

CHAPTER 3: ANALYSIS OF ALTERNATIVES

1.1 INTRODUCTION

This chapter has been comparing the feasible alternatives to the proposed project with respect to site, technology, design etc. The alternatives examined taking into account all the possible and feasible options and include with and without project scenarios in terms of the potential environmental impacts of the project.

1.2 CRITERIA FOR SELECTION OF SITE

- The Economic Corridor between two terminal stations should be short and straight as far as possible, but due to engineering, social and environmental considerations, some deviations may be required.
- The project should be constructible and easy to maintain; the Greenfield project should reduce the vehicle operation cost with respect to the existing option already available i.e. using the NH-19 to reach from point A to point B.
- It should be safe at all stages i.e. during design, construction and operation stages.
- Safety audits at each stage should confirm the same.
- The project initial cost, maintenance cost, and operating cost should be optimum to be considered economical with respect to its options.
- The alignment should be finalized giving due consideration to sitting/location of major structures including Major/Minor Bridges, Interchanges and ROBs. The space requirement of interchanges to be kept into consideration to avoid major resettlement.
- Tunnel / Box cutting of Hills should be considered as the last option and should be provided only when it is absolutely necessary.
- The location of spurs for connecting the important towns to be decided while fixing the alignment Options.
- The alignment should follow the unused / barren land to the extent possible to reduce the cost of land acquisition.
- The proposed options in the present case connects the under developed regions of Bihar which would lead to the development of new growth centres along the proposed highway i.e. paving the way for economic development of the region.

Obligatory points through which alignment options should not pass are detailed below:

Habitations: Proposed alignment is fixed in such a way that traverses at a minimum distance of 150 m from built up areas and avoiding important buildings and structures. However, few isolated buildings falling along the alignment cannot be avoided due to Geometric requirements.

Wildlife Sanctuaries, National Parks, Reserve Forest and other Eco Sensitive Zones: The proposed alignment does not passes through any Wildlife Sanctuary but falls within 10 km boundary, National Park and other Eco Sensitive Zones. Also approx. 103.211 ha of the proposed project passes through Protected Forest. Utmost care is taken while fixing the alignment near forest areas. The MOEF&CC guidelines have been adhered to and the alignment has been fixed keeping it away from any eco-sensitive zone.

Water Bodies: The proposed alignment has been fixed taking due consideration & importance of retaining the existing water bodies as far as feasible.

Railway Crossings and Important Structures: The components, which increases the project cost, are the presence of the Major bridges, ROBs and other structures. In order to reduce the project cost number of structures and its length were given due consideration while finalizing the alignment.

Alternate alignment On Google Map For Development of 4/6 lane (green field) access control expressway from Varanasi to Kolkata Package-III from Km 113.400 (near Tetarahar village) to Km 184.400 (near Shahpur village, Bihar/Jharkhand Border) in the state Bihar under Bharatmala Pariyojana Phase-II (lot-9 package-3).

