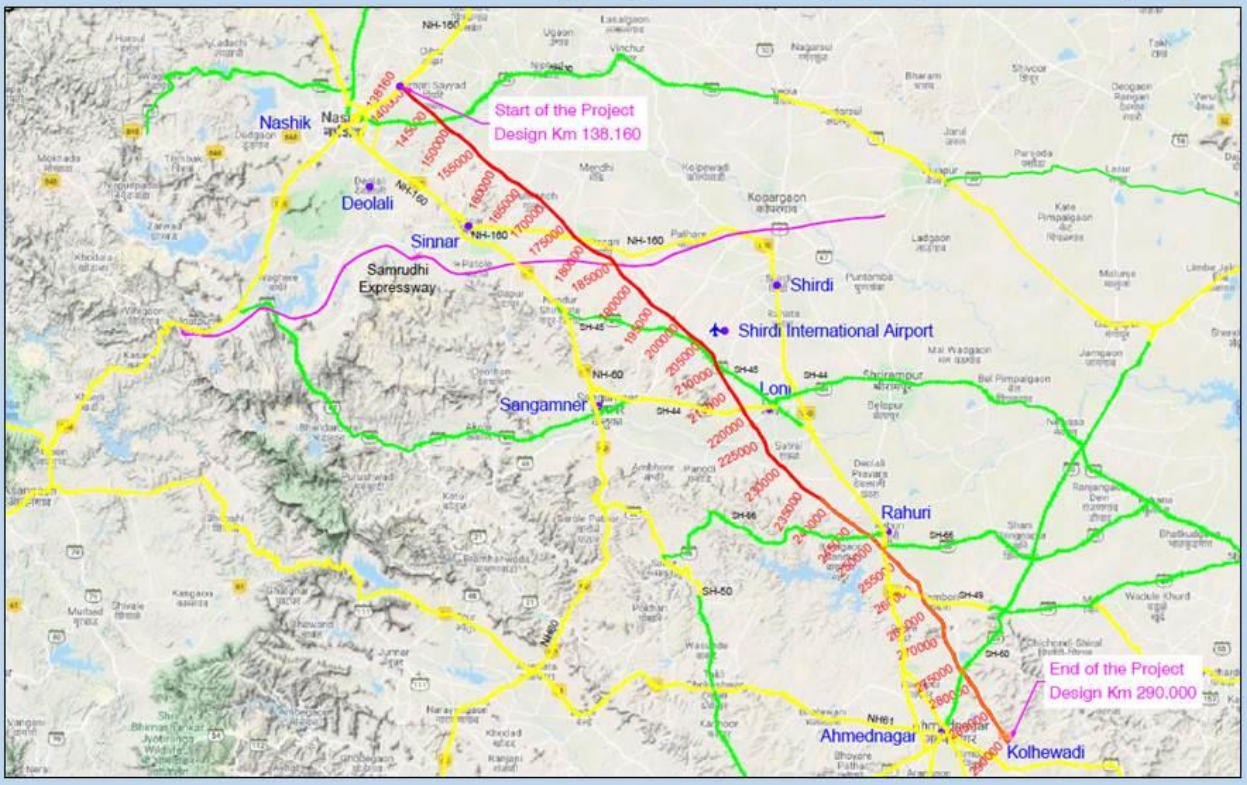
NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
&
ENVIRONMENT MANAGEMENT PLAN

Construction of 6-lane access-controlled Greenfield Economic Corridor Proposed from the Junction of NH-60 at Km. 138.160 near Adgaon Village, Nashik District to Km. 290.000 near Sarolabaddhi Village, Ahilyanagar District (erstwhile Ahmednagar) in the state of Maharashtra (Total Length - 151.840 km) by National Highway Authority of India

MOEF&CC File No.: 10/47/2021-IA.III, Dt: 08.04.2026 & Proposal No. IA/MH/INFRA1/568265/2026

Project or Activity under Schedule 7(f) Highways, Category-A (Greenfield Project)



Environmental Consultant

Aarvee Engineering Consultants Limited

QCI Certificate No.: NABET/EIA/23-26/SA 0247

Period of Baseline Monitoring: Pre-monsoon (March 2024 to May 2024)

Laboratory

M/s. Mitra S.K Private Limited, Gujarat

NABL Accrediated: TC-8673 valid up to 02.10.2028

EXECUTIVE SUMMARY

ES1.0 Introduction

Bharatmala Pariyojana is an umbrella programme for the highways sector aimed at improving the efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through development of expressways, economic corridors, inter-corridors, feeder routes, border and international connectivity roads, coastal and port connectivity roads, and greenfield expressways.

Initially, NHAI proposed a 6-lane access-controlled Greenfield Economic Corridor (Surat-Nashik-Ahilyanagar Section) starts at Sarpur Village (Km. 0.000), Navsari District, Gujarat Surat via Nashik, traversing the Western Ghats and ends at Kolhewadi Village (Km. 290.700), Ahilyanagar (erstwhile Ahmednagar) District, Maharashtra. Terms of Reference (ToR) for the 290.700 km alignment were granted by the MoEF&CC under Activity 7(f) – Highways (Category-A) vide F. No. 10/14/2021-IA.III dated: 04.10.2023.

Subsequently, the Government of Maharashtra evaluated alternative connectivity options to Nashik from the Surat/Vadodara–Mumbai Expressway (VME), including the Amne (near Thane)–Nashik connectivity, the proposed 6-lane Palghar–Nashik Expressway, and the existing NH-60 (Agra–Mumbai Corridor). In view of these alternatives, the Public Private Partnership Appraisal Committee (PPPAC), with the approval of the Cabinet Committee on Economic Affairs (CCEA), revised the alignment to retain only the Nashik–Ahilyanagar section, thereby avoiding passage through the Western Ghats.

Now, the revised proposal comprises is for construction of a 6-lane access-controlled Greenfield Economic Corridor from the junction of NH-60 near Adgaon Village (Km. 138.160), Nashik District to near Sarolabaddhi Village (Km. 290.000), Ahilyanagar District in the state of Maharashtra with a total length of 151.840 km. Aarvee Engineering Consultants Limited (AECL) has been entrusted by NHAI to carry out the Environmental Impact Assessment (EIA) study and prepare the Environmental Management Plan (EMP) for the project corridor.

As per the EIA Notification, 2006 and subsequent amendments vide S.O. 2259 (E) dated: 22.08.2013, the project falls under Activity 7(f) – Highways (Category-A), requiring prior Environmental Clearance (EC) from MoEF&CC. Owing to the revised alignment, amendment to the existing EC process was initiated through submission of Form-3 vide Proposal No. IA/MH/INFRA1/568265/2026 dated: 20.02.2026. ToR was granted by MoEF&CC vide File No. 10/47/2021-IA.III dated: 08.04.2026. Based on the approved ToR, the EIA study has been carried out incorporating assessment of baseline environmental conditions, impact prediction, formulation of mitigation measures, and preparation of the Environmental Management Plan (EMP), which are presented in this report.

