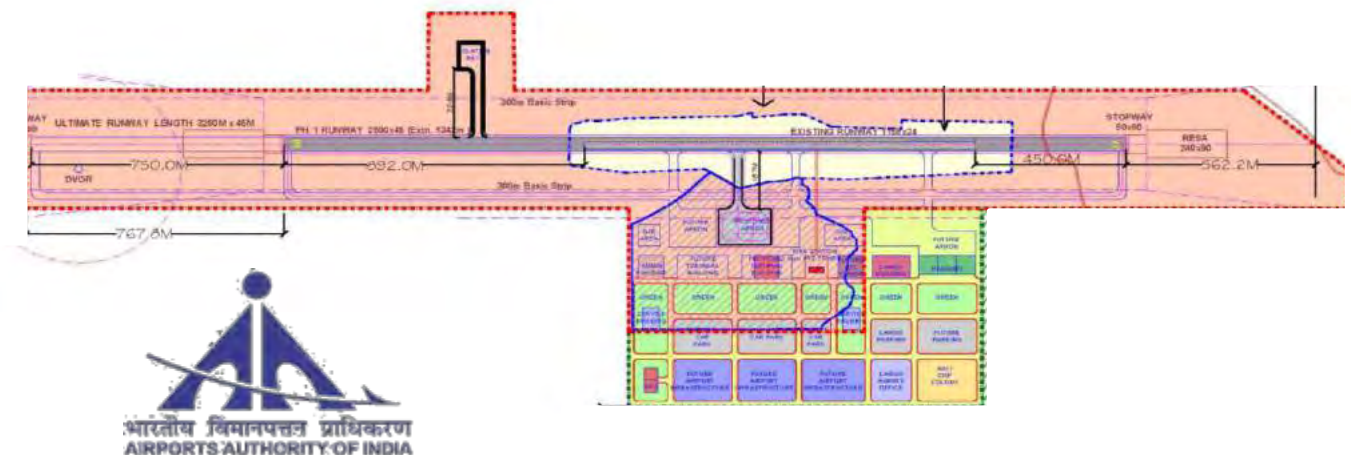


PRE-FEASIBILITY REPORT

ENVIRONMENTAL CLEARANCE FOR DEVELOPMENT OF DEOGHAR AIRPORT, AT DEOGHAR, DEOGHAR DISTRICT, JHARKHAND



PROJECT PROPONENT AIRPORTS AUTHORITY OF INDIA, RANCHI



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NABET/EIA/RA014/04

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EXECUTIVE SUMMARY



Executive Summary

Introduction: Airports Authority of India proposes to develop Deoghar Airport in Asahana, Babupur, Bhitiya, Katia, Paharpur & Singhpur yogidih village, District-Deoghar, Jharkhand. A MoU (Memorandum of Understanding) was signed between State Government and Airports Authority of India for the development of Deoghar Airport. The project will be developed in an area of 656.79 Acres with an area of 53.41 Acres of existing airstrip. The land for the project has been provided by State Govt. of Jharkhand.

The airport will be developed to cater for operation of ATR-72 type of aircraft and after that if required then it will be developed for operation of A-321 type of aircraft, subject to viability and traffic demand. The estimated cost of the project is approx. INR 350 Crores.

The proposed site is 3 km from Deoghar. NH-114A is adjacent to Eastern boundary of the site. Badyanathdham Railway Station is at 4.5 km distance from project site in North direction.

Concept: This project involves construction of facilities like 1 terminal building, apron, air traffic controller, RESA, apron, link taxi track shoulders, isolation bay shoulders, firefighting equipments etc.

Component/ Facility	Proposed Size
Runway Size	2700 m x 45 m
Runway Shoulders	7.5 m
Runway Orientation	09-27
Stop way	60 m x 60 m
Apron	165 m x 115 m
Apron Shoulders	7.5 m
Taxiway	188 m x 23 m
Taxiway Shoulders	7.5 m
RESA	90 m x 90 m
Isolation Bay	64 m x 79 m
Isolation Bay Shoulders	7.5 m
Terminal Building	5400m ²
Fire Station	No. 1 (category VII)
ATC	Mobile Control Tower

Source: Technical Report, AAI

During operation phase, approx. 72.6 KLD of water would be required which will be sourced from bore well (ground water).

The power requirement will be 1,200 kVA for the proposed project. The bulk power supply of 1250 KVA shall be drawn from the grid of State Electricity Board. Electric substation will be built inside the project site for housing HT and LT panels, DG set etc. provision of Solar Power will be explore in this proposed project.

Area: The project will be developed in an area of 656.79 Acres with an area of 53.41 Acres of existing airstrip. There is some first order stream crossing through the proposed project site. There is no PF/ RF inside the proposed project site but 18.18 acres of forest land (as khasra Map) exist in the proposed site area. Some small scattered settlement also found edges of inside the proposed project site and one road cross through the eastern side of the proposed project site from North to south. For development of Deoghar Airport, State Govt. of Jharkhand provided land after removing of all obstructions and diversion of various facilities.

Project Cost: The estimated project cost is approx. INR 350.00 crores.

CHAPTER-1

INTRODUCTION



1. INTRODUCTION

1.1 BACKGROUND

Deogarh district is located in the western portion of Santhal paraganas. It is bounded by Bhagalpur district in north, Dumka in south and east and Giridhi in west. The district extends from 24°29' N 86°42' E to 24°48' N 86°70' E. and comprises 2481 sq. km area. Deoghar was earlier part of Dumka District, but now itself a district & district town also. The Deoghar district is composed of 7 community development blocks namely Deogarh, Madhupur, Mohanpur, Sarwan, Palolori, Sarath and Karon.

Deoghar is the main city of the Deoghar in the state of Jharkhand, India. It is an important Hindu pilgrimage centre with the Baidyanath Temple being one of the twelve Shiva Jyothirlingas in India and one of the 51 Shakti Peethas in India.

1.2 PROJECT PROPONENT

AAI under the Ministry of Civil Aviation is responsible for creating, upgrading, maintaining and managing civil aviation infrastructure in India. Airports Authority of India (AAI) has decided to develop an Airport at Deoghar (Jharkhand). The airport will be developed to cater for operation of ATR 72 type of aircraft AAI has full-fledged sections for civil engineering, electrical engineering, which looks after planning, and designing of new or expansion airport projects and maintenance of existing ones. AAI also takes up consultancies for designing and construction in India and abroad.

1.3 TYPE OF PROJECT

The proposed project is new Airport spread over an area of 656.79 acres is to be constructed for air side, Land Side. The proposed project falls in Category 7(a) of the Schedule vide EIA notification 2006 amended to date involving preparation of Environment Impact Assessment study and Environment Management Plan. However general condition is not applicable to this project. This project is independent and is not linked with other project/s which may attract directly or indirectly any provisions of schedule of EIA notification 2006 amended to date.

1.4 AIRPORT SECTOR PROFILE

India's transformation from an agrarian economy to an urbanized one is an inevitable consequence of GDP growth led by service sector and saturation of agricultural productivity. Air connectivity can ensure integration of such urbanizing areas with the rest of the country and national economy. Development of appropriate connectivity between robust urban agglomerations could check the influx of migrants to large metro and provide for more balance regional development.

The civil air transport network has been called the Real World Wide Web. It has been observed that the improvement in air connectivity has brought tremendous benefits to users of air transport services by:

- Reducing time spent in transit,
- Increasing the frequency of service,

- Allowing for shorter waiting times and better targeting of departure and arrival times;
 - Improving the quality of service, such as reliability, punctuality and quality of the travel experience.
- Improvements in connectivity will effectively contribute to the economic performance of the wider economy through enhancing its overall level of productivity. Table 1.1 shows the quantum of passengers handled at major airports in India in last few years.

Table 1-1: Passenger Handled at Major Airports in India (in millions)

S. No.	Airports	City	State	2012-13	2013-14	2014-15
1	Delhi International Airport Limited	Delhi	Delhi	34.4	36.9	41.0
2	Chhatrapati Shivaji International Airport	Mumbai	Maharashtra	30.2	32.2	36.6
3	Chennai International Airport	Chennai	Tamil Nadu	12.8	12.9	14.3
4	Kempegowda International Airport	Bangalore	Karnataka	12.0	12.8	15.4
5	Netaji Subhash Chandra Bose International Airport	Kolkata	West Bengal	10.1	10.1	10.9
6	GMR Hyderabad International Airport Limited	Hyderabad	Telangana	8.4	8.8	10.5

Source: Airports Authority of India, APAO, New Delhi

1.5 AIR CONNECTIVITY PATTERN

In India, with its geographical spread interspersed with deserts, seas, forests and hilly terrain, regional and remote area air connectivity can play a crucial role in this context. Establishing or relying on railway / road networks for connecting such parts of the country may not be time effective or even viable (technically /financially).

Also, while railway and road networks may be viable connectivity options to other parts of the country (not impacted by issues of terrain, security, etc.); air connectivity provides a key advantage in terms of time saving. The routes connecting Tier-2 towns / cities to Tier-3 towns / Cities-1 only constitute about 7% of the air transport market in India in terms of seat deployment. While routes can be configured in numerous ways in terms of combination of frequencies, timing of the flights and aircraft sizes, a number of these routes are likely to witness traffic that can be better serviced using small aircraft such that the aircraft could be optimally utilized over the day as well as achieve viable PLF.

1.6 NEED OF THE PROJECT

1.6.1 Traffic Analyses

The first and foremost parameters for planning of an airport is to establish air traffic demand and forecast the growth of traffic to determine the type, adequacy and sizing of facilities to be provided. This would ensure that oversized facilities are not created which then would become a financial liability on the investments.

Traffic forecasts for any infrastructure development, especially a Greenfield airport carries a certain amount of uncertainty. The present day Government policies have encouraged the growth of aviation industry and therefore movement of cargo by air. This healthy growth is likely to continue in the coming years.

Deoghar which is famous for Baidyanath Temple, the Shiv Temple of Basukinath at is located at 4.5 km distance from proposed project site. The tourist population of Deoghar is 1,50,000 per day in peak season and 15000-25000 per day is non-peak season has potential traffic for the proposed airport. Traffic potential of Deoghar Airport for the year 2016-17 and Traffic forecast for the next 21 years is given in Table 1.2.

Table 1-2: Year wise Traffic Forecast on Deoghar Airport

Year	A/C movements/year (in Nos.)	Passengers (in Lacks)	Freight (in Tonnes)
2016-17 (Base Year)	3300	3.0	800
Growth Rate	6.0%	8.0%	5.5%
2017-18	3498	3.2	844
2018-19	3708	3.5	890
Growth Rate	8.0%	10.0%	7.5%
2019-20	4005	3.8	957
2020-21	4325	4.2	1029
2021-22	4671	4.7	1106
2022-23	5045	5.1	1189
2023-24	5448	5.6	1278
2024-25	5884	6.2	1374
2025-26	6355	6.6	1477
2026-27	6863	7.5	1588
2027-28	7412	8.3	1707
Growth Rate	8.0%	9.1	1835
2028-29	10.0%	12.0%	9.0%
2029-30	8806	10.2	2000
2030-31	9686	11.4	2180
2031-32	10655	12.8	2377
2032-33	11720	14.3	2591
2033-34	12892	16.0	2824
2034-35	14181	17.9	3078
2035-36	15600	20.1	3355
2036-37	17160	22.5	3657
2037-38	18875	25.2	3986
	20763	28.2	4345

Source: Airports Authority of India, APAO, New Delhi

1.7 EMPLOYMENT OPPORTUNITIES

The direct employment during operation phase in proposed project will be 250 people. However indirect employment will be around 500 to 600 people who will be employed in taxi operations and other allied services. During construction phase, 250-300 labours and supervisors will be employed in various construction, transportation and storage activities. It is also proposed that these labours will be employed locally for the proposed project.

