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USING 'REAL' AIRCRAFT NOISE INFORMATION TO ASSIST THE NOISE SENSITIVE INDIVIDUAL

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ABSTRACT

In common with many countries Australia has a long established equal energy noise contouring system which delineates areas with 'acceptable' and 'unacceptable' noise environments around airports. However, in recent times noise complaints and pressures to impose operational restrictions on airports have been coming overwhelmingly from residents of areas which the 'official' system defines as 'acceptable'. Many of these people believe that they are the victims of misleading aircraft noise information. This paper describes the approaches that are being adopted by the Australian Department of Transport and Regional Services to address this problem

1 - BACKGROUND

In the early 1980s the Australian Noise Exposure Forecast (ANEF) System was established as the basic tool for describing and assessing aircraft noise in Australia [1]. This is an equal energy descriptor which is essentially similar to other aircraft noise contouring metrics such as the DNL and Leq.

ANEF contour maps are used to describe aircraft noise exposure patterns around an airport with the outer contour being the 20 ANEF (which approximates to 55 Leq). The outer contour has been set at 20 ANEF as this has been determined to be the '10% seriously affected' line [2]. In a similar manner to other noise contouring systems, under the ANEF system areas outside the outer contour are taken to be 'acceptable' as far as aircraft noise exposure is concerned.

In line with this determination of 'acceptability' the focus of noise amelioration strategies and environmental assessment has conventionally been on the 'unacceptable' areas within the contours (ie areas with an aircraft noise exposure exceeding 55 Leq). Until recent times very little noise exposure information has been produced for areas outside the contours and very little recognition has been given to the proportion of the population outside the contours which considers itself 'seriously affected'.

However, our experience is that noise complaints, and pressures to place restrictions on airport operations, increasingly come from residents of areas outside the noise contours. These people are what the noise practitioner would conventionally define as noise sensitive individuals living in areas receiving low levels of aircraft noise exposure.

This changing situation has seen the Australian Department of Transport and Regional Services re-assess its aircraft noise strategies and it has recently released a major discussion paper on its proposed approaches for dealing with this issue [3].

2 - UNFULFILLED EXPECTATIONS

While there are clearly many reasons why residents of areas outside the contours complain about aircraft noise, monitoring of the reasons for this discontent reveals a strong recurring theme – people in these areas believe they are being misled by 'official' aircraft noise information. In essence it appears that the 'acceptable'/'unacceptable' concept underlying the noise contouring system is generating expectations which are not being met. In these circumstances it is not surprising that people feel aggrieved and put pressure on airports.

For example, people have accepted the advice of published ANEF material and moved into houses in the 'acceptable' areas only to find that the noise levels are not acceptable to them. Similarly people have claimed that the noise exposure levels generated following an airport development have not been 'acceptable' as indicated in the project EIS. In particular, there are many areas under, or close to, busy flight paths which are subject to noise exposure patterns which are highly annoying for some people, but which have a noise exposure of less than 55 Leq. Under the ANEF system these areas are not differentiated from areas which are remote from flight paths – they are all 'acceptable'.

Clearly therefore there is a need to re-evaluate the type of aircraft noise information that is currently produced. In simple terms if we are to address this problem we need to ensure that people are not surprised when exposed to 'new' aircraft noise and we need to develop approaches which assist noise sensitive people to avoid living near flight paths.

If there are to be 'no surprises' then people need both to have access to aircraft noise information for the area they are interested in and the information also needs to be comprehensible. To address the first issue aircraft noise information clearly needs to be produced and made available for areas which extend well beyond conventional noise contours. To make the information comprehensible we believe that we need to take, what is for some, a radical new direction and move away from using conventional equal energy noise contours as an information tool.

3 - 'REAL' AIRCRAFT NOISE INFORMATION

The deficiencies with the ANEF system first came to prominence in 1995 when the Australian Senate carried out a Public Inquiry into aircraft noise in Sydney. This Inquiry was established as a result of the public outcry that followed the opening of a new runway at Sydney Airport. A large number of submissions to the Inquiry were from people who believed they had been misled by the ANEF information in the EIS for the project. The Inquiry largely agreed with the thrust of these submissions [4].

As a result of the Senate Inquiry the Department began to explore alternatives to ANEF contours for advising non-experts about aircraft noise exposure patterns. The broad conclusion we reached was that if the public is unwilling or unable to accept the noise specialist's way of presenting information then we should start producing information using the layperson's language.

