# Project Description

## PROJECT BACKGROUND

National Highways Authority of India (NHAI) is engaged in the development of national highways and as part of this endeavour, the authority has decided to upgrade Hapur – Moradabad section of NH-24 in the state of Uttar Pradesh under NHDP Phase V.

Project road is one of the important link between Delhi and Moradabad. The road passes through some of the major settlements like Hapur, Garh and Gajraula before connecting Moradabad from Delhi. The civil work for Delhi-Meerut Express-way is already under progress. The proposed development will connect Moradabad to Delhi via Delhi Meerut Expressway

## PROJECT DESCRIPTION

The project road starts from Hapur bypass on NH-24 in the district of Ghaziabad and ends at Moradabad district (NH-24) in the state of Uttar Pradesh. The project road passes through the districts of Hapur, Amroha and Moradabad of Uttar Pradesh State. The project road traverses through the villages / towns like Hapur, Babugarh, Garhmukteswar, Kuchesar road, Simbhaoli, Bihuni, Gajraula, Rajabpur, Joya, Sheonali, Neeli kheri, Buhanpur and Paikbara. The total existing length of project road is 99.250 km and design length is 99.867 km.

The present configuration of the road is from four Lane divided Carriageway to Six lanes divided carriageway. There are 06 intersections (Major and Minor) present along the project stretch.

## KEY TRAFFIC STUDY FINDINGS

Various traffic surveys and analyses have been carried out on the project road for addressing the objectives and issues pertaining to upgradation. The average daily traffic (ADT) has been converted to average annual daily traffic (AADT) using seasonal factors. The AADT is used as the input for various analyses like traffic forecast, financial analysis, capacity augmentation, pavement design, etc. Table below provides the ADT and AADT at four locations on the project road.

**Summary of ADT & AADT at Count Locations**

| S. No. | Location (Km) | ADT in PCUs | AADT in PCUs |
|---|---|---|---|
| 1 | 63.000 | 46621 | 43647 |
| 2 | 89.000 | 46734 | 43111 |
| 3 | 122.000 | 27816 | 25812 |
| 4 | 135.000 | 33914 | 31525 |

Traffic forecasting is made by use of economic models developed to co-relate past vehicle registration data and economic indices such as per capital income (PCI), net state domestic product (NSDP) and gross domestic product (GDP). By using the elasticity values obtained from the economic models and the likely rate of growth of indicators, the mode wise growth rates are obtained. By applying this growth rates, future traffic volume is estimated. The projected traffic details are given in Table below.

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**Projected sectional traffic (AADT) in PCUs for Most Likely scenario**

| Section | 2012 | 2016 | 2026 | 2036 | 2044 |
|---|---|---|---|---|---|
| I | 43647 | 52673 | 84668 | 136696 | 200923 |
| II | 43111 | 52117 | 83959 | 135615 | 199292 |
| III | 25812 | 31247 | 50468 | 81667 | 120144 |
| IV | 31525 | 38065 | 61221 | 98835 | 145237 |

## KEY ENGINEERING SURVEY FINDINGS

The detailed reconnaissance survey has been carried out to identify and plan various surveys and investigations. Topographic survey has been carried out using total station and auto level as per standards prescribed.

Pavement Investigations have been conducted comprising of inspection by pavement specialist, excavation of Trial pits with existing Pavement composition determination, and Sub-grade investigations.

The condition of the existing road varies from Good to Fair. The existing road is bituminous for the entire length and hence Benkelman Beam deflection survey has been carried out.

The material investigations have been carried out and various quarries / borrow areas have been identified and tested. The soaked CBR values of existing sub-grade soil and borrow area soil varies from 7.60% to 12.30% and 7.50 to 9.50% respectively.

For the purpose of Pavement Design a soaked Effective CBR of 8% is considered.

## DESIGN PROPOSALS

### Geometric design

The existing alignment is in plain terrain and adopted design speed as per IRC: SP: 84 - 2009 is 100 kmph. Geometric design viz. horizontal and vertical curves are being designed as per IRC: SP: 84-2009, IRC: 73 - 1980 & IRC: SP 23 - 1983.

### Alignment proposal

6 laning with divided carriage is proposed except the stretches, where Hastinapur Wildlife Sanctuary follows the project road. The highway stretch between Km 85.850 to Km 107.000 shall remain intact as per recommendation of sub-committee on Guidelines for roads in Protected Areas on dated 22nd December, 2014. No development is proposed in this part of Highway. Effective chainages for Forest Diversion proposal are as follows.

