

**EXECUTIVE SUMMARY
OF
EIA FOR CONSTRUCTION OF NEW INTEGRATED TERMINAL BUILDING WITH
ALLIED WORKS AT IMPHAL INTERNATIONAL AIRPORT, IMPHAL (MANIPUR)**

11.1 Introduction

Imphal International Airport is the only Airport in the state of Manipur bordering Myanmar and is lying in the huge valley of Manipur. Imphal Airport is the second largest airport built in the North-eastern region of India. It is located 6.5 km south-west of Imphal city, the capital of Manipur. The Imphal International Airport belongs to Airports Authority of India and is suitable for "C" type (A-320/321) of Aircraft operations in all weather conditions.

The existing old passenger's terminal building at Imphal International Airport to handle 500 passengers at a time (250 arriving+250 departing) is now insufficient and congested for handling increasing numbers of passengers. The existing terminal building at Imphal International Airport has saturated and remain congested. In view of the future traffic growth at Imphal International Airport, there is immediate requirement of new integrated terminal building and associated facilities at the Imphal International Airport.

Airports Authority of India (AAI) has planned for construction of New Integrated Terminal Building and associated facilities at Imphal International Airport.

The EIA studies have been carried out as per TOR approved by MoEF&CC vide letter F.No.10-75/2018-1A-III Dated 3rd December, 2018. EIA & EMP report has been prepared as per TOR approved by MoEF&CC.

11.2 Project Description

11.2.1 Justification of Proposed New Integrated Terminal Building

The passenger handling capacity of the existing old terminal building at Imphal Airport has saturated. In view of the future traffic growth at Imphal International Airport, there is an urgent requirement of New Integrated Terminal Building with allied works at the

Imphal International Airport premises on the land already available within the existing Imphal International Airport.

The direct and indirect benefits of the New Integrated Terminal Building and allied works at Imphal International Airport are as follows:

- Better infrastructure facilities for air passengers
- Promotion of tourism, trade, commerce, etc
- Increase in regional economy as it will boost tourism and commercial activities in the region.
- Generation of more revenue to the state, hence more development of the region.
- More employment opportunity to people.
- More business and industrial opportunities

11.2.2 Key Scope of New Integrated Terminal Building and Allied Works

Under the proposed project, construction of new integrated terminal building and allied works are proposed at the Imphal International Airport. The summary of work for the same is as given below:

- Construction of a centrally air-conditioned Modular New Integrated Terminal Building with all modern facilities and amenities. The Terminal Building with area of 28125 sqm shall be designed for 200 international and 1000 Domestic passengers at a time with swing operations.
- Construction of Apron suitable for (08) eight nos. parking bays for A321 as per lay out plan of approximate area 187m X 142m (22560 sqm) with 7.5 m shoulder on three sides suitable for operation of A 321.
- Construction of two link taxiways of 144m X 23m with shoulder connecting the Apron with the Runway
- Construction of New Technical Block cum Control Tower of approx. 40 mtr. height and 4000 sqm area as per the design based on the requirements of the user DTE
- The car parking for 1000 cars and 15 buses.

- Other allied works including Electrical Work, CNS Works, IT & Airports Systems Works, etc.

11.2.3 Utilities and Other Features

- Land for new integrated terminal building is already available within Imphal International Airport.
- Total power requirement for the proposed works will be 3068 kW. It is proposed to install 2 numbers of DG sets of 2500 kVA capacity and one DG set of 1500 kVA.
- Central Airconditioning plant is proposed and total estimated air-conditioned load is 1400 TR after diversity. Microprocessor based control system (BMS) will also be installed at the new integrated terminal building.
- At the new integrated terminal building Energy Conservation will be as per Energy Conservation Building Code 2007 (ECBC). 400 kW solar PV power plant will be established to generate solar power.
- Total water requirement is 814 kld. Fresh water requirement will be 300 kld for domestic, food courts, retail, offices, HVAC, etc. Water requirement will be met through rainwater.
- As per water balance diagram, 572 kl/d sewage will be generated after the operation of integrated terminal building which will be treated in STP of capacity 600 kl. Moving Bed Biofilm Reactor (MBBR) type STP will be installed for treatment of waste water. Treated waste water will be reused for flushing of toilets, HVAC and green belt/landscaping.
- For storm water management at the site, rectangular sections for side drains will be provided. The drains have been kept sufficiently away from the taxiway / runway.

