the implementation work on behalf of Patel Infra, who will be responsible for planning all Environmental Management Plan (EMP) activities in the construction phase of the Project.

7.1 Environmental Expert

For effective implementation and management of the EMP, the PMC has an Environmental Expert with two Jr. Environmental Executives to deal with the environmental issues day to day at work site at different project roads. These officers shall interact with the Road Manager to ensure that the mitigation and enhancement measures mentioned in the EMP are adhered. Prime responsibility shall be to apprise the Team Leader of PMC and the Road Manager about the ground conditions. Environmental Expert shall also monitor the requisite clearances and the NOCs for the project and shall also strictly supervise the adherence to the EMP at site. The qualifications and responsibilities of Environmental Expert are given in Box-1.

Box 6-1: Proposed Qualification and Responsibilities of Environmental Expert (EE)

Qualifications & Experience

- Postgraduate in Environmental Science / Environmental Management / degree in Civil Independent Engineering with specialisation in environment
- 7 years of total experience with a minimum of 3 years in the implementation of EMP of highway projects and an understanding of environmental, health and safety issues
- Prior practical experience in State and National Highways would be an advantage

Roles & Responsibilities

- Primarily responsible for implementation of the EMP on site and ensuing that the environmental quality is meeting the standards laid down by CPCB and other related authority
- The EE shall implement the EMP by assigning the necessary resources and attending such meetings as are required for the effective implementation of the EMP on behalf of M/s PATEL INFRA.
- The EE shall interact with the Road Manager to ensure that the mitigation and enhancement measures mentioned in the EMP are adhered

7.2 Reporting System

Reporting system provides necessary feedback to ensure quality of the works and that the program is on schedule. The rationale for a reporting system is based on accountability to ensure that the measures proposed as part of the ESMF Framework and WB Guidelines provided in OPRC documents. Environmental Management Plan gets implemented in the Project. Reporting system shall be for environmental performance indicators as documented in the contract agreement. The items / performance indicators that shall be reported are:

- RoW Encroachment within five working days of observing any encroachment of RoW – Monthly
- Borrow area management – Monthly
- Construction waste management - Monthly
- Ambient Air Quality &Noise Levels in construction stretches - Quarterly (during construction period)
- Operational Management Processes including labour deployment during routine and maintenance work - Monthly
- Management of any chance discovery of archaeological remains at any site excavated under the contract. Quarterly (during construction period)
- Prevention of communicable diseases spreading to new areas due to increased communications - Quarterly

The detail list of reporting formats are given in the Annexure-4.

7.3 Environmental Capacity Building

Training of staff will be done at a number of levels to raise their levels of environmental awareness. The training can be conducted by either some external agency or through the help of in-house expertise. The main focus of training programmes shall be on implementation of EMP with special emphasis on OPRC Link road.

8. ENVIRONMENTAL MONITORING PLAN

To mitigate the potential negative impacts of OPRC Link road, an Environmental Monitoring Plan is developed typically to identify the mitigation measures to be undertaken during construction, and operation stages. The formulation of an appropriate environmental monitoring plan and its diligent implementation are key to overall success for the project. Monitoring includes:

- Selection of environmental parameters at specific locations;
- Sampling and regular testing of these parameters.

8.1 Monitoring Parameters and Standards

The Environmental monitoring of the parameters involved and the threshold limits specified are discussed below:

8.1.1 Ambient Air Quality Monitoring (AAQM)

The air quality parameters viz: Sulphur Dioxide (SO_2), Oxides of Nitrogen (NO_X), Carbon Monoxide (CO), Particulate Matters ($PM_{2.5}$ & PM_{10}) shall be regularly monitored at identified locations from the start of the construction activity. The air quality parameters shall be monitored in accordance with the National Ambient Air Quality Standards as given in Table 8-1. The location, duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed in the Environmental Monitoring Plan Table 8-5.

Table 8-1: National Ambient Air Quality Standards

Sl. No.	Pollutants	Time-weighted average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural & other Areas	Ecologically Sensitive Areas (notified by Central Government)	
1	Sulphur Dioxide (SO_2) µg/m^3	Annual*	50	20	- Improved West & Gaeke - Ultraviolet fluorescence
		24 hours**	80	80	
2	Nitrogen Dioxide (NO_2) µg/m^3	Annual*	40	30	- Modified Jacob and Hochheiser (Na-Arsenite) - Chemilumiscence
		24 hours**	80	80	
3	Particulate Matter (size less than 10 µm) or PM_{10} µg/m^3	Annual*	60	60	- Gravimetric - TOEM - Beta attenuation
		24 hours**	100	100	
4	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ µg/m^3	Annual*	40	40	- Gravimetric - TOEM - Beta attenuation
		24 hours**	60	60	
5	Ozone (O_3)µg/m^3	8 hours**	100	100	- UV photometric - Chemilumiscence - Chemical Method
		1 hours**	180	180	
6	Lead (Pb) µg/m^3	Annual*	0.50	0.50	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 hours**	1.0	1.0	
7	Carbon Monoxide (CO) (mg/m^3)	8 hours**	02	02	- Non Dispersive Infra Red (NDIR) spectroscopy
		1 hours**	04	04	
8	Ammonia (NH_3) µg/m^3	Annual*	100	100	- Chemilumiscence - Indophenol Blue Method
		24 hours**	400	400	
9	Benzene (C_6H_6) µg/m^3	Annual*	05	05	- Gas chromatography based continuous analyser - Adsorption and Desorption followed by GC analysis
10	Benzo(a) Pyrene Particulate Phase only ng/m^3	Annual*	01	01	- Solvent Extraction followed by HPLC/GC analysis
11	As ng/m^3	Annual*	06	06	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Ni ng/m^3	Annual*	20	20	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

** Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.*

*** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.*

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or monitoring and further investigation.

Source: MoEF Notification dated 16th November, 2009

8.1.2 Noise Quality Monitoring

The noise levels shall be monitored at already designated locations in accordance with the Ambient Noise Quality standards given in Table 2 below. The location, duration and the noise pollution parameters to be monitored and the responsible institutional arrangements are detailed in the Environmental Monitoring Plan Table 8-5.

Table 8-2: National Ambient Noise Quality Standards

Category of Area / Zone	Limits in dB(A) Leq	
	Day Time	Night Time
Industrial area	75	70
Commercial area	65	55
Residential area	55	45
Silence Zone	50	40

Note: (1) Day time shall mean from 6.00 a.m. to 10.00 p.m. (2) Night time shall mean from 10.00 p.m. to 6.00 a.m. (3) Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority (4) Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

8.1.3 Water Quality Monitoring

Water quality parameters such as pH, BOD, COD, DO, coliform count, total suspended solids, total dissolved solids, Iron, Fluorides etc. shall be monitored at all identified locations during the construction stage as per standards prescribed by Central Pollution Control Board and Indian Standard Drinking water specifications IS 10500, 1991, presented in Table 8-3 & 8-4 respectively. The location, duration and the pollution parameters to be monitored and the responsible institutional arrangements are detailed out in the Environmental Monitoring Plan in Table 8-5.