**HAPUR FOREST DIVISION**

**Total Chainage-** Km 50.000 to Km 93.048

**Bypass Chainage-** Km 50.000 to Km 79.000

**Hastinapur Wildlife Sanctuary-** Km 87.000 to Km 93.048

**Proposed Eco-sensitive Zone-** Km 86.000 to Km 87.000

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**EFFECTIVE CHAINAGE FOR FOREST DIVERSION PROPOSAL IN HAPUR DIVISON-** Km 79.000 to Km 85.850 (Limited 150m before Start of Eco-sensitive Zone)

**AMROHA FOREST DIVISION**

**Total Chainage-** Km 93.048 to Km 143.342

**Hastinapur Wildlife Sanctuary-** Km 93.048 to Km 105.700

**Proposed Eco-sensitive Zone-** Km 105.700 to Km 106.700

**EFFECTIVE CHAINAGE FOR FOREST DIVERSION PROPOSAL IN AMROHA DIVISON-** Km 107.000 (Limited to nearest milestone after Eco-sensitive Zone for easy identification) to Km 143.342

**MORADABAD FOREST DIVISION**

**EFFECTIVE CHAINAGE FOR FOREST DIVERSION PROPOSAL IN MORADABAD DIVISON-** Km 143.342 to Km 149.250

## Pavement Design

Flexible pavement has been recommended for entire length of the project road. The toll plaza area, rigid pavement has been recommended.

## Service Roads

The Service roads are proposed to be provided at locations of the project road where it is passing through urban areas. Service roads have been designed for 10 MSA (as per IRC SP: 87) for 8 % CBR.

## Truck Parking

Truck parking facility is proposed at Km 76.150 (Design Chainage) on both sides and at km 112.600 (Design Chainage) on both sides of the road. Flexible pavements as designed for the new carriageway of the project road section is proposed for these truck parking.

## PROPOSAL FOR STRUCTURES

## Major & Minor Bridges

Total proposed major bridges along project corridor are 7. Out of 7 major bridges, 3 major bridges are new construction on Bypass, for 3 major bridges one side is to be reconstructed and one side retained and for 1 major bridge extensive rehabilitation is to be done on one side and other side is retained with minor repair.

Total proposed minor bridges along project corridor are 14. Out of 14 minor bridges, 2 minor bridges are new construction on Bypass, 2 new minor bridges are to be provided on existing alignment for proposed canal, for 2 minor bridges one side is to be reconstructed and one side

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retained, for 1 minor bridge new parallel bridge is to be provided for main carriageway on one side, for 1 minor bridge new service road bridge is to be provided on both side and main carriageway bridge is to be retained, for 1 minor bridge new bridge is to be provided for one side main carriageway and service road, 1 minor bridge ( box structure ) is to be widened to cater both side service road and 4 minor bridges are completely retained with minor repairs.

### Underpasses

There are total 49 Underpasses along the project corridor. Out of 49 underpasses 15 are new VUP's, 13 are new PUP's, 14 are existing VUP's, 5 are existing CUP's and 2 existing PUP's. Out of 14 existing VUP's 6 are to be widened and 8 VUP's are to be retained, all (5No's ) existing CUP's are to be widened and 2 existing PUP's are to be retained.

### Culverts

There are total 69 culverts along the project corridor. Out of 69 culverts 46 are new proposed culverts and 23 are existing culverts. Out of 23 existing culverts 22 are to be widened and 1 culvert is to be retained. Out of 46 new culverts 23 are pipe culverts and 23 are box type culverts. Out of 23 existing culverts 15 are box culverts and 8 are pipe culverts.

### ROB

There is 1 ROB along the project corridor. New parallel structure is proposed on one side to cater 3 lanes traffic in either direction.

### COST ESTIMATION

The cost estimation for the project is extremely important as the viability and implementation of a project depends on the project cost. Therefore, cost estimates have been carried out with due care. Estimation of preliminary cost, a primary pre-requisite for financial evaluation, has been carried out for widening the existing road to a six lane divided carriageway including strengthening of the existing pavement, strengthening / widening of existing bridge structures, construction of new bridges, rehabilitation and reconstruction / widening of cross drainage structures, longitudinal drains, junction improvements, road furniture, bus bays, truck bays, way side amenities, toll plazas, etc. The total cost of the project is about INR 20,333,272,873.

It is concluded that the project is viable on DBFOT/BOT (Toll) format with 36% grant for a concession period of 18 years. Hence consultant recommends up-gradation of project highway, on BOT (Toll) mode for a concession period of 18 years.

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