

0. EXECUTIVE SUMMARY

0.1 PROJECT BACKGROUND

National Highways Authority of India (NHAI) has been entrusted by the Ministry of Shipping, Road Transport and Highways, Government of India with the task of the development of selected stretches of National Highways into 4-lane with paved shoulders configuration with provision of capacity augmentation.

Upgrading of the existing road to 4-Lane with paved shoulders configuration of NH-6 From Arang to Saraipalli in the state of Chhattisgarh". NHAI is the executing agency for implementation.

The major criteria used for selection of studies include traffic volume, pavement conditions, economic activity in the influence area of the road, volume of the commercial traffic, and interconnectivity of the roads. This volume of this feasibility stage deals with screening of Environmental Impacts.

NHAI has appointed the M/S. Sheladia Associates Inc. as Project consultants to assist NHAI in all aspects of project preparation for implementation in accordance with the objectives as detailed in the Terms of Reference (TOR). The screening exercise has been carried out as a part of the feasibility study in the state of Chhattisgarh.

THE PROJECT ROAD & AREA

The project road "Rehabilitation and Upgrading to 4-Lane with paved shoulders configuration of NH-6 from Arang to Saraipalli in the state of Chhattisgarh". The 150.4 Kms length of project road is connecting Arang (Raipur District) to Saraipalli (Mahasamund District). Road section does not pass through any eco-sensitive areas. However, the proposed ROW from Arang-Saraipalli is passing through the patches of Reserved Forest like Tumgaon & sirpur (202.300 KM TO 213.800 KM/Realignment from 202.900 KM TO 203.400 KM) & 190.700 KM TO 202.900 KM, Chirko (188.000 KM TO 190.000 KM)& (173.800 KM TO 187.500 KM), Raja Sawaiya (165.700 KM TO 170.900 KM), Singobha (88.000 KM TO 92.800 KM) and Sankra Protected forest(154.000 KM TO 155.000 KM)& (150.000 KM TO 154.600 KM). There is no endangered flora and fauna found in this Reserved and Protected Forest. Even at 10 m buffer on either side of the ROW the forest trees are found to be very less and there is no endangered species of animals are found. Though, these are not legally defined eco-sensitive areas as per GOI regulations, the GOI regulations will not be applicable to this. The World Bank Operational Policy 4.01 on environmental and Natural habitats OP 4.04 applies to this corridor. All these aspects have been included in the screening analysis documented in this report.

PROPOSED IMPROVEMENTS

To cater to the future traffic, the project proposes to:

- Up gradation to four lane with paved shoulders and strengthening the existing carriageway by overlays / rehabilitation / reconstruction.
- Improve the geometric deficiencies through curve improvements and the improvement of the various intersections.
- Repair / rehabilitation of existing cross-drainage (CD) structures on the highway and provision of new CD structures on the new 4-lane at appropriate locations.
- The proposed works shall be limited to a proposed ROW. It is also proposed to have concentric widening to the extent possible to remove discrimination and local conflicts.
- Proper drainage, grade-separation, road furniture, utilities and amenities wherever required shall also be provided.

0.2 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY IN THE PROJECT

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The Environmental Impact Assessment study of the project road has been carried out as per terms of reference of NHA and guidelines given by the Ministry of Environment & Forests, Govt. of India.

The study methodology for the PPR stage EIA employs a simplistic approach in which the important environmental receptors were identified during the Environmental Screening phase. Based on the identification baseline data was generated and then analysed to predict the impacts and quantify them. Avoidance, Mitigation and Enhancements measures were then developed and these have been incorporated in the Environmental Management Plan (EMP), design drawings and / or Bills of Quantities as appropriate. Implementation arrangements including responsibilities of all the factors have been streamlined and documented for future guidance.

0.3 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

0.3.1 Institutional Setting

The project has been initiated by the GOCh and is being carried out by the NHA. The primary responsibility of the project rests with the NHA in providing encumbrance free ROW to the contractor, who shall implement the project.

0.3.2 Clearances

As part of the project preparations, NHA shall seek forest diversion for 56.48 ha and tree felling permission from the respective Divisional Forest Officer, who is the designated officer under the WALTA act by GOCh. The application for Forest diversion has also been processed and submitted to the Nodal Officer in the Forest Department.

As additional right of way requirement for improvement of the project road is less than 30m, this project come under the purview of the MoEF Notification (Sept 2006). The assessment of the additional right of way has been made considering the average additional land width requirement over the length of the corridor.

