

ICAO-ACI/LAC Seminar on Bird Hazards,
Environmental Protection and Land Use at Airports
for the NAM/CAR/SAM (Americas) Regions
Miami, 24 - 27 April 2001

Land Use and Environmental Control

Michiel Vreedenburgh

ICAO Regional Officer Aerodromes & Ground Aids
North American, Central American and Caribbean
Regional Office - Mexico

Issues

- Obstacles affecting aircraft flight operations
- Obstruction of visual aids
- Interference with non-visual aids
- Aircraft bird strikes in-flight and on the ground
- Reduced visibility due to smoke affecting flight operations
- Noise, air, water and soil pollution
- Constraints on airport expansion and capacity

Measures

- Airport master planning
- Land use planning and safeguarding
- Land use management
- Bird hazard management
- Environmental management
- Legislation and regulation

Land Use Objectives

Ensuring Safety

- Bird hazards
- Obstacles
- Visibility
- Interference

Protecting the Environment

- Aircraft noise exposure
- Air quality
- Water quality
- Waste and energy management

Safeguarding Capacity

- Airport expansion

ICAO References



ICAO References

Annex 14 – Aerodromes, Volume I –
Aerodrome Design and Operations (1999)

Physical Characteristics

Obstacle Restriction and Removal

- Obstacle limitation surfaces & requirements
- Objects outside the obstacle limitation surfaces
- Light plane for approach lighting systems
- Obstacle protection surface for PAPI / T-VASIS
- Nav aids protection areas (Annex 10)

Bird Hazard Reduction

ICAO References

Airport Planning Manual (Doc 9184), Part 1 -
Master Planning (1987)

Airport Site Evaluation and Selection

- Physical planning – airspace, land area
- Environmental planning – people, flora & fauna
- noise, air, water, soil
- Hazards – smoke, wildlife
- Surrounding land use - compatibility

ICAO References

Airport Planning Manual (Doc 9184), Part 2 –
Land Use and Environmental Control (1985)

- Ecological considerations
- Environmental control measures
- Land use
- Land use planning
- Land use administration
- Land use guidelines for the avoidance of bird hazards

ICAO References

Airport Services Manual (Doc 9137), Part 3 –
Bird Control and Reduction (1991)

Environment Management and Site Modification

- Food, water and shelter

Incompatible Land Use Around Airports

- Agriculture; garbage dumps and landfill sites; food outlets; wildlife refuges; lakes; golf and polo courses; animal farms; fish processing; and slaughter houses.

ICAO References

Airport Services Manual (Doc 9137), Part 6 –
Control of Obstacles (1983)

- Surfaces
- Controlling obstacles at an airport
- Temporary hazards
- Obstacle surveys
- Airport equipment and installations which may constitute obstacles
- Model zoning ordinance to limit height of objects around an airport

