

Study of Environmental Impact Assessment and Environmental Management Plan for Nh-216, Ipurupalem - Repalle Andhra Pradesh

Duggiseti Manoj Kumar, K. Shyam chamberlin

Abstract: *Transport and highway construction play a key role in infrastructure development. As a result, there is tremendous construction activity going on in this field. Irrespective of the numerous works in road and highway works, there is a drastic change in the environmental components due to the works as there was no environmental control board in earlier days. Due to the increase in pollution of all the components of the environment, new government bodies were formed in which environmental impact assessment is one such government body which concerns the environmental effects in construction projects and tries to reduce the pollution of environmental components. The study in this paper is about environmental impact assessment and environmental management plan for NH-216, Ipurupalem, Repalle and Andhra Pradesh. The methodology used is based on environmental impact assessment and environmental management plan by assessing the affected environmental components by collecting the baseline data, analyzing the extent of pollution, estimate the approximate future pollution and suggesting mitigation measures for the affected components. The results will be based on the environmental audit for the proposed mitigation measures and the impact of proposed mitigation measures.*

Index Terms: *National Highways, Environmental impact assessment, Mitigations, Environmental management Plan, Physical, Biological components.*

I. INTRODUCTION

Transportation are increasingly common in today's world as human development expands and people increasingly on daily basis roads. Based on recent economic development growth highway project plays one of the crucial role not only economic development it also create environment distraction and property destruction may or may not be direct paths. Environment distractions means harm to touchy eco-frameworks, soil disintegration, changes to seepage design and subsequently ground water, obstruction with natural life development, loss of profitable agrarian grounds, resettlement of individuals, disturbance of neighborhood financial exercises, statistic changes and quacked urbanization. Model study on going deals with there habilitation and up gradation for existing 2 lane to 4 lane rehabilitation and up gradation for existing 2 lane to 4 lane from Repalle (129/927 km) to ipurupalem (195/000) section of paved shoulders in national highway -214A (new national

highway-216) in state Andhra Pradesh.environment impact assessment (EIA)and environment management plan (EMP) study covers pre construction phase and construction phase investigating and analyzing the potential impacts of project. The ecological parts physical and organic and financial inside the task impact region and giving measure limit the potential effect and upgrade the positive effect just as viability execution and checking plan nature defend measure amid phases of the venture Environmental management plan with necessary budget and institutional roles for effective implementation. The purpose of EMP is to visualize and implementing appropriate environmental controls and monitoring procedure within the construction phase of project development.

India is particularly faster movement development and transportation good require and economic development .infra-structure development is proper good required and but is increasing road traffic require better riding quality of road improvement. Road construction certain identification impact of zone. Construction material sources, statutory clearance, Right of way (row) of proposed and 500m on LHS and RHS [1] a systematic investigation of environment impact assessment of both positive and negative impacts on physical, biological, socio economic environment. EIA provides a plan to reduce the negatives effects and enhance positive impacts of project. EIA is the site should be light existing situation of project, major sources of damage to road development is ecological destabilization, flora and fauna. The noise level were found exceeded permissible limits, minimum soil degradation, seepage framework extend was discovered exceptionally poor was observed. the present to highway lane insufficient to handle the current traffic volume so the section required immediately to four laning accommodate more traffic.after analyzing parameters and the probable impact suggestion are made regarding the mitigation measure and different stages in reduced to environment impacts [2] present highway capacity was analyzed and two lane highway is insufficient to handle the current pathetic traffic volume. Environment impact likely to occur due to widening of 130 km of nh-4, identify impacts the heavy loss of road side tress leading to increase the air and noise pollution [3].infrastructure development road effects both biotic and abiotic components of

Revised Manuscript Received on April 09, 2019.

Duggiseti Manoj Kumar, Department of Civil Engineering, Koneru Lakshmaiah Educational Foundation (Deemed to be University), Guntur, Andhra Pradesh, India.

