Environment and Social Due Diligence Report

December 2013

IND: Accelerating Infrastructure Investment Facility in India –BSCPL Aurang Tollway Limited (BATL)

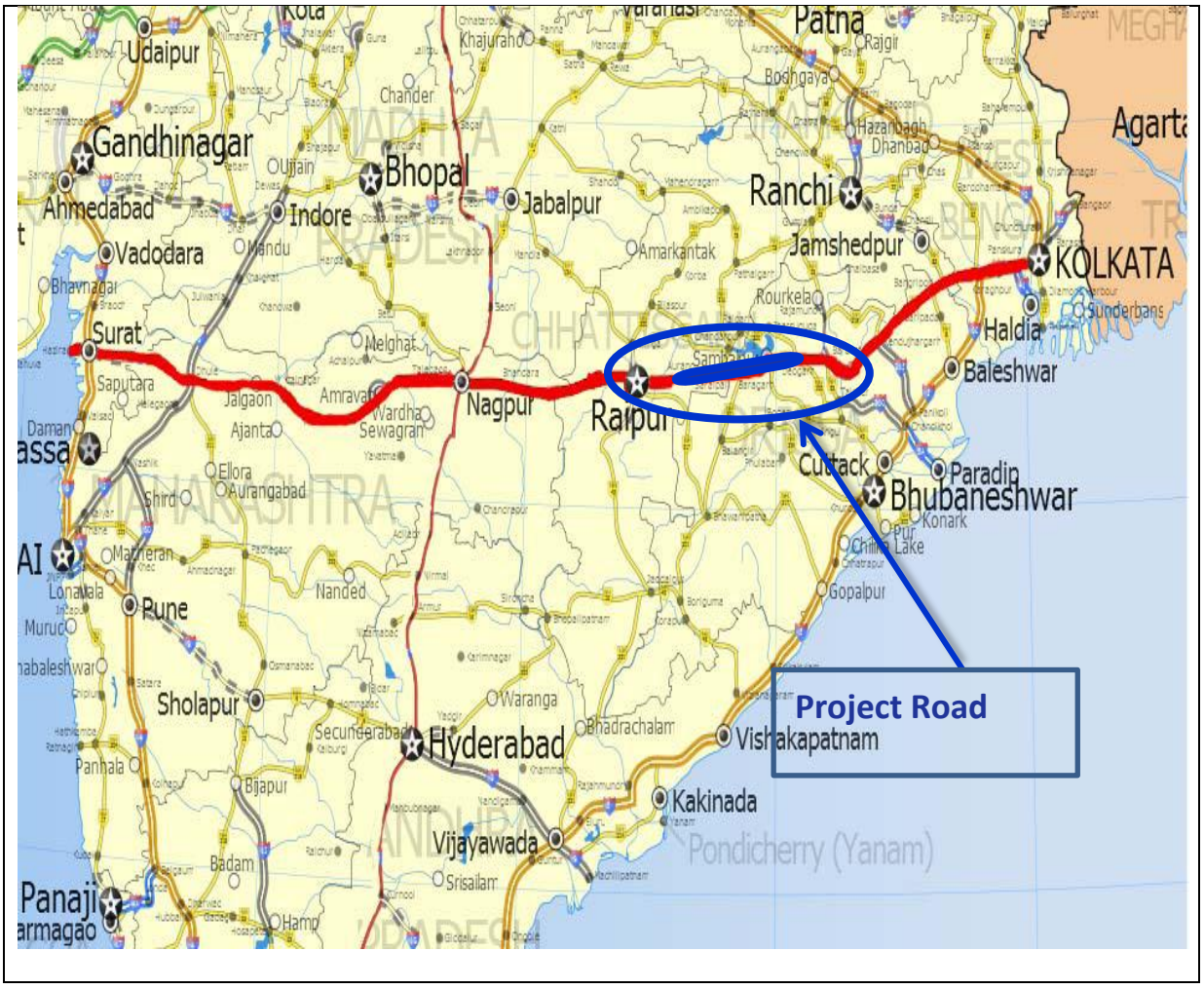
Prepared by

India Infrastructure Finance Company Limited for the Asian Development Bank

India Infrastructure Finance Company Limited

Environment and Social Safeguards Due Diligence Report

Sub Project: Four Laning of Chattisgarh/ Orissa Border – Aurang Section-from km 88.000 to km 239.000 of NH- 6 (53) in the state Chattisgarh to be executed as BOT (Toll) on Design, Built, Operate and Transfer (DBFOT) basis



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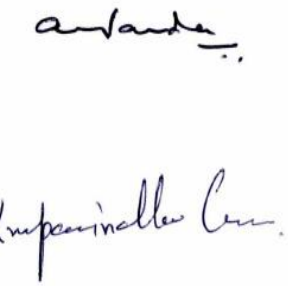
Environment and Social Safeguards Due Diligence Report

Prepared by	Dr. Abhash C. Panda, Head ESMU, IIFCL Mr. Krupasindhu Guru, Social Safeguard Specialist , IIFCL	
Reviewed and Approved by	Mr. Sanjeev Ghai, Chief General Manger, IIFCL	

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PROJECT BACKGROUND:

1. SUB-PROJECT TITLE:

1. The Sub Project road Augmenting the existing 150.4 km by four-laning of Chhattisgarh/ Orissa Border – Aurang Section-from km 88.000 to km 239.000 of NH-6 (53) in the state of Chattisgarh to be Executed as BOT(Toll) on Design, Built, Operate and transfer (DBFOT) basis.

2. SUB PROJECT SCOPE:

2. The scope of subproject includes:

- Augmenting the existing road of 150.4 km by four-laning on design, build, finance, operate and transfer (DBFOT) on toll basis;
- Operation and maintenance of the project highway;
- Performance and fulfillment of all other obligations as the concessionaire in accordance with the provisions of the Concession Agreement attached as **Appendix-V.**

3. SUB-PROJECT DESCRIPTION:

3. The project road stretch (which is now known as NH-53 earlier it was known as NH-6), starts from Chhattisgarh – Orissa Border (Km 88.00) and ends at Aurang in Chhattisgarh (km 239). The National Highway, NH-6, starts from Kolkata in West Bengal and ends at Hazira Port in Gujarat. It is a major connecting link between West Bengal, Orissa, Chhattisgarh, Maharashtra and Gujarat.

4. The National Highway – 6, also known as the Great Eastern Road, is 1,884 km long. It starts from Kolkata, West Bengal and ends at Hazira, Gujarat connecting States of West Bengal, Orissa, Chhattisgarh, Maharashtra and Gujarat. The highway passes through several important cities such as Surat, Dhule, Nagpur, Durg, Raipur, Sambalpur and Kolkata.

5. The project road stretch falls in the districts of Raipur & Mahasamund in Chhattisgarh State. The project does not pass through National Park/Sanctuary/ Wildlife Corridor/ Eco-sensitive zone. It crosses River Mahanadi at km 230. The settlements of Saraipalli, Basna, Pithora, Patewa and Tumgaon lie along the project corridor.

6. Project corridor has a two lane carriageway 7.00 m in its almost entire length barring some places where width is between 10.00 m and 19.00 m. earthen shoulders of width 1.5 m to 2.0 m exist in the entire length except where shoulders are paved. Paved shoulders of 1.5 m to 1.0 m exist in two stretches from Km 298.075 to Km 303.000 and Km 337.000 to Km 339.000.

7. Under Phase IV of NHDP, in the month of June 2011, NHAI invited proposals for four laning of Orissa Border - Aurang section from Km 88.00 to Km 239.00 of NH-6 in the State of Chhattisgarh on Design, Build, Finance, Operate and Transfer (DBFOT) toll basis. BSCPL Infrastructure Limited (BIL) was awarded the project on the basis of the highest premium quoted of 29.7 Cr.

8. The proposed RoW is 60 m except in forest area where it is restricted to 45m. In case of the toll plazas, the proposed ROW is 90 m for 300 m length on either side.

9. Considering the safety of local people and to facilitate the crossing in settlement area, 18 Km length of service roads are to be provided in 18 locations and to avoid the disruption of life and property and minimizing the rehabilitation of affected people, seven bypasses totaling to Km.28.900 have also been proposed in the project. The details are depicted in the **Figure-1:** below.

Figure 1: Project details

10. The proposed widening and strengthening work would mainly involve: Toll Plazas, roadside furniture, pedestrian facilities, landscaping and tree plantation, truck lay byes, bus-byes and passenger shelters, cattle crossing / underpasses (vehicular) /flyovers, highway lighting, administrative, operation and maintenance base camp, vehicle rescue posts, telecom system and highway traffic management systems. The project salient features are given in below **Table-1:**

Table- 1: Project Salient Features

Particulars	Project Road
Concessionaire	BSCPL Aurang Tollway Ltd.
Project Road	Four Laning of Chattisgarh/ Orissa Border – Aurang Section-from km 88.000 to km 239.000 of NH- 6 (53) in the state Chattisgarh to be Executed as BOT(Toll) on Design, Built, Operate and transfer (DBFOT) basis
Length	150.400
Terrain	The project road alignment passes through plain terrains with partly forest and agricultural activities.
Service Road	18 Km length of service roads
Bypass	seven bypasses totaling to Km.28.900
Realignment	14 Km
Major Bridges	7Nos.
Minor Bridges	23 Nos.
Flyover	1
PUP/VUP	24 Nos.
Box Culverts	24 Nos.
Slab Culverts	37 Nos.
Pipe Culverts	34 Nos.
Width of Carriageway	17. M (Excluding Median)
Truck lay-byes	5 Nos.

Bus bays & Bus shelters	2x13=26
Toll Plaza	2 Nos. at km 122.00 and km 182.00

Source: Information Memorandum

4. ROAD FURNITURE AND ENHANCEMENT:

11. Further as part of the project road furniture and enhancement of Common property Resources, various project facilities shall be provided which will also put advantage to the environmental and social safeguards of the project. The project facilities to be provided has been mentioned below:

- Toll Plaza;
- Roadside furniture;
- Pedestrian facilities;
- Landscaping and tree plantation;
- Rest areas;
- Truck lay-bys and bus bays;
- Street Lighting;
- Ambulances;
- Cranes;
- Traffic Aid Post;
- Medical Aid Post;
- Vehicle rescue posts;
- Vehicular Underpasses and Pedestrian/Cattle Underpasses;
-
- Administration, Operation and Maintenance of Base Camp;
- Junction Improvements carried out at all major junctions;
- Highway patrolling, ambulance measures during operation;

- MS Crash Barriers on outer side of carriageway wherever the embankment height is more than 3m.