Table 8-3: Primary Water Quality Standards

S. No.	Designated Best Use	Class of Water	Criteria
1	Drinking Water source (with conventional treatment)	A	• Total Coliform MPN/100 ml shall be 50 or less • pH between 6.5 to 8.5 • Dissolved Oxygen 6 mg / 1 or more • Biochemical Oxygen demand (BOD) 5 days 200C 2 mg/1 or less
2	Outdoor bathing (organised)	B	• Total Coliform MPN/100 ml shall be 500 or less • pH between 6.5 to 8.5 • Dissolved Oxygen 5 mg / 1 or more • Biochemical Oxygen demand (BOD) 5 days 200C 3 mg/1 or less
3	Drinking Water source (without conventional treatment)	C	• Total Coliform MPN/100 ml shall be 5000 or less • pH between 6 to 9 • Dissolved Oxygen 4 mg / 1 or more • Biochemical Oxygen demand (BOD) 5 days 200C 3 mg/1 or less
4	Propagation of Wildlife	D	• pH between 6.5 to 8.5 for fisheries • Dissolved Oxygen 4 mg / 1 or more • Free Ammonia (as N) 1.2 mg/1 or less
5	Irrigation, Industrial Cooling, Controlled Waste	E	• pH between 6.0 to 8.5 • Electrical Conductivity at 250C µmhos/cm Max. 2250 • Sodium absorption rations Max. 26 • Boron, Max.2 mg/1

Ref: CPCB (1999). Bio mapping of rivers, Parivesh New Letter, 5 (iv), Central Pollution Control Board, Delhi, PP.20.

Table 8-4: Indian Standard Drinking Water Specifications (IS 10500: 1994)

S. No.	Substance / Characteristics	Requirement (desirable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods of Test (ref. To IS)	Remarks
Essential Characteristics						
1	Colour, Hazen Units, Max.	5	Above 5, consumer acceptance decreases	25	3025 (part4) 1983	Extended to 25 only if toxic substances, in absence of alternate sources.
2	Odour	Unobjectionable	-	-	3025 (parts 5): 1984	A test cold and when heated. Test at several dilution
3	Taste	Agreeable	-	-	3025 (part 8): 1984	Test to be conducted only after safety has been established
4	Turbidity NTU, Max.	5	Above 5, consumer acceptance decreases	10	3025 (part 7): 1984	
5	PH value	6.5 to 8.5	Beyond this range the water will not effect the mucous membrane and /or water supply system	No relaxation	3025 (part 11): 1984	
6	Total hardness (as CaCo3) mg/1, Max.	300	Encrustation in water supply structures an adverse effect on domestic use	600	3025 (part 21): 1983	
7	Iron (as Fe) mg /l Max.	0.3	Beyond this limit taste/appearance are affected has adverse effect on domestic uses and water supply structures and promotes iron bacteria	1	3025 (part 21): 1983	
8	Chlorides (as Cl) mg/1 Max.	250	Beyond this limit, taste corrosion and palatability are affected	1000	3025 (part 32): 1988	
9	Residual, free chloride, mg/1 Min.	0.2			3025 (part 26): 1986	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be Min. 0.5 mg/1
Desirable characteristics						
1	Dissolved solids mg/1 Max.	500	Beyond the palatability decreases and may cause gastro intestinal irritation	2000	3025 (part 16): 1986	
2	Calcium (as Ca) mg/1 Max.	75	Encrustation in water supply structure and adverse effects on domestic use	200	3025 (Part 16) 1986	
3	Magnesium (as Mg) mg/1, Max.	30	Encrustation in water supply structure and adverse effects on domestic use	1.5	16,33,34 of IS 3025: 1964	
4	Copper (as Cu) mg/1 Max.	0.05	Beyond taste, discoloration of pipes, fitting and utensils will be caused beyond this	0.3	35 of 3025: 1964	
5	Manganese (as Mn) mg/1, Max.		Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures.	0.3	35 of 3025: 1964	

S. No.	Substance / Characteristics	Requirement (desirable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods of Test (ref. To IS)	Remarks
6	Sulphate (as 200 So2), mg/1, Max.	200	Beyond this causes gastro intestinal irritation when magnesium or sodium are present	400	3025(part 24): 1986	May be extended up to 400 provided (as Mg) does not exceed 30
7	Nitrate (as No2) mg/l, Max.	45	Beyond this methaemoglobinemia take place	100	3025 (part24): 1988	To be tested when pollution is suspected
8	Fluoride (as F) mg/1, Max.	1	Fluoride may be kept as low as possible. High fluoride may cause fluorosis	1.5	23 of 3025:1964	To be tested when pollution is suspected
9	Phenolic compounds (as C6H5OH) mg/1, Max.	0.001	Beyond this it may cause objectionable taste and odour	0.002	54 of 3025:1964	To be tested when pollution is suspected
10	Mercury (as Hg) mg/1, Max.	0.001	Beyond this the water becomes toxic	No relaxation	(See not mercury ion analyses)	To be tested when pollution is suspected
11	Cadmium (as cd), mg/1, Max.	0.01	Beyond this the water becomes toxic	No relaxation	(See note)	To be tested when pollution is suspected
12	Selenium, (as Se). mg/1, Max.	0.01	Beyond this the water becomes toxic	No relaxation	28 of 3025:1964	To be tested when pollution is suspected
13	Arsenic (As) mg/1, Max.	0.05	Beyond this the water becomes toxic	No relaxation	3025 (part 37); 1988	To be tested when pollution is suspected
14	Cyanide (as CN) mg/1, Max.	0.05	Beyond this the water becomes toxic	No relaxation	3025 (part 27) 1988	To be tested when pollution is suspected
15	Lead (as Pb), mg/1, Max.	0.05	Beyond this the water becomes toxic	No relaxation	(See note)	To be tested when pollution is suspected
16	Zinc (as Zn) mg/1, Max.	5	Beyond this limit it can cause astringent taste and an opalescence taste and an opalescence in water	15	39 of 3025:1964	To be tested when pollution is suspected
17	Anionic detergents (as MBAS) mg/1, Max.	0.2	Beyond this it can cause a light froth in water	1	Methylene-blue extraction method	To be tested when pollution is suspected
18	Chromium (as Cr6+) mg/1, Max.	0.05	May be carcinogenic above this limit	No relaxation	38 of 3025:1964	To be tested when pollution is suspected
19	Poly nuclear aromatic hydra carbons (as PAH) mg/1, Max.	-	May be carcinogenic above this limit	-	-	-
20	Mineral oil mg/1, Max.	0.01	Beyond this limit undesirable taste and odour after chlorination take place.	0.03	Gas Chromatography method	-
21	Pesticides mg/1, Max.	Absent	Toxic	0.001	-	-
22	Radioactive material	-	-	-	58 of 3025:1964	-
23	Alpha emitters bq/1, Max.	-	-	0.1	-	-
24	Beta emitter pci/1, Max.	-	-	1	-	-
25	Aluminium (as Al) mg/1, Max.	200	Beyond this limit taste becomes unpleasant	600	13 of 3025:1964	-

S. No.	Substance / Characteristics	Requirement (desirable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods of Test (ref. To IS)	Remarks
26	Aluminium (as Al) mg/1, Max.	0.03	Cumulate effect is reported to cause dementia	0.2	31 of 3025:1964	-
27	Boron mg/1, Max.	1	-	5	29 of 3029:1964	-

Source: Indian Standard Drinking Water Specification – IS 10500, 1994

8.2 Environmental Monitoring Plan

The Environmental Monitoring Plan is given in table below.

