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“ASSESSMENT OF ENVIRONMENTAL OF IMPACT IN BUILDING CONSTRUCTION PROJECT”

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ABSTRACT

Rapid industrialization and population explosion in India has led to the migration of peoples from villages to cities which increase human settlement in world's growing cities and towns. This generates several issues with regard to the environment. Environmental Impact Assessment (EIA) is becoming a very important study before commissioning of any project plan or development in our country. In order to study either its beneficial or harmful effect; evaluation of any project through EIA has become a must; Indian construction industry is rapidly growing at a rate of 9.2% as against the world average of 5.5%. Undertaking EIA for construction industry and improving site management can reduce environmental impacts both on and off site. Several agencies use procedures for EIA of construction projects which might result in significant environmental impacts. The EIA study is necessary to prepare a detailed account of environmental impact of the proposed activity so that appropriate interventions could be taken. An attempt has been made in this paper to study environmental impact of building construction project using checklist analysis methodology.

Keywords - Environmental Impact Assessment, Building Construction.

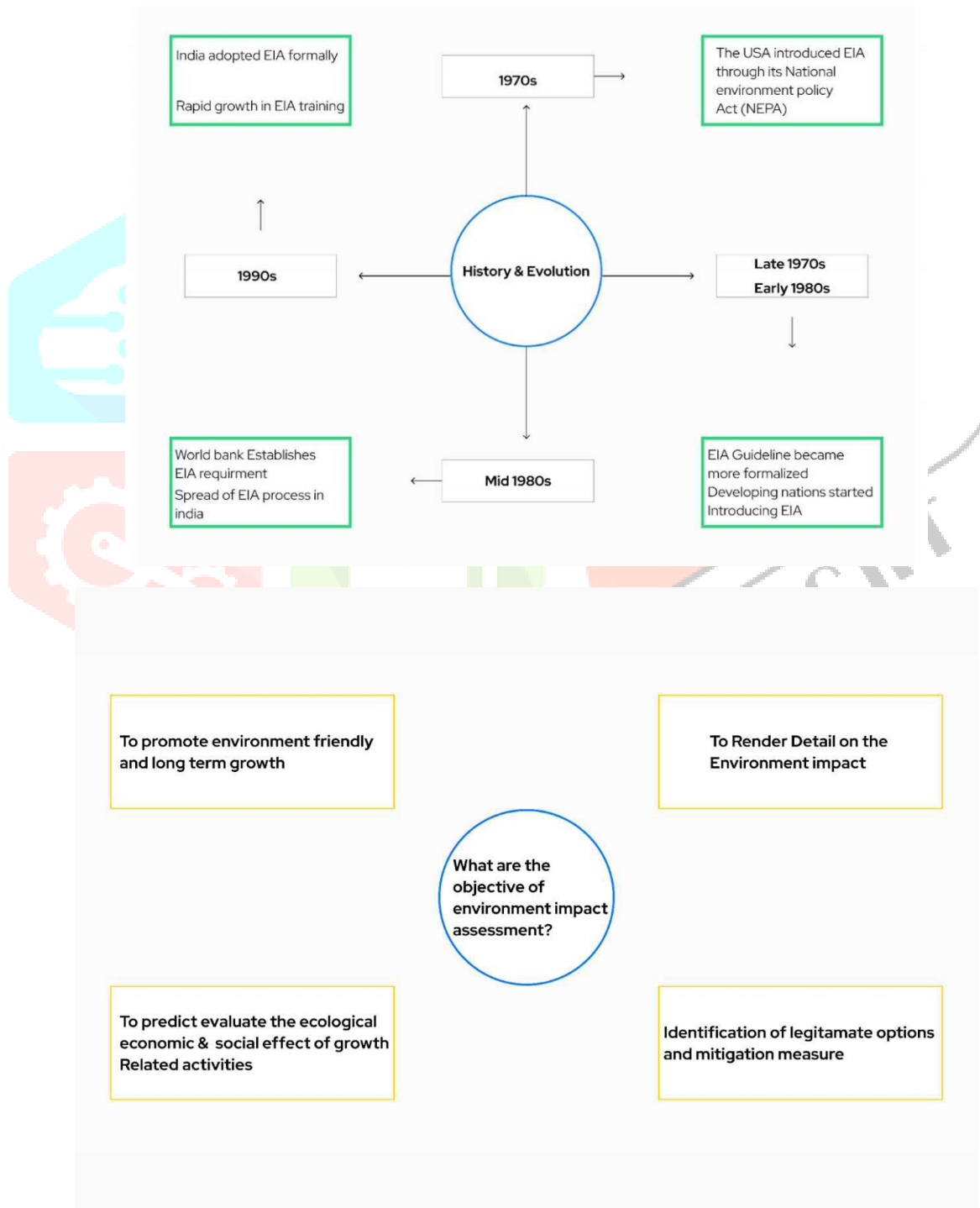
INTRODUCTION

Environmental Impact Assessment (EIA) is a tool to properly anticipate and evaluate the likely impacts of a proposed construction project or development activity and propose measures and strategies to mitigate the adverse impacts. It also takes into consideration, both the negative and positive impacts due to interdependent socio-economic, cultural and human-health aspects due to these construction projects. In short, it is a tool to achieve sustainable development throughout the world. Environment had been damaged immensely in the past without considering the environmental consequences while initiating the construction projects and development activities. Thus, when the government and public became concerned about the environment, seeing its degradation, the mechanism of EIA was introduced to assess the impacts of these construction activities.

