

No.23 /3/2020-21/PWD/WDVII (NH)/ADM/ 768

Government of Goa,  
Office of the Executive Engineer,  
Works Division VII (NH), P.W.D.,  
Junta House, Panaji – Goa.

Dated: 05/08/2020.

To,  
The Dy. Conservator of Forests,  
Monitoring & Evaluation,  
Goa Bhavan, Forest Department,  
Altinho, Panaji, Goa.

Sub: Diversion of 29.836 ha. of forest land for Four lanning of existing NH-17 from Km. 475.040 to Km. 611.00 in the State of Goa on BOT (Toll) basis under NHDP-III (Patradevi to Pollem Section on NH-17), in favour of Executive Engineer, WD VII (NH), PWD, Panaji, Goa.

Ref: No. 6-863-2020-21-FD/1081 dated 03/07/2020.

Sir,

With reference to the above, this is to inform you that the details of Cost Benefits Analysis are enclosed below for further needful please:

**COST BENEFITS ANALYSIS**

**Name of the Project:** Four laning of existing NH-17 from Km. 475.040 to Km. 611.000 in the state of Goa (Patradevi – Pollem section)

**Name of the Proposal:** Diversion of 29.836 Ha. Forest land under FCA, 1980 for road widening

**Purpose:** The Cost of Benefit Analysis is undertaken for proposed diversion of Forest land.

Division- wise Area Proposed for Diversion:

Name of the Forest Division	Name of the Reserve Forest	Area (Ha.)
South Goa		29.836

**TABLE-A:** Cases under which a Cost- Benefit Analysis for Forest Diversion is required.

S No	Nature of Proposal	Applicable / Not Applicable	Remarks
1	All categories of proposals involving forest land up to 20 hectare in plains and up to 5 hectare in hills.	Applicable	Diversion in plains > 20 Ha. (29.836 Ha.)
2	Proposal for defence installation purposes and oil prospecting (prospecting only).	Not Applicable	
3	Habitation, establishment of industrial units, tourist lodges complex and other building	Not Applicable	

TABLE-B: Estimate of Cost of Forest Diversion		
S No	Parameters	Remarks
1	Ecosystem services losses due to proposed forest diversion.	NPV = 9.39 Lakh per Ha. = $29.836 \times 9.39$ = 280.1600 lakh
2	Loss of animal husbandry productivity, including loss of fodder.	Loss = 5ton/Ha./year@ INR 100/- per tonne. = $5 \times 29.836 \times 100$ = 14,918*50 (for 50 years) = 74.5900 lakh OR = 10% of environment costs (NPV) = $(10/100) \times 280.1600$ = 28.016 lakh
3	Cost of human settlement	No human settlement is found
4	Loss of public facilities and administrative infrastructure (Roads, Buildings, Schools, Dispensaries, electric lines, railways etc.) on forest land, which would require forest land if these facilities were diverted due to project.	No such loss
5	Possession value of forest land diverted.	Per hectare rate along highway = 55 lakh For 29.836 Ha. = $55 \times 29.836$ = 1640.98 lakh OR = 30% of environment costs (NPV) = $(30/100) \times 280.016$ = 84.046 lakh Considering INR 3423.75 lakh
6	Cost of suffering to oustees.	Not Applicable
7	Habitat Fragmentation Cost	= 50% of NPV applicable as thumb rule. = $(50/100) \times 280.016$ = 140.08 lakh
8	Compensatory afforestation and soil & moisture conservation cost.	Approximate CA cost per hectare with 10 years maintenance considering cost escalation is = INR 9.2 lakhs  CA cost = $9.2 \text{ lakh} \times (29.836 \times 2)$ = 548.9824 lakh

**Total Cost (Environment Loss) (A) = 4467.5624 lakh**

TABLE-C: Existing Guidelines for Estimating Benefits of Forest Diversion in CBA		
S No	Parameters	Remarks
1	Increase in productively attribute to the specific project.	During construction period, temporary employment generation = 500 people for 3 years- 547500 man-days.  During operation period (including toll) for 25 years, permanent employment for 100 people would be generated.
2	Benefits to economy due to the specific project.	Economic benefit in terms of increase in trade in saving vehicular operation and maintenance and saving travel time. However they have not been quantified as it will be a function of various government

3 Number of population benefited due to specific project

Proposed project traverses through Panjim the state capital of Goa connecting Mumbai the financial capital of India with the districts of Karnataka and Kerala thus it serves the needs of approximately 22,50,000 population.