5. PROJECT ADMINISTRATIVE AND FINANCIAL DETAILS:

12. The administrative and financial details of the project as follows in the below **Table-2:**

Table- 2: Administrative details of the project:

Sl. No.	Description	Project Data
1	Client	National Highways Authority of India
2	Project Cost	1236.00Cr.
2	Design Consultant	EGIS,HBS Infra Ltd.
3	EPC Contractor	M/s BSCPL Infrastructure
4	EPC Cost	INR 1040 Cr.
5	EPC Agreement	21st day of June 2012
6	Date of Concession Agreement	25th January 2012
6	Date of Financial Closure	17th January 2013
7	Appointed Date	15th February 2013
8	Concession Period	28 Years from the Appointed date including construction period of 30 months.
9	Lenders Engineer	Halcrow Consulting India Pvt. Ltd.

Source: LIE Report: June 2013

13. The debt component of the proposed project is being financed by a syndication of loan with lead Bank as ICICI Bank. BSCPL Aurang Tollway Ltd. has signed a Common Rupee Loan Agreement with a consortium of other 9 lenders. The consortium of Lenders comprises of India Infrastructure Finance Company Limited (IIFCL), Central Bank of India, Corporation Bank, LIC of India, State Bank of Hyderabad, Vijaya Bank, Tamilnadu Mercantile Bank, Allahabad Bank. The total cost of the project is ` 1236.00 Cr. and the debt component of the project is ` 856.00 Cr. out of which ` IIFCL has sanctioned of term loan of 200 Cr.

6. CONCESSIONAIRE:

14. NHAI has appointed M/s. BSCPL Aurang Tollway Ltd. as the concessionaire for this sub-project section from km 88.000 to km 239.000 of NH- 6 (53) in the state Chattisgarh. The Concession Agreement signed on 25th January 2012 between NHAI and M/s. BSCPL Aurang Tollway Ltd. The financial close has been achieved on 17th January 2013.

7. EPC CONTRACTORS:

15. M/s. BSCPL Aurang Tollway Ltd. has signed the EPC contract agreement with M/s BSCPL Infrastructure on 21st day of June 2012 and the EPC cost is `1040.00 Cr.

8. LENDER'S ENGINEER:

16. M/s. Halcrow Consulting India Pvt. Ltd. has been appointed as Lender's Engineer for the project M/s. BSCPL Aurang Tollway Ltd. As per the Lender's Engineer report for the month of June 2013 financial progress up to end of June is about 21.08%.

DUE DILIGENCE ON ENVIRONMENTAL SAFEGUARDS

9. AVAILABILITY OF EIA/EMP REPORTS:

17. National Highway Authority of India (NHAI) through its consultant M/s VITYA Consultants Pvt. Ltd. has prepared the Environmental Assessment and Environment Management Plan. A copy of the EIA report is given in **Appendix-I.**

10. ENVIRONMENTAL SENSITIVITY AND DUE DILIGENCE:

18. The project road covers a total length of 150.400 km starting from Aurang (Raipur District) to Saraipali (Mahasamund District). The project stretch passes through Reserved Forests namely Tumgaon, Nigam Forest & Sirpur, Chirko, Plantation area, Orange Forest, Raja Sawaiya, Sankra, Chuhipali, Nursery B Singobha and the total forest land to be acquired is about 101.25 ha. There is no endangered flora and fauna found in the Reserve and Protected Forests.

19. The sub-project was visited by the Environmental Safeguard specialist of IIFCL during 6th -7th of August 2013 for field verification of environmental safeguards as reported in the EIA/EMP reports and consultation with the concessionaire. The new four lane facility has provision for seven bypasses; seven major bridges; 23 minor bridges; one flyover; 24 PUP/VUP and 102 culverts to cater to cross drainage requirements and various project facilities. The site visit photographs are given in **Photo plate-I**. The environmental sensitivity assessment is given below:

- The project is located between Latitude 21°18'27.84"N, 83°15'43.38"E Longitude and Latitude21 "1 1'53.1 6"N, 81 "56'47.52"ELongitude, passing through the Districts of Mahasamund and Raipur in Chhattisgarh State.

- The area along the project road represents mostly forest and rural environment. Topographically, project road for most of its length passes through mainly plain terrain and rolling terrain;

- The project road does not pass through any protected area like Wildlife Sanctuary, National Park, Bio Reserve etc.;

- There are no known rare, threatened or endangered flora and fauna species reported in the area close to the project highway i.e. corridor of impact;

- The proposed ROW from Aurang-Saraipali is passing through the patches of Reserved Forests such as Singhobha RF (89.700 km to 92.700 km); Orange Forests (92.700 km to 93.300 km) & (184.500 km to 185.200 km); Nursery (96.300 km to 97.000 km); Chuhipali RF (102.100 km to1 04.000 km); Sankra RF (149.800 km to 152.400 km); Raja Sawayya RF (160.800 km to 168.800 km); Chirko RF (179.600 km to 180.600 km) & (192.400 km to 198.100 km); Plantation (181.408 km to 181.500 km); Sirpur RF (202.500 km to 203.000 km) & (206.500 to 208.900 km); Nigam Forests (203.100 km to 206.400 km)

& Tumgaon, Sirpur & Nigam Forests (210.000 km to 213.600 km) and the total forest land to be acquired is about 101.25 ha.

- There are as many as 51, 030 trees along the roadsides likely to be impacted, for which 1, 53,000 trees are planned to be planted as avenue plantation. The predominant tree species in the corridor are Raavi, Sisa, Neem, Siriga, Kiran, Tamarind and Teak.

- There are no archeological monuments and cultural sites of national importance within corridor of impact for this project;

- Public consultations are being conducted regularly to address the views/aspirations of the local people along this NH section. Public hearings were carried out for the project at Arang, District Raipur on 14.09.2011 and at Village Sakara, District Mahasamund on 16.09.2011;

- Elaborate environmental management and monitoring programme has been suggested for this NH section;

- The concessionaire has undertaken the implementation of environment management measures as per agreed EMP including physical monitoring of environmental parameters during the construction stage of the project;

- As per EIA, a provision of INR 9 Crore has been proposed for environment protection works. Provision of 5% per annum as recurring cost of total capital cost of environment management is also proposed in the EIA report.

11. CATEGORIZATION OF SUB-PROJECT:

20. The sub-project can be classified as category B based upon ADB's EA requirements as per their Safeguard Policy Statement (2009). This classification is based on the review of the EA report and other available documents with respect to the environmental sensitivity due to project activities.

12. STATUS OF REGULATORY CLEARANCES:

21. It is required that the sub-project meets the requirements of appropriate Indian legislations by considering appropriate obligations and guidelines of Regulatory Authorities. The sub project needs to have necessary national and local environmental clearances as well as permits and approvals for project implementation and suitable environmental management. The statutory clearances required as part of the proposed widening and strengthening of the sub-project has been assessed and current status of such clearances are given in **Table-3**.

Table- 3: Status of Regulatory Clearances Obtained:

Sl. No.	Clearances Required	Statutory Authority	Current Status of Clearance
1	Environmental Clearance	Ministry of Environment and Forests, GoI, New Delhi	MoEF has granted Environmental Clearance to this project on 5th October, 2012: F.No. 10-80/2010-IA-III **(Appendix- IV)**
2	Forest Clearance	Ministry of Environment and Forests, Government of India (FC Division)	MoEF has granted final Forest Clearance to this project on 30th July 2013: F.No. 8-20/2010-FC for diversion of 101.25 ha (72.22 ha of forest land and 24.03 ha of revenue forest land) **(Appendix-IV)**
3	Tree felling Permissions for Roadside Trees	District Collector, Mahasamund	a) Tree cutting permissions have been obtained from the District Collector, Mahasamund for non-forestry species (Letter No. 53/A-62, 2011-12 dated 02.05.2012) **(Appendix IV)**
4	Consent for Establishment and Operation	CG Environment Conservation Board, Raipur	Consents have been received from Chhattisgarh Environment Conservation Board for construction work of the highway under section 25 of the Water (prevention and control of pollution) Act, 1974, and under section 21 of Air (Prevention & Control of Pollution) Act, 1981. These consents are taken for establishment and operation of plant sites at **Camp Site-I :** Chhuipalli (V), Tehsil - Saraipali, Mahasamund District (Consent File no. 884 & 886/ RO/TS/CECB/2012, date of issue: 14-06-2012; (i) Stone Crusher: 2,00,000 MT per year

			(ii) Concrete Mixer: 50,000 cm per year (iii) Hot Mix : 2,00,000 cm per year (iv) WMM Plant : 2,00,000 MT/year **Camp Site-II :** Ghodari (V),Tehsil & District Mahasamund (Consent File no. 512-14/ III-CON(NOC)/13/2012-13, date of issue: 26-05-2012 & Consent File no. 2745/ III-CON(NOC)/13/2012-13, date of issue: 26-05-2012 ; (i) Stone Crusher: 2,00,000 MT per year (ii) Concrete Mixer: 50,000 cm per year (iii) Hot Mix : 2,00,000 cm per year (iv) WMM Plant : 2,00,000 MT/year
5.	Blasting License	Office of Joint Chief Controller of Explosives, Agra	Permission to carry out blasting operations in quarries/mines/project work against license number E/CC/CG/22/259 (E 25223) has been received from Jt. Chief Controller of Explosives Central Circle, Agra dated 01/01/2013
6.	Water for construction purposes	Office of the Executive Engineer, Office of the Water Resources Division, Mahasamund	Permission to draw 100 KL of water per day from natural resources (Memo No/3980/G.S/2012-13 Mahasamund dated 06/08/2012)
7.	Borrow Area Permission from	Village Panchayat, Birkona &	Borrow area permissions are also obtained for different locations from different village

