Chapter -1
Executive Summary

1.1 Introduction

Madhya Pradesh State Road Development Corporation (MPRDC) Ltd., has been entrusted preparation of Detailed Project Report of selected stretches/corridor of Highway for Two/Four lanning with paved shoulder configuration

The Detailed Project Report thus prepared shall contain the scheme and layout of the development of the highway and the project facilities, preliminary design, costing and financial viability based on present and future traffic. The Detailed Project Report would thus provide all technical details, based on which comprehensive bid document can be prepared so that realistic bids are received from prospective bidders.

In order to fulfill the traffic needs and road safety requirement, MPRDC has appointed the **LN Malviya Infra Projects Pvt.Ltd., Bhopal (M.P.)** as consultants to Providing Consultancy Services for Preparation of Detailed Project Report of Goras to Sabalgarh Road in the State of Madhya Pradesh for up-gradation to Two Lanes with paved shoulder /Four lane configurations., the assignment for package no.-3 LOA NO.164/MPRDC/DPR/NHS/P-VII/2016/15026 BHOPAL DATED 15 DECEMBER 2016.

1.2 Scope of Study

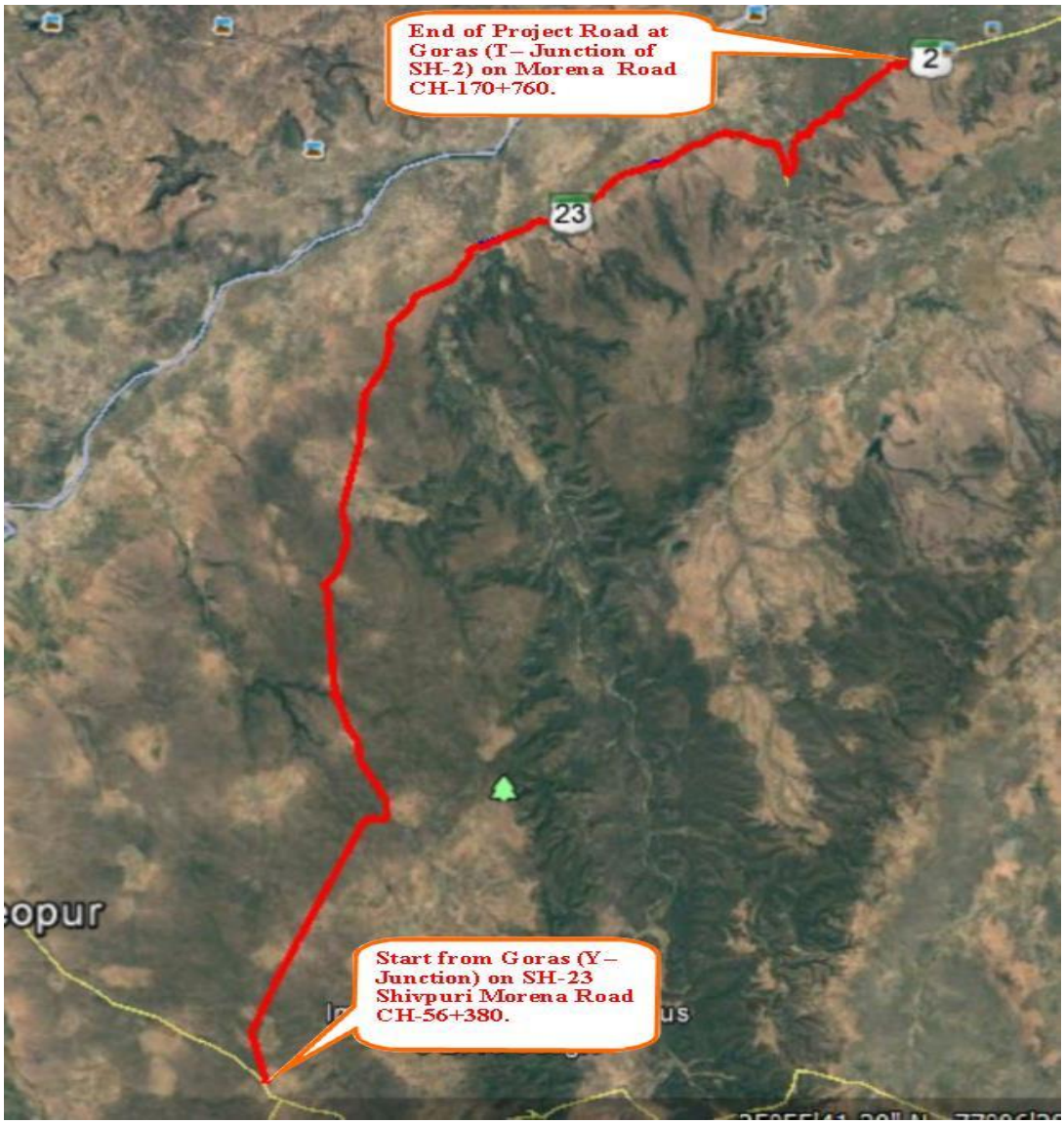
The project study consists of preparation of the following:
Stage 1 – Inception Report & Quality Assurance Plan;
Stage 2 – Feasibility, Strip Plan and Clearance & Land Acquisition Report
Stage 3 – (a) – Draft Detailed Project Report.
(b) – Final Detailed Project Report.

1.3 Socio - Economic Profile

The **Goras Shyampur Sabalgarh Road** is located in the district of ***Sheopur and Morena*** which in turn is located in the State of Madhya Pradesh. Madhya Pradesh is the second largest state in terms of geographic extent, covering an area of 308,244 sq. km. The state is administratively divided into 51 districts. As per 2011 census, Madhya Pradesh has a population of 72 million accounting to 6 per cent of India's population. State population has grown at 20.3 per cent between 2001- 2011. Population density of the state is 236 persons per square kilometre and is significantly lower than the national average of 382 persons per square kilometre. Further, distribution of population among the districts is uneven with 21 districts registering population density of less than 200 persons per square kilometre resulting in regions with relatively higher and lowers human capital availability.
Majority of the state (around 72 per cent) population still lives in rural areas. However, there has been a steady growth in urbanization, with the emergence of industrial clusters in the districts of Indore, Bhopal, and Gwalior as destinations for intra state migration.
Index Map Enclosed Below

INDEX MAP

Fig-1-1 : Index Map of Project Road



1.4 Project Description

The project road starts from 56+380 km Goras (Y-Junction) on SH-23 Shivpuri – Morena Road Highway (25°32'41.34"N & 76°56'11.85"E Longitudes) and Ends at Sabalgarh (T-Junction) on SH-2 Morena Road (25°32'41.34"N & 76°56'11.85"E Longitudes). The Project Road Goras to Sabalgarh is situated in Madhya Pradesh. Having a total existing length 114.380 Kms and Design length 105.880 Kms.

Start point of the project road:

Photo -: Starting Point of Project Road

End point of the project road:

Photo-: End Point of Project Road

Climate of Sheopur District –

Sheopur District:

Sheopur district comes under Gwalior division, with its headquarters at Shivpuri town. As per Census 2011, Sheopur has a population of 6.87831lakh, which constitutes .01% of the total population of Madhya Pradesh. The density of population is around 104 per sq.km compared to 236 of Madhya Pradesh and 382 of India, as per Census, 2011. When it comes to rural population, Sheopur has a percentage of 84.1%, which is much higher than the state's average. The urbanization in the district is very low, with only 15.9% of people living in the urban areas. The male population in Sheopur District is around 52.5% and sex ratio is 902 per thousand males as per Census, 2011. The sex ratio of children below the age of 6 is also lower, and has declined over the last decade. There are only 888 girl children per thousand male children, which is higher compared to the 2001 Census figures of 837 per thousand.

Morena District:

Morena district is one of the 50 districts of the central Indian state of Madhya Pradesh. The name, Morena is derived from the mor + raina means the place where peacock is enormously found. Morena, which has an identity of being home to perhaps the largest number of peacocks in the India. The district is part of Chambal Division. The town of Morena is the district and divisional headquarters. The district has a widely dispersed population of 1,965,137 as of 2011. Morena is fifth district in state in density of population after Bhopal, Indore, Jabalpur, and Gwalior. The district is mostly farmland, and trains are a popular form of transportation, although they connect only about 15% of the villages within Morena. At present buses are most useful and popular means of transportation. Morena is famous for its mustard production and one of the most famous KS oils HQ is situated here. Morena is also famous for Honey production. This region is dominated by Tyagi (Brahmins), Brahmins, Baghel, Gurjar, Kirar , Dhakad (Mr. Maniram Dhakad, Ex-MLA), Sikarwar and Tomar Rajputs Clans Paan Singh Tomar and other famous dacoits who operated in and around Morena have etched a Robin Hood-esque romanticism on Indian psyche about this remote region.

Pavement Condition -

The existing road has anIntermediate lane and Single lane configuration from Km 56.380 to 170.760Carriageway width 5.50 m bituminous surfaces (Generally Carriageway width varies from 5.50 m to 3.75 m in built up section and Shyampur to Sabalgarh Carriageway width 3.50 to 4.0 m) and condition of the pavement is Fair to Poorandhaving shoulder width of 1.2 m to 2.0 m on either side along the road and condition of shoulders is also poor and covered with vegetation. The entire project road traverses between plain / Hilly terrains.

Photo- : Pavement Condition of Project Road

Photo-: Pavement Condition of Project Road

All major utilities follow the road alignment as the project road connects to Sironi, Shyampur, Birpur, Tentara, Rampahadi and Mangrol. Utilities like electric pole, Transformers, OFC, hand pumps etc. were observed on both sides of road.

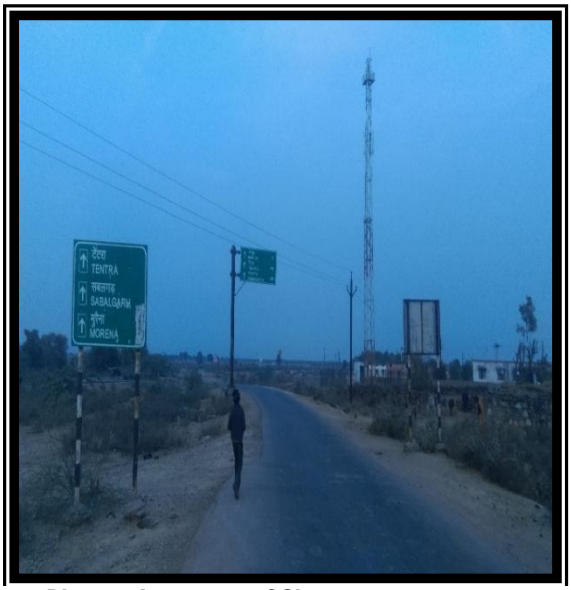


Photo-: Location of Shyampur

Photo-: Location of near Rampahadi

Table 1-1 List of Villages

Sr. No.	Existing Chainage (m.)		Length (m)	Name of Village/Town
	From	To		
I	II	III	IV	V
1	66+600	67+650	1050	Piprani
2	69+850	70+100	250	Karrai
3	91+400	91+750	350	Sironi
4	106+950	107+900	950	Ochhapura
5	111+050	111+250	200	Ghamloki
6	121+550	122+650	1100	Shyampur
7	127+500	127+750	250	Chhawar
8	133+650	134+150	500	Panchocolony
9	134+550	135+650	1100	Birpur
10	135+750	136+400	650	Syarda
11	136+850	137+050	200	Mushariya Ka Pura
12	137+650	138+050	400	Harkoi
13	141+850	142+150	300	Kaimara Kalan
14	146+950	147+150	200	Tatupura
15	147+300	147+650	350	Kishnupura
16	148+050	148+300	250	Manpura
17	149+700	150+200	500	Bawdipura
18	151+600	151+800	200	Bhimnagar
19	152+380	152+550	170	Madewa Ka Pura
20	153+180	155+000	1820	Tentara(Station)
21	155+850	156+150	300	Tentara(Choraha)
22	156+700	156+850	150	Shankarpur

Sr. No.	Existing Chainage (m.)		Length (m)	Name of Village/Town
	From	To		
I	II	III	IV	V
23	157+600	158+000	400	Tentara
24	162+300	162+600	300	Ranipura
25	162+800	164+000	1200	Janved Ka Pura
26	164+450	165+100	650	Rampahadi
27	165+600	165+750	150	Ramnagar
28	166+650	166+950	300	Nanda Ka Pura
29	167+150	167+900	750	Mangrol

Traverses through plain terrain. It is essential to improve substandard geometrics at various locations on project road. Geometric improvements shall be made as per standard and specifications. In order to upgrade the road to the geometric requirements commensurate with the design speed, improvement has been proposed for the Project Road. The alignment passes through several villages and habitation areas of which some have built-up sections.

The improvement works, consist of the existing Intermediate lane carriageway to 2 lane with paved shoulder carriageway (10.0 m width) of Rigid pavement with hard shoulder of 2.0 m on either side of rural section and Intermediate lane to 2 lane with paved shoulder of 2.50 m carriageway (12.0 m width) of rigid pavement on either side on built up section.

Longitudinal lined/unlined drain shall be provided near ROW in scattered built up section with outlets to cross drainage structures.

Photo-: Horizontal alignment along the project road.

1.4.2 Road Junctions

The project road traverses through various habitations and village. Various important cross roads also join the project road at different locations. Project road encountered with 2 Major and 34 Minor intersections. List of major and minor intersections is given in Table 1.2 below.