1. General Information on Building Construction

Construction activities in India have been pursued without giving much attention on environmental issues. This has resulted in pressure on its finite natural resources. Unplanned and unsustainable urban development has lead to severe environmental pressures. The green cover, ground water resources have been forced to give way to the rapidly developing urban centers. Modern buildings built in our cities have high levels of energy consumption because of requirements of air-conditioning and lighting. In this scenario it is necessary to critically access the utilization of natural resources in these activities. Approximately 50 percent of the energy use in buildings is devoted to producing an artificial indoor climate through heating, cooling, ventilation, and lighting. Water conservation and efficiency programs have begun to lead to substantial decreases in the use of water within buildings. Studies have shown that water-efficient appliances and fixtures can reduce consumption by up to 30 percent or more.

History of Environmental Impact Assessment (EIA)



In India, EIA was introduced in the year 1978 for river valley projects. Later on, other development sections were also included under the EIA, by enhancing its effectiveness. In India, EIA comes under *Notification on Environmental Impact Assessment(EIA) of development projects, 1994* under the provisions of *Environment (Protection) Act.1986*.

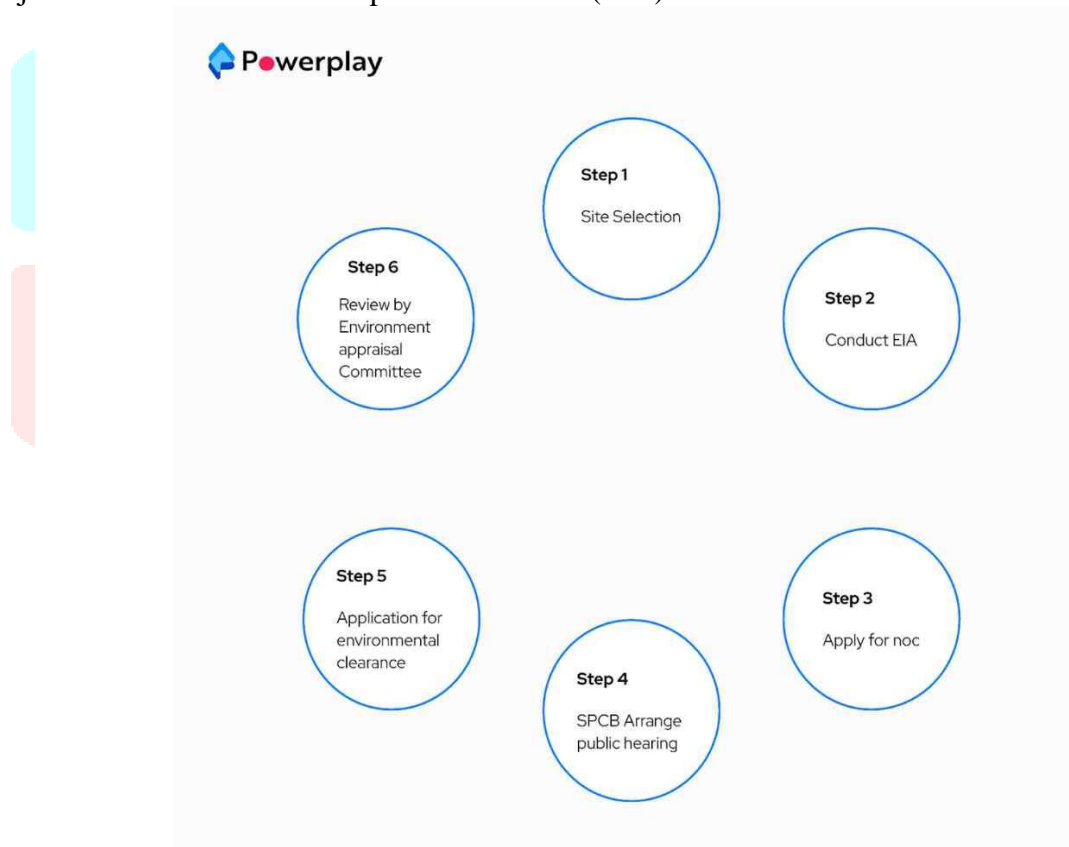
The go-ahead or EC is granted by the **Impact Assessment Agency** under the **Ministry of Environment and Forests**, Government of India. Out of these categories, the construction activities which require clearance from the central government are:

2. Environmental Impact Assessment (EIA) Participants.

EIA applies to all proposed public and private construction projects and the main entities involved in the entire process are:

- The proposing party.
- The environment consultant who prepares the EIA on behalf of the client.
- Regional or Central Pollution Control Board.
- The Impact Assessment Agency.
- The regional center of the Ministry of Environment and Forests.
- The public also has the right to express their views if they want to.

Objectives of Environment Impact Assessment (EIA)



3. Types of Environmental Impacts Are Analyzed.

- Quality of Air
- Noise Level
- Water Quality As Well As Quantity
- Land Environment

Quality of Air

- The air quality present in the environment is predicted and evaluated.
- Quantity of emission of harmful gases from the construction project.
- Impact of the emissions on the nearby area
- Meteorological data such as wind speed, the direction of the wind, and the humidity.

- Standards of the air quality When it comes to air quality, I guess you must go through the below blog to know about the feasible option for air pollution control.

Noise Level

- The levels of noise in the surroundings due to the project are predicted.
- Different strategies can be implemented for the reduction of noise pollution.

