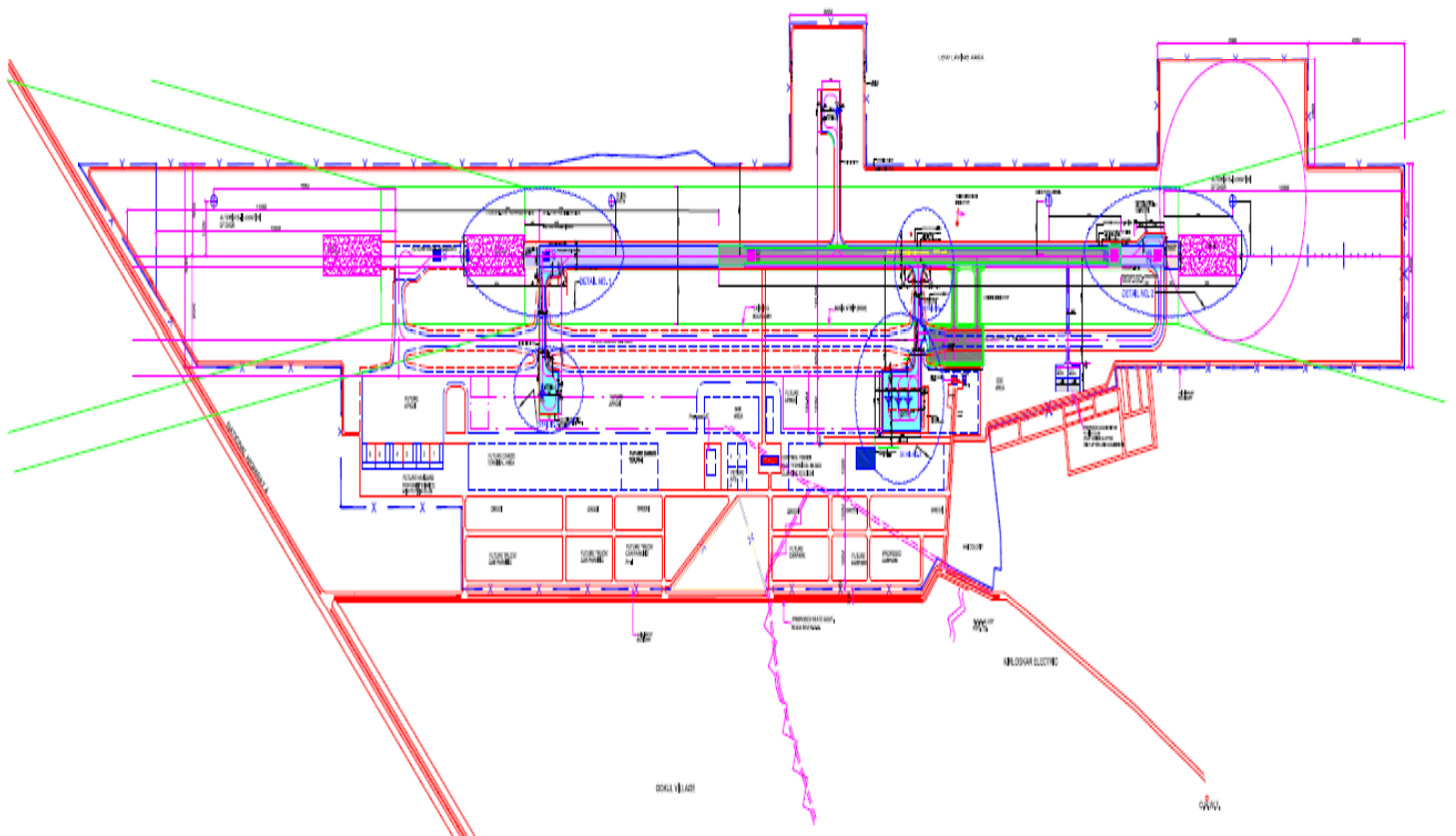


EXECUTIVE SUMMARY

ENVIRONMENT CLEARANCE FOR

DEVELOPMENT OF AIRPORT AT HUBLI IN KARNATAKA SH:
DOMESTIC AIRPORT AT HUBLI, DHARWAD DISTRICT,
KARNATAKA



Project Proponent : Airports Authority of India, Hubli ,
Karnataka

Environment Consultant : Greencindia Consulting Private Limited,
NCR, Ghaziabad
(NABET/EIA/1013/034)

