



Australian Government

**Department of Infrastructure, Transport,
Regional Development and Local Government**

Safeguards for airports and the communities around them

Discussion Paper



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PART A: Safeguards for operations at airports

The National Aviation Policy Green Paper, *Flight Path to the Future*, released on 2 December 2008 by the Minister for Infrastructure, Transport, Regional Development and Local Government, the Hon Anthony Albanese MP, identified the need for a more effective planning regime both on and off airport sites that supports the effective use of airports and the safety of aviation activity at the airport.

The Green Paper stated at page 169 that:

A unified risk-based framework could be developed to enable all levels of government to take responsibility for safeguarding airports from off-airport development that is incompatible with the future safe and effective operations of an airport. This framework would also need to consider whether safeguarding provisions should apply to both new and existing development or, if it is to apply to existing development, which criteria should be applied. The Government will initiate this approach through the public release of a more detailed discussion paper on a national airport safeguarding framework.

The Government is committed to working with the state and territory governments to develop a framework including initiatives such as:

- national airspace protection legislation that protects approaches to major airports to prevent intrusion into airspace by buildings approved at state and local government level;
- developing a clear policy on the definition of public safety zones around airports which can be taken into account in local planning with a view to ensuring that the community is not exposed to any undue level of risk from aircraft operations; and
- developing strategies and plans to address other airport related issues such as aircraft noise, traffic linkages, and best practice community consultation models.

The need for a coordinated approach

Airport sites are valuable transport, tourism, employment and business assets for the local and national economy. All governments have an interest in maintaining their operational capability and potential for growth. The development of airports needs to be considered in the broader context of the local economy, local community and the environment in which they operate.

Developments around airports and under flight-paths can constrain operations, either directly where they conflict with safety or operational requirements, or indirectly where they lead to public pressure to change flight paths, impose restrictions on operations, or close and move the airport.

Australia has an excellent safety record and the likelihood of an accident is very low. However, there is an inherent risk associated with flying and the operation of aircraft at or around airports.

A clear and coordinated regulatory environment for land use planning and development controls on and off airports would serve both aviation operators and the public.

A range of interrelated factors need to be considered:

- protection of community safety by ensuring commercial or residential developments do not occur in areas close to runway ends where there is a higher risk of damage from aircraft;
- protection of the safety of aircraft operations by preventing developments which could present a physical obstacle to aircraft, interfere with communications or navigation equipment, or produce significant hazards in the form of smoke or turbulence;
- preserving the reasonable amenity of areas surrounding airports and under flight-paths;
- providing for the effective use of the airport, recognising that airport sites are scarce and that aviation activity has a high economic value;
- the need for clarity in planning for land uses around airports to balance these factors.



The Government is keen to work cooperatively with State Governments and other planning authorities to ensure an appropriate balance is maintained between the social, economic and environmental needs of the community and the effective use of airport sites.

Airports can be affected by developments off the airport site. Buildings, other structures or plumes from chimney stacks can interfere with the safety of operations around the airport, reducing safety margins and restricting operational options. Developments under flight-paths, even some distance from the runway, often lead to complaints about aircraft noise and calls to restrict airport operations.

Equally, flights present safety risks for residences or businesses near the ends of runways. Increased operations at airports or changes in patterns of operation can also impact on the amenity of areas affected by aircraft noise.

A comprehensive and balanced approach to safeguards would incorporate actions designed to protect safety, support the effective use of airport sites into the future and protect amenity for communities near airports. It would also bring together an informed approach to managing risks on and off airports and ensure planning for the airport's future and planning for the surrounding areas are integrated.

A large number of complex factors impact on aviation safety. Responsibility for safe operations to and from airports is shared by airport operators, air navigation service providers, regulatory agencies and the airlines.

Some risks to aviation operations around airports, such as limiting the height of buildings and controlling bird and bat activity in the vicinity of airports, are well understood. Other concerns, such as how new development can have an impact on air flow across runways or the operation of navigational aids and radar, are not always as apparent.

There are also risks for those people living and working near airports. The risk to public safety from an air crash is quantifiable, with areas in the vicinity of a runway end considered to be at the greatest risk.

Examples of safeguard approaches

Public Safety Zones The specification of public safety zones (PSZs), that identify a quantifiable risk contour off the ends of runways based on runway use statistics correlated against international crash data, provides an objective basis for precautionary planning decisions in those areas of highest risk.

PSZs, as developed and applied in various forms internationally over some years, are used as the basis to limit new development activity that would increase the risk beyond acceptable levels. The PSZ approach takes account of the increased number of people who would live, work or otherwise congregate within such areas as a result of the development.

It needs to be acknowledged, however, that the identification of PSZs, even if only to manage any proposed future development, is likely to be a contentious issue with landowners, residents and occupants who currently live or work in these areas. Their interests are important and any decision to delineate areas of high risk around airports needs careful examination and community consultation.