Water Quality As Well As Quantity

- Different groundwater resources and surface water resources in the vicinity.
- Quality and the quantity of water present.
- Impact of the proposed project on the quality and the quantity of the water.
- Waste water and its treatment and use for other purposes.
- Rain-water harvesting
- Disposal of storm water

Land Environment

- Study of the soil characteristics,
- Uses of the land, drainage patterns, and the impact of the project.
- Study of land erosion, land degradation etc.
- Impact on flora, fauna, wildlife etc.

4. Objectives of Environmental Impact Assessment (EIA)

There are various objectives of environmental impact assessment which are as follows

- To identify the construction project's probable impact on the environment and the surrounding area.
- To determine the environmental compatibility of any housing or building project.
- To evaluate and select the best alternatives of technology, materials, etc., that create less impact on the environment.
- To study the existing bio-geo physical and socio-economic conditions of the area where the project will be executed and its impact on them.
- To assess and weigh the environmental costs and the benefits of the development project to the community.
- The EIA will help incorporate the various environmental management plans and monitor multiple mechanisms to minimize the short-term and long-term impacts.

5. Limitations of Environmental Impact Assessment in Construction.

There are also some limitations and challenges that EIA faces in the implementation. They are as follows

- The poor availability and the reliability of the Data. So, need more research and improvements to tackle the challenges due to the uncertainty in the data.
- The complete process of EIA should be taken at the project level, but it is undertaken at the planning and the policy level, which is one of the limitations of EIA.
- The availability of the different range of project alternatives in the project environmental impact assessment is small.
- Practically on the field, the EIA will end just after the approval of the project clearance, and there will be no further follow-up.

Proposed System

This section of the manual provides information and guidance on Environmental Impact Assessment (EIA) in building construction projects. It is intended as a resource for those who are involved in EIA practice. Particular emphasis is given to concepts, procedures and tools that are used currently or are potentially relevant in preparing environmental impact assessment reports for clearance from regulatory agencies. EIA is a technical exercise, to predict environmental impacts, assess their significance, and provide recommendations for their mitigation. EIA report covers a wide range of technical disciplines and covers areas such as noise and vibration, air quality, ecology, contamination, water quality & hydrology, archaeology & cultural

heritage, landscape & visual character, sustainability and socio-economics. The EIA report will describe how the project has been improved through the EIA process and what alternatives were considered.

METHODOLOGY

Environment Impact Assessment (EIA) Procedure for Construction Projects The complete EIA procedure for any construction project can be mainly divided into two categories, namely- Review of Project Area, and EIA Process, which have been explained below:

1. Review of Project Area- For any construction project, a review process involving the extensive study of previous works of literature from EIA or any similar reports and other related studies on the environmental characteristics of the project area is performed to analyze and assist in anticipating the impacts of the proposed project.

2. Environment Impact Assessment (EIA) Process- This is the core framework of the EIA mechanism that involves several steps and processes to identify, predict and evaluate the environmental impact of the construction project. The steps have been mentioned below in a sequential format:

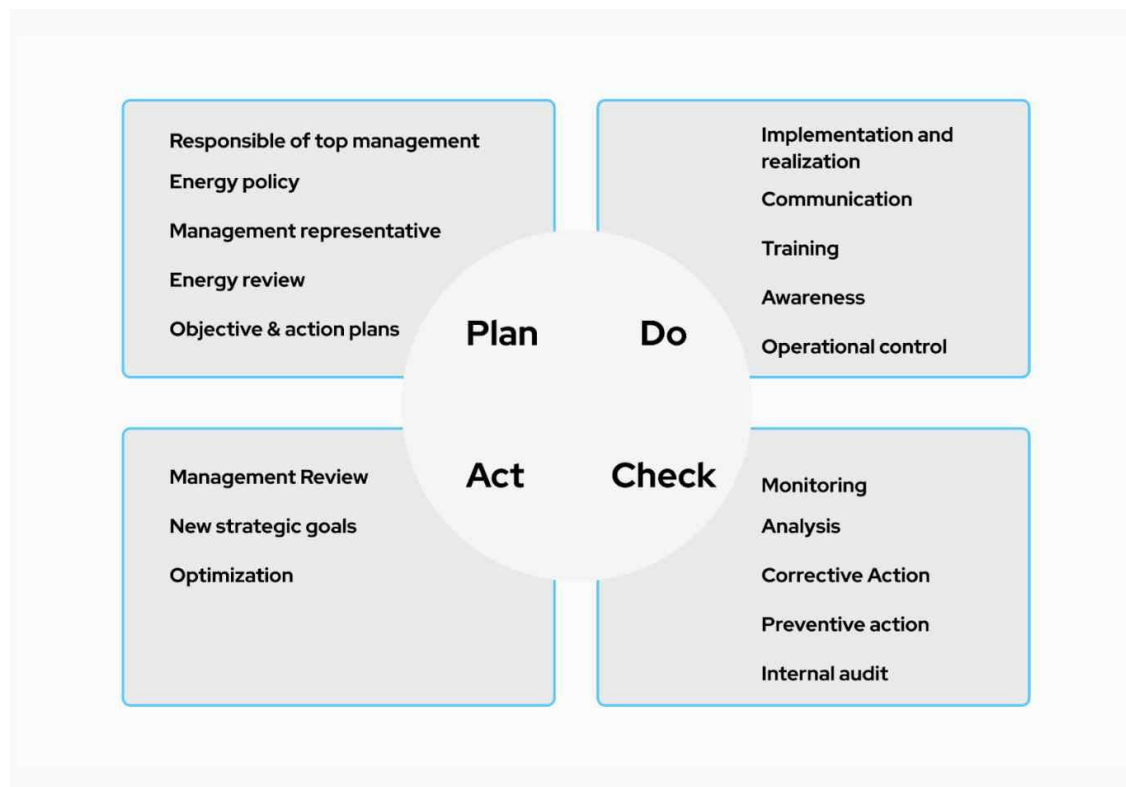
a. Screening- The first step in the EIA process is to decide if the construction project requires EIA or not. It is an initial study to examine the benefits and adverse impacts or the qualitative and quantitative impacts of the proposed project. The environmental impact is predicted by evaluating the type, location of development and scale of the project. Screening can be performed using two main approaches, by using thresholds and by doing a case-to-case examination for the prescribed criteria. At the end of the screening process, a document known as Initial Environmental Examination or Evaluation (IEE) is prepared, on the basis of which it is decided whether an EIA is necessary or not.

