Project Name : Improvement and Up-gradation of Existing Road (NH-731) to 4-Lane with Paved Shoulder from Km 88.750 to Km 123.650, Start of Shahjahanpur Bypass to Start of Shahabad Bypass of NH-731 on HAM basis of Shahjahanpur & Hardoi Forest Divisions & Districts in the state of Uttar Pradesh **(Total Length-34.900 Km of Package 2A)**

Project Description

Project Brief

Ministry of Road Transport & Highways (MORTH), an apex organization under the Central Government, is entrusted with the task of formulating and administering in consultation with other Central Ministries / Departments, State Governments / UT Administrations, organization and individuals, policies for Road Transport, National Highways and Transport Research with a view to increase the mobility and efficiency of the road transport system in the country.

Ministry of Road Transport and Highways through NHAI planned for improvement and up-gradation of Stretch of Palia, Shahjahanpur via Hardoi-Lucknow length 270 Km (in principle declared National Highways) in the State of Uttar Pradesh under package RO/LKO/DPR/I.P.NH/Pkg-VI.

The salient features of the project stretch of Palia, Shahjahanpur via Hardoi - Lucknow are described as follows:

- Project stretch connects major towns / settlements along Palia Kalan, Mailani, Khutar, Powayan, Shahjahanpur, Shahabad, Hardoi, Sandila, Lucknow, etc.
- Total length of the Project Highway alignment is 266.014 km
- Land use is predominantly agriculture.
- Forest stretch is situated near Mailani (14.645 Km)
- Existing corridor has bituminous pavement.
- Existing road between Palia Kalan and Shahjahanpur is 2-Lane carriageway (Package 1), Shahjahanpur and Hardoi is 4-Lane divided carriageway (Package 2), Hardoi to the district boundary of Lucknow is 2-Lane with paved shoulder (Package 3) and the existing road located in district of Lucknow is 2-Lane Road and is being developed to 4-Lane divided carriage way and is nearing completion (Package 4).

Bypasses are proposed to the alignment where it passes through congested and populated areas in the locations Khutar, Powayan, Shahjahanpur, Shahabad, Behta Dheera and Hardoi.

District map showing project alignment is shown in figure below.

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प०का०ई०—बरेली

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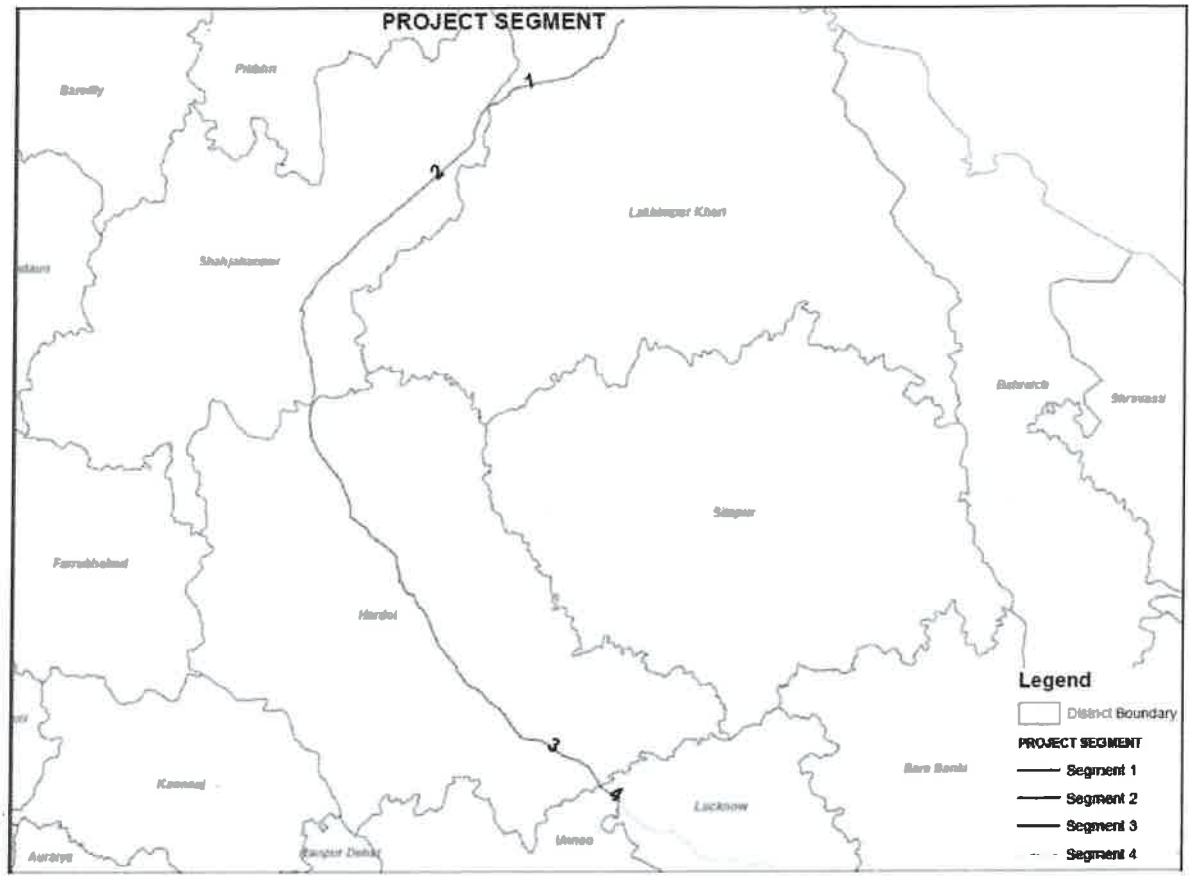