Photo-Grade junction at Goras (CH-56+380)

Photo-Grade junction at Sabalgarh (CH-170+760)

Table 1-2: List of Junctions

Sr. No.	Existing Chainage (Km)	Destinations of Cross Road	Type of Junction	Road Side	Category of Junction(Major/Minor)
I	II	III	IV	V	VI
1	56+380	Shivpuri	Y-Junction	RHS	Major Junction
2	67+050	Piprani	T-Junction	LHS	Minor Junction
3	70+220	Karrai	T-Junction	RHS	Minor Junction
4	76+050	L/S-Budhera R/S-Bargaon	X-Junction	BHS	Minor Junction
5	80+600	Dob	T-Junction	RHS	Minor Junction
6	86+300	Simroniya	T-Junction	LHS	Minor Junction
7	91+370	Bagcha	T-Junction	RHS	Minor Junction
8	98+350	Khadi	T-Junction	LHS	Minor Junction
9	100+000	Dokarka	T-Junction	LHS	Minor Junction
10	105+600	Bhairopura	T-Junction	RHS	Minor Junction
11	107+350	Ochha	T-Junction	RHS	Minor Junction
12	107+870	Moreka	T-Junction	LHS	Minor Junction
13	115+050	Bampura	T-Junction	RHS	Minor Junction
14	116+850	Raghunathpura	T-Junction	LHS	Minor Junction

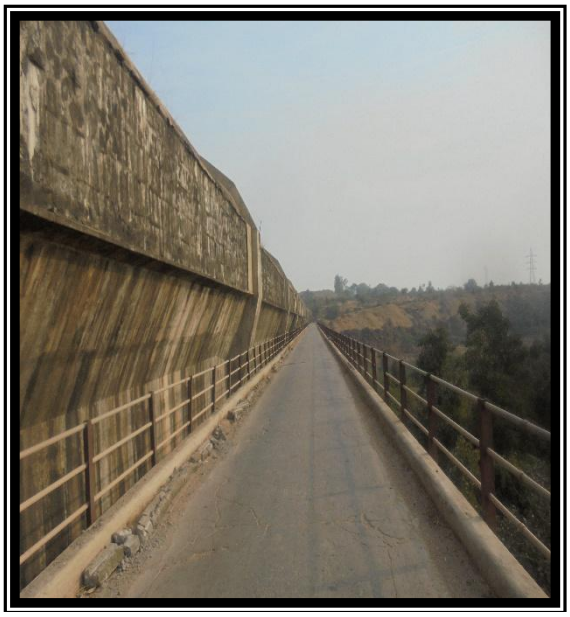
Sr. No.	Existing Chainage (Km)	Destinations of Cross Road	Type of Junction	Road Side	Category of Junction(Major/Minor)
I	II	III	IV	V	VI
15	121+050	Shyampur	T-Junction	LHS	Minor Junction
16	122+600	Station	Y-Junction	LHS	Minor Junction
17	127+980	L/S-Nadigaon R/S-Kuno	X-Junction	BHS	Minor Junction
18	130+650	Jakher	Y-Junction	LHS	Minor Junction
19	131+440	Telipura	T-Junction	RHS	Minor Junction
20	132+860	L/S-Gohar R/S-V.R.	X-Junction	BHS	Minor Junction
21	134+050	Panchogaon	T-Junction	LHS	Minor Junction
22	136+900	Saiarda	T-Junction	LHS	Minor Junction
23	138+350	Badagaon	T-Junction	LHS	Minor Junction
24	142+970	Kaimara Kalan	T-Junction	LHS	Minor Junction
25	144+450	Kaimara Kalan	Y-Junction	LHS	Minor Junction
26	145+950	Bolach	T-Junction	RHS	Minor Junction
27	146+050	Kaimara Khurd	T-Junction	LHS	Minor Junction
28	149+820	Gondola	Y-Junction	LHS	Minor Junction
29	154+270	L/S-Tentara V.R. R/S-Khirka	X-Junction	BHS	Minor Junction
30	156+070	Matewada	Y-Junction	RHS	Minor Junction
31	161+040	Jatoli	T-Junction	LHS	Minor Junction
32	164+900	Rampahadi V.R.	X-Junction	BHS	Minor Junction
33	166+130	Gulalai	T-Junction	RHS	Minor Junction
	166+170	Kmirapur	Kmirapur	LHS	Minor Junction
34	167+500	L/S-Mangrol R/S-Pawai	X-Junction	BHS	Minor Junction
35	169+270	Kajona	T-Junction	LHS	Minor Junction
36	169+770	Stone Crusher	T-Junction	RHS	Minor Junction
	170+775	Chambal	T-Junction	LHS	Major Junction

1.4.3 Bridge & Cross Drainage Structures

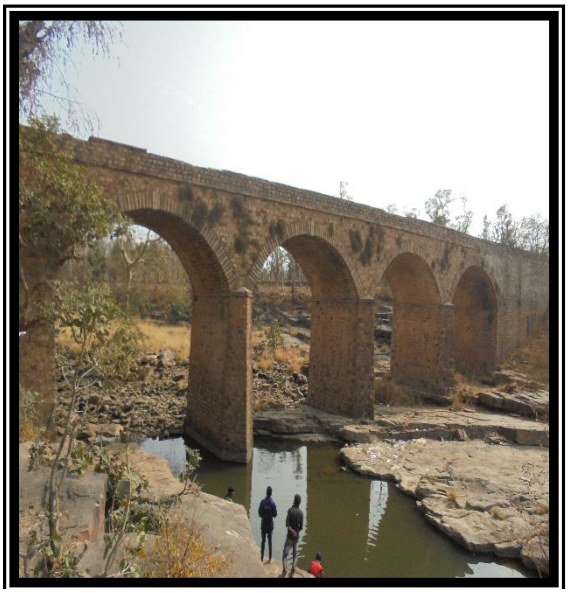
There are 4Major, 40Minor bridges along with 113 culverts and 1 Canal Underpass on the project road.Table containing details about existing Major/ Minor Bridges and Culvertsfor this road may be seen in annexure-7.2.

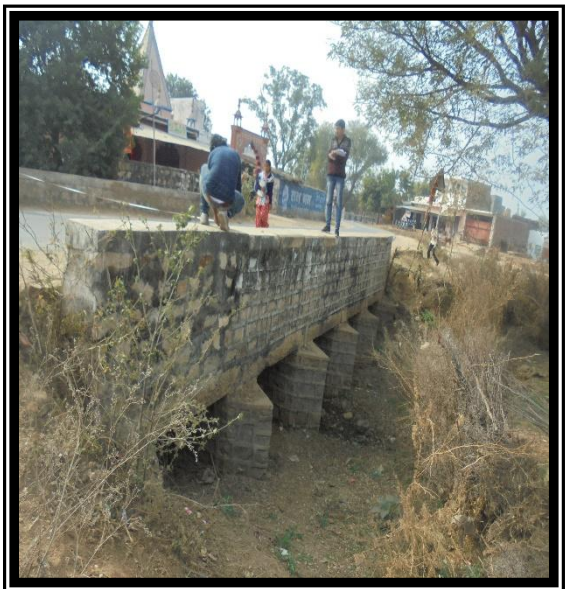
Table 1-3: Summary of Existing Bridges and CD

Type of Structure	Major Bridges	Minor Bridges	Slab /Arch/BOX Culvert	VCW / FCW	Hume Pipe Culvert	Other
I	II	III	IV	V	VI	VII
Existing Structure 158 Nos.	4	40	22	7	84	1 (Canal Underpass)



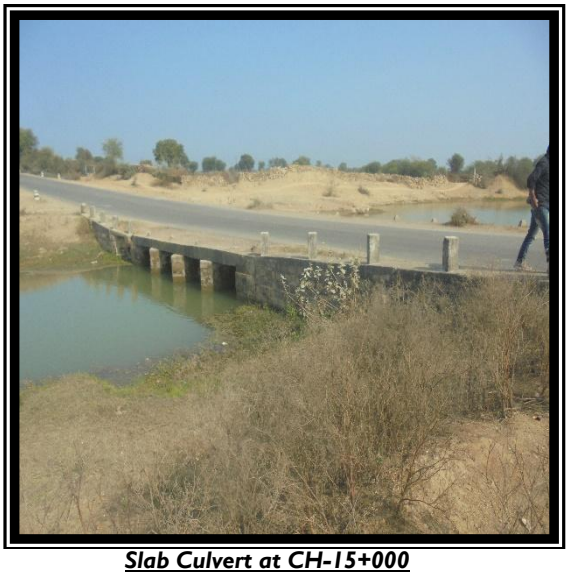
Major Bridge at CH-69+350Major Bridge at CH-130+200



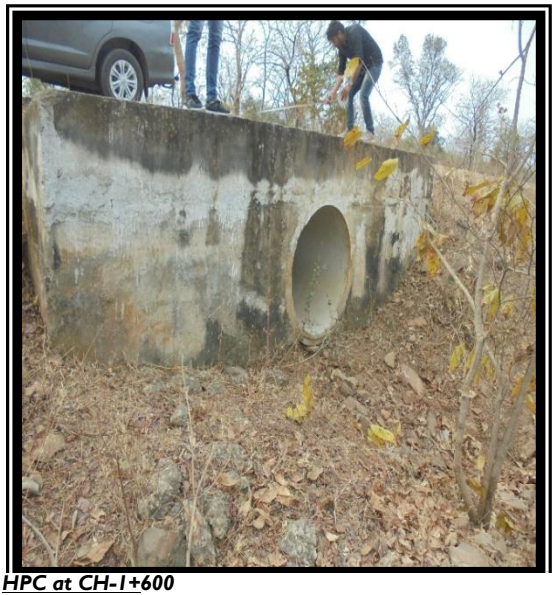


Minor Bridge at CH-80+050 ***Minor Bridge at CH-136+050***

Slab Culvertat CH-2+760

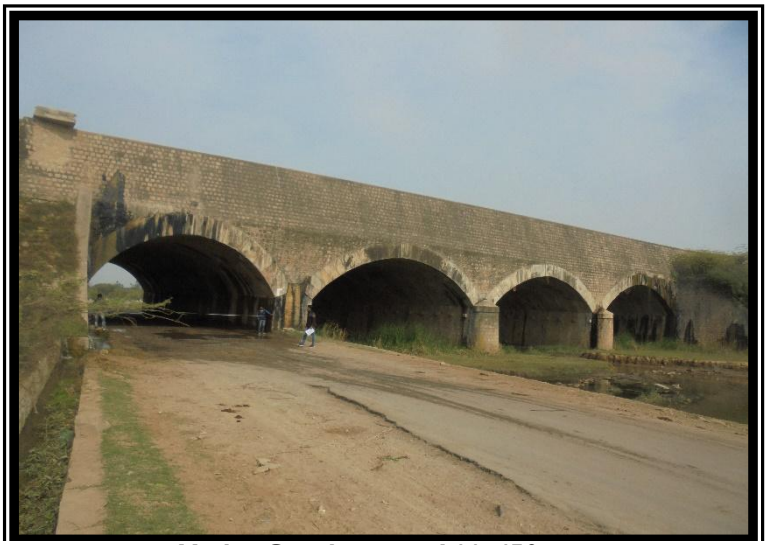


Slab Culvert at CH-15+000



HPC at CH-1+600

HPC at CH-136+880



Under Canal pass at 144+450
Photo-: Structure along the project road

Table 1-4: Major Bridge

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	67+160	MJB	6 X 10.5	12.00	Fair
2	69+350	MJB	6 X 10.5	8.40	Good
3	71+950	MJB	6 X 10.5	8.40	Good
4	130+200	MJB	11 X 25.0	4.10	Poor

Table 1-5: Minor Bridge

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	59+480	MNB	8 X 6.0	12.00	Good
2	63+980	MNB	3 X 8.40	8.40	Good
3	65+650	MNB	2 X 6.50	12.00	Good
4	74+080	MNB	4 X 7.0	12.00	Good
5	75+330	MNB	3 X 7.0	12.00	Good
6	77+620	MNB	4 X 7.0	12.00	Good
7	80+050	MNB	4 x 10.00	5.70	Poor
8	85+180	MNB	4 X 7.0	12.00	Fair
9	87+180	MNB	2 X 7.0	12.00	Fair
10	90+350	MNB	5 X 3.50	10.00	Poor
11	92+350	MNB	4 X 7.0	12.00	Fair
12	93+250	MNB	2 X 7.0	12.00	Fair
13	95+550	MNB	4 X 7.0	12.00	Poor
14	98+800	MNB	6 X 3.50	10.00	Fair
15	99+880	MNB	4 X 7.0	12.00	Fair
16	102+480	MNB	5 X 2.7	7.50	Fair
17	103+280	MNB	1 X 7	12.00	Fair

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
18	109+940	MNB	6 X 7.0	12.00	Fair
19	111+740	MNB	4 X 7.0	12.00	Fair
20	113+250	MNB	2 X 7.20	12.00	Fair
21	115+480	MNB	4 X 7.0	12.00	Poor
22	119+740	MNB	2 X 7.0	12.00	Poor
23	127+940	MNB	6 X 3.0	7.20	Poor
24	133+390	MNB	2 X 3.50	6.70	Poor
25	134+070	MNB	3 X 3.50	6.70	Poor
26	135+680	MNB	3 X 5.30	6.70	Poor
27	136+050	MNB	5 X 2.50	6.80	Poor
28	139+610	MNB	8 X 2.50	6.70	Poor
29	141+720	MNB	5 X 2.50	6.70	Poor
30	145+550	MNB	7 X 2.50	6.80	Poor
31	147+250	MNB	9 X 3.0	6.70	Poor
32	147+850	MNB	2 X 3.50	7.00	Poor
33	149+850	MNB	2 X 7.5	7.00	Poor
34	150+950	MNB	6 X 2.5	6.70	Poor
35	152+780	MNB	8 X 3.0	6.80	Poor
36	156+210	MNB	5 X 2.0	6.30	Poor
37	160+880	MNB	4 X 4.50	6.30	Poor
38	165+130	MNB	3 X 9.0	8.40	Fair
39	167+490	MNB	2 X 4.5	8.40	Fair
40	168+590	MNB	2 X 5.0	8.40	Poor