ICAO References

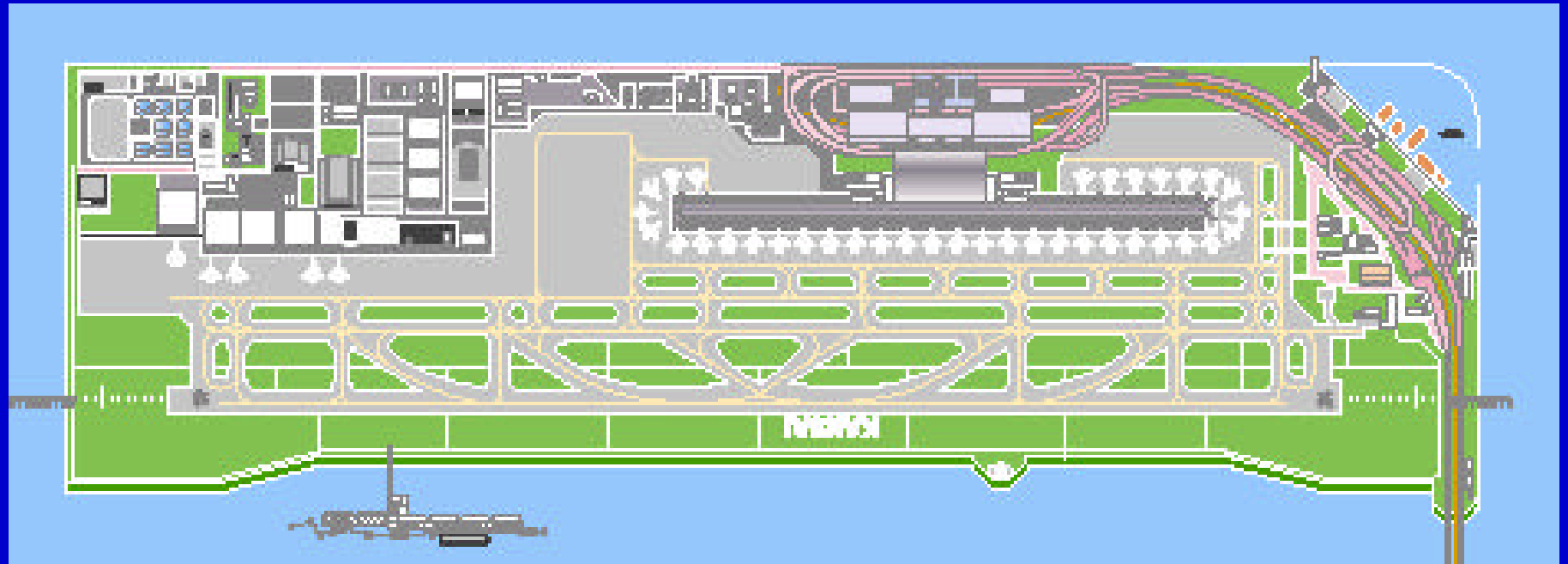
Airport Services Manual (Doc 9137), Part 8 –
Airport Operational Services (1983)

- Bird hazard reduction
- Control of ground noise
- Airport zoning and obstacle clearance
- Incidents affecting people and property outside the airport boundary

ICAO References

- Manual on the ICAO Bird Strike Information System (IBIS) (Doc 9332)
- Manual on the Use of the Collision Risk Model (CRM) for ILS Operations (Doc. 9274)
- Recommended Method for Computing Noise Contours around Airports (Circ 205)
- Aerodrome Environmental Aspects Workshop (Cairo, February 2001, English only)
- Manual – Guia de Proteccion Ambiental para Aeropuertos (Spanish only - 1997)
- PANS/OPS – Aircraft Operations (Doc. 8168), Volume I – Flight Procedures

ICAO Meetings



ICAO Meetings

3rd CAR/SAM RAN Mtg. – Argentina, October 1999

Conclusion 4/10 - Bird hazard control and reduction (Sum.)

That States confronting problems of bird strike hazard:

- a) create a bird strike committee responsible for the overall management of a bird reduction programme;
- b) take necessary management measures of the habitat on and in the vicinity of the aerodromes to make it less attractive to birds;
- c) use effective dispersal measures;
- d) remove attractions to birds i.e. food, nesting and resting places;
- e) avoid the presence of refuse dumps in the vicinity of airports;
- f) encourage aircraft operators to provide aerodrome authorities with reports on bird strike incidents involving their aircraft;
- g) submit to ICAO bird strike reports for the IBIS programme; and
- h) ensure information about the presence of birds is available to pilots.

ICAO Meetings

3rd CAR/SAM RAN Mtg – Argentina, October 1999

Rec. 4/14 - Land use at airports and adjacent areas

That:

- a) States revise and/or adopt regulations governing the use of land adjacent to airports in order to prevent the construction of obstacles, obstruction of visual aids, interference with radio aids and presence of birds;
- b) States adopt regulations which govern the use of lands adjacent to airports taking into account the impact of aircraft noise; and
- c) ICAO consider the possibility of incorporating in Annex 14, Volumes I and II, provisions relating to land use in the vicinity of airports taking into account aircraft operations and public safety.