ES2.0 Project Description

ES2.1 Location

The revised alignment of Nashik-Ahilyanagar Corridor is proposed from the junction of NH-60 near Adgaon Village (Km. 138.160), Nashik District to near Sarolabaddhi Village (Km. 290.000), Ahilyanagar District in the state of Maharashtra with a total length of 151.840 km. The Index Map is given in **Figure ES1.**

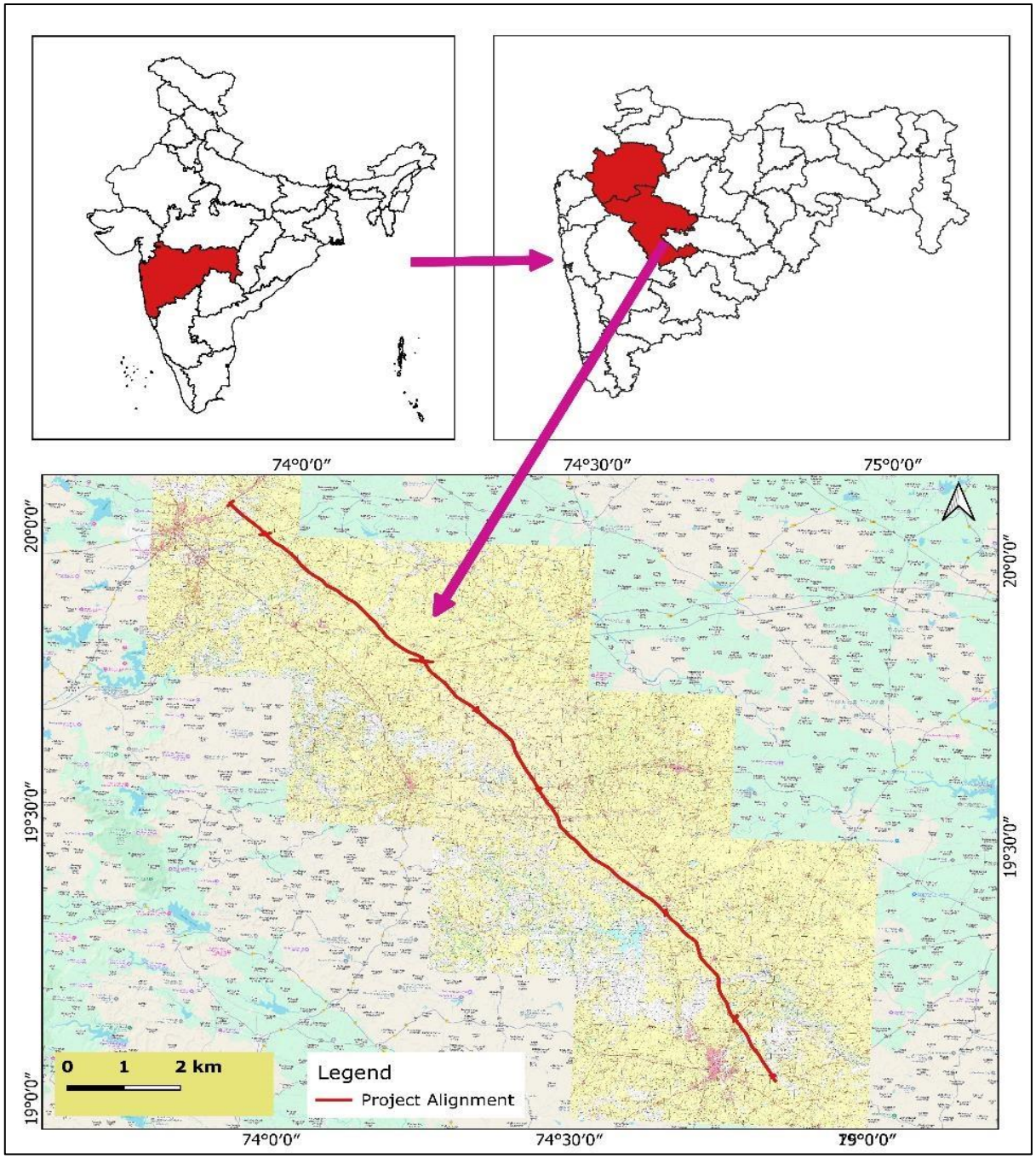


Figure ES1: Index Map of the Project Alignment

ES2.2 Salient Features of the Proposed Project

Salient features of the proposed corridor are given in **Table ES1** and engineering features of the proposed corridor after the amendment is given in **Table ES2.**

Table ES1: Salient Features of the Proposed Project Stretch

S. No	Particulars	Details
1.	Right of Way (RoW)	70 meters
2.	Latitude and longitude	Starting point: Lat:20°55'23.09" N & Long: 73°03'44.75" E Ending point: Lat:19°04'28.88"N & Long: 74°50'52.08"E
3.	Elevation above MSL	560 m - 650 m
4.	Terrain	It traverses through plain, rolling and hilly terrain with a mixed land use of agricultural, barren, forests.

S. No	Particulars	Details
5.	Major settlements along the proposed project stretch	Nashik, Niphad, Sinnar, Sangamner, Shirdi, Rahuri, Loni, Rahata, Rahur and Ahilyanagar.
6.	Nearest National Highways	NH-60, NH-61, NH-160, NH-360 & NH-848
7.	Nearest railway stations	Ahilyanagar Junction is at 11 km from the proposed alignment Nashik Road is at 11.5 km from the proposed alignment
8.	Nearest Airports	Shirdi Airport is at a distance 900 m from the proposed alignment.
9.	Nearest cities	Aerial distance to the nearest cities rom proposed project Corridor are furnished here under: Nashik–10km Sinnar–8km Sangamner–12km Shirdi–15km Rahuri–10km Ahilyanagar–9 km
10.	Rivers/streams	Major waterbody crossings along the alignment include the Godavari River, Darna River, Kadva River, Pravara River, Mula River, Sina River, Pravara Left and Right Bank Canals, and the Mula Right Bank Canal, in addition to several smaller streams and irrigation channels within the project area.
11.	Hills/valleys	An area of 5.65 km in Ahmednagar is passing through hilly terrain
12.	Land Area requirement	1456.22 Ha (Forest - 81.652 ha & Non-forest - 1374.569 ha)
13.	National parks/wildlife sanctuary /core biosphere reserve	The project does not pass through the National Parks/ Wildlife Sanctuaries, but the alignment is passing aerially 6.5 km from the Nandur Madmeshwar Bird Sanctuary (ESZ buffer) and 22 km from Great Indian Bustard Sanctuary (ESZ buffer).
14.	Archaeologically important places	Salabat Khan tomb about 600m away from the Km. 290.00
15.	Major industries	Cotton, Textile, Sugar and food industries

***Note**: *ToR amendment was obtained 1,457 ha of total land area and 82.431 ha of forest land.The reduction in forest land requirement also resulted in a revision of the total land requirement, as reflected in the above table.*

Table ES2: Engineering Features of the Original and Revised Project Stretch

S. No.	Description	As per MoEF&CC ToR File No. 10/47/2021-IA.III. dated: 04.10.2023	NHAI Proposal for Amendment in ToR dated: 08.04.2026
1.	Major Bridges	17 nos.	11 nos.
2.	Minor Bridges	132 nos.	64 nos.*
3.	Viaducts	21 nos. (29.440 km)	1 no. (2.90 km)
4.	Light Vehicle Under Pass (LVUPs) /Small Vehicular Under Pass (SVUPs)	122 nos.	96 nos.*
5.	Vehicle Interchange - Junction Points	60 nos.	35 nos.
6.	Vehicle Overpass (VOPs)	14 nos.	7 nos.
7.	Road Over Bridge (ROBs)	3 nos.	2 nos.
8.	Tunnel Length	5 nos.(4.8 km)	Nil
9.	Interchanges	12 nos.	6 nos.
10.	Culverts (Box/Pipe)	561 nos.	339 nos.*

***Note: ****ToR amendment dated: 08.04.2026 was obtained for 65 minor bridges, 95 LVUPs/SVUPs and 337 culverts. Subsequently, due to technical modifications in the project design, the corresponding numbers were revised, as reflected in the above table.*

ES2.3 Traffic Analysis

Traffic projections are essential for assessing the expected volume of vehicles using the proposed road corridor in the future. These projections help in estimating likely increases in air and noise pollution levels in the surrounding areas, thereby enabling the identification and implementation of appropriate mitigation measures to minimize environmental impacts.

