

6 SUBMISSION RESPONSES – VOLUME D

6.1 D3 – Airspace Architecture (32 of 196 submissions)

Draft EIS/MDP reference: Chapter D3 – Airspace Architecture

32 of the 196 submissions made comments relating to existing aircraft flight paths and/or future aircraft flight paths and the airspace architecture in Chapter D3 in the Draft EIS/MDP. Many of the comments and request for information have been addressed in the Draft EIS/MDP with additional information provided in the Noise and Flight Path Information Booklet and the Transparent Noise and Information Package (TNIP).

Some of the comments and suggestions regarding the flight paths relate also to current runway operations as discussed in Chapter D2, the noise assessment in Chapter D5 or future parallel runway operations discussed in Chapter D10 of the Draft EIS/MDP.

Submitter Issues:

Some of the specific comments on flight paths included:

- Concern about the flight paths over Brisbane relating to existing operations (14/32);
- Request and suggestions for a fairer sharing/distribution of aircraft movements on the flight paths (12/32), including:
 - i) the alternate use of flight paths to provide respite;
 - ii) a system for the continual flight path improvement with implementation of new navigation technology that minimises aircraft noise as soon as possible;
 - iii) spreading movements over the flight path zones with radar vectoring and less use of waypoints;
- Flight paths should be designed so aircraft fly over the bay (e.g. “90% should fly over bay now”) or use uninhabited corridors (e.g. Gateway Motorway corridor) (12/32);
- Criticism regarding the current Runway 01 ILS flight path that some large international aircraft descend too low and too quickly, then fly in a ‘dirty’ noisy configuration unnecessarily (3/32);
- Belief that an individual aircraft movement in a flight path zone will be heard across the whole zone (3/32);
- Concern that Runway 19R departure flight paths to destinations north and west (flight path zones H & I on NPR flight path figures) do not deviate away immediately from the 01L arrival flight paths like Runway 19L departures (flight path zone E on NPR flight path figures) do from the 01R arrivals flight paths and this is not consistent with the principles for the development of flight paths that “*residential areas overflowed on a departure SID track by departing aircraft should not to the extent practicable also be overflowed by arriving aircraft on an arrival STAR track*” in Chapter D3, Section 3.4.2 (3/32);
- Disbelief that weather conditions affect the choice of flight paths over Murarrie (Runway 19 departures) and the use of the 01 visual ‘River’ track (2/32);
- Eastern suburbs south of the Brisbane River will be ‘blanketed’ by aircraft, difficult to find area unaffected (2/32);
- Aircraft should fly higher on flight paths than they do (2/32);
- Why can’t flight paths be over the bay like at night? (2/32);
- Existing flight path over Cleveland and Thornlands has not been acknowledged in Draft EIS/MDP or TNIP and movements on this flight path should be decreased (2/32);
- Flight paths over Moreton Bay and ocean do not consider impacts on Stradbroke Island;

- Request that flight paths be published “well before” the opening of the NPR so that all residents are fully aware of what to expect;
- The existing flight path over the Brisbane River (Runway 01 visual arrivals) should be narrow and strictly enforced;
- Aircraft on flight path D in Flight Path and Noise Information Booklet (FPNIB) should turn later and fly higher over Manly;
- Criticism that the principle for the development of flight paths that states: “No suburb group or individual can demand or expect to be exempt from aircraft noise exposure” is an expression of arrogance and provocation on the part of BAC. It also demonstrates absolutism with respect to approval of the NPR and that aircraft noise is not taken seriously.
- Airservices Australia noted a typographical error in Section 3.6.4.

The above comments will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	3, 22, 23, 29, 45, 89, 107, 115, 118, 122, 131, 132, 133, 139, 147, 160, 151, 161, 164, 174, 175, 176, 180, 182, 187, 191, 208, 210, 220, 233, 234			201
Total	31	0	0	1

BAC Response:

6.1.1 Existing Flight Paths over Brisbane

In response to concerns about the flight paths over Brisbane relating to existing operations Chapter D2 in the Draft EIS/MDP provides useful background information on existing flight paths and operations at the airport.

The existing flight paths have been designed and are operated in accordance with the principles for the design of flight paths provided in Chapter D3, Section 3.4 (and reproduced also at the end of the Flight Path and Noise Information Booklet).

6.1.2 Fairer Sharing/Distribution of Movements on the Flight Paths

i) Alternate flight paths to provide respite

How flight paths will be used is described in detail in the Draft Parallel Runway Operating Plan [PROP] for aircraft noise management in Chapter D10. There are provisions in the Draft PROP to only use certain flight paths at certain times to provide respite.

The NPR will provide a greater opportunity for noise sharing than currently possible. The availability of two main parallel runways allows aircraft movements to be spread across the two runways and allows a greater use of over-bay flight paths, particularly at the more noise sensitive times such as at night and the late evening and early morning when movement numbers are low and weather permits. Some over-bay movements will also be possible during the day when traffic volumes are low and weather permits.

ii) Implementation of new navigation technology

Further opportunity for spreading traffic on flight paths may be available in the future with improved navigation technology such as Required Navigation Performance (RNP) as discussed in Chapter D5, Section 5.10. RNP trials commenced at Brisbane Airport in December 2006. The implementation of new technologies in standard arrival procedures is subject to review and approval by the airlines and air traffic control authorities.

iii) Radar vectoring¹ over the flight path zones

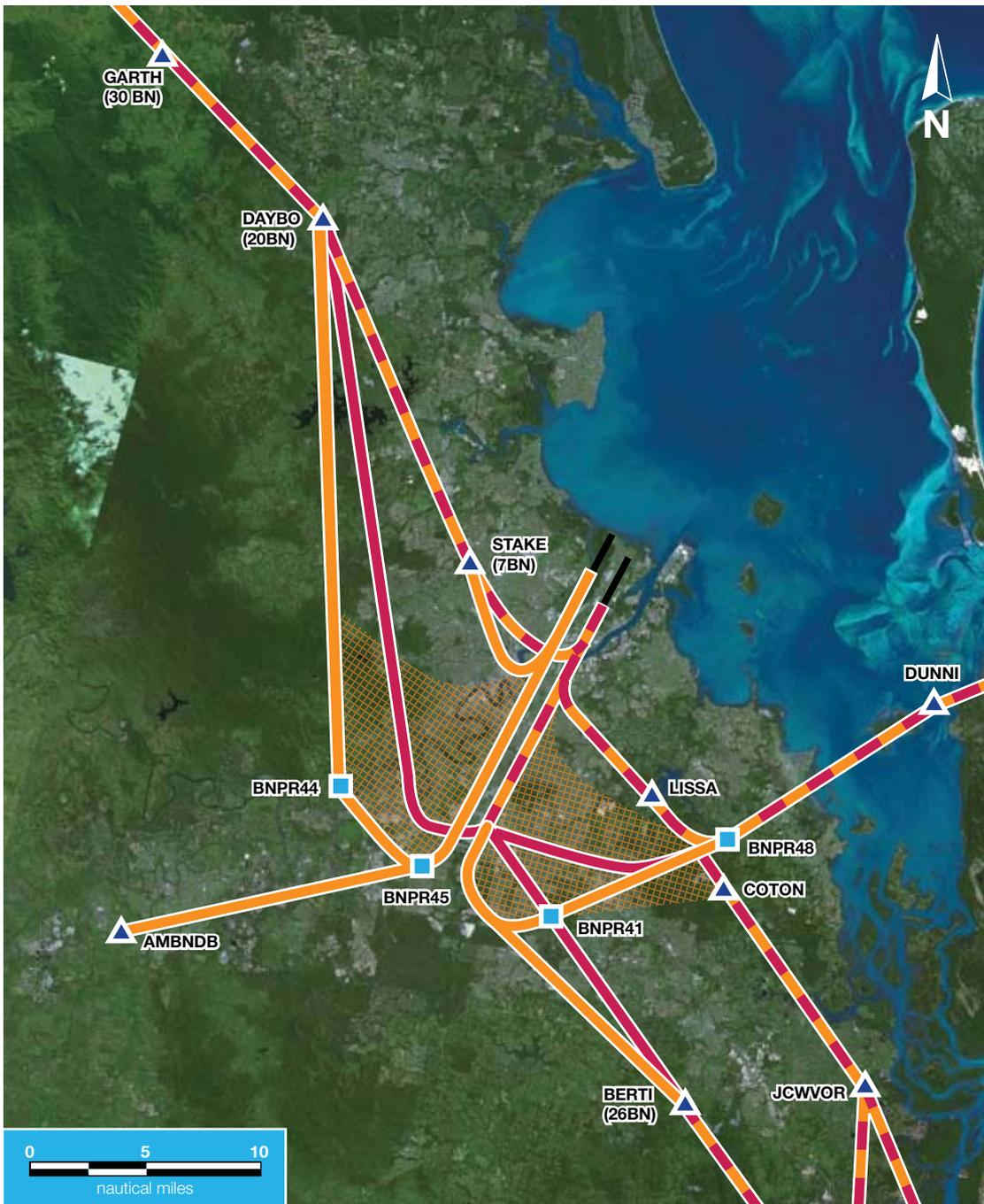
The NPR will provide greater opportunity for noise sharing than is currently available with the radar vectoring of aircraft into the Chevron airspace (discussed in Chapter D3) for the arrivals on Runways 01L&R and departures off Runways 19L&R over Brisbane.

The radar vectoring of aircraft in the future flight path design is shown in Figures 3.6a to 3.6g in Chapter D3. Figure 3.6d is reproduced below as an example. The orange cross hashed area represents the area in which aircraft will be vectored.

The proposed NPR flight path zones are also shown in the figures of the existing runway system flight path zones and the NPR system flight path zones in the noise assessment in Chapter D5 and the Flight Path and Noise Information Booklet and reproduced in Section 6.13.1 of the Supplementary report in response to Chapter D10. The spreading of aircraft movements is demonstrated by the shaded flight path zones in these figures.

