EXECUTIVE SUMMARY

1.0 Introduction

The Maharashtra State Road Development Corporation Limited (MSRDC), as the Project Proponent, has been entrusted with the development of access-controlled super communication expressways in eastern Maharashtra. MSRDC has proposed expressways into three different Packages falling in Nagpur Revenue Divisions as under,

1. Package I: Construction of Nagpur - Gondia Access Controlled Super Communication Expressway Starting at Gavasi in Nagpur District and ends at LodhiTola in Gondia district (Ch 0.000 to 144.807). In addition to the main alignment two feeder routes are included in Package I i.e., Gondia Bypass (Ch 0.000 to Ch 13.744) and Tiroda Feeder Route (Ch 0.000 to Ch 3.826).

The overall length of Package I is 162.377 Km.

2. Package II: Construction of Bhandara-Gadchiroli Access Controlled Super Communication Expressway starts Sawarkheda Interchange of Nagpur-Gondia Expressway to Gadegaon on National Highway NH-53(B) leading to Raipur (Ch 0.000 to Ch. 24.706) and Borgaon Interchange of Sawarkheda – Gadegaon (Ch. 0.00 to Ch. 69.536) link to Kinhi village on NH 353D.

The overall length of Package-II including the Connector is approx. 94.242 km

3. Package III: Construction of Nagpur- Chandrapur Access Controlled Super Communication Expressway starts from Seldoh Interchange of Hindu HrudaysamratBalasaheb Thackeray Maharashtra SamruddhiMahamarg to Navegaon More, Ghatkul (Ch. 0.000 to Ch.191.315). In addition to the main alignment, one more alignment of Ghugus Interchange to Chandrapur connector (Ch. 0.000 to Ch. 11.969) is included in Package III.

The overall length of the package III including the connector is approx. 203.284 Km

The proposed project is for Package II: Starting from Nagpur Bhandara to Chandrapur. As per Environment Impact Assessment (EIA) Notification dated 14th September 2006, and its amendments until date, the proposed project falls under 'Category A' with activity is number 7(f). This is due to applicability of General Condition i.e., the proposed project activity falling within 5 km of the Notified Navegaon-Nagzira Tiger Reserve vide Notification S.O.612 (E) dated 25th February 2016.

Accordingly, the application was submitted to obtain the Terms of Reference (ToR) for prior environmental clearance for Package II. The project was recommended in the 347thEAC Infra-1 meeting held on 28thNovember 2023. The project was accorded ToR vide TOR Identification No. TO23A3602MH5952561N dated 27th December 2023. However, then a TOR amendment application was submitted and revised TOR letter was received vide TOR Identification No. TO24A3602MH5148383A dated 22nd October 2024 (copy of original TOR & Amendment of TOR is enclosed as ***Annexure 1***).

2.0 Project Location

The proposed project alignment passes through 68 Villagesof Five (5) Talukas viz. Kuhi, Bhandara, Pauni, Lakhandur and Bramhapuri of Three (3) districts of Nagpur, Bhandara and Chandrapur in the State of Maharashtra.

The Google Earth Imagery of the project is as shown in **Figure 1** and Toposheet Map of the project site & study area is as shown in **Figure 2**.

The details of the area and length in each of the village are as provided in **Table 1**.