Safety Management Systems Each airport has an ongoing responsibility as part of its Safety Management System (SMS) requirements under the Civil Aviation Safety Regulations 1998 (CASR) Part 139 to demonstrate how it has assessed all safety risks and the mitigation approaches it proposes to take, including to on-airport development. The effectiveness of this requirement is limited to the aerodrome property and has limited, if any, influence off-airport.

State and Overseas models The approach to safeguarding risks under the Queensland State Planning Policy 1/02 *Development in the Vicinity of Certain Airports and Aviation Facilities* (SPP 1/02) and its associated Guideline has more comprehensive application on and off airports. SPP 1/02 is based on the United Kingdom (UK) safeguarding model.

The UK safeguarding arrangements involve a framework to manage activities and consultations in relation to off-airport activities in order to minimise operational risks given the proximity of the activity to an aerodrome. The UK approach requires planning authorities to consult with 'officially safeguarded' civil and



military aerodromes and advises consultation with other aerodromes on local development activity in order to ensure that their operation is not inhibited by: tall buildings, structures or works which might infringe protected airspace, lighting that might confuse runway approaches or distract pilots, installations that might impair the technical performance of telecommunications, radar, radio and navigational aids, and development activity that might increase the risk to aircraft of birdstrike.

Wind turbine guidelines are in place as part of the UK framework to resolve issues prior to formal planning and ensure civil and military aviation needs are protected and PSZs are specified for ends of runways at the busiest airports.

In defining areas of greater risk, the UK approach is to establish guidelines, which assist local planning authorities in considering planning applications relating to land use in the vicinity of airports.

The Netherlands authorities also apply a risk management approach to a range of off-airport aviation hazards while Ireland applies a hybrid version of the UK and Dutch models.

Queensland's SPP 1/02 identifies airspace protection, bird hazards and also noise as matters affecting development in the vicinity of civil and military airports that require coordination and also provides for a generic PSZ model that should be applied to less busy airports.

The issues raised in this discussion paper potentially apply to all aerodromes in Australia, but the risks and complexity are much greater for the high volume airports in densely populated urban areas. Any further development of a possible national approach to safeguards will need to examine how the framework can apply across the variety of operational environments of our aerodromes.

An initial indication of the safeguarding elements, their key requirements and issues, the specific related regulations and guidelines available and potential options are summarised in Table 1.

Comment sought

Submissions are welcomed on any aspect covered in this discussion paper and also on matters not raised but which the submitter considers are relevant to the issue of safeguarding and its sub-elements.

Submissions (preferably in electronic formats Microsoft Word or Adobe Acrobat pdf) and enquiries in relation to the discussion paper should be directed to:

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Submissions should be made by **Friday 31 July 2009**.

Summary of possible elements of a safeguarding framework Table 1

The table below identifies key elements to be considered in a safeguarding framework including issues and potential options. Further discussion of these elements is included in Part B of this paper.

Safeguard Element	Key Requirement / Issue	Available Regulation and Guidelines	Potential Option(s)
Planning for Compatible Development	<ul style="list-style-type: none"> To support flexible land use planning which takes account of hazards/risks and threats to future operations arising in relation to new development activity. 	<ul style="list-style-type: none"> Australian Standard AS 2021 and associated state planning instruments. 	<ul style="list-style-type: none"> Enhanced national framework for planning and development controls near airports and under flight paths to be agreed between governments. Review of AS 2021 Supplementation of ANEF with other tools for describing aircraft noise.
Protection of Operational Airspace	<ul style="list-style-type: none"> The availability of a uniform take-off, landing and manoeuvring airspace guideline for planners: to protect aviation infrastructure, as defined by notional surfaces up to 15km around airports is adequately protected from the potential impact of new tall structures and vegetation on and off airports. 	<ul style="list-style-type: none"> <u>All civil</u>: Civil Aviation Safety Regulations 1988, Civil Aviation (Buildings Control) Regulations 1988, CASA Manual of Standards pt.139. <u>Federal airports</u>: The <i>Airports Act 1996</i> and Airports (Protection of Airspace) Regulations 1996. <u>Defence</u>: Defence (Areas Control) Regulations 1989. State and local government references to the above. 	<ul style="list-style-type: none"> Revision and Extension of Airports (Protection of Airspace) Regulations for all CASA-Certified and Registered aerodromes. Onus on developer to prove no detrimental impact on safety, efficiency and regularity of aviation operations.
Turbulence and Wind Shear	<ul style="list-style-type: none"> The availability of adequate guidance material to airports and developers to identify, assess and mitigate the potential impacts of turbulence and wind shear potentially arising from new development in close proximity to runways. 	<ul style="list-style-type: none"> No guidelines available. Airports would need to satisfy CASA safety concerns if raised in terms of consistency with airport SMS. 	<ul style="list-style-type: none"> Development of guidelines for case-by-case assessment.
Wildlife Hazards	<ul style="list-style-type: none"> Coordinated national guidelines and regulation for the effective management of the potential risks of bird strike in relation to land use planning within 15km of airports. 	<ul style="list-style-type: none"> ATSB monitoring and guidance. ICAO recommended practices. 	<ul style="list-style-type: none"> Formalised planning guidelines and standards to complement airport activity.
Wind Turbines	<ul style="list-style-type: none"> To reach agreement on criteria to be applied in the assessment of the potential impact of wind turbines (to 152m) on aviation infrastructure and effective notification procedures. 	<ul style="list-style-type: none"> Limited guidance from industry (CASA Advisory Circular currently under revision). 	<ul style="list-style-type: none"> National guidelines and regulations.