1. Vectoring means that air traffic control can direct aircraft to turn and join its final landing alignment at any point within the orange cross hatched area resulting in different aircraft being spread across a wide range of area

Figure 3.6d Current and proposed (Option 2A) STARs on Runway 01R and 01L



Current & Proposed Arrivals – Runway 01R & 01L – Option 2A

- | | | |
|---|---|---|
|  Current arrival track | Proposed Waypoint - BNPR41 |  |
|  Proposed arrival track | Current Waypoint - STAKE |  |
|  Combined proposed & current arrival track | Aircraft radar vectored downwind to Final |  |

6.1.3 Flight Paths Over the Bay* or Uninhabited Corridors

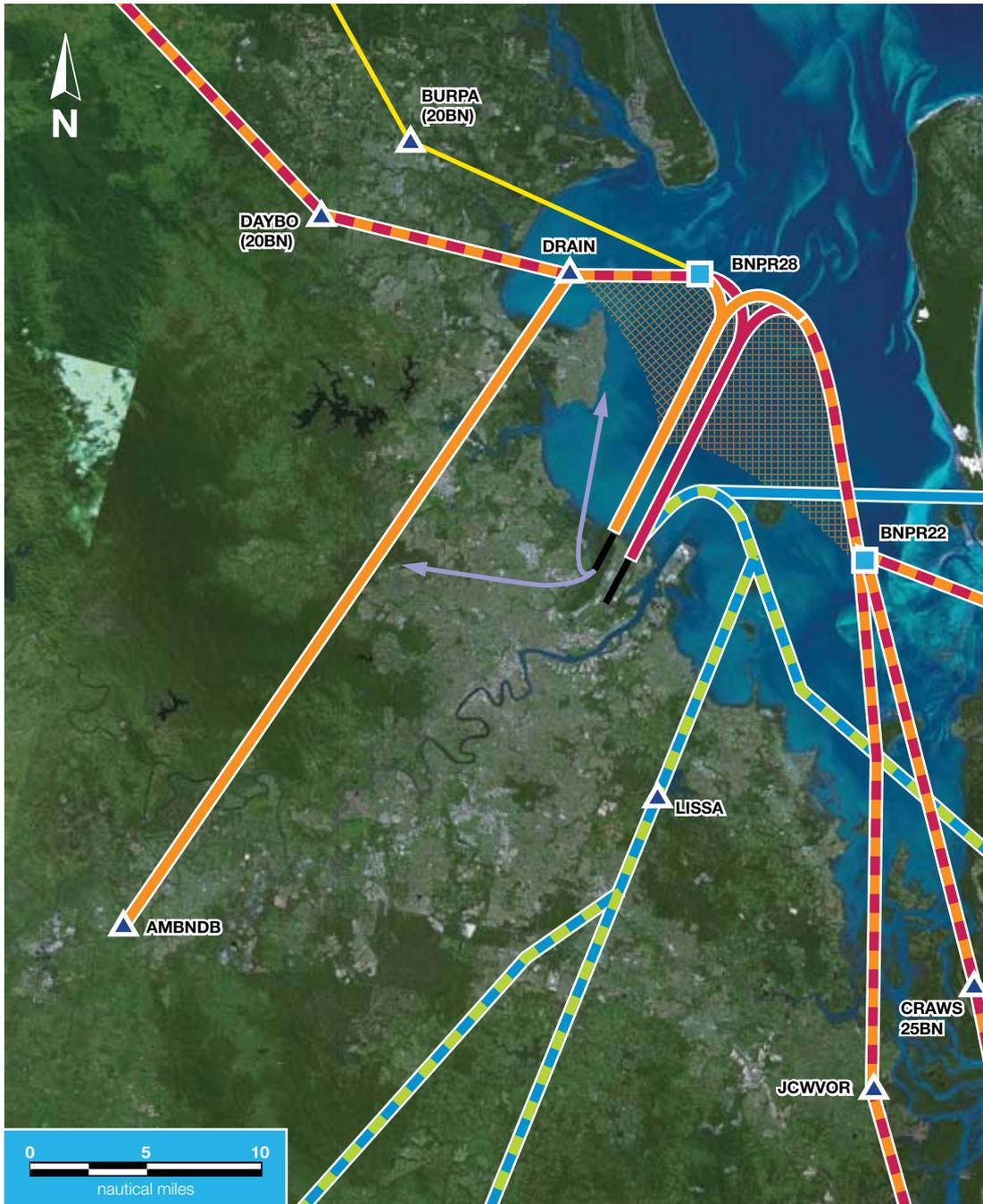
Several submissions commented that flight paths should be designed so most aircraft fly over the bay all the time or use uninhabited corridors such as the Gateway Motorway corridor.

The Draft Parallel Runway Operating Plan has been designed to maximise the number of flights over Moreton Bay. Most movements at night will be over the bay, however, due to weather conditions and traffic volumes, over-bay operations are only available for a small percent of the time during the day and early evening periods. The flight paths for over-bay operations were provided in Figure 3.6g in Chapter D3, which is reproduced below.

The operating requirements for the over-bay modes (SODPROPS, DODPROPS and existing Reciprocal Operations) are discussed in detail in Chapter D10, Section 10.3. Useful background information to assist understanding Airport operations and modes has also been provided in Chapter D2.

* “Over the Bay” flights refers to the initial stages of take-off and final stages of flight for landing.

Figure 3.6g: Over-bay flight paths



SODPROPS/DODPROPS + Non-jet departures Runway 19R

- | | |
|---|---|
|  Current arrival track |  Current departure track |
|  Proposed arrival track |  Proposed departure track |
|  Combined proposed & current arrival track |  Combined proposed & current departure track |
|  Non-jet arrival track (indicative only) |  Non-jet departure track (indicative only) |
|  Proposed Waypoint - BNPR22 |  Aircraft radar vectored downwind to Final |
|  Current Waypoint - POODL | |

The forecast percentages of over-bay operations for the different modes and periods were presented in Draft EIS/MDP Chapter D5 in Table 5.2j & 5.2k and have been reproduced in Section 6.13 of the Supplementary report in response to Chapter D10. Currently at night up to 90% of aircraft movements during winter are over the bay and about 80% during summer and this is expected to be the same or improve with the NPR.

Flight paths over uninhabited corridors (or non residential areas) are always preferred and sought where over land flight paths are required, as discussed in Chapter D3, Section 3.4. For example, the existing 19 departure flight path does follow the existing Gateway Motorway corridor to some extent. However, long corridors of uninhabited or non-residential land are not available in Brisbane for the whole extent of either the existing and future arrival or departure flight paths and therefore some element of flight over residential areas is inevitable.

6.1.4 International Aircraft on Runway 01 ILS Flight Path

There were several submissions that criticised the current activities on Runway 01 instrument approach (ILS) flight path, where some large international aircraft descend too low and too quickly, then fly in a noisy configuration unnecessarily

This observation has been made by several members of the community under this flight path and relates to existing 01 ILS international arrivals and is not related to the NPR project directly. However, it has been raised in the submissions in the context that it questions the credibility of the existing flight path operations with respect to best outcomes for noise mitigation and therefore, the Draft EIS/MDP does not accurately reflect what is currently happening at the airport and what has been forecast with the NPR.

BAC has confirmed through preliminary discussions with some aviation industry stakeholders these observations to be true and this issue has been investigated by the former Brisbane Airport Environment Committee. The outcome of the investigation was that some international airlines have different standard operating procedures and that relevant aviation authorities have made requests for improved cooperation from the airlines involved to educate pilots and encourage the use of a more continual descent approach.

6.1.5 Individual Aircraft Movements Impact in Flight Path Zone

A few submissions suggested that an individual aircraft movement in a flight path zone will be heard across the whole zone, that is, residences under the existing flight paths will also hear aircraft on the NPR flight paths or visa versa. Other comments also suggested that each aircraft flyover will be heard across the whole flight path zone.

The flight path zones do not represent the extent of the noise footprint for a single aircraft movement but represents the area in which the aircraft arriving and departing will fly. The actual extent of the noise footprint of each aircraft will depend on the type of aircraft, the type of operation and the prevailing weather. Examples of noise footprints are shown in the single event contours presented in Chapter D5 and single event contours for each aircraft can also be determined using the TNIP software.

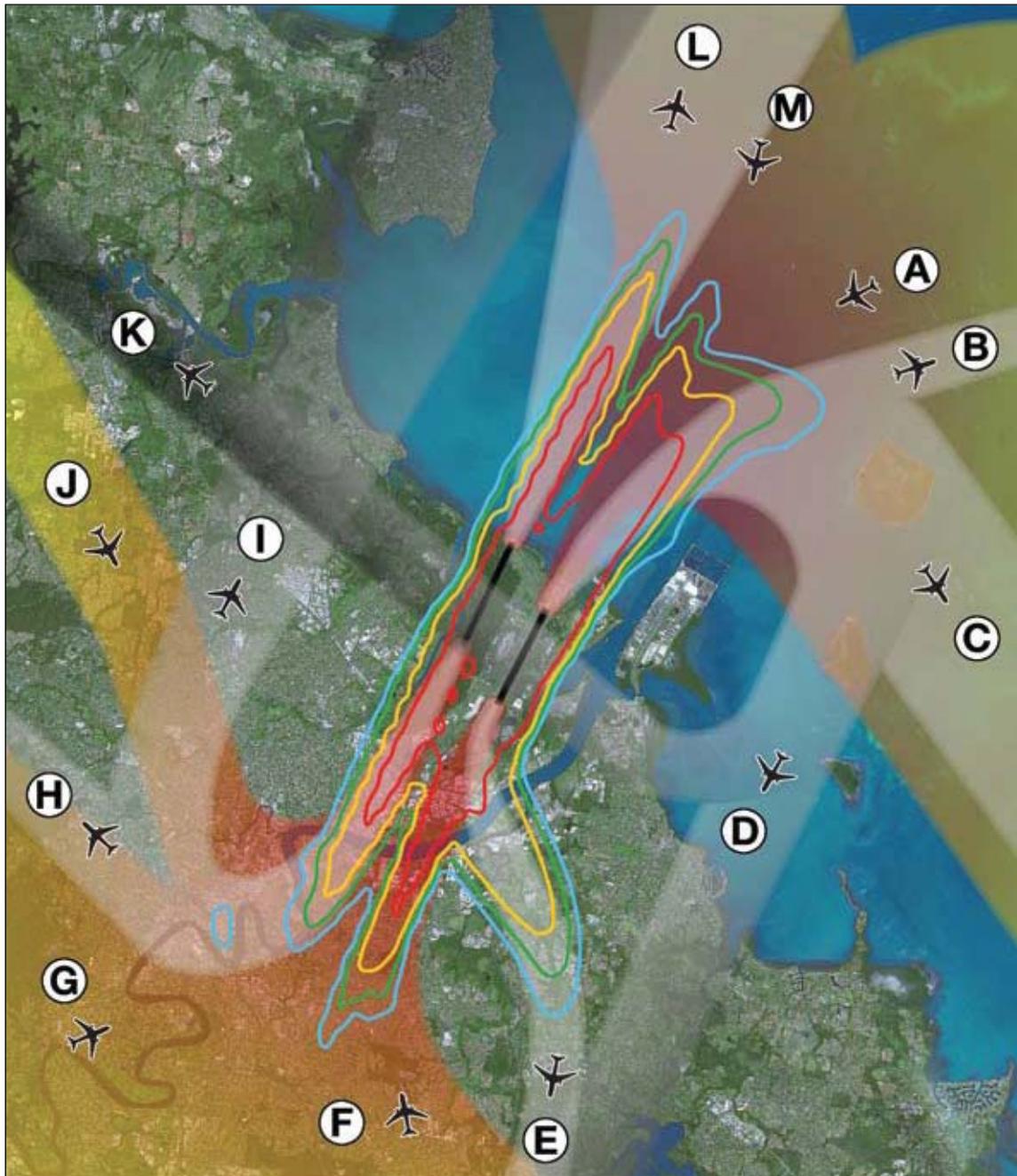
6.1.6 Coincident Departing 19R and Arriving 01L Flight Paths

A few submissions specifically noted that 19R departure flight paths to destinations north and west (flight path zones H & I on NPR flight path figures) do not deviate away immediately from the 01L arrival flight path like 19L departures (flight path zone E on NPR flight path figures) do from the 01R arrival flight path. Therefore, this is not consistent with the principles for the development of flight paths that “residential areas overflowed on a departure SID track by departing aircraft should not to the extent practicable also be overflowed by arriving aircraft on an arrival STAR track” as stated in Chapter D3, Section 3.4.2.