1.8 STRUCTURE OF THE REPORT

The purpose of this report is to establish techno-economic feasibility for the proposed project at Deoghar. The report is divided into seven chapters excluding this chapter, the details of which are summarized below:

Chapter 2: Project Description- This chapter discusses the details of the project like location, project salient features, project magnitude, summary of proposed infrastructure and various other requirements like water, power, construction materials etc.

Chapter 3: Site Analysis- This chapter discusses the site profile, landform, and existing land use and drainage pattern. The land details, climate and meteorological parameters are also described in various sections of the chapter. The traffic forecast is also mentioned in this chapter.

Chapter 4: Planning Considerations- This Chapter presents layout drawing and design considerations for construction of new runway with all allied facilities like terminal, Building, Apron, Apron Shoulder, Taxi Track, Runway Shoulder, boundary wall, perimeter roads etc.

Chapter 5: Proposed Infrastructure- This chapter discusses the Concept Plan for aviation support facilities and utilities also provides for the redevelopment & re-planning of existing air strip.

Chapter 6: Rehabilitation and Resettlement (R&R) Plan- This chapter discusses the R&R study due to the proposed project area.

Chapter 7: Project Schedule & Cost Estimates- This Chapter describes the total investment and cost regarding the project.

Chapter 8: Analysis of Proposal (Financial & social benefits to the locals) - This chapter summarizes the Analysis of Proposal of proposed Deoghar Airport, Jharkhand.

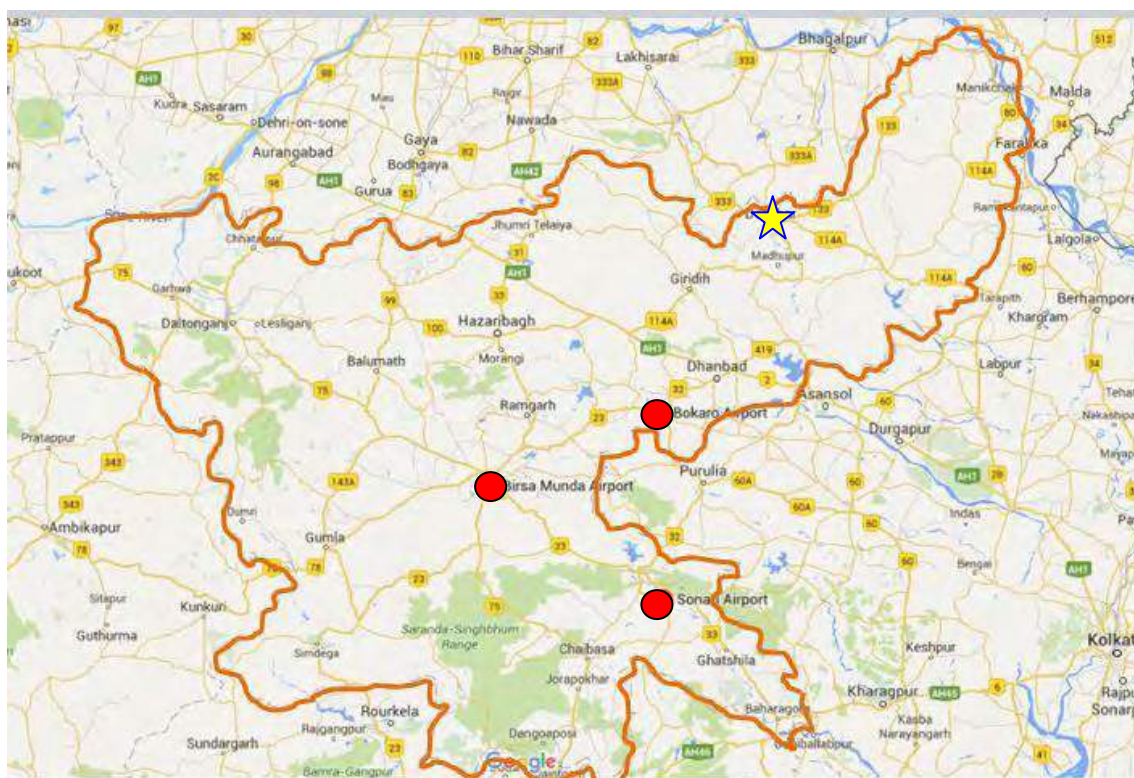


Figure 1-1: Airports in Jharkhand



Airports in Jharkhand



Deoghar Airport

CHAPTER-2

PROJECT DESCRIPTION



2. PROJECT DESCRIPTION

2.1 INTRODUCTION

Airports Authority of India proposes to develop a Domestic Airport in Asahana, Babupur, Bhitiya, Katia, Paharpur & Singhpur yogidih villages in Deoghar District in Jharkhand. A MoU was signed between State Govt. and AAI for development of Deoghar Airport at proposed site. In the initial stage, the airstrip will be developed to cater for operation of Dash ATR-72 type of aircraft in fair weather conditions having passenger's carrying capacity of 68 Nos. Initially there will be provision of landing and take-off of 5 aircrafts per day. This will involve construction of new runway with all allied facilities like terminal building, Apron, Apron Shoulder, Taxi Track, and Runway Shoulder, boundary wall, perimeter roads, colony and parking facilities.

2.2 LOCATION & LINKAGE

The proposed airport is located at a distance of approximately 4 km from Deoghar in South direction. Details of location of the proposed airport are given in Table 2.1 Figure 2.1 & 2.2.

Table 2-1: Project Description

Description	Details		
Project Site	Asahana, Babupur, Bhitiya, Katia, Paharpur & Singhpur yogidih village		
Tehsil/ Block	Deoghar Block- Asahana, Babupur, Katia & Singhpur yogidih Mohanpur Block- Bhitiya & Paharpur		
Location	Deoghar District, Jharkhand		
Coordinates	Points	Latitude	Longitude
	A	24° 26' 54.5" N	86° 40' 41.8" E
	B	24° 26' 54.5" N	86° 41' 49.7" E
	C	24° 27' 02.7" N	86° 41' 50.4" E
	D	24° 27' 02.8" N	86° 41' 59.5" E
	E	24° 26' 54.6" N	86° 41' 58.8" E
	F	24° 26' 54.7" N	86° 43' 14.7" E
	G	24° 26' 41.7" N	86° 43' 24.3" E
	H	24° 26' 41.8" N	86° 42' 46.4" E
	I	24° 26' 20.3" N	86° 42' 44.3" E
	J	24° 26' 20.1" N	86° 42' 07.4" E
	K	24° 26' 41.5" N	86° 42' 09.1" E
	L	24° 26' 41.4" N	86° 40' 45.9" E
Villages & Plot No.	Attached as Annex- I		
Total Area in hectares	656.79 acres		
Access Road	National Highway-114A	Adjacent	

Description	Details		
District Headquarter	Deoghor	3.0 km	N
Nearest Town	Deoghor	2.5 km	N
Nearest Railway Station	Badyanathdham Railway Station	4.7 km	N
Nearest Domestic Airport	Kazi Najrul Islam Airport, Andal	103.2 km	SE
Nearest International Airport	Netaji Subhas Chandra Bose International Airport, Kolkata	266 km	SE

Source: Primary Survey, Greencindia Consulting Private Limited, NCR, Ghaziabad;

2.3 DETAILS OF ALTERNATIVE SITES

The Proposed Project is developed on Deoghar airstrip with land area of 53.41 acres existing airstrip belongs to State Govt. of Jharkhand and is transferred to Airport Authority of India along with additional area of 603.38 acres. As the proposed project is for develop airport for operations of wide bodied aircraft with augmentation of required facilities. It was decided by Airports Authority of India to develop the proposed project on this site and no alternate site was studied for the purpose of this project. A MoU was signed between State Govt. and AAI for development of Deoghar Airport at proposed site. The environment consideration of the site is discussed in Chapter-3 of this report. However it observed from the satellite imagery and preliminary site visit that there are no environmentally sensitive receptors within the proximity of the project site and technically also site is suitable for the project.

2.4 PROJECT MAGNITUDE

AAI proposes to upgrade the existing airstrip in Deoghar into a full-fledged airport serving ATR-71 in initial phase and subsequently for A321 category aircrafts.

The ATR 72 is a twin-engine turboprop short-haul regional airliner manufactured by the French-Italian aircraft manufacturer ATR. It was developed as a stretched variant of the ATR 42, and entered service in 1989. It has been typically employed as a regional airliner, although other roles have been performed by the type such as corporate transport, cargo aircraft and maritime patrol aircraft. Successive models of the ATR 72 have been introduced, a single aircraft can seat up to 78 passengers in a single-class configuration.

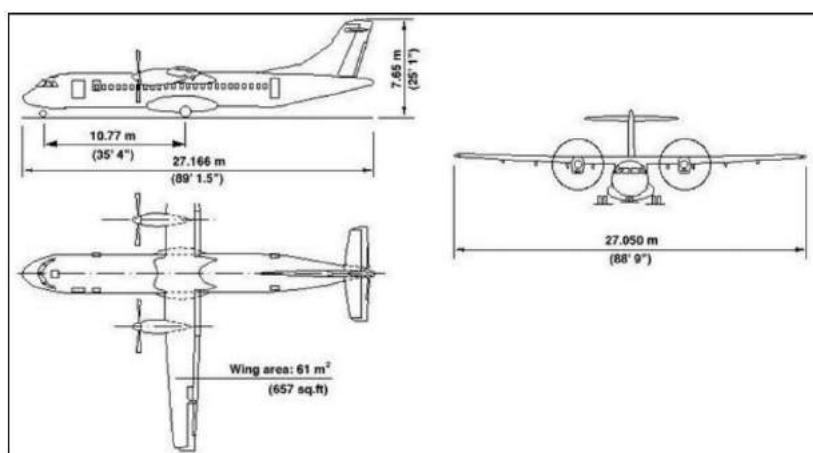


Figure 2-3: ATR-72 Dimension

Table 2-2: ATR-72 Specification

	ATR 72-200	ATR 72-500
Dimensions		
Length (m)	27.2	27.2
Wingspan (m)	27.0	27.0
Height (m)	7.6	7.6
Wing area (m ²)	61.0	61.0
Weight		
Maximum take-off weight (kg)	21 500	22 000 - 22 800
Maximum landing weight (kg)		21 850
Operating empty weight (kg)	12 400	12 950
Maximum zero fuel weight (kg)		20 000 - 20 800
Maximum payload (kg)		7 050 - 7 350
Standard fuel capacity (litres)		6 400
Performance		
Range with max payload (km)	1 195	1 330 - 1 650
Cruise speed (km/h)	460	510
Maximum speed (km/h)	525	640
Maximum operating altitude (m)	7600	7 600
Take-off field length (m)		1 220
Landing field length (m)		1 050
Engines	P&WC PW124B, 2 x 2160 hp	P&WC PW127F, 2 x 2750 hp
Cabin Data		
Passengers (1-class)	64-74	62-74
Economy seat pitch (cm)	76-81	76-81
Cabin width (m)	2.57	2.57

Source: ATR information, www.airlines-inform.com**2.5 DESCRIPTION OF PROPOSED PROJECT**

The proposed project is the development of Deoghar airport that involves development of the following features:

- a. Expansion of runway
- b. Construction and development of
 - Over-run
 - Taxiways
 - Apron

- Isolation bay
 - Runway strip
 - Drainage
 - Fire and rescue services
 - Mobile ATC Tower
 - MET, equipment
- c. Civil works include
- Pavements
 - Passenger Terminal Building
 - Technical block
 - Fire station
 - Colony
- d. Miscellaneous works include
- Water storage
 - Sewage treatment plant
 - Substation for housing of DG sets
 - Security gates
 - CCR room
 - Horticulture and gardening
- e. Electrical & Mechanical Works include
- Lighting System
 - Conveyor belts
 - Signage in passenger terminal building
 - Cabling & etc.

The above mentioned works are given in detail in Chapter 4.

