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## CHAPTER-0: EXECUTIVE SUMMARY

### 0.1 INTRODUCTION

The Ministry of Road, Transport and Highways (MORTH), Government of India through National Highways Authority of India (NHAI) is implementing “Bharatmala Pariyojana”, an umbrella program for the highways sector. This focuses on optimizing efficiency of freight and passenger movement across the country by bridging critical infrastructure gaps through effective solutions like development of economic corridors, inter-corridor, national corridors efficiency improvement, border & international connectivity roads, coastal & port connectivity roads and expressways.

In pursuance to above program, NHAI is undertaking “Satellite Town Ring Road (West Side), a newly declared highway as NH-948A” under the *Bharatmala Pariyojana (Lot-3)*. The proposed project starts from Ch. 0.000 in Dabaspeta and ends at Ch. 179.969 near Devarapalli village in Tamil Nadu/Karnataka Border. The project road is entirely a new Greenfield highway. The project road is falling in two states viz. Karnataka (length 134.942km) and Tamil Nadu (length 45.027km).

**This report is for Environmental Impact Assessment of Phase-II of the Satellite Town Ring Road (West Side) starting from Ch. 82.200 to Ch. 140.000. The total length of phase-II is 57.8 km.**

The objective of the project is to improve the performance of the state road and regional transport network and make it a part of the ongoing Bharatmala Pariyojana (Lot-3) by improving road conditions and capacity, as well to avoid traffic congestion of Bangalore city in terms of heavy vehicles.

### 0.2 PROJECT DESCRIPTION

The project road currently intends to connect Dobbaspeta, Magadi, Ramanagara, Kankapura, Anekal, Hosur & Sarjapur. The proposed road passes through Bangalore Rural, Bangalore Urban, and Ramanagara districts in Karnataka state and Hosur town in Krishnagiri district of Tamil Nadu state. The total length of this alignment will 179.969 km. The start point co-ordinate of STRR -750104.8329/1465840.4410 (near Dobbaspeta). End coordinates of STRR merging with KITCO alignment at Tamil Nadu/Karnataka Border – 83614.6946/1424665.8098 (near Sampangere).

In consideration to it, NHAI has categorised the project into 3 phases for expeditious implementation of the project. The entire corridor is proposed to be taken up in 3 phases as given below:

Phases	Description (Design km)	Length (km)	District	State
Phase-I	Ch. 0.000 to Ch. 82.200	82.200	Bangalore Rural Ramanagara	Karnataka
Phase-II	Ch. 82.200 to Ch. 140.000	57.800	Ramanagara Bangalore Urban Krishnagiri	Karnataka & Tamil Nadu
Phase-III	Ch. 140.000 to Ch. 179.969	39.969	Krishnagiri	Tamil Nadu

The present EIA study has been done for Phase-II only. The section of Phase-II falls in the state of Karnataka and Tamil Nadu, starts from km 82.200, and terminates at km 140.000. The entire section of the proposed Phase-II is a Greenfield alignment. The proposed alignment is passing through the core zone of Bannerghatta National Park (BNP) from Km 114.635 to Km 118.431 (length about 3.796km) and Eco sensitive Zone (ESZ) from km 95.525 to km 138.0000. Considering the MOEF&CC guidelines and as discussed with Forest officials it is proposed to provide an elevated corridor on single pier in the entire core zone from Km 114.635 to Km 118.431 (length about 3.796km) and ten km length of ESZ on both sides to segregate human and animal conflict. The total length of the proposed elevated corridor will be 6.63km. After detailed deliberation with Deputy Conservator of Forests (BNP), project proponent and DPR Consultant, a provision of ramp to the elevated corridor was envisaged to connect the existing Kanve Shivpura village in the core zone of Bannerghatta National Park.

The details of the proposed alignment sections of STRR phase II given in the Table below:

**Table 0.1 Details of the Proposed Alignment Sections of STRR Phase II**

Geo-Coordinates		Design/ Proposed Chainage (Ch.)		Length (km)
Start Point	End Point	From	To	
75°86'9.262"E 14°34'62.510" N	80°18'10.826"E 13°98'631.353" N	82.200	140.000	57.800

Salient features of the proposed project given below:

**Table 0.2: Salient features of the proposed project road**

S. No.	Particulars	Proposed (Design)
<b>Technical Features</b>		
1	State and District	State: Karnataka & Tamil Nadu; District: Ramanagara, Bangalore Urban & Krishnagiri
2	Length	57.8 km
3	No. of affected villages by land	51 nos.
4	Total Area of Land Acquisition	405 ha
5	Seismic Zone	Zone-II
6	Proposed Carriageway	6-lane divided carriageway configuration
7	Proposed ROW	70m generally and 28.50m in BNP area.
8	Design Speed	100kmph
9	Embankment	About 3m on existing ground generally
10	Elevated Corridor	The proposed elevated corridor starts from km 113.000 and ends at km 119+630 for a total length of 6.63 km in the entire core zone of Bannerghatta National Park.

