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WESTERN AUSTRALIAN PLANNING COMMISSION

STATEMENT OF PLANNING POLICY No. 5.1

LAND USE PLANNING IN THE VICINITY OF PERTH AIRPORT

FEBRUARY 2004

PREPARED UNDER SECTION 5AA OF THE TOWN PLANNING AND DEVELOPMENT ACT 1928 (AS AMENDED) BY THE WESTERN AUSTRALIAN PLANNING COMMISSION AND ISSUED WITH THE APPROVAL OF THE MINISTER FOR PLANNING AND INFRASTRUCTURE AND HIS EXCELLENCY THE GOVERNOR

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1. INTRODUCTION AND BACKGROUND

1.1 Perth Airport as an Element of Regional Development

Perth Airport is fundamental to the continued development of the Perth Metropolitan Region and the State as a whole. Investment in airport infrastructure and the economic opportunities associated with the operation of the airport are now recognised as an important, and perhaps critical element in the prosperity of a city such as Perth.

Accordingly, the airport and its ongoing development need to be recognised in the planning of the region, and its operation protected as far as practicable from development with the potential to prejudice its performance. One of the main issues to be addressed in the planning of areas in the vicinity of the airport is aircraft noise, which is the focus of this Policy.

1.2 Development in the Vicinity of Perth Airport

While aircraft noise is a significant environmental factor to be considered in relation to land use planning in the vicinity of Perth Airport, there are other issues which need to be addressed. A more sustainable pattern of development requires a greater level of consolidation, which means that it is not feasible to exclude all noise-sensitive development from the environs of Perth Airport.

There are a number of existing built-up areas in the vicinity of Perth Airport which are already affected by significant levels of aircraft noise, and the extent of affected areas is likely to expand in the future as a consequence of the growth in air traffic and the development of new runway facilities. The challenge in planning for these areas is to manage the impact of aircraft noise, taking into account the interests of existing communities and the needs of a growing metropolitan region.

1.3 Need for Co-operation

Because of the division between Commonwealth, State and local responsibilities, a co-operative approach is needed, in which land use planning agencies at both State and local level work with the airport operator and relevant Commonwealth agencies to achieve a satisfactory outcome for all stakeholders. This involves—

- an appreciation of the strategic importance of the airport and its operational requirements;
- an appreciation of the nature and significance of development and community interest which exists in the vicinity of the airport; and
- a stable and predictable framework within which to plan for the future use and development of the airport and land in the vicinity of the airport.

1.4 Aircraft Noise Measurement

The system of aircraft noise measurement used in Australia for the purposes of evaluating land use compatibility is known as the Australian Noise Exposure Forecast (ANEF) system. This system is employed to produce the following noise measures, which are usually illustrated in the form of noise exposure contours—

- ANEF—being a noise exposure *forecast* for a particular time in the future or based on particular circumstances such as ultimate capacity;
- ANEI—being a noise exposure *index* based on data for a previous year where the exact numbers and types of aircraft which used the airport are known;
- ANEC—being a noise exposure *concept* depicting possible noise exposure levels based on a predetermined set of assumptions about the operation and use of the airport.

1.5 Australian Noise Exposure Forecast

This Policy is predicated upon the ANEF prepared by Westralia Airports Corporation in consultation with Airservices Australia as shown in Figure 1. A brief overview of the modelling including the inputs and assumptions underlying the forecast, is included in Appendix 3. The level of operations adopted for the forecast is 350,000 movements per year. The ANEF will be referred to with reference to the movement figure, i.e. ANEF (350,000). The noise modelling will be reviewed approximately every five years.

1.6 Impacts of Aircraft Noise

The impact of aircraft noise on residents in proximity to airports is subjective and is influenced by a number of factors including attitudes toward the aviation industry, personal sensitivity to noise and fear of aircraft crashing. Figure A1 of *Acoustics-Aircraft Noise Intrusion-Building Siting and Construction* (AS 2021) indicates that 17% of the population is seriously affected by aircraft noise at the 25 ANEF noise contour. This figure increases to 27% at the 30 ANEF noise contour.

1.7 Policy Measures

Policy measures have been based on the *Building Site Acceptability* table from AS 2021. However, the policy measures included in this Policy provide more definitive guidance with respect to those matters identified as discretionary in the AS 2021.[1]

[1] AS 2021 *Acoustics-Aircraft Noise Intrusion-Building Siting and Construction*, is purely advisory, and has no direct statutory application.