March 2014

EXECUTIVE SUMMARY

INTRODUCTION

AAI Hubli is an operational airport for northern Karnataka region and at present the airstrip is operational for two flights per day of Bombardier Dash 8Q-400 type of aircraft in all weather conditions having carrying capacity of 72 passengers.

Airports Authority of India proposes to modernize/expand the airport in Hubli. As part of the process, land has been acquired in Unkal and Gokul villages of Hubli Taluka of Dharwad District, Karnataka. A MoU has been signed between the State Government and AAI for modernization/expansion of Hubli Airport at proposed site. After expansion there will be provision of landing and take-off of A-321 aircrafts.

PROJECT DESCRIPTION

The proposed airport will be located at a distance of approximately 8km from Hubli city towards south-west direction. The proposed expansion of the domestic airport is due to the increase in traffic as the region has the potential to attract the tourist and the city is the commercial hub of Northern Karnataka and also a developing industrial, automobile and educational hub of the State. Thus the expansion of the facilities will provide better connectivity to the region. At present the airport will be developed for operation of A-321 type of aircraft with minimum seating capacity of 169 passengers, subject to viability and traffic demand. The estimated cost of the project is 141.44 crores. The area of the existing airport is 369 acres and an additional land having 600 acres area has been provided for the expansion phase by the State Government.

The expansion phase will involve extension of runway with allied facilities like terminal building, apron, apron shoulder, taxi track, runway shoulder, boundary wall, perimeter roads and parking facilities. All the existing facilities will be modernized accordingly during expansion.

BASELINE ENVIRONMENT STATUS

Baseline environmental studies have been carried during post-monsoon season from October'2013 to December' 2013. Studies have been carried out in 10-km radius from project area for Soil quality, ambient air quality, water quality, noise level monitoring studies, ecological studies and demography.

Land-use

The land use pattern indicates the manner in which different parts of land in the study area is being utilized. The land use pattern of the study area consists of the following land types.

- **Settlements:** The study area is dominated by both town and village settlements (47.35%). Sporadic settlements are scattered all around the 10km radius of the Study Area. However, the major settlement of Hubli city in the east direction and Dharwad 8km in the north-west direction forms the major part of settlements in the Study Area.
- **Agriculture Land:** About 39.6% of the study area is agricultural land which is majorly single cropped and only double-cropped along water bodies or water sources.
- **Water bodies:** The area major water bodies all around the project site viz., Unkal Lake (1km towards NE), Nirsagar Lake (8km towards WSW), Devaragudihal Lake (2km towards SW), Navalur Lake (8 Km NN-W), Nuggi Lake (8 Km towards NN-W) and Bhairikoppa pond (3km towards NE). Most of these water-bodies are now part of Hubli Municipality and have been converted to water parks, recreational areas, etc.
- **Forest:** There are 4 reserved forests, one in West direction (4km), two in South direction (5.5km), and one in South West direction (4.5 km).

Land use pattern of the project site in terms of important land uses such as existing airport, barren/scrub land, agriculture land, settlements, roads, plantations, industries and cemetery.

Topography

The proposed project site is almost flat agriculture land with elevation ranging from 665 m to 650 m above MSL. The project site is flat with gentle slope only. The general slope is towards South West to North East.

Seismicity

The project site falls under Seismic Zone II which is a low damage risk zone (MSK VI or less).