ICAO Meetings

CAEP – Committee on Aviation Environmental Protection

- ICAO involvement in environmental issues began in late 1960's due to concerns with noise and air pollution around airports
- CAEP established in 1983
- CAEP composition
 - 18 ICAO Contracting States
 - airports, airlines and aircraft manufacturers
 - environmental organisations
- 5 Meetings – 1986, 1991, 1995, 1998, 2001
- 5th Mtg. CAEP/5 held at ICAO HQs, 8-17 January 2001

ICAO Meetings

CAEP Work Programme

Noise - Airports and Operations

- MAGENTA - global exposure model
- Noise abatement operational measures
- Airport planning and land use planning
- Airport noise modelling and monitoring

ICAO Meetings

CAEP Work Programme

Airport Planning and Land Use Planning

- Maintain the Airport Planning Manual updated;
- Explore the possibility of developing guidance material for Annex 14 and Annex 16;
- Exchange information on best practices by comparing different national systems;
- Investigate the possibility of having legislation safeguarding land use around airports;
- Document, for the purpose of developing ICAO guidance, successful land use policies and procedures;
- Prepare guidance on the process to be used by States to implement and manage the balanced programme with the objective of preparing an ICAO framework.

ICAO Meetings

CAEP Working Group 2 - Airports & Operations

- Provide guidance to airport authorities and planners on environmental issues related to airport expansion, construction and operation;
- Provide guidance and improved means of predicting and quantifying aircraft noise exposure from aircraft operations in the vicinity of airports;
- Define operational procedures and strategies to reduce noise exposure around airports;
- Develop guidance material to encourage optimally compatible land-use around airports; and
- Fully develop and validate the Global Aircraft Noise Impact Assessment Model for assessment of optimal noise control strategies.

ICAO Meetings

CAEP/5 endorsed a balanced approach to aircraft noise mitigation, consisting of:

- reduction of noise at source
- improved land use planning and control
- wider use of noise abatement operational procedures
- operating restrictions for the noisier aircraft types

ICAO Meetings

Specific CAEP/5 recommendations in these four areas included:

- a new noise standard which is 10 decibels lower, on a cumulative basis, than the current Chapter 3 standards in Annex 16, for new aircraft design, effective 1 January 2006;
- procedures for re-certification of existing aircraft meeting the new standard;
- more stringent noise standards for helicopters;
- publication of guidance material on land-use planning; and
- a proposal for new take-off noise abatement procedures.

ICAO Meetings

CAEP/5 Rec. 3/9 – Land Use Planning

That

- a) The Secretariat be requested to expedite the amendment of the Airport Planning Manual, Part 2 (Doc. 9184); and
- b) The attention of States be drawn, at the appropriate time, to the amendment and the importance of land use planning

Principal ICAO Reference for Airport Land Use Planning



Principal ICAO Reference for Airport Land Use Planning

Airport Planning Manual (Doc 9184), Part 2 – Land Use and Environmental Control

- Current edition – 2nd 1985
- Considerable evolution in environmental area
- CAEP WG 2 updates presented to CAEP 4 – April 1998
- Final updates approved by CAEP Steering Group – July 1999
- Undergoing review by ICAO Secretariat
- Revision expected to be issued in 2002

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

The Airport and its Environs

The Need for Environmental Control

The Need for Land-use Planning

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Environmental Impacts associated with Aviation Activities

- Aircraft noise
- Effects on air quality in the vicinity of airports
- Global environmental problems to which airports contribute
- Environmental problems arising from the construction and expansion of airports or associated infrastructure
- Water and soil pollution in the vicinity of airports
- Waste at airports
- Environmental problems arising from aircraft accidents, incidents or emergency procedures

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Environmental Consequences and Control Measures

- Noise abatement
- Air pollution control
- Water pollution control
- Waste management
- Energy management
- Environmental emergencies
- Environmental impact assessment of airport development projects
- Environmental management – activities & system

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Land Use

- Natural
- Agricultural
- Highways and railways
- Recreational
- Municipal utilities
- Commercial
- Industrial
- Residential and institutional

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Land Use Planning

- Assessing noise for land-use planning
- Noise zones and associated maximum noise indices
- Risk of aircraft accidents around airports
- Land uses within noise zones and high risk zones
- Review of land-use measures with respect to aircraft noise in various countries

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Land Use Administration / Control Systems