11.2.4 Project Cost

Approx. cost for construction of new integrated terminal building and allied works is Rs 727 Crores.

11.3 Description of Environment

Topography and Physiography: The topography of the most of study area is tiny plain topography. Hilly areas are located in north, east and south east. The

elevation in the plain area varies from 771 to 787 m amsl. Hills are located north, east and south east part of the study area. On the hills highest elevation is 1086 amsl. The average elevation at the site is 776 amsl. The study area comprises most of part of Imphal City.

Geology: Geologically the district is underlain by Quaternary formation comprising Recent alluvium followed by Tertiary group of rocks represented by Disang formation.

Soil Characteristics: In the study area, fertile soil with clay to clay loam structure are found.

Surface Water Resources: The rivers Imphal, Nambul, Thoubal and their tributaries mainly drain the district. The Nambul River is made up of number of small streams on its upper course and flows through the Imphal town dividing the town almost into two equal halves. The course of the rivers is short and falls in the Loktak Lake, which is about 20 km from the project site in South West Direction.

The results of surface water samples were compared to Indian Standard Specification of drinking water IS:10500:2012. Most of analysed parameters meet acceptable limits for drinking standards in all surface water sampling locations. However, bacteriological contamination was found in all the surface water sources and required suitable treatment for using it drinking purpose.

Micro Meteorology: January is the coldest month with the lowest temperature at 0.6°C. May is hottest month and the highest temperature at 32.5°C. The humidity is high and is about 82% in the mornings from June to October. March is the driest month of the year, the humidity being 50% in the evenings. Annual average wind speed is 3.8 kmph. Highest average monthly wind speed is observed to be in March & April (5.4 kmph) while lowest (2.3 kmph) in November and December months.

Ambient Air Quality: Ambient air quality monitoring have been carried out at eight locations during winter season for PM_{2.5}, PM₁₀, SO₂, NO₂, NH₃, O₃, C₆H₆, BaP, Pb, As, Ni and CO. National ambient air quality standards for industrial, residential, rural & other areas are met for all monitored parameters at all AAQM locations during the study period.

Noise Level: Noise measurements were carried out at 8 locations. The measured day and Night time Leq noise levels are within the limit stipulated noise standards.

Natural Hazards and Disaster Risk: The Imphal International Airport lies in seismic zone V according to zoning map of India. Structure of new terminal building has been designed in view of seismic factor and other natural hazards.

Landuse & Land Cover in the Study Area – As per satellite image interpretation, built up area account for 34.37% followed by agriculture crop land (29.61 %), agriculture fallow land (19.93 %), agriculture plantation (7.46%), Forest (4.2%), water bodies (3.21%) and barren/unculturable/waste lands/ scrub land (1.22%).

Terrestrial Ecology: Within 10 km radius area, no species of flora and fauna have been categorized as rare, endangered and threatened (RET) species. There is no wildlife sanctuary, national park or other protected area within 10 km distance from the Imphal International Airport.

Socio-Economic Environment of Study Area: There are total 87611 households in the study area. The population of settlements in the study area is 410378. The male population constituted nearly 48.81% persons while the female population is 51.91% of the total population. Sex ratio in settlements located in the study area are 1049. Scheduled castes population of 0.4% while scheduled tribes population is 7.9% In the study area, 78.96% is literate, 83.10% amongst males and 75.02% amongst females.

11.4 Anticipated Environmental Impacts & Mitigation Measures

Topography & Physiography: Topography of the area is plain. For construction of the new terminal building and allied works, approximately 120000 cum filling of earth will be required.

Mitigation Measures

- Land clearing at the site will be kept to the absolute minimum practicable;
- Construction site would be designed to minimize filling of the earths.

Land Use Pattern: The land required for the new integrated terminal building and allied works is already available within Imphal International Airport, which is for airport related activities. The land use pattern of the land to be used for construction of new integrated terminal building and allied works, will be changed permanently from open land to built-up area, however this impact will be localized.

