*representational image

Pre – Feasibility Report

for

Environmental Impact Assessment (EIA)

Construction of 6-Lane Bhopal – Indore Green Field Expressway – 146.880 Kms in the State of Madhya Pradesh

August 2018

MPRDC

FEEDBACK INFRA
Making Infrastructure Happen

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It is, however, to be noted that this report has been prepared in best faith, with assumptions and estimates considered to be appropriate and reasonable but cannot be guaranteed. There might be inadvertent omissions/errors/aberrations owing to situations and conditions out of the control of MPRDC and DPR Consultant. Further, the report has been prepared on a best-effort basis, based on inputs considered appropriate as of the mentioned date of the report.

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Table of Contents

List of Tables

List of Figures

1 EXECUTIVE SUMMARY

The proposed project pertains to construction of 6-Lane Bhopal – Indore Green Field Expressway in the State of Madhya Pradesh. Proposed expressway shall start near *Itaya Kalan Village* on Bhopal Bypass at NH-12 and terminates at NH-59A near *Karnawad Village*. Geographical Coordinates of start and end point are 23°3'52.68"N 77°32'26.96"E to 22°42'58.32"N 76°13'44.42"E. The total length of proposed expressway is approx. 146.880 km and proposed RoW (Right of Way) is 70m. Project road passes through 4 districts namely *Raisen, Bhopal, Sehore and Dewas.*

The proposed project will shorten the travel distance and improve connectivity between Bhopal and Indore. The existing route between Bhopal and Indore measures about 188 Kms which shall be reduced to approximately 146.88 km i.e. approx. 22% reduction in travel distance. The land use along the proposed expressway is predominantly agricultural land with patches of settlements, forest and barren land. The topography of the project stretch is undulating plain with varying elevations i.e. as low as 445 m AMSL (Above Mean Sea Level) to 597 m AMSL. The project region experiences a tropical climate.

The total water requirement for construction phase shall be approx. 87,32,402 KL. Power requirement for construction phase shall be met from the State Electricity boards. DG Sets shall also be provided as an alternate arrangement. Approx. 115.53 ha of forest land will require to be diverted for the project purpose. *Ratapani Wildlife Sanctuary* is located at a distance of approx 1.3 km from the project expressway near Ch. 13.8.

The construction of the expressway shall take approx. 36 months and the estimated total Civil Cost (2018-2019) of the project is about INR 2,942.56 Crores.

The benefits of the Project are multi-fold. Project will substantially reduce the travel time and further boost the economy of the region by providing better connectivity option.

Proposed project is covered under category **7 'f'** of **EIA notification, 2006.** As per the statutory requirements, the project needs to submit the Environmental Impact Assessment Report to MoEF&CC, Delhi in order to obtain Environmental Clearance.

Present pre-feasibility study is the part of ToR application for conducting EIA study as per EIA Notification, 2006 (amended thereof).

2 INTRODUCTION TO THE PROJECT

2.1 Identification of the Project and Project Proponent

The proposed project pertains to Construction of 6-Lane Bhopal – Indore Green Field Expressway in the State of Madhya Pradesh. Project expressway shall start near *Itaya Kalan Village* on Bhopal Bypass at NH-12 and terminates at NH-59A near *Karnawad Village*. Proposed project passes through 4 districts namely Raisen, Bhopal, Sehore and Devas.

MPRDC shall be the nodal authority/ Project proponent for the development of this Project. Madhya Pradesh Road Development Corporation (MPRDC) is an autonomous agency of the

Government of Madhya Pradesh, entrusted with responsibility for implementation of the proposed project.

2.2 Brief Description of nature of the Project

Salient features of the Project are as follows.

Table 2-1 Project Salient Features

Sl. No.	Particular	Details
1.	Project Name	Construction of 6-Lane Bhopal – Indore Green Field Expressway in the State of Madhya Pradesh
2.	Nature of Project	Green Field Expressway
3.	Location of project stretch	Starting Point- Near *Itaya Kalan Village* on Bhopal Bypass at NH-12 Terminating Point- *NH-59A near Karnawad Village.* Districts- *Raisen, Bhopal, Sehore and Devas*
4.	Geographical Coordinates	Start Point: 23°3'52.68"N 77°32'26.96"E End Point: 22°42'58.32"N 76°13'44.42"E
5.	Land use details	Agricultural land with patches of settlements, forest and barren land
6.	Water demand	8732402 KL (during construction Phase)
7.	Sources of water	Tanker Supply and Groundwater (if required)
8.	Man power	900 (during construction phase)
9.	Power requirement	Power requirement shall be arranged from State Electricity boards. DG Sets shall also be provided as an alternate arrangement.
10.	Nearest railway station	Mandi Dip railway station, 4.3 Km (approx.) in the NW direction from Ch. 0.0 Km. Obaidullaganj Railway Station, 9.3 km (approx.) in SE direction from Ch. 0.0 Km.
11.	Nearest state highway/national Highway	The proposed project passes through NH 59A, SH 41, NH 12.
12.	Nearest air-port	Rajabhoj International Airport, Bhopal 17 km (aerial distance) in South East Direction from Ch. 27 Kms.
13.	Seismic zone	Zone III (Moderate Damage Risk Zone)

2.3 Need of the project and its Importance to the country of region

The proposed project shall enhance and improve the current route between Bhopal and Indore. Commuters commuting between the route shall save both time and fuel. The existing route between Bhopal and Indore measures about 188 Kms which shall be reduced to approximately 146.88 km i.e. approx. 22% reduction in travel distance.

