

EXECUTIVE SUMMARY

TECHNO – ECONOMIC FEASIBILITY STUDY

KANNUR INTERNATIONAL AIRPORT

EXECUTIVE SUMMARY

(i) Project Background

The Government of Kerala has commissioned a techno-economic study to establish the feasibility of new airport near Kannur to cater to the international, domestic and freight traffic of the northern districts of Kerala and thus promote tourism, exports and other economic activities in this region. The land use plan for the airport area would ensure controlled development and assist the State Government to regulate land use in the immediate environs of the airport so as to permit only those land uses which would be commensurate with the development plans of the State Government and in conformity with the airport safety requirements. M/s Engineers and Management Associates of New Delhi in association with M/s Parsons Brinkerhoff Aviation Inc. of USA have been retained to conduct this study.

The consultants have taken into consideration the historical background of Kannur, its scenic beauty, salubrious climate, exquisite flora and fauna, over 80 Km of beach line with silver sands and clean water fronts which can be developed and expanded into first rate leisure parks, tourist attractions and water sports. Alongside with this unexploited tourism potential, there are tremendous opportunities for promoting business in textiles, spices, handicrafts and other local products, export of seafoods, fresh produce, cutflowers etc.

The basic objects of the study therefore are to establish feasibility for:-

- Airport facilities of a world-class standard to serve tourists, NRIs and other passengers.
- Cargo facilities for export of perishables and other products of South India and critical imports.
- Commercial activities in and around the airport which are compatible with airport operation and generate/catalyse economic growth of the region.
- Potential investors to undertake the proposed airport development as a financially attractive proposition to be taken up on a BOT or BOOT basis.

(ii) Consultant's Vision Of The Role Of This Airport

Consultant's vision of the role of this airport is much more than a world class international airport serving the foreign tourists and NRIs. This project development is perceived as a new modern minicity which promotes economic activities such as processing and packaging of spices, cut flowers, food products, ware housing of sea foods and fresh vegetables/fruits at correct temperatures and humidity, handicraft and textile units, electronics industry, computer hardware and software units, facilities for tourists to promote leisure and health tourism, tourist attractions such as a golf course, display centres for exquisite handicrafts and other local products. An international airport with state of the art facilities and multimode transport interconnections is the life line of this economic giant which ushers in a new era of employment opportunities, rapid growth and prosperity of this region. With this concept, the airport will develop its own catchment area and exploit untapped business potential of the region without seriously under – mining the traffic and revenues of existing airports in the region and particularly Kerala State.

(iii) Airport Site – Its Physical Characteristics

The consultants were informed that the State Government had identified a site in the Kara-Mattannur-Kotheri-Elampara Kanad desom area, north of Anjarakkandi-Mattannur Road. The consultants have carried out an extensive contour survey of the area using an electronic total survey station and generated survey levels at 5 metre grid for the entire site. A detailed obstacle survey around the airport site extending to 20 Km radius has also been carried out to establish obstruction free operations from/to the airport. The undulating terrain at the airport site would call for extensive quantities of earthwork.

Exhaustive sub-soil investigations were carried out to establish the properties and strength of sub-soil to support aircraft loads. 41 soil samples were collected and subjected to extensive laboratory tests at Thrissur and Cochin. Deep bore holes were made at many locations to establish the soil profile and changes in the strata. Plate load tests were made to ascertain the bearing capacity of soil and determine 'K' values for the design of pavements.

Meteorological data for the site was collected from the nearest Met. Observation Station. This data included monthly figures for the last 30 years in respect of maximum and minimum temperatures, relative humidity, barometric pressure, wind speed, wind direction, visibility, cloud ceiling height, rain fall etc. Based on this, consultants have developed wind rose diagram proposals for deciding the orientation of

the runway, which would restrict the cross-wind components and would result in the airport operationally meeting the ICAO criteria fully. An orientation of runway with 07/25 bearings was selected to allow for a maximum length of the runway, which would be required for operation B-747-400 with minor load penalty.

(iv) Traffic Forecasts

For this Greenfield airport location, the consultants have made a detailed study of the air traffic pattern for the State of Kerala, origin and destination surveys conducted at the existing airports of AAI at Mumbai and Chennai and existing traffic at Thiruvananthapuram, Kozhikkode and Cochin Airports. Abintio studies were conducted to assess the passenger traffic from the catchment area of the proposed airport in the categories of tourist traffic, NRI Keralites working abroad and business travelers. Based on these studies, projections were made for the likely passenger traffic in the year 2002-03 when this airport is likely to be made operational. Annual growth rates were projected based on economic forecasts in respect of GDP growth, projections developed by ICAO for South East Asia and the Corporate Plan of the Airports Authority of India.