A person experiences aircraft noise as a series of separate events and this clearly influences the way they communicate on aircraft noise. When members of the public talk to each other, and make a complaint to the authorities, they focus on the location of flight paths and on the number and times of aircraft movements. For example, they use language such as 'the flight path has moved right over my house today; there have been 50 flights this morning and they started before 6.30am'. In order to be able to communicate effectively with the community the Department has therefore attempted to model its new information strategies on this type of language.

An example of the type of aircraft noise information that the Department is now using to replace cumulative noise energy contours is shown in Figure 1. This combines information on flight paths and numbers of movements and provides a 'picture' of aircraft noise which experience has shown to be very useful to non-experts. The 20 ANEF (55 Leq) contour for the Airport has been superimposed on the chart for comparative purposes. These aircraft flight path movement charts are very simple and quick to produce and have achieved wide acceptance with the public, elected representatives and the media. It can be seen from Figure 1 that the charts give aircraft noise information over a much wider area than the ANEF contour. It can also be seen that there is a very poor correlation between the noise contour and the flight paths – this has been a constant source of public dissatisfaction with noise contours. The charts also provide basic information on daily variations on noise exposure and do not just refer to the 'average day'.

Describing aircraft noise solely by reference to the 'annual average day' has been another key area of dissatisfaction with conventional information. Due to the wide temporal variations in aircraft noise from hour to hour, day to day and season to season the 'average' day is very rarely a 'typical' day. In order to address this question charts of the type shown in Figure 2 are also being routinely produced for Sydney Airport. These show when there are periods of 'respite' along each of the flight paths for parts of the day or for particular days. A statement in one of the boxes such as 'respite hours 50%' means that for half of the clock hours over the period in question there were no jet movements on that flight path. The 'respite' metric has been developed in response to strong community demands for this type of information and it is considered very likely that it will become an important 'noise' indicator in the future as the number of aircraft movements at airports begins to grow.

It is noteworthy that neither of the descriptors shown in the Figures is based on sound pressure levels. Despite, or possibly because of, this it has become very evident that representing 'noise' in this way

gives the layperson a much better picture of what is, or will be, happening than can be achieved using conventional noise contours. With the introduction of these 'new' descriptors only a small proportion of the public now appears to show an interest in receiving information on noise levels per se. This seems to be because people are familiar with the sounds at their homes and they generally think in terms of either moving flight paths or reducing the number of movements, particularly those at sensitive times. The focus on individual noisy aircraft has diminished in recent years in Australia now that movements are almost exclusively by high by-pass ICAO Chapter 3 aircraft.

Individuals that do show an interest in sound pressure levels invariably want to know about single event, not logarithmically averaged, noise levels. In order to provide an aggregated form of this information the Department produces N70 charts – contour maps showing the number of events louder than 70 dB(A). This type of presentation has proven much more acceptable to the non-expert than conventional cumulative noise energy contours since it reports the noise in the way that a person experiences it – as a number of noise events. The contours are also arithmetic, not logarithmic, which is also very attractive to the layperson.

4 - USING THE 'REAL' INFORMATION

It was argued earlier in the paper that we need to move to an aircraft noise regime based on 'no surprises'. We believe that the 'real' information now being produced will enable this type of approach to be implemented. In essence there is a need to establish a system based on full 'disclosure'.

Conventionally airports have solely seen 'disclosure' as a legislative requirement being placed on a homeowner to tell a prospective house purchaser about aircraft noise exposure. While this type of approach is useful and worth pursuing, it does not address the current problem because such rules can only feasibly apply to areas within the noise contours and also they only apply in circumstances of house sale or rental. If the concept of 'disclosure' is to be taken further the onus must be placed on airports to produce aircraft noise information that relates to the areas where the main pressures are coming from – that is to areas outside the contours. This would then facilitate 'disclosure' both in the circumstances of house sales involving noise sensitive people and also in situations where proposed operational changes at an airport would alter noise exposure patterns.

In the context of this paper we would argue that 'disclosure' cannot be achieved with conventional noise metrics – 'real' information along the lines of that discussed in the previous section has to be used. Once everyone in the community has full access to the 'real' information then the individual is in a position to decide for themselves whether to move into an area where there is audible aircraft noise or whether to become involved in an EIS process on a proposed development at an airport.