The Project will further have following benefits at national and regional level:

- **High-speed connectivity and access:** Proposed expressway will avoid traffic congestion and speed-up the freight movement.
- **Aiding economic growth:** The Project will reduce travel time and provide boost to trade and commerce linked to the regions connected through this expressway

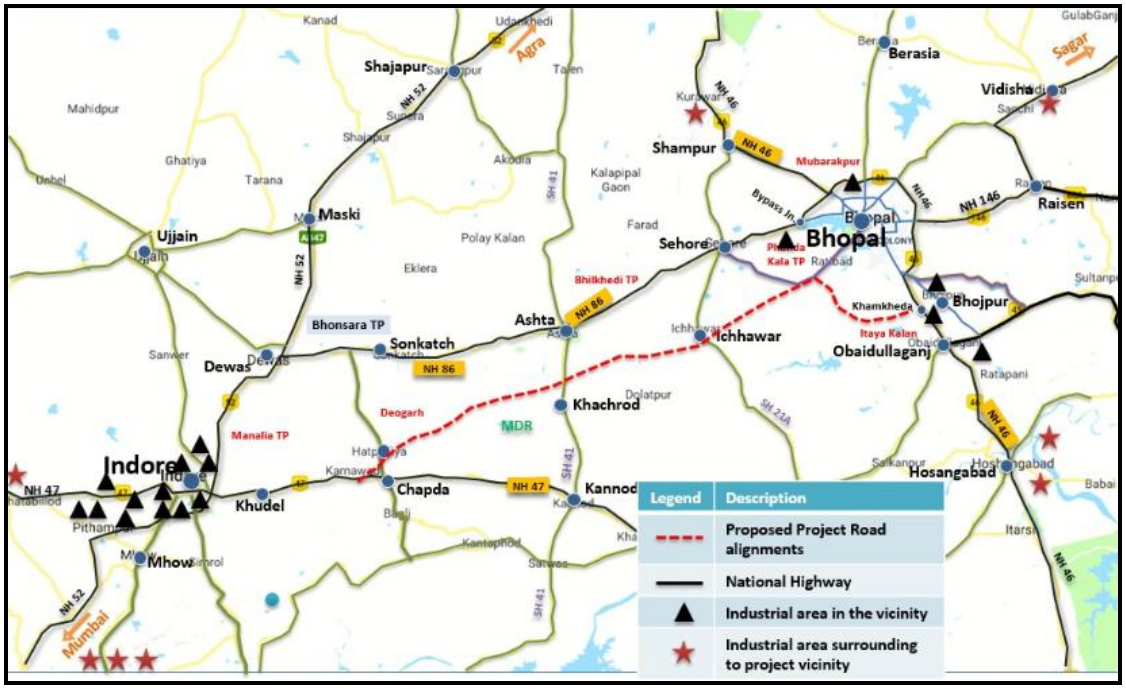

Figure 2-1 : Industries along the Bhopal Indore Corridor

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- **Decongestion of existing National and State Highways:** The proposed expressway will take away traffic pressures from existing SH and NH of the region. Long-distance traffic will shift to the proposed expressway, thereby leaving the NH and SH for regional and local usage.
- **Improved safety**: Due to access control, the Roadway & Travel Safety of the traffic connecting the cities will be enhanced due to minimum distractions & conflict zones.

2.4 Market Analysis

The proposed Project plans to link Bhopal and Indore via districts of Dewas and Sehore in Madhya Pradesh. The strong regional connectivity proposed through the Project will further increase regional trade and economic growth. The regions to be connected through the Project have their distinct economic profiles:

- Proposed Projects along the Bhopal-Indore corridor are given below:
    - *Pithampur-Dhar-Mhow* as a General Manufacturing Investment Region close to Indore city.[1]
    - Diamond Park in the village Rangwasa of Indore District. [1]

[1] *MSME, Development Institute, Indore, Ministry of MSME, Government of India, 'Industrial profile of Madhya Pradesh' (2014-2015).*

- Indore has Stone/*Gitti* as major mineral present in the district with annual production of more than 17,00,000 tonnes.[2]
- Six industrial clusters have been identified in Indore by MSME, DI Indore. These are Namkeen cluster, MPPMO Pharma cluster, Indore Pharma cluster, Plastic packaging cluster, Rechargeable Torch Cluster and Readymade Garment clusters. [2]
- There are several large scale industries/ public sector undertakings and numerous medium scale enterprises in Bhopal. The nature of the industries is varied and consists of agro-based, textile, leather, chemical, paper, rubber, mineral, metal, etc. [3]
- Several agro based export-oriented units are based out of Indore and Bhopal:
    - Indore: Potato, onion and garlic export zones
    - Bhopal: Wheat Durum and sharbati export units[1]
- 'Audoyogik Kendra Vikas Nigam' has developed Industrial units at 'Mandideep' and 'Pilukhedi' in Bhopal district and 'Pithampur sector 3' and 'SEZ Indore' in Indore district. [1]
- Dewas has more than 10,000 industrial units with more than 50 large scale industries. The major export items of the industries are Fabrics, Automobile parts, Pharma products, Machinery spare parts etc.[3]
- Sehore has Quartzite as major mineral present in the district with annual production of more than 38,000 tonnes (approximately).[4]
- VIT Bhopal University in Sehore district will attract traffic on the Bhopal-Indore corridor.
- Mhow is an important cantonment town in Indore District which has three Indian Army's premier training institutes. [2]

The corridor will provide efficient access to various markets by ensuring smooth flow of goods. The highway will also support the local businesses and economy along the project corridor. It will facilitate potential MSME clusters such as Agro based, Steel Fabrication, Soya products, chemical and allied products in Indore; leather goods, sports good, pharmaceuticals, Invertors and stabilizers, Automobile parts and Food Processing units in Bhopal etc. by streamlining transport of raw and finished material.