Figure 1: Location Map of the Project Site

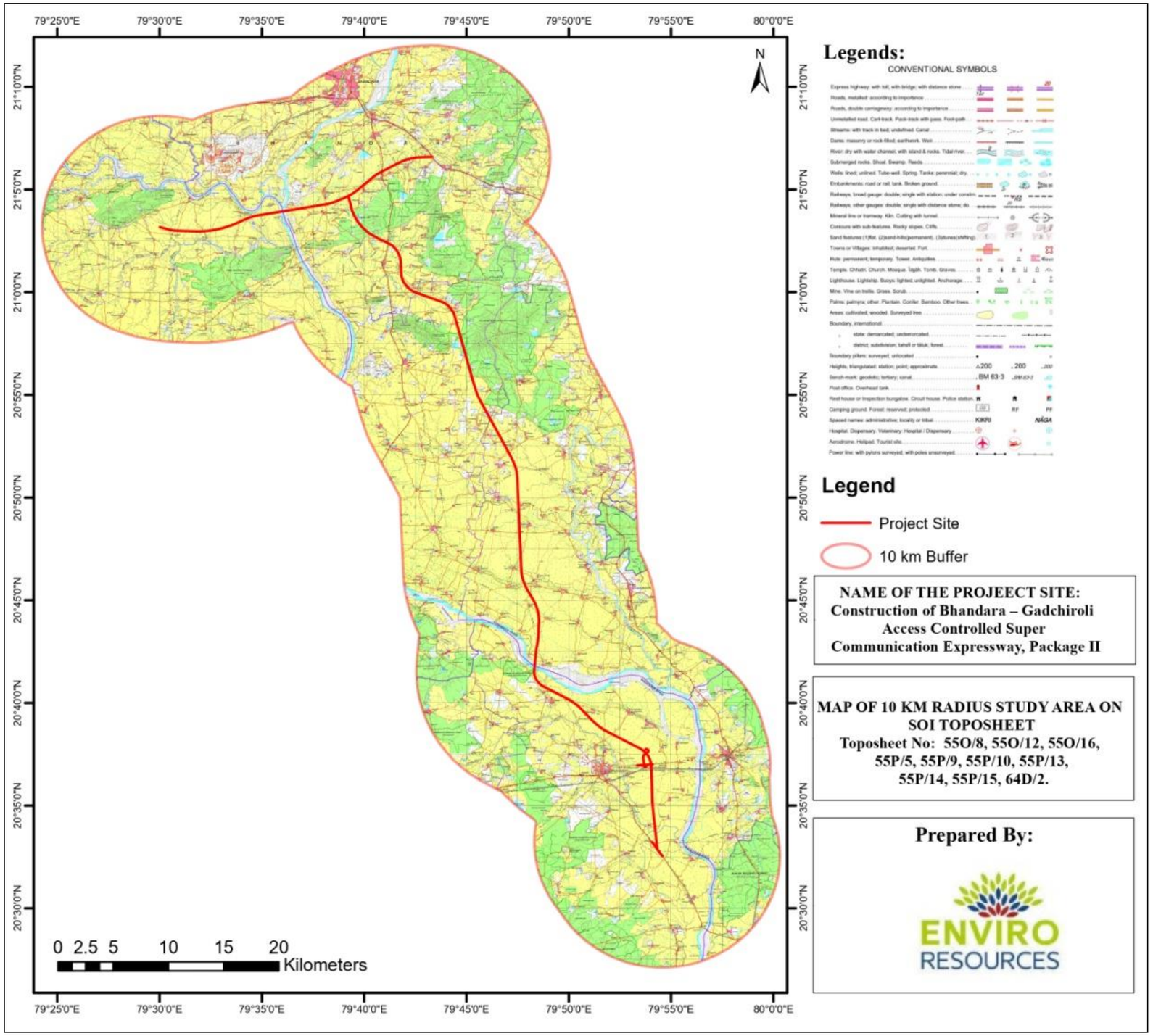


Figure 2: Toposheet Map of the Project Site & Study Area

Table 1: Details of Land Acquisition Area in Each Village

SN	District	Taluka	Village Name	Total Gut Nos.	Acquired Area Sqm	Acquired Area In Ha	Private	Govt	Forest
Land Acquisition For BhandaraGadchiroli (Chandrapur) Pkg – 2 Village wise Summary									
1	Bhandara	Bhandara	Garada_Bk	98	249367.7	24.93677	16.25546	8.681307	0
2	Bhandara	Bhandara	Basora	13	3614.222	0.361422	0.361422	0	0
3	Bhandara	Bhandara	Boregaon_Bk	2	84723.94	8.472394	8.465253	0.007141	0
4	Bhandara	Bhandara	Chowa	1	44740.86	4.474086	0	0	4.474086
5	Bhandara	Bhandara	Usaripar	33	143387	14.3387	8.922341	5.416355	0
6	Bhandara	Bhandara	Shrinagar	37	123606	12.3606	11.07568	1.284919	0
7	Bhandara	Bhandara	Wakeshwar	33	86465.79	8.646579	8.043103	0.603475	0
8	Bhandara	Bhandara	Chikhal_Pahela	46	135665	13.5665	13.15873	0.407766	0
9	Bhandara	Bhandara	Golewadi	67	238789.5	23.87895	22.33545	1.543499	0
				330	**1110360**	**111.036**	**88.61744**	**17.94446**	**4.474086**
1	Bhandara	Pauni	Pannasi	27	70783.45	7.078345	6.990897	0.087448	0
2	Bhandara	Pauni	Minsi	22	67376.28	6.737628	6.425302	0.312326	0
3	Bhandara	Pauni	Tirri	89	322061.5	32.20615	31.00067	1.205479	0
4	Bhandara	Pauni	Khairi (Tirri)	24	81758.39	8.175839	7.808987	0.109637	0.257215
5	Bhandara	Pauni	Tambekhani	15	45155.68	4.515568	4.289049	0.226519	0
6	Bhandara	Pauni	Forest	1	68666.52	6.866652	0	0	6.866652
7	Bhandara	Pauni	Bhivkhidki	2	108162.2	10.81622	0	10.81622	0
8	Bhandara	Pauni	Telpendhari	16	60388.77	6.038877	2.096054	0.236157	3.706667
9	Bhandara	Pauni	Katurli	37	179508.2	17.95082	17.80212	0.1487	0
10	Bhandara	Pauni	Pilandri	48	155362.5	15.53625	14.90099	0.635263	0
11	Bhandara	Pauni	Khambadi	47	158723.8	15.87238	9.6843	0.560877	5.627203
				328	**1317947**	**131.7947**	**100.9984**	**14.33863**	**16.45774**
1	Bhandara	Lakhandur	Palependhari	72	206394	20.6394	18.84777	1.791623	0
2	Bhandara	Lakhandur	Ghodezari	24	62662	6.2662	6.260462	0.005738	0
3	Bhandara	Lakhandur	Pachgaon	37	75247.35	7.524735	6.931344	0.593391	0
4	Bhandara	Lakhandur	Belati	41	208483.6	20.84836	19.84192	1.006438	0

SN	District	Taluka	Village Name	Total Gut Nos.	Acquired Area Sqm	Acquired Area In Ha	Private	Govt	Forest
5	Bhandara	Lakhandur	Masal	15	48080.81	4.808081	4.808081	0	0
6	Bhandara	Lakhandur	Khairi (Ghar)	74	258046	25.8046	25.41387	0.390727	0
7	Bhandara	Lakhandur	Ghartoda	8	25370.49	2.537049	2.427695	0.109355	0
8	Bhandara	Lakhandur	Sarandi Bk.	88	335359.7	33.53597	31.8283	1.707663	0
9	Bhandara	Lakhandur	Rajani	79	227284.5	22.72845	21.5123	1.216155	0
10	Bhandara	Lakhandur	Karandala	57	215350.6	21.53506	19.90009	1.63497	0
11	Bhandara	Lakhandur	DokeSarandi	7	41369.6	4.13696	4.002408	0.134552	0
12	Bhandara	Lakhandur	Kirmati	44	167542.7	16.75427	16.24198	0.512287	0
13	Bhandara	Lakhandur	Rohani	25	123910.7	12.39107	12.23526	0.155811	0
14	Bhandara	Lakhandur	Khairna	34	90931.63	9.093163	8.795708	0.297455	0
15	Bhandara	Lakhandur	Moharana	59	235904.5	23.59045	19.92566	3.664795	0
				664	**2321938**	**232.1938**	**218.9728**	**13.22096**	**0**
1	Chandrapur	Brahmapuri	Tapal	2	24547.49	2.454749	0.014026	2.440723	0
2	Chandrapur	Brahmapuri	Forest	1	253.6912	0.025369	0	0	0.025369
3	Chandrapur	Brahmapuri	Dighori	103	361913.1	36.19131	34.09151	1.276892	0.822902
4	Chandrapur	Brahmapuri	Nanhori	12	92898.25	9.289825	9.131873	0.157951	0
5	Chandrapur	Brahmapuri	NandgaonJani	113	501615.4	50.16154	48.89098	1.270558	0
6	Chandrapur	Brahmapuri	Bondegaon	30	147783	14.7783	14.65097	0.127335	0
7	Chandrapur	Brahmapuri	Kurza	63	259701.9	25.97019	25.66232	0.307872	0
8	Chandrapur	Brahmapuri	KhambTalodhi	45	210221.1	21.02211	20.82206	0.200048	0
9	Chandrapur	Brahmapuri	Sondri	16	104780.4	10.47804	10.47804	0	0
10	Chandrapur	Brahmapuri	Kothulna	12	29482.52	2.948252	2.886854	0.061397	0
11	Chandrapur	Brahmapuri	Surbodi	29	120414	12.0414	11.37723	0.66418	0
12	Chandrapur	Brahmapuri	NavegaonMakta	32	169955.8	16.99558	13.64168	3.353897	0
13	Chandrapur	Brahmapuri	Zilbodi	8	55137.77	5.513777	4.957044	0.556734	0
14	Chandrapur	Brahmapuri	Borgaon	15	87672.92	8.767292	8.609869	0.157424	0
15	Chandrapur	Brahmapuri	Udapur	3	18663.26	1.866326	1.866326	0	0
16	Chandrapur	Brahmapuri	Paradgaon	32	152210.9	15.22109	15.22109	0	0