2. APPLICATION OF THE POLICY

This Policy applies to land in the vicinity of Perth Airport, which is, or may in the future, be affected by aircraft noise. Policy measures outlined in Section 4 apply to land within the 20 ANEF noise contour.

3. OBJECTIVES

The objectives of this Policy are to—

- protect Perth Airport from unreasonable encroachment by incompatible (noise-sensitive) development, to provide for its ongoing development and operation; and
- minimise the impact of airport operations on existing and future communities with reference to aircraft noise.

4. POLICY MEASURES

4.1 Interpretation

ANEF Level

Refers to the level of noise exposure forecast under the ANEF (350,000) and illustrated in Figure 1. Noise exposure contours are illustrated at intervals of 5 ANEF units beginning at 20 ANEF and ranging up to 40 ANEF.

Noise Exposure Zone

Refers to the areas within a specified range of noise exposure levels as illustrated on the ANEF (350,000) contour plan in Figure 1. Noise exposure zones referred to in this policy include—

- areas below 20 ANEF (350,000);
- areas between 20 ANEF (350,000) and 25 ANEF (350,000); and,
- areas above 25 ANEF (350,000)

In the case of sites which are dissected by one or more of the nominated noise exposure contours, the following interpretation shall apply—

(i) Where the site has an area less than 1000m^2, the noise exposure zone for the whole site shall be deemed to be the level to which the majority of the site is subject.

(ii) Where the site has an area greater than 1000m^2, the noise exposure zone shall be determined separately for the individual parts of the site into which it is divided by the relevant noise exposure contour(s).

Building Site Acceptability

Refers to the acceptability of sites for particular building types within various ANEF zones. Appendix 1 includes a classification of building site acceptability, which has been adapted from AS 2021. Building types are classified as acceptable, conditionally acceptable or unacceptable depending on the sensitivity of associated use or occupation of the building and the level of noise exposure forecast for the site.

4.2 Areas below 20 ANEF (350,000)

There is no restriction on zoning or development within this noise exposure zone, which is identified as acceptable for all building types in the Building Site Acceptability table in Appendix 1. However, according to the Australian Standard, noise nuisance may still be experienced in areas below the 20 ANEF exposure level, particularly in the case of newly exposed communities.

4.3 Areas Between 20 ANEF (350,000) and 25 ANEF (350,000)

4.3.1 Zoning

(1) Zoning and associated development control provisions should take into consideration the level of noise exposure forecast for the area and the Building Site Acceptability for the particular noise exposure zone as identified in Appendix 1. This includes structure planning by which development is controlled.

(2) Development involving building types identified as conditionally acceptable with reference to the Building Site Acceptability table in Appendix 1, should be subject to discretionary control under local government town planning schemes. Such development includes—

- dwellings and caravan parks
- educational establishments
- child-care premises
- hospitals and nursing homes
- places of worship
- cinemas, theatre and exhibition centres

4.3.2 Residential Density

Where land is zoned for residential purposes, or to permit residential development, the maximum dwelling density should generally be limited to R20, except where—

- there is a strategic need for more consolidated development,

- a higher density coding is desirable to facilitate redevelopment or infill development of an existing residential area, and,
- there is some other public interest reason which justifies the need for higher density coding.

4.3.3 Subdivision and Strata Subdivision

(1) Subdivision and/or strata subdivision may be approved, provided it is consistent with the zoning and density coding of the land.

(2) Where no density coding is prescribed for Residential zoned land, the maximum density should generally be limited to R20, except as provided for in relation to the application of residential density controls under clause 4.3.2.

4.3.4 Development

(1) Development may be approved, provided it is consistent with the zoning and density coding of the land under the operative town planning scheme.

(2) In the case of development which is subject to discretionary control under an operative town planning scheme (as provided for under clause 4.3.1), the impact of aircraft noise on the users or occupiers of the development should be taken into consideration in the determination of applications, and where relevant, in the imposition of conditions of approval.

(3) Where no density coding is prescribed for Residential zoned land, the maximum density should generally be limited to R20, except as provided for in relation to the application of residential density controls under clause 4.3.2.

4.3.5 Noise Insulation

(1) Noise insulation is not mandatory for residential development within this noise exposure zone. However, some areas may experience peak aircraft noise levels in excess of the Indoor Design Sound Levels specified in AS 2021, and noise insulation is recommended in such cases.