Development of Satellite Town Ring Road (STRR) Phase-II newly declared National Highway NH-948A from Ramanagara to Peddamadhagondapalli (km 82.000 to km 140.000) 57.800 km in District Ramanagara and Bangalore Urban in the state of Karnataka and District Krishnagiri in the state of Tamil Nadu

S. No.	Particulars	Proposed (Design)																
<b>Technical Features</b>																		
11	Junctions/ Fly Over/Interchange	Three Interchanges																
		<table border="1"> <thead> <tr> <th>Road</th> <th>Chainage of Cross road Cross point (km)</th> <th>Proposed STRR (km)</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>NH 209</td> <td>431.310</td> <td>95.360</td> <td>NH-209 (Bengaluru – Coimbatore road)</td> </tr> <tr> <td>SH 35</td> <td>51.500</td> <td>131.990</td> <td>SH-35 (Sidlaghatta to Karnataka/Tamil Nadu State Border via Anekal road)</td> </tr> <tr> <td>SH 17B</td> <td>14.790</td> <td>139.260</td> <td>SH-17B (Nanjanagud to Karnataka/Tamil Nadu State Border via Chamarajanagar road)</td> </tr> </tbody> </table>	Road	Chainage of Cross road Cross point (km)	Proposed STRR (km)	Description	NH 209	431.310	95.360	NH-209 (Bengaluru – Coimbatore road)	SH 35	51.500	131.990	SH-35 (Sidlaghatta to Karnataka/Tamil Nadu State Border via Anekal road)	SH 17B	14.790	139.260	SH-17B (Nanjanagud to Karnataka/Tamil Nadu State Border via Chamarajanagar road)
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12	Vehicular Underpasses/Overpasses	16 VUP, 18 LVUP, 10 VOP (for details refer Table no 2.5 (a,b,c)) of the report																
13	ROB	Nil																
14	RUB	Nil																
15	Major Bridges	1 no (km 92.640, Span 3 x 27)																
16	Minor Bridges	8 nos. (for details refer Table no 2.6) of the report																
17	Culverts	80 nos.																
18	Service Roads	The service roads are provided as per the local requirements either or one side or on both sides. Also to provide uninterrupted free flow in the existing SH 3, as at some locations the proposed STRR passes over the existing state highway.( For details, refer Table no 2.7 of the report)																
19	CBR adopted for pavement	8% as per IRC standards																
20	Median	5m provided																
21	Slope protection	Turfing/ stone pitching																
22	Safety Measure	Crash Barriers provided																
23	Lighting	Lighting in all proposed Interchanges and toll booths etc.																

S. No.	Particulars	Proposed (Design)
<b>Technical Features</b>		
24	Horticulture and landscaping	Shrubs will be planted on the medians all along the corridor. Avenue plantation will done at available locations. Landscaping will be done at interchange locations.
<b>Environmental Features</b>		
25	Whether passing through Wildlife area/Protected area/CRZ area/Mangroves area/Critically Polluted area	The proposed project road passes through the core Zone and Eco-Sensitive Zone of Bannerghatta National Park (BNP). In order to minimize the ecological impacts, the upgradation of existing Bannerghatta/Harohalli - Jigni Road (MDR) alignment from Km 112.600- km.120.700 in the entire core zone of BNP and in the adjoining ESZ area @10km on both sides including approaches, an elevated corridor is proposed for a length of 6.63 km in order to avoid the entire National Park area.
26	Protected Monuments &	Nil
27	Land Use Pattern	Land use within 10km buffer from either side of project roads: <ul style="list-style-type: none"> <li>• Cultivated :86%</li> <li>• Barren/fallow land :9%</li> <li>• Vegetation: 2%</li> <li>• Forest land :1%</li> <li>• Settlement : 1%</li> <li>• Water bodies :1%</li> <li>• Settlement : 2%</li> </ul>
28	Forest Land Diversion	The proposed project passes through Bannerghatta National Park; therefore, Reserved Forest land of about 11 ha of Bannerghatta National Park will diverted.  Additional approximately 2.5 ha.of forest land will be diverted due to construction of ramp to connect the existing Kanve Shivpura village within Bannerghatta National Park with the elevated corridor.
29	Trees	A total of approx. 9827 trees along the PROW are to be affected in which 241 trees are falling within core zone of BNP.
30	River crossings	River Vrishabawathi crosses at location Ch. 92.650 and a few minor streams crossing the alignment.
31	Ponds	Nil
32	Terrain	Mix of Plain and rolling
33	Green belt development	As per IRC SP 21:2009 /MORTH Code/Guidelines and Green corridor's terms of reference for plantation by GHD/NHAI

