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# "Assessment of Potential Impact on Environment due to Upgradation of Highway Work from Padubidri to Karkala." -A case study.

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## Abstract

In India, it is highly essential to concentrate on the various developmental activities which are yard sticks for the degree of heights of development in term of technology and economy. The main objective of this work is to assess the potential impacts which have taken place during the 2-laning of State highway from Padubidri to Karkala.

Many number of small Panchayaths, Towns are in this areas. The collected base line environmental details of land could be taken as a base data prior to the study. The potential impacts both positive and negative such as climatic condition, land resources, water resources, air quality, flora, community facilities, cultural properties and social environment were collected and analysed. However, the temporary impacts may occur and hence suitable mitigation measures should be made. It could be observed that there, improve accessibility and connectivity, reduce vehicle operator and maintenance cost, facilities to road works, improve quality of life and faster travel could be carried out. To reduce the air impacts and noise impacts in future, more plantations of trees on road side and development of green belts could be carried out.

***Keywords:*** Assessment, Potential Impacts, 2-Lane, Padubidri to Karkala**.**

## 1. Introduction

It is common Knowledge that humans continue to have a high impact on the environment. The combination of an exponentially growing population, escalating use of the earth's resources and human desire to modify rather than adapt to our surroundings, may seriously challenge the assimilative capacity of our natural system. Up to one half of the Earth's territorial environment has already been altered from its natural state through human activity. Over the passage of time, two conflicting facts have become clear that we continue to degrade the environment that we rely on and that we disrupt the functioning of it processes for both our economic and physical survival.

**Environmental Impact Assessment**

The Environmental Impact Assessment can be defined as the process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development projects proposals prior to major decisions being taken and commitments made. EIA report is also called as Environmental Impact Assessment Statement; sometime it is also called as only Environmental Statement i.e. ES.

**EIA Process**

The EIA process should applied as early as possible in decision making and throughout the life cycle of the proposed activity. It should be applied to all development proposals that may cause potentially significant effects also it is applied to biophysical impacts and relevant socio-economic factors, including health, culture, gender, lifecycle age and cumulative effects cositentent with the concept and principles of sustainable development..

1. Screening
2. Scoping
3. Examination of alternatives
4. Impact Analysis
5. Mitigation and impact management

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6. Evaluation of significance
7. EIS report
8. Review of EIS
9. Decision making
10. Follow up

## 2. Literature review

### Guidelines and manuals

As a part of the study number of literature and government manual of various countries are available was reviewed both for manuals in India and abroad. Almost every nation who is all adopting EIA has their own committee to prepare the guidelines and manuals. Review of these types of manuals and guidelines give the basic idea about the procedure of preparations of EIA report. Preparation of environmental impact assessment report should be as per the manual of MoEF in India.

### Prediction techniques

*Canter and Sadler* (1997) provides a listing of prediction techniques in their review which are applicable to different aspects of EIA. Canter (1996) provides an excellent overview, based on American experience, of many of these prediction techniques. In many EIA applications, these basic prediction techniques are actually combined. This is particularly true when using computerized modelling software for specific applications, as the application of a computer model usually requires collection of environmental information to set baseline values for the model's variables and to determine the values for model's parameters. [6]

### Review of EIA

Review of various projects in India and foreign that may help how to conduct a various level of impact analysis and how to predict the various impacts to the environment like air water, soil and flora and fauna. Different authority uses different methodologies for the assessment. In most cases, a technical evaluation of the EIA report is made by specialists. This technical evaluation provides the basis for the review. The output of the review is either a rejection of the project, or an approval report outlining terms and conditions under which the project may proceed. [5] The Asian Development Bank and the World Bank also use experts for the review and evaluation of EIA reports submitted to them as part of their environmental assessment requirements.

