[redacted]

From: Kim Martin <kmartin@ttf.org.au>
Sent: Wednesday, 15 August 2012 12:52 PM
To: Stone Scott
Cc: Doherty John; Wilson Andrew; [redacted]
Subject: RE: Brisbane Airport curfew review - Draft discussion paper - feedback from TTF

Hi Scott

Thanks for the opportunity to provide feedback on this document. Broadly speaking, I'm happy with the overall flow of the discussion paper, however, after consultation with my aviation team, I would recommend the following issues be addressed:

1. Data on complainants: BAC and Airservices Australia routinely compile information on the number of complainants and the proportion of the total complaints per complainant per month. For instance, BAC receives a large amount of complaints (approx. average of 98%) from one person each month which significantly skews the complaint data. I feel this should be reflected in the section discussing noise complaint data on page 16.

2. Feedback question 10: I think this question should be rephrased, especially the first part of the question. While I understand the aim of this feedback question, I do not agree with the way it is set out.

3. Smart tracking: This section should be expanded to explain in greater detail the differences between 'Smart Tracking' (RNP), ILS approaches and visual approaches. Given the complexity of this issue, I think there should be more clarity around the difference between this new technological approach to navigation in contrast with well-established navaid equipment and procedures.

In particular, greater explanation should be given to the ability of RNP to share or concentrate noise over particular areas, i.e. more emphasis on available options to spread or confine noise in contrast to less sophisticated navaid technology and procedures. Paragraph 4 on page 23, for example, states that RNP technology minimises the overall noise footprint – this needs to be outlined in a more descriptive manner.

Paragraph 1 on page 24 also outlines that RNP Track 2 is the only available approach path after dark for safety reasons. A succinct explanation of the reasons behind this should be included.

4. Airport curfews: With regard to curfews in operation around Australia and the aircraft currently authorised to operate during curfew hours, further information should be provided on the average noise profile of the aircraft typically operating at these airports during this time. A comparison between the typical noise footprint of commercial aircraft operating during day hours and curfew-approved aircraft should be provided. I would imagine this would be similar in nature to the chart in Appendix 4.

5. Feedback question 12: I do not think this question is appropriate for inclusion in this paper. I would suggest removing or rephrasing it significantly.

6. Appendices: Appendix 1 – I think the 2009 Master Plan proposed map of the airport in 2029 would be more appropriate – this is a newer map.

Appendix 6 should have an improved explanation at the base of the diagrams.

Appendices 2,3 and 7 should have a description at the base of the diagrams/maps to aid clarity and understanding.

Should you have any questions about these issues, please feel free to contact me directly or alternatively, contact Jon Stewart | Manager, Aviation Policy & Public Affairs on (02) 9240 2018 or jstewart@ttf.org.au

Kind regards

John Lee

From: [redacted] **On Behalf Of** Stone Scott
Sent: Wednesday, 1 August 2012 9:19 AM
To: Wilson Andrew; 'paul.martyn@dtesb.qld.gov.au'; 'kerry.doss@brisbane.qld.gov.au'; John Lee; 'Jason.Harfield@airservices.gov.au'
Cc: Doherty John; [redacted] 'paula.gale@brisbane.qld.gov.au'; [redacted] 'gail.yates@airservicesaustralia.com'; [redacted] 'jessica.glover@dtesb.qld.gov.au'
Subject: Brisbane Airport curfew review - Draft discussion paper [SEC=UNCLASSIFIED]

Dear members,

I refer to the upcoming first meeting of the steering committee for the Brisbane Airport curfew review, which has been rescheduled to Tuesday 28 August 2012. One of the agenda items at this meeting will be consideration of the curfew review discussion paper, which has been prepared to form the basis for public submissions to the review.

I previously sent you the first draft of the discussion paper (attached for reference), and would now like to update the paper prior to our first meeting. To that end, could you please provide your comments on the draft paper by **Tuesday 14 August**. My team will update the paper based on your feedback, and I will circulate a new draft to you no later than Tuesday 21 August.

Please do not hesitate to contact me should you have any queries.

Kind regards,

Scott Stone
General Manager
Aviation Environment
Department of Infrastructure and Transport
GPO Box 594
CANBERRA ACT 2601

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AUG 2012

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Brisbane Airport Curfew Review Steering Committee

Summary of discussion paper feedback

Comments so far received from Queensland Government and Tourism & Transport Forum. None formally received from Brisbane City Council or Airservices Australia, but there has been verbal feedback.

General comments

1. No major issues; members are broadly supportive of the paper in its current form.

    - Are members happy to publish the paper in early September? This would give the review a chance to be finished before Christmas.
    - We will need to confirm timing with Minsters.

2. Members have expressed a wish to remove "curfew" from the title of the review and replace with "noise mitigation strategies".

    - Suggest we retain "curfew", as this was the wording used in the White Paper. Changing the title now might indicate we have pre-empted the review itself.
    - The terms of reference are deliberately broad and do not mention a curfew. Suggest also revising the sub-title of the discussion paper to include reference to noise mitigation strategies.

3. Some comments have requested further comparative analysis of complaints data with respect to other capital city airports, pointing out that Brisbane is better placed to manage night-time noise than Perth and Melbourne.

    - Suggest we focus instead on a physical comparison of airports – i.e. Sydney and Adelaide have curfews because houses are so close (<1km) to the extended runway centreline, whereas the closest houses to Brisbane Airport are 6.7km away. We don't want the review to imply that there should be curfews at Perth or Melbourne.

Tourism & Transport Forum (TTF)	
Comment	***Response***
Insert discussion about complaints data, noting the high-level complainants who skew the data.	Done.
Rephrase feedback question 10, particularly the first part.	No action yet. Query how the question should be re-phrased.
Expand the 'Smart Tracking' section to explain the difference between RNP, ILS and visual approaches. Better explain the ability of RNP to share or concentrate noise over particular areas. Explain why RNP Track 2 is the only available approach path after dark for safety reasons.	No action yet. Will request Airservices' input to this section if necessary.
Further information required about the aircraft currently authorised to operate during curfew periods, including the noise profile of these aircraft. Suggest a comparison of the typical noise footprint of aircraft operating during the day versus those operating during curfew hours.	Done. Curfew section has been augmented with further details, including aircraft types. Not possible to include specific details about noise footprints due to the huge diversity of operating aircraft.
Delete Feedback Question 12.	Done. Feedback Question 12 has been revised and merged with Question 13.
Replace map at Appendix 1 with Master Plan map of ultimate airport development.	Done.
Annotate appendices in more detail.	Query whether this is necessary. All appendices are referenced/explained in the main text.

Queensland Government	
Comment	***Response***
The paper uses the Appendix 3 contour map to show the low impact on the community from night time movements. This is an important point as it supports a position that there is little need for a curfew, and current land use planning practices around Brisbane Airport have been effective at providing a balanced approach. It also demonstrates an appropriate use of such a contour map – which is to inform strategic decision making.	Noted.
ANEF contours are used to some extent in strategic land use planning decisions, but more extensively in development assessment (has this particular development proposal mitigated noise impacts appropriately). The single event contour maps are appropriate for the former - not the latter.	Noted.
The complaints table shows a significantly lower level of complaint from Brisbane airport in comparison with other major airports. The paper says that "Brisbane Airport generates the fifth highest level of complaints and the third highest percentage of complainants". But this understates the situation – the data would suggest that Brisbane generates an order of magnitude lower level of complaints. This supports the suggestion that Brisbane's land use planning has had a major positive effect.	Noted.
The report states "that the night-time noise footprint generated by operations at Brisbane Airport is less severe than some other Australian airports". Again this significantly understates the situation. Brisbane airport is significantly less severe. This result would indicate that the impact is not high and that appropriate land use planning measures would be appropriate to keep the situation under control.	Noted.

Brisbane City Council ABN 72 002 765 795

City Planning and Sustainability
City Planning and Economic Development Branch
Reception Level 7 Brisbane Square
GPO Box 1434 Brisbane Qld 4001
T 07 3403 9030 F 07 3334 0013
www.brisbane.qld.gov.au

Dedicated to a better Brisbane

31 August 2012

Scott Stone
General Manager, Aviation Environment
Department of Infrastructure and Transport
GPO Box 594
CANBERRA ACT 2601

Dear Scott,

To provide feedback on the document "A Review of the Need for a Curfew at Brisbane Airport".

I submit the following comments against the Feedback Questions posed in the discussion paper for consideration by the Brisbane Airport Curfew Review Steering Committee.

Feedback Q1 & Q7

Noise Abatement Operational Procedures: Airport night time curfews are used relatively rarely throughout the world. It has generally been considered to be more economically efficient to use night noise quotas and noise surcharges to offer incentive for noise mitigation. All European Union countries now implement some type of noise charge. Noise surcharges are also used in Sydney.

Under Feedback Question 1, Noise surcharges should be reviewed as a *noise abatement operational procedure* (ICAO principle 3).

Reference: Performance assessment for airport noise charge policies and airline network adjustment response,
http://s3.amazonaws.com/zanran_storage/www.aseanenvironment.info/ContentPages/1046651476.pdf

Feedback Q2

Economic Effects of Noise: Economic methodologies have been developed and adopted by policy makers to evaluate certain characteristics that determine property values. This type of work has been undertaken at numerous airports including Sydney. Economic modelling can be used to evaluate the benefits to the community when considering noise mitigation measures.

Reference: The Shadow Price of Aircraft Noise Nuisance,
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.29.729&rep=rep1&type=pdf

Economic Development Impacts: Operating without a curfew is a key strategic advantage for Brisbane Airport and is an economic enabler for Brisbane, SEQ and the Queensland. The introduction of a curfew to Brisbane Airport will create the following issues:

- **Reduced growth potential of long haul services** – As Brisbane is distant from many overseas destinations and international flights are part of a global network, the airport must be flexible to accept international flights when they arrive. Flights to Brisbane interact with flights coming from international airports which may operate with a curfew. Given the distance to Brisbane the flights that depart these international locations will arrive in Brisbane at late hours.

  If Brisbane Airport has a curfew these flights would either be cancelled or rescheduled to be within the curfew hours. This would impact the growth potential and operation of long haul services to Brisbane Airport.

- **Limits the operation of low cost carriers** – Low cost carriers operate within these curfew hours to provide cheap flights to travellers who don't mind the hours of operation. A curfew would reduce the turnaround times of low cost carrier making it unfeasible to operate. A curfew could therefore reduce the number of low cost flights to and from Brisbane airport and the attractiveness as a location for low cost carriers to operate from.

- **Freight movement** – A proportion of flights during curfew hours are freight shipments. These freight shipments are both domestic and international and can be part of a passenger flight or a dedicated service for freight. Limiting the hours these freight movements can occur may influence the cost of freight movement and impact the supply chains of businesses shipping or receiving freight.

- **Increased cancellation** – A curfew prohibits the movements of flights between a designated time period. Flights that are due to depart around the start and finish times of a curfew are considered vulnerable. If these flights are delayed, from legitimate or unforeseen events, it may extend their departure time past the curfew. This often leads to the cancellation of the flight resulting in significant passenger inconvenience, financial penalties for the carrier and operational disruption for the airline.

- **Daylight savings** – Queensland currently does not operate with daylight savings during summer months like other states in Australia. This means that a number of domestic flights to southern states must depart Brisbane between 5am and 6am to reach their destinations at key business travel times. If a curfew was imposed many flights could not depart Brisbane at this time and therefore would not arrive at their destination before the key arrival required for business travel.

- **Growth of the Airport** – The issues identified above would impact on the growth and development of Brisbane Airport. This would result in reduced employment growth, reduced economic output of the airport and generate a number of knock on effects for the local, regional and state economy.

Economic Development Implications: As highlighted in the paper the Brisbane Airport Masterplan of 2009 estimates that if a curfew was imposed on Brisbane Airport it would reduce the Gross Regional Product of SEQ by $542 million and reduce the economic welfare of consumers by approximately $1.3 billion. In addition to this we feel that the introduction of a curfew to Brisbane Airport will create the following issues:

- **Job creation** – With reduced hours of operation the growth and development of Brisbane Airport is lessened. It is estimated that a curfew on Brisbane Airport will decrease jobs growth in SEQ by 5,455 by 2029.

- **Attractiveness of investment** – As highlighted in the Windows of Opportunity Report a key priority action is for Council to actively focus on growing Brisbane's capacity and reputation as a leading global hub for business. An action from this was to connect industry hubs with international markets and support increased airline connections to key trading markets to increase foreign investment. A curfew on Brisbane Airport would limit the potential growth of these international connections to key trading markets which could impact foreign investment in the city and region.

- **Foregone expenditure** – If a curfew reduces the movement and number of travellers to a city it will reduce the expenditure generated from their visit. This will primarily impact the tourism and hospitality industries of Brisbane and SEQ

- **Increase cost of flights** – A curfew at Brisbane Airport would result in a number of operational changes to flights to and from the airport. Flights would need to operate within a window of time which would reduce the potential number of seats to and from Brisbane Airport. This reduced supply of seats means that carriers can increase the cost of flights to match the demand to travel i.e. reduced supply does not change demand but only the price to achieve market equilibrium. As a result the cost of flights is increased making it more expensive to travel to and from Brisbane Airport.

Feedback Q12

Community annoyance and sleep disturbance: Community response to aircraft noise in terms of annoyance and sleep disturbance has been extensively researched in recent decades. The most recent international consensus on night time aircraft noise is given in the World Health Organisation Document (WHO) *Night Noise Guidelines For Europe 2009*. This work is based on regression analysis of a large number of international airports and includes the Australian data obtained in the 1982 study.

It is worth noting that the 1982 Australian study results are very similar to current WHO results. That is, the noise dose response relationships are closely matched.

Reference: Night noise guidelines for Europe
www.euro.who.int/document/e92845.pdf

SUMMARY:

The paper would benefit from an increased level of rigor to properly evaluate the effects of a curfew. In terms of economic and environmental outcomes, Brisbane Airport lags behind the majority of Australian and International airports in its ability to objectively quantify the effect of its aircraft noise.

To address this issue the following suggestions are tabled for consideration:

- That Brisbane Airport model noise scenarios (curfew versus no curfew) and determine the predicted number of highly noise affected residents. This can be done using either the Australian Standard method (AS2021) or the World Health Organisation formula. Both methods would likely reach similar conclusions.

- That Brisbane Airport produces an economic model of the effects of aircraft noise on property values. The effect on property values can then be tested for different scenarios depending on noise exposure, i.e. curfew versus no curfew. The economic benefit of noise mitigation can be considered against the economic benefits of the airport.

- That Brisbane Airport undertakes a social survey in accordance with ISO15666:2003 *Acoustics Assessment of Noise Annoyance by means of social and socio-acoustic surveys.* Use results to determine specific Brisbane community noise response curves.

Council's general view is that a curfew at Brisbane Airport should not be supported, and if the primary reason for a curfew is to reduce noise then other mitigation strategies should be reviewed and considered.

Yours sincerely

Graeme Jones
Acting Divisional Manager
City Planning and Sustainability

Future Brisbane Airport Operations

A Review of the Need for a Curfew at Brisbane Airport

Discussion Paper prepared by the Brisbane Airport Curfew Review Steering Committee to assess the need for night-time noise mitigation strategies at Brisbane Airport

Contents

Introduction

Airline operations commenced at the site of what is now Brisbane Airport as early as 1926. In 1928, Sir Charles Kingsford Smith successfully concluded the first trans-Pacific flight there when he landed at the then-Eagle Farm Aerodrome in 1928.

Preparation for the modern Brisbane Airport began in 1971 with the reclamation of nearby Cribb Island to establish a modern airport to cater to the future needs of the city. The current airport site is 2,700 hectare site approximately 15 kilometres from the Brisbane CBD.

The current runway configuration for Brisbane Airport has been in operation since 1988, along with the current control tower and domestic terminal. The then-Australian Government anticipated that the redeveloped Brisbane Airport would operate curfew-free, a position informed by a Report of the House of Representatives Select Committee on Aircraft Noise, 'Aircraft Operations and the Australian Community', in September 1985.

Brisbane Airport has grown substantially since this time, with annual passenger numbers reaching 20.1 million in the 2010-11 financial year[1] and expected to reach more than 35 million by 2023[2]. The city of Brisbane has also increased in size. In 1980, Brisbane was home to 1.02 million people[3] and by 2010 this had doubled to 2.04 million people[4]. This is a trend that is predicted to continue well into the future.

Aviation contributes substantially to the national economy. In 2010-11, the gross value added by the air and space industry to the Australian economy was over $6.8billion[5]. In May 2012, over 54,000 Australians were directly employed in the air and space industries, with nearly 80 per cent of them full-time employees[6]. The aviation industry is also of vital importance to Australia's trade and tourism industries.

Aircraft noise is an unfortunate but inevitable by-product of aviation activity. The Australian Government's 2009 National Aviation Policy White Paper 'Flight Path to the Future' included recognition from the Government of the adverse impacts of aircraft noise and the need to manage these impacts in a balanced and transparent manner. The White Paper also included a commitment to a formal review of the need for a curfew at Brisbane Airport. This discussion paper is an important first step in that review.

The purpose of this discussion paper is to describe Brisbane Airport's operations both present and projected, the associated noise impacts, the noise mitigation strategies used to date and the potential to improve those strategies in the future to better manage night-time aircraft noise at Brisbane Airport. It also describes the role of airport curfews in other cities and attempts to examine the issues that will assist in deciding whether an airport curfew is an appropriate night-time noise management strategy at Brisbane.

The Government has established a high level Steering Committee to conduct the review. The Steering Committee is jointly chaired by the Australian and Queensland Governments, with representation from the aviation industry, business community and local government. The Government has also asked that the Steering Committee seek input to the review from other interested stakeholders, including the general public.

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[1] http://bne.com.au/media-centre/passenger-statistics 31 January 2012
[2] http://bne.com.au/projects-and-development/new-parallel-runway-project/related-materials 26/10/11
[3] 2103.0 – Census of Population and Housing, 1981, ABS
[4] ABS 2011a, Regional Population Growth, Australia 2009-10, cat. no. 3218.0, Canberra.
[5] ABS cat. No. 5206.0, June 2011, Table 33.
[6] ABS cat. No. 6291.0.55.003, Table 6.

Steering Committee

The Steering Committee comprises a cross-section of representatives from the aviation, business and government sectors.

The Steering Committee comprises:

- **Mr Andrew Wilson**, Deputy Secretary, Australian Government Department of Infrastructure and Transport;
- **Mr Paul Martyn**, Deputy Director-General Tourism, Queensland Government Department of Tourism, Major Events, Small Business and the Commonwealth Games;
- **Mr Kerry Doss**, Manager, City Planning, City Planning and Sustainability Division, Brisbane City Council;
- **Mr John Lee**, Chief Executive, Tourism and Transport Forum; and
- **Mr Jason Harfield**, Manager, Air Traffic Control, Airservices Australia.

Terms of Reference

The Australian Government has established the following Terms of Reference for the review.

The Steering Committee will consider and advise on:

- the contribution of Brisbane Airport to the local, regional and national economy;
- the current and forecast night-time noise profile of the Airport;
- existing strategies to mitigate night-time noise impacts and their effectiveness, including the outcomes of Airservices Australia's review of Brisbane Airport's noise abatement procedures;
- potential practical strategies, consistent with the International Civil Aviation Organization's 'Balanced Approach', to further mitigate night-time noise impacts at the Airport, including:
  - the impact of the new parallel runway on the night-time noise profile of the Airport and the potential for the new runway to be used in managing night-time noise; and
  - the potential for advanced satellite-based technologies to reduce the night-time noise profile at the Airport;
- the operational, social, economic and environmental implications of imposing a curfew requirement on categories of aircraft operations at the Airport; and
- the need for additional night-time operational measures at Brisbane Airport and what form any such measures should take.

How to Make a Submission

Submissions received in response to the issues raised in this discussion paper will be used to inform the Steering Committee's report to the Australian Government Minister for Infrastructure and Transport to allow the Government to further consider this matter.

Submissions are welcome 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 Brisbane Airport and the consideration of the need for a curfew. At various points in the paper, feedback questions have been posed to prompt potential submissions.

The outcomes of the review will then be available to inform the next Brisbane Airport Master Plan, due to be finalised in 2014.

Submissions[7] and enquiries in relation to the discussion paper should be directed to:

Scott Stone
General Manager
Aviation Environment

Telephone: 1800 661 904
Email: <brisbanecurfewreview@infrastructure.gov.au>

Submissions should be made by Friday 26 October 2012.

[7] Submissions and comments provided in response to this invitation may be published online unless the person or organisation making the submission requests confidentiality.

Brisbane Airport in perspective

Geographical and Meteorological Characteristics of Brisbane Airport

Brisbane Airport is situated on a 2,700 hectare site 15 km north-east of the Brisbane central business district. The Airport sits on a reclaimed portion of a river delta at the mouth of the Brisbane River. The location of the Airport is illustrated in Figure 1.

Brisbane Airport has a large buffer zone between the end of the existing main runway, with the nearest residence 6.7 km from the runway centreline and conservation/green space and industrial land uses occupying the areas immediately surrounding the Airport. This compares favourably to other capital city airports, where the nearest residences are closer – for example, Melbourne (6km), Perth (1.8km), Sydney (0.7km) and Adelaide (0.6km).

The Pinkenba-Eagle Farm Statistical Local Area (SLA) immediately adjacent to the Airport has the second-lowest population density for the Brisbane Statistical Division (SD), with 6.4 people per sq km. Some of the more densely-populated SLAs in Brisbane are located around 10km from the Airport, including inner-city New Farm (5,900 people per sq km), Kangaroo Point (5,600) and City - Inner (5,000)[8] (Figure 2).

The main operational runway at Brisbane Airport is Runway 01/19. The designation of the runway indicates that is it orientated 10°east of due north, or 190° east of due north (10° west of due south) depending on whether the runway is being operated in a northerly or southerly direction (see Appendix 2 for current operating modes). The current single runway configuration of the airport means that, unless there is very low levels of activity (less than 10 movements per hour), it is necessary to operate all traffic in one direction to maintain aircraft separation.

When operating in a northerly direction, aircraft arrive over inner-city suburbs, such as Norman Park and Morningside, and depart over Moreton Bay. When operating in a southerly direction, aircraft arrive over Moreton Bay and depart over a number of southern and eastern suburbs (depending on the aircraft's intended destination), such as Hemmant, Tingalpa, East Brisbane and West End. Figure 3 shows the use of various flight paths at the Airport.

Aircraft typically have different noise profiles on arrival and departure. Arriving aircraft require only small amounts of engine thrust on approach and are therefore quieter than departing aircraft, which require much higher levels of thrust to be able to take off. However, arriving aircraft must descend gradually and typically fly at lower altitudes for longer periods than departing aircraft, which gain height relatively quickly. The impacts of aircraft noise are described in more detail in the following section, 'The Extent of Night-time Aircraft Noise at Brisbane'.

Wind direction and speed are important determinants of the direction from which aircraft can land or take off and the consequent exposure of communities to noise. For safety reasons, aircraft must take-off and land into the wind.

Wind directions at Brisbane Airport are characterised by distinct seasonal patterns. In summer, winds at the Airport predominantly come from a north to north-easterly or south-easterly direction. In winter, they are predominantly from a south to south-westerly direction.

[8] http://www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2009-10~Main+Features~Queensland?OpenDocument#PARALINK31

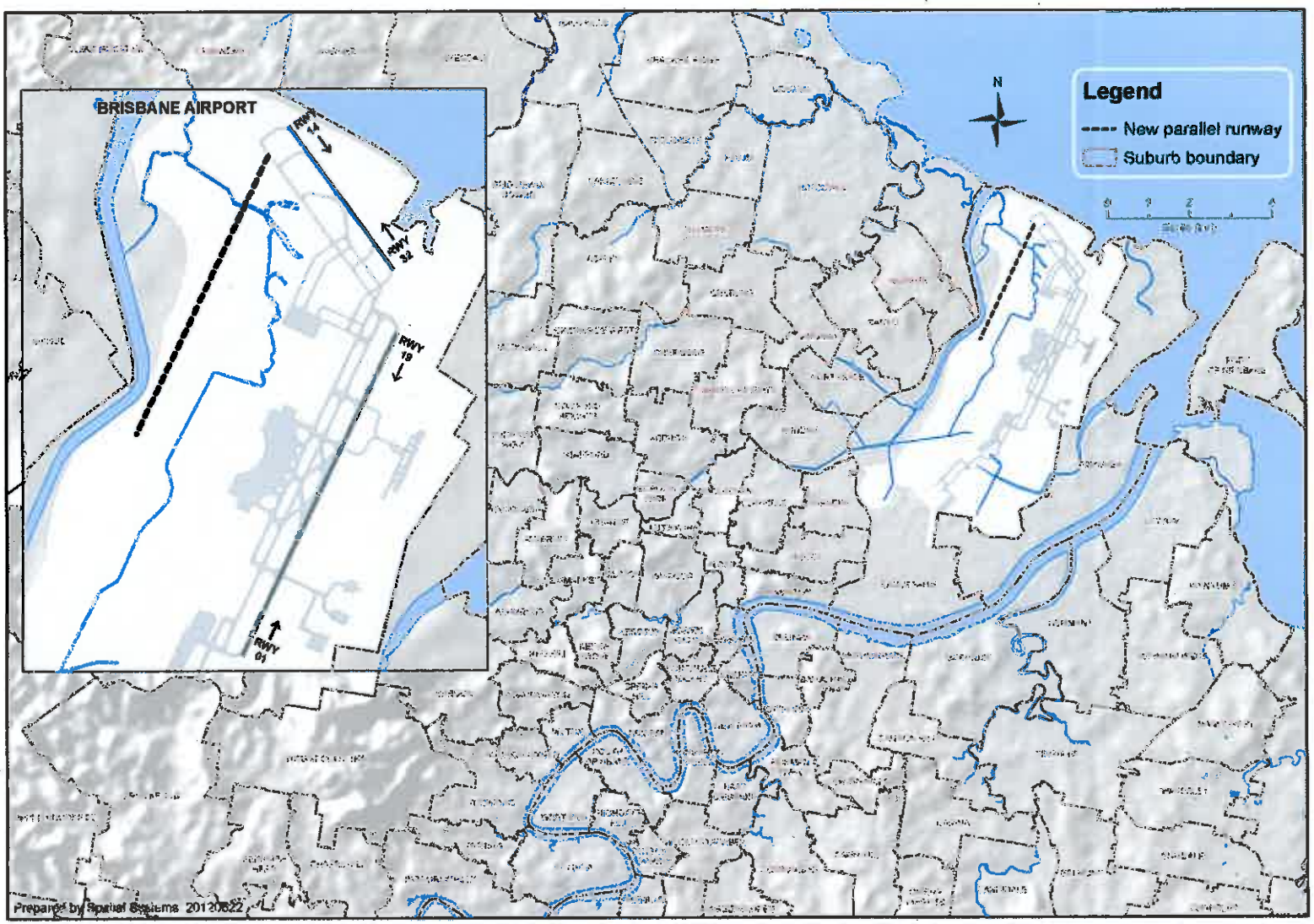


Figure 1: Location of Brisbane Airport.

At Brisbane Airport, wind speeds fluctuate widely, but generally are stronger during daylight hours and in the early evenings. As the ground temperature cools, local wind speeds generally decrease. This means that, in broad terms, the airport will be more likely to operate in a southerly flow in winter, in a northerly flow during a summer north-easterly wind, and in a southerly flow during a summer south to south-westerly wind.

When conditions are calm, the airport can operate in either direction. A downwind component of five knots can be accommodated in dry conditions. Operating rules for aircraft change if it has been raining and the runway is considered 'wet' rather than 'dry'. When the runway is wet, no downwind component can be accepted. Brisbane records an annual average of 107 rainy days[9].

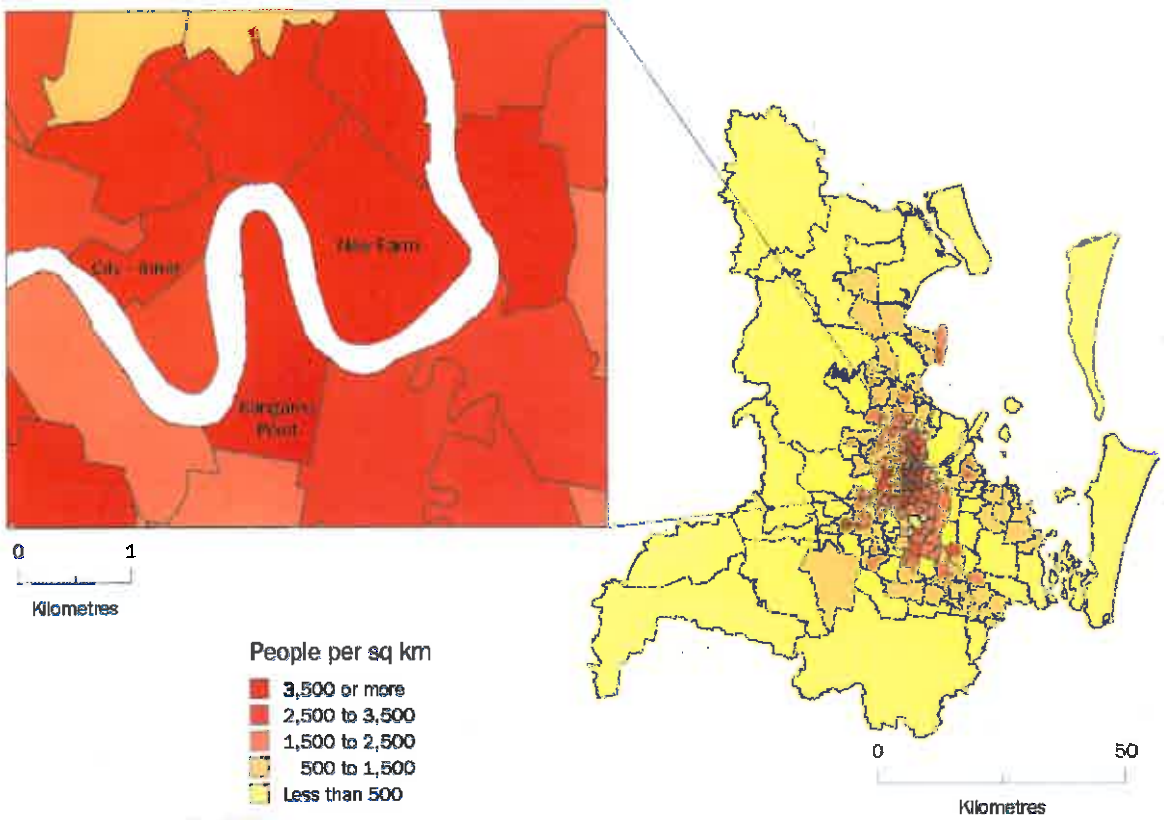


Figure 2: Brisbane residential densities

Brisbane Airport's Economic and Social Contribution

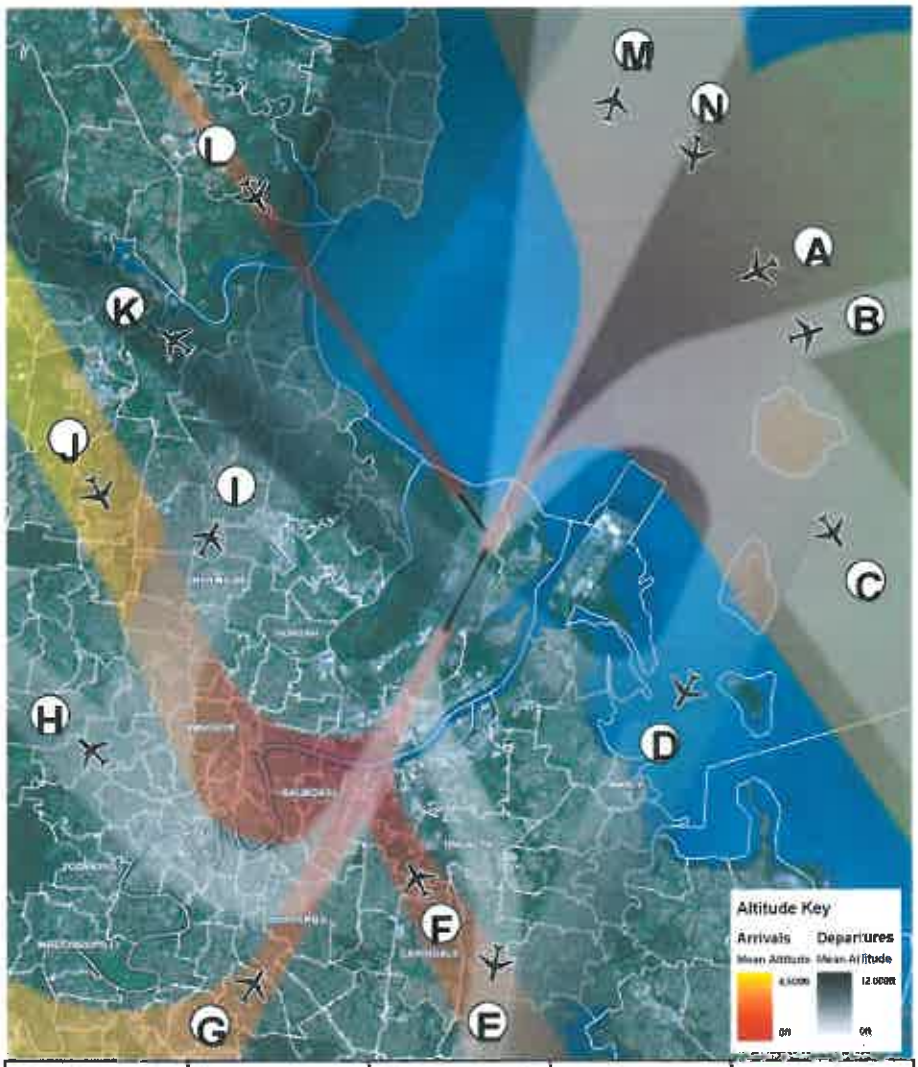
Brisbane Airport traffic

Brisbane Airport is Australia's third-busiest airport. In 2010-11, Brisbane Airport recorded 20.1 million passenger movements: 4.3 million international and 15.8 million domestic[10]. There were 168,300 aircraft movements in this period[11].