Soil Quality

Samples were collected and analyzed from five locations as per approved methods of CPCB.

- The pH of the soil varied between 6.7 and 7.4 in different locations within the study area.
- The texture of the soil is dominantly Sandy Clay Loam in nature.
- The moisture content of the soil samples is found to be low. This is due to the dry weather and moderate water holding capacity of the soil. Moisture content ranges from 2.3% to 5.3%.
- Organic carbon, a major nutrient for soil fertility, was found to be moderate in most of the sampling locations.
- The soil samples showed presence of good nitrogen content. Available phosphorous is on an average sufficient and potassium content is low.

Meteorological Data

The meteorological parameters were recorded on hourly basis during the study period near proposed site and comprises of parameters like wind speed, wind direction, ambient temperature, relative humidity, atmospheric pressure, rainfall and cloud cover. The onsite data for the study period is given below:

- **Ambient Temperature:** It can be seen that during the study season the maximum recorded temperature in October was 32.7°C to minimum in December was 12.2°C.
- **Relative Humidity:** The mean relative humidity of the area varied from 35.7% to 88.9% during the study period.
- **Wind Speed:** The wind speed on an average was recorded at 1.4 m/s.
- **Wind Direction:** The recorded predominant wind direction was from east followed by north-east and west.
- **Rainfall:** The rainfall of the area was found to be 79.1mm in the study season.

Air Quality

The ambient air quality with respect to the study zone of 10-km radius around the proposed site forms the baseline information. The various sources of air pollution in the region are industrial, vehicular traffic related and rural activities. This will also be useful for assessing the conformity to standards of the ambient air quality during operation. The study area represents mostly rural environment.

- The maximum and minimum concentrations for PM10 were recorded as 115.2 $\mu\text{g}/\text{m}^3$ and 53.4 $\mu\text{g}/\text{m}^3$ respectively. The PM10 value is more in some locations due to dust generation activities and vehicular load.
- The maximum and minimum concentrations for PM2.5 were recorded as 48.4 $\mu\text{g}/\text{m}^3$ at Unkal Kere and 19.7 $\mu\text{g}/\text{m}^3$ at Anchatgeri.
- The maximum and minimum SO₂ concentrations were recorded as 13.9 $\mu\text{g}/\text{m}^3$ at Anchatgeri, and 10.8 $\mu\text{g}/\text{m}^3$ at project site.
- The minimum concentration of 18.9 $\mu\text{g}/\text{m}^3$ for NO_x was recorded at Gamangatti and maximum concentration of 21.4 $\mu\text{g}/\text{m}^3$ was observed at Anchatgeri.
- The maximum concentration of 1.20 $\mu\text{g}/\text{m}^3$ for CO was recorded at Unkal Kere with minimum of 0.89 $\mu\text{g}/\text{m}^3$ observed at Gamangatti.

Presently, in spite of flights operating from the airport, the pollution level was found to be the lowest among all the monitoring locations.

Topography

Proposed project site is almost flat agriculture land with elevation ranging from 665 m to 650 m above MSL. The project site is flat with gentle slope only. The general slope is towards South West to North East.

Water Quality

Five surface water and five ground water sources were examined for physico-chemical characteristics, heavy metals and bacteriological parameters in order to assess the effect of industrial and other activities on surface and ground water. The samples were analyzed as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA).