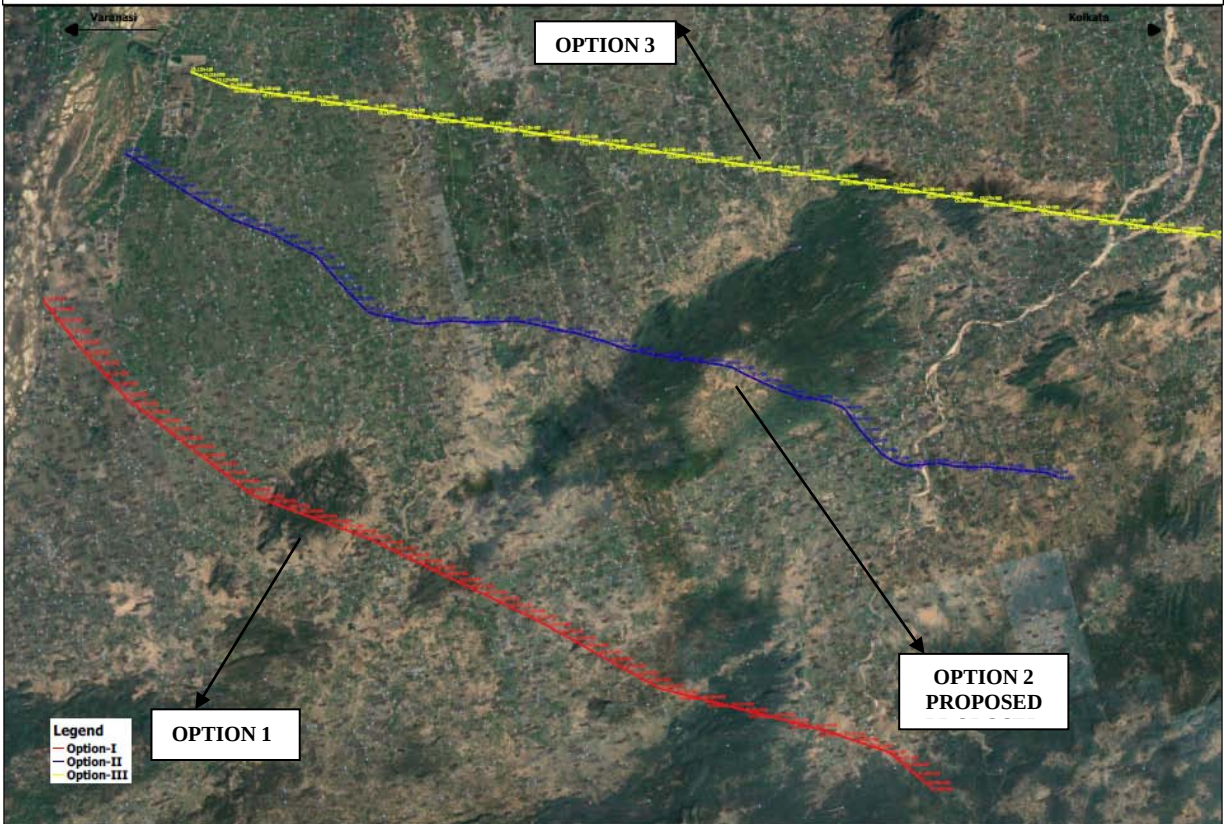


Figure 3-1: Toposheet Map showing all alignment options

Table 3-1: Comparative statement for all options

S.N	Parameters/Issues	Option 1 (Red)	Option 2 (Proposed final alignment) (Blue)	Option 3 (Yellow)
1	Length (km)	70.8	70.4	71.3
2.	Total land acquired (ha)	588.7	589.4	595.2
	Govt. land (ha)	162.5	166.389	175.4
	Pvt. Land (ha)	326.2	319.9	326.8
	Forest land (ha)*	99	103.211	93
3.	Area under protected/ important or sensitive species of flora or fauna/Wildlife Sanctuary	The alignment does not pass through any wild life sanctuary, protected area	The alignment does not pass through any wild life sanctuary,	The alignment does not pass through any wild life sanctuary, protected area
4.	No. of trees	15000	7362	14500
5.	Area under water bodies (ha)*	5.5	5.0	6.2
6.	No. of structure to be impacted due to proposed alignment	245 (include Semi-puca and pucca Structure)	295 (include Semi-puca and pucca Structure)	275 (include Semi-puca and pucca Structure)
7.	No. of families	245	152	275
8.	No. of structure to be constructed	Major Bridges – 6 Minor Bridges-29 LVUP- 51 SVUP -39 Interchange-1 Fly-2 ROB-1	07 Major Bridge, 10 Minor Bridge, Minor Bridge cum Under Passes (25 nos. at MCW and 04 nos. at Interchange location), VUP (6 nos. at MCW and 01 nos. at Interchange location), 25	Major Bridges – 6 Minor Bridges-31 LVUP- 45 SVUP 36 Interchange-2 Fly-2 ROB-2



S.N	Parameters/Issues	Option 1 (Red)	Option 2 (Proposed final alignment) (Blue)	Option 3 (Yellow)
			LVUP, SVUP (7 nos. at MCW and 02 nos. SVUP at Interchange location), 06 nos. of Flyover and 06 nos. Viaduct at MCW and 2 nos. flyovers at Interchange location, 217 Box culverts, 01 no. of ROB, 228 nos. of Box. Culverts	
9.	Connectivity	The proposed The proposed alignment will be part of Varanasi- Kolkata 4/6 lane expressway will connect Cities like Varanasi, Bhabhua, Sasaram, Chatra, Hazaribagh, Ramgarh, Ranchi, Bokaro, Purliya, Bankura, Jamshedpur, Kharagpur, Kolkata etc.	The proposed The proposed alignment will be part of Varanasi- Kolkata 4/6 lane expressway will connect Cities like Varanasi, Bhabhua, Sasaram, Chatra, Hazaribagh, Ramgarh, Ranchi, Bokaro, Purliya, Bankura, Jamshedpur, Kharagpur, Kolkata etc.	The proposed The proposed alignment will be part of Varanasi- Kolkata 4/6 lane expressway will connect Cities like Varanasi, Bhabhua, Sasaram, Chatra, Hazaribagh, Ramgarh, Ranchi, Bokaro, Purliya, Bankura, Jamshedpur, Kharagpur, Kolkata etc.
10.	Project cost (cr.)	2855	2792	2865