Mitigation Measures

- Land clearing for construction site will be kept to the absolutely minimum practicable;
- The filling of soil would be kept minimum; and
- Construction debris and waste generated during construction activities will be collected and disposed in environmental sound manner as per applicable rules depending upon type of wastes.

Water Resources and Water Quality: During the construction phase of the construction of new integrated terminal building and other associated work at Imphal International Airport, approx 30 to 40 kl/day water will be required depending upon the type of construction activities. The water requirement will be met through rainwater collected in ponds. Total water requirement at Imphal International Airport after proposed new terminal building is estimated as 814 kld, which includes water for HVAC, Flushing, green belt purposes. Fresh water requirement is estimated as 300 kld. 572 kld waste water generated from Imphal International Airport will be treated in 600 kld capacity MBBR technology based Sewage Treatment Plant (STP) and reused for HVAC, flushing, greenery development.

Mitigation Measures

- Continuous efforts will be made to reduce water consumption using less water required cisterns;
- Water efficient urinal and toilets will be provided in new integrated terminal building.
- Efforts will be made to stop wastage and leakage of water;
- Sewage and domestic waste water will be treated in MBBR based Sewage Treatment Plant
- Reused treated waste water in HVAC, flushing, greenery and landscaping

Soils: Approx 1575 kg per day solid waste will be generated during operation of the new terminal building at Imphal International Airport, which will be collected, segregated and managed by external agency for disposal as per Solid Waste Management Rules, 2016. Hence, the impact on the soil will be insignificant as an organized solid waste collection and disposal practices exist at the Imphal International Airport.

Mitigation Measures

- Agency will be hired for disposal of solid wastes as per the provisions of the Solid Waste Management Rules, 2016;
- Solid waste generated from the Imphal International Airport will be transported in close containers;
- Used lubricating waste oil and oil contaminated clothes etc will be collected separately in containers and will be sold to authorized recyclers as per CPCB/ Manipur Pollution Control Board guidelines.

Ambient Air Quality: During the operational phase of the new terminal building at Imphal International Airport, the intermittent air emissions will be generated from aircraft engines during approach, landing, taxiing, take-off and initial climb, which is termed as reference Landing and Take-off Cycle (LTO cycle). For power back up, there will be 2 DG sets of 2500 kVA capacity each and One DG set of 1250 KVA will be available, which will be sufficient for new terminal building and associated facilities. Vehicular emissions will also be generated from the operation of vehicular traffic at the new integrated terminal building as ground support vehicles, passengers' pickup and dropping vehicles. Exhaust emissions comprising NO₂, SO₂, PM, CO, HC, etc will be generated from aircraft, DG sets and vehicular emissions.

Mitigation Measures

- Compliance of all standards prescribed by the ICAO during operation of aircrafts by preventive maintenance and monitoring;
- 15 m stack height for 2500 kVA DG sets and 13 m stack height for 1500 kVA DG set will be provided to vent the flue gases into the atmosphere as per the CPCB guidelines;

- Proper traffic management plan will be prepared to ensue that there is no traffic congestion in front of new terminal building. It will help in reduction of vehicular emissions from the airport.
- Ground vehicles at the airport will be maintained and have a "Pollution Under Control" certificate;
- Development of greenery and landscaping at the airport for improving ambient air quality.

Ambient Noise Levels: The new integrated terminal building at Imphal International Airport will be sound proof. DG sets room will be acoustically treated to control noise levels.

Mitigation Measures

- The compliance of all standards prescribed by the ICAO during operation of aircrafts by preventive maintenance and monitoring,
- Proper traffic management will be prepared to ensue that there is no traffic congestion at the airport. It helps in reduction of vehicular noise emissions from the airport,
- DG sets will be provided with acoustic enclosure as per CPCB guidelines,
- Green belt, landscaping and boundary at the airport act as barrier for noise;
- Monitoring of ambient air quality/source emission will be carried out as per monitoring plan.

Terrestrial Ecology: During the operation phase of new integrated terminal building and allied facilities, green belt will be developed on 69687.17 sqm area. For irrigation of green belt, treated waste water from STP will be available and same shall be used. This has positive and long-term beneficial impact on terrestrial ecology of the area.