In response, the flight paths have been designed in accordance with the principles for the design of flight paths provided in Chapter D3, Section 3.4. In designing flight paths, safety is always paramount and individual flight paths must be designed in respect of all the design principles giving regard to the total airspace requirements and potential conflicts with other flight paths.

There are times that some of the principles are unable to be satisfied or conflict with each other. With respect to the flight paths H & I for the NPR, these flight paths turn where they do in order to ensure there is adequate vertical separation between the departing aircraft (on flight path I) with arriving aircraft on flight path M (see the following attached figure showing NPR flight zones). So in this instant, for safety reasons, it is not practicable for the departing aircraft to commence a turn earlier and some coincidence with the arrival flight path is unavoidable.

Figure 5.3e: 2015 NPR Flight Path Movement Chart



Flight path	Flight path type	Average number of jet flights on flight path	Expected minimum and maximum numbers of jet flights on path	Percentage of Brisbane Airport's total jet flights on path	Percentage of days with no jet flights on path
A	Arrival	57	0 - 135	15%	22%
B	Departure	11	0 - 22	3%	7%
C	Departure	7	0 - 13	2%	9%
D	Departure	64	0 - 110	17%	7%
E	Departure	53	0 - 125	14%	22%
F	Arrival	62	0 - 126	17%	23%
G	Arrival	7	0 - 69	2%	23%
H	Departure	7	0 - 17	2%	23%
I	Departure	18	0 - 46	5%	23%
J	Arrival	22	0 - 53	6%	27%
K	Departure	5	0 - 10	1%	8%
L	Departure	22	0 - 42	6%	23%
M	Arrival	35	0 - 92	9%	17%

Altitude Key

Arrivals
Mean Altitude
4,500 ft
0 ft

Departures
Mean Altitude
12,000 ft
0 ft

Contour Key
The number of overflights of 70dB(A) and above during the indicated time period

- 5 to 9 overflights
- 10 to 19 overflights
- 20 to 49 overflights
- 50 or more overflights

However, there will be some spreading of individual flight paths for the departing aircraft on H & I for the NPR as there is for the existing departures as shown in Figure 2.3c in the Chapter D2 in the Draft EIS/MDP.

Figure 2.3c: Runway 19 Jet Departures



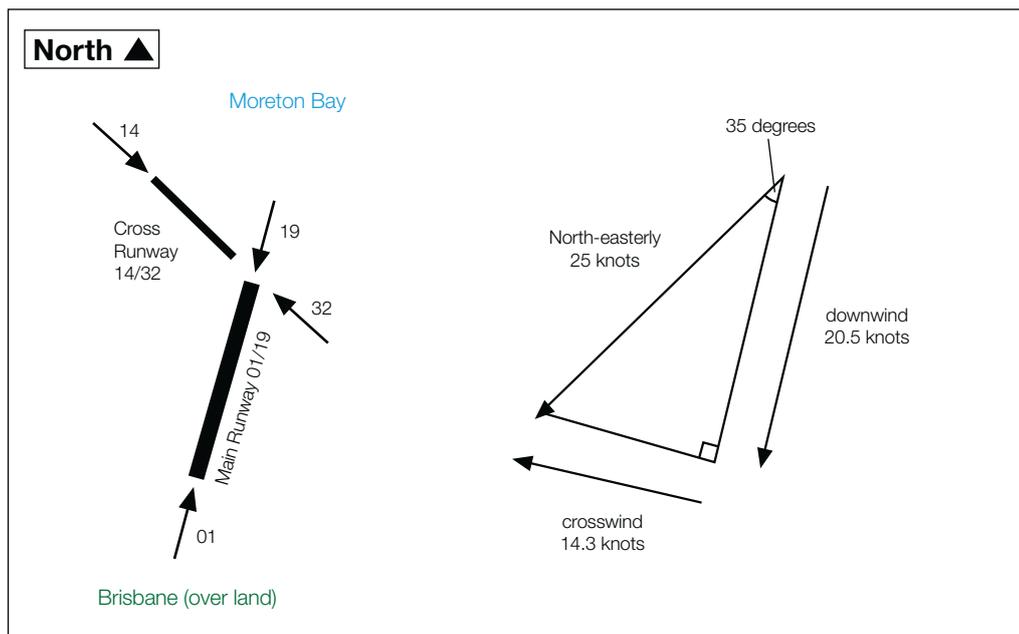
6.1.7 Weather Conditions Don't Affect Flight Path Choice

Two submissions did not believe that weather conditions really affect the choice of flight paths over Murarrie (Runway 19 departures) and the use of the 01 visual 'River' track because of personal observations.

Wind directions, wind speeds, cloud cover, rainfall and visibility at the Airport determine what the preferred runway and flight paths will be at any time. This is explained in detail in the background information in Chapter D2 in the Draft EIS/MDP. It is also important to note that the wind at the airport is most commonly described in its crosswind and downwind component. Figure 2.2b from the Draft EIS/MDP is reproduced below for information.

The crosswind is the vector component of wind that blows perpendicular to the runway and the downwind component is the vector component of wind that blows in line with the runway. This is important, as it is the downwind component that determines which runway is used. If the downwind is less than 5 knots, then ATC can choose either runway. Runway 01 is currently the preferred default on the basis that arriving aircraft are typically less noisy than departing aircraft, however, the choice will depend on air traffic conditions at the time as switching runways requires a rearrangement of impending arrivals. For example, if the airport is operating with Runway 19 and downwind drops below 5 knots, ATC will elect to stay with Runway 19 rather than switch to Runway 01, especially at busy times, in order to maintain operating efficiency or if the winds are forecast to pick up again.

Figure 2.2.b: Crosswind and Downwind on Runway 01/19 for a 25 Knot North-Easterly



It is important to note also that the wind speed and/or direction can vary across Brisbane compared with the Airport, such that there are times where winds may appear calm to light at a suburb in Brisbane away from the coast, but at the airport, the winds can be quite strong and even from a different direction. This can often be the case in summer with the localised coastal effects of a sea-breeze.

6.1.8 Eastern Suburbs South Of River Will Be ‘Blanketed’ By Aircraft

This comment is an observation of the potential spreading (or vectoring) of flight paths across the flight path zones (a mitigation option requested by other submissions discussed previously). This means that it is possible that any residence in these zones may experience an aircraft fly over at some time, but the aircraft movements across the zone are shared. The number of aircraft overflights experienced by a residence typically decreases the further from the airport a residence is.

The development of the flight path zones is explained in detail at the beginning of the Flight Path and Noise Information Booklet. The modelling of flight paths is explained in Chapter D4, Section 4.5.

6.1.9 Aircraft Should Fly Higher On Flight Paths Than They Do

The arrival and departure procedures are described in Chapter D2, Section 2.6 in the Draft EIS/MDP. The height of departing aircraft at a given time is determined by a number of factors including the performance characteristics of the aircraft, the destination and load of the aircraft, the strength of the prevailing wind, air temperature and humidity. For example a half laden Boeing 737-800 travelling to Sydney will climb quicker than a fully laden 737-800 travelling to Sydney and even quicker again than a fully laden 737-800 travelling to Perth.

Arriving aircraft typically have a descent glide slope of 3 degrees to the horizontal, irrespective of the aircraft type. It may be possible that this glide slope could be increased slightly in the future with new navigation technology such as Required Navigation Performance (RNP) and Constant Descent Approaches (CDA), which are described in Chapter D5, Section 5.10.

6.1.10 Why Can't All Flight Paths Be Over The Bay Like At Night?

The operating requirements for the over-bay flight paths are discussed in detail in Chapter D10, Section 10.3. Useful background information to assist understanding Airport operations, flight paths and modes has also been provided in Chapter D2.

The limiting factors for the over-bay modes during the day are the number of aircraft movements in a given hour and the strength of the prevailing tailwind. Additional information is provided in the response to Chapter D10.

6.1.11 Existing Flight Paths over Cleveland and Thornlands

Two submissions claimed existing flight paths over Cleveland and Thornlands have not been acknowledged in the Draft EIS/MDP or in TNIP and that movements on this flight path should be decreased.

The existing and future flight paths in the Cleveland area are arrival (STAR) flight paths and are shown in the Draft EIS/MDP in Chapter D3 in Figures 3.6c, d & e (Figure 3.6.d is reproduced earlier in this Section), as well as in the TNIP model.

The predicted noise level for the majority of arriving aircraft is typically less than 60 dBA over Cleveland. The exception is large aircraft such as the 747-400, which have modelled noise levels of between 60 dBA and 70 dBA over Cleveland and Thornlands.

The spread of flight paths on the STAR over the Cleveland area is also shown on Figure 1 reproduced from the Noise and Flight Path Monitoring System (NFPMS) last quarter report for 2006 (produced by Airservices Australia) showing the flight tracks for a week in December.

There may be a possibility for greater spread of aircraft over the Cleveland area with new navigation technology such as Required Navigation Performance (RNP) in the future, which is described in Chapter D5, Section 5.10. However, there are currently no plans to alter the existing STAR flight path.

6.1.12 Flight Paths over Stradbroke Island Not Shown

The flight paths over Stradbroke Island have not been shown in the TNIP model or the Draft EIS/MDP or in the Noise and Flight Path Monitoring System (NFPMS) quarterly reports produced by Airservices Australia as it is beyond the extent of the study area considered to be impacted by aircraft noise. An example figure from the NFPMS last quarter report for 2006 showing the flight tracks for a week in December is reproduced in Figure 1 below

Aircraft that fly over Stradbroke Island are on the same standard arrival route (STAR) flight path that passes over Cleveland as discussed in the previous point and shown in Figure 1 below. The STAR passes between the townships of Dunwich or Point Lookout and the occasional aircraft may fly directly over these townships. However, the predicted noise level for the majority of arriving aircraft is typically less than 55 dBA when over Stradbroke Island, with the exception of the large aircraft (eg: 747-400), which are between 55 dBA and 60 dBA.