2.6 CONSTRUCTION MATERIAL

The basic raw materials quantity envisaged for construction is mentioned in Table no. 2.3.

Table 2-3: Construction material (Estimated)

Sl. No	Description	Quantity
1	Earth / Murrum	5,59,000 cum
2	Gravels	6,17,000 cum
3	Aggregates	2,93,00 cum
4	Bitumen	1,62,00 MT
5	Reinforcement steel	13,500 tons
6	Structural steel	14,100 tons

Source: Airport Authority of India, New Delhi

2.7 POWER REQUIREMENT

Power required for the entire airport would be 1200 KWA which will be provided by Jharkhand State Electricity Board. The power requirement for the project will be sourced from 440KV sub-station to step down sub-station within the premises of proposed project.

Provision for solar power explored in this proposed project. Two DG sets of 2x500 KVA will be stand by for backup.

2.8 WATER REQUIREMENT

The project will utilize the ground water. The daily consumption of water during operation phase will be about 72.6KLD of which 41.8 KLD will be fresh water and 30.3 KLD will be recycled water. Table 2.4 provides the water requirement and wastewater generation for construction and operation phase .

Table 2-4: Water requirements of the project

Sl.no	Parameters	Unit	Quantity	Water Consumpti on (LPCD*)		Water Requirement in KLD**			Wastewater Generation (KLD)			Sewage Treatment Plan (20% excess) in KLD
				Fresh	Recycled	Fresh	Recycled	Total	Fresh	Recycled	Total	
									80%	95%		
A	OPERATION PHASE											
a	Passengers	No.	1000	10	15	10.0	15.0	25.0	8.0	14.3	23.3	SBT Technology 100 KLD
b	Visitors	No.	250	7	-	1.8	-	1.8	1.4	-	1.4	
c	Airport Staff	No.	250	30	20	7.5	5.0	12.5	6.0	4.8	10.8	
d	Residential Area	No.	250	70	25	17.5	6.3	23.8	14.0	5.9	19.9	
e	Kitchen, floor washing & Restaurant Seats	No.	100	50	40	6.5	5.0	11.5	5.2	4.8	10.0	
Total Water Demand in KLD						41.8	30.3	72.6	33.4	28.7	62.3	
B	CONSTRUCTION PHASE											
a	Daily Labour	No.	200	30	15	6.0	3.0	9.0	4.8	2.9	7.7	Septic Tanks & Toilets
b	Residential Labour	No.	100	50	36	5.0	3.6	8.6	4.0	3.4	7.4	
C	Officials	No.	30	30	15	0.9	0.5	1.4	0.7	0.4	1.1	
Total Water Demand in KLD						11.9	7.1	19.0	9.5	6.7	16.2	

Source: Airport Authority of India, New Delhi

2.9 WATER STORAGE

Since the hours of supply may not be continuous, it is recommended to go for 2 days bulk storage at the main receiving tanks, wherein the domestic water will receive the desired level of treatment. Further to

bulk storage, individual Buildings / Utility will have their own storage tanks catering to a day's requirement. Besides the above, a Fire reserve storage of 4,00,000 liters is envisaged at the receiving tank.

2.10 WASTEWATER GENERATION AND TREATMENT

The main source of drainage generation will be the discharges from toilets (water closet), urinals, sinks, pantry's, kitchen and other similar utilities. The total wastewater generation in operation phase will be 62.3 KLD and that during construction phase is 16.2 KLD. The wastewater will be treated in 100 KLD Soil Bio-filter Technology (SBT) developed by IIT Bombay.

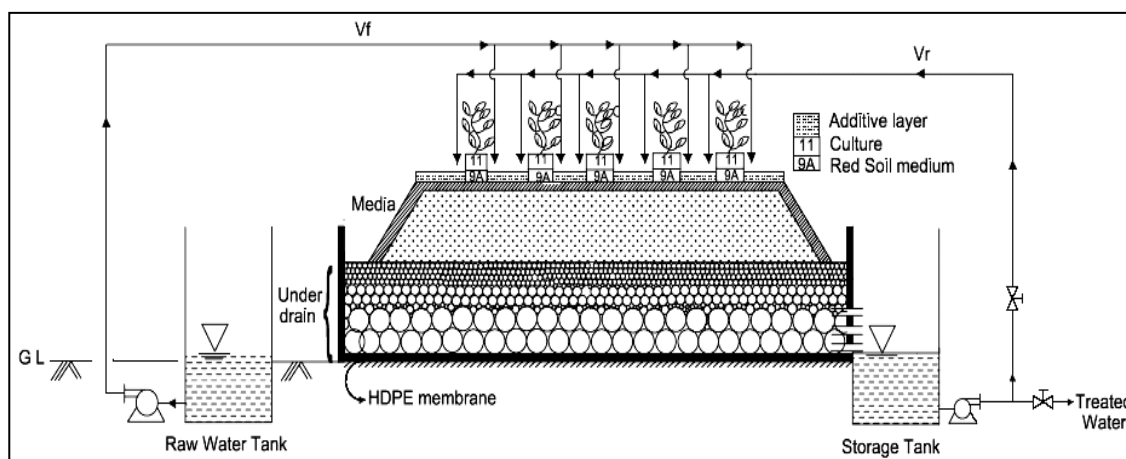


Figure 2-4: Typical Layout of Soil Bio-Filter

The SBT technology has following advantages

- It provides primary, secondary and tertiary treatment all in one unit; in a **single evergreen facility** open to atmosphere.
- It is very **simple to operate**, maintain.
- It does not require skilled man-power.
- It is **cost competitive** particular with reference to **O&M cost**.
- **No pre-treatment**
- **No chemical** usage
- Absence of any moving part
- **Odour-free**
- **Low energy requirement** and
- **Green environment** are its unique features.

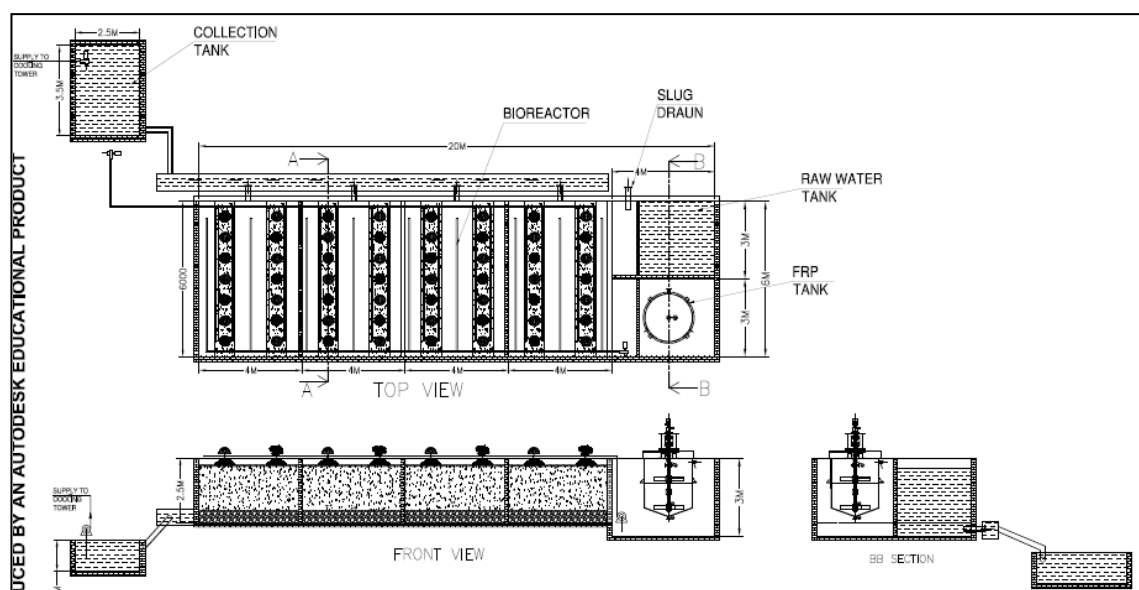
The plant will be designed to meet the standards stipulated by the Pollution Control Board. As mentioned earlier the treated waste is envisaged to be used for landscaping and for Air-conditioning makeup. To achieve this, the plant will meet the standards especially for pH, BOD and suspended solids (SS) parameters as depicted in Table 2.5.

Table 2-5: SBT Output Water Quality

S.no	Parameters	Unit	Input	Output
1	pH	-	6.0-7.1	7.1-7.4
2	Suspended Solids	mg/l	78-293	6-10
3	Dissolved Oxygen	mg/l	ND-2.8	4.0-5.5
4	COD	mg/l	186-360	12-18
5	BOD	mg/l	64-130	<5.0
6	Turbidity	NTU	46-148	<1.0
7	Fecal Coliform	CFU/100ml	10^6 - 10^7	< 10^3

ND-Not Detectable, CFU-Colony Forming Unit

Source: Airport Authority of India, New Delhi

**Figure 2-5: Schematic Treatment Process****2.10.1 Sewerage Network**

Drainage will be based on a two pipe system i.e. a piping to carry discharge from water closet / urinals and another for wash basin / showers / floor drains, kitchen sink etc. The kitchen drainage will pass through grease separators / chambers before discharging into sanitary network. Proper venting and anti-siphonage pipes will be provided. There could also be discharge emanating from the workshop and other maintenance facilities which will have greasy contaminants. It will be necessary to adopt local treatment like Oil separator before discharging into sanitary network.

The total sewage generated will be led through a network of pipes, chambers and manholes to finally discharge into the sewage treatment plant. As the topography of the site has a natural slope from East to West, the sewage collection system will also follow the same gradient.

Water Use Reduction

To estimate the reduction in water use achieved by the building by following the mitigation measures, use following steps: (i) Step 1: Estimate total water demand based on the occupancy and type of building; (ii) Step 2: List various efficient fixtures and other measures and (iii) Step 3: Calculate demand reduction as compared to the BIS per capita water consumption.

Water Conservation in Landscaping

Landscape forms an important part of the building environment. This is constituted by combination of vegetation, and paving. The vegetation includes lawns, shrubs, herbs and trees. In general, the water demand for lawns and shrubs are higher as compared to trees, which does not require or require less water after establishment. In addition, native species also require less water.

2.11 MEASURES FOR REDUCING WATER DEMAND FOR LANDSCAPE:

The water consumption for the gardening depends on the type of plant species and the plant factors. As the plant factor for native species and trees is the minimum, one of the options to reduce the water demand for gardening is to include more native species and low water consuming species. Other options include use of efficient fixtures for watering, following certain best practices to minimize losses and optimize consumption.

2.11.1 Efficient irrigation Equipment:

- **Drip irrigation:** To save water, drip irrigation is an efficient technique as it prevents loss of water due to evaporation, run-off and percolation. Further, it has a better control and facilitates uniform water distribution. However, this system cannot be used for lawns and ground covers but for non –native turf and other non-xerophytes plants.
- **Sprinkler irrigation:** Sprinkler irrigation system requires a network of pipes and pumping system to maintain sufficient pressure for uniform distribution. It is best suited for areas with sandy soils which have high infiltration rates. To prevent water logging, the system should be designed in such a way that infiltration rate exceeds the application rate. Sprinklers which can produce fine sprays are more efficient as compared to those that produce large water droplets. The efficiencies of irrigation systems differ widely. Further, to improve the efficiency certain measures can be followed, which includes use of a pressure regulator for pressures greater than 30 psi which will significantly reduce the loss during watering.

2.12 STORM WATER DRAINAGE

Since the airport is located in a rain belt having annual rainfall exceeding 1382.2 mm, it is recommended to design the storm drainage system for 100 mm / hr intensity of rainfall.

It is recommended to provide the following types of Drains for the designated areas.

- **Taxiways & Runways-** For taxiways running parallel to the runway, covered storm water channels in RCC located in the project site between runway & taxiway with concrete box inlets covered at the top with grating (Suitable for Aircraft wheel load). Inlet to be spaced at 60m c/c.

