COST BENEFITS ANALYSIS IN ACCORDANCE WITH GOI FC GUIDLINES NO 7- 69/2011-FC DATED 01-08-2017

Name of Project: Construction, of 2-lane specification road with Paved shoulder as re-alignment (Greenfield alignment) of existing stretch between Legship to Gyalshing of NH-510 (Design chainage from km 58.840 to km 75.000) in the state of Sikkim (Package-V)

Nature of Proposal: Proposal for Diversion of Forest land Construction, of 2-lane specification road with Paved shoulder as re-alignment (Greenfield alignment) of existing stretch between Legship to Gyalshing of NH-510 (Design chainage from km 58.840 to km 75.000) in the state of Sikkim (Package-V)
Total Length of Project: 16.16 Km

Number of district involve- 01

Number of forest division involve: 01

S.no.	Forest Division	Proposed Area (ha)
1.	West Sikkim (T)	6.8305

Purpose: The cost Benefit Analysis is being undertaken as the required forest land is > 5 hectre for proposed diversion of forest land being affected due to widening of existing road for above said project.

Guidelines for conducting cost-benefit analysis for projects involving forest diversion

(i) While considering proposal for diversion of forest land for non forestry use, it is essential that ecological and environmental losses and eco economic distress caused to the people who are displaced are weighted against economic and social gains.

(ii) Whenever the forest land is involved in the development projects, the cost of ecosystem services and fragmentation of habitat of wildlife and economic distress caused to the people dependent on forests and the cost of settlement of people dependent on forest should also be added as the cost of forest diversion in addition to the standard project cost which would have been incurred by the user agencies without involvement of forest land while conducting the cost benefit analysis of the project. Similarly the benefits from the project accruing due to diversion of forest land and used in the project should also be accounted for in the benefits component in addition to the standard benefits of the project which would have been accrued without involvement of forest land while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).

(iii) The cost of Compensatory afforestat

ion and its maintenance in future and soil & moisture conservation at present discounted value and future benefits from such compensatory forestation accruing over next 50 years monetized and discounted to the present value should be included as cost and benefits respectively of compensatory affrestation while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).

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(iv) **Table A** list the details the types of projects involving forest land for which cost benefit analysis will be required, **Table-B** Lists the parameters according to which the cost aspect of forest land diverted for the development projects will be determined, while **Table C** lists the parameters for assessing the benefits accruing to the project using forest land.

(v) A cost benefits analysis as above should be accompany the proposals sent to central Government for forest clearance under the Forest Conservation Act.

Table A: Cases under which a Cost -benefit analysis for forest diversion are required

Sl	Nature of Proposal	Applicable/Not Applicable	Remarks
1	All Categories of proposal involving forest land upto 20 hectres in plains and upto 5 hectres in hills	Not Applicable	These proposals may be considered a case to case basis and value judgments.
2	Proposed for defense installation purpose and oil prospecting only	Not Applicable	In view of national priority accorded to these sectors, the proposal would be critically assessed to help ascertain that the utmost minimum forest land is diverted for non forest use
3	Habitation, establishment of industrial units, tourist lodge complex and other building construction	Not Applicable	These activities being detrimental in protection and conservation of proposals would be rarely entertained.
4	**All other proposal involving forest land more than 20 hectres in plain and more than 5 hectres in hills including roads,transmission line, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like microwave stations, auto repeater centres, TV tower etc.**	**Applicable**	**These are cases where a cost benefit analysis is necessary to determine when diverting the forest land to non forest use in the overall public interest.**

Since the proposal is for diversion of forest land measuring more than 5 hectare in Hill area for the road project cost benefit analysis report is applicable

