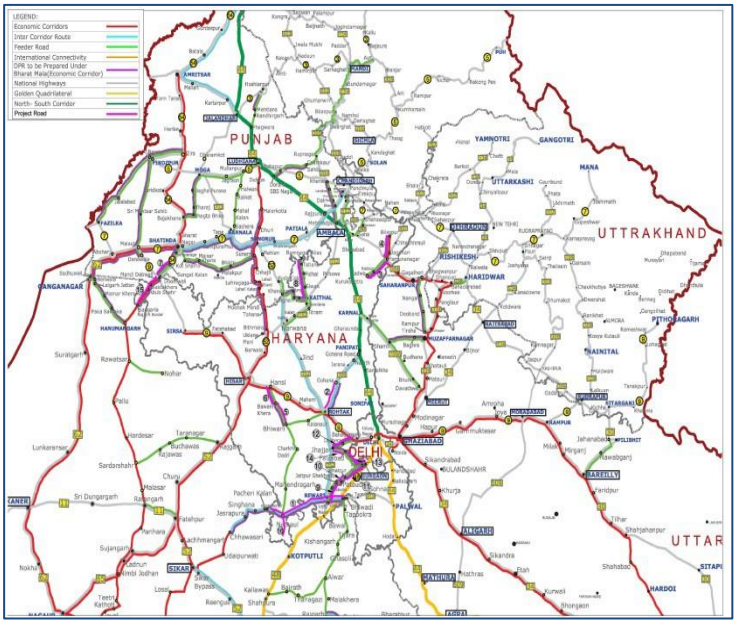
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority Of India
(Ministry Of Road Transport & Highways Government Of India)

Consultancy services for preparation of DPR for Development of Economic Corridors, Inter Corridors and Feeder Routes to improve the efficiency of Freight movement in India (Lot-2/Haryana/Package-1)



Project Report
(Package I)

October 2018

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Project Name ***4/6 lane of Paniyala Mor (NH-48Jn.) to Narnaul section of NH-148B and Narnaul to Pacheri Kalan section of NH -11 in the state of Haryana on Hybrid Annuity Mode***

Proposal No ***FP/HR/ROAD/38782/2019***

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Project Notes:

Project Name	***4/6 lane of Paniyala Mor (NH-48Jn.) to Narnaul section of NH-148B and Narnaul to Pacheri Kalan section of NH -11 in the state of Haryana on Hybrid Annuity Mode***
Proposal No	***FP/HR/ROAD/38782/2019***

1.1. General

The Ministry of Road Transport & Highways has taken up development of New Corridors and Feeder Routes to effectively improve road connectivity under the programme entitled "Logistic Efficiency Enhancement Programme" (LEEP) aimed to enhance the freight transportation in India through improving cost, time, tracking and transferability of consignments through infrastructure, procedural and information technology (IT) interventions.

RITES Ltd. in association with Matrix Geo Solution Pvt. Ltd. has been entrusted with the assignment of Consultancy services for preparation of Detailed Project Report for Development of Economic Corridors, Inter Corridors and Feeder Routes to improve the efficiency of freight movement in India under Bharatmala Pariyojna (Lot-2/Haryana/Package-1) vide NHAI Letter no. NHAI/ Planning/ EC/ 2016/ DPR/Lot-2/Haryana/Package-1/96917 and the Contract Agreement was signed on 24.04.2017.

1.2. Commencement of Service and Present Status

The present Project services were commenced on 24.04.2017 upon signing of the Contract Agreement and receiving letter of Commencement from the Client NHAI.

The project **"Bharatmala Pariyojna"** is a prestigious and one of the most important mandates by Government of India. The Bharatmala Pariyojna primarily covers / emphasizes the strategic importance for:

- Expanding existing road infrastructure to improve connectivity in the country through
  - Developing new economic corridors to improve connectivity to key centers, not connected by GQ and NS-ES corridor.
  - Upgrading key feeder routes to the existing national corridors and proposed economic corridor to enhance first and last mile connectivity
- Improving efficiency of existing and proposed corridors through
  - Alleviating local congestion due to city traffic on existing national corridors and proposed economic corridors through development of bypasses, ring roads etc.
  - Ensuring seamless inter-state freight movement by streaming the documents and processes at inter-state borders.
  - Developing logistics parks at strategic locations to enable freight consolidation and disaggregation.

The project mandate as per the Terms of Reference (TOR) is to establish the technical, economic and financial viability of the project and for development of Economic corridors, Inter-corridors and Feeder routes, as the case may be. These corridors are proposed for development to at least 4-lane access controlled, however, DPR for access controlled 6-laning may be required, in certain stretches, depending upon traffic.

Accordingly, upon award of the project, the Consultant made a sincere effort to identify the project road sections, its length and its functionability. Also, effort was made to collect the

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information on the project road section on development activities if any by the concerned department/division, since the project road sections are owned by several organization/agencies such as MoRT&H, B&R Haryana, City Municipal Gurugram, Haryana Urban Development Authority (HUDA) etc.

The Consultant team has conducted quick reconnaissance of the project and identified the pragmatic influence and their category and functionality to access the project area given below:

- Importance of the project road section.
- Functional ability after improvement.
- Implementation & development near project road envisaged by state/central bodies.
- Detailed discussion with the respective original custodian/PWD (B&R) of the particular road section to know the past history & present & futuristic development plan if any.

The findings/status of each project road section as per original contract has been deliberated in the draft inception report and in turn the road section finalized by the NHAI is indicated in **Table 1-1**: Project Road Details.

The Draft Inception Report and QAP of the Project was submitted to the Client NHAI on 27.06.2017. By the kind courtesy and timely intervention of CGM (Tech / RO), a meeting was arranged at NHAI, HQ on 28.06.2017 to finalize the routes.Based on technical discussions on draft inception report, **Minutes of Meeting was issued vide NHAI letter no. NHAI/Planning/EC/2016/DPR/Lot-/Haryana/Package-1/104328 dated 16.08.2017** finalising the project road sections for further engineering studies.

Final Inception Report (IR) and QAP was submitted by the Consultant on 25.08.2017 vide letter no. RITES/ HW/ RT300-00036/ NHAI/ DPR/ 2016 incorporating the instructions/ comments raised by the Client vide letter no. NHAI/ Planning/ EC/ 2016/ DPR/ Lot-/ Haryana/ Package-1/ 104328 dated 16.08.2017. The submission of Final Inception Report (IR) is in compliance with **"Stage 1, Clause 10.1 and 10.2 of Terms of Reference (ToR)."**

The project road sections are mainly present in Haryana state while some of the road sections are present in adjoining states of Punjab & Rajasthan.

The present report is submitted in accordance with the Stage 2 (Clause 10.3) of Terms of Reference incorporating various suggestions given by the client NHAI.

1.3. Details of Project Road Sections

The project road sections mainly present in Haryana state while some of the road section present in adjoining states of Punjab & Rajasthan.

Start & End of the each project road section were deliberately discussed during detailed technical discussions. Existing 4 lane road sections were deleted for further engineering studies while road sections from Narnaul to Nangal Chaudhary, Nangal Chaudhary to Paniyala mor (NH-48 jn.) & Hansi to Moonak were added in the present scope of work. The details of final project road sections under Bharatmala Pariyojna (Lot-2/Haryana/Package-1) as per MoM issued vide NHAI letter dated 16.08.2017 and 20.10.2017 for further engineering studies is tabulated as under:

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TABLE 1.1. ALIGNMENT ROUTE PROPOSED FOR EFFICIENT FREIGHT MOVEMENT

S. No.	Classification	Name of Corridor	Road ID (ToR)	Start Point	End Point	Road Length as per ToR (Km)	Revised Road Length for DPR* (Km)	Revised Road ID	Remarks
1	Inter Corridor	Gurgaon - Sikar	NH-919	Khaliawas (Rewari)	Pacheri Kalan (Haryana/ Rajasthan border)	97.00	97.00	NH-11	-
2	Inter Corridor	Rohtak - Sonepat	SH-18	Rohtak	Gohana	24.79	-	NH-709	**Road section deleted.** (Existing 4 lane configuration)
3	Feeder Route	Bilaspur-New Delhi	SH-06	Ladwa	Yamuna Nagar	26.14	-	SH-6	**Road section deleted.** (DPR work is already awarded by IAHE)
4	Feeder Route	Bilaspur-New Delhi	SH-18	Bilaspur	Yamuna Nagar	22.40	22.40	NH-907G	
5	Feeder Route	Bhiwani-Narnaul	SH-17	Bhiwani	Bawani Khera	21.73	21.73	NH-148B	
6	Feeder Route	Bhiwani-Narnaul	SH-17	Bawani Khera	Hansi	21.14	21.14	NH-148B	
7	Feeder Route	Bhatinda-Mandi Dabwali	NH-54	Doomwali	Sangat Kalan	19.26	19.26	NH-64E	
8	Feeder Route	Patran- Kaithal + Branches)	SH-11	Kaithal	Ram Nagar alias Bakshiwala	37.99	37.99	NH-352A	
9	Feeder Route	Gurgaon - Pataudi - Rewari	SH-26	Vijay Nagar	Jaitpur Shekhpur	16.03	16.03	NH-352W	
10	Feeder Route	Gurgaon - Pataudi - Rewari	SH-26	Jaitpur Shekhpur	Jamalpur	17.94	17.94	NH-352W	
11	Feeder Route	Gurgaon - Pataudi - Rewari	Pataudi Rd.	Jamalpur	Shakti Nagar	20.76	20.76	NH-352W	
12	Feeder Route	Delhi-Sirsa(Branch to Jhajjar)	SH-22	Jhajjar	Bahadurgarh	23.47	23.47	NH-352R	
13	Feeder Route	Gurgaon - Jhajjar	MDR 136	Gurgaon	Faizabad	26.03	-	MDR-136	**Road sections deleted.** (Existing 4 lane configuration)
14	Feeder Route	Gurgaon - Jhajjar	MDR 123	Faizabad	Jhajjar	11.55	-	MDR-123	
15	Feeder Route	Nagaur -Mandi Dabwali	SH-54	Sangaria (Rajasthan/ Haryana border)	Mandi Dabwali	34.90	34.90	NH-54	
16	**Economic**	**Narnaul - Nangal Chaudhary**	**MDR-129**	**Narnaul**	**Nangal Chaudhary**	**-**	**20.30#**	**NH-148B**	**Additional Road sections**