In addition, local commuters/ freight from Panjim to Canacona and vice-versa gets facilitated.

4 Economic benefits due to of direct and indirect employment due to the project.

Benefit due to temporary employment  
= INR 500 per day = 500\*547500 man days  
= 2737.50 lakh

Assuming 50% of labour in construction period as locals, utilities cost per day per person, assuming, INR 25

Total cost = 25\*250\*1095  
= 68.43750 lakh

Benefit due to permanent employment with approx. annual income 2.8 lakh  
= 100\*2.8\*25  
= 7000.00 lakh

5 Economic benefits due to compensatory afforestation

CA will be taken up in 60:00 Ha. Having a minimum density of 0.7. The ecological value for 50 years period for the density of 1.0 is INR 126.74 lakh per hectare as per Forest Conservation Act 1980. Therefore ecological gain would be = 7604.4 lakh

Total Benefit (B) = 17314.5 lakh

$$\begin{aligned}\text{Benefit to Cost Ratio} &= (B) / (A) \\ &= 17314.5 / 4467.5624 \\ &= 3.8756(>1)\end{aligned}$$

The Benefit to cost ratio being greater than 1 (i.e. 3.8756) the project is found viable as per the analysis/described criteria.

Yours faithfully,



Executive Engineer,  
W.D-VII (NH), P.W.D.,  
Panaji - Goa.

No. 23/3/2020-21/PWD/WDVII (NH)/ADM/588

Government of Goa,  
Office of the Executive Engineer,  
Works Division VII (NH), P.W.D.,  
Ground Floor, Junta House,  
Panaji – Goa.

Dated: 03 / 07 / 2020.

To,  
The Sub Divisional Forest Officer,  
South Goa Division,  
Canacona-Goa


Sub: - Diversion of 29.836 ha. of forest land for four laning of  
existing NH-17 from Km. 475.040 to Km.611.000 in the State  
of Goa on BOT (Toll) basis under NHDP-III (Patradevi to  
Pollem Section on NH-17) in favour of the Executive Engineer,  
WD-VII(NH), Public Work Department, Panaji-Goa.....reg.

Ref: Letter No. 42/SDFOC/FCA/CAN/2020-21/72, dt.27/05/2020

Sir,

With reference to your letter referred on the subject cited above, please find  
enclosed herewith the clarification received by email from the Consultant M/s  
AARVEE in view of letter dated 06/05/2020 received from the Dy. Inspector  
General of Forests (Central), Ministry of Environment Forests & Climate change,  
Regional Officer, Bangalore.

Yours faithfully,

  
Executive Engineer  
Works Division VII (NH),  
PWD- Goa.

Copy to:

- 0/c
1. The Chief Engineer, NH, R&B, PWD, Altinho, Panaji for kind information.
  2. The Superintendent Engineer, C.O IX (NH), PWD, Altinho, Panaji for kind information.
  3. The Deputy Conservator of Forests, South Goa Division, Margao- Goa for kind information.
  4. The Executive Engineer, Division XV, PWD, Ponda, Goa for information and follow up.

Replies to the queries raised by the Regional Office, Bangalore :

**1. Detailed information on the alternatives verified and a relook into the feasibility of tunnel at critical junctures of the proposal**

The alignment passes through the forest area for a length of about 10 Km. In this 10km of forest the existing alignment in Karmal Ghat stretch has sub standard horizontal & vertical curves in particularly from Km. 579 to Km. 582.000

Two Options has been studied for the critical location in the Ghat section i.e., from Km. 579.000 to Km. 582.000

- Following the existing alignment with geometric improvement
- Re alignment with a 1.45 Km length of tunnel proposal and improving the existing geometry.

Comparative study for both the alternatives from Km. 579.000 to Km. 582.000 is given below:

Description	Alternative – I Existing alignment	Alternative – II Realignment with Tunnel
Extra forest land to be acquired	12 Ha	15 Ha.
Construction time	Less compared to other option	Tunnel formation will be time consuming
Construction cost	30 Cr/Km	Approximately 250 Cr/Km (Twin Tunnel)
Maintenance	Maintenance is easy as it is open	Maintenance is difficult as it is closed
Structures involved	Breast wall, Soil nails, retaining wall may be required for ensuring slope stability. Viaduct are required at critical valley locations. Animal Underpasses/Overpasses are required for safe passage of animals	Viaduct, Tunnel and earth retaining structures
Environmental issues	This option would involve disturbance while cutting the hill. Viaducts are proposed on major valley locations.	This option would involve significant disturbance to environment during construction.
Geometry	As it is existing alignment few sub standard curves will remain with minor improvements	Sub standard curves will be improved
Design speed	40 to 60 Kmph	80 Kmph

Ministry of Road Transport and Highways approved the Alternative – I vide its letter no. RW/NH-37015/03/2017/NHDP-IVA dated. 25<sup>th</sup> April, 2017.