For the runway side without parallel taxiway piped conduits with concrete box inlets covered at the top with grating located at the toe of the slope of the graded area. Inlets to be spaced at 60m c/c.

- **Aprons & Paved areas-** Covered Rectangular, RCC drains, with inlet gratings at 60m c/c, for collecting runoff and also for access.
- **Terminal Buildings & other similar areas-** Drain channels in Brickwork covered with grating. The storm water runoff will have potential contaminants entering into the system. These contaminants could be leaking fluids from transport vehicles, discharges from maintenance area spills, parked vehicles, aircrafts etc.

Oil separators with detention basins will be provided at the final outfall / discharge points to eliminate these contaminants. The final discharge from the runoff will be led into Rain water Harvesting Pits as a conservation measure. The rate of percolation of the water will depend on the percolating ability of the soil.

2.13 SOLID WASTE MANAGEMENT

Construction Stage: 760 kg / day (@0.2 kg / person /day for 300 labors+ 50 dependents + 30 employees) will be collected and disposed as per established laws and Procedures. The Organic waste will be treated at site.

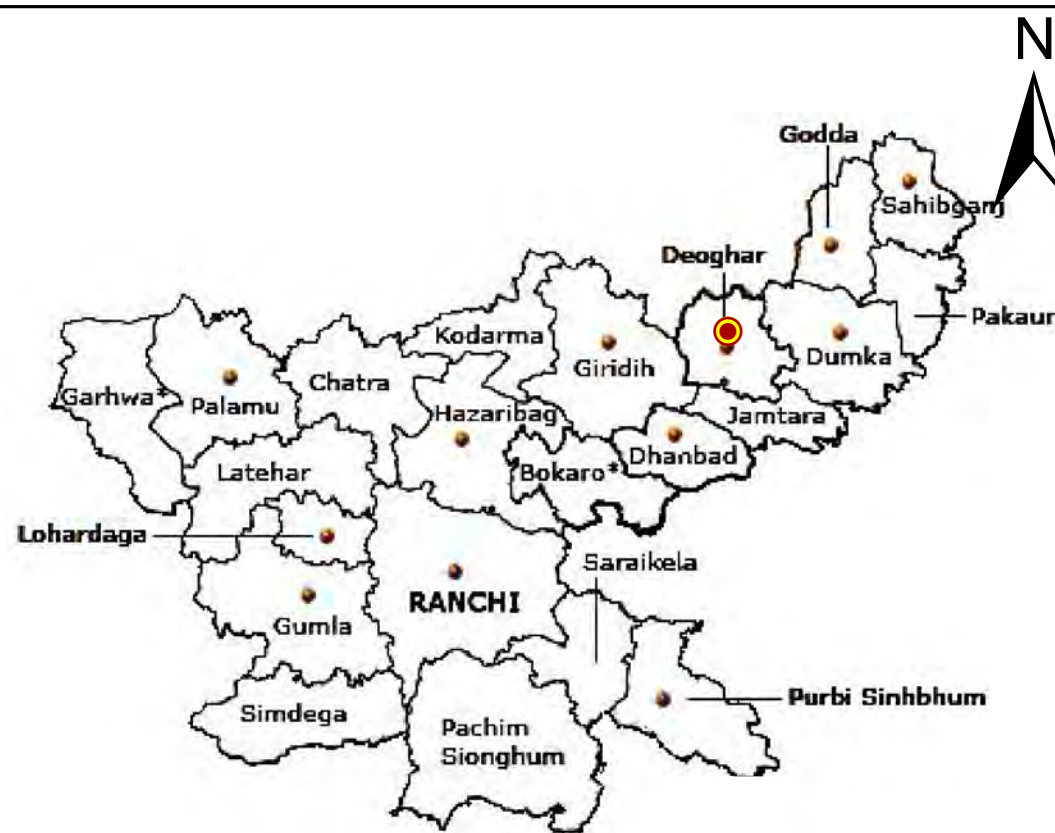
During the operation phase, twin bin waste collection system– green bins for bio-degradable wastes and blue bins for non-biodegradable wastes shall be provided. Solid waste generated from the proposed airport mainly comprises of food waste and garbage waste. Further, small quantities of sludge from STP, medical waste and other waste will be generated. Collection and handling of domestic solid waste would be done in line with the provisions of the Indian standards. The total waste generated from the airport & colony approx. 300 kg/day which will be collected, segregated and disposed to the integrated solid waste management at Deoghar Municipal Corporation waste disposal site.

Hazardous waste shall be disposed by authorized vendor of MoEF&CC.



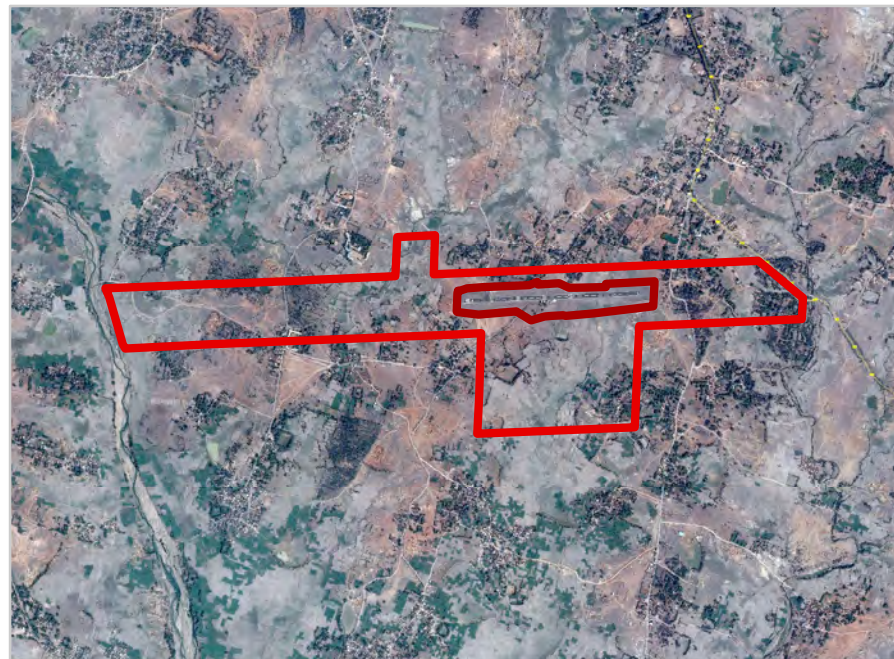
Source: <http://www.india-in-your-home.com/physical-map-of-india.html>
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A Map of India



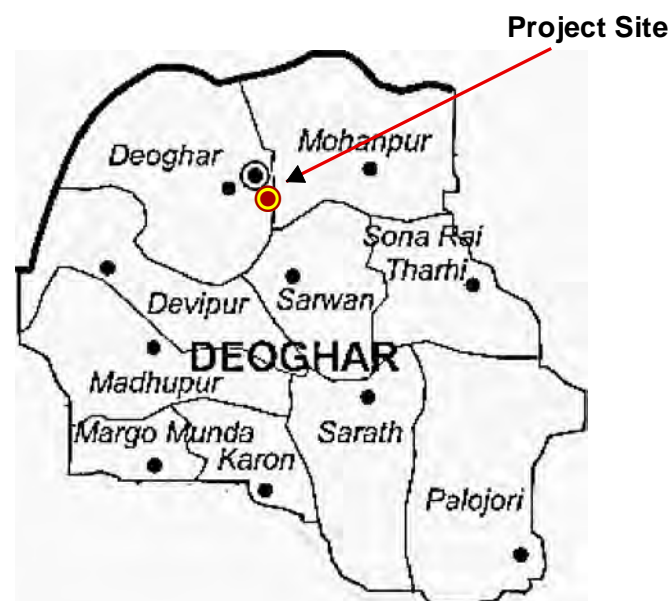
Source: [http://www.cpreecenvs.nic.in/WriteReadData/UserFiles/5\(1\).jpg](http://www.cpreecenvs.nic.in/WriteReadData/UserFiles/5(1).jpg)
Scale: Not to Scale

B State of Jharkhand, India



1. Survey of India Toposheet No. 72 L/10, 72 L/11, 72 L/14, 72 L/15
2. Project Layout Plan, AAI
3. Google Satellite Imagery, 2014

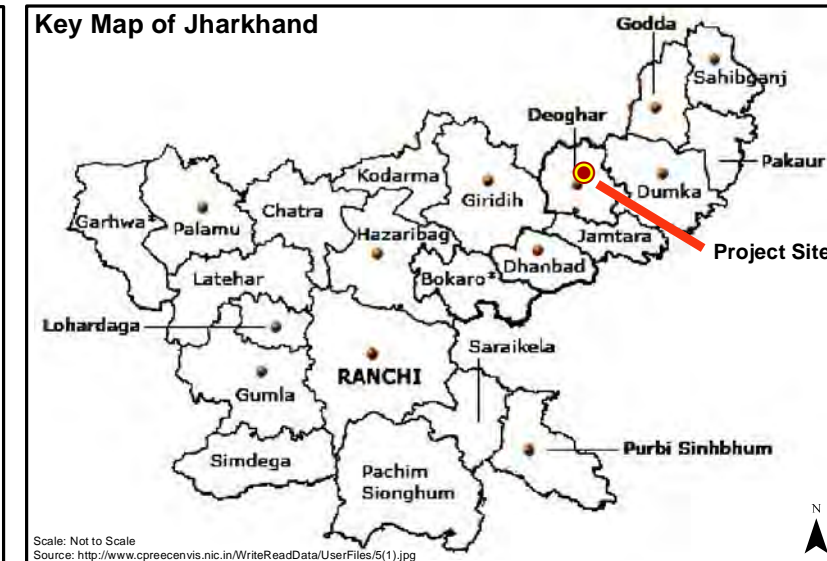
D Project Site





Source: <http://www.onefivenine.com/images/DistrictMaps/186.jpg>
Scale: Not to Scale

C Deoghar District, Jharkhand

Key Map of Jharkhand



Legend

-  Existing Airstrip
-  Project Site

Source:
1. Survey of India Toposheet No. 72 L/10, 72 L/11, 72 L/14, 72 L/15
2. Project Layout Plan, AAI
3. Data Provided by FAE (LU)
4. Google Satellite Imagery, 2015

Software Used:
1. ArcGIS 10.1, 2. AutoCAD 2012, 3. ER Mapper 7, 4. Erdas Imagine 10

Figure: Location of the Project Site

Project:
Development of Deoghar Airport
Near Village Asahana, Anchal: Deoghar, District: Deoghar, Jharkhand