Figure1: Project Alignment in respect to Uttar Pradesh District Map

Present Status

The project stretch under discussion is Improvement and Up-gradation of Existing Road (NH-731) to 4-Lane with Paved Shoulder from Km 88.750 to Km 123.650 of NH-731, Start of Shahjahanpur Bypass to Start of Shahabad Bypass in Shahjahanpur & Hardoi Districts of NH-731 in the State of Uttar Pradesh under Shahjahanpur & Hardoi Forest Divisions of Uttar Pradesh State (Total Length–34.900 Km of Package 2A).

This site comprises of Four Lane with Paved Shoulder for the section of Shahjahanpur-Hardoi National Highway-731. The project road starts at Km 88.750, Paina Buzurg Village, and ends at Km 175.080, Udaranpur Village, Shahjahanpur & Hardoi Districts in the state of Uttar Pradesh. The abovementioned section of NH-731 is mostly running through plain terrain.

Existing NH-731 Road (Package 2A) was seeing by PWD with 32-60 m of ROW. In which, only 12-38 m ROW of NH-731 and 29-60 m ROW of NH-24 were used for existing road or roadway formation with FCA diversion. Remaining area was left for future purpose. Now NHAI is going to take care of this section and proposed for construction with upgradation of that section to 4-lane with paved shoulder.

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The linear plantation along the side of ***Shahjahanpur-Shahabad-Hardoi-Lucknow National Highway-731 Road was notified as Protected Forest Land vide Gazette Notification No. 1115/14-331-50, dated 10th February 1960, Pilibhit-Shahjahanpur Railway Line was notified as Protected Forest Land vide Gazette Notification No. 8109/XIV-2-503-77, dated 25th January 1979, and Bareilly-Lucknow National Highway-24 Road was notified as Protected Forest Land vide Gazette Notification No. 3208/14, dated 23rd August, 1955 of Uttar Pradesh Forest Department.***

Realignment and Bypasses

Three bypasses are proposed at Shahjahanpur, and Shehra Mau at Ch. 89.415 to Ch. 107.800, and Ch. 114.185 to Ch. 117.400 to avoid sharp curve and improving geometric deficiency.

Design Standards

The whole corridor traverses through plain and rolling terrain. Although in congested/populated areas it is sensitive in acquiring additional ROW, engineering preference has been given to concentric widening along the entire corridor.

At isolated locations like junctions, bypasses/realignments, rest areas, high embankments, entry and exit location of service road etc. more land has been proposed in order to accommodate these facilities.

The geometric design standards are adopted as per IRC: SP: 73-2015 and IRC: SP: 84-2014.

Widening schemes, proposed cross sectional elements, identification of the overlay sections for rehabilitation/strengthening of existing carriageway and new pavement stretches, drainage, service road provision and provision of the other components along the road have been developed as per IRC design standards. For structures, relevant IS/IRC design codes/guidelines have been followed.