Table B: Estimation of Cost of forest diversion

S. No	Parameters	Given Guideline	Evaluation
1	Ecosystem services looses due to proposed forest diversion	Economic value of loss of ecosystem services due to diversion of forest shall be the net present Value (NPV) of the forest land being diverted as prescribed by central Government (MOEF & CC) Note: In case of National parks the NPV shall be ten (10) times the normal NPV and in case wildlife Sanctuary the NPV shall be five (5) times the normal NPV or otherwise prescribed by the ministry or any other competent authority	NPV value has been Calculated as **Rs 50 lakhs**

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2	Loss of animal husbandry productivity, including loss of fodder	To be quantified and expressed in monetary terms or 10% of NPV applicable whichever is maximum	Loss of Animal husbandry due to proposed diversion is very, moderate and calculated below. Gross Loss @5 ton/Ha/Year @ Rs.100/- per tonne. Therefore loss of fodder as estimated for about 6.8305 hect .will be 6.8305X5X100X100 Years =Rs. 3,41,525/- 10% of NPV =0.1X 50=5 lakhs. So considered amount is **Rs 5 Lakhs.**
3	Cost of human resettlement	To be quantified and expressed in monetary terms as per approved R & R plan.	**NIL** human resettlement is required since no family residing in forest land.
4	Loss of public facilities and administrative infrastructure (Roads, buildings School, dispensaries, electric lines, railways etc) on forest land, or which would require forest land if these facilities were diverted due to the project.	To be quantified and expressed in monetary terms on actual basis at the time of diversion.	No Loss of public Infrastructure and administrative infrastructure (roads, buildings, railways, etc) on the forest land. All public utilities affected will be shifted by NHAI at cost of **Rs 150 Lakhs**
5	Possession value of forest land diverted	30% of environment costs (NPV) due to loss of forests or circle rate of adjoining area in the district should be added as a cost component as possession value of forest land whichever is maximum	The circle rate of adjoining area in the district is about 70 Lakhs per hectare where as 30 % of NPV is 15 (=0.3X50) lakhs. Which is less than 35 lakh per hectare. Therefore Procession Value of forest land will be =6.8305 X 35 lakhs =**239lakhs**
6	Cost of Suffering to oustees	The social cost of rehabilitation of Oustees (in addition to the cost likely to be incurred in providing residence, occupation and social services as per R & R plan) be worked out as 1.5 times of what oustees should have earned in two years had he not been shifted	**Nil** as no Resettlement and Rehabilitation is required in forest land. Which is proposed to be diverted.
7	Habitat fragmentation Cost	While the relationship between fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule.	Habitat fragmentation Cost is 50% of NPV i.e0.5 X 50 = **Rs 25 Lakhs.**
8	Compensatory afforestation and soil & moisture conservation cost	The actual cost of compensatory afforestation and soil & moisture conservation and its maintenance in future at present discounted value	Total 6.6018 degraded forest land proposed for CA in lieu of 6.8305 ha forest land @ 7 lakh per Hac. Cost of CA is **40 Lakhs**

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Table C: Existing Guidelines for estimating benefits of forest land diversion in CBA