Safeguard Element	Key Requirement / Issue	Available Regulation and Guidelines	Potential Option(s)
Technical Facilities	<ul style="list-style-type: none"> The effectiveness of state and territory powers and of planning notification procedures regarding the potential impact on aviation facilities from new developments. 	<ul style="list-style-type: none"> ACMA electromagnetic compatibility emissions standards. 	<ul style="list-style-type: none"> Identification of issue in state and local planning safeguarding information.
Lighting and Pilot Distractions	<ul style="list-style-type: none"> The adequacy of legislation at all levels of government to restrict the use of lasers, high intensity lighting and other potential pilot distractions within 5km of airports. 	<ul style="list-style-type: none"> Civil Aviation Regulations 1988 and Manual of Standards pt.139. 	<ul style="list-style-type: none"> Formal requirement in state and local planning safeguarding information.
Public Safety Zones	<ul style="list-style-type: none"> To work with planning authorities on land use guidelines for areas adjacent to the end of a runway considered to be at the highest risk of on-the-ground fatalities from aircraft accidents, within which development of land should be restricted if it would be likely to increase significantly the numbers of persons residing, working or gathering there. 	<ul style="list-style-type: none"> No national guidelines available. Overseas models, notably UK framework, may be suitable. State Planning Policy SPP 1/02 applied in Queensland. 	<ul style="list-style-type: none"> Requirement for all passenger airports to have customised PSZs. Generic PSZs approach for other CASA-Certified and Registered aerodromes.

Part B: Issues and Options for Safeguards

Planning for compatible development

ISSUE: The need for a nation-wide cooperative land use planning approach that protects both the operations to and from the airport and the interests of surrounding communities

Airports are essential elements of regional and national transport networks and are valuable infrastructure investments. It is essential that airports are protected from off-airport development that could undermine their safety or operational efficiency. According to the International Civil Aviation Organization (ICAO), aircraft noise is the most significant cause of adverse community reaction to the operation and expansion of airports. Until recent years aircraft noise management and assessment focussed on areas 'close in' to an airport. It is now internationally recognised that the issue of community exposure and reaction to aircraft noise is not confined to areas inside conventional noise contours.

The nature of aircraft noise patterns around airports and subsequent public expectations have changed in recent years with increased community pressure to impose operational constraints on airports or oppose airport growth. The issues of concern are the level of noise generated by individual aircraft, increasing numbers of flights and decreasing periods of respite as airports get busier. Particular concerns include increased movements during the sensitive night time period and reduced respite periods on weekends.

Some state planning schemes provide guidance, or direction, on the acceptability of development in areas affected by aircraft noise, based largely on Australian Standard AS2021. AS2021 sets out a graduated series of recommendations for development as noise exposure increases. This is shown in Table 2 below.

Table 2 - Current Australian Standard AS2021

BUILDING TYPE	ACCEPTABLE	CONDITIONALLY ACCEPTABLE	UNACCEPTABLE
House, home unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

The Australian Noise Exposure Forecast (ANEF) system was established in the early 1980s to provide a system for land use planning around airports based on average daily community noise exposure levels calculated by reference to the anticipated volume and pattern of movements at a particular airport.

Computation of the ANEF takes into account the amount of noise generated by each aircraft type; the forecast frequency of aircraft types and movements on the various flight paths; and the time of day of each aircraft operation.

ANEF charts are provided for most aerodromes throughout Australia. The charts are plans of the aerodrome and the surrounding localities on which noise exposure contours of 20, 25, 30, 35 and 40



ANEF units have been drawn. These contours indicate land areas around an aerodrome which are exposed to average aircraft noise of certain exposure levels. The higher the ANEF value the greater the average daily noise exposure.