2.5 Demand & Supply Gap

The proposed expressway is expected to reduce the distance between Bhopal to Indore which measures about 188 Kms which shall be reduced to approximately 146.88 km i.e. approx. 22% reduction in travel distance, which will be leading to the following cost savings for the commuters:

- Vehicle Operation Cost
- Vehicle Maintenance Cost
- Cost of productivity

Future Traffic Estimations:

[2] *MSME, Development Institute, Indore, Ministry of MSME, Government of India, 'Brief Industrial profile of Indore District, Madhya Pradesh'.*

[3] *MSME, Development Institute, Indore, Ministry of MSME, Government of India, 'Brief Industrial profile of Dewas District, Madhya Pradesh' (2015-2016).*

[4] *MSME, Development Institute, Indore, Ministry of MSME, Government of India, 'Brief Industrial profile of Sehore District, Madhya Pradesh' (2015-2016).*

It is estimated that because of reduction in travel time and costs, more traffic will be diverted from the existing routes. Further, more traffic will be generated from the developments in the surrounding regions which will add to the traffic on the proposed corridor. The total estimated traffic along the five (5) Sections of proposed expressway includes diverted traffic, development traffic and induced traffic. Following is the estimated traffic that will ply across these sections of the project road:

Table 2-2 Projected Traffic

Year	Section 1		Section 2		Section 3		Section 4		Section 5		Average	
	Start Point NH-12 – Badjhiri		Badjhiri - Sehore Road (SH 53)		Sehore road (SH 53) - Ashta road (SH 41)		Ashta road (SH 41) - Garakhedi		Garakhedi - End point (Indore, NH 59A)		Average of Five Sections	
	Vehicles	PCU	Vehicles	PCU	Vehicles	PCU	Vehicles	PCU	Vehicles	PCU	Vehicles	PCU
2022-23	4918	12725	8286	16741	9675	18806	9379	18548	9394	18592	8,330	17,082
2024-25	6303	16431	10210	21052	11825	23456	11479	23152	11493	23196	10,262	21,457
2029-30	8680	22674	14286	29183	16623	32679	16115	32220	16132	32271	14,367	29,805
2034-35	10653	27762	18528	36774	21837	41740	21106	41061	21126	41120	18,650	37,691
2039-40	13214	34435	23990	46624	28545	53489	27535	52540	27558	52610	24,168	47,940
2044-45	16257	42367	30468	58292	36506	67415	35159	66137	35188	66223	30,715	60,087
2049-50	19600	50786	37786	71013	45514	82626	43780	80969	43813	81068	38,099	73,292

On an average, it is estimated that Average Annual Daily Traffic will be ~73,292 PCUs (Passenger Car Units) in the year 2049-50 on the proposed corridor.

2.6 Imports vs. Indigenous Production

The proposed project is an expressway and doesn't involve any manufacturing and production process. Thus, the section is not applicable for present project.

2.7 Export Possibility

The proposed project is an expressway and doesn't involve any manufacturing and production. Thus, the section is not applicable for present project. However, the connectivity improvements through the proposed Project shall have several indirect benefits. Proposed development will support freight traffic movement between various parts of Madhya Pradesh, thereby aiding faster movement to and from the connected region.

2.8 Domestic and Exports Market

Proposed expressway will connect State Capital with Indore City. Project is likely to provide better market reach local perishable product.

2.9 Employment Generation (Direct and Indirect)

The proposed project will generate employment opportunity to about **900 persons** during construction phase. It shall also generate additional employment opportunities in form of transportation of construction materials, greenbelt development and implementation of EMP.

During operations phase, the Project shall largely have indirect employment benefits in form of highway amenities and through economic & social hubs developed around the Expressway.

3 PROJECT DESCRIPTION

3.1 Type of the Project including Interlinked and Interdependent Projects, if any

The proposed project pertains to Development of 6-Lane Bhopal – Indore Green Field Expressway in the State of Madhya Pradesh. Proposed expressway shall start near *Itaya Kalan Village* on Bhopal Bypass at NH-12 and terminates at NH-59A near *Karnawad Village*. Total length of expressway measures about 146.880 km.

3.2 Project Location

Proposed expressway shall start near *Itaya Kalan Village* on Bhopal Bypass at NH-12 and terminates at NH-59A near *Karnawad Village*. Proposed expressway passes through 4 districts namely Raisen, Bhopal, Sehore and Devas.