K. Shyam Chamberlin, , Department of Civil Engineering, Koneru Lakshmaiah Educational Foundation (Deemed to be University), Guntur, Andhra Pradesh, India.

ecosystem by changing the population of plants & animals [4], the particular to the task and land condition in the territory of Kuwait. The EMP ought to comprise of cost gauges for observing project hardware, acquisition, labour, transportation, office cost considers, detailing stationeries and so on [5].

II. RESEARCH SIGNIFICANCE

To identify significant impacts from environment and provide mitigation measure to reduce these impacts highway project. Environment management plan (EMP) specifically aim to manage the impacts during the construction phase of development.

III. DESCRIPTION

The project on section national highway, project to faster transport to vehicular traffic. Project road starting point is Repalle (chain section 129/927) and ending or termination point is ipurupalem (chain section 195/000). national highway 214&214 A were merged and (new name NH -216) rehabilitation and up gradation of repalle to ipurupalem two line paved shoulders in state of Andhra Pradesh. national highways developed in phase -1V project five districts covered the mainly two districts boarders covered in project Krishna and Guntur district. Total length of road 65.07 km. there are 3 major bridges, 9 minor bridges, 79 culverts on the road., slab culverts -18, pipe line culverts-44, box culverts-17, and additional culverts-82. soil condition of mainly in black cotton soils and sandy soils. the forest area not passes in project, railway crossing on the Guntur division section tenali to Repalle level crossing. major junction are Repalle and Bapatla, minor junction-16 from vemavaram, battiprolu, kangala, govada, nizampattnam, chandole roadover bridges (ROB) /road under bridges the project area is nil. Fig. I shows the location of project.

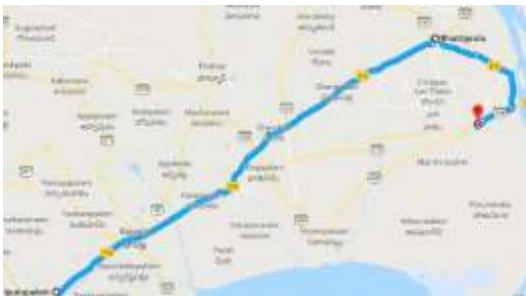


FIG. I: Location Of Project

Environmental Impact Assessment Project

The existing certain polices and legislation and institutional and guidelines followed to environment impact assessment at the national level and state level and panchayatis has been cleared permission requirements for the stages of project. Category A projects are national level projects. Every project environment clearance required the project. mainly clearance required following procedure. First should be construction site identification and after will be pre-feasibility report project and proposed terms and reference to MOEF next will be be scoping by Eac. Basically two steps followed one is accepted and another is rejected. Accepted the TOR approved. After project should be detailed

EIA report to SPCB by the project proponent next will be public consultant process and after the appraisal and advice committee last step approved the MOEF. The approved Environment and rejected from the MOEF advice of EAC. The environment impact assessment has been project first step mainly screening required the criteria type of development and location of developed impacts of project. Scoping can be identifying of impacts and all issues of significance and importance the decision makers and experience persons should checked with get answer. Impact assessed on the basis frequency, and duration and prevalence

A. Environmental Polices, Legal, Regulatory Frame Work

The government of India has various polices guidelines, acts and regulations pertaining to environment. the government of India passed Environment protect act 1986 under this act, ecological effect appraisal (EIA) warning 2006 has been issued and revision 2009 by the service of condition and timberland (MOEF) and focal contamination control board, the earlier condition freedom for undertaking.. the road project have listed at serial no -7. the environment clearance process dynamic on development needs, technologies available and standards for cleaner environment for a sustainable development(MOEF).contractor shall be obtain as required under the applicable laws,

The permission of state government for extraction of boulder from quarry, permission of village panchayat and pollution control board for installation of crushers, permission of state government for drawing water from rivers, license from inspector of factories or other competent authority for setting up batching plant, clearance of pollution control board for setting of batching plant and asphalt plant, permission of village panchayats and state government for borrow earth.