The ANEF system and the planning controls which are derived from the system, have a number of limitations:

- The system is a 'one size fits all' approach which does not take into account local circumstances - large airports are treated the same as small airports; greenfield airports are treated the same as built out airports;
- Experience has shown that ANEF contours do not provide a complete picture of the areas where residents are likely to have an adverse reaction to aircraft noise;
- The contours do not easily correlate to a publicly understandable 'decibel' noise level;
- ANEFs do not capture areas under very busy flight paths used by light aircraft, such as training circuits, which can be more annoying to some individuals than a small number of loud noise events; and
- Aircraft noise does not stop at a contour line on a map.

Notwithstanding the use of the ANEF system, complaints about aircraft noise around airports continue to lead to pressure to restrict aircraft operations and constrain airport operations. While some level of tension may be inevitable, there is scope to act to minimise community exposure, protect the airport activity and the economic benefits it provides and increase available information to increase the community's understanding of an airport's operations.

In response to community concerns, additional tools have been developed to assist individuals gain a clear understanding of aircraft noise exposure patterns - in particular the generation of information showing the location of flight paths and how often and at what times they are used. Noise information is provided in the form of descriptors based on single event contours (eg the N70 which shows how many noise events louder than 70dB(A) there are at a particular location).

The Government considers that it would be beneficial to develop and implement additional strategies for assessing and managing aircraft noise at much greater distances from airports than has conventionally been the case. Options for enhancement to the current arrangements include:

- Reviewing the ANEF system and clarifying whether it is solely a tool for land use planning or whether it has a role in describing noise exposure patterns around airports;
- A full review of AS2021 as a planning guide for state and local governments;
- In addition to the ANEF, provision of comprehensible noise information, such as flight path location and activity diagrams and N70s, enabling individuals to gain a clearer understanding of aircraft noise exposure patterns around airports which enables them, for example, to factor this information into decisions about house purchase;
- Ensuring that supporting the current and future operations of airports is one of the objectives of planning, and establishing arrangements for that objective to be balanced with others in planning and development decisions;
- Developing stronger arrangements for protection of corridors under flight paths, particularly avoiding residential and other noise-sensitive development in such corridors;
- Considering more conservative criteria for noise-sensitive developments under flight-paths, particularly in relation to development of greenfield sites or where other options are available; and
- Considering special arrangements for state and local government consultation with the Commonwealth government on proposed developments around federal airports so that the impacts on airport operations can be fully assessed and taken into consideration in decision-making.

- 1. Does the ANEF system provide an effective basis for planning in noise affected areas?**
- 2. How effective is the ANEF system as a land use planning standard for greenfield developments around airports?**
- 3. Are the acceptable levels of aircraft noise for particular develops identified in AS2021 consistent with current community expectations?**
- 4. How can the current planning arrangement to address developments in noise-affected areas around airports and under flight paths be improved to take account of community expectations, while also providing for the reasonable growth of aviation activity at airports?**
- 5. For developments around the major capital city and freight airports, should state governments have to refer residential development within a defined buffer zone to the Commonwealth Transport Minister or Secretary for approval?**

Protection of operational airspace

ISSUE: Development of a uniform policy guideline for planning authorities to regulate the potential impact on aviation from new tall structures and vegetation (i.e. trees) on and off airports.

Commonwealth legislation – the Airports (Protection of Airspace) Regulations 1996 (Airspace Protection Regulations), CASR, the Civil Aviation (Buildings Control) Regulations 1988 and CASA’s Manual of Standards Part 139 – identifies the need for consistency with internationally agreed criteria for protecting the low level airspace up to 15km radius around all civil aerodromes from tall buildings and other structures, smoke (or other particulate matter) and plumes.

‘Airports require airspace in their vicinity to allow for aircraft landing, take-off or manoeuvring operations to be undertaken safely and efficiently. This airspace is described as operational airspace. During these operations, pilot workload is greatest and the aircraft is least manoeuvrable. Different airspace requirements are defined for visual and non-visual flight conditions. This depends on whether or not a pilot has the scope to operate below cloud with sufficient visibility to see and avoid other aircraft and/or obstacles while completing landing or take-off manoeuvres.’¹

The approach, departure and manoeuvring paths form the protected notional surfaces of:

- the Obstacle Limitation Surface (OLS, see diagram below) for visual flight procedures; and
- the Procedures for Air Navigation Systems Operations (PANS-OPS) which relate to instrument procedures and are generally located above the OLS.

These surfaces are ascertained in accordance with International Civil Aviation Organization (ICAO) Annex 14 and ICAO document 8168.

