

EXECUTIVE SUMMARY OF EIA

1.1 INTRODUCTION

The report aims to record the anticipated environmental outcomes resulting from the proposed project. An environmental impact assessment was performed to pin point crucial environmental concerns that should be addressed in the initial phases of project development, with the goal of minimizing any potential adverse environmental effects throughout various stages of the project lifecycle. This process involves establishing the current environmental baseline conditions, recognizing significant environmental impacts, and proposing necessary mitigation measures to minimize environmental damage

The scope of the Environment Impact Assessment (EIA) study covers to identify, predict and evaluate potential environmental and socio-economic impacts which may result from the proposed Municipal Solid Waste Management project and to develop suitable Environment. Management Plan (EMP) to mitigate the impacts by formulating suitable remedial measures.

1.2 DESCRIPTION OF PROJECT

The project is classified as category “B” under the MoEF notification dated 14th September 2006 and involves Municipal Solid Waste Management Facility having capacity of 15 MTPD. Municipal Solid Waste Management Facility in Lunglei Town, an analysis of the extensive survey data indicates that a total quantity of 25.65 TPD waste is generated in Lunglei Town (2011) out of which 30.10% (7.72 TPD) is biodegradable, 49.09% (12.59 TPD) is recyclable and 20.81% (5.34 TPD) is inert ash & debris. The calculations also suggest that per capita per day waste generation is around 0.450 kg/ capita/ day. At present, waste collected from Lunglei Town is dumped at disposal site at Tlabung Road, 8.5 km away from Lunglei town core area, without segregation or pre-processing. The site is in used from last 8 years, since crude dumping is being done at this site, it possess severe negative impacts on environment.

1.3 DESCRIPTION OF THE ENVIRONMENT

To assess the impact of Solid Waste Management Centre on different components of environment of Lunglei Town, the study was carried out to generate baseline data w.r.t. air, water, noise, land use pattern, hydrology, flora & fauna, socio- economic aspects during the winter season. The environmental status of the different monitored parameters is discussed briefly in the following paragraphs.

1.3.1 Physical Environment

Meteorology (Climate)

The climate condition of project areas is divided in 4 seasons viz. winter season (December to February), summer season (March to May), monsoon season (June to September) and retreating monsoon season (October to November). The temperature in the region is quite moderate and does not experience any extreme variations both in summer as well as in winter. Winter sets in from around the end of October and lasts till the end of February. The climate of Lunglei city is characterized by its coolness, relative high humidity nearly all the year round and abundant rainfall. In brief, it enjoys pleasant climate which is neither very hot nor very cold throughout the year. The average annual rainfall is around 2350.9mm. About 20 percent of the annual rainfall occurs during the pre-monsoon months and is mostly in the form of thunder-showers and about 60 to 70 percent of the annual rainfall occurs during the period from May to August.

Topography and Drainage

The general topography of Lunglei District varies widely. While the eastern and northern parts of the district are characterized by a rather hilly terrain with high and prominent relief, the western and south western parts of the district, on the other hand is portrayed by comparatively low and less prominent ridges. There are, as a whole is characterized mainly by several ridge lines and intervening valleys.

Drainage

Lunglei being situated on a hilly terrain with more than 20 % slopes, most of the rainwater flows down as surface run off. The natural drainage system of the location includes: (i) eastern drainage system; and (ii) western drainage system. Two rivers surround the city along its sides, namely Mat on the eastern side, Tlawng on the northern site and Rangte on the western side. The storm water and the wastewater from Lunglei town mostly get drained out into Tlawng River system.

Air Environment

Ambient air quality monitoring was carried out in six location. The locations were selected in downwind, cross wind and up wind of the proposed project. The air pollutants namely Particulate matter (PM10 & PM2.5), Sulphur dioxide (SO₂), the oxides of nitrogen (NO_x), were sampled on 8/24 hourly and results were averaged to 24 hours to meet the requirements of the MoEF and compared with the standards stipulated by CPCB. The minimum and maximum levels of Particulate Matter < 2.5 microns are recorded in the range of 2.1 to 4.3 µg/m³, whereas the particulate matter < 10 microns are in the range of 15 to 40 µg/m³. The sulphur dioxide

concentrations within the study area are in the range of 3.2 to 6 µg/m³ and the oxides of nitrogen observed are in the range of 1.5 to 4 µg/m³. The observed pollutant levels were compared with CPCB Standards for Particulate Matter (100µg/m³) and sulphur dioxide and nitrogen dioxide (80µg/m³) and found to be well within the limits indicating the baseline environmental status in terms of air pollution is better with all the pollutants are within the concentration levels.