Table 8-5: Environmental Monitoring Plan

Environmental Component	Project Stage	Monitoring						Institutional Responsibility	
		Parameters	Special Guidance	Standards	Location	Frequency	Duration	Implementation	Supervision
Air	Construction Stage	PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO,	High volume sampler to be located in the downwind direction. Use method specified by CPCB for analysis	Air (Prevention and Control of Pollution) Rules, CPCB, 1994	At construction stretches and camp	Three seasons annually for construction period	As per MoEF notification on Ambient Air Standard dated 16th November 2009 or its subsequent amendments	M/s Patel Infra through approved agency	PRBDB, Project Manager
Water Quality	Construction Stage	pH, Turbidity, TSS, TDS, COD, BOD, DO, Chlorides, Hardness, Oil & Grease, TSS, TDS, Total Coliform, Iron, Fluorides, Nitrates, E. coli, Total coliform, faecal coliform etc. as per IS 10500:1991	Grab sample collected from source and analyse as per Standard Methods for Examination of Water and Wastewater	Water quality standards by CPCB	At sources of water identified for construction purpose and camp	Once during pre and post monsoon every year for 3 years	Once during a season		
Noise Levels	Construction Stage	Noise levels on dB (A) scale	Equivalent Noise levels using an integrated noise level meter kept at within a distance of 5 m from edge of Pavement	Noise standards by CPCB	At construction stretches and camp	Once during three seasons annually for construction period	Readings to be taken at 15 seconds interval for 15 minutes every hour and then averaged		
Construction Sites and Construction Camps (not applicable for the project road)	Construction Stage	Monitoring of: Storage Area Drainage arrangements Sanitation in Construction Camps	The parameters mentioned are further elaborated in the reporting formats. These are to be checked for adequacy.	To the satisfaction of the employer and the standards	As storage area and construction camps	Quarterly in the construction stage		M/s Patel Infra	

Annexure 1: Guidelines for Setting, Operation & Redevelopment of Borrow Areas

- **Setting**

Opening of new borrow areas will be based on environmental as well as civil Engineering considerations. Location of source of supply of material for embankment or sub-grade and the procedure for excavation or transport of material shall be in compliance with the environmental requirements, and as specified in IRC: 10-1961. The borrowing shall not be carried out in cultivable lands; unless and until, it shall be agreed upon by the Project Manager that there is no suitable uncultivable land in the vicinity for borrowing or private landowners are willing to allow borrowing on their fields.

- **Operation**

To avoid any embankment slippage, the borrow areas will not be dug continuously and redevelopment of the borrow areas to mitigate the impacts will be the responsibility of the Patel Infra who shall evolve site-specific redevelopment plans for each borrows area location, and implement after the approval of Project Manager.

Precautionary measures as the covering of vehicles will be taken to avoid spillage during transport of borrow materials. To ensure that the spills, which might result from the transport of borrow and quarry materials do not impact the settlements, it will be ensured that the excavation and carrying of earth will be done during day-time only. The unpaved surfaces used for the haulage of borrow materials will be maintained properly. Borrowing of earth shall be carried out at locations recommended as follows:

i) **Non-Cultivable Lands**: Borrowing of earth will be carried out up to a depth of 2.0 m from the existing ground level. Borrowing of earth shall not be done continuously. Ridges of not less than 8m width shall be left at intervals not exceeding 300 m. Small drains shall be cut through the ridges, if necessary, to facilitate drainage. Borrow pits shall have slopes not steeper than 1 vertical in 4 horizontal.

ii) **Productive Lands**: Borrowing of earth shall be avoided on productive lands. However, in the event of borrowing from productive lands, under circumstances as described above, topsoil shall be preserved in stockpiles. The conservation of topsoil shall be carried out as described in section of this chapter. At such locations, the depth of borrow pits shall not exceed 45 cm and it may be dug out to a depth of not more than 30 cm after stripping the 15 cm top soil aside.

iii) **Elevated Lands**: At locations where private owners desire their fields to be levelled, the borrowing shall be done to a depth of not more than 2 m or up to the level of surrounding fields.

iv) **Borrow pits along Roadside**: Borrow pits shall be located 5m away from the toe of the embankment. Depth of the pit should be such that the bottom of the pit shall not fall within an imaginary line of slope 1 vertical to 4 horizontal projected from the edge of the final section of the bank. Borrow pits should not be dug continuously. Ridges of not less than 8 m width should be left at intervals not exceeding 300 m. Small drains should be cut through the ridges to facilitate drainage.

v) **Borrow pits on the riverside:** The borrow pit should be located not less than 15m from the toe of the bank, distance depending on the magnitude and duration of flood to be withstood.

vi) **Community / Private Ponds**: Borrowing can be carried out at locations, where the private owners (or in some cases, the community) desire to develop lands (mostly low-lying areas) for pisciculture purposes and for use as fishponds.

vii) **Borrow Areas near Settlements:** Borrow pit location shall be located at least 0.8 km from villages and settlements. If unavoidable, they should not be dug for more than 30 cm and should be drained.

Table: Probable Borrow Area along the Project Corridor

Sample no.	Name of Village	Material type	Site identification			Approximate Quantity (Cum)				Available Land use Type	Surrounding Land use Type	Remarks
			Nearest Chainage (Km.)	Left / Right	Offset from nearest Chainage (m)	Length (m)	Breadth (m)	Depth (m)	Total (Cum)			

- **Criteria for Evaluation of Borrow Areas**

i) Existing land use (Agricultural / Barren / Scrub / grazing / any other type)

ii) Vegetation / trees to be removed

iii) Erosion / degradation potential

iv) Distance and name of the nearest settlement
v) Distance from the nearest surface water body
vi) Drainage pattern of the area
vii) Distance of the nearest Forest area (if any)
viii) Distance of the nearest Sacred Tree (if any)
ix) Distance from the nearest school / hospital / primary health centre
x) Daily / Occasional use of borrow area by the community
xi) Any schemes or avenues for generation of income for adjoining community

- **Documentation for Borrow Pits**

Following checklist provides guidelines in order to ensure that redevelopment of borrow areas must comply with MoRT&H, IRC and Contract Requirement. To ensure that following data based must be documented for each identified borrow areas that provide the basis of the redevelopment plan.

i) Chainage along with offset distance
ii) Area (in Sq m)
iii) Type of Access / width etc from carriageway
iv) Soil Type
v) Slope / Drainage Characteristics
vi) Existing Land-use such as barren/agricultural/grazing land
vii) Location & distance from Borrow Area
viii) Daily / occasional use of the Borrow Area by the community, if any

- **Guidelines for Stripping, Stocking, Preservation of Top Soil**

During the excavation of the borrowing material Patel Infra will ensure that the topsoil from all areas of cutting and all areas to be permanently covered shall be stripped to a specified depth of 150mm and stored in stockpiles. At least 10% of the temporarily acquired area shall be earmarked for storing topsoil. The stockpile shall be designed such that the slope does not exceed 1:2 (vertical to horizontal), and the height of the pile is restricted to 2m. Stockpiled will not be surcharged or otherwise loaded and multiple handing will be kept to a minimum to ensure that no compaction will occur. The stockpiles shall be covered with gunny bags or tarpaulin.