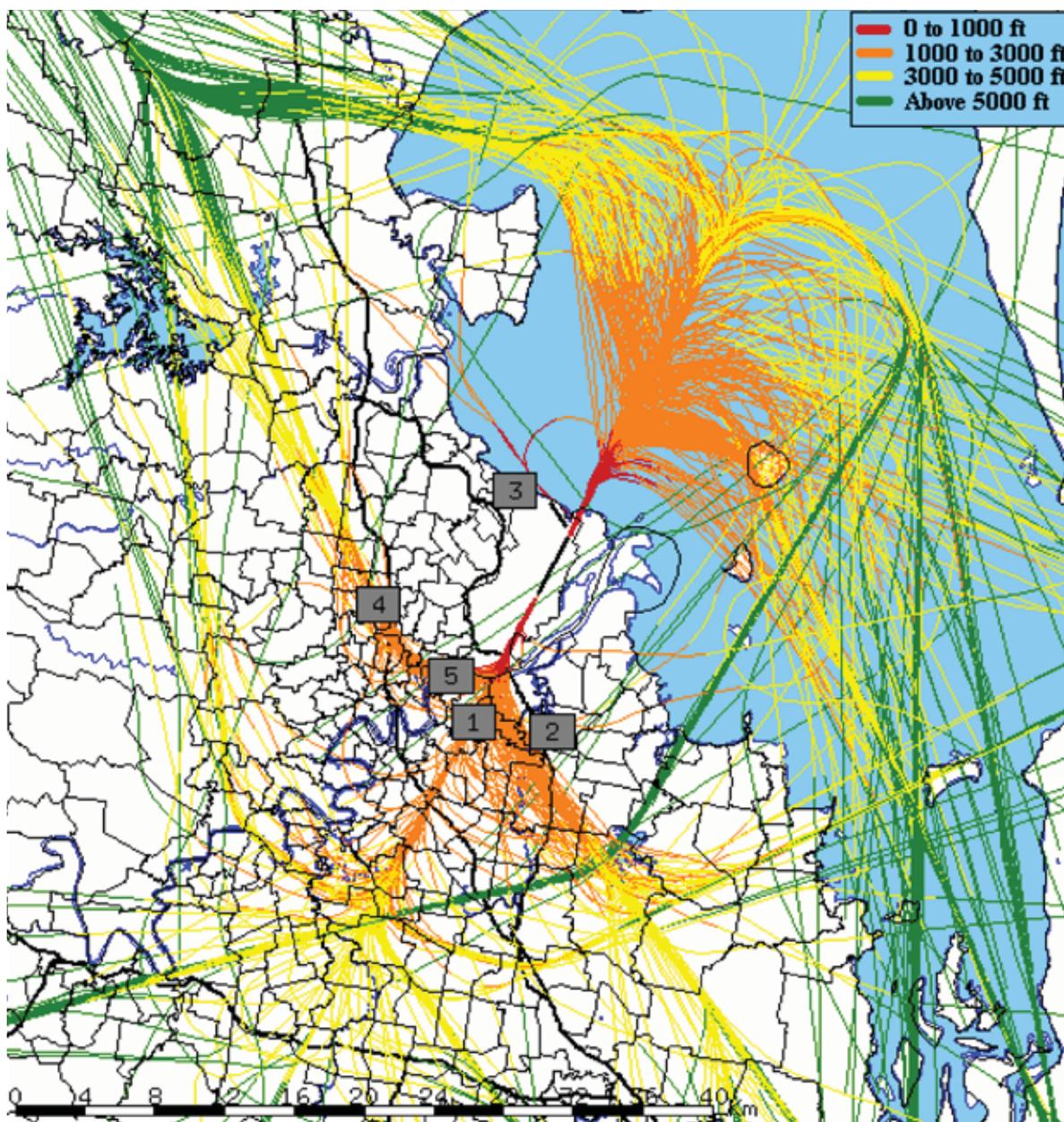


Figure 1: Track Plot: coloured by height for jet arrivals for the period 2/12/2006 to 8/12/2006

6.1.13 Flight Paths to be Published “Well Before” Opening of NPR

There was a submission requesting that flight paths be published “well before” the opening of the NPR so that all residents are fully aware of what to expect.

In response, the proposed NPR flight paths have already been published and presented in the Draft EIS/MDP in Chapter D3 and an assessment of the aircraft noise exposure of the flight paths in Chapter D5. As indicated in the Draft EIS/MDP, final approval of these flight paths will be sought closer to the opening of the NPR and will be made available to the public again at this time.

6.1.14 Existing Runway 01 Visual “River Track” STAR

One submission requested that the existing Runway 01 visual “River Track” standard arrival route (STAR) flight path should be narrow and strictly enforced. In response, this comment relates to existing movements on the 01 visual STAR. Aircraft do fly the STAR as close as possible but aircraft do on occasion drift north or south of the STAR as explained in Chapter D2.

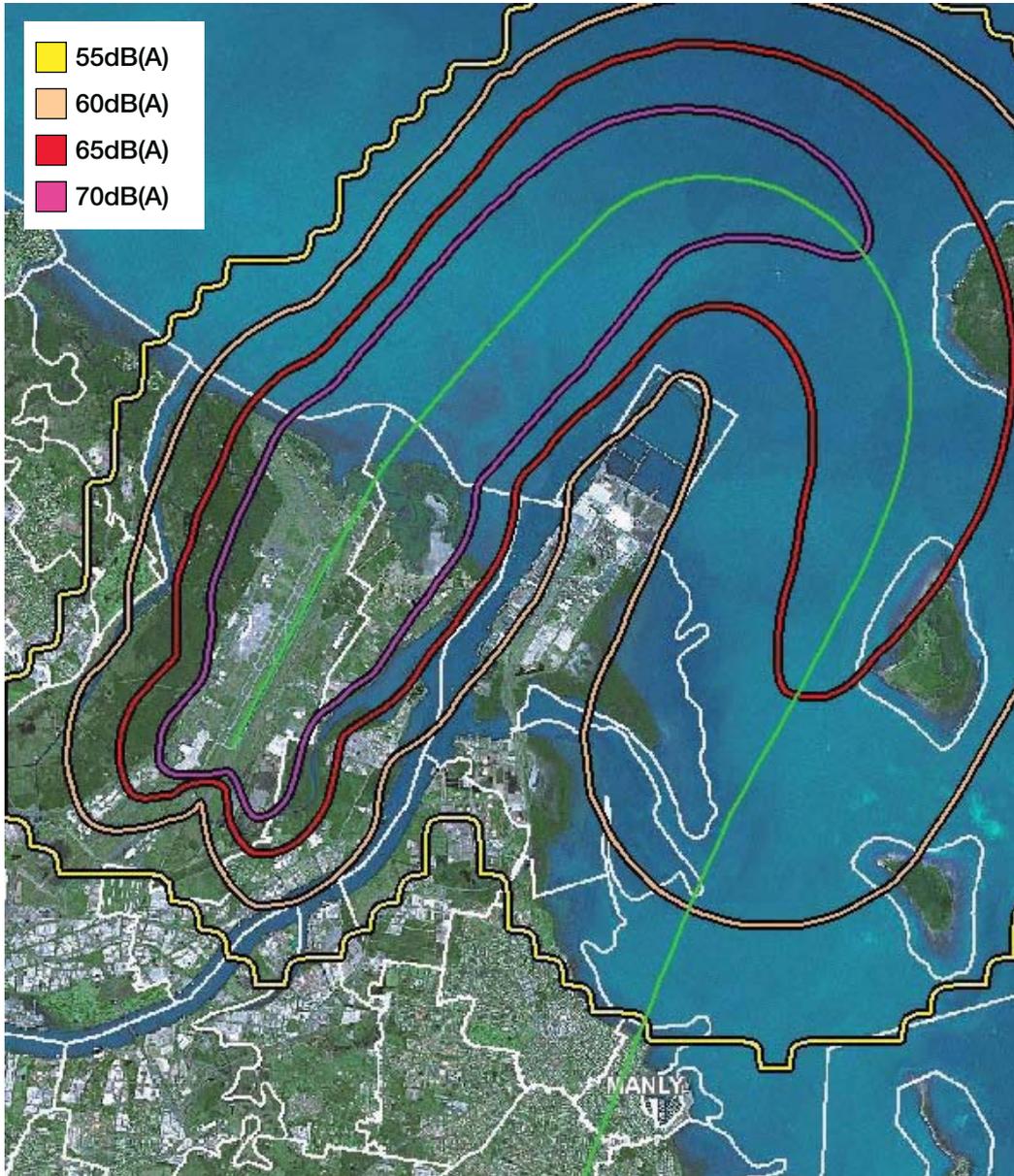
However, this STAR will move further south with arrivals on the NPR as shown in Figure 3.6d in Chapter D3 and reproduced earlier in this Section.

6.1.15 Flight Path D Over Manly

One submission requested aircraft on flight path D in Flight Path and Noise Information Booklet should turn later so that they fly higher over Manly.

In response, aircraft that depart on Runway 01 on Flight path D will have reached an altitude of more than 5000 feet by the time they cross the coast at Manly with a noise level less than 55 dBA. As an example, a single event noise contour from TNIP for a Boeing 747-400 departure (one of the largest and noisiest aircraft to use this flight path) is shown in Figure 2.

Figure 2: A 747-400 departure on flight path D in FPNIB



6.1.16 Criticism of Principles for the Development of Flight Paths

One submission was critical that the principle for the development of flight paths that states: “No suburb group or individual can demand or expect to be exempt from aircraft noise exposure” is an expression of arrogance and provocation on the part of BAC as well as demonstrating ‘absolutism’ with respect to approval of the NPR and that aircraft noise is not taken seriously.

The statement that “No suburb, group or individual can demand or expect to be exempt from aircraft noise exposure” is from the document “Environmental Principles and Procedures for Minimising Impact of Aircraft Noise” developed by Airservices Australia (1997). It is one of a suite of principles and its intent is to indicate openly and honestly that some aircraft noise may be unavoidable and when this is the case, no one should expect preferential treatment.

It is not intended to be arrogant or provocative and nor does it mean that aircraft noise is not taken seriously. In fact, BAC believes that all efforts and steps have been made in determining the best overall outcome with respect to the mitigation of aircraft noise at Brisbane Airport.

6.1.17 Airservices Australia Comment

BAC notes Airservices Australia correction in Chapter D3, Section 3.6.4 on page 49 (last dot point in Point 2) that the second sentence should read:

*“Areas below the initial departure track and during the initial turn are **not** currently overflowed by jet aircraft departures.”*

Addition/Omission to Draft EIS/MDP:

No other changes are proposed to Chapter D3 of the Draft EIS/MDP except the minor correction listed in 6.1.16 above.

6.2 D4 - Noise Assessment Methodology *(20 of 196 submissions)*

Draft EIS/MDP reference: Chapter D4.

20 of the 196 submissions raised concerns about the aircraft noise modelling methodology. In order to provide the community with as clear a picture as possible of the potential exposure to aircraft noise, modelling methodology was outlined in Chapter D4 of the Draft EIS/MDP.

