

AIRPORT PLANNING MANUAL

PART 2 – LAND USE AND ENVIRONMENTAL MANAGEMENT

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In recent years, there has been increased public concern regarding the protection of the natural environment from the impact of transportation, and consequently, a growing emphasis on the need to employ effective measures to minimize such impacts. Since pollution may be generated within an airport as well as within the area surrounding it, environmental management practices should be applied at the airport and its environs.

The need for land-use planning in the vicinity of an airport was recognized in the early history of civil aviation and focused on use and control of land. The objectives of these measures were to ensure the safety of people in the air and on the ground and to maintain efficient airport operations. In recent years, there has been increased public concern regarding the protection of the natural environment from the impacts of transportation.

To lessen local and global impacts, it is important that the civil aviation industry endeavors to manage environmental impacts. This includes operational impacts

Background

ICAO Doc 9184 Airport Planning Manual is focused on master planning at an airport. The Airport Planning Manual Part 1 (APM Part 1) is primarily focused on operational safety and efficiency. The ICAO Doc 9184 Airport Planning Manual Part 2 – *Land Use and Environmental Management* (APM, Part 2) is focused on land use and environmental management on and around an airport. The purpose of APM, Part 2 is to provide effective practices at an airport to reduce the potential environmental effects caused by the airport and its operations. The scope of APM, Part 2 does include information on impacts from ground sources, but does not focus on reducing the impacts of aircraft in-flight. The recommendations and considerations for airport planning from APM, Part 1 should always be considered in cooperation with the information provided in APM, Part 2 to manage environmental impacts.

The APM Part 2 was released in the early 1980's as a guidance document for new airports. Over time it was recognized as a valuable tool for existing and expanding airports. Since 1996, it has been continually updated by the ICAO Committee on Aviation Environmental Protection (CAEP) Working Group 2 "Airports and Operations", to reflect new and emerging knowledge in the area of environmental management and land-use planning. An update in 2016 expanded the information related to recommended infrastructure decisions to facilitate environmentally-friendly airport design and management.

The following sections outline the essential areas of the APM, Part 2:

- Environmental Impacts Associated with Aviation Activities
- Environmental Management Measures and Considerations
- Infrastructure for Environmental Management
- Land Use
- Land-Use Planning
- Land-Use Administration
- Heritage Considerations
- Climate Change Resilience and Adaptation

General

The compatibility of an airport with its environs can be achieved by proper planning of the airport, management of pollution-generating sources, and land-use planning of the area surrounding the airport. The aim is to provide the best possible conditions for the needs of the airport, the community in the surrounding area, and the ecology of the environment. The location, size and configuration of the airport needs to be coordinated with patterns of residential, industrial, commercial, agricultural and other land uses of the area, taking into account the effects of the airport on people, flora, fauna, the atmosphere, water courses, air quality, soil pollution, rural areas and other facets of the environment.

To the extent that safety and operational considerations permit a choice, decisions on runway alignment and other airport

development should take into account their potential effects on the environment in order to prevent or minimize environmental conflicts. In effect, “land-use management” is a term which describes only a portion of the total planning process, and even highly innovative management practices can have little impact unless they are imposed within the context of sound policies and careful planning. “Land-use planning” or “planning for compatible land uses which takes into account the needs of airport development” more adequately describes the process of achieving an optimum relationship between an airport and its environs.

Pollution occurring in and around the airport can have an effect on human health and the ecology of a broad area surrounding an airport. Efforts should be made towards pollution prevention in the first instance and impact management in the second instance. Environmental management thus provides a means of either decreasing pollution at the source or reducing the potential for negative environmental impacts. Environmental management includes items such as air and water quality guidelines, aircraft engine or ground-sourced noise limits, waste management plans, environmental emergency plans, and environmental management plans. By planning for intended growth and development, estimations can be made about the type and extent of potential future environmental impacts to allow for a more integrated approach to environmental management.

Environmental Impacts Associated with Aviation Activities

APM Part 2 identifies most of the major environmental issues that may be directly associated with air transport and civil aviation in particular. The environmental issues described focus on land use, soil erosion, impacts on surface and subsurface water drainage, and the impact on flora and fauna. For each environmental issue presented, a brief description is provided, including a summary of past and present ICAO activities aimed at mitigating the issue, as well as comments on the relevant activities of other organizations, whenever pertinent.

Environmental Management Measures and Considerations

Implementation of environmental management measures at airports and surrounding areas is in the best interest of the airport operators, the community and the natural environment. These measures may include compliance with international standards and national and/or local regulations. They are implemented by airports, often in collaboration with airport stakeholders. When planning infrastructure development an airport operator should consider how environmental management will be integrated to reduce the impacts on operations and the environment.