b. Scoping- In the scoping stage, the potential impacts of the construction project or development activities are determined and subsequently, the final list of parameters for the impact assessment is decided. These assessment parameters are generally based upon legislative requirements, international conferences, experience and expertise and public participation. The main objective at this stage is to determine the most important environmental issues from among a bunch of potential impacts of the proposed project along with all other alternatives.

c. Impact Assessment and Evaluation- A comparative study is done between the effects related to the implementation of the project and the effects related to abortion of the project to determine the environmental impacts. This stage is divided into two stages, Identification of Impacts and Prediction of Impacts. Alternative solutions are worked out if there is any adverse impact on the environment due to the implementation of the project. If these impacts are inevitable then appropriate measures are taken to eliminate or counterbalance the adverse effects on biodiversity. If there is no solution to the concurrent problem, the option of not proceeding with the proposed project is also available. Since the impact duration is equally important, the evaluation can be done based on three-time ranges that are, Short term(3- 9 years), Medium term(10- 20 years) and Long term(more than 20 years).

d. Mitigation- Recommendations are provided in this step for the damaging effects on the environment revealed from the assessment of impacts, to mitigate the adverse impacts of the proposed construction project. Mitigation refers to the measure taken to reduce or remove the above assessed impacts, which can also help to portray the iterating behaviour of EIA. The mitigation measures can be Preventive (by organising public awareness programmes), Compensatory(to reduce potential reactions) and Corrective(placing devices and installations).

e. Preparation of EIA Report or Environmental Impact Statement (EIS)- EIS sets out factual information related to the construction project along with information gathered from screening, scoping, impact assessment and evaluation, mitigation and other monitoring measures. This report includes an Environmental Management Plan (EMP) and a non-technical summary of the proposed construction project for the general public. EISs are crucial documents that are intended to inform the public of the type and probable consequences of the project in the near future. If it is not done properly, the entire effort put into the EIA process until then will be negated.



An EIS document should include reports on the impact on soil and water quality, impact on land use such as forests, agriculture, etc, long and short term socio-economic impacts, health impacts, impact on biodiversity, and cost efficiency analysis along with environmental impacts. An EMP should cover aspects such as safeguarding the proposed measures to mitigate the adverse environmental impacts, habitation projects in the surrounding, contingency plans for disasters and monitoring feedback mechanisms used for implementation of necessary safeguards.

f. Public Hearing- The law states that after the EIA report is prepared, the public must be informed and asked to review the proposed construction project and anyone who is probably going to be affected by the project in any way is entitled to have access to the executive summary of the EIA.

g. Decision Making- In this stage, the Impact Assessment Authority consults the project-in-charge along with the consultant to take the final decision of going ahead with the proposed construction project or not. They take the decision based on both the Environmental Impact Assessment(EIA) and Environment Management Plan(EMP).

h. Monitoring -Enforcing and Environmental Auditing- Monitoring is done throughout the execution of the project to check for any kind of violation of the conditions mentioned in the EIA report. This step is performed to compare the actual outcomes with the predicted outcomes and subsequently assist in assessing the quality of forecasts and effectiveness of mitigation measures. It is vital step which allows us to learn the EIA process. Impacts that were not predicted or any kind of mitigation measures that failed can be easily identified and compensated in time due to the monitoring process.

IMPORTANCE

1.Public Hearing- The law states that after the EIA report is prepared, the public must be informed and asked to review the proposed construction project and anyone who is probably going to be affected by the project in any way is entitled to have access to the executive summary of the EIA.

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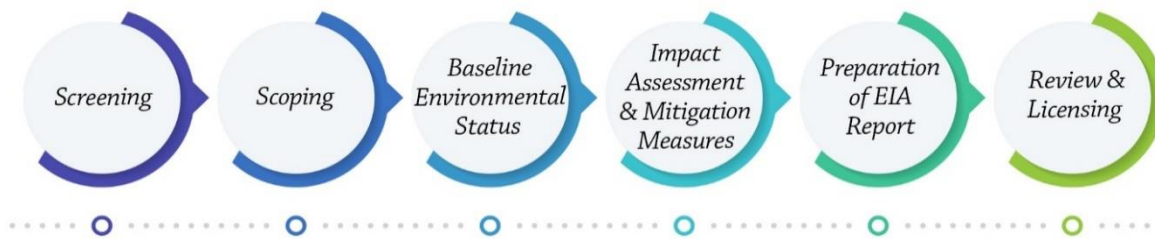
3 EIA Necessary.

Whenever we construct any structure or development project, it has both positive and negative impacts on the environment. The large-scale housing projects may adversely affect the environment and the natural resources present nearby the project.

It is essential to evaluate and determine the impact of the proposed project on the environment so that the required measures can be taken and the changes can be done in the project to ensure that it will not badly affect the environment.