The contractor shall seek the following clearances, NOCs & licenses from the authorities prior to his work initiation:

- NOC And Consents Under Air , Water, EP Acts & Noise rules of SPCB for establishing and operating plants from SPCB
- NOC under Hazardous Waste (Management and Handling) Rules, 1989 from SPCB
- PUC certificate for use of vehicles for construction from Department of Transport
- Quarry lease deeds and license and Explosive license from Dept. of Geology and Mines & Chief controller of explosives
- NOC for water extraction for construction and allied works from Ground Water Authority

Apart from the above clearances, the contractor also has to comply with the following:

- Clearance of Engineer for location and layout of Worker's Camp, Equipment yard and Storage yard.
- Clearance of Engineer for Traffic Management Plan for each section of the route after it has been handed over for construction.
- An Emergency Action Plan should be prepared by the contractor and approved by the Engineer for accidents responding to involving fuel & lubricants before the construction starts.
- Submit a Quarry Management Plan to the Engineer along with the Quarry lease deeds

0.3.3 World Bank Operational Policies

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The project has triggered 4 environmental related Operational Policies of the World Bank. As per the World Bank environment assessment (EA) categorisation, this project is a Category 'A' project and therefore requires environmental analysis. However, emphasis of the World Bank is in the integration of mitigation measures into the project design and mainstreaming environment in all stages of project planning, implementation and operation. The operational policies triggered have been suitably mitigated.

0.4 BASELINE ENVIRONMENTAL PROFILE

0.4.1 Physical Environment

Chhattisgarh comes under the hot Torrid Zone and hence the state observes tropical type of climate. Though weather varies from region to region, it's warm in most of the places. Like any other part of India, Chhattisgarh enjoys three seasons, summers, winters, and monsoons. During summers (April-June), the temperature sometimes goes up to 45°C (max) whilst the sun shines brightly over heads.

Late in the month of June, Monsoons (July-September) arrive in the state as a respite from the scorching heat. Chhattisgarh receives pretty decent amount of rainfall with an average of 1292mm. Since it falls under the rice-agro-climatic zone, rainfall proves to be the main source of irrigation. A significant variation in the annual rainfall adversely affects the harvest. The elevated regions in the north and south observe moderate climate round the year.

In October, cool breeze envelops the entire state as if heralding the arrival of winters. The winter season (November-February) doesn't necessarily mean wearing loads of woollens in Chhattisgarh. At this time, the temperature drops down to 10-15°C.

Raipur

Raipur is situated at 21.14°N 81.38°E, 21.14°N 81.38°E coordinates. Raipur has a tropical wet and dry climate, temperatures remain moderate throughout the year, except from March to June, which can be extremely hot. The city receives about 1,300 millimetres (51 in) of rain, mostly in the monsoon season from late June to early October. Winters last from November to January and are mild, although lows can fall to 5 °C (41 °F).

Mahasamund

Mahasamund district is spread out in an area of 3902.39 Sq. Kms in the Central-East of Chhattisgarh State. The district lies between 20°47' to 21°31'30" latitude and 82°00' to 83°15'45" longitude, surrounded by districts of Raigarh and Raipur of Chhattisgarh State and Nawapara and Bargarh of Orissa. Mahasamund's climatic conditions are similar to Raipur.

Wind

Based on Indian Meteorological Data collected from various secondary sources, it reveals that (i) the predominant wind direction was observed to be blowing from south-southwest (ii) the wind speeds were mostly in the ranges of 1-2 m/sec (iii) the maximum temperature recorded was 37⁰ to 45⁰C and the minimum was 13⁰ to 23⁰C and (iv) the average relative humidity recorded was in the range of 73%.

Seismicity

The project area falls in low seismic hazard category as Zone-I. Suitable seismic factor as per the India Meteorological Department (IMD) to be adequate needs to be considered for design purpose for Civil Engineering structures and while finishing civil designs.

Air Quality

The air quality in the project area is generally pristine. The SPM, RPM levels were found well within the prescribed standards of CPCB. The gaseous concentration such as SO₂, NO_x, CO and HC were also within CPCB prescribed limits.

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Noise Quality

It has been observed that noise levels exceed prescribed limits of CPCB in major locations, as normally observed in other State highways. The noise levels are below the stipulatory standards near rural and forest sections

Water Hydrology and Drainage

Major rivers are the Maha nadi and Jhonk. To facilitate the cross-drainage at these water crossings, cross-drainage structures are proposed. The water quality of the surface water samples, when tested, indicates biological contamination of both the surface water sources, making water from these sources unsuitable for drinking.