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S. No.	Classification	Name of Corridor	Road ID (ToR)	Start Point	End Point	Road Length as per ToR (Km)	Revised Road Length for DPR* (Km)	Revised Road ID	Remarks
	Corridor								**conveyed through Minutes of Meeting issued vide NHAI letter no. NHAI/Planning/EC/2016/ D PR/Lot-**
17	**Economic Corridor**	**Nangal Chaudhary – Paniyala mor (NH-48 Jn)**	**MDR-129**	**Nangal Chaudhary**	**Paniyala mor (NH-8 Jn.)**	**-**	**18.00#**	**NH-148B**	
18	Feeder Route	Hansi – Moonak		Hansi	Moonak	-	75.00#	NH-148B /NH-52	Additional Road section conveyed through NHAI letter no. NHAI/Planning/EC/2016/DPR/Lot-2/Haryana/Package -1/107514 dated 20.10.2017
19	Economic Corridor	Extended Nangal Chaudhary Bypass (Nizampur Link Road)	-	Nangal Chaudhary bypass end	Nizampur – Nangal Chaudhary road (km 1.3)	-	2.7	NH-148B	Nangal Chaudhary extended bypass
Total						**421.13**	**448.62**		

Note: * *Revised Road Length for DPR as per Minutes of Meeting issued vide NHAI letter no. NHAI/Planning/EC/2016/DPR/Lot-2/Haryana/Package -1/104328 dated 16.08.2017 and NHAI/Planning/EC/2016/DPR/Lot-2/Haryana/Package -1/107514 dated 20.10.2017.*

\# *The **road section S. No. 16 Narnaul–Nangal Chaudhary, S. No. 17 Nangal Chaudhary –Paniyala mor (NH-48 jn.)** & **S. No. 18 Hansi - Moonak** are included as additional roads and these are to be developed as Feeder route.*

Sl. 16 and 17 is the project for which forest clearance is online submitted.

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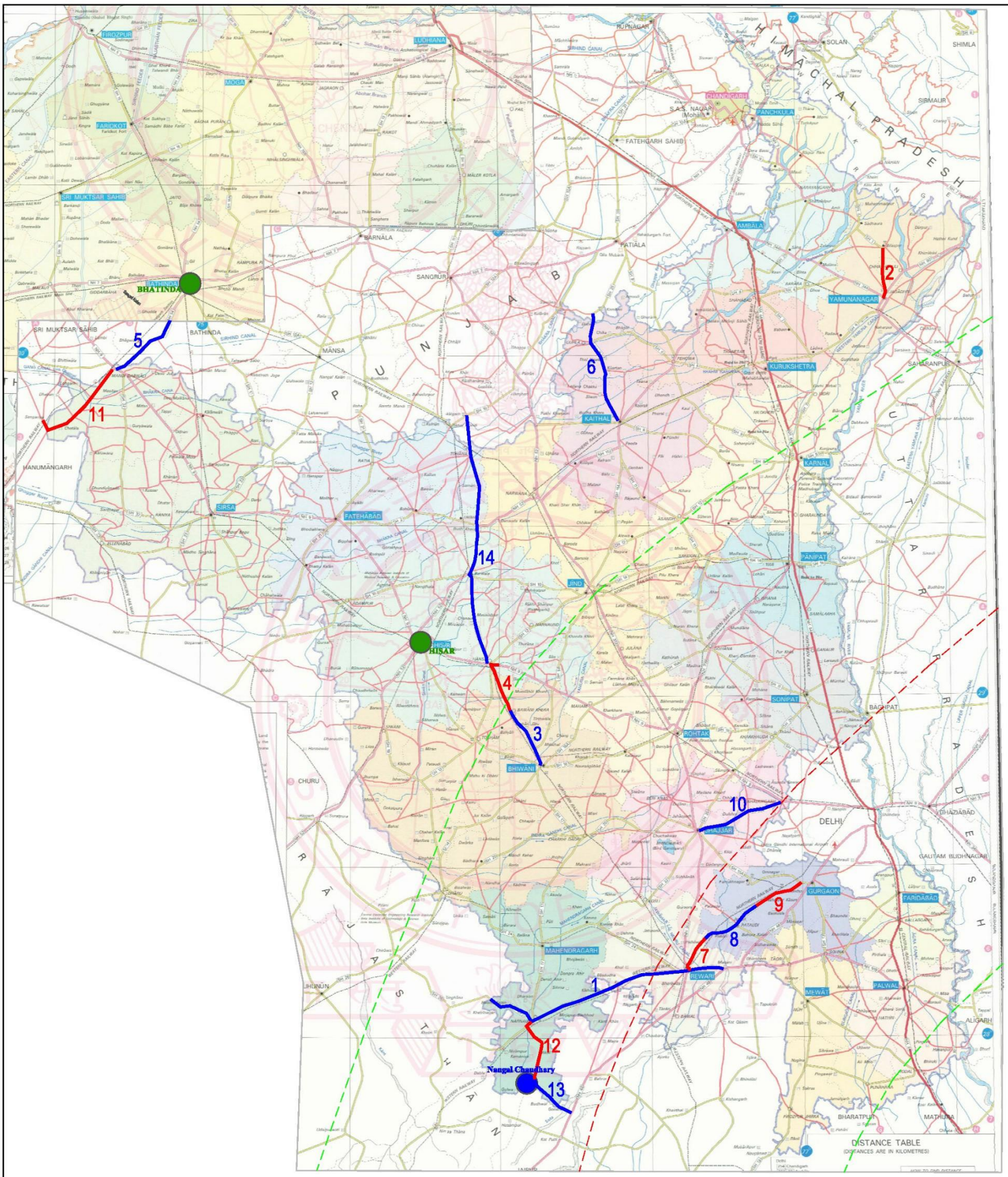
Figure 1.1: Project Location Map



Legend:

- DFC Alignment
- Zone of Influence
- Logistic Park developed by MORTH & NHAI
- Logistic Park developed by DMICDC

Sl. No.	Road Name	Road ID	Length (Km) as per MoM dated 16.08.17
1.	Khalawas (Rewari) - Pacheri Kalan (Haryana-Rajasthan Border)	NH919/NH11	97.0
2.	Bilaspur - Yamuna Nagar	SH1	22.4
3.	Bhiwani - Bawani Khera	NH148B	21.73
4.	Bawani Khera - Hansi	NH148B	21.14
5.	Doomwali - Sangat Kalan	NH64E	19.26
6.	Kaithal - Ramnagar Alias Bakshiwala	NH352A	37.99
7.	Vijay Nagar - Jaitpur Shekhpur	SH26	16.03
8.	Jaitpur Shekhpur - Jamalpur	SH26	17.94
9.	Jamalpur - Shakti Nagar	SH26	20.76
10.	Jhajjar - Bahadurgarh	SH22	23.47
11.	Sangaria (Rajasthan / Haryana Border) - Mandi Dabawali	NH54	34.9
12.	Namaul - Nangal Chaudhary	NH148B	20.3
13.	Nangal Chaudhary - Paniyala mor (NH48 Jn.)	NH148B	18.0
14.	Hansi - Moonak	NH148B/NH52	75.0
		Total Length (Km) =	**445.92**

NATIONAL HIGHWAYS AUTHORITY OF INDIA	Consultancy Services for prepration of DPR for Development of Economi Corridor, Inter corridor, Feeder Routes to improve the efficiency of freight movement in india. (LOT-2/HARYANA/Package-1)	Drg. No.	RITES/HW/RT300-00036	Location Map	Drawn by:	Revision No.- R2 Date : Oct 2017	RITES LIMITED (A GOVT. OF INDIA ENTERPRISE)
		Scale	Not to scale		Designed by:		
					Checked by:	Approved by:	

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1.4. Project Description

The project road under this study is the section of **NH-11 starting from Rewari to Pacheri Kalan (Rajasthan/Haryana border)** and **NH-148B starting from Narnaul – Nangal Chaudhary – Paniyala mor (at NH-48 Jn)**. The project road has intermediate 2-lane / 2-lane with paved shoulder configuration with flexible pavement. This is the one of the important route connecting Delhi through Rewari to Rajasthan.