SN	District	Taluka	Village Name	Total Gut Nos.	Acquired Area Sqm	Acquired Area In Ha	Private	Govt	Forest
17	Chandrapur	Brahmapuri	Betala	53	205220.9	20.52209	19.91642	0.605673	0
18	Chandrapur	Brahmapuri	Kinhi	51	226450.9	22.64509	19.53571	3.109385	0
					2768923	**276.8923**	**261.754**	**14.29007**	**0.848271**
Land Acquisition For Sawarkheda to GadegaonPkg – 2 Village wise Summary									
1	Nagpur	Kuhi	Sawarkheda	3	35726.12	3.572612	3.572612	0	0
2	Nagpur	Kuhi	Amti	38	200616.3	20.06163	19.27217	0.789463	0
3	Nagpur	Kuhi	Bori (Naik)	55	302868.5	30.28685	28.99132	1.295532	0
4	Nagpur	Kuhi	Hardoli	15	107636.3	10.76363	10.76363	0	0
5	Nagpur	Kuhi	Navegaon	21	102761.7	10.27617	0	10.27617	0
6	Nagpur	Kuhi	Chichghat	33	157917.9	15.79179	15.43828	0.353509	0
7	Nagpur	Kuhi	Gondpipri	25	169195.8	16.91958	0	16.91958	0
8	Nagpur	Kuhi	Paoni	2	5375.89	0.537589	0.021949	0.51564	0
				192	**1082099**	**108.2099**	**78.05996**	**30.14989**	0
1	Bhandara	Bhandara	Tiddi	44	208345.4	20.83454	13.81646	7.018083	0
2	Bhandara	Bhandara	Manegaon	67	247072.3	24.70723	23.84577	0.861468	0
3	Bhandara	Bhandara	GaradaBk	50	242354.4	24.23544	23.62504	0.610401	0
4	Bhandara	Bhandara	Basora	33	81812.36	8.181236	8.057981	0.123255	0
5	Bhandara	Bhandara	GaradaKh	52	167909	16.7909	15.91193	0.878966	0
6	Bhandara	Bhandara	Dawdipar (Bajar)	56	175390.4	17.53904	16.18432	1.354727	0
7	Bhandara	Bhandara	Pachkhendi	55	106139.6	10.61396	10.13465	0.479303	0
8	Bhandara	Bhandara	Chandori	74	213542.2	21.35422	20.84926	0.504954	0
9	Bhandara	Bhandara	Koknagad	33	97864.08	9.786408	9.119254	0.667153	0
				464	**1540430**	**154.043**	**141.5447**	**12.49831**	0
	BhandaraGadchiroli (Chandrapur)					**751.9169**	**670.3427**	**59.79412**	**21.7801**
	Sawarkheda-Gadegaon				**Ha**	**262.2528**	**219.6046**	**42.6482**	**0**
	Grand Total					**1014.17**	**889.9473**	**102.4423**	**21.7801**

Source: Land record by Monarch

****Note: Forest land to be diverted may be changed during Forest Clearance process***

3.0 Project Description

The salient features of the proposed project are as tabulated below in **Table 2**.

