# Summary

*Proposed 6-lane Access Controlled Section of NH-348B (Greenfield) from Pagote (km.0.100) to Chowk (km.29.319), Raigad District in the state of Maharashtra*

| | | |
|---|---|---|
| Project Proponent | : | National Highway Authority of India<br>Ministry of Road, Transport & Highways, Govt. of India |
| DPR Consultant | : | TPF Engineering Pvt.Ltd. |
| Env. Consultant | | Mantras Innovation and Solutions Private Limited |

July 2025

*For National Highway Authority of India*

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# 1 SUMMARY & CONCLUSION

## 1.1 Introduction

The proposed project starts near JNPT Junction (Ch: 0+100) and terminates near Chowk Junction (Ch. 29+319) in Raigad in the state of Maharashtra. This alignment is traverse through The stretch passes through Uran, Panvel, and Khalapur in Raigad district in the State of Maharashtra. Total length of the proposed alignment is 29.219 Km with 60m Row.

## 1.2 Need of the Project

The proposed project will improve connectivity from The alignment is passes through Uran, Panvel, and Khalapur and ends at Chowk in the state of Maharashtra. The development of proposed highway will improve the connectivity Raigad disricts of Maharashtra. The proposed highway will act as a significant axis of entry to / from different part of Maharashtra.

Moreover, the proposed highway facility will provide good riding quality, better safety and a reliable infrastructure. All these elements will result in cost savings and efficiency improvement.

## 1.3 Project Proponent

National Highways Authority of India (NHAI), an autonomous agency of the Government of India, is responsible for management of the network of national highways across the country. It is a nodal agency of the Ministry of Road Transport and Highways (MoRTH), Government of India. NHAI vision is to meet the nation's need for the provision and maintenance of national highways network to global standards and to meet user expectations in time-bound and cost-effective manner, within the strategic policy framework set by the Government of India and thus promoting economic well-being and quality of life of the people.

NHAI is the nodal authority / project proponent for the development of the highway project under present study.

## 1.4 Environmental Impact Assessment (EIA) Study

The study methodology for the EIA employs a simplistic approach in which the important environmental issues have been identified before initiation of the baseline study. Based on the identification baseline data along the proposed project was collected during the study period from October to December 2024. This data has analysed to predict and quantify the impacts and suggest best suited mitigation measure to mitigate the identified impacts.

## 1.5 Policy, Legal and Administrative Framework

As part of the project execution, the following clearances and NOCs has to be obtained by NHAI & the Contractors:

- Prior Environmental Clearance from MoEF&CC under the purview of EIA Notification 2006 & its subsequent amendments, as the proposed project is a development of new national highway
- Forest clearance as the proposed alignment is passing through strip plantation along the existing roads/canals

- CRZ clearance as the proposed alignment is crossing the CRZ of Karanja creek and Patalganga River
- Prior permission for felling of trees from Forest dept. / District Authorities
- Compensate the affected households as per entitlement matrix based on Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation & Resettlement Act 2013. Following due procedure in th NH act 1956.
- Prior Environmental Clearance from MoEF&CC / SEIAA by the Contractors for sand and aggregate quarries, wherever and if required
- NOC and Consents under Air & Water Acts for establishing and operating the construction plants including but not limited to hot mix plants, WMM, crushers etc. from StatePollution Control Board
- NOC under the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 & amended thereof from SPCB
- PUC certificate for use of vehicles for construction from Transport department
- NOC for water extraction for construction and allied works from Irrigation department
- Conversion of land use from the revenue department for setting camps and plants
- Approval of Independent Engineer / Supervision Consultant / Authority Engineer for location and layout of Camps & plants before start of Construction
- Approval of Independent Engineer / Supervision Consultant / Authority Engineer for Traffic Management Plan before start of Construction
- Approval of Independent Engineer / Supervision Consultant / Authority Engineer for the Emergency Action Plan for accidents responding to involving fuel & lubricants before the construction starts

## 1.6 Baseline Environmental Profile

### *1.6.1 Physical Environment*

***Climatology***

In Summers in Raigad district is sweltering as the temperatures go up high making the days quite hot. The evenings are cool and they give relief from the scorching heat of the sun. Although summers begin to hit Raigad by the end of March, the slightly warmer days and cool nights create a good time for tourism.The climate of the Raigad district is typical of west coast and characterized with plentiful and regular seasonal rainfall, oppressive weather in summer and high humidity throughout the year. The mean minimum temperature is 17.7°C and mean maximum temperature is 31.8°C.

***Topography***

The proposed alignment mostly follows 'plain, rolling & Hilly' terrain. The elevation varies from~977ft to ~57 ft above MSL at different locations. Average elevation of the project stretch is ~171ft above MSL.