	Panchayats	Kharkhari	Panchayats on short term basis.
8.	Installation of Petroleum Class A,B Consumer Pump	Petroleum and Explosives Safety Organization (PESO), Government of India	Storage of Petroleum Class B through Licence No F/CCICG114/1731 (P291539) dated 26/04/2013 granted in Form XIV under the Petroleum Rules, 2002 at Chupalli, Mahasamund & through Licence No F/CCICG114/1645 (P291543) dated 14/12/2012 granted in Form XIV under the Petroleum Rules, 2002
9.	Engagement of Contract Labour	Office of the Assistant Labour Commissioner , Raipur	Engagement of contract labour (Max 20 per day) under BOCW(RE&CS)Act, 1996 - Registration Certificate under Section 7(3) of BOCW(RE&CS) Act, 1996 and Rule 24(1) of BOCW (RE&CS) Central Rules, 1998 through Letter No. RP-57(83)/2012-LAC dated 24.12.2012 and (Max 300 per day) through Letter no. No. RP - 57(84)/2012-ALC dated 24.12.2012

Source: Concessionaire

22. Copies of all relevant consents and approvals are given in **Appendix-II.**

13. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE:

23. Formal Public Hearings as part of Environment Clearance Process were conducted to disseminate the project information and to record the views/aspirations of the local people along this NH section in both the districts (Raipur & Mahasamund). Public hearings were carried out for the project in Raipur district on 14.09.2011 at Arang and for Mahasamund district at Village Sakra on 16.09.2011. Copies of proceedings of public hearing for both the districts are attached as **Appendix-III.**

14. ALTERNATIVE ANALYSIS:

24. The analysis of alternatives is one of the most important exercises that need to be carried out to find the least cost option with regards to socio-economic and environmental consequences to each alternative and the cost attributed to it. The alternatives examined take in to account all possible and feasible actions and includes both with and without project scenarios in terms of the potential

environmental impacts for the justification of the project. The alternative assessment is summarized here:

25. Alternatives for widening play very important role in protection of the environment. Through the selection of right alternative, trees cutting and acquisition of structures can be avoided in significant numbers. After field visits for detailed survey on alternative analysis, following outcomes have resulted due to selection of proposed road alignment for widening of project section as given in EIA report:

    - Displacement of shops and houses have been minimized up to great extent by suggesting adequate number of bypasses;
    - Cost of resettlement & rehabilitation measures have been controlled up to great extent by minimizing displacement of properties;
    - Affected persons would also be less in comparison to other alternatives;
    - Anticipated environmental impact will be relatively insignificant under this alternative;
    - Maintenance of design speed through improved geometrics;
    - Accommodating service roads by reduced medians;
    - Provision of adequate number of drains;
    - Reduction of air and noise pollution through aggressive tree plantations;
    - Improvement of road safety through provision of underpasses and improvements at curves and grades separation;

15. ENVIRONMENT AND SAFETY CLAUSES IN CONCESSION AGREEMENT:

26. NHAI has signed concession agreement on 25th January 2012 with M/s BSCPL Aurang Toll-way Ltd. The concession period is 28 years from the appointed date including construction period. The appointed date has been notified by NHAI as 15th February 2013. Copy of the concession agreement is attached as **Appendix- V**. As per article 5 under obligations of Concessionaire in concession agreement, the concessionaire shall comply with all applicable laws and applicable permits (including renewals as required) in the performance of its obligations under this agreement. Subject to the provisions of Clause 5.1.2, the Concessionaire shall comply with all applicable laws and applicable permits in the performance of its obligations under this agreement and under Clause 5.1.3 shall discharge its obligations in accordance with good Industry practice and as a reasonable and prudent person. Concession agreement for this project is attached as Appendix-V.

Under Clause 11.4, the authority shall assist the Concessionaire in obtaining the applicable permits for felling of trees to be identified by the authority for this purpose if and only if such trees cause a material adverse effect on the construction, operation or maintenance of the project highways.

27. Safety requirements are given under Article 18 in which it is specified that the Concessionaire shall comply with the provisions of this agreement, applicable laws and applicable permits and conform to good industry practices for securing the safety of the users. Besides, the authority shall appoint a qualified and experienced firm or organization for carrying out safety audit of the project highways in accordance with the safety requirements and shall take all other actions necessary for securing compliance with the safety requirements. In particular, the Concessionaire shall develop, implement and administer a surveillance and safety programme for providing a safe environment on or about the project highway and shall comply with the safety requirements set forth in Schedule-L.

28. As per the schedule- L of CA, safety requirements apply to all phases of construction, operation and maintenance with emphasis on identification of factors associated with accidents, consideration of the same, and implementation of appropriate remedial measures. The concessionaire shall abide with applicable laws and applicable permits; manual for safety in road design issued by MOSRTH; relevant standards/guidelines of IRC relating to safety of road and associated facilities in accordance with the provisions of CA and good industry practices relating to safety of users. NHAI shall appoint an experienced and qualified firm or organization as a safety consultant for the project for carrying out safety audit of the project highway in accordance with the safety requirements. The Safety Consultant shall employ a team comprising, without limitation, one road safety expert and one traffic planner to undertake safety audit of the Project Highway.

16. ENVIRONMENT AND SAFETY CLAUSES IN EPC CONTRACT:

29. The BSCPL Aurang Tollway Limited has awarded the EPC works for this project to BSCPL Infrastructure Limited. Copy of the EPC Contract for this project has been attached as **Appendix-VI.** As per EPC Contract, under Clause-2 for The Contractor, under sub-clause of 2.2, it has been mentioned that the employer shall provide reasonable assistance to the Contractor in obtaining any permits, licenses required by the Laws of the Country. Under Clause 4.1, the Contractor shall make its own arrangements for quarrying of materials needed for the works under and in accordance with the applicable laws and applicable permits.

30. Under Clause 4.8 (f), the Contractor has to undertake traffic management during the construction period including but not limited to barricading, signages, lighting and any other safety precautions and measures as per the Employer's requirements.

31. Under Clause 4.18, the Contractor shall develop an Environment management plan highlighting its impact on natural resources; human health & safety; compliance of

environment related legal requirements and regulations and capacity building of its staff on environment related matters.

32. Without prejudice to the foregoing, the contractor shall obtain all Central Government Clearances and permits under the Applicable Laws relating to environmental protection and conservation from the Ministry of Environment and Forests, not later than six months from the date of execution of the concession agreement.

33. The contractor will develop, implement and administer a surveillance and safety program for the Project Highway, the users thereof, the contractor's and concessionaire's personnel including correction of safety violations and deficiencies, and taking of all other actions necessary to provide a safe environment in accordance with the Project Agreements (including Schedule 'L' of the Concession Agreement), Applicable Laws and Good Industry Practice. The contractor shall take all reasonable precautions for the prevention of accidents on or about the project highway and provide all reasonable assistance and emergency medical aid to accidental victims.

34. As per Safety Requirement- Schedule-L of the concession agreement and all liabilities arising out of and all traffic management and maintenance of the project road including the existing road will be the responsibility of the Contractor. Copy of the Contractor's agreement is attached as **Appendix VI.**

17. EMP IMPLEMENTATION BUDGET:

35. As part of the project, detailed EMP measures have been undertaken including a budget of Rupees 9 Cr. (as given in EIA Report) during pre-construction, construction and operation phase for implementing the same. The EMP budget exclusively includes the following measures:

- Compensatory afforestation and its maintenance for 03 years;
- Planting and maintenance of flowering plants and shrubs in the central verge for the entire duration of the contract period;
- Providing oil interceptors as per design and drawing at vehicle parking areas;
- Extension of the existing compound walls and dismantling and new construction of compound wall at government schools and health units to control noise;
- Silt fencing around soil stockpiled near water bodies;
- Sampling and monitoring ambient air quality of SPM and gaseous pollutants at sensitive areas;

- Collection and analysis of grab samples of water quality at different locations;
- Monitoring of noise levels at equipment yards;
- Training and awareness building among workers and community;
- Safety provisions at construction sites including PPEs for laborers;
- Water sprinkling and cover for vehicles transporting construction material during construction;
- Waste collection, segregation and disposal;

18. ENVIRONMENT MANAGEMENT PLAN (EMP) IMPLEMENTATION:

36. An extensive environmental management plan has been provided in **Appendix-VII.** The EMP has proposed mitigation measures which are being adopted during the pre-construction, construction and operational phases of the project. The EMP also elaborates on environmental monitoring.

37. Implementation matrix of EMP is provided below in **Table-4:**

Table- 4: EMP Implementation Matrix Status:

Sl. No	Particular of Works	Compliance		Remarks
		Yes	No	
1.	Monitoring of Ambient Air Quality, Water Quality & Noise Level at all the construction camps (Quarterly basis)			Yet to start
2.	Permission of tree cutting from Competent Authorities like Forest Department (as applicable)	Yes		
3.	Permission for Diversion of Forest land from Competent Authorities like Forest Department (as applicable)	Yes		Final clearance for 101.25 ha of forest land
4.	Status of Site Clearance from MoEF	Yes		
5.	Sources of water for construction	Yes		Have

Sl. No	Particular of Works	Compliance		Remarks
		Yes	No	
				permission to use from natural resources
6.	Have you obtained permission from the government, if you are using river water			NA
7.	Are any water bodies / water sources being affected? Give details for each case			NA
8.	Permission for operation of Quarrying and Borrowing	Yes		
9.	**Quarry:** The contractor shall obtain materials from quarries only after the consent of the Department of Mining / GPCB / District Administration or will use existing approved sources of such materials	Yes		
10.	Road side utility relocation plan (Detailing / Permission and reestablishment schedule etc.)	Yes		
11.	NOC from State Pollution Control Board (SPCB) under Water (Prevention and Control of Pollution) Act – 1974 and the Air – Act 1981 and the environmental (protection) Act 1986	Yes		
12.	Status of dust control at crusher and along the road where construction is under progress	Yes		Work has just begun
13.	Traffic Safety / Road side signage	Yes		
14.	Are the warning signs sufficient in number	Yes		