Noise Environment

Base noise levels are monitored in 6 different locations within study zone, using a continuous noise measurement device. The day levels of noise have been monitored during 6 AM to 10 PM and the night levels during 10 PM to 6 AM. The noise levels were monitored as per the Ambient Noise Standards of residential standards. In rural areas wind blowing and movements of birds would contribute to noise levels especially during the nights. The day equivalents during the study period are range between 44.6 to 46.9 dB (A), whereas the night equivalents were in the range of 36.8 to 39.5 dB (A). From the results it can be seen that the day equivalents and the Night equivalents were within the Ambient Noise standards of residential.

Water Environment

Surface and Ground water samples were collected from different sources within the study area and analyzed for all important physico-chemical and biological parameters to establish the quality of water prevailing in the project surroundings. The groundwater samples was drawn from the hand pumps and open wells used by villagers for their daily use. The surface water samples were drawn from lakes, ponds and rivers. The pH of ground water observed to be 5.92 and in surface water it is from 6.06 to 6.32, the TDS level of ground water is 23.36 mg/l, whereas in surface water the levels are 9.3 to 12.3 mg/l. The chloride concentrations in ground water is 34.96 mg/l, whereas the surface water has a chloride values of 29.12 to 39.99 mg/l. The hardness observed in ground water is 138 mg/l and in surface water the hardness found to be between 20 to 40.2 mg/l. Overall, all the ground water sample and surface water collected from the study area were found to be fit for human consumption; within the permissible limits and all surface water samples are meeting the class 'A' norms as per IS: 2296-1982 inland surface water Standards.

Soil

The soil formation Lunglei falls in the North Eastern Hills (Purvachal) agroclimatic

zone with warm and humid climate. About 43% of the total land area is occupied by laterite soil, the remaining land area is equally covered with alluvial soil and forest soil with a rich humus cover (ICAR, 2018). Physiographically, the district consists of parallel to sub parallel hill ranges trending in the North to South direction. These hills are steep with narrow gorges and are often separated by rivers and streams. Most of these streams are tributaries to the Kaladan River. Geologically, Lunglei is rich in shale, siltstone, and sandstone of Surma formed during the Miocene age.

Land Use

Land use land cover rate is differing from time to time as well as cultural practices. In the study area we found five different types of land use and land cover. Due to the population ever increase which degrade and exhaust for human wants and satisfaction and livelihood. The built-up land comprises 9.87% which includes town area and road, Agriculture 20.13%. Open forest make up majority of the study area and account for 55.25% of the land use while 14.75% of the area are cover by dense forest. The figure 5.10 shows that the land use pattern, the vegetation cover areas were found in the southern part of the dump site, while built-up land were found in the eastern site surrounded by cropped land around the build-up area.

Biological Environment/Bio Assessment:

In Lunglei District (4572.00 sq.km) forest area covers 88.6 % of the total area (FSI, 2019). The communities have the right to utilize the land and cultivate in the vicinity forests as per the approval accorded by the Village Council. As per the ISFR classification of 2019 (FSI, 2019), 283105 ha. of the forests in Lunglei falls under open forests (70.39%), 119013 ha. (29.59%) under moderately dense forests and 99 ha. (0.02%) under very dense forests.

The Study area include 10 km radius from the proposed SWMC. This includes open Forest cover, fallow land, agriculture land and build up area.

FLORA

The Study Area covers 10 sq. kms. but the Proposed Landfill Site covers only 7.2 hectares. The Study Area is an abandoned jhum land and so the forest is an open forest with no definite forest type. Most of the land in the study area falls under private ownership and had been used mostly abandoned. Due to jhumming, the vegetation of the study area is poor and there is no or little chance of occurring rare and endangered

species. The water source is also poor with three small streams or nallahs with scanty of water during dry season.

Rare and Endangered Species

With reference to the biodiversity survey, no endemic, rare and endangered species has been located in the Study Area.

FAUNA

Fauna includes all animals that can be found in the study area. In this study IUCN Red List criteria is used to describe the condition of the fauna found in the area. Most of the data are secondary in nature due to the lack of time for adequate fauna study.