Based on the above study the following observations are there:-

Table 3-2: Analysis of Alternatives

S	Factors	Without	With Project Impacts
---	---------	---------	----------------------



r . N o .		Project Impacts							
		Posi ti ve	Negativ e	No bypasses/re- alignment		Only small Re- alignment at critical sections		With Bypasses	
				Positi ve	Negativ e	Positive	Negativ e	Positive	Negat ive
1	All weather Accessibi lity	-	Due to improp er drainage system, road may get flooded during heavy rains.	-	Due to improp er drainage system, road may get flooded during heavy rains.	Drainage in some sections will be improved	Only some sections may get good drainage	Road will be accessibl e all along the year since drainage will be improved along all sections.	-
2	Road Safety/Ac cident rate	-	Due to congesti on accident s may increase	-	Due to congesti on accident s may increase at heavily populate d areas and at critical	With realignment in critical sections, road safety would increase in these sections.	In densely populated congested areas, accidents may increase	Heavily congested areas will be bypassed so less chances of traffic jam/accid ents at these sections.	-



					road sections				
3	Transportation/vehicle maintenance /operating cost	-	Increase d cost due to heavy traffic at populated/congested areas. And also more wear & tear because of frequent application of sudden brakes.		Increase d cost due to heavy traffic at populated/congested areas And also more wear & tear because of frequent application of sudden brakes.	More comfortable driving at critical sections due to section improvement/realignment.	Increase d costs due to more wear & tear at heavily populated/congested areas.	Less wear & tear cost, more riding comfort	Increase in air pollution due to vehicular and short-term increase in dust due to earth work during construction at micro level.
4	Travel time / increased speed	-	Travel time is more due to	-	Travel time is more due to	-	No significant change in travel time	Reduction in travel time and	More chances of accidents



			less speed & congestion.		less speed & congestion.		or speed	increased speed.	nts due to increased speed
5	Change in Land use pattern	-	-	-	Minor change in land use pattern	-	Small change in land use pattern.	-	Change in Land use pattern with land diversion from forest to road.
6	Loss of Property and livelihood	-	-	-	More loss of property & livelihood.	-	Very little loss of property and minor loss of livelihood.	-	Minor Loss of property & significant loss of livelihood due to



									traffic diversion on bypass
7	Change in Environmental quality during construction	-	-	-	-	-	-	-	Temporary degradation of environmental quality because of vehicular traffic during construction.
8	Change in Environmental quality	-	Project road will further deteriorate and	-	-	-	No significant change	Less Noise pollution because of ease in	Increase in Air pollution

	after constructi on		more dust and noise pollution					congestio n and diversion of traffic through bypasses	due to increa sed vehic ular traffic .
9	Loss of vegetativ e cover			Great er loss of veget ative cover than other optio ns	-	-	Small amount of vegetati ve cover loss		Loss veget ative cover along the road side will be less. But signifi cant loss of Agric ultura l land due to bypas s.
1	Access to	-	Difficult	Diffic	-	-	Difficult	Easily	-



0	basic facilities such as Markets, schools, Hospitals etc.		y in accessin g the basic facilities due to heavy traffic.	ulty in acces sing the basic facilit ies due to heavy traffic .			y in accessin g the facilities	accessibl e as the traffic will be less.	
1	Employment opportunities & local economy growth.	-	Limited business opportunities. Overall development of area will be affected.	Limited business opportunities.	-	Minor increase in business opportunities	-	Faster transportation of agricultural/ commercial/perishable goods to prospectu s markets and local employment generation.	-

1 2 .	Others	-	Increase in fuel consumption, dust pollution & vehicular emission . And overall economy of the state will be affected.	-	-	Minor savings on fuel consumption	-	Tourism will flourish (Access to Wadi improved), Improved riding quality & smooth traffic flow. Will reduce accidents in congested areas.	Loss of business opportunity in the congested populated area.
-------------	--------	---	--	---	---	-----------------------------------	---	--	---