

Project Name *Development of Urban Extension Road-II (UER-II) NH-344M from Design Km 0+000 at NH-1 Intersection (Km 23+800, near Bankoli village) to Design Km 38+111 near Sector 24, Dwarka in the state of NCT of Delhi under Bharatmala Pariyojana*
Forest Proposal No. FP/DL/ROAD/49252/2020

Cost Benefits Analysis (CBA). Whether the area is more than 20.00 ha.

Proposed Forest Area for diversion is 54.8724 ha (More than 20 hectares)

As per cost (Conservation) Rules 2003, Rules 6, Form 'A' S. No. 1 (v) and guidelines (Under Forest Act 1980).

(a) Parameters for Evaluation of the loss of Forests and estimation of cost of forest diversion

Sl. No.	Parameters	Remarks																
1.	Ecosystem services losses due to proposed forest diversion.	<p>Economic Value of Ecosystem services due to diversion of forest land = Proposed Forest area x NPV rate per Hectare (Ha) Net Present Value (NPV) for forest land of Eco-class III (density range 0.0 to <0.4) = INR 6,26,000/- per Ha. Eco-class III (density range 0.4 to 0.6) = INR 8,03,000/- per Ha. Eco-class III (density range 0.7 to 1.0) = INR 8,87,000/- per Ha.</p> <p>Therefore, division wise ecosystem services losses due to proposed diversion of forest land are as follows:</p> <table border="1"> <thead> <tr> <th>Division</th> <th>Proposed Forest Area (ha)</th> <th>NPV Rate</th> <th>Ecosystem services Losses in INR</th> </tr> </thead> <tbody> <tr> <td>North</td> <td>37.7726</td> <td>8,87,000</td> <td>3,35,04,296</td> </tr> <tr> <td>West</td> <td>17.0998</td> <td>8,87,000</td> <td>1,51,67,523</td> </tr> <tr> <td>Total</td> <td>54.8724</td> <td>-</td> <td>4,86,71,819</td> </tr> </tbody> </table> <p>No. of trees that will be affected due to proposed diversion of forest land are 14245 trees in North Division and 5185 trees in West Division. Total no. of trees is 19430.</p> <p>Therefore, total value of trees is = INR 11,07,51,000/-.</p>	Division	Proposed Forest Area (ha)	NPV Rate	Ecosystem services Losses in INR	North	37.7726	8,87,000	3,35,04,296	West	17.0998	8,87,000	1,51,67,523	Total	54.8724	-	4,86,71,819
Division	Proposed Forest Area (ha)	NPV Rate	Ecosystem services Losses in INR															
North	37.7726	8,87,000	3,35,04,296															
West	17.0998	8,87,000	1,51,67,523															
Total	54.8724	-	4,86,71,819															
2.	Loss of animal husbandry productivity, including loss of fodder.	10% of NPV = INR 48,67,182/-.																
3.	Cost of human resettlement.	Nil.																
4.	Loss of public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric lines, railway, etc.) on forest land, which would require forest land if these facilities were diverted due to the project.	There are no Public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railways, etc.) are not going to be affected due to the diversion of forest land, therefore, the loss on this account will be Nil.																
5.	Possession value of forest land diverted.	30% of NPV = INR 1,46,01,546/-.																
6.	Cost of suffering to oustees.	Nil.																
7.	Habitat Fragmentation Cost.	50% of NPV = INR 2,43,35,910/-.																
8.	Environmental losses: (Soil erosion, effect on hydrological cycle, wildlife habitat, microclimate upsetting of ecological balance)	<p>As per Forest (Conservation) Act, 1980, the environmental loss for a 50 years period for the density of 1.0 is INR 126.74 Lakhs per hectare. The division wise environment loss is as follows:</p> <table border="1"> <thead> <tr> <th>Division</th> <th>Proposed Forest Area (ha)</th> <th>Density</th> <th>Environmental Loss in INR</th> </tr> </thead> <tbody> <tr> <td>North</td> <td>37.7726</td> <td>0.8</td> <td>38,29,83,946</td> </tr> <tr> <td>West</td> <td>17.0998</td> <td>0.7</td> <td>15,17,06,005</td> </tr> <tr> <td>Total</td> <td>54.8724</td> <td>-</td> <td>53,46,89,951</td> </tr> </tbody> </table> <p>Hence, total environmental loss for the project is INR 534.69 lakhs.</p>	Division	Proposed Forest Area (ha)	Density	Environmental Loss in INR	North	37.7726	0.8	38,29,83,946	West	17.0998	0.7	15,17,06,005	Total	54.8724	-	53,46,89,951
Division	Proposed Forest Area (ha)	Density	Environmental Loss in INR															
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(Handwritten Signature)
 Project Director
 Project Implementation Unit
 Ministry of India
 National Highways Authority of India
 New Delhi
 Dwarka, New Delhi