Submitter Issues:

Comments from submissions regarding aircraft noise modelling methodology are as follows:

- The aircraft noise assessment methodology was generally inadequate or inappropriate (18/20);
- The fleet type, size and number of aircraft, as well as the forecast noise improvements through technology in new aircraft, used in the noise modelling was inadequate or contradictory (3/20);
- Airservices Australia noted the approach file for a Boeing 777-200 aircraft profile in the Integrated Noise Model (INM) model - Version 6.1 was wrong (the version used in the Draft EIS/MDP assessment) (1/20).

The above comments will be addressed in separate sections below.

Raised by:

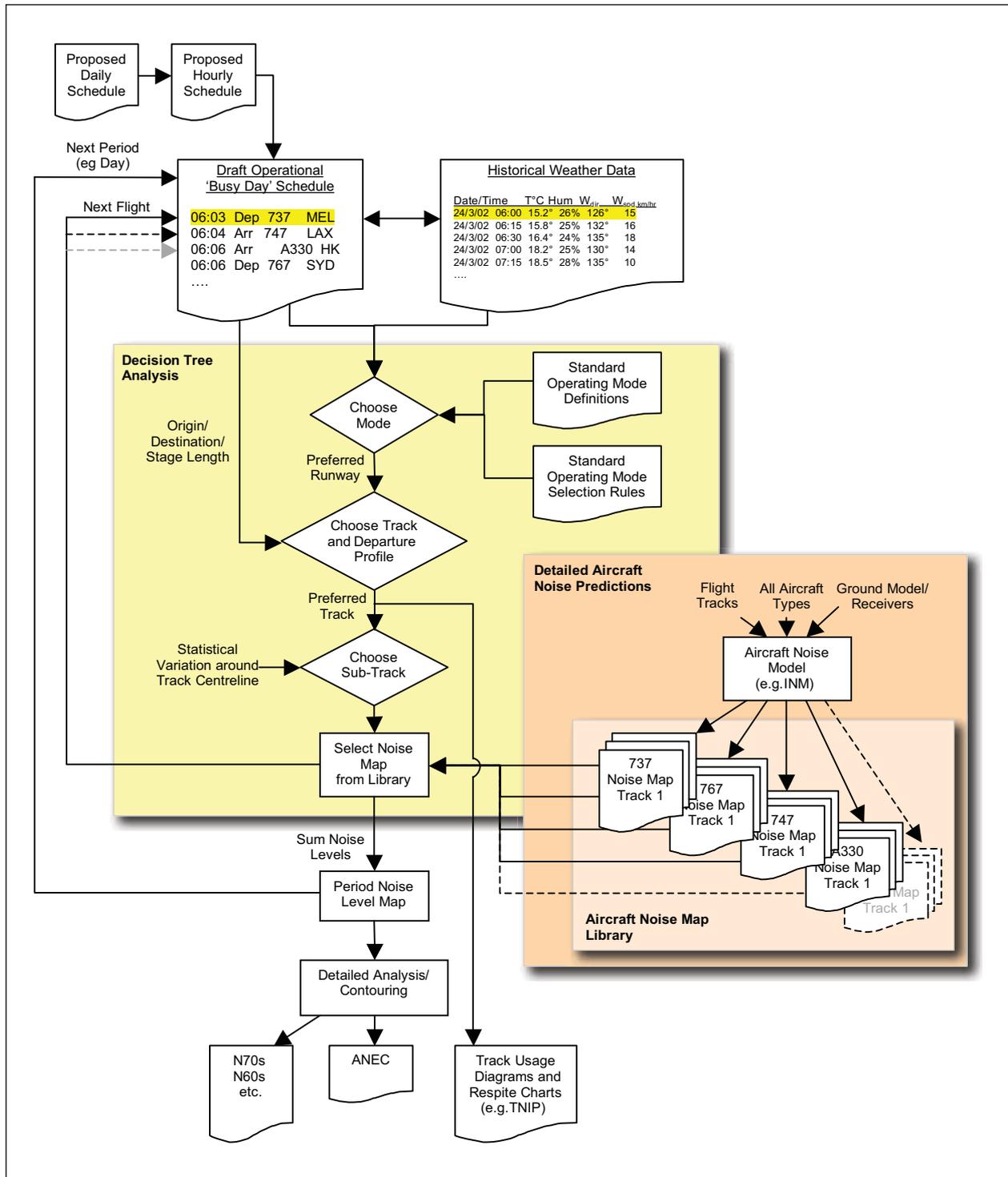
	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	4, 101, 117, 118, 134, 135, 136, 145, 160, 187, 211, 239	153, 203	113, 159	114, 137, 141, 201
Total	12	2	2	4

BAC response:

6.2.1 Aircraft Noise Assessment Methodology

The Draft EIS/MDP responded to a set of comprehensive Guidelines issued by the then Department of Environment and Heritage which had input from relevant Australian Government departments including the Department of Transport and Regional Services, Queensland Government agencies and the general public. BAC believes it has exceeded the Draft EIS/MDP requirements and has provided the right balance of information and furthermore the level of detail provided in the NPR aircraft noise assessment can be held up as a benchmark for future runway projects at other airports.

The assessment was based on a complex noise modelling exercise. The process is shown in diagrammatic form in the Draft EIS/MDP Volume D **Figure 4.1** which has been reproduced below.



In summary the inputs to the modelling included the following:

- Airport operating schedules, including the numbers, times, origin or destination of aircraft operations, and the aircraft types that would be operating in a future year - 2015 and 2035;
- The selection of the operating mode which takes account of weather and air traffic management rules;
- Aircraft flight paths, including the track (and the spread of the track) followed on the ground and the height of the aircraft at various points; and
- Noise levels produced by the various aircraft types performing arrival and departure operations.

Information regarding these inputs are clearly outlined in Chapter D4 pages 61-79 and Chapter A2 pages 46-70. In addition to this, the Transparent Noise Information Package (TNIP) provides a list of the raw data that underpins each individual noise contour enabling interrogation to a fine level of detail down to as far as tracking individual aircraft types on individual flight paths.

6.2.2 Fleet Composition

Some submissions argued that the fleet type, size and number of aircraft, as well as the forecast noise improvements through technology in new aircraft, used in the noise modelling was inadequate or contradictory.

The number, size and type of aircraft used in the noise modelling were determined from the TFI (Tourism Futures International) forecast data and information provided by the airlines with respect to their current and future fleets and is explained in the Draft EIS/MDP Chapter D4.2. Where it was certain that new aircraft were going to be acquired in the future, such as the Airbus A380 and Boeing 787 for Qantas, these aircraft were considered in the future fleet mix in the 2015 and 2035 operation scenarios, instead of the aircraft they are replacing.

There was criticism also that there was contradiction with respect to the statement in the Draft EIS/MDP that: *“the use of these new aircraft, which are expected to deliver positive benefits to the community, has been taken into account in the modelling”* and the statement in Fact Sheet 17: *“Because of this uncertainty all noise modelling for the new parallel runway has been undertaken using today’s aircraft. Therefore all noise information provided to the community is based on a worse case scenario.”*

While these statements may at first appear contradictory, both these statements are in fact correct. The reason for the apparent confusion is that while the new aircraft such as the A380 and B787 have been taken into account, exact noise data for these new aircraft were not certified and therefore not prudent for use in the modelling. Therefore, in order to model these new aircraft, noise data for the most modern aircraft that are operating today that have a noise profile similar, but still noisier than expected from the new aircraft, were used in modelling, instead of the older noisier aircraft that they are replacing.

For example, a Boeing 777-200 was used to model the new Boeing 787, which is replacing the Boeing 767-300 at Qantas. The comparative noise profiles for these aircraft are presented in Volume D, Figure 5.10f and 5.10g in the Draft EIS/ MDP. It can be seen from these figures that the B787 is still expected to perform considerably better than the B777-200 and this is why the data is considered conservative.

6.2.3 Noise Model Discrepancy

Airservices Australia noted in its submission the approach file for a Boeing 777-200 aircraft profile in the Integrated Noise Model (INM) - Version 6.1 (version used in the assessment) has an error.

In response, BAC identified the error in the 777-200 data in the INM model during the preparation of the Draft EIS/MDP. This error was corrected and the noise modelling assessment was undertaken with the corrected profile.

Addition/Omission to Draft EIS/MDP:

In light of the comments above no changes are proposed to the Draft EIS/MDP with respect to the Aircraft Noise Assessment Methodology as detailed in Chapter D4 or the modelling undertaken in the noise assessment.

6.3 D5 - Aircraft Noise Assessment (116 of 196 submissions)

Draft EIS/MDP reference: Chapter D5

116 of the 196 submissions voice concerns about various aspects of the noise assessment. These concerns relate to either current impacts of existing aircraft noise or the potential impacts of aircraft noise with the NPR or both.

Most of these submissions also had specific concerns and questions on related issues which are addressed in separate sections of this report. These include:

- Airspace architecture and flight paths (Draft EIS/MDP Chapter D3) – refer to Section 6.1;
- Aircraft noise assessment methodology (Draft EIS/MDP Chapter D4) – refer to Section 6.2;
- Health issues encompassing noise, sleep and air quality (Draft EIS/MDP Chapter D7) refer to Sections 6.6 - 6.8;
- Social issues including lifestyle and amenity, schools and other public facilities (Draft EIS/MDP Chapter D9) refer to Sections 6.10 - 6.11;
- Draft Parallel Runway Operating Plan or noise management plan (Draft EIS/MDP Chapter D10) – refer to Section 6.13;
- A night-time curfew (Draft EIS/MDP Chapter D10) – refer to Section 6.12; and
- Lateral noise effects connected with runway separation (Draft EIS/MDP Chapter A3) refer to Section 3.8.

Submitter Issues:

Submitters raised the following concerns regarding noise assessment and the issues can be grouped as follows –

General Noise Concerns

- Noise from the existing runway (55 of 116);
- Noise from new runway (37 of 116);
- Lateral noise to the west of the new runway including reverse thrust issues (24 of 116);

Use of N70 contour

- Reliance on N70 noise metric (18 of 116);
- The N70 noise metric was insufficient to show what was happening above or below the 70 decibel level (8/116);
- Other noise metrics should have been provided such as the N60s, N65s, N75s and N80s (6/116);
- The N70 metric was based on the 1994 superseded version Australian Standard AS2021: *Aircraft Noise Intrusion – Building Site Construction*. (5/116);
- The N70 overestimates the noise insulation of Brisbane dwellings. The adoption of the N70 metric is based on the assumption that there is a 10 dBA reduction in noise from outside to inside a dwelling (4/116);
- N55 (or N60) and N60 (or N65) noise contours are needed to identify the areas that will exceed the AS2021-2000 criteria for bedrooms at night and living spaces in the evening respectively (4/116);
- The N70 contours only show the average for each time scenario and not the worse days (3/116);
- N70 under-represents the broader impact of aircraft noise(1/116);
- Department of Transport and Regional Services (DOTARS) should not have set such “subjective” noise metrics (1/116);

Other noise related issues

- The noise metrics were not acceptable according to State noise policy guidelines (2/116);
- Noise maps and diagrams did not show suburbs/streets in relation to flight paths or did not have a scale (2/116);
- The TNIP software was difficult to understand and use, and on-line tutorials were hard to download and difficult to follow (2/116);
- Aircraft taking off and landing will cause noise-induced vibration;
- Airservices Australia noted two errors in Chapter D5.10 in the Draft EIS/MDP in relation to the RNP operations.