Table 1-6: - List of Existing HPC/VCW/Pipe Culverts

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	56+420	HPC	1 ROW 1000	12.60	FAIR
2	57+740	HPC	1 ROW 1000	12.40	FAIR
3	58+390	HPC	1 ROW 1000	12.50	FAIR
4	65+300	HPC	2 ROW 1000	15.10	GOOD
5	67+750	HPC	1 ROW 1000	12.40	GOOD
6	68+280	HPC	2 ROW 1000	12.40	GOOD
7	68+540	HPC	2 ROW 1000	15.00	GOOD
8	69+860	HPC	2 ROW 1000	12.50	FAIR
9	70+570	HPC	2 ROW 1000	12.60	FAIR
10	71+030	HPC	1 ROW 1000	12.60	FAIR
11	71+620	HPC	2 ROW 1000	12.60	GOOD
12	72+420	HPC	1 ROW 1200	12.70	GOOD
13	74+680	HPC	1 ROW 1000	12.40	GOOD
14	76+030	HPC	1 ROW 1000	12.50	GOOD
15	76+430	HPC	1 ROW 1000	12.50	GOOD
16	77+330	HPC	1 ROW 1000	15.00	GOOD
17	79+040	HPC	2 ROW 1000	12.40	GOOD
18	79+570	HPC	1 ROW 1000	12.60	GOOD
19	79+800	HPC	1 ROW 1000	12.50	GOOD
20	80+690	HPC	1 ROW 1000	15.20	POOR
21	81+030	HPC	2 ROW 1000	12.50	GOOD
22	82+230	HPC	1 ROW 1000	12.50	GOOD
23	85+840	HPC	2 ROW 1000	12.50	GOOD
24	86+680	HPC	1 ROW 1000	12.50	GOOD
25	88+840	HPC	1 ROW 1000	12.50	GOOD
26	89+540	HPC	2 ROW 1000	12.50	GOOD
27	91+700	HPC	1 ROW 1000	12.50	GOOD
28	93+650	HPC	2 ROW 1000	12.70	GOOD
29	94+280	HPC	1 ROW 1000	12.60	GOOD
30	96+740	HPC	2 ROW 1000	12.50	GOOD
31	99+270	HPC	1 ROW 1000	12.60	GOOD
32	99+440	HPC	1 ROW 1000	12.60	GOOD
33	104+440	HPC	1 ROW 1000	12.60	GOOD

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
34	108+840	HPC	1 ROW 1000	12.20	GOOD
35	110+890	HPC	1 ROW 1000	12.00	POOR
36	112+410	HPC	2 ROW 1000	7.50	POOR
37	114+060	HPC	2 ROW 1000	12.90	GOOD
38	114+260	HPC	1 ROW 1000	12.60	GOOD
39	115+010	HPC	2 ROW 1000	12.00	GOOD
40	116+700	HPC	1 ROW 1000	12.10	GOOD
41	117+940	HPC	1 ROW 1000	12.50	FAIR
42	122+370	HPC	1 ROW 600	7.90	POOR
43	122+540	HPC	1 ROW 1000	10.10	FAIR
44	122+650	HPC	1 ROW 1200	8.30	POOR
45	123+710	HPC	1 ROW 1000	10.20	FAIR
46	125+000	HPC	2 ROW 1000	15.10	FAIR
47	127+040	HPC	2 ROW 1000	10.10	FAIR
48	128+680	HPC	1 ROW 1000	10.10	FAIR
49	128+950	HPC	CHOCKED	7.70	FAIR
50	129+240	FCW		4.10	POOR
51	129+440	HPC	1 ROW 1000	10.20	FAIR
52	132+820	HPC	2 ROW 900	10.00	FAIR
53	135+200	HPC	1 ROW 900	10.30	FAIR
54	135+340	HPC	2 ROW 900	10.20	GOOD
55	136+440	HPC	1 ROW 1000	10.10	FAIR
56	136+680	HPC	1 ROW 1000	10.10	GOOD
57	136+880	VCW	5 ROW 1000	10.10	GOOD
58	138+040	HPC	2 ROW 1000	10.20	GOOD
59	138+810	HPC	1 ROW 1000	10.10	FAIR
60	139+500	HPC	1 ROW 1000	10.10	FAIR
61	142+210	HPC	2 ROW 1000	10.00	GOOD
62	142+350	HPC	3 ROW 1000	10.10	GOOD
63	142+760	HPC	3 ROW 1000	10.10	GOOD
64	143+160	HPC (CANAL)	1 ROW 1000	10.10	GOOD
65	143+850	HPC	1 ROW 1200	10.40	POOR
66	144+290	HPC	2 ROW 1000	10.10	GOOD
67	144+470	VCW	3 ROW 1000		POOR
68	144+490	VCW	5 ROW 1000	10.00	POOR

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
69	144+810	HPC	2 ROW 1000	10.00	GOOD
70	146+320	HPC	2 ROW 1000	10.20	GOOD
71	148+540	HPC	2 ROW 1000	7.20	POOR
72	150+510	HPC	3 ROW 1000	10.10	GOOD
73	151+320	HPC	2 ROW1000	10.00	FAIR
74	152+250	HPC	3 ROW 1000	10.20	GOOD
75	155+140	HPC	2 ROW1000	10.10	FAIR
76	156+850	HPC	2 ROW1000	10.00	FAIR
77	157+270	VCW	6 ROW 1000	6.50	POOR
78	159+370	HPC	2 ROW1000	10.30	FAIR
79	159+660	HPC	1 ROW 1000	10.20	FAIR
80	159+760	HPC	1 ROW 1000	10.10	FAIR
81	160+020	HPC	2 ROW1000	10.10	GOOD
82	160+140	HPC	1 ROW 1000	10.10	FAIR
83	160+350	VCW	6 ROW1000	10.00	FAIR
84	160+580	HPC	1 ROW 1000	10.10	FAIR
85	161+730	HPC	2 ROW 1000	10.20	FAIR
86	162+030	HPC	2 ROW 1000	10.10	FAIR
87	162+130	HPC	2 ROW 1000	10.10	FAIR
88	162+670	HPC	2 ROW 1000	10.10	FAIR
89	162+830	HPC	1 ROW 1000	10.10	POOR
90	163+830	HPC	Chocked	10.00	POOR
91	166+830	VCW	5 ROW 1000	10.10	POOR

Table 1-7: List Of Existing Slab/Arch Culverts

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	58+520	SLAB	1 X 3.00 m	12.00	GOOD
2	68+700	SLAB	1 X 3.00 m	12.20	GOOD
3	73+080	SLAB	1 X 3.00 m	12.00	GOOD
4	105+440	BOX	1 X 2.0 X 4.0	12.00	GOOD

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
5	105+700	BOX	1 X 2.0 X 2.50	12.00	GOOD
6	106+610	BOX	1 X 3.0 X 3.50	12.00	GOOD
7	114+550	BOX	1 X 3.0 X 2.0	6.50	GOOD
8	120+140	BOX	1 X 2.0 X 2.0	7.50	GOOD
9	120+440	BOX	1 X 3.0 X 2.0	7.50	GOOD
10	121+140	BOX	1 X 3.0 X 2.0	12.00	GOOD
11	121+500	BOX	1 X 2.0 X 2.0	12.00	FAIR
12	121+910	BOX	1 X 3.0 X 2.0	12.00	GOOD
13	122+980	SLAB	1 X 2.0	8.50	FAIR
14	123+310	SLAB	1 X 3.0	8.70	FAIR
15	123+930	SLAB	1 X 3.0	8.60	FAIR
16	131+990	SLAB (CANAL)	1 X 1.50	6.80	POOR
17	134+690	SLAB	1 X 2.50	6.80	POOR
18	148+940	ARCH	1 X 3.0	5.70	POOR
19	153+940	SLAB	1 X 1.20	5.40	POOR
20	159+240	SLAB	1 X 4.0	8.40	FAIR
21	163+130	SLAB	2 X 2.00	5.00	POOR
22	170+570	SLAB	1 X 1.5	10.10	POOR

Table 1-7(a): List Of Existing Under canal pass

Sr. No.	Existing chainage	Details of Existing Structures			
		Type of Existing Structure	No of Span / Pipe x Length of Span / dia	Width of Structure	Condition of Structure
I	II	III	IV	V	VI
1	144+450	Arch		8.80	Fair

1.5 Railway line crossing

Along the project alignment there is 4exists railway Level crossing.

Table 1-8: List of Existing Level Crossing

S.No.	Existing Chainage (Km)	No. of line	Type of line
I	II	III	IV
1	122+550	Single Lane	Narrow Gauge
2	129+000	Single Lane	Narrow Gauge
3	136+400	Single Lane	Narrow Gauge
4	152+540	Single Lane	Narrow Gauge

Photo: Railway Crossing Existing CH-122+550Photo: Railway Crossing Existing CH-129+000

Photo: Railway Crossing Existing CH-136+400Photo: Railway Crossing Existing CH-152+540

1.6 Traffic Survey Analysis and Forecast

To establish the traffic flow characteristics and travel pattern of the project corridor between **Goras to Sabalgarh Road** the following traffic surveys were carried out:

- Classified Traffic Volume Count Survey
- Intersection Turning Movement Survey
- Axle Load Survey
- Origin Destination Survey

1.6.1 Classified Continuous Volume Count Survey

The objective of classified traffic volume count survey is to estimate traffic intensity on the project road. The classified volume count surveys have been carried out for 7 days, 24 hours. The traffic is counted in number of vehicles by vehicle category-wise in each direction over 24Hrs a day for 7 Days. The counts were recorded in the formats as per IRC specifications. Classified volume count survey has been carried out on two locations the details given in table 1-10.

Table 1-9: Average Daily Traffic (ADT)

S.No.	Chainage (km)	Location	Survey Dates
I	II	III	IV
1	136+900	Near Birpur	6.03.2017 to 12.03.2017
2	170+500	Near Sabalgarh	6.03.2017 to 12.03.2017

Reference: Details have been given in Annexure—4.1

1.6.2 Traffic Characteristics on Project Road

The summary of all data collected from traffic volume survey for the 2 locations on the Project Road is presented in annexure. -4.1Average Daily Traffic (ADT) for the month of October 2015 is summarized in Table 1-11. Traffic volume count summary sheets along with ADT tables are presented in annexure-4.1 to this report.

Table 1-10Traffic Volume at Two Locations of the Project Road (ADT)

Type of Vehicles	Survey	
	(km 136+900)	(km170+500)
I	II	III
2-Wheeler	201	4737
3-Seater	3	113
Car/Vans/Jeeps(Taxi)	88	502
Mini Bus	0	5
Buses	14	134

Type of Vehicles	Survey	
	(km 136+900)	(km170+500)
LCVs	72	145
2-Axle Trucks	23	73
3-Axle Trucks	21	83
Multi Axle Trucks	49	6
Tractor	5	14
Tractor with Trailor	31	223
Cycle	15	662
Cycle Rickshaw	1	2
Others	0	26
Total	**492**	**6727**

Source: Traffic Surveys, March,2017

A. Near Birpurat Km. 136+900

Survey was carried out at Km 136+900Near Birpur village. Selected location lies between Goras shyampur sabalgarh is away from urban section to avoid influence of local traffic.

ADT recorded at this station is492 nos. / 743PCU. Fast moving vehicles were recorded as 96.95% of the total traffic (in PCU). Peak hour traffic flow of 80 nos. formed around16.26% of the total traffic. Peak hour is identified during 10.0 to 11.00AM.

B. Near Sabalgarh at Km. 170+500

Survey was carried out at Km 170+500Sabalgarh village. Selected location lies between Goras shyampur sabalgarh is away from urban section to avoid influence of local traffic.

ADT recorded at this station is 6727 nos. / 5796 PCU. Fast moving vehicles were recorded as 89.71% of the total traffic (in PCU). Peak hour traffic flow of 750 nos. formed around 11.15% of the total traffic. Peak hour is identified during 12.00 to 11.00PM.

There will be variation of traffic for each day. The daily and hourly variation of traffic observed at Km 170+500 is presented graphically in Figure 4.7.

1.6.3 Turning Movement Count

The objective of turning movement count survey is to estimate the direction-wise movement of the traffic at all major intersections on the project road and thus to arriving at the contribution and diversion of the traffic from adjacent road network.

1.6.4 Origin Destination

Surveyto capture the productions and attractions of passenger and goods movement, from the respective zones, OD survey was carried. Roadside Interview method, as detailed in IRC: 102-1988, was used for O-D survey. The survey was carried out for both passenger and goods vehicles for 24 hours (in both directions) and trip data was collected at the volume count locations by trained enumerators under the supervision of Transportation Engineers. From the O-D survey, travel characteristics like origin and destination, occupancy, trip purpose and length of trip by mode type are captured. For goods modes, the survey elicited characteristics like origin and destination, commodity type, trip frequency and length of trip**.** A reasonable sample size (about 10%) of vehicles was collected. Travel patterns for were established on the basis of these surveys.

1.6.5 Axle Load Survey

The vehicle damage factor is a multiplier for converting the number of commercial vehicles of different axle loads to the number of standard axle load repetitions. Design of new pavement for additional lane or strengthening of existing pavement is based upon the cumulative number of 80 KN (IRC-37-2012 clause no. 4.4.2) equivalent standard axles (ESA) that will pass over during the 15 year design period. The classes of traffic which lead to significant axle loads (or damage) to the pavement and accordingly considered for design are: LCVs, two / three axle and multi axle trucks. Cumulative standard axles (CSA) are calculated in accordance with the guidelines provided in IRC: 37 – 2012 and IRC: 81 - 1997. The overloaded vehicles have serious adverse impact on performance of pavement. It has been ascertained that the damaging effect of axles on flexible pavement is approximately proportional to the fourth power of the axle load (IRC-37-2012 clause no. 4.4.3).

The equivalent single axle loads (ESALs) have been calculated assuming that the project road will be opened to traffic in the year 2018.

Table 1-11: Summary of VDF

LOCATION	DIRECTION	Commercial Vehicle			
		LCV	2 AXLE	3 AXLE	MAV
I	II	III	IV	V	VI
KM : 136+500	**Goras to Sabhalgarh**	0.0110	2.1608	1.7342	11.9034
	Sabhalgarh to Goras	0.0032	1.2825	1.4213	1.4890
Adopted Maximum VDF		**0.0110**	**2.1608**	**1.7342**	**11.9034**
KM : 170+600	**Goras to Sabhalgarh**	0.0087	6.3481	6.2674	11.3229
	Sabhalgarh to Goras	0.0069	2.6661	4.2871	0.1897
Adopted Maximum VDF		**0.0087**	**6.3481**	**6.2674**	**11.3229**

Reference: Details have been given in Annexure-4.2

Table 1-12: Summary of MSA

Name of the road	MSA for 15th (136+500)	MSA for 15th (170+600)	Adopted Design MSA
Goras shyampur sabalgarhRoad	*2.96*	*11.29*	*20*

Reference: Details have been given in Annexure-4.3

1.6.6 Homogeneous Section

The entire Project Road is considering as one homogeneous sections based on traffic volume and its characteristics.