S. No	Parameters	Given Guideline	Evaluation
1	Increase in productivity attributable to the specific project	To be quantified and expressed in monetary terms avoiding double counting	The proposal project for which diversion of forest land is sought is for widening of existing road .The project road will improve accessibility to the region .This will help in both economic & social development in the region. The project will enable smooth accessibility in the region by which people of the region will be directly benefited. This will accelerate industrialization /commercialization in region and the same will directly generate maximum employment opportunities in these areas and boosting up the economy of the region and state. Again directly the project will have the potential for employment generation for local people 365000 man days during the construction period. The proposed project does not involve any manufacturing or production. Hence, This section is not applicable. Monetary benefits due to increase in productivity is **NIL.**
2	Benefits of economy due to the specific project	The incremental economic benefit in monetary terms due to the activities attributed to the specific project.	Economic benefit in terms of increase in trade, saving in vehicular operation and maintenance cost better connectivity, safer journey to commuter and saving of travel time. Improved road connectivity helps in better implementation and management of government schemes .it will provide last and economical transport of goods, After completion of project, the local people and industries situated in the area will be greatly benefited . The widening of project road will provide safe and fast, economical and environment friendly transportation to the State, which in term will accelerate the rate of growth in this area. Fuel saving = 2.2-1.96 = 0.24 litre Average fuel cost = 80 rupee per litre Fuel saving on 1000 PCU =0.24 x 1000 = 24 Litre per day approx. Savings (in monetary terms) = 24x80 = 1920 Rupees per day Total benfits in 5 years (5*365.4=1827 days) = 1827x1920 = 3507840 **= 35 Lakhs**
3	No. of population benefited due to specific project	As per the detailed project report	The project road passes through Legship and Gyalshing Sub Division of West Sikkim Disrict, the entire population of the subdivision would be benefitted by the project.
4	Economic benefits due to of direct and indirect employment due to the project.	As per the detailed project report	A Total of 365000 man days employment will be generated during construction phase for skilled/unskilled labour. Average wages inclusive of all cost of living is 500 per day. Total financial implication will come out to b =

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			365000X500= **Rs 1825 Lakhs**
5	Economic benefits due to Compensatory Afforestation	Benefits from such compensatory forestation accruing over next 50 years monetized and discounted to the present value should be included as benefits of compensatory afforestation. *For benefits of CA the guideline of the ministry for NPV estimation may be considered.	In lieu of total trees to be remove from proposed Row in forest land along the project road it is proposed to undertake at least equal of affected area as Compensatory afforestation and forest conservation act 1980 So the net productivity will increase. The Compensatory Afforestation will be done in 6.8305 **(6.8305 Hectare land identified)** hectare of degraded forest land. Which is down the line would be having a density of minimum 0.4. The ecological value for a 50 years period for the density of 10 is Rs. 126.74 Lakhs per hectare .By considering minimum 0.4 density the ecological gain for the project would be **126.74X0.4X6.8305= Rs. 346 lakhs**

Summary of Cost -Benefit Analysis for the Project

S.No	Loss (in Lakh)	Benefit (Lakh)
1	Ecosystem services losses **Rs 50 Lakhs**	Ecology gain for Compensatory **Rs. 346 lakhs**
2	Loss of Animal Husbandry Productivity including loss of Fodder =**Rs 5 Lakhs.**	365000 Man days will be generated assuming 500 Rs per Day as wages total benefit = 500X365000= **1825Lakhs**
3	Loss of Public facility **Rs 150 Lakhs**	Benefits of economy due to the specific project = **35 Lakhs**
4	Possession Value of Forest Land diverted **Rs 239 lakhs**	
5	Habitat Fragmentation Cost **Rs 25 Lakhs.**	
6	Compensatory Afforestation and Soil and Moisture Conservation **Rs.40 Lakhs,**	
	Total Loss = **376**	Total Benefit **Rs. 2195 Lakhs**

Benefit Cost Ratio =Total Benefit /Total Loss =

Rs 2195 Lakhs/ Rs 376 Lakhs=5.83 which is more than 1 hence project is viable.

Note 1: Net Present Value (NPV) of environment and ecosystem services loss:
The concept of NET Present Value of the forest land diverted is a scientific method of calculating the environment cost and other losses caused due to diversion of forest land for non-forestry purposes. The NPV represents the net value of various ecosystem services and other environment services in monetary terms which the forest would have provided if the forest would not have been diverted.

Note 2: Possession Value of forest land diverted:
The forest land diverted for the project such as irrigation, hydropower, railways, roads, wind, and transmission lines and mining etc are unlikely to be returned and remains in possession of the user agencies. Therefore 30% of the net present value (NPV) of the forest land diverted or market rate of adjoining area in the district should be added as a cost of component as "possession value of forest land" in addition to the environment costs due to loss of forests.

Date: 15.03.2021

Place: Gyalshing

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