The Project stretch has been divided into four (4) packages to understand each stretch package wise. Details of which is as follows:

- *PACKAGE I: Proposed Narnaul bypass crossing to Paniyala mor (at NH- 48 jn.)=31.24 Km*
  Extended Nangal Chaudhary Bypass = 2.76 Km
  Proposed Narnaul Bypass crossing to Pacheri Kalan (NH-11) = 11.30 Km
  *(Forest proposal is online submitted **FP/HR/ROAD/38782/2019**)*
- **PACKAGE II:** Proposed Narnaul Bypass = 24 Km
  Proposed Bachhod realignment = 2.5 Km
  Proposed Ateli Mandi bypass = 6.6 Km
  Existing road = 4.4 Km (1.4 Km + 3.0 Km)
- **PACKAGE III:** Rewari To Ateli Mandi of NH-11 (Ex. Km 13 to Km 44) = 31 Km
- **PACKAGE IV:** Proposed Rewari Bypass = 14 Km

1.5. Road Inventory

The height of embankment varies from 0.5 m to 2 m. The embankment height is more at the approchs to the structure. At some locations the embankment is even less than 0.5 m leading to the local drainage problems.

The Summary of important features along the project road section is tabulated as under:

TABLE 0-2 : EXISTING ROAD DETAILS

S. No.	Project Road		Road ID	RoW (m)	Road Width (m)		Shoulder (m)		Minor Bridge	Major Bridge	Culvert	Railway Crossing	Causewa
	Start point	End Point			Formation Width	Type	Width	Type					
1	Rewari	Narnaul	NH-11	28-30	10	2 - Lane			1	-	15	1	-
2	Narnaul	Pacheri Kalan	NH-11	28-30	10	2 - Lane			1	-	4	-	1
3	Narnaul	Paniyala Mor (at NH-48 Jn.)	NH-148B	25-30	10	2 - Lane			2	-	14	1	1

TABLE 0-3 : EXISTING VILLAGE (BUILT UP AREA) DETAILS

SI. No.	Project Road		Road ID	Name of Village	Start Ch. (Ex.)	End Ch. (Ex.)	Length (Km)
	Start	End					
1	**Rewari**	**Narnaul**	**NH-11**				
				Rewari	0+000	10+000	10

				Khori	18+800	19+800	1

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SI. No.	Project Road		Road ID	Name of Village	Start Ch. (Ex.)	End Ch. (Ex.)	Length (Km)
				Teent	23+420	23+700	0.28
				Gothra	23+700	24+200	0.5
				Pali	25+100	25+600	0.5
				Nandha Medha	27+300	27+600	0.3
				Majra	28+600	29+400	0.8
				Kund	30+640	31+930	1.29
				Manethi	32+000	32+600	0.6
				Padla	32+600	33+300	0.7
				Kathuwas	36+500	37+600	1.1
				Chandpura	39+100	39+700	0.6
				Sujapur	40+200	40+400	0.2
				Gokulpur	43+700	43+900	0.2
				Uninda	45+300	46+000	0.7
				Dhuninda	46+000	47+000	1.0
				Ateli	47+000	48+900	1.9
				Bachhod	51+900	53+600	1.7
				Sarain Bahadur	55+100	55+600	0.5
						Total	**23.87 Km**
2	**Narnaul**	**Pacheri Kalan**	**NH-11**				
				Narnaul	58+000	64+000	6.0
				Hamidpur	70+800	71+300	0.5
				Khatoti Khurd	73+100	73+800	0.7
				Godh Balawa	77+000	77+600	0.6
				Badawa	78+400	79+000	0.6
						Total	**8.4 Km**
3	**Narnaul**	**Paniyala Mor**	**NH-148B**				
				Narnaul	0+000	4+000	4.0
				Dhani Bhatota	9+800	10+800	1.0
				Totaheri	12+900	13+200	0.3
				Bhojawas	13+200	13+700	0.5
				Akbarpur	15+200	15+700	0.5
				Mohanpura	20+500	20+900	0.4
				Nangal Chaudhary	20+900	22+900	2.0
				Nangal Nunia	25+900	26+600	0.7
				Raimalikpur	34+200	34+600	0.4
				Kaluhera	37+800	38+500	0.7
						Total	**10.5 Km**

TABLE 0-4 : PAVEMENT CONDITION DETAILS

SI. No.	Condition	Rewari – Narnaul Section (NH-11)	Narnaul - Pacheri Kalan Section (NH-11)	Narnaul – Paniyala Mor Section (NH-148B)
1	Good	-	-	-
2	Fair	55.4 %	53.4%	69.7%
3	Poor	21.8%	33.9%	24.0%

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SI. No.	Condition	Rewari – Narnaul Section (NH-11)	Narnaul - Pacheri Kalan Section (NH-11)	Narnaul – Paniyala Mor Section (NH-148B)
4	Very Poor	23.3%	12.7%	6.4%

The project road passes through various habitations, settlements and towns. Also, many other important cross roads joining the project road at different locations. The typical arrangement shall be in lines with Type Design for Intersections on National Highways Ministry of Surface Transport (Roads Wing):1995. Detailed design of junctions would be taken up during detailed design.

The details of junctions are as follows:

TABLE 0-5: LIST OF JUNCTIONS ALONG REWARI – NARNAUL SECTION (NH-11)

Rewari-Narnaul			
Details of Cross Roads (Ex. Chainage)			Remarks
L.H.S	R.H.S	C-Way type & Width	
19+908		3.5m (BT)	Cross Road towards Dhamlawas. Slab culvert at 15.993 (size 1x1.0m)
16+175		3.5m (CC)	Cross Road towards Sundroj villlage.
17+675		3.5m (BT)	Towards Village
	18+275	3.5m (BT)	Towards Rajpura
19+006 19+050		5.5m BT (19+006) 5.5m BT (19+050)	To bajrana Village (19+006) To Harjipur & Kundal (19+050)
	20+225	5m (BT)	To Khori Village
	20+890	3.5m (BT)	To Teent village
21+740		3.5m (BT)	To Bawana Gujjar.
	22+875	5.5m (BT)	To Mamadia Asmpur
23+175		3.5m (Gravel)	To Gothra
	23+555	3.5m (Gravel)	To Gothra Village
25+230		3.5m (BT)	To Pahra Pali; 25+315 to 25+360 - LC no.13 Pali station Crossing/ DFC crossing)
	25+390	3.5m (Gravel)	Towards village/farm area
25+750		2m (Gravel)	Inside village area
	28+125	5m BT	To Nandha
	30+800	3.5m Gravel	To Police Chowki & Temple
31+290	31+290	5.5m BT	To Kund Railway station (LHS) To Mandola village (RHS)
32+025	32+030	5.5m BT	To Village (LHS) To Manethi (RHS)
32+650		7.0m BT	To Behror
	33+050	5m BT	33.025 - Kailash Hospital; Cross Road to Inside village area
	33+460	6.5m - BT	To Bhaujas village
	35+560	3m (Gravel)	To village Hudiya Khurd
36+740		6m - CC Road	To Logistic Park
37+050	37+050 (ER); 37+060 (BT)	LHS- 3.5m (Gravel); RHS- 3.5m (ER), 5.5m (BT)	Gravel road to inside village; ER road to Huriya Khurd, BT road to Huriya Kala
	37+200	2m (Gravel)	To village area
37+525	37+520	3m (LHS)- CC road; 3m (RHS)- Interlock bricks	Both to village farms & houses; 37.500 - Slab Culvert size(1x3.5m)
38+760		3.5m (BT)	Cross Road to Bajadh village; 38.775- Police Station

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Rewari-Narnaul			
Details of Cross Roads (Ex. Chainage)			Remarks
L.H.S	R.H.S	C-Way type & Width	
			(LHS)
	39+620	5m BT	To Ganiyar Vill.
	43+770	5.5m BT	To Bocharia Vill.
45+530		5m CC Block road	To Ateli & Bakepur vill.
45+580		5m CC Block road	To Uninda vill.
46+500		5m C/C	To Mandi
46+500		5m C/C	To Mandi
	48+430	6m BT	To Khor
48+630		5m BT	To Tobra
49+280	49+280	5.5m(LHS)-Gravel 2.5m (RHS)-BT	To Fatehpur(LHS) To Village(RHS)
49+800		4m BT	To Behrodh
52+510 52+580	52+510	52.510-6m Interlocking (LHS) to Bachhod 52.510-6m ER (RHS) to Tigra	52.580-3m to Village Area Bachhod
	52+995	6m BT	To Guani and Seema village
53+305		5m- BT	To Kunjpura
	55+240	3.5m - BT	To Surani village