***Geology***

The district has three physiographic divisions i.e. (i) Coastal zone in west covers about 20% percent of the district (ii) Central zone covers about 1/3 rd of the district, consisting of fertile land in low lying area (iii) Hilly zone in the eastern part highly uneven in altitude and covered with forest. This hill range is characterized by ruggedness and uneven topography, with crestline of peaks and saddles forming the eastern horizon. Ulhas, Panvel and Patalganga are the three main rivers in northern part. Kundalika River is the main river in central part whereas in the southern part Savitri River is the main river.

**Soil**

The soil of the project affected area is found to be Clayey loam in nature.Soil samples were collected from 3 representative locations for assessment of soil characteristics for proposed project. pH of soil along project section were found in the range of 6.78 to 7.01. The texture of soil is found to be clayey loam in nature. Conductivity of soil in the proposed study area is found to be in the range of 298.7 µm/cm to 380 µmhos/cm. Available phosphorous in soil samples along the study area ranges from 28.8 kg/ha to 35.7 kg/ha. Potassium content as K in soil samples in the study area is found in the range of 70.3 kg/ha to 87.05 kg/ha.

**Ambient Air Quality (AAQ)**

Ambient air quality monitoring has been done at evenly distributed 4 locations along the proposed alignment. The results indicate that all air quality parameters are within the standards specified in the NAAQS in absence of any major pollution generation activities near study area.

**Ambient Noise Level (ANL)**

Noise monitoring has been carried out once during the entire study period at 4 locations along the proposed alignment for a period of 24 hours. Day & Night-time Leq has been computed from the hourly Leq values as per standards. The Noise quality result shows that Leq Day time varies from 40.2 to 52.7 dB(A) and Leq Nighttime varies from 36.5 dB(A) to 40.4 dB(A). and it is found well within the Standards.

**Surface Water**

Surface water quality along the project stretch was monitored at 3 representative locations along the proposed alignment as per the parameters laid down by Central Pollution Control Board for surface water quality criteria. The surface water results for project section showed that the pH of the collected Surface water in the study area was found to be in the range of 7.36 to 7.91. The value of TDS found to be in the range from 1110 to 1147 mg/l. The chloride and Sulphate values of the samples were observed from 155.6 to 190 mg/l and from 127 to 182 mg/l respectively. Most of the trace metal concentration is observed below limit of quantification.

**Ground Water**

Keeping in view the importance of ground water to the local population, 3 representative ground water sampling locations along the proposed alignment were identified and samples were analysed for assessment of ground water quality.

The results for project section shows that pH was found ranging from 7.33 to 7.49 in ground

water samples taken along the proposed alignment. The chloride content varied between 94 to 130 mg/l. The Fluoride content was found within the maximum permissible limit (1.0 mg/l) in drinking water as prescribed by BIS. The concentration of Nitrate ranges between 3.1 to 3.9 mg/l. The concentration of iron in ground water has been found within the permissible limits at all locations.

### *1.6.2 Biological Environment*

**Protected Areas**

The proposed alignment is passing outside the notified ESZ area of Karnala Bird Santuray.

**CRZ Area**

The proposed alignment passess through the CRZ-IA. CRZ-IA (50m mangrove buffer zone),CRZ-IB, CRZ-III(NDZ), CRZ-IVB. Hence CRZ clearance is applicabe under CRZ notification, 2019.

**Forest**

As per the India State of Forest Report, 2019, The state of Maharashtra has only 20.17% of forest cover to its total geographic area. Legally this area has been classified into "Reserved Forest, Protected Forests, and Unclassified Forest" and their areas are 49,546 sq. km (80.46 %), , 6,733 sq. km (10.93 %) and , 5,300 sq. km (8.61%) respectively.

The total forest area is approx. ~27.133 ha, hence, there will be diversion of forest land and necessary clearances shall be obtained as per requirements under Forest (Conservation) Act, 1980.

### *1.6.3 Social Environment*

**Census Profile**

As per Census 2011, the total population of Maharashtra is 112,374,333 with the density as 365 per sq.km. Sex ratio of Raigad district is 959 females per 1000 males.

**Workforce in Project area**

The people in the villages are mostly engaged in the agricultural work and economy is largely based on agricultural activities. Some people are also working in nearby industries and brick kilns.

## 1.7 Public Interactions & Consultation

Public Interactions & 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.

## 1.8 Potential Environmental Impacts

The environmental components are mainly impacted during the construction and operational stages of the project and must 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.Slight change in the micro-climate of the area is expected due to heat island effect as unpaved area will be converted into the paved road. However, Impact on the climate conditions from the proposed road project will not be significant in long run as removal of vegetation will be compensated by compensatory plantation.