[9] http://www.weatherzone.com.au/climate/station.jsp?lt=site&lc=40842
[10] Brisbane Airport Passenger Statistics, http://bne.com.au/media-centre/passenger-statistics
[11] 'Bureau of Infrastructure, Transport and Regional Economics, Airport Traffic Data, http://www.bitre.gov.au/publications/ongoing/airport_traffic_data.aspx

Brisbane Airport: Jet Flight Path Movements

1 Jan 2005 to 31 Dec 2005, All Jets



average daily movements 62 percent of movements 10% daily range 0 - 123 zero movement days 3%	average daily movements 1 percent of movements 0% daily range 0 - 6 zero movement days 59%	average daily movements 6 percent of movements 2% daily range 0 - 16 zero movement days 17%	average daily movements 45 percent of movements 14% daily range 0 - 101 zero movement days 12%	average daily movements 51 percent of movements 16% daily range 0 - 109 zero movement days 12%
average daily movements 22 percent of movements 7% daily range 0 - 73 zero movement days 33%	average daily movements 36 percent of movements 11% daily range 0 - 167 zero movement days 28%	average daily movements 9 percent of movements 3% daily range 0 - 23 zero movement days 19%	average daily movements 20 percent of movements 6% daily range 0 - 51 zero movement days 17%	average daily movements 16 percent of movements 5% daily range 0 - 47 zero movement days 31%
average daily movements 3 percent of movements 1% daily range 0 - 10 zero movement days 28%	average daily movements 1 percent of movements 0% daily range 0 - 4 zero movement days 56%	average daily movements 27 percent of movements 8% daily range 0 - 78 zero movement days 1%	average daily movements 27 percent of movements 8% daily range 0 - 81 zero movement days 5%	

Total number of movements = 117,838

Figure 3: Brisbane Airport jet flight path movements, 2005

Passenger movements are expected to increase to 51.2 million by 2029-30, with an annual increase of 6 percent on Brisbane's international routes, 4.8 percent on inter-capital routes and 4 percent on regional routes[12].

Brisbane is Australia's third-busiest international air freight port. The Airport currently handles approximately 12 percent of Australia's international air freight and 15 percent of the country's domestic air freight. The Airport estimates that international freight volumes will almost double from 149,000 tonnes in 2008-09 to over 270,000 tonnes by 2028-29[13]. In coming years, the airport also expects to see a substantial increase in fly-in, fly-out (FIFO) operations related to the mining and resources industry.

Current financial contribution and job generation

In the 2009 Brisbane Airport Master Plan, it was reported that during 2008 the Airport would directly contribute an estimated:

- $3.2 billion in output to the South-East Queensland economy;
- $1.4 billion in spending in the wider community;
- $840 million in total wages for people working on the Airport; and
- 16,000 Full Time Equivalent jobs.

Forecast financial contribution and job generation

The Brisbane Airport Corporation (BAC) forecasts that by 2029 employment at Brisbane Airport will increase to more than 50,000 jobs.

The Airport also estimates that as a result of planned expansion, by 2029, the cumulative economic impact for the South-East Queensland region will:

- increase Gross Regional Product by $1.2 billion;
- increase real household consumption by $1.7 billion; and
- increase jobs in the region for approximately 11,000 workers in addition to the projected increase in jobs at Brisbane Airport[14].

Feedback Question 1

How does the community balance noise concerns with the economic contribution of airports in general and Brisbane Airport in particular?

Brisbane Airport's Development History

The current Brisbane Airport site was established and became operational in 1988.

The International Terminal Building and associated apron taxiways opened in September 1995. This was supplemented by the establishment of services and facilities for business and

[12] Aircraft movements through capital city Airports to 2029-30, Bureau of Infrastructure, Transport and Regional Economics Report 117
[13] Brisbane Airport Master Plan 2009
[14] Brisbane Airport Master Plan 2009

industry development, establishment of a range of additional operators and tenants, extension of the Domestic Terminal Building and extension of Airservices Australia facilities.

Since privatisation in 1997, BAC has invested approximately $850 million in the growth of Brisbane Airport, including:

- expansion of the International Terminal and its aprons;
- establishment of the 'Airport Village' precinct, which will consist of a number of commercial, business, leisure and retail ventures;
- the Northern Access Roads Project – a 4½-kilometre multi-lane road system providing a second major access route to terminals and on-Airport businesses;
- expansion of the domestic apron to allow for new plane parking areas and taxiway facilities at the Northern Satellite of the domestic Airport; and
- the construction of the Da Vinci area at Export Park dedicated to logistics and aviation/aeronautical uses[15].

Brisbane Airport's Development Plans

BAC's development plan for Brisbane Airport involves investment of $4.2 billion in on-Airport infrastructure by 2029. Expansion works listed in the 2009 Master Plan include:

- expansion and upgrade of the domestic terminal involving changes to the terminal, the precinct's road network and car park locations;
- expansion and upgrading of the international terminal processing areas to meet current airline practices and technology;
- Airport access and business and industry-related development involving 12 road projects and various public transport, cycling and pedestrian access initiatives; and
- a New Parallel Runway (NPR).

The NPR is a particularly significant development and the single largest investment in Australian aviation infrastructure over the last 20 years.

Brisbane Airport will construct and operate a new 3,300m runway west and parallel to the existing 01/19 runway and staggered in a northerly direction towards Moreton Bay. The new runway will be sufficiently separated from the existing runway to allow the simultaneous, independent operation of both runways. The project will also include associated taxiways, navigational aids and land-based access infrastructure.

The necessary Australian Government approvals for the project were issued on 18 September 2007. The Airport anticipates commencing works for the NPR in 2012 and expects the runway to be operational by 2020. The location of the NPR is shown in Appendix 1. Analysis of the likely aircraft noise impacts of the parallel runway system is included in the following section of this paper, 'Options: Further potential measures for managing night-time noise impacts'.

[15] Brisbane Airport Master Plan 2009.

Aircraft Noise

Why is Aircraft Noise a Problem?

While not all individuals exposed to aircraft noise are negatively affected by it, evidence is available through organisations including the World Health Organization and the International Civil Aviation Organization (ICAO) detailing the impacts of night time noise on sleep, health and cognitive performance. According to ICAO, aircraft noise is the most significant cause of adverse community reaction to the operation and expansion of airports.

Reaction to aircraft noise is subjective and is influenced by a number of factors, including fear of an aircraft accident, attitudes towards the aviation industry and personal sensitivity to noise. Issues of concern to the public include the level of noise generated by individual aircraft, increasing numbers of flights and decreasing periods of respite. Particular concerns include increased movements during the sensitive night-time period and reduced respite periods on weekends. The issue of community exposure and reaction to aircraft noise is not confined to areas 'close in' to an Airport.

The Australian Government takes aircraft noise very seriously and committed in its 2009 Aviation White Paper to a range of measures to minimise the impacts of aircraft noise, including:

- stricter aircraft noise standards on older, noisier jet aircraft at major airports (through the Air Navigation (Aircraft Noise) Amendment Regulations 2010) (for further information, see the following section, 'Current Initiatives at Brisbane Airport for Managing Night-Time Aircraft Noise');
- establishment of the Australian Aircraft Noise Ombudsman to:
    - independently review noise complaints handling procedures and make recommendations for improvements where necessary; and
    - improve Airservices' consultation arrangements and the presentation and distribution of aircraft-related information to the general public;
- improved community consultation measures; and
- a program of work with states and territories to improve assessment of aircraft noise in land-use planning decisions.

International Civil Aviation Organization (ICAO) Guidance on the Balanced Approach to Aircraft Noise Management

ICAO is the United Nations specialised agency that serves as a forum for cooperation in all fields of civil aviation among its 191 Member States. Australia is a founding member of ICAO and sits on its Governing Council.

In 2001, the ICAO Assembly endorsed the concept of a 'Balanced Approach' to aircraft noise management. In 2007, the Assembly reaffirmed the 'Balanced Approach' principle and called upon States to recognise ICAO's role in dealing with the problems of aircraft noise.

The 'Balanced Approach' concept involves identifying the noise problem at an airport and then analysing the various measures available to reduce noise, in the most cost-effective manner, through exploration of four principal elements, namely:

1. *Reduction at source (quieter aircraft).* Much of ICAO's effort to address aircraft noise over the past 40 years has been aimed at reducing noise at source. Aeroplanes and

helicopters built today are required to meet the noise certification standards adopted by the Council of ICAO.

2. *Land-use planning and management.* Land-use planning and management is an effective means to ensure that the activities nearby airports are compatible with aviation. Its main goal is to minimise the population affected by aircraft noise by introducing land-use zoning around airports. Compatible land-use planning and management is also a vital instrument in ensuring that the gains achieved by the reduced noise of the latest generation of aircraft are not offset by further residential development around airports.
3. *Noise abatement operational procedures.* Noise abatement procedures include, for example, preferential runways and routes, particular procedures for take-off, approach and landing, or curfews. The appropriateness of any of these potential measures depends on the physical lay-out of the airport and its surroundings, but in all cases the procedure must give priority to safety considerations.
4. *Operating restrictions.* Noise concerns have led some States, mostly developed countries, to consider banning the operation of certain noisy aircraft at noise-sensitive airports.

Consistent with the 'Balanced Approach', the Steering Committee will seek to develop a comprehensive noise management strategy to balance community amenity and the effective operations of Brisbane Airport.

Further information about the ICAO Balanced Approach can be found at:

<http://www.icao.int/environmental-protection/pages/noise.aspx>

Feedback Question 2

What elements of the ICAO Balanced Approach can be best applied at Brisbane Airport to manage the effects of night-time aircraft noise?

The Extent of Night-time Aircraft Noise at Brisbane

Aircraft Movements

As a curfew-free airport, Brisbane Airport experiences aircraft movements at all times of the day and night. Figure 4 shows the average number of movements (take-offs and landings) per day in 2011, separated by time of day and season.

The vast majority of take-offs and landings at the Airport occur during the day and early evening. Less than seven percent of all aircraft movements occur at night (11:00pm – 6:00am). This equates to around five movements per hour during this period. The occurrence of daylight saving in other states during summer tends to result in a substantial increase in the number of aircraft movements between 5:00am and 6:00am during this time (October to March).

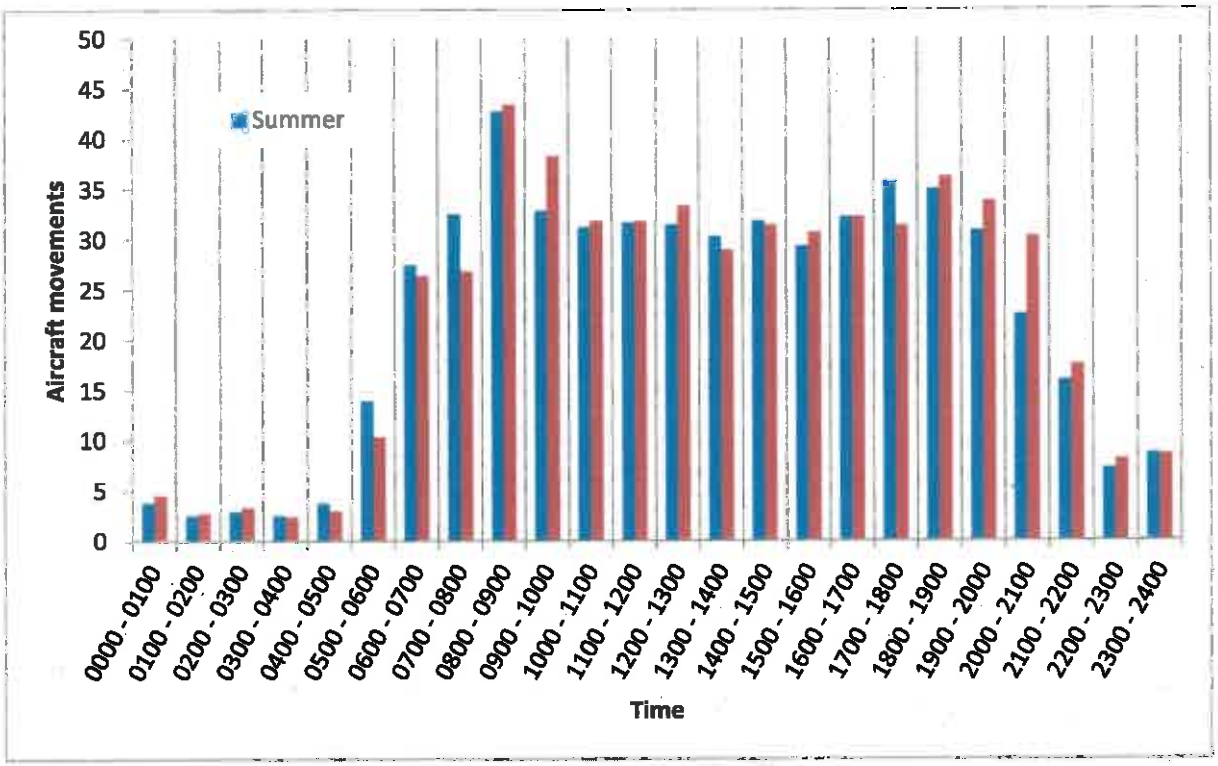


Figure 4: Average Brisbane Airport aircraft movements per day, 2011

Feedback Question 3

What would be the impact on the Queensland and Australian economies if flights were not permitted from Brisbane Airport between 5:00am – 6:00am during summer?

Use of Runways

About 68 percent (summer) and 82 percent (winter) of all operations at night (11:00pm – 6:00am) have been directed over Moreton Bay in recent years[16] (see Figure 5), through the 'Reciprocal Mode' of operation. When the Reciprocal Mode of operation is unavailable due to weather or traffic conditions, Mode 19 or Mode 01 is used, which involves either departures or arrivals, respectively, taking place over Brisbane. Existing modes of operation at Brisbane Airport are depicted in Appendix 2.

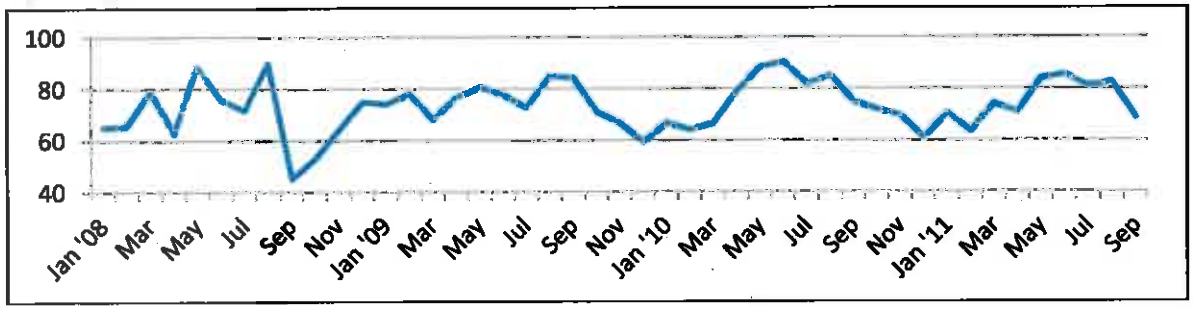


Figure 5: Proportion of Night-Time Operations Occurring Over Moreton Bay (11:00pm – 6:00am)

[16] AsA NFPMS Data

Feedback Question 4

What additional strategies can Brisbane Airport, Airservices Australia and airlines employ to maximise the use of over-water arrivals and departures during sensitive night-time hours?

Night-time Noise Contours

Appendix 3 sets out contours illustrating the number of predicted events above 60 dB(A) between the hours of 10pm-6pm on an average day in 2029, according to Brisbane Airport's ultimate capacity forecast (which includes the operation of the NPR). The forecast reveals that certain areas south of the Brisbane River will be exposed to between three and six events of 60dB(A) or more on a typical night in 2029, but few residences would be exposed to more than an average of six movements per night. It should be noted that this data refers to average exposure. It could be expected that on many nights residents could expect no aircraft movements, while on some nights there would be more movements.

The level of 60 dB(A) is chosen because, after attenuation of approximately 10 dB(A) by the fabric of a house with open windows, exposure to an event of 50 dB(A) or above has been judged based on experience in Australia as disruptive to sleep[17].

Noise Monitoring

Airservices Australia has established a Noise and Flight path Monitoring System (NFpMS) at Australia's major airports, including Brisbane. It has been designed to monitor aircraft noise as measured on the ground. Brisbane's NFpMS has five strategically located Noise Monitoring Terminals (NMTs) at Tingalpa, Cannon Hill, Bulimba, Kedron and Nudgee Beach.

The information collected by the NFpMS is used for several purposes, including to assess the effects of operational and administrative procedures for noise control, and compliance with these procedures, or to assist in reviewing noise complaints, with outcomes reported quarterly on the Airservices Australia website.

Brisbane Airport Complaints Data

Complaints about noise originating from Brisbane Airport demonstrate the subjective nature of reactions to aircraft noise, including how exposure to aircraft noise can be a particularly negative experience for some people. Complaints data over the past three years are characterised by a very small number of complainants accounting for a very high proportion of complaints. Between 1 September 2009 and 31 May 2012, there were 16,980 noise complaints from 915 unique complainants. However, the top four complainants accounted for over 80% of all these complaints, with the most frequent complainant alone lodging 11,428 complaints during the period. The disproportionately high number of complaints from these complainants obscures the underlying trends in the complaints data, and the top four complainants have therefore been discounted from the following analysis.

Outside of the top four complainants, the data shows that there were 3,301 complaints during this 32-month period – an average of 3.3 complaints per day. Of the 911 unique complainants, 605 lodged only one complaint. The remaining 306 complainants (who lodged multiple complaints) therefore lodged an average of 8.8 complaints each during the period.

[17] AS2021

Describing aircraft noise

Decibels

The decibel is the most common unit of measure for sound. The human ear is relatively insensitive to changes in sound level, and the decibel scale therefore increases exponentially. So, for example, a 70 decibel sound will be perceived by the human ear to be about twice as loud as a 60 decibel sound, but actually represents a ten-fold increase in sound energy.

Measurements of sound usually have a correction factor applied to reflect the sensitivity of the human ear. This factor is referred to as 'A-weighting' and environmental noise is usually measured in dB(A) units.

The following list[18] represents the sound levels of a range of common events:

- *120dB(A): Threshold of pain*
- *95dB(A): Pneumatic drill (un-silenced at 7m distance)*
- *90dB(A): Modern twin-engine jet (at take-off at 75m distance)*
- *70dB(A): Passenger car (60 km/h at 7m distance)*
- *60dB(A): Ordinary conversation*
- *35dB(A): Quiet bedroom*
- *0dB(A): Threshold of hearing*

Land-use planning around airports

Land-use planning decisions around airports generally rely on mapping the extent to which aircraft noise carries beyond the boundary of the airport, largely from arriving and departing aircraft. The Australian Noise Exposure Forecast (ANEF) is a contour-based mapping tool that shows cumulative noise levels around an airport over the course of a year. It has been used for many decades in land-use planning. More recently, frequency-based maps of aircraft noise have been developed. Appendix 3 shows an example of such a map.

The 3,301 complaints originated from 160 different suburbs. The top ten suburbs by number of complaints, which accounted for almost two-thirds of all complaints, were as follows (total complaints in brackets):

1. Morningside (480)
2. Tingalpa (373)
3. Cannon Hill (244)
4. Holland Park (181)
5. Seven Hills (173)
6. Murarrie (172)
7. Wakerley (159)
8. Coorparoo (148)
9. Camp Hill (140)
10. Ashgrove (65)

As noted above, the absence of daylight saving in Queensland tends to result in a substantial increase in the number of aircraft movements between 5:00am and 6:00am during summer. This is reflected in the complaints data, with Figure 6 showing how the average number of complaints per month spikes sharply during this time.

[18] Source: Noise Mapping Northern Ireland http://www.noiseni.co.uk/index/glossary_of_noise_terms.htm

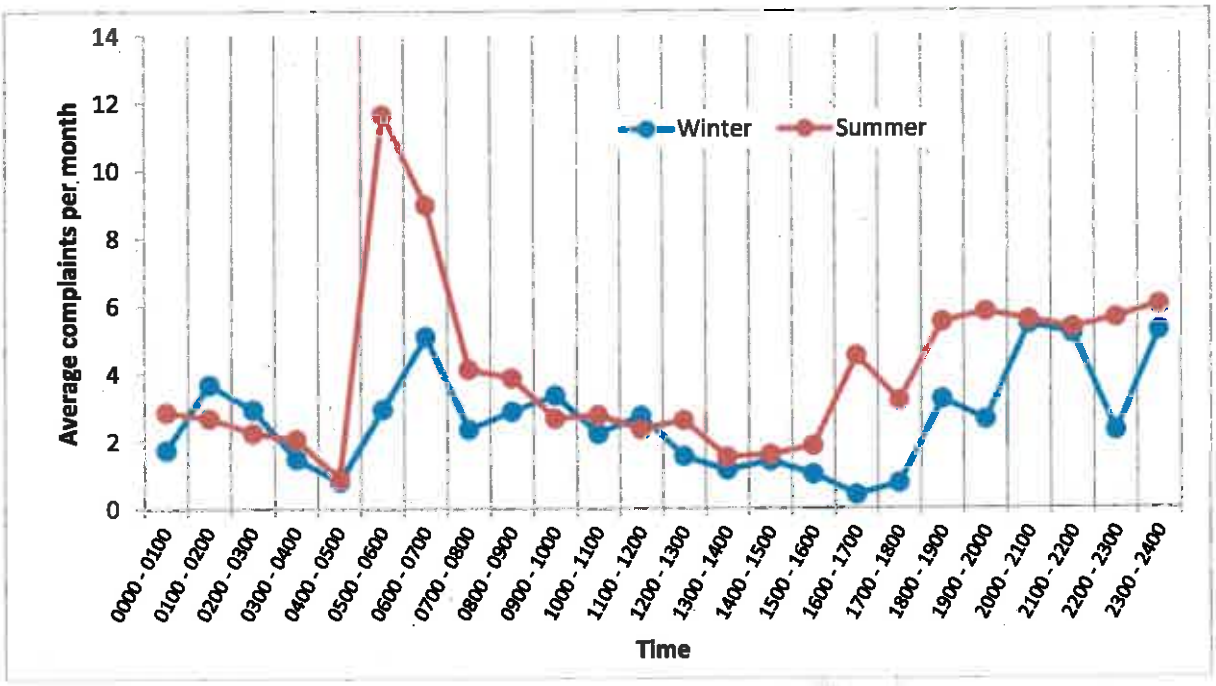


Figure 6: Brisbane Airport noise complaints, average per month, 1 Sep 2009 – 31 May 2012

Noise complaints can be expected to reflect the level of aircraft movements at any given time of day. Despite the significantly reduced frequency of flights, night-time hours are expected to show a higher proportion of complaints, given the increased sensitivity of this period and lower ambient background noise levels. These trends are reflected in the complaints data, with the number of noise complaints per 1,000 aircraft movements being far higher at night than during the day (Figure 7). Interestingly, the number of complaints is generally higher during summer (October to March) than winter (April to September), perhaps reflecting the public's increased outdoor lifestyle, and consequent greater exposure to aircraft noise, during this period.

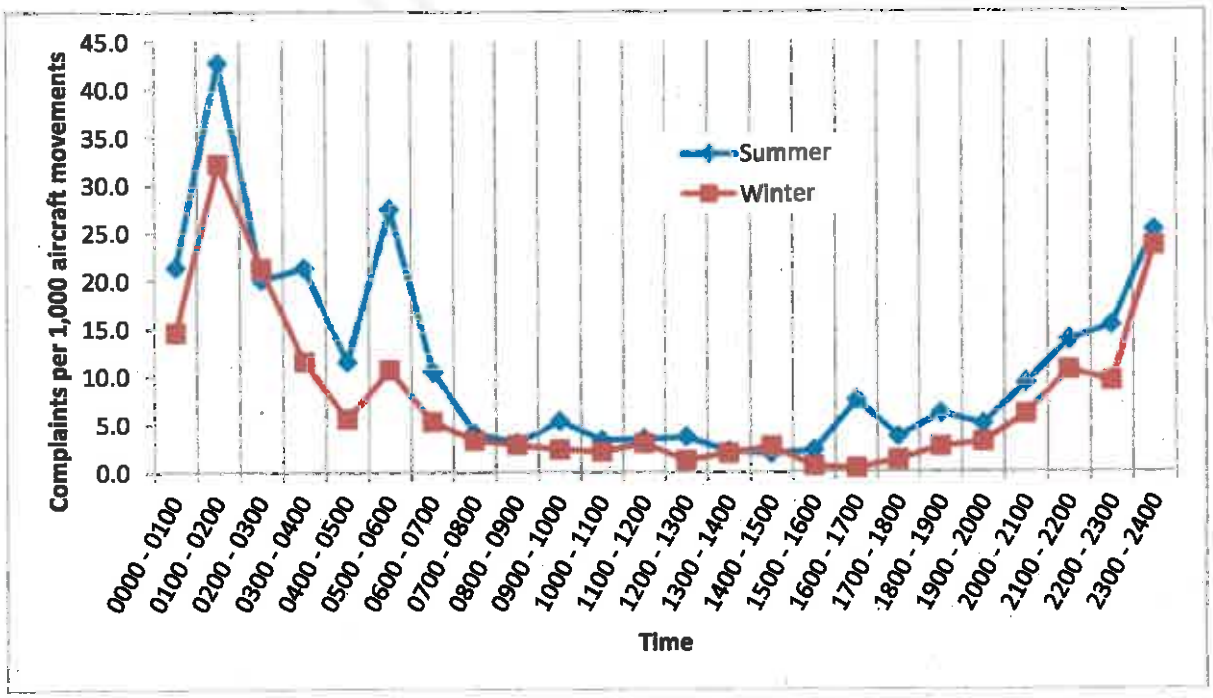


Figure 7: Brisbane Airport noise complaints per 1,000 aircraft movements, calendar 2011

Australian Airport Noise Complaint Data

Table 2 sets out noise complaint and complainant data per 10,000 aircraft movements[19] at the five busiest Australian airports. It shows that Brisbane Airport generates the third-highest number of complaints and complainants out of these five airports.

The Airport receives around half the complaints of Sydney Airport, which operates under a curfew. However, the Airport also has fewer complaints than Perth Airport, which does not have a curfew. Note that complaints data for Brisbane, Sydney and Perth Airports are all influenced heavily by a small number of complainants who lodge a very high number of complaints.

As noted earlier, the closest residences to the end of the main Brisbane Airport runway are 6.7 km away.

Airport	Reference Period	Complaints per 10,000 aircraft movements	Complainants per 10,000 aircraft movements	Distance (m) from runway to nearest residence
Adelaide	January – June 2012 (6 months)	52	18	600
Sydney		993	73	700
Perth		1664	96	1800
Melbourne		38	16	6000
Brisbane		477	31	6700

Table 1: Comparison of aircraft noise complaints, selected Australian airports, various time periods

[19] 'Curfews at international Airports – A study of current practice summary booklet', BAC October 2010 and 'Curfews at international Airports – a study of current practice', J. Bulicke

Current Initiatives at Brisbane Airport for Managing Night-Time Aircraft Noise

In line with the ICAO 'Balanced Approach' to aircraft noise management, a number of initiatives are currently in place or in the process of being implemented that contribute to the management of night-time aircraft noise at Brisbane Airport.

Reduction of Noise At Source

Considerable progress continues to be made in reducing noise exposure through the introduction of more modern, quieter aircraft and improved air traffic procedures. Noise performance is seen as an important selling point of modern aircraft.

As an example, the B707, the first early high-capacity commercial jet aircraft, emitted sound levels of 120 dB(A), measured at 450 metres from the source. The modern A380, while carrying 3-4 times the number of passengers, emits around 90 dB(A) by the same measure. Appendix 4 illustrates the evolution of noise characteristics of jet aircraft over the past 50 years.

It is important to note that, while modern aircraft are much quieter than their predecessors, these gains have been offset at many airports by the ever-increasing number of aircraft movements (i.e. arrivals and departures) and the tendency by airlines to 'upguage' (i.e. use bigger aircraft).

Feedback Question 5

What strategies and incentives can Brisbane Airport, Airservices Australia and airlines employ to encourage use of the most modern, low-noise aircraft at Brisbane Airport, particularly during sensitive night-time hours?

Land-Use Planning and Management

The Queensland Government State Planning Policy (SPP) 1/02 – Development in the Vicinity of Certain Airports and Aviation Facilities – sets out the State's approach to development in the vicinity of those airports considered essential for the State's transport infrastructure, including Brisbane Airport. The Policy states that development in the vicinity of airports should avoid large increases in the numbers of people adversely affected by significant aircraft noise and includes a number of outcomes to this affect. Local councils (in this case, Brisbane City Council) are required to develop and implement their local planning schemes to ensure the same outcomes as expressed in SPP 1/02.

SPP 1/02 references the Australian Standard Acoustics – Aircraft Noise Intrusion – Building Siting and Construction (AS2021). AS2021 provides guidance on the siting and construction of buildings in the vicinity of airports to minimise aircraft noise intrusion.

SPP 1/02 will be further enhanced by the National Airports Safeguarding Framework (the Safeguarding Framework), which was endorsed in May 2012 by the Australian Government and State and Territory governments. The Safeguarding Framework will provide guidance to land-use planners by enabling a broader range of noise information to be taken into consideration when making land-use planning decisions near airports. The Safeguarding Framework can be found at:

< http://www.infrastructure.gov.au/aviation/environmental/nasf/index.aspx>.

One of the key objectives of the Safeguarding Framework is a more sophisticated approach to assessment of potential aircraft noise impacts on new residential developments. Planning systems that rely solely on the Australian Noise Exposure Forecast (ANEF) are unlikely to effectively assess the potential impact of night-time noise, as individual moderately-noisy events can disturb sleep without necessarily showing excessive noise impacts in the ANEF.

Feedback Question 6

How can land-use planning practices in Brisbane best complement the operations and growth of Brisbane Airport to serve the state's transport, business and tourism needs while minimising the impact on communities?

Noise Abatement Operational Procedures

Noise Abatement Procedures (NAPs) are currently used at Brisbane Airport to reduce the impact of aircraft operations on residential areas, especially at night. The NAPs describe Preferred Runways and Preferred Flight Paths for both departing and arriving aircraft, and include measures such as:

- jet aircraft departing runway 19 (i.e. towards the CBD) must begin take-off from the farthest end of the runway to allow maximum altitude gain before flying over residential areas;
- altitude restrictions over land for both arriving and departing aircraft during noise-sensitive periods; and
- restrictions on the hours of flight training operations.

The NAPs are attached at Appendix 5 and should be read in conjunction with Appendix 2, which illustrates existing modes of operation at Brisbane Airport. NAPs are not always able to be applied and are subject to weather and traffic considerations and urgency (e.g. emergency) of operations.