Planning Instruments

- Comprehensive planning
- Noise zoning
- Subdivision regulation
- Transfer of development rights
- Easement acquisition

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Land Use Administration / Control Systems

Mitigating Instruments

- Building codes
- Noise insulation programmes
- Land acquisition and relocation
- Transaction assistance
- Real estate disclosure
- Noise barriers

Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Land Use Administration / Control Systems

Financial Instruments

- Capital improvements planning
- Tax incentives
- Noise-related airport charges

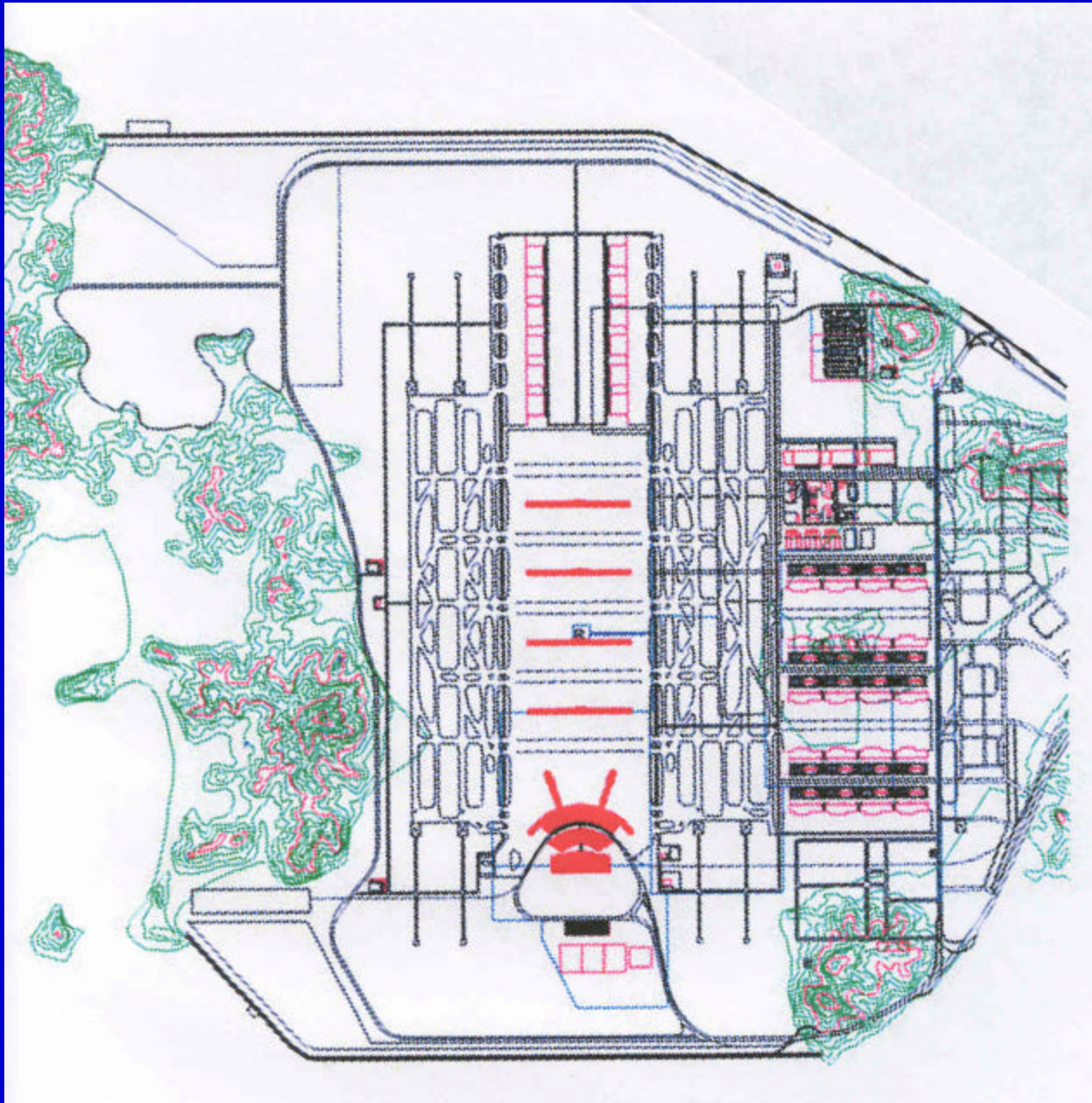
Draft Revised Airport Planning Manual, Part 2 – Land Use and Environmental Control