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Therefore, Current Environment Net loss

= INR 4,86,71,819/- (Ecosystem losses) + INR 11,07,51,000/- (Tree values) + INR 53,46,89,951/- (Environmental loss) + INR 1,46,01,546/- (Possession value of forest land) = INR 708714316/-

Expenditure for development and maintenance of the project for 15 years

= Cost of Project + Renewal cost of BC for two cycle
 = INR 3455,51,00,000 + INR 250,00,00,000 = INR 37055100000

Net Total Losses/Cost = INR 708714316 + INR 37055100000
 = INR 37763814316

(b) Parameters for evaluation of Benefit Notwithstanding Loss

Sl. No.	Parameters	Remarks										
1.	Increase in productivity attributable to the specific project.	In lieu of total area to be affected in forest land it is proposed to undertake at least twice of the affected trees as compensatory afforestation as per Forest (Conservation) Act, 1980. Since, due to the current project proposed forest land area to be diverted is 54.8724 ha and total 19430 no. of felling trees. The CA will be done in 54.97 ha of non-forest land; thus, total 59065 trees are to be planted as per compensatory afforestation which is down the line after seven years would be having the density of 1.0. The Compensatory Afforestation cost will be INR 48,09,66,295/- . The ecological value for a 50 years period of density of 1.0 is 126.74 lac per hectare. By considering the min. 0.5 density the ecological gain for this project would be INR 36,57,71,640/-										
2.	Benefits to economy due to specific project.	The proposed highway will provide better, fast, safe and smooth connectivity for the commuters of Delhi and Haryana state. Smooth and fast-moving traffic will cause only lower emissions thereby reducing pollution levels. Accident rates are also expected to come down substantially. Development of the proposed project road will improve the local agriculture and enable farmers to realize better value for their products as well as attract more investment to that region, thus boost economy of the area, state and nation as a whole. The vehicle operating and maintenance cost is expected to go down substantially. The proposed road alignment will also include general amenities like bus bays, truck lay byes, rest areas, service road at built-up locations, pedestrian and cattle underpasses, landscaping and tree plantation, traffic aid post, emergency telecom system, emergency medical aid post, street light at built ups etc. and thus overall facilities to the road users shall improve. People will have increased access to better social and health infrastructure and other services located outside the project area. This will in turn lead to overall improvement of the quality of life of the people residing in the project zone in terms of their economic, social and health status. Growth of local tourism and resultant boost to local economy is also expected due to proposed project. Industrialization of area will be uplifted approximately 30%. The above benefit in term of rupees is about Rs. 300.00 Lakhs per year.										
3.	No. of population benefited to specific project.	An average population of 2600000 people from the region will be benefited directly and indirectly.										
4.	Economic benefits due to of direct and indirect employment due to the project.	Approximately 5-man days of permanent employment and 5475000-man days temporary employment will be generated due to the Project.										
5.	Economic benefits due to Compensatory afforestation.	The benefit of economy shown in table below: <table border="1"> <thead> <tr> <th>Project Details</th> <th>Increasing Rate of Cost year</th> <th>Project Cost after 50 years (INR Crores)</th> <th>Current Cost Involve in Construction of Project (INR Crores)</th> <th>Net Profit in 50 Years</th> </tr> </thead> <tbody> <tr> <td>Urban Extension Road - II</td> <td>4%</td> <td>24557.22</td> <td>3455.51</td> <td>21101.71</td> </tr> </tbody> </table>	Project Details	Increasing Rate of Cost year	Project Cost after 50 years (INR Crores)	Current Cost Involve in Construction of Project (INR Crores)	Net Profit in 50 Years	Urban Extension Road - II	4%	24557.22	3455.51	21101.71
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Urban Extension Road - II	4%	24557.22	3455.51	21101.71								

So benefit of economy in 50 years = 21101.71 Crores

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		On an average GDP will increase Total Saving due to less consumption of fuel and fatalities (VOC) = 7726 Crores over a period of 30 Years Total NPV of the VOC Savings due to the project = 726 Crores The result of economic evaluation show that the proposed development of project is economically viable with EIRR 21.43%
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Therefore, Project Benefit

= INR 48,09,66,295/- (CA cost) + INR 36,57,71,640/- (Ecological gain) + INR 21101,71,00,000 (Economic Benefits) + INR 7726,00,00,000 (Savings) + INR 726,00,00,000 (NPV).

Net Profit = INR 296383837935

Therefore, Benefit cost ratio = $296383837935/37763814316$
= 7.85


Project Director
Project Implementation Unit
National Highways Authority of India
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