Feedback Question 7

Where noise impacts are unavoidable, should they be shared to minimise the effects on any one group or concentrated to minimise the number of affected residents?

Preferred Runways

On Sunday through to Friday nights (10 pm to 6am) and on Saturday nights (9pm to 6am), the preferred mode of operation is Reciprocal Mode over Moreton Bay, with landings on Runway 19 and take-offs on Runway 01. If weather conditions are unfavourable, the preferred mode is to have aircraft arrive over the city (Runway 01) and depart over Moreton bay (Runway 01). During daylight saving period in the southern states, Runway 01 is the preferred runway for all jet arrivals and departures between 5am – 6am Monday to Friday (local time), while Runways 14 and 32 are equally preferred for all non-jet arrivals.

Preferred Flight Paths

NAPs for Brisbane Airport specify preferred flight paths that facilitate maximum use of over-water tracks and specify minimum altitudes over land as far as practicable. They also specify additional requirements for minimum altitudes for those portions of flights that must be carried out over land.

All jet aircraft landing on Runway 19 will normally be routed east of the coast to avoid noise-sensitive areas. Descent for these aircraft is such that they need to be above 5000ft until after they cross the coastline for landing at Runway 19 between 10pm – 6am.

For aircraft departing from Runway 01, the altitude for departures before crossing the coast is 5000ft. In the case of jet aircraft arriving from the north for landing on Runway 01 using the River Track, descent below 3000ft is not permitted during night-time until aligned with the Runway.

Jet Noise Abatement Climb Procedures

Jet Noise Abatement Climb Procedures refer to different combinations of power/thrust settings and flap retractions at specific heights to minimise noise exposure on the ground. Jet aircraft taking off from Runway 19 over the city must adhere to the Jet Noise Abatement Climb procedures. This procedure applies 24 hours a day for Runway 19.

Airservices Australia, in consultation with a technical noise working group, is currently undertaking a review of the Brisbane Airport NAPs. The review will look at compliance levels of operations with the NAPs, the effectiveness of the NAPs and options for making them more effective.

Feedback Question 8

To what extent are the existing noise abatement procedures effective? In what ways could they be improved?

Operational Restrictions

ICAO encourages States not to apply operating restrictions as a first resort, but only after consideration of the benefits to be gained from the other three principal elements of the Balanced Approach (set out above). In 2010, the Australian Government amended the Air Navigation (Aircraft Noise) Regulations to ban the operation of older, noisy jet aircraft at many Australian airports.

Older aircraft such as the Boeing 727-200 and Boeing 737-200 models were originally noise-certified to International Civil Aviation Organization (ICAO) Annex 16, Volume I, Chapter 2 noise standards (introduced by ICAO in 1970). Following the introduction of stricter Chapter 3 noise standards in 1977 and the commencement of a phase-out of Chapter 2 aircraft operations by ICAO in 1995, some Chapter 2 aircraft were modified (or 'hush kitted') in order to achieve re-certification to Chapter 3 standards, and thereby prolong their operating life.

In July 2010, as a commitment of its Aviation White Paper, the Australian Government introduced the Air Navigation (Aircraft Noise) Amendment Regulations 2010, which restrict the operation of marginally-compliant Chapter 3 (MCC3) aircraft at Australian airports where they contribute to unacceptable levels of aircraft noise. The noise emitted by these aircraft was for some time a source of concern to communities surrounding airports where

they operated. This was further aggravated by the fact that the aircraft were mainly used for freight purposes and often operated during noise-sensitive night-time periods.

The new Regulations (under the *Air Navigation Act 1920*) were phased in between 1 July 2010 and 1 September 2010, and prohibit services by MCC3 aircraft at Brisbane, Sydney, Melbourne, Perth, Adelaide, Hobart, Canberra, Darwin, Cairns, Cold Coast, Newcastle (Williamtown), Essendon and Avalon Airports.

The phase-out of these noisy aircraft had been canvassed with the aviation industry since 2000, but was prioritised by the Government following representations made by Brisbane Airport to the Minister for Infrastructure and Transport to limit operations by MCC3 aircraft due to their aircraft noise impact. Table 3 illustrates the extent of activity by MCC3 aircraft at Brisbane Airport prior to their ban.

Aircraft	2008-09 Movements	Flights to/from
B727-100 (hush-kitted)	169	Port Moresby, Honiara, Cairns, Darwin, Broome, Mount Hagen, Port Vila
B727-200 (hush-kitted)	28	Port Moresby, Auckland, Cairns, Sydney, Melbourne, Perth, Adelaide, Biak, Marshall Islands
Antonov AN-124, DC86	4	Honolulu, Auckland, Taiwan, Williamstown
B737-200 (hush-kitted)	270	Norfolk Island, Honiara, Sydney, Darwin, Perth, Canberra, Fua'amotu, Pago Pago, Melbourne, Port Moresby
TOTAL	**471**	

Table 2: MCC3 aircraft activity at Brisbane Airport 2008-09

Community Engagement and Communications

Brisbane Airport committed in its 2009 Master Plan to strengthen its approach to noise management through a number of community engagement initiatives, including:

- improved community engagement in the Airport's operations through:
  - annual Community Forum meetings in affected parts of Brisbane, open to broad public participation;
  - a new community-based noise committee comprised of community and Government representatives along with industry and regulatory authorities. The committee has an independent Chair and considers ways to improve noise mitigation measures and communication of noise information to the community. Further information about the Brisbane Airport Community Aviation Consultation Group is available at <http://bacacg.com.au>; and
  - a continuing public engagement strategy for community engagement and communication of noise information in the lead up to commissioning the planned

new parallel runway, with the strategy to be published and progress reported regularly to the Government; and

- improved dissemination of information to the community through:
    - establishment of a Community Experiential Centre facility on the Airport to provide displays and interactive information exchange on noise and other operational and Airport development issues;
    - more information on noise issues on the Airport's website;
    - a freecall telephone enquiry service and dedicated email enquiry address;
    - community displays and presentations;
    - print media, including a Flight Paths and Noise Information Booklet; and
    - exploration of options to develop an alternative noise metric to supplement the ANEF system and provide a better level of information to the community, in conjunction with State and local planning authorities.

The Australian Government 2009 Aviation White Paper included a formal requirement for all leased federal airports to establish Community Aviation Consultation Groups to ensure that local communities have direct input on airport planning matters, with appropriate arrangements for engagement with other industry stakeholders such as airlines and Airservices Australia where necessary.

Further potential measures for managing night-time noise impacts

Brisbane Airport is a significant national infrastructure asset that contributes billions of dollars to the local, regional and national economy and supports considerable employment in the South-East Queensland region.

The current and projected noise footprint of the Airport along with the trends in complaints and complainant data indicates that the night-time noise footprint generated by operations at Brisbane Airport is less severe than some other Australian airports. However, this is not to say that aircraft noise is a trivial issue for those affected by it.

With the projected increase in air traffic, and despite technological improvements resulting in an increasingly quieter aircraft fleet, aircraft noise at Brisbane Airport will need to be carefully managed.

There are a number of potential measures for further minimising noise at the Airport.

New Parallel Runway (NPR)

The primary proposed modes of operation for night-time operations following the opening of the NPR at Brisbane Airport are set out in Appendix 6, along with the conditions of availability for each of these modes.[20] Appendix 7 sets out the percentage use of operating modes in 2035 as estimated by Brisbane Airport Corporation (BAC).

The Environmental Impact Statement and Major Development Plan for the NPR project that the opening of the NPR will see a decrease in the area exposed to more than two aircraft noise events per night greater than 70dB(A). This is because of the potential that the NPR offers to direct both arriving and departing aircraft over Moreton Bay in low to medium traffic demand periods. Depending on weather conditions, this would be done by using one runway solely for arrivals and the other solely for departures, either:

- simultaneously – known as SODPROPS (simultaneous opposite-direction parallel runway operations); or
- alternately – known as DODPROPS (dependent opposite-direction parallel runway operations).

This could be particularly important during the morning 5am to 6am period, which is a departure peak when daylight saving is in effect in other states.

BAC has developed strategies to minimise noise exposure to residents when preferable modes of operation are unavailable, including:

- the use of over-Bay operations for jet aircraft, with the quieter turbo-prop aircraft taking off from the NPR in the city direction. This allows the maximum opportunity for jet aircraft to remain operating over the Bay whilst minimising delays; and
- when weather conditions do not allow for all flights over the Bay, to use only the existing runway for operations over the city at night (11:00pm – 6:00am)[21].

In summary, the NPR provides some opportunities to further mitigate night-time noise impacts on the Brisbane community. However, these opportunities are dependent on weather and traffic conditions.

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[20] New Parallel Runway Draft EIS/MDP D5-105
[21] New Parallel Runway Draft EIS/MDP D5

Feedback Question 9

To what extent will the new parallel runway help to mitigate aircraft noise originating from Brisbane Airport during the night? How could these benefits be maximised?

Smart Tracking

A growing number of modern aircraft are now fitted with navigation systems that use satellite-assisted guidance. These systems offer the potential for flight routes to follow existing noise corridors (e.g. highways) or to avoid noise-sensitive areas and instead traverse water, industrial or non-residential areas. Airservices Australia refers to this technology as *Smart Tracking*. It is also known as Required Navigation Performance (RNP).

The potential benefits of Smart Tracking are threefold:

1. Smart Tracking aircraft are able to fly certain flight paths that they would otherwise be unable to use at night or in poor weather conditions. This has the potential to provide respite to noise-affected communities by allowing the use of flight paths and noise-sharing procedures that would normally only be possible in high-visibility, daytime conditions.
2. Smart Tracking aircraft can be flown with greater accuracy, with only a small variation in the actual tracks flown from one aircraft to another. Smart Tracking aircraft can adhere to a lateral path of plus or minus 70 feet, which is less than the wingspan of the aircraft. This has the benefit of minimising the overall noise footprint; however, it can also concentrate noise impacts underneath the RNP track. Noise-sharing arrangements could be implemented as a means of providing respite to those directly under a Smart Tracking path.
3. Smart Tracking facilitates the use of Continuous Descent Approach (CDA) arrivals. Landing procedures traditionally involve aircraft descending in successive steps from cruising altitudes to the runway, with additional power required each time the aircraft levels out at the next step down in altitude. In a CDA, the aircraft flies from cruise altitude to the runway in one smooth and uninterrupted descent. Under ideal circumstances, a plane can glide into the airport with engines idling for up to 20 minutes. The application of CDA has been shown to reduce community noise on average by about 4dB(A) to 6dB(A)[22].

Smart Tracking technology is fitted in most new aircraft and can be retrofitted into some older aircraft. It is anticipated that the technology should be available in most aircraft by 2015.

Smart Tracking has been trialled at Brisbane Airport since 2007 and in early 2012 became a permanent measure for all aircraft using the Airport that have this capability. Figure 8 shows the Smart Track routes used by aircraft at Brisbane Airport, which are all within existing and long-standing flight path corridors.

Airservices Australia has undertaken an analysis of the projected noise impacts arising from the permanent introduction of Smart Tracking in Brisbane as follows[23]:

[22] New Parallel Runway Draft EIS/MDP D5

[23] http://www.airservicesaustralia.com/projects/smart-tracking/environmental-analysis-brisbane/

Figure 8: Brisbane Smart Track Routes (Source: Airservices Australia February 2012)[24]

Runway 01 arrivals

- *Track 1* is the approach for traffic arriving from the north. The level of noise of any individual flight is not expected to change for most communities under this route. A few locations may experience decreases of up to 6dB(A) or increases of up to 5dB(A). The 24-hour average noise level may decrease by up to 4dB(A).
- *Track 2* is the overland straight-in approach. There should be no change to the maximum noise exposure of any individual flight to any community. A few areas at the southern end of this route may experience increases of up to 5dB(A) in average noise level over a 24-hour period. Most areas are expected to experience no change.
- *Track 3* is the approach from the south. It is used by about two-thirds of flights arriving in Brisbane. While there should be no change to the maximum noise exposure of any individual flight to any community, the final segments of the Smart Tracking route are

[24] http://www.airservicesaustralia.com/projects/smart-tracking/environmental-analysis-brisbane/

offset slightly from the centre of the current flight path corridor. Some areas close to the airport may experience more noise events. Other areas will experience less noise events than they do now. No perceptible change is expected to the average noise level over a 24-hour period.

Runway 19 arrivals

- *Track 4* is initially over land but at high altitude (above 5000 ft or 1500 metres). There is unlikely to be any change in aircraft noise that is noticeable by the community.
- *Track 6* takes aircraft further away from residential areas on North Stradbroke Island. The noise impact to residents from aircraft is already very low and will reduce further.
- *Tracks 5, 7 and 8* are over Moreton Bay and will not result in any changes to noise impacts on communities.

In summary, Airservices Australia is of the view that Smart Tracking has the potential to reduce the overall night-time noise footprint of Brisbane Airport, both through the adoption of CDA landing procedures and through a higher degree of accuracy in flight paths over non-residential areas.

Feedback Question 10

How might Smart Tracking technology to be used to further improve night-time noise outcomes, both in the near and longer term? What would be the key indicators of success?

Airport Curfews

Airport curfews are one way of managing night-time aircraft noise and providing communities around airports with some respite.

Night-time operations at Sydney, Adelaide, Essendon and Gold Coast Airports are strictly limited by curfews between 11:00pm and 6:00am. Curfew arrangements are established under the *Sydney Airport Curfew Act 1995*, the *Adelaide Airport Curfew Act 2000*, the Air Navigation (Coolangatta Airport Curfew) Regulations 1999, and the Air Navigation (Essendon Airport) Regulations 2001.

The curfew arrangements at these four airports have arisen primarily due to the proximity of residents to the end of the runway at each airport (see Table 2). The nearest houses to the southern end of the Brisbane Airport main runway are 6.7km away, as compared to less than 1km at Sydney, Adelaide, Gold Coast and Essendon Airports.

It is worth noting that the previous location of Brisbane Airport, at the now-defunct Eagle Farm Airport, used until 1988, was much closer to surrounding residences. The nearest houses in the suburbs of Eagle Farm and Hendra were less than 1km from the end of the runway, and the airport operated under a curfew very similar to the current curfew arrangements in place at other airports.

Curfews, however, do not restrict all night-time aircraft movements. While each airport's legislation varies slightly, all curfewed airports provide exemptions for emergency operations, including air ambulance and search and rescue aircraft, and for dispensations to be granted in exceptional circumstances. Legislation also allows certain low-noise aircraft to

operate unrestricted during curfew hours, although usually only where the aircraft are specified by the Minister and meet strict ICAO noise standards. Such aircraft include some small jets (less than 34,000kg), low-noise heavy freight jets (usually BAe 146 and B737 aircraft) and most propeller-driven aircraft. Helicopters are also permitted to operate during curfew hours at some curfewed airports.

Existing curfew arrangements also permit a limited number of 'shoulder' movements of passenger aircraft on a quota basis during curfew periods to address the time differences during northern hemisphere summer and to fit in with international flight schedules and other international airport curfews.

It is important to note that curfews apply only to take-offs and landings at the specified airport, and do not apply to movements at any other nearby airports or to aircraft flying over or in the vicinity of the curfewed airport. Further details of the curfew arrangements at each airport are provided in Appendix 8.

Costs

There is significant national benefit in maintaining a network of curfew-free airports. Curfews impact on the efficient movement of passengers and freight, not just at the airport to which the curfew applies, but to the whole network. For example, a curfew has the potential to restrict an airport's ability to recover from flight delays caused by adverse weather, which can in turn cause other delays at airports all across the country.

Furthermore, curfews can indirectly impact other airport regions by shifting the night-time noise problem to another region or can lead to shifted demands and new peaks during the rest of the operating day.

An airport curfew can limit the role an airport can play as an economic driver to local and national economies. BAC estimated in the 2009 master plan that the ability to continue operating curfew-free will directly contribute $542 million in gross regional product and $1.3 billion in economic welfare to consumers by 2029[25].

BAC identifies that implementation of a curfew could:

- result in scheduling difficulties associated with different time zones of destination and origin ports of departing and arriving aircraft, particularly international flights;
- impact on the management of efficient domestic operations that are affected by time differences between Queensland and other states for several months each year as a result of daylight saving;
- impact provision of regional overnight financial and commercial services; and
- impact delivery of local perishable goods for the export market.

In submissions made to the Australian Government in developing the White Paper, many stakeholders expressed opposition to a curfew at Brisbane Airport, including the Australian Airports Association (AAA), the Australian Hotels Association and the Board of Airline Representatives of Australia Inc. These stakeholders expressed concerns relating to the potential impacts of a curfew on the economy and on their respective industries. The AAA requested that the Government take into account modern developments in aircraft engines,

[25] Accumulated over 20 years until 2029 with a theoretical curfew

air traffic management strategies and other noise-abatement procedures when making future decisions on airport curfews.

Feedback Question 11

What would be the impact of a night-time (11pm – 6am) airport curfew on the economic contribution of Brisbane Airport? Could these impacts be minimised?

Benefits

In developing the Australian Government's Aviation White Paper, there was support for a curfew from some in the local Brisbane community to reduce night-time noise exposure. It was stated that this could help reduce sleep disturbance and associated health impacts.

Sleep disturbance has been identified as having a wide range of both short and long term health effects[26]. However, quantifying the benefits of reducing night-time noise is not straightforward. Many researchers have carried out studies analysing the correlation between the quantity of night-time aircraft noise and the extent of sleep disturbance (e.g. Miller and Gardner, 2008[27]- Figure 6).

At present there is no international consensus on the most appropriate way to describe, measure or assess night-time aircraft noise. There is ongoing debate as to whether cumulative, or average, noise exposure, or the number of noise events is more important. For illustrative purposes, Figure 9 shows a sample chart relating the number of night-time noise events to the likelihood of waking during the night.

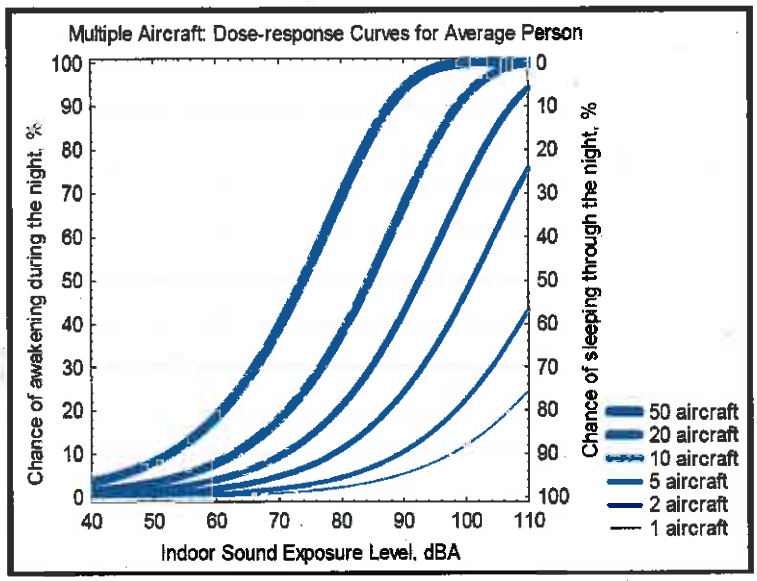


Figure 9: Effect of aircraft noise on sleep, various aircraft frequencies

[26] See World Health Organization Night Noise Guidelines for Europre, 2009.

[27] 'How Many People Will Be awakened by Nightime Aircraft Noise?', Miller and Gardner, 9th international Congress on Noise as a Public Health Problem (International Commission on Biological Effects of Noise) 2008, Foxwoods, CT.

Australian Standard AS2021-2000, *Acoustics—Aircraft noise intrusion—Building siting and construction* recommends that sleeping areas inside dwellings be designed so that single-event aircraft noise events are no louder than 50dB(A). It can be seen from the accompanying figure that in a bedroom designed to meet the Australian Standard AS2021, there is an approximate 5 percent chance of an average person being awoken if there are 20 aircraft noise events per night.

In Brisbane, Appendix 3 demonstrates that there are unlikely to be any residential areas in Brisbane that are exposed to this amount of night-time noise, even under the ultimate operating capacity of the Airport.

Existing curfew arrangements at other Australian airports

A curfew at Brisbane Airport could restrict operations in a number of different ways. Similar to the existing curfew arrangements at Sydney, Adelaide, Gold Coast and Essendon Airports, these restrictions could include permitting night-time operations only:

- over-water (i.e. Moreton Bay);
- by small, propeller-driven aircraft and certain low-noise jets;
- in emergency circumstances; and/or
- where dispensation has been granted by the Minister in 'exceptional circumstances'.

Movement quotas, engine run-up restrictions, reverse thrust restrictions or noise level limits are also potential operating restrictions that could apply at night. Similar to existing curfew arrangements at other Australian airports, it is unlikely that imposition of a curfew would result in prohibition of aircraft movements in their entirety.

Feedback Question 12

What restrictions could be imposed under a curfew for Brisbane Airport? To what extent would this impact on residents' experience of night-time aircraft noise?

An Operating Plan

A potential option for managing night-time noise at Brisbane Airport could involve an operating plan agreed with the community whereby aircraft movements are maximised over water and non-residential land. Where overflight of residential areas cannot be avoided, the plan could include provision to share noise between communities according to noise-sharing targets. An operating plan could also feature operating restrictions as described above.

Next Steps

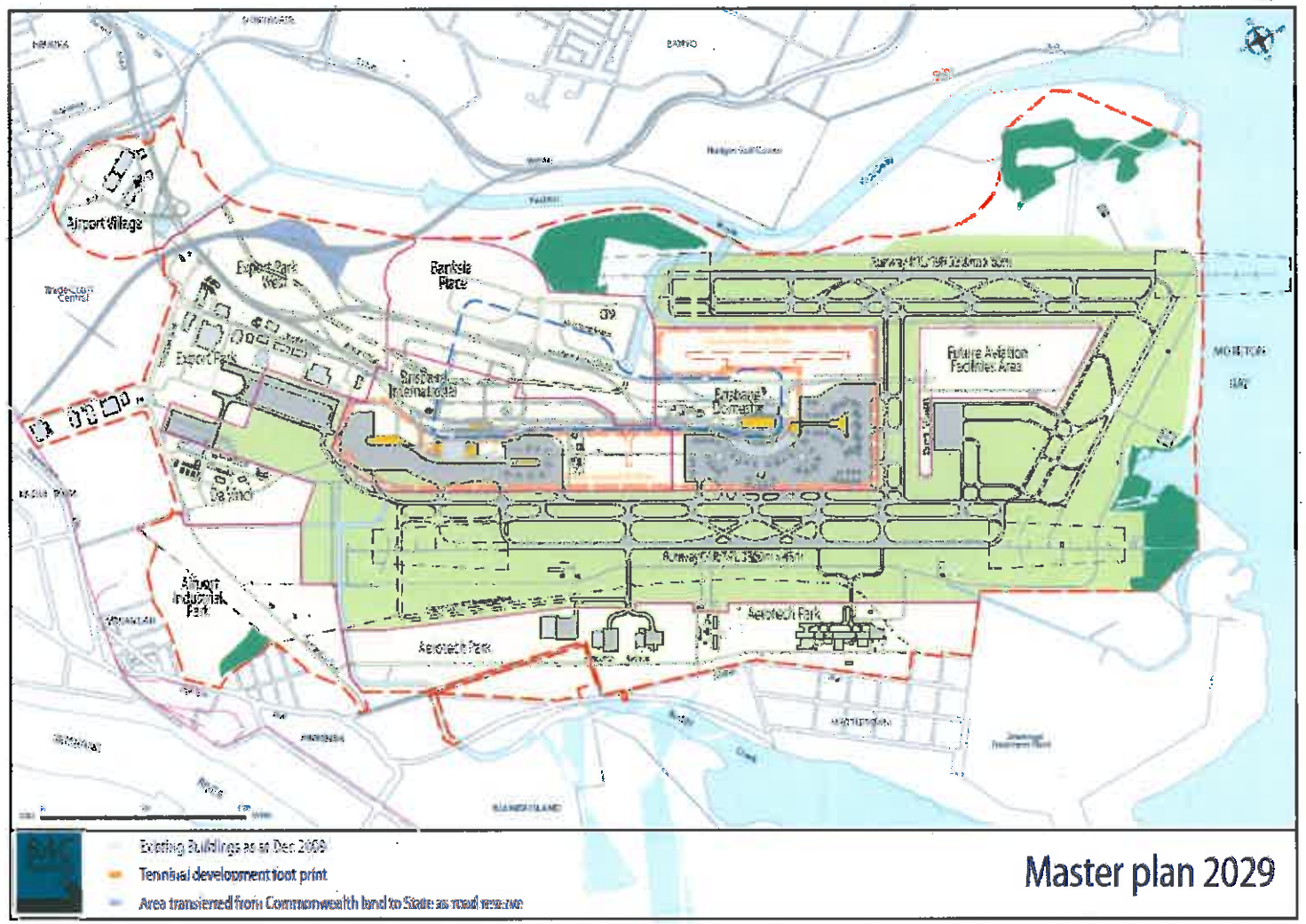
The Steering Committee is interested in views on the issues and options covered in this discussion paper, including the necessity or otherwise of a curfew at Brisbane Airport. These views will be used by the Steering Committee to determine which strategies for managing night-time noise at Brisbane Airport warrant further consideration.

In particular:

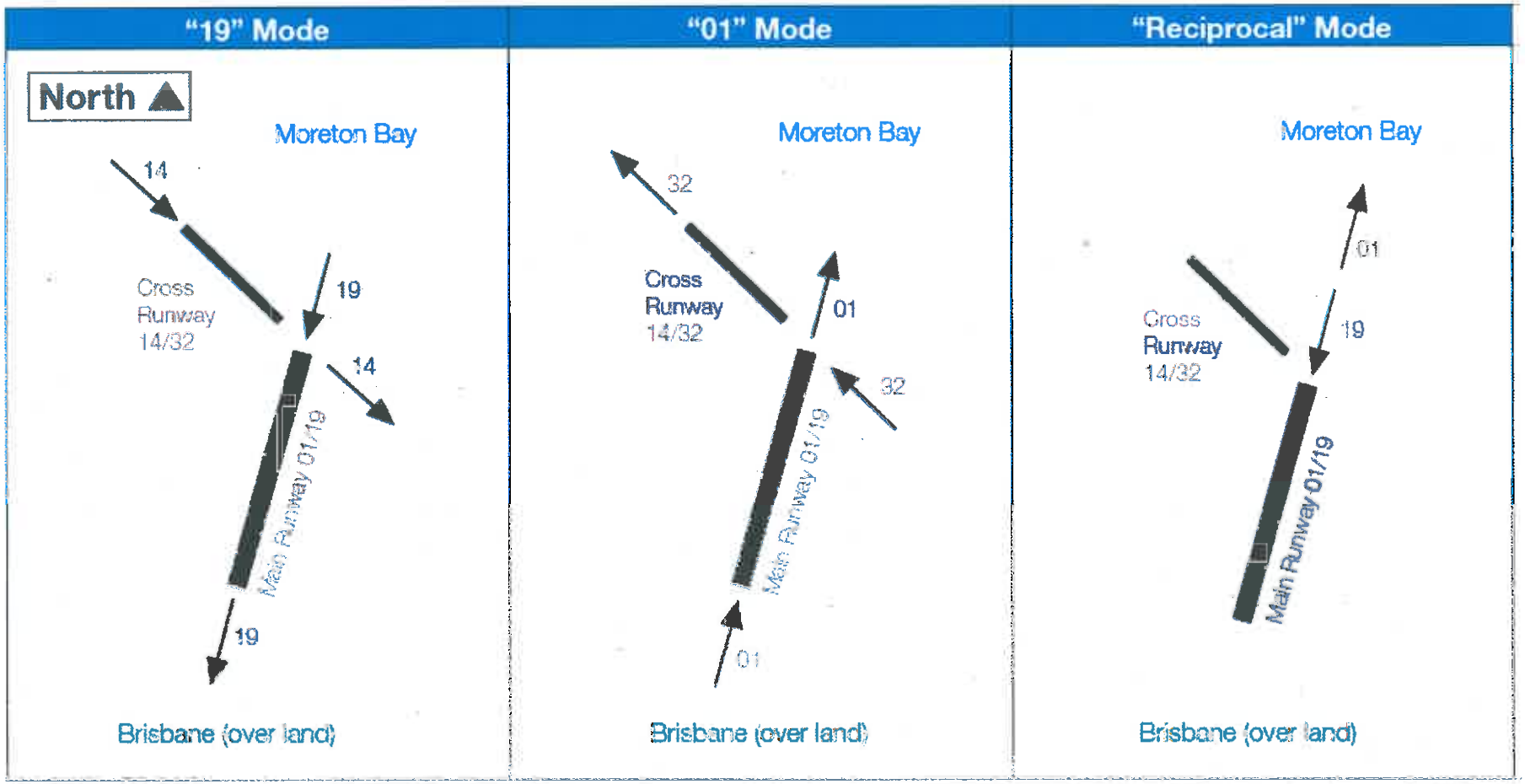
- To what extent should the growth of aviation activity at the Airport be provided for?
- Are the current initiatives in place at Brisbane Airport sufficient for managing night-time aircraft noise, both present and projected?
- Which of the options canvassed in this discussion paper have the potential to alleviate night-time aircraft noise exposure for those affected in the community?
- Are there any other potential measures not discussed in this discussion paper that the Steering Committee should consider?

Appendices

Appendix 1: Location of the New Parallel Runway at Brisbane Airport. Source: BAC EIS/MDP NPR

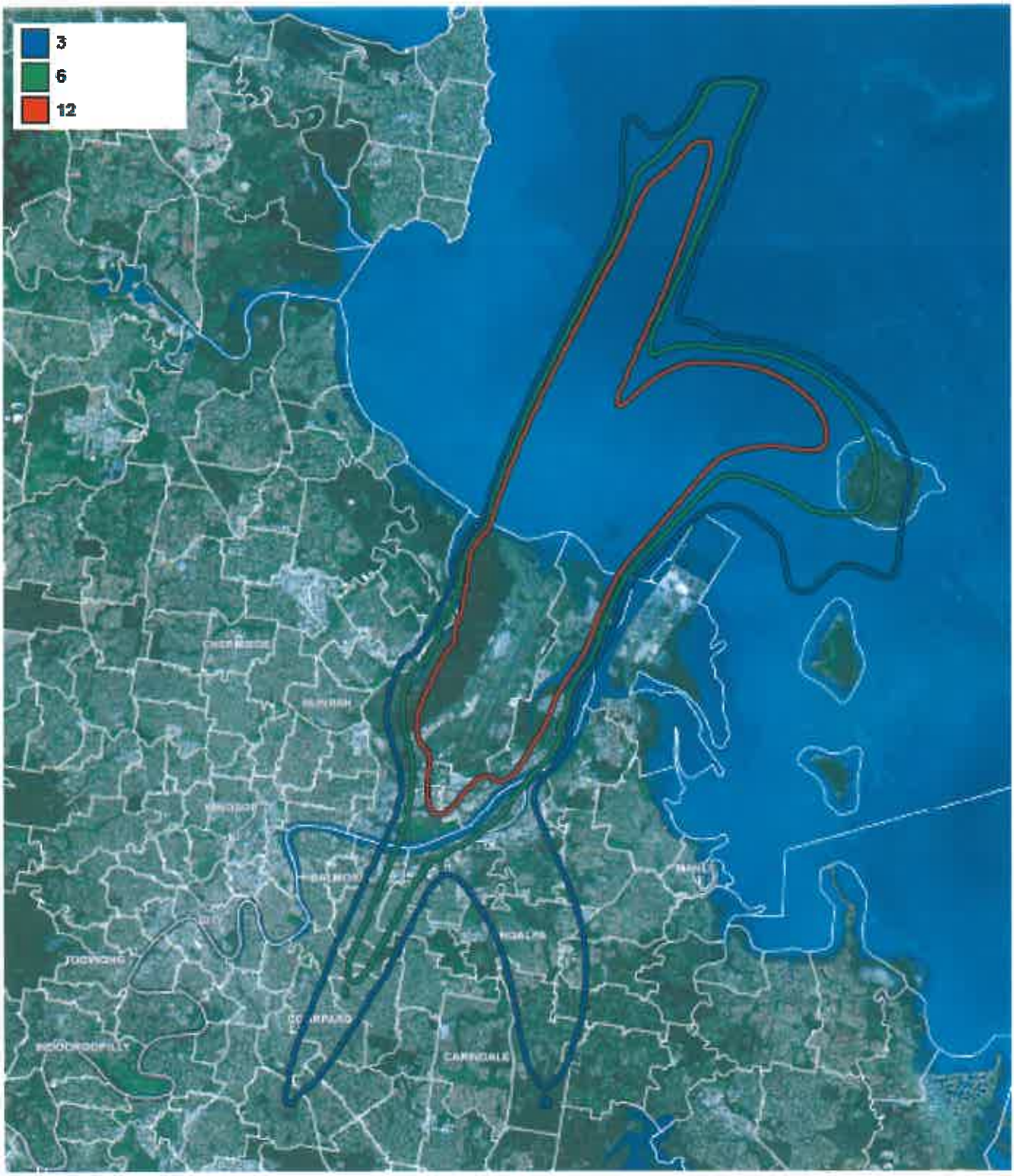


Appendix 2: Existing Modes of Operation at Brisbane Airport.