It shall be ensured by that topsoil will not be unnecessarily trafficked either before stripping or when in stockpiles, unless the owner of the land requires the same for his own use and mentioned in the agreement. Stockpiled topsoil will be returned to cover the disturbed area and cut slopes. Residual topsoil will be distributed on adjoining/proximate barren/rocky areas in a layer of thickness of 75mm-150mm. Top soil shall also be utilized for redevelopment of borrow areas, landscaping along slopes etc.

- **Guidelines for Enhancement**

As far as possible borrow area selected for enhancement shall be on government / community land in the vicinity of settlement. The Contractor must ensure that any enhancement design proposed should be workable, maintenance free and preferably worked out in consultation with the community and proposed enhancement materials should be locally available. The borrow area can be developed either of the following:

i) Vegetative cover must be established on all affected land
ii) Topsoil must be placed, seeded, and mulched within 30 days of final grading if it is within a current growing season or within 30 days of the start of the next growing season
iii) Vegetative material used in reclamation must consist of grasses, legumes, herbaceous, or woody plants or a mixture thereof
iv) Plant material must be planted during the first growing season following the reclamation phase
v) Selection and use of vegetative cover must take into account soil and site characteristics such as drainage, pH, nutrient availability, and climate to ensure permanent growth
vi) The vegetative cover is acceptable if within one growing season of seeding
vii) The planting of trees and shrubs results in a permanent stand, or regeneration and succession rate, sufficient to assure a 75% survival rate
viii) The site shall be inspected when the planting is completed and again at one year to ensure compliance with the reclamation plan.
ix) Certificate of Completion of Reclamation

x) To obtained certificate of satisfaction from the landowner and submit it to the PMC/IE before final payment is to done

- **Photographs to be Include**

To ensure that photographs are to be taken before and after the excavation of borrow materials and also after the implementation of redevelopment plan

Annexure 2: Guidelines for Identification of Debris Disposal Sites & Precautions Needed

Guidelines for identification

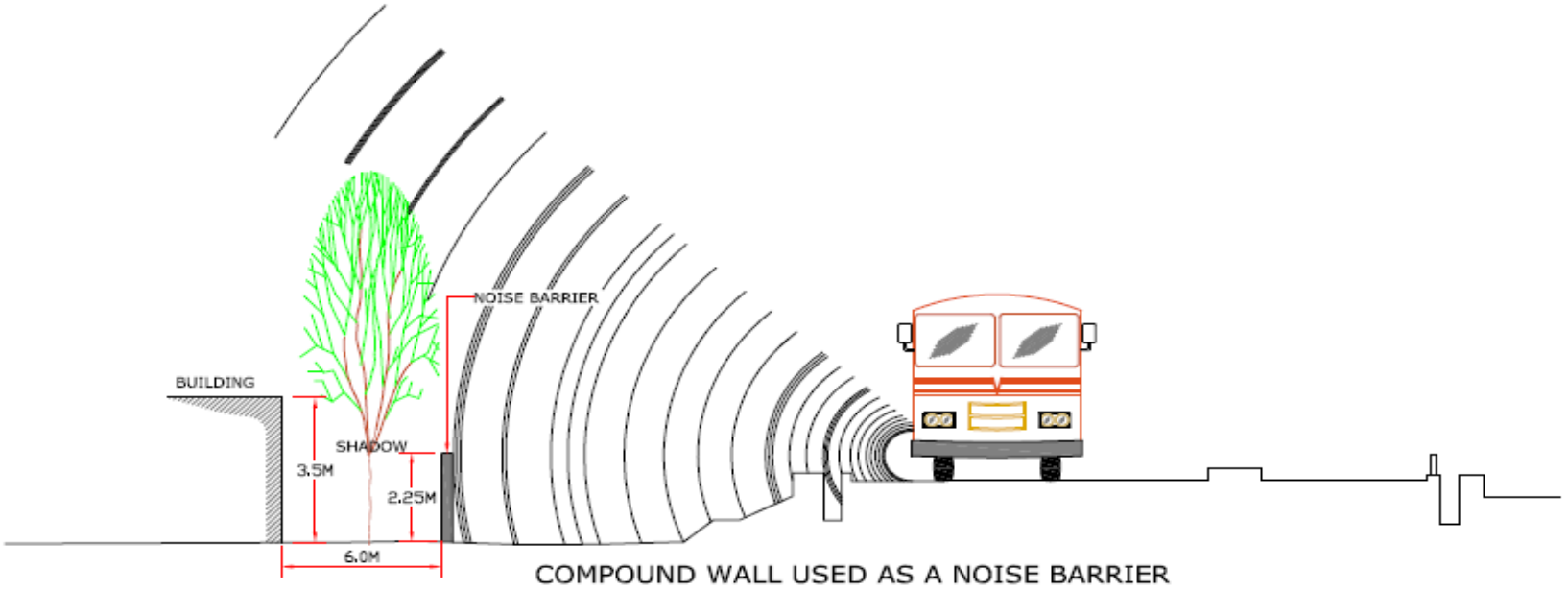
The locations of dumping sites have to be selected such that:

- No residential areas are located downwind side of these locations,
- Dumping sites are located at least 1000 m away from forest areas and water bodies
- Dumping sites do not contaminate any water sources, rivers etc.
- Dumping sites have adequate capacity equal to the amount of debris generated.
- Public perception about the location of debris disposal site has to be obtained before finalizing the location.

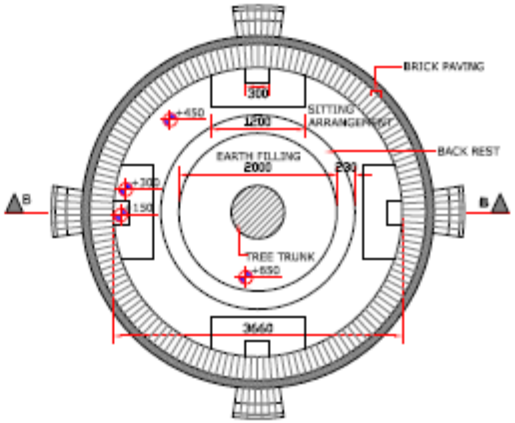
Precautions to be adopted during Dumping of Debris / Waste Material

Following precautions are required while disposing off the waste material

- Dispose off debris only to the identified places only with prior permission of the Project Manager
- Dispose off the debris for the improvements in public utilities after the proper consent of villagers and approval of Project Manager
- In the event of any spoil or debris from the sites being deposited on any adjacent land, immediately remove all such spoil debris and restore the affected area to its original state to the satisfaction of the Project Manager
- Ensure that the entire existing stream courses and drains within and adjacent to the site are kept safe and free from any debris.
- To utilise effective water sprays during the delivery and handling of materials when dust is likely to be created and to dampen stored materials during dry and windy weather.
- Materials having the potential to produce dust will not the loaded to a level higher than the side and tail boards and will be covered with a tarpaulin in good condition.
- During disposal of debris, proper warning signs to be installed to the satisfaction of Project Manager
- Any diversion required for traffic during disposal of debris shall be provided with traffic control signals and barricades after the discussion with local people and with the permission of Project Manager
- Adequate arrangements will be made to ensure that the debris / waste material is disposed off nearest to the designated dumping site. The report on this activity shall be prepared and submitted to Project Manager