Sl. No	Particular of Works	Compliance		Remarks
		Yes	No	
15.	Are the warning signs adequately clear	Yes		
16.	**Noise Pollution :** Noise from Vehicles, Plants and Equipment:- i) All plants and equipment used in construction will strictly confirm to the MoEF/ CPCB/ GPCB noise standards; ii) All vehicles and equipments used in construction will be fitted with exhaust silencers; iii) Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaces.	Yes		
17.	**Emission from Construction Vehicles, Equipment and Machineries:-** i) Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of GPCB/CPCB. ii) The Contractor will submit PUC (Pollution under Control) certificates for all vehicles/equipment/machinery used for the project.	Yes		
18.	Status of dust control during construction activities	Yes		
19.	**Dust Pollution:** i) The contractor will take every	Yes		

Sl. No	Particular of Works	Compliance		Remarks
		Yes	No	
	precaution to reduce the level of dust from crushers/hot mix plants, construction sites involving earthwork by sprinkling of water, encapsulation of dust source and by erection of screen/barriers; ii) The contractor will provide necessary certificate to confirm that all crushers used in consultation confirm to relevant dust emission control legislation.			
20.	**Drainage:** Contractor will ensure that no construction materials like earth, stone, ash or appendage is disposed of in a manner that blocks the flow of water of any water course and cross drainage channels. Contractor will take all necessary measures to prevent any blockage to water flow.	Yes		
21.	License of labour: Insurance Policy for all labor force	Yes		
22.	Does the labour / construction have the First Aid	Yes		
23.	Has the contractor provided and maintaining temporary living accommodation and ancillary facilities for labor to the standards and scale approved.	Yes		But more required as the work progresses
24.	Supply of safety equipments and safety devices (helmet / shoe / goggles etc.) to the workers	Yes		
25.	Does the contractor have a safety plan during construction	Yes		

Sl. No	Particular of Works	Compliance		Remarks
		Yes	No	
26.	**Labour Camp Management:** i) Accommodation- maintained necessary living accommodation and ancillary facilities in functional and hygienic manner; ii) Potable Water- Supply of sufficient quantity of potable water (as per IS) in every workplace/labour campsite at suitable and easily accessible places and regular maintenance of such facilities; iii) Sources of water for the camp; iv) Sanitation and Sewage System- the sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place, separate toilets/bathrooms, wherever required, screened from those from men (marked in vernacular) are to be provided for women, adequate water supply provided in all toilets and urinals and all toilets in workplace are with dry-earth system (receptacles) which are to be cleaned and kept in a strict sanitary condition.			NA (Local labor go back to their villages after working hours)
27.	Are the garbage bins provided in the camps and regularly emptied and the garbage disposed of in a hygienic manner, to the satisfaction	Yes		
28.	General cleanliness of camps area	Yes		

Sl. No	Particular of Works	Compliance		Remarks
		Yes	No	
29.	Name and location of each hot mix plant under operation	Yes		Chhuipalli & Ghodari
30.	Good house-keeping practices for various work places of projects e.g. Worker's Camp, Crusher, Construction area of Road etc.	Yes		
31.	Safety arrangements for worker, public and associated environment – during construction	Yes		
32.	Is the storage of fuel/lubrication done satisfactorily?	Yes		
33.	Are you using blasting material, if you please provide the – permissions obtained, storage facility and location	Yes		
34.	Drinking water facility in camps and work site	Yes		
35.	**Water:** No ground water shall be tapped for the construction of the project. Water for construction works shall not be drawn from community water sources.	Yes		Permission has been taken to use natural resources
36.	**Air:** i) Water sprinkling is carried out at mixing sites, temporary diversions, unpaved roads as well as haulage roads to control dust emission; ii) The gaseous emissions and particulate matter from the project construction confirm to the standards prescribed by the GPCB. At no time, the emission levels shall go beyond the stipulated	Yes yes		Not yet

Sl. No	Particular of Works	Compliance		Remarks
		Yes	No	
	standards; iii) Concessionaire obtained the requisite permissions for Asphalt plant, Hot-Mix Plants, Wet-Mix Plants and Concrete Batching Plants from the statutory authority before commencing any activity; iv) Occupational health surveillance of the workers shall be carried out on a regular basis and proper records shall be maintained for the same; v) Pre-employment and periodical medical examination for all workers undertaken as per statutory requirements.			
37.	Occupational health surveillance of the workers is carried out on a regular basis and proper records shall be maintained for the same. Pre-employment and periodical medical examination for all workers is undertaken as per statutory requirement.			Yet to start Yet to start
38.	Oil interceptors are provided wherever petroleum, oil, lubricants are handled / utilized / stored to avoid soil contamination.	Yes		
39.	Training given to all workers on safety and health aspects.			Yet to start
40.	No water bodies are affected due to the project.	Yes		

Source: Field Observation and Concessionaire

19. CONCESSIONAIRE AND EPC CONTRACTOR'S HSE PLAN:

38. Project Health, Safety and Environment Plan have been prepared for BSCPL to facilitate safe execution of the works by incorporating safety in to various stages of construction. This document works as a guidance manual for implementing good industry practices w.r.t. environmental management, worker safety and accident/hazard prevention at work site. Major objectives of HSE Plan are: assess the risk associated therein and suggest precautionary measures to avoid accidents; integrate safety with work practices; create safety awareness amongst every individual associated with the project; formulate and effectively maintain the accident prevention program of the project and to achieve the prime goal of zero accident.

39. Apart from HSE Plan, a Traffic Management Plan at Project sites has been formulated with the prime objectives of warning the road user clearly and sufficiently in advance; providing safe and clearly marked lanes for guiding users; providing safe and clearly marked buffer and work zones and providing adequate measures that control driver behavior through construction zones. HSE Plan and Traffic Management Plan prepared for the project has been attached as **Appendix-VIII.**

19.1. EMP COMPLIANCE STATUS:

40. Concessionaire through its EPC Contractor is complying with environmental protection measures as outlined in EIA-EMP report and also in compliance with the conditions issued by different authorities in their clearances/consents during construction stage for this project. Status of Environmental Management Plan compliance by Concessionaire has been elaborated in **Section 19** of this report.

20. ENVIRONMENTAL MONITORING:

41. Monitoring of environmental quality during construction and during operation reflects the success of implementation of the mitigation measures and it also provides a chance to review the suggested measure and improve upon the measures. The environmental monitoring is primarily the responsibility of the EPC contractor. A detailed environmental monitoring programme has been envisaged to address all environmental issues. As the project is at an initial stage, the monitoring work is yet to be outsourced to a laboratory. Copy of the Environmental Monitoring Programme as mentioned in EIA report is attached as **Appendix-IX.** As informed by project developer, monitoring of air, noise, water and soil are to be carried out on a regular basis.

21. INSTITUTIONAL FRAMEWORK FOR EMP IMPLEMENTATION:

42. The project institutional framework as given in the project EMP indicates that the overall implementation responsibility of the EMP lies with the Project Implementation Unit (PIU); Project Director at PIU is supported by the Environment Officer of NHAI. NHAI has not yet appointed the Independent Engineer (IE). Once IE is appointed,

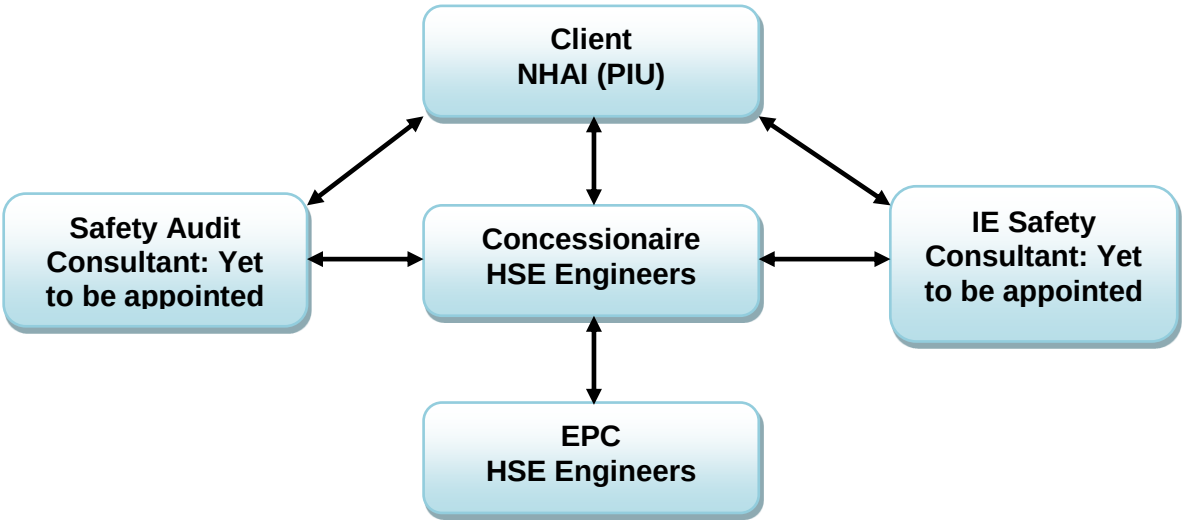
safety consultant will be available for carrying out safety audit of the project highway in accordance with the safety requirement and shall take all other actions necessary for securing compliance with safety requirements.

43. Responsibilities for environmental management associated with the proposed highway construction works involve a number of parties each with specific responsibilities for particular activities. They are as follows:

- NHAI/PIU;
- Concessionaire (HSE Engineers);
- EPC (HSE Engineers);
- IE Safety Consultant (Yet to be appointed).