Table 3-1: Project Coordinates

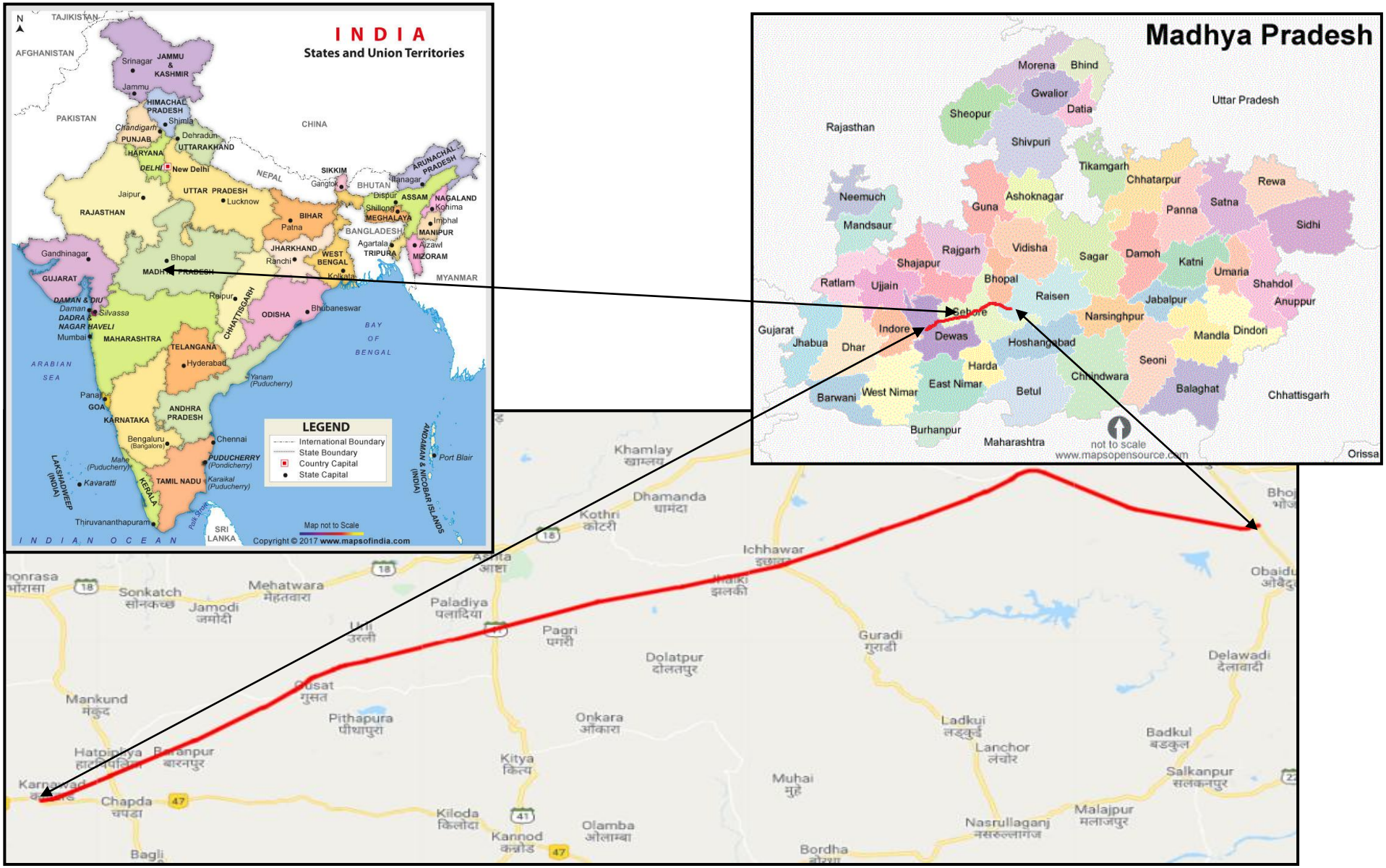
Sl. No.	Coordinates
Starting point	23° 3'52.70"N 77°32'26.97"E
Terminating point	22°42'58.44"N 76°13'44.44"E

Proposed expressway duly superimposed on Google Imagery is shown as Figure 1.

Location of the Project stretch is shown in the following figure:

Figure 3-1: Proposed Alignment

Figure 1: Location of the Project stretch



3.3 Details of Alternative Sites to be considered and basis of selection of proposed site

Four alternate alignment options were considered in order to finalise the proposed alignment. All the alignments were compared and the final alignment has been selected on the basis of minimum Land acquisition, tree felling, minimum cost and lesser environmental impacts. The detailed alternative analysis is enclosed as **Annexure-3.**

3.4 Size and Magnitude of Operation

The total length of the proposed road is approx. **146.88 km**. The proposed RoW shall be **70 meters.**

3.5 Project Description

The proposed project pertains to development of 6-Lane Bhopal – Indore Green Field Expressway in the State of Madhya Pradesh.

The location map of the project is shown in **Figure 1**.

3.6 Raw Materials, mode of transportation of raw materials and finished product

The Project entails development of a 6-lane expressway and will require road construction materials. Construction material like aggregates, sand, stone, etc. shall be procured from nearby approved quarries. Quantity of the construction material required for the proposed Project is given in table below.

Table 3-2: Raw Material requirement

Material Consumption			
S. No.	**Description**	**Unit**	**Quantity**
1	Earthwork	Cum	28501555
2	GSB	Cum	1336088
3	WMM	Cum	1234541
6	Bitumen	MT	62552.94
7	Emulsion	MT	5458.201
8	Cement	MT	183548.6
9	10 mm	Cum	321209
10	20 mm	Cum	406880.7
11	40 mm	Cum	204827.9
12	Dust	Cum	393967
13	Sand	Cum	207765.6
14	Filler	MT	17968.14
15	Steel	MT	30031.53
16	Water	KL	8732402

3.7 Resource Optimization / Recycling and Reuse

The Project will reuse the soil and other material in the following ways:-

- Topsoil from the agriculture land shall be stored separately for utilisation in avenue and median plantation

- The earth material excavated from the elevated area shall be used for backfilling of low laying area and embankment.
- Sewage shall be routed through portable STP or diverted into the soak pit. Treated water from STP will be used for sprinkling or gardening.
- Oil generated from Diesel Generator (DG) sets shall be properly stored in HDPE drums and to be sold to State Pollution Control Board (PCB) approved recycling vendor.