Compound wall as Noise Barrier



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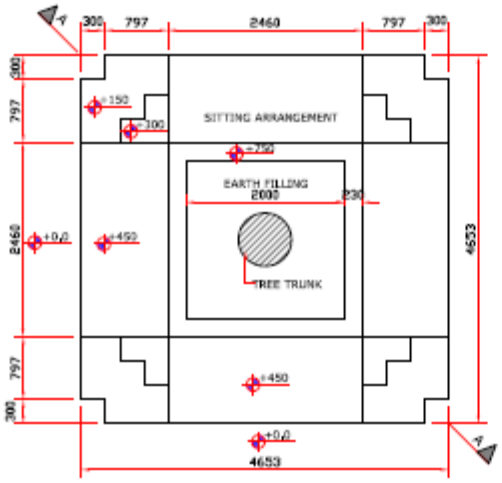

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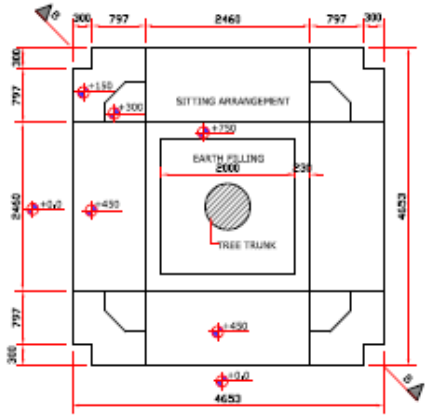

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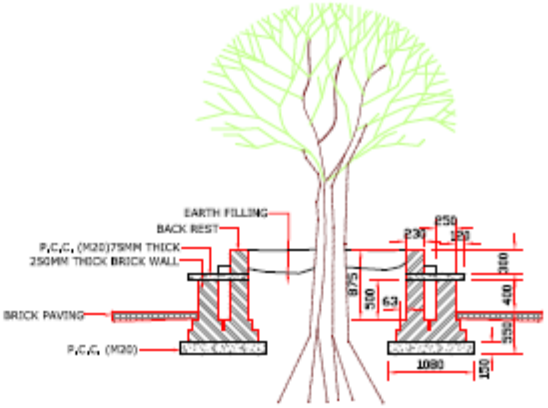

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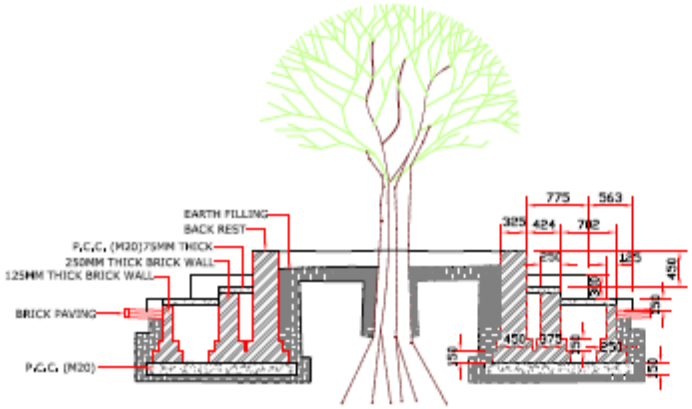

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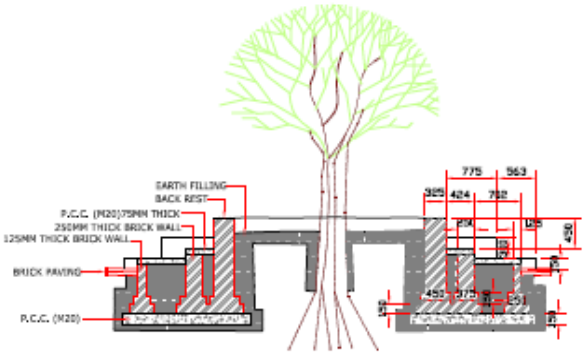
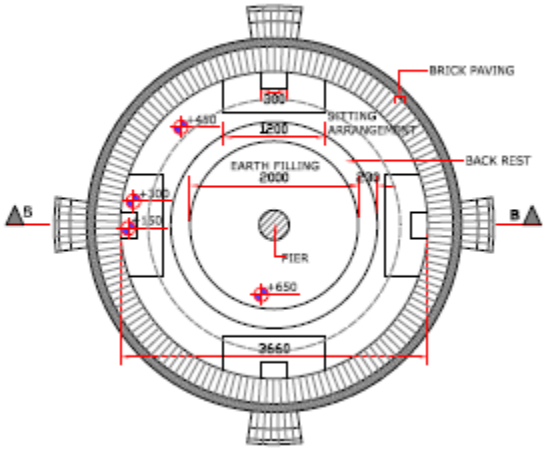
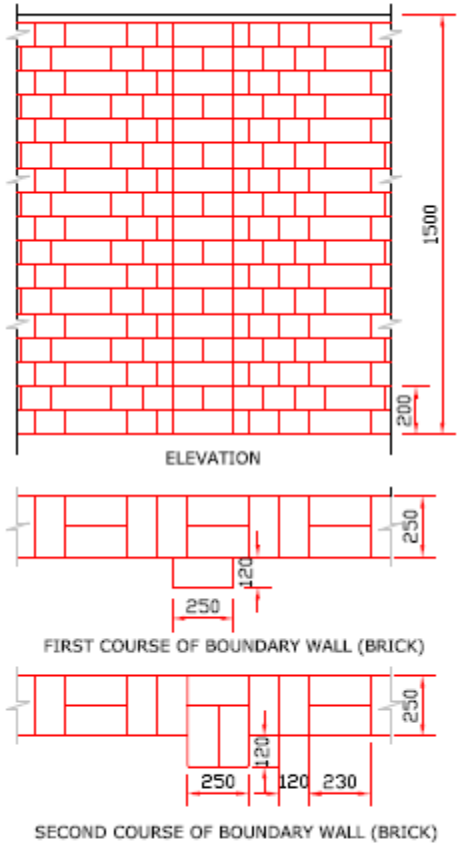


SECTION B-B (TYPE 3)

Seating Arrangements





Seating Arrangements

Annexure 4: Waste Management Plan

INTRODUCTION

Construction and demolition waste is generated whenever any construction/demolition activities takes place during construction and widening of roads, bridges, flyover, subway, and resurfacing and rehabilitation works involved in the road projects. It consists mostly of inert and non-biodegradable material such as concrete, plaster, metal, wood, plastics etc.

These wastes are having high density and very heavy, often bulky and occupy considerable storage space either on the road or communal waste bin/container.

It is estimated that the construction industry in India generates about 10-12 million tons of waste annually. Projections for building material requirement of the housing sector indicate a shortage of aggregates to the extent of about 55,000 million cum and for highway projects 750 million cum aggregate material from construction and demolition waste may reduce the demand-supply gap in both these sectors.