44. As far as implementation of environmental aspects is concerned, the overall responsibility lies with the PIU i.e. NHAI. The NHAI is headed by the Project Director. NHAI is yet to appoint safety consultant (IE) to assist the concessionaire in carrying out all safety aspects. The institutional arrangement made for implementation of environmental aspects is given in **Figure- 2**

Figure- 2: Institutional arrangement for implementation and monitoring of EMP at BSCPL Aurang Tollway Project



22. SITE VISIT:

45. A site visit was undertaken by IIFCL's Environmental and Social Safeguard Specialists during 6th-7th of August 2013 to review the implementation of the project's environmental safeguards. During the site visit it has been observed that:

    - At construction plant sites, crushers have been provided with wind breaking walls and water sprinkler at the start of crushing operation in crusher equipment and Hot Mix Plants have been provided with Bag House filter;
    - More than 50% of tree cutting has been completed in non-forest areas on road side. Cutting of forest species will start soon as final forest clearance has been granted recently;
    - Proper traffic diversions and appropriate signage are being provided at the site to prevent any disruption to the highway traffic;
    - Workers are being provided with the required safety gears to be worn during execution of work;
    - Necessary barricading and safety precautions for deep excavations are also being ensured. Work safety signages have been provided in places where the construction work has begun;
    - Local laborers will be deployed for construction purposes. These laborers will go back to their houses in the evening after completing day's work;
    - Staff accommodation facility at camp site has been provided with adequate drinking water, mess and sanitation facilities;
    - Periodic Environmental quality monitoring has been planned to be carried out at the plant locations during construction phase;
    - Old trees which are situated inside the camp have been retained and new plantation activities inside the camp are in progress;

46. The site visit photographs showing some of the environmental safeguard measures and progress of construction work details are given in **Photoplate-I.**

23. CONCLUSIONS AND RECOMMENDATION:

47. Based upon the available documents, it is concluded that the concessionaire through their EPC contractor has undertaken adequate environmental safeguard measures. As the project is in its initial stage and once the Independent Engineer's

Safety Consultant will be in place, the Concessionaire will get necessary guidance on environmental management.

48. The conclusions for the sub-project are given below:

- The sub-project has been prepared by NHAI as per its own funding requirement and not in anticipation to ADB operation;
- The sub-project has necessary environmental clearance, including forest clearance as well as permits and approvals for project implementation as given in Appendix-II and Appendix IV;
- Concessionaire has confirmed during site visit that all required consents to establish and operate are obtained prior to operating the respective construction equipment;
- The sub-project does not affect any eco-sensitive zones as declared by MoEF. Also the project does not pass through any national park or wild life sanctuary area. No historical or archaeologically important monuments are affected due to this road project;
- Institutional arrangement is also being done for regular environmental management. EPC Contractor has to engage a monitoring consultant soon;
- The sub project may also have a positive GHG emission reduction due to less fuel consumption for the same traffic density;
- Based on the due diligence findings, it can be deduced that the sub-project has no significant environmental safeguard issues;
- The Sub-project therefore does not appear to involve any kind of reputational risk to Asian Development Bank funding on environmental safeguards and recommended for funding under the proposed project.
- It is confirmed by the subproject developer that, all statutory environmental clearances /approvals /consents are obtained /renewed as the case may be;
- Concessionaire has confirmed that continued compliance has been carried out by the EPC contractor with the terms and conditions stipulated for according statutory environmental clearances /approvals /consents.

DUE DILIGENCE ON SOCIAL SAFEGUARDS

24. SOCIAL SAFEGUARDS COMPLIANCE REVIEW:

24.1. METHODOLOGY ADOPTED FOR SOCIAL COMPLIANCE REVIEW:

49. The social safeguard due diligence study was carried out for the sub-project with the information and documents provided by the concessionaire BSCPL Aurang Tollway Ltd. Social due diligence for the subproject was initiated by IIFCL after review of the Project Information Memorandum, Feasibility Report and Environmental Impact Assessment report to understand the social compliance status and various social and resettlement concerns. The following documents were referred in order to prepare the Social Safeguard Due Diligence Report :

- Project Information Memorandum;
- Feasibility Report;
- Environment Impact Assessment Report (EIA);
- Lender's Independent Engineer Report (June 2013);

25. MINIMIZATION OF SOCIAL IMPACTS:

50. Efforts have been taken during the project planning and design stage to minimize the resettlement impact on the existing structure and additional land acquisition. During finalizing the alignment, bypasses, realignment, symmetrical widening and side widening have been proposed to minimize the social impact. Alternatives have been adopted keeping in mind the prime objective of reducing the displacement of the people and disruption of livelihoods as much as possible. Following efforts have been undertaken to minimize negative social impact:

25.1. BYPASS:

51. The National Highway -6 (NH-6) passes through all the major cities and towns like Aurang, Tumgaon, Zhalap, Pithora, sankara, Basana, and Saraipalli under Raipur and Mahasamund Districts. All the seven towns are heavily built-up and are business hub for the adjacent villages.

Table- 5: Chainage wise Bypasses Details:

Sl No	Chainage			Length (M)
	Name of the Bypasses	From	To	
1	Saraipalli	112+870	119+000	6130
2	Basna	135+000	139+300	4300

3	Sankra	153+000	156+970	3970
4	Pithora	169+390	172+740	3350
5	Tumgoan	214+700	218+100	3400
6	Birkoni	226+260	230+110	3850
7	Aurang	233+700	237+600	3900
Total				28.900

Source: Concessionaire

52. To avoid displacement of structure and disruption of life and to minimizing the rehabilitation and resettlement as much as possible along the city which is more congested due to the connectivity of the other villages along the stretch, Seven bypass have been proposed, totaling to Km.28.900 have been proposed in the project. The Chainage wise details of the bypasses are given in the **Table-5**.

25.2. REALIGNEMNT:

53. Major portion of encroachments/ encumbrances has been avoided by re-aligning of about 14 Kms. of the existing road and providing seven new bypasses of totaling to 28.900 km total length.

26. PUBLIC CONSULTATION AND HEARING:

54. During project planning and preparation stage, consultations were carried out with the different stakeholders along the project road, villages, shopkeepers, project affected people and the people of the different section of the society. Public Consultation were carried out on

55. The main issues as raised by the local people during the consultation were related to air, noise, water quality, roadside trees and plantation, health and safety issues, loss of livelihood and income restoration option, land acquisition and mode of compensation, road safety, relocation of religious structures, assistance to affected people, providing employment opportunities to the local people during the civil work location of labour camp and hot mix plant sites. The Details of public consultation have been given in Chapter 7 of EIA Report **(Appendix-I).**

56. Moreover during the project planning and design stage, public hearing were also conducted at two different locations, in respect of Environmental Assessment for 4 laning of NH-6 From Aurang to Saraipali in the state of Chattisgarh conducted by Chattisgarh Environment Conservation Board on 14/09/2011 at the premises of Janpad Office Aurang, Raipur and near rest house of NH-53, village Sakara, Tahasil- Pithora, Dist- Mahasamund, Chattisgarh on 16/09 2011. The Public Hearing

related communication between State Pollution Control Board and the District Administration and minutes of meeting is given in **Appendix-III.** Notice for the general public to conduct Public Hearing was published on 13th and 14th August 2011 in the daily News Paper 'The Dainik Vaskar'. The newspaper cutting for conducting public hearing is as attached in **Appendix-X**.

27. LAND ACQUISITION IN THE SUB-PROJECT:

57. As per the Lenders Independent Engineer Report, July 2013 and the information provided by the Concessionaire the total land required for the project is 829.00 Ha. The detail land available with the concessionaire is given in **Table-6.**

Table- 6: Summery of Land acquisitions:

Total land to be acquired	: 829.00 Ha.
Publication of 3D (as on 30.05.13)	: 18.75 Ha. (3G award in progress)
Land Available	: 709 Ha.
Land handed over (%age)	: (86.14%)
Linear Length Available for 4 Laning	: 129.561 KM.
For balance land 3G in progress and structure evaluation in progress.	

Source: LIE Report July 2013

58. The joint verification for encroach free land and Right of Way (RoW) hand over to the concessionaire the BSCPL Aurang Tollway Ltd. by NHAI for the sub-project is given in **Appendix-XI**.

59. The proposed RoW is 60 m except in forest area where it is restricted to 45m. In case of the toll plazas, the proposed RoW is 120 m for 300 m length on either side of each toll plaza. The detail village/Tahsil wise status of land acquisition is given in **Table-7** below.

Table 7: Village/Tahsil wise Land Acquisition Details:

Particulars	Tehsil1 (Saraipall & Basna)	Tehsil-2 (Pithora)	Tehsil-3 (Mahasamund)	Tehsil-4 (Aurang)
Total villages	40	26	25	5

3D completed & Award completed	39	25	25	5
Award Completed	39	25	25	0
Compensation Process	36	21	25	0

Source: LIE Report July 2013:

60. Land proposed to be acquired for improvement and widening of the road is 515.25 ha. Out of which Government land is 135.00 ha, private land is 279.00 ha, reserve & protected forest is 77.22 ha, and revenue forest is 24.03 ha. Approval of Stage-II Forest clearance for diversion of 101.25 ha of forest land is given in **Appendix-IV**.

61. Land acquisition is being done by NHAI as per the applicable policy of NHAI Act-1956. The compensation for the loss of properties has been decided by competent authority. The payment of compensation is being paid through Cheque. A sample copy of Cheque relating to payment of compensation is attached as **Appendix-XII.**

28. REHABILITATION AND RESETTLEMENT ISSUES:

62. As documented in the LIE report July 2013, there are no Rehabilitation and Resettlement issues in the project affected area. Since, major portion of encroachments encumbrances has been avoided by re-aligning of about 14 Kms. of the existing road and providing seven new bypasses of 30 km.

63. As informed by the concessionaire the affected people are being compensated for loss of land and structures, according to the policies and procedures of NH Act-1956. The compensation for the loss of land has been paid by the competent authority considering the market value obtained from the Revenue Department of the state.

29. COMPENSATION AND ENTITLEMENT:

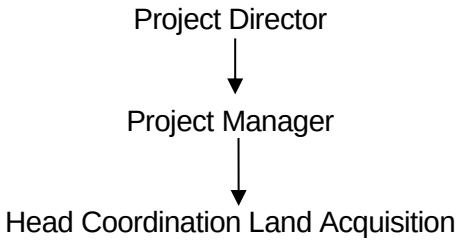
64. The land acquisition has been done by NHAI and the compensation for the loss of properties is decided by the Competent Authority. The payment of compensation is done by NHAI as per the applicable policies.

65. The compensation of the land has been worked out after survey of the PAPs, verification of local market rates from local people and government rates prevalent in this area. Thus rate analysis was undertaken after verification of local market rates from local people and the government – registered prices were ascertained from the Registrar.

30. INSTITUTIONAL ARRANGEMENT TO DEAL WITH LAND ACQUISITION AND REHABILITATION:

66. The concessionaire has appointed facilitator team which will look after making Land acquisition and rehabilitation process easier. General Manager Administration, followed by Head Coordination Land Acquisition & their team works as facilitator team. This team involved in personally meeting PAPs i.e. Land Losers Squatters etc. & mutual discussion with them regarding compensation.

