ANNEXURE- ALTERNATIVE SITES EXAMINED

Four laning of Chitrakoot - Kothi Section of NH 135BG from km 0.000 to km 55.000 (Package-I) under Bharatmala Pariyojana in the State of Uttar Pradesh and Madhya Pradesh

1.0 INTRODUCTION

During the course of the detailed site investigations, the Consultant examined both the option of improvement & widening of the existing road and also the possibility of Re-alignments / Bypasses for some built up stretches which are difficult to widen due to Engineering and other constraints and the collective details are explained below.

2.0 IMPROVEMENT AND WIDENING OF EXISTING ROAD

The consultants have carried out detailed topographic survey of the existing alignment along with other engineering investigations.

As enumerated in Section 3.0 of this report, the existing road is deficient in geometrics and improving the geometrics will involve higher social unrest due to dismantling of road side structures. Further, there are some major bottlenecks for widening and improvement of existing road.

The project road is carrying medium to heavy traffic and become eligible for capacity augmentation to four lanes. With existing geometrics, terrain and involvement of R&R constraints, it is not feasible to widen the existing road to four lanes.

Considering the above facts, it is apparent that improvement & widening the existing road will be possible for some length and not for the entire length. Hence some alternative proposals of Re-alignments / Bypasses have been explored. The Consultant has accordingly worked out the alternative proposals and is described in the following sections:

The evaluation criterion for widening proposals is as follows:

- ***Technical Considerations*** – Geometric, movement of traffic during construction, earthwork, cross drainage works, junction layout, relocation of existing utilities, bypasses, construction costs, and maintenance costs.
- ***Environmental Consideration*** – land use change, location of water bodies, river / canal / stream crossing, location of protected areas / critically polluted areas / eco-sensitive areas / forest etc.
- ***Social Consideration*** - Area of land acquisition, type of land acquisition, location of religious places / educational institutions / medical amenities / drinking water sources, resettlement and rehabilitation problems and costs.

3.0 POSSIBLE BYPASSES / RE-ALIGNMENTS

Chitrakoot is a famous religious place and during religious festival, it was observed that, the congestion situation is serious. Traffic movement along the existing road is very critical. Due to presence of market and religious structures along existing road widening

is not feasible. Widening along existing will involve large scale demolition and will create social unrest .Improvement along existing as per IRC codal provision may not be feasible and will involve large scale demolition of structures. Hence to avoid these hindrances for improvement a bypass option has been proposed. Further, during the presentation and discussion on 5th Dec 2017 at PIU, Katni and 8th Dec 2017 with the State Govt. stake holders (RO, MoRTH, Bhopal, CE, NH and GM, MPRDC, it was finally decided to provide **bypass at Chitrakoot**.

Within a short stretch of 3.5 km (existing km 28+500 to Km 32+000) near village **Pindra**, there are 8 substandard horizontal curves having radius of 75m 100m and 180m and habitation are along the existing road with building line clearance of 31m. Improvement along existing road including curve improvement will involves demolition of structures. Hence to avoid such demolitions a small **realignment** of length 3.35 km has been proposed.

At Km 32+500 (design Km 31+300) the alignment crosses Mandakini river and traverses in Uttar Pradesh for a length of 1 km. Due to presence of habitation and the river is running parallel to the existing road. The existing horizontal radiuses are about 60 and 160m between Km 32+600 to Km 34+450(existing). Improvement along existing is not feasible on right side. Hence to avoid such constraints realignment of about 1.6 length km has been proposed. The details of bypass and realignment are tabulated in **Table 1-1** below:

Table 1 - 1 Possible Locations of Realignments / Bypasses

Sl. No.	Existing Chainage (Km)		Design Chainage (Km)			Remarks
	Start	End	Start	End	Length	
1	0+000	10+800	0+000	11+13	11.13	Chitrakoot Bypass
2	28+500	32+000	27+450	30+800	3.350	Realignment at Pindra Village
3	32+600	34+450	31+400	33+000	1.600	Realignment

Source: Feasibility Study carried out by ICT Pvt. Ltd., New Delhi

4.0 ANALYSIS OF ALTERNATIVES

Chitrakoot Bypass: The project road starts from junction of NH 35 (Old NH 76) at Chitrakoot, the famous religious place in Uttar Pradesh. Due to the religious activities, the initial 8 km passes through congested market area which includes 5 km in Uttar Pradesh and balance length in Madhya Pradesh. The building to building distances within this market area are about 15m to 25m. There are about 21 sub-standard horizontal curves with least radius of 12m. Improvement along existing will involve large scale demolition of commercial as well as religious structures. Due to religious sentiment and large scale commercial activities demolition will increase social unrest and loss of livelihood. Hence considering the facts bypass options have been explored.

