SECTION: 7

ENVIRONMENTAL IMPACT ASSESSMENT

7.1 INTRODUCTION

The environmental assessment process endeavors to mitigate and prevent undesirable impacts of developmental activities. It is in no way intended to hamper socio-economic development but to guide project proponents in making the right investment in land, manpower, technology and mitigation measures to ensure that projects have the least possible impacts on the environment.

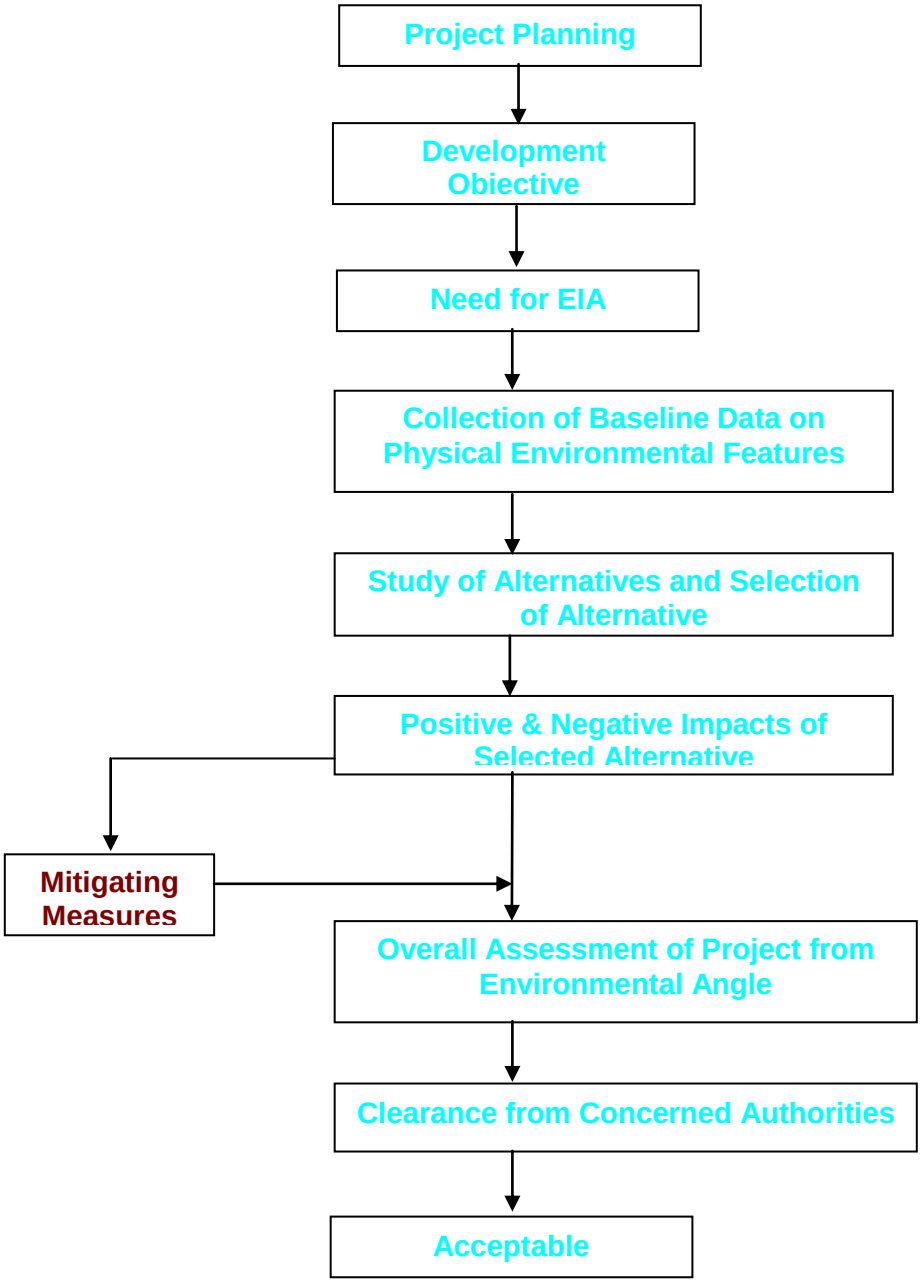
Environmental study for road projects involves several steps, starting from clear understanding of the development objectives, collection of base line data, and evaluation of alternatives to overall assessment of the environmental impact of the selected alternative. The involved activities are:

- Collection of base line data and physical environmental features
- Study of alternatives and selection of alternative
- Positive and negative impacts of selected alternative
- Mitigation measures
- Overall assessment of project from environmental angle
- Filing of application for environmental clearance
- Clearance from the concerned authorities
- Project implementation

The above activities are given in the flow diagram of environmental assessment of the project.

Salient features are extracted hereunder:

- Baseline data collection
- Physical and Environmental features
- Beneficial Impact
- Negative Impacts
- Some Environmental Parameters Associated with the Project
- Initial Environmental Assessment



Flow Diagram for Environmental assessment of Road Projects

7.2 NEED FOR ENVIRONMENTAL STUDY

The existing NH-717 (A) takes off at Km 80.500 on existing NH 10 at Ranipool in East Sikkim and runs towards North to South direction passing through a number of towns/villages like Ranipool - Aho – Yangtam – Panchwati – Pakyong within East District.

The initial stretch of existing / present NH-717 A passes through heavily built-up areas which shall involve costly Land Acquisition and serious resettlement problems for improvement. Due to these reasons, it was felt absolutely necessary to re-align the existing initial stretch of the NH 717 A between km 0/00 – 2/45 by shifting the existing take-off point

at km 80/60 to a proposed new take-off point at km 78/100 (i.e. located at out skirt of Ranipool town toward Singtam) on Sevok-Gangtok section of NH-10. The proposed alignment is realigned from the existing road from Km 7/250 to Km 12/520 to bypass the Sinking & Sliding Portion. The proposed realignment take off points are very near due to which, it will not affect and deprive the connectivity with villages and hence, the villagers would be the beneficiaries with the proposed alignment. The proposed re-alignment does not pass through heavily built-up area and would involve much less L.A cost as well as resettlement problem as compared to the existing alignment. The re-alignment also passes through an area with a much better topographical as well as soil conditions. The re-alignment also passes through an area with a much better topographical as well as soil conditions. Hence, apart from the reduction in distance between Pakyong Airport and Capital City Gangtok by Km 2.5, which would greatly benefit for the public in terms of vehicle operating cost and travel time, the proposed re-alignment is technically far better and financially cost effective in the long run.

This work will include improvement of gradient, re-alignment, pavement, retaining walls, culverts etc. In order to improve the gradient of this road, some stretches of the road will have to be re-aligned whereas some existing stretches can be improved to conform to single lane specification in respect of its gradient, curves, super elevations etc.

In view of the above, there is a requirement to have the environmental study of the project road which contains the following elements:

- Preliminary Or Initial Examination And Environmental Analysis
- Environmental Impact Assessment
- Environmental Management Action Plan

The Environmental Assessment and Environmental Management Action Plan are applicable in case the initial environmental examination indicates that there is potential to determine the environmental impact and thereby to have the environmental design.

7.3 COLLECTION OF BASELINE DATA

Data Collection during Reconnaissance

The data collection to be conducted during reconnaissance period which includes road factors, terrain and traffic factors, land-use, environmental factors. The data collection proforma has been developed and the information is below mention

Data Collection during Reconnaissance

1	Climatic / Meteorological Data	
	• Rainfall	• 3200 mm per year
	• Temperature max & minimum	• 28° C to 8° C
	• Humidity	• Moderate