In addition, since the project corridor includes a tolling facility, traffic projections play a crucial role in estimating the potential toll revenue over the concession period. The projected Average Daily Traffic (ADT) in terms of Passenger Car Units (PCUs) for the proposed alignment is estimated to increase from approximately 45,961 PCU/day in 2030 to about 1,41,171 PCU/day by 2053.

ES2.4 Construction Schedule and Project Cost

The construction period is estimated to be three (3) years (36 months). The project is envisaged to be commissioned and opened to traffic during the first half of 2030. The total estimated cost for construction of the proposed project stretch is approximately **Rs. 9,494 crores**, corresponding to an average cost of **Rs. 62.52** crore per km.

ES3.0 Description of the Environment

As per the EIA Guidance Manual for Highways (MoEF&CC, 2010), a study area of 10 Km radius from the project road was considered for secondary data collection. Primary data has been collected within 500 meters on either side of the proposed alignment. Secondary data were collected from published reports, research papers, working plans, consultations and discussions with government officials. Primary baseline environment monitoring was carried out for the period of one season from March 2024 to May 2024 (summer season) by MSK Laboratories, Gujarat, a NABL accredited (TC-8673 valid upto 02.10.2028) and MoEF&CC recognized laboratory.

ES3.1 Site and Its Environs

The reconnaissance survey and subsequent field studies were carried out in the study area which falls in Nashik and Ahilyanagar Districts in Maharashtra state.

ES3.2 Climatology

As part of the EIA study, an Automatic Weather Station (AWS) was installed at Adgaon, (Latitude: 20°03'01.40"N & Longitude: 73°52'40.30"E), Nashik District and monitored during the period from March to May 2024. The summary of the meteorological conditions is provided in **Table ES3.**

Table ES3: On-site Meteorological Conditions

S. No.	Parameters	Maximum	Minimum
1.	Temperature in °C	40.8	17.6
2.	Relative Humidity	87.13	8.45
3.	Wind Speed, m/sec	10.97	0.11
4.	Wind Direction	West south-West and Calm: 33.93%	
5.	Rainfall in mm	3.6	

ES3.3 Ambient Air Environment

Six (06) Ambient Air Quality Monitoring Stations were identified and monitored.

- PM_{10} values were observed in the range of 52.70 – 91.40 µg/m^3
- $PM_{2.5}$ values were found in the range of 20.20 – 58.80 µg/m^3
- Sulphur Dioxide (SO_2) values were observed in the range of 7.30 – 15.20 µg/m^3
- Nitrogen Dioxide (NO2) values were observed in the range of 13.20 – 27.60 µg/m^3
- Carbon Monoxide (CO) values were observed in the range of 0.29 – 0.74 mg/ m^3

At all monitored locations, the concentrations of PM_{10}, $PM_{2.5}$, SO_2, NO_2, & CO were found to be within the respective CPCB prescribed standards of 100 µg/m^3, 60 µg/m^3, 80 µg/m^3, 80 µg/m^3 and 4 mg/m^3 for residential/industrial/rural/other areas excluding ecologically sensitive areas.

ES3.4 Ambient Noise Environment

The daytime noise levels in the study area ranged from 52.3 to 73.7 dB(A), with the maximum recorded near Rahuri Khand (N9) and the minimum near Sarola Baddi (N13). Comparison with the prescribed limits under the Noise Pollution (Regulation and Control) Rules, 2000, indicated exceedances at commercial locations N1, N2 and N5, and residential location N14.

The night-time noise levels ranged from 42.4 to 60.7 dB(A), with the maximum recorded at Dhakamba (N1) and the minimum near Kolhewadi (N14). Exceedances of the prescribed night-time limits were observed only at commercial locations N1 and N2, while the levels at the remaining monitoring locations were within the applicable limits.

ES3.5 Water Environment

Surface Water Quality

During the preliminary assessment, Ten (10) surface water sampling locations were identified for assessing the water quality. These monitoring locations were identified by considering proximity to the project site, their activities and depending upon its utility by the people in the region. The surface water quality in the study area is given below.

- pH values are varying between 7.27 to 8.34 which are well within the Class C limits of 6.5 to 8.5.
- Conductivity values ranging from 314 to1619 µs/cm.
- Total Hardness values vary between 112 and 468 mg/L.
- TDS concentrations are varying from 188 mg/L to 968 mg/L which is within the Class C limit concentration of 1,500 mg/L.
- BOD concentrations are varying from <2.0 mg/L to 10 mg/L against the Class C limit of 3 mg/L. The elevated BOD levels indicate the presence of biodegradable organic matter in the water.
- DO varying from 5.8 mg/L to 6.5 mg/L which are above the minimum requirement of 4 mg/L, shows sustainability of aquatic life in the lakes/ponds/streams.
- Chlorides levels are varying from 18 to 346 mg/L which are well within the Class C limit of 600 mg/L.

- Sulphate values are varying from 13 mg/L to 310 mg/L which are within the Class C limit of 400 mg/L.
- Nitrate concentrations are ranging from below the detection limit of <0.5 mg/L to 46 mg/L which are within the Class C limit of 50 mg/L. Elevated nitrate levels in certain samples may be attributed to agricultural runoff, leaching of fertilizers, domestic wastewater intrusion, or decomposition of organic matter entering the water body.
- Fluoride concentrations ranging from below the detection limit of <0.1 mg/L to 0.6 mg/L against the Class C limit of 1.5 mg/L.

Overall, the surface water quality is observed to be satisfactory and found to be mostly matching with the IS: 2296 Class C Standards

Ground Water Quality

For assessing the ground water quality in the study area, Thirteen (13) sampling locations were identified (bore/dug wells). Selection of samples considered as per the utilization of the people along the proposed corridor. Ground water quality at these sampling locations was given below:

- pH values vary between 7.24 to 8.15 which are well within the desirable limit of 6.5-8.5. Odour of all samples is found to be Agreeable.
- Total Hardness values are observed to vary between 100 mg/L to 1032 mg/L. Desirable and permissible limits are 200 mg/L to 600 mg/L respectively. At three locations total hardness values exceeded the limit of 600 mg/L.
- TDS values are observed to vary between 188 mg/L to 2480 mg/L. Desirable and permissible limit of TDS are 500 mg/L & 2000 mg/L respectively. At one location TDS value exceeded the limit of 2,000 mg/L.
- Nitrates values are observed to be varying between <0.5 to 141 mg/L. Desirable limit of Nitrates is 45 mg/L. At 8 sampling locations Nitrates levels were within the acceptable limits and in the remaining locations the values exceeded the acceptable limits
- Fluoride values are observed to be varying between <0.1 to 1.36 mg/L. Desirable and permissible limit of Fluorides are 1 mg/L & 1.5 mg/L.

Overall, the groundwater quality in the study area is found to be satisfactory and generally conforms to the IS 10500 Drinking Water Standards. However, elevated nitrate concentrations were observed at seven sampling locations, which may be attributed to the intensive use of nitrogenous fertilizers in agricultural activities. The groundwater at these locations may be considered suitable for drinking purposes after undergoing appropriate treatment prior to use.

ES3.6 Land Environment

The land use along the proposed corridor is predominantly agricultural, accounting for about 79.40% of the total study area. Scrub land & barren land constitute approximately 7.73% & 4.33%, respectively. Other land use categories occupy comparatively smaller proportions, including settlements (3.78%), forest areas (1.41%), roads (0.88%), and riverine features (0.82%). Water bodies such as lakes and ponds cover around 0.46% of the study area, while canals, industrial areas, mining/quarry sites, fallow land, and waterlogged areas together account for about 0.80% of the total area.