For the design & construction of 4-Lane/6-Lane Highway sections, designer has referred to the latest IRC publications and NHAI circulars regarding design standards for National Highways in India. The relevant Indian and international design standards referred include:

- IRC: SP: 73-2015 "Manual of Specifications and Standards for Two Laning of Highways with Paved Shoulder".
- IRC: SP: 84-2014 "Manual of Specifications & Standards for Four Laning of Highways Through Public Private Partnership".
- Manual on Uniform Traffic Control Devices – 2009, a standard manual for road signing from United States Federal Highway Administration. Referred to introduce S-Curve signage (W1-4R and W1-4L) which is not provided in IRC 67 – 2012 Code of Practice for Road Signs (Third Revision)

Traffic

To establish the traffic characteristics along the project road, consultants have carried out 24 hour 7-day classified traffic volume count, intersection turning movement surveys, O-D surveys, willingness to pay surveys, pedestrian surveys, axle load surveys and speed-delay survey.

Traffic Volume as observed at different location in Package 2(A) is tabulated below.

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S. No.	Existing Chainage	ADT in PCUs	AADT in PCUs	Tollable (%)	Non-Tollable (%)
1	121.00	14635	16584	50.01	49.99

As per IRC: SP: 73-2015 "Manual of Specifications and Standards for Two Laning of Highways with Paved Shoulders" and IRC: SP: 84-2014 "Manual for Specifications & Standards for Four Laning of Highways through Public Private Partnership" are used for design service volume reference. Based on these guidelines, IRC: SP: 73 – 2018, capacity of 2-Lane highway is considered 10,000 PCU/Day as per the circular RW/NH – 33044/37/2015/S & R (R) dated 26th May 2016 and IRC: SP: 84 – 2014, capacity of 4-lane highway is considered 40000 PCU/Day (This capacity might be under revision, no circular was found) for level of service 'B'.

Capacity augmentation proposals (Lane requirement) – Projected traffic for each section is compared with design service volume mentioned in IRC: SP: 73-2015 and IRC: SP: 84-2014. Further capacity analysis is carried out for projected traffic and Capacity Augmentation Plan and Lane requirement is worked out on the basis of projected traffic levels.

Project shall experience traffic in the tune of 48154 in the year 2049-50 under most likely scenario.

Pavement

The design for new pavement of flexible as well as strengthening of existing pavement has been carried out as per IRC: 37-2012, "Tentative Guidelines for the Design of Flexible Pavements".

Moreover, existing carriageway is of flexible type and the widening proposed is concentric to avoid the high land cost in the case of eccentric widening, so it would be more convenient to construct & maintain the flexible pavement option. Therefore, it is recommended to use flexible pavement option for the project highway. For the reserve forest stretch, only overlaying to the existing pavement has been proposed.

Cross Drainage Structures

Major Bridge

S. No	Existing (km)	Type of Structure		Span Length (m)	No. of Spans	Total Length (m)
		Super Structure	Pier/Abutment			
1	131.705	Portal pier type abutment and masonry wall piers	Brick Masonry Piers	12+30+12+30+12	6	126

Minor Bridges

S. No	Existing Chainage (km)	Existing Type of Structure			No. of Spans with span length (m)
		Foundation	Sub-structure	Super-Structure	
1	112.284	Open Foundation	Brick Masonry Piers	RCC Slab	3x6 m

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Railway Level Crossings

S. No	Existing Chainage (km)	Remarks
1	95.7	ROB

Culverts

58 Culverts including Hume Pipe, Slab, Box Culvert, and Arch Culverts are designed along the project road.

Major Junctions

The details of the Major junctions are as follows:

S. No	Existing Chainage (km)	At grade	Separated	Category of Cross Road			
				NH	SH	MDR	Others
1	88.225	Yes	-		SH25		3x6 m
2	93.090	Yes	-		SH29		
3	100.484	Yes	-	NH24			
4	101.743	Yes	-		SH29		
5	102.550	Yes	-	NH24			
6	103.805	Yes	-		SH25		
7	120.087	Yes	-		SH25		

(NH: National Highway, SH: State Highway, MDR: Major District Road, & ODR: Other District Road)

Minor Junctions

30 nos. of minor junctions are designed within the proposed project road.

National Highways Authority of India (NHAI)

Place: Bareilly

(Amit Ranjan Chitranshi)
Project Director, Bareilly

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