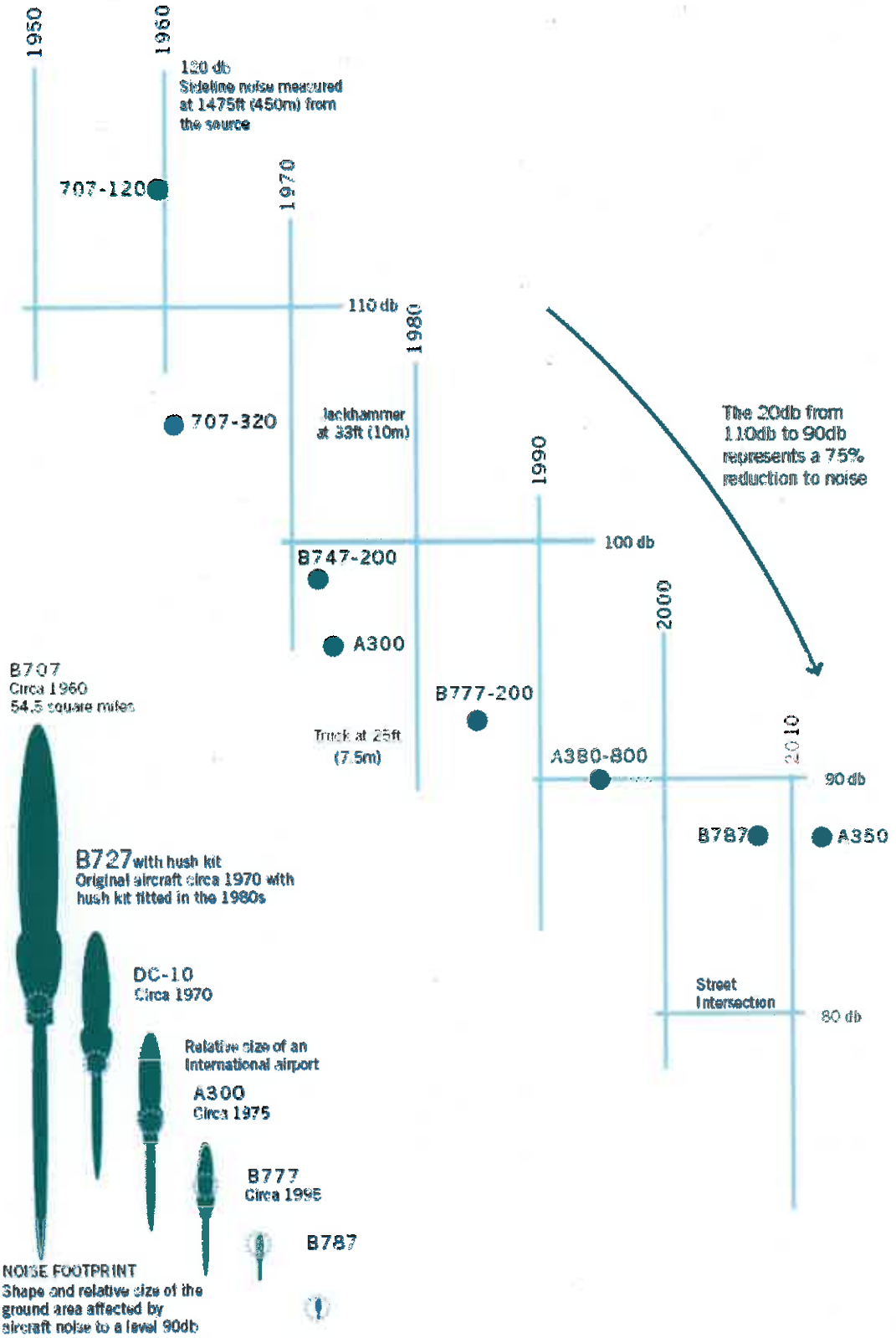


Source: New Parallel Runway Draft EIS/MDP, D2

Appendix 3: 3,6 and 12 event N60s, 10pm – 6am, (at 2029), source – Brisbane Airport



Appendix 4: The reduction of aircraft noise over time



Source: 'Plane Simple Truth' G Thomas, C. Forbes Smith, G. Norris, S. Creedy and R Pepper

NOISE ABATEMENT PROCEDURES

BRISBANE

1. - PREFERRED RUNWAYS

Jet Noise Abatement climb procedures apply H24 RWY 19.

(a) 2000-1200 UTC Sunday to Friday and 2000-1100 UTC Saturday, the preferred runways are:

1. RWY 01
2. RWY 14 or 32 equal
3. RWY 19

(b) 1200-2000 UTC Sunday to Friday and 1100-2000 UTC Saturday, the most preferred configuration is "Reciprocal Runway Operations".

LANDING	TAKE-OFF
1. RWY 19	1. RWY 01
2. RWY 32	2. RWY 14
3. RWY 14	3. RWY 32
4. RWY 01	4. RWY 19

(c) 1900-2000 UTC Monday to Friday, during the daylight saving period in the southern states, the preferred runways are:

1. All departures and Jet arrivals - RWY 01, and
   All Non-Jet arrivals-Rwy 14 or 32 equal.
2. All arrival and Jet departures - RWY 19, and
   All Non-Jet departures-Rwy 14 or 32 equal.

NOTE 1: *Intersection departures on RWY 19 are not permitted for aircraft exceeding 30,000kg MAUW during (a) and by all aircraft during (b) and(c).*

NOTE 2: *Applicable to (b) and (c). Runways 01 and 19 will be nominated as preferred runways for take-off and landing when the downwind component does not exceed 10 knots (including gusts) and the runway surface is completely dry.*

NOTE 3: *Pilots of MED 1 priority aircraft shall advise ATC if they have a level of urgency that requires exemption from compliance with Noise Abatement Procedures. This notification should be made as early as practicable. ATC will facilitate requests for exemption.*

2 - PREFERRED FLIGHT PATHS

2.1 - Arriving Aircraft.

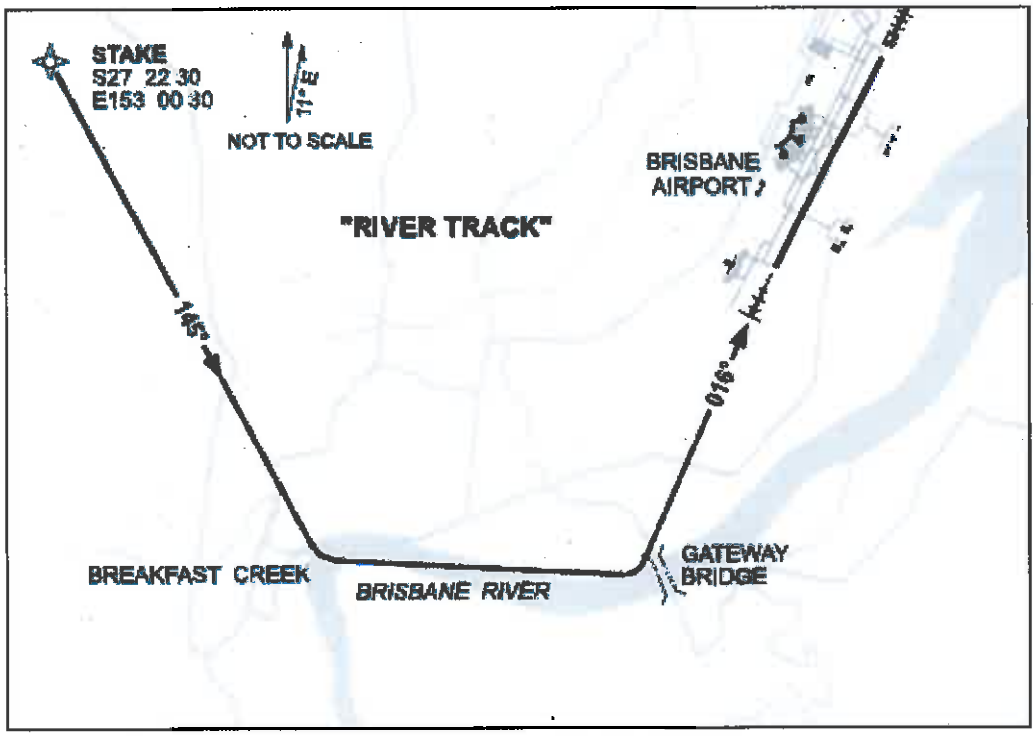
(a) Landing runway 19:
- All JET propelled aircraft will normally be routed east of the coast to avoid noise sensitive areas.
- Descent for these aircraft below 3000FT is not permitted until east of the coast.
- During the period 1200-2000, applicable to all JET aircraft, descent below 5000FT is not permitted until east of the coast.
- During the period 1200-2000, applicable to all NON-JET aircraft, descent below 3000FT is not permitted until east of the coast.

(b) Landing runway 32:
- Track for a right base

(c) Landing runway 14:
- Track for a left base

Note: *To satisfy the requirement of 2.1(a) and (c) for aircraft tracking from the south, ATC will radar vector or direct aircraft to track JACOBS WELL-POODL-BRISBANE. Pilots are to plan JACOBS WELL-BRISBANE.*

(d) Landing runway 01:
- Jet propelled aircraft arriving from the north on the SMOKA V ARRIVAL will be routed via "RIVER TRACK" ex waypoint STAKE for a visual approach. (See depiction below)
- During the period 1200-2000 all aircraft shall not descend below 3000FT until aligned with the runway.



2.2 - Departing Aircraft.

(a) Departing runway 19:

- Jet propelled aircraft departing to the south via Laravale, must follow a procedural SID when ground navigation aids are available. On other routes, Jet propelled aircraft will normally follow procedural SID's
- Non Jet propelled aircraft will normally follow radar-based SIDs.
- During the period 1200-2000 all aircraft will be routed, as far as possible, clear of noise sensitive areas.

(b) Departing runway 14/32:

- All aircraft will follow radar-based SID's.
- Jet propelled aircraft will normally be contained within a sector 360°-120°, over water until leaving 5000FT.
- During the period 1200-2000 all aircraft will be contained within a sector 360°-120°, over water until leaving 5000FT.

(c) Departing runway 01:

- Jet propelled aircraft will normally follow procedural SID's. Anticipate a requirement to reach 5000FT prior to over flying a residential area.
- Non Jet propelled aircraft will normally follow radar-based SID's.
- During the period 1200-2000, all aircraft, expect to be contained within a sector 360°-120°, over water until leaving 5000FT.

NOTE 1: *In the above procedures the term "all aircraft" applies to all aircraft categories described in AIP ENR 1-5, Para 11.1.1 and all other aircraft having two or more engines.*

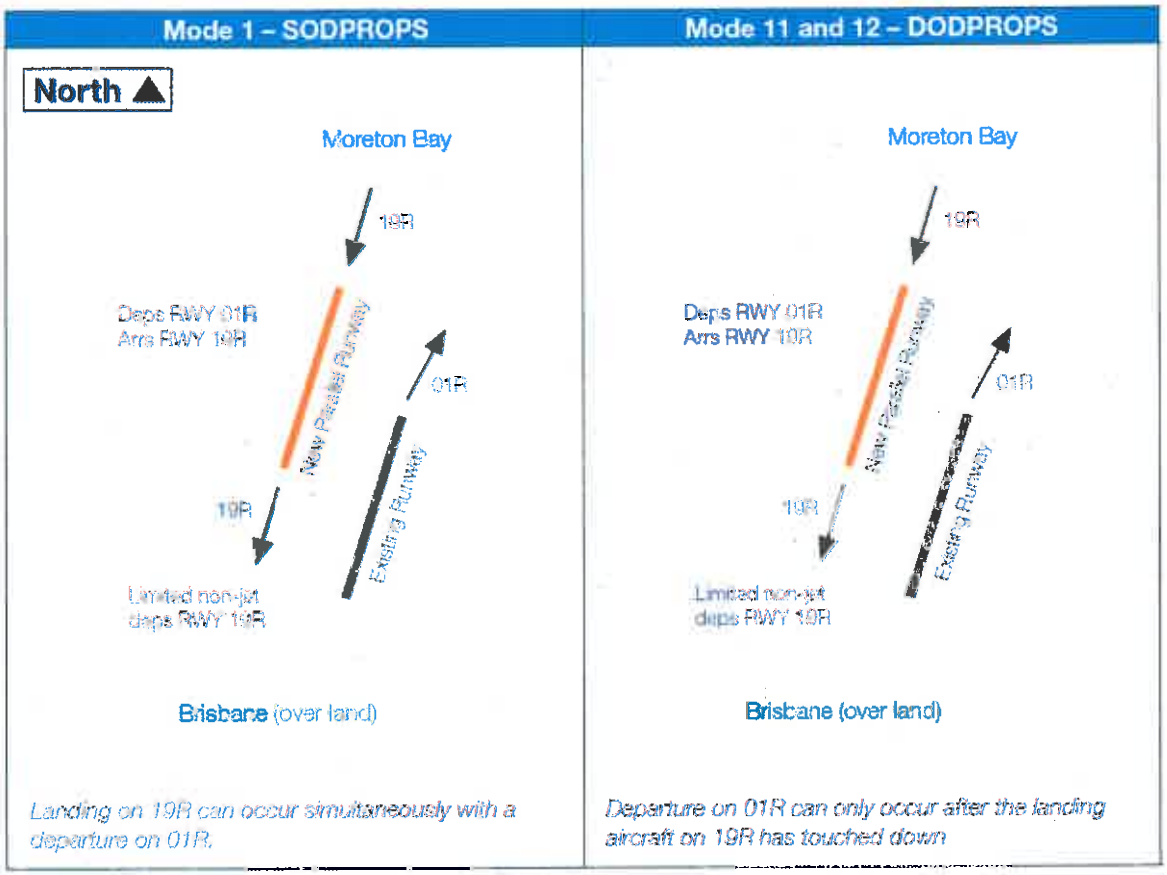
NOTE 2: *Procedural SID's issued to jet propelled aircraft all have preferred noise abatement procedure flight paths.*

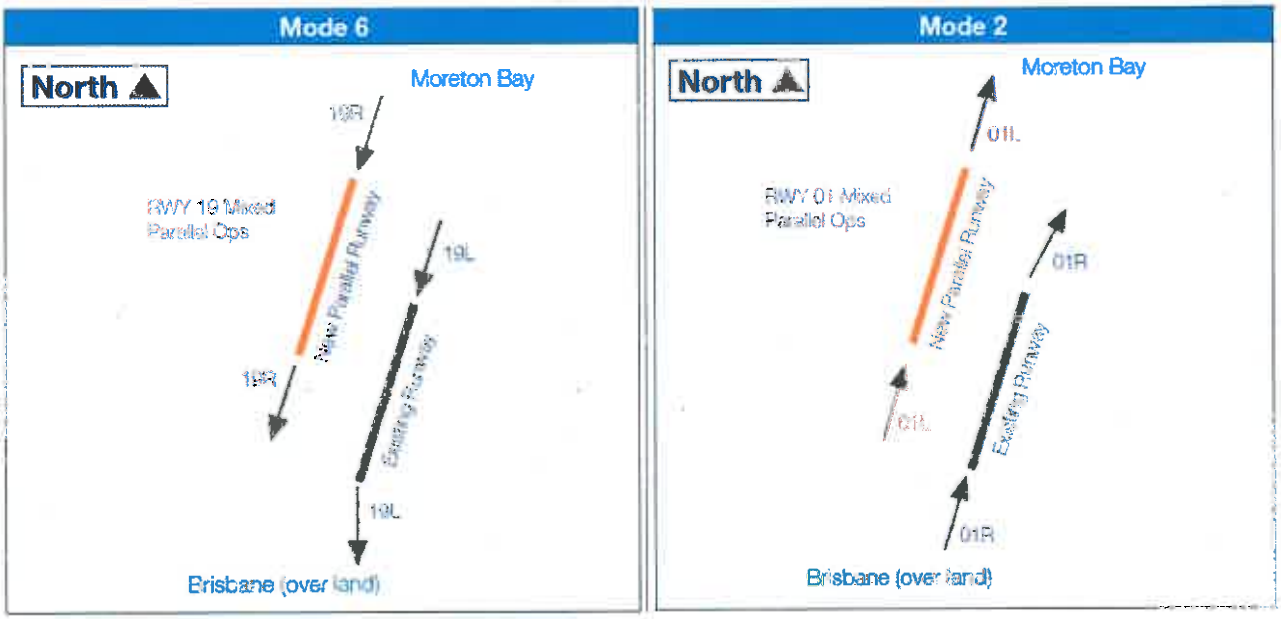
NOTE 3: *The expectations described above when operating on a RADAR SID are to meet Noise Abatement Procedures and are in lieu of nominating specific preferred flight paths.*

3 - TRAINING FLIGHTS - See AIP/ERSA

Source: Airservices Australia

Appendix 6: Proposed Modes of Operation for the NPR

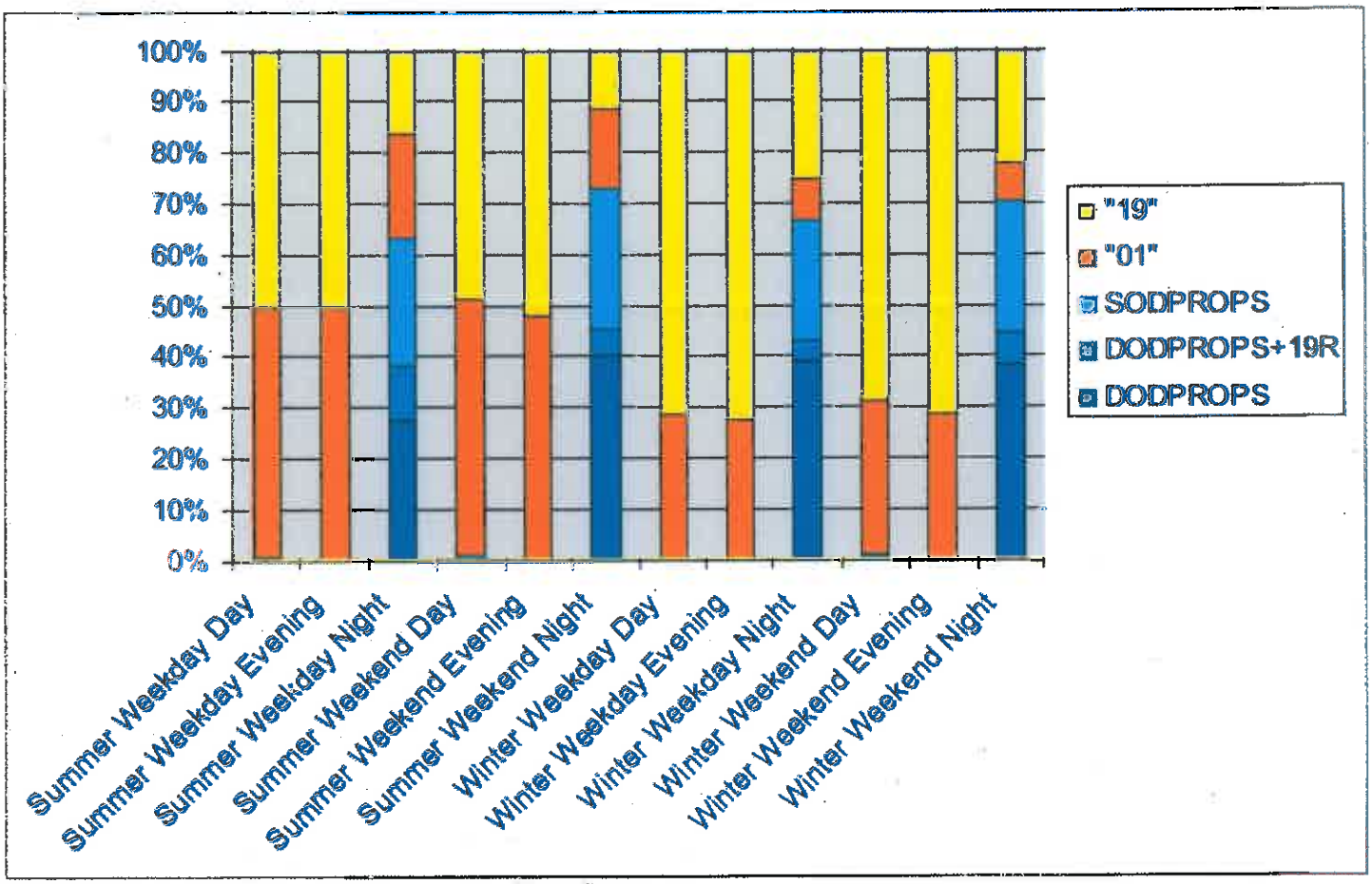




Note that modes 2 and 6 are supported with a number of variations of semi-mixed parallel operations. Mode 1 (SODPROPS) requires visual flying conditions with a maximum 5 knots downwind and a dry runway only. Aircraft movements must not exceed 55 in a single hour. Mode 11 and 12 DODPROPS requires visual flying conditions with a maximum 10 knot downwind and a dry runway only. Aircraft movements must not exceed 20 movements per hour.

Extracted from New Parallel Runway Draft EIS/MDP, D3

Appendix 7: Percentage Usage of Modes, year 2035 with NPR



Extracted from New Parallel Runway Draft EIS/MDP D5

Appendix 8

Current Curfew Arrangements at Australian Airports

Airport	Sydney	Adelaide	Coolangatta (Gold Coast)	Essendon
Curfew Applicability	2300 – 0600	2300 – 0600	2300 – 0600	2300 – 0600
Permitted Operations	• Small (<34,000kg) noise certified propeller driven aircraft and 'low noise' jets as gazetted. • A limited number of freight movements by low noise, medium sized freight aircraft (BAe 146). • A limited number of landings by international passenger aircraft between 2300-2400 and 0500-0600 subject to meeting specified quota and noise standard requirements. • Emergency operations. • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.	• Small (<34,000kg) noise certified propeller driven aircraft and 'low noise' jets as gazetted. • Low noise heavy freight aircraft, subject to quota restrictions. • National Jet Systems BAe146 aircraft undergoing scheduled maintenance or major defect rectification, subject to dispensation for each flight. • A limited number of landings by international passenger aircraft between 2300-2400 and 0500-0600 subject to meeting specified quota and noise standard requirements. • Emergency operations. • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.	• Jet aircraft with a maximum take-off weight ≤ 34,000kg and compliant with Chapter 3 and 90-95 noise level rule. • Propeller driven aircraft ≤ 34,000kg. • Aircraft that have received taxi clearance by Air Traffic Control or started taxiing for take-off when ATC not available, before curfew period starts. • Aircraft using Coolangatta Airport as an alternate Airport. • Domestic passenger jets or freight jets who have applied and been granted approval under the quota system. • Emergency Operations • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.	• Propeller-driven aircraft ≤8,618kg that do not exceed specified noise emissions. • Helicopters compliant with relevant maximum noise levels. • Emergency operations • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.

Restrictions on Permitted Operations	• Aircraft must operate over Botany Bay (this applies from 2200 – 0700 on Saturdays and Sunday) subject to weather and traffic conditions.	• Aircraft must land on Runway 05 and take-off on Runway 23.	• For aircraft using the Airport as an alternate for Brisbane Airport: - international services may land and take-off during curfew; and - domestic services may land but not take off during curfew.	• Aircraft should not depart from its origin port where the estimated time of arrival is after 2300. • Arrivals before 0600 must hold until after the curfew ends. • The Airport must not be nominated or used as a planned alternate Airport. • Operation during curfew hours must lodge a flight plan with Airservices Australia.

Further information is available at http://www.infrastructure.gov.au/aviation/environmental/curfews/index.aspx

5

DRAFT FRAMEWORK OF PAPER OCT 2011

A Review of the Need for a Curfew at Brisbane Airport

Discussion Paper

Background

The Australian Government committed in the 2009 Aviation White Paper to a review of the need for a curfew at Brisbane Airport.

The Government has committed to a formal review of the need for a curfew at Brisbane Airport in time for the outcomes to inform its consideration of the next Airport Master Plan in 2014.

The review needs to be completed in late 2012 to allow Brisbane Airport to incorporate its conclusions into the development of its draft Master Plan. The preparation of airport Master Plans requires considerable time and preparation so it is important the review is concluded to allow work on the Master Plan through 2013 and 2014 to be informed by the review's findings.

The review will be led by a high level steering committee with broad-based representation from the aviation industry, business community, state and local government and community representatives. The steering committee will be required to consult widely with the Brisbane community.

Terms of reference

The Terms of Reference will include:

- analysis of the local, regional and national contribution of Brisbane Airport to the economy;
- analysis of the current and forecast night-time noise profile of the airport;
- the effectiveness of existing strategies to mitigate impacts;
- the scope to address the forecast future impacts from any growth of night-time operations; and
- the operational, social, economic and environmental implications of imposing a curfew requirement on the airport.

Steering Committee

The Steering Committee comprises representatives from:

- the aviation industry (BAC, Qantas and Virgin);
- the business community (a representative from the Brisbane Chamber of Commerce currently represents the Member for Lilley on the Brisbane Airport Community Consultation Group);
- the Department;
- Queensland State Government;
- Brisbane City Council;
- community representatives (through representation of the Chair of the Brisbane Airport Community Consultation Group); and
- Airservices Australia (as an observer – would need to be closely involved to provide technical advice).

Brisbane Airport in perspective

What is the airport's economic and social contribution?

Airport development history

What are the geographical characteristics of Brisbane Airport?

What are the airport's development plans and how do these affect the above?

Noise

Why is aircraft noise a problem?

What is the extent of night-time aircraft noise at Brisbane?

How can aircraft night-time aircraft noise at Brisbane be managed?

In the recent review of the Brisbane Airport Master Plan, the airport's proposals for management of noise issues was a key focus. The Airport has committed to strengthen its approach to noise management and community engagement on noise issues, including:

- improved community engagement in the airport's operations through:
    - annual Community Forum meetings in affected parts of Brisbane, open to broad public participation;
    - a new community-based noise committee comprised of community and Government representatives along with industry and regulatory authorities. The committee will have an independent Chair and will consider ways to improve noise mitigation measures and communication of noise information to the community.
    - a continuing public engagement strategy for community engagement and communication of noise information in the lead up to commissioning the planned new parallel runway, with the strategy to be published and progress reported regularly to the Government;
- improved dissemination of information to the community through:
    - establishment of a Community Experiential Centre facility on the airport to provide displays and interactive information exchange on noise and other operational and airport development issues;
    - more information on noise issues on the airport's website;
    - a freecall telephone enquiry service and dedicated email enquiry address
    - community displays and presentations; and
    - print media including a Flight Paths and Noise Information Booklet;
    - exploration of options to develop an alternative noise metric to supplement the ANEF system and provide a better level of information to the community, in conjunction with State and Local planning authorities; and
    - quarterly reporting by Airsevices on noise monitoring results from five terminals at Tingalpa, Cannon Hill, Bulimba, Kedron and Nudgee Beach which can be used to inform the airport's approach to addressing noise complaints

and in assessing operational procedures for noise minimisation including compliance.

- industry operational improvements including:
    - quarterly meetings of the Technical Noise Working Group with representatives from regulatory authorities, industry, business and the community; and
    - continued examination of runway options for departures and arrivals to maximise over water operations and minimise aircraft noise over urban areas building on the current approach of;
        - preferred 'over Bay' operations (80-90 per cent of all traffic between 10pm and 6am);
        - allocated 'over Bay' flight tracks for arrivals and departures with minimum altitude requirements for over-flight of land;
        - over land departures required from a runway end threshold that results in higher over-flight of residential areas;
        - preferred runway operations between 5-6am during daylight savings period; and
        - additional requirements to minimise noise effects where over land operations are not avoidable, such as in unfavourable weather conditions.
- improved coordination with government planners through the establishment of a high level planning forum comprising all levels of government to address planning and off-airport impacts including aircraft noise and off-airport planning decisions such as residential in-fill that may increase noise affected areas;

What is a curfew? (benefits & costs)

What are the alternatives to a curfew?

6

Australian Government

Department of Infrastructure and Transport

Future Brisbane Airport Operations

A Review of the Need for a Curfew at Brisbane Airport

Discussion Paper prepared by the Brisbane Airport Curfew Review Steering Committee to assess the need for night-time noise mitigation strategies at Brisbane Airport

July 2013

CONTENTS

Introduction

Airline operations commenced at the site of what is now Brisbane Airport as early as 1926. In 1928, Sir Charles Kingsford Smith successfully concluded the first trans-Pacific flight there when he landed at the then-Eagle Farm Aerodrome in 1928.

Preparation for the modern Brisbane Airport began in 1971 with the reclamation of nearby Cribb Island to establish a modern airport to cater to the future needs of the city. The current airport site is 2,700 hectare site approximately 15 kilometres from the Brisbane CBD.

The current runway configuration for Brisbane Airport has been in operation since 1988, along with the current control tower and domestic terminal. The then-Australian Government anticipated that the redeveloped Brisbane Airport would operate curfew-free.

Brisbane Airport has grown substantially since this time, with annual passenger numbers reaching 20.1 million in the 2010–11 financial year[1] and expected to reach more than 35 million by 2023[2]. The city of Brisbane has also increased in size. In 1980, Brisbane was home to 1.02 million people[3] and by 2010 this had doubled to 2.04 million people[4]. This is a trend that is predicted to continue well into the future.

Aviation contributes substantially to the national economy. In 2010–11, the gross value added by the air and space industry to the Australian economy was over $6.8 billion[5]. In May 2012, over 54,000 Australians were directly employed in the air and space industries, with nearly 80 per cent of them full-time employees[6]. The aviation industry is also of vital importance to Australia's trade and tourism industries.

Aircraft noise is an unfortunate but inevitable by-product of aviation activity. The Australian Government's 2009 National Aviation Policy White Paper, *Flight Path to the Future*, included recognition from the Government of the adverse impacts of aircraft noise and the need to manage these impacts in a balanced and transparent manner. The White Paper also included a commitment to a formal review of the need for a curfew at Brisbane Airport. This discussion paper is an important first step in that review.

The purpose of this discussion paper is to describe Brisbane Airport's operations both present and projected, the associated noise impacts, the noise mitigation strategies used to date and the potential to improve those strategies in the future to better manage night-time aircraft noise at Brisbane Airport. It also describes the role of airport curfews in other cities and attempts to examine the issues that will assist in deciding whether an airport curfew is an appropriate night-time noise management strategy at Brisbane.

The Government has established a high-level Steering Committee to conduct the review. The Steering Committee is jointly chaired by the Australian and Queensland Governments, with representation from the aviation industry, business community and local government. The Government has also asked that the Steering Committee seek input to the review from other interested stakeholders, including the general public.

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[1] http://bne.com.au/media-centre/passenger-statistics 31 January 2012.
[2] http://bne.com.au/projects-and-development/new-parallel-runway-project/related-materials 26 October 2011.
[3] 2103.0 – Census of Population and Housing, 1981, ABS.
[4] ABS 2011a, Regional Population Growth, Australia 2009-10, cat. no. 3218.0, Canberra.
[5] ABS cat. No. 5206.0, June 2011, Table 33.
[6] ABS cat. No. 6291.0.55.003, Table 6.

Steering Committee

The Steering Committee comprises a cross-section of representatives from the aviation, business and government sectors.

The Steering Committee comprises:

- **Mr Andrew Wilson**, Deputy Secretary, Australian Government Department of Infrastructure and Transport;
- **Mr Paul Martyn**, Deputy Director-General Tourism, Queensland Government Department of Tourism, Major Events, Small Business and the Commonwealth Games;
- **Mr Kerry Doss**, Manager, City Planning, City Planning and Sustainability Division, Brisbane City Council;
- **Mr John Lee**, Chief Executive, Tourism and Transport Forum; and
- **Mr Jason Harfield**, Manager, Air Traffic Control, Airservices Australia.