These growth rates were moderated and presented in three possible scenarios of high growth, most likely and low growth. Of these, the growth on the most likely scenario is presented in Table 4.11 of Section 4 of volume 1 of the report.

Cargo traffic projections were based on the current figures of perishable cargo, seafoods, handicrafts, Jewellery and other high value low volume items being handled by Cochin Airport. Consultants have assessed that with cost effective cargo handling facilities and convenient air transport connections 10-12.5 percent of the cargo presently handled as sea-freight would switch over to air freight. A conservative figure of 7.5 percent was, however, assumed for the first phase of airport infrastructure development. Forecast of cargo growth at Kannur Airport is shown in Table 4.16 of section 4 of volume 1 of the report.

(v) Airport Master Plan

The objectives of the airport master plan were defined as follows:-

- (a) Assess the airport infrastructure requirements, necessary to respond to the projected traffic growth over a 20 years period.
- (b) Develop land use plan for the airport site so that all developments can take place in an orderly manner and the

airport developments are architecturally and environmentally merged into the surrounding land-scape.

- (c) Provide guidelines for phasing out development programmes, so that private entrepreneurs/airport developers can assess and appreciate the investments required, annual operating costs and likely revenues.

The airport Master Plan identifies the following distinct land-use zones in which developments would be implemented:

- **Airside operational Area** – comprising of runway, taxilinks, parallel taxiways, isolation bay, aprons etc, other associated obstacle clearance areas and air navigation and landing facilities related to runway operations.
- **Terminal Area** - This area contains passenger terminals for international and domestic traffic, car parks, airport hotel, business centre and other commercial public facilities to which public shall have access.
- **Airport Technical Area** - comprising of the ATC complex, Technical block for telecommunications, aeronautical information services, briefing and meteorological services, electrical centre/sub-station, water pumping station, Fire & Rescue station etc.
- **Cargo Terminal Area** - This is a special purpose zone to accommodate air cargo functions both airside and landside facilities including make-up and breakdown stations, cargo receipt and inspection area, warehousing and cargo forwarders' facilities etc. This area has its own truck docking and parking facilities.
- **Aircraft maintenance Area** - The master plan provides for an aircraft maintenance area for all technical functions related to aircraft maintenance and associated activities such as aircraft maintenance, painting, engine testing, run up, parts storage etc. These functions are accomplished in Hangars, aircraft apron, run-up bay and ancillary buildings.
- **General Aviation Area** - This zone located on the northern side of runway 07/25, is earmarked for all general aviation activities, small charters, flying club/training academy etc. The facilities in this area would be in the form of hangars, small terminal, apron(s), aviation support facilities, parking lot etc.

- **Export Promotion Zone/Free Trade Zone** - This zone is the hub of economic activities in close vicinity of the airport operational area. While the actual planning and development of this zone is envisaged through a professionally organized subsidiary company or a specialized concessionaire party, it is envisaged that this zone will have sub-zones/areas catering to:-
 - Fresh produce/Flower trimming, processing, packaging and temporary warehousing at the required temperature and humidity.
 - Food processing/packaging and forwarding of selected items of food including seafood, which is in good demand in overseas markets.
 - Processing and packaging of spices, tea and coffee
 - Electronics hardware/software park
 - Handicrafts and Textiles for export
 - Other light industries catering to export requirements

In short, this zone covering approx 200 hectares of land in the first phase of development is visualized as the growth engine of the region providing enormous employment opportunities through export oriented initiatives. The State Government is expected to provide financial incentives in the shape of tax holiday, export subsidies, assured availability of power supply and other utilities and technical support in developing new markets etc.

- The airport will be provided in a phased manner a leisure park, a golf course, an executive club, an exposition hall with ancillary facilities etc.

V(A) Brief Description of Main Airport Facilities

Runway 07/25 : The master plan proposes a main runway oriented 07/25, corresponding to ICAO code 4E, with a total length of 3400 meters, width 45 meters and 7.5 m wide shoulders on either side. The runway shall be designed for PCN 75 for operation of B-747-400 and equipped for instrument precision operations on an ILS on 25 end. High intensity runway approach lights and edge lights would be provided for category I operations.