Table 1-13: Homogeneous Section

Sr. No.	Homogenous Section	Existing Length (km)	Design Length (km)
1	***Goras shyampur sabalgarh Road***	114.380	105.880

1.6.7 Growth Rate

Adopted growth rate is 5% Ref. IRC-37, 2012 Page 6 clause 4.2.2 for commercial vehicles along the project road. The growth of remain traffic moving vehicles is taken as 5% "Reference: Ministry of Shipping, Road Transport & Highways, (18th January, 2008 reference no. RW/NH-37011/57/2006-PIC)5% traffic growth rate."
Summary of projected traffic based on adopted growth rate is provided in Table given below:

Table 1-14: Projected Traffic Volume, Veh/day and PCU/day
Goras shyampur sabalgarhRoad

Project Road	Year 2017	Year 2020	Year 2027	Year 2032	Year 2034
I	II	III	IV	V	VI
Projection of ADT					
Total Fast Moving Vehicle (Motorised Traffic)	3256	4128	5809	7414	8174
Slow Moving Vehicle (Non-Motorised Traffic)	352	446	628	801	883
Traffic (Number)	3608	4575	6437	8215	9057
Projection (PCUs/day)	**(3270)**	**(4146)**	**(5833)**	**(7445)**	**(8208)**

Note: Values in bracket indicate PCUs/day

1.7 Capacity Analysis

Capacity analysis for project road has been carried out in order to define the Level of Service (LOS) offered by road sections under the prevailing roadway and traffic conditions.
Capacity and level of service guidelines
Capacity and design service volumes for various lane configurations specified by IRC: 64 – 1990: 'Capacity of Roads in Rural Areas' has been adopted for determining the Level of Service offered by the road sections during design period.
Based on the average rise & fall observed from the field surveys, the project corridor runs through Plain terrain only. The capacity and design service volumes for various lane configurations in case of plain terrain at different LOS's are presented in Table 1.16 below.

Table 1.15 Capacity and Design Service Volume

Road Configuration	Shoulder Type	Plain Terrain	
		LOS B	LOS C
2 Lane	Paved Shoulder	18000	25000
4 Lane	Earthen shoulders	35000	49000
	Paved shoulders	40000	60000

Capacity augmentation proposals (lane requirement)

The observations on the traffic data and traffic projections as per ministry circular no. **NH-14019/6/2012-P&M dated 5 oct 2012**

Table 1-16: Capacity augmentation

Homogeneous Section	Chainage from Km (Design length)	Year by which Two lane with paved Capacity Terminates	Lane Width Ref. NH-14019/6/2012-P&M dated 5 oct 2012 2 lane with paved shoulders Proposed year
I	II	III	V
Goras shyampur sabalgarh Road	49.300 to 155.160	-	2020

Table 1-17: Summary of ADT

AVERAGE DAILY TRAFFIC SURVEY OF GORAS - SHYAMPUR - SABALGARH ROAD

(Date:06.03.2017 to 12.03.2017)

Section : GORAS - SHYAMPUR - SABALGARH ROAD

Direction : Bothways Location: Two location

Location	Motorised Traffic											Non-Motorised Traffic					Grand Total	
	Passenger Vehicles					Goods Vehicles				Agricultural		Passenger	Goods Vehicles					
							Ord. Trucks							Animal Drawn				
	Two Wheeler	Three Wheeler	Car/Jeep	Mini Bus	Bus	Tempo / LCV	2 Axle	3 Axle	M Axle	Tractor with Trailor	Tractor	Cycle	Cycle Rickshaw	Animal Drawn	Horse Drawn	Hand Cart	ADT	PCU
PCU Factor	0.5	1.0	1.0	1.5	3.0	1.5	3.0	4.5	4.5	4.5	1.5	0.5	2.0	8.0	4.0	3.0		
KM 136+900	201	3	88	0	14	72	23	21	19	31	5	15	1	0	0	0	492	743
KM 170+500	4737	113	502	5	134	145	73	83	6	223	14	662	2	24	2	0	6727	5796
AVG OF ALL LOCATIONS	2469	58	295	3	74	108	48	52	12	127	10	338	2	12	1	0	3609	3270

1.8 Results of Engineering Surveys and Investigations

1.8.1 Pavement Condition

The condition survey of existing pavement includes the assessment of pavement, shoulder, embankment and drainage condition. In pavement condition data regarding pavement distress like cracking, ravelling, potholes are recorded in terms of pavement affected. The edge break is measured in length and rutting is measured in mm depth. Shoulder Condition is assessed as earthen shoulder, corrugation or ruts development in mm and shoulder edge drop in mm.

Distresses like ravelling, Patching and Cracks are found during the investigation at many locations along the project road hence, entire project road goes under reconstruction from WBM layer, which is almost present in the entire project stretch Road. The existing crust WBM & GSB layers are consider as a thickness of proposed subgrade.The appropriate grade and profile correction is assumed in the reconstruction of existing pavement.

Photo-; Pavement Condition at Rural Section

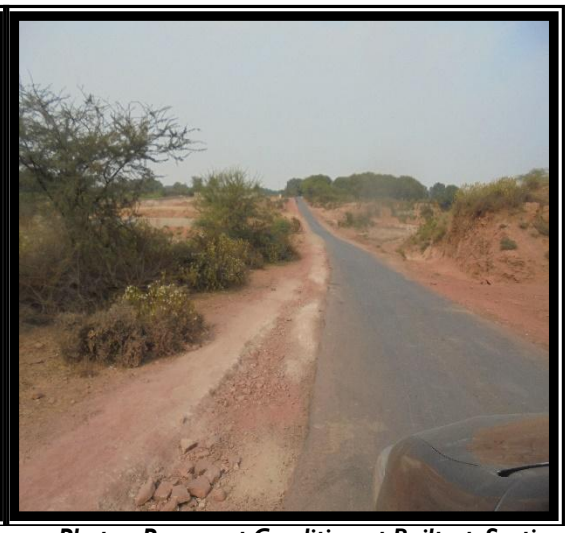


Photo-; Pavement Condition at Built-up Section

1.8.2 Rigid Pavement

There is no existing rigid pavement.

Table 1-19: Existing Rigid Pavement

Sr. No.	Chainage		Length (m)	Villages/Town	Width
	From	To			
I	II	III	IV	V	VI
…Nil…					

1.9 Improvement Proposals

The improvement proposals for proposed widening include the provisions for the following major items:

- Proposed Pavement Design
- Rearrangement of Junctions
- Traffic Control and Safety Measures
- Bridge and Cross Drainage Structures

1.9.1 Bypasses and Re-alignments

The present existing alignment of SH-06 passes through many villages/ towns where the present road becomes narrower due to parking of vehicles, lot of commercial activities, bus stand/market places and there is a no space for further improvement to segregate the local slow moving traffic. To reduce the huge demolition of built-up structures, to avoid traffic congestion and safe movement of vehicles, alternative routes have been proposed in terms of bypasses to divert the traffic from town areas.

Based on reconnaissance and detailed site visit 2 Nos. of locations were initially identified for alternate alignment at different sections of project road and bypasses will be provided as 2 lane with paved shoulder carriageway. The Influencing parameters considered for recommended option of bypass alignment are followings

- Length of Proposed Option
- Road Geometric Standards
- Land Acquisition
- Structures – Minor & Major Bridges
- Junctions with MDR's, Flyovers
- Environmental Constraint
- Social Impact – Relocation and Rehabilitation costs.
- Construction Problem
- Cost

The proposed bypass locations for the project road are given in Table 1-21

Table 1-20 Proposed Bypass Locations

S.No.	Existing km		Proposed Chainage		Length	Urban Area	Side
	From	To	From	To			
1	121+220	123+245	111+800	113+800	2000	Shyampur	RHS
2	133+600	136+265	123+500	126+235	2740	Birpur	LHS
3	147+150	150+200	137+000	139+760	2760	Krishnupura tatipura	LHS+RHS
4	163+160	165+975	147+920	150+550	2630	Rampahadi	RHS

A brief description of each bypass is presented in following paragraphs. Plan of bypasses are shown in the alignment plan. Other than the above listed towns/villages, there are small size habitations along the project road.

➢ Shyampur Bypass

The first major township encountered on the project road requiring bypass is Shyampur village. The township is thickly populated and has residential and commercial strip houses along the project road. The project road has very bad geometry and sight distance in this stretch. Any widening along the existing alignment leads to major loss to the residential and commercial structure of this very old township. Also the project road has limited ROW of 12m -15m in the town area.

Hence, it is proposed to bypass the town to avoid acquisition of the land and disturbance to the local people. The details of the options studied and recommended are given below:

Table 1-21: Features of Proposed Shyampur bypass Option-1 (Recommended by MPRDC & PCM)

Sr.No.	Feature	Description
1	Starting	Proposed Ch: 111+800
2	Ending	Proposed Ch: 113+800
3	Route Alignment	LHS
4	Length of Bypass	2.00 km
5	Length of existing alignment Bypassed	2.025 km
6	Terrain	Passing Through Plain Terrain
7	Speed	80-100 km/hr
8	Geometrics	Horizontal and vertical geometric designed as per IRC
9	At Grade Junction Improvement	Major- 2 Nos. Railway Crosssing - 1 No.
10	Existing Land use pattern through proposed alignment	Agricultural & Barren land
11	No of Structures	Minor Bridge-1 nos., Culvert - 4 nos. And ROB – 1 Total no. of Structures is = 6 nos.
12	Land Acquisition	45m wide strip of land is required

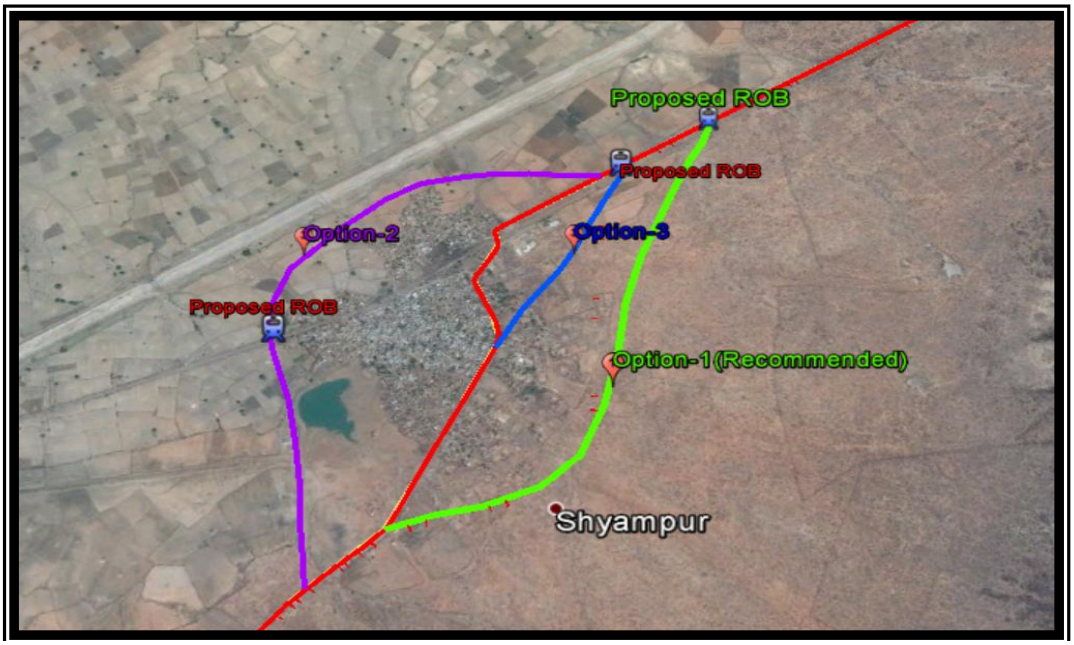


Photo-; Shyampur Bypass all Option-1, 2 & 3

- **Birpur Bypass**

The second major township encountered on the project road requiring bypass is Birpur village. The township is thickly populated and has residential and commercial strip houses along the project road. The project road has very bad geometry and sight distance in this stretch. Any widening along the existing alignment leads to major loss to the residential and commercial structure of this very old township. Also the project road has limited ROW of 12m -15m in the town area.