Soil Quality

The soil samples from different areas along the project stretch were collected from Thirteen (13) locations near agricultural areas for assessing the physico-chemical characteristics of the soil in the project alignment and in the study area. The Soil quality at these sampling locations was given below:

- Soil texture is mainly Loam, Clay Loam and Sandy Clay Loam in nature.
- pH values are varying from 6.09 to 8.43, indicates slightly acidic to slightly alkaline.
- EC of the analysed samples are varying between 101 µS/cm to 453 µS/cm.
- Nitrogen, Phosphorous and Potassium (NPK) are the index of the soil fertility. The NPK values are in the range of 157 to 851 mg/kg, 3.1 to 50 mg/kg and 60 to 1393 mg/kg respectively.
- Organic Carbon varying in between 0.22 to 0.96%. In general, if the Organic Carbon content is more than 0.75% in soils, then it is treated as high fertile soils in India.
- The micro-nutrients such as Iron and Lead are ranging between 5.9 to 10 mg/kg and 5.4 to 14.4 mg/kg respectively.

ES3.7 Biological Environment

The proposed alignment traverses the districts of Nashik and Ahilyanagar in the state of Maharashtra, passing predominantly through agricultural and barren lands with largely plain terrain and 5.65 km in hilly terrain conditions.

The study area is characterized by tropical dry deciduous and scrub ecosystems typical of the Deccan Plateau, with sparse vegetation and no dense forests observed. Dominant flora includes drought-resistant tree species such as *Azadirachta indica*, *Vachellia nilotica*, *Prosopis cineraria*, and *Butea monosperma*, along with shrubs like *Calotropis procera*, *Lantana camara*, and Ziziphus *spp.* Scattered grassland patches support native grasses and herbs, while wetlands and water bodies contain aquatic vegetation including *Ipomoea aquatica*, *Nelumbo nucifera*, *Hydrilla verticillata*, *Typha angustata*, *Phragmites karka*, *Bacopa monnieri*, and *Alternanthera sessilis*. Overall, the area represents a dry scrub-dominated landscape with limited natural forest cover & moderate floral diversity.

The alignment passes through agricultural lands, rivers, scrublands, and human habitations that support diverse fauna. A total of 18 mammal species, 70 bird species, and 16 reptile species were recorded within the Study Area. Schedule-I species include 07 mammals (*Blackbuck*, *Indian Porcupine*, *Asian Palm Civet*, *Four-horned Antelope*, *Small Indian Mongoose*, *Grey Mongoose*, and *Common Fox*), 05 birds (*White-eyed Buzzard*, *Black Eagle*, *Indian Peafowl*, *River Tern*, and *Shikra*), and 02 reptiles (*Indian Chameleon* and *Indian Monitor Lizard*).

The aquatic ecosystem comprises floating, submerged, emergent, and marshy hydrophytic vegetation associated with ponds, lakes, canals, and wetlands. Dominant aquatic flora recorded includes *Eichhornia crassipes*, *Ipomoea aquatica*, *Nelumbo nucifera*, *Hydrilla verticillata*, *Typha angustata*, and *Phragmites karka*, while marshy habitats are represented by species such as *Bacopa monnieri* and *Alternanthera sessilis*Freshwater bodies also support moderate fish diversity, with commonly observed species including *Anabas testudineus*, *Channa punctatus*, *Cirrhinus mrigala*, *Labeo rohita*, *Labeo catla*, & *Glossogobius giuris*, which serve as important local food resources.

Ecological Sensitivity

The project traverses forest land for an approximate length of 11.8 km and involves diversion of about 81.652 ha of forest area. However, the proposed project corridor does not pass through any eco-sensitive or protected areas.

The nearest protected area is the Nandur Madhmeshwar Bird Sanctuary (ESZ buffer), which is located approximately 6.5 km (aerial) from the proposed alignment. The sanctuary is also a designated Ramsar Site of international importance. The Great Indian Bustrad Sanctuary (ESZ buffer) is located approximately 22 km (aerial) from the project alignment. Considering the separation distance and the absence of direct intrusion into protected habitats, no significant direct impact on major wildlife or ecologically sensitive areas is anticipated.

ES3.8 Socio-Economic Environment

The project corridor traverses through the Nashik & Ahilyanagar districts of Maharashtra. The proposed road connects major towns of Nashik, Niphad and Sinnar talukas in Nashik district and Sangamner, Rahata, Rahuri and Nagar talukas of Ahilyanagar district. Brief socio-demographic profile of the project districts is given in below **Table ES4.**

Table ES4: Census data of Nashik and Ahilyanagar Districts

S.No	Particulars	Nashik	Ahilyanagar (Ahmednagar)
1	**Geographical Area (Sq.km)**	15,530	17,048
2	**Population as per 2011 Census**		
(a)	Total Population	61,07,187	45,43,159
(b)	Male Population	31,57,186	23,42,825
(c)	Female Population	29,50,001	22,00,334
3	**Sex Ratio**		
(a)	**Total district**	934	939
(b)	Rural	945	938
(c)	Urban	920	942

The socio-economic environment of the study area is characterized by a predominantly rural population dependent on agriculture with Major crops cultivated in the area include Bajra, Jowar, Maize, Paddy, Wheat, Sugarcane, Grapes & Onion. Infrastructure facilities such as roads, education and healthcare are moderately developed. The project is expected to significantly improve connectivity and access to markets and services.

ES3.8.1 Project Affected Persons (PAPs)

The proposed road alignment traverses 75 revenue villages across seven talukas in two districts. Based on the proposed cross-sections, approximately 70 m of land is required for development of the roadway and associated infrastructure. The Social Impact Assessment (SIA) has been carried out within the proposed RoW.

The proposed corridor, having an approximate length of 151.840 km, requires about 1,374.569 ha of land (535 ha in Nashik district and 839.569 ha in Ahilyanagar district), comprising both government and private land with private land constituting the major share. As per the survey findings, approximately 3,440 Project Affected Persons (PAPs) are likely to be impacted by the proposed project. The estimated land acquisition cost for the proposed project is around **Rs. 1,677 crores.**

ES4.0 Impacts during Design, Construction & Operation Phases

This chapter assesses the nature, type and magnitude of the potential impacts likely on physical, biological and cultural environmental components along the project corridor and also discusses suitable mitigation. For the assessment of impacts, the baseline information was collected based on primary surveys and secondary data.

ES4.1 Design Phase

The design phase involves the siting of the final right-of-way footprint and all aspects of structural design and within design mitigations. This phase also provides several important mitigation opportunities including both site-scale avoidance of sensitive habitats and structural modifications to the highway design that may reduce impacts of fragmentation or off-site effects. Accordingly, the following measures were considered during the design phase:

ES4.1.1 Biological Environment

The revised alignment has been planned to completely avoid the Western Ghats region and corridor is located approximately 6.5 km (aerial) away from the Nandur Madhmeshwar Bird Sanctuary (ESZ buffer) and 22 km (aerial) away from Great Indian Bustard Sancruary (ESZ buffer). The project involves diversion of about 81.652 ha of forest land, for which the Forest Clearance proposal has been submitted on the PARIVESH portal vide Proposal No. **FP/MH/ road/570087/2026,** which is currently under process.

ES4.1.2 Water Environment

The proposed project alignment intersects 44 rivers/streams, including major rivers such as the Godavari River (Km 152.017) and the Mula River (Km 249.720). To maintain natural water flow and drainage continuity, a total of 414 Cross Drainage (CD) structures are proposed along the alignment, comprising 11 major bridges, 64 minor bridges (new and reconstruction), and 339 culverts.