(2) Noise insulation requirements for development other than residential, which is identified as conditionally acceptable with reference to the Building Site Acceptability table in Appendix 1, should be determined having regard to—

- levels of aircraft noise likely to be experienced at the site;
- likely noise attenuation from the type of construction proposed;
- background noise level to which the site is subject;
- times of day or night when overflights are likely to occur;
- frequency of overflights by the various classes of aircraft; and
- occupational characteristics of the proposed development.

(3) Closure of windows and other openings to habitable rooms can significantly reduce the intrusion of aircraft noise. This will normally require forced ventilation, and may also necessitate some form of active cooling, such as refrigerative air-conditioning. However, the operational management of buildings is outside the ambit of this policy, and will therefore be subject only to advice.

4.3.6 Notification on Title

A notice on title advising of the potential for noise nuisance is to be required as a condition of subdivision or planning approval within this noise exposure zone, except where the proposed building type is identified as acceptable with reference to the Building Site Acceptability table in Appendix 1. Appendix 4 includes standard wording to be used in notices and memorials on title.

4.3.7 Advice to Developers

(1) Advice should be provided in association with applications for planning approval and building licences, of the potential for noise nuisance and any noise insulation requirements or recommendations in accordance with the provisions of clause 4.3.5. Developers should also be made aware of the benefits of window closure and the associated need for forced ventilation.

(2) Information about aircraft types and the timing and frequency of aircraft operations is available from Westralia Airports Corporation. AS2021 includes tables of peak noise levels for selected aircraft types and specific locations in the vicinity of the airport runways.

4.4 Areas Above 25 ANEF (350,000)

4.4.1 Zoning

(1) Zoning and associated development control provisions should take into consideration the level of noise exposure forecast for the area and the Building Site Acceptability for the particular noise exposure zone as identified in Appendix 1. This includes structure planning by which development is controlled.

(2) There is a presumption against zoning which may permit development involving building types identified as unacceptable with reference to the Building Site Acceptability table in Appendix 1. This includes particularly residential zoning, where the predominant type of development is likely to be housing.

PLEASE REFER TO THE PRINTED COPY FOR COLOUR MAP INSERT

(Pages 624 – 625)

(3) Where land has already been zoned to permit development defined as unacceptable, and where in the opinion of local government, it is not practicable to allocate the land for alternative uses, existing zoning may remain.[2]

(4) Development involving building types identified as either conditionally acceptable or unacceptable with reference to the Building Site Acceptability table in Appendix 1, should be subject to discretionary control under local government town planning schemes. Such development includes:

- dwellings and caravan parks
- educational establishments
- child-care premises
- hospitals and nursing homes
- places of worship
- hotels and motels
- residential buildings
- offices and shops
- medical centres
- restaurants

(5) Under no circumstances should Rural or other non-residential zoned land be rezoned for residential development or any other form of development involving building types identified as unacceptable with reference to the Building Site Acceptability table in Appendix 1.

(6) In considering the practicability of alternative land uses, local government should give particular emphasis to areas forecast to be affected by noise exposure levels above 30 ANEF.

4.4.2 Residential Density

(1) Where alternative (non-residential) zoning of existing Residential zoned land is not practicable, the density of development should generally be kept to a minimum. Possible exceptions are where—

- a higher density is necessary to facilitate redevelopment or infill development of an existing residential area;
- there is a strategic need for more consolidated development;
- there is some other public interest reason which justifies the need for higher density coding, and
- a higher density would facilitate the concurrent provision of noise insulation in accordance with the indoor design sound levels prescribed in AS 2021.

(2) In areas subject to noise exposure levels above 30 ANEF, the permissible density of residential development should generally not be increased.

4.4.3 Subdivision and Strata Subdivision

(1) No further subdivision or strata subdivision is to take place where it would result in an increase in the number of dwellings which may be developed, unless it is consistent with the zoning and density coding of the land under the operative town planning scheme.

(2) Where no density coding or minimum lot size is prescribed for Residential zoned land, the maximum density should generally be limited to R12.5 except as provided for in relation to the application of residential density controls under clause 4.4.2.

4.4.4 Development

(1) No further development is to take place where it would result in an increase in the number of people likely to be accommodated, unless it is consistent with the zoning and density coding of the land.

(2) In the case of development which is subject to discretionary control under an operative town planning scheme (as provided for under clause 4.4.1), the impact of aircraft noise on the users or occupiers of the development should be taken into consideration in the determination of applications and where relevant, in the imposition of conditions of approval.