Socio-Economic Environment: During construction and operation phase new integrated terminal building at Imphal International Airport will open additional direct and indirect job opportunities in the area and region. Further, it will attract more and more tourist, commercial and developmental activities in the area. Therefore, positive impacts are anticipated on socio-economic environment during new integrated terminal building at Imphal International Airport.

Employment and Economic Growth - The construction of new integrated terminal building at Imphal International Airport will result in a boost in employment opportunities, tourism, commercial activities in the region. This will improve direct and indirect employment opportunities, revenue generation, commercial and industrial activities; therefore, resulting in positive impact on the employment and economic growth of the region.

11.5 Analysis of Alternatives

During design, construction and operation of new integrated terminal building at Imphal International Airport necessary measures will be taken for conservation of energy in line with "Energy Conservation Building Code-2017" and "National Building Code 2016". The important energy conservation measures proposed for new terminal building are described below:

- New Integrated Terminal building will be designed and constructed for GRIHA Rating 4 star,
- Use of Energy Efficient building material & glass,
- Energy efficient HVAC system,
- Solar passive techniques for terminal building,
- Microprocessor-based Building Management System (BMS) will be installed for minimization of energy consumption,
- Automatic lighting on/ off control system will be provided in the airport area for optimum utilization of energy.

It is proposed that 400 KW solar power generation plant will be established at the Imphal International Airport to produce clean energy. By adopting above measures more than 40% energy will be saved.

11.6 Environmental Monitoring Plan

To ensure the effective implementation of the mitigation measures and environmental management plan during construction and operation phases of the new integrated terminal building at Imphal International Airport, environmental monitoring plan have been prepared for ambient air quality, water quality, soil characteristics and noise monitoring. Suitable mitigation measures will be taken in case of monitored parameters are exceeding the stipulated limits.

11.7 Additional Studies - Risk Assessment & Disaster Management Plan

Hazard occurrence at the new integrated terminal building at Imphal International Airport may result in on-site implications, like, fire at the storage of HSD for DG sets followed by fire, bomb threat at terminal building, cargo terminal & aircraft and natural calamities like, earthquake, etc. Other incidents, which can also result in a disaster at the Imphal International Airport are agitation/forced entry by external group of people, sabotage, air raids; and aircraft crash while landing or take-off.

Disaster management plan has been prepared comprising key functions of Airport operator, other supporting organizations/agencies/services for response during emergency at the new integrated terminal building at Imphal International Airport.

11.8 Project Benefits

The direct and indirect benefits of the construction of new integrated terminal building at Imphal International Airport are as follows:

- Better infrastructure facilities passenger at new terminal building,
- Decongestion at terminal building with more space and comfort,
- More parking facilities for Aircrafts and safe taxiing,
- Increase in regional economy as it will boost tourism and commercial activities in the region.
- Generation of more revenue to the state, hence more development of the region.
- Boost in tourism and more people to travel in the state
- Employment opportunity to people.
- More business and industrial opportunities

11.9 Environmental Management Plan

The Airports Authority of India will be responsible for the implementation of mitigation measures identified in Environmental Management Plan (EMP) for construction and operation phases of the new integrated terminal building at Imphal International Airport. There will be Environmental Management Cell (EMC) at new integrated terminal building at Imphal International Airport to look after

day to day basis implementation of mitigation measures for construction and operation phases.

Budget for Environmental Management and Monitoring Plan

Total budget of **Rs 6.4 Crores** has been kept for implementation of environmental management plan during construction and operation phases of new integrated terminal building and associated facilities. Total budget of **Rs 0.13 Crore** has been kept for environmental monitoring during construction and operation phases.

11.10 Conclusions

Anticipated adverse environmental impacts from the construction of new integrated terminal building and associated work at Imphal International Airport will be localised, short term and low/moderate in nature, and visible only during construction phase. Adverse environmental impacts identified in EIA study due to the proposed project will be mitigated by implementation of mitigation measures/environmental management plan (EMP) described in EIA report and compliance of applicable environmental regulations. The proposed project will have long term and regional beneficial/positive direct and indirect impacts on employment, socioeconomic conditions, state economy, tourism and development of the area and region.