Defence aerodromes are protected under the Defence (Areas Control) Regulations 1989. The Defence Obstacle Clearance Surfaces (OCS) are very similar to the OLS. The OCS are detailed in ADFP 602 - Joint Works and Administration Aerodrome Design Criteria.²

The Airspace Protection Regulations for the leased federal airports provide a well-established model for protecting operational airspace from tall structures and developments. Proposed activities that would infringe airspace require approval by DITRDLG, subject to the advice of CASA, Airservices and the

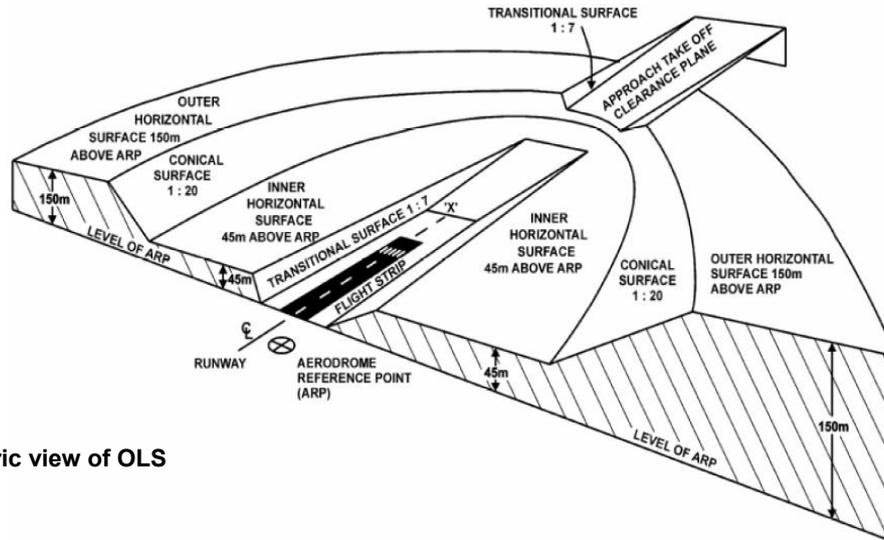
1 SPP 1/02 Guideline 3.1 p.3

2 And also Joint Obstruction Clearance Surfaces or JOCS – a combination of the military OCSs, height restriction zones and the civilian OLS and PANS-OPS as depicted in the *Defence (Areas Control) Regulations 1989*

airport operator company with input from the proponent, the building authority and, if relevant, Defence.

There is no equivalent for certified or registered aerodromes other than the federally leased airports.

Despite this, or perhaps because these regulations do permit infringements of operational airspace, significant development encroachment on operational airspace continues.



Isometric view of OLS

While the basic principles of airspace protection may be simple, proposals for constructing tall buildings in the vicinity of major airports are often promoted with little regard to the possible impact on safe aviation activity and developers are often ignorant of the problem or of Commonwealth regulations, where they apply.

The reasons may lie with intrusions into airspace being permitted if the potential impacts are not considered significant and in the difficulty in identifying the extent of the potential impact of a development:

- assessment of proposals for controlled activities, i.e. intrusions into the OLS, may be complex, requiring an identification of the potential impact on safety, efficiency and regularity of aircraft operations;
- planning authorities may not have easy access to an airport's OLS and PANS-OPS charts, to identify surface heights at particular locations for developers;
- it may not be possible to identify wide development areas ('blanket shielding') or anticipate reference to existing tall structures as being sufficient, as the application for each controlled activity is likely to result in a different impact assessment: and
- the impact of a particular intrusion may not appear significant but may become significant when its cumulative effect is considered with other intrusions.

Effective measures for the protection of airspace and also PSZs (below) that balance complex technical provisions with simple comprehensible principles will require considerable coordination of the roles and responsibilities of all tiers of government.

- 6. Should the current protection of airspace regulatory provisions be strengthened and broadened to cover all CASA-Certified and Registered aerodromes?**
- 7. How might state, territory and local government planning rules help protect airports from encroachment by unsafe intrusions into airspace?**

Turbulence and wind shear

ISSUE: To establish effective protocols for the assessment and possible mitigation of turbulence and wind shear potentially arising from new development in close proximity to runways.

During 2007, the Department of Infrastructure, Transport, Regional Development and Local Government formally raised the question of how to manage safety issues, including establishing PSZs, with the operators of the leased federal airports. Notable in their concerns was receiving guidance on managing mechanical turbulence and wind shear impacts from buildings encroaching aerodromes. There are no formal guidelines on the assessment and possible mitigation of turbulence and wind shear.

The ICAO Manual on Low Level Wind Shear notes 'it will always be a serious hazard for aviation and a potential killer, and there must be continued vigilance and pilot training on wind shear.'³ As proximity is a critical factor, wind shear and turbulence issues will usually be an on-airport consideration. The potential impacts of proposed developments close to runways should be appropriately modelled.

Schiphol Airport in the Netherlands takes a proactive approach to assessment of the potential risks posed by new buildings encroaching on the aerodrome, undertaking modelling for all new buildings. The Dutch use a one in 35 ratio 'rule of thumb' for investigating buildings over a certain height to distance from any runway centreline.