It may be noted that, during the site visit of Member (P) on 20th June 2017 and 21st June 2017, **it was decided that, the bypass of this project will start from the proposed bypass** (Km 1.1) **of BRT project (Chitrakoot-Palhana BRT project).** The proposed bypass of BRT project has been planned to traverse on right side. Hence, a bypass on right site (West side) starting from village Ranipur has been explored. Further in the

meeting held on 2nd May 2018 in PIU Katni, it was decided that the BRT project will not take up immediately and hence the bypass will start from NH 35 (near Km 278). Then the bypass alignment traversing on the west side of the Kamad Giri and joins the existing road just after the road to Hanuman dhara. A layout of the proposed bypass options is shown in **Figure-1**.

A. Option I : Bypass on Right side (Westside existing Km 0+000 to Km 11+130)
B. Option II : Up gradation / widening of the existing road

The comparison of the bypass options on various parameters is given in **Table-1.**

Table-1: Comparison of different Alignment Proposal of Chitrakoot Bypass

S. No.	Factor / Parameter	Option I (Bypass)	Option II (widening of existing road)
1.	Length (Km)	10.800	11.13
2.	Lane Configuration	4 Lane	4 Lane with service road
3.	Service road/ slip (Km)-Both side	5.37	9.5
4.	Geometrics	Good. Design speed 100 Kmph	Poor Design Speed 20 Kmph
5.	PROW (m)	70	45
6.	Land Acquisition (ha)	75.6	46
7.	Bridges/ structures	VUP-5 Minor Bridge-1 Flyover - 1	Minor Bridge-2 Elevated - 4.0km
8.	Major Junctions	3	3
9.	Water bodies	No impact	**1 pond will be impacted**
10.	Land use	Large Scale	Medium Scale
11.	Forest	No impact	No impact
12.	Impact on Trees	**Approx. 200** private trees to be felled	**Approx. 594 numbers of trees along existing road to be felled**
13.	Protected Areas (NP/ WLS/ BR etc.)	No Protected Areas within 10 km	No Protected Areas within 10 km
14.	Eco Sensitive Zone (ESZ)	No ESZ within 10 km	No ESZ within 10 km
15.	Environmentally Sensitive Receptors	No impact	**27 religious structures & 2 hospitals are to be demolished;** 2 educational institutions will be partially impacted
16.	Structures Impacted	Approx. **27 structures** are to be demolished	Approx. **977 structures** are to be demolished
17.	Utility Relocation	Negligible	Large scale
18.	Social Impact	Cultivation/ barren land acquisition	Land acquisition is not feasible due to thick built up
19.	Civil Cost (Rs. in Crores)	**152.21**	**770.00**

Source: Feasibility Study carried out by ICT Pvt. Ltd., New Delhi

Figure-1 Alignment Options of Proposed Chitrakoot Bypass

It could be seen from the above discussion that **Option II will involve large scale demolition and social unrest and hence Option I is recommended**. The above proposed bypass passes through Uttar Pradesh for a length of 8.7 km and balance 2.1 km in Madhya Pradesh.

After the proposed Chitrakoot Bypass, the project road enters the forest area (Pathra Choubey Jagir village, Design Km 14+650) in Madhya Pradesh and the forest area continues upto Km 27+400. During investigation, it was observed that, improvement to 2 lane standard work by MPRDC was under progress. The substandard curves were not also improved to National Highway Standard. At some location the gradients are also more than 6%. There are **22 substandard curves which have been proposed for improvement.**

Realignment at Pindra Village: Then the project road follows the newly developed SH upto Km 27+900. Within a short stretch of 3.5 km (existing km 28+500 to Km 32+000) near village Pindra, there are 8 substandard horizontal curves having radius of 75m 100m and 180m and habitation are along the existing road with building line clearance of 31m. Improvement along existing road including curve improvement will involves demolition of structures. Hence to avoid such demolitions **a small realignment of length 3.35 km has been proposed**. A layout showing the realignment is shown in **Figure-2** below:

Figure-2 Re-alignment Proposal for Pindara Village

Realignment: At Km 32+500 (design Km 31+300) the alignment crosses Mandakini river and traverses in Uttar Pradesh for a length of 1 km. Due to presence of habitation and the river is running parallel to the existing road. The existing horizontal radiuses are about 60 and 160m between Km 32+600 to Km 34+450(existing). **Improvement along existing is not feasible on right side**. Hence to avoid such constraints **realignment of**