The above permissions are required for construction of roads.

a. Environment Management Plan (Emp) Process

EMP promotes the best awareness and use of best practice environment management by operating during planning pre construction phase and construction phase and operation phase. Environmental management plan (EMP) deals with the implementation procedure of the guidelines and measure recommended to avoid, minimize and mitigate environmental impacts of the project.

b. Impacts during preconstruction phase

The fundamental issue include in the pre-development organize are obtaining of land properties, tree fillings, redirection of backwoods arrive, water tanks & ponds, procurement of regular property assets, migration of open utilities. Most the effects of pre-development organize are changeless in nature.

c. Impact during construction and operation phase

The major ecological issues will be identified with residue age due to activity of plants, loss of fertility in soil,

contamination of water bodies, traffic and transport problem, and noise pollution, air pollution these effects can be moderated successfully through appropriate arrangement, planning and utilization of ecological development state.

B. Methodology

The environment impacts of project over all listed following getting some information from site and can be studied with help of environment impact assessment (EIA) process also it will be minimize can be mitigated provide proper impact. To cover up all parameter of the purpose dissertation work and systematic and time bound manner following steps

Reconnaissance Survey: The conducted for collecting all type of initial information about project and physical feature of site and locating important points along site.

Possible impacts of the project:

- a) Borrow areas, embankment slopes
- b) Road side plantation
- c) Compaction of soil, air quality of parameters
- d) Contamination of soil from fuel, construction of waste and lubricant, soil erosion.
- e) Emission from construction vehicles and machinery, loss of top soil.
- f) Water bodies and water sources.
- g) Noise from vehicles, blasting operation, asphalt plant.

C. Data collection

Collection of data is the next step of different parameters.

Water characteristics: sample was taken from different location ground water and surface water and canal water taken of the project.

Soil characteristics: there are different site location soil samples were collected along side highways.

Baseline study: Ensure water collecting samples different location are Bapatla and Chandole and bhattiprolu and Repallecan take canal following area, ground water source should effected. Soil should be affected mainly project area sandy soils long the river and black cotton soils. Sandy soil should be most affected highways. physical parameters should be soil types and ground water and surface water condition, topography, geology is pollution effected. Biological and effected aquatic ecosystem, flora and fauna. socioeconomic condition effected population analysis and infrastructure, economics activities etc.

Auditing/monitoring during construction: The EMP likewise gave a system to consistence reviewing and observing to guarantee that its points are being met. EMP formed part of during the construction of highways inspection and audit were undertaken to ensure plan was implemented. Environmental effect components checked get and within EIA guideline manual. after auditing from quarterly get checked corrective results maintained. Where the problem were identified corrective actions were required to undertaken.

Monitoring impacts of construction phase and operation phase of potential impacts on project measure. Table I shows the auditing/ monitoring during construction.

Table I: Auditing/Monitoring During Construction

EMP Kind Of Pollution Source	Contamination Sources	Location Pollutant Sources	Significant Toxic	Frequency	Standards And Responsibility	
Ambient Air Quality	Construction Phase	Blasting, construction equipment, vehicles	Surrounding areas road access, construction site area	Totalsuspended pollutant, No ₂ , So ₂ , particulate matter	Monthly and quarterly	MOEF guidelines, NA AQ, SSEIAA contactor and management
	Operation phase	Emission from traffic, industries	Road root	Smoke and TSP, particulate matter, No ₂ , So ₂ .	Quarterly and Halferly	SPCB, NAAQS, contractors and management
Noise And Disturbances	Construction Phase	Blasting areas, excavation work, operation of heavy vehicles	Workplace sites, boundary areas	65-60D(25m)	Monthly	Noise ambient air quality standards
	Operation Phase	Vehicles sounds, Fast moving vehicles	Routes ways through susecptable areas like schools, residential are, hospitals	65-60D(30m)	Weekly	EIA guidance manual; NAAQS
Soil Erosion	Construction Phase	Loss of sediment concentration by run off methods, Heavy earth digging	Workplace sites, spoil disposal sites	Loss of soil	Regularly	Engineering practices
	Operation phase	Run off from bottom layers and soil disposal sites	Bottom layers and spoil disposal sites	Loss of soil	Twice a week	Engineering practice