The above comments will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	3, 4, 11, 13, 15, 17, 19, 22, 23, 25, 27, 28, 29, 30, 35, 37, 42, 43, 45, 46, 56, 60, 61, 62, 66, 67, 68, 71, 81, 89, 90, 91, 92, 95, 101, 102, 104, 107, 109, 110, 115, 116, 117, 118, 122, 124, 126, 128, 130, 131, 132, 133, 134, 135, 136, 138, 139, 142, 145, 147, 148, 150, 151, 159, 160, 161, 162, 164, 165, 171, 174, 175, 176, 177, 180, 181, 182, 187, 190, 191, 192, 194, 197, 198, 199, 203, 208, 209, 201, 210, 211, 214, 215, 219, 220, 224, 226, 230, 232, 233, 234, 238, 239	41, 153, 203	113, 159, 231	114, 127, 137, 141, 184, 188, 201
Total	103	3	3	7

BAC response:

6.3.1 General Noise Concerns

Noise from existing runway

55 of the submissions were from residences south of the Brisbane River under or near existing flight paths. Thus concerns and comments regarding future noise impacts associated with the NPR appear to stem from current experiences rather than the results of the aircraft noise assessment in the Draft EIS/MDP. As most of these submitters are under the existing flight path, they would experience a reduction in overall noise exposure with the opening of the NPR.

Noise from NPR

37 of the submissions were from residences south and south-west of the NPR, most notably Hawthorne, Balmoral, Bulimba, Hamilton, Ascot and Hendra, which will be under or near the new NPR flight paths. All of these submissions were concerned with the aircraft noise they will experience as result of the NPR, which they believe will be significant compared with what they are experiencing now. Some of these concerns were specifically based on the results of the N70 noise assessment contours and the flight path movement charts.

Lateral noise from NPR

24 of the submissions were from residences west of the NPR, most notably Nudgee Beach, Nudgee, Banyo, Northgate and Nundah. The noise concerns were about the potential lateral noise impacts associated with the separation distance between the two runways. The issue of the runway separation distance has been addressed separately in the response to Chapter A3 in Section 3.8 of this Supplementary report.

The issue of lateral noise due to landing (reverse thrust), take-off and taxiing and the difference in the separation distance was addressed in detail in Draft EIS/MDP Chapter D5, Section 5.8 and the Brisbane Airport Lateral Noise Study.

Lateral Noise Study

The results of the study indicated that the potential impacts of lateral noise to the west are minor to negligible at the nearest sensitive receptors (The Australian Catholic University and an aged care facility) and beyond.

The lateral noise study did not take into account the effects of shielding that may be provided by the natural rise and fall in topography between the NPR and the residential areas in the suburbs to the west. The study also did not consider the effects of noise masking by current or future traffic on the Gateway Arterial Road, which would be most notable during the day and early evening periods, which runs between the NPR and suburbs to the west.

It was also determined that the separation distance of 1525 m versus 2000 m would make no discernable difference to the potential noise impacts.

It is worth noting here that the Australian Catholic University made a submission supporting the NPR with the proposed 2000 m separation.

Restrictions on the use of reverse thrust at night

It was stated in Chapter D5, Section D5.8 that at night (10pm to 6am), the aged care facility would potentially be impacted by reverse thrust with the possibility of 4 to 7 landings above 70 decibels with the use of reverse thrust by larger jets on the NPR. The forecast jet arrivals in the Draft EIS/MDP indicates that these events would mostly occur between the hours of 10pm to midnight or 5am to 6am.

The preferred use of over-bay operations at night will mean that the NPR will be the arrival runway for a large percentage of the night-time period 10pm to 6am. BAC has recommended in Chapter D5.8 that for noise mitigation, limitations be placed on the use of reverse thrust for night time operations on the new runway. It is understood that this

measure is used at other airports at night and so should be possible at Brisbane Airport. The Draft Parallel Runway Operating Plan in Chapter D10 will be amended to include this mitigation measure for landings on the NPR at night.

However, at night there may be occasions where operational or weather conditions require the use of reverse thrust for safety reasons. In these cases, it has been recommended in Chapter D5.8 that aircraft use the existing runway with existing reciprocal runway operation procedures.

In addition, when over-bay operations are not available at night due to weather conditions, the draft Parallel Runway Operating Plan in Chapter D10 will be amended to recommend the use of the existing main runway for all take-off and landings (Modes 10a and 10b).

6.3.2 Use of N70 Contour

Reliance on N70 metric

Many comments regarding reliance on the N70 metric for the noise assessment were received, however, Brisbane City Council (BCC) provided the most comprehensive remarks which it is understood are based on the findings of an independent acoustic consultant engaged by BCC. In its submission the Council commented that the Draft EIS/MDP focuses on a single noise metric, namely the N70 contour, in its assessment of predicted noise impact on residential suburbs and goes on to list what it believes to be a number of limitations in regard to the sole use and incorrect use of the N70 contour (as outlined in dot point form above and addressed in the following sections). The comments were supported by several other submissions, mostly submissions from elected Council representatives, which are very similar in nature.

The choice of the N70 contour was stipulated in the Department of Environment and Heritage issued guidelines for the Draft EIS/MDP as part of the noise assessment to be provided. The N70 was developed as a result of extensive community and industry consultation which occurred following the opening of Sydney's third runway. In terms of conveying the level of noise impact to an individual resident, the concept of the number of flights surfaced as a key aspect of information the community was seeking. The N70 is aimed at providing this key aspect of aircraft information in terms of the number of flights 70 decibels and above.

The criticism that the assessment was lacking due to reliance on the N70 noise metric overlooks that other noise descriptors were also used and that the use of the N70 is a specific requirement of the Australian Government issued guidelines for the Draft EIS/MDP. An outline of the other noise descriptors and where they were provided is given below:

- Flight path movement charts (Volume D, TNIP)
- Flight path and noise charts which are combination flight path movement charts and N70 diagrams (Volume D, Flight Path and Noise Information Booklet);
- Single event contours (Volume D, TNIP);
- ANEC contours (Australian Noise Exposure Concept) (Volume D, TNIP).

Flight Path Movement Charts

Flight path movement charts provide a number of pieces of information including:

- The location of flight paths and the extent of the spread of aircraft across a particular flight path;
- Whether the aircraft are using the flight path as an arrival or a departure route;
- The approximate height at which an aircraft will be along the flight paths.
- The average number of times per day that a plane is likely to use the flight path, the expected maximum and minimum number of times per day, the percentage of the total flights using the flight path and the number of days within a period expected to experience no flights.

Flight path movement information was displayed in combination with N70 diagrams in the Flight Path and Noise Information Booklet for 3 different periods of the day (Day, Evening and Night), for week days and week-ends, for different seasons (Summer and Winter) for the years 2005 (current situation), 2015 before the NPR opens, 2015 after the new runway opens and 2035, 20 years after the new runway becomes operational. A total of 48 different situations were presented in the booklet.

Single event contours

Single event contours (showing 70 and 75 decibel contours) were shown for representative aircraft including a Boeing 747-400, currently one of the noisiest aircraft of the fleet, in Volume D of the Draft EIS/MDP. TNIP also has the capacity to show all aircraft types on all flight tracks in either the arrival or departure mode for a full range of decibel contours.

ANEC contours

The Draft EIS/MDP also showed ANEC contours for the 2015 and 2035 scenarios. These contours provide annualised average information used primarily as a land use planning tool to determine the suitability for certain land uses in the vicinity of the airport. They are important to assist local authorities such as Brisbane City Council in regulating for certain building acoustic treatments depending on the type of proposed use and the location with respect to the ANEC contours.

Above and below 70 decibels

BCC further commented that the N70 noise metric was insufficient to show what was happening above or below the 70 decibel level. Decibel levels above and below 70 decibels were provided in the package of information released on the Transparent Noise Information Package (TNIP) disc.

TNIP is a state-of-the-art model providing actual and modelled information on aircraft movements and associated noise. The N70 is just one of the descriptors used in TNIP. Additional information on other noise levels from 50 dBA to 100 dBA in increments of 1 dBA or more (including 60, 65, 75, 80, 85 or 90 dBA levels) can be obtained through TNIP through the “single event contour” option for each aircraft type and on each flight track. This option allows the user to drill down to determine specific noise levels of individual aircraft overflights that their premises may experience. Figure 1 opposite provides an example of this.