The construction projects should create a proper balance in the environment and be sustainable.

Process of EIA for Housing Projects



PREPARATION OF PROJECT BRIEF AND SUBMISSION OF DRAWINGS

The housing projects are mainly categorized into three types based on the size of the project

- Large-cost residential housing projects
- Low-cost residential housing projects
- Small-scale mixed residential and commercial projects

01. Screening

The screening is the initial stage for the environmental impact assessment in construction. In the screening process, decide whether the housing project requires an environmental impact assessment or not.

The screening process is done for the proposed development project, and it may have four outcomes:

1. No further EIA is required for the proposed project.
2. A full and comprehensive EIA is necessary for the proposed project.
3. A more limited EIA is required for the proposed project.
4. A further and detailed study is necessary to decide the level of the EIA needed for the proposed project.

02. Scoping

It is important to determine the scope of the EIA for the particular project. Scoping is defined as the early coordination with the interested and the affected agencies, and the public.

The scoping process will help to determine the important issues and concerns, areas of concern for the particular project, and the other regulatory requirements.

The main aim of the scoping process is to identify the various issues and the impacts likely to be important in construction projects.

03. Baseline Environmental Status

After establishing the project's scope, the next stage is to establish the baseline environment of the area and understand the existing conditions of the proposed site.

04. Impact Assessment and Mitigation Measures

After establishing the baseline, the next stage is to put all the reports together and assess the impacts on the BES parameters due to the project's implementation.

The project is sub-categorized into two phases: the construction phase and the operational phase.

a. Construction Phase

The various impacts of the project predicted during the construction phase are as follows

1. Impact on the use of the land
2. Impact on the geology, topography including natural resources
3. Air quality
4. Impact on water due to construction
5. Increase in the noise level due to construction activities and types of equipment.
6. Green initiatives to mitigate the impact

Operational Phase

The various impacts during the operational phase are as follows

Commercialization of area

Traffic congestion issues

Look at the area

Employment opportunities due to project

Purpose

- EIA is a process with several important purposes, which can be categorized as follows:
- **To facilitate decision-making:** For the decision-maker, for example the local authority, it provides a systematic examination of the environmental implications of a proposed action, and sometimes alternatives, before a decision is taken. The decision-maker along with other documentation relating to the planned activity can consider the environment impact statement (EIS).
- **To aid in the formation of development:** Many developers see EIA as another set of hurdles for them to cross in order to proceed with their various activities. They may also see the process involved in obtaining the permission from various authorities as costly and time-consuming. In reality, however, EIA can be of great benefit to them, since it can provide a framework for considering location and design issues and environmental issues in parallel. It can be an aid to the formulation of developmental actions, indicating areas where the project can be modified to minimize or eliminate altogether the adverse impacts on the environment. The consideration of environmental impacts early in the planning life of a development can lead to environmentally sensitive development; to improved relations between the developer, the planning authority and the local communities; to a smoother planning permission process and sometimes to a worthwhile financial return on the expenditure incurred.

EIA System

1- Screening: This entails the application of EIA to those projects that may have significant environmental impacts. It is quite likely, however, that screening is done partly by the EIA regulations, operating in a country at the time of assessment.

Based on a project application, a decision needs to be made whether the development requires an EIA. For any work that will alter the physical nature of the land, the person proposing the development must submit an EIA screening application.

An Approving authority is any public authority or person authorized under a written law to approve a development proposal. Examples of approving authorities include:

According to the EIA notification 2006, proposals that come under category-A and category-B will require EIA.

Under category-B, any proposal that could come in general condition and special condition it can be treated as category-A. The category can be divided on the basis of threshold limit mentioned in the notifications amendments.

2- Scoping: This step seeks to identify, at an early stage, the key, significant environmental issues from among a host of possible impacts of a project and all the available alternatives. It involves activities like formal and informal meeting with all affected people, physical site inspection, public participation, and writing up a Terms of Reference [TOR] for the conduct of the EIA study. However, the data collected from site inspection

and information collated from face-to-face meeting can be provided as input into the system for further processing and subsequent TOR Report and EIA decision

3- Data collection: The baseline data collection also cannot be computerized. Due to changes in site variations, climatic factor, local peoples and environmental conditions the computerized process is not suit but the data collected from site inspection and information collated from face-to-face meeting can be provided as input into the system for further processing and subsequent TOR Report and EIA decision.

4-Consideration of alternatives: This seeks to ensure that the proponent has considered other feasible approaches, including alternative project locations, scales, processes, layouts, operating condition and the no-action option.

5-Description of the project/development action: This step seeks to clarify the purpose and rationale of the project and understand its various characteristics, including the stages of development, location and processes.

6-Description of the environmental baseline Data: This includes the establishment of both the present and future state of the environment, in the absence of the project, taking into account the changes resulting from natural events and from other human activities.

7-Identification of key impacts: This brings together the previous steps with a view to ensuring that all potentially significant environmental impacts (adverse and beneficial) are identified and taken into account in the process.

8-The prediction of impacts: This step aims to identify the likely magnitude of the change (i.e., impact) in the environment when the project is implemented in comparison with the situation when the project is not carried out.

10-Evaluation and assessment of significance of Impacts: This seeks to assess the relative significance of the predicted impacts to allow a focus on key adverse impacts. Formal definition of significance is the product of consequence and likelihood as $\text{Significance} = \text{Consequence} \times \text{Likelihood}$

11-Mitigation and Environmental Management Plan (EMP): The implementation of an EMP, mitigation measures are some of the weaknesses in EIA system. This step of EIA can check for regulatory compliance of climate change regulations and other pollution levels. This involves the introduction of measures to avoid, reduce, remedy or compensate for any significant adverse impacts.