Terms of Reference

The Australian Government has established the following Terms of Reference for the review.

The Steering Committee will consider and advise on:

- the contribution of Brisbane Airport to the local, regional and national economy;
- the current and forecast night-time noise profile of the Airport;
- existing strategies to mitigate night-time noise impacts and their effectiveness, including the outcomes of Airservices Australia's review of Brisbane Airport's noise abatement procedures;
- potential practical strategies, consistent with the International Civil Aviation Organization's 'Balanced Approach', to further mitigate night-time noise impacts at the Airport, including:
    - the impact of the new parallel runway on the night-time noise profile of the Airport and the potential for the new runway to be used in managing night-time noise; and
    - the potential for advanced satellite-based technologies to reduce the night-time noise profile at the Airport;
- the operational, social, economic and environmental implications of imposing a curfew requirement on categories of aircraft operations at the Airport; and
- the need for additional night-time operational measures at Brisbane Airport and what form any such measures should take.

How to Make a Submission

Submissions received in response to the issues raised in this discussion paper will be used to inform the Steering Committee's report to the Australian Government Minister for Infrastructure and Transport to allow the Government to further consider this matter.

Submissions are welcome 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 Brisbane Airport and the consideration of the need for a curfew. At various points in the paper, feedback questions have been posed to prompt potential submissions.

The outcomes of the review will then be available to inform the next Brisbane Airport Master Plan, due to be finalised in 2014.

Submissions[7] and enquiries in relation to the discussion paper should be directed to:

Scott Stone
General Manager
Aviation Environment

Telephone: 1800 661 904 | Email: brisbanecurfewreview@infrastructure.gov.au

Submissions should be made by Friday 13 September 2013.

[7] Submissions and comments provided in response to this invitation may be published online unless the person or organisation making the submission requests confidentiality.

Brisbane Airport in Perspective

Geographical and Meteorological Characteristics of Brisbane Airport

Brisbane Airport is situated on a 2,700 hectare site 15km north-east of the Brisbane central business district. The Airport sits on a reclaimed portion of a river delta at the mouth of the Brisbane River. The location of the Airport is illustrated in Figure 1.

Brisbane Airport has a large buffer zone between the end of the existing main runway, with the nearest residence 6.7km from the runway centreline and conservation/green space and industrial land uses occupying the areas immediately surrounding the Airport. This compares favourably to other capital city airports, where the nearest residences are closer – for example, Melbourne (6km), Perth (1.8km), Sydney (0.7km) and Adelaide (0.6km).

The Pinkenba–Eagle Farm Statistical Local Area (SLA) immediately adjacent to the Airport has the second-lowest population density for the Brisbane Statistical Division (SD), with 6.4 people per sq km. Some of the more densely-populated SLAs in Brisbane are located around 10km from the Airport, including inner-city New Farm (5,900 people per sq km), Kangaroo Point (5,600) and City–Inner (5,000)[8] (Figure 2).

The main operational runway at Brisbane Airport is Runway 01/19. The designation of the runway indicates that it is orientated 10° east of due north, or 190° east of due north (10° west of due south) depending on whether the runway is being operated in a northerly or southerly direction (see Appendix 2 for current operating modes). The current single runway configuration of the airport means that, unless there are very low levels of activity (less than 10 movements per hour), it is necessary to operate all traffic in one direction to maintain aircraft separation.

When operating in a northerly direction, aircraft arrive over inner-city suburbs, such as Norman Park and Morningside, and depart over Moreton Bay. When operating in a southerly direction, aircraft arrive over Moreton Bay and depart over a number of southern and eastern suburbs (depending on the aircraft's intended destination), such as Hemmant, Tingalpa, East Brisbane and West End. Figure 3 shows the use of various flight paths at the Airport.

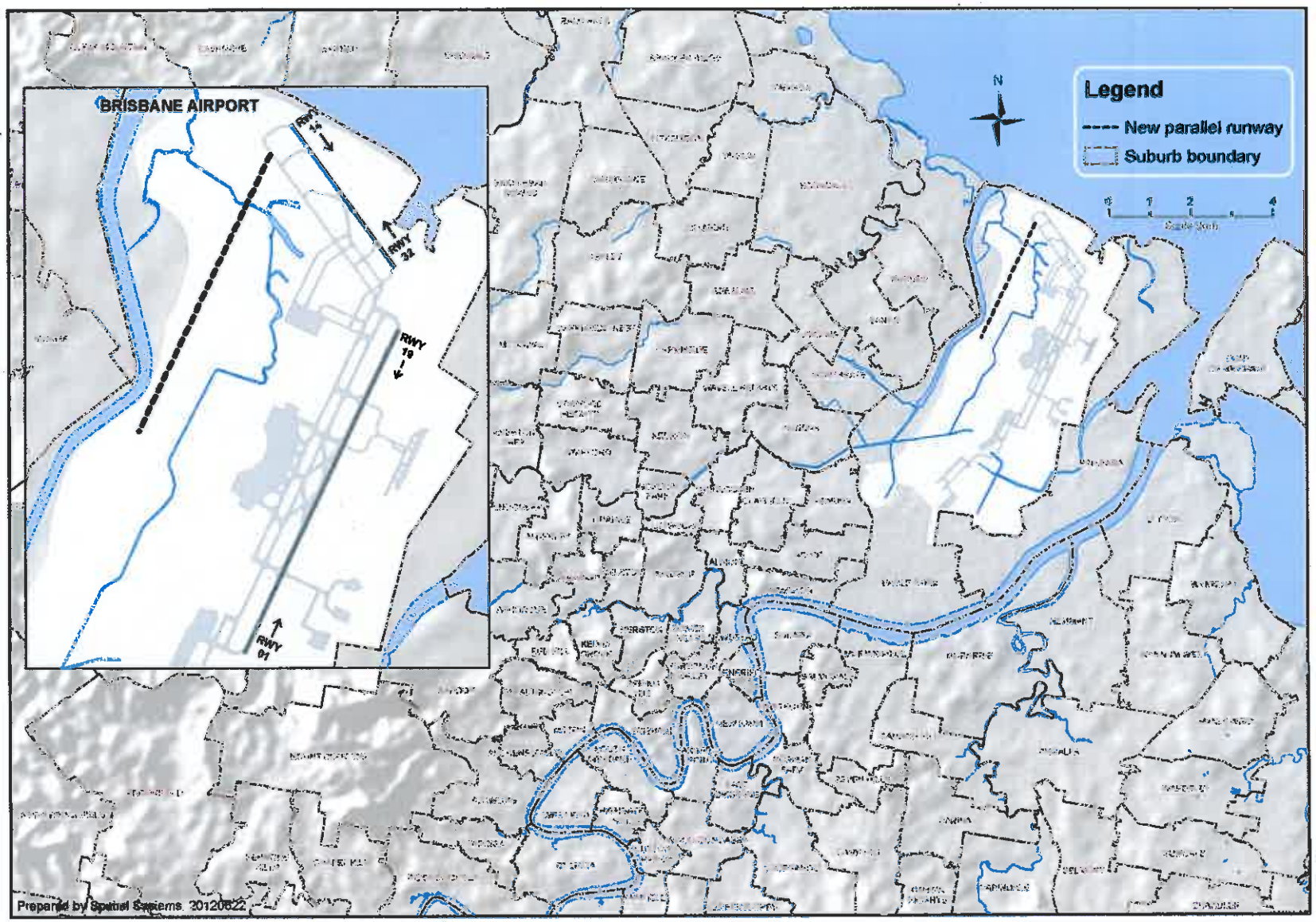
Aircraft typically have different noise profiles on arrival and departure. Arriving aircraft require only small amounts of engine thrust on approach and are therefore quieter than departing aircraft, which require much higher levels of thrust to be able to take off. However, arriving aircraft must descend gradually and typically fly at lower altitudes for longer periods than departing aircraft, which gain height relatively quickly. The impacts of aircraft noise are described in more detail in the following section, 'The Extent of Night-time Aircraft Noise at Brisbane'.

Wind direction and speed are important determinants of the direction from which aircraft can land or take off and the consequent exposure of communities to noise. For safety reasons, aircraft must take off and land into the wind.

Wind directions at Brisbane Airport are characterised by distinct seasonal patterns. In summer, winds at the Airport predominantly come from a north to north-easterly or south-easterly direction. In winter, they are predominantly from a south to south-westerly direction.

[8] http://www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2009-10~Main+Features~Queensland?OpenDocument#PARALINK31

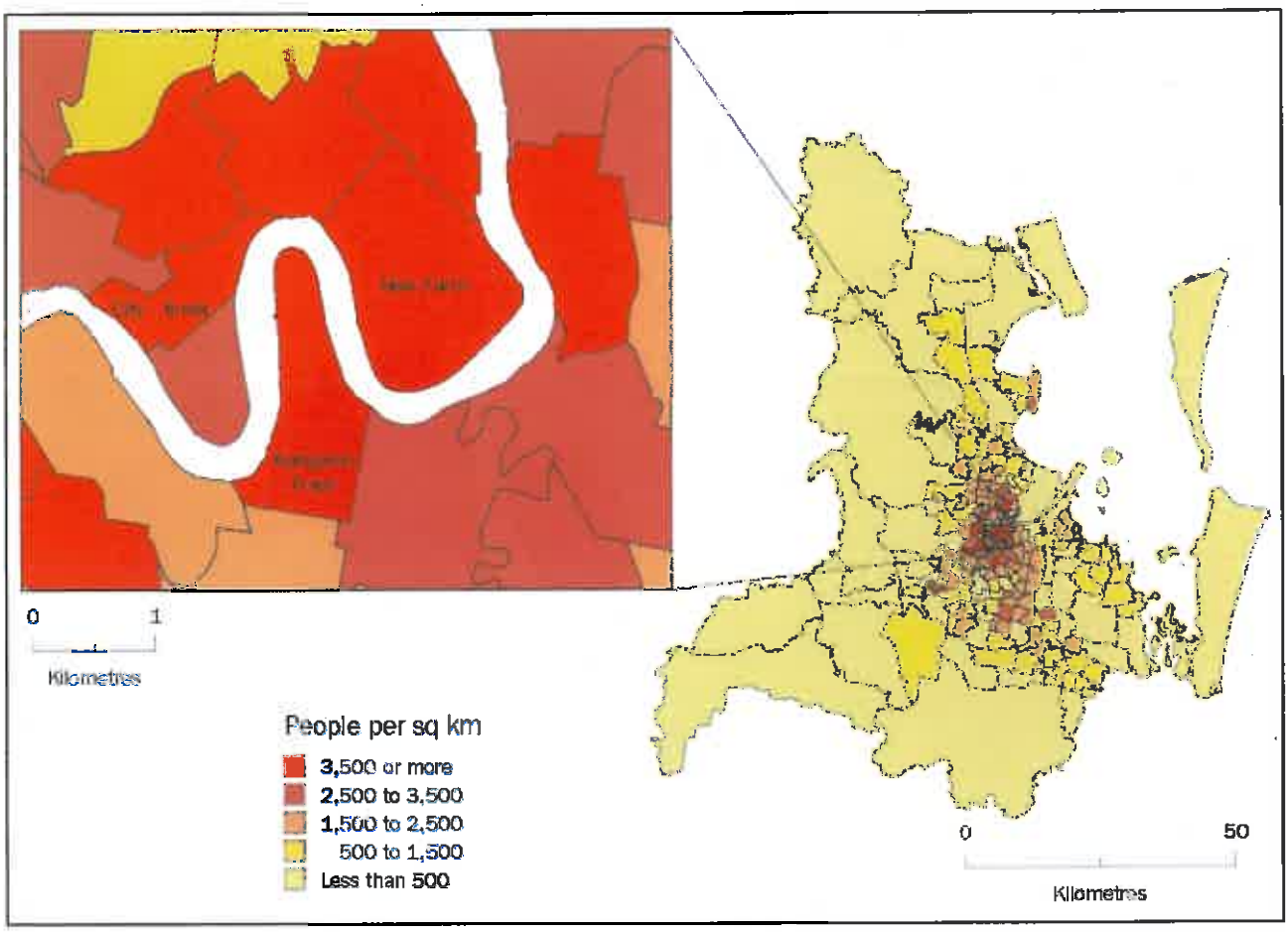
Figure 1: Location of Brisbane Airport



At Brisbane Airport, wind speeds fluctuate widely, but generally are stronger during daylight hours and in the early evenings. As the ground temperature cools, local wind speeds generally decrease. This means that, in broad terms, the Airport will be more likely to operate in a southerly flow in winter, in a northerly flow during a summer north-easterly wind, and in a southerly flow during a summer south to south-westerly wind.

When conditions are calm, the Airport can operate in either direction. A downwind component of five knots can be accommodated in dry conditions. Operating rules for aircraft change if it has been raining and the runway is considered 'wet' rather than 'dry'. When the runway is wet, no downwind component can be accepted. Brisbane records an annual average of 107 rainy days[9].

Figure 2: Brisbane Residential Densities



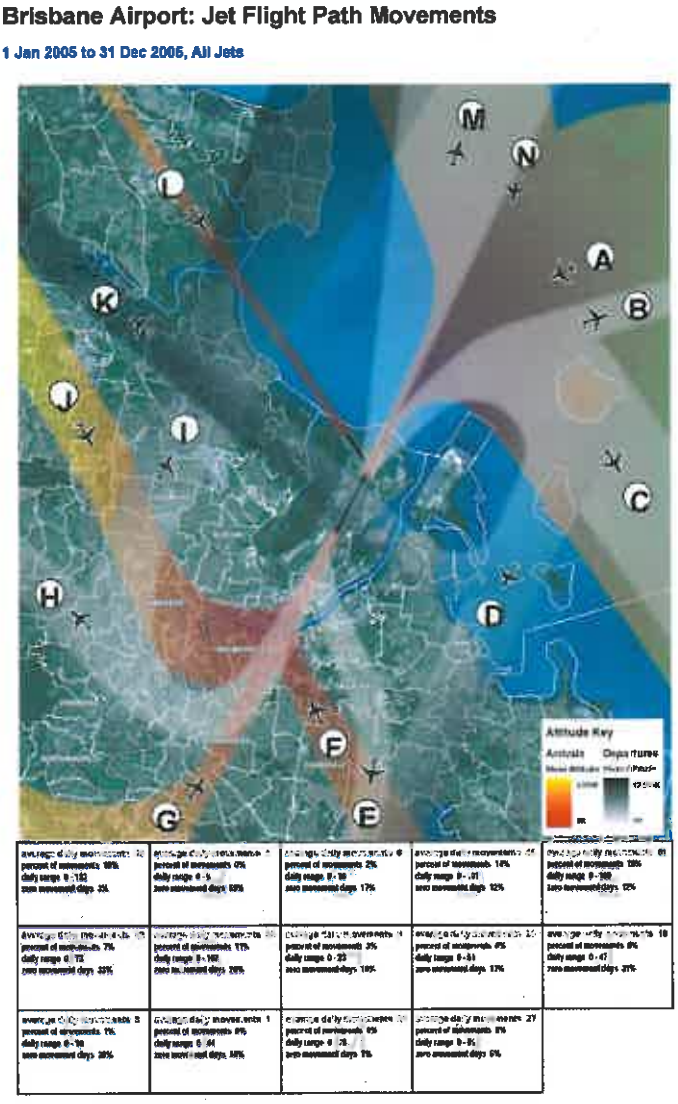
[9] http://www.weatherzone.com.au/climate/station.jsp?lt=site&lc=40842

Brisbane Airport's Economic and Social Contribution

Brisbane Airport Traffic

Brisbane Airport is Australia's third-busiest airport. In 2012, Brisbane Airport recorded 21.1 million passenger movements: 4.5 million international and 16.6 million domestic and regional[10]. There were 214,264 aircraft movements in this period (including freight aircraft movements)[11].

Figure 3: Brisbane Airport Jet Flight Path Movements, 2005



Total number of movements = 117,838

[10] Bureau of Infrastructure, Transport and Regional Economics, Airport Traffic Data, http://www.bitre.gov.au/publications/ongoing/airport_traffic_data.aspx
[11] BAC data.

Passenger movements are expected to increase to 51.2 million by 2029–30, with an annual increase of 6 per cent on Brisbane's international routes, 4.8 per cent on inter-capital routes and 4 per cent on regional routes[12].

Brisbane is Australia's third-busiest international air freight port. The Airport currently handles approximately 12 per cent of Australia's international air freight and 15 per cent of the country's domestic air freight. The Airport estimates that international freight volumes will almost double from 149,000 tonnes in 2008–09 to over 270,000 tonnes by 2028–29[13]. In coming years, the airport also expects to see a continuing increase in fly-in/fly-out (FIFO) operations related to the mining and resources industry.

Current Financial Contribution and Job Generation

In the 2009 Brisbane Airport Master Plan, it was reported that during 2008 the Airport would directly contribute an estimated:

- $3.2 billion in output to the South-East Queensland economy;
- $1.4 billion in spending in the wider community;
- $840 million in total wages for people working on the Airport; and
- 16,000 full-time equivalent jobs.

Forecast Financial Contribution and Job Generation

The Brisbane Airport Corporation (BAC) forecasts that by 2029 employment at Brisbane Airport will increase to more than 50,000 jobs.

The Airport also estimates that as a result of planned expansion, by 2029, the cumulative economic impact for the South-East Queensland region will:

- increase gross regional product by $1.2 billion;
- increase real household consumption by $1.7 billion; and
- increase employment in the region by approximately 11,000 jobs, in addition to the projected increase in jobs at Brisbane Airport[14].

Feedback Question 1

How does the community balance noise concerns with the economic contribution of airports in general and Brisbane Airport in particular?

Brisbane Airport's Development History

The current Brisbane Airport site was established and became operational in 1988.

The International Terminal Building and associated apron taxiways opened in September 1995. This was supplemented by the establishment of services and facilities for business and industry development, establishment

[12] Aircraft movements through capital city Airports to 2029-30, Bureau of Infrastructure, Transport and Regional Economics Report 117.
[13] Brisbane Airport Master Plan 2009.
[14] Brisbane Airport Master Plan 2009.

of a range of additional operators and tenants, extension of the domestic terminal building and extension of Airservices Australia facilities.

Since privatisation in 1997, BAC has invested approximately $850 million in the growth of Brisbane Airport, including:

- expansion of the international terminal and its aprons;
- establishment of the 'Airport Village' precinct, which will consist of a number of commercial, business, leisure and retail ventures;
- the Northern Access Roads Project – a 4.5 kilometre multi-lane road system providing a second major access route to terminals and on-Airport businesses;
- expansion of the domestic apron to allow for new aeroplane parking areas and taxiway facilities at the northern satellite of the domestic Airport; and
- the construction of the Da Vinci area at Export Park dedicated to logistics and aviation/aeronautical uses[15].

Brisbane Airport's Development Plans

BAC's development plan for Brisbane Airport involves investment of $4.2 billion in on-Airport infrastructure by 2029. Expansion works listed in the 2009 Master Plan include:

- expansion and upgrade of the domestic terminal, involving changes to the terminal, the precinct's road network and car park locations;
- expansion and upgrade of the international terminal processing areas to meet current airline practices and technology;
- Airport access and business and industry-related development involving 12 road projects and various public transport, cycling and pedestrian access initiatives; and
- a New Parallel Runway (NPR).

The NPR is a particularly significant development and the single largest investment in Australian aviation infrastructure over the last 20 years.

Brisbane Airport will construct and operate a new 3,300m runway west and parallel to the existing Runway 01/19 and staggered in a northerly direction towards Moreton Bay. The new runway will be sufficiently separated from the existing runway to allow the simultaneous, independent operation of both runways. The project will also include associated taxiways, navigational aids and land-based access infrastructure.

The necessary Australian Government approvals for the project were issued on 18 September 2007. The Airport expects the runway to be operational by 2020. The location of the NPR is shown in Appendix 1. Analysis of the likely aircraft noise impacts of the parallel runway system is included in the following section of this paper, 'Further Potential Measures for Managing Night-Time Noise Impacts'.

The NPR and Capacity at Brisbane Airport

BAC is currently in the late stages of negotiation over funding arrangements for the NPR. While BAC has reached a funding agreement with Virgin Australia, other airlines have been unwilling to pre-commit funds for the project at

[15] Brisbane Airport Master Plan 2009.

this stage. Some airlines have publicly stated that they do not expect to pay for use of the runway until it is fully operational[16].

Recent experience has demonstrated that the NPR is required as soon as possible to resolve airport delays that are resulting from the limited constraints of the current single main runway system.

The future of the NPR is critical in the context of a review of the need for a curfew at Brisbane Airport for several reasons, including that:

1. the NPR will contribute to the current growth in airport traffic that has already raised some concerns about increased noise impacts;
2. the NPR delivers the potential to increase the use of over-water operations; and
3. the imposition of a curfew may impact on investment commitments for the NPR.

Feedback Question 2

What impact will the NPR have on aircraft noise originating from Brisbane Airport? Conversely, what impact might curfew restrictions create for investment in the NPR?

[16] For example: http://www.couriermail.com.au/news/queensland/no-go-for-qantas-brisbane-airport-runway-bill-bid/story-e6freoof-1226498884819

Aircraft Noise

Why is Aircraft Noise a Problem?

While not all individuals exposed to aircraft noise are negatively affected by it, evidence is available through organisations including the World Health Organization and the International Civil Aviation Organization (ICAO) detailing the impacts of night-time noise on sleep, health and cognitive performance. According to ICAO, aircraft noise is the most significant cause of adverse community reaction to the operation and expansion of airports.

Reaction to aircraft noise is subjective and is influenced by a number of factors, including fear of an aircraft accident, attitudes towards the aviation industry and personal sensitivity to noise. Issues of concern to the public include the level of noise generated by individual aircraft, increasing numbers of flights and decreasing periods of respite. Particular concerns include increased movements during the sensitive night-time period and reduced respite periods on weekends. The issue of community exposure and reaction to aircraft noise is not confined to areas immediately surrounding an airport.

The Australian Government takes aircraft noise very seriously and committed in its 2009 Aviation White Paper to a range of measures to minimise the impacts of aircraft noise, including:

- stricter aircraft noise standards on older, noisier jet aircraft at major airports (through the Air Navigation (Aircraft Noise) Amendment Regulations 2010) (for further information, see the following section, 'Current Initiatives at Brisbane Airport for Managing Night-Time Aircraft Noise');
- establishment of the Australian Aircraft Noise Ombudsman to:
  - independently review noise complaints handling procedures and make recommendations for improvements where necessary; and
  - improve Airservices' consultation arrangements and the presentation and distribution of aircraft-related information to the general public;
- improved community consultation measures; and
- a program of work with states and territories to improve assessment of aircraft noise in land-use planning decisions.

International Civil Aviation Organization (ICAO) Guidance on the Balanced Approach to Aircraft Noise Management

ICAO is the United Nations specialised agency that serves as a forum for cooperation in all fields of civil aviation among its 191 Member States. Australia is a founding member of ICAO and sits on its Governing Council.

In 2001, the ICAO Assembly endorsed the concept of a 'Balanced Approach' to aircraft noise management. In 2007, the Assembly reaffirmed the 'Balanced Approach' principle and called upon States to recognise ICAO's role in dealing with the problems of aircraft noise.

The Balanced Approach concept involves identifying the noise problem at an airport and then analysing the various measures available to reduce noise, in the most cost-effective manner, through exploration of four principal elements.

1. *Reduction at source (quieter aircraft).* Much of ICAO's effort to address aircraft noise over the past 40 years has been aimed at reducing noise at source. Aeroplanes and helicopters built today are required to meet the noise certification standards adopted by the Council of ICAO. The standards are periodically reviewed, with proposals currently being considered for increased stringency of aircraft noise standards for new aircraft from 2017.
2. *Land-use planning and management.* Land-use planning and management is an effective means to ensure that the activities nearby airports are compatible with aviation. Its main goal is to minimise the population affected by aircraft noise by introducing land-use zoning around airports. Compatible land-use planning and management is also a vital instrument in ensuring that the gains achieved by the reduced noise of the latest generation of aircraft are not offset by further residential development around airports.
3. *Noise abatement operational procedures.* Noise abatement procedures include, for example, preferential runways and routes and particular procedures for take-off, approach and landing. The appropriateness of any of these potential measures depends on the physical layout of the airport and its surroundings, but in all cases the procedure must give priority to safety considerations.
4. *Operating restrictions.* Noise concerns have led some States to consider banning the operation of certain noisy aircraft at noise-sensitive airports or to introduce restrictions such as movement caps or curfews. ICAO recommends such restrictions are considered only after consideration of the benefits from the other three elements of the Balanced Approach.

Consistent with the Balanced Approach, the Steering Committee will investigate a comprehensive noise management strategy to balance community amenity and the effective operations of Brisbane Airport.

Further information about the ICAO Balanced Approach can be found at:

http://www.icao.int/environmental-protection/pages/noise.aspx

Feedback Question 3

What elements of the ICAO Balanced Approach can be best applied at Brisbane Airport to manage the effects of night-time aircraft noise?

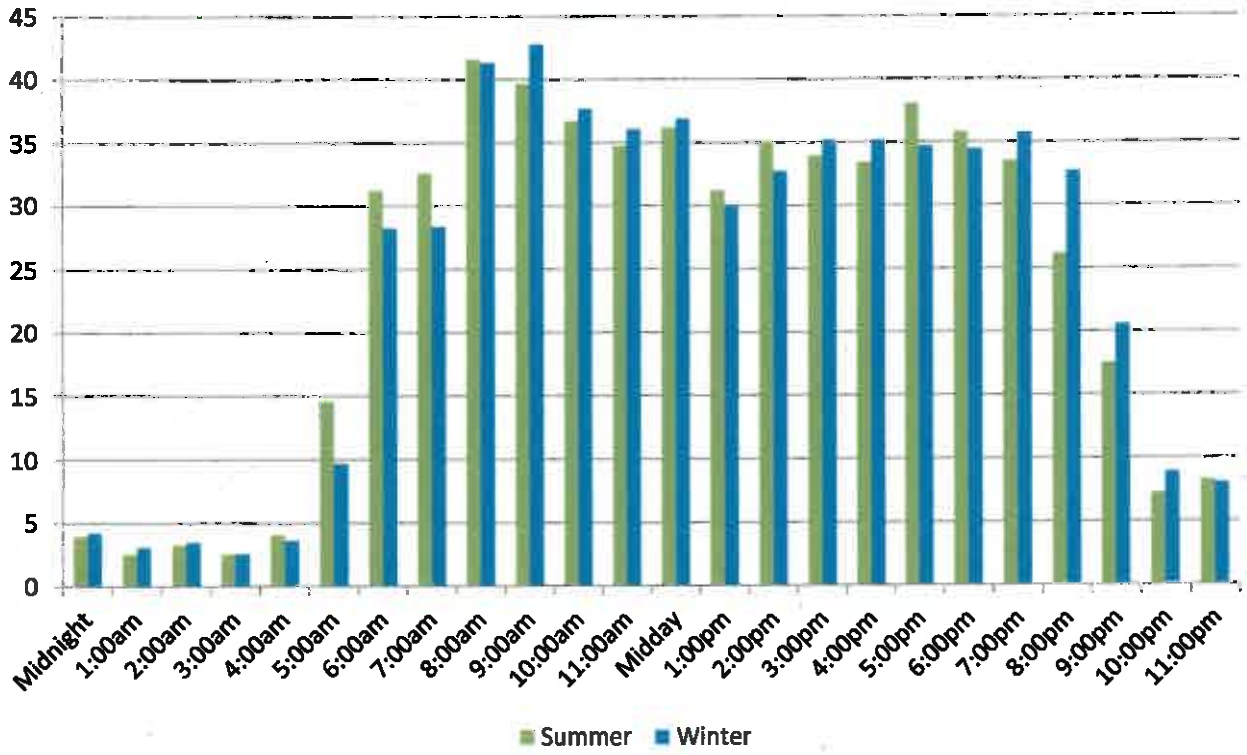
The Extent of Night-time Aircraft Noise at Brisbane

Aircraft Movements

As a curfew-free airport, Brisbane Airport experiences aircraft movements at all times of the day and night. Figure 4 shows the average number of movements (take-offs and landings) per day in 2012, separated by time of day and season.

The vast majority of take-offs and landings at the Airport occur during the day and early evening. Less than seven per cent of all aircraft movements occur at night (11:00pm – 6:00am). This equates to around five movements per hour during this period. The occurrence of daylight saving in other states during summer tends to result in a substantial increase in the number of aircraft movements between 5:00am and 6:00am during this time (October to March), particularly to facilitate the arrival of business travellers for a full business day in southern destinations.

Figure 4: Average Daily Brisbane Airport Aircraft Movements, Per Hour, 2012



Feedback Question 4

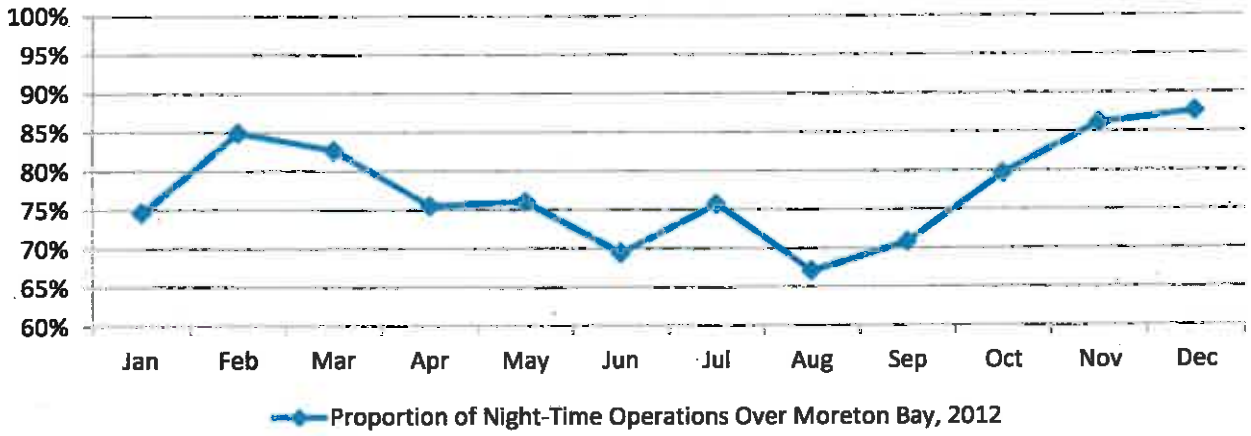
What would be the impact on the Queensland and Australian economies if flights were not permitted from Brisbane Airport between 5:00am – 6:00am during summer?

Use of Runways

Approximately 83 per cent (summer[17]) and 72 per cent (winter[18]) of all operations at night (11:00pm – 6:00am) were directed over Moreton Bay in 2012[19] (see Figure 5), through the 'Reciprocal Mode' of operation. When the Reciprocal Mode of operation is unavailable due to weather or traffic conditions, Mode 19 or Mode 01 is used, which involves either departures or arrivals, respectively, taking place over Brisbane. Existing modes of operation at Brisbane Airport are depicted in Appendix 2.

[17] October – March.
[18] April – September.
[19] BAC data.

Figure 5: Proportion of Night-Time (11:00pm – 6:00am) Operations Over Moreton Bay, 2012



Feedback Question 5

What additional strategies can Brisbane Airport, Airservices Australia and airlines employ to maximise the use of over-water arrivals and departures during sensitive night-time hours?

Night-time Noise Contours

Appendix 3 sets out contours illustrating the number of predicted events above 60dB(A) between the hours of 10:00pm and 6:00am on an average day in 2029, according to Brisbane Airport's ultimate capacity forecast (which includes the operation of the NPR). The forecast reveals that certain areas south of the Brisbane River will be exposed to between three and six events of 60dB(A) or more on a typical night in 2029, but few residences would be exposed to more than an average of six movements per night. It should be noted that these data refer to average exposure. It could be expected that on many nights residents could expect no aircraft movements, while on some nights there would be more movements.

The level of 60dB(A) is chosen because, after attenuation of approximately 10dB(A) by the fabric of a house with open windows, exposure to an event of 50dB(A) or above has been judged based on experience in Australia as disruptive to sleep[20].

Noise Monitoring

Airservices Australia has established a Noise and Flight Path Monitoring System (NFPMS) at Australia's major airports, including Brisbane. It has been designed to monitor aircraft noise as measured on the ground. Brisbane's NFPMS has five strategically located Noise Monitoring Terminals (NMTs) at Tingalpa, Cannon Hill, Bulimba, Kedron and Nudgee Beach.