- **Taxiway and Aprons** - All taxiways connected to RWY 07/25, parallel taxiway and links to the apron would be 23m wide with 10.5 m wide shoulders on either side and curvature fillets for manoeuvring of wide-body aircraft. Passenger Terminal apron is expected to have initially 6 aircraft parking stands eventually to be increased to 12 stands. Apron construction would be with pavement quality concrete so as to avoid damage on account of fuel spillage. The apron stands will be provided with hydrant fueling, high mast flood lights, visual docking system for in contact stands and a road circulation system for movement of passenger coaches and other ground support vehicles.
- **Passenger Terminal** - Essential design features of the passenger terminal which will be a two level construction would be –
 - i) Space planning which results in streamlined flow of passengers and baggage, efficient processing and convenience of passengers, visitors and other users of airport facilities
 - ii) Architectural designs which are most suited to the landscape of Kerala and reflect the State's rich heritage
 - iii) Permanent finishes which result in high standards of aesthetics and demand little or no maintenance
 - iv) State of the art passenger facilities, so that the airport can qualify to be assessed as a world class airport.

The passenger Terminal building would essentially be a two level building, the lower level serving as the arrivals floor and the upper level for departures.

The terminal would be a framed structure with superior finishes in the form of granite / marble flooring in public areas, high quality false ceiling panels with acoustic lining, integrated luminaries and air-conditioning diffusers, loud speakers, smoke detectors all in a harmonized design décor, permanent finish wall panel boards with stainless steel trims, large size glazing on the city side and airside, carpeted flooring in security – hold lounges, lighting levels averaging 300 lux in all public areas, conveniently located large toilet units with heavy duty superior type of fittings and fixtures. On the airside the terminal would be provided with three passenger – loading bridges initially, for direct access without the

passengers being exposed to rain / summer heat. The passenger loading bridges would cater to aircraft ranging from B-737 to B-747. The departure floor would have a large check – in area with 20 check – in counters in the initial phase, with integrated weight scales and baggage conveyors. The arrivals baggage claim hall will have 3 Nos. crescent type of carousels with a claim length commensurate for B-747 handling. The terminal will have state-of-art flight information display system, CCTV monitors, public address system, escalators, elevators, passenger furniture, signage and all other amenities including the basic essential facilities for handicap passengers / visitors.

The terminal will have large area earmarked for concession activities e.g. snack bars, coffee bars, refreshment counters, restaurants, shops for a variety of merchandize, especially handicrafts of south India, spices, coffee, tea, book stalls, traveller's requisites. Vending machines, video entertainment major airlines, a large duty free shopping area to be managed by a reputed professional group on concession basis and provision for additional space for such commercial activities as may be required to be added on the basis of a market survey.

Special emphasis shall be laid on the planning and management of commercial areas applying international stands, so as to attract prospective buyers to use such commercial areas for their promotional and business interest. Several activities which are not a part of the airport operations but commercially akin to the airport business which are catalytic to the traffic growth, so that for passengers and cargo shall be inducted into the airport operation and management and such satellite commercial activities can attract considerable volume of business and in turn higher growth of passenger and cargo traffic that what has been envisaged in the feasibility report.

The car park in front of the terminal is at two levels each capable of accommodating 250 cars and 10 buses. The access road to the terminal area will be a dual carriage way constructed as a four lane facility, with capability of upgrading to six lanes.

- **Cargo Terminal:** In the first stage of development, the cargo terminal will have a floor area of 4000 sqm. catering to an annual 40,000 MT of cargo. This would be expanded on a modular concept, to keep pace with the demand. Floor space in the cargo building would adequately cater to cargo inspection, warehousing, cargo make-up and breakdown. Separate facilities are proposed for long stay consignments, special consignments such as frozen foods, perishables medicines etc, freight forwarders and other agencies. In the first stage of development, semi-mechanized type of freight handling with pallet carts, fork lifts, high mast lifts, ULD etc is

foreseen. The structure however shall be designed for a multi-tiered stacker system with elevating transfer vehicle (ETV) and automatic controls. For imports, a computerized inventory control system would be provided to facilitate easy location and retrieval of import items.

- **Air navigation & Telecommunication facilities** System comprising of localizer, glide path, middle marker and outer marker for precision approach on RWY 25 and a locator beacon (NDB) for non-precision approaches, particularly for smaller aircraft. Adequate flexibility shall be provided in the planning of the ATC, so as to ensure that these facilities can be adopted to fast changing technologies in air traffic control, Nav/Com. Aids. In addition, these facilities shall be capable of adopting with some modification to the satellite communication system, which are likely to be introduced in a big way on all the airports all over the world.