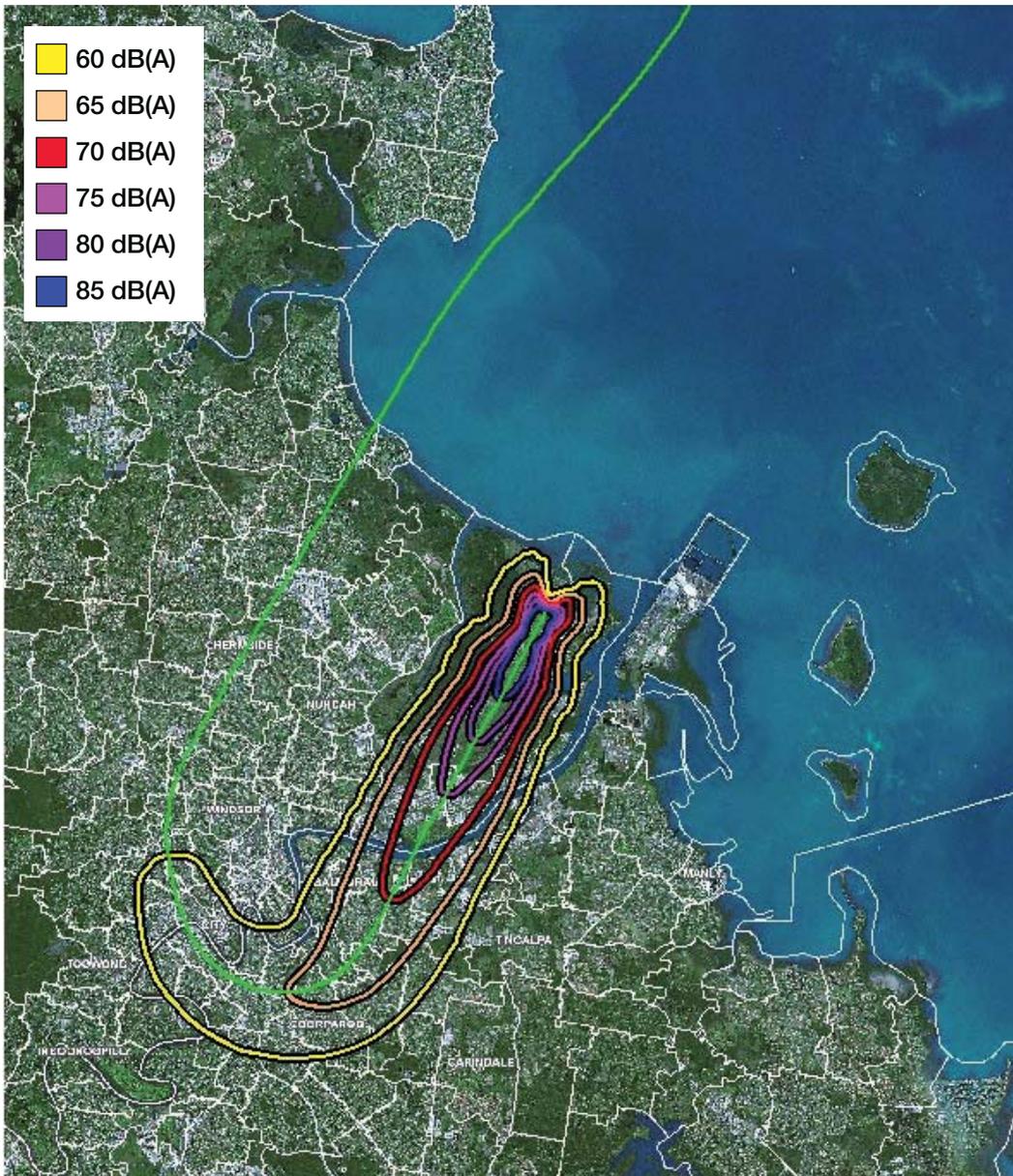


Figure 1: Example of single event contour from TNIP of a 737-800 showing the 60, 65, 70, 75, 80, 85 dBA contours

In addition, BAC provided avenues to assist the public to understand and extract information from the documentation including an 1800 hotline number, an email address, a manned Community Information Centre with on-demand assistance 6 days a week during the public comment period as well as three Community Information Sessions (as detailed in Section 2.11 of this report) in order to answer directly any questions and to provide assistance in interpreting the data or using TNIP.

Over 240 members of the community (including some elected government representatives), took advantage of these information services and were given a tutorial by BAC staff on TNIP. The general feedback from those who received a tutorial, found it very useful and informative. While in some cases they were perhaps not satisfied with the potential noise exposure forecast in their suburb, in nearly all cases they were satisfied (and in some cases surprised) with the level of detail of aircraft noise exposure information available, which helped them understand the impacts on their suburb and more importantly, their actual residence.

There was comment by some members of the community that there was too much information provided and that the data was very confusing and complex (including feedback from information sessions). Therefore, to have provided more descriptors would only serve to add more complexity to the noise assessment and thus provide more confusion with respect to the aircraft noise assessment.

BAC believes it has provided an appropriate balance of information in the Draft EIS/MDP through the range of materials released.

Application of Australian Standard (AS) 2021

It was claimed that the N70 metric has been based on the now superseded 1994 version of AS2021: *Aircraft Noise Intrusion – Building Site Construction* and therefore the N70 is no longer the valid noise metric.

The objective, common to both the 1994 and the 2000 issues, of the Australian Standard AS2021 is to provide guidance for local planning and building authorities with respect to the acoustic treatments recommended for achievement of specified indoor noise levels and not to be used as an assessment tool for aircraft noise.

The standard applies to building sites within the Australian Noise Exposure Forecast (ANEF) contours which fall within a 15 kilometre radius of Brisbane Airport and clearly states “*this standard is not intended to be applied for the purposes of assessing the effects of noise from aircraft.*” It is not aimed or intended to assess noise impacts from a new runway.

The noise metric considered most appropriate for assessing aircraft noise is the N70 metric. This is explained in the Department of Transport and Regional Services 2003 publication “*Guidance Material for Selecting and Providing Aircraft Noise Information*” (developed post the new AS2021:2000 being introduced) which supports the use of the N70 as a noise descriptor for EIS assessments. The N70 gives a ‘macro’ picture of noise around an airport to complement and put into perspective information based on flight paths and movement numbers and times, etc. Hence, the stipulation of the N70 metric for the NPR aircraft noise assessment by the EIS/MDP guidelines is entirely appropriate.

The preference for the N70 metrics evolved out of community interest in single event contours following the opening of the parallel runway in Sydney. Extensive discussions with Sydney community representatives on finding new ways to describe aircraft noise led to the development of the N70 noise metric. In essence, the N70 contour map summarises single event data for a specified time period over the area surrounding an airport and has been demonstrated as a good way to produce a ‘whole of airport’ picture of single event aircraft noise movements.

The noise contours on an N70 chart indicate the number of aircraft noise events equal to or louder than 70 decibels, which occurred on an average day during the period covered by the chart. An aircraft noise event of 70 decibels is one that is likely to disturb conversation and interfere with activities like watching television, using the telephone or listening to radio inside a house with open windows.

The N70 overestimates the noise insulation of Brisbane dwellings

It was suggested that the 10 decibel reduction in noise from outside to inside a dwelling overestimates the noise insulation of Brisbane dwellings and, therefore, the adoption of the N70 metric is inappropriate.

This statement is incorrect. The 10 decibel reduction in noise from outside a dwelling to inside a dwelling is based on the fact that windows are open and is irrespective of where the dwelling is located, how it is constructed or whether it is insulated because open windows (or doors) render insulation ineffective. In fact, if all external windows and doors were closed reductions of up to 20 decibels could be expected. This is discussed in Volume D, Section 2.8 of the Draft EIS/MDP.

N60 for night hours and N65 contours for day and evening

It was suggested that the N60 and N65 contours should also be provided to identify the areas that will exceed the AS2021-2000 criteria for bedrooms at night and living spaces in the evening respectively.

These contours have not been provided as discussed above with respect to the appropriate noise descriptor being the N70. Nonetheless, occurrences of flights generating 55, 60 or 65 decibels at an individual location are available in TNIP through the single event contours for individual aircraft movements in the time periods of concern should it be required as shown in Figure 1.

Sleep disturbance issues

An assessment of night time impacts on sleep was also undertaken in the Health Impact Assessment in Volume D, Chapter 7, with the conclusion finding “a **reduction** of approximately 185,000 people potentially affected by night time noise-induced awakenings resulting from aircraft noise” with the NPR in operation.

The BCC submission has also incorrectly interpreted the relationship of AS2021-2000 and the application of this standard with respect to the assessment of aircraft noise.

AS2021-2000 “Acoustics- Aircraft Noise Intrusion – Building Site and Construction” is the Australian Standard intended only to be used as a land-use planning tool for the siting and construction of new buildings in the vicinity of Airports by authorities such as Brisbane City Council.

The application of the indoor design sound levels in Table 3.3 of AS2021-2000 is intended as a condition of approval for the design and construction of new buildings that are located within the ANEF 20 and NOT to buildings located outside the ANEF 20 - except possibly for building sites outside but near to the ANEF 20 (refer Sections 1 & 2 in AS2021-2000).

Note 3 in Table 3.3 in AS2021-2000 states that: “*The indoor design levels are intended for the sole purpose of designing adequate construction against aircraft noise intrusion (within the ANEF 20) and are not intended to be used for assessing the effects of noise. Land-use planning authorities may have their own internal noise levels requirements which may be used in place of the above levels.*”

Therefore, the N55, N60 or N65 contours are not required. Nonetheless, BCC or members of the community are still able to determine these contours in TNIP through the single event contours for individual aircraft movements in the time periods of concern should it be required.

The N70 contours only show average number of movements

It was also suggested that the N70 contours only show the average number of aircraft movements for each time scenario and not the maximum number that can occur on any given day.

The flight path and noise charts in the Flight Path and Noise Information Booklet provide a range of information in addition to the N70 diagrams: The flight path and noise charts show for each flight path zone and for each time period provided:

- the maximum and minimum number of total aircraft movements on any day (not just those above 70 dBA);
- the percentage of days without movements; and
- the percentage number of the total aircraft movements.

This information is also provided in TNIP.

As explained in previous sections additional information on other noise levels from 50 dBA to 100 dBA (in increments of your choosing including 60, 65, 75, 80, 85 or 90 dBA levels) can be obtained through TNIP through the “single event contour” option for each aircraft type and on each flight track (again refer to the Figure 1). This option allows the user to drill down to determine specific noise levels of individual aircraft overflights that their premises may experience.

The N70 under-represents the broader impact of the aircraft

The BCC submission claimed that the N70 contour under-represents the broader impact of the aircraft noise because the N70 contour cuts off at 70 decibels. For example, the submissions asserted that in the range 60-65 or 65-70 decibels using the noise level data presented in Tables 3.4 to 3.24 of AS2021-2000, if there were 5 to 9 overflights at or above 70 decibels at a residential location, it is quite likely that there would be 20-49 overflights at 65 decibels at the same location.

The 20 to 49 overflights at 65 decibels suggested by BCC is over exaggerated. Actual monitoring data for 2005 at Noise Monitoring Terminals 1 and 2 (provided in TNIP) indicate that measured N70s in the range of 5 - 9 events at or above 70 decibels produced 10 to 16 events at or above 65 decibels, which is significantly less than the 20 to 49 suggested by BCC.

N70 is a “subjective” noise metric

One submitter commented that the Department of Transport and Regional Services should not have set a subjective noise metric such as the N70 as the main tool of assessment.

The merits and rationale for the use of the N70 as one of the main noise metrics has been described in previous sections but was selected on the basis of extensive community and industry consultation which occurred in the aftermath of the Sydney third runway experience. The N70 conveys information in order for an individual resident to determine for themselves the effect that number of aircraft overflights will have on them.

The impacts of any noise, including aircraft noise, and the tolerance of such noise by an individual is to a large degree subjective. For this reason the noise metrics used in the aircraft noise assessment do not represent levels that are considered “acceptable” or “unacceptable”, instead they are provided as raw information in order for the community to determine whether it will affect them or not.

6.3.3 Other Noise Related Issues

State noise guidelines

A couple of submitters said the noise metrics presented were not acceptable according to the State noise policy guidelines. With respect to the assessment of aircraft noise, the Australian Government is the determining body for the appropriate noise metrics in accordance with the Airports Act 1996 and the Airports (Environment Protection) Regulations 1997 and not the State Government.

Noise maps and diagram inclusions

There was criticism in two submissions that the noise maps and diagrams did not show suburbs and streets in relation to flight paths or did not have a scale.