	• Wind speed & wind direction	• Moderate
2	Land use in the area	Frequently cultivated jhum land
3	Cut and fill sections	Cut section only
4	Vegetation in the area	Growth rapid
5	Nearby ecological sensitive area – forest, reserve forest, wild life sanctuary, wet land	Ref. forest clearance
6	Geology of the area	Soil to Hard rock
7	Religious structure near the alignments	Ref. L.A. Plan
8	Heritage Cultural, Historical Structure In Nearby Area	Not Available
9	Community structure – near the alignment – Community Well, Hand Pump, Community Pond, Panchayat Bhawan, etc.	Nil
10	School, College, Hospital In The Nearby Area	Nil
11	Traffic on the road & traffic projection	Traffic survey Data
12	Connectivity of the alignment – tourist importance, connected to industrial, towns & cities, school, college, hospital, markets. and port	Ranipool - Aho – Yangtam – Panchwati – Pakyong within East District
13	Report of HIV & AIDS in the area	Not noticed in the Area
14	Source of stone, cement, sand, etc.	Refer quarry chart
15	Source of construction water	Available
16	Status of surface water bodies – pond, river, stream in the nearby area	Not affected
17	Status of groundwater	Very deep being hilly area
18	Disposal area / sites near the alignment to accommodate surplus earth	Disposal sites available
19	Selection of borrow area in the nearby area	Not required
20	Is the alignment acting as embankment in between agricultural lands	No
21	Source of fly ash for road construction in the area	N.A.
22	Population (Direct & Indirect) served by the road	-

23	Importance of the road to the connecting habitations	For providing economical upliftment.
24	Analysis of alternatives for alignment selection	Suitable and best alignment selected
25	Analysis of alternatives for selection of material for road construction	Materials lead surveyed
26	Air quality in the area	Good
27	Water quality in the area	Good
28	Road safety analysis	Cautionary/ informatory boards have been considered for provision crash barriers at sharp or blind curves, parapets over retaining walls
29	Road drainage	Culverts of different spans and side drains provided
30	Soil quality	Ordinary Soil and soil mixed with Boulders to Hard Rock
31	Nature of terrain	Mountainous to steep
32	Any flood hazard	Nil
33	Erosion potential	Erosion potential taken care of by providing Breast wall and vegetation turfing
34	Demarcation of Land slide prone areas	Nil
35	Major & minor rivers – Hydrology	Nil
36	Land to be acquired	Ref L.A
37	Nature of the land	Government Land
38	Displacement of house holds	Ref. L.A. Plan
39	Population composition – demography	Lepchas, Bhutias and Nepalese

Physical and Environmental Features

In order to have a complete assessment of the project, the physical and environmental features are brought out as follow

Physical and Environmental Features

Sn	Particulars	Selected Alternative
1	Length (Kms)	
	• Improvement of Existing Road to Single - lane	11.989 Km
	• Re alignment of Existing Road	4.55 Km
2	Terrain (Plain rolling / hilly)	Hilly
3	Land width Proposed (m)	24 m /12 m

Sn	Particulars	Selected Alternative
4	Category of land proposed to be acquired (ha	
	• Forest Land	3.0 Ha
	• Agricultural land	18.25 Ha
	• Habited area	5.55 Ha
	• Swampy land	Nil
5	Displacement of households (Nos)	31
6	Cut Sections	
	• Length in cut (Km)	14.5 Km
	• Maximum depth of cut at centre line(m)	20 m
7	Fill Sections	
	• Length in fill (Km)	2.039 Km
	• Maximum height of fill (m)	3-6 m
8	Vegetation : No. of trees exceeding 30 cm in girth to be cut	Ref. forest clearance
9	Flood hazard (encroachment on flood plain)	Nil
10	Erosion potential	Ref. Sl.No. 33 of table -1
11	Landslide potential	Nil
12	Stretch in geologically unstable area	Nil
13	Drainage and adverse impact on water flow	Adequate provision has been made
14	Number of major river crossings (exceeding 60 m)	Nil
15	No. of road intersections	08
16	No. of railway crossings	Nil
17	Schools, colleges, hospitals falling enroute	Ref. L.A. Plan
18	Number and type of utilities requiring relocation	Ref. L.A. Plan
19	Possibility of providing wayside amenities	nil
20	Air quality (very poor, poor, fair, good)	Good
21	Noise level	Good
22	Estimated Cost	Rs 207.30 Cr.