Cases of Effective Land Use Management

- Amsterdam Airport Schiphol / Netherlands
- Australian Experience - Land-use planning around airports
- Land-use Management around Washington Dulles International Airport / USA
- Land-use Planning in Brazil

New Incheon International Airport

- Opened 29 March 2001
- US\$ 5.5 Billion
- 27 mppa – 100 mppa (2020)
- 2 Close-spaced parallel runways
- passenger terminal with 44 contact gates
- 60 km from Seoul city centre

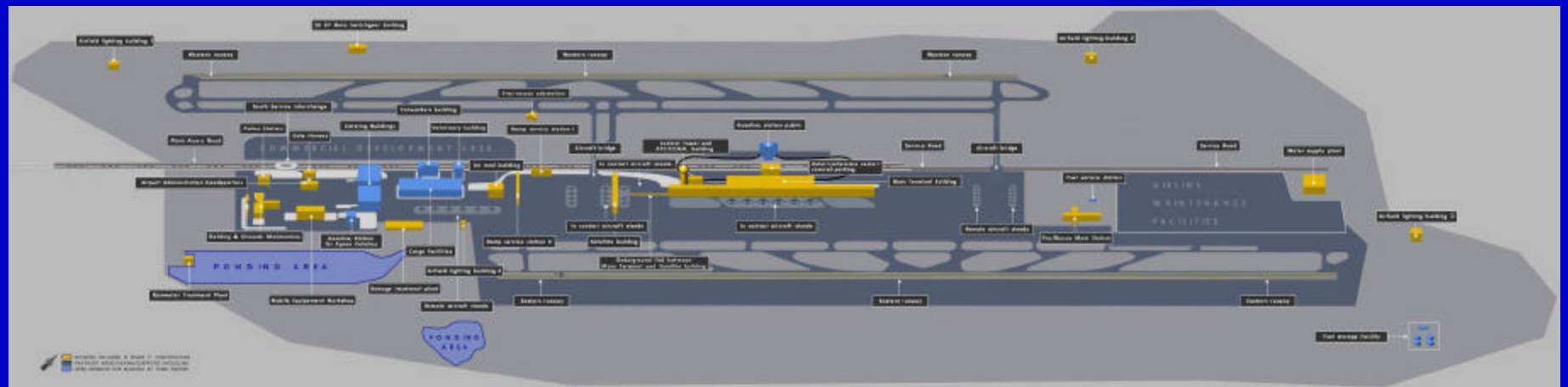


New Incheon Int'l Airport

- Environmental studies to minimise environmental impact of the development during construction and operation
- Effects on island and sea environment
- During construction – measures against diffusion of dust
- Awarded ISO14001 Environment Certification in May 1998
- 30% green areas - 9 parks
- noise major factor in site selection
- Tele-Metering System – monitors air and water 24 hours
- Grey water treatment facility – treats / recycles waste water
- Waste water treatment facility – prior to discharge into sea
- Oil-water separation facility
- De-icing fluid re-cycling and disposal facilities
- Solid waste incinerator – less air pollution/generates energy

New Eleftherios Venizelos International Airport

- Opened 28 March 2001
- US\$ 2.0 Billion
- 16 mppa – 50 mppa (future)
- 2 wide-spaced parallel runways
- passenger terminal with 24 contact gates
- 30 km from Athens city centre