While retrievable items such as bricks, wood, metal, titles are recycled the concrete and masonry waste, accounting for more than 50% of the waste from construction and demolition activities are not being currently recycled in India.

Concrete and masonry waste can be recycled by sorting, crushing and sieving into recycled aggregate. This recycled aggregate can be used to make concrete and WMM for road constructions and building materials. Works on recycling of aggregate has been done at Central Building Research Institute (CBRI), Roorkee and Central Road Research Institute (CRRI) New Delhi.

CHARACTERISTICS

This category of waste is complex due to the different types of construction materials being used but in general may comprise the following materials:

- Clearing and Grubbing (C&G)
- Scarified/Dismantled Bituminous materials
- Dismantled Concrete/Bricks waste
- Oil/Battery/Tyre waste
- Waste from Hot Mix Plant (Aggregate dust)
- Settling Tank waste (Concrete Batching Plant)
- Organic Waste from camp site and Kitchen of different workers camp

STORAGE/ COLLECTION AND REUSE OF CONSTRUCTION AND DEMOLITION WASTE

These waste are best stored at source; i.e., at the point of generation. If they are scattered around or thrown on the road, they may not only cause obstruction to traffic but also add to the workload of the local body. Following methods shall be adopted such as:

a) Clearing and Grubbing (C&G):

- The material collected after C&G at site stored within the ROQ or at approved disposal site so that waste does not get scattered and does not become an eyesore.
- The waste material is carted to disposal site in tippers properly covered and disposed off at disposal site.
- There are various types of materials collected during C&G process like weeds, stumps of trees, or other organic matters. Attempts are made to keep the waste segregated into different heaps as far as possible so that further gradation and reused is facilitated. These materials are generally self degrading and are not health hazard and some of the material are may be used for land fill if required.

b) Scarified / Dismantled Bituminous Material:

- The material collection for scarification of bituminous road or from dismantling of existing road are stored at site and preserved.
- These materials may be mixed in required percentage with GSB material to achieve the desired gradation and may be utilised in medial filling.
- The material is carted by tippers to the stockyard and preserved for reuse.

c) Dismantled Concrete/Bricks Waste:

- The materials are collected from different location of dismantling of bridges and other structures during the road construction.
- They are generally heavy and bulky in nature and require huge effort to handle such type of waste.
- The material is generally stacked at or near the site and later is disposed a suitable locations. The suitable and reusable materials are stacked separately for reuse.

d) Oil/ Battery/ Tyre Waste:

- The oil waste is collected in the oil interceptor constructed at each workshop location. Further, the oil is collected the in the drums. Similarly, the batteries/ Tyres those are out of service and become un-usable are stored at safe place
- Those wastes when collected in sufficient amount are generally sold in the market for re-use.
- Hazard to the surrounding due to such waste are prevented and income to the pocket is added by just good practices
- The proper record of such waste must be maintained at site.

e) Waste from hot Mix Plant (Aggregate Dust):

- The aggregate waste is collected near the plant and considerable amount of waste shall be reused as filled in the bituminous works.
- Dust at plant site is to be reduced at considerable extent.

f) Settling Tank Waste (Concrete Batching Plant):

- The waste generated at batching plant is allowed to settle in the settling tank. Further this will be collected and reused for the haul road to the plant site.
- This helps in the reducing of dust during the movement of heavy vehicles. Further, the haul road shall be regularly watered and kept moist.

g) Organic Waste from Kitchen/Workers Mess:

- The waste generated in the kitchen at camp site is to be collected in proper covered container (20 kg /day)
- The waste are further carried away and disposed to the municipal committee waste disposal areas and after that shall be send for composting.

Annexure 5: List of EMP Reporting Formats

Sl. No.	Title	Doc. Ref. No.	Retention period	Location
1	Identification of Disposal Site Locations	OPRC-EMP-01-Rev 00	30 Months	Site In charge
2	Setting-up Construction Camp and Storage area	OPRC-EMP -02-Rev 00	30 Months	Site In charge
3	Establishment of Borrow Areas	OPRC-EMP 03-Rev 00	30 Months	Site In charge
4	Details of Earthwork	OPRC-EMP 04-Rev 00	30 Months	Site In charge
5	Details of Hot Mix Plant	OPRC-EMP 05-Rev 00	30 Months	Site In charge
6	Identification of Disposal Site	OPRC-EMP 06-Rev 00	30 Months	Site In charge
7	Redevelopment of Borrow Areas	OPRC-EMP 07-Rev 00	30 Months	Site In charge
8	Restoration of Construction Sites	OPRC-EMP 08-Rev 00	30 Months	Site In charge
9	Environmental Pollution Monitoring	OPRC-EMP 09-Rev 00	30 Months	Site In charge
10	Checklist for Environment Inspection	OPRC-EMP 10-Rev 00	30 Months	Site In charge
11	Cleaning of Culvert Opening and Longitudinal Drain	OPRC-EMP 11-Rev 00	30 Months	Site In charge
12	Identification of Source of Water for Construction	OPRC-EMP 12-Rev 00	30 Months	Site In charge
13	Details of Machinery In Operation	OPRC-EMP 13-Rev 00	30 Months	Site In charge
14	Waste Management	OPRC-EMP 14-Rev 00	30 Months	Site In charge
15	Environmental Enhancement Site	OPRC-EMP 15-Rev 00	30 Months	Site In charge
16	Summery Sheet For Environmental Reports	OPRC-EMP 16-Rev 00	30 Months	Site In charge

patel	***1. IDENTIFICATION OF DISPOSAL SITE LOCATIONS*** (OPRC-EMP-01-Rev 00)	FEEDBACK INFRA Making Infrastructure Happen

Name of Project Road:
Date:

Sl. No.	Criteria on which information for each site is to be collected	
1.	Existing Land Use.	
2.	Area covered (m^2).	
3.	Total Material that can be dumped within the site (m^3).	
4.	Depth to which dumping is feasible (m).	
5.	Distance of nearest watercourse (m).	
6.	Nearest Settlements (m).	
7.	Date/s Community Construction/s.	
8.	Whether the community is agreeable to siting of dumping site (Y/N).	
9.	Date of Permission from Villager/local community.	
10.	Proposed future use of the Site.	
11.	Selected Site (Tick any one column only).	

Enclosures (Tick as appropriate)

1. Map of each location. √
2. Photographs. √
   a. Each Disposal Location. √
   b. Each community construction. N.A
3. Photo copy of Agreement. √

Remarks

Prepaired & Checked By
Signature ……
Name ……

Approved By
Signature ……
Name ……

Environmental Engineer

2. SETTING-UP CONSTRUCTION CAMP AND STORAGE AREA OPRC-EMP -02-Rev 00

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format).