Hence, it is proposed to bypass the town to avoid acquisition of the land and disturbance to the local people. The details of the options studied and recommended are given below:

Table 1-21: Features of Proposed Birpur bypass Option-1 (Recommended by MPRDC)

Sr.No.	Feature	Description
1	Starting	Proposed Ch: 123+500
2	Ending	Proposed Ch: 126+235
3	Route Alignment	LHS
4	Length of Bypass	2.74 km
5	Length of existing alignment Bypassed	2.66 km
6	Terrain	Passing Through Plain Terrain
7	Speed	80-100 km/hr
8	Geometrics	Horizontal and vertical geometric designed as per IRC
9	At Grade Junction Improvement	Major- 2 Nos., Railway Crossing-1 Nos
10	Existing Land use pattern through proposed alignment	Agricultural & Barren land
11	No of Structures	Minor Bridge-2 nos., Culvert - 5 nos. and ROB – 1Nos. Total no. of Structures is = 8 nos.
12	Land Acquisition	45m wide strip of land is required

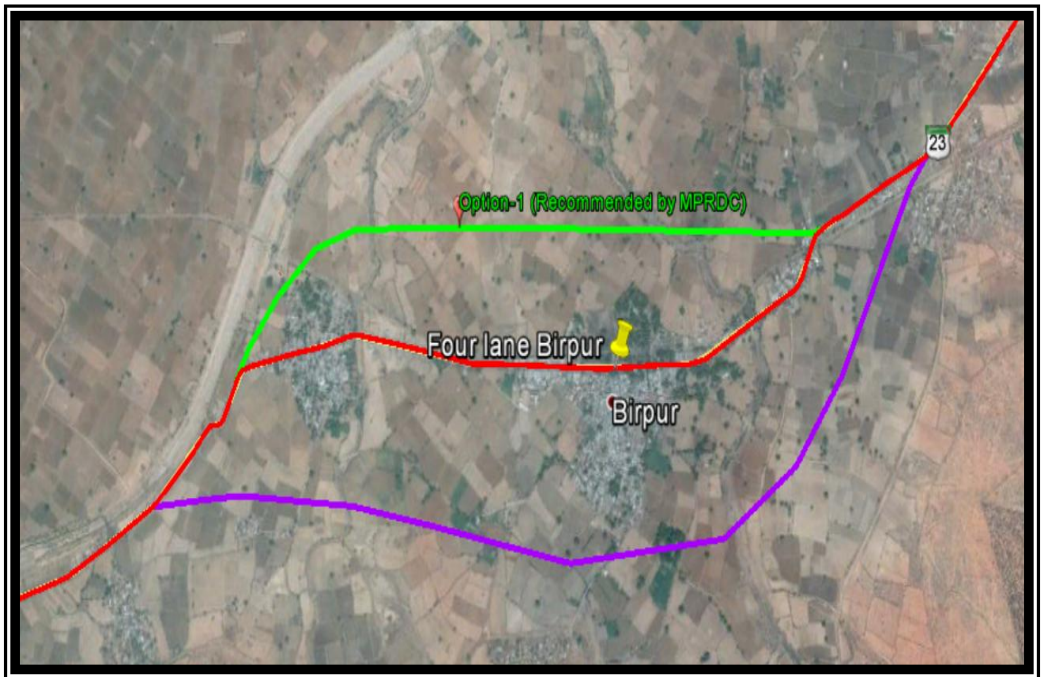


Photo-; Birpur bypass all Option- 1 & 2

➢ Krishnupura & tatipura Bypass

The third major township encountered on the project road requiring bypass is Kishnupura & tatipura. The township is thickly populated and has residential and commercial strip houses along the project road. The project road has very bad geometry and sight distance in this stretch. Any widening along the existing alignment leads to major loss to the residential and commercial structure of this very old township. Also the project road has limited ROW of 12m -15m in the town area.

Hence, it is proposed to bypass the town to avoid acquisition of the land and disturbance to the local people. The details of the options studied and recommended are given below:

Table 1-22: Features of Proposed Krishnupura & Tatipura bypass Option-1 (Recommended by MPRDC and PCM)

Sr.No.	Feature	Description
1	Starting	Proposed Ch: 137+000
2	Ending	Proposed Ch: 139+760
3	Route Alignment	LHS
4	Length of Bypass	2.76 km
5	Length of existing alignment Bypassed	3.05 km
6	Terrain	Passing Through Plain Terrain
7	Speed	80-100 km/hr
8	Geometrics	Horizontal and vertical geometric designed as per IRC
9	At Grade Junction Improvement	Major- 2 Nos.
10	Existing Land use pattern through proposed alignment	Agricultural & Barren land
11	No of Structures	Minor Bridge – 3 nos. and Culvert 5 nos., Total no of Structures is = 8 nos.
12	Land Acquisition	45 m wide strip of land is required

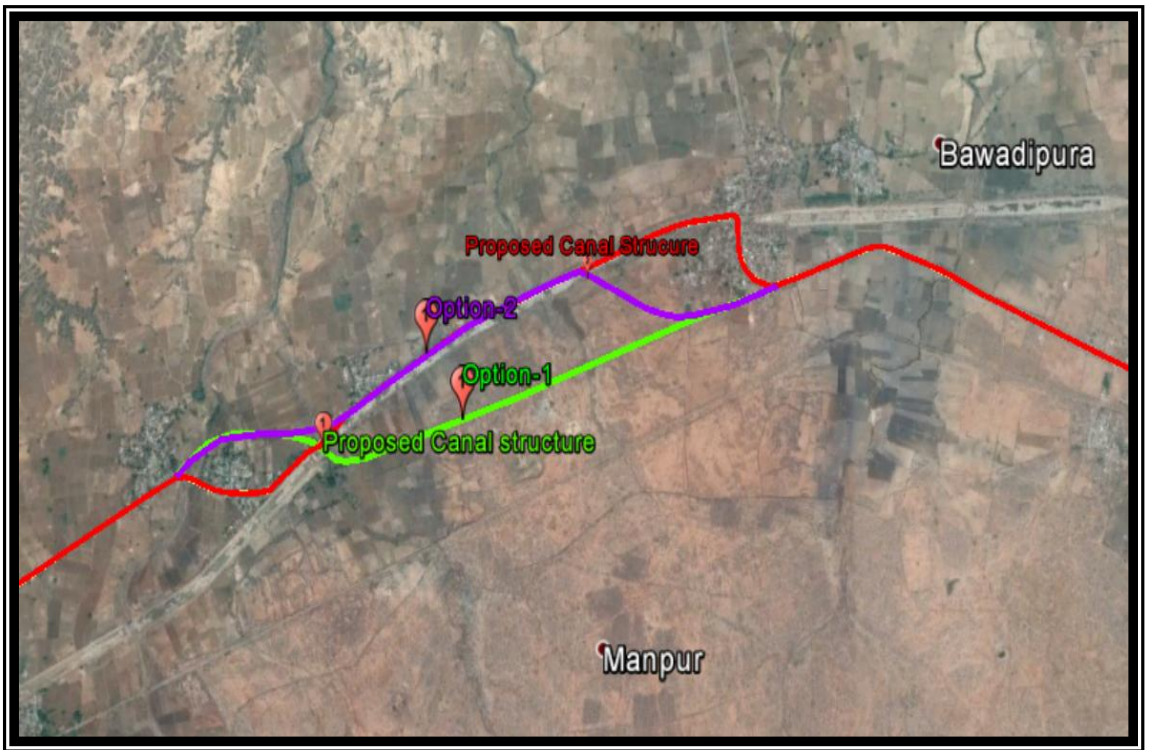


Photo-: Krishnupura & Tatipura bypass Option- 1 & 2

- **Rampahadi Bypass**

The third major township encountered on the project road requiring bypass is Rampahadi. The township is thickly populated and has residential and commercial strip houses along the project road. The project road has very bad geometry and sight distance in this stretch. Any widening along the existing alignment leads to

major loss to the residential and commercial structure of this very old township. Also the project road has limited ROW of 12m -15m in the town area.

Hence, it is proposed to bypass the town to avoid acquisition of the land and disturbance to the local people. The details of the options studied and recommended are given below:

Table 1-22: Features of Proposed Rampahadi bypass Option-3 (Recommended by MPRDC and PCM)

Sr.No.	Feature	Description
1	Starting	Proposed Ch: 147+920
2	Ending	Proposed Ch: 150+550
3	Route Alignment	LHS
4	Length of Bypass	2.63 km
5	Length of existing alignment Bypassed	2.82 km
6	Terrain	Passing Through Plain Terrain
7	Speed	80-100 km/hr
8	Geometrics	Horizontal and vertical geometric designed as per IRC
9	At Grade Junction Improvement	Major- 2 Nos.
10	Existing Land use pattern through proposed alignment	Agricultural & Barren land
11	No of Structures	Minor Bridge – 1 nos. and Culvert 4 nos., Total no of Structures is = 5 nos.
12	Land Acquisition	45 m wide strip of land is required

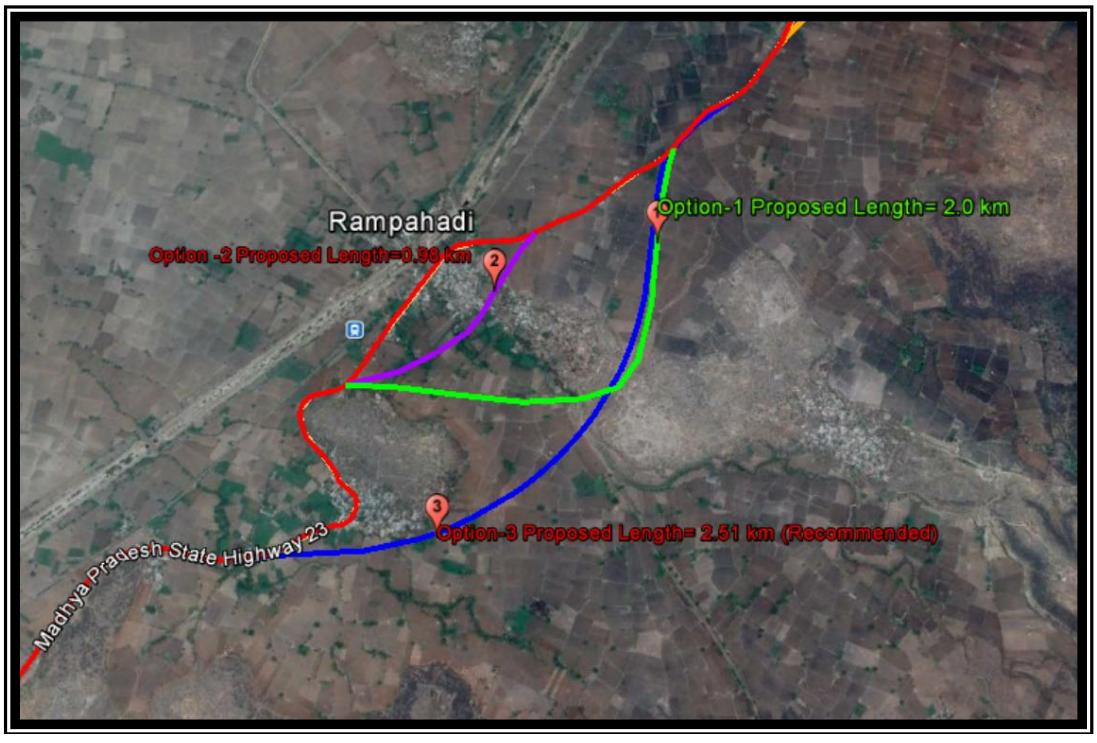


Photo-: Rampahadi Bypass all Option-1,2 & 3

Re-alignments: -

The present existing alignment of SH-23 passes through many villages/ towns where the present road becomes narrower due to parking of vehicles, lot of commercial activities, bus stand/market places and there is a no space for further improvement to segregate the local slow moving traffic. To reduce the huge demolition of built-up structures, to avoid traffic congestion and safe movement of vehicles, alternative routes have been proposed in terms of bypasses to divert the traffic from town areas.

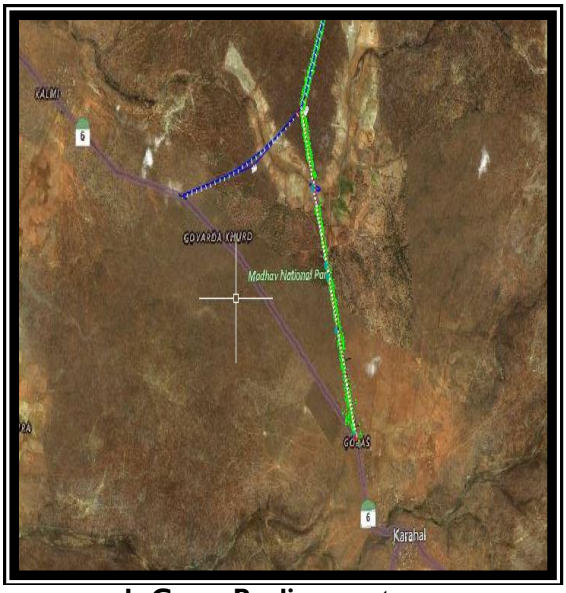
Based on reconnaissance and detailed site visit 14 Nos. of locations were initially identified for alternate alignment at different sections of project road and bypasses will be provided as 2 lane with paved shoulder carriageway. The Influencing parameters considered for recommended option of bypass alignment are followings

- Length of Proposed Option
- Road Geometric Standards
- Land Acquisition
- Structures – Minor & Major Bridges
- Junctions with MDR's, Flyovers
- Environmental Constraint
- Social Impact – Relocation and Rehabilitation costs.
- Construction Problem
- Cost

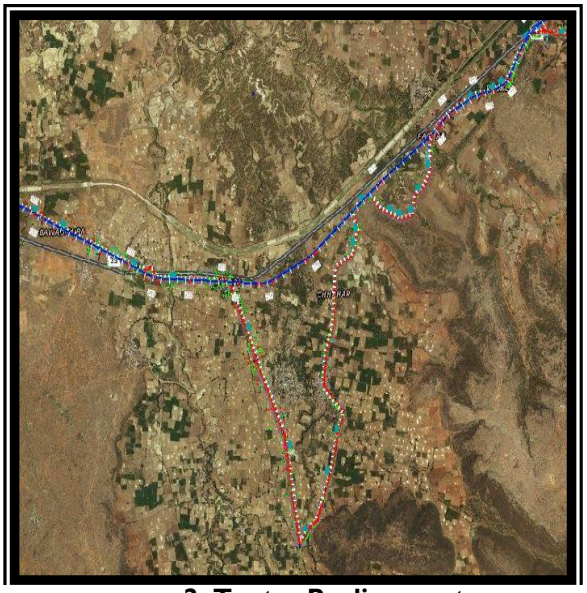
The Re-alignment locations for the project road are given in Table 1-26

Table 1-26 Re-alignment Locations

S.No.	Existing km		Proposed Chainage		Length	Remark
	From	To	From	To		
1	56+380	60+500	48+920	51+700	2780	Goras
2	79+700	80+350	70+700	71+430	730	Near Dhob
3	89+750	90+750	80+760	81+500	740	Near Hanuman Temple
4	98+220	99+400	89+000	89+960	960	Near Khuntka
5	102+270	102+550	92+850	93+100	250	
6	127+820	130+670	118+400	120+600	2200	Near Chhawar (Syphone canal)
7	143+050	144+490	133+070	134+390	1320	Near Bohare ka Pura (Under pass canal)
8	145+700	146+170	135+600	136+040	440	
9	152+340	152+600	141+880	142+110	230	
10	153+470	161+160	142+880	145+920	3040	Tentra Village
11	166+600	166+600	151+160	151+450	290	Nanda ka pura
12	168+100	168+570	152+650	153+100	450	
13	169+500	170+760	154+020	154+800	780	Near Sabalgarh
	Total Length (in Km)				**14.21**	

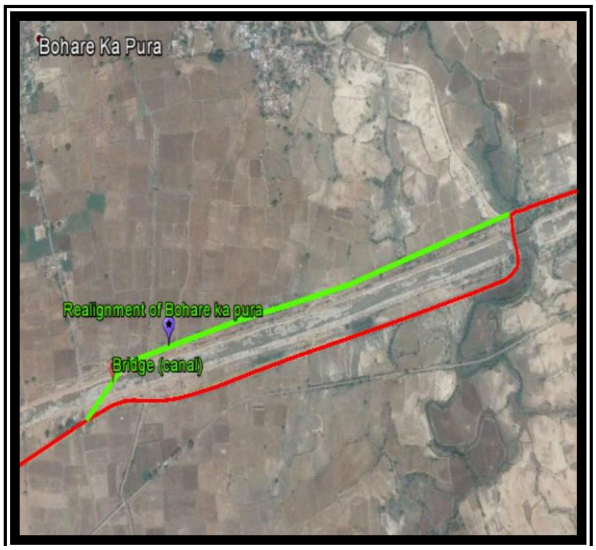


1. Goras Realignment



2. Tentra Realignment

3. near Chawar(Shyphone canal) Realignment



4. Bohare ka pura Realignment

1.9.2 Reconstruction Proposal

In order to meet future traffic requirement, the existing carriageway is proposed to upgrade to achieve high speed of travel with comfort and safety. Concentric widening scheme shall be followed to minimise land acquisition issues and to ensure maximum utilisation of existing carriageway. Tables given below shows relation between existing and proposed Chainage and section wise improvement proposed for the project road.