ES.4.1.3 Social Environment

- The project may affect 3,440 PAPs (approx.) which is lesser than other alternatives.
- The finalization of project alignment also considered avoiding of graveyards, temples, cold storage warehouses etc., wherever possible to avoid disturbs to the public utilities.
- Shifting of alignment away from the existing utilities such power grid lines were carried out in co-ordination with Utility owners

ES4.2 Construction Phase

ES4.2.1 Physical Environment

Impact

An increase in daytime temperature near the road surface due to increased pavement surface, which in turn might lead to formation of heat islands especially near the inhabited sections. This increase in the daytime temperature assumes significant especially in close vicinity of proposed highway.

Mitigation measures

Although the impact is significant but reversible in nature and shall be compensate by avenue tree plantation alongside the proposed highway as per IRC SP-21:2009 to compensate the micro-climatic impacts.

ES4.2.2 Physiography

Potential impacts on physiography may include localized alteration of landform and slope destabilization due to cut-and-fill activities during construction. These impacts will be minimized through appropriate slope stabilization measures, controlled excavation, retaining structures, and proper engineering design

ES4.2.3 Geology and Seismicity

The entire stretch of the project traverses through Seismic Zone III (Moderate damage Risk zone). The project does not have any direct impact on the geological or seismic stability of the area.

ES4.2.4 Borrow Areas/Stone and Sand Quarries

The proposed project corridor requires raw materials from borrow areas, metal quarries and sand quarries. Total 21 nos. borrow areas, 07 nos. metal quarries and 1 nos. sand quarries have been identified for the entire project stretch.

Mitigation measures

- To avoid any embankment slippage, the borrow areas will not be dug continuously, and the size and shape of borrow pits will be decided by the Site Engineer.
- Precautionary measures as the covering of vehicles will be taken to avoid spillage during transport of borrow materials.
- To ensure that the spills, which might result from the transport of borrow and quarry materials do not impact the settlements.
- Quarries and borrow pits will be back filled with rejected construction wastes and will be given a vegetative cover.
- Appropriate plant species for the planting programme should be selected in consultation with ecological consultant and local forest department.

ES4.2.5 Utilization of Flyash

It is estimated that **1,55,43,883 cum** of flyash will be utilised for the construction of proposed project corridor. This may be procured from Nashik Thermal Power Plant, Eklahare, Maharashtra which is 6.5 km away from the Project Corridor.

Utilization of fly ash in highway construction provides environmental benefits by reducing disposal requirements and conserving natural resources. Fly ash used in embankments will be properly encapsulated to minimize rainwater ingress and potential leaching, while its use in concrete enhances material stability and reduces environmental contamination risks.

ES4.2.6 Surplus Earth/Muck/Construction & Demolition Waste

The total quantity of muck generated from excavation is estimated to be about **50,07,094 cum** with no C&D waste. The disposable volume after reuse potential is **10,03,546 cum** will be disposed at 8 designated muck disposal sites in an area of 33.44 ha along the corrdior.

Site Selection Criteria

Muck disposal sites are selected away from habitations, flood-prone areas, water bodies, forests, wetlands, and other environmentally sensitive locations. Preference has given to stable land near muck generation areas to minimize transportation impacts, while maintaining adequate buffer distances from settlements, agricultural lands, and infrastructure. Site

selection will be carried out in compliance with applicable SPCB, Forest Department, and MoEF&CC guidelines and approvals.

Conservation Measures

Gabion retaining walls will be constructed at muck disposal sites to contain dumped material within designated boundaries. Regular monitoring will be undertaken to prevent spillover into nearby water bodies, while slope stabilization measures such as stone pitching, turfing, geo-mats, and bioengineering techniques will be adopted to ensure long-term stability of the disposal sites.

ES4.2.7 Soil Erosion

Impacts

Elevated sections of the highway, high embankments near bridges & bridge approaches are vulnerable to soil erosion and therefore require appropriate slope protection measures to ensure long-term stability and prevent erosion. Construction of new bridges involves excavation within riverbeds and along riverbanks for foundations and piers. If the excavated spoil and residual materials are not properly managed and disposed of, there is a possibility of increased sedimentation downstream of the bridge locations, which may affect the hydraulic regime and aquatic environment.

Mitigation Measures

Adequate slope protection measures have been incorporated into the engineering design to minimize erosion along elevated sections, embankments, and bridge approaches. Silt fencing and other sediment control measures shall be provided to prevent eroded materials from entering nearby watercourses. Although temporary drainage alteration & localized downstream erosion/siltation may occur during the construction period, the provision of suitably designed cross-drainage structures based on detailed hydrological studies shall help maintain natural drainage patterns and mitigate potential impacts on the surrounding area.

For the 5.65 km hilly terrain stretch, hill cutting and excavation shall be minimized and undertaken in a controlled manner. Suitable slope stabilization, drainage and erosion-control measures, including retaining structures, catch-water drains, check dams and silt traps, shall be provided wherever required. Exposed slopes shall be stabilized through turfing, hydroseeding and native plantation. Suitable excavated material shall be reused, and surplus material disposed of at designated locations. Regular slope inspections and timely corrective measures shall be undertaken to prevent erosion and slope instability..

ES4.2.8 Impact on Water Resources and Water Quality

To prevent accumulation of water by the roadside, adequate cross drainage (CD) structures in the form of bridges/culverts/causeways with adequate discharge, along the road capacity will be constructed. During reconstruction of old cross drainage structures and construction of new ones, diversion is required to aid uninterrupted movement of traffic. Material will not be put in the drainage to avoid blockage and prevent the erosion. This will help in protecting the aquatic ecology. Proposed Cross Drainage Structures includes, 11 major bridges, 64 minor bridges (new and reconstruction), and 339 culverts.

ES4.2.9 Impact on Air Quality

Fugitive dust emissions during the construction phase, primarily arising from movement of trucks on haul roads, excavation activities, and loading/unloading operations, have been estimated based on the relevant US EPA reference guidelines. Key input parameters considered

for the assessment include 120 precipitation days with rainfall greater than 0.254 mm, silt content of 12%, and moisture content of 8%. With the implementation of proposed EMP measures achieving an assumed control efficiency of 95%, a total reduction of approximately 4,109.59 TPA of PM_{10} emissions is anticipated.

Mitigation measures

- Hot mix plants shall be located away from the inhabited areas, residential settlements and water bodies.
- Trucks and tippers carrying earth for filling, sand, gravel or stone will be duly covered with tarpaulin sheets to avoid spilling.
- Dust level at the construction sites shall be controlled by sprinkling water on haulage roads thrice in a day.
- Construction material, machinery and equipment will be maintained in a good working condition and shall be handled with due precaution and only by trained professionals.

ES4.2.10 Impact on Noise

For predicting the noise levels during the construction phase, two scenarios carried out i.e., Residential, Commercial areas. The input values for the above table was utilized and output was predicted at distance of 40 m from the center of the proposed alignment using the Roadway Construction Noise Model (RCNM). The predicted values (Leq) are 87.2 dB(A) and 87.3 dB(A) for Residential, Commercial areas respectively. Some of the instruments considered for the modelling study are Concrete batch plant, concrete mixer truck, crane, backhoe, vibrator pile driver, pavement scarafier, paver etc.

Mitigation measures

- The required mitigation measures include location of construction equipment at least 250 m away from inhabited areas.
- Construction workers will have to be provided with protection devices like earplugs.
- Maintenance of equipment in good condition, proper design of engine enclosures.

ES4.2.11 Impact on Land Environment

The proposed construction is expected to alter existing land use patterns along the project corridor. The alignment predominantly traverses agricultural land (70%), followed by barren land (24.34%) and forest land (5.66%). The project involves acquisition of approximately 1456.22 ha of land, resulting in conversion of agricultural & other land uses into transportation infrastructure. Likely impacts include loss of agricultural land, fragmentation of land holdings, localized soil erosion, temporary land degradation, and increased development pressure along the corridor. However, as the terrain is largely plain and 5.65 km length in hilly terrian, no major land disfiguration is anticipated.

