

Cost Benefit Analysis

A. Loss of Forest for upgradation to Two Lane with Paved Shoulder of Belekeri to Hattikeri (766EE) and Kumta to Sirsi (NH766E) (excluding Stretch of NH66) in the State of Karnataka

SNo.	Parameters	Remarks
1.	Ecosystem Services Losses due to the proposed forest Diversion	<p>Economic value of loss of eco-system services due to diversion of forests shall be the net present value (NPV) of the forest land being diverted as prescribed by the Central Government (MoEF&CC). All the reference parameters were quantified in the Net Present Value for forest land suggested by Central Empowered Committee constituted by Supreme Court of India. As per the forest area classification in Central Empowered Committee report, the forest areas along the proposed highway alignment fall in to Eco Class – I consisting of tropical wet evergreen forest with an NPV value of Rs. 43.34 lakhs/Ha of moderate dense forest.</p> <p>Hence total cost due to diversion of forest land for the present project including Compensatory Afforestation Cost and NPV totals to:</p> <p>21.7629Ha x Rs. 43.34 lakhs/Ha = Rs. 943.20 lakhs</p>
2.	Loss of animal husbandry productivity, including loss of fodder	<p>10% of NPV</p> <p>Hence, the value will be Rs.94.32 lakhs</p>
3.	Cost of human resettlement	There is no human resettlement along the proposed alignment within forest area; hence it is not applicable.
4.	Loss of public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric lines, railway etc) on forest land, or which would require forest land if these facilities were diverted due to the project.	<p>There is no loss of public facilities and administrative infrastructure on forest land for this project.</p> <p>Public facilities within the proposed RoW out side the forest area impacted due to proposed upgradation will be shifted. But no Forest land will be required for the shifting of these facilities.</p>
5.	Possession value of forest	30% of environmental costs (NPV) due to loss of

SNo.	Parameters	Remarks
	land diverted	forests or circle rate of adjoining area in the district should be added as a cost component as possession value of forestland whichever is maximum. Considering the 30% of the NPV, the possession value will be Rs.282.96 lakhs
6	Cost of Suffering to oustees	Not applicable since there is no resettlement from forest areas for highway development.
7.	Habitat Fragmentation Cost	This project is only an upgradation of existing road and there is no fragmentation of any habitat involved in this.
8.	Compensatory afforestation and soil & moisture conservation cost	Slope protection measures are included in the design of highway along the hill cutting areas of forest. Further in the plain terrain, turfing and pitching will be done for stabilising embankments there by avoiding soil erosion. No wildlife habitat will be affected due to the widening of existing road. Impact on microclimate due to tree cutting along the proposed alignment will be compensated with avenue plantation of thrice the number of trees to be cut with indigenous species. Hence the project is expected to have only minor impact on environment. Compensatory Afforestation Cost in double the area of degraded forest land is estimated to $21.7629\text{Ha} \times 2 \times \text{Rs.}3,00,000/\text{Ha} = \text{Rs.}130.58 \text{ lakhs}$
	Total Cost due to forest land diversion for the project.	Parameter 1 + Parameter 2 + Parameter 5+ Parameter 8 Rs. 943.20 lakhs + Rs.94.32 lakhs + Rs.282.96 lakhs + Rs.130.58 lakhs Rs. 1451.06 lakhs / year Rounded to Rs. 1451 lakhs / year


S. D. POTDAR
DGM (TECH) & PD
NHAI, PIU-DHARWAD

B. Benefits, notwithstanding Loss of Forests for upgradation to Two Lane with Paved Shoulder of Belekeri to Hattikeri (766EE) and Kumta to Sirsi (NH766E) (excluding Stretch of NH66) in the State of Karnataka.