Table 2: Salient Features

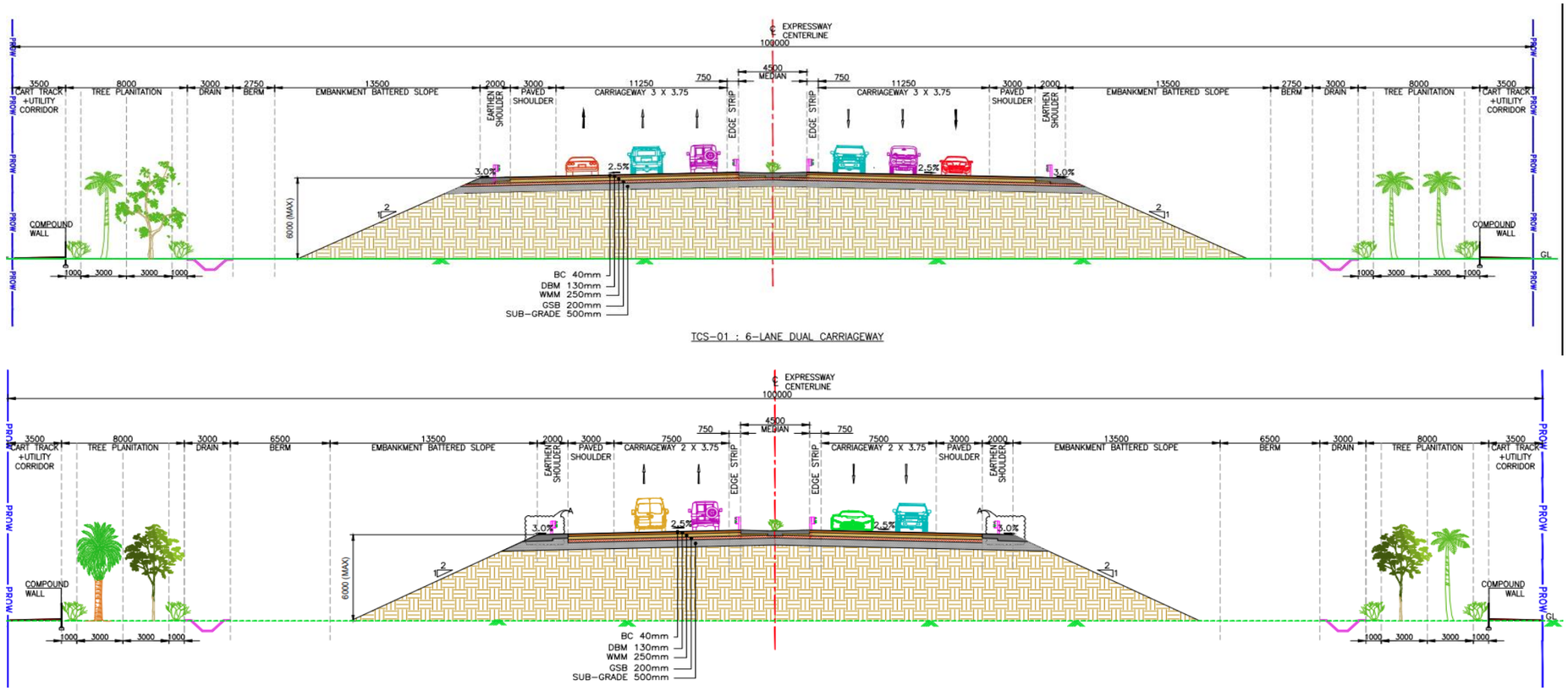
1	TotalLength	94.242 km
2	State	Maharashtra
3	District	Nagpur, Bhandara and Chandrapur
4	Talukas	The proposed alignment will pass through. Kuhi, Bhandara, Pauni, Lakhandur and BramhapuriTalukas. i.e. 5 Talukas
5	Terrain	Mostly plain and hilly at some places
6	Seismic Zone	II as per IS 1893 (Part 1) : 2002
7	Land Use	Thealignmentispassingthroughplainterrain.Thepredominantlanduse alongthealignmentisagriculturalfollowedbyresidential&commercialand mix (built up) land use.
8	RoW	100m except at Interchanges and Forest Area 45m
9	TotalArea ofLand Acquisition	Total Land Acquisition: 1014.1697 ha Government Land: 102.4423 ha Private Land: 889.9473 ha Forest Land: 21.7801 ha (Source: Land records by Monarch; **Note: Forest land to be diverted may be changed during Forest Clearance process)
10	MainCarriageway (Proposed)	Section 1- Sawarkheda Interchange to Gadegaon on National Highway NH - 53(B):(CH. 0+000 to CH 24+706), ROW 100m, 3 +3 lanes Section 2- Sawarkheda-Gadegoan Expressway Connector at Boregoan Interchange Garada_Bk to Kinhi village in Chandrapur district (CH. 00+000 to CH 69.536), ROW 100m, 2+2 lanes.
11	Interchange	7 locations at:

Bhandara to Gadchiroli		
IC-1	Garada Bk. Interchange	0+000
IC-2	Khairi Interchange	15+447
IC-3	Karandala Interchange	40+595
IC-4	KhanbatdoliInterchange	60+803
IC-5	Kinhi Interchange	69+536
Sawarkheda to Gadegaon		
IC-1	Interchange with Nagpur Gondia	0+000
IC-2	Dawadipar Interchange	20+200

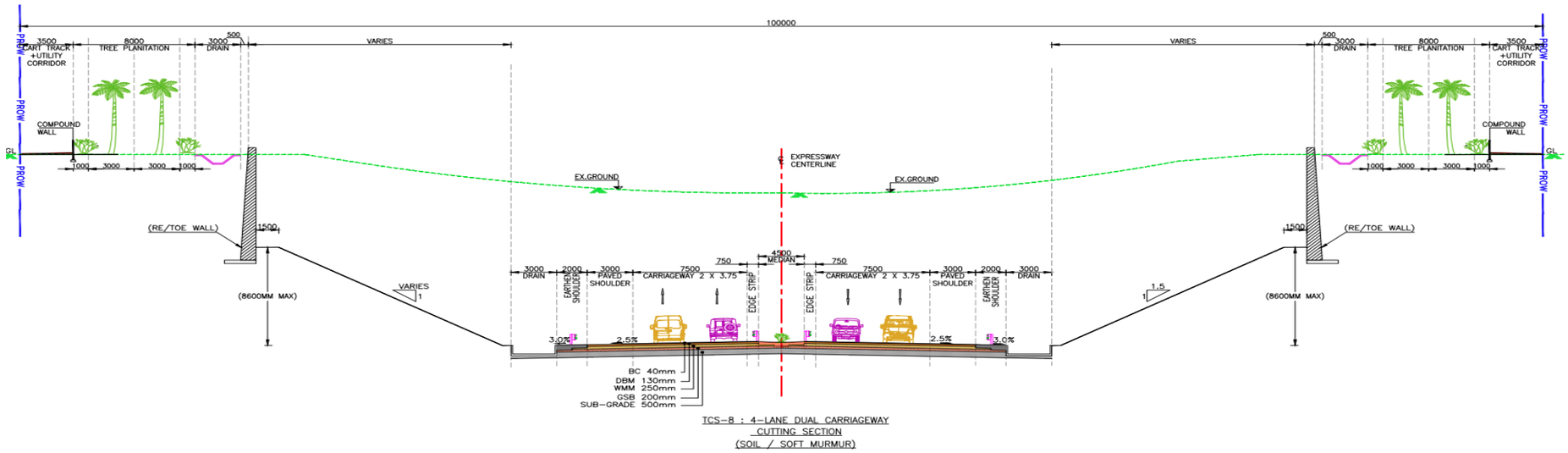
12	Major Bridge	5 Nos.
13	Minor Bridge	25 Nos.
14	Elevated Flyover	17 Nos.
15	Animal Underpass	2 Nos.
16	CUP/PUP	71 Nos.
17	VUP/ VOP/LVUP	48 Nos.
18	Road Over Bridges (ROB's)	1 Nos.