1.3.2. Socio-economic Environment

Mizoram is a vibrant, exotic state where tradition and royal glory meet in a riot of colors. The land is endowed, rich culture and heritage, beauty and natural resources. The festivals of Mizoram mirror the people, their culture, their artistic genius and skill in music and dance which is a vital element in the life of every tribe

The state of Mizoram has an area of 21081 sq.kms. As per details from Census 2011, Mizoram has population of 10.97 Lakhs, an increase from figure of 8.89 Lakh in 2001 census. Total population of Mizoram as per latest census data is 1,097,206 of which male and female are 555,339 and 541,867 respectively. The State has population density of 42per sq. km. (as against the national average of 312). The decadal growth rate of the state is 29.18% (against 21.54% for the country) and the population of the state continues to grow at a much faster rate than the national rate. Major demographic indicators are shown

General Statistic of the district

| | | |
|-----------|--------|-----------------------|
| AREA | SQ.KM. | 4,536 km ² |
| LONGITUDE | DEGREE | 22.8831° N |
| LATITUDE | DEGREE | 92.6984° E |

| | | |
|----------|--------|------|
| ALTITUDE | METRES | 1222 |
|----------|--------|------|

1.4. Anticipated Environmental Impacts and its Mitigation Measures

The potential impacts on the environment from the proposed project are identified based on the nature of the various activities associated not only with the project implementation and operation, but also on the current status of the environmental quality at the project site. The proposed project may cause impact on the environment in two phases.

- Impact during development phase
- Impact during operation phase

a) Impacts during development phase:

Development phase works include site clearance, site formation, building works, infrastructure provision and any other infrastructure activities. The impact is generally confined to the project area and is expected to be negligible outside the plant boundaries.

b) Impacts during Operation Phase

During the operation phase of the proposed project there would be impacts on the air environment, water environment, land environment and socio-economic aspects.

Impact on Air Quality

The potential source of air quality impact arising from the construction of the proposed project is fugitive dust generation. Exhaust emissions from vehicles and equipment deployed during the construction phase is also likely to result in marginal increase in the levels of PM, SO₂, NO_x, CO and unburnt hydrocarbons. The main sources of air pollution during operation phase are from landfill operations, vehicular movement, incinerator, and DG set.

The proposed mitigation measure:

- Regular water sprinkling.
- Temporary tin sheets of sufficient height (3m) will be erected around the site of dust generation.
- Tree plantations around the project boundary with 10 – 15m
- Plantation of 2 to 3 years old saplings, regular watering will be done.
- Incinerator will be provided with a stack height meeting Guidelines (minimum 30m), Spray dryer, Multi cyclone, Bag house, Wet scrubber.
- During operation part of the landfill, to minimize the odor and gases generation, daily it will be covered with soil/ash and during rainy period with temporary cover (HDPE/plastic sheets).

Impact on Water Quality

During construction, impacts from the workers include wastewater generated from canteen areas, and sewage from temporary sanitary facilities. The used engine oil and lubricants, and their storage as waste materials as the potential to create impacts if spillage occurs. The site formation may produce large quantities of run-off water, washing of various equipment, vehicles and containers, leachate collected from landfill leachate generated at treatment, incineration, recycling plants etc.

The proposed mitigation measure:

- Runoff water and equipment washed water from the site will be collected to working pit to arrest the suspended solids and if any over flow is, it will be diverted to nearby greenbelt/plantation area.
- The settled water will be reused for construction purposes, and for sprinkling on roads to control the dust emission, etc.
- The domestic sewage generated will be treated in portable STP or sent to septic tank/soak pit.
- The excess leachate/wastewater will be sent to incinerator, the dry sludge from incineration will be handled as a solid waste and will be disposed in the landfill.
- Rainwater from surface areas will be harvested by construction of check dams all along the storm water drainage network at a definite pitch.

Impact of Noise Level

The major activities, which produce periodic noise, during construction phase, are foundation works, fabrication of structures, plant erection, operation of construction equipment, movement of vehicles etc. During operation phase the major source of noise in proposed project will be from unloading of Solid waste, Incinerator, DG set, etc.

The proposed mitigation measure:

- All noise generating equipment will be used during day time for brief period of its requirement.
- Proper enclosures will be used for reduction in noise levels, where ever possible the noise generating equipment will be kept away from the human habitation.
- All vehicles entering into the project will be informed to maintain speed limits, and not blow horns unless it is required.
- Noise level specifications for various equipment as per Occupational Safety and Health Association (OSHA) standards.

- Employees will be provided with PPE like ear plugs, helmets, safety shoes, etc.
- Development of greenbelt all along the boundary and along the roads within the project.
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Impact on Land Environment

Land environment in the area has potential for contamination arising out of municipal solidwaste stored on to the landfill area.