A range of factors need to be considered: the bulk and form of the building, both upstream and downstream wind flows, prevailing and adverse seasonal weather conditions, the potential to mitigate impacts upstream through landscaping or other development activity and the specific location and orientation of development activity in relation to critical points on the runway.

Even at smaller airports, encroaching development and vegetation off-airport but close to the runway may significantly increase the potential for adverse flying conditions, particularly for landing light aircraft.

Increased planning powers for state, territory and local government decision-making may be required to prevent encroachment on aerodromes where existing or potential safety impacts are identified. Such hazardous encroachment may be under operational airspace.

There are a large number of variables in determining the impact of turbulence from a development: shielding and actual building profile are major considerations as are the potentially mitigating factors up and downstream of terrain, vegetation and development. This may require coordination of on and off airport development activity at some locations.

It might not be possible, therefore, to set a practicable standard and provide specific guidance and regulations for mechanical turbulence. It might be more appropriate to require expert modelling and risk assessment. On airport this would be on a building-by-building basis and in line with an airport's Safety Management System, as endorsed by CASA. Seeking a credible assessment for off-airport developments (where applicable) might be an acceptable approach.

8. Should there be a consistent industry standard for mechanical turbulence and wind shear? If so, should the standard be proscriptive or allow for a case by case assessment?

9. Should expert modeling reports on turbulence and wind shear be mandatory for developments in close proximity to runways and who should bear the cost?

3 Doc 9817 *Manual on Low Level Wind Shear*, ICAO 2005, Foreword p.iv

Wildlife hazards

ISSUE: The adequacy of existing land use provisions for the management of birdstrike (including bats).

Another significant issue to consider with airport operation is birdstrike, where birds and bats collide with aeroplanes in normal flight or adjacent to airports.

Protocols exist under Commonwealth legislation for reporting and reviewing bird strike incidents. Bird strike incidents must be reported to the Australian Transport Safety Bureau (ATSB). Over the five year period 2002 to 2006, the ATSB reported there were 5,103 reported bird strikes in Australia and around 7.5 per cent of all birdstrike occurrences caused damage to the aircraft.⁴

Airports employ a wide range of effective measures to limit wildlife activity in the vicinity of airports. ICAO Annex 14 recommends monitoring and restrictions on certain types of development activity and land uses, notably waste disposal sites, within 13km of airports.

Such incidents as simultaneous bird strike causing double engine failure to an Airbus 320 and the landing of the US Airways Flight 1549 on New York's Hudson River in January 2009 are extremely rare and the probability of a significant aircraft accident remains low. As modern aircraft and aircraft engines are designed to minimise the resultant consequences, the impacts are normally confined to structural damage and the efficiency and regularity of service.⁵

Nevertheless, planning approval authorities need to take into account the potential for any development to increase the level of attraction for bird life within the vicinity of an airport. Sites that might increase the risk of bird strikes to aviation also include landfill sites, wetlands and nature reserves.

While every airport will have its own set of wildlife management issues, it would be possible to deliver national guidelines on best practice approaches and, where necessary, planning authorities might apply regulatory standards that protect both aviation and the public.⁶

Planning authorities could seek expert assurance that landscaping activity does not increase birdstrike risks and, if not already doing so, consult with the airports in limiting attractions for bird life.

If not already a feature of planning regulation, it may be appropriate for planning approvals to identify these considerations and place relevant conditions on development applications, such as a landscaping condition, requiring that the proposal does not include landscaping or water features that may increase the risk of bird strike to aircraft using the airport.

To ensure that there is no unnecessary congregation of birds and flying foxes, landscaping around airports could be reviewed continually, including:

- monitoring the activity of birds and flying foxes in the existing landscaped areas, making modifications as necessary to reduce the attractiveness of these areas; and
- designing landscaping and vegetation selection to avoid attraction of birds and flying foxes.

10. Given variable regional circumstances for birds and flying foxes, would a recommended standard zone (e.g. 15km radius) be appropriate?

11. What other planning issues might arise in safeguarding against birdstrike?

4 See ATSB Report AR-2008-027 *An analysis of Australian birdstrike occurrences 2002 to 2006* (June 2008): <http://www.atsb.gov.au/publications/2008/pdf/AR2008027.pdf>

5 At Perth in August 2005, a Malaysian Boeing 777 sat on the ground for 28 hours after ingesting just one galah. The engine was flown in and passengers delayed for connecting flights

6 See the Australian Aviation Wildlife Hazard Group at aawhg.org, with government and industry representatives set up in response to the ATSB research paper *The Hazard Posed to Aircraft by Birds*, March 2003



Wind turbines

ISSUE: To reach agreement on the rules and notification procedures for assessing the impact of wind turbines.