19	Tunnel	Nil
20	Culvert	25 Nos.
21	Rainwater Harvesting System	Rain water harvesting shall be done as per IRC: SP: 50-2013 and as per Ministry Circular no. NHAI/TIC/VIP Ref/ 2012 dated 26thOctober 2015.
22	Toll Plaza	Closed Loop system adopted for this corridor. Toll Tokens issued/vehicle registered at Entry Point and Toll deducted from Fast tag at Exit Point based on Travel Distance. at the Entry point 2 lanes of 3.50m and 2 lanes of 4.50m for OSV are proposed at the Exit point 3 lanes of 3.50m and 2 lanes of 4.50m for OSV are proposed
23	Construction Period	30 months
24	Employment	Approx. 1750 during construction and approx. 50 during operation phase (for Toll Plazas).
25	Total Civil Cost	7106.53 Cr.
26	Total Capital Cost (including LA and Utility Shifting, etc.)	12586.62 Cr.
27	R&R Plan	The R&R compensation activities shall be accomplished in consonance with Maharashtra Highways Act, 1955. Provisions of R&R Plan in Maharashtra Highways Act form the basis for Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. The budget is already included in the land acquisition portion for the same.

The typical cross-section of the proposed alignment is as shown in **Figure 3**.



TCS-01 : 6-LANE DUAL CARRIAGEWAY



TCS-8 : 4-LANE DUAL CARRIAGEWAY
CUTTING SECTION
(SOIL / SOFT MURMUR)

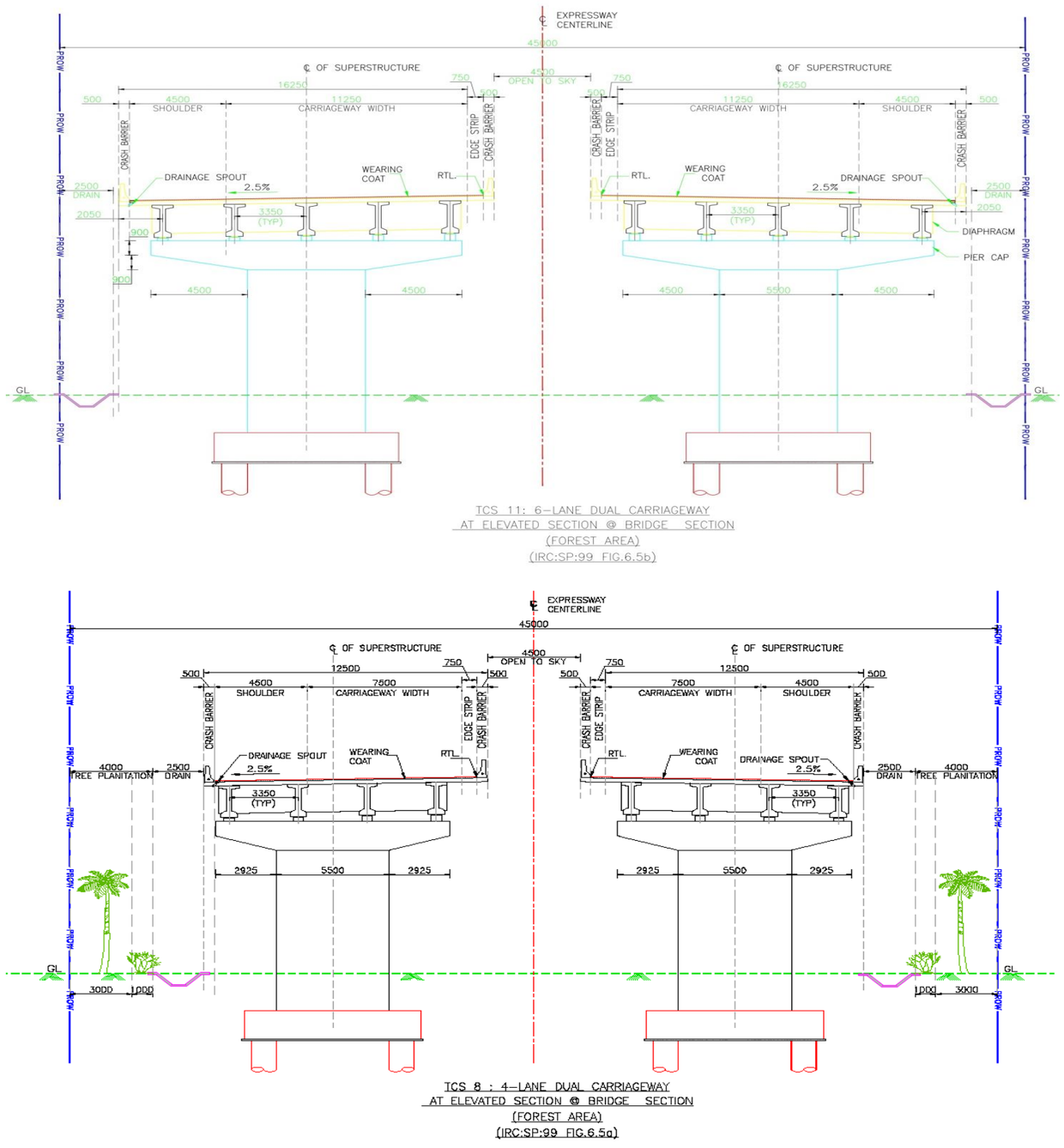


Figure 3: (Typ.) Cross Section of Proposed Alignment

Source: MSRDC (PP) and Monarch (DPR Consultant)

Project Schedule & Cost : The proposed project is scheduled to be completed within 30 months after Environment Clearance (EC) and other statutory approvals are granted. The estimated cost of the project is Rs. 12586.62 Crores. The budget for Environment Protection for the proposed project is ~ 183Crores.