VHF communication facilities would be provided for ground to air communications. Separate frequencies will be assigned to ATC aerodrome control, approach control, ground movements, upper airspace control etc. AFTN communication facilities using PTT and satellite system for voice communication with neighboring airports and teleprinters will be provided for transmitting and receiving communications.

- **Air Traffic Control**

An air traffic control tower building and a technical block are proposed on the eastern side of the passenger terminal/. The tower cabin located at a height of 30m provides for a total line –of sight vision over the entire operational area. The control tower would be equipped for monitoring navigational aids, meteorological parameters, voice communications through VHF trans-receivers, two controller positions, tape recorders, aerodrome beacon, fire siren and controls for airfield lighting etc.

The technical block will accommodate the navigation equipment control panels, VHF and AFTN equipment, antennas, AIS facilities, meteorological services, briefing room, fire and rescue co-ordination centre, workshop, stores, training facilities, etc.

- **Airport Fire & Rescue Service**

In accordance with para 9.2.2 of ICAO Annex 14, the airport fire-fighting category shall be category 8. Therefore, corresponding facilities of crash fire tenders (minimum 3 Nos), a fire and rescue building with e equipment parking bays, workshop and storage for equipment spares, principal and complimentary agents, communication facilities, water storage, training of fire crews etc. shall be provided.

* **Aviation Fuel Facilities**

Aviation fuel storage facilities comprising of 3 storage tanks each of 2.5 million litres for aviation turbine fuel dispensing facilities and hydrant fuelling at the apron are proposed. The fuel farm has convenient access for fuel tankers from the refinery. It is envisaged that the development of fuel farm and the hydrant fuelling system will be undertaken by the selected fuel company of repute, under a concession agreement.

* **Airport Utility Services**

- **Power supply** - In the first phase of development, a maximum demand of 1500 KVA of power supply is foreseen, increasing to 2500 KVA in 5 years. This is proposed to be met by extending 11 KV independent feeder from the nearby 66 KV grid station of Kerala State Electricity Board. Emergency supply to operational services of the airport upto 500 KVA is proposed through automatic mains failure type diesel generating sets.
- **Water supply** - In the initial phase, daily water requirement is estimated at 700,000 litres. This is proposed to be met by pumping water from the nearest treatment plant of the Kerala Water authority. Approx. 3 days storage is built at the airport site. Water from these storage tanks is fed to the distribution system through a hydropneumatic system, which maintains a constant pressure through out the distribution network.
- **Sewerage System** - A sewerage treatment plant with a daily capacity of 700,000 litres is located near the south-east boundary of the airport. Because of the topography of the site, the effluent flows on its own by gravity to the treatment plant. The clear effluent from the treatment plant is led to the outfalls on the south-east side. Solid waste generated at the airport is proposed to be disposed off through an incinerator or sold as manure.
- **Airport Drainage** - The site selected for the airport, being on a hill top makes the area drainage relatively easier. The land generally slopes from west to east. The area drainage is based on the maximum rainfall intensity of 72 mm per hour. The airport area is divided into a number of zones and each zone provided with adequate size drainage pipes or V shaped drainage channel so as to effectively drain each zone and lead the water to main outfalls on the eastern side.

- **Environmental Studies** - A comprehensive environmental study has been carried out by a specialist firm M/s Mantec Consultants Pvt Ltd. to study environmental degradation, if any due to the development of the airport and the measures likely to be taken to mitigate the negative effect of such a development. The report has clearly brought out that the adverse effects on the environment due to airport development are not serious. This is applicable to several aspects which have been studied, namely Earth movement, stability of slopes, drainage of the area, air/water pollution, effect of greenery and disturbances to any national park, birds and animal habitat etc. In addition attention has been given to the rehabilitation of very limited number of persons who will be displaced due to the development of this airport.

(vi) Operation & Management Strategies

The operation and management of the airport is proposed with a professional corporate body headed by a CEO and four functional directors – each responsible for (i) Operations, (ii) Commercial Functions, (iii) Planning/Engineering and (iv) Finance & Administration. The basic approach would be to develop cost-effective airport services based on state of the art technologies, market airport services and respond to the changing requirements with least delay. Private enterprise would be involved in housekeeping, engineering maintenance, car park management and other airport services. Through well-developed contracts, a high standard of maintenance shall be accomplished at optimum prices. Concession partners would be chosen through competitive bidding process so that the airport provides the best of the commodities/services the country can offer and the customers get their moneys' worth. The real estate business potential of the airport would be exploited in a high professional manner so that revenues are maximized within a framework of policies laid down by the State Government / Airport Management. The approach, in short, is to deal with all the aspects of airport marketing and airport operations in a professional manner so as to obtain a competitive edge over the neighbouring airports and promote efficiency and cost-effectiveness.