Table 1-27: Existing – Proposed Chainage

Sr.No.	Section	Existing Chainage	Proposed Chainage
1	***Goras shyampur sabalgarh Road***	56+380 to 170+760	48+920 to 154+800

Table 1-28 : Pavement Proposal for Project Road

Goras-Shaympur-Sabalgarh Road, Length:- 105+880 KM & 10.83 km Overlay												
Chainage From	Chainage To	Length (m)	Proposal	Design CBR (%)	Proposed Width (m)	Shoulder (BHS in m)		Proposed Pavement Composition (All Dimensions are in mm)				C/S Type
						Paved	Hard	PQC	DLC	GSB	Subgarde	
48+920	57+700	8780	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
57+700	58+900	1200	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	_	300	150	225	500	II
58+900	97+500	38600	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
97+500	98+400	900	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	_	300	150	225	500	II
98+400	118+100	19700	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
118+100	118+400	300	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	_	300	150	225	500	II
118+400	129+750	11350	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
129+750	130+100	350	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	_	300	150	225	500	II
130+100	136+800	6700	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
136+800	137+050	250	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	_	300	150	225	500	II
137+050	139+500	2450	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
139+500	139+800	300	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	_	300	150	225	500	II
139+800	147+500	7700	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
147+500	148+050	550	Reconstruction by Rigid Pavement with paved Shoulder & Drain	8.0	7.0	2.50	_	300	150	225	500	II
148+050	154+800	6750	Reconstruction Rigid Pavement	8.0	7.0	1.50	2.00	300	150	225	500	I
Total Length (m)		**1E+05**										
EX. CH:121+160	EX. CH:121+350	190	Intermediate BT OverLay (Strengthening)	8.0	5.5	BT=40 mm , DBM=60 mm						III
EX. CH:121+350	EX. CH:123+300	1950	Single Lane BT OverLay (Strengthening)	8.0	3.8	BT=40 mm , DBM=60 mm						IV
EX. CH:133+475	EX. CH:136+280	2805	Single Lane BT OverLay (Strengthening)	8.0	3.8	BT=40 mm , DBM=60 mm						IV
EX. CH:147+150	EX. CH:150+250	3100	Single Lane BT OverLay (Strengthening)	8.0	3.8	BT=40 mm , DBM=60 mm						IV
EX. CH:163+250	EX. CH:166+030	2780	Single Lane BT OverLay (Strengthening)	8.0	3.8	BT=40 mm , DBM=60 mm						IV
Total Length (m)		**10825**										

Table 1-28(B): Summary of Pavement Proposal

S.No.	TCS	Proposal	Length (km)
1	TCS-I	Reconstruction Rigid Pavement	102.03
2	TCS-II	Reconstruction Rigid Pavement with Drain	3.85
	Total Length (km)		**105.88**
	BT Overlay (Strengthening)		**10.83**

- The project road is to be designed for 80 km/hr to 100 km/hr speed in entire project road length.

1.9.3 Pavement Design

The existing pavement is reconstructed on base layer of WBM, which is almost present in the entire project stretch Road. The appropriate grade and profile correction is assumed in the reconstruction of existing pavement.

The rigid pavement is adopted for proposed carriageway reconstruction. Design period of 30 year for CC layer are adopted for carriageway and Flexible Pavement design period of 15 year. That has been designed as per **IRC 58:2015**
The proposed pavement design standard is presented in Table given below:

Table 1-29: Rigid Pavement Design

Homogeneous Section	Goras shyampur sabalgarh Road (Length = 105.880 km)
Design Period	30 Year
Design CBR (%)	8
Design CBR (%) for Hard Shoulder	12
PQC (mm)	300
DLC (mm)	150
Granular Sub-base (mm)	225
Sub grade (mm)	500

1.9.4 Junction Improvement

Simplicity and uniformity is the guiding principle for intersection design to ensure safe passage maneuvers. The primary factors considered while proposing improvement to the geometry of the existing junctions are smooth turning of vehicles, reduction of conflicts, provision of corner sight distance and safety. The geometric design of junctions is based on IRC: SP 41: Guidelines for the Design of at grade Intersections in Rural & Urban Areas. The design and detailing of all intersections are based on the type designs as outlined in the document titled, Type Designs for Intersections on National highways. Prepared by the MORTH New Delhi 1995.

Few of the notable major junctions along the project road are mentioned at Table 1-2. Apart from these, there are several minor roads that are intersecting the project road. Most of the roads are constructed under schemes namely Pradhan Mantri Gram Sadak Yojana (PMGSY) and National Rural Employment Guaranty Act (NREGA). Thus, adequate connectivity to surrounding habitations from the project road is found.

Table 1-29: Improvement Proposed for at-Grade Intersections

Table 1-29 (A): Major Junction Details

Sr. No.	Design Chainage (Km)	Major/ Minor Junction	Destination		Surface Type	Type of Junction	Width (m)
			Left	Right			
I	II	III	IV	V	VI	VII	VIII
1	48+920	Major Juction		Shivpuri	BT	Y-Junction	
2	170+760	Major Junction		Chambal	BT	T-Junction	

Table 1-29(B): Minor Junction Details

Sr. No.	Design Chainage (Km)	Destinations of Cross Road	Type of Junction	Road Side	Category of Junction(Major/Minor)
I	II	III	IV	V	VI
1	67+050	Sheopur	T-Junction	LHS	Minor Junction
2	70+220	Karrai	T-Junction	RHS	Minor Junction
3	76+050	L/S-Budhera R/S-Bargaon	X-Junction	BHS	Minor Junction
4	80+600	Dobh	T-Junction	RHS	Minor Junction
5	86+300	Simroniya	T-Junction	LHS	Minor Junction
6	91+370	Bagcha	T-Junction	RHS	Minor Junction
7	98+350	Khadi	T-Junction	LHS	Minor Junction
8	100+000	Dokarka	T-Junction	LHS	Minor Junction
9	105+600	Bhairopura	T-Junction	RHS	Minor Junction
	107+000	Sheopur	T-Junction	LHS	Minor Junction
10	107+350	Ochha	T-Junction	RHS	Minor Junction
11	107+870	Moreka	T-Junction	LHS	Minor Junction
12	115+050	Bampura	T-Junction	RHS	Minor Junction
13	116+850	Raghunathpura	T-Junction	LHS	Minor Junction
	121+050	Shyampur	T-Junction	LHS	Minor Junction
14	122+600	Station	Y-Junction	LHS	Minor Junction
15	127+980	L/S-Nadigaon R/S-Kuno	X-Junction	BHS	Minor Junction
16	130+650	Jakher	Y-Junction	LHS	Minor Junction
17	131+440	Telipura	T-Junction	RHS	Minor Junction

Sr. No.	Design Chainage (Km)	Destinations of Cross Road	Type of Junction	Road Side	Category of Junction(Major/Minor)
I	II	III	IV	V	VI
18	132+860	L/S-Gohar R/S-V.R.	X-Junction	BHS	Minor Junction
19	134+050	Panchogaon	T-Junction	LHS	Minor Junction
20	136+900	Saiarda	T-Junction	LHS	Minor Junction
21	138+350	Badagaon	T-Junction	LHS	Minor Junction
22	142+970	Kaimara Kalan	T-Junction	LHS	Minor Junction
23	144+450	Kaimara Kalan	Y-Junction	LHS	Minor Junction
24	145+950	Bolach	T-Junction	RHS	Minor Junction
25	146+050	Kaimara Khurd	T-Junction	LHS	Minor Junction
26	149+820	Gondola	Y-Junction	LHS	Minor Junction
27	154+270	L/S-Tentara V.R. R/S-Khirka	X-Junction	BHS	Minor Junction
28	156+070	Matewada	Y-Junction	RHS	Minor Junctionx`
29	161+040	Jatoli	T-Junction	LHS	Minor Junction
30	164+900	Rampahadi V.R.	X-Junction	BHS	Minor Junction
31	166+130	Gulalai	T-Junction	RHS	Minor Junction
	166+170	Kmirapur	T-Junction	LHS	Minor Junction
32	167+500	L/S-Mangrol R/S-Pawai	X-Junction	BHS	Minor Junction
33	169+270	Kajona	T-Junction	LHS	Minor Junction
34	169+800	Stone Crusher	T-Junction	RHS	Minor Junction

1.9.5 Geometric Improvement

In order to upgrade the road to the geometric requirements commensurate with the design speed, improvement has been proposed for the Project Road. The alignment passes through several villages and habitation areas of which some have built-up sections.

In order to utilize the existing carriageway to the maximum extent, the proposed centre line has been aligned within the existing carriageway with necessary correction to geometry.

Properly designed horizontal curves have been provided commensurate with design speed. All super-elevated curves have been provided with designed transition lengths. The existing geometry (both horizontal and vertical) is found to be inadequate. The alignments of the curves in these locations have been suitably corrected as per IRC standards. At the location of structures and back-to-back occurrence of summit and valley curves, correction of vertical profile is also carried out keeping in view the available and adequate sight distances.

Photo- ; Horizontal alignment along the project road.

Table 1-30: List of Curve

Sl. No.	Stretch/Design Chainage (from km to km)		Type of deficiency		Remarks
			Radius of curve	Design Speed	
1	51+932	52+104	400	100 to 80 km per hr	
2	69+932	70+111	250	100 to 80 km per hr	
3	70+716	70+732	250	100 to 80 km per hr	
4	71+199	71+488	250	100 to 80 km per hr	
5	72+865	72+909	250	100 to 80 km per hr	
6	76+300	76+350	250	100 to 80 km per hr	
7	77+969	78+053	250	100 to 80 km per hr	
8	78+836	78+854	250	100 to 80 km per hr	
9	81+233	81+294	400	100 to 80 km per hr	
10	81+871	81+909	70	100 to 80 km per hr	
11	82+079	82+152	155	100 to 80 km per hr	
12	82+362	82+378	250	100 to 80 km per hr	
13	82+594	82+677	400	100 to 80 km per hr	
14	89+837	90+036	400	100 to 80 km per hr	
15	90+453	90+535	400	100 to 80 km per hr	
16	91+369	91+465	400	100 to 80 km per hr	
17	93+662	93+689	400	100 to 80 km per hr	
18	95+460	95+497	400	100 to 80 km per hr	
19	95+933	96+010	350	100 to 80 km per hr	
20	96+465	96+495	400	100 to 80 km per hr	
21	101+415	101+442	400	100 to 80 km per hr	
22	104+886	104+900	250	100 to 80 km per hr	
23	105+489	105+542	400	100 to 80 km per hr	
24	107+537	107+561	300	100 to 80 km per hr	
25	109+096	109+113	250	100 to 80 km per hr	
26	110+032	110+056	250	100 to 80 km per hr	
27	110+964	111+057	300	100 to 80 km per hr	
28	112+351	112+432	350	100 to 80 km per hr	
29	113+170	113+243	140	100 to 80 km per hr	

Sl. No.	Stretch/Design Chainage (from km to km)		Type of deficiency		Remarks
			Radius of curve	Design Speed	
30	113+447	113+472	25	100 to 80 km per hr	
31	113+548	113+651	250	100 to 80 km per hr	
32	113+662	113+745	100	100 to 80 km per hr	
33	116+591	116+636	250	100 to 80 km per hr	
34	118+930	119+007	250	100 to 80 km per hr	
35	121+330	121+343	250	100 to 80 km per hr	
36	121+456	121+490	350	100 to 80 km per hr	
37	122+242	122+257	250	100 to 80 km per hr	
38	123+120	123+131	250	100 to 80 km per hr	
39	123+924	124+054	250	100 to 80 km per hr	
40	124+448	124+500	250	100 to 80 km per hr	
41	124+914	124+959	250	100 to 80 km per hr	
42	125+456	125+457	400	100 to 80 km per hr	
43	125+799	125+851	230	100 to 80 km per hr	
44	126+252	126+314	160	100 to 80 km per hr	
45	126+419	126+460	100	100 to 80 km per hr	
46	126+567	126+612	400	100 to 80 km per hr	
47	126+657	126+693	400	100 to 80 km per hr	
48	126+908	126+983	350	100 to 80 km per hr	
49	127+686	127+761	400	100 to 80 km per hr	
50	129+458	129+539	300	100 to 80 km per hr	
51	130+979	131+026	400	100 to 80 km per hr	
52	133+539	133+581	50	100 to 80 km per hr	
53	133+595	133+706	120	100 to 80 km per hr	
54	135+047	135+073	400	100 to 80 km per hr	
55	135+569	135+680	250	100 to 80 km per hr	
56	137+204	137+210	200	100 to 80 km per hr	
57	137+330	137+559	250	100 to 80 km per hr	All curve are improved
58	137+570	137+663	250	100 to 80 km per hr	
59	137+826	137+831	80	100 to 80 km per hr	
60	138+008	138+064	250	100 to 80 km per hr	
61	138+077	138+126	250	100 to 80 km per hr	
62	139+320	139+445	250	100 to 80 km per hr	
63	139+821	139+929	250	100 to 80 km per hr	
64	140+651	140+762	250	100 to 80 km per hr	
65	140+970	141+042	400	100 to 80 km per hr	
66	142+590	142+658	400	100 to 80 km per hr	
67	143+930	144+060	400	100 to 80 km per hr	
68	146+678	146+739	400	100 to 80 km per hr	
69	147+027	147+162	400	100 to 80 km per hr	
70	147+402	147+520	250	100 to 80 km per hr	
71	148+498	148+696	400	100 to 80 km per hr	
72	148+911	148+962	250	100 to 80 km per hr	
73	149+110	149+219	350	100 to 80 km per hr	
74	149+703	149+789	180	100 to 80 km per hr	