### *1.8.1 Impact on Air Quality*

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

### *1.8.2 Impact on Noise Levels*

The area is likely to experience an increment in noise level due to increase in vehicle density after road strengthening. Construction camp shall be established at least 1000m away from nearest habitation and forest area. Temporary noise barriers should be provided surrounding the high noise generating construction equipment during work near to settlement area. Avenue plantation have been proposed on either side of the highway to control the associated air and noise pollution.

### *1.8.3 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. Design made to avoid physical loss to the water bodies to the extent possible. Contamination to water bodies may result due to spilling of construction materials, oil, grease, fuel and paint in the construction camp. This will be more prominent in case of locations where the project road crosses drains, ponds, etc. Silt fencing shall be provided along the major canals and pond. Oil interceptors are proposed near fuel handling areas.

### *1.8.4 Impact on Ecological Resources*

Trees within ROW are likely to be affected due to the proposed development leading temporally loss of micro ecosystem. However, on the long run the impacts will be compensated in terms of compensatory and avenue plantation. The proposed alignment is passing through forests approx. 27.133 ha. diversion of forest land is required.

### *1.8.5 Impact on Land*

During the construction of the proposed project, the topography will change due to cuts & 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.

### *1.8.6 Social Impacts*

About 175.914 Ha. total land is required for proposed project.

## 1.9 Analysis of Alternatives

Detailed analyses of the alternatives have been conducted taking into account both with and without project. The proposed development of partially greenfield highway is likely to

have a positive impact on the economic value of the region. However, there are certain environment and social issue, these needs to be mitigated for sustainable development.

## 1.10 Mitigation Avoidance & Enhancement Measures

Mitigation and enhancement measures have been planned for identified adverse environmental impacts. The construction workers camp will be located at least 1000 m away from nearby habitations. Hot mix plants, batching plants, etc. will also be located more than 1000 m away from habitations and in downwind directions. Existing cross drainage structures have been planned to maintain for 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 1:3 i.e. for every tree to be cut, ten trees will be planted. The project shall also witness the plantation of trees for providing aesthetic beauty and shade. As the space for compensatory plantation 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 five 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 etc. In order to avoid contamination of water bodies during construction Silt fencing, oil interceptors at storage areas and at construction yard have been proposed.

## 1.11 Institutional Requirements & Environmental Monitoring Plan

The responsibility of implementing the mitigation measures lies with environment team duly appointed by the Contractor/Concessionaire. The overall supervision of Environmental monitoring works during construction and operation stage shall be carried out by NHAI with the help of the Monitoring Consultant / Supervision Consultant / Authority Engineer.To mitigate the potential negative impacts of proposed development and measurement the performance of mitigation measures, an Environmental Monitoring and Management Plan is developed. The formulation of an appropriate environmental monitoring plan and its diligent implementation are keys to overall success for the project.

## 1.12 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. The cost forenvironmental management during construction has been indicated in EMP. The project impacts and management plan suggested thereof are summarized in next section.

## 1.13 Environment Impact & Management Matrix

**Table 1-1: Environment Impact & Management Matrix**

| Particulars | Stages | Potential Impacts | Mitigation Measures |
|---|---|---|---|
| **Physiographic Environment** | | | |

| Particulars | Stages | Potential Impacts | Mitigation Measures |
|---|---|---|---|
| Topography | Preconstruction & Construction | • Slight changes are expected due to development of the road<br>• Impacts are marginal, but permanent. | • Proper planning to keep the land reformation upto bare minimum<br>• No new quarry for the project |
| Geology | Preconstruction & Construction | • Impacts are moderate because of extraction of sand | - |
| **Climate** | | | |
| Temperature / Rain fall / Humidity | Preconstruction & Construction | • Tree felling will have an impact of micro-climate of the area<br>• Heat island effect due to increase in paved roads<br>• Low spatially restricted short-term impact | • Compensatory plantation of the trees to be cut<br>• With the proposed avenue plantation scheme, the micro climate of the project corridor will be smoothened |
| **Land** | | | |
| Loss of Other Land | Design, Preconstruction & Construction | • Loss of Property & Livelihood | • Compensation applicable as per section RFCTLARR act |
| Induced Development | Preconstruction & Construction | • Insignificant change in the land use pattern | • Civil authorities to plan and guide any induced development under regulatory framework |
| **Soil** | | | |
| Soil Erosion | Preconstruction, Construction & Operation | • In Road slopes and spoils<br>• Erosion in excavated areas | • Embankment protection through pitching & turfing<br>• Regular water sprinkling in excavated areas |
| Contamination of Soil | Preconstruction, Construction & Operation | • Scarified bitumen wastes<br>• Oil and diesel spills<br>• Emulsion sprayer and laying of hot mix<br>• Production of hot mix and rejected materials<br>• Residential facilities for the labour and officers | • Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016<br>• Oil Interceptor will be provided in storage areas for accidental spill of oil and diesel<br>• Rejected material to be laid as directed by monitoring consultant.<br>• Septic tank to be constructed for waste disposal. |
| **Water** | | | |