While turbulence from wind generator turbines may not be an aviation hazard, as a physical obstacle, wind farms have the potential to be a controlled activity under the Airspace Protection Regulations, and they can also distort radar performance and cause electromagnetic interference at certain frequencies.

Recognising the growing number of wind farm developments across Australia, it may be appropriate to establish consistent planning protocols. It is suggested that:

- all proposed wind turbine sites should be notified to CASA prior to application for planning permission; and
- planning authorities should forward all proposals for wind turbine sites within a 30km circle of an aerodrome to the aerodrome operator concerned, to ensure that both civil and military aviation interests are recognised.⁷

There is also the need to address potential impacts on aviation safety further away from aerodromes. Turbines more than 152m above ground pose a hazard, particularly in conditions of poor visibility, as normal aircraft operations are permitted down to that height.

While limiting their visual impact in the landscape would be a local consideration, high visibility of wind turbines to pilots flying at low altitudes is a safety priority. Defence requires visibility of all wind-turbine developments that may impact flying training, regardless of height or the distance from military airfields.

Where it has been determined that a planning application for a proposed development may have an effect on navigational or other aeronautical systems, it is common for simulation or other types of interference modelling of the effects of the development to be conducted.

12. What guidance do state, territory and local governments require on the siting of wind farms and the potential impacts on aviation?

13. Should developers of wind farms be required to provide CASA with a report on the potential impacts on aviation and aviation infrastructure of the turbines?

⁷ CASA requires notification of potential infringements of protected airspace, i.e. within 15km of an aerodrome or, under regulation 139.365 of CASR, where the height of a proposed wind turbine is going to be 110m or more above ground level. CASA Advisory Circular AC 139-18(0) *Obstacle marking and lighting of wind farms* (July 2007 - www.casa.gov.au/rules/1998casr/139/139c18.pdf) has recently been withdrawn pending revision. See also Auswind - *Best Practice Guidelines for Implementation of Wind Energy Projects in Australia*, December 2006 pp.30-32: www.auswind.org, and UK CAA *Policy and Guidelines on Wind Turbines CAP 764* (July 2006): www.caa.co.uk/docs/33/Cap764.pdf

Technical facilities

ISSUE: The effectiveness of existing planning rules to minimise the impact of new developments on radar and navigation systems.

The size, shape and construction materials used in a development may affect the performance of aeronautical systems, such as radar and navigational aids, within 5km of an aerodrome or technical site.

Telecommunication, broadcasting or other radiating equipment can also cause electromagnetic interference to radar and navigational systems.

On airport sites priority needs to be given to preserving the integrity of air traffic management (ATM) infrastructure such as towers, control units, radar navigational aids and rescue and fire fighting facilities.

Whether a leased federal airport or not, an aerodrome operator needs to consult with the ATM provider, so that new development does not affect the operation of ATM infrastructure already in place and also has regard to potential future ATM infrastructure requirements.

The surveillance and navigation systems, including radar, operated by Airservices and by Defence are calibrated to perform within their specific environment. However, these systems can accommodate new developments near an airport if the new development is managed with the input of Airservices and/or Defence.

Farther afield, as with wind farms, other aviation infrastructure, such as ADS-B (Automatic Dependent Surveillance – Broadcast) ground stations operated by Airservices may also be affected. Again an automatic referral in the early stages of planning for technical facilities would enable CASA to coordinate a response about possible impacts.

Just as conditions placed on approvals of controlled activities under the Airports (Protection of Airspace) Regulations may require resolution of reflection or interference issues to the satisfaction of Airservices, so developers could be required to take account of the impact of proposed development on radar and navigational systems and other technical sites. Approval of major developments on the leased federal airport sites, under Part 5 of the *Airports Act 1996*, requires input from both CASA and Airservices on the potential impacts of proposals.

As with the other identified safeguarding elements, increased powers for planning approval authorities may be required to prevent hazardous encroachment to aerodromes. Where necessary, planning authorities might establish procedures to assist in meeting this requirement. In addition to approaching an aerodrome operator, contact with other aviation organisations, notably Airservices and/or Defence, may be appropriate to ensure the proposal does not impact on their electronic systems.⁸

Defence considerations would also need to be addressed in any consultation with respect to planning approvals in the vicinity of Defence and joint-user aerodromes.

14. Should development of technical facilities near aerodromes (say within 5 km) require automatic referral to CASA for assessment of impact on radar and navigation systems?

15. What additional guidance do state, territory and local governments require on the siting of technical sites and the potential impacts on radar and navigation systems?

⁸ See the electromagnetic compatibility framework managed by the Australian Communications and Media Authority: www.acma.gov.au/WEB/STANDARD/pc=PC_310704

Lighting and pilot distractions

ISSUE: The adequacy of existing laws to restrict the use of lasers, high intensity lighting and other potential pilot distractions in the vicinity of airports.