(3) Where no density coding is prescribed for residential zoned land, the maximum density should generally be limited to R12.5, except as provided for in relation to the application of residential density controls under clause 4.4.2.

4.4.5 Noise Insulation

(1) Except as provided for in this clause, noise insulation is required as a condition of planning approval, for all development involving building types identified as 'unacceptable' with reference to the Building Site Acceptability table in Appendix 1. This includes in particular all new residential development, educational establishments, hospitals and nursing homes.

[2] Australian Standard 2021 recognises that many non-aviation factors have to be taken into account in decisions about land use, and that where established residential development exists, it is generally not appropriate to apply the recommended land use compatibility criteria unless the opportunity for re-zoning arises.

(2) Noise insulation requirements for development involving building types identified as conditionally acceptable with reference to the Building Site Acceptability table in Appendix 1, should be determined having regard to the—

- levels of aircraft noise likely to be experienced at the site;
- likely noise attenuation from the type of construction proposed;
- background noise level to which the site is subject;
- times of day or night when overflights are likely to occur;
- frequency of overflights by the various classes of aircraft; and
- occupational characteristics of the proposed development.

(3) Where practicable, the standard of insulation required should be based on achievement of indoor design sound levels recommended for the particular building type or activity in AS 2021. (Refer to *Indoor Design Sound Levels for Determination of Aircraft Noise Reduction* in Appendix 2.) For the purposes of this Policy, guidance as to the practicable standard of insulation may be obtained from the Deemed to Comply Noise Insulation Specifications available from local government.

(4) Closure of windows and other openings to habitable rooms which is necessary to achieve the benefits of noise insulation, normally involves forced ventilation, and may also necessitate some form of active cooling, such as refrigerative air conditioning. However, the operational management of buildings is outside the ambit of this policy, and will therefore be subject only to advice. (Refer clause 4.4.7)

(5) Heritage listed buildings and pre-existing housing within a designated heritage area may also be exempted from the requirements for noise insulation, as provided for under an operative town planning scheme.[3]

(6) Minor additions to existing residential development involving no more than two habitable rooms and no more than 25% increase in habitable floorspace, should be exempted from the requirement for noise insulation. Where more substantial additions are proposed, the additional areas should be insulated in accordance with the recommended indoor design sound levels of AS 2021 or otherwise as provided for in sub-clause (3) above. Noise insulation is not mandatory for the existing areas of the house, but is desirable, and may, in some circumstances, be appropriate to meet the indoor design sound levels prescribed under AS 2021 and or the variations provided for in sub-clause (3) above.[4]

4.4.6 Notification on Title

A notice on title advising of the potential for noise nuisance is to be required as a condition of any subdivision or planning approval, except where the proposed development is identified as acceptable for this ANEF level with reference to the Building Site Acceptability table in Appendix 1. Appendix 4 includes standard wording to be used in notices and memorials on title.

4.4.7 Advice to Developers

(1) Advice is to be provided in association with planning applications and building licences, of the potential for noise nuisance and any noise insulation requirements or recommendations. Developers should also be made aware of the benefits of window closure and the associated need for forced ventilation.

(2) Information about aircraft types and the timing and frequency of aircraft operations is available from Westralia Airports Corporation. AS 2021 includes tables of peak noise levels for selected aircraft types and specific locations in the vicinity of the airport runways.

5. IMPLEMENTATION

It is intended this Policy be implemented using a combination of the following measures—

- zoning and density coding
- development controls
- subdivision control
- referral arrangements
- notification and advice

5.1 Zoning and Density Coding

Local government should review the zoning and residential density coding under town planning schemes, to ensure consistency with the objectives of this Policy and the policy measures detailed in Section 4. This relates to all land forecast to be affected by noise exposure levels above 20 ANEF (350,000).

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[3] Town planning schemes prepared in accordance with the *Model Scheme Text* (clause 7.5) already provide for variations to development requirements where desirable to facilitate the conservation of heritage buildings or preservation of heritage values in a designated heritage area.

[4] According to AS 2021, the requirement for different internal design sound levels for different indoor spaces could require the construction of substantial barriers between habitable spaces. Accordingly, consideration should be given to a uniform perimeter insulation approach.