Eleftherios Venizelos Int'l Airport

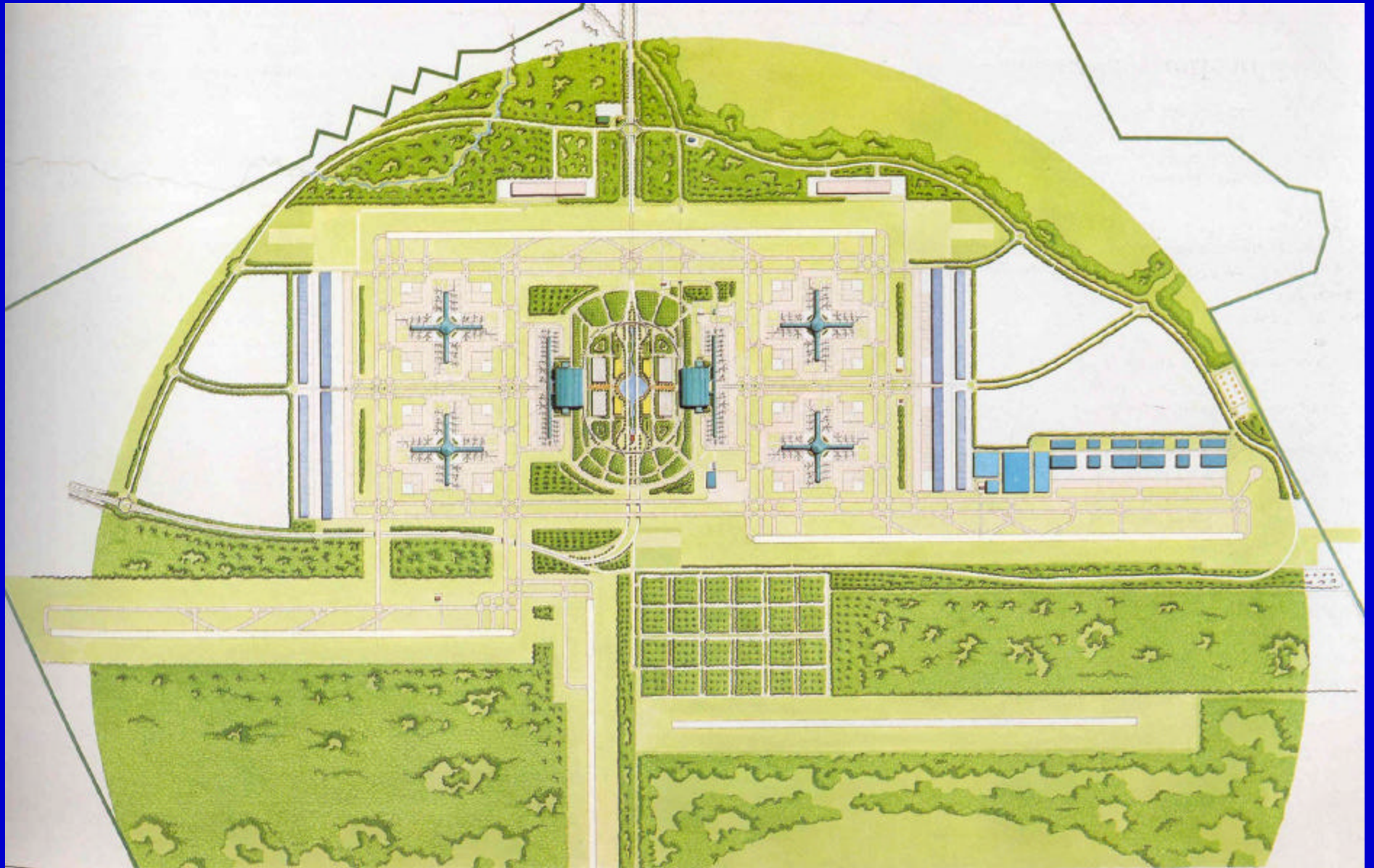
- Environmental Policy
- Environmental Plan – construction
- Environmental Management System - operation
- ISO14001 Environment Certification in Dec. 2000
- Flattened a hill
- Moved a 15th century Greek Orthodox church
- Dust monitoring programme during construction
- Air quality monitoring network
- Aircraft noise monitoring and flight tracking system
- Ground water monitoring
- Oil spillage detection systems
- Waste water treatment facility – recycling
- Solid waste separation for treatment, recycling & disposal
- Energy management systems in facilities