[20] AS2021.

The information collected by the NFPMS is used for several purposes, including to assess the effects of operational and administrative procedures for noise control, and compliance with these procedures, or to assist in reviewing noise complaints, with outcomes reported quarterly on the Airservices Australia website.

Describing Aircraft Noise

Decibels

The decibel is the most common unit of measure for sound. The human ear is relatively insensitive to changes in sound level, and the decibel scale therefore increases exponentially. So, for example, a 70 decibel sound will be perceived by the human ear to be about twice as loud as a 60 decibel sound, but actually represents a ten-fold increase in sound energy.

Measurements of sound usually have a correction factor applied to reflect the sensitivity of the human ear. This factor is referred to as 'A-weighting' and environmental noise is usually measured in dB(A) units.

The following list represents the sound levels of a range of common events:

- 120dB(A): Threshold of pain
- 95dB(A): Pneumatic drill (un-silenced at 7m distance)
- 90dB(A): Modern twin-engine jet (at take-off at 75m distance)
- 70dB(A): Passenger car (60km/h at 7m distance)
- 60dB(A): Ordinary conversation
- 35dB(A): Quiet bedroom
- 0dB(A): Threshold of hearing

Land-Use Planning Around Airports

Land-use planning decisions around airports generally rely on mapping the extent to which aircraft noise carries beyond the boundary of the airport, largely from arriving and departing aircraft. The Australian Noise Exposure Forecast (ANEF) is a contour-based mapping tool that shows cumulative noise levels around an airport over the course of a year. It has been used for many decades in land-use planning. More recently, frequency-based maps of aircraft noise have been developed. Appendix 3 shows an example of such a map.

Brisbane Airport Complaints Data

Complaints about noise originating from Brisbane Airport demonstrate the subjective nature of reactions to aircraft noise, including how exposure to aircraft noise can be a particularly negative experience for some people. Complaints data over the past three years are characterised by a very small number of complainants accounting for a very high proportion of complaints. Between 1 September 2009 and 31 May 2012, there were 16,980 noise complaints from 915 unique complainants. However, the top four complainants accounted for over 80% of all these complaints, with the most frequent complainant alone lodging 11,428 complaints during the period. The disproportionately high number of complaints from these complainants obscures the underlying trends in the complaints data, and the top four complainants have therefore been discounted from the following analysis.

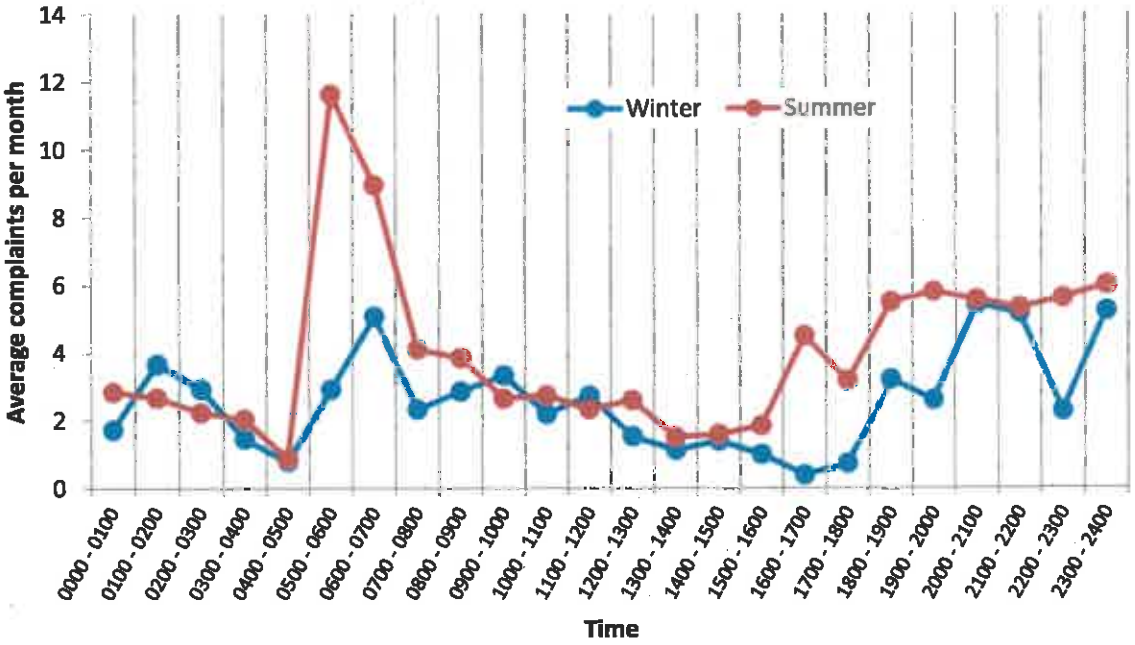
Outside of the top four complainants, the data show that there were 3,301 complaints during this 32-month period – an average of 3.3 complaints per day. Of the 911 unique complainants, 605 lodged only one complaint. The remaining 306 complainants (who lodged multiple complaints) therefore lodged an average of 8.8 complaints each during the period.

The 3,301 complaints originated from 160 different suburbs. The top ten suburbs by number of complaints, which accounted for almost two-thirds of all complaints, were as follows (total complaints in brackets):

1. Morningside (480)
2. Tingalpa (373)
3. Cannon Hill (244)
4. Holland Park (181)
5. Seven Hills (173)
6. Murarrie (172)
7. Wakerley (159)
8. Coorparoo (148)
9. Camp Hill (140)
10. Ashgrove (65)

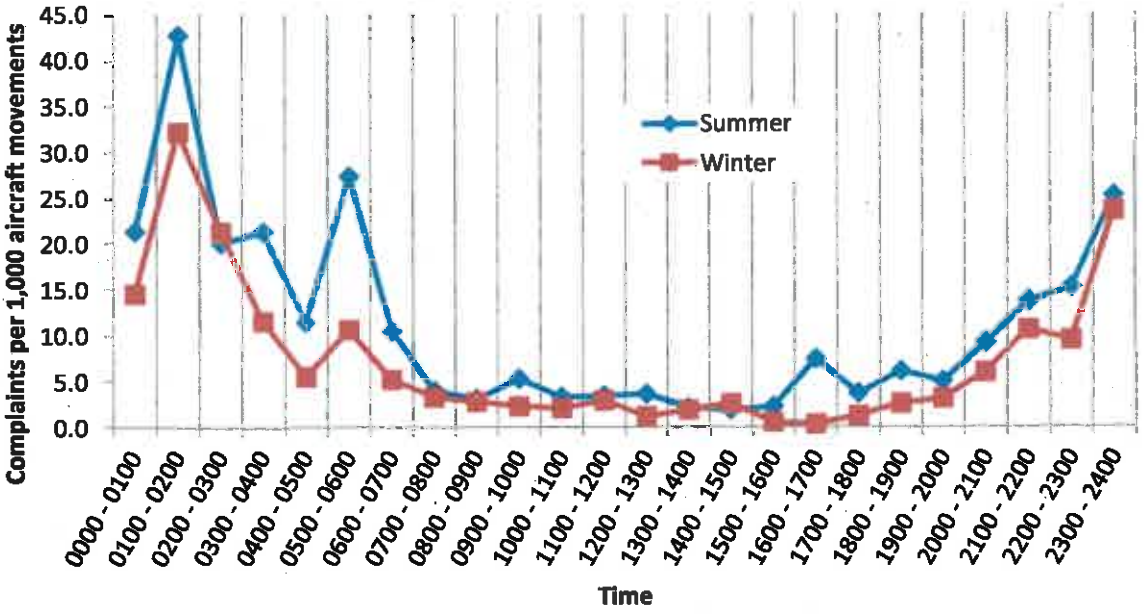
As noted above, the absence of daylight saving in Queensland tends to result in a substantial increase in the number of aircraft movements between 5:00am and 6:00am during summer. This is reflected in the complaints data, with Figure 6 showing how the average number of complaints per month spikes sharply during this time.

Figure 6: Brisbane Airport Noise Complaints, Average Per Month, 1 September 2009 – 31 May 2012



Noise complaints can be expected to reflect the level of aircraft movements at any given time of day. Despite the significantly reduced frequency of flights, night-time hours are expected to show a higher proportion of complaints, given the increased sensitivity of this period and lower ambient background noise levels. These trends are reflected in the complaints data, with the number of noise complaints per 1,000 aircraft movements being far higher at night than during the day (Figure 7). The number of complaints is generally higher during summer (October to March) than winter (April to September), perhaps reflecting the public's increased outdoor lifestyle, and consequent greater exposure to aircraft noise, during this period.

Figure 7: Brisbane Airport Noise Complaints Per 1,000 Aircraft Movements, Calendar 2011



Australian Airport Noise Complaint Data

Table 1 sets out noise complaint and complainant data per 10,000 aircraft movements[21] at the five busiest Australian airports. It shows that Brisbane Airport generates the third-highest number of complaints and complainants out of these five airports.

The Airport receives around half the complaints of Sydney Airport, which operates under a curfew. However, the Airport also has fewer complaints than Perth Airport, which does not have a curfew. Note that complaints data for Brisbane, Sydney and Perth Airports are all influenced heavily by a small number of complainants who lodge a very high number of complaints.

As noted earlier, the closest residences to the end of the main Brisbane Airport runway are 6.7km away.

Table 1: Comparison of Aircraft Noise Complaints, Selected Australian Airports

Airport	Reference Period	Complaints Per 10,000 Aircraft Movements	Complainants Per 10,000 Aircraft Movements	Distance (m) from Runway to Nearest Residence
Adelaide	January – June 2012 (6 months)	52	18	600
Sydney		993	73	700
Perth		1,664	96	1,800
Melbourne		38	16	6,000
Brisbane		477	31	6,700

[21] 'Curfews at International Airports – A study of current practice summary booklet', BAC October 2010 and 'Curfews at international Airports – a study of current practice', J. Bulicke.

Current Initiatives at Brisbane Airport for Managing Night-Time Aircraft Noise

In line with the ICAO Balanced Approach to aircraft noise management, a number of initiatives are currently in place or in the process of being implemented that contribute to the management of night-time aircraft noise at Brisbane Airport.

Reduction of Noise At Source

Considerable progress continues to be made in reducing noise exposure through the introduction of more modern, quieter aircraft and improved air traffic procedures. Noise performance is seen as an important selling point of modern aircraft.

As an example, the B707, the first early high-capacity commercial jet aircraft, emitted sound levels of 120dB(A), measured at 450m from the source. The modern A380, while carrying three to four times the number of passengers, emits around 90dB(A) by the same measure. Appendix 4 illustrates the evolution of noise characteristics of jet aircraft over the past 50 years.

It is important to note that, while modern aircraft are much quieter than their predecessors, these gains have been offset at many airports by the ever-increasing number of aircraft movements (i.e. arrivals and departures) and the tendency by airlines to 'upgauge' (i.e. use bigger aircraft).

Feedback Question 6

What strategies and incentives can Brisbane Airport, Airservices Australia and airlines employ to encourage use of the most modern, low-noise aircraft at Brisbane Airport, particularly during sensitive night-time hours?

Land-Use Planning and Management

The Queensland Government State Planning Policy (SPP) 1/02 – *Development in the Vicinity of Certain Airports and Aviation Facilities* – sets out the State's approach to development in the vicinity of those airports considered essential for the State's transport infrastructure, including Brisbane Airport. The Policy states that development in the vicinity of airports should avoid large increases in the numbers of people adversely affected by significant aircraft noise and includes a number of outcomes to this effect. Local councils (in this case, Brisbane City Council) are required to develop and implement their local planning schemes to ensure the same outcomes as expressed in SPP 1/02.

SPP 1/02 references Australian Standard AS2021-2000: *Acoustics—Aircraft noise intrusion—Building siting and construction* (AS2021). AS2021 provides guidance on the siting and construction of buildings in the vicinity of airports to minimise aircraft noise intrusion.

The Queensland Government has recently developed a draft single SPP that will encompass SPP 1/02 and all other SPPs currently in force in Queensland[22]. The aviation aspects of the draft SPP also incorporate the guidance of the National Airports Safeguarding Framework (the Safeguarding Framework), which was endorsed in May 2012 by the Australian Government and all state and territory governments. The Safeguarding Framework provides guidance to land-use planners by enabling a broader range of noise information to be taken into consideration when making land-use planning decisions near airports. The Safeguarding Framework can be found at:

http://www.infrastructure.gov.au/aviation/environmental/nasf/index.aspx

One of the key objectives of the Safeguarding Framework is a more sophisticated approach to assessment of potential aircraft noise impacts on new residential developments. Planning systems that rely solely on the Australian Noise Exposure Forecast (ANEF) are unlikely to effectively assess the potential impact of night-time noise, as individual moderately-noisy events can disturb sleep without necessarily showing excessive noise impacts in the ANEF.

Feedback Question 7

How can land-use planning practices in Brisbane best complement the operations and growth of Brisbane Airport to serve the state's transport, business and tourism needs while minimising the impact on communities?

Noise Abatement Operational Procedures

Noise Abatement Procedures (NAPs) are currently used at Brisbane Airport to reduce the impact of aircraft operations on residential areas, especially at night. The NAPs describe preferred runways and preferred flight paths for both departing and arriving aircraft, and include measures such as:

- jet aircraft departing Runway 19 (i.e. towards the CBD) must begin take-off from the farthest end of the Runway to allow maximum altitude gain before flying over residential areas;
- altitude restrictions over land for both arriving and departing aircraft during noise-sensitive periods; and
- restrictions on the hours of flight training operations.

The NAPs are attached at Appendix 5 and should be read in conjunction with Appendix 2, which illustrates existing modes of operation at Brisbane Airport. NAPs are not always able to be applied and are subject to weather and traffic considerations and urgency (e.g. emergency) of operations.

Airservices Australia has recently reviewed Brisbane Airport's NAPs. The review found a high level of compliance with procedures by airlines and made a number of recommendations for potential areas of improvement, including:

- addressing instances where there is a low level of compliance with procedures;
- implementing reciprocal runway operations earlier when possible; and
- improved community consultation.

[22] See http://www.dsdip.qld.gov.au/about-planning/state-planning-policy.html

The NAP review can be found at:

http://www.airservicesaustralia.com/wp-content/uploads/Brisbane-Airport-Noise-Abatement-Review.pdf

Feedback Question 8

Where noise impacts are unavoidable, should they be shared to minimise the effects on any one group or concentrated to minimise the number of affected residents?

Preferred Runways

On Sunday through to Friday nights (10:00pm – 6:00am) and on Saturday nights (9:00pm – 6:00am), the preferred mode of operation is Reciprocal Mode over Moreton Bay, with landings on Runway 19 and take-offs on Runway 01. If weather conditions are unfavourable, the preferred mode is to have aircraft arrive over the city (Runway 01) and depart over Moreton Bay (Runway 01). During daylight saving period in the southern states, Runway 01 is the preferred runway for all jet arrivals and departures between 5:00am – 6:00am Monday to Friday (local time), while Runways 14 and 32 are equally preferred for all non-jet arrivals.

Preferred Flight Paths

The NAPs for Brisbane Airport specify preferred flight paths that facilitate maximum use of over-water tracks and specify minimum altitudes over land as far as practicable. They also specify additional requirements for minimum altitudes for those portions of flights that must be carried out over land.

All jet aircraft landing on Runway 19 will normally be routed east of the coast to avoid noise-sensitive areas. Descent for these aircraft is such that they need to be above 5,000ft until after they cross the coastline for landing at Runway 19 between 10:00pm and 6:00am.

For aircraft departing from Runway 01, the altitude for departures before crossing the coast is 5,000ft. In the case of jet aircraft arriving from the north for landing on Runway 01 using the River Track, descent below 3,000ft is not permitted during night-time until aligned with the Runway.

Jet Noise Abatement Climb Procedures

Jet Noise Abatement Climb Procedures refer to different combinations of power/thrust settings and flap retractions at specific heights to minimise noise exposure on the ground. Jet aircraft taking off from Runway 19 over the city must adhere to the Jet Noise Abatement Climb procedures. This procedure applies 24 hours a day for Runway 19.

Feedback Question 9

To what extent are the existing noise abatement procedures effective? In what ways could they be improved?

Operational Restrictions

ICAO encourages States not to apply operating restrictions as a first resort, but only after consideration of the benefits to be gained from the other three principal elements of the Balanced Approach (set out above). In 2010, the Australian Government amended the Air Navigation (Aircraft Noise) Regulations to ban the operation of older, noisy jet aircraft at many Australian airports.

Older aircraft such as the Boeing 727-200 and Boeing 737-200 models were originally noise-certified to ICAO Annex 16, Volume I, Chapter 2 noise standards (introduced by ICAO in 1970). Following the introduction of stricter Chapter 3 noise standards in 1977 and the commencement of a phase-out of Chapter 2 aircraft operations by ICAO in 1995, some Chapter 2 aircraft were modified (or 'hush kitted') in order to achieve re-certification to Chapter 3 standards, and thereby prolong their operating life.

In July 2010, as a commitment of its Aviation White Paper, the Australian Government introduced the Air Navigation (Aircraft Noise) Amendment Regulations 2010, which restrict the operation of marginally-compliant Chapter 3 (MCC3) aircraft at Australian airports where they contribute to unacceptable levels of aircraft noise. The noise emitted by these aircraft was for some time a source of concern to communities surrounding airports where they operated. This was further aggravated by the fact that the aircraft were mainly used for freight purposes and often operated during noise-sensitive night-time periods.

The new Regulations (under the *Air Navigation Act 1920*) were phased in between 1 July 2010 and 1 September 2010 and prohibit services by MCC3 aircraft at Brisbane, Sydney, Melbourne, Perth, Adelaide, Hobart, Canberra, Darwin, Cairns, Gold Coast, Newcastle (Williamtown), Essendon and Avalon Airports.

The phase-out of these noisy aircraft had been canvassed with the aviation industry since 2000, but was prioritised by the Government following representations made by Brisbane Airport to the Minister for Infrastructure and Transport to limit operations by MCC3 aircraft due to their aircraft noise impact. Table 3 illustrates the extent of activity by MCC3 aircraft at Brisbane Airport prior to their ban.

Table 2: MCC3 Aircraft Activity at Brisbane Airport 2008–09

Aircraft	2008–09 Movements	Flights To/From
B727-100 (hush-kitted)	169	Port Moresby, Honiara, Cairns, Darwin, Broome, Mount Hagen, Port Vila
B727-200 (hush-kitted)	28	Port Moresby, Auckland, Cairns, Sydney, Melbourne, Perth, Adelaide, Biak, Marshall Islands
Antonov AN-124, DC86	4	Honolulu, Auckland, Taiwan, Williamstown
B737-200 (hush-kitted)	270	Norfolk Island, Honiara, Sydney, Darwin, Perth, Canberra, Fua'amotu, Pago Pago, Melbourne, Port Moresby
TOTAL	**471**	

Community Engagement and Communications

Brisbane Airport committed in its 2009 Master Plan to strengthen its approach to noise management through a number of community engagement initiatives, including:

- improved community engagement in the Airport's operations through:
  - annual Community Forum meetings in affected parts of Brisbane, open to broad public participation;
  - a new community-based noise committee comprised of community and Government representatives along with industry and regulatory authorities. The committee has an independent Chair and considers ways to improve noise mitigation measures and communication of noise information to the community. Further information about the Brisbane Airport Community Aviation Consultation Group is available at http://bacacg.com.au; and
  - a continuing public engagement strategy for community engagement and communication of noise information in the lead up to commissioning the planned new parallel runway, with the strategy to be published and progress reported regularly to the Government; and
- improved dissemination of information to the community through:
  - establishment of a Community Experiential Centre facility on the Airport to provide displays and interactive information exchange on noise and other operational and Airport development issues;
  - more information on noise issues on the Airport's website;
  - a freecall telephone enquiry service and dedicated email enquiry address;
  - community displays and presentations;
  - print media, including a Flight Paths and Noise Information Booklet; and
  - exploration of options to develop an alternative noise metric to supplement the ANEF system and provide a better level of information to the community, in conjunction with State and local planning authorities.

The Australian Government's 2009 Aviation White Paper included a formal requirement for all leased federal airports to establish Community Aviation Consultation Groups to ensure that local communities have direct input on airport planning matters, with appropriate arrangements for engagement with other industry stakeholders such as airlines and Airservices Australia where necessary.

Further Potential Measures for Managing Night-Time Noise Impacts

Brisbane Airport is a significant national infrastructure asset that contributes billions of dollars to the local, regional and national economy and supports considerable employment in the South-East Queensland region.

The current and projected noise footprint of the Airport along with the trends in complaints and complainant data indicates that the night-time noise footprint generated by operations at Brisbane Airport is less severe than some other Australian airports. However, this is not to say that aircraft noise is a trivial issue for those affected by it.

With the projected increase in air traffic, and despite technological improvements resulting in an increasingly quieter aircraft fleet, aircraft noise at Brisbane Airport will need to be carefully managed.

There are a number of potential measures for further minimising noise at the Airport.

New Parallel Runway (NPR)

The primary proposed modes of operation for night-time operations following the opening of the NPR at Brisbane Airport are set out in Appendix 6, along with the conditions of availability for each of these modes.[23] Appendix 7 sets out the percentage use of operating modes in 2035 as estimated by BAC.

The Environmental Impact Statement and Major Development Plan for the NPR forecast that the opening of the NPR will see a decrease in the area exposed to more than two aircraft noise events per night greater than 70dB(A). This is because of the potential that the NPR offers to direct both arriving and departing aircraft over Moreton Bay in low to medium traffic demand periods. Depending on weather conditions, this would be done by using one runway solely for arrivals and the other solely for departures, either:

- simultaneously – known as SODPROPS (simultaneous opposite-direction parallel runway operations); or
- alternately – known as DODPROPS (dependent opposite-direction parallel runway operations).

This could be particularly important during the morning 5:00am to 6:00am period, which is a departure peak when daylight saving is in effect in other states.

BAC has developed strategies to minimise noise exposure to residents when preferable modes of operation are unavailable, including:

- the use of over-Bay operations for jet aircraft, with the quieter turbo-prop aircraft taking off from the NPR in the city direction. This allows the maximum opportunity for jet aircraft to remain operating over the Bay whilst minimising delays; and
- when weather conditions do not allow for all flights over the Bay, to use only the existing runway for operations over the city at night (11:00pm – 6:00am)[24].

In summary, the NPR provides some opportunities to further mitigate night-time noise impacts on the Brisbane community. However, these opportunities are dependent on weather and traffic conditions.

[23] New Parallel Runway Draft EIS/MDP D5-105.
[24] New Parallel Runway Draft EIS/MDP D5.

Feedback Question 10

To what extent will the new parallel runway help to mitigate aircraft noise originating from Brisbane Airport during the night? How could these benefits be maximised?

Assessing the Impact of the NPR

Delivery of the NPR will fundamentally alter the operational environment at Brisbane Airport. There will be a change in the distribution of aircraft flight paths, with some residents receiving a benefit and some receiving new aircraft noise. Continual transparency from BAC will help to manage community expectations in the lead-up to the opening of the NPR.

Even with the best efforts to inform the community, it is likely that there will be considerable uncertainty about how the NPR will affect aircraft noise exposure until it has been in operation for some time, through varying weather conditions. It may then be useful to formally review this impact after a reasonable period of operation.

Feedback Question 11

Should the operational effectiveness of the new parallel runway in managing night-time noise be formally reviewed following the opening of the runway? And, if so, after what operational period of time?

Smart Tracking

A growing number of modern aircraft are now fitted with navigation systems that use satellite-assisted guidance. These systems offer the potential for flight routes to follow existing noise corridors (e.g. highways) or to avoid noise-sensitive areas and instead traverse water, industrial or non-residential areas. Airservices Australia refers to this technology as *Smart Tracking*. It is also known as Required Navigation Performance (RNP).

The potential benefits of Smart Tracking are threefold.

1. Smart Tracking aircraft are able to fly certain flight paths that they would otherwise be unable to use at night or in poor weather conditions. This has the potential to provide respite to noise-affected communities by allowing the use of flight paths and noise-sharing procedures that would normally only be possible in high-visibility, daytime conditions.
2. Smart Tracking aircraft can be flown with greater accuracy, with only a small variation in the actual tracks flown from one aircraft to another. Smart Tracking aircraft can adhere to a lateral path of plus or minus 70ft, which is less than the wingspan of the aircraft. This has the benefit of minimising the overall noise footprint; however, it can also concentrate noise impacts underneath the RNP track. Noise-sharing arrangements could be implemented as a means of providing respite to those directly under a Smart Tracking path.
3. Smart Tracking facilitates the use of Continuous Descent Approach (CDA) arrivals. Landing procedures traditionally involve aircraft descending in successive steps from cruising altitudes to the runway, with additional power required each time the aircraft levels out at the next step down in altitude. In a CDA, the aircraft flies from cruise altitude to the runway in one smooth and uninterrupted descent. Under ideal

circumstances, a plane can glide into the airport with engines idling for up to 20 minutes. The application of CDA has been shown to reduce community noise on average by about 4dB(A) to 6dB(A)[25].

Smart Tracking technology is fitted in most new aircraft and can be retrofitted into some older aircraft. It is anticipated that the technology should be available in most aircraft by 2015.

Smart Tracking has been trialled at Brisbane Airport since 2007 and in early 2012 became a permanent measure for all aircraft using the Airport that have this capability. Figure 8 shows the Smart Track routes used by aircraft at Brisbane Airport, which are all within existing and long-standing flight path corridors.

Figure 8: Brisbane Airport Smart Track Routes[26]

Source: Airservices Australia, February 2012

[25] New Parallel Runway Draft EIS/MDP D5.
[26] http://www.airservicesaustralia.com/projects/smart-tracking/environmental-analysis-brisbane/

Airservices Australia has undertaken an analysis of the projected noise impacts arising from the permanent introduction of Smart Tracking in Brisbane[27].

Runway 01 Arrivals

- *Track 1* is the approach for traffic arriving from the north. The level of noise of any individual flight is not expected to change for most communities under this route. A few locations may experience decreases of up to 6dB(A) or increases of up to 5dB(A). The 24-hour average noise level may decrease by up to 4dB(A).
- *Track 2* is the overland straight-in approach. There should be no change to the maximum noise exposure of any individual flight to any community. A few areas at the southern end of this route may experience increases of up to 5dB(A) in average noise level over a 24-hour period. Most areas are expected to experience no change.
- *Track 3* is the approach from the south. It is used by about two-thirds of flights arriving in Brisbane. While there should be no change to the maximum noise exposure of any individual flight to any community, the final segments of the Smart Tracking route are offset slightly from the centre of the current flight path corridor. Some areas close to the airport may experience more noise events. Other areas will experience less noise events than they do now. No perceptible change is expected to the average noise level over a 24-hour period.

Runway 19 Arrivals

- *Track 4* is initially over land but at high altitude (above 5,000ft or 1,500m). There is unlikely to be any change in aircraft noise that is noticeable by the community.
- *Track 6* takes aircraft further away from residential areas on North Stradbroke Island. The noise impact to residents from aircraft is already very low and will reduce further.
- *Tracks 5, 7 and 8* are over Moreton Bay and will not result in any changes to noise impacts on communities.

In summary, Airservices Australia is of the view that Smart Tracking has the potential to reduce the overall night-time noise footprint of Brisbane Airport, both through the adoption of CDA landing procedures and through a higher degree of accuracy in flight paths over non-residential areas.

Feedback Question 12

How might Smart Tracking technology be used to further improve night-time noise outcomes, both in the short and long term? What would be the key indicators of success?

Airport Curfews

Airport curfews are one way of managing night-time aircraft noise and providing communities around airports with some respite.

Night-time operations at Sydney, Adelaide, Essendon and Gold Coast Airports are strictly limited by curfews between 11:00pm and 6:00am. Curfew arrangements are established under the *Sydney Airport Curfew Act 1995*,

[27] http://www.airservicesaustralia.com/projects/smart-tracking/environmental-analysis-brisbane/

the *Adelaide Airport Curfew Act 2000*, the Air Navigation (Coolangatta Airport Curfew) Regulations 1999, and the Air Navigation (Essendon Airport) Regulations 2001.

The curfew arrangements at these four airports have arisen primarily due to the proximity of residents to the end of the runway at each airport (see Table 2). The nearest houses to the southern end of the Brisbane Airport main runway are 6.7km away, as compared to less than 1km at Sydney, Adelaide, Gold Coast and Essendon Airports.

It is worth noting that the previous location of Brisbane Airport, at the now-defunct Eagle Farm Airport (used until 1988), was much closer to surrounding residences. The nearest houses in the suburbs of Eagle Farm and Hendra were less than 1km from the end of the runway, and the airport operated under a curfew very similar to the current curfew arrangements in place at other airports.

Curfews, however, do not restrict all night-time aircraft movements. While each airport's legislation varies slightly, all curfewed airports provide exemptions for emergency operations, including air ambulance and search and rescue aircraft, and for dispensations to be granted in exceptional circumstances. Legislation also allows certain low-noise aircraft to operate unrestricted during curfew hours, although usually only where the aircraft are specified by the Minister and meet strict ICAO noise standards. Such aircraft include some small jets (less than 34,000kg), low-noise heavy freight jets (usually BAe 146 and B737 aircraft) and most propeller-driven aircraft. Helicopters are also permitted to operate during curfew hours at some curfewed airports.

Existing curfew arrangements also permit a limited number of 'shoulder' movements of passenger aircraft on a quota basis during curfew periods to address the time differences during northern hemisphere summer and to fit in with international flight schedules and other international airport curfews.

It is important to note that curfews apply only to take-offs and landings at the specified airport, and do not apply to movements at any other nearby airports or to aircraft flying over or in the vicinity of the curfewed airport. Further details of the curfew arrangements at each airport are provided in Appendix 8.

Costs

There is significant national benefit in maintaining a network of curfew-free airports. Curfews impact on the efficient movement of passengers and freight, not just at the airport to which the curfew applies, but to the whole network. For example, a curfew has the potential to restrict an airport's ability to recover from flight delays caused by adverse weather, which can in turn cause other delays at airports all across the country.

Furthermore, curfews can indirectly impact other airport regions by shifting the night-time noise problem to another region or can lead to shifted demands and new peaks during the rest of the operating day.

An airport curfew can limit the role an airport can play as an economic driver to local and national economies. BAC estimated in its 2009 Master Plan that the ability to continue operating curfew-free will directly contribute $542 million in gross regional product and $1.3 billion in economic welfare to consumers by 2029[28].

BAC identifies that implementation of a curfew could:

- result in scheduling difficulties associated with different time zones of destination and origin ports of departing and arriving aircraft, particularly international flights;
- impact on the management of efficient domestic operations that are affected by time differences between Queensland and other states for several months each year as a result of daylight saving;

[28] Accumulated over 20 years until 2029 with a theoretical curfew.

- impact provision of regional overnight financial and commercial services; and
- impact delivery of local perishable goods for the export market.

In submissions made to the Australian Government in developing the White Paper, many stakeholders expressed opposition to a curfew at Brisbane Airport, including the Australian Airports Association (AAA), the Australian Hotels Association and the Board of Airline Representatives of Australia Inc. These stakeholders expressed concerns relating to the potential impacts of a curfew on the economy and on their respective industries. The AAA requested that the Government take into account modern developments in aircraft engines, air traffic management strategies and other noise abatement procedures when making future decisions on airport curfews.

Feedback Question 13

What would be the impact of a night-time (11:00pm – 6:00am) airport curfew on the economic contribution of Brisbane Airport? Could these impacts be minimised?

Benefits

In developing the Australian Government's Aviation White Paper, there was support for a curfew from some in the local Brisbane community to reduce night-time noise exposure. It was stated that this could help reduce sleep disturbance and associated health impacts.

Sleep disturbance has been identified as having a wide range of both short and long term health effects[29]. However, quantifying the benefits of reducing night-time noise is not straightforward. Many researchers have carried out studies analysing the correlation between the quantity of night-time aircraft noise and the extent of sleep disturbance (e.g. Miller and Gardner, 2008[30] – Figure 9).