TABLE 0-6: LIST OF JUNCTIONS ALONG NARNAUL-SINGHANA SECTION (NH-11)

Narnaul Singhana Road			
Details of Cross Roads (Ex. Chainage)			Remarks
L.H.S	R.H.S	C-Way type & Width	
70+400		BT (3.5m)	Rama & Krishna Institute
	71+750	3.5m (BT)	To Bapdoli & Nangal Khata
	72+275	3.5m (BT)	To Dhormohanpur
73+675		5m (BT)	To village Bhakhri
75+720		3.5m - Gravel	To village area
76+165	76+175	3.5m- BT (Both)	RHS road to Ag farms; LHS road to Krishna Nagar; 76.175- Indian Oil Petrol Pump (LHS)
77+225	77+250	7m - CC tiles (Both)	RHS-Godh village; LHS- Balawa

TABLE 0-7: LIST OF JUNCTIONS ALONG NARNAUL – PANIYALA MOR SECTION (NH-148B)

Narnaul-Paniyala Mor			
Details of Roads**			Remarks
L.H.S	R.H.S	C-Way type & Width	
8+100		3.5m BT	Mandi
9+025	9+025		Road to Ag land both sides
10+280	10+260	BT5m(L) ER2.5m®	
11+400		7.0m BT	To Kavai Village and meeting to Behror
12+750		3.5m GR	To Village
	13+375	3.5m GR	to Village
13+695		5.5m BT	13.625 Pipe Culvert (7*0.9m) road towards Nangli and Nehru Nagar village
15+600	15+600	Brick 5.5m (L) BT3.5m®	(L) to Akbarpur ® to Pipanangal
15+675		3.5m BT	to Akbarpur
17+500	17+500	3.5m (L) 3.5m®	to village Sirohi Bahali(L) to village Biharipur®

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Narnaul-Pa niyala Mor			
Details of Roads**			Remarks
L.H.S	R.H.S	C-Way type & Width	
18+300	18+300	3.5m ER(L) 3.5m BT®	to village Sirohi Bahali on LHS to village Nangal Kalia on RHS
	18+775	4m GR	to Nizampur
19+975		3.5m CC	Dhani Bandhawali
24+650	24+650	3.5m(L) 5.5m BT ®	Towards goshala(L) Towards Nolpur ®
28+535	28+535	3.5m(L) -BT 3.5m® - Gravel	L.H.S road to Banihardi, R.H.S road to Amarpura
29+450	29+450	3.5m(L) 3.5m® - BT	L.H.S. road to Nareda (Raj.) & R.H.S road village.
35+340		5m- CC	To Goneda Village
35+790	35+775	5m- BT ®; 5m- CC (L)	To Chechika Nangal (RHS); To Goneda (LHS)
	35+970	5m- BT	To Karwas
36+365		3.5m- BT	To Keshwana Gujar
38+200		3.5m (BT)	38.200- BCC Cement on RHS & Cross road to Kaluhera Village.

1.6. Indicative Design Standards

The indicative design standards proposed for the Project are as following:

TABLE 0-8: PROPOSED INDICATIVE DESIGN STANDARDS FOR FEEDER ROUTE

S. No.	Design Standard	Value
1	Design Speed (km/h)	100
2	Main Carriageway (m)	2 x 7.0 = 14.0
3	Structures	4 – Lane Structures
4	Kerb Shyness (m)	2.0 x 0.5 = 1.0
	Foot Path (m) in Built up Areas	2.0 x 1.50 = 3.0
5	Median Width	
(a)	Open Country With Isolated Built up (m)	5.0
(b)	Built Up (m)	2.5
(c)	Approach to Grade Separated Structures(m)	5.0
6	Paved Shoulder	
(a)	Open Country With Isolated Built up (m)	2 x 1.50
(b)	Built Up (m)	2 x 2.0
7	Earthen Shoulder (m)	2 x 2.0 = 4.0
8	R. C. C. Drain	
(a)	along Main Project Road (m)	2 x 2.0
(b)	along Service Road (m)	2 x 1.5
9	Space for Services (Utility Corridor (m)	2 x 2.0 = 4.0
10	Overall Roadway Width (Eff.) inclusive of Side Slopes, for (m)	
(a)	4 lane divided Carriageway	60
(b)	4 lane VUP/PUP/NVP	60
(c)	Bypass	60
11	Cross Fall / Camber	
(a)	Carriageway and Paved Shoulder	2.5%
(b)	Earthen Shoulder	3.0%
12	Service Road	
(a)	Width (m)	7.0
(b)	Kerb Shyness	0.5
13	Radius of Horizontal Curves	
(a)	Ruling (m)	400

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S. No.	Design Standard	Value
(b)	Absolute Minimum (m)	250
14	Maximum Super Elevation	5%
15	Vertical Alignment	
(a)	Ruling Gradient	2.5%
(b)	Limiting Gradient	3.3%

TABLE 0-9: PROPOSED INDICATIVE DESIGN STANDARDS FOR ECONOMIC CORRIDOR

S. No.	Design Standard	Value
1	Design Speed (km/h)	100
2	Main Carriageway (m)	2 x 10.5 = 21.0
3	Structures	6 – Lane Structures
4	Kerb Shyness (m)	2.0 x 0.5 = 1.0
	Foot Path (m) in Built up Areas	2.0 x 1.50 = 3.0
5	Median Width	
(a)	Open Country With Isolated Built up (m)	5.0
(b)	Built Up (m)	2.5
(c)	Approach to Grade Separated Structures(m)	5.0
6	Paved Shoulder	
(a)	Open Country With Isolated Built up (m)	2 x 1.50
(b)	Built Up (m)	2 x 2.0
7	Earthen Shoulder (m)	2 x 2.0 = 4.0
8	R. C. C. Drain	
(a)	along Main Project Road (m)	2 x 2.0
(b)	along Service Road (m)	2 x 1.5
9	Space for Services (Utility Corridor (m)	2 x 2.0 = 4.0
10	Overall Roadway Width (Eff.) inclusive of Side Slopes, for (m)	
(a)	6 lane divided Carriageway	60/70
(b)	6 lane VUP/PUP/NVP	60/70
(c)	Bypass	60/70
11	Cross Fall / Camber	
(a)	Carriageway and Paved Shoulder	2.5%
(b)	Earthen Shoulder	3.0%
12	Service Road	
(a)	Width (m)	7.0
(b)	Kerb Shyness	0.5
13	Radius of Horizontal Curves	
(a)	Ruling (m)	400
(b)	Absolute Minimum (m)	250
14	Maximum Super Elevation	5%
15	Vertical Alignment	
(a)	Ruling Gradient	2.5%
(b)	Limiting Gradient	3.3%

1.7. Traffic Studies and ADT

The project road has been divided in following five homogenous sections for the purpose of traffic studies:

TABLE 0-10: TRAFFIC HOMOGENOUS SECTIONS ON PROJECT ROAD

Homogenous Section	Road Section	Chainage (km) From	Chainage (km) To	Length (km)
I	Rewari – Kund	0+000	32+700	32.700
II	Kund – Narnaul	32+700	62+900	30.200

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Homogenous Section	Road Section	Chainage (km) From	Chainage (km) To	Length (km)
III	Narnaul – Nangal Chaudhary	0+000	21+400	21.400
IV	Nangal Chaudhary – Paniyala mor (at NH-48 Jn.)	21+400	39+450	18.050
V	Narnaul – Pacheri Kalan (Rajasthan/Haryana border)	62+900	79+010	16.110

Based on the different Traffic Surveys conducted along Project Roads and Secondary data collected frow IHMCL and PWD Haryana, the summary of Average Daily Traffic on Project road is presented in table below:

TABLE 0-11: SUMMARY OF ADT ON PROJECT SECTIONS (BY RITES)

S. No.	Vehicle Type	Average Daily Traffic (ADT)			
		Station 1 (Narnaul-Mahendergarh)	**Station 2 (Narnaul-Pacheri Kalan)**	**Station 3 (Narnaul-Paniyala Mor)**	**Station 4 (Rewari-Narnaul)**
1	2 Wheelers	4319	5348	4252	3163
2	3 Wheelers	237	641	214	162
3	Car	3352	3422	3059	2659
4	BUS	320	317	297	624
5	LCV	1101	522	997	636
6	TRUCK	2789	400	2563	1650
7	Other Fast*	187	250	181	280
8	ALL FAST	**12305**	**10900**	**11561**	**9174**
9	ALL SLOW	40	51	37	528
ADT (in Nos.)		**12345**	**10952**	**11599**	**9702**
ADT (in PCUs)		**18942**	**10794**	**17608**	**14231**