Conclusion

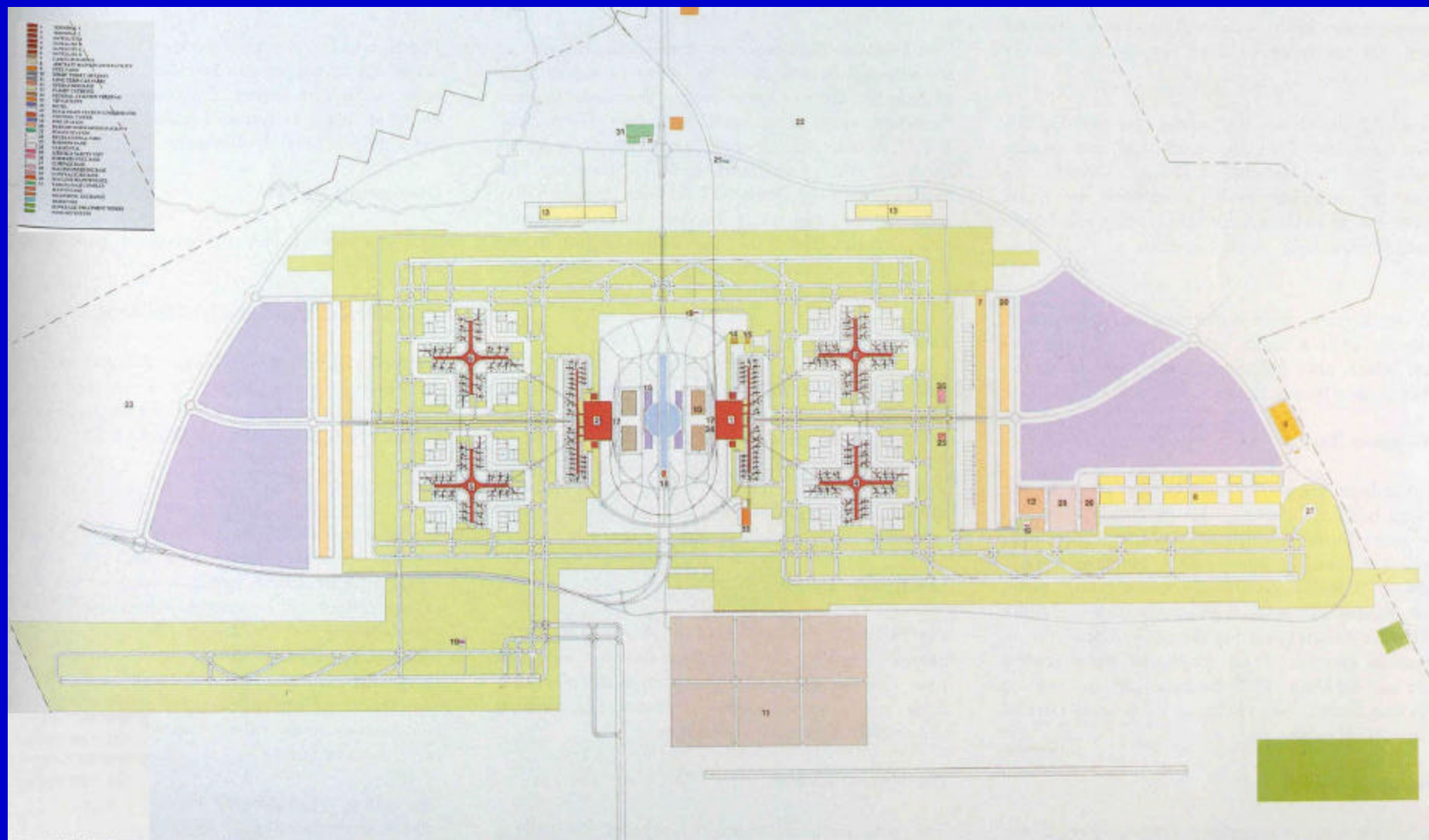
The following elements are considered necessary to safeguard the continuous safety, environmental protection and capacity of the airport and surrounding lands through land use and environmental planning and control:

- Master Plan Ultimate Airport Layout Plan
- Airport and Adjacent Land Use Plan
- Obstacle Limitation Plan
- Wildlife/Bird Hazard Control Programme
- Environmental Management System
- Aerodrome Operations Manual
- Legislation and regulation

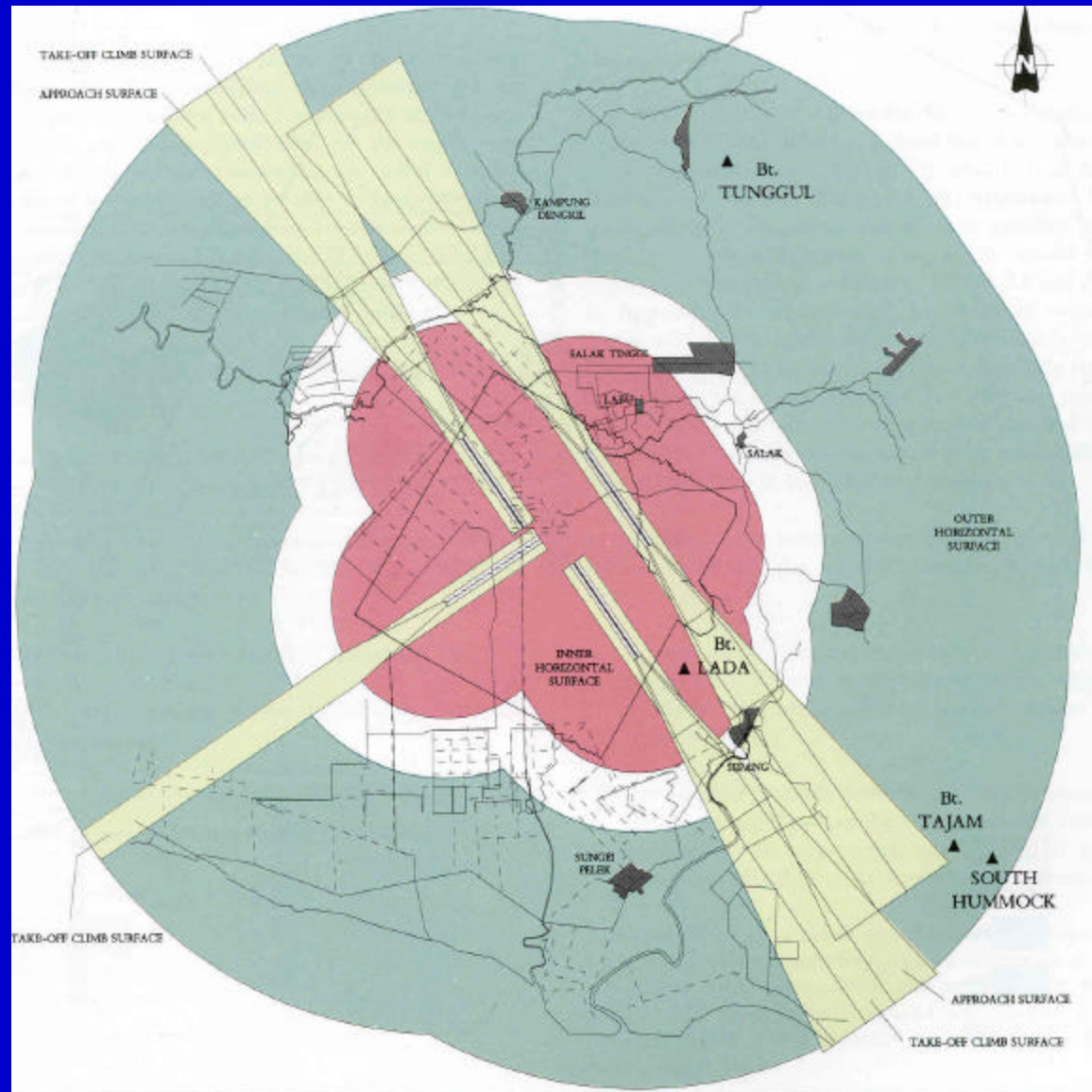
Airport Layout Plan



Airport Land Use Plan



Airport Obstacle Limitation Plan



Aircraft Noise Exposure Plan