67. As information provided by the concessionaire, the project authority has formed their own institutional arrangements to deal with the land acquisition and resettlement issues in the project area, which is shown below.



31. MONITORING AND EVALUATION:

68. On behalf of Lenders the Lenders Independent Engineer (LIE) M/s Halcrow Consulting I India Pvt. Ltd is monitoring the financial as well as physical progress of the project and submitting the Monthly Report to the lenders.

32. LABOUR HEALTH, SAFETY, HYGIENE OF CONSTRUCTION WORKERS:

69. The EPC Contractor has obtained the Labour license for the subproject granted by Ministry of Labour & Employment: Govt. Of India. The company has hired skilled and unskilled workers belonging to the project region. As per the labour license given by Government of India, Ministry of Labour and Employment the maximum number of building workers are to be engaged is 300 Nos. These workers have been provided with adequate safety measures such as safety helmets, safety boots, earplugs, jackets and gloves. Facilities like onsite accommodation with basic amenities like water & toilets, transportation to work site and safety gears. Construction workers have also been provided with ready access to on- or off-site health care checkup facilities and provide first aid for minor injuries. The detail of Labour license is given under **Appendix-XIII.**

33. EMPLOYMENT GENERATION AND INCOME RESTORATION:

70. As informed by the concessionaire they have given job opportunity to 80 local people from the affected area. Based on the skill available and qualification requirements employment preference have been given to 10 skilled, 20 semiskilled and 50 unskilled labourers in the construction activity.

71. Further, the EPC contractor has employed local people in security, administration etc. Few Vehicles from the locality have taken on hire basis from the local villagers. Even during operation phase, significant numbers of persons will get employment opportunity in toll plaza. The labour employed in the project from the project affected area is given in below **Table:8**

Table 8: Employment generated during construction stage of the project:

Component	Local Labour employed	Total
Skilled	16	16
Semi-Skilled	28	44
Unskilled	24	68

Source: information provided by the Concessionaire

34. SITE VISIT OBSERVATIONS:

72. A site visit was undertaken by IIFCL's Environmental and Social Safeguard specialists during 6th and 7th of August 2013 to review the implementation status of the environment and social safeguards of the project. During the site visit it has been observed that:

- As informed by the concessionaire a pond was developed by the concessionaire near to the Camp site Chupali Chainage 103.00;
- Supply of drinking water through tankers as required by villagers;
- Enhancement of village road near Palsada, Mahasamundra district , Taluka Saripali;
- Providing Vehicle to the Public Health Centre as required
- As informed by the concessionaire local labour has been employed for skilled and unskilled activities;
- As informed by the concessionaire, land acquisition has been done by the Concessioning Authority;
- Proper traffic diversions and appropriate signages are being provided at the site to prevent any disruption of life and the highway traffic.

73. The site visit photographs are given in **Photoplate-I.**

35. CONCLUSION AND RECOMMENDATIONS:

74. Based upon the available documents and its review it is concluded that the concessionaire has undertaken adequate social safeguard measures for the implementation of the project. The conclusions for the sub-project is given below:

- The sub-project has been prepared by NHAI as per its own funding requirement and not anticipation to ADB operation;
- Land acquisition has been done by NHAI under NH Act-1956 and the compensation has been paid to the affected families before handing over the land to the concessionaire;
- There are no Rehabilitation and Resettlement issues in the project affected area. Since, major portion of encroachments encumbrances has been avoided by re-aligning of about 14 Kms. of the existing road and providing seven new bypasses of 30 km.
- Adequate measures have been adopted for the minimization of social impacts during the planning stage of the sub-project. The design has been finalized with due consideration so that the alignment do not pass through any congested settlement area;
- Local people's view have been given due consideration during the project planning and designing of the project;
- With public consultation of the local people, the affected cultural properties are being relocated by the concessionaire;
- Local labours are being engaged in the construction activities for skilled as well as unskilled activities;
- Concessionaire has undertaken various community development activities to benefit the local people;
- It seems that the sub-project does not appear to involve reputational risk to Asian Development Bank funding on social safeguards and recommended for funding under the proposed project.

CHAPTER 10: ENVIRONMENTAL MANAGEMENT PLAN

CHAPTER 10: ENVIRONMENTAL MANAGEMENT PLAN

10.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The Environmental Management Plan (EMP) is required to ensure sustainable development of the road during construction and operational phases. EMP is location and time specific. In general, NHAI with assistance from Contractor and Consultant is the responsible entity for ensuring that the mitigation measures are carried out. Mitigation measures for generic impacts are listed in **Table 10.1.** The list provides reference (NHAI specification), implementing organization and responsible entity.

10.1.1 Specific Activities by NHAI

The role of NHAI in the implementation of EMP involves the following activities:

- Clearance from Forest Department for diversion of 101.25 hectares of forest land.
- Permission from Forest Department for felling of trees.

10.1.2 Sensitive Features

- Noise barriers have been proposed.
- The educational institutes (mainly primary and high schools) and hospitals wherein no direct impacts of the road widening shall happen, the existing compound walls shall be raised to a height of 2m.

10.1.3 Community properties

- Some community properties are impacted. The relocation / rehabilitation shall be as recommended in the RAP.
- Govt. offices like panchayat buildings, police station etc. shall be provided access either in the form of service roads, median openings and zebra crossings. Advance signs shall be provided.
- Water resources to be impacted shall be relocated prior to construction works.

10.2 IMPLEMENTATION OF EMP

The Environmental Officer of the contractor should be available for the entire duration of the project. The Environmental Officer of the contractor shall be primarily responsible for

compliance of EMP. The Environmental Specialist, who should ideally be deployed for the entire duration shall monitor the compliance of the EMP. The key issues that require special attention along with the mitigations and enhancement measures to be implemented have been detailed in **Table 10.1**.

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility	
				Implementation	Supervision
DESIGN STAGE					
General consideration of Cross section Alternatives	As per design specifications.		During Design	Contractor	NHAI
Geometric Design	The proposed alignment is selected / adjusted (within IRC / NHAI specifications) • to minimise land disturbance • to avoid culturally & environmentally sensitive areas – cultural properties, water bodies etc.		During alignment Design	Contractor	NHAI
Issues from stakeholder Consultations	Various issues raised were examined & suitably incorporated based on merit & other road safety measures.		During Design	Contractor	NHAI
Impact on Cultural Properties	Provide access facilities and / or relocate the affected structure as per the mitigation measures recommended in chapter 8.		During alignment Design	Contractor	NHAI
Preservation of trees	No tree will be cut beyond toe line. Identify incidental spaces for plantation of trees		During alignment design	Contractor	NHAI, Department of Forest, CG.
Orientation of Implementation Agency	A comprehensive tanning / orientation schedule has been prepared at different stages of NHAI.		During Design	NHAI	NHAI
Road safety issue due to poor geometrics	Design of Geometric improvements as per IRC codes and NHAI Specifications		During alignment design	Contractor	NHAI
PRE-CONSTRUCTION STAGE					
Implementation of RAP and LA	All requirements of the RAP shall be complete before start of construction stage. The activities broadly include acquisition of structures, cultural properties, relocation of utilities, common property resources etc	Right of Way (ROW)	Before construction starts	NGOs, Collaborating Agencies, SLAO, NHAI, Grievance	NHAI

[1] Some of the mitigation measures are preventive in nature while some others include additional measures in terms of environmental conservation and involve physical and construction work.

[2] Unless otherwise stated, the Project Site covers area beyond ROW, such as borrow areas, access roads, service roads and equipment storage sites (MoRTH: 306.3).

[3] Time frame refers to the duration or instant of time when the mitigation measures will be taken.

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	The land acquisition will be done as per LA Act, 1894. • Compensation will be paid to PAPs based on the RAP that includes the Entitlement Policy.			Redressal Cells (GRC), District Revenue authorities		
Relocation of Utilities	All community underground and overhead utilities will be shifted as per Utility Shifting Plan, prior permission will be required from regional offices of Electricity, Telecommunications, OFC, Water works etc.		Post design to Pre-construction	NHAI Officer, Contractor	NHAI	
Loss of drinking water source	Private drinking water source replaced according to RAP and public water sources replaced. Temporary arrangements shall be provided, if the existing water supply is disrupted accidentally.		Post design to Pre-construction	Contractor	NHAI	
Cultural Properties	Cultural properties affected to be relocated as per RAP and Public Consultation. Mitigation / enhancement measures have been suggested for each of the cultural property individually.		Pre-construction	Contractor	NHAI	
Loss of existing bus stops and waiting shed facilities	Bus stops suitably relocated or integrated to the design. Bus lay byes and bus waiting shed designs are provided.		During design stage.	Design Consultants		
Mobilization & Site Clearance						
Removal of Vegetation	Vegetation will be removed from the ROW before the commencement of Construction after obtaining necessary permissions from the CG forest Department.	ROW	Before construction Starts After centre line marking at site	Contractor	NHAI	
Procurement of Crushers, Hot-mix plants & Batching Plants, other Construction Vehicles, Equipment and Machinery	Specifications of crushers, 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		Prior to mobilization at site	Contractor	NHAI	
Setting up of construction camps	The construction camps will be located at least 500m away from habitations & 1 km away from sensitive locations	All areas in immediate	During Establishment,	Contractor .	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	The Contractor during the progress of work will provide, erect and maintain necessary (temporary) living accommodation and ancillary facilities for labour to standards and scales approved by the NHAI	vicinity of construction campsite chosen by the contractor and approved by the NHAI	Operation and Dismantling of Such Camps.			
Setting up of Hot mix Plants and crushers	Hot mix plants, crushers and batching plants shall be located at least 1000m away from the nearest habitation. The contractor shall obtain the consent to operate the plants from the SPCB and submit a copy to the NHAI	All Hot mix Plants Batching Plants	During erection, testing, operation and dismantling of such plants	Contractor	NHAI	
Identification of dumping sites	Location of dumping sites shall be finalized based on the guidelines and the NHAI shall certify that : • These are not located within designated forest areas. • The dumping does not impact natural drainage courses • Settlements are located at least 1 km away from the site.	Throughout the corridor	During mobilisation	Contractor	NHAI	
CONSTRUCTION STAGE						
Clearances and approvals	Secure the following clearances 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. Permission for storage of hazardous chemical from CPCB — Manufacture storage and Import of Hazardous Chemicals Borrow Area, approval — Borrow area for		Construction stage (Prior to initiation of any work). Time period in getting the permission is 2-3 months.	NHAI, SPCB, CPCB, Chief Controller of Explosives, District Collector State Department of Mines, State Ground Water Board, State Irrigation Department, Labour Commissioner Officer	The Contractor	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility	
				Implementation	Supervision
	from District Collector, Consent letter, lease agreement with the Owner of land. excavation of earth Quarry Lease Deed and Quarry License from State Department of Mines Quarry operation (for new quarry) Permission for extraction of ground water for use in road construction activities from State Ground Water Board Extraction of ground water Permission for use of water for construction purpose from irrigation department Use of surface water for construction Labour license from labour commissioner office Engagement of Labour Provide a copy of all necessary clearances to the NHAI • Adhere to all clearance terms and conditions • Obtain written permission from private landholders to conduct construction activities on their land prior to commencing works.				
Land					
Soil Erosion and Sedimentation control	Main reason of soil erosion is rains. Contractor should plan the activities so that No naked / loose earth surface is left out before the onset of monsoon, for minimizing the soil erosion following preventive measures to be taken such as: • Embankment slopes to be covered, soon after completion. • Next layer / activity to be planted, soon after completion of clearing and grubbing, laying of embankment layer, sub-grade layer, sub-base layer, scarification etc.	Throughout Project Corridor, Service roads and equipment storage sites, etc.	Upon completion of construction activities at these sites. During construction	Contractor	NHAI