3.8 Water and Energy- Source and Availability

The total water demand of the project is 8732402 KL, which is inclusive of

- 85,94,027 KL for Construction purpose
- 1,11,375 KL for domestic consumption and utilities requirement
- 12000 KL for gardening/ green belt development
- 15000 KL for Dust Suppression

The water requirement for the construction phase will be met by water tankers from approved vendors. Bore-well, if required, will be operated after approval from the competent authority.

Power, during construction, will be sourced from local distribution company. DG sets as an alternative arrangement will also be arranged in construction camp.

3.9 Quantity of wastes to be generated and scheme for their management and disposal

Waste management shall be done as per Solid Waste Management Rules, 2016 and Construction and demolition waste Management Rules 2016.

Mostly municipal waste shall be generated by the workers in the construction camp.

The approximate quantity of wastes to be generated from the project is approx. 450 Kg per day. As per CPHEEO Norms, 500 grams of solid wastes is likely to be generated by per unit employee/worker.[5]

3.10 Schematic Representations of the Feasibility Drawings

Typical Cross Section Drawings are enclosed as **Annexure-5**.

4 SITE ANALYSIS

4.1 Site Connectivity

The proposed road shall connect two major cities of Madhya Pradesh i.e. Bhopal and Indore. The proposed expressway directly connects to various important roads and railway stations.

Proposed expressway shall start near *Itaya Kalan Village* on Bhopal Bypass at NH-12 and terminates at NH-59A near *Karnawad Village*.

[5] *Source-* *http://mohua.gov.in/publication/manual-on-solid-waste-management-systems-cpheeo-2000.php*

The nearby railway stations are Obaidullaganj Railway Station which is 9.3 km (approx.) in SE direction from Ch. 0.0 Km. and Mandi Dip railway station which is 4.3 Km (approx.) in the NW direction from Ch. 0.0 Km.

Rajabhoj International Airport, Bhopal is about 17 km in South East Direction from the Ch. 27 km.

4.2 Land Form, Use & Ownership

The land use of the proposed stretch is agricultural with patches of settlements and forest area. Majority of the land is owned by local farmers and other private stakeholders. However, there are patches which are owned by government as well.

4.3 Topography

The topography of the project stretch is undulating plain with varying elevations i.e. as low as 445 m AMSL to 597 m AMSL. Topographical variation of the proposed expressway alignment is shown in the following figure:

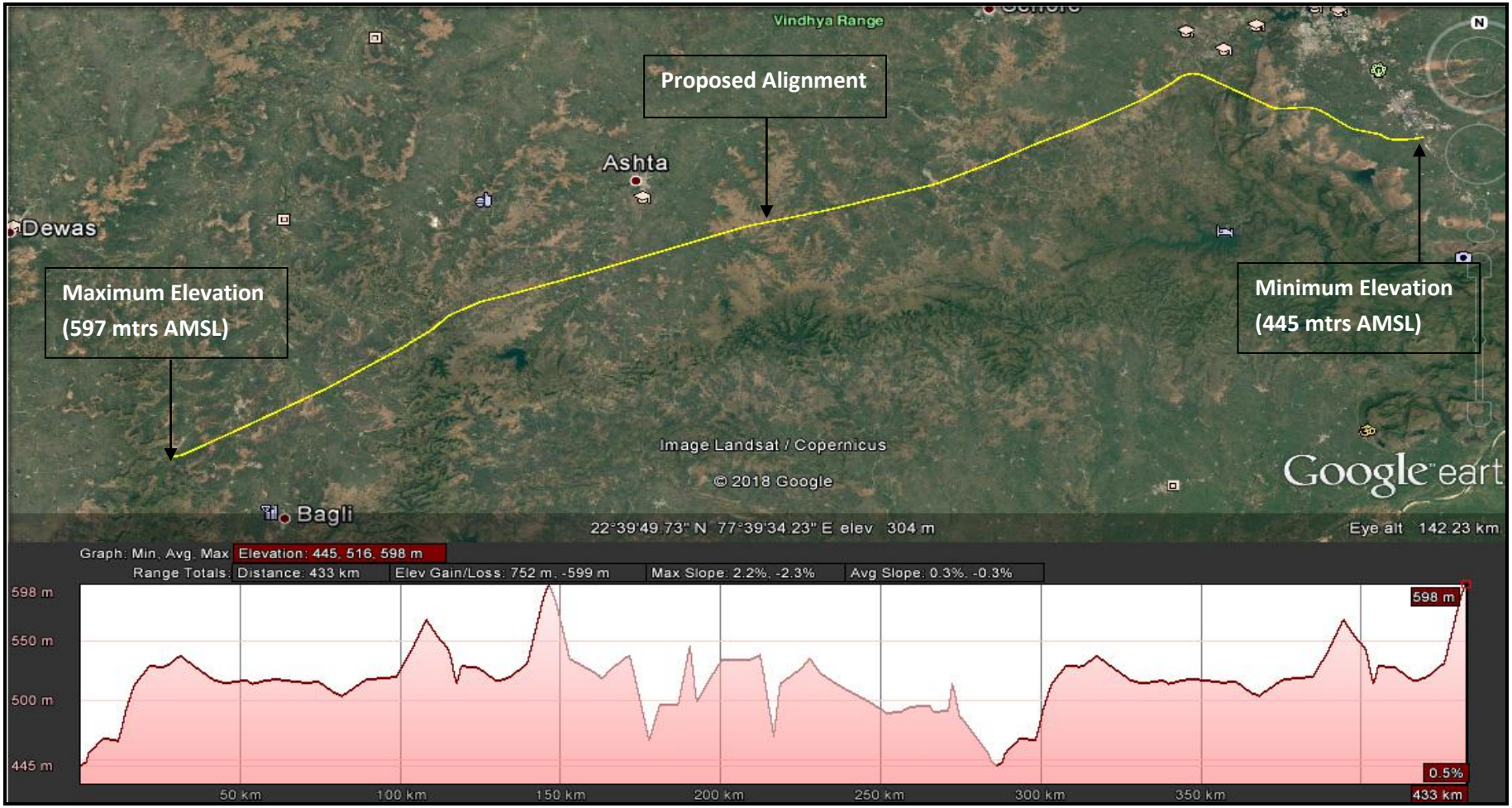


Figure 4-1: Topography of the project area

4.4 Existing Land-use Pattern

The land use along the proposed expressway is mostly agricultural land followed by forest and settlement area.

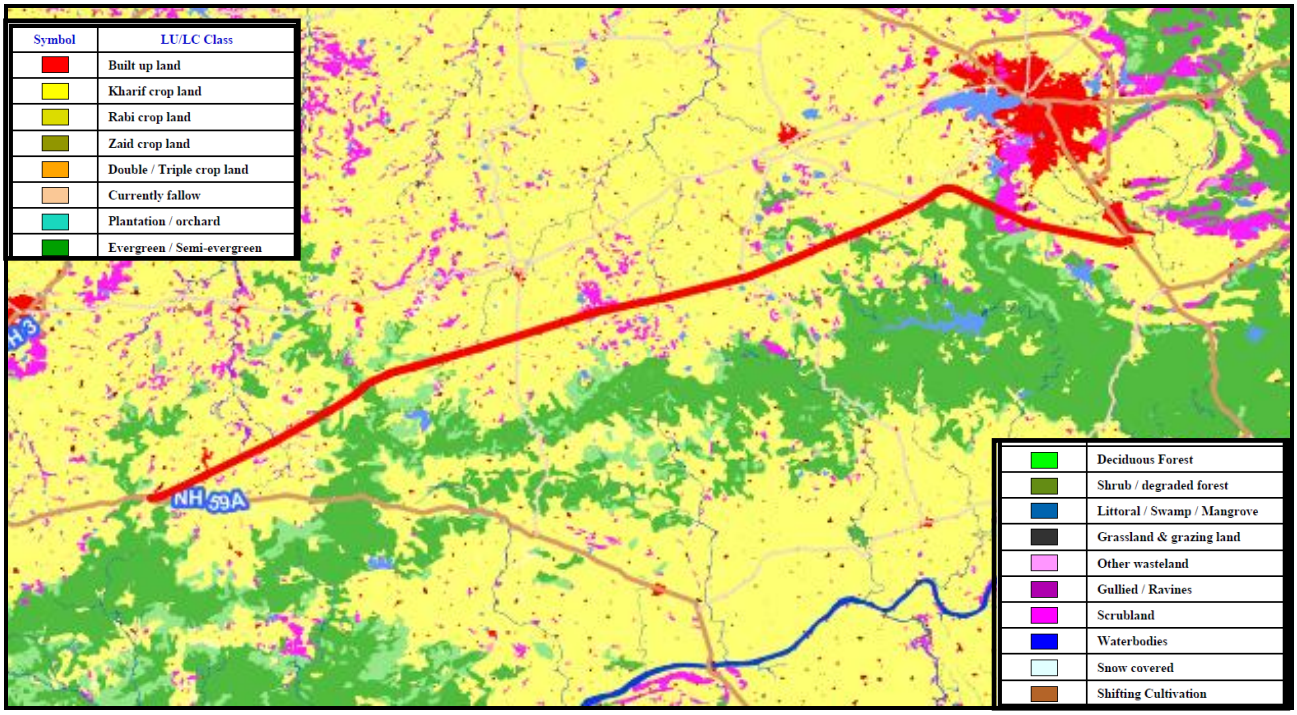


Figure 4-2: Land Use of the project area

(Reference- Bhuvan)

4.5 Existing Infrastructure

There are a few commercial and residential structures which fall in the proposed stretch. Detailed investigation shall be carried out during DPR Stage.

4.6 Soil Classification

Localized patches of alluvium cover occur along the banks of major and minor rivers and streams. Major part of the study area is covered by black cotton soil. Other types of soil are yellowish-red, mixed soils derived from sandstone and shale. In general, it is difficult to differentiate between alluvium and product of black cotton soil underlain by yellow clay with Kankar.

(Reference- CGWB booklet (Sehore and Bhopal))

4.7 Climatic Data from Secondary Sources

The climate of area around the proposed alignment is tropical. The average annual rainfall of the region is about 1110 mm. Most of the precipitation occurs in the month of August, averaging 352.1 mm. The temperature varies from 6.5°C to 43.7°C. The temperatures are highest in May, at around 43.7°C, whereas, January is the coldest month, with minimum temperatures of 6.5 °C. Indian Meteorological Dept. is operating 2 nos. of observatories in near vicinity of proposed highway alignment i.e Indore and Bhopal.