Some measures limit pollution at its source, while others reduce its effect on communities and ecosystems. An Environmental Management System (EMS) is seen as the best method to

incorporate environmental management into all levels of corporate operations and decision-making processes. A well planned EMS at an airport can help to manage environmental impacts.

Airport operators can reduce the environmental impacts of their operations by incorporating environmental management plans and procedures with land-use planning. Several important components of environmental management at an airport are noise mitigation, emissions reduction and pollution prevention. Pollution prevention includes the use of materials, processes and practices that reduce or eliminate the creation of pollutants and wastes at the source. Adequate pollution prevention pre-empts the need for remedial actions later.

Infrastructure for Environmental Management

APM Part 2 provides high-level guidance material on the infrastructure that can be included in an airport design that can enable and facilitate environmental management by the airport operator.

Land-Use

Land use around airports can impact community exposure to the environmental effects of airport operations. As guidance on proper airport and land-use compatibility planning, APM Part 2 presents a variety of possible land uses with a broad appreciation of their relative sensitivity to the operational safety of aircraft and airport operations, local third party risk and aircraft noise exposure, and describes their compatibility with aircraft noise and airport operations.

Land-Use Planning

Land-use planning is an effective means to ensure that the activities nearby airports are compatible with aviation activities. Its main goal is to minimize the population affected by aircraft noise by introducing land-use planning measures, such as land-use zoning around airports. Compatible land-use planning and management based on appropriate “planning” noise contours, rather than “current” noise contours, can prevent encroachment of residential development at airports where future aircraft noise levels are projected to increase. ICAO Doc 9829 *Guidance on the Balanced Approach to Aircraft Noise Management* provides guidance on alleviating the problem of noise in the vicinity of airports. This Balanced Approach recommends consideration of four noise management pillars, one of which is land-use planning. There are substantial benefits to be gained from the correct application of land-use planning techniques in the development of airports. While these benefits should not be overstated, more attention should be given to proper land-use planning as a tool with the main objective being to minimize the population affected by aircraft noise. Land-use planning benefits may take time to be fully realized and should be implemented as soon as noise problems are foreseen.

Land-use Administration

Noise exposure is not the only factor to be taken into account for the purpose of land-use management in the vicinity of airports. It is recognized that economic factors are involved in land-use choices. Ideally, land-use decisions around airports would try to find a compatible balance between the interests in the land and the aeronautical use of the airport. For this reason, the authorities, local or central, have an important part to play in ensuring that aircraft noise exposure is taken into account when planning land-use in the vicinity of airports and that the ensuing plans are implemented.

There are many techniques for regulating development or bringing about conversion or modification of existing land-uses to achieve greater compatibility between the airport and its environs. Some of these may be controls, such as zoning or building and housing codes; other methods influence development through acquisition or taxation. The desired goal is for effective land-use planning based on objective criteria to minimize the amount of noise-sensitive development close to airports, while allowing for other productive uses of the land.

Heritage Considerations

Airports may be located within or close to natural or cultural environments that have aesthetic, historic, scientific, social or national significance which States may wish to protect for future generations. Airports may also include buildings and artefacts on site which are deemed to have heritage values. It is important, therefore, to consider in the planning of airport infrastructure whether any development proposal may impact upon heritage elements at the airport and how such impacts may be mitigated.

Climate Change Resilience and Adaptation

The level of greenhouse gas emissions in the atmosphere is understood to be having an effect on climate and will continue to do so into the future. According to the Intergovernmental Panel on Climate Change, “Climate change is projected to amplify existing climate-related risks and create new risks for natural and human systems”¹. Going forward, despite States’ agreement to limit global warming through the United Nations Framework Convention on Climate Change, the effects of a changing climate on human activities are expected to intensify; this presents risks and challenges for all sectors of society including the transportation sector.

APM Part 2 identifies possible impacts, risks and vulnerabilities and provides examples of effective adaptation and resilience practices to reduce projected climate change impacts on airports. Airports are often classified as critical infrastructure by their States and Regions as they facilitate mobility, economic growth, and provide essential services during disaster and emergency recovery situations. Moreover, any disruption that results in a loss of capacity at one airport can have a ripple effect throughout the wider network. In this context, it is important to develop resiliency against the projected effects of climate change, as they may negatively impact service continuity for aircraft and airport operations. The APM Part 2 provides guidance on how to address potential climate impacts in order to build more climate resilient infrastructure.

References

1. IPCC, Climate Change 2014, Impacts, Adaptation, and Vulnerability – Summary for Policymakers, Available at https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/ar5_wgll_spm_en.pdf