Resource Requirements

Land : The proposed project will be executed on total land area of ~1014.1697 Ha which is being acquired by MSRDC, Government of Maharashtra.

Water : The domestic water requirement will be approximately 78.75 m^3/day (i.e. 45 lpd for 1750 labours). Additional water of ~1048 m^3/day will be required for dust suppression &construction activities. The water will be sourced from nearby surface water sources such as Gosekhurd dam & Wainganga River with prior consent from the Authorities having Jurisdiction.

Power : LSD D.G sets will be used for power for onsite construction and labour camps, wherever grid supply is not available.

Manpower : The manpower envisaged is approximately 1750 for the proposed project.

4.0 Description of the Environment

As per the EIA Guidance Manual for Highways (MoEF&CC, February 2010), a studyarea of 15 km radius from the proposed alignment was considered for secondary datacollection. Primary data has been collected within 500 meters on either side of theproposed alignment. Baseline environment monitoring was carried out for the period of October 2023 to December 2023.

The land use and land cover of the study area prevailed 4 major land use classes viz. Built-up, Agriculture, Surface water reservoirs, & Forest amongst which Agriculture land was the dominant land use class with 1513.23 km^2followed by Forest with 334.16, whereas Surface water reservoirs with 127.98 km^2andBuilt-up land were present in 120.98 km^2. The prevailing land cover forms in study area were Wastelands lands spanning in 381.50 km^2

Soil - The soil quality was monitored at twelve (12) locations within the study area. Some of the important soil parameters are summarised in the below table;

Parameter	Value
pH	7.2 – 8.2
Nitrogen mg/kg	73.5-101.5
Phosphorus mg/kg	23.43- 52.7
Potassium mg/kg	36.04 – 56.18
Organic Carbon %	1.4 1.9

As per the Chemical Classification of Soil Quality by ICAR, the soils in study area come under moderate to highly productive, whereas as per Levels of Soil Fertility by Tondon H.L.S, the soils in study are can be classified under high fertile category.

Ambient Air Quality - The Ambient Air quality was monitored at twelve (12) locations for parameters such as PM_{10}, $PM_{2.5}$, NOx, SO_2, CO in the study area.

Parameter		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
$PM_{2.5}$ ($\mu g/m^3$)	Min	28.8	30.04	28.42	25.56	29.72	25.76	26.84	32.12	25.66	27.34	27.02	23.94
	Max	40.6	41.84	39.82	36.16	41.72	35.96	37.54	44.92	36.36	39.34	39.02	34.64
	Average	33	34.21	32.52	29.32	33.92	29.36	30.84	36.62	29.56	31.54	31.22	27.74
	98 percentile	40.2	41.44	39.42	35.76	41.32	35.66	37.14	44.52	35.96	38.94	38.62	34.24
PM_{10} ($\mu g/m^3$)	Min	67.6	69.74	65.22	60.06	69.52	59.36	61.74	74.22	60.56	63.84	65.52	57.54
	Max	83.4	85.54	78.42	72.46	83.92	71.56	74.24	89.62	73.06	78.24	79.92	70.04
	Average	74.5	76.66	71.12	65.6	76.02	64.86	67.04	81.12	65.76	70.34	72.02	63.14
	98 percentile	82.6	84.74	78.32	72.36	83.82	71.46	74.14	89.52	72.96	78.14	79.82	69.94
SO_2 ($\mu g/m^3$)	Min	7.1	7.84	5.92	4.26	7.42	6.96	5.44	8.72	4.26	6.34	6.02	3.84
	Max	14.6	15.34	13.92	11.76	15.02	13.36	12.94	16.72	11.76	13.94	13.62	11.34
	Average	12	12.7	11.22	9.24	12.32	11.06	10.14	13.82	9.06	11.24	10.92	8.84
	98 percentile	14.6	15.34	13.82	11.66	15.02	13.36	12.84	16.62	11.66	13.94	13.62	11.24
NO_X ($\mu g/m^3$)	Min	21.6	23.24	21.72	19.16	22.22	19.46	20.44	24.32	19.26	19.84	19.52	17.54
	Max	28.7	30.34	28.32	25.46	29.42	25.46	26.74	31.92	25.56	27.04	26.72	23.84
	Average	23.8	25.48	23.92	21.18	24.52	21.46	22.44	26.82	21.26	22.14	21.82	19.54
	98 percentile	27.9	29.54	27.72	24.76	28.72	24.86	26.14	31.22	24.96	26.34	26.02	23.24
CO (mg/m^3)	Min	1.18	0.89	1.53	0.17	0.17	0.91	1.22	0.93	0.2	1.16	0.1	0.67
	Max	1.6	1.29	1.95	0.59	0.57	1.31	1.64	1.3	0.46	1.56	0.22	1.09
	Average	1.4	1.15	1.82	0.42	0.42	1.16	1.44	1.22	0.36	1.44	0.16	0.94
	98 percentile	1.6	1.24	1.92	0.56	0.52	1.26	1.64	1.32	0.46	1.54	0.22	1.04

In general, the ambient air quality is satisfactory with respect to all major pollutants. The 98th percentile values of all pollutants were found to be below NAAQS, 2009 and its further amendments.

Noise Quality - The noise quality was monitored at twelve (12) locations in the study area during the study period.

Category	Leq daytime	Leq night time	Daytime Standard	Night time Standard
Residential	52	41.5	55	45

The noise quality in the study area except around the commercial locations was found to be satisfactory in the residential & industrial areas.