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	• Top soil from borrow area, Debris disposal sites; borrow area, construction site to be protected / covered for soil erosion. • Debris due to excavation of foundation, dismantling of existing cross drainage structure will be removed from the water course immediately. • Diversions for bridges will be removed from the water course before the onset of monsoon • Along sections abutting water bodies, stone pitching needs to be carried out. • At the outfall of each culvert, erosion prevention measure, such as the following, will be undertaken,					
Loss of agricultural top soil	All areas of cutting and all areas to be permanently covered will be stripped to a depth of 150 mm and stored in stockpile. The stockpile will be designed such that the slope does not exceed 1:2 (vertical to horizontal), and the height of the pile is to be restricted to 2m. Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. The stockpiles will be covered with gunny bags or tarpaulin. It will be ensured by the contractor that the topsoil will not be unnecessarily trafficked either before stripping or when in stockpiles. Top soil will be safeguard from erosion and will be reused as follows: • Covering all borrow areas after excavation is over. • Dressing of slopes of road embankment • Agricultural field, acquired temporarily	All along Project Corridor, where productive land is acquired	During construction	Contractor	NHAI	
Compaction of Soil and Damage to Vegetation	Construction vehicles should operate within the Corridor of Impact avoiding damage to soil and vegetation. Diversions, access road used will be redeveloped by Contractor, to the satisfaction of the owner / villagers. Construction vehicle, machinery and equipment shall move or be stationed in the ROW only. While operating on temporarily acquired agricultural land for any construction activities, top soil will be preserved in stockpiles.	Throughout Project Corridor and all areas temporarily acquired.	During construction	Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
Contamination of soil	• Guidelines of "Hazardous waste (management and handling) rules, 1989 will be enforced. • Vehicle / machinery and equipment operation, maintenance and refuelling shall be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. An "oil interceptor" will be provided for wash down and refuelling areas. • Fuel storage shall be in proper bunded areas. All spills and collected petroleum products shall be disposed off in accordance with MoEF and SPCB guidelines at designated locations. • Plant to be set up 500 m away from surface water body. • Oil interceptor will be installed at construction site. • Septic tank will be constructed for safe disposal of waste.	At fuel storage areas – usually at construction camps, temporarily acquired site.	During Construction.	Contractor	NHAI	
1. Quarrying 2. Material sources	• Quarry material shall be sourced from approved and licensed aggregate and sand quarries as given in Chapter 8. Copy of licenses to be submitted to the NHAI. • For operating new quarries, the contractor shall obtain materials from quarries only after consent of the DoF or other concerned authorities and only after development of a comprehensive quarry' redevelopment plan. • Adequate safety precautions shall be ensured during transportation of quarry material from quarries to the construction site. Vehicles transporting the material shall be covered to prevent spillage. Operations to be undertaken by the contractor as per the direction and satisfaction of the NHAI.	Table 8.3 & 8.4	During construction	Contractor	NHAI	
Generation of Debris	Debris generated due to the dismantling of the existing pavement structure and the cutting of the hillside for the widening shall be suitably reused in the proposed construction as fill materials for embankments	Throughout Project Corridor.	During Construction	Contractor	NHAI	
Disposal of Debris	The disposal of debris shall be carried out only at sites identified for the purpose. The contractor shall carry out the disposal as described. All arrangement for transportation during construction including provision, maintenance, dismantling and clearing	Sites identified by the contractor and approved by the NHAI.	During Construction	Contractor, NHAI.	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	debris, where necessary will be considered incidental to the work and should be planned and implemented by the contractor as approved and directed by the NHAI.					
Air						
Dust Generation	• Vehicles delivering materials should be covered to reduce spills and dust blowing off the load. • Clearing and grubbing to be done, just before the start of next activity on that site. • In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular intervals to limit the dust to below • Road surface should be cleaned with air compressor and vacuum cleaners prior to the construction works. Manual labour using brooms should be avoided, if used labour to be provided masks. • Embankment slopes to be covered with turfing / stone pitching immediately after completion. • The Contractor shall take every precaution to reduce the level of dust emission from the hot mix plants and the batching plants up to the satisfaction of the NHAI.. • All existing highways and roads used by vehicles of the contractor , or any of his sub-Contractor or suppliers of materials or plant and similarly roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres. • Plants, machinery and equipment shall be so handled (including dismantling) as to minimise generation of dust.	Throughout Project Corridor, all access roads, temporarily acquired sites.	Beginning with & throughout construction until asphalting is completed and side slopes are covered.	Contractor	NHAI	
Equipment Selection, Maintenance and Operation	• The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly adhered to. All vehicles, equipment and machinery used for construction shall conform to the relevant Bureau of Indian Standard (BIS) norms. • All vehicles, equipment and machinery used for construction shall be regularly maintained to ensure that	Throughout Project Corridor, all access roads, sites temporarily acquired and all borrow areas.	During Construction.	Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	pollution emission levels comply with the relevant requirements of SPCB and the NHAI..					
Pollution from Crusher	• All crushers used in construction shall conform to relevant dust emission control legislations. Clearance for siting shall be obtained from the SPCB. • Alternatively, only crushers already licensed by the SPCB shall be used. • Water will be sprayed during the non-monsoon months, regularly to minimize dust, in the whole crusher plant area. • The suspended particulate matter contribution value at a distance of 40m from a controlled isolated as well as from a unit located in a cluster should be less than 500µg/m3. The monitoring is to be conducted as envisaged in the monitoring plan.	All Aggregate Crushing Plants.	During Erection, Testing, Operation and Dismantling of Such plants.	Contractor	NHAI	
Water						
Loss of water bodies/ surface / ground	• No excavation from the bund of the water bodies. • No debris disposal near any water body. • Prior written permission from authorities for use of water for construction activity will be submitted to NHAI. • Construction labours to be restricted from polluting the source or misusing the source. • Shifting of source to be completed prior to disruption of the actual source. • Alternate measures to be taken / ensured during disrupted period. • Source to be replaced immediately, in case of accidental loss. • Construction work shall be restricted to 3m – 4m width from the existing formation near ponds. • The volume of water storage lost shall be compensated for by excavation of an equal volume of similar depth at closest possible location in the direction of flow and shall be done with the approval of the NHAI.	Near all water bodies	During construction	Contractor	Contractor	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
Alteration of drainage	• Diversions will be constructed during dry season, with adequate drainage facility, and will be completely removed before the onset of monsoon. • Debris generated due to the excavation of foundation or due to the dismantling of existing structure will be removed from the water course. • Temporary Silt fencing to be provided on the mouth of discharge into natural streams. • Continuous drain (lined / unlined) is suggested / will be provided. Obstruction, if any, will be removed immediately.	Throughout Project Corridor, all access roads, temporarily acquired sites.	Whenever encountered during construction	Contractor	NHAI	
Runoff and drainage	• Throughout continuous drain is provided. • Lined drain is provided at built-up locations for quick drainage. • Increased runoff due to increased impervious surface is countered through increased pervious surface area through soak pits and rain water harvesting structures. • Water harvesting system and oil grease separators have been proposed at 25 locations		During Construction	Contractor	NHAI	
Water requirement for project	• Contractor will provide a list of sources (surface / ground) for approval from NHAI.. • Prior to use of source contractor will take the written permission from authority, to use the water in construction activity, and submit a copy to NHAI. • During construction only permitted quantity (permission taken) from approved sources will be used. • Contractor will ensure optimum use of water; discourage labour from wastage of water.	Throughout Project Corridor, all access roads, temporarily acquired sites.	During Construction	Contractor	NHAI	
Silting / sedimentation	• Measures suggested under "Soil Erosion and Sedimentation control" will be enforced. • Silt fencing is provided around water bodies. • Construction activities will be stopped near water bodies during monsoon.		Throughout construction period	Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	• Soil trap are suggested / will be provided in all ancillary sites and camps.					
Contamination of water	• Measures suggested under "Contamination of soil" will be enforced. • Construction work close to water bodies will be avoided during monsoon. • Labour camps will be located away from water bodies. • Car washing / workshops near water bodies will be avoided.	All areas in immediate vicinity of construction campsite chosen by the contractor.	Throughout construction period, During Establishment, Operation and Dismantling of Labour Camps.	Contractor	NHAI	
Noise						
Noise from Vehicles, Plants and Equipment	• Noise standard at processing sites, eg. Aggregate crushing plants, batching plant, hot mix plant will be strictly monitored to prevent exceeding of noise standards. • Workers in vicinity of loud noise, and workers working with or in crushing, compaction, concrete mixing operations shall wear earplugs and their working time should be limited as a safety measure. • In construction sites within 150 m of sensitive receptors construction will be stopped from 22:00 to 06:00. • Machinery and vehicles will be maintained to keep their noise to a minimum. • Construction of noise barriers at sensitive receptors. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. • Noise limits for construction equipment used in this project (measured at one metre from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB(A), as specified in the Environment (Protection) Rules, 1986.	Throughout Project Corridor, all access roads, sites temporarily acquired and all borrow areas.	Throughout construction	Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility	
				Implementation	Supervision
Noise from Blasting or Pre-splitting Operations	• Blasting shall be carried out only with permission of the NHAI. All the statutory laws, regulations, rules etc., pertaining to acquisition, transport, storage, handling and use of explosives shall be strictly followed. • Blasting shall be carried out during fixed hours (preferably during mid-day), as permitted by the NHAI.The timing should be made known to all people within 500m (200m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200m (50m for pre-splitting) from the blasting site in all directions at least 10 minutes before the blasting.	All Blasting and Pre-splitting Sites.	During Preparation, Operation and Closure of Such Sites.	Contractor	NHAI
Flora & Fauna					
Loss of trees and Avenue Planting	• Plant trees as per the plantation strategy specially developed for the project. Cost of plantation to be included in the EMP Budget. • Contractor has to make sure that no trees / branches to be fell by labourer for fuel, warmth during winter. Enough provision of fuel to be ensured.		After completion of construction activities	Contractor	NHAI
Vegetation clearance	• Clearing and grubbing should be avoided beyond that which is directly required for construction activities. • Next activity to be planned / started immediately, to avoid dust generation and soil erosion during monsoon. • Turfing / re-vegetation to be started soon after completion of embankment.		During cleaning operations. During construction	Contractor	NHAI
Fauna	• Construction workers must protect natural resources and wild animals. • Hunting will be prohibited. • Nesting grounds & migratory paths will be protected.		During construction	Contractor	NHAI
Socio – Economic Environment					
Public Health and Safety	Debris generated will be disposed to the satisfaction of NHAI. Monitoring of air, water, noise and land during construction and operational phase.		During Construction	Contractor	NHAI