Name of Project Road:

Date:

Location of Camp

Sl. No.	Item	Unit	Details	Remarks if any
1.	**Detail of Item Camp**			
a.	Size of camp.	mxm		
b.	Area of Camp.	Sq. m		
c.	Distance from Nearest Settlement.			
d.	Distance from Nearest Water Source.	Type Size/Capacity Present Use/ Ownership		
	Date of camp being operational dd/mm/yy.			
	Present land use.			
	No. of trees with girth > 0.3m.			
e.	Details of Storage area (Availability of impervious surface)	mxm		
f.	Availability of separate waste disposal from storage area.	Cum		
2.	**Details of Topsoil Stacking**			
a.	Quantity of top soil removed	Sq.m		
b.	Detail of storage of topsoil.	Describe attacking arrangement		
3.	**Details of Workforce.**			
a.	Total No. of Labours	Nos.		
b.	Total No. of Male Workers.	Nos.		
c.	No. of Male Workers below 18 Years of ago.	Nos.		
d.	Total No of Female Workers.	Nos.		
e.	No. of Female Workers below 18 Years of ago.	Nos.		
f.	No. of Children.	Nos.		
4.	**Details of Dwelling Units.**			
a.	No of dwelling/huts	Nos.		
b.	Minimum Size of Dwelling.	mxm		
c.	No. of opening per dwelling.	Nos.		
d.	Minimum size of opening.	mxm		

e.	Walls	Specifications		
f.	Roofing	Specifications		
g.	Flooring	Specifications		
h.	Drinking Water Tank	Specifications		
i	Capacity of drinking Water Tank	Cum		
J	Size of Drinking Water Tank.	mxm		
K	Total no of WC	Nos.		
l.	No, of Wcs for female workers	Nos.		
m.	Minimum size of WC	mxm		
n.	Total No. of Bathrooms for female workers	Nos		
o.	Size of septic tank for WC/Baths.	mxm		
p.	Capacity of Water tank for WCs/Bathrooms and general purpose.			
q.	Fencing around camp.	Y/N		
5.	**Details of facilities.**			
a.	Availability of security guard 24 hrs a day	Yes/No		
b.	Details of First Aid Facility	Yes/No		
c.	Availability of Dav Care centre.	Yes/No		
d.	Availability of dust bins (Capacity 60 Ltr.)	Yes/No		

Remarks

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Name ……

3. ESTABLISHMENT OF BORROW AREAS

OPRC-EMP 03-Rev 00

Name of Project Road _____

Sl. No.	Location				Area (m^2)	Quantity of Available Material	Type of Material	Distance from nearest Water Course (m)	Distance from nearest Settlement	Land Use		No. of Trees to be Affected	Approved by Env. Exp. (Y/N)	Remarks
	Name of Village	Chainage (Km)	Side (LHS/ RHS)	Haul road length (m)						Before	After			

Attach Photograph of Proposed Site, Location Map, and Agreement.

Rehabilitation Plan Measures. Location 1: Location 2:
Remarks

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Environmental Engineer

Approved By
Signature ……
Name ……

4. DETAILS OF EARTHWORK

OPRC-EMP 04-Rev 00

Name of the Project Road:

Date of Submission …… .

1.	Name of Village	Chainage (Km)	Side (LHS / RHS)	Haul road length (m)

(Show on a Sketch Plan clearly indicating distance and approach roads.)

2. Details of Borrow Areas.

2.1	Capacity of the Borrow Area.	
2.2	Percentage of the capacity exhausted	
2.3	Total Quality of the Earth Excavated In cum)	
2.4	Quality of Top Soil removed from the Borrow Areas	
2.5	Location of Top Soil stored removed	
2.6	Quantity of Top Soil stored at the beginning of the month	
2.7	Quantity of Top Soil utilized at the end of the month	
2.8	Location (s) where Top Soil has been utilized (Specify on a location plan)	
2.9	Quantity of earthwork excavation from existing road	
2.10	Total quantity of earthwork reused in cum.(5%)	
2.11	Location disposal (if other than sites) (Specify clearly on a location plan)	
2.12	Quantity of earthwork re-used in fill operation	
2.13	Location of borrow areas in disuse / exhausted	
2.14	Outline a rehabilitation plan for each of the exhausted borrow areas with special reference to Erosion Protection Measures. Also, submit at separate detailed rehabilitation plan for exhausted borrow areas for approval supported adequately with layouts, plans and drawings.	

Remark

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Name ……

Environmental Engineer

Approved By
Signature ……
Name ……

	5. *DETAILS OF HOT MIX PLANT* OPRC-EMP 05-Rev 00	

Name of Project Road:

Date of Submission …… .

1. **Environment Features of the surrounding area**

1.1	Name and Location of Hot Mix Plant (w. r. t PWD km ch.)	
1.2	Wind direction	
1.3	Name (s), distance population and type of settlements in a 1.5 km radius of site.	

2. Draw Sketch plan of HMP clearly indicating distance and approach roads.

3. Details of HMP and Mitigation Measures taken

3.1	Installed Capacity	
3.2	Average Utilization	
3.3	Make	
3.4	Model	
3.5	Last Serviced	

4. Explain Air Pollution Control Measures taken at the HMP site

5. Explain Noise Pollution Control Measures taken at the HMP site

Remarks

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Signature ……
Name ……

	6. IDENTIFICATION OF DISPOSAL SITE OPRC-EMP 06-Rev 00	

Name of Project Road:
Date of Submission …….

1. Environment Features of the surrounding area

1.1	Location of each land fill site (Provide sketch Map below)	Name of Village	Chainage (km)	Side (LHS/RHS)	Haul road langth (m)
1.2	Capacity of each land fill site				
1.3	Safety measure taken at land fill site (s)				
1. 2. 3. 4. 5.					

Remark

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Name ……
Environmental Engineer

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Signature ……
Name ……

7. REDEVELOPMENT OF BORROW AREAS

OPRC-EMP 07-Rev 00

Name of Project Road:

Date:

Drawing for Redevelopment to be attached for each Borrow Area, (photography of sites before use &after rehabilitation to be attached)

Sl.No.	Borrow Area No.	Borrow Area Location					Land Use	Rehabilitation Measures	Date of approval of Rehabilitation	Date of Handing Over to Owner	Remarks
		Name of Village	Chainage (Km)	Side (LHS /RHS)	Area (m2)	Heal road length (M)					

Remark

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Environmental Engineer

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Signature ……
Name ……

8. RESTORATION OF CONSTRUCTION SITES (OPRC-EMP 08-Rev 00)

Name of the Project Road:
Construction stage Monthly Report - Date: _____Month: _____Year:_____

Sl. No.	Contract Package	Labour Camp		Construction Camp		Plant Site		Borrow Areas		Disposal Locations'		Top Soil	
		O	R	O	R	O	R	O	R	O	R	Preserved	Reused
1													
2													

Remarks

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Name ……
Environmental Engineer

Approved By
Signature ……
Name ……

9. ENVIRONMENTAL POLLOUTION MONITORING (OPRC-EMP 09-Rev 00)

Name of the Project Road:_____
(Location at which monitoring to be conducted as per EMP)

Sl. No.	Chainage (km)	Details of Loactions	Duration of Monitoring	Instruments used	Standared	Results	Reasons for exceeding standards	Mitigation Measures suggested	Type (Residential / Industrial / Commercial)	Remarks
AIR QUALITY					SPM RSPM HC Sox Nox	SPM RSPM HC Sox Nox				
WATER QUALITY					pH TSS TDS Turbidity Hardness Colifrom BOD COD Oil & Grease	pH TSS TDS Turbidity Hardness Colifrom BOD COD Oil & Grease				
SOIL QUALITY					pH Organic Matter Alkalinity Conductivity Water Holding Capacity Pb	pH Organic Matter Alkalinity Conductivity Water Holding Capacity Pb				
NOISE QUALITY					$L_{\text{day equivalent}}$ $L_{\text{night equivalent}}$ $L_{\text{equivalent}}$	$L_{\text{day equivalent}}$ $L_{\text{night equivalent}}$ $L_{\text{equivalent}}$				