0.4.2 Biological Environment

Forest Resources

The proposed ROW from Arang-Saraipali is passing through the patches of Reserved Forest like Tumgaon & sirpur(202.300 KM TO 213.800 KM/Realignment from 202.900 KM TO 203.400 KM) & 190.700 KM TO 202.900 KM, Chirko(188.000 KM TO 190.000 KM)& (173.800 KM TO 187.500 KM), Raja Sawaiya (165.700 KM TO 170.900 KM), Singobha (88.000 KM TO 92.800 KM) and Sankra Protected forest(154.000 KM TO 155.000 KM)& (150.000 KM TO 154.600 KM). There is no endangered flora and fauna found in this Reserved and Protected Forest. Even at 10 m buffer on either side of the ROW the forest trees are found to be very less and there is no endangered species of animals are found.

Trees within ROW

Tree survey is being carried out along the proposed alignment. Most of the trees were planted along the roads in the past. From the environmental point of view there exists numbers of big trees on either side of the Existing Road. There are as many as 14000 trees along the roadsides likely to be impacted. The predominant tree species in the corridor are are Raavi, Sisa, Neem, Siriga, Kiran, Tamarind, Teak.

Fauna

Domesticated animals mainly constitute the faunal population within the project area. Wild animals are not reported in the project vicinity. ***No endangered species of flora and fauna are found in the project area.***

0.4.3 Social Environment

Settlement

There exist settlements varying in size and populations along the project corridor.

Cultural Properties

The project highway traverses through a number of settlements and there are some religious and cultural properties which though not of archaeological significance are nevertheless, significant to the community.

Census Profile

The total population of the State according to the 2001 Census, is 2.08 crore. Of this, 80 percent of the people live in rural areas and 20 percent live in urban areas. The State has a low density of population, 151 persons per square kilometre. The sex ratio for the State is 989 females per 1,000 males. In rural Chhattisgarh, however, there are more women than men, and the ratio is 1,004 women per 1,000 men, while in urban Chhattisgarh the ratio is 932 women.

Public Consultation

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Public consultations were conducted during the project preparations. The main purpose of these consultations was to know the community's reaction to the perceived impact of proposed project on the people at individual and settlement level. The issues of the most concern were related to rehabilitation and resettlements and have been dealt in social assessment report. It was also felt during the public consultation process that most of the people are aware about the project but they did not appreciate environmental problems associated with road projects. However, some people were concerned about environmental issues, mainly air and noise pollution. The other concerns raised at during public consultation were demand for submergence of project road and safety problems. The issues raised by the public have been duly incorporated in project design.

0.5 POTENTIAL ENVIRONMENTAL IMPACTS

The environmental components are mainly impacted during the construction and operational stages of the project and have to be mitigated for and incorporated in the engineering design. Environmental mitigation measures represent the project's endeavour to reduce its environmental footprint to the minimum possible. These are conscious efforts from the project to reduce undesirable environmental impacts of the proposed activities and offset these to the degree practicable. Enhancement measures are project's efforts to gain acceptability in its area of influence. They reflect the pro-active approach of the project towards environmental management.

0.5.1 Impacts on Climate

Impact on the climate conditions from the proposed road project widening will not be significant as no major deforestation and / or removal of vegetation is involved for the project.

0.5.2 Impact on Air Quality

There will be rise in SPM levels during the construction activities, which shall again be within prescribed limit after the construction activities are over.

0.5.3 Impact on Noise Levels

The impact of noise levels from the proposed project on the neighbouring communities is addressed. It has been concluded that both day and nighttimes equivalent noise levels are within the permissible limits right from start of project life. Noise sensitive receptors have been identified along the project road.

0.5.4 Impact on Water Resources and Quality

The construction and operation of the proposed project roads will not have any major impacts on the surface water and the ground water quality in the area. Contamination to water bodies may result due to spilling of construction materials, oil, grease, fuel and paint in the equipment yards and asphalt plants. This will be more prominent in case of locations where the project road crosses rivers, canals distributaries, etc. Mitigation measures have been planned to avoid contamination of these water bodies.

0.5.5 Impact on Ecological Resources

There is no major loss of vegetation hence adverse impact in terms of availability of nesting sites for the bird doesn't arise. Furthermore, there is no sensitive ecological area along the existing project roads, so the impact will be insignificant during construction period. But on the long run the project shall have a positive impact due to the compensatory forestation and avenue plantation.