Considering close proximity of Bhopal, data of Bhopal observatory has been considered for pre-feassibility.

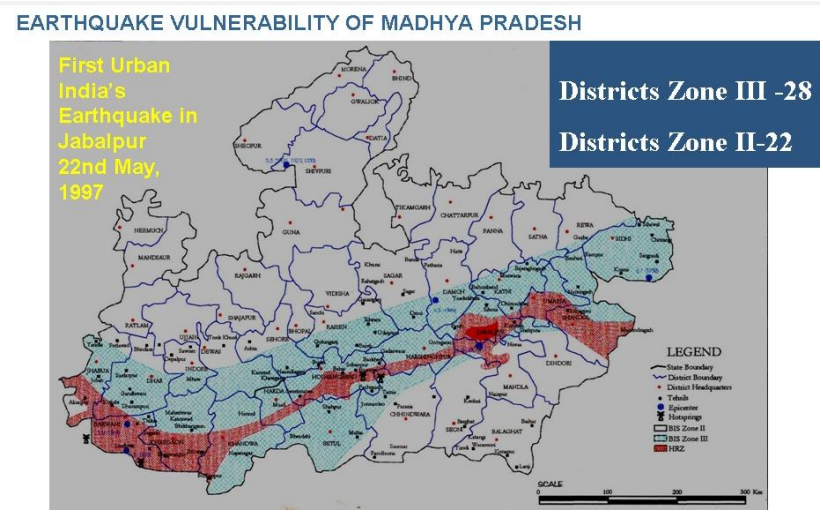
Table 4-1: Long-term (1981-2000) Climatological Conditions at IMD Observatory at Bhopal

Months / Parameter	January	February	March	April	May	June	July	August	September	October	November	December
Temperature (Min& Max)	6.5 - 30.3	8.1-33.4	12.7 - 38.5	17.3-42.1	21.9-43.7	21.8-42.8	21.3-35.8	21.2 - 32.7	19.9-34.3	14.9-35.1	10.9-32.4	7.3-29.9
Avg Humidity	64, 40	53, 30	38, 21	31, 18	39, 21	63, 45	84, 71	88, 78	81, 65	61, 42	56, 40	61, 40
Avg Wind Speed	6.3	7.1	8	10.1	12.1	13.5	12.1	10.7	8.1	5.7	5.6	5.3
Wind Direction	NE	NE	NE	NW	NW	NW	NW	NW	NW	NE	NE	NE
Precipitation / Rainfall (mm)	14.7	9.8	11.9	4.8	19.8	127.9	339.6	352.1	168.7	38.9	11.4	10.5

Reference- *IMD Climetological Table*

Review of above data presents that NE followed by NW are the predominant wind directions in the region.

Seismic Zone of the project road is II



4.8 Available Social Infrastructure

Few commercial and residential structures are likely to be affected due to proposed development. Detailed investigation shall be carried out during DPR stage.

4.9 Forest & Wildlife Area

The Forest areas involved in the proposed project are as follows:-

Table 4-2 Forest Area involved

Division	Block	Legal Status of Forest	Name based on Sol topo	Compartment Nos.	Start Chainage	End Chainage	length (km)	Length(m)	Area in Ha.
Bhopal	Samarda	Protected Forest	Bhopal PF	P222	16.400	18.100	1.700	1700	119000
Bhopal	Samarda	Protected Forest	Bhopal PF	P223	18.100	18.300	0.200	200	14000
Bhopal	Samarda	Protected Forest	Bhopal PF	P221	18.300	18.956	0.656	656	45920
Bhopal	Samarda	Protected Forest	Bhopal PF	P220	18.950	19.850	0.900	900	63000
Bhopal	Samarda	Protected Forest	Bhopal PF	215	19.850	21.620	1.770	1770	123900
Bhopal	Samarda	Protected Forest	Bhopal PF	212P	21.620	22.300	0.680	680	47600
Bhopal	Samarda	Protected Forest	Bhopal PF	216	21.620	21.84	0.220	220	15400
Bhopal	Samarda	Protected Forest	Bhopal PF	211P	22.300	23.100	0.800	800	56000
Bhopal	Samarda	Protected Forest	Bhopal PF	206	29.505	29.745	0.240	240	16800
Sehore	Sehore	Reserve Forest	Sehore RF	42	40.590	40.820	0.230	230	16100
Sehore	Sehore	Reserve Forest	Sehore RF	35	42.650	43.695	1.045	1045	73150
Sehore	Sehore	Reserve Forest	Sehore RF	34	43.965	44.700	0.735	735	51450
Sehore	Ichhawar	Protected Forest	Ichhawar RF	195	52.848	53.318	0.470	470	32900
Sehore	Ashta	Reserve Forest	Open Mix Jungle	113	100.872	102.648	1.776	1776	124320
Sehore	Ashta	Reserve Forest	Open Mix Jungle	112	103.138	103.450	0.312	312	21840
Sehore	Ashta	Reserve Forest	Open Mix Jungle	111	103.450	105.100	1.650	1650	115500

Division	Block	Legal Status of Forest	Name based on Sol topo	Compartment Nos.	Start Chainage	End Chainage	length (km)	Length(m)	Area in Ha.
Sehore	Ashta	Reserve Forest	Open Mix Jungle	110	105.100	106.15	1.050	1050	73500
Sehore	Ashta	Reserve Forest	Open Mix Jungle	107	106.150	107.122	0.972	972	68040
Dewas	Dewas	Reserve Forest	Umaria RF	76	112.65	113.45	0.800	800	56000
Dewas	Panigaon	Reserve Forest	Kamalpur RF	70	120.585	120.883	0.298	298	20860
Total							16.50	16504.00	115.53

Approx 115.53 Ha. of Forest land will require diversion. Ratapani Wildlife Sanctuary is located at a distance of approx 1.3km from the project expressway near Ch. 13.8.