Remarks

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Name ……
Environmental Engineer

Approved By
Signature ……
Name ……

patel	***10. CHECKLIST FOR ENVIRONMENT INSPECTION*** (OPRC-EMP 10-Rev 00)	FEEDBACK INFRA Making Infrastructure Happen

Name of Road:

Date of Inspection:_____

Sl. No.	ESMP Measures
1	Provision of a personnel accountable for implementation of ESMP / Safety Measures with Contractor
2	Consent of PCB to Establish HMP
3	Consent of PCB to operate HMP
4	Compliance of PCB Conditions for HMP installation and operation
5	Whether compliance reported through monthly Progress report of Divisional Office of Executive Engineer
6	PUC taken for all Construction Vehicles
7	Concrete platform with trap bitumen boiler, Fuel Tank for HMP and generator set provided or not
8	Precautions to prevent contamination of soil by emulsion, Bituminous, oil and lubricant taken while storing
9	Providing covert fine construction material & bituminous mix during transportation
10	Borrow Areas:
	a) Borrow areas approved by department
	b) Existing land was used
	c) Nos Opened
	d) Available Quantity
	f) Balance Quantity
	g) Nos of Borrow areas Rehabilitated
11	Spoil and debir disposal:
	a) Present status of land
	b) Closure and completion plan
12	Site specific traffic Safety management Pla:
	a) Contractor installed the warning / regulatory Traffic signs at the at the construction site

	b) The arrangement adequate
13	Safety equipment i.e. helmet, gloves, gumboot, mask, earplugs etc. provided to workers
14	Health Facility at camp and worksite i.e. First Aid kit & suitable vehicle for conveyance in case of emergency / accident
15	Permit for Procuring River sand
16	License from apartment of mines for quarrying
17	Consent to establish / operation of crusher
18	Provision of labour camp with sanitation 7 potable water
19	Fire precautions at Hot Mix Plant and site office
20	Air and noise monitoring done in camp site
21	Whether any cultural property is being impacted
22	Status of drainage provision in camp area
23	General House Keeping

Remarks

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Name ……
Environmental Engineer

Approved By
Signature ……
Name ……

patel	***11. CLEANING OF CULVERT OPENING & LOGITUDINAL DRAIN*** (OPRC-EMP 11-Rev 00)	FEEDBACK INFRA Making Infrastructure Happen

Name of the Project Road:
Date:

Sl. No.	Structure No.	Pre-monsoon	Date	Post monsoon	Date
Name of the project road					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Remarks

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Approved By
Signature ……
Name ……

Environmental Engineer

12. IDENTIFICATION OF SOURSE OF WATER FOR CONSTRUCTION (OPRC-EMP 12-Rev 00)

Name of the Project Road:

Date:_____

S. No.	Source Name	Location/ Ch.	Distance from Road	Permission Required	Remarks

Remarks

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Name ……

Environmental Engineer

Approved By
Signature ……
Name ……

13. DETAILS OF MACHINERY IN OPERATION

(OPRC-EMP 13-Rev 00)

Name of Project Road:

Date:

(Attach copy of PPCB emission control certificate every 3 months)

1. Details of Machinery Operation

1.1	Total machinery in operation (Nos.)	
1.2	Number of pavers	
1.3	Number of rollers	
1.4	Number of excavators	
1.5	Number of graders	
1.6	Number of dumpers	
1.7	No. of workshops with repairs facility (furnish location and type of facility provided)	
1.8	Number of vehicles in repair at each at each location	
1.9	Number of oil interceptor provided in each Repair / fuelling site	
1.10	Total quantity of oil and wastes recovered in each interceptor during last month.	
1.11	Details of waste disposal. (Whether Sold/Disposed)	

Remark

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Approved By
Signature ……
Name ……

14. WASTE MANAGEMENT

OPRC-EMP 14-Rev 00

Name of Project Road _____

Sl. N.	Characteristics of Waste	Type of Waste	Total Quantity generated (cum/l)	Reused/ Recycled, If any (Quantity in cum/l)	Final Quantity of waste generated (cum/l)	Disposed Quantity (cum/l)	Disposal Practices	Disposal site	Remarks

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15. ENVIRONMENTAL ENHANCEMENT SITES

OPRC-EMP 15-Rev 00

Name of Project Road _____

Sl. No.	Project Road	Chainage	Side	Offset from PCL	Type of Property/ structure	Owner ship	Size (Sqm)	Community consultation status	Consent Status	Willingness / participation	Proposed enhancement	Drawing no.	Status	Remarks

Attach Photograph of Proposed Enhancement Site, Locatio

Enhancement Site Location 1: Location 2:
Remarks

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Signature ……
Name ……

Environmental Engineer

Approved By
Signature ……
Name ……

16. SUMMERY SHEET FOR ENVIRONMENTAL REPORTS

(OPRC-EMP 16-Rev 00)

Name of the Project Road:

Date:_____

Sl. No.	Description	Remarks
1	**No Objection Certificate**	
A	Hot Mix Plant	
	Location 1	
	Location 2	
	Location 3	
B	Cement Batching Plant	
	Location 1	
	Location 2	
	Location 3	
2	**Pollution Under Certificate**	
	Vehicles	
	Machineries	
3	**No Objection Certificate**	
	Location 1	
	Location 2	
4	**Labour Camps**	
	No. of sites Indentified	
	Approved	
	Opened	
	Conforms to conditions imposed at the time of opening of Sites	
	Closed	
5	**Workers**	
	No. of Workers employed	
	No. of male workers	
	No. of female workers	
	No. of days workers	
6	**Borrow Area**	
	No. of sites Indentified	
	Approved	
	Opened	
	Quantity of available material	
	Quantity of measures Utilized	
	Quantity Topsoil preserved	
	Quantity of top soil used	
	No of sites closed	
	No. of sites Rehabilitated	

7	**Quarry**	
	No. of sites Indentified	
	Approved	
	Opened	
	Material available	
	Material obtained	
	No. of sites Rehabilitated	
8	**Disposal Locations**	
	No. of sites Indentified	
	Approved	
	Opened	
	Amount of Waste disposed	
	Type of waste disposed	
	No. of sites Rehabilitated	
9	**Road Safety**	
	Road Safety norms followed as per guidelines, SP-55 and approved Traffic plan	
10	**Cleaning of Culvert / drains**	
	No. of culverts / drains	
	Nos. Cleaned	
11	**Tree**	
	No. of tree marked for cutting in field	
	No. of trees cut	
	No. of trees to be Planted	
	Trees Planted	
12	**Haul Roads**	
	Adequacy of maintenance of Haul Road Network	

Remarks

Prepaired & Checked By
Signature ……
Name ……

Environmental Engineer

Approved By
Signature ……
Name ……