Surface Water:

- The analysis results indicate that the pH value of the samples are in the range of 7.3 to 7.8, these values were observed at SW3 (Sanatorium), and at SW2 (Devragudihal) respectively.
- TDS was observed in the range of 412 mg/l to 564 mg/l, indicating that the surface water bodies has TDS values are within permissible limits as per IS-2296, Class-C code. These values were found at SW3 (Nurupturanga) and at SW5 (Sanatorium) respectively. It is suitable for drinking only after conventional treatment followed by disinfection as per IS-2296, class-C.
- DO was found to be in the range of 2.4 to 3.1 mg/l. It indicates that water is suitable for irrigation etc (Ref :IS-2296, Class-E)
- The chloride and sulphate were found to be in the range of 94.8 to 138.4mg/l and 10.4 to 15.2 mg/l respectively. It is observed that chloride and sulphate are well within the permissible limits. (Ref :IS-2296, Class-C)
- The BOD levels in the water samples are very high compared to the specified standard with 10.8mg/l as the minimum value observed at SW3 (Nirsagar) and 18.2mg/l as the maximum value observed at SW4 (Dumvada). This was mainly due to discharge of sewerage, bathing of human and cattle in these water bodies. Consequently the COD of the water samples were found to be high.
- As per IS:2296, the surface water quality meets the criteria for Class C and class-E (for DO & BOD) therefore can be used for drinking purpose after conventional treatment and disinfection. It was observed that the surface water can be used for drinking after conventional treatment as per Class C of CPCB standards and for irrigation purpose.

Ground Water:

- Most of the villages in the project area have hand pumps and wells, as most of the residents of these villages make use of this water for drinking and other domestic uses. Therefore 5 bore well samples have been considered for sampling.
- The analysis results indicate that the pH of the samples ranges in between 7.2 to 7.8 which is well within the specified standard of 6.5 to 8.5.
- Total hardness was observed to be ranging from 223.5 to 284.2 mg/l. The maximum hardness (223.5 mg/l) was recorded at GW5 (Tarihal) and the minimum (284.2 mg/l) was recorded at GW1 (Unkal city). The hardness was found to be within the acceptable limit of 300 mg/l as per IS 10500:2012.

- Chlorides were found to be in the range of 94.5 mg/l at GW3 (Gokul) to 114.5 mg/l at GW1 (Unkal city) which is well within the specified standard of 250 mg/l, as per IS 10500:2012.
- Sulphate was found to be in the range of 8.9 mg/l to 11.8 mg/l. The maximum value observed at GW4 (Amargoal) whereas the minimum value observed at GW3 (Gokul). which is well within the specified standard of 200 mg/l, as per IS 10500:2012.
- It can be concluded that the ground water quality meets the standards of IS 10050:2012 and therefore can be used for drinking purposes.
- It is observed that the concentrations of all the parameters are in comparison with IS: 10500-2012 and does not indicate any industrial contamination.

Noise Level Survey

The noise monitoring has been conducted at 10 locations in the study area. The L_{eq} were recorded in the range of 46.2 to 55.4 dB(A) during daytime and 34.7 to 38.4 dB (A) during night time.

The noise levels in general found mostly within the acceptable levels as per standards for various zones as prescribed by Central Pollution Control Board (CPCB).

Ecology

The district enjoys a varied type of flora. The forest of the study area is scrub forest. Among the faunal groups, birds are most conspicuous, which are commonly seen in all the habitat types of terrestrial origin. The project site is surrounded with Reserved Forest. There is no Wildlife Sanctuary in the study area. Although the Forest Department has recorded the presence of a few Schedule I species in the District, however, presence of such species in the study area could not be established during field study. This is due to the development of Hubli Town and settlements have spread till the airport.

Demography & Socio-Economic Condition

There are a total of 32 villages in the Study Area and part of Hubli Town. The total population of the villages as per 2011 Census of India data is 10,03,621 with 2,12,200 households. It has been seen that the literacy rate in the Study Area is good and stands at 76.1% (2011) which was 69.9% in 2001 and is greater than the National literacy rate of 74.1%. Also there has been a marked increase in the female literacy rate of the area from 2001, when it was only 63.91% to 72.25 in 2011. The male literacy rate of the area is also very good and is 79.9%.

Most of the workers of the area are dependent on allied activities, such as cattle rearing, fishing or work in the industries located in the area. The population of Hubli is mainly employed in tertiary sectors in Hubli, Dharwad.