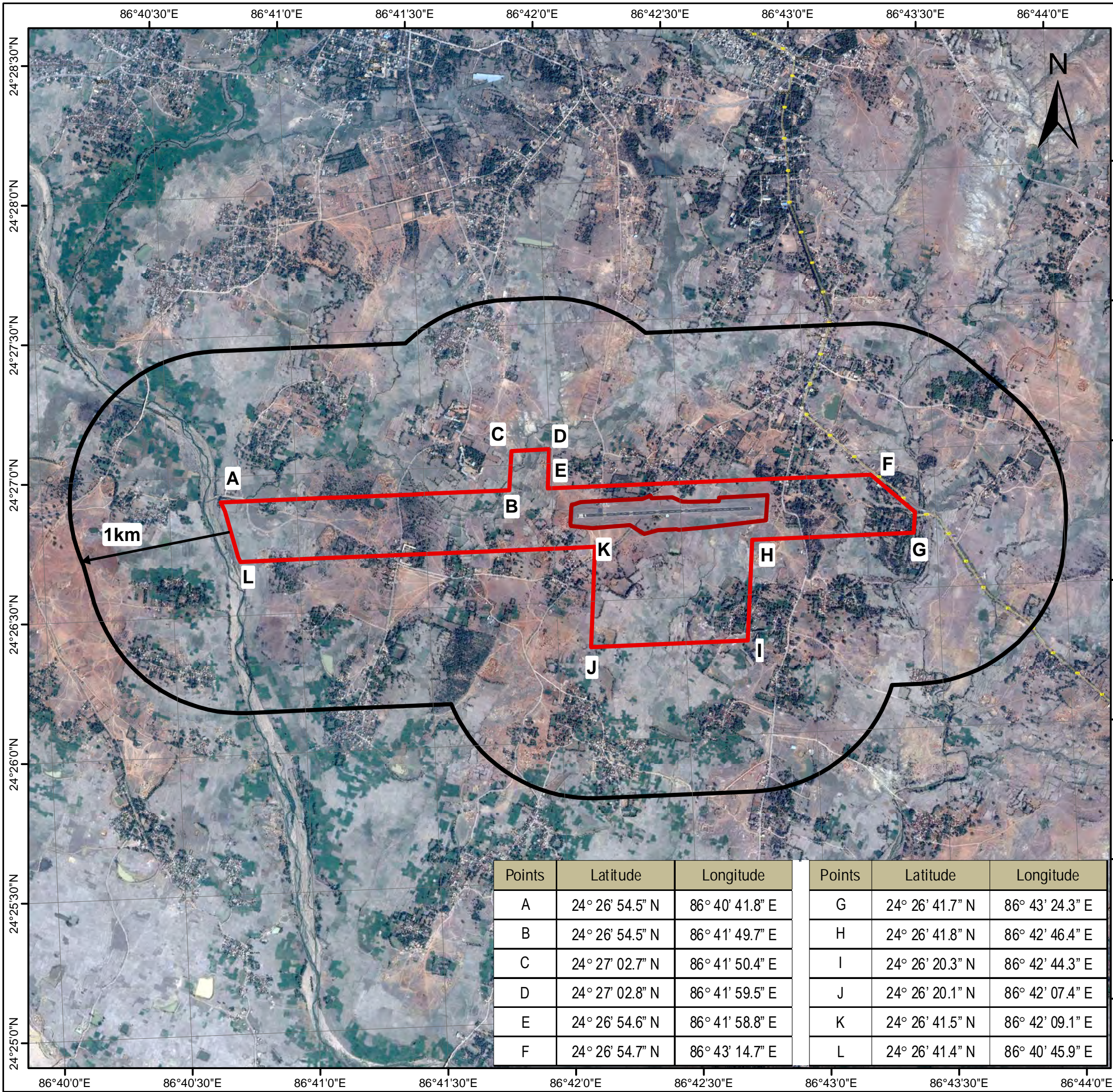
Project Proponent:
Airports Authority of India

Environment Consultant:
GREENCINDIA Consulting Private Limited
(An ISO: 9001 QMS, ISO: 14001 EMS & OHSAS: 18001 H&S MS Certified by BSI)
QC/NABET Accredited Environment Consultant Certificate No. NABET/EIA/RA 014/041

Graphic Scale:
0 500 1,000 2,000 3,000 4,000 m

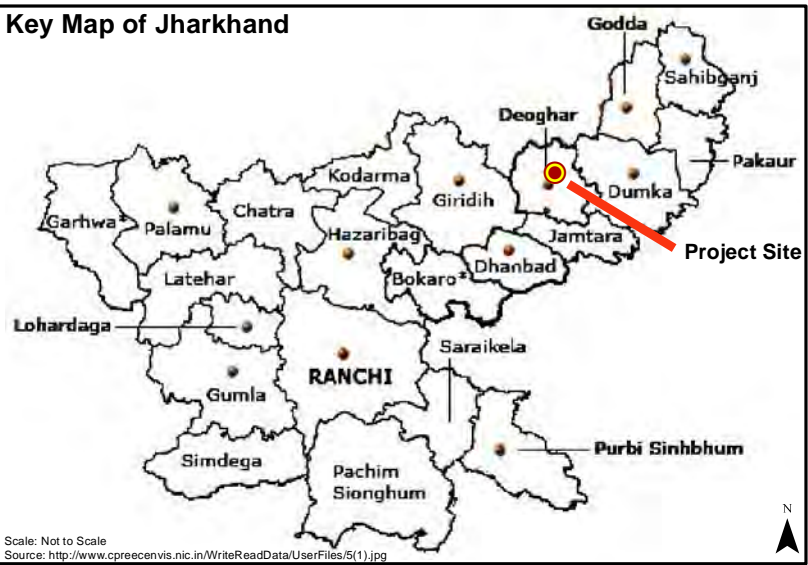
Drafted By:	Checked By:	Approved By:
Date	02/04/2016	
Revision	01	





Points	Latitude	Longitude
A	24° 26' 54.5" N	86° 40' 41.8" E
B	24° 26' 54.5" N	86° 41' 49.7" E
C	24° 27' 02.7" N	86° 41' 50.4" E
D	24° 27' 02.8" N	86° 41' 59.5" E
E	24° 26' 54.6" N	86° 41' 58.8" E
F	24° 26' 54.7" N	86° 43' 14.7" E

Points	Latitude	Longitude
G	24° 26' 41.7" N	86° 43' 24.3" E
H	24° 26' 41.8" N	86° 42' 46.4" E
I	24° 26' 20.3" N	86° 42' 44.3" E
J	24° 26' 20.1" N	86° 42' 07.4" E
K	24° 26' 41.5" N	86° 42' 09.1" E
L	24° 26' 41.4" N	86° 40' 45.9" E



Legend

- Existing Airstrip
- Project Site
- 1km Buffer

Source:
1. Survey of India Toposheet No. 72 L/10, 72 L/11, 72 L/14, 72 L/15
2. Project Layout Plan, AAI
3. Data Provided by FAE (LU)
4. Google Satellite Imagery, 2015

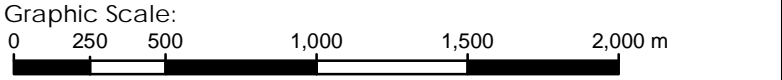
Software Used:
1. ArcGIS 10.1, 2. AutoCAD 2012, 3. ER Mapper 7, 4. Erdas Imagine 10

Figure: Co-ordinate of Project Site

Project:
Development of Deoghar Airport
Near Village Asahana, Anchal: Deoghar, District: Deoghar, Jharkhand

Project Proponent:
Airports Authority of India

Environment Consultant:
GREENCINDIA Consulting Private Limited
(An ISO: 9001 QMS, ISO: 14001 EMS & OHSAS: 18001 H&S MS Certified by BSI)
QC/NABET Accredited Environment Consultant Certificate No. NABET/EIA/RA 014/041



Drafted By:	Checked By:	Approved By:

Date	02/04/2016			
Revision	01			

CHAPTER-3

SITE ANALYSIS



3. SITE ANALYSIS

3.1 INTRODUCTION

Site analysis is a pre-design research activity which focuses on existing and potential conditions on and around the project site. It is an inventory of the site factors and forces, and how they coexist and interact. The purpose of the analysis is to provide thorough information about the site assets and liabilities prior to starting the design process. The typical site analysis includes the site location and size, neighborhood context, zoning, legal aspects, geology, physiographic (natural and man-made features), hydrology, soils, vegetation, wildlife, climate, culture, pedestrian and vehicular circulation, access, utilities, historic factors, density, sensory stimuli, and any other factor deemed appropriate for the particular site. This chapter discusses the site profile, landform, and existing land use and drainage pattern. The land details, climate and Metrological parameters are also described in various sections of this chapter.

3.2 LOCATION & CONNECTIVITY

Deoghar, located in the Deoghar district of Jharkhand state is the 5th largest city of Jharkhand. It is situated 150 km from region's largest city Bhagalpur. Deoghar was earlier part of Dumka District. The nearest railway station is Baidyanathdham. Jasidih Junction is about 7 km from Baidyanathdham railway station, which is on the main line of the Howrah-Delhi route of the Indian railway. It is about 229 km from Patna (capital of Bihar), 322 km from Ranchi (capital of Jharkhand).

LAND FORM, LAND USE & LAND OWNERSHIP

The total land required for developing the airport is about 656.79 acres, of which-

- Existing Land- 53.41 acres
- Additional area- 603.38 acres

Approximately 18.18 Acre area falls in forest land for the proposed site.

3.3 TOPOGRAPHY

The topography of the proposed expansion facilities is semi flat. Presently, proposed site for building works consists of short trees. The slope of this proposed site is 241 - 222m, from East to West direction.

3.4 PROPOSED LAND USE PATTERN

The site proposed for airport development will be converted into 'public use' category. A residential complex for the essential operational and other staff is also proposed within the airport boundary.

3.5 EXISTING INFRASTRUCTURE

Presently, the airport has the following infrastructure:

- Runway – Orientation is 09-27
- Runway Size – 1158 m x 24 m
- Surface – Flexible
- Apron – Small paved area
- Terminal – Guest house & office only

3.6 EXISTING LAND USE PATTERN

The land use pattern indicates the manner in which different parts of land in the study area is being utilized. It is an important indicator of environmental setting and human activity and a degree of inter-play between these two important parameters. The study area consists of the following features.

- **Settlements:** Sporadic settlements and major settlement are seen scattered all around the 10 km radius of the study area. However, the major settlement is Deoghar which is located 3km at north direction from the project site. There are some scattered settlements are present inside the proposed project site area.
- **Water bodies:** Some first order streams crossed the proposed project site. Proper study for diversion will be given in EIA study.
- **Roads:** Project site is connected by NH-114A from the Eastern side. One road cross the proposed project site from North to South direction.
- **Forest:** The 15 km radius of project site there is no protected forests or reserve forest exist, but 2 small forest patches (mentioned in Khasra Map) are found in the proposed site.

3.7 SOCIAL INFRASTRUCTURE AVAILABLE

The all types of social infrastructure in Deoghar which is located at about 3 km from the site are:

- Hospital with ambulance;
- Banks;
- Post office;
- Bus station;
- Fire station;
- Secondary school;
- Police station;
- Shopping complex;
- Sports infrastructure;
- Community halls;
- Primary health care centres.

3.8 GEOLOGY & SOIL

The district contains several clusters of rocky hills covered with forest, but series of long ridges with intervening depressions. Most of the rolling uplands are cultivated by highland crops. The average elevation of the district is 247 m above msl. 3 soil orders namely Entisols, Inceptisols and Alfisols were observed in Deoghar district. Geologically the district is mainly covered by chhotanagpur granite gneiss of Archean age with patches of alluvium, sandstone and shale of Gondwana formations. Important rivers flowing in the district are the Ajay, the Paltro etc. These rivers gather a large number of tributaries which form the land scape full of Tanrs and Dons.

3.9 LOCAL GEOLOGY & GROUND WATER CONDITION

Deoghar district is largely covered by Chotanagpur granites and gneissic complex associated with some metasediments and metabasic rocks. The Gondwanas have been developed in tectonic basin fill deposits and are resting on Archaean basements. The Gondwanas mainly consist of sandstones, shales, coal seams and are exposed in Karon and Madhupur blocks of the district. Alluvium occurring along the river channels and adjoining areas and are mainly composed of fine to coarse sand and clays. Laterites occur in isolated patches. About 70% of the district area is underlain by hard and compact granitic rocks, known as Chotanagpur granite gneiss. Weathering, fracturing and jointing have introduced secondary porosities in these hard rocks and these govern the occurrence and movement of groundwater in these rocks. In these formations groundwater occurs under unconfined condition in the weathered mantle and under semi-confined to confined conditions in the fractures underneath. Groundwater also occurs under unconfined condition in the narrow stretches of alluvium along stream courses; however, groundwater potentiality in the alluvium is not promising. The ground water level is in Pre Monsoon season= 5-10 mbgl and post monsoon season= 2-5mbgl.