Beneficial Impact for Highway Project

The beneficial Impact for the proposed Project is given as follows. It is observed that the analysis of the Environmental Impact indicates that this project road has much positive impact on the socio-economic aspects and the development of the region.

Beneficial Impacts for Highway Project :	
Employment Opportunity to People	Yes. Project offers good employment opportunity to skilled / unskilled workers
Enhancement of Local Industry, Agriculture and Handicrafts	Yes. Good reduction in vehicle operating cost and time of communication will have positive impact.
Income from Visitors and Taxes	Yes. Passenger and freight traffic will increase to enhance income and taxes
Enhancement of Rural Development through quick and easy transportation of building materials	Yes.
Transporting, Processing and Marketing of agricultural products	Yes. Fast and economical movement of products
Opening up of opportunities for new occupations	Yes. Fast and economical movement will open opportunity for new occupations.
Approach to quick services and safety	Yes. Time saving due to short length and improved road geometric.
Improved quality of life for people and so on	Yes. Project will substantially contribute to improvement in the quality of life in South & West district.

Negative Impact

Environmental Study with respect to the Negative Impact has also been considered and an analysis is placed as follows. There is no visible negative impact of this project road on spoiling and destroying environmental issues and features of the region and the project influence area.

Negative Impacts for Highway Project:	
Erosion and sediment discharge	No. Proposed Road mostly passes through stable hill slope, soft & hard rock area which will keep in control the erosion and sediment discharge.
Poor drainage resulting in rail / road / highway damage and leading to flooding problems and degradation f water resources. Formation of new gullies	No. Adequate provision has been made for drainage and quick discharge of run-off. There are 606.00 culverts.
Increase in concentration of runoff causing surface water pollution	No Route alignment is made in a manner to ensure quick discharge of run-off. There will be no ponding up or any surface water pollution
Clearing of roadside vegetation for fire-wood, grazing, cultivation and urbanisation	There are no new village on this route and hence will not have impact of in-discriminate use of

	forest products. On the contrary, the road will provide LPG at cheaper rate to the existing village and deforestation will be reduced.
Increase in traffic litter, noise and dust pollution	No. There will be no dust pollution. There is no traffic concentration point to cause noise pollution.
Air quality affected by vehicular exhaust smoke with reference to SPM, NOx, CO, HC and lead	No. Air quality will not be affected as the route passes through open area.
Spell of toxic and hazardous chemicals from the carriers using the highway for transportation of such material	No
Transfer of vector diseases	No
Effect on wildlife through habitat loss and encroachment	No. The road does not pass through wildlife habitat.

Some Environmental Parameters associated with the Environmental Project

The basic environmental parameters have been broadly brought out and are tabulated as follow

Table No. 5 : Some Environmental Parameters Associated with Transportation Sector Project

Sr.No.	Environmental Parameters	Remarks
1	Surface Water Quality	Good; Not going to be effected
2	Air Quality	Good; Not going to be effected
3	Seismology / Geology	Hard Rock area Good girth of vegetation in soil mixed with boulder area
4	Erosion	Nil
5	Land Quality	Fertile
6	Fisheries	Nil
7	Forests	Medium to Dense Forest mainly of bamboo forest.
8	Terrestrial Wildlife	Nil
9	Noise	No
10	Land use	Individual owned agricultural land with minor irrigation.
11	Aesthetics	Beautiful and scenic
12	Industries	Nil
13	Resettlement	Nil There is no habitation requiring relocation
14	Archaeological / Historic	Nil
15	Significance	Economical concern
16	Public Health	Not effected
17	Socio-Economic	Good prospects