ANTICIPATED IMPACTS & MITIGATION MEASURES

Topography & Drainage

As the project site is almost flat with little undulating at a point, therefore leveling activities will be required which is not going to affect the topography of the project site.

Air Environment

The emission load, in present case, has been evaluated using ISCST 3, US-EPA software for DG set and Caline 4 for Vehicular Movement.

The resultant ground level concentrations for PM is highest at AQ3 (Unkal Kere) (115.49 $\mu\text{g}/\text{m}^3$) due to high baseline level of the site. The maximum incremental GLCs for SO₂ will be at AQ8 (Anchatgeri) (14.02 $\mu\text{g}/\text{m}^3$) while the maximum GLC for NO_x is at AQ3 (Unkal Kere) (31.64 $\mu\text{g}/\text{m}^3$). The maximum incremental GLCs for CO and HC are found at AQ3 (Unkal Kere). It is evident that all values of PM, SO₂ and NO_x will be well within the prescribed standards of MoEF / CPCB.

Sources of air pollutant emission during operation phase include emission from aircrafts, DG sets and road traffic. The rate of NO_x emission from aircrafts is maximum during climb-out stage while emission of HC and CO will be maximum during idle stage. The incremental emission form DG sets will comply with prescribed standards of MoEF/CPCB. The vehicles plying to and from the airport will be maintained for effective combustion in order to reduce emission.

Water Resources & Quality

The project will utilize the ground water and water supply from Hubli-Dharwad Municipal Corporation. The daily consumption of water during operation phase will be about 101 KLD of which 71 KLD will be fresh water and 30 KLD will be recycled water.

Wastewater will be suitably treated in SBT based STP and utilized for make-up water in cooling system, floor washing, flushing, gardening and dust suppression etc. Rain water harvesting structures are proposed to recharge ground water thereby reducing the impact on water resource.

Noise Environment

The main noise generating sources will be aircraft operation and vehicular traffic which will be properly mitigated by installation of noise barriers and complying with the International Code on noise levels during landing and take-off of and airport so that the incremental noise levels do not go beyond the prescribed limits.

Solid Waste Generation

During the operational phase, two types of waste would be generated namely the solid waste and the hazardous waste. The disposal of the solid wastes will be done after proper arrangements with authorized transporters and disposers. The hazardous wastes will be handled as per Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules, 2008.

Biological Environment

Impact during operation phase shall mainly result due to increase in ecological footprint and due to emission of air pollutants. However, since the project site is almost free of any forest, no major wildlife has been encountered in the area. To compensate for any impact on flora and fauna, greenbelt development will be taken up in specified plots leaving space required to be kept vacant for safety reasons.

Socio-Economic Environment

The flow of men, money and material will affect the socio-economic status of the people in the area. Change in land-use, disruption of residences and tension among communities will be some of the impacts on social environment. The positive impact may be the increase of employment opportunities for un-skilled and semi-skilled workers.

ENVIRONMENT MONITORING

The environmental monitoring programme will be required to manage the effectiveness of the mitigation measures and to report to the regulatory authorities. Most, if not all avoidable adverse impacts from the construction and operation of airport development can be prevented through sound environmental management. An environmental monitoring plan has been developed for managing environmental as well as health and safety issues associated to the project.

The scope of the environmental monitoring program will be to:

- Assist in detecting the development of any unwanted environmental situation, and thus, provides opportunities for adopting appropriate control measures, and define the responsibilities of all stake-holders;
- Define monitoring mechanism and identify monitoring parameters;
- Evaluate the performance and effectiveness of mitigation measures proposed in the Environment Management Plan and suggest improvements in management plan; and
- Identify training requirement at various levels.