Solid Waste	Construction Phase	Residual waste due to residence of staff	Workplace site, staffquarters, worker temporary stay houses	Construction waste, spoils, domestic wastes	Daily	MOEF guideline and municipality
Waste Water	Construction phase	Temporary camps,staffresidence, construction equipment	Construction sites,garage worker camps	TSS,DO	daily	MOEF guideline and municipality
Social And Economic Environment	Construction phase	Land loss,impact on livelihood of villagers	Site near constructions	Livelihood of people	Half yearly	MOEF guildelines, contract management.
	Operation phase	Loss of stability of rural economics	Nearby place of construction	Livelihood people	monthly	Contract management

Considering above table there are tests are ss conducted to analysis and outputs are given

D. TESTING

Samples of water, soil and noise which collected from the throughout stretch shall be tested in laboratory.

Water: pH, chlorides content, alkanity, acidity, hardness, total dissolved oxygen, electrical conductivity (IS 10500:2012 &EIA Guidance manual -highways)

Soil: physical properties of soil and engineering properties of soil and contamination soil tested (EIA guidance manual highway and IS: 2720)

IV. RESULTS AND DISCUSSION

Analysis of ground water sample taken from different locations alongside the highways. All samples of water have been collected from underground hand pumps and canals near to highways. Collected data has been analyzed for different parameters, between the standards as given by the ministry of environment & forest. Table II, III and IV explains the permissible water sample limits in area

Table II: Bapatla Water Parameters

s. no	Locations		Parameters						
			Ph	EC	Acidity	Alkanity	Hardness	Chlorides	DO
1	Bapatla	S1	7.6	0.87	9	74	64.5	156	0.4
		S2	8	7.03	6	38	46.5	144	0.3
		S3	7.7	1.15	6	18	36.8	185	0.3

Table III: Chandole And Bhatiprolu Water Parameters

2	Chandole	S1	7.1	1.2	7	69	74.5	147	0.3
		S2	7.9	6.0	6.5	40	56.5	139	0.2
		S3	7.4	2.1	7.7	25	35.8	181	0.2
3	Bhattiprolu	S1	6.9	1.6	6	72	63.5	142	0.4
		S2	7.4	4.9	5	41	44.5	148	0.2
		S3	7.8	2.9	5	17	34.5	159	0.4

Table IV: Repalle Water Parameters

4	Repalle	S1	7.8	1.9	8	58	72.5	144	0.4
		S2	8.0	7.0	7.1	39	52.5	138	0.2
		S3	7.4	3.1	6.2	21	34.8	179	0.1

EC –Electrical conductivity, DO- Dissolved oxygen

Water sample taken from S1-canal water, S2- one km radius of water, S3-bore water.

The water sample taking contain test procedure can be effect chance of water. Ph value can be effected get canal water, but future will be loss occurred.chlorine water can be effect chance future problems can be breathing problems, asthma, hazardous children’s health effected chance occurred.

Mitigation measure

- Adequate slopes and drainage channels to be provided across the site.

- Water conservation measure at camp site and canals flowing along with adequate awareness program to be organized for contractors and workers.
- For runoff roads are necessary avoid to risk contamination.
- Solid waste management plan will be developed for collecting, treatment and disposal of waste.



Soil: The soil samples were taken alongside the highways from different location and analyzed. Table v shows the soil testing results samples.