Water Quality - Surface water samples were collected once during the study period at eight (8) locations to assess the baseline water quality in the study area. The samples were compared with the CPCB's surface water classification and they conform to 'Class E' Water Quality Criteria. Some of the important parameters are summarized in the below table;

Parameter	Value
pH	6.8 -7.6
Dissolved Oxygen mg/l	4.08 – 6.46
Biochemical Oxygen Demand mg/l	5.5– 8.0
Total Coliform No./100ml	Absent
E- Coli No./100 ml	Absent

Ground water samples were collected from twelve (12) locations to assess the existing groundwater quality of the study area during the study period. The physico-chemical characteristics of Ground water are confirming to permissible limits of drinking water standards, prescribed in IS: 10500 (2012) (Test Characteristics for Drinking Water) and suitable for consumption. Some of the important parameters are summarized in the below table;

Parameter	Value
pH	7.22 – 8.05
Turbidity NTU	<0.1
Total Dissolved Solids mg/l	446 – 596
Total Hardness as CaCO3 mg/l	221– 390
Alkalinity	254 – 311
Fluoride as F mg/l	0.43 – 0.76
Nitrate as NO_3 mg/l	1.01 – 1.54

Biotic Environment

Project Site and surrounding- Flora & Fauna

The area in and around proposed alignment prevailed varied terrain features such as hills, hillocks, mounds, scrub lands, vegetated areas, depressions, plantations & agricultural fields. The observed in vegetation in study area was by virtue of natural vegetation & plantations in some locations.

Flora:170 plant species, which comprised 13 herb species, 14 species of Grass, 11 climber species, 18 shrub species & 114 tree species.

Fauna:49 bird species, 3 reptile &5 mammal species were recorded in & within immediate vicinity of proposed alignment.

Species of concern category –The observed bird, reptile & mammal species are common & abundantly wide spread across the Vidharbha Region. *Herpestesedwardsii* (Indian grey mongoose) a mammal species is the only schedule species observed during survey. While *Rhesus Macaque*&langur recorded from RoW area. Overall, 49 bird's species recorded during survey. In which, 43 falls under schedule II & 4 species under Schedule I of WPA 2022. Only 1 amphibian species i.e. *polypedatesmaculatus* (Indian Tree frog) is recorded. All the species recorded in and around the project site are very common in the Vidharbha region.

Study Area Flora & Fauna

Flora: 242 plant species, which comprised 36 herb species, 16 species of Grass, 11 climber species, 42 shrub species & 137 tree species.

Fauna: 80 bird species & 26 mammal species, 9 reptilian species were recorded from study area.

Species of Concern Category –As per the IUCN red data list 105 species listed in Least category while 5 species under data deficiency category, 3 species viz.*Cleistanthuscollonus, Dalbergialatifolia*and Chloroxylonswieteniarecorded in the study area is listed as Vulnarable species while 3 species viz. *Aeglemarmelos* (beal tree), *Pterocarpusmarsupium*(Bija) and *Ensetesuperbum* (Ran-kel) listed as Near threatened category which are very common in the entire Vidharbha region. *Tectonagrandis*is the only endangered species recorded from study area.

1 Near Threatened bird species viz. (*Mycterialeucocephala*- Painted stork) which are a resident species, 2 reptilian species viz. *Python molurus* (Rock Python) and *Varanusbengalensis*(Indian monitor lizards), 6 Vulnarable species of mammals viz. *Macaca radiate* (Bonnet macaque), *Cervusunicolour*(sambhar), *Melursusursinus*(Sloth bear), *Tetracerosquadricornis* (Four-horned Antelope) and *BosGarus*(Indian bison) were recorded in study area from primary study and from interaction with locals. However, no mammal sighted in RoW of proposed alignment & nearby surrounding areas

Socio-Economic Environment

The socio economics of study area was studied through primary and secondary survey. The socio-economic aspects of the study area is summarised in the table given below.

Parameters	Study area (10 km)
Total No. of Villages	68
Total no. of Households	17326
Total Population	71834
Sex ratio	992
SC/ST population	17.95% (SC) &3.08% (ST)
Literacy Rate	71.12%

Source: *Primary Census Abstract & DCHB 2011, Bhandara, Nagpur &Chandrapur Districts, State Maharashtra.*

Sex ratio (number of females per thousand of males) in the region is recorded as 992 indicatingmale population in the region is marginally higher than the female population.

In the study area, Gadchiroli city is likely to have high Population density. The reason for this could be equipped facilities like education, health, sanitization, banking and transportation

In the study area, Telpendhari village is likely to have very low population density. The reason for this could be lack of facilities like health, Communication, transportation, sanitization and banking.

5.0 Anticipated Environment Impacts and Mitigation Measures

Construction Phase: The proposed project is a green field project. The construction involves minimum ground clearing, as the profile of the proposed alignment will match the natural topography to the extent feasible. The construction phase of the proposed project will be of shorter duration for about 30 months only.

The potential impacts will be localised, very limited and insignificant due to the construction activity like fugitive dust, noise during excavation, civil works, operation of construction equipment's, storage & handling of construction material, surface water runoffs etc

These impacts shall be minimised by providing appropriate storage for construction material, provision of acoustic barriers and enclosures for high noise generating equipment, fugitive dust control by water sprinkling on road used by vehicles, construction activities shall be avoided during night time, surface runoff shall be checked for contaminations such as oil & grease by routing the surface runoffs in small bunds around the construction areas, all hazardous & non-hazardous material shall be handled as per statutory requirements.

Further except for the identified trees to be felled in 100 m ROW, the proposed project activities does not alter the surrounding the surrounding biotic environment in whatsoever manner. If pilling activity is to be done in river bed, this may lead to rise in suspended solids which may render the bottom waters turbid. However such effect will be temporal & original contours will be restored after cease of construction activity at river bed.

Therefore, the impacts during construction phase is to be short term, reversible, localised and are not expected to contribute significantly.

Operational Phase: The potential environmental impacts due to the proposed project have been assessed in detail. These includes impact on air quality, noise, water quality, solid waste, ecology and socio economics, etc. The modelling and analysis of the data indicate that the predicted impacts are minimal and are within the prescribed norms and standards. Comprehensive mitigation measures have been incorporated in the environment management plan to ensure that the environmental quality is protected and enhanced. These have been summarised in below table.

Air Environment:

The following probable sources are identified in operation phase:

- Vehicular emissions from vehicles plying on the constructed road

The prediction of the Ground Level Concentrations (GLC's) due to emissions of pollutants such as PM, SO_2, NOx and CO from the operation phase has been computed by ACALINEpro.

CALINE3 based CO model with queuing and hot spot calculations and with a traffic model to calculate delays and queues that occur at signalized intersections.