For the remaining stretch excluding Km. 579.000 to Km. 582.000, the alignment follows the existing alignment with minor improvements of sub standard curves. Viaducts are proposed for least disturbance in the forest area. These viaducts also act as passage for Animals as well as Storm water. In addition to the Viaducts, in consultation with forest department few

locations are proposed as Animal Underpasses/Overpasses. 5 Minor bridge will also be widened for storm/Spring water as well as movement of small animals. List of viaduct and Animal Underpass/Overpasses are listed below:

**Proposed Viaducts in the forest area ( Karmal Ghat )**

S.No	Viaducts (Des.Chainage in Km)		Length in Km
	From	To	
1	576.165	576.435	0.270
2	578.000	578.120	0.120
3	578.800	578.890	0.90
4	579.040	579.100	0.60
5	580.825	580.915	0.90

**Proposed Animal Underpasses/Overpasses**

S.No	Design Chainage in Km	Span in m	Proposal
1	573.614	1 X 12 X 5	Animal Underpass
2	574.660	1 X 12 X 5	Animal Underpass
3	579.630	1 X 32.6 X 5.5	Animal Overpass

2. Exact width of the road which is proposed in forest areas and feasibility of restricting to road to existing width or at least minimising the requirement of widening. Accordingly, what would be the forest land required?
  - As per the Indian Roads Congress standards of clause No - 2.3 of SP 84 2014, minimum Right of Way (RoW) of 60m should be available for development of a 4 lane highway.
  - However in forest areas the RoW has been restricted to 45m.
  - Thus it is the barest minimum forest area required for the widening of the project road
3. Why non-forest land is not being proposed as the project is being implemented by the State authority ?
  - This is a Government of India Project Under the Ministry of Road Transportation and Highways.
  - The role of the State government in this project is only implementation in nature.
  - As per the provisions of the Forest Conservation Act - 1980, central government organizations are exempted from providing non- forest land to compensate the forest land diverted for non forestry purpose. But the cost of the Compensatory Afforestation has to be borne by the User Agency
4. What will happen to the relocation/ reconstruction of building that may have to be demolished for the project? Where will they be relocated ?
  - The loss incurred due to the demolition will be compensated by the user agency.
5. In part - II of the proforma proposal, the number of trees to be felled is mentioned as Nil whereas the proposal involves felling of 13,471 trees. Therefore the same may also be incorporated in the Part - II of the proforma proposal, including girth wise details.\

- The concerned DCF shall make the necessary corrections

6. Duration of the project may be informed

- 2 Years

7. PCCF has proposed 3% additional amount of the project cost from the User Agency. Comments of the State government and User Agency as per the guidelines issued under the Forest (Conservation) Act 1980 restrict levying on such additional amount. The State may also elaborate in the activities proposed with the amount.

- To be clarified by the PCCF

8. The existing EIA notification state that " expansions of NH greater than 100km involving additional right of way or land acquisition greater than 40m on existing alignments and 60m on re-alignments or by-passes, only need EC under EIA notification 2006 as amended". The details of the project vis-a-vis above notification may be examined and commented.

- Proposed expansion of NH - 17 is not continuous. Stretches are at different locations to enable smooth passage of traffic.

Details of the stretches proposed for widening are mentioned below:

S. No	From	To	Length in Km	Stretch
1	475.000	513.000	38	Patradevi – Porvorim
2	518.000	523.000	5	Panaji – Bambolim
3	536.000	543.000	7	Cortalim –Nagoa-Nuvem
4	555.000	586.000	31	Navelim-Canacona
5	603.000	611.000	8	Loliem

Total Proposed length of expansion = 89 Km.

- None of the stretches are more than 100km in length. Even the total length of all the stretches proposed for expansion is less than 100 km.
- Further the proposed Right of Way along the stretch is less than or equal to 45m only.
- Thus the proposed development of the NH - 17 doesn't attract the Environmental Clearance as per the EIA notification of 2006.