An aircraft noise system which results in an airport telling a noise sensitive person that it is 'acceptable' to purchase a house at a particular location simply because it is outside the noise contours is clearly not rational if the aim of the system is to achieve compatibility between the community and the airport. If the house in question happens to be under a busy flight path both the individual and the airport are highly likely to lose out. With 'real' information we can turn this into a 'win/win' situation. The onus is now on all concerned to recognize that if aircraft noise issues are to be effectively managed we have to move beyond conventional equal energy noise contours and start showing the 'real' picture.

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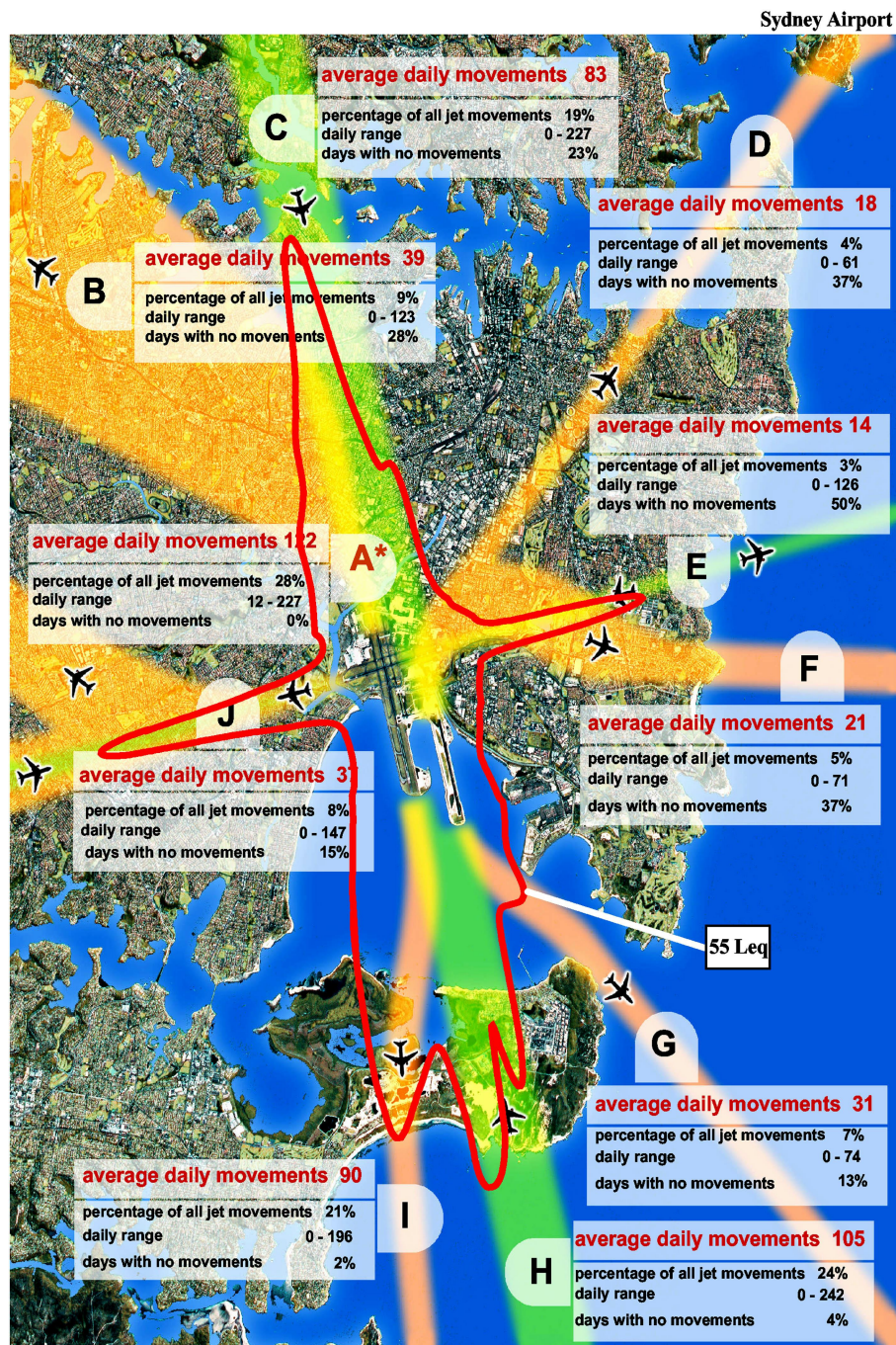


Figure 1: Comparison of 1998 flight path movements and 1998 55Leq contour.