The proposed mitigation measure:

The leachate generated from the landfill area is collected in the leachate holding tank and the leachate is used back on to the landfill for dust suppression, mixing in stabilization process, etc. If any excess leachate is left over, it will be treated in spray dryer.

Impact on Ecology

There is no ecological and otherwise sensitive areas viz. wildlife sanctuary, national parks, archeological important areas within 10km radius of the project site. There are no known rare, endangered or ecologically significant animal and plant species.

The proposed mitigation measure:

Due to the development of green belt at the project vicinity the impact on the ecology will be minimal.

Impact on Socio Economics

The proposed facility is likely to provide direct and indirect employment and likely to increase the socio-economic status of the nearby villages in the study area. Due to proposed project the facilities for public transport, water supply telecommunications, education, public wealth etc., are likely to improve.

ENVIRONMENT MANAGEMENT PLAN

The Environmental Management Plan (EMP) is required to ensure a sustainable development of the plant area and the surrounding areas of the plant. The EMP will be integrated in all the major activities of the project, with clearly defined policies, to ensure that the ecological balance of the area is maintained and the adverse effects are minimized. EMP requires multidisciplinary approach with mitigation, management, monitoring and institutional measures to be taken during implementation and operation, to eliminate adverse environmental impacts or reduce them to acceptable levels. In order to ensure sustainable development in the study area; it needs to be an all-encompassing plan for which the plant

authorities, government, regulating agencies, and the population of the study area need to extend their cooperation and contribution.

The mitigation measures are planned for construction and operation phases and the overall management plan helps to improve the supportive capacity of the receiving bodies. The EMP aims to control pollution at the source level to the possible extent with the available and affordable technology followed by the standard treatments before getting discharged. The recommended mitigation measures will synchronize the economic development of the study area with the environmental protection of the region.

ENVIRONMENT MONITORING PROGRAM

Environmental monitoring program describes the processes and activities that need to take place to characterize and monitor the quality of the environment. Environmental monitoring is used in the preparation of environmental impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment. Different activities involved in the proposed project and their impact on various environmental attributes have been taken into account while designing a detailed environmental monitoring program. A separate budgetary provision has been made for implementation of Environmental Monitoring Plan. The environmental monitoring cost is estimated based upon the environmental monitoring program being considered. A budgetary provision of Rs 5.875 Lakhs has been kept for environmental monitoring during construction stages. For operation stage Rs 22.815 Lakhs are being kept for 3 years. The total environmental monitoring cost is being considered as Rs 28.69 Lakhs. A comprehensive monitoring mechanism has been devised for monitoring of impacts due to proposed project.

All monitoring strategies and program have reasons and justifications which are often designed to establish the current status of an environment or to establish trends in environmental parameters. In all cases the results of monitoring will be reviewed, analyzed statistically and submitted to concerned authorities. The design of a monitoring program must therefore have regard to the final use of the data before monitoring starts. The monitoring program will have three phases

- Construction phase
- Monitoring phase
- Post monitoring phase

PROJECT BENEFITS

The contribution of the proposed project on local social infrastructure is expected to be significant. This Project will provide a significant amount of direct and indirect employment opportunities to the local people. From the proposed project the major benefits, include

improving the degraded environment by establishing an Integrated Municipal Solid Waste Management Facility

- It will be the showcase for other states for management of Solid waste with additional benefit of green and clean Environment.
- It minimizes the pollution load on environment from Municipal Solid waste
- Compliance with prescribed regulatory norms which in turn avert the risk of closure on account of violation of rules
- It reduces the number of Municipal Solid waste dump sites in the area and also eliminates the pollution potential
- The management of wastes is relatively easier & economically viable at common facility.
- Cost of environmental monitoring is less at common facility
- Prevention of natural resource contamination thereby improving overall environmental status of the region
- Demand for housing and other facilities will increase

CONCLUSION

The EIA study has made an overall assessment of the potential environmental impacts likely to arise from the proposed Integrated Municipal Solid Waste Treatment and Disposal Facility. Baseline data was collected for various environmental attributes so as to compute the impacts that are likely to arise due to proposed developmental activity.

The potential impacts on the environment from the proposed project are identified based on the nature of the various activities associated not only with the project implementation and operation, but also on the current status of the environmental quality at the project site. Mitigation measures are proposed to minimize the adverse impacts if any due to the project in the form of Environment Management Plan. The costing for each of the plant has been done based on land cost with respective civil, building and plant and machineries. The total project cost is Rs. 6 crore