S. No.	Particulars	Proposed (Design)
<b>Technical Features</b>		
34	Compensatory Plantation	Ten times (1:10) the trees cut has been proposed as compensatory afforestation in Karnataka and Tamil Nadu state
35	Mangroves, sand dunes etc.	N/A
36	Environmental Management Cost including Corporate Environmental Responsibility	27.22 Crores approx.
37	No. of structures affected	306 nos approx.

### 0.3 POLICY LEGAL AND ADMINISTRATIVE FRAMEWORK

The proposed road development project of NH-948A is a New National Highway with Right of Way (ROW) of 70m. Hence, as per EIA notification 2006, the proposed project falls under “Category A” and attracts the conditions of obtaining prior Environmental Clearance from Ministry of Environment, Forest & Climate Change (MoEF&CC).

Further, project attract the provisions of Forest Act 1980 and Wildlife Act 1972, therefore requires forest and wildlife clearances as well.

### 0.4 ANALYSIS OF ALTERNATIVES

**Table 0.3: Comparison between 'With' and 'Without Project' Scenarios**

Component	“With” Project Scenario	“Without” Project Scenario
Carriageway	The carriageway will be construct to 6-lane configuration with paved and earthen shoulders on either side. This will ensure seamless traffic flow	The freight traffic will traverse through Bangalore City area and further lead to traffic congestion.
Traffic Congestion	The new road will be capable of ensuring uninterrupted free flow traffic. This will ensure the Bangalore city is free from long route trucks that do not need to enter just for passage.  The environment parameters of the region will significantly improve besides saving in vehicle operating cost.	The heavy traffic will continue to move through Bangalore city, thereby mixing with the city traffic and increasing the traffic congestion in within the city.
Road Safety	There will be reduction in road accidents after development of the new highway, as adequate space for plying safe movement of vehicles to cross and to overtake will be available.  The city traffic will be separate with commercial traffic and thereby ensuring adequate safety to light city vehicles.	Mix of city traffic with commercial traffic leads to traffic congestion in all arterial roads. This leads to many road accidents. As per the community consultation, many accidents are taking place on the existing road stretches due to mix traffic. With increase in traffic, the situation may worsen.

Component	“With” Project Scenario	“Without” Project Scenario
Environmental Quality	The free flow of traffic on the new highway will improve the environmental quality, as emissions from the plying vehicles will reduce due to seamless flow.  There will be temporary increase in dust and emissions during the construction phase only and is reversible.	Environmental quality will further deteriorate due to pollution and high emission from slow traffic movement and congestions. With increase in traffic, the pace of degradation of environment will only hasten.
Transportation Facilities	Free flow interchanges, VUPs/LVUPs, and truck lay byes are proposed along the project road for convenience of people. Thus, the travel quality will significantly improve on the road conditions.	Bad travel quality.
Economic Development	Economic activities will automatically improve once the new road is developed around the Bangalore city. It will also benefit farmers, as they will be able to sell their produce in distant markets due to improved transportation.	The economic activity will remain static.
Employment Opportunities	The proposed project road development will require around 50 technical staff, 100 skilled labours and 200 non-skilled labours during construction phase depending upon the proposed construction package.	No such opportunity
Development Potential	There will be higher potential for development in this area due to improvement in access and consequent increase in economic activity. Essential community infrastructures like drainage system, water supply, electricity, transportation etc. will come because of current development.	Development activity will greatly hampered due to inadequate connectivity.

It can be concluded that “With” project scenario having positive/ beneficial impacts will significantly enhance social & economic development of the region when compared to the “Without” project scenario. Hence, the “With” project scenario with some reversible impacts is a preferred and acceptable option rather than the “Without” project scenario. The implementation of the project, therefore, will definitely be beneficial for overall socio-economic environment of the impacted region.