** Other fast vehicles include Agricultural Tractors with/without trailer.*

TABLE 0-12: SUMMARY OF ADT ON REWARI – NARNAUL SECTION (BY IHMCL) ATCC DATA

S. No.	Vehicle Type	Average Daily traffic (ADT)	
		Rewari – Narnaul Section	
		Year 2016	**Year 2017**
1	Bicycle	21	22
2	2 Wheeler	4027	3853
3	3 Wheeler	302	285
4	Tractor	23	36
5	Tractor with Trailer	121	167
6	2 Axle SCV	757	771
7	LMV2 Axle LMV	4212	4807
8	LCV2 2 Axle	374	365
9	2 Axle Truck or Bus	733	779
10	3 Axle Truck or Bus	1352	1621
11	Multi Axle Vehicles MAV	392	538
12	Oversized Vehicle OSV	0	0
13	Cycle Rickshaw	1	9
14	Earth Moving Equipment	14	7
ADT (in Nos.)		**12374**	**13260**
ADT (in PCUs)		**16543**	**18826**

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TABLE 0-13: SUMMARY OF ADT DATA OF IHMCL AND PWD HARYANA

Road Name		Rewari-Pacheri Kalan(Haryana/Rajasthan Border)	Narnaul-Nangal Chaudhary-Paniyala Mor
Road ID		NH-11	NH-148B
Length(Km)		97	38.3
Traffic Data from IHMCL	**Location**	Rewari-Narnaul-Singhana Rd	
	PCU	16543	
	Year	Nov-16	
	PCU	18826	
	Year	Apr-17	
Traffic Data from PWD (B&R)	**Location**	Rewari-Narnaul Rd	
	PCU	26952	
	Year	May-17	
Traffic Data from NH-148B Report	**Location**	Mahendergarh-Narnaul	Raimalikpur - Narnaul
	PCU	15476	11041
	Year	Dec 2015	Dec-15

1.8. Traffic Projection: Summary (5% Traffic Growth Rate)

Traffic forecasting components in Narnaul-Paniyala Mor Section

- **Normal Traffic:** as per traffic survey the normal traffic in this section is around 17,000 pcu.
- **Generated Traffic** has two parts which comes when there is any road improvement.

1. Diverted traffic:

   The Narnaul to Paniyala Mor road section is a part of "North-South Economic Corridor" which traverse through Haryana state. Traffic originated from J&K, Punjab, Himachal Pradesh, Uttakhand etc may use the proposed project road section to commute southern states bypassing Delhi-NCR region in view of saving time and money.

   Traffic generated from IMT Manesar/Rewari Industrial Area may use the project road section to commute Northern/Southern part of Country bypassing the Delhi-NCR region.

2. Induced traffic: it is defined as the total vehicle-Kilometres of travel due to road improvement.

   Consultant accounted various Generated Traffic from various routes in PIA and necessary incremental growth in traffic projection has been considered to cater future need of Project Road Sections.

- **Developmental Traffic:**

  Dedicated Freight Corridor Corporation of India (DFCCIL) is constructing a Corridor to promote freight traffic in the project influence area. Dedicated Freight Corridor will

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functional within 2-3 years, there will be significant growth in the traffic as project road sections will behave like a feeder route to promote hassle free traffic movement.

Proposal of Logistic Hub in the close vicinity of project influence area (PIA), also promote growth of traffic especially freight traffic. Proposed Logistic Hub would be operational within 2-3 year. Apart from several local/self styled logistic hubs, there are three major Logistic Hub on the project road sections.

1. Proposed Integrated Multi Model Logistic Hub (ILMH) on Paniyala Mor-Nangal Chaudhary-Narnaul Road section (NH 148B)
2. Functional Multi Modal Logistics Park (MMLP) at Kathuwas on Rewari-Narnaul Road Section (NH 11)
3. Functional Logistic Hub by Adani at Gurgaon-Pataudi-Rewari road section (NH352W)

It is anticipated that the development of Dedicated Freight Corridor and Logistic Hub would be completed within specified of time and due to these developments traffic in project road section will increase significantly.

Consultant accounted various developments plans in PIA and necessary incremental growth in traffic projection has been considered to cater future need of Project Road Sections.

Road Sections / Year	Projected Traffic: Narnaul to Paniyala Mor All Vehicle in		Rewaril to Narnaul All Vehicle in		Narnaul to Pacheri Kalan All Vehicle in		Remarks
	Nos	PCU	Nos	PCU	Nos	PCU	
2017	11,382	16,841	8,894	12,201	10,650	9,707	DP
Growth Rate(%)	5%	5%	5%	5%	5%	5%	
2018	11,951	17,683	9,339	12,811	11,183	10,192	CP
2019	13,502	20,624	10,326	14,378	12,133	11,200	CP
2020	14,647	23,059	10,987	15,484	12,797	11,894	CP
2021	15,921	25,833	11,536	16,259	13,437	12,489	1
2022	16,718	27,124	12,280	17,520	14,162	13,237	2
2023	17,553	28,481	12,894	18,396	14,870	13,899	3
2024	18,431	29,905	13,538	19,316	15,613	14,594	4
2025	19,353	31,400	14,215	20,282	16,394	15,323	5
2026	20,320	32,970	14,926	21,296	17,214	16,090	6
2027	21,336	34,618	15,672	22,361	18,074	16,894	7
2028	22,403	36,349	16,456	23,479	18,978	17,739	8
2029	23,523	38,167	17,279	24,653	19,927	18,626	9
2030	24,699	40,075	18,143	25,886	20,923	19,557	10
2031	25,934	42,079	19,050	27,180	21,969	20,535	11
2032	27,231	44,183	20,002	28,539	23,068	21,561	12
2033	28,593	46,392	21,003	29,966	24,221	22,640	13
2034	30,022	48,711	22,053	31,464	25,432	23,772	14
2035	31,523	51,147	23,155	33,037	26,704	24,960	15
2036	33,100	53,704	24,313	34,689	28,039	26,208	16

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Road Sections	Projected Traffic						Remarks
	Narnaul to Paniyala Mor All Vehicle in		Rewaril to Narnaul All Vehicle in		Narnaul to Pacheri Kalan All Vehicle in		
	Nos	PCU	Nos	PCU	Nos	PCU	
2037	34,755	56,390	25,529	36,424	29,441	27,519	17
2038	36,492	59,209	26,805	38,245	30,913	28,894	18
2039	38,317	62,169	28,145	40,157	32,459	30,339	19
2040	40,233	65,278	29,553	42,165	34,082	31,856	20
2041	42,244	68,542	31,030	44,273	35,786	33,449	21
2042	44,357	71,969	32,582	46,487	37,575	35,121	22
2043	46,574	75,567	34,211	48,811	39,454	36,877	23
2044	48,903	79,346	35,921	51,252	41,427	38,721	24
2045	51,348	83,313	37,718	53,814	43,498	40,657	25
2046	53,916	87,479	39,603	56,505	45,673	42,690	26
2047	56,612	91,853	41,584	59,330	47,956	44,825	27

As per the traffic projections for different road sections along the project Corridor, immediate 4-lanning is required as the traffic on project road sections already crosses the 10,000pcu.

As per present traffic forecast, the Narnaul-Paniyala Mor Section as a part of "Northern-Southern" Economic Corridor crosses the limit of 40,000 pcu in year 2030. The road section is associated with futuristic developmental plan and the consultant uses the realistic approach to traffic projection. The consultant recommend the single stage up-gradation of Narnaul-Paniyala Mor road section to 6 Lane with Service Road to meet the future need as Economic Corridor (Fully Access Controlled Road).

1.9. Improvement Proposal for Bridges, Cross Drainage Works (Culverts) & Structures

The widening proposed for Bridges, Cross Drainage works (Culverts) and structures (VUP,ROB etc.) along the project road with respect to existing km is given in the table below:

TABLE 0-14: IMPROVEMENT PROPOSAL FOR BRIDGES, CROSS DRAINAGE WORKS (CULVERTS) & STRUCTURES

Package-I					
Sl. No.	**Structurtes**	**Type**	**Existing (Reconstruction)**	**New Proposal**	**Total**
1	Culverts	Box Culverts	23	28	51
2	Minor Bridges	Box Bridges Voided Slab	3 1	2 1	7
3	Underpasses	VUP	0	11	11
4	Major Bridges		0	2	2
5	Grade Separator Interchange		0	1	1
	Total		**27**	**45**	**72**

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Package-II					
Sl. No.	**Structurtes**	**Type**	**Existing (Reconstruction)**	**New Proposal**	**Total**
1	Culverts	Box Culverts	10	1	11
2	Minor Bridges	Box Bridges Voided Slab	0 0	3 1	4
3	Underpasses	VUP	0	13	13
4	ROB's		0	1	1
5	Grade Separator Interchange		0	4	4
	Total		**10**	**23**	**33**

Package-III					
Sl. No.	**Structurtes**	**Type**	**Existing (Reconstruction)**	**New Proposal**	**Total**
1	Culverts	Box Culverts	16	1	17
2	Minor Bridges	Box Bridges Voided Slab	0 1	0 0	1
3	Underpasses	VUP	0	7	7
4	ROB's		0	0	0
5	Grade Separator Interchange		0	0	0
	Total		**17**	**8**	**25**

Package-IV					
Sl. No.	**Structurtes**	**Type**	**Existing (Reconstruction)**	**New Proposal**	**Total**
1	Culverts	Box Culverts	0	10	10
2	Minor Bridges	Box Bridges Voided Slab	0 0	7 2	9
3	Underpasses	VUP	0	6	6
4	ROB's		0	3	3
5	Grade Separator Interchange		0	2	2
	Total		**0**	**30**	**30**

1.10. Service Road Proposals along the Project Road

Paniyala Mor – Narnaul section of NH148B including proposed Narnaul bypass is a part of Economic corridor and other road sections are Feeder Router / Inter Corridor.