In those areas with potential for further subdivision or re-development, consideration should be given to ways in which the effects of aircraft noise can be reduced. Where practicable, noise sensitive uses should be prohibited in noise exposure zones for which the relevant building type is classified as unacceptable in the Building Site Acceptability table in Appendix 1.

5.2 Development Control

Where practicable, local governments should include special control areas into operative town planning schemes to provide an additional head of power to control development in areas within the 20 ANEF (350,000) contour.

As well as being defined on town planning scheme maps, special control areas should provide for supplementary control of development in order to address the policy measures detailed in Section 4. Relevant provisions should include—

- requirement for planning approval for all noise-sensitive development, including particularly single houses in noise-affected areas;
- discretionary provisions to enable applications to be refused where the development would be inconsistent with this Policy;
- discretionary provisions to facilitate the imposition of conditions to address the requirements of this Policy with respect to noise reduction in buildings, i.e. insulation; and,
- discretionary provisions to facilitate the registration of notices on title where land is affected by aircraft noise above 20 ANEF (350,000).

5.3 Subdivision Control

The Western Australian Planning Commission is responsible for the control of subdivision under the *Town Planning and Development Act 1928*, as well as certain classes of strata subdivision under the *Strata Titles Act 1985.* In exercising its discretion in relation to applications for subdivision and strata subdivision, the Commission will have due regard to this Policy.

Local government should also have regard to this policy in making its recommendations to the Western Australian Planning Commission on applications for subdivision and those classes of strata subdivision for which the approval of the Commission is required.

5.4 Referral Arrangements

Proposals involving any of the following should be referred by the relevant local government or in the case of subdivision the Western Australian Planning Commission, to Westralia Airports Corporation for comment and advice—

Scheme Amendments

- increase in density coding above R20 in areas between 20 ANEF (350,000) and 25 ANEF (350,000);
- changes of zoning and/or density coding in areas above the 25 ANEF (350,000) noise exposure contour, which have the potential to enable an increase in population density;

Subdivision

- subdivision of land for residential purposes, where the lot sizes would enable development at a density in excess of that provided for under this policy;

Development

- development identified as unacceptable with reference to the Building Site Acceptability table in Appendix 1 with the exception of residential development which accords with the density coding applicable under the operative town planning scheme;
- development involving penetration of the Prescribed Airspace[5] or other controlled activities as prescribed in the *Airports (Protection of Airspace) Regulations.*[6]

Land Use

- non-structural activities (artificial light, sunlight, emissions of smoke, dust and other particulate matter, and emissions of steam or other gas) subject to approval under the *Airports (Protection of Airspace) Regulations*.[7]

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[5] Prescribed Airspace is defined under the *Airports (Protection of Airspace) Regulations* as the airspace above any part of either an OLS or a PANS-OPS surface.

[6] Height above ground contours have been prepared by Westralia Airports Corporation, to assist local government in relation to the referral process with respect to Prescribed Airspace.

[7] Further information concerning referral and approval requirements under the commonwealth legislation may be obtained from the federal Department of Transport and Regional Services.

- use or development of land in the vicinity of the airport, which is likely to attract significant gathering of birds. (Further information on this issue may be obtained from Westralia Airports Corporation.)

5.5 Notification and Advice

Advice to developers concerning the potential for noise nuisance and notices on title as a condition of planning approval where required, can most effectively be administered by the relevant local government. In the case of proposals involving land subdivision, the Western Australian Planning Commission also has a role to play in the dissemination of information and/or the registration of memorials on title. An advice note suitable for use in relation to development and subdivision approvals, has been included in Appendix 4.

Advice concerning the need to ascertain noise levels and recommendations or requirements for noise insulation, should generally be the responsibility of local government. However, Westralia Airports Corporation has primary responsibility for providing information about aircraft noise exposure levels, and the Corporation's Noise Management Strategy Committee will oversee the preparation of an information package to inform the community about aircraft noise.