5 PLANNING BRIEF

The proposed project is in the feasibility study stage. After the completion of feasibility studies and grant of ToR the Detailed Project Report shall be prepared. Detailed Project Report shall comprise of the complete planning brief of the project. The highlights of the same shall be provided in the EIA report.

6 PROPOSED INFRASTRUCTURE

6.1 Industrial Area

Not applicable

6.2 Residential Area

Not applicable

6.3 Green Belt

Greenbelt development shall be carried out as compensatory afforestation as well as avenue plantation on both sides of the highway and median for improvement of landscape and aesthetic view of the area. It shall be made sure the species to be chosen must be local and no alien species shall be introduced.

The area to be earmarked for avenue plantation shall be provided in the EIA report.

6.4 Social Infrastructure

Bus & truck lay Bye and rest areas with toilet facilities shall be developed along the proposed Project. Location of these facilities will be finalised after consultation with stakeholders.

6.5 Connectivity

The proposed project connects Indore to Bhopal and after crossing NH-12, SH41, and NH 47.

6.6 Drinking Water Management

Drinking water shall be arranged from local supplier and thus no permanent installation shall be required. It is estimated that a total of approximately 20250 KL water will be required for consumption of construction workers.

6.7 Sewerage System

Portable bio-toilets or septic tanks shall be provided for construction and operational workers.

6.8 Industrial Waste Management

Defunct machineries or parts of the mixing plants shall be stored at designated place before selling the scrap to an approved vendor.

6.9 Solid Waste Management

The solid waste generated from labour camp shall be in the form of municipal solid waste. The waste generated shall be segregated at site itself by provision of coloured bins. The wastes shall be collected from there and dumped in government designated sites. Waste management shall be done as per Solid Waste Management Rules, 2016 & and Construction and demolition waste Management Rules 2016.

In addition to the Sub-Clause 111.4 of MoRTH Specifications, The Contractor shall adopt the following Mitigation Measures.

- Control of Soil Erosion and sedimentation (Clause 306.3)
- Control of Water Pollution

The Contractor shall avoid construction works close to the streams or water bodies during monsoon. All precautionary measures shall be taken to prevent run-off during construction from entering into streams, water bodies or the irrigation channels. Oil interceptors shall be provided for vehicle parking, wash down and refuelling areas.

The Contractor shall adopt the following rules and regulations for effective Control of Solid and Liquid water Management

- Schedule VI - General Standards for Discharge of Environmental Pollutants, CPCB
- The Environment (Protection) Rules, 1986 and Water Act, 1974.
- Petroleum Act, 1934 and subsequent amendments
- Annexure ‘A’ to Clause 501 (Protection of Environment) of MoRTH Specification
- Construction and Demolition Waste Management Rule 2016
- Municipal Solid Waste Management Rule 2016

The Contractor is to ensure that there is good drainage at all construction areas, to avoid water accumulation.

6.10 Power Requirement—Supply & Source

The power required for the project shall be met from state electricity board and for backup purpose DG Sets will be provided as and when required.

7 REHABILITATION AND RESETTLEMENT PLAN

Project alignment mostly follows agriculture land followed by forest and settlement area. Land acquisition shall be undertaken as per the provision of LARR, 2013 and MP State govt. Rules and Regulations. Rehabilitation and resettlement plan will be prepared after detailed census survey during EIA Study and will be submitted in EIA Report.

8 PROJECT SCHEDULE AND COST ESTIMATES

The Project shall start its construction work after fulfilment of the following activities:

- Finalization and approval of Detailed Project Report
- Receipt of Environmental and Forest clearance from MoEF&CC.
- Selection and on-boarding of Contractor for implementation works

The completion period of the construction is estimated to be about 36 months.

The estimated total Civil Cost (2018-2019) of the project is about INR **2,942.56 Crores.** Detailed cost break-up and Project schedule shall be discussed in the EIA report.

9 ANALYSIS OF PROPOSAL

The benefits of the Project are multi-fold. It will substantially reduce the travel time between Bhopal and Indore and the other remote areas falling on the alignment. In addition to the improved connectivity, it will also provide a boost to the economic status of the villages / towns falling in the dedicated Project area.

Overall improvement will be expected in local area in terms of:

- Better connectivity to economic, social and political hubs of Madhya Pradesh
- Faster growth and outreach to better and improved facilities
- Fast and safe connectivity resulting in savings in fuel, travel time and total transportation cost
- Reduction in accidents
- Better approach to medical & educational services
- Faster transportation of perishable goods like fruits, vegetables, and dairy products
- Better opportunities for transporting, processing and marketing of agricultural products
- Development of local agriculture and handicrafts
- Development of tourism and pilgrimage
- Opening up of opportunities for new occupations and trade on the route
- Indirect and direct employment opportunity to people from all skilled, semi-skilled and unskilled streams
- Improved quality of life for people
- Development of backward areas through rapid industrialization and access to distant markets
- Creation of ancillary ecosystem through highway amenities, support services and industrial / manufacturing areas

Thus, as per the preliminary analysis and secondary data collected, the proposed project is financially, socially and environmentally feasible.