Bypasses are proposed to be access control and accordingly service road has been proposed throughout in the proposed bypasses on either side.

The service road proposed along the project road with respect to existing km is given in the table below:

TABLE 0-15: SERVICE ROAD PROPOSALS ALONG THE PROJECT ROAD

Package I	**Length (Km)**
(i) Narnaul Bypass Crossing- Paniyala Mor Road Section (Existing)	28.0

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(ii) Narnaul Bypass Crossing to Pacheri Kalan (Rajasthan/Haryana Border)	4.5
Grand Total	**32.500**

Package II	**Length (Km)**
(i) Proposed Narnaul Bypass	24.00
(ii) Ateli Mandi Bypass start to Narnaul Bypass crossing on NH-11	13.100
Grand Total	**37.100**

Package III	**Length (Km)**
Rewari to Start of Ateli Mandi Bypass on NH 11 (Existing)	17.200
Grand Total	**17.200**

Package IV	**Length (Km)**
Rewari Bypass	14.000
Grand Total	**14.000**

1.11. Widening Scheme along the Project Road

The widening scheme proposed and adopted for the project road with respect to existing km is given in the table below:

TABLE 0-16: **SCHEME OF IMPROVEMENT**

PACKAGE-I

Design Chainage		**Length(m)**	**Cross Section Type**	**Remarks**
Start	**End**			
NH-148B: Paniyala Mor (NH-48 Junction) – Proposed Narnaul Bypass Crossing				
0.000	1.000	1.000		Grade Seprator interchange; Major Junction Improvement
1.000	3.200	2.200	A	
3.200	4.000	0.800	F	
4.000	4.600	0.600	A	
4.600	5.600	1.000	B	(1x20) + (2x7x3) (VUP)
5.600	7.600	2.000	A	
7.600	8.400	0.800	F	
8.400	9.700	1.300	A	
9.700	11.100	1.400	B	(1x20) + (2x7x3) (VUP)
11.100	11.400	0.300	A	
11.400	12.200	0.800	F	
12.200	12.500	0.300	A	
12.500	13.500	1.000	B	1x12m GR-II (VUP)
13.500	14.500	1.000	A	
14.500	15.300	0.800	F	
15.300	15.700	0.400	A	
15.700	16.700	1.000	B	1x30 (VUP)
16.700	16.850	0.150	A	
16.850	17.850	1.000	B	2x30 (VUP)
17.850	18.500	0.650	A	

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18.500	19.300	0.800	F	
19.300	19.700	0.400	A	
19.700	20.700	1.000	B	(1x30) + (2x7x3) (VUP)
20.700	21.100	0.400	A	
21.100	21.900	0.800	F	
21.900	24.000	2.100	A	
24.000	25.000	1.000	B	(1x20) + (2x7x3) (VUP)
25.000	26.600	1.600	A	
26.600	27.400	0.800	F	
27.400	28.000	0.600	A	
28.000	31.240	3.240	D	
		31.240		
0.000	2.760	2.760	C	

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NH-11: Proposed Narnaul Bypass Crossing – Pacheri Kalan (Rajasthan border)				
0	2.200	2.200	D	-
2.200	2.700	0.500	E	
2.700	4.500	1.800	D	
4.500	5.900	1.400	B	(1x30) + (2x7x3) (VUP)
5.900	8.100	2.200	D	
8.100	9.500	1.400	B	(2x30) + (2x7x3) (VUP)
9.500	11.300	1.800	D	
		11.300		

PACKAGE II				
Design Chainage		**Length(m)**	**Cross Section Type**	**Remarks**
Start	**End**			
Ateli Mandi Bypass				
30.500	31.700	1200	B	1x30m(VUP)
31.700	33.100	1400	E	
33.100	34.100	1000	B	1x30m(VUP)
34.100	35.600	1500	E	
35.600	37.600	2000	B	1x30m(VUP)
Existing Road from Ateli Mandi Bypass Xing to Bachhod Bypass X-ing				
37.600	38.750	1150	D	
Bachhod Realignment				
38.750	39.700	950	E	At Grade Intersection
39.700	40.700	1000	B	1x20m(VUP)
40.700	41.400	700	E	At Grade Intersection
Existing Road from Bachhod Bypass X-ing to Narnaul Bypass X-ing				
41.400	41.900	500	D	
41.900	42.900	1000	B	
42.900	44.500	1600	D	
Narnaul Bypass				
0.000	1.400	1400	A	Dove-tailing with ILMH access road
1.400	2.400	1000	B	Grade Separator Interchange; Major junction improvement
2.400	3.100	700	A	
3.100	4.100	1000	B	1x12m GR-II (VUP)
4.100	5.100	1000	A	
5.100	6.100	1000	B	2x30m (VUP)
6.100	8.100	2000	A	
8.100	9.100	1000	B	1x30m (VUP)
9.100	10.200	1100	A	
10.200	11.200	1000	B	ROB 1x30+36+18+1x30
11.200	11.900	700	A	
11.900	12.900	1000	-	Major junction improvement
12.900	15.600	2700	A	
15.600	16.600	1000	B	1x30m (VUP)
16.600	17.700	1100	A	
17.700	18.700	1000	-	Major junction improvement
18.700	19.700	1000	A	
19.700	20.700	1000	B	1x30m (VUP)

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20.700	22.300	1600	A	
22.300	24.000	1700	-	Major junction improvement

PACKAGE-III

Design Chainage		Length	Cross Section	Remarks
Start	**End**	(m)	Type	
0.000	1.200	1200	D	
1.200	4.100	2900	D	
4.100	5.100	1000	B	1x12m GR-II(VUP)
5.100	5.600	500	D	
5.600	6.900	1300	B	(1x30) + (2x7x3) (VUP)
6.900	8.100	1200	-	Not in present scope of work
8.100	9.500	1400	D	
9.500	10.500	1000	B	1x12m GR-II(VUP)
10.500	11.700	1200	D	
11.700	12.760	1060	-	Not in present scope of work
12.760	15.700	2940	D	
15.700	16.700	1000	B	(1x20) + (2x7x3) (VUP)
16.700	17.500	800	D	
17.500	19.000	1500	E	
19.000	20.000	1000	B	(2x30) + (2x7x3) (VUP)
20.000	20.400	400	E	
20.400	23.100	2700	D	
23.100	24.100	1000	B	(2x30) + (2x7x3) (VUP)
24.100	25.500	1400	D	
25.500	26.500	1000	B	1x12m GR-II(VUP)
26.500	30.500	4000	D	

PACKAGE IV				
Design Chainage		Length(m)	Cross Section	Remarks
Start	End		Type	
Rewari Bypass				
0.000	0.500	500	-	Major junction improvement
0.500	1.400	900	E	
1.400	2.400	1000	B	1x30m(VUP)
2.400	2.700	300	E	
2.700	3.700	1000	B	1x30m(VUP)
3.700	4.150	450	E	
4.150	5.400	1000	B	2x30m(VUP)
5.400	5.500	100	-	ROB 1x18+2x36+1x18 (Skew)
5.500	6.150	650	B	
6.150	7.400	1250	E	
7.400	8.400	1000	B	1x30m(VUP)
8.400	8.500	100	-	ROB 1x18+30+1x18 (Skew)

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PACKAGE IV				
Design Chainage Start	End	Length(m)	Cross Section Type	Remarks
8.500	9.000	500	B	
9.000	10.100	1100	E	
10.100	11.100	1000	B	1x30m(VUP)
11.100	12.100	1000	E	
12.100	12.550	450	B	
12.550	12.650	100	-	ROB 2x36+51.4+2x36(Skew)
12.650	13.100	450	B	
13.100	13.900	800		
13.900	14.40	500.00	-	Major junction improvement

1.12. Proposed Pavement Layers

Based on Preliminary Survey and Investigation following composition of pavement layers have been adopted:

Pavement Layers	Narnaul-Paniyala Mor (90msa)	Narnaul Bypass (90msa)	Narnaul-Pacheri-Kalan (60msa)	Rewari-Narnaul (90msa)	Rewari Bypass (60msa)	Service Road(10msa)
BC/SDBC	50	50	50	50	50	40
DBM	120	120	100	120	100	60
Granular Base	250	250	250	250	250	250
GSB	200	200	200	200	200	200
Sub Grade Soaked CBR (8%)	500	500	500	500	500	500