Innovative method of handling passenger and cargo shall be applied to create highly efficient airport systems to provide maximum comfort and high speed of passenger flow. The level of services and comfort to the passenger and visitors will be at the highest level on IATA norms.

(vii) Financial Analysis

A comprehensive financial analysis was carried out to study the financial viability of the project. The present cost of the project for the three phases is Phase-I Rs.427.6 crores (2000-2002), Phase-II Rs.90.96 crores (2010-2011) and Phase III Rs.42.57 crores (2020), making a total of Rs.560.7 crores. This cost includes the high cost of earthwork due to the nature of the site and state of art facilities for a world class airport with comparable traffic. This figure however does not include the cost of acquisition of land, which shall be made available by the Kerala State Government. Considering the concept and vision of KINFRA and Kerala Government of creating a world-class airport, the cost of Rs.560.7 crores is considered reasonable. With a very conservative approach and considering the construction period as three years and concession period of 30 years, the Financial Internal Rate of Return (FIRR) works out from 16-23%, with different funding options, Sensitivity analysis carried out indicates that the project in purely financial terms is a viable project and would result in innumerable indirect economic benefits. These are, to mention only few, employment opportunities, tourism growth, export of perishable and handicraft cargo, development of several industries connected with tourism and export etc. It is further interesting to note that for a proposed investment of R2.596.77 crores, by the airport operators an attractive FIRR of 16 to 22% is almost assured. With an efficient marketing and management of airport services and the real estate in the export promotion/trade free zone, the FIRR can be easily increased by another 2.5 – 3.0%. Furthermore these returns are based on two important assumptions:-

1. Airport tariff/scale of charges for various types of activities and services are considered strictly at par with the existing rates at other international airports in the country. In the case of private funded airports, if the efficiency levels and standard of services are considerably better than those at existing airports, there would be full justification for upward revision of scale of charges by atleast 10-15 percent.
2. The catchment area for passenger and cargo traffic can be considerably enlarged by starting several activities on the periphery of the airport like leisure parks, sports complexes, golf club, convention centres, trade fares for textiles, spices, handicraft exports etc.

These activities certainly result in further increase the FIRR. It is considered that the FIRR will conveniently touch a figure of 25% within a period of 10 years from the year of starting the operations of the airport. The project as per Financial Feasibility Analysis is thus considered a highly viable project.

Conclusion:

This study has been conducted for the establishment of an airport at Kannur, meeting international standards and operating as a world-class airport. The study has produced a master plan for the airport preliminary design and cost estimates for all the facilities necessary for establishing an international airport. Even though the site needs movement of large mass of earth for leveling the site, nevertheless the site can be made suitable for establishing an airport with a clean and healthy environment. The study has also indicated conclusively that the establishment of this airport will in no any way effect the volume of traffic handled by the other three airport in Kerala. This is due to the fact, that by establishing certain activities at the airport, the planners have tried to enlarge the catchment area, thus not effecting the traffic and growth at the other three airports namely, Trivandrum Airport, Cochin Airport and Calicut Airport. Secondly, there is absolutely no operational risk of Kannur and Calicut airports operating simultaneously within a distance of about 150 Km. The Nav/Com aids available these days and the operational procedures at the two airport will ensure that there is no risk of operating the two airports within a distance of 150 Km.

The very fact that airport is going to be developed on BOT concept gives further strength to the case that investment is coming from private sources, the government is not putting in any money and government's role is that of a regulatory authority and a facilitator for economic development activities.

The Financial Analysis carried by highly experienced Transport Economists indicates that for various combination of investment the FIRR varies between 16 – 23%. These figures are arrived using very conservative approach to the analysis namely the charges made at the airport, revenues generated, growth rates of traffic, passenger and cargo are based on the conventional system operating at airports in the country. Innovations in marketing of airport facilities, real estate management, flexibility in tariff/pricing policies, progressive HRD policies and management techniques would give a substantially higher rate of return that reflected in this financial analysis. However, even the FIRR of 16-23% is concerned satisfactory from the point of view of the investment to be made by the prospective investors.