Sl. No.	Stretch/Design Chainage (from km to km)		Type of deficiency		Remarks
			Radius of curve	Design Speed	
75	149+948	150+042	400	100 to 80 km per hr	
76	150+269	150+320	400	100 to 80 km per hr	
77	150+484	150+516	400	100 to 80 km per hr	
78	150+628	150+667	250	100 to 80 km per hr	
79	150+868	150+963	250	100 to 80 km per hr	
80	151+036	151+151	350	100 to 80 km per hr	
81	151+357	151+384	400	100 to 80 km per hr	
82	151+473	151+551	100	100 to 80 km per hr	
83	151+567	151+662	250	100 to 80 km per hr	
84	152+147	152+233	250	100 to 80 km per hr	
85	152+287	152+327	100	100 to 80 km per hr	
86	152+818	152+906	400	100 to 80 km per hr	
87	153+003	153+094	250	100 to 80 km per hr	
88	153+276	153+441	400	100 to 80 km per hr	
89	153+917	154+050	250	100 to 80 km per hr	
90	154+268	154+317	400	100 to 80 km per hr	

As per IRC : SP :73 – 2015 page no 13 the Ruling Minimum Radii for plain terrain is 400m & absolute Minimum radii for plain terrain is 250 m. Also the details are given in table no 2.5 of Section 2 at Page no 13.

1.9.6 Bus Lay bays

There is 13 proposed Bus Lay-bays

1.9.7 Truck Lay bays

There is 12 proposed Truck lay Bays

1.9.8 Bus Shelter

There is 25 proposed Bus Shelter

1.9.9 Road Marking & Traffic Signs

Appropriate road markings are provided with stop signs, give-way signs, traffic merging and diverging signs, lane closure signs, compulsory keep left/right signs or any other signs as per IRC-67. Advance cautionary signs are proposed for sharp curves along with chevron signs at the outer edge of the curves with appropriate delineators.

1.9.10 Major Bridge/ Minor Bridge & Cross Drainage Structures

There are existing4 Major and 40 Minor bridges along with numbers of culverts. During inventory and condition survey, the details of culverts wise Improvement Proposal containing Rehabilitation, Widening or Reconstruction is given in table: 1-31.

Table 1-31Summary of Existing Bridges and CD woks is as below

Type of Structure	Major Bridges	Minor Bridges	Slab /Arch/BOX Culvert	VCW / FCW	Hume Pipe Culvert	Other
I	II	III	IV	V	VI	VII
Existing Structure 158 Nos.	4	40	22	7	84	1 (Canal Underpass)

Table 1-32: Summary of Improvement

Summary of Improvement								
S.No	Type of Structure	Existing Nos.	New Proposals				Total	Remark
			Rehabilitation	Widening	Reconstruction	New Proposed		
1	Hume Pipe Culverts	84	31	49	3	28	111	28 HPC proposed for Realignment & Bypass
2	Vented Causeway	7	4	1	2	Nil	7	2 VCW upgrade to Slab
3	Slab/Arch Culverts	13	7	3	3	9	22	9 Slab proposed for Realignment
4	Box Culverts	9	2	7	Nil	Nil	9	
5	Minor Bridge	40	18	15	7	16	56	1 MNB Rehabilitation with New construction & 16 new for Bypass
6	Major Bridge	4	4	Nil	Nil	3	7	2 MJB Rehabilitation with New construction and 1 MJB new Construction
Total Structures							187	58 structure new proposed for Realignment & Bypass

(a) Table 1-33: Details of Major Bridge

Details of Existing Bridge						Details of Proposed Bridge		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m) Overall	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
1	67+160	58+360	MJB	6 X 10.5	12.00	MJB	6 X 10.5	Rehabilitation
2	69+350	60+530	MJB	6 X 10.5	8.40	MJB	6 X 10.5	Rehabilitation& New Construction (RHS/LHS)
3	71+950	63+140	MJB	6 X 10.5	8.40	MJB	6 X 10.5	Rehabilitation& New Construction (RHS/LHS)
4	-	120+300	Realignment			MJB	11 X 25.00	New Construction
5	130+200	-	MJB	11 X 25.0	4.10	MJB	11 X 25.0	Retain

(b) *Table 1-34:* Details of Minor Bridge

Details of Existing Bridge						Details of Proposed Bridge		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m) Over all	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
1		50+750	**Goras Realignment**			MNB	5X10.40	New Construction
2	59+480		MNB	8 X 6.0	12.00	MNB	8 X 6.0	Retain
3	63+980	55+160	MNB	3 X 8.40	8.40	MNB	3 X 8.40	REHABILITATION & New Construction (RHS/LHS)
4	65+650	56+830	MNB	2 X 6.50	12.00	MNB	2 X 6.50	Widening
5	74+080	65+280	MNB	4 X 7.0	12.00	MNB	4 X 7.0	REHABILITATION
6	75+330	66+530	MNB	3 X 7.0	12.00	MNB	3 X 7.0	REHABILITATION
7	77+620	68+800	MNB	4 X 7.0	12.00	MNB	4 X 7.0	Widening
8	80+050		MNB	5X5.00	5.70	MNB	5X5.00	Retain
9		71+100	**Realignment Location**			MNB	4 x 10.00	New Construction
10	85+180	76+210	MNB	4 X 7.0	12.00	MNB	4 X 7.0	Widening
11	87+180	78+200	MNB	2 X 7.0	12.00	MNB	2 X 7.0	Widening
12	90+350		MNB	5 X 3.50	10.00	MNB	5 X 3.50	Retain
13		81+280	**Realignment Location**			MNB	2 X 10.40	New Construction
14	92+350	83+140	MNB	4 X 7.0	12.00	MNB	4 X 7.0	Widening
15	93+250	84+050	MNB	2 X 7.0	12.00	MNB	2 X 7.0	Widening
16	95+560	86+360	MNB	4 X 7.0	12.00	MNB	4 X 7.0	Widening
17	98+800		MNB	6 X 3.50	10.00	MNB	6 X 3.50	Retain
18		89+500	**Realignment Location**			MNB	3 X 8.0	New Construction
19	99+880	90+460	MNB	4 X 7.0	12.00	MNB	4 X 7.0	Widening
20	102+480		MNB	5 X 2.7	7.50	MNB	5 X 2.7	Retain
21		93+000	**Realignment Location**			MNB	2X10.00	New Construction
22	103+280	93+830	MNB	1 X 7	12.00	MNB	1 X 7	Widening
23	109+940	100+480	MNB	6 X 7.0	12.00	MNB	6 X 7.0	Widening
24	111+740	102+290	MNB	4 X 7.0	12.00	MNB	4 X 7.0	Widening
25	113+250	103+790	MNB	2 X 7.20	12.00	MNB	2 X 7.20	Widening
26	115+480	106+030	MNB	4 X 7.0	12.00	MNB	4 X 7.0	Widening
27	119+740	110+280	MNB	2 X 7.0	12.00	MNB	2 X 7.0	Widening
28	127+940		MNB	6 X 3.0	7.20	MNB	6 X 3.0	Retain

Details of Existing Bridge						Details of Proposed Bridge		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m) Overall	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
29	133+390		MNB	2 X 3.50	6.70	MNB	2 X 3.50	Retain
30		123+300	**At Birpur Bypass**			MNB	1X8.00	New Construction
31	134+070		MNB	3 X 3.50	6.70	MNB	3 X 3.50	Retain
32	135+680		MNB	3 X 5.30	6.70	MNB	3 X 5.30	Retain
33	136+050		MNB	5 X 2.50	6.80	MNB	5 X 2.50	Retain
34		124+310	**At Birpur Bypass**			MNB	1X12.00	New Construction
35		125+350	**At Birpur Bypass**			MNB	1X10.00	New Construction
36		126+080	**At Birpur Bypass**			MNB	1X10.00	New Construction
37	139+610	129+640	MNB	8 X 2.50	6.70	MNB	2 x 9	Reconstruction
38	141+720	131+740	MNB	5 X 2.50	6.70	MNB	3 x 5	Reconstruction
39		133+200	**Realignment Location**			MNB	3X25.00	New Construction
40	145+550	135+460	MNB	7 X 2.50	6.80	MNB	2 x 9	Reconstruction
41	147+250		MNB	9 X 3.0	6.70	MNB	9 X 3.0	Retain
42	147+850		MNB	2 X 3.50	7.00	MNB	2 X 3.50	Retain
43	149+850		MNB	2 X 7.5	7.00	MNB	2 X 7.5	Retain
44		137+200	**At Tatipura Bypass**			MNB	3X15.00	New Construction
45		137+820	**At Tatipura Bypass**			MNB	2X25.00	New Construction
46	150+950	140+500	MNB	6 X 2.5	6.70	MNB	3 x 5	Reconstruction
47	152+780	142+300	MNB	8 X 3.0	6.80	MNB	3 X 9.0	Reconstruction
48	156+210		MNB	5 X 2.0	6.30	MNB	2 x 6	Retain
49		143+600	**Realignment Location**			MNB	3 X 10.00	New Construction
50	160+880		MNB	4 X 4.50	6.30	MNB	2 x 10.0	Retain
51		145+350	Realignment Location			MNB	4X10.00	New Construction
52	165+130	149+860	MNB	3 X 9.0	8.40	MNB	3 X 9.0	Widening
53		149+340	**At Rampadi Bypass**			MNB	2X15.00	New Construction
54	167+490	152+040	MNB	2 X 4.5	8.40	MNB	2 X 4.5	Reconstruction
55	168+590	153+120	MNB	2 X 5.0	8.40	MNB	2 x 6	Reconstruction

(c) Table 1-35: Details of Hume Pipe Culverts

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
1		49+400	At Goras Realignment			HPC	2 ROW 1200	New Construction
2		49+800	At Goras Realignment			HPC	1 ROW 1200	New Construction
3		50+500	At Goras Realignment			HPC	1 ROW 1200	New Construction
4		51+400	At Goras Realignment			HPC	1 ROW 1200	New Construction
5	56+420		HPC	1 ROW 1000	12.60	HPC	1 ROW 1000	Retain
6	57+740		HPC	1 ROW 1000	12.40	HPC	1 ROW 1000	Retain
7	58+390		HPC	1 ROW 1000	12.50	HPC	1 ROW 1000	Retain
8	65+300	56+480	HPC	2 ROW 1000	15.10	HPC	2 ROW 1000	Rehabilitation
9	67+750	58+930	HPC	1 ROW 1000	12.40	HPC	1 ROW 1000	Widening
10	68+280	59+450	HPC	2 ROW 1000	12.40	HPC	2 ROW 1000	Widening
11	68+540	59+720	HPC	2 ROW 1000	15.00	HPC	2 ROW 1000	Rehabilitation
12	69+860	61+040	HPC	2 ROW 1000	12.50	HPC	2 ROW 1000	Widening
13	70+570	61+750	HPC	2 ROW 1000	12.60	HPC	2 ROW 1000	Widening
14	71+030	62+200	HPC	1 ROW 1000	12.60	HPC	1 ROW 1000	Widening
15	71+620	62+800	HPC	2 ROW 1000	12.60	HPC	2 ROW 1000	Widening
16	72+420	63+590	HPC	1 ROW 1200	12.70	HPC	1 ROW 1200	Widening
17	74+680	65+850	HPC	1 ROW 1000	12.40	HPC	1 ROW 1000	Widening
18	76+030	67+200	HPC	1 ROW 1000	12.50	HPC	1 ROW 1000	Widening
19	76+430	67+600	HPC	1 ROW 1000	12.50	HPC	1 ROW 1000	Widening
20	77+320	68+490	HPC	1 ROW 1000	15.00	HPC	1 ROW 1000	Rehabilitation
21	79+040	70+200	HPC	2 ROW 1000	12.40	HPC	2 ROW 1000	Widening
22	79+570	70+730	HPC	1 ROW 1000	12.60	HPC	1 ROW 1000	Widening
23	79+800		HPC	1 ROW 1000	12.50	HPC	1 ROW 1200	Retain
24		70+900	Realignment Location			HPC	1 ROW 1200	HPC
25	80+690	71+720	HPC	1 ROW 1000	14.30	HPC	1 ROW 1000	Rehabilitation
26	81+030	72+060	HPC	2 ROW 1000	11.60	HPC	2 ROW 1000	Widening
27	82+230	73+240	HPC	1 ROW 1000	11.70	HPC	1 ROW 1000	Widening