The resultant modelled (incremental) concentrations for all the pollutants (PM, SO_2, NOx and CO) have been found to remain within the corresponding National Ambient and Air Quality Standards (NAAQS). Mitigation measures will be in place to minimize potential adverse impacts of air emissions on health of receptors. In view of this, the atmospheric emissions during the operation phase are anticipated to be localised and the impact significance is assessed as negligible.

Mitigation Measures

- BS-IV or higher version accommodating engines shall be adopted in future, however modelling is been performed considering emission factors for BS-II version vehicles.
- Roads shall be maintained regularly to avoid dust emissions
- Tree plantation shall be done to avoid dispersion of particles
- Native trees with higher APTI (Air Pollution Tolerance Index) value shall be planted

Noise Environment

Noise generating sources are due to the following activities:

- During operation phase/ after completion of road construction work, the major source of noise will be due to Vehicular movement by vehicles using the road.

The prediction of ambient noise from the proposed project was carried out using software tool "dhwani PRO". The anticipated noise generation by vehicles plying on the road will be 45 dB(A).

The distance wise drop down in anticipated cumulative noise from road in operational phase will be as given in following table.

Sr. No.	Distance in meters from alignment boundary	Noise in dB(A)
1	100	55.65
2	200	50.12
3	300	47.31
4	400	43.16
5	500	40.64

Thus, these noise levels will remain well within acceptable limits and will not have any impact outside the boundary from the proposed project.

Mitigation Measures

- Tree plantation is to be proposed along the alignment to minimize the intensity of dissipating noise
- Noise barrier shall be provided on bridges and links close to human habitation

Water Environment

The road operations do not require any significant water quantity, apart from time to time requirement during works such as maintenance of road. However, as needed water will be sourced from water tankers or Wainganga River and Gosekhurd Reservoir with necessary consents from the jurisdictional authorities. Adequate precautions will be taken and proper withdrawal management plan shall be thoroughly followed.

Land Environment

Land pollution may take place during the operation phase due to accidental spillage hazardous materials in case are transported/conveyed using the proposed road.

Mitigation Measures

- Such scenarios will be tackled by District Disaster Management in place & use.
- Littering of solid wastes on proposed road shall be strictly prohibited.

Biotic Environment

Emissions & Noise – Vehicular emissions & noise generated from vehicles plying on the proposed road, however such emissions will be non point& non continuous & the concentration of such emissions escaping the proposed road corridor will be extremely minimal and noise generation will be event specific viz. only during passing/ travel course of vehicles at any given point of time hence adverse/negative impacts on surrounding biotic environment during road operational phase are not envisaged.

6.0 Analysis of Alternatives

Three different alignments were thoroughystudiesnbased on engineering, socio economics, and Environmental, Cost & safety aspect. Weightage of parameters within each of the aspect were tabulated and in accordance to the ranking, the said alignment was finalised. Details of alternative alignment locations have been discussed in details within the EIA Report and the finalised alignment has been discussed and analysed within this EIA Report.

7.0 Environmental Monitoring Programme

The Environmental Monitoring Programs are also suggested to provide information on which management decisions may be taken during construction and operational phase. The objective of this program is to evaluate the efficiency of mitigation and enhancement measures, updating the actions & impacts of baseline data and adaptation of additional mitigation measures.

The environmental monitoring cost is estimated based on the length and existing environmental scenario of the proposed project. Environmental monitoring cost of, 6,24,75,000/- during Construction Phase and 1,48,92,000/-for 10 years during Operation Phase has been allocated.

The sampling, analysis and frequency of environmental attributes including monitoring locations will be as per the guidelines provided by MoEF&CC/CPCB/MPCB. The monitoring shall be carried out by third party laboratories that are accredited by NABL or recognized by MoEF&CC.

8.0 Environmental Management Plan

The proposed project will be certified for internationally accepted Environmental Management System based on ISO-14001, Quality Management and Occupational Health & Safety Management Systems. An environmental monitoring program shall be put in place, periodic review & audits shall be carried out for effective environmental management. The execution team shall have an Environmental Management Cell which shall ensure overall effective implementation of the management plan.

In general, systems shall be in place to ensure compliance with respect to environmental statutory requirements and Environment Policy are strongly adhered to all time.

9.0 Project Benefits

The proposed expressway will provide better, fast, safe and smooth connectivity for the commuters of Nagpur, Bhandara and Chandrapur Districts. Smooth and fast-moving traffic will cause only lower emissions thereby reducing pollution levels. Development of the proposed project road will improve the local agriculture and enable farmers to realize better value for their products as well as attract more investment to that region, thus boost economy of the area, state and nation as a whole. The vehicle operating and maintenance cost is expected to go down substantially. The proposed road alignment will also include general amenities like rest areas, etc. as feasible at built-up locations, pedestrian and cattle underpasses, animal underpasses, landscaping and tree plantation, traffic aid post, emergency telecom system, emergency medical aid post, street light at built ups etc. and thus overall facilities to the road users shall improve. People will have increased access to better social and health infrastructure and other services located outside the project area. This will in turn lead to overall improvement of the quality of life of the people residing in the project zone in terms of their economic, social and health status. Growth of local tourism and resultant boost to local economy is also expected due to proposed project.

10.0 Project Schedule and Cost

The proposed project is scheduled to be commissioned within 30 months after Environment Clearance (EC) and other statutory approvals are granted. The estimated cost of the proposed project is Rs. 12586.62 Crores. For protection of environment, it is proposed to spend 183 Crores as capital cost of EMP budget.

11.0 Conclusion

This impact assessment study indicates that the overall impact from the proposed project activities will be short term, reversible, localised and are not expected to contribute significantly

to the surrounding environment. In addition, with the implementation of the pollution control and the environment management measures, these anticipated impacts due to construction and operation of the proposed project will be mitigated to reduce it further.

The project proponent will also ensure that the environmental performances of all the activities are monitored throughout execution of the project during both construction and operation phase. The project proponent will report environmental performance and monitoring reports regularly to statutory authorities.

The Project Proponent shall develop systems and procedures for effective environmental management. The effective management system coupled with monitoring of environmental components and efforts for continual improvements will result in exemplary environmental performance.

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