12-Public consultation and participation: The public should be able to view the Application and its related information online. All the data and information collected so far in the process of the application is available online for public knowledge. The EIA process becomes transparent and accountable. The public can air their concerns about the proposed development via online submissions or attend public scoping meetings to be heard. The applicant and the processing authority are present to answer questions.

This aims to assure the quality, comprehensiveness and effectiveness of the EIA, as well as to ensure that the public's views are adequately taken into consideration in the decision-making process.

13-EIS presentation: This is a vital step in the process. If done badly, much good work in the EIA may be negated.

14-Review: This involves a systematic appraisal of the quality of the EIS, as a contribution to the decision-making process.

15-Appraisal: At this stage, decisions are made by the relevant authority of the EIS (including consultation responses) together with other material considerations as to whether to accept, defer or reject the project. In India the online submission of TOR and EIA report are available on e-Government Portal of MoEF and State Environmental impact Assessment Authority (SEIAA) website.

STUDY AREA

The entire study was conducted at Swargate Underground Metro Station Pune, Maharashtra, located at Latitude 18019'56.29''N and Longitude 73051'28.29'' E. Today it is an important educational, industrial hub. The intricate network of creek, tanks and groundwater forms the city's essential blue-green infrastructure, providing water, drainage and sanitation for domestic, agricultural and industrial use. This will lead to further pressures on infrastructure, housing and basic services.



Study Area-Background:

The study area details are listed below in the **Table no 01**. Environmental Aspects of Study Area are given below in **Table no 02**.

Study area-Environmental Survey

According to, EIA notification 2006, any new project or Expansion/Modernization of existing projects requires submitting a Form- 1(Details of the project) consists of Name, Location, nearest places, project facilities etc mention in the above table I & II and Form- 1A (Information Checklist) consist of primary and secondary impact of the project. Information checklist consists of series of questions based upon the environmental parameters. It can be evaluated by extensive field checks and questionnaire surveys. The selected study area can be surveyed under visual and behavioral observation to gather the required information for the questionnaires.

Scope of Baseline Studies

For the present Environmental Impact Assessment study, the attributes of environment considered are:

- i. Noise Level Study;
- i. Water environment;
- ii. Air environment (Meteorology, ambient air quality, etc.);
- iii. Land use pattern (Geology, Geo-hydrology, land use, solid waste disposal etc.);
- iv. Socio-economic environment (Demography, occupational structure, educational, medical facilities, literacy etc.)
- v.

Air Quality Monitoring

Air pollution during construction activity is mainly due to dust generation and gaseous emission from vehicular movement. Such emission was temporary and controlled by providing below mentioned precautionary measures to control air pollution:

- Peripheral barricading to prevent dust emission.
- Stacking of all the construction materials was confined within the select areas of the project site to avoid dust emissions from building materials.
- The particulate matter generated due to the vehicular movement during construction was reduced by frequent sprinkling of water on the road surfaces and on other areas where dust arises due to

- material handling.
- Vehicles hired for bringing construction material are maintained in good operable condition and conform to air and noise emission standards prescribed by SPCB/CPCB.
- The vehicles operated only during non-peak hours at site resulting in minimal vehicular emissions. Hence, there is no emission from the project site activities.

Land use pattern/soil

The plot area of the project is 41,972 Sq. meter. Existing/Proposed land use details are tabulated below in

For construction of the project excavation was carried out for foundation & basement of the building. The project activities have not affected surroundings & any significant land disturbance resulting in soil erosion, subsidence and instability. The area is not susceptible to erosion. 50% of excavated earth / soil were reused for backfilling, internal roads & other paved areas within premises. Balance excavated earth was used for other projects in the vicinity. Land/soil environment was temporarily affected due to activities like site preparation, excavation, material handling & storage etc. during construction phase.

Loss of Top soil

The primitive impact of any development starts with ground clearance and leveling. The loss of top soil will directly impact the fertility level of the soil at site. Top soil was reused in a stretch of 150 m long & 1.5 m wide along 18 m wide road on north side of the project site for landscaping/greenbelt development. Thus, no loss of top soil occurred.

Loss of vegetation and habitats

The site comprised of with vegetation of few shrubs and grasses and trees. There were 422 trees and 128 trees of them, were transplanted and remaining trees are available at location, hence, for development of the project no major disturbance to local ecology was occurred. In addition, 15,772 Sq. meter of total plot area has been earmarked for green belt development. The greenbelt development will be maintained.

Diverting course of natural drainage

The ground surface of the project was almost level. The project is not likely to alter or obstruct any natural drainage courses. There is no natural watercourse passing through the project site. Hence the project does not involve alteration of natural drainage system. As a result of excavation of topsoil during construction phase, the impact on drainage pattern and run off characteristics have been restricted to the small area.

Loss of area for ground water recharging

Proper drainage systems are provided to deal with the storm water in case of rain. Proper rain water drainage facility has been provided and the run-off generated has been used for recharging the ground water level. No groundwater abstraction carried out for the construction and the water during the construction phase was supplied through tankers.

As remediation plan for the loss of recharge of annual runoff due to construction from the project site, the roof top runoff & surface runoff is diverted into recharge pits located within the project site. 2 nos. of recharge pits have been provided in the project site to recharge the surface runoff.