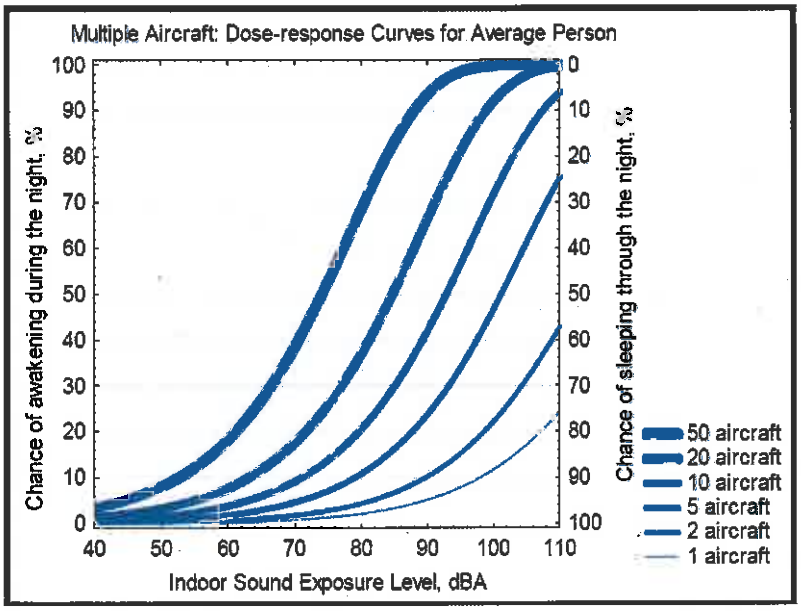
At present there is no international consensus on the most appropriate way to describe, measure or assess night-time aircraft noise. There is ongoing debate as to whether cumulative or average noise exposure or the number of noise events is more important. For illustrative purposes, Figure 9 shows a sample chart relating the number of night-time noise events to the likelihood of waking during the night.

Australian Standard AS2021 recommends that sleeping areas inside dwellings be designed so that single-event aircraft noise events are no louder than 50dB(A). It can be seen from the accompanying figure that in a bedroom designed to meet the Australian Standard AS2021, there is an approximate five per cent chance of an average person being awoken if there are 20 aircraft noise events per night.

Appendix 3 demonstrates that there are unlikely to be any residential areas in Brisbane that are exposed to this amount of night-time noise, even under the ultimate operating capacity of the Airport.

[29] See World Health Organization Night Noise Guidelines for Europe, 2009.
[30] 'How Many People Will Be awakened by Nightime Aircraft Noise?', Miller and Gardner, 9th International Congress on Noise as a Public Health Problem (International Commission on Biological Effects of Noise) 2008, Foxwoods, CT.

Figure 9: Effect of Aircraft Noise on Sleep, Various Aircraft Frequencies



Existing Curfew Arrangements at Other Australian Airports

A curfew at Brisbane Airport could restrict operations in a number of different ways. Similar to the existing curfew arrangements at Sydney, Adelaide, Gold Coast and Essendon Airports, these restrictions could include permitting night-time operations only:

- over water (i.e. Moreton Bay);
- by small, propeller-driven aircraft and certain low-noise jets;
- in emergency circumstances; and/or
- where dispensation has been granted by the Minister in 'exceptional circumstances'.

Movement quotas, engine run-up restrictions, reverse thrust restrictions or noise level limits are also potential operating restrictions that could apply at night. Similar to existing curfew arrangements at other Australian airports, it is unlikely that imposition of a curfew would result in prohibition of aircraft movements in their entirety.

Feedback Question 14

What restrictions could be imposed under a curfew for Brisbane Airport? To what extent would this impact on residents' experience of night-time aircraft noise?

Feedback Question 15

In terms of maintaining certainty of aircraft scheduling, what are the practical implications of employing restricted procedures that may only be available in certain weather conditions?

Trialling Curfew Arrangements

One way of assessing the longer term implications of a curfew at Brisbane Airport might be to establish restrictions on a trial basis.

In considering such an option, the Steering Committee is mindful of the possible disruption that might occur to established services at Brisbane. New tourism markets and airline routes can take some time to establish and it would therefore be informative to test support from airlines for this approach.

Feedback Question 16

Would a short-term trial of a curfew at Brisbane Airport be a practical and effective way to assess the merits of a longer-term curfew at the Airport?

An Operating Plan

A potential option for managing night-time noise at Brisbane Airport could involve an operating plan agreed with the community whereby aircraft movements are maximised over water and non-residential land. Where overflight of residential areas cannot be avoided, the plan could include provision to share noise between communities according to noise-sharing targets. An operating plan could also feature operating restrictions as described above.

Next Steps

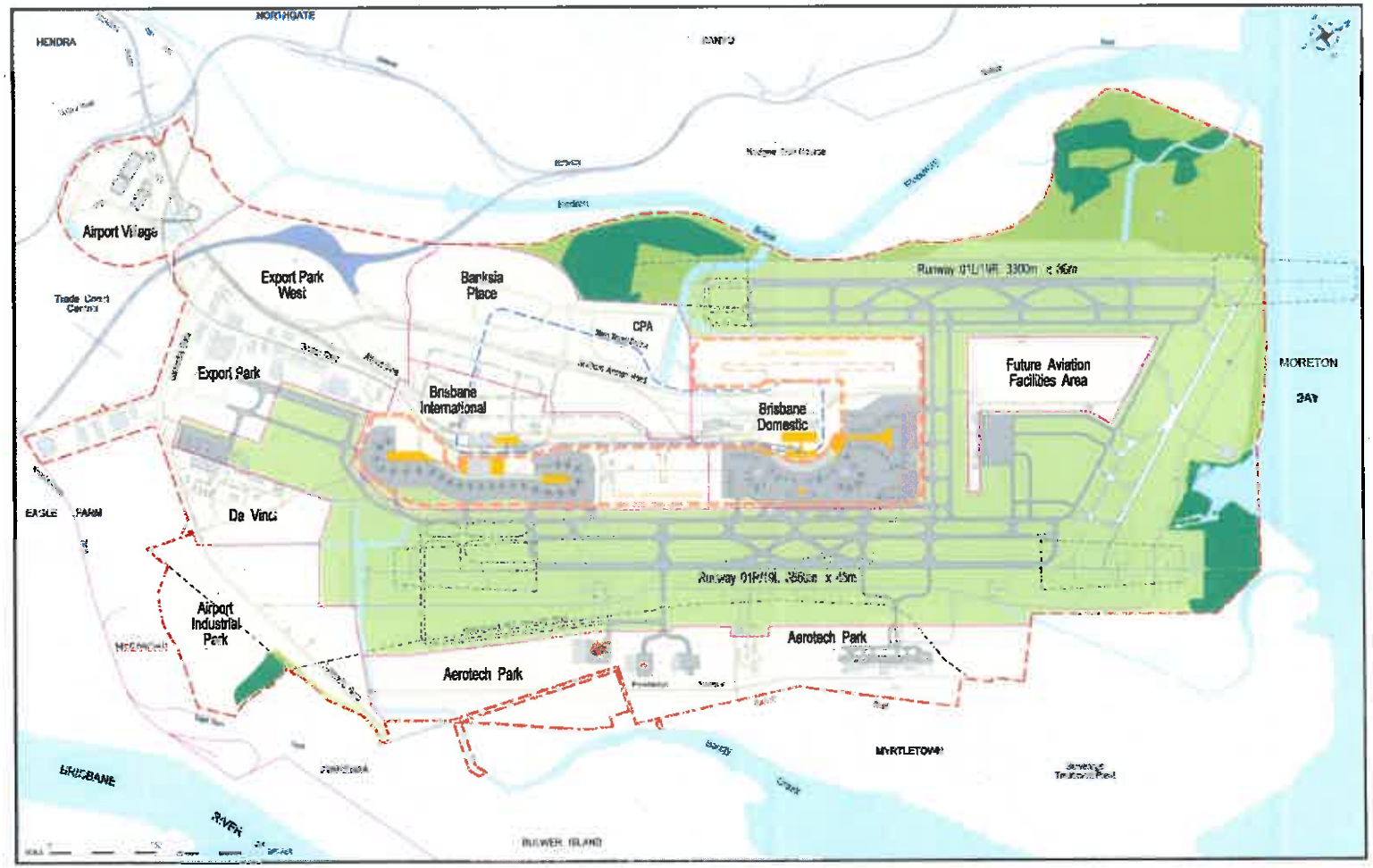
The Steering Committee is interested in views on the issues and options covered in this discussion paper, including the necessity or otherwise of a curfew at Brisbane Airport. These views will be used by the Steering Committee to determine which strategies for managing night-time noise at Brisbane Airport warrant further consideration.

In particular:

- To what extent should the growth of aviation activity at the Airport be provided for?
- Are the current initiatives in place at Brisbane Airport sufficient for managing night-time aircraft noise, both present and projected?
- Which of the options canvassed in this discussion paper have the potential to alleviate night-time aircraft noise exposure for those affected in the community?
- Are there any other potential measures not discussed in this discussion paper that the Steering Committee should consider?

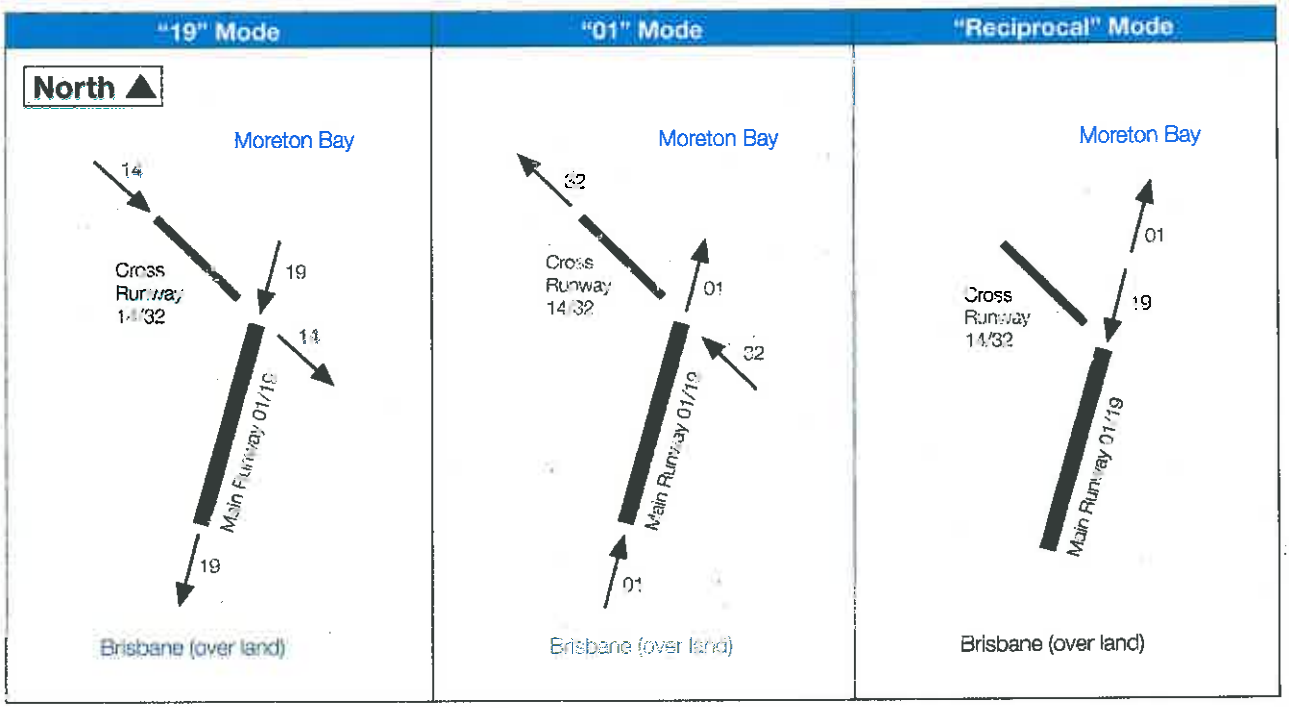
Appendices

Appendix 1: Location of the New Parallel Runway at Brisbane Airport



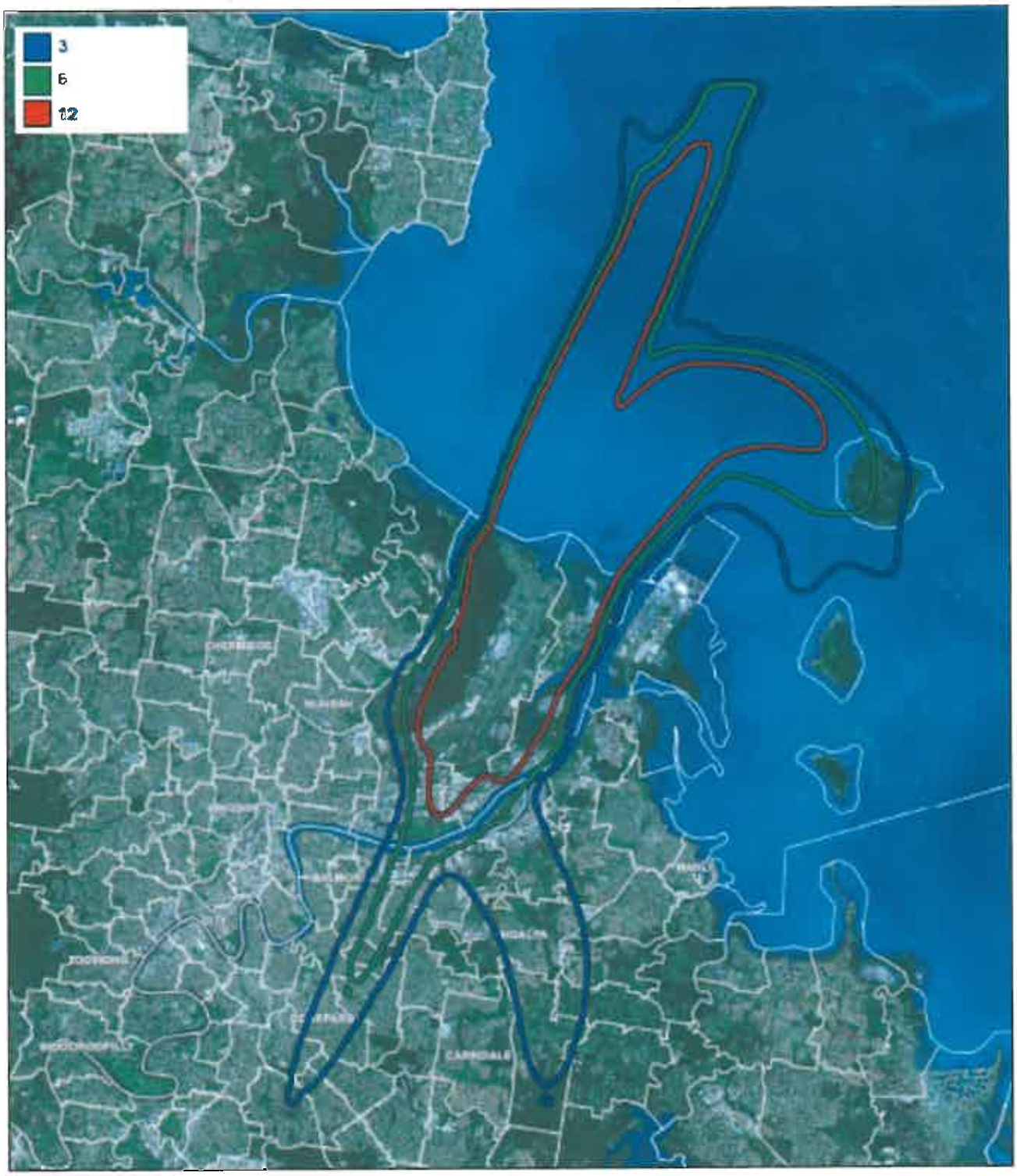
Source: BAC EIS/MDP NPR.

Appendix 2: Existing Modes of Operation at Brisbane Airport



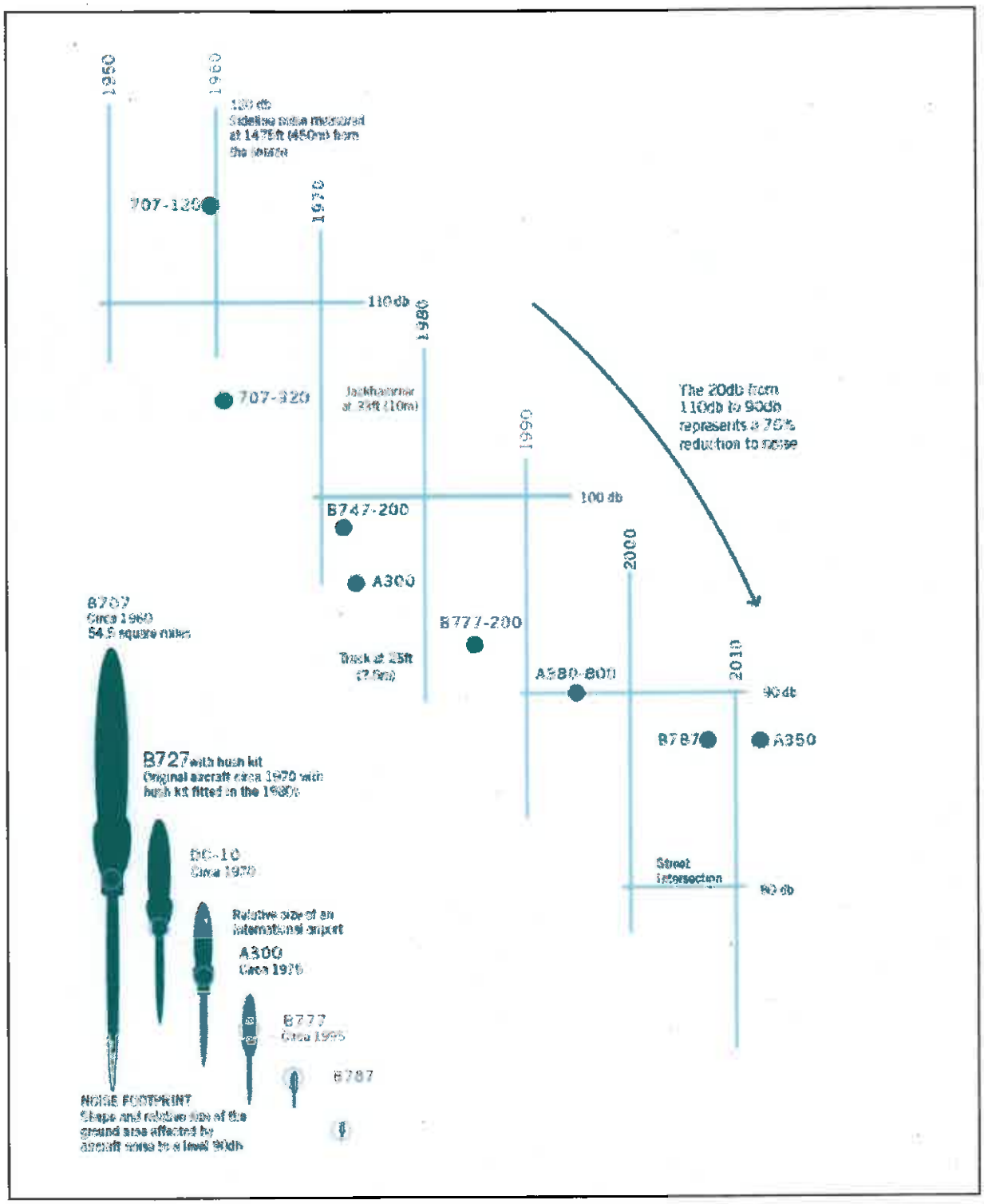
Source: NPR Draft EIS/MDP, D2.

Appendix 3: 3, 6 and 12-event N60s, 10:00pm – 6:00am (at 2029)



Source: Brisbane Airport.

Appendix 4: The Reduction of Aircraft Noise Over Time



Source: 'Plane Simple Truth' G. Thomas, C. Forbes Smith, G. Norris, S. Creedy and R. Pepper.

Appendix 5: Noise Abatement Procedures at Brisbane Airport

NOISE ABATEMENT PROCEDURES

BRISBANE

1. - PREFERRED RUNWAYS

Jet Noise Abatement climb procedures apply H24 RWY 19.

(a) 2000-1200 UTC Sunday to Friday and 2000-1100 UTC Saturday, the preferred runways are:

1. RWY 01
2. RWY 14 or 32 equal
3. RWY 19

(b) 1200-2000 UTC Sunday to Friday and 1100-2000 UTC Saturday, the most preferred configuration is "Reciprocal Runway Operations".

LANDING	TAKE-OFF
1. RWY 19	1. RWY 01
2. RWY 32	2. RWY 14
3. RWY 14	3. RWY 32
4. RWY 01	4. RWY 19

(c) 1900-2000 UTC Monday to Friday, during the daylight saving period in the southern states, the preferred runways are:

1. All departures and Jet arrivals - RWY 01, and
   All Non-Jet arrivals-Rwy 14 or 32 equal.
2. All arrival and Jet departures - RWY 19, and
   All Non-Jet departures-Rwy 14 or 32 equal.

NOTE 1: *Intersection departures on RWY 19 are not permitted for aircraft exceeding 30,000kg MAUW during (a) and by all aircraft during (b) and(c).*

NOTE 2: *Applicable to (b) and (c). Runways 01 and 19 will be nominated as preferred runways for take-off and landing when the downwind component does not exceed 10 knots (including gusts) and the runway surface is completely dry.*

NOTE 3: *Pilots of MED 1 priority aircraft shall advise ATC if they have a level of urgency that requires exemption from compliance with Noise Abatement Procedures. This notification should be made as early as practicable. ATC will facilitate requests for exemption.*

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Appendix 5: Noise Abatement Procedures at Brisbane Airport *(cont'd)*

2 - PREFERRED FLIGHT PATHS

2.1 - Arriving Aircraft.

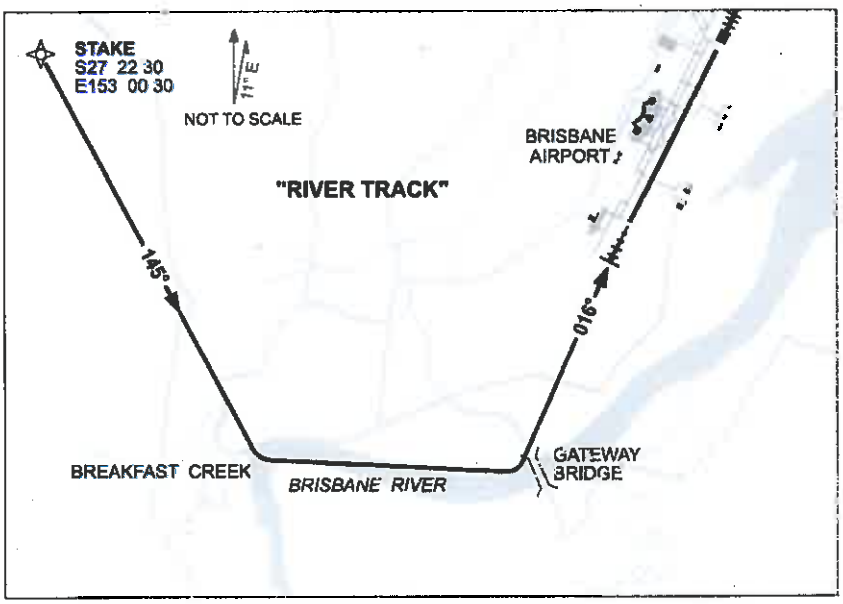
(a) Landing runway 19:
- All JET propelled aircraft will normally be routed east of the coast to avoid noise sensitive areas.
- Descent for these aircraft below 3000FT is not permitted until east of the coast.
- During the period 1200-2000, applicable to all JET aircraft, descent below 5000FT is not permitted until east of the coast.
- During the period 1200-2000, applicable to all NON-JET aircraft, descent below 3000FT is not permitted until east of the coast.

(b) Landing runway 32:
- Track for a right base

(c) Landing runway 14:
- Track for a left base

***Note**: To satisfy the requirement of 2.1(a) and (c) for aircraft tracking from the south, ATC will radar vector or direct aircraft to track JACOBS WELL-POODL-BRISBANE. Pilots are to plan JACOBS WELL-BRISBANE.*

(d) Landing runway 01:
- Jet propelled aircraft arriving from the north on the SMOKA V ARRIVAL will be routed via "RIVER TRACK" ex waypoint STAKE for a visual approach. (See depiction below)
- During the period 1200-2000 all aircraft shall not descend below 3000FT until aligned with the runway.



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Appendix 5: Noise Abatement Procedures at Brisbane Airport *(cont'd)*

2.2 - Departing Aircraft.

(a) Departing runway 19:
- Jet propelled aircraft departing to the south via Laravale, must follow a procedural SID when ground navigation aids are available. On other routes, Jet propelled aircraft will normally follow procedural SID's
- Non Jet propelled aircraft will normally follow radar-based SIDs.
- During the period 1200-2000 all aircraft will be routed, as far as possible, clear of noise sensitive areas.

(b) Departing runway 14/32:
- All aircraft will follow radar-based SID's.
- Jet propelled aircraft will normally be contained within a sector 360°-120°, over water until leaving 5000FT.
- During the period 1200-2000 all aircraft will be contained within a sector 360°-120°, over water until leaving 5000FT.

(c) Departing runway 01:
- Jet propelled aircraft will normally follow procedural SID's. Anticipate a requirement to reach 5000FT prior to over flying a residential area.
- Non Jet propelled aircraft will normally follow radar-based SID's.
- During the period 1200-2000, all aircraft, expect to be contained within a sector 360°-120°, over water until leaving 5000FT.

NOTE 1: *In the above procedures the term "all aircraft" applies to all aircraft categories described in AIP ENR 1-5, Para 11.1.1 and all other aircraft having two or more engines.*

NOTE 2: *Procedural SID's issued to jet propelled aircraft all have preferred noise abatement procedure flight paths.*

NOTE 3: *The expectations described above when operating on a RADAR SID are to meet Noise Abatement Procedures and are in lieu of nominating specific preferred flight paths.*

3 - TRAINING FLIGHTS - See AIP/ERSA

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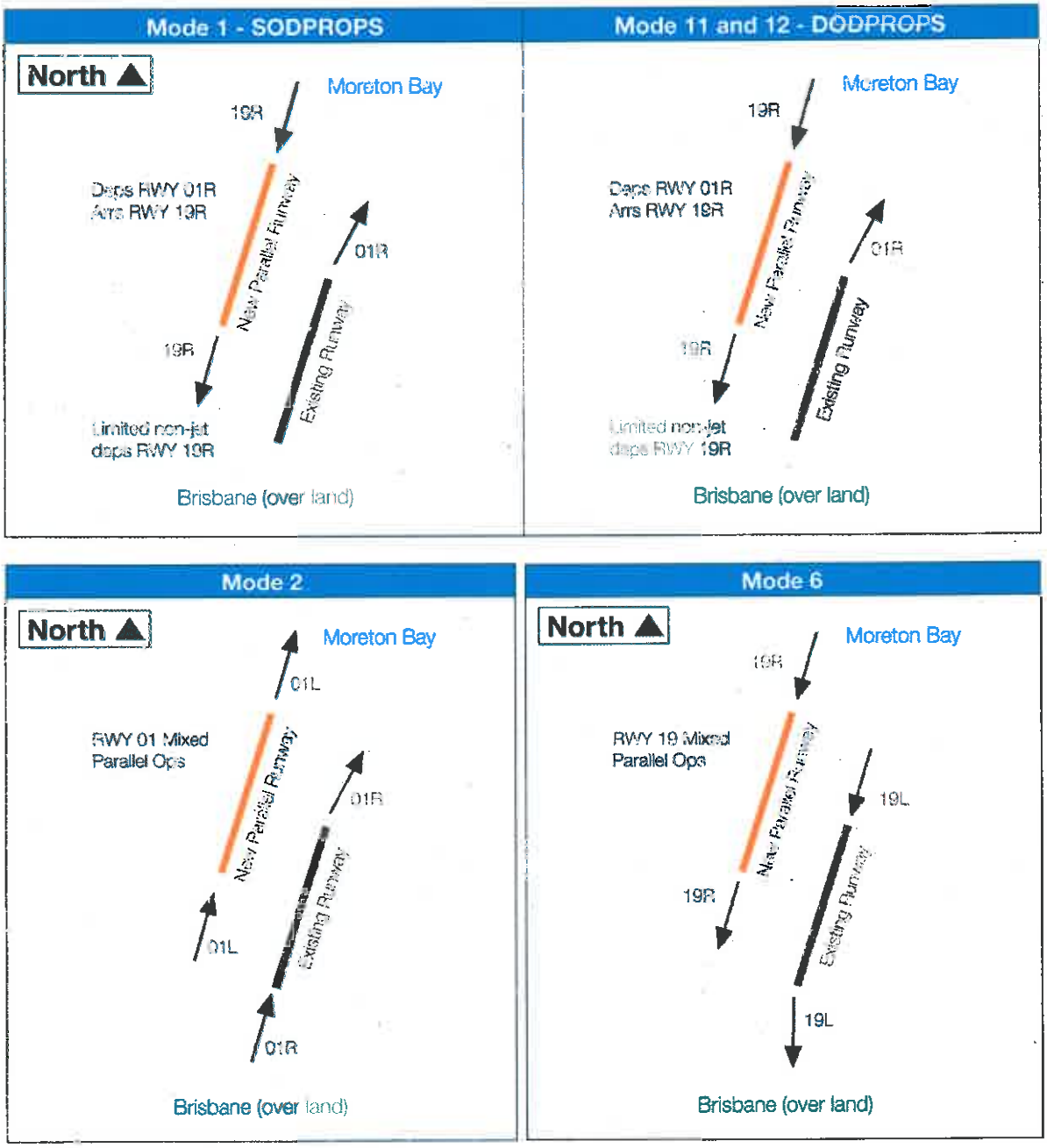
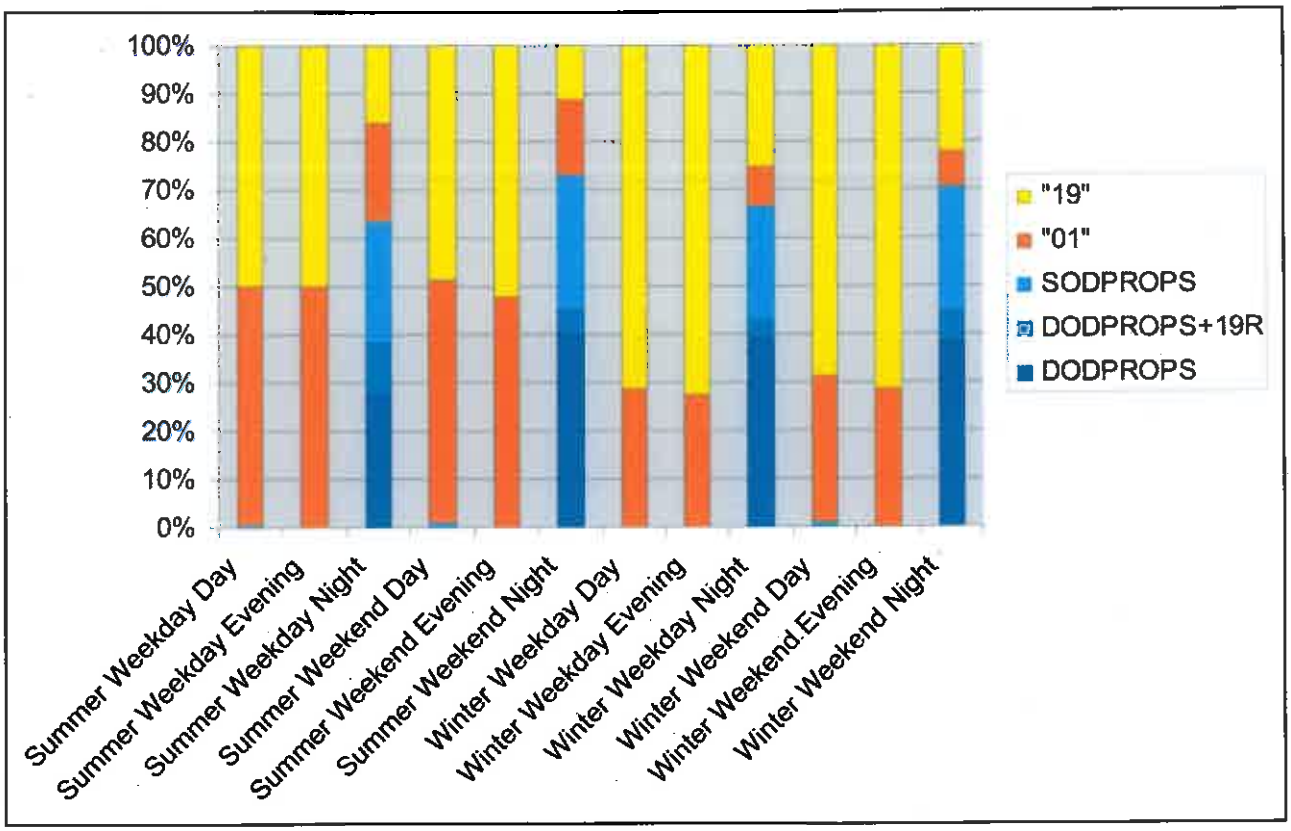
Appendix 6: Proposed Modes of Operation for the NPR



Note that Modes 2 and 6 are supported with a number of variations of semi-mixed parallel operations. Mode 1 (SODPROPS) requires visual flying conditions with a maximum 5 knots downwind and a dry runway only. Aircraft movements must not exceed 55 in a single hour. Mode 11 and 12 DODPROPS requires visual flying conditions with a maximum 10 knot downwind and a dry runway only. Aircraft movements must not exceed 20 movements per hour.