Sydney Airport

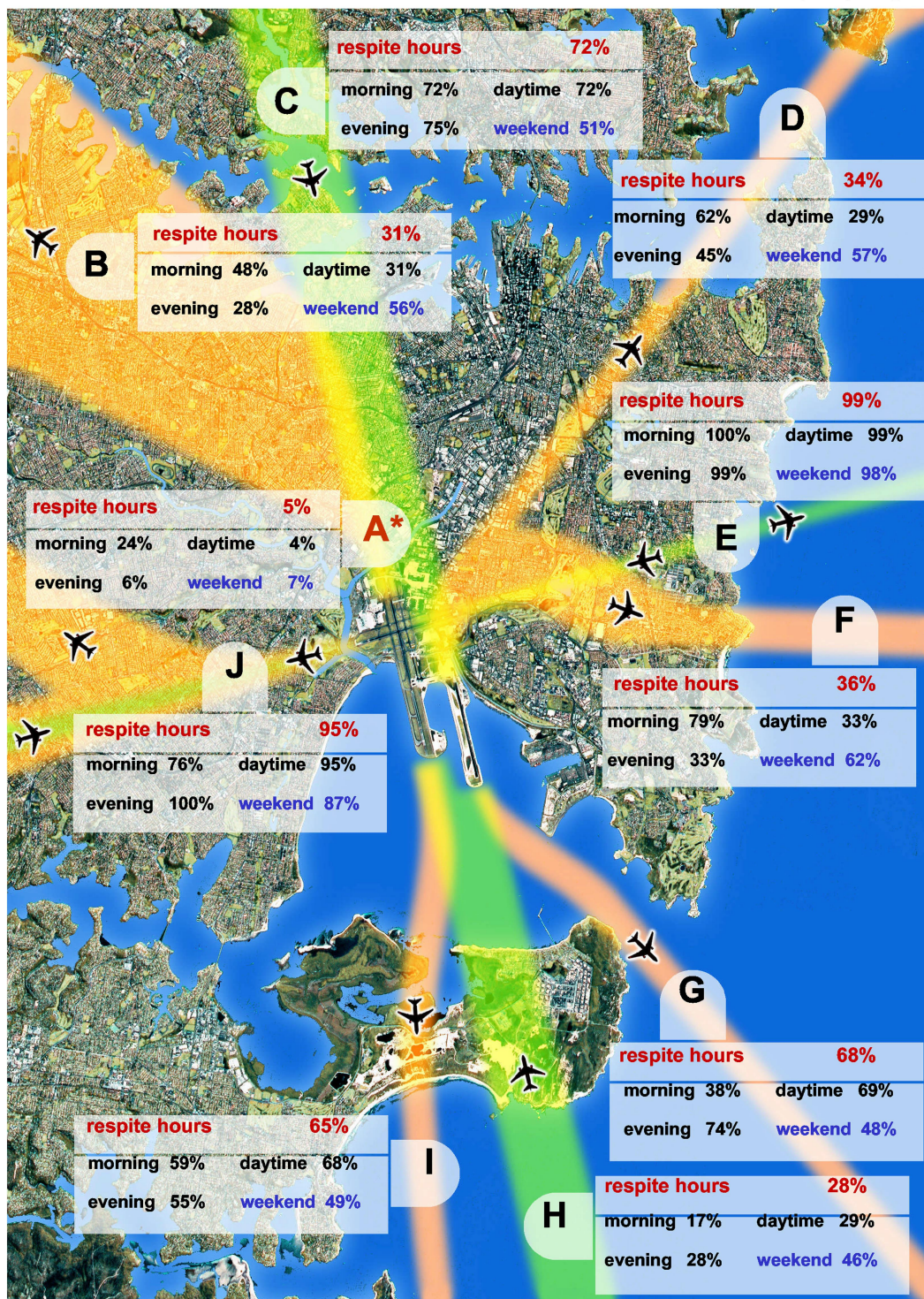


Figure 2: Respite from jet aircraft for the month of february 2000.