APPENDIX 1: BUILDING SITE ACCEPTABILITY

Adapted from AS 2021, Table 2.1: *Building Site Acceptability Based on ANEF Zones*

BUILDING TYPE	**FORECAST NOISE EXPOSURE LEVEL (ANEF)**			
	less than 20 ANEF (Note 1)	**20 to 25 ANEF** (Note 2)	**25 to 30 ANEF**	**30 to 35 ANEF**
House, home unit, flat, caravan park	Acceptable	Conditionally Acceptable	Unacceptable (Note 4)	Unacceptable (Note 4)
School, university	Acceptable	Conditionally Acceptable	Unacceptable (Note 4)	Unacceptable (Note 4)
Hospital, nursing home	Acceptable	Conditionally Acceptable	Unacceptable (Note 4)	Unacceptable (Note 4)
Hotel, motel, hostel	Acceptable	Acceptable	Conditionally Acceptable	Unacceptable (Note 4)
Public building	Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable (Note 4)
Commercial building	Acceptable	Acceptable	Conditionally Acceptable	Conditionally Acceptable
Light Industrial	Acceptable	Acceptable	Acceptable	Conditionally Acceptable
Other industrial	Acceptable	Acceptable	Acceptable	Acceptable

Notes—

1. The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.
2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A.)
3. There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases Table 2.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3.
4. This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect of aircraft noise on outdoor areas associated with the buildings should be considered.
5. In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.

APPENDIX 2: INDOOR DESIGN SOUND LEVELS

(Excerpt from AS 2021: Table 3.3)

Table 3.3 Indoor Design Sound Levels* for Determination of Aircraft Noise Reduction

Building type and activity	Indoor design sound level*, dB(A)
Houses, home units, flats, caravan parks	
Sleeping areas, dedicated lounges	50
Other habitable spaces	55
Bathrooms, toilets, laundries	60
Hotels, motels, hostels	
Relaxing, sleeping	55
Social activities	70
Service activities	75
Schools, universities	
Libraries, study areas	50
Teaching areas, assembly areas (see Note 5)	55
Workshops, gymnasia	75
Hospitals, nursing homes	
Wards, theatres, treatment and consulting rooms	50
Laboratories	65
Service areas	75
Public buildings	
Churches, religious activities	50
Theatres, cinemas, recording studios (see Note 4)	40
Court houses, libraries, galleries	50
Commercial buildings, offices and shops	
Private offices, conference rooms	55
Drafting, open offices	65
Typing, data processing	75
Shops, supermarkets, showrooms	
Industrial	
Inspection, analysis, precision work	75
Light machinery, assembly, bench work	80
Heavy machinery. warehouse, maintenance	85

* These indoor design sound levels are not intended to be used for measurement of adequacy of construction. For measurement of the adequacy of construction against aircraft noise intrusion see Appendix C.

NOTES—

1 The indoor design sound levels in Column 2 are hypothesized values based on Australian experience. A design sound level is the maximum level (dB(A)) from an aircraft flyover which, when heard inside a building by the average listener, will be judged as not intrusive or annoying by that listener while carrying out the specified activity. Owing to the variability of subjective responses to aircraft noise, these figures will not provide sufficiently low interior noise levels for occupants who have a particular sensitivity to aircraft noise.

2 Some of these levels, because of the short duration of individual aircraft flyovers, exceed some other criteria published by Standards Australia for indoor background noise levels (see AS 2107).

3 The indoor design sound levels are intended for the sole purpose of designing adequate construction against aircraft noise intrusion and are not intended to be used for assessing the effects of noise. Land use planning authorities may have their own internal noise level requirements which may be used in place of the levels above.

4 For opera and concert halls and theatres, and for recording, broadcast and television studios and similar buildings where noise intrusion is unacceptable, specialist acoustic advice should always be obtained.

5 Certain activities in schools may be considered particularly noise sensitive and 50 dB(A) may be a more desirable indoor sound level to select for any teaching areas used for such activities. However, the effect of other noise sources should be considered.

6 The provisions of this Standard relating to different internal design sound levels for different indoor spaces could result in the use of different construction and materials in contiguous spaces, and require the construction of substantial barriers between habitable spaces, e.g. heavy self-closing internal doors, detracting from the amenity of the building. Therefore consideration should be given to a uniform perimeter insulation approach.

APPENDIX 3: OVERVIEW OF ANEF (350,000)

ANEF Metric

The Australian Noise Exposure Forecast (ANEF) is a cumulative measure of aircraft noise exposure which takes into account the following features of aircraft noise—

(a) the intensity, duration, tonal content and spectrum of audible frequencies of the noise from aircraft take offs, approaches to landing, and reverse thrust after landing.

(b) the forecast frequency of aircraft types and movements on the various flight paths; and,

(c) the average daily distribution of aircraft arrivals and departures in both daytime and night-time. (Daytime is defined 7.00am to 7.00pm.)