Mitigation measures

- Restricting construction activities within the RoW,
- Rehabilitation of approved borrow areas, preservation and reuse of topsoil.
- Proper management of construction waste and regulation of construction vehicle movement
- Access to agricultural fields and settlements shall be maintained through service roads, underpasses, and crossings.

- Temporary construction sites shall be restored after completion.
- Compensatory & livelihood restoration measures shall be implemented in accordance with applicable policies.

ES4.3 Impact on Biological Environment

The proposed alignment is passing through 81.652 ha of reserve forest land in Ahilyanagar district which is envisaged to be diverted for this project as per Forest (Conservation) Act, 1980. This will disturb the natural habitat and its dependent wildlife. In forest areas the passing of the road will fragment the habitat.

Trees and vegetation of the RoW shall be cleared for the road. About **28,115 trees** are likely to be felled. The felling of trees will disturb the habitat and shall have impact on Fauna depending on them for various purposes.

Degree of erosion will also be increased with the removal of vegetation. Road development activity is likely to disturb the aquatic habitat if activities and handling are uncontrolled.

No WPA Sch-1 wildlife was found in the primary survey in the project area, however, there is some possibility of Blackbuck deer coming across the alignment, therefore, and there are some chances that movement of some wildlife species may be obstructed.

Mitigation Measures

- Compensatory afforestation shall be undertaken as per statutory requirements, preferably on suitable non-forest land, using indigenous/native species for better survival and ecological compatibility.
- The loss of trees and ecosystem shall have to be compensated through Green Belt Development along both sides and median of the road (97,600 nos. of Avenue plantation and 40,667 nos. of median plantation) duly adopting IRC: SP: 21-2009.
- Compensatory plantations in accordance with the principles of the Forest (Conservation) Act and Forest Policy will be done inline of the Forest land diverted.
- Clearing of the RoW and propagation of the road structure will be carried carefully to cause least possible disturbance to the soil, water and air environment.
- Disposal of construction wastes shall be done in approved wastelands besides recycling and reuse of certain materials as per the approval obtained from SPCB.
- No labour camps shall be permitted in the vicinity of any water body.
- Construction material or debris etc. will not be stored near the water bodies.
- Silt fencing has also been proposed to ensure that siltation and hence turbidity doesn't increase.
- Smoking, hunting & fishing by the labour and other staff in the wild are prohibited
- If any wild animal is found near the construction site at any point of time, the contractor should immediately inform the Environmental Expert/Forest Department and carry out the instructions given by them for dealing with the same.
- The impacts on wildlife have already been minimized by incorporating design level changes. Also, the movement of the Black buck and other wildlife will be facilitated by providing the sufficient crossing structures in the road embankment in consultation with the forest department.

ES4.4 Social Environment

ES4.4.1 Impact on Human Use Values

Construction of newly proposed 6-lane Greenfield Economic Corridor complying with National Highway norms may lead to a change in the land use pattern of areas adjacent to the road. The existing land adjacent to the road stretch at present is predominantly agricultural land and barren land. Total land required for the project is around 1456.22 ha involving approximately 3,440 Project Affected Persons (PAPs).

Mitigation measures

- Approximately 1,500 workers shall be employed during the peak construction phase of the project for three years and local people shall be given priority. It shall provide at least 50 nos. of permanent employees.
- The compensation for the project affected and project affected families shall be provided as per the RFCTLARR Act, 2013
- It is expected in next 10 years at least 60 to 80 agro-based and manufacturing industries shall be developed along the proposed stretch.
- Major settlement has been avoided to reduce impact on the local communities.
- Construction activities shall be limited to the corridor only.
- Care shall be taken to ensure that the construction workers camp do not disturb the surrounding land use.
- The bypass alternatives that are best from engineering, environmental and social aspects are selected for this project.
- Construction camps shall be located in environmentally suitable areas away from settlements, sensitive zones, drainage lines, and water sources, with adequate waste management and sanitation facilities to minimize environmental impacts.
- The project road will provide economic boost to the local population through facilitation of easy transportation of materials to the commercial centres.
- As a result, villagers would be able to transport their produce faster and get more profit margins instead of depending solely on local 'haats' and middlemen.
- Improved quality of life is expected for the population in the project influence area.

ES4.5 Impact on Archaeological sites/Artefacts

As per "The Ancient Monuments and Archaeological Sites and Remains Act, 1958", as amended in 2010", the construction activities should be 200 m away from the ASI site. There are no ancient or historical monuments and archaeological sites are coming within 200 m vicinity along the proposed project corridor, but a Salabat Khan Tomb is about 600 m away from the proposed corridor.

Mitigation measures

- The Contractor will not disturb the found artefacts further until an assessment by competent professionals is made and actions consistent with the requirements of ASI are taken.
- The Contractor, on behalf of the NHAI, will coordinate with the Archaeology Dept. to designate an on-site representative during the entire duration of the project.

- All workers will undergo a briefing with the Archaeology Department to ensure safeguarding of artefacts/heritage resource and cultural/religious practices.

ES4.6 Impacts from Construction Workers Camp

Local labourers shall be engaged to the maximum extent possible during construction activities, thereby reducing the requirement for large worker camps and associated domestic waste generation. Approximately 1,500 persons are expected to be employed during the peak construction period. Potential impacts associated with labour camps may include improper disposal of domestic & municipal solid waste of 750 kg/day, sanitation-related issues of generated of 108 KLD, and disturbance to local fauna due to unauthorized hunting or poaching activities, despite regulatory prohibitions.

Mitigation measures

- The contractor and safety manager will be responsible for providing adequate knowledge to workers regarding the protection of fauna.
- Workers will be trained regarding nature protection and the need to avoid cutting down trees during construction.
- Contractors will be responsible for supplying appropriate fuel in the work camps to prevent firewood collection.
- Labourers residing in the camps shall be provided with safe drinking water, adequate sanitation facilities, kerosene/gas and all other amenities as per the prevailing Labour laws
- Domestic waste generated will be treated as per IS: 2470 norms. Sanitation and Solid Waste Management Plan shall be strictly implemented at the camp sites.

ES4.7 Impacts during Operation Phase

ES4.7.1 Impact on Landuse

Road development may encourage the establishment of petty shops and other commercial activities by local communities along the project corridor. To regulate such developments, the local statutory authorities shall enforce applicable land-use regulations and planning norms. In addition, the project proponent shall coordinate with the concerned authorities to prevent the development of unauthorized squatter settlements and encroachments within the vacant portions of the RoW of the road.

ES4.7.2 Impact on Air Quality

The proposed project is expected to have a beneficial impact on the air environment by improving traffic flow and reducing congestion along the corridor connecting Surat, Nashik, and Ahilyanagar. Removal of existing bottlenecks and reduction in travel distance and time are anticipated to lower fuel consumption and vehicular emissions. Accordingly, the estimated reduction in GHG emissions is projected to range from approximately **208 TPA to 443 TPA** during the period from **2030 to 2053,** contributing to improved ambient air quality in the project area.

ES4.7.3 Impact on Noise Quality

Future noise levels along the project corridor have been predicted using the FHWA (Federal Highway Administration) noise modelling technique for the years 2030, 2035, 2040, 2045, 2050, and 2053 at a distance of 35 m from either side of the carriageway under the with-project scenario. The predicted daytime noise levels remain within the stipulated CPCB standard of 65 dB(A) for commercial areas throughout the stretch. However, night-time noise

levels are expected to exceed the CPCB limit of 55 dB(A) during all predicted years. To mitigate noise impacts, greenbelt development comprising two rows of avenue plantation (97,600 nos.) on either side of the road and one row of median plantation (40,667 nos.) has been proposed, which will further help in attenuation of noise levels.