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
Accidents	The contractor will provide, erect and maintain barricades, including signs marking flats, lights and flagmen as required by the NHAI.		During Construction	Contractor	NHAI	
Resettlement Action of People	A comprehensive resettlement action plan has been prepared to improve the standard of living of the affected population.		During Construction	Contractor , NHAI	NHAI	
Sensitive community and cultural facilities	• Precaution to be taken for any accidental loss to community and cultural property • Any loss made shall be the responsibility of the contractor and made good by him at his own cost • Through access / identification to be maintained • Endeavour towards enhancement of community and cultural property • Community consultations for any relocation, mitigation measures adopted		During Construction	Contractor	NHAI	
Temporary Loss of Access	• The Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock to and from side roads and property accesses connecting the project road. Work that affects the use of side roads and existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the NHAI. • The works shall not interfere with or cause inconvenience to public or restrict the access to use and occupation of public or private roads, and any other access footpaths to or of properties whether public or private. • Access across the work-zone will be provided for two slots every day during construction (2 hours in the morning and 2 hours in the afternoon). For this purpose the contractor shall maintain a strip of pavement across the work zone of such quality that light motor vehicles (LMV) can pass without difficulty or danger of breaking down.	All along the Project corridor	During Construction	Contractor	NHAI	
Road and Construction Safety						
Traffic Delays and Congestion	• Detailed Traffic Control Plans shall be prepared and submitted to the NHAI. for approval, 5 days prior to	All along the Proje	During Construction	Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	commencement of works on any section of road. The traffic control plans shall contain details of arrangements for construction under traffic and details of traffic arrangement after cessation of work each day. • The Contractor shall ensure that the running surface is always maintained in running condition, particularly during the monsoon so that no disruption to the traffic flow occurs.	ct Corridor.				
Traffic Control and Safety	• The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the NHAI for the information and protection of traffic approaching or passing through the section of the highway under improvement. • All signs, barricades, pavement markings shall be as per the MoSRT&H specification. Before taking up construction on any section of the highway, a traffic control plan shall be devised to the satisfaction of the NHAI.	Entire Project site.	During Construction	Contractor	NHAI	
Risk from Operations	• The Contractor is required to comply with all the precautions as required for the safety of the workmen as far as those are applicable to this contract. • The contractor shall supply all necessary safety appliances such as safety goggles, helmets, masks, etc., to the workers and staff. • The contractor has to comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • No child labour shall be utilized in the project	Entire Project site.	During Construction	Contractor	NHAI	
Risk from Electrical Equipment	• Adequate precautions will be taken to prevent danger from electrical equipment. • No material or any of the sites will be so stacked or placed as to cause danger or inconvenience to any person or the public.	Entire Project site.	During Construction	Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	• All necessary fencing and lights will be provided to protect the public. • All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provisions and to the satisfaction of the NHAI.					
Risk at Hazardous Activity	• All workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., will be provided with protective footwear and protective goggles. • Workers, who are engaged in welding works, would be provided with welder's protective eye-shields. Stonebreakers will be provided with protective goggles and clothing and will be seated at sufficiently safe intervals. • The use of any toxic chemical shall be strictly in accordance with the manufacturer's instructions. The NHAI shall be given at least 6 working day's notice of the proposed use of toxic chemical. A register of all toxic chemicals delivered to the site shall be kept and maintained up to date by the Contractor. The register shall 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.	Entire Project site.	During Construction	Contractor	NHAI	
Risk caused by Force' Majure	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.	Entire Project site	During Construction	Contractor	NHAI	
First Aid	• At every workplace, a readily available first aid unit including an adequate 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	Entire Project site.	During Construction	Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
	take injured or ill person(s) to the nearest applicable hospital. At every workplace and construction camp, equipment and nursing staff shall be provided.					
Safety Measures During Construction	• 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 to. • 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.	All construction sites	During construction	Contractor	NHAI	
Hygiene	• Latrines shall be provided with septic tank. The effluents can be diverted for horticulture inside the camps. • The septic tank may be cleaned once in 6 months and filter cleaned after a year. • All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. • 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 Contractor 's expense, to the entire satisfaction of the NHAI.	All Worker's Camps	During construction	Contractor	NHAI	
Clearing of Construction of Camps &	Contractor to prepare site restoration plans for approval by the NHAI. The plan is to be implemented by the contractor prior to demobilisation.	All Workers' Camps		Contractor	NHAI	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility		
				Implementation	Supervision	
Restoration	On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the NHAI. Residual topsoil will be distributed on adjoining / proximate barren / rocky areas as identified by the NHAI in a layer of thickness of 75mm - 150mm.					
Monitoring at critical locations	The monitoring of Air, land, water and Noise to be carried out identified critical locations as given in Chapter 4, besides locations identified by NHAI along the project corridor.			Contractor	NHAI	
OPERATION STAGE						
Water quality degradation due to road run-off	Silt fencing, Oil & Grease traps, etc. shall be provided at sensitive water bodies to ensure that the water quality is not impaired due to contaminants from road run-off. Monitoring shall be carried out as specified in the Monitoring plan	At sensitive water bodies identified. As specified in the monitoring plan	During Operational Stage	NHAI and / or SPCB	NHAI	
Contamination of Soil and Water Resources from Spills Accidents	• Contingency plans to be in place for cleaning up of spills of oil, fuel and toxic chemicals. • Spill of oil, fuel and automobile servicing units without adequate disposal systems in place to be discouraged. • Accidental spills are potentially disastrous, but its probability is quite low as one of the objectives of this project is to enhance road safety. • The Public will be informed about the regulations on land pollution. • Land pollution monitoring program has been devised for checking pollution level and suggesting remedial measures.	Entire Project corridor.	During Operational Stage	Contractor	NHAI	
Traffic and Accident Safety	• Depending on the level of congestion and traffic hazards, traffic management plans will be prepared. • Traffic control measures including speed limits to be enforced strictly. • Road control width to be enforced. Local government bodies and development authorities will be encouraged to control building development along the highway.	All along the Project corridor and surrounding areas.	During Operational Stage	Contractor, Local Government Bodies, Development Authorities.	NHAI / Contractor	

Table 10.1: Environmental Management Plan-issues and mitigation measures

Environmental Impact / Aspect	Mitigation Measures[1]	Location[2]	Time Frame[3]	Responsibility	
				Implementation	Supervision
Accidents involving Hazardous Materials	• Compliance with the Hazardous Wastes (Management and Handling) Rules, 1989 • Creation of an Emergency Response team • For delivery of hazardous substances, permit license, driving license and guidance license will be required. • Public security, transportation and fire fighting departments will designate a special route for vehicles delivering hazardous material. These vehicles will only be harboured at designated parking lots. • In case of spill of hazardous materials, the relevant departments will be intimated at once to deal with it with the spill contingency plan.	All along the Project corridor and surrounding areas	During Operational Stage	Contractor	NHAI, Motor Vehicles Department, District Administration
Road side tree plantation	• Trees planted along the corridor shall be maintained for a period of three years. Maintenance works include, watering of the saplings, and all necessary measures for survival of the sapling. • The avenue plantation should be completed, maintained and casualties to be replaced. • Discouraging local peoples from cutting tree / branches for fuel, cattle food etc. • Educating people about the usefulness of trees.	All along the corridor Immediately from the planting of sapling	During Operational Stage	Contractor	NHAI
Monitoring at critical locations	The monitoring of Air, land, water and Noise to be carried out identified critical locations as given in Chapter 4, besides locations identified by NHAI along the project corridor.			Contractor	NHAI
Noise	• HORN PROHIBITED sign post will be enforced • Maintenance of noise barriers • Discouraging local people from establishing sensitive receptor near the road. • The public will be informed about the regulations on noise pollution.	After completion of construction Throughout and after project development period	During Operational Stage	SPCB, State Police, Traffic Police, State Forest Dept., Transport Dept., Contractor and Planning Authorities	NHAI`

10.3 CORPORATE SOCIAL RESPONSIBILTY

Concessionaire will undertake many activities at the project Alignment surroundings under Corporate Responsibility for Environment Protection:

- Drinking water/sanitation facilities in schools nearby project road alignment.
- Solar street lights to nearby villages
- Afforestation in villages
- Environmental awareness programs in the nearby villages.