Source: Extracted from New Parallel Runway Draft EIS/MDP, D3.

Appendix 7: Percentage Usage of Modes, 2035 (including NPR)



Source: Extracted from NPR Draft EIS/MDP, D5.

Appendix 8: Current Curfew Arrangements at Australian Airports

Airport	Sydney	Adelaide	Coolangatta (Gold Coast)	Essendon
Curfew Applicability	2300 – 0600	2300 – 0600	2300 – 0600	2300 – 0600
Permitted Operations	• Small (<34,000kg) noise certified propeller driven aircraft and 'low noise' jets as gazetted. • A limited number of freight movements by low noise, medium sized freight aircraft (BAe 146). • A limited number of landings by international passenger aircraft between 2300-2400 and 0500-0600 subject to meeting specified quota and noise standard requirements. • Emergency operations. • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.	• Small (<34,000kg) noise certified propeller driven aircraft and 'low noise' jets as gazetted. • Low noise heavy freight aircraft, subject to quota restrictions. • National Jet Systems BAe146 aircraft undergoing scheduled maintenance or major defect rectification, subject to dispensation for each flight. • A limited number of landings by international passenger aircraft between 2300-2400 and 0500-0600 subject to meeting specified quota and noise standard requirements. • Emergency operations. • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.	• Jet aircraft with a maximum take-off weight ≤34,000kg and compliant with Chapter 3 and 90-95 noise level rule. • Propeller driven aircraft ≤34,000kg. • Aircraft that have received taxi clearance by Air Traffic Control or started taxiing for take-off when ATC not available, before curfew period starts. • Aircraft using Coolangatta Airport as an alternate airport. • Domestic passenger jets or freight jets who have applied and been granted approval under the quota system. • Emergency operations. • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.	• Propeller-driven aircraft ≤8,618kg that do not exceed specified noise emissions. • Helicopters compliant with relevant maximum noise levels. • Emergency operations. • Operations which have been granted dispensation by the Minister in 'exceptional circumstances'.
Restrictions on Permitted Operations	• Aircraft must operate over Botany Bay (this applies from 2200 – 0700 on Saturdays and Sunday) subject to weather and traffic conditions.	• Aircraft must land on Runway 05 and take-off on Runway 23.	• For aircraft using the Airport as an alternate for Brisbane Airport: o international services may land and take off during curfew; and o domestic services may land but not take off during curfew.	• Aircraft should not depart from its origin port where the estimated time of arrival is after 2300. • Arrivals before 0600 must hold until after the curfew ends. • The Airport must not be nominated or used as a planned alternate airport. • Operation during curfew hours must lodge a flight plan with Airservices Australia.

Further information is available at: http://www.infrastructure.gov.au/aviation/environmental/curfews/index.aspx

Organisation/Author	Dated	Suburb	Summary	for curfew	against	not clear/stated
s.47F	15/10/2013	Tingalpa QLD	Supports introduction of a curfew on the basis of a right to quiet enjoyment. QLD climate and building construction materials (ie tin and timber) do not lend themselves to noise insultation being effective.	1		
s.47F	15/10/2013	Cannon Hill QLD	Supports introduction of a curfew. No direct comment on content of Discussion Paper.	1		
Brisbane Airport Corporation	22/10/2013	Brisbane Airport QLD	Does not support the introduction of a curfew at Brisbane. Airport has a clear commitment to working with Government and Industry to deliver best possible noise outcomes for affected community. A curfew imposed at Brisbane would impact international and domestic flights, tourism, the economy, jobs, businesses, air freight and the community.		1	
Sydney Airport	22/10/2013	NSW	Does not support introduction of curfew at Brisbane. Flight restrictions would impact state and national economy due to the interconnected nature of Australia's aviation network. Not desirable given that a number of options exist to reduce impact of night time operations. Application of more modern noise abatement procedures should be considered for the future.		1	
Melbourne Airport	24/10/2013	VIC	Does not support introduction of a curfew at Brisbane. Maintaining curfew-free operations is an important tool in maximising the efficiency of Australia's aviation network. Operational and technological measures should be employed to address public concern about noise impacts.		1	
Mantra Group	24/10/2013	Gold Coast QLD	Does not support introduction of a curfew at Brisbane. Potential introduction of a curfew represents a significant risk to QLD visitor economy. Up to 160,000 visitors per year may be lost as a result.		1	
Accor	24/10/2013	Brisbane QLD	Does not support introduction of a curfew at Brisbane. Potential introduction of a curfew represents a significant risk to QLD visitor economy. Up to 160,000 visitors per year may be lost as a result.		1	
Cairns Airport	25/10/2013	Cairns QLD	Does not support introduction of a curfew at Brisbane. Imposition of such operating restrictions curtails economic growth for the city, state and nation. Poses a barrier to negotiations with international carriers for new routes or extensions to existing services.		1	

Hobart Airport	25/10/2013	TAS	Does not support the introduction of a curfew at Brisbane. Imposition of a curfew would severely curtail long term capacity of the airport.			1
Property Council of Australia (QLD) Branch	30/10/2013	Brisbane QLD	Does not support introduction of a curfew at Brisbane. Airport plays critical role in State and National economys. Potential economic growth loss if operations are curtailed. Property Council supports use of supplementary noise metrics. Is of the opinion that community concerns can be addressed through effective land-use planning and noise abatement technology. NOTE: Additional letter sent indicating Council does NOT support supplementary metrics.			1
s.47F	31/10/2013	Cannon Hill QLD	Supports introduction of a curfew. Economic contribution of the airport is not in question, however this must be balanced with the needs of affected communities. Under current operational load windows for respite are narrowing and will deteriorate more over the next 7 years. Under NPR larger areas of densely populated residential areas will be impacted. Large numbers of european airports have night time restrictions and still prosper. Claims airport buffer is adequate, however, some 8kms from the airport there are still aircraft noise readings exceeding 70 decibels. Noise abatement procedures are not enforceable which has a profound effect during noise sensitive periods. Supports a trial of curfew restrictions. It should be noted that proposed increases in activity by other modes of transport accessing Port of Brisbane will additionally impact areas already affected by night time aircraft noise	1		
Queensland Govt - Dept Premier & Cabinet	7/11/2013	QLD	Does not support curfew			1
				3	9	0

EMAIL SUBS

Date Received	Suburb	Summary
2/09/2013	Coorparoo QLD	We moved there in 2008 and didn't notice the aircraft until 2009 and mainly in the warmer months. The noise is extremely annoying. Seems to be more planes landing over house early morning and at night. Which suburbs were previously in the landing corridor? Why have the landing flights been re-routed over my area? Suggest the flight path is expanded so that the noise is shared over a greater area.
24/09/2013	Morningside QLD	Direct ALL traffic over Moreton Bay between 10pm and 6am. Utilise Smart-tracking more to reduce number of aircraft using ILS.
26/09/2013	Carina Heights QLD	Introduce night time curfew or move airport to less populated location.
16/10/2013	East Brisbane QLD	Supports introduction of night time curfew. Claims airport is disseminating misleading information regarding impacts of noise. Advocates for widening of cross runway to facilitate use by more types of aircraft.
15/10/2013	Carindale QLD	Advocates for exclusive use of over Moreton Bay operations between 9pm and 7am. If not possible then strict, no flight, curfew should apply.
17/10/2013	Hawthorne	No direct comment on Discussion Paper.
17/10/2013	Morningside QLD	Supports introduction of a curfew. No direct comment on Discussion paper.
17/10/2013	Coorparoo QLD	Supports introduction of a curfew. No direct comment on Discussion Paper.
18/10/2013	Seven Hills QLD	Strongly supports introduction of night time curfew. No direct comment on the Discussion paper
18/10/2013	Seven Hills QLD	Disagrees that double glazing is a viable option due to QLD climate. Supports introduction of curfew.
20/10/2013	Coorparoo QLD	Asks planes to stop flying over at night when he is trying to sleep. No direct comment on Discussion paper.
22/10/2013	NT	Does not support introduction of a curfew as this would limit capacity and economic viability of airport. Believes the airport buffer is a contributing factor in the low number of noise complaints received by Airservices.

23/10/2013	NSW	Opposes introduction of curfew at Brisbane. Such action would pose a threat to tourism and retail and effect the QLD economy. Believes the airport buffer means Brisbane does not experience the same aircraft noise issues faced by other major cities.
24/10/2013	Tarragindi QLD	Supports introduction of curfew. Have lived in the area for 32 years and notice a marked increase in flights during the night and aircraft flying lower.
24/10/2013	Morningside QLD	Supports introduction of a curfew. No direct comment on Discussion paper.
24/10/2013	Hendra QLD	Supports introduction of a curfew. Appreciates the economic benefit BAC brings to Queensland, we does not understand why at 10pm onwards, planes need to fly low over a residential area.
24/10/2013	Norman Park QLD	Supports introduction of a curfew. No direct comment on Discussion paper.
24/10/2013	Bunya QLD	Supports introduction of a curfew. There are not a huge amount of the flights but it only takes one per night for it to impact on his young family. The economic impact argument put against a curfew is a ridiculous one purely because the number of flights between those times is small.
24/10/2013	Balmoral QLD	Supports introduction of a curfew. Since 1976 has seen a huge increase in the number and variety of flights into Brisbane Airport with a subsequent rise in noise. Even at night when there are fewer flights, still reportedly at least 5 per hour, they are often disturbed by very noisy and laborious flights. While the second runway expansion is obviously great for tourism and business, the impacts of the increased aircraft noise on residents may not have been so obvious and like the findings of WHO and ICAO, they find that night noise in particular " impacts on sleep, health and cognitive performance".
24/10/2013	Tarragindi QLD	Supports introduction of a curfew. The Federal Government, acting on behalf of the people of Australia, should responsibly regulate the use of that resource. 1. A curfew at Brisbane airport between 11 pm and 7 am eastern standard time. 2. Find a way to put all arrivals and departures in/out over Moreton Bay; keep aircraft noise pollution from suburban skies. 3. Tax BAC on aircraft arrivals and departures and airline companies and aircraft manufacturers to fund research into noise abatement technologies for the aircraft they operate/build. 4. Research the impact of the proposed Brisbane-Sydney-Melbourne high speed rail on air traffic into/out of Brisbane.

24/10/2013	Morningside QLD	Supports introduction of a curfew. Flight numbers have increased dramatically in past 25 years. She works in the travel industry and understands the growth in airline transportation but asks why is there a need to have aircraft movement in Brisbane throughout the night while other cities have a curfew?
25/10/2013	Ferny Hills QLD	Supports introduction of a curfew. No direct comment on Discussion paper. Cites outbound long haul flights as causing most disturbance at night.
27/10/2013	Seven Hills QLD	Supports introduction of a curfew. No direct comment on the Discussion Paper. Increasing amount of noise is affecting her ability to sleep, mental stability, and stress levels .
27/10/2013	Keperra QLD	Opposes introduction of a curfew at Brisbane. Suggests in lieu of a curfew perhaps the industry should be thinking of some form of yearly payment to land owners/residents living in a set radius of an airport.
27/10/2013	Coorparoo QLD	Supports introduction of a curfew. Needs to be legislation forcing BAC to comply with noise abatement strategies. Given the large economic benefits from avoiding curfew, Government and/or BAC should financially assist residents under flight paths to have their homes acoustically insulated to defined standards that allow uninterrupted sleep.
28/10/2013	Hawthorne QLD	Supports the introduction of a curfew. The report mentions a relatively low number of aircraft movements at night (11.00pm - 6.00am) so clearly the impact of a curfew would have little affect on the overall economic proposition outlined in the report.
28/10/2013	Brisbane QLD	Opposes introduction of a curfew at Brisbane. Curfew would risk State and Commonwealth Govt tourism target comitments; disadvantage QLD at a tourism destination; and jeopardise Australia's share in the global tourism market.
28/10/2013	Brisbane QLD	Opposes introduction of a curfew at Brisbane. Curfew would risk State and Commonwealth Govt tourism target comitments; disadvantage QLD at a tourism destination; and jeopardise Australia's share in the global tourism market.
28/10/2013	Eagle Farm QLD	Opposes introduction of a curfew at Brisbane. Advises that onflow effects to QLD network would result in decreased productivity. Cites that potential impact on fly in fly out operations may be underestimated.

28/10/2013	Cannon Hill QLD	Supports introduction of a curfew. Brisbane Airport noise impact on the overall quality of life and amenity of surrounding residents. Noise complaint data does not reflect true magnitude of problem. Noise abatement compliance is not enforceable. Airport noise information is dismissive and misleading for the public.
28/10/2013	Mitchelton QLD	Supports introduction of a curfew. Experiences few night time outbound flights but they are disturbing.
28/10/2013	Coorparoo QLD	Supports introduction of a curfew. Understands tourism is important to Brisbane but could there be some reprieve in the evenings so that people can have a decent night's sleep. Perhaps the government or aviation authority would consider double glazing windows as they did in Sydney.
28/10/2013	Eagle Farm QLD	Opposes introduction of a curfew at Brisbane. 24-hour operation is a key component to the airport's domestic and international competitiveness. Acknowledges importance of this Review but contends that public's interests are best served through 24-hour status.
29/10/2013	Coorparoo QLD	Supports introduction of a curfew. Increase in aircraft traffic and associated noise over past 22 years. Greater impact during warmer months. Closing all doors and windows and run air-conditioning is hardly a cost effective or environmentally friendly option. Very concerned about future noise pollution from aircraft when the parallel runway is completed.
29/10/2013	Morningside QLD	Supports introduction of a curfew. Night time noise abatement procedures concentrate noise for those near centre-line flight path. Is of the view that Airservices and BAC are disseminating misleading noise information. Public health and environment factors not key considerations in the Review Terms of Reference. Concerns parallel runway will increase number of night time movements.
29/10/2013	Brisbane Airport QLD	Opposes the introduction of a curfew at Brisbane. Supportive of detail and comment contained in the discussion paper.
29/10/2013	Norman Park QLD	Home is under direct path for aircraft both arriving and taking off. Noise is disruptive to three children and family's quality of living. Advocates that a review of operating times and flight paths be undertaken.

29/10/2013	ACT	Opposes introduction of a curfew at Brisbane. Brisbane Airport key hub in Toll Group's operations and 24-hour access is critical to maintaining international and national air freight and continuity of the national supply chain.
29/10/2013	Gaythorne QLD	Does not support introduction of a curfew. No direct comment on the Discussion Paper.
29/10/2013	Coorparoo QLD	Supports introduction of a curfew. Suffers a number of health and productivity problems due to the sleep deprivation caused by night time noise. Stricter penalties should be applied for non-compliance with noise abatement procedures and also compensation should be given to the people affected. Having aircraft land over the bay as much as possible would ease the noise pollution for many outer suburbs.
30/10/2013	ACT	Opposes introduction of a curfew at Brisbane. Such a limiting of operating hours would have substantial negative impact on charter, FIFO and possibly RPT services to and from Brisbane.
30/10/2013	Brisbane QLD	Opposes introduction of a curfew at Brisbane. Timely that the Federal Government recognises the significant economic benefit Queensland's main aviation gateway brings to the national economy. A curfew would have widespread impacts on QLD's domestic economic performance, and more broadly, Australia's economy.
30/10/2013	Not provided	Supports introduction of a curfew. No direct comment on the Discussion Paper.
30/10/2013	Yamanto QLD	Supports introduction of a curfew. Unhappy about changed flight paths in Amberley area.
30/10/2013	Tingalpa QLD	Supports introduction of a curfew. Aircraft noise places burden on our community in terms of mental and physical illness. Airport noise information is misleading. Worried about increased night time noise from parallel runway.
30/10/2013	Not provided	Supports introduction of a curfew. No direct comment on the Discussion Paper. Provided screenshots from Webtrak showing multiple arrivals and departures over land (not water) between 2330 and 0100.
30/10/2013	NSW	Opposes introduction of a curfew at Brisbane. Night time freight into and out of Brisbane is of significant economic benefit to QLD economy. A curfew would reduce productivity for the mining industry due to interruptions to staff movements.

30/10/2013	Brisbane QLD	Opposes introduction of a curfew at Brisbane. Recommends BAC undertakes modelling on community disturbance and numbers affected, based on current and future runway configurations and curfew vs no curfew scenario. Night time noise charging should be examined as a noise abatement method. Also recommends that economic modelling be done to ascertain impacted house prices, and noise mitigation costs vs economic benefit of Brisbane Airport operations. Airport is key economic driver for State economy. Claims there would be a 1.3 billion shortfall in the economy by 2029 if curfew introduced. Night time restrictions would curtail future growth and impact on current operations, affecting job opportunities within a number of industries and global investment.
30/10/2013	ACT	Unclear if curfew is supported. Comments provided relate to the validity of the land use planning information included in the Discussion Paper.
30/10/2013	Not provided	Supports introduction of a curfew. No direct comment on the Discussion Paper.
31/10/2013	NSW	Opposes introduction of a curfew at Brisbane. Such reviews should be informed by a meaningful study of community impacts and expectations. Such a study would open up the options available and reduce potential 'regulatory creep' on industry. Aviation is a significant contributer to the QLD and Australian economy. A reduction in the amount of traffic through a curfew would translate into lost productivity and jobs and reduced global competitiveness.
31/10/2013	ACT	Opposes introduction of a curfew at Brisbane. Airport is a major driver of economic activity for the State. Curtailing operations would jeopardise jobs and hinder economic growth.
31/10/2013	Spring Hill QLD	Opposes introduction of a curfew at Brisbane. Australia's network of airports provide valuable connections between Australia's geographically dispersed population. Maximising the efficiency of key gateway airports such as Brisbane is vital to the functioning of the entire network. Virgin is of the opinion that the economic detriment associated with the imposition of operational constraints outweighs any potential reduction in aircraft noise exposure. Imposing a curfew would significantly reduce Virgin's efficiency and productivity.

31/10/2013	Murarrie QLD	Supports introduction of a curfew. Real effects on family health and financial costs arising from sleep disturbance. Uncertainty if there will be no-noise periods as it is an unpredictable lottery dependent on prevailing meteorological conditions and flight schedules. Current initiatives for managing night-time noise assist in reducing night time noise, but it is clear there are limits to what further measures can be adopted to reduce the noise unless aviation technologies improve substantially. The answer lies in not permitting aircraft to operate, except in limited circumstances, as is the case at Sydney, Adelaide, Gold Coast and Essendon Airports. If night movements contribute $224 million to the South-East Queensland economy, this economic contribution should be balanced against the medical and other costs incurred by the associated ill health and social impacts. **This issue, which will increase when the New Parallel Runway is built, has not been addressed at all in the Paper and should have been considered in detail.** While the economic contribution of airports is certainly valuable, the wellbeing of the population must also be taken into consideration.
31/10/2013	Redcliffe QLD	Supports introduction of a curfew. Accepts that planes are now a way of life but there has to be a compromise and the well- being of those on the ground has to be taken into account. Their complaints and concerns re quality of life and health cannot be allowed to be trivialised by corporations and individuals in pursuit of the almighty dollar and other vested interests.
31/10/2013	Not provided	Supports introduction of a curfew. No direct comment on Discussion paper.
31/10/2013	Camp Hill QLD	Supports introduction of a **trial curfew.** Mitigation methods are not keeping pace with increased aircraft movements.
31/10/2013	Greenslopes	Supports introduction of a curfew. Claims airport is disseminating misleading information regarding impacts of noise. Balanced Approach relies on identifying the noise problem, analyzing various measures to reduce noise, and deploy the most cost effective approach. Land use planning is failing as BCC has allowed development of Seven Hills and it is a top 10 complaints registering suburb for aircraft noise.

31/10/2013	NSW	Opposes introduction of a curfew at Brisbane. Full access to Brisbane Airport is necessary to facilitate aviation's contribution to the state and national economy. Night time restrictions would impact on low cost carrier operations; causing cancellation of 10 per cent of current services, night time freight operations for Qantas, Australia Post and Australian Air Express would also be impacted.
31/10/2013	Camp Hill QLD	Supports introduction of a **trial curfew.** Have lodged noise complaints but found Airservices staff rude and unhelpful.
31/10/2013	Morningside QLD	Supports introduction of a **trial curfew.** Acknowledges significant economic contribution of the airport but is of the opinion that this needs to be balanced with the amenity of residents affected by night time aircraft noise. Electorate office has received 3,500 community complaints related to aircraft noise, which leads him to the opinion that there in increasing excessive aircraft noise. Current noise mitigation methods are inadequate.
31/10/2013	Brisbane QLD	Opposes introduction of a curfew at Brisbane. Advises that onflow effects to QLD network would result in decreased productivity especially in relation to mining fly in fly out operations.
31/10/2013	NSW	Opposes introduction of a curfew at Brisbane. Curfew-free status is a critical economic driver for QLD economy. Additional points - safety (key alternate airport), regional and inter-state connectivity, international and domestic tourism, night time freight, also facilitates international relations through its night time availability to diplomatic flights.
31/10/2013	ACT	No direct comment on Discussion paper. Comments provided relate to the validity of the land use planning information included in the Discussion Paper.
31/10/2013	Brisbane QLD	Would welcome a curfew even if it is only temporary until the new runway is operational. No direct comment on Discussion paper.
31/10/2013	Coorparoo QLD	Believes a trial curfew would be a prudent idea. No direct comment on Discussion paper.
31/10/2013	Not provided	Doesn't mind the planes so much but not at midnight.

31/10/2013	Seven Hills QLD	Experiences loud noise events at all times of the day. Cites Germany as example of positive action on effects of aircraft noise. Use of noise abatement procedures during noise sensitive times not always complied with. No direct comment on Discussion paper.
31/10/2013	Mitchelton QLD	Would like a better plan for aircraft operating at night.
31/10/2013	ACT	Opposes introduction of curfew at Brisbane. Such action would affect the QLD economy.
	Coorparoo QLD	Supports introduction of a curfew. Current noise mitigation strategies do not work. Planes taking off bother less than planes arriving on Runway 01.
	Coorparoo QLD	Supports introduction of a curfew. Current noise mitigation strategies do not work. Early morning planes, particularly Emirates are particularly disturbing.

9

From:
Sent: Tuesday, 26 June 2012 9:30 AM
To:
Cc:
Subject: FW: First Meeting of Brisbane Curfew Review - 06/07/12 [SEC=UNCLASSIFIED]

FYI

| Executive Assistant to Scott Stone
General Manager for Aviation Environment
Phone 02 6274 6039

From:
Sent: Tuesday, 26 June 2012 08:54
Subject: FW: First Meeting of Brisbane Curfew Review - 06/07/12 [SEC=UNCLASSIFIED]

Apologies,

I would also like to confirm the time of the meeting: **9.30am – 12.30am (including lunch).**

Kind Regards,

| Executive Assistant to Scott Stone
General Manager for Aviation Environment
Phone 02 6274 6039

From:
Sent: Tuesday, 26 June 2012 08:50
Subject: First Meeting of Brisbane Curfew Review - 06/07/12 [SEC=UNCLASSIFIED]

Good morning,

I recently contacted you regarding availability of members to attend the first meeting of the Steering Committee for the Brisbane Curfew Review. It is now confirmed for Friday the 6th of July 2012 and is being held in Brisbane at the Novotel Brisbane Airport, 6-8 The Circuit, Brisbane Airport QLD 4007, in the Bailey Room.

Members of the Steering Committee are as follows:

Co-chair	**Mr Andrew Wilson**	Deputy Secretary	Commonwealth D
Co-chair	**Mr Paul Martyn**	Deputy Director-General Tourism	Queensland Depa Business and the General)
Member	**Mr Kerry Doss**	Manager, City Planning, City Planning and Sustainability Division	Brisbane City Cou
Member	**Mr John Lee**	Chief Executive	Tourism and Tran
Member	**Mr Jason Harfield**	Manager, Air Traffic Control	Airservices Austra

Unfortunately Mr. Kerry Doss from Brisbane City Council is unable to make the first meeting and will be sending Ms. Vicki Pethybridge (Divisional Manager for City Planning and Sustainability) as his replacement. Mr. Jason Harfield from Airservices Australia is also unable to attend, and will be sending Mr. Geoffrey Dittmar (Manager East Coast Services North, Air Traffic Control Group) from Airservices as his replacement.

Could I please ask you to ensure that this appointment is in your respective members' diary, and also get back to me on whether they have any dietary requirements.

I will need this information by Wednesday 27th of June if possible, or at your earliest convenience.

Kind Regards,

[redacted] | Executive Assistant to Scott Stone
General Manager for Aviation Environment
Phone 02 6274 6039
Fax 02 6274 7804

Department of Infrastructure and Transport
Lvl 4 111 Alinga Street Canberra City ACT 2601 |
GPO Box 594 Canberra ACT 2601 |

[redacted]

From: Hennessey, Shannon <Shannon.Hennessey@dtesb.qld.gov.au>
Sent: Tuesday, 14 August 2012 2:56 PM
To: Stone Scott
Subject: RE: Brisbane Airport curfew review - Draft discussion paper [SEC=UNCLASSIFIED]

Hi Scott

Our comments are awaiting Premier approval - I will forward them to you once approved.

Regards
Shannon Hennessey
Executive Assistant to the Deputy Director-General
Tourism
Department of Tourism, Major Events, Small Business and the Commonwealth Games
Level 20, 111 George Street, Brisbane Qld 4000
PO Box 15168, City East Qld 4002
t: +61 7 323 54529
f: +61 7 3898 0364
e: shannon.hennessey@dtesb.qld.gov.au

From: [redacted] **On Behalf Of** Stone Scott
Sent: Wednesday, 1 August 2012 9:19 AM
To: Wilson Andrew; Martyn, Paul (DTESB); 'kerry.doss@brisbane.qld.gov.au'; 'jlee@ttf.org.au'; 'Jason.Harfield@airservices.gov.au'
Cc: Doherty John; [redacted] 'paula.gale@brisbane.qld.gov.au'; 'kmartin@ttf.org.au'; 'gail.yates@airservicesaustralia.com'; [redacted]
Subject: Brisbane Airport curfew review - Draft discussion paper [SEC=UNCLASSIFIED]

Dear members,

I refer to the upcoming first meeting of the steering committee for the Brisbane Airport curfew review, which has been rescheduled to Tuesday 28 August 2012. One of the agenda items at this meeting will be consideration of the curfew review discussion paper, which has been prepared to form the basis for public submissions to the review.

I previously sent you the first draft of the discussion paper (attached for reference), and would now like to update the paper prior to our first meeting. To that end, could you please provide your comments on the draft paper by **Tuesday 14 August**. My team will update the paper based on your feedback, and I will circulate a new draft to you no later than Tuesday 21 August.

Please do not hesitate to contact me should you have any queries.

Kind regards,

Scott Stone
General Manager

[redacted]

From: Stone Scott
Sent: Wednesday, 22 August 2012 1:58 PM
To: McMahon, Paula
Cc: [redacted]
Subject: RE: Brisbane Noise Abatement Procedure review [SEC=UNCLASSIFIED]

Paula, we are having the first steering committee meeting for the Brisbane Curfew review next Tuesday 28 August. I will be able to let you know more about expected timing Tuesday night following IMC.

Even though the first meeting was delayed, we're not expecting it to impact too much on the final report timing. We have advanced the discussion paper out of session and now hope to compress the first 2 meetings into 1. So would still be hoping for end of year delivery to the government.

Steering Committee (including Jason Harfield) will discuss Tuesday. It might be worthwhile briefing Jason on the NAP review timing before then so the Committee can have an informed discussion about it. Ideally the outcomes of the NAP review would inform the curfew review but if it can't be done we might have to have a plan B.

Scott

-----Original Message-----
From: McMahon, Paula [mailto:Paula.Mcmahon@AirservicesAustralia.com]
Sent: Wednesday, 22 August 2012 1:52 PM
To: Stone Scott
Subject: Brisbane Noise Abatement Procedure review

Hi Scott

Just wanted to check in with you re the Brisbane curfew review and our noise abatement procedure review. My understanding is that the curfew review has not progressed as per the original plan. Our NAP review is also a bit behind schedule - we had originally planned to have it done for discussion at the CACG in December (no public commitment) but this is now very tight for us. Statements re the curfew review have indicated that it would be informed by the NAP review. If our NAP review was delayed would this be a problem for you?

Regards

Paula

Paula McMahon
Manager, Environmental Services
Environment Group

Phone: 02 6268 4785
Mobile: 0407 017 463
Fax: 02 6268 5695
Email: paula.mcmahon@airservicesaustralia.com

[redacted]

To: [redacted]
Subject: FW: Brisbane Curfew Review Steering C'tee member [SEC=UNCLASSIFIED]

From: [redacted]
Sent: Tuesday, 16 July 2013 2:48 PM
To: [redacted]
Cc: [redacted] Stone Scott
Subject: RE: Brisbane Curfew Review Steering C'tee member [SEC=UNCLASSIFIED]

Thanks [redacted] – you are quick!

That would be great if you can send out a meeting invite. There are no other externals to invite. Internally, it will be Andrew, Stephen, Scott, [redacted] and myself.

Cheers,
[redacted]

[redacted]
Aircraft Noise Management Section
(02) 6274 8126

From: [redacted]
Sent: Tuesday, 16 July 2013 2:44 PM
To: [redacted]
Cc: [redacted] Stone Scott
Subject: RE: Brisbane Curfew Review Steering C'tee member [SEC=UNCLASSIFIED]

Thanks [redacted]

I have contacted all the members and we have agreed on Friday 16 August, 10am – 12pm. I have booked a meeting room at Brisbane Airport. Would you like me to send out the meeting request ? and is there anyone else I need to invite ?

Many thanks [redacted]

From: [redacted]
Sent: Monday, 15 July 2013 12:44 PM
To: [redacted]
Cc: [redacted] Stone Scott
Subject: RE: Brisbane Curfew Review Steering C'tee member [SEC=UNCLASSIFIED]

Hi [redacted]

Here are the best contact details that I have. Jessica Lean organised the last meeting and most likely has better details of direct numbers, EAs, etc, but unfortunately she is away this week. Please let me know if you need anything more.

Mr Paul Martyn	Deputy Director-General Tourism	Queensland Department of Tourism, Major Events, Small Business and the Commonwealth Games (Office of the Director-General)	07 3225 821
Mr Kerry Doss	Manager, City Planning, City Planning and Sustainability Division	Brisbane City Council	07 3403 422

Mr Ken Morrison	Chief Executive	Tourism and Transport Forum	02 9240 200 (general)
Mr Jason Harfield	Manager, Air Traffic Control	Airservices Australia	02 6268 411 (general)

[redacted]
Aircraft Noise Management Section
(02) 6274 8126

From: Stone Scott
Sent: Monday, 15 July 2013 12:21 PM
To: [redacted]
Cc: [redacted]
Subject: Brisbane Curfew Review Steering C'tee member [SEC=UNCLASSIFIED]

[redacted]
Could you please provide [redacted] with contact details for the Brisbane Curfew Review Steering committee members so she can organise the meeting for Andrew's return from leave.
Thanks

Scott

[redacted]

From: [redacted]
Sent: Friday, 9 August 2013 3:41 PM
To: Stone Scott
Subject: RE: Words for curfew review meeting cancellation [SEC=UNCLASSIFIED]

Thanks Scott, I will send out the cancellation with your words

From: Stone Scott
Sent: Friday, 9 August 2013 3:20 PM
To: [redacted]
Subject: Words for curfew review meeting cancellation [SEC=UNCLASSIFIED]

As the discussion paper for the Brisbane Airport Curfew Review is now out for public comment, Mr Wilson proposes we reconvene the Steering Committee following the federal election to discuss public submissions and next steps.