### Mitigation plans

For protecting environment during construction especially road and highway construction there are so many remedial measures are available the planning stage itself we needed to take care about the environment, Arijit Choudhury[4] conducted a study on good environmental management practices with case study of tree transplantation in highway project in India. Shakthi prakash is conducted a study on hill roads of uttarakhand and prepared the implementing environmental management plan. [4]

## 3.Case study ;Padubidri-Karkala highway

### Location of the project

The project is located near to the Udupi, and which is going to be constructed from Padubidri to Karkala and followed by the route Nadikoor-Belman-Nitte Panchayaths of Karnataka.

### Project Description-Project background.

Up gradation of Padubidri to Karkala state highway project was under the initiative of "The Second Karnataka State Highways Improvement Project (KSHIP-II) is a part of the ongoing road improvement programme in Karnataka State to support the growing economy and social development programme. The project is only belongs to the up gradation of existing 5.5m road into 2-lane road along the existing alignment. So it does not affect the traditional people or any ethnic minority in this region. Geographical location of the project is given below Fig. 1 the proposed project is marked in the map.

As per the 14$^{th}$ September 2006 notification of Ministry of Environment And Forest Department (MoEF) this project will comes under the category Project. Environmental impact assessment may

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helpful to the people, industry and the surrounding institutions. After finishing this project, people can quickly access to Udupi and Mangalore.

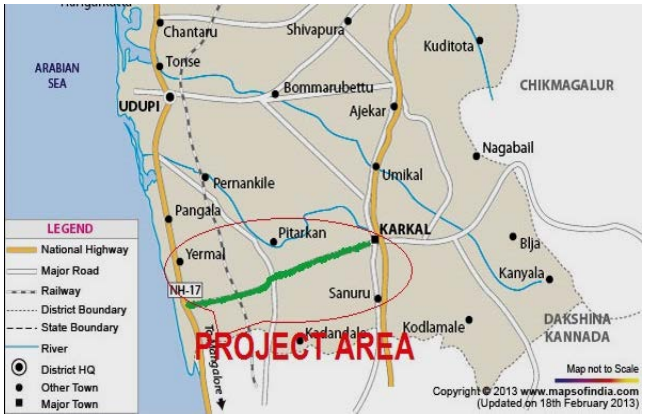


**Fig.1 Geographic location of the highway project.**

## 3.Assessment of impact

Projects have typical potential impacts though these vary in accordance with the intensity of construction works involved, future scenario envisaged during the operation stage and the importance attached to the impacted environmental attributes. Since the project involves widening of the existing state highway.

**Possible impacts of the project**

As we visited to site we observed that, there were certain effects of the project over the environment so that can be studied out to project as:-

- Emission from construction vehicles and machinery
- Noise from the vehicles, asphalt plants, due to blasting operation and equipment's.
- Roadside landscape development.
- Accident risks from construction activities.
- Dust and its treatment.
- Impacts on water quality due to construction of highway
- Some health issues.

**Raw material requirement**

The KSHIP-II planned to improve 882km of highway with the estimated cost of Rs.1.748 corers as a part of their highway improvement programme II. From the table-1 it is clear that there should require 14.7core M.T. of blue metal,2.2lacks M.T. of sand,98208M.T. of cement, and 10lacks M.T. of bitumen are roughly required to complete the 882 Km of total project. Hence the quantum of environmental impacts is increases every year depends on the project type and it may very high rate thought the India. The figures above through may actually vary if the road works are properly planned by considering all environmental aspects.

**Table 1 Estimated Raw material requirement**

| Item | Quantity (M.T.) | Mode of transport | Source |
|---|---|---|---|
| Blue Metal | 448277 | By truck | Stone Quarry |
| Sand | 6674 | By truck | Gurupura river |
| Cement | 2976 | By truck | ACC Ltd. |
| Bitumen | 3049 | By tanker | MPRL |
| Diesel | 4000(KL) | By tanker | IOCL |

## Climate

By and large, there was no significant change expected in the climatic setting (precipitation, temperature and wind) of the project corridor. However the climate is likely to be modified slightly due to removal of roadside trees and the addition of increased pavement surface. In addition, temporary loss of shade giving roadside trees will cause discomfort to the slow moving traffic and pedestrians.