As lighting or reflective surfaces may dazzle or distract pilots and air traffic controllers, planning authorities could verify that the lighting of roads, railways and other development proposals within 5km of an aerodrome do not suggest a runway configuration, particularly in conditions of poor visibility.

Under the Manual of Standards Part 139 Section 9.21, CASA 'has the power through regulation 94 of the Civil Aviation Regulations 1988 (CAR 1988), to require lights which may cause confusion, distraction or glare to pilots in the air, to be extinguished or modified. Ground lights may cause confusion or distraction by reason of their colour, position, pattern or intensity of light emission above the horizontal plane.'⁹

In addition to the regulation of the use of high intensity lights and similar to the protection of navigable airspace as prescribed through OLS and PANS-OPS surfaces and surface heights, it may be necessary to identify a range of potential restrictions on outdoor laser operations, to protect aircraft operations within operational airspace.¹⁰ If not already addressed, state, territory and local authorities might regulate to take account of this obligation in approving any infrastructure scheme.¹¹

16. Are CASA's current requirements sufficient, and what additional guidance might state, territory and local governments require regarding lighting and pilot distractions?

Public safety zones (PSZs) and third party risk

ISSUE: To work with planning authorities to identify zones adjacent to the end of a runway where special considerations might be applied to new developments to maximise safety.

Safety areas off the ends of runways (on and off-airport) have been used overseas for several years to minimise the risk of damage by aircraft during landing or take off. In recent years, the UK and Netherlands have established the concept of runway-specific PSZs, while the USA has Runway Protection Zones (RPZs).

Identification of a PSZ may assist planning authorities ensure new development within the zone do not add unduly to existing levels of risk.

The boundaries of a PSZ would be determined by reference to levels of statistical chance of an accident at a particular location. The number of aircraft movements, and the distance of the location from the critical take-off and landing points, would be considered to model the total statistical chance of a fatal accident at the location over a one-year period. In line with the broad approach to PSZs overseas, a conservative approach might be adopted, with the PSZ defined, for example, to include those areas where it is assessed that there would be more than a one in 100,000 chance of a fatality in a year.

The PSZ system is primarily a means for focussing attention on potential new developments, but a defined PSZ may also include areas where development already exists. Overseas experience suggests the impact of introducing PSZs would be limited, and that remedial action for existing development has rarely been called for.

9 See: www.casa.gov.au/rules/1998casr/139/139m09.pdf

10 For example, FAA Order JO 7400.2G Procedures for Handling Airspace Matters (April 10, 2008) – Part 6. Miscellaneous Procedures, Chapter 29 Outdoor Laser Operations and Chapter 30 High Intensity Light Operations. See: http://www.faa.gov/airports_airtraffic/air_traffic/publications/at_orders/media/Basic7400.2G.pdf

11 *Safeguarding Aerodromes, Technical Sites and Military Explosives Storage Areas: The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) Direction 2002*, UK (January 2006 updated) p.10 notes that British Standard 5489 Part 8 identifies a 4.8 km proximity: www.dft.gov.uk/pgr/aviation/safety/safeguarding



The shape of PSZs for larger airports with frequent passenger traffic can be customised on the basis of statistical data about the nature and frequency of aircraft movements at the particular runway end to reflect the specified level of statistical risk. The PSZ defined by this quantitative risk method is typically a narrow triangular zone tapering from the runway end.

For smaller airports with a high proportion of light aircraft, an option is to use a shorter generic public safety zone in a trapezoid shape, based on a precautionary approach.

Where a PSZ is identified, additional scrutiny might be considered for new developments that:

- increase residential use and population density in the zone;
- attract large numbers of people, such as major retail or entertainment developments;
- involve institutional uses, such as schools and hospitals;
- involve the manufacture or depot storage of noxious and hazardous materials; and
- attract significant static traffic.

Examples of new developments that would not be affected may include:

- property extensions not increasing population density
- warehouse development (where the number of people is low);
- low intensity use public open space, but not playgrounds and sports grounds;
- long stay surface car parking;
- agriculture and mineral extraction (not increasing bird hazards); and
- road and rail infrastructure – risk assessed.

- 17. Should an approach based on the identification of public safety zones be introduced to help ensure that new developments around the ends of runways do not lead to undue levels of risk?**
- 18. For which airports might such public safety zones be identified – all airports or only major airports with regular airline traffic?**
- 19. What methodology and criteria should be applied in defining the boundaries of a PSZ?**
- 20. What sort of additional controls might be imposed for new developments in identified PSZs?**
- 21. What sort of steps might be taken to ensure the identification of a PSZ does not unduly affect the value and enjoyment of existing properties within the zone?**

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