1.13. Land Requirement:

Total 190.6313 ha. Non forest land is required for the project road section ***4/6 lane of Paniyala Mor (NH-48Jn.) to Narnaul section of NH-148B and Narnaul to Pacheri Kalan section of NH -11 in the state of Haryana.***

1.14. Forest land Diversion

A. ***Forest land Diversion before 4-laning***

i. Project road was section of MDR-129 (Narnaul-Nangal Chaudhary bypass- km 4.500 to km 34.342) , SH-16(Nangal Sitrohi- Badhwan road) which has been declared as NH-148B.

ii. PWD (B&R), Mahendragarh and Bhiwani has already granted Forest clearance from **MOEF vide F.No. 8-75/2011 dated 26 December 2013** ***(See Annexure-1 attached at the end of this project notes) for road section*** SH 16 and MDR19. Forest clearance

iii. From the date of issue of Forest clearance approval by MOEF to till date no widening work commend by PWD(B&R)

iv. Later Govt. of India declared this section as as NH-148B

B. ***Proposed Forest Land Diversion***

i. Project road is comprising of ***Paniyala Mor (NH-48Jn.) to Narnaul section of NH-148B and Narnaul to Pacheri Kalan section of NH -11 .***

ii. Proposed 4/6 laning of project will diverted 0.9349ha. of link road/canal /drain/river crossing which falling within the proposed Roght of Way.

iii. 4/6 laning of NH-11 section will divert 20.9502ha. PF on NH land including road/canal/drain crossings.
Thus 4/6 laning of the project road section will require diversion of 21.8851ha. Protected Forests declared on NH-land including roa/canal/dran crossings.

1.15. Project Cost

The cost estimate has been presented in the following table:

TABLE 0-17: SUMMARY OF COST ESTIMATES

The Cost of Civil Works have been worked to **INR 840.90 Crore**.The work has to be completed in two years with construction phasing of 40% and 60%respectively. The Project Cost derived at Feasibility stage is tentative and is subject to ± 20% variation at detailed design stage.

(i) Civil Cost

Bill No.	Description	Amount (Rs.)
1	SITE CLEARANCE AND DISMANTALING	82,75,309
2	EARTH WORKS	52,00,32,103
3	GRANULAR SUB-BASE AND BASE COURSES	1,71,69,10,923
4	BITUMINOUS COURSES AND CONCRETE PAVEMENTS	1,92,25,15,717
5	CROSS DRAINAGE WORKS	49,68,62,868
6	BRIDGES / UNDERPASS	1,97,43,24,217
7	DRAINAGE AND PROTECTIVE WORKS	1,12,89,00,000
8	TRAFFIC SIGNS, MARKINGS AND ROAD APPURTENANCES	49,12,16,744
9	REHABILITATION OF BRIDGES	0
10	TOLL PLAZA	15,00,00,000
Total Cost (Rs)		8,40,90,37,881
Total Cost (Cr.)		**840.90**
Length (Km)		45.30
Total Cost (Cr. Per Km)		**18.56**

(ii) Total Project Cost

Bill No.	Description	Amount (Cr.)
1	Base Civil Construction Cost	840.90
2	Escalation @ 5% upto Bid due date	0.00
3	**Civil Construction Cost on Bid Date (1 + 2)**	**840.90**
4	Contingencies @ 1% of Civil Construction Cost as mentioned in (3) above	0.00
5	**Total EPC Cost (3 + 4)**	**840.90**
6	IC / Pre-Operative Expences @ 1% of total EPC Cost mentioned in (5) above	8.41
7	O&M during development period	0.00
8	**Total Cost (5 + 6 + 7)**	**849.31**
9	Financing Charges @ 2% Debt at DER 70:30	4.77
10	**Project Cost without IDC (8 + 9)**	**854.08**
11	Interest during Construction (IDC) @ 10.70% p.a. on Debt	39.34
12	**Estimated project Cost as on Bid date (10 + 11)**	**893.42**
Cost of pre-construction Activities		
13	Land Acquisition (With 100% solicium) including cost of structures	348.06
14	EIA and Utility Shifting (electrical overhead / underground, water supply, sewerage)	15.87
15	**Total Cost of Pre-construction Activities (13 + 14)**	**363.93**

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Total Capital Cost (12 + 15)	**1257.35**

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1.16. Conclusions and Recommendations

1) The up-gradation of existing two lane road with substandard geometrics to Six/Four Lane with/without Service Road configuration of National Highway Standard shall return benefit by:

- Reduction in Travel time
- Reduction / Savings in vehicles operation cost and
- Significant reduction in road accidents (by Improving Substandard Geometrics)

2) The "Paniyala Mor- Nangal Choudhary-Narnaul" including Narnual Bypass provides the connectivity of proposed Logistic Hub to NH 48 (Towards Jaipur) and Narnual Section and shall be developed as Economic Corridor Six lane with service road as fully access control, to provide the smooth movement of Freight Traffic.

The road sections "Rewari- Narnaul" &"Narnaul-Pacheri Kalan" and Rewari Bypass provide alternative route of traffic coming from southern to northern part and vice versa and shall be developed as Four lane with/without service road to encourage Road Transport to IRC Standards ensuring safe and smooth journey.

3) The project road is planned to be rehabilitated / upgraded to be Six/Four Lane with/without Service Road configuration facility.

TABLE 0-18: *YEAR IN WHICH TRAFFIC CROSSES 10,000 & 40,000 PCU*

PACKAGE	AADT (PCU) 2017	Traffic reached 10000 PCU in Year	Traffic reached 40000 PCU in Year
➢ **Narnaul – Pacheri Kalan**	9,707	2018	2045
➢ **Narnaul – Paniyala mor**	16,841	-	2030
➢ **Rewari – Narnaul**	12,201	-	2039

4) The alignment corridor is free from any eco-sensitive zone.

5) Considering the brown and green field up gradation of project road sections, it is suggested to implement the Project as following four Construction Packages:

TABLE 0-19: PACKAGING OF PROJECT HIGHWAY

PACKAGE	STRETCH INCLUDED
➢ **PACKAGE I**	• Narnaul bypass crossing to Paniyala mor (at NH- 48 jn.) = 31.24 Km • Narnaul Bypass crossing to Pacheri Kalan (NH-11) = 11.30 Km • Extended Nangal Chaudhary Bypass = 2.76 Km
➢ **PACKAGE II**	• Narnaul Bypass = 24 Km • Bachhod realignment = 2.5 Km • Ateli Mandi bypass = 6.6 Km • Existing road = (1.4 Km + 3.0 Km) 4.4 Km
➢ **PACKAGE III**	• Rewari To Ateli Mandi of NH-11 (Ex. Km 13 - Km 44 = 31 Km
➢ **PACKAGE IV**	• Rewari Bypass = 14 Km

6) The upgradation of existing RoW requires acquisition of 664 ha Land.

7) Two years duration for project implantation has been proposed with a phasing of 40% and 60% respectively in each year.

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8) Overall Civil Project Cost is Rs. **18.56** crores/km.

9) Project is Economically Viable with passenger time Cost but financially not viable. Hence, Project is to be taken up under **Hybrid Annuity Mode (HAM)** for urgent Implementation for Overall Development of Road Network and Socio Economic Development of Project Area. The project **"Bharatmala Pariyojna"** is a prestigious and one of the most important mandates by Government of India. The Bharatmala Pariyojna primarily covers / emphasizes the strategic importance for:

- Expanding existing road infrastructure to improve connectivity in the country through
  - Developing new economic corridors to improve connectivity to key centers, not connected by GQ and NS-ES corridor.
  - Upgrading key feeder routes to the existing national corridors and proposed economic corridor to enhance first and last mile connectivity
- Improving efficiency of existing and proposed corridors through
  - Alleviating local congestion due to city traffic on existing national corridors and proposed economic corridors through development of bypasses, ring roads etc.
  - Ensuring seamless inter-state freight movement by streaming the documents and processes at inter-state borders.
  - Developing logistics parks at strategic locations to enable freight consolidation and disaggregation.

10) The up-gradation of existing two lane road with substandard geometrics to Four/Six Lane with/without Service Road configuration of National Highway Standard shall return benefit by:

- Reduction in Travel time
- Reduction / Savings in vehicles operation cost and
- Significant reduction in road accidents (by Improving Substandard Geometrics)

Project Director
NHAI, PIU-Rewari

F. No. 8-75 / 2011-FC
Government of India
Ministry of Environment and Forests
(F.C. Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road,
New Delhi-110 003
Dated: 26th December, 2014

To

The **Principal Secretary (Forests)**
Government of Haryana,
Chandigarh.

Sub: Diversion of 178.64 hectares of forest land in favour of the Executive Engineer, Provincial Division PWD (B&R), Mahendergarh & Bhiwani for widening of Narnaul-Nangal Chowdhary-Rajasthan Border Road Km. 4.500 to 34.342 including Nangal Chowdhry bypass of MDR 129 and widening of Nangal-Sirohi-Badhwan Road km 27.825 to 59.500 of SH 17 including Narnaul & Nangal Sirohi byepass in Mahendergarh district and SH 16 from Rohtak district Border-Bhiwani Km 113.750 including Bhiwani Bypass in Bhiwani District under Forest Divisions and Districts Mahendergarh and Bhiwani, Haryana.