## Ambient air quality

Air quality along the project road alignment and at congested major settlements locations like Padubidri, Belman and Karkala would be adversely impacted both during construction and operation stages. Most of the dust (Suspended Particulate Matter) during construction arises from operations such as excavation and filling during site preparation works, loading, unloading and transportation of construction material, drilling, use of heavy equipments and machinery in the earthworks and pavement works.

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The acceptable concentration of deposited dust is also related to the sensitivity of the receiving environment. The Table 2 shows the inspection results of air pollution level. Average of total sample result is given the table. It is clearly shows that there is no evident that exceeding of the quality level of the corridor during the testing time. But there may be a chance of exceeding this limits depends on various construction phases.

Large quantities of dust become wind borne and were carried away depending on the wind velocity and wind direction. The fugitive dust released during the construction activities cause immediate effect on the construction workers as well as on the settlements adjacent to the alignment, especially those in the downwind direction. Increased suspended particulate matter and fugitive gaseous emissions like, Oxides of Sulphur ($SO_2$), oxides of nitrogen ($NO_2$), carbon monoxide (CO) and hydrocarbon (HC) would be released from vehicles, hot mix plant, batching plants and diesel generator sets; stone crushing units in the stone quarries, also add to the problem. Most of the generated pollutants from the above activities were limited to construction phases and confined to impact zone in downwind direction of the site, hence no significant was envisaged. Operation stage impacts will not be as severe as the construction stage impacts and they will be confined generally to a ribbon development close to edge of the pavement. The potential impact of air and dust pollution on both the workforce and local residents can best be minimized at source by proper maintenance and handling of construction equipment and by providing appropriate protective working gear (masks, goggles etc.) as required.

**Table-2; Ambient air quality levels**

| **Parameters (24hrs) duration** | **Average results of samples (µg/m$^3$)** | **Industrial, Residential, Rural and Other area (µg/m$^3$)** |
|---|---|---|
| Sulphur Dioxide | 12.43 | 80 |
| Nitrogen Dioxide | 13.83 | 80 |
| Particulate matter (less than 10µ) | 64.28 | 100 |
| Particulate matter (less than 2.5µ) | 15.3 | 60 |
| Lead | .015 | 1.0 |
| Carbon monoxide | 1.0 | 04 |

**Noise**

The community abutting subproject road will be adversely affected by increase in noise level due to road development activities. Road noise depends on factors such as nature of construction activity, traffic intensity, type and condition of the vehicles plying on the road, various road construction activities increase noise levels in the impact zone of the project corridor. The construction activities such as excavation for foundations, grading of the site, construction of structures and facilities, movement of heavy vehicles, loading, transportation and unloading of construction materials produce significant noise during construction stage.

Observed Noise quality in respect of different areas as per noise pollution rules 2000 are in the following table-3

**Table-3; Ambient Noise quality levels**

| **Area** | **Day(Leq dB(A))** | **Night(Leq dB(A))** |
|---|---|---|
| Residential | 58 | 42 |
| Commercial | 63 | 51 |
| Industrial | 68 | 63 |
| Silence Zone | 48 | 37 |

**Impact on ground water**

Water required for construction of road and for domestic uses of labour camps and workers drawn from existing community bore wells or open wells and nearby irrigation canals may impact the local users. Paved surface of the road will reduce the percolation of runoff water and decreases the ground water recharge. Sources of ground water such as bore wells and hand pumps are getting affected by the widening of the road project. Unscientific disposal of the untreated waste water

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generated in the construction camp and labour camps may contaminate the ground water.