ES4.7.4 Impact on Water Environment

Ground Water

No adverse impacts are anticipated during operation phase. Around 580 nos. of RWH pits are proposed on either side of the project corridor at 500 m intervals to manage storm water and enhance groundwater recharge. Each pit, with a diameter of 1.5 m and depth of 3.8 m, is designed to collect runoff from the impervious highway surfaces such as carriageway and shoulders, which otherwise increase surface runoff and reduce natural infiltration.

Surface Water

During the operation period, no significant surface water pollution is expected.

ES4.8 Biological Environment

Roads are recognized as one of the major sources of environmental pollution due to increased vehicular movement, which may result in impacts on the surrounding biotic environment. Noise generated from vehicular traffic has the potential to disturb faunal movement and temporarily affect nearby habitats. However, the proposed alignment does not pass through any Protected Area or its notified Eco-Sensitive Zone. The nearest protected area, Nandur Madhmeshwar Bird Sanctuary (ESZ Buffer) and Great Indian Bustard Sanctuary (ESZ Buffer) is located at an aerial distance of approximately 6.5 km and 22 km respectively from the proposed alignment. Further, a total forest land extent of 81.652 ha is envisaged for diversion under the proposed project,

Mitigation measures

1. Greenbelt development and compensatory afforestation shall be undertaken to offset the loss of vegetation due to the proposed project. The plantation along the proposed highway corridor and associated areas shall aid in restoration of the local landscape and provide habitat for small mammals and avifauna, thereby minimizing long-term ecological impacts and improving the aesthetic environment of the project area.
2. Suitable embankments, crash barriers, and protective barricading measures shall be provided, wherever required, to minimize accidental entry or crossing of wild and domesticated animals onto the carriageway. Access to the highway shall be regulated only through designated interchanges and approved entry/exit point.
3. Regular maintenance and protection of plantation shall be ensured until the saplings become self-sustainable. Adequate watering, particularly during dry and summer seasons, shall be carried out to prevent wilting and ensure healthy growth of the plantation.
4. Turfing and grass cover development on embankment slopes shall be undertaken to stabilize the slopes and minimize soil erosion.
5. Noise barriers and dense plantation shall be developed near ecologically sensitive locations, wherever required, to minimize disturbance due to traffic noise and vehicular illumination.
6. Periodic monitoring of roadside plantation survival rate and faunal movement in sensitive stretches shall be undertaken and corrective measures shall be implemented wherever necessary.

ES5.0 Analysis of Alternatives

This chapter is an attempt to compare feasible alternatives to the proposed development in respect to site, technology, design, etc. The criteria adopted for the evaluation of the alternate route for construction of proposed alignment comprises engineering, economic, environmental and social considerations. The chapter discusses how environmental and social parameters were assigned due importance and were carefully considered in the analysis of alternatives. Three (03) alignment options were studied and compared in order to finalize the proposed alignment.

The alternative analysis was carried out using the **Impact Scoring Matrix** by comparing the three alternatives. The impacts scoring matrix was assessed by considering the impacts of the project on the physical environment such as natural resources and biological life and also includes the impacts on socio-economics as well as financial and economics (Refer Chapter 5) From the assessment, it is evident that proposed alignment **(Alternative - 3)** is the preferred option due to following reasons and hence the same was selected by the NHAI:

- Minimal impact on forest area.
- Minimum impact on habitations
- Less number of structures affected
- Better connectivity to major towns
- Least distance so that lesser carbon footprint is generated

ES6.0 Environmental Monitoring Programme

The Environmental Monitoring Programme (EMoP) has been formulated to assess the effectiveness of EMP and to ensure that the proposed mitigation measures are implemented efficiently during both the construction & operation phases of the project. The programme will facilitate continuous evaluation of environmental quality and provide a mechanism for timely corrective actions wherever required.

The key objectives of the monitoring programme are as follows:

- To assess the effectiveness of the mitigation measures proposed in the EMP
- To identify any adverse environmental changes arising from project activities and recommend corrective measures
- To ensure compliance with statutory requirements and environmental standards prescribed by regulatory authorities
- To fulfil environmental commitments made to stakeholders and local communities
- To provide feedback for strengthening environmental management practices during project implementation and operation

Construction Phase

During the construction phase, periodic environmental monitoring shall be carried out for a period of Three (03) years to evaluate impacts associated with construction activities. The monitoring program includes Ambient Air Quality (6 locations), Noise Levels (14 locations), Water Quality (23 locations) and Soil Quality (13 locations).

The monitoring results will be reviewed on a quarterly basis and submitted to the project management for compliance evaluation & implementation of necessary mitigation measures wherever required.

Operation Phase

During the operation phase, environmental impacts are anticipated to be comparatively minimal and localized. However, to ensure continued environmental compliance and effectiveness of the mitigation measures, environmental monitoring shall be carried out for a period of one year covering the following components which includes Ambient Air Quality (6 locations), Noise Levels (14 locations), Water Quality (23 locations) and Soil Quality (13 locations).

The monitoring results during the operation phase will be compiled and submitted to the management on a quarterly basis for review and compliance assessment.

ES7.0 Additional Studies

ES7.1 Disaster Management, Risk Assessment and Mitigation Measures

Risk assessment is a process that seeks to estimate the likelihood of occurrence of adverse effects as a result of major road mishaps, gas tanker explosions, fire hazards, floods, cyclones, earthquakes etc. at Highway projects. Fatality rate on Indian highways is very high mainly due to road accidents. The other adverse impacts due to gas tanker explosions, fire hazards, floods, cyclones, earthquakes etc. are nominal. Elimination of the risk (avoidance of accidents) is given prime importance and NHAI has introduced road safety provisions during the design of highway with the help of Road Safety Manual. Some of these are listed below:

- Safety barriers/delineators hard shoulders on main roads
- Traffic signs and pavement markings
- Underpasses and other grade separators at junctions
- Removal of junctions and direct access points on main roads
- Improved median openings with stacking lanes
- Separate provisions and direct access point
- Service roads in towns and villages for segregating local and highways traffic.

The contractors shall conduct Risk Assessment for all works to decide on priorities and to set objectives for eliminating hazards and reducing risks. The detailed plan is provided in the chapter 7.

ES8.0 Environmental Management Plan (EMP)

Based on the detailed assessment of anticipated environmental impacts, an Environmental Management Plan (EMP) has been formulated to minimize adverse impacts and ensure environmentally sustainable implementation of the project. The EMP incorporates mitigation measures and management plans for various environmental components, including a Green Belt Development & Plantation Programme aimed at enhancing the ecological environment along the project corridor. Post-project environmental monitoring and analysis shall be carried out in accordance with CPCB guidelines with respect to sampling frequency, methodology, and analysis of environmental parameters.

In addition, the EMP outlines specific management plans to minimize environmental impacts and support sustainable infrastructure development. The major management plans include:

- Green Belt Development Plan
- Muck Management Plan

- Construction Camp Management Plan
- Sanitation and Solid Waste Management Plan
- Labour Management Plan
- Ecological Mangement Plan
- Land Acquistion and Livelihood Maanagement Plan
- Soil & Moisture Consveration Plan
- Rain Water Harvesting Plan
- Traffic Management Plan

The EMP also defines the institutional framework and organizational arrangements required for effective implementation, supervision & monitoring of environmental measures. It emphasizes capacity building, resource allocation & adoption of best environmental management practices for efficient implementation throughout the project lifecycle. The key components of the EMP include:

- Identification of implementing agencies responsible for mitigation measures
- Monitoring mechanisms for compliance verification and performance evaluation
- Training and capacity-building programmes for personnel involved in environmental management
- Budgetary provisions for implementation and monitoring of EMP activities

The Environmental Management Cell (EMC) of National Highways Authority of India shall be responsible for the overall supervision, implementation, and monitoring of the mitigation measures prescribed in the EMP. The EMC shall be strengthened with adequate manpower and resources to effectively discharge its responsibilities.