Sl. No.	Parameters	Remarks																												
1.	Increase in productivity attributable to the specific project.	The monetary benefits due to highway will total to Rs.36060 lakhs in design life of 30 years due to reduction in travel time, vehicle operating cost, fuel consumption, accident risks, congestion, increased economic growth along the project influenced areas, reduced environmental pollution etc.																												
2.	Benefits to economy	Highway development will trigger incremental economic development in the project influence area with opportunities for new commercial and industrial establishments. Better connectivity with reduced travel time and better road geometrics will result in saving in travel time, fuel, and health improvements due to smoother road and congestion reduction which will add to economic growth of the state as a whole.																												
3.	No. of population benefited	Since the project road is having national importance and is a notified National Highway, the direct beneficiaries will include both State and Inter State commuters.																												
4.	Economic Benefit due to the direct and indirect Employment potential	<p>More local people will be benefited during construction as well as operation of this National Highway.</p> <p>The project results in Rs. 410.64 lakhs through employment generations as under:</p> <table border="1"> <thead> <tr> <th></th> <th></th> <th>Construction</th> <th>Maintenance</th> </tr> </thead> <tbody> <tr> <td>i)</td> <td>Skilled</td> <td>54</td> <td>5</td> </tr> <tr> <td>ii)</td> <td>Semiskilled</td> <td>65</td> <td>7</td> </tr> <tr> <td>iii)</td> <td>Unskilled</td> <td>102</td> <td>12</td> </tr> <tr> <td colspan="2">Total</td> <td>221</td> <td>24</td> </tr> </tbody> </table> <p>The economic value per year out of this employment potential is as under:</p> <p>a) During construction period:</p> <table border="1"> <thead> <tr> <th>Employment Type</th> <th>MD</th> <th>Rate/D</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>i) Skilled</td> <td>19440</td> <td>650</td> <td>1,26,36,000</td> </tr> </tbody> </table>			Construction	Maintenance	i)	Skilled	54	5	ii)	Semiskilled	65	7	iii)	Unskilled	102	12	Total		221	24	Employment Type	MD	Rate/D	Amount	i) Skilled	19440	650	1,26,36,000
		Construction	Maintenance																											
i)	Skilled	54	5																											
ii)	Semiskilled	65	7																											
iii)	Unskilled	102	12																											
Total		221	24																											
Employment Type	MD	Rate/D	Amount																											
i) Skilled	19440	650	1,26,36,000																											

Sl. No.	Parameters	Remarks																																			
		<table border="1"> <tr> <td>ii)</td> <td>Semiskilled</td> <td>23400</td> <td>450</td> <td>1,05,30,000</td> </tr> <tr> <td>iii)</td> <td>Unskilled</td> <td>36720</td> <td>380</td> <td>1,39,53,600</td> </tr> <tr> <td colspan="2">Total</td> <td>79560</td> <td></td> <td>3,71,19,600</td> </tr> </table> <p>Employment cost during construction works out to Rs. 371.19 Lakhs / year.</p> <p>b) During maintenance:</p> <table border="1"> <thead> <tr> <th>Employment Type</th> <th>MD</th> <th>Rate/D</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>i) Skilled</td> <td>1800</td> <td>650</td> <td>11,70,000</td> </tr> <tr> <td>ii) Semiskilled</td> <td>2520</td> <td>450</td> <td>11,34,000</td> </tr> <tr> <td>iii) Unskilled</td> <td>4320</td> <td>380</td> <td>16,41,600</td> </tr> <tr> <td>Total</td> <td>8640</td> <td></td> <td>39,45,600</td> </tr> </tbody> </table> <p>Employment cost during operation phase works out to Rs. Rs 39.45 lakh /year.</p>	ii)	Semiskilled	23400	450	1,05,30,000	iii)	Unskilled	36720	380	1,39,53,600	Total		79560		3,71,19,600	Employment Type	MD	Rate/D	Amount	i) Skilled	1800	650	11,70,000	ii) Semiskilled	2520	450	11,34,000	iii) Unskilled	4320	380	16,41,600	Total	8640		39,45,600
ii)	Semiskilled	23400	450	1,05,30,000																																	
iii)	Unskilled	36720	380	1,39,53,600																																	
Total		79560		3,71,19,600																																	
Employment Type	MD	Rate/D	Amount																																		
i) Skilled	1800	650	11,70,000																																		
ii) Semiskilled	2520	450	11,34,000																																		
iii) Unskilled	4320	380	16,41,600																																		
Total	8640		39,45,600																																		
5.	Economic Benefits due to Compensatory Afforestation	<p>The Standard Compensatory Afforestation Restoration Factor (SCARF) has been estimated to further adjust the applicable NPV based on the proportion of value of ecosystem services restored due to compensatory afforestation. SCARF Adjustment of Rs.40.80461 lakhs per hectare is considered for this project.</p> <p>43.5258Ha x Rs.40.80461 lakh/Ha = Rs. 1776.053 lakhs</p>																																			
	Total benefit due to project not withstanding loss of forest.	<p>Parameter 1 + Parameter 4 + Parameter 5</p> <p>= Rs. 36060 lakhs + Rs. 410.64 lakhs + Rs. 1776.053 lakhs</p> <p>= Rs. 39599.54 lakhs</p> <p>Rounded to Rs. 39600 lakhs</p>																																			

C. Cost – Benefit Ratio

Cost Benefit Analysis	
Total Cost Due to Forest Loss (Rs. in lakhs)	1451
Total Benefit Due to Project (Rs. in lakhs)	39600
Cost Benefit Ratio	26.35