1.6 km length has been proposed. A layout showing the realignment is shown in **Figure-3** below:

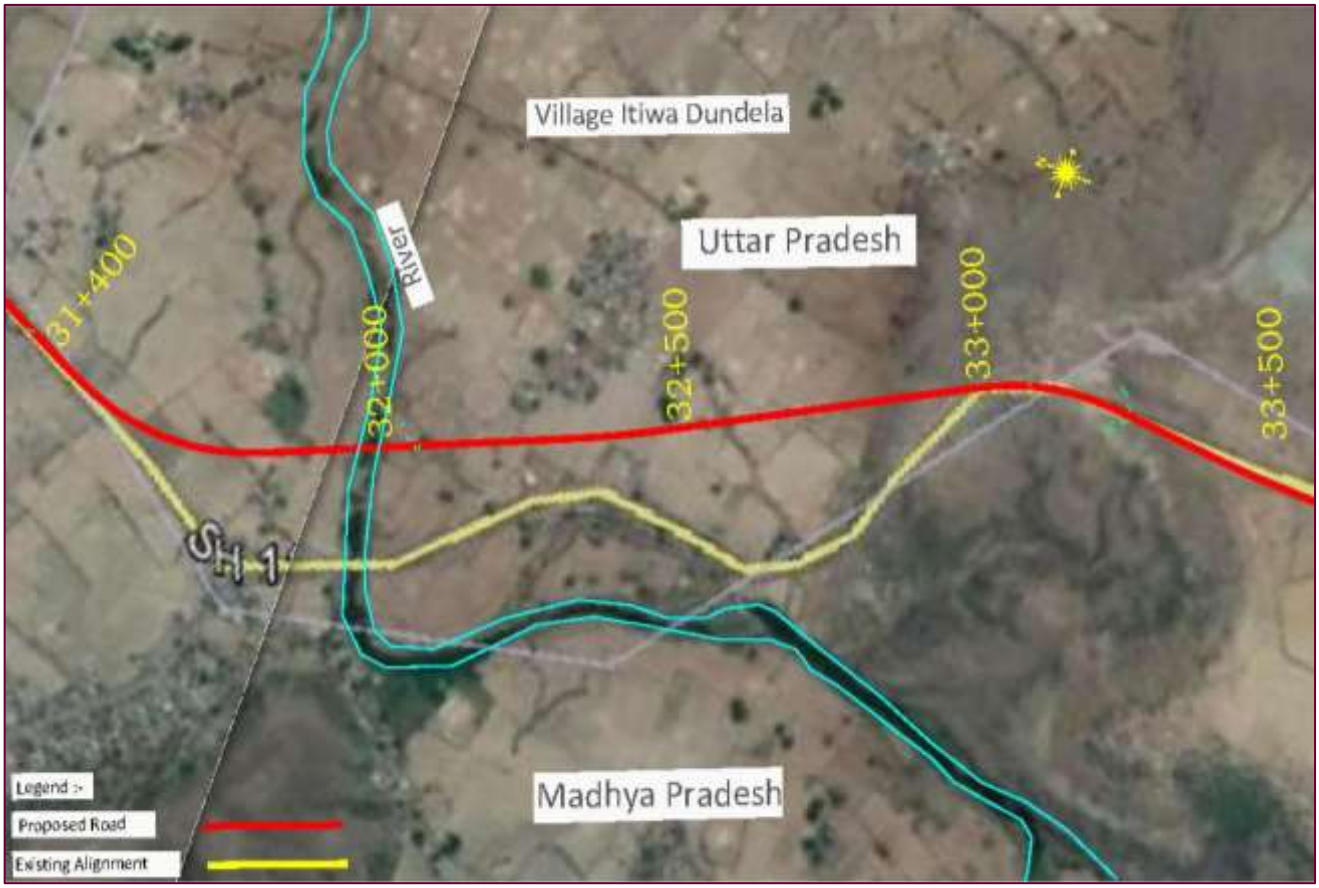

Figure-3 Alignment proposal for Itwa Dudella

Then the alignment follows the existing road upto Kothi including newly constructed bypass at Majhgawa. The alignment in this section passes through forest area up to Km 53+500.

Excluding the above bypassed and realignment sections, **there are 15 locations where the existing substandard curves have been proposed for improvement as per IRC standard**.

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