Solid waste

There was Bus stand and vegetation also available nearby on land posses for the project before starting of current project. Hence, demolition was carried out and waste generated before starting the new construction was disposed according to the MPCB guidelines. The solid waste generated during construction activities is limited to project site only. These are segregated manually to remove non- reusable waste and reusable wastes and are reused for backfilling, internal road development up to the maximum possible extent. The non-reusable waste is disposed of by selling to approve vendors.

Socio-Economic Environment

The project falls under Maharashtra state, Pune district. Study area is covered by Pune Municipal Corporation. The entire area consists of urban population. The study area consists of 1 Municipal corporation. For the same study area however, census data for year 2011 is available. Total population of male is 11237 and female population is 10596. The study area is predominantly Hindu, Muslim and others.

Most of the people belong to the General, Schedule Cast, Schedule tribe Muslims and OBC. There is very small amount of population of Scheduled tribe. In the study area it was observed that primary as well as higher level education facilities are very good. The basic infrastructure of school and colleges is fairly well constructed. School gets the electricity regularly and water. During the primary survey it has been observed that the Municipal Corporation is having schools up to senior secondary level and College.

Main source of drinking water is water supply by Municipal Corporation. Other water resources such as wells bore well, lakes etc. Mode of transport is road. The nearest railway station is Pune Junction. The field can be divided into infrastructure, vehicles and operations. Transport is important because it enables trade between people, which is essential for the development of civilizations.

Mainly the study area consists of urban area i.e. Municipal Corporation and Census towns' area. In the outskirts there are some villages where crops like wheat etc. are grown.

Mitigation Measures

The main aim of the mitigation measures to protect and enhance the existing environment of the study area.

The measures should have positive effects on environment. Environmental mitigations are essential and shall be undertaken in various phase of project cycle viz. preconstruction, construction and operation stage of the any project. As per the noise quality, water quality and air quality records of study area, the noise quality in some of the places that can be exceed the standards level. The water quality parameters are under permissible limits. The another main components of ambient air quality results within limits, namely suspended particulate matter as per the standards of National ambient air quality standards (NAAQS). Hence our study area does not affect by air pollution but we need mitigation measures required to prevent noisy environment. So we suggest some mitigation measures to control the noise pollution by installation of barriers, strong leafy trees, limitation of vehicle speed and provide sound proof doors and windows are proposed in our study area. The environmental monitoring can be done periodically once in three month of frequency of sampling and analysis of ambient air quality, stack emission from DG set, ambient noise level and treated sewage to maintain the eco friendly environment as well as to reach as sustainable campus in future.

DISCUSSION

Developing nation like India needs developmental projects for social and economic development. In many case, poor EIA for developmental projects leads to permanent environmental damage such as climate change, environmental degradation, natural resources depletion, and loss of biodiversity and also affect human beings. A detailed EIA study is a contribution for Effective impact assessment process, Environmental monitoring, Eco-friendly building and Sustainable development

CONCLUSION

Environmental Impact Assessment (EIA) can be defined as a Process, providing an anticipatory and preventive mechanism for environmental management and protection to achieve sustainable development. EIA certainly plays a vital role in assessing the environmental impacts of surrounding developmental project. It is a study of the effects of a proposed project, plan or program on the environment. In other words, EIA is an administrative process that identifies the potential environmental effects of any proposal along with its advantages and disadvantages on environment. Positive effects are maximized whereas; adverse effects are minimized to greatest possible extent.

It can be concluded on a positive note that due to the adequate provision and efficient operation of proposed environmental management systems and mitigation measures, the project activities during the operation phase would have manageable & largely have reversible impacts on the environment, and on balance the project would be beneficial to surrounding communities and the region.

Figures:

1. Generalized Flow sheet of EIA:

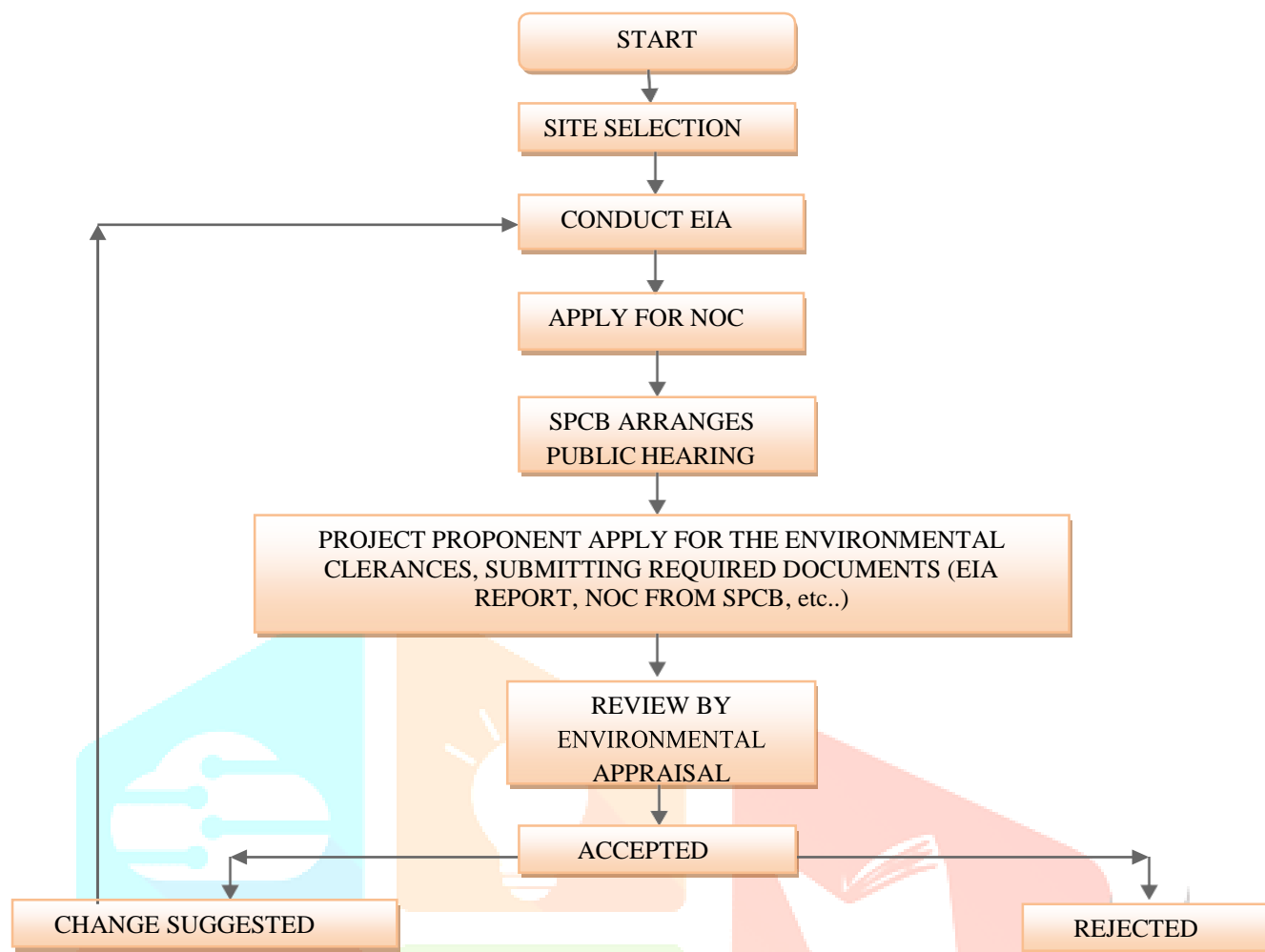


Figure-1 Generalized Flow Sheet of the EIA Process

Table no 01. Details of Study area

Sr.No	Parameters	Details of Study Area
1.	Study Location	Swargate
2.	Nearest Railway Station	Pune Railway Station
3.	Source Of Supply Water	Borewell- For Construction Activity Municipal Water Supply- For Domestic Use.
4.	Nearest City	Pune
5.	Nearest Water Bodies	Mutha Canal and Mula-Mutha River
6.	Nearest Highway	NH04
7.	Nearest Sensitive Zone	Hospitals
8.	Nearest Airport	Pune Airport
9.	Nearest Forest	Parvati Hills, Katral Tekdi.

Table no 02. Environmental Aspects of Construction activities and Use

Sr. No	Area	Aspect
.		

I.	Energy conservation	Solar Heat Gains Solar Heating Day lighting Design Natural Ventilation Thermal Transfer Value of Building Material Energy Efficient Building Services and Equipment Public Area Lighting Exterior Lighting
II	Water Conservation	Water Metering Reuse of recycled Water Gardening Water Source Bathroom Fittings Rainwater Harvesting
III	Internal Roads and Accesses	Pedestrian Access Ramps for Disabled Persons Road Painting and Signage Speed Breakers
IV	Material Use	Construction Materials Selection Paint Selection Use of Recycled Materials Use of Ozone Depleting Substances Use of Permanent Timber for Permanent Works Use of Timber for Temporary Works
V	Aesthetics During Functional Use	Stilt parking Visitors Parking Vehicle Washing Arrangements Play ground for children Service Roads for Walking Air Conditioning Arrangements Stand by Power Supply Provision for Garden and Complex Maintenance Staff
V	Facilities for Building Complex Servants	Servant Quarters Rest Rooms with toilets for Security Persons Rest Rooms and Eating Places for Drivers
V I.	Location with respect to Potential Hazards	Contaminated Land Industrial Area Solid Waste Disposal Area Municipal Wastewater Treatment Plant Hazardous Waste Disposal Facilities Sea coast

Table no 03. Ambient Noise Quality Standards

Area Code	Category of Area/Zone	Limits in dB(A) Leq	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Table no 04. Water Quality standards

Sr. No.	Parameters	Unit	Permissible limits
1.	Colour	Hazen	25
2.	Odour	-	Unobjecti onable
3.	pH	-	6.5 - 8.5
4.	Temperature	°C	NS
5.	Suspended Solids	mg/lit	NS
6.	Oil & Grease	mg/lit	0.03
7.	Total Residual Chlorine	mg/lit	--
8.	Total kjeldahl Nitrogen (TKN)	mg/lit	--
9.	Chlorides	mg/lit	NS
10.	Bio-Chemical Oxygen Demand (5 days at 20°C)	mg/lit	NS
11.	DO	mg/lit	NS
12.	Lead	mg/lit	0.05
13.	Chromium as Cr+6	mg/lit	NS
14.	Total Chromium	mg/lit	0.05
15.	Copper as Cu	mg/lit	1.5
16.	Zinc as Zn	mg/lit	15
17.	Cadmium	mg/lit	0.01
18.	PO4	mg/lit	--
19.	Sulphide	mg/lit	--
20.	Phenol	mg/lit	0.002
21.	Manganese as Mn	mg/lit	NS
22.	Iron as Fe	mg/lit	1.0
23.	NO3	mg/lit	--

Note: N.D:- Not Detected, N.S:- NOT Specified

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