Sir

I am directed to refer to the State Government of Haryana's letter No. 3598- B-2-2011/8111 dated 20th May 2011 on the above-mentioned subject wherein prior approval of the Central Government for the diversion of 178.64 hectares of forest land in favour of the Executive Engineer, Provincial Division PWD (B&R), Mahendergarh & Bhiwani for widening of Narnaul-Nangal Chowdhary-Rajasthan Border Road Km. 4.500 to 34.342 including Nangal Chowdhry bypass of MDR 129 and widening of Nangal-Sirohi-Badhwan Road km 27.825 to 59.500 of SH 17 including Narnaul & Nangal Sirohi byepass in Mahendergarh district and SH 16 from Rohtak district Border-Bhiwani Km 113.750 including Bhiwani Bypass in Bhiwani District under Forest Divisions and Districts Mahendergarh and Bhiwani, Haryana, was sought, in accordance with section-2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under section-3 of the said Act, stage-I approval for the said proposal was granted vide this Ministry's letter of even number dated 16th July 20123, subject to fulfillment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the stage-I approval and has requested the Central Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government of Haryana vide letters No. Prasha-D-Teen-1456/811 dated 27th June 2013, No. Prasha-D-Teen-4591/ 2037 dated 1st August 2013, No. D-III- 4591/ 3084 dated 17th October 2013 and No. D-III/4-13/ 4609 dated 18th December 2013 read with Chief Secretary, Haryana's D. O. No. 22/126/ 2013-IGS-III dated 19th November 2013 addressed to the Secretary, Ministry of Environment and Forests approval of the Central Government is hereby granted under section 2 of the Forest (Conservation) Act, 1980 for diversion of 178.64 hectares of forest land in favour of the Executive Engineer, Provincial Division PWD (B&R), Mahendergarh & Bhiwani for widening of Narnaul-Nangal Chowdhary-Rajasthan Border Road Km. 4.500 to 34.342 including Nangal Chowdhry bypass of MDR 129 and widening of Nangal-Sirohi-Badhwan Road km 27.825 to 59.500 of SH 17 including Narnaul & Nangal Sirohi byepass in Mahendergarh district and SH 16 from Rohtak district Border-Bhiwani Km 113.750 including Bhiwani Bypass in Bhiwani District

P. Vashishth.
Project Director
NHAI, PIU-Rewari

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) State Government shall raise and maintain compensatory afforestation over degraded forest land, double in extent to the forest land being diverted, from funds already realized from the user agency;

(iii) The State Government shall realise the additional NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India and transfer the same to the Ad-hoc CAMPA under intimation to this Ministry;

(iv) The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required under the said Act;

(v) No labour camp shall be established on the forest land;

(vi) Felling of trees on the forest land being diverted shall be reduced to the bare minimum and the trees should be felled under strict supervision of the State Forest Department;

(vii) Sufficient fuelwood, preferably the alternate fuel shall be provided by the User Agency to the labourers after purchasing the same from the State Forest Department or the Forest Development Corporation or any other legal source of alternate fuel;

(viii) User agency shall raise strip plantation on both sides and central verge of the road;

(ix) User agency shall ensure that no damage is caused to the wildlife available in the area because of this project;

(x) The boundary of the forest land being diverted shall be demarcated on ground at the project cost, using four feet high RCC pillars, each pillar inscribed with the serial number, DGPS coordinates, forward and backward bearings and distance from adjoining pillars etc.;

(xi) The forest land shall not be used for any purpose other than that specified in the proposal;

(xii) In case the Ministry of Tribal Affairs does not concur with the views of the Government of Haryana that in the absence of any population belonging to Scheduled Tribes or Traditional Forest Dwellers in the State, the compliance of the guidelines dated 3rd August 2009 this Ministry issued under the FRA, 2006 to initiate and complete process to settle rights of these communities does not arise and there seems no need to undertake such an exercise in the State of Haryana, the State Government shall complete settlement of rights, in term of the Scheduled Tribes and Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in it's letter No. 11-9/1998-FC (pt.) dated 3rd August 2009 read with letter No. 11-9/98-FC (pt.) dated 5th February 2013, in support thereof;

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Project Director
NHAI, PIU-Rewari

(xiii) The user agency shall submit the annual report on compliance to conditions stipulated in the approval to the to the State Government and concerned Regional Office of this Ministry; and

(xiv) Any other condition that the Chief Conservator of Forests (Central), Northern Regional Office, Chandigarh may impose from time to time for protection and improvement of flora and fauna in the forest area; and

(xv) The User Agency and the State Government of Haryana shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

Yours faithfully,

Sd/-

(H. C. Chaudhary)
Assistant Inspector General of Forests

Copy to:

1. The Principal Chief Conservator of Forests, Government of Haryana, Chandigarh.
2. The Nodal Officer, Forest Department, Government of Haryana, Chandigarh.
3. The Addl. Principal Chief Conservator of Forests (Central), Regional Office (Northern Zone), Chandigarh.
4. User Agency.
5. Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard File.

26/12/2013

(H. C. Chaudhary)
Assistant Inspector General of Forests

P. Vashist
Project Director
NHAI, PIU-Rewari

Break up of Forest & Non-Forest Area of MDR - 129 and SH -17 within Mahendragarh District

MDR – 129

Mainline
Chainage from km 4.500 to km 34.342

Existing ROW = 20.12m
Proposed ROW = 40m
Net length excluding Nangal Chowdhury Bypass = 26.382 km
Therefore, Forest Area = 26382 * (20.12 - 11) m^2
= 24.06 Ha
Non Forest Area = 26382 * (40 - 20.12) m^2
= 52.45 Ha

Nangal Chowdhury Bypass
Chainage from km 23.290 to km 19.830

Length = 3.460 km
Proposed ROW = 40 m
One Cross Road with 13.41 m ROW and 5.5 m Carriage way
Therefore, Forest Area = 40 * (13.41 - 9.5) m^2
= 156.4 m^2
=0.016 Ha
Non Forest Area = 40 * 3460 - 40 * (13.41 - 9.5) m^2
=13.82 Ha

Therefore, **Total Forest Area under MDR 129 = 24.07 Ha**
Total Non Forest Area under MDR 129 = 66.27 Ha

SH – 17

Mainline
i> Chainage from km 27.825 to km 35.800

Bypass - 3000 m
Existing ROW - 20.12 m
Proposed ROW - 40 m
Net length excluding Bypass = (35800 - 27825 - 3000) m
=4.975 km
Forest Area = 4975 * (20.12 - 11) m^2 = 45372 m^2 = 4.5372 Ha
Non Forest Area = 4975 * (40 - 20.12) m^2 = 98903 m^2 = 9.8903 Ha

ii> Chainage from km 35.800 to km 59.500
Existing ROW - 31.85 m

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Proposed ROW - 40 m
Length = (59500 - 35800) m = 23.700 km
Therefore, Forest Area = 23700 (31.85 - 11) m^2 = 494145 m^2 = 49.4145 Ha
Non Forest Area =23700(40 - 31.85) m^2 = 193155 m^2 = 19.3155 Ha

Nangal Sirohi Bypass
Length = km 31.000 to km 28.000 = 3.000km

2 Cross Roads having Carriage way 5.5 m & 3.6 m respectively
Therefore, Forest Area = $40 \cdot (13.41 - 9.5) + 40 \cdot (13.41 - 7.66)\ m^2$
$= 386.4 m^2 = 0.03864$ Ha
Non Forest Area = $40 \cdot 3000 - [40 \cdot (13.41 - 9.5) + 40 \cdot (13.41 - 7.66)]\ m^2$
$= 119613.6\ m^2 = 11.96136$ Ha

Narnaul Bypass

Length - 8.002 km
Proposed ROW - 40m

3 Cross Roads :

Carriageway		ROW
1	7.0	25.15
2	4.5	13.41
3	3.66	13.41

- Starting Zone ROW 40 m, Length 304 m

3 Distributaries

	ROW
1	23.45
2	21.8
3	25.15

Therefore Forest Area = $(304 - 11) \cdot 40 + 40 \cdot (25.15 - 11) + 40 \cdot (13.41 - 9.5) + 40 \cdot (1$[illegible]
$7.66) + 40 \cdot 23.45 + 40 \cdot 21.8 + 40 \cdot 25.15 = 15488.4 m^2 = 1.54884$ Ha

Non Forest Area = $7698 \cdot 40$ - Forest Area
$= 292431.6\ m^2 = 29.24316$ Ha

Therefore, **Total Forest Area under SH17**
= (4.5372 + 49.4145 + 0.03864 + 1.54884) Ha = **55.54 Ha**

Total Non Forest Area under SH17
=(9.8903 + 19.3155 + 11.96136 + 29.24316) Ha
=70.41 Ha

Exec
Provincial D
NARNAUL

Project Director
NHAI, PIU-Rewari