Capital cost for installing pollution control equipments, development of green belt and setting up of laboratory for sample testing will be approximately `14.6 crores. Other than the above the annual recurring cost for monitoring and green belt maintenance has been estimated about `55 lacs without manpower cost

RISK ASSESSMENT & DISASTER MANAGEMENT

Activities likely to pose a risk to humans, environment or property associated with the Airport are addressed in this report. Such activities include natural disaster, aircraft accident related disaster, terror attack, plane hijack, sabotage, fire etc. Specific precautions should be taken with respect to hazardous chemicals such as Fire Extinguishers, Fire Tenders, Fire crew deployment at site and regular mock drills should be carried out to enact accident scenarios with reports sent to the top management. Suitable fire protection system comprising hydrants and spray systems are provided for fire protection. Fire extinguishers should be tested periodically and to always be kept in operational mode. On-site disaster management and offsite emergency plans, commands communication and controls will be established and maintained. Adequate provisions like emergency response, response organization, response plan, material safety data sheet, command & control, capabilities, transportation, medical facilities, mitigation measures, training, education, public awareness emergency plan review etc. to control any disaster situation will be made available

ENVIRONMENT MANAGEMENT PLAN

During operation phase, the impacts on the various environmental attributes should be mitigated using appropriate pollution control equipment. The Environment Management Plan prepared for the proposed project aims at minimizing the pollution at source.

Air Pollution Management

Air pollutant emission from aircrafts, vehicles and DG sets will lead to increase in air pollutants in nearby areas. The mitigation measures proposed to mitigate such impacts are:

- Single/reduced engine taxiing
- Reduced engine idling time
- Usage of battery operated vehicles for transferring passengers from one terminal to another.
- DG Stack height shall be as per CPCB guideline.
- Traffic Management by dedicated incoming & outgoing vehicles.

Water Pollution Management

The effluents generated from the project during operations will be collected for various treatments. The wastewater recovery, as practiced, will considerably reduce the impact on the water quality. The recovered wastewaters will be reused with in project premises and greenbelt/irrigation. The measures proposed to minimize the impacts are:

- Installation of water meter at the inlet point of the water intake and the discharge point to monitor daily consumption.

- To manage ground water resource, rainwater harvesting structures will be constructed on all built-up area and proper drainage will be provided to drain water into rainwater harvesting pits.
- The wastewater generated will be treated in Soil Bio-filter Technology (SBT) based Sewage Treatment Plant.

Noise Pollution Management

During operation of the airport, various noise generating sources include aircraft noise, traffic links to airport, etc. The proposed means to mitigate higher noise levels are:

- Providing noise barriers in and around the airport.
- Providing appropriate traffic infrastructure.
- Provision of earplugs to the workers working in high noise level area.

Solid Waste Management

The solid waste will be collected and transported in covered trucks at approved municipal disposal sites through contractors. At present a bin at roadside is used for collection of waste (degradable and non-biodegradable), which is cleaned by HDMC (Hubli-Dharwad Municipal Corporation).

Hazardous waste shall be treated in accordance with Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules, 2008; batteries waste shall be handled in accordance with Batteries Management Rules, 2010 and E-wastes as per E waste Guidelines, 2008. The redundant machinery if any shall be stored separately and will be sold to approved recyclers, which is followed presently.

Energy Conservation

Use of energy conservation measures as part of airport design and operations, will be part of the Master Planning and the specifications as part of awarding development work of this airport to a private contractor.

Green Belt Development

Although in an airport project a wide landscaped area cannot be proposed due to security reasons, a green belt will be developed. The green belt will be expanded between terminal building and parking area. The area will be planted and landscaped with local species of plants.

Socio-economic Development

Airport Authority of India will be having its own CSR activities which will encompass developmental and social activities. The CSR activities will aim to help in overall development of the area around the proposed airport project.

The thematic/ programme focus of the AAI's CSR work will include:

- Environment conservation
- Integrated community development
- Education, including formal and informal education and vocational training
- Health as an integral component of better quality of life with special focus on women and girls.
- Disaster Management including preparedness and capacity building.