| Particulars | Stages | Potential Impacts | Mitigation Measures |
|---|---|---|---|
| Impact on Water Resource | Design, Preconstruction, Construction & Operation | • Depletion of ground water recharge<br>• Contamination from fuel and lubricants & waste disposal in camp area<br>• Contamination of surface water system due to run-off from road construction area | • Provision of Storage/harvesting structure of water, wherever feasible<br>• Oil Interceptor and Septic tank in construction camp<br>• Enforcement of Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016<br>• Both side drain facility to suitably divert the run-off from roads |
| **Air** | | | |
| Dust generation | Preconstruction& Construction | • Shifting of utilities, removal of trees & vegetation, transportation of material | • Regular Sprinkling of Water<br>• Fine materials to be completely covered, during transport and stocking.<br>• Hot mix plant to be installed in down wind direction with at least 1000m distance from nearby settlement.<br>• Regular monitoring of particulate matter in Ambient Air |
| Gaseous pollutants | Preconstruction, Construction & Operation | • Operation of Hot mix plant and vehicle operation for material transportation | • Air pollution Norms will be enforced.<br>• Only PUC certified vehicle shall be deployed<br>• Labourers will be provided with mask.<br>• Regular gaseous pollution monitoring in ambient air |
| Ambient air quality | Operation | • Air pollution from traffic<br>• CO level is likely to increase | • Compliance with statuary regulatory requirements |
| **Noise** | | | |
| Pre-Construction Activity | Pre-Construction | • Man, material and machinery movements<br>• Establishment of labour camps, onsite offices, stock yards and construction plants | • No Horn Zone sign, Speed Barriers near sensitive receptors<br>• Camps will be setup more than 1000m away from settlements. |
| Construction Activity | Construction | • Operation of high noise equipment like hot mix | • Camp will be setup more than 1000m away from the |

| Particulars | Stages | Potential Impacts | Mitigation Measures |
|---|---|---|---|
| | | plant, diesel generators etc.<br>• Community residing near to the work zones. | settlements, in down wind direction.<br>• Noise pollution regulation to be monitored and enforced. |
| Operation Stage | Operation | • Indiscriminate blowing of horn near sensitive area | • Restriction on use of horns<br>• No Horn Zone sign. |
| **Ecology** | | | |
| Flora | Preconstruction, Construction | • Loss of vegetation cover<br>• Felling of 11500 of trees in non forest area | • Felling of only unavoidable trees<br>• Compensatory Plantation in the ratio of 1:3 |
| Fauna | Preconstruction, Construction & Operation | • Loss of insect, avian and small mammalian species due to felling of trees<br>• Impact on protected areas Conservation Reserve (if any)<br>• Impact on migratory birds in wildlife Sanctuaries (if any)<br>• Accidental run over | • Compensatory Plantation<br>• Speed breaker, Signage and limit in sensitive areas<br>• Construction of bridge over water channels |
| **Social** | | | |
| Socio Environment | Design, Preconstruction & Construction | • Loss of Property & Livelihood<br>• Loss of CPRs, Religious Structures | • Compensation applicable as per section of RFCTLARR act following due procedure in NH act 1956<br>• Relocation of CPRs, Religious Structures to suitable place |
| **Public Health and Road Safety** | | | |
| Health and safety | Pre-construction, Construction &Operation | • Psychological impacts on project affected people<br>• Migration of worker may lead to sanitation problem creating congenial condition for disease vectors<br>• Discomfort arising of air and noise pollution<br>• Hazards of accident | • Ensuring sanitary measures at construction camp to prevent water borne disease and vector borne disease.<br>• Provision for appropriate personal protective equipment like earplugs, gloves gumboot, and mask to the work force.<br>• Safe traffic management at construction area.<br>• Drive slow sign and speed barriers near community facilities like school, hospital, etc. |

## 1.14 Conclusions

Based on the draft EIA study and surveys conducted for the proposed 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 draft 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 trade efficiency and bring economic growth. In terms of air and noise quality, the project shall bring considerable improvement to possible exposure levels to population.