For effective implementation of the EMP, the project proponent shall coordinate with various government departments and agencies, including the Public Works Department, Revenue Department, State Pollution Control Board, State Forest Department, Police Department, and other concerned authorities.

ES9.0 Summary and Conclusions

Earlier, the proposal is for Construction of 6-lane Access Controlled Greenfield Economic Corridor (Surat-Nashik-Ahmednagar Section) starts near Sarpur Village (Km 0.000) in Navsari District, Gujarat, traversing the Western Ghats, connects Nashik and terminates near Kolhewadi Village (Km 290.700) in Ahmednagar District, Maharashtra, with a total length of 290.700 km. ToR obtained from MoEF&CC vide File No. 10/14/2021-IA.III Dated: 04.10.2023.

Subsequently, the Government of Maharashtra evaluated alternative connectivity options to Nashik the PPPAC, with the approval of the CCEA, revised the alignment to retain only the Nashik–Ahilyanagar section, thereby avoiding passage through the Western Ghats. The revised alignment now starts from the junction with NH-60 at Km 138.160 near Adgaon Village in Nashik District and ends at Km 290.000 near Sarolabaddhi Village in Ahilyanagar (erstwhile Ahmednagar) District, Maharashtra. Amendment in ToR for the revised alignment was obtained from MoEF&CC vide File. No 10/47 /2021-IA.III Dated: 08.04.2026.

The principal findings of the study are summarized below:

Climate Change Mitigation: The proposed corridor is expected to reduce traffic congestion and travel distance, resulting in an estimated reduction in greenhouse gas (GHG) emissions ranging from 208 to 443 TPA during the period 2030–2053, along with improved traffic flow between Nashik and Ahilyanagar.

Noise Reduction: Diversion of traffic to the proposed corridor is expected to reduce ambient noise levels by up to 4 dB(A) along the existing highway as well as the proposed corridor.

Dust Suppression: Dust generated during construction will be controlled through regular water sprinkling and other dust mitigation measures. A budget provision of **Rs. 855 lakhs** has been made under the EMP.

Greenbelt Development: Approximately 97,600 avenue trees and median shrub plantations are proposed along the corridor in accordance with IRC: SP:21-2009. Budget provisions of Rs. **1,268.80 lakhs and Rs. 203.34 lakhs** have been allocated for avenue and median plantation, respectively.

Compensatory Afforestation: 165 ha of compensatory afforestation have been proposed against the diversion of 81.652 ha of forest land, with a budget allocation of **Rs. 25.24 crores**, included in the project cost.

Ecological Management: A project-specific Ecological Management Plan has been prepared considering the proximity of the Nandur Madhmeshwar Bird Sanctuary and Ramsar Site. A budget provision of **Rs. 15 lakhs** has been allocated for biodiversity conservation and ecological monitoring.

Soil and Moisture Conservation Plan: For 81.652 ha of forest land along the 151.840 km project corridor includes measures such as contour trenches,grassland development, waterhole improvement and restoration of degraded forest patches to reduce soil erosion, enhance groundwater recharge and promote natural regeneration, in consultation with the Forest Department.

Rainwater Harvesting: A total of 608 rainwater harvesting pits are proposed at 500 m intervals along the corridor. A budget provision of **Rs. 121.60 lakhs** has been made under the EMP.

Muck Management: Approximately 50,07,094 m^3 of surplus earth will be generated, of which 10,03,546 m^3 will be disposed of at 08 identified locations along the project corridor in an area of 33.44 ha following approved disposal practices. A budget provision of **Rs. 1,171.65 lakhs** has been made as a part of DPR.

Fly Ash Utilization: Approximately 1,55,43,883 m^3 of fly ash will be utilized in accordance with the Fly Ash Notification, 2021, with sourcing from the Nashik Thermal Power Plant. A provision of **Rs. 32,642.15 lakhs** has been included in the project cost.

Waterbodies Conservation: A Waterbodies Conservation Plan has been prepared to protect the Godavari River, Mula River, canals, streams, and drainage channels by maintaining hydraulic connectivity, water quality, and ecological integrity throughout the project lifecycle.

Borrow Area Management: Approximately 2,99,97,966 cum of borrow earth will be sourced from 21 identified borrow areas following approved Borrow Area Management Plans. A provision of **Rs. 1.00 lakh** per borrow area has been allocated under the EMP for restoration.

Employment Generation: The project is expected to generate employment for approximately 1,500 workers during construction, creating about **13.50 lakhs mandays** during the three-year construction period and 45,000 mandays during operation, while also promoting regional industrial development.

Labour Management Plan: The plan has been developed to ensure worker welfare, occupational health and safety, statutory compliance, skill development, and an effective grievance redressal mechanism during the construction phase. A budget provision of **Rs. 100 lakhs** has been earmarked under the EMP.

Construction Camp Management Plan: The plan has been prepared to provide safe accommodation, potable water, sanitation, healthcare, environmental safeguards, and restoration of temporary camp sites after construction. A budget provision of **Rs. 300 lakhs** has been made under the EMP.

Sanitation and Solid Waste Management Plan: The plan has been developed to ensure proper collection, treatment, and disposal of domestic wastewater, municipal solid waste, and biomedical waste generated from construction camps and work sites, while maintaining hygiene and public health standards. A budget provision of **Rs. 250 lakhs** has been made under the EMP.

Energy Conservation: An Energy Conservation Plan has been developed incorporating energy-efficient equipment, LED lighting, LPG-based cooking, solar lighting & fuel conservation measures. A budget provision of **Rs. 120 lakhs** has been allocated.

Traffic Management Plan: A site-specific TMP shall be implemented during construction in accordance with applicable IRC guidelines to ensure safe traffic movement and minimize disruption to existing roads and junctions. The plan shall include appropriate signboards, barricades, reflective markings, delineators, temporary diversions, flagmen and controlled movement of construction vehicles at critical locations. Construction zones shall be adequately segregated, with necessary safety measures, including mandatory PPE for workers, regular inspections and maintenance of traffic control arrangements throughout the construction phase.

Land Acquisition and Livelihood Management: Approximately 1,374.569 ha of land will be acquired across 75 villages, affecting 3,440 Project Affected Persons (PAPs). A Land Acquisition and Livelihood Management Plan has been prepared to ensure statutory compensation, livelihood protection, stakeholder consultation, and grievance redressal. **Rs. 1,677 crore** has been allocated towards land acquisition in the DPR.

The total estimated cost for implementation of the EMP during the construction and operation phases is **Rs. 456.94 crores**, including project cost components such as fly ash utilization, muck disposal, rainwater harvesting, compensatory afforestation, and Net Present Value (NPV). Excluding these components, the dedicated EMP implementation cost is **Rs. 56.51 crores**, providing adequate financial resources for pollution control, environmental monitoring, ecological conservation, greenbelt development, and implementation of various environmental and social management plans.

ES10.0 Disclosure of the Consultants Engaged

Aarvee Engineering Consultants Limited (AECL) is an ISO 9001:2015 certified multidisciplinary engineering consultancy established in 1989, with its headquarters in Hyderabad and offices across India, along with a wholly owned subsidiary in Brisbane, Australia. The company has successfully completed over 1,000 assignments in India and internationally, including projects funded by the World Bank (WB), Asian Development Bank (ADB), DFID, and JICA. Aarvee is QCI–NABET accredited Certificate No. NABET/EIA/23-26/SA 0247 for carrying out EIA and EMP studies for various sectors, including Highways, River Valley Projects, Thermal Power Plants, Mining, Oil & Gas Pipelines, Industrial Estates/SEZs, and other infrastructure projects.