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
28	85+840	76+870	HPC	2 ROW 1000	11.60	HPC	2 ROW 1000	Widening
29	86+680	77+700	HPC	1 ROW 1000	11.60	HPC	1 ROW 1000	Widening
30	88+840	79+860	HPC	1 ROW 1000	11.70	HPC	1 ROW 1000	Widening
31	89+540	80+560	HPC	2 ROW 1000	11.70	HPC	2 ROW 1000	Widening
32	91+700	82+490	HPC	1 ROW 1000	11.70	HPC	1 ROW 1000	Widening
33	93+650	84+440	HPC	2 ROW 1000	11.90	HPC	2 ROW 1000	Widening
34	94+280	85+080	HPC	1 ROW 1000	11.80	HPC	1 ROW 1000	Widening
35	96+740	87+520		2 ROW 1000	11.70	HPC	2 ROW 1000	Retain
36	99+270		HPC	1 ROW 1000	11.80	HPC	1 ROW 1000	Retain
37		89+800	Realignment Location				1 ROW 1200	HPC
38	99+420	90+000	HPC	1 ROW 1000	11.80	HPC	1 ROW 1000	Widening
39	104+490	95+030	HPC	1 ROW 1000	11.70	HPC	1 ROW 1000	Widening
40	108+830	99+370	HPC	1 ROW 1000	11.40	HPC	1 ROW 1000	Widening
41	110+890	101+430	HPC	1 ROW 1000	11.20	HPC	1 ROW 1200	Reconstruction
42	112+410	102+960	HPC	2 ROW 1000	6.70	HPC	2 ROW 1200	Reconstruction
43	114+060	104+610	HPC	2 ROW 1000	11.10	HPC	2 ROW 1000	Rehabilitation
44	114+260	104+810	HPC	1 ROW 1000	11.70	HPC	1 ROW 1000	Widening
45	115+010	105+550	HPC	2 ROW 1000	11.00	HPC	2 ROW 1000	Widening
46	116+700	107+240	HPC	1 ROW 1000	11.20	HPC	1 ROW 1000	Widening
47	117+940	108+470	HPC	1 ROW 1000	11.70	HPC	1 ROW 1000	Widening
48	122+370		HPC	1 ROW 600	-	HPC	1 ROW 600	Retain
49	122+540		HPC	1 ROW 1000	9.30	HPC	1 ROW 1000	Retain
50	122+650		HPC	1 ROW 1200	7.20	HPC	1 ROW 1200	Retain
51		112+100	At Syampur Bypass			HPC	1 ROW 1200	New Construction
52		112+450	At Syampur Bypass			HPC	1 ROW 1200	New Construction
53		112+900	At Syampur Bypass			HPC	1 ROW 1200	New Construction

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
54		113+300	At Syampur Bypass			HPC	1 ROW 1200	New Construction
55	123+710	114+290	HPC	1 ROW 1000	10.20	HPC	1 ROW 1000	Widening
56	125+000	115+580	HPC	2 ROW 1000	15.10	HPC	2 ROW 1000	Rehabilitation
57	127+040	117+610	HPC	2 ROW 1000	10.10	HPC	2 ROW 1000	Widening
58	128+680		HPC	1 ROW 1000	10.10	HPC	1 ROW 1000	Retain
59	129+440		HPC	1 ROW 1000	10.20	HPC	1 ROW 1000	Retain
60		118+600	Realignment Location			HPC	1 ROW 1200	New Construction
61		119+650	Realignment Location			HPC	1 ROW 1200	New Construction
62		120+160	Realignment Location			HPC	1 ROW 1200	New Construction
63	132+820	122+750	HPC	2 ROW 900	10.00	HPC	2 ROW 900	Widening
64	135+200		HPC	1 ROW 900	10.30	HPC	1 ROW 900	Retain
65	135+340		HPC	2 ROW 900	10.20	HPC	2 ROW 900	Retain
66		123+820	At Birpur Bypass			HPC	1 ROW 1200	New Construction
67		124+850	At Birpur Bypass			HPC	1 ROW 1200	New Construction
68	136+440	126+450	HPC	1 ROW 1000	10.10	HPC	1 ROW 1000	Widening
69	136+680	126+700	HPC (CANAL)	1 ROW 1000	10.10	HPC	1 ROW 1000	Widening
70	138+040	128+050	HPC	2 ROW 1000	10.20	HPC	2 ROW 1000	Widening
71	138+810	128+820		1 ROW 1000	10.10	HPC	1 ROW 1000	Widening
72	139+500	129+510	HPC	1 ROW 1000	10.10	HPC	1 ROW 1000	Widening
73	142+210	132+220	HPC	2 ROW 1000	10.00	HPC	2 ROW 1000	Widening
74	142+350	132+360		3 ROW 1000	10.10	HPC	3 ROW 1000	Widening
75	142+760	133+780	HPC	3 ROW 1000	10.10	HPC	3 ROW 1000	Widening
76	143+160		HPC	1 ROW 1000	10.10	HPC	1 ROW 1000	Retain
77	143+850			1 ROW 1200	10.40	HPC	1 ROW 1200	Retain

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
78	144+290		HPC	2 ROW 1000	10.10	HPC	2 ROW 1000	Retain
79		134+000	Realignment Location				2 ROW 1200	HPC
80	144+810	134+720	HPC	2 ROW 1000	10.00	HPC	2 ROW 1000	Widening
81		135+790	Realignment Location				1 ROW 1200	HPC
82	146+320	136+165	HPC	2 ROW 1000	10.20	HPC	2 ROW 1000	Widening
83	148+540		HPC	2 ROW 1000	7.20	HPC	2 ROW 1000	Retain
84		137+420	At Tatipura Bypass			HPC	1 ROW 1200	New Construction
85		138+200	At Tatipura Bypass			HPC	1 ROW 1200	New Construction
86		138+900	At Tatipura Bypass			HPC	1 ROW 1200	New Construction
87		138+600	At Tatipura Bypass			HPC	1 ROW 1200	New Construction
88	150+510	140+110	HPC	3 ROW 1000	10.10	HPC	3 ROW 1000	Widening
89	151+320	140+860	HPC	2 ROW1000	10.00	HPC	2 ROW1000	Widening
90	152+250	141+800	HPC	3 ROW 1000	10.20	HPC	3 ROW 1000	Widening
91	155+140		HPC	2 ROW1000	10.10	HPC	2 ROW1000	Retain
92	156+850		HPC	2 ROW1000	10.00	HPC	2 ROW1000	Retain
93	159+370		HPC	2 ROW1000	10.30	HPC	2 ROW1000	Retain
94	159+660	144+850	HPC	1 ROW 1000	10.20	HPC	1 ROW 1000	Widening
95	159+760			1 ROW 1000	10.10	HPC	1 ROW 1000	Retain
96	160+020		HPC	2 ROW1000	10.10	HPC	2 ROW1000	Retain
97	160+140		HPC	1 ROW 1000	10.10	HPC	1 ROW 1000	Retain
98	160+580			1 ROW 1000	10.10	HPC	1 ROW 1000	Retain
99		145+000	Realignment Location			HPC	1 ROW 1200	New Construction
100		145+680	Realignment Location			HPC	2 ROW 1200	New Construction
101	161+730	146+490	HPC	2 ROW 1000	10.20	HPC	2 ROW 1000	Widening
102	162+03	146+680	HPC	2 ROW 1000	10.10	HPC	2 ROW 1000	Widening

Details of Existing Culvert						Details of Proposed Culvert		
S. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe X Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe X Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
	0							
103	162+130		HPC	2 ROW 1000	10.10	HPC	2 ROW 1000	Widening
104		146+900				HPC	1 ROW 1200	HPC
105	162+670	147+430	HPC	2 ROW 1000	10.10	HPC	2 ROW 1000	Widening
106	162+830	147+590	HPC	1 ROW 1000	10.10	HPC	1 ROW 1200	Reconstruction
107	163+830		HPC	Chocked	10.00	HPC	Chocked	Retain
108		149+000	At Rampadi Bypass			HPC	1 ROW 1200	HPC
109		149+900	At Rampadi Bypass			HPC	1 ROW 1200	New Construction
110		150+400	At Rampadi Bypass			HPC	1 ROW 1200	New Construction
111		154+220	Realignment Location			HPC	1 ROW 1200	New Construction

(d) ***Table 1-36Details of VCW / FCW***

Details of Existing Culvert						Details of Proposed Culvert		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
1	129+240	-	FCW		4.10	FCW		Retain
2	136+880	126+890	VCW	5 ROW 1000	10.10	VCW	5 ROW 1000	Widening
3	144+470	134+380	VCW	3 ROW 1000		SLAB	1 X 6	Reconstruction
4	144+490	134+400	VCW	5 ROW 1000	10.00	SLAB	1 X 6	Reconstruction
5	157+270	-	VCW	6 ROW 1000	6.50	SLAB	1 X 6	Retain
6	160+350	-	VCW	6 ROW1000	10.00	VCW	6 ROW1000	Retain
7	166+830	-	VCW	5 ROW 1000	10.10	SLAB	5 ROW 1000	Retain

(e) Table 1-37 Details of Slab/BOX/Arch Culverts

Details of Existing Culvert						Details of Proposed Culvert		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m) Overall	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
1	58+520		SLAB	1 X 3.00 m	12.00	SLAB	1 X 3.00 m	Retain
2	68+700	59+880	SLAB	1 X 3.00 m	12.20	SLAB	1 X 3.00 m	Widening
3	73+080	64+250	SLAB	1 X 3.00 m	12.00	SLAB	1 X 3.00 m	Widening
4	105+440	95+980	BOX	1 X 2.0 X 4.0	12.00	BOX	1 X 2.0 X 4.0	Widening
5	105+700	96+240	BOX	1 X 2.0 X 2.50	12.00	BOX	1 X 2.0 X 2.50	Widening
6	106+610	97+160	BOX	1 X 3.0 X 3.50	12.00	BOX	1 X 3.0 X 3.50	Widening
7	114+550	105+090	BOX	1 X 3.0 X 2.0	6.50	BOX	1 X 3.0 X 2.0	Widening
8	120+130	110+670	BOX	1 X 2.0 X 2.0	7.50	BOX	1 X 2.0 X 2.0	Widening
9	120+420	110+970	BOX	1 X 3.0 X 2.0	7.50	BOX	1 X 3.0 X 2.0	Widening
10	121+140	111+680	BOX	1 X 3.0 X 2.0	12.00	BOX	1 X 3.0 X 2.0	Widening
11	121+500		BOX	1 X 2.0 X 2.0	12.00	BOX	1 X 2.0 X 2.0	Retain
12	121+910		BOX	1 X 3.0 X 2.0	12.00	BOX	1 X 3.0 X 2.0	Retain
13	122+980		SLAB	1 X 2.0	8.50	SLAB	1 X 2.0	Retain
14	123+310	113+900	SLAB	1 X 3.0	8.70	SLAB	1 X 3.0	Reconstruction
15	123+930	114+510	SLAB	1 X 3.0	8.60	SLAB	1 X 3.0	Widening
16		119+300				SLAB	1 X 3.0	New construction
17	131+990	121+920	SLAB (CANAL)	1 X 1.50	6.80	SLAB (CANAL)	1 X2	Reconstruction
18	134+690		SLAB	1 X 2.50	6.80	SLAB	1 X 2.50	Retain
19		125+700	At Birpur Bypass			SLAB	1 X 4.0	New construction
20	148+940		ARCH	1 X 3.0	5.70	ARCH	1 X 3.0	Retain
21		137+650	At Tatipura Bypass			SLAB	1 X 4.0	New construction
22	153+940		SLAB	1 X 1.20	5.40	SLAB	1 X 2	Retain
23	159+240		SLAB	1 X 4.0	8.40	SLAB	1 X 4.0	Retain
24		143+100	Realignment Location			SLAB	1 X 3.00 m	New construction
25		143+850	Realignment Location			SLAB	1 X 3.00 m	New construction

Details of Existing Culvert						Details of Proposed Culvert		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m) Overall	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
26		144+620	Realignment Location			SLAB	1 X 3.00 m	New construction
27	163+130	147+880	SLAB	2 X 2.00	5.00	SLAB	1 X6.0	Reconstruction
28		148+510	At Rampahadi Bypass			BOX	1 X 2.0 X 2.50	New construction
29		151+270	Realignment Location			BOX	1 X 3.0 X 3.50	New construction
30	170+570		SLAB	1 X 1.5	10.10	SLAB	1 X 1.5	Retain
31		154+500	Realignment Location			BOX	1 X 2.0 X 2.0	New construction

(f)Table 1-37 Details of ROB

Details of Existing Culvert						Details of Proposed Culvert		
Sr. No	Existing Chainage	Design Chainage	Type of Existing Structure	No of Span / Pipe x Length Span / dia	Existing Width (m)	Type of Structure Proposed	Arrangement No of Span / Pipe x Length Span / dia	Proposal & Proposed width
I	II	III	IV	V	VI	VII	VIII	IX
1	-	113+690	At Shyampur Bypass			ROB	1 X 36.0	New construction
2	-	118+960	Realignment			ROB	1 X 36.0	New construction
3	-	123+900	Birpur Bypass			ROB	1 X 36.0	New construction
4	-	141+980	Madewa ka pura village			ROB	1 X 36.0	New construction

1.10 Cost Estimate

Cost estimate for the project Road is finalised based on the improvement proposals.

Table 1-38: Total Cost of Project Road

Section	Proposed Length (km)	Base Cost (Crores)	Base Cost Per K.M. (Crores)
I	II	III	IV
Goras to Sabalgarh	105.880	773.75	7.31

Reference: - Details have been given in chapter -6

1.11 Conclusions and Recommendations

As per contract agreement the current stage of corridor comprises preparation of DPR for rehabilitation and upgrading of existing road to 2-lane with paved shoulder. We have conducted Classified Traffic Volume counts at 2 No locations for analysing the capacity. As per analysis of the traffic surveys total number of PCUs at all two locations has crossed the threshold limit (15000 PCU) of design service volume for 2 lane roads with paved shoulder configuration as per the IRC in year 2041.

The existing road has stretches whose geometrics do not conform to IRC standards will need to be improved by means of realignments and by reconstruction. The road passes through ribbon development at 15 Nos locations, where travel speed does not meet NH standards, hence bypasses have been proposed for them. The soil conditions along the project road are generally good and the construction materials like soil and aggregates are available nearby.

It is recommended that the project be undertaken for two laning with paved in the immediate future.