0.5.6 Impact on Land

During the construction of the proposed project, the topography will change due to excavation of borrow areas, stone quarrying, cuts and fills for project road and construction of project related structures etc. Provision of construction yard for material handling will also alter the existing topography. The change in topography will also be due to the probable induced developments of the project. Benefits in the form of land levelling and tree plantations in the vicinity of the project road shall enhance the local aesthetics.

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0.5.7 Impact on Human Use Values

The PAPs shall be compensated as per the RAP. Accidents are bound to increase coupled with ribbon development. There shall also be some impacts on cultural or religious properties along the corridor.

0.6 ANALYSIS OF ALTERNATIVES

Detailed analyses of the alternatives have been conducted taking into account both with and without project scenario and the available alignment options. The analysis also dealt with the justification of selections of the proposed alignment and the modifications on it due to environmental considerations, realignment and bypasses and the minimisation of negative impacts. Based on all these alternative studies the present alignment was proposed.

0.7 MITIGATION AVOIDANCE AND ENHANCEMENT MEASURES

Both generic and site specific mitigation and enhancement measures have been planned for identified adverse environmental impacts. The construction workers camp will be located at least 500m away from habitations. The construction yard, hot mix plants, crushers etc. will be located at 500m away from habitations and in downwind directions. Adequate cross drainage structures have been planned to maintain proper cross drainage. In order to compensate negative impacts on flora due to cutting of trees the project plans compensatory plantation in the ratio of 1:2 i.e. for every tree to be cut, two trees will be planted. The project shall also witness the plantation of trees for providing aesthetic beauty and shade. As the space for compensatory afforestation might not be adequate along the project road, this plantation shall be taken up by the forest department, after payment of the cost for raising and maintaining the saplings for three years. The project will take an opportunity to provide environmental enhancement measures to improve aesthetics in the project area. The planned environmental enhancement measures include plantation in available clear space in ROW, enhancement of water bodies, enhancement of cattle market etc. In order to avoid contamination of water bodies during construction sedimentation chambers, oils and grease separators, oil interceptors at storage areas and at construction yard have been planned.

0.8 INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

The responsibility of implementing the mitigation measures and all activities under environmental management plan (EMP) lies with the contractor (selected through International Competitive Bidding) through the contractor. All construction activities being taken up by the contractor and shall be scrutinised by NHAI.

The implementation of RAP shall be as per the details given in the RAP report. In the pre-construction phase of the project the consultant as appointed by NHAI shall review the EMP and RAP to identify environmental and social issues and arrive at a suitable strategy for implementation.

For effective implementation and management of the EMP, The Contractor shall establish a Safety, Health and Environment (SHE) Cell headed by an Environment Officer to deal with the environmental issues of the project. This officer shall interact with the contractor, NHAI and other departments to ensure that the mitigation and enhancement measures mentioned in the EMP are adhered. The Environmental officer of the contractor shall be the interface between the Environmental Specialist of IC and the Environmental Officer of the contractor. His prime responsibility shall be to appraise the Environmental Specialist about the ground conditions. He shall also procure the requisite clearances and the NOCs for the project and shall also strictly supervise that the contractor adheres to the EMP. The officer shall also participate in training programmes and assist NHAI in preparing documentation for good practices in environmental protection.

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The reporting system will operate linearly – contractor who is at the lowest rung of the implementation system reporting to the Contractor, who in turn shall report to NHAI. All reporting by the contractor shall be on a quarterly basis, while the reporting time of the contractor shall be decided upon by the contractor. The NHAI Site Office will be responsible for setting the targets for the various activities anticipated during construction phase and obtaining agreement from the Contractor after mobilisation but before beginning of works on site. The contractor will report from then on regarding the status on each of these. The NHAI Site Office will monitor the activities through its own staff or the consultant's Environmental Specialist after it has obtained the Contractor's report with the Consultant's remarks on it during the construction phase. During the operation phase, the supervision as well as reporting responsibilities will lie with the NHAI Site Office.

0.9 ENVIRONMENTAL MANAGEMENT PLAN

Project specific environmental management plan have been prepared for ensuring the implementation of the proposed measures during construction phase of the project, implementation and supervision responsibilities, sufficient allocation of funds, timeframes for anticipated activities etc. has been dealt with in this document, which will eventually form a part of the Contract documents between the NHAI and the Contractor.

0.10 CONCLUSIONS

Based on the EIA study and surveys conducted for the Project, it can be safely concluded that associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA Report. Adequate provisions shall be made in the Project to cover the environmental mitigation and monitoring requirements, and their associated costs as suggested in environmental budget. The proposed project shall improve Road efficiency and bring economic growth. In terms of air and noise quality, the project shall bring considerable improvement to possible exposure levels to population.