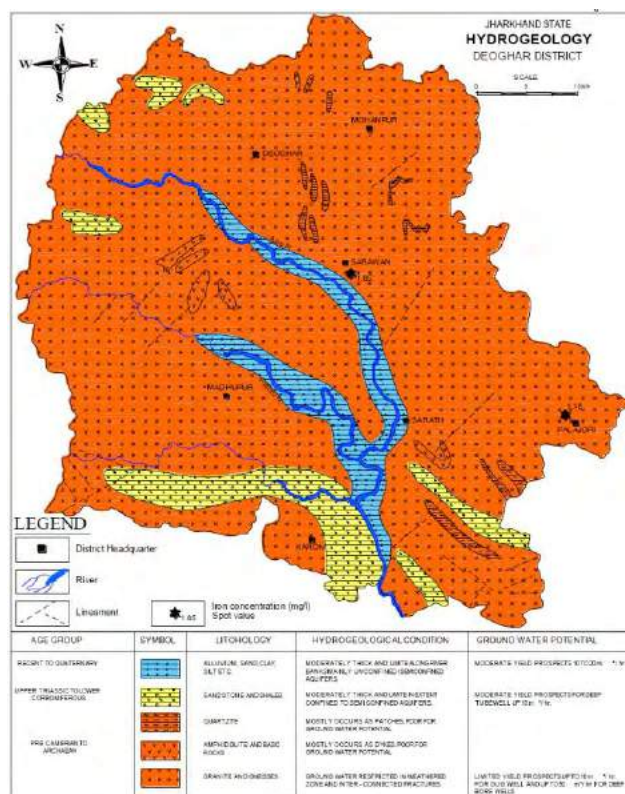


Figure 3-1: Hydrology of Deoghar District

3.10 METEOROLOGY & CLIMATOLOGY

The data obtained from the Meteorological Department of India for Dumka observatory has been utilized.

Climatic Condition (30-years IMD Data)

Total mean annual rainfall for the period 1970-2000 of the Dumka (IMD station) is 1,382.2 mm. Summary of 30 years average data is presented in the Table 3.1 below:

Table 3-1: Climate data on IMD for Dumka (1971–2000)

Sl. No.	Parameters	Description of the Season		
1	Rainfall in mm	Total Annual average Rainfall is 1382.2 mm		
		Winter (Dec to Feb)	Months	Total rainfall (in mm)
			December	3.9
			January	9.5
			February	1.4
			Total	14.8
		Summer (Mar to May)	March	18.3
			April	26.7
			May	78.8
			Total	123.8
		Monsoon (June to Sept)	June	219.5

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FOR DEVELOPMENT OF DEOGHAR AIRPORT AT DEOGHAR, DEOGHAR DISTRICT,
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			July	336.6				
			August	285.7				
			September	260.9				
			Total	1102.7				
		Post-Monsoon (Oct to Dec)	October	116.6				
			November	8.6				
			December	3.9				
			Total	129.1				
2	Temperature (Mean Daily Temp. in °C)		Months	Max	Min	Avg		
		Winter (Dec to Feb)	Dec	26.9	11.1	19.0		
			Jan	25.9	10.3	18.1		
			Feb	29.0	13.3	21.2		
			Average	27.3	11.6	19.4		
		Summer (Mar to May)	Mar	34.4	17.5	26.0		
			Apr	38.6	22.3	30.5		
			May	37.7	24.1	30.9		
			Average	36.9	21.3	29.1		
		Monsoon (June to Sept)	June	35.5	24.8	30.2		
			Jul	32.7	24.2	28.5		
			Aug	32.5	23.8	28.2		
			Sep	32.9	23.6	28.3		
			Average	33.4	24.1	28.8		
		Post-Monsoon (Oct to Dec)	Oct	33.0	21.1	27.1		
			Nov	30.5	16.0	23.3		
			Dec	26.9	11.1	19.0		
			Average	30.1	16.1	23.1		
		3	Relative Humidity in per cent	Winter (Dec to Feb)	Month	08.30 hrs	17:30 hrs	
					Dec	65	58	
Jan	65				55			
Feb	57				48			
Average	58				53.67			
Summer (Mar to May)	Mar			52	42			
	Apr			55	42			
	May			66	54			
	Average			51.8	46.0			
Monsoon (June to Sept)	Jun			75	70			
	July			82	81			
	Aug			83	81			
	Sep			80	81			
	Average			79.1	78.3			
Post-Monsoon (Oct to	Oct			76	71			

		Dec)	Nov	67	61
			December	65	58
			Average	66.3	63.3
4	Wind-speed	Winter (Dec to Feb)	Month	Speed (kmph)	
			Dec	5.1	
			Jan	5.3	
			Feb	5.1	
			Average	5.17	
		Summer (Mar to May)	Mar	5.2	
			Apr	5.6	
			May	5.9	
			Average	5.57	
		Monsoon (June to Sept)	Jun	5.7	
			July	6.1	
			Aug	6.3	
			Sep	6.1	
			Average	6.1	
		Post-Monsoon (Oct to Dec)	Oct	5.6	
			Nov	5.1	
			Dec	5.1	
			Average	5.3	

Source: Climatological Table 1971 – 2000, Indian Meteorological Department, Govt. of India, New Delhi

CHAPTER-4

PLANNING CONSIDERATION



4. PLANNING CONSIDERATION

4.1 INTRODUCTION

The purpose of this chapter is to present the Planning Concepts for Deoghar Airport, in terms of both their vision and reasoning. Therefore, several basic assumptions have been established, which are intended to direct the future planning of the Airport. These assumptions are supported by the aviation activity forecasts and include a commitment for continued airport operation, which supports local and regional needs.

Airport planning and design primarily depends upon availability of land, its topography, orientation, accessibility, etc. Traffic is the other major factor that decides the size of runway, terminal building and other related infrastructure required for the proposed airport. The site and traffic studies have been discussed in the preceding chapters. Based on the site and traffic studies the planning and conceptual design of the proposed airport is discussed in this chapter.

4.2 PLANNING CONCEPT

Because all airport functions relate to and revolve around the basic runway/ taxiway layout, airside planning recommendations must first be carefully examined and evaluated. It is essential that the initial development of the Airport be commensurate with the anticipated needs and requirements of the airport users; however, the long-term capabilities of the facility must also be considered and planned for to ensure the future success of the project. The main objective of the proposed project is to ensure design requirement to cater to the passenger demand.

The airport is not only for Jharkhand interstate transportation but also national transportation and also carriage transport. Aerodrome code of Deoghar airport is 4C. Aerodrome Reference Code is defined by the characteristics of the aircraft intended to use the airport. The parameters to categorize the Aerodrome reference code by ICAO are mentioned in Table 4.1. Lay-out plan of proposed project site shown in Figure no. 4.1.

Table 4-1: Categories of Aerodrome based on Aeroplane Reference Field Length

Code Number	Aero plane reference field length
1	Less than 800m
2	800m up to 1200m but not including 1200m
3	1200m up to 18000m but not including 1800m
4	Over 1800m

Source: ICAO

Table 4-2: Categories of Aerodrome based on Wing Span & Outer Main Gear Wheel Span

Code Letter	Wing span	Outer main gear wheel span
A	Up to and not including 15m	Up to and not including 4.5m
B	15m up to and not including 24m	4.5m up to and not including 6m
C	24m up to and not including 36m	6m up to and not including 9m
D	36m up to and not including 52m	9m up to and not including 14m
E	52m up to and not including 65m	9m up to and not including 14m
F	65m up to and not including 80m	14m up to and not including 16m

Source: ICAO

4.2.1 RUNWAY ORIENTATION

The most suitable orientation of the runway for Deoghar airport is 09-27, W-E direction.

4.2.2 RUNWAY LENGTH

AAI proposes one runway with the following dimensions:

Table 4-3: Dimension of various parameters of Proposed Airport

Name	Dimension
Length	2700m
Width	45m
Runway Shoulder	7.5 m on either side
Runway End Safety Area(RESA)	2nos. x 90m x 90m
Basic strip	300m on either side of runway center line

Source: Technical Report, AAI

4.2.3 RUNWAY GEOMETRY

The runway is planned for Code 4C. The proposed width of the runway is 45 m and length of 2700 m. The orientation of the runway for Deoghar airport is 09-27 direction. The permissible values of slopes as per ICAO are given in Table 4.4 below:

Table 4-4: Permissible values of slopes as per ICAO

Name	Slope	Permissible
Runway	Longitudinal	1.25% (Max.) with Max. slope of 0.8% in the last quarters on both ends and overall slope not to exceed 1.00%
	Transverse	1.50% (Max.) 1.00% (Min.)
Runway Strip	Longitudinal	1.50% (Max.)
	Transverse	2.50% (Max.)
Taxiway	Longitudinal	1.50% (Max.)
	Transverse	1.50% (Max.)
Taxiway Strip	Transverse	2.50% (Max. Downward) 0.50% (Max. Upward)
Apron	Longitudinal	1.00% (Max.)

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Name	Slope	Permissible
	Transverse	1.00% (Max.)

Source: Technical Report, AAI

4.2.4 TAXIWAY

The taxiway system is planned with the flexibility for future demand. Space for a parallel taxiway along the length of the runways is provided. The initial phase will only have an apron taxiway and two perpendicular exit taxiways connecting the apron. Details of dimension of taxiway are given in Table 4.5.

Table 4-5: Dimension of taxiways

Parameter	Measurement
Length	188m
Width	23m
Shoulders	7.5m on either side

Source: Technical Report, AAI

4.2.5 APRON

Only one Apron of the Deoghar airport is proposed. Dimension of apron is 156 m x 115 m.

4.2.6 ISOLATION BAY

Isolation Bay is constructed with the dimension of 64 m x 79 m, with 7.5 m shoulder.

4.2.7 AIR TRAFFIC CONTROL TOWER

The tower is intended to handle Air Traffic Control. For the effective provision of airport control service, a clear unobstructed view of the entire movement area of the airport and of air traffic in the vicinity of the airport is necessary. The position and height of the tower should allow a clear visibility to runways, taxiways and the surrounding airspace, especially the approach and departure areas. There will be mobile ATC tower being proposed.

4.2.8 PAVEMENT

Aprons and aircraft stands shall be constructed as rigid pavement. Concrete pavements are necessary on aprons since fuel spillage during re-fueling is likely to occur. Flexible pavements are not able to withstand fuel spillage or high temperatures of summer in combination with static loads from aircraft without being damaged.

Taxiways can be constructed both as rigid and flexible pavements. Both pavement types have advantages and disadvantages but none of the disadvantages are of such a character that one type is preferred over other. It should therefore be left to the detailed design to find the most economically beneficial pavement type.

4.2.9 PARKING SPACE

Parking for 150 cars & 5 Buses, VIP car park (15 cars), AAI and Airlines staff car / scooter parking area at 100 m away from any building as per BCAS norms.

4.2.10 CIVIL WORKS

Pavements

- Extension of existing runway 09/27 of length 2,700 m x 45 m to make the operation of ATR-72 type of aircraft. The centre line of the runway remains the same and expansion of runway width is proposed equally on both sides. The extension of the runway length is proposed at both ends.
- New aprons for cargo, MRO and passenger terminals are proposed. A defined and dedicated isolation bay is also planned.
- New taxiways linking to isolation bay, passenger terminal, MRO apron and cargo apron. A parallel taxiway is also proposed.
- Provision of Runway End Safety Area of dimensions, Length 90m x Width 90m for both the Runway 09 and 27.
- Levelling, Grading and Development of Runway Basic strip (300m on either side of runway centre line). The soil of Runway strip should be flush with the edges of pavements and appropriate slope to facilitate draining of rain water into drainage system beyond the basic strips.
- Levelling of ground beyond Runway Strip up to Boundary Wall.
- Levelling & grading of Taxiway strip for taxiway & apron taxi lanes.
- Provision of Isolation Bay of dimensions 64 m x 79 m along with taxi track of 23 m width & shoulders of width 7.5 m.
- Construction of drainage system for the runways, beyond Runway strip.
- Removal or reduction in height of identified manmade obstacles including trees, HT/LT power lines, water and diversion of road, if passing through development area and approach funnel area
- Construction of building for housing DVOR/DME.