ANEF (350,000)

The following is a brief overview of the inputs and assumptions used as the basis for the ANEF (350,000)—

Operations: The level of operations adopted for the forecast has been based on the nominal capacity of the airport identified in the *1999 Perth Airport Master Plan*, being 350,000 movements per year. This represents an approximate 400 per cent increase on current levels of operations.

Time Frame: No specific time frame has yet been identified for the ANEF (350,000). The previous ANEF included in the *1999 Airport Master Plan* which was based on 300,000 movements per year, had a time frame of 2047. However, more recent demand forecasting has indicated a significant reduction in growth rates compared to those assumed for the forecast in the 1999 Master Plan. Accordingly a longer time frame is anticipated for the current forecast.

Flight Tracks: The flight tracks used in the ANEF (350,000) were based upon those being flown today. The traffic management system derived by Airservices Australia and Westralia Airports Corporation for the ANEF (350,000) moved existing easterly and southerly tracks on to the parallel runway (03R/21L) while the westerly and northerly tracks remained on 03L/21R.

Whilst there are some exceptions to this "rule of thumb", it is ostensibly a replica of the tracks used in the 2000 ANEI but separated to incorporate the parallel runway. The existing reporting points in Perth Airspace were maintained, thereby minimising the changes in flight paths to the airport vicinity.

Traffic Allocation: Traffic for the ANEF (350,000) was allocated on to ultimate runway infrastructure during the development of the proposed Traffic Management System. The allocation combined the separation of easterly and southerly traffic from the existing 03/21 runway on to the parallel runway, with additional changes to facilitate a manageable balance and safer control of approaching and departing traffic.

The following table illustrates the distribution of average daily movements of fixed-wing aircraft used for the ANEF (350,000). In addition to fixed-wing aircraft, there are 13.18 helicopter movements per day included in the 350,000 per year movement figures on which the forecast is based.

LOCALITY	Arrivals		Departures		Sub-Total	% Total
	Runway	Volume	Runway	Volume		
Queens Park	03L	48.82	21R	144.10	192.92	20.4%
East Cannington	03R	60.10	21L	171.64	231.74	24.5%
Redcliffe	06	18.75	24	0.35	19.10	2.0%
South Guildford	21R	128.33	03L	36.95	165.28	17.5%
Midland	21L	103.81	03R	45.23	149.04	15.8%
Bellevue	24	113.03	06	74.60	187.59	19.8%
TOTALS		472.84		472.87	945.71	100.0%

Fleet Mix: The fleet mix evolved from the ANEC (existing runway infrastructure) and was based on Tourism Futures International traffic forecasts for Perth 1999/00 to 2024/25. The number of movements associated with the mix was divided into international, domestic, freight and general aviation. The international and domestic figures were further categorised according to aircraft class, i.e. wide body, mid wide body and narrow body aircraft.

The final fleet mix for the ANEF was derived after further consultation with Qantas and Airservices Australia and took into account the reduction in movements due to the greater seating capacity for introduced aircraft.

Day-night split: The proportion of movements forecast to use the airport during the day and at night has been based on the current day-night split of approximately 65%/35% as identified in the ANEI 2000. The ANEF model defined daytime as between 7.00am and 7.00pm while night-time is defined as between 7.00pm and 7.00am.

APPENDIX 4: ADVICE NOTE FOR SUBDIVISION/DEVELOPMENT APPROVALS

Aircraft Noise Affected Property

The following Advice Note has been prepared for use in conjunction with subdivision approvals, and planning applications involving property affected by aircraft noise above 20 ANEF (350,000). The advice may not be required where the permissible use of the land is identified as being Acceptable in the equivalent noise exposure zone of the Building Site Acceptability table in Appendix 1.

> *Advice Note: The property is situated in the vicinity of Perth Airport, and is currently affected, or may in the future be affected, by aircraft noise. Noise exposure levels are likely to increase in the future as a result of increases in numbers of aircraft using the airport, changes in aircraft type or other operational changes. Further information about aircraft noise, including development restrictions and noise insulation requirements for noise-affected property, are available on request from the relevant local government offices.*[8]

APPENDIX 5: REFERENCES

Airservices Australia, 1999, *The Australian Noise Exposure Forecast System and Associated Land Use Compatibility Advice for Areas in the Vicinity of Airports*.

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[8] Mechanisms for the registration of notices include section 12A of the *Town Planning & Development Act 1928* (for subdivisions) and section 70A of the *Transfer of Land Act 1993* (for development).