## 0.5 ENVIRONMENTAL BASELINE DATA

The brief description of the environment is given as follows:

**Table 0.4: Brief Description of the Environment**

S. No.	PARAMETER	DESCRIPTION
<b>1. Physical Environment</b>		
(i)	Topography and Geography	The project road section of NH948A passes mainly through rolling terrain while few stretches passes through plain terrain. The latitudes and longitudes of project road start and end are: 75086'9.262"E to 14034'62.510" N 80018'10.826"E to 13098'631.353" N respectively. River Vrishabawathiathi is crossing at location Ch.92.650 and a few minor streams crossing the alignment.
(ii)	Geology and Seismicity	The geological formation of the Bangalore Urban, Ramanagara and Krishnagiri district consists largely rocky upland, plateau and flat-topped hills with major part of the districts underlain by gneisses and granites. The project influence area falls under least active to moderate damage risk Zone II
(iii)	Soils	The soils in the districts are red loams, red gravelly sandy loams and lateritic soils. The soils are fertile and support a variety of crops except the few rugged terrains.
(iv)	Borrow Areas	Total 19 borrow areas have been identified for the project.
(vi)	Fly Ash	Fly ash shall be collected from the Ennore Thermal Power Plant, Mettur Thermal Power Plant and Rayalseema Thermal Power Plant and it shall be used for construction purposes.
(vii)	Land Use Pattern	In project influence area (within 10km from alignment), the predominant land use is agriculture (86%), followed by forest (9%), barren land/fallow land (2%), Plantation (1%), water body (1%).
<b>2.</b>	<b>Meteorology</b>	Average rainfall of Ramanagara district varies from 777 mm to 940 mm, in Bangalore Urban it ranges between 864 mm to 943 mm .In Krishnagiri district, it varies from 750mm to about 900mm. Rainfall is concentrated during the months of July to November. Mean daily maximum temperature is about 33°C and the mean daily min. is about 15°C.
<b>3.</b>	<b>Air</b>	Ambient Air Quality data was collected during the month of June 2018 from five (5) locations. The parameters monitored were Particulate Matter (<PM <sub>10</sub> ); Particulate Matter (<PM <sub>2.5</sub> ); Sulphur dioxide (SO <sub>2</sub> ), Nitrogen oxide (NO <sub>x</sub> ) and Carbon monoxide (CO).The monitoring results reveal that Ambient Air Quality parameters are found to be below the prescribed permissible limits of CPCB.
<b>4. Water</b>		
(i)	Water resources	<p><b><u>Surface Water Resources</u></b> Vrishabawathi river crossing at location (Design Ch.92.650) and a few minor streams crossing the alignment.</p> <p><b><u>Ground Water Resources</u></b> Locals use dug wells, hand pumps, bore well and wells for various purposes. The water requirements of rural and urban areas in the district are met either thorough surface water sources or through various mini water supply schemes or integrated water supply schemes utilizing the available ground water resources.</p>



S. No.	PARAMETER	DESCRIPTION
(ii)	Water Quality	<p><b>Surface Water Quality</b> Surface water quality samples were collected from two (2) locations. The physio-chemical analysis of water samples revealed that the water quality criteria of study area falls in the range of Class B-E as prescribed by CPCB (as per the overall result) and hence recommended for drinking water source without conventional treatment but after disinfection. All the measured parameters were observed well within the prescribed limit.</p> <p><b>Ground Water Quality</b> Ground water quality samples were assessed by collecting three (3) samples along the project area. As per CGWB, ground water in the region is colourless, odourless and predominantly alkaline in nature. It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except iron and nitrate, which is observed to be on the higher side. The incidence of high total hardness can be attributed to the composition of litho-units constituting the aquifers in the district, whereas nitrate pollution is most likely due to the use of fertilizers and other improper waste disposal.</p>
5.	Noise	Ambient Noise levels were monitored during the month of June 2018 from five (5) locations from 6:00 am to 10:00 pm (Day) and from 10:00 pm to 6:00 am (Night). The daytime and nighttime noise levels are exceeding the prescribed limits of CPCB at monitored locations due to vehicular movement in near vicinity of the project road, student activity and breezing effect of wind.
6.	<b>Biological Environment</b>	
(i)	Forest	<p>3.796 Km of length of proposed alignment is passing through the forests of Bannerghatta National Park. Therefore, there is requirement of diversion of approximately 11 ha forest land.</p> <p>Additional approximately 2.5 ha. of forest land will be diverted due to construction of ramp to connect the existing Kanve Shivpura village within Bannerghatta National Park with the elevated corridor.</p>
(ii)	Flora	Predominant tree species found along the NH-948A project road sections in Bangalore Rural and Ramanagara are <i>Acacia</i> , <i>Tectona</i> , <i>Zizyphus</i> etc. Total of approx. 9827 trees are falling within 70m PRow of the project road. Plantation along the highway shall be taken up as per Green plantation strategy (as per IRC: SP-21:2009). Shrubs will be planted on the medians all along the corridor. Avenue plantation will done at available locations. Landscaping will be done at interchange locations.
(iii)	Fauna	Due to the rocky terrain and availability of corridors in private lands many wild animals such as Elephants, Leopard, sloth bear, Jackal, Spotted Deer, Wild Boar, Hare etc. are present in the Divisions. Potential animal crossing in consultation with Forest department identified and for structural passages.
7.	Socio-economic environment	51 villages are falling along the PRow of the proposed road corridor. Most of the people in affected villages depend on