Passenger Terminal Building

- Construction of new passengers terminal building of total area 5400 Sq. m and features of Low Cost Terminal Building with modular design for handling 150 arriving and 150 departing passengers at a time with a scope for future expansion. The building shall be provided with essential amenities for passengers, airlines such as check-in counters, conveyor belt for departing baggage, one number of conveyor belt in the arrival baggage collection area with provision/space for future installation of additional conveyor with minimum spacing of 11 m, space for storage of baggage trolleys (300 nos.), toilet facilities for passengers including those for physically challenged persons, adequate number of signage's, Fire Fighting/ alarm system, Drinking Water Coolers/Purifiers, adequate

lighting inside & kerb side of the terminal building, provision of Renewable Energy System etc.

- Covered Kerb Area on city side with lanes each for arriving and departing passengers, covered baggage make-up and break-up area on air side.
- Car park for 150 cars & 5 Buses, VIP car park (15 cars), AAI and Airlines staff car / scooter parking area at 100m away from any building as per BCAS norms

Construction of new technical block cum control tower

- There is one mobile ATC tower.
- Provision of control tower table and other equipment, furniture, fixtures as per requirement of ATM, CNS & Met etc.

Construction of fire station

Construction of Fire Station Category- VII, to house 2 fire tenders and 2 ambulances.

Airside Roads

The airside service road system is planned to connect the different apron and service areas with each other. The road system has been laid out with as few intersections with taxiways as possible.

A crash road system leading from the aircraft rescue and fire fighting stations to the runways is established. The crash road runs along the airside perimeter fence. All crash roads are 10 m wide and asphalted.

Miscellaneous civil works

- Provision of water storage and water supply, pump house for overhead water tanks and sump etc. for terminal building and residential colony, preferably by pressurizing system and rain water harvesting system
- Construction of sewerage treatment plant.
- Construction of regular boundary wall of height as per BCAS norms around periphery and crash gates at either end of runway direction to provide for outside access to RFF vehicles in case of emergency. Provision of watch towers as per requirements.
- Construction of sub-station for housing DG sets, stepping down main power supply, transformers etc., storage facility for diesel, equipment, spare parts etc.
- Construction of approach road from fire station to runway and apron through shortest distance and runway end to boundary of airport in the approach path of runway, of sufficient strength.
- Procurement of furniture, chairs and baggage trolleys.
- Provision of culvert (pipe / box) at appropriate location in the operational / non-operational area for

crossing of electrical, communication cables, draining of storm water from runways, apron, terminal building and car park area. The strength of culverts must be designed for highest category aircraft of Code 'C' to facilitate long term usage without need for dismantling & reconstruction.

- Horticulture and gardening works on city and airside.
- Construction of residential quarters (50 dwelling unit) for transit accommodation for AAI & CISF staff. Presently the area identification and utilities demand is planned for and identified within the airport premises. Looking to the nearby residential development works.
- The soil investigation carried out after commissioning of project.

4.2.11 ELECTRICAL AND MECHANICAL WORKS

- High intensity Runway Lighting System (HIRL) comprising runway edge lights, runway end lights, threshold lights, apron flood lights, Mandatory and informative signage etc. Internal and external electrification for all buildings and consideration of Energy Efficient solutions including renewable energy like Solar Power.
- Procurement and Installation of standby DG sets of adequate capacity, to provide essential 50% power supply to terminal building and 100% to control tower and equipment room and fire station and 100% for airfield lightings. 300 litres/hour is the estimated consumption of diesel.
- Unitary AC/Packaged ACs etc. of adequate capacity for Terminal Building, centralized Fire Control System and Building Management System for Terminal Building.
- Provision of Apron Flood Lights at appropriate locations without infringing apron safety lines/clearance area for safety of aircraft operating on the apron with power-in/power-out parking stands.
- Lighting on car park, approach road, around terminal building area, Perimeter road and Watch Towers.
- Procurement, installation and commissioning of conveyor belts behind the check-in counters and baggage collection area.
- Procurement, installation of additional split air-conditioners for reserved lounge, and Equipment Room, mobile Control Tower, DVOR building etc.
- Necessary electricity supply to DVOR building and other operational buildings.
- Substation equipment, cabling, augmentation of power supply including deposits to State Electricity Board of Jharkhand Utilities etc.

4.2.12 C.N.S WORKS

- Provision of DVOR / DME and other associated communication and navigation aids including calibration and commissioning of DVOR/ DME, at the location indicated in the Master Plan.

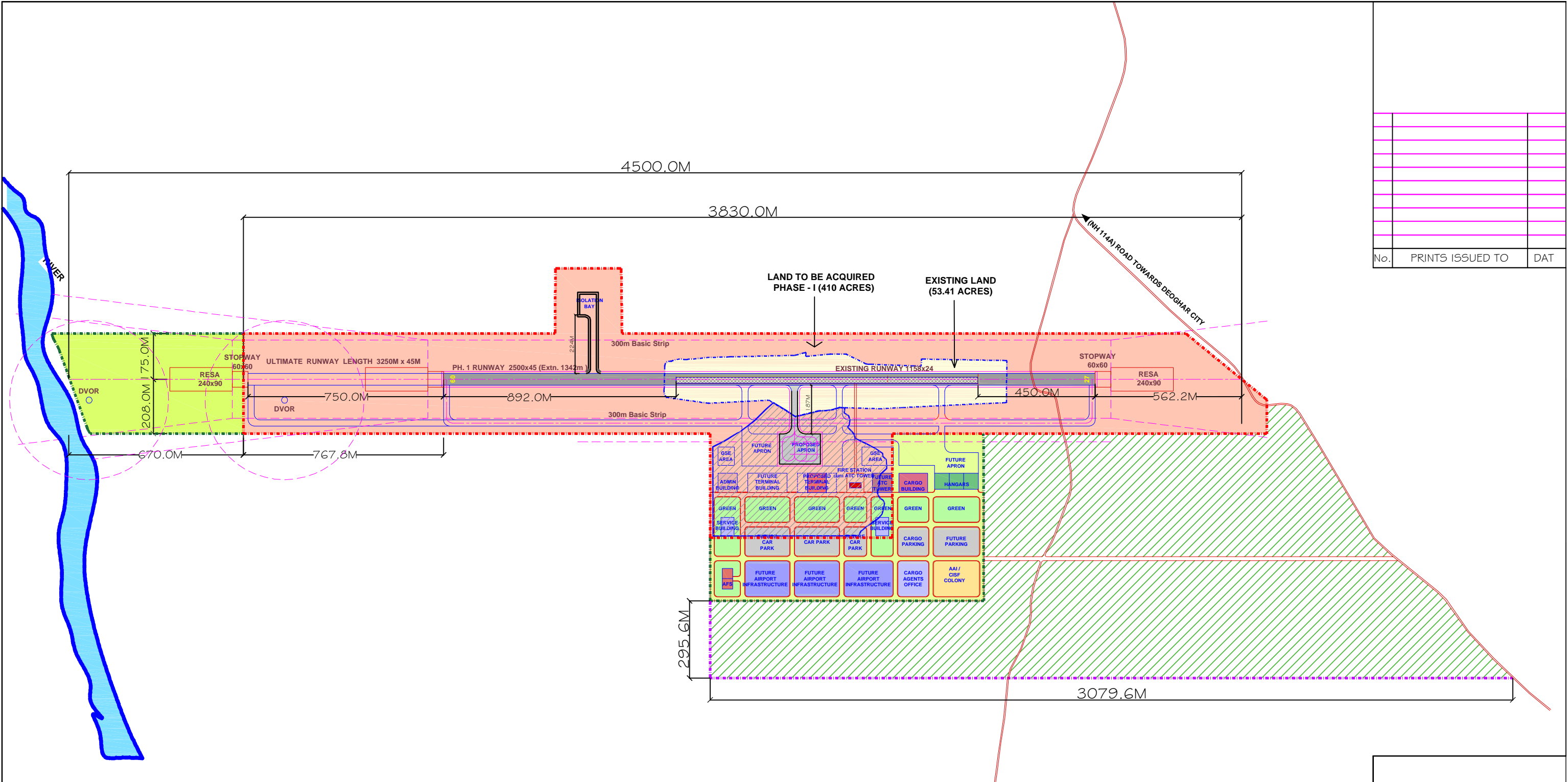
4.2.13 IT AND AIRPORTS SYSTEM

- Public address system and car calling system.
- Surveillance Close circuit TV system (SCCTV) and provision of adequate number of close circuit TV monitors, Security Surveillance System with monitoring facilities in the Terminal Manager Room, Security Control Room, APD Office etc.
- Provision of Flight Information Display System (FIDS) with adequate number of plasma TV's in departure, arrival and security hold area for passenger facilitation/ entertainment
- Provision of adequate no. of X-ray machines for scanning hand/checked-in baggage, including provision of required number of ETDs, DFMDs & HHMDs, as per BCAS norms.
- Computer cable data networking.
- Provision of adequate no. of VHF FM Sets (Walkie Talkie, Base Stations & Mobile Stations).
- Provision of Telephone Exchange / digital EPABX system for Terminal Building including telephone/ intercom instruments, wiring etc

4.3 SUPPORT AMENITIES

The following facilities will be available in the proposed airport

- Baggage handling system
- Passenger boarding bridges
- Flight information and displays
- Sewage treatment facility
- Firefighting system
- Security equipments
- Bookshop
- Restaurant



No.	PRINTS ISSUED TO	DAT

DEOGHAR AIRPORT

	EXISTING LAND	53.41 Acres
	LAND TO BE ACQUIRED PH-I (FOR C-130)	410.00 Acres
	LAND TO BE ACQUIRED PH-II (FOR A-321)	196.00 Acres
	ADDITIONAL LAND TO BE ACQUIRED	400.00Acres
	LAND ACQUIRED BY STATE GOVT.	77.0 Acres

DEOGHAR

PROJECT TITLE

DEVELOPMENT OF DEOGHAR AIRPORT

DRAWING TITLE

MASTER PLAN (DRAFT)

AIRPORTS AUTHORITY OF IND
DIRECTORATE OF PLANNING
ARCHITECTURAL CELL
'C' BLOCK, RAJIV GANDHI BHAWAN, NEW DELHI

JR. EXEC. (ARCH) MALLIKA	Asstt. G.M. (ARCH.) SHANTANU
JT.G.M. (ARCH.) TILOTTAMA LAHIRI	G.M. (ARCH.) SANGEETA MAHAY
E.D. (PLG) A.K.PATHAK	

SCALE 1:12500 DATE MARCH 2015

DRG.NO.

JOB NO.

CHAPTER-5

PROPOSED INFRASTRUCTURE



5. PROPOSED INFRASTRUCTURE

5.1 THE PLAN

The Concept Plan for the proposed airport defines the ultimate scope of the proposal and the development of facilities in accordance with the requirements of traffic. Earlier discussion on Traffic Analysis and Project Sizing are used as the basis for planning of the various components.

It is the overall objective of this effort to produce a balanced airside and landside complex to serve forecast aviation demands. However, before defining and evaluating specific alternatives, airport development objectives need to be outlined. The primary goal of the Master Plan is to define a development concept which allows for the airport to be marketed, developed, and safely operated for the betterment of the region and its users. With this in mind, the following development objectives have been defined for this planning effort:

- Maintain an attractive, efficient, and safe aviation facility in accordance with government, state, and local regulations.
- Develop facilities to efficiently serve general aviation users and encourage increased use of the airport, including business and corporate activity.
- Provide sufficient airside and landside capacity, efficiency, and safety through additional facility improvements which will meet the long term planning horizon level of demand for the airport and region.
- Identify any future land acquisition needs.
- Ensure that any recommended future development is environmentally compatible.
- Enhance local economic development through maximizing the use of available property.