Table V: Soil Testing Results Samples

S.No	Locations	Characteristics								
		GSA %			Atterbreg Limits			MDD G/Cc		CBR %
		Gravel	Sand	Silt & Clay	LL%	PI%	PI%	And OMC %		
1	Bapatla	1.4	84.4	14.20	23.0	NP	NP	1.80	11.0	6.5
2	Yazali	1.8	88.7	9.41	22.30	NP	NP	1.88	10.10	7.0
3	Chandole	0.37	73.65	25.98	23.90	NP	NP	1.815	9.90	7.1
4	Bhattiprolu	0.30	8.29	91.41	70.10	40.38	49.72	1.65	20.20	6.0
5	Repalle	0.18	53.32	46.65	27.70	13.84	13.86	1.80	14.20	5.8

Above test results the soil is non-plasticity and index with CBR Value, this type of soil sample are utilizing to embankment fill of road works, based on the our available limitation given into the our manual.

Mitigation measure

- Initial collected the soil sample based on the your code of practice and Top soil to be preserved and specified depth of 150mm and height not less than 2m.
- Preserved trees are the ones that are uprooted and replantation. Fast growing grasses are used on shoulder of the road and dividers.

V. CONCLUSION

EMP gives a connection among EIA and undertaking implementation. EIA legislation could be strengthened and made more credible if EMPs were mandatory, incorporating environmental auditing during construction /operation. The EMP prepared contains mainly of mitigation measure, monitoring plan.

Some impacts are mainly effected highways trees are loss in borrow areas, loss top soil is due to no losses forest area, contamination of canal water sources and ground water aquifers, air and noise affected median.

REFERENCES

1. B. Sumesh and Santosh k.sar, “study of Eia process national highway -200 Raipur –bilaspur”, *International Journal Of Advanced Engineering Technology (IJAET)*, vol-04, issue-02, pp. 98-102, 2013.
2. K.nitin and sunita kumara, “Environment impact assessment for highways”, *International Conference Of Recent Development In Engineering Science*, pp. 19-25, 2017.
3. Sagar M. Gawande, Prashant A. Kadu, “Environmental impact assessment of six laning through NH-4”, *International journal of scientific and engineering research*, vol-4, issue-12, pp. 152-159, 2013.
4. KashishWalia, R.K. Aggarwal& S.K. Bhardwaj, “Environmental Impact Assessment of Highway Expansion”, *Current World Environment*, vol-12, pp. 507-519, 2017.
5. Baby S, “approach In Developing Environmental Management Plan”, *2nd International Conference on Environmental Engineering and Applications*, vol-17, pp. 253-264, 2011.
6. S.NRanshur, P.H.Sawant and R.A. Hedge, “Environmental impact assessment in Indian scenario”, *Journal Of Environment Research And Development*, vol-3, issue-4, pp.1040-1047, 2009.
7. “CRDA AP GOVT”, [online] Available: <https://crda.ap.gov.in/apcrdadocs/Environment/Environ>

[mental%20Clearance/EIA%20report%20Amaravati%20from%20EC.pdf](#)

8. “Moef”, [online]. Available: http://www.moef.nic.in/downloads/public-information/EMP_Bajoli.pdf
9. Environment impact assessment guidelines manual for highways”[online]http://envfor.nic.in/sites/default/files/highways-10_may_0.pdf

AUTHORS PROFILE



Duggiseti Manoj Kumar Received the B.Tech Degree in Civil Engineering from Visvodaya engineering collage, Kavali, Andhra Pradesh, India in 2016.He is Pursuing M.Tech degree in Construction Technology Management from Koneru Lakshmaiah Education Foundation A.P., India. He actively participates in workshops and seminars in andaround the University.



K. Shyam Chamberlin (PhD), working as an Associate Professor in Department of Civil Engineering at Koneru Lakshmaiah Education Foundation A.P.. M. Tech in Geotechnical Engineering from JNTU, Kakinada, currentlyperusingPhD in Ground improvement techniques from Acharya Nagarjuna University, Guntur. He actively organized conferences, workshops and Guest Lectures in the Department of Civil Engineering, K L University.