S. No.	PARAMETER	DESCRIPTION
		agriculture for their livelihood. The major agricultural crops in the district are grown Ragi, Bajra, and pulses like Tur, Avare and Horse gram. People are also employed in constructions, government jobs, agriculture and household activities.

## 0.6 ENVIRONMENTAL AND SOCIAL IMPACT AND MITIGATION

The impacts and their mitigation were examined during the EIA study. The major impacts are on land use as total 405-hectare land has been acquired for proposed development. Most of the land is agricultural and barren land. Further, 11 hectares of forestland will be acquired for the proposed development, as the corridor is passing through notified forest area of Bannerghatta. Additional approximately 2.5 ha. of forest land will be diverted due to construction of ramp to connect the existing Kanve Shivpura village within Bannerghatta National Park with the elevated corridor.

The mitigation for acquisition is compensation for landowner as per NH Act, State R&R and National R&R policy. Also, the properties and structures will also be compensated as per the state policy. As far forestland is concerned, forest clearance will be obtain prior to the road construction.

The other major impact is that road is passing through the core and Eco-sensitive Zone of Bannerghatta National Park. This will affect the wildlife of BNP and their natural habitat. The prior clearance of State Board of Wildlife (SBWL) and National Board of Wildlife (NBWL) will be obtained. Also, habitat improvement and wildlife management activities will be carried out under Corporate Environment Responsibility provisions.

One animal under pass has been proposed in phase-II for the free passage of wildlife as a mitigation measure. There will be a loss of approximately 9827 number of trees along the alignment during pre-construction stage of the project. The compensatory plantation will be carried out as per the State Forest Policy.

The other impact are noise and light pollution during operation of the project. Structure mounted noise barriers will be provided in BNP section throughout the elevated corridor. No lighting will be provided in the elevated corridor to ensure minimal disturbance to wildlife within BNP.

In addition, there will be temporary air, water and noise pollution during construction stage, which will be mitigated properly with adequate and suitable measures.

## 0.7 PUBLIC CONSULTATIONS

Consultation with stakeholders and government agencies was been done during the EIA preparation. Formal consultations are being carried through structured surveys/interviews and have been detailed in the Social Impact Assessment Report.

Number of officials from various governmental departments have been consulted to assess the actual environmental as well as social conditions of the region.

The consultation were done also with forest and wildlife officials of Bannerghatta. The major outcome of consultation with forest and wildlife officials of Bannerghatta is the proposal of animal underpass at one locations in Phase-II. In addition, valuable suggestions of wildlife management were discuss with the concerned officials.

The consultation with local people helped in identifying the alignment in which there is minimum loss of structures and properties.

## **0.8 BENEFITS OF THE PROJECT**

The project will give significant economic benefits to the State. Construction of the project road will lead to better connectivity and will also play a significant role in changing the socio-economic condition of the people living in the region. Installation of proper road safety system through signage, barricades, crash barriers and by providing adequate bus bays, truck lay byes, underpasses, etc. on project roads will further enhance the road safety on these project roads.

The project will also generate direct and indirect employment to the local people of the state. The indirect benefits include savings in vehicle operating costs, less fuel consumption, reduced vehicular emissions and decreased cost of passenger travel.

## **0.9 ENVIRONMENTAL MONITORING PROGRAMME**

The environmental monitoring programme of air quality, noise quality, water quality, soil quality and roadside plantation during construction and operation phases has been suggested in Chapter 10 of the report. The estimated monitoring cost is approximately **INR 21 Lakhs**.

## **0.10 ENVIRONMENTAL MANAGEMENT PLAN**

Environmental management plan has been prepared for mitigation/ management/avoidance of the potential adverse impacts and enhancement of various environmental components along the project road. For each mitigation measure to be carried out, its location, time frame, implementation and overseeing/ supervising responsibilities have been identified. Monitoring plan for construction and operation phase has been framed to ensure effective implementation EMP. The EMP will be part of the contract document. The total EMP budget has been estimated as **INR 27.22 Crores**. The contractor under the supervision of PMC and environmental cell of Concessionaire will implement the EMP during construction. During operation phase, EMP will implemented by the concessionaire.