The proposed project involves construction and development of a number of facilities which are outlined in Table 5.1.

Table 5-1: Proposed Infrastructure

Component/ Facility	Key Specification	Proposed Size	AREA (m ²)	Area (Acres)
Runway	Orientation	09-27		
	Ultimate Length	2,700 m	1,21,500 m ²	30.33
	Width	45 m		
Stop way	Length	60m at either end.	3,600 m ²	0.90

Component/ Facility	Key Specification	Proposed Size	AREA (m²)	Area (Acres)
	Width	60m at either end.		
Taxiways	Length	188m	4,324 m²	1.08
	Width	23m		
	Shoulders	7.5m	1,410 m²	0.35
Apron	Length	156 m	19,110 m²	4.77
	Width	115 m		
	Shoulder	7.5 m		
Isolation Bay	Length	64 m	5,536 m²	1.38
	Width	79 m		
	Shoulder	7.5 m		
RESA	Length	90 m	8,100 m²	2.02
	Width	90 m		
Terminal Building			5,400 m²	1.35
Fire Station			900 m²	0.90
Drainage	Open Drain	Concrete/ Lined		
ATC Tower	Mobile ATC Tower			
Nav/ Comm Aids	Non Visual aids communication Facilities	DVOR/ DME		
Visual Aids	Category I	Approach Lights		
		Runway End Lights		
		Obstruction Lights		
		Apron Flood lights		
		Apron / Taxiway edge lights		
Fire and Rescue Services	Category VII	Crash fire tenders (CFT) 2 Nos.		
		Ambulance 2 Nos		
MET, Equipment	Forecasting Station	Barometer		
		Barograph		
		Anemometer		
		Rain Gauge		
		Sunshine Recorder		
		Stevenson Screen		
		Thermo Hygograph		
		Ballooning Station		
		Met Communication		
Station Linked with AMSS				

Source: Technical Report, AAI

CHAPTER-6

REHABILITATION & RESETTLEMENT PLAN



6. REHABILITATION & RESETTLEMENT PLAN

Total 656.79 acres area would be required for the proposed Deoghar Airport. Existing Deoghar airstrip with land area of approx. 53.41 acres belongs to State Govt. of Jharkhand and rest of the 603.38 acres of land will transferred by State Govt. of Jharkhand to Airports Authority of India. As previously mentioned there are some settlements inside the proposed project site, Resettlement and Rehabilitation will be done by State Govt. of Jharkhand for the proposed airport.

CHAPTER-7

PROJECT SCHEDULE & COST ESTIMATE



7. PROJECT SCHEDULE & COST ESTIMATES

The estimated cost of work for Development of Deoghar Airport is worked out as INR 350 Crores.

7.1. QUANTITIES

Quantities of the runway pavements, buildings, electrical works, navigational equipment's and other associated works for development of the airport at Deoghar are calculated based on preliminary planning, design and assessment of requirements based on codes and specifications.

7.2. RATES

The rates of pavement work items have been prepared based on Airports Authority of India guidelines and market rates. The cost estimates for buildings are based CPWD plinth area rates duly enhanced for prevailing cost index. Additional provisions for superior specifications have also been made in the estimate. The estimates of remaining items / facilities are based on market enquiries.

7.3. CONTINGENCIES

For the purpose of estimation, Contingencies @ 3% of the total cost of the works has been added.

7.4. WORKS TAX

Works Tax @ 4% of the total cost of the project (including contingencies) is applicable on construction projects in Jharkhand. However the same has not been included in the cost estimates being a statutory government levy.

7.5. LABOUR CESS

Labour Cess @ 1% of the total cost of the project (including contingencies) is applicable on construction projects all over India. However the same has not been included in the cost estimates being a statutory government levy.

7.6. SERVICE TAX ON CONSTRUCTION COST

Service Tax @ 14% on the 40% of construction cost of the project is applicable on construction projects all over India. However the same has not been included in the cost estimates being a statutory government levy.

7.7. PROJECT MANAGEMENT COSTS

For the purpose of estimation no consultancy charges for design and PMC have been added.

7.8. PRICE ESCALATION / VARIATION

Price escalation has been added in the estimates.

7.9. FINANCIAL ANALYSIS

Operating cost estimates have been worked out using benchmarks for airports operated by Airports Authority of India (AAI).

- Construction is likely to start in 2017, after clearance from Ministry of Defense, approval of Standing Committee, detailed designing's of the project and environment clearance are yet to be obtained.
- For discounted cash flow the rate is taken as 10%.
- Non-aeronautical revenues forecast include lease rental income from the Concessionaire, in the vicinity of the airport.
- Operating expenses have been estimated based on benchmarks for comparable Indian airports, expected traffic growth and adjusted for inflation.
- Estimated project cost is of approx. INR 350.00 crores on the basis of initial estimate.

Details project schedule and cost break-up analysis will be discussed in EIA report.

CHAPTER-8

ANALYSIS OF PROPOSAL



8. ANALYSIS OF PROPOSAL

A MoU was signed between State Govt. and AAI for development of Deoghar Airport to cater the need of the visitors coming to Deoghar and Basukinath. The land for the project will be provided by State Govt. after removing of obstructions like diversion of various facilities.

Since, easy access is the wheel for any of the tourism development, the surrounding villages, neighboring districts and particularly Deoghar district would get maximum benefits out of generated tourism business. The Project will play an important role in supporting the tourism growth of Deoghar district.

The easy and speedy access of the location also attracts the investment from high profile players of the market. The probability of the investment by the builders and hoteliers is also likely due to the proposed development of the airport. Hence, the project would act as a boon for development of the region.

The general evaluation of the site indicates that the following:

- Land to be provided by State Govt. after removing of obstructions like diversion of road, HT & LT lines and road passing through airport premises and approach funnel
- Land has will be acquired by State Govt. and process for handing over to AAI has been commenced
- Adequate access exists to sources of bulk services including water, power and telecommunications.

In summary, the site appears to be feasible for putting up the Deoghar airport for handling domestic traffic.

ANNEX



ANNEX -I



Khasra Details

Village	Khata Number	Khasra Number
Asahna	1	3, 75, 73, 61, 63, 62, 64, 65
	2	50, 56, 58
	3	34, 44, 80, 66, 39, 42, 79, 43, 81
	4	29, 54
	5	3, 7, 9, 11, 12, 20, 21, 25, 26, 33, 40, 47, 48, 46, 51, 55, 59, 14, 30, 37, 40, 60, 51, 46/143
	6	77, 76
	9	2
	10	4, 5, 8, 10, 13, 15, 17, 19, 24, 27, 32, 36, 38, 45, 49, 52, 57, 74
Babupur	1	19
	3	22
	4	7, 8, 9, 10
	5	1, 3, 4, 5, 6, 11, 12, 13, 14, 15, 17, 30/55, 06/54, 41, 42, 40, 38, 39, 32, 30, 33, 36, 52
	5/k	47, 48, 50
	6	23, 24, 20, 21, 28, 26, 25, 27
	7	31
Bhitiya	1	344
	4	33, 28, 70, 73, 87, 100, 128, 144, 186, 205, 320, 321, 333, 34, 48, 72, 88, 96, 123, 127, 145, 179, 185, 99, 103, 29
	12	76, 65, 71, 35, 27, 91, 97, 98, 101, 102, 177, 184, 207, 319, 322, 324
	5	30, 41, 75, 121, 204, 211, 315, 45, 82, 109, 132, 149, 158, 187, 192, 216, 316, 317, 335, 346, 347, 64, 112
	6	32, 31, 23, 44, 64, 67, 93, 94, 106, 107, 126, 150, 170, 178, 181, 182, 202, 210, 334, 342
	7	118/348
	8	74, 124, 129, 165, 166, 176, 201, 199, 328, 131, 125, 105, 25, 42, 46, 62, 66, 77, 92, 95, 104, 130, 148, 147, 323, 327, 337
	9	120, 133, 134, 168, 169, 174, 197
	10	24, 36, 37, 38, 39, 40, 47, 49, 63, 68, 69, 78, 79, 80, 81, 86, 89, 90, 114, 115, 116, 117, 118, 119, 146, 154, 155, 151, 156, 159, 160, 173, 175, 180, 188, 189, 190, 203, 325, 326, 329, 330, 331, 332, 338, 339, 340, 341, 343
	11	19, 161, 162, 163, 43, 51, 83, 108, 171, 208, 200, 198
	13	20, 16, 15, 17, 22, 26, 52, 50, 84, 85, 157, 164, 172, 183, 191, 193, 194, 110, 122
Katia	1	42, 47, 43, 44, 46, 52, 55, 56, 52, 55, 56, 66
	3	59, 64, 40, 31, 76, 77, 82, 498, 489, 488, 391, 483, 598
	4	595, 399, 417, 384, 383, 361, 437, 305, 301, 472, 477, 395
	6	404, 402, 421, 423, 394, 393, 378, 382, 348, 347, 429, 431, 324, 474, 471
	8	392, 346, 403, 405, 412, 445, 407, 430, 453, 473, 459, 419, 435, 451, 463, 408, 410, 433, 468, 323, 376, 377, 375, 306, 344, 385, 468
	9	307, 296
	11	502, 508, 510, 532, 526, 528
	13	397, 415, 387, 386, 352, 354, 439, 452, 304, 470, 476

	15	527, 578, 61, 65, 35, 70, 75, 74, 81, 80, 503, 512, 585, 580, 62, 33, 68, 73, 71, 78, 504, 509, 531, 529, 586, 584, 582, 39, 34, 69, 72, 79, 505, 511, 511, 530, 587, 583, 564, 581, 577
	16	461, 291
	20	520
	21	506
	22	521, 601
	23	507, 516, 513, 563, 549, 603, 602, 593, 591, 592, 588, 589, 493, 497, 485, 481, 480, 597, 600, 607, 458, 484
	24	409, 411, 420, 422, 418, 381, 371, 349, 450, 434, 443, 444, 446, 467, 462, 460, 458, 455, 345
	26	51, 53, 57, 50, 54/621, 45, 51, 53, 45, 54/621
	27	524, 525, 490
	28	400, 436, 428, 380, 343, 440, 441, 448, 442, 325, 302, 292, 293, 299, 464, 469, 456, 449, 401, 413, 424, 389, 388, 379, 351, 350, 432, 438, 322, 465, 457, 416, 426, 427, 373, 370, 372, 356, 340, 298, 466, 478, 469, 303, 398, 414, 390, 353, 290, 447, 374, 425
	29	37, 38, 501, 608, 605, 32, 495, 496, 500, 606, 499, 604, 609, 501/624
	30	522, 523, 576
	32	54
	33	297, 89
	36/1	30
	37	406
Paharpur	1	11, 139, 138
	2	21, 142, 143, 144, 133, 134
	4	2, 6, 12, 16, 40, 43, 41, 48, 52, 57, 61, 135, 192
	5	46
	6	10, 140, 141
	7	54, 123, 126, 127
	8	191, 3, 7, 14, 15, 45, 49, 53, 56, 60, 137
	9	51, 47, 58, 59, 190
	10	20, 29, 32, 33, 37, 38, 39, 62, 115, 117, 76, 163, 162, 30, 114, 116, 105, 106, 107
	11	22, 13, 28, 35, 160, 161
	12	153, 128, 132, 120, 122, 8, 124, 125, 130, 121, 119, 9, 129, 131, 118
	13	18, 19, 23, 24, 25, 26, 27, 31, 34, 42, 44, 146, 147, 148, 149, 150, 151, 152, 155, 154, 158, 168, 108, 109, 110, 111, 112, 113, 156, 157, 159
	14	65
Singhpur yogidih	6	293, 294
	9	201, 202, 203, 204, 206, 207, 208
	11	199, 211, 212, 218, 290
	12	291
	14	241
	16	200, 292
	17	165, 167, 169, 190, 220, 209, 205, 213, 210, 216, 289, 192