**Impact on ground water bodies**

There are small streams Gurupura River in the impact zone and Swarna River in the influence zone. And there are a few small streams crossed by the project road. There are no major ponds along the project road. Disturbance to flows; alteration of drainage causing erosion; sewage and oil/grease/lubricant contamination from construction camps may occur.

During operation stage Surface water contamination may result from storm water containing oil and grease, metals and other pollutants released by vehicles on the roadway. Storm water may also contain nutrients and herbicides used for management of vegetation in the right-of-way. Widening also contributes to consolidation of embankment decreasing the permeability of the paved and unpaved shoulder area by decreasing the ground water recharge and increasing in run off aftermaths of road construction. Surface runoff also increases due to paved impervious surface of main carriage way.

**Table-4; Water quality levels**

| Parameters | Desirable Limit (IS 10500:1991) | Result |
|---|---|---|
| Colour(Pb-Co) | 5 | Colourless |
| Turbidity(NTU) | 10 | 1.02 |
| pH | 6.5-8.5 | 7.42 |
| Total Hardness | 300 mg/l | 123 mg/l |
| Calcium (as Ca) | 75 mg/l | 34.8 mg/l |
| Magnesium (as Mg) | 30 mg/l | 8.74 mg/l |
| Iron (as Fe) | 0.3 mg/l | 0.027 mg/l |
| Chloride (as Cl) | 250 mg/l | 32 mg/l |
| Sulphate (as $SO_3$) | 150 mg/l | 6.2 mg/l |
| Nitrate (as $NO_3$) | 45 mg/l | 4.9 mg/l |
| Fluoride (as F) | 0.6-1.2 mg/l | 0.66 mg/l |
| Chromium (as$Cr^{+6}$) | 0.05 mg/l | 0.002 mg/l |

From the above table it is shown that all the water quality parameters well within the limit. And there is no sever impact on ground and surface water quality due to construction of highway project from Padubidri to Karkala.

**Impact on soil and land use**

Some stretches of the project corridor constitutes productive agricultural land which may be affected. Loss of agricultural land may result from the establishment of construction camp, labour camp, concrete batching plant; hot mix plants borrow areas, quarries near to subproject roads and access roads. Suspended particulate matter from quarries and crushers lead to decrease in productivity of the soil; degeneration of plant species and retards the plant growth found. After the construction of road is over, some of the land use changes are envisaged due to improved accessibility to far off distances and changes in socio economic activities, especially linear developments at the villages and towns will increase. The agricultural and horticultural activities will be positively benefited from better roads and connectivity.

**4. Conclusions**

New and good roads might significantly alter the fine balance between community, people and development. Much more indirect effect will occur in later if we ignore the negative impact of this type of construction. Hence it is necessarily need to

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identify and mitigate negative impact for new developments. Construction of sustainable roads for better, changed outlook environmental component and economy of the surrounded places.

There was no high significant effect to the environmental attributes because of the Upgradation work of state highway Padubidri to Karkala. There was some common temporary effect to environment during the time of construction phase, which we can be avoided by taking extra provision for protection towards environment and peoples. Rather than this there is lot of benefits are in this area, they are.

- Improved accessibility and connectivity.
- Reduced maintenance cost and operating cost of vehicles.
- Improved facilities to road users.
- Improved quality of life.
- Reduced risk of accidents.
- Saving of fuel consumption.
- Increase land value and development.

Anyhow, less significant adverse impacts are anticipated due to the proposed project; however, the temporary impacts on water quality, Air quality, noise levels, soil quality, flora and social economic environment of the project area are anticipated. Some impacts are as marginal impact some trees are lost in borrow areas, the compaction of soil may not be affected largely, the loss of top soil is due to the acquisition of agricultural land and due to construction dumps, no sensitive area exists in the corridor, no losses of protected forest, the issue of water logging in adjoining area will improve due to the raising of the road, heavy loss of road side trees leading to increase in air and noise pollution**3**etcimpacts are identified.

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