The noise maps and diagrams in the Flight Path and Noise Information Booklet (FPNIB) and the base maps used in TNIP used the latest satellite map of Brisbane.

The TNIP base map shows the boundaries of all the suburbs, with some of the main suburbs identified for reference. It was considered impractical to try and show all the suburbs on the base map in TNIP as it would have made the maps too busy and difficult to interpret. The zoom mechanism in TNIP did provide the ability to enlarge the satellite base map and identify within about 100 metres individual residences.

In the Flight Path and Noise Information Booklet, a transparent overlay with all the suburbs identified was provided that could be removed and used to overlay each of the maps, identifying the potential impacts in each suburb. It was considered impractical to be able to show every street in Brisbane on the maps at the scale provided.

A scale bar was not shown on the satellite base maps in TNIP and the Flight Path and Noise Information Booklet, but BAC believes that does not affect the ability to interpret the potential noise impacts. However a scale bar will be included in the future versions of TNIP.

Therefore, it is considered by BAC that the level of detail provided in the Draft EIS/MDP documentation provides members of the community with sufficient detail to identify potential noise exposure for individual circumstances.

The TNIP software was complex

It was claimed in a couple of submissions that the TNIP software was difficult to understand and use, and on-line tutorials were hard to download and difficult to follow.

In order to provide the community with as clear a picture as possible of the potential for exposure to aircraft noise, detailed information was provided in the Draft EIS/MDP and Appendices, as well as through a range of other materials including the Flight Path and Noise Information Booklet and the software package TNIP.

It was recognised that there would be members of the community who would have difficulty using TNIP or who did not have computers. BAC provided direct assistance in using TNIP and interpretation of the noise assessment data was provided to the community through:

- an 1800 hotline number,
- an email address,
- a manned Community Information Centre with computers and on-hand assistance 6 days a week during the Public Comment Period, and
- three 4-day community information sessions (as detailed in Section 2.1 of this report).

BAC personnel provided over 240 tutorials on TNIP to people seeking information and advice on potential aircraft noise impacts and typically spent 1 to 2 hours with each individual until they were satisfied they understood what they wanted to know.

As previously described the general feedback from those who received a tutorial was positive saying they found it very useful and informative. While in some cases people were perhaps not satisfied with the potential noise exposure forecast in their suburb, in nearly all cases they were satisfied with the advice and level of detail of aircraft noise exposure information available through TNIP, which helped them understand the impacts on their suburb and more importantly, their actual residence.

Vibration due to aircraft movements

The issue of aircraft noise-induced vibration and vibration from wake turbulence was addressed in Chapter D5.9. The assessment concluded that:

- there is currently negligible impact from noise-induced vibration and this would not change with the introduction of the NPR.
- Brisbane Airport's large buffer zone means that wake turbulence does and will not have any impact on residential areas in Brisbane.

RNP Notes

Airservices Australia in its submission noted two corrections in Chapter D5.10 regarding Continuous Descent Approach (CDA) profiles and RNP.

BAC notes Airservices Australia correction that CDA profiles used in Australia typically start at the top of descent (about 30,000 feet) and not 6,000 feet as stated. Therefore, the first sentence in the 2nd paragraph in Chapter D5, Section 5.10.1.1 should be amended to read: *“CDA starts at the top of descent altitude (about 30,000 feet) where the aircraft continuously descends at 3° instead of short descents to cleared altitudes and joining the 3° glide slope as typically required by Air Traffic Control.”*

Airservices notes that the statement: *“This means that these aircraft can use visual arrival tracks in instrument conditions requiring only a two mile arrival clearance.”* in Chapter D5, Section 5.10.1.2 on page 169 is not supported by Airservices.

BAC acknowledges Airservices comment and this statement should be amended to read: *“This means that these aircraft (using Required Navigation Performance) can use visual tracks in instrument conditions that have a shorter ‘final’ approach, subject to clearance from air traffic control.”*

Addition/Omission to Draft EIS/MDP:

Chapter D5, Section 5.10.1.1, 2nd paragraph, 1st sentence amend to read:

“CDA starts at the top of descent altitude (about 30,000 feet) where the aircraft continuously descends at 3° instead of short descents to cleared altitudes and joining the 3° glide slope as typically required by Air Traffic Control.”

Chapter D5, Section 5.10.1.2, 1st paragraph, 2nd sentence amend to read: *“This means that these aircraft (using Required Navigation Performance) can use visual tracks in instrument conditions that have a shorter ‘final’ approach, subject to clearance from air traffic control.”*

In addition to these changes to Chapter D5, BAC will also make some minor amendments to the TNIP model. The TNIP model will continue to be updated and improved as required and the latest version of TNIP is attached with this Supplementary Report and will be available to order from the BAC website.

6.4 D6 – Aircraft Emissions and Air Pollution *(21 of 196 submissions)*

Draft EIS/MDP reference: Chapter D6 – Aircraft Air Emissions / Air Pollution.

21 of the 196 submissions voice concerns to varying degrees about aircraft emissions (Chapter D6 in the Draft EIS/MDP).

Submitter Issues:

Specific issues related to concerns about aircraft exhaust emissions that affect local air pollution included:

- Concern about impact of aircraft emissions on health (5/21);
- Concern that air pollution from aircraft exhaust will contaminate rainwater tanks and Brisbane water supply reservoirs and leave 'dirty deposits' on clothes on washing line, internal and external surfaces (3/21)
- Complaint about existing jet fumes odours at Nudgee or odours not assessed (3/21);
- Claim that aircraft air pollution will diminish quality of life (3/21);
- Concern that emissions will increase with larger aircraft and there are no guarantees that new aircraft and/or new technology will provide improvements (2/21);
- Question if air monitoring is proposed (2/21);
- Claims that the air assessment understates current and future fallout (2/21);
- Concern about heat from exhaust emissions will damage musical instruments at a school (1/21);
- Question on how often fuel dumping occurs (1/21);
- Claim that effects on air pollution is worse from aviation because of the total emissions stated in NPI database compared with emission from other industries (1/21);
- Comment suggesting the wind data used is incorrect and there is a capacity for higher air pollution than that modelled (1/21).

The above comments will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	30, 42, 43, 56, 95, 116, 128, 130, 131, 162, 164, 165, 181, 194, 199, 219	41	113, 166, 231	184
Total	16	1	3	1

BAC Response:

6.4.1 Impact of Aircraft Emissions on Health

The potential impacts of aircraft emissions on the health was assessed in detail in Chapter D7 and additional responses to specific concerns or questions regarding air pollution health can be found in Section 6.6 of this report.

6.4.2 Contamination by Aircraft Exhaust Emissions

There were a few submissions expressing concern that air pollution from aircraft exhausts will contaminate rainwater tanks and Brisbane water supply reservoirs and leave 'dirty deposits' on clothes on washing line as well as internal and external surfaces.

Chapter D6, Section 6.4.5.10 in the Draft EIS/MDP addressed the issue about residue fallout and contamination of water from aircraft exhaust. It was noted that while aircraft may contribute a very small proportion of residues, the levels being emitted, even close to the airport, are negligible in comparison with emissions from other sources in and around Brisbane such as cars, trucks, industry, burn-offs and bushfires.

6.4.3 Emissions will Increase with Larger Aircraft

There were a few submissions that emissions will increase with larger aircraft and there are no guarantees that new aircraft and/or new technology will provide improvements.

Chapter D6, Section 6.5 in the Draft EIS/MDP provides the details on the estimates of aircraft emissions in 2015 and 2035 with and without the NPR and notes there will be an increase in total emissions with the growth in aviation. The emission estimates in the NPR air assessment do not make an allowance for technology improvements in new aircraft in the future.

The Draft EIS/MDP air assessment concluded that the impacts of emissions from aircraft on Brisbane air quality in 2015 and 2035 will be minor to negligible and within the acceptable air quality goals for Brisbane without allowances for future technology improvements.

Therefore, the projected air emission estimates in the Draft EIS/MDP air assessment are conservative, especially as real improvements in emissions can be expected when the new Airbus A380 and Boeing 787 (and possibly Boeing 747-8) aircraft commence operation over the next few years at Brisbane Airport replacing older less efficient aircraft.

6.4.4 Jet Fumes and Odours

An assessment and discussion on jet fume odours from aircraft was provided in the Draft EIS/MDP in Chapter D6, Section 6.4.5.6 and Section 6.8.2. It was noted that there have been some occasional complaints historically from residents to the west of the Airport at Nudgee Beach, but there have been very few complaints to the EPA recently. The potential impacts and frequency of future odour episodes is predicted to not change significantly.

6.4.5 Air Monitoring with the NPR

As discussed in Chapter D6, Section 6.4.5.4, the Queensland EPA currently operates air quality monitoring sites at Pinkenba and Wynnum located within a short distance from the airport. It is suggested that these monitoring stations can be used as reference stations to monitor existing and future air quality in the vicinity of Brisbane Airport.

Within 10 kilometres of the airport there is also monitoring stations in the Brisbane CBD and South Brisbane and there is one at Rocklea about 17 kilometres to the south under the existing Runway 01 ILS arrival flight path.

It was also noted in the Draft EIS/MDP that Sydney Airport conducted an air quality monitoring program for 10 years between 1994 and 2003 following the construction of the new third runway. A detailed analysis of the 10 years of data found there was no discernible contribution from airport emission sources on the ambient air quality in the vicinity of the airport and as a consequence, the Sydney Airport monitoring program has now been discontinued.

In light of the above comments, the existing network of EPA air quality monitoring stations in Brisbane will be adequate to provide data for monitoring future air quality trends in Brisbane and any contribution Brisbane Airport may make to local ambient air quality.

6.4.6 Air Assessment Understates Current and Future Fallout

Chapter D5, Section 6.5 in the Draft EIS/MDP provides the details on the estimates of aircraft emissions in 2015 and 2035 with and without the NPR and notes there will be an increase in total emissions with the growth in aviation. The emission estimates in the NPR air assessment do not make an allowance for technology improvements in new aircraft in the future.

The Draft EIS/MDP air assessment concluded that the impacts of emissions from aircraft on Brisbane air quality in 2015 and 2035 will be minor to negligible and within the acceptable air quality goals for Brisbane without allowances for future technology improvements.

Therefore, the projected air emission estimates in the Draft EIS/MDP air assessment are conservative, especially as real improvements in emissions can be expected when the new Airbus A380 and Boeing 787 (and possibly Boeing 747-8) aircraft commence operation over the next few years at Brisbane Airport replacing older less efficient aircraft.

6.4.7 Heat from Exhaust Emissions will Damage Instruments

Heat from the exhaust emissions from individual aircraft, especially when in the air, dissipates and rises very quickly due to convection and is not discernable at ground level.

There is a phenomenon known as the “heat island effect” where the ambient temperature in the centre of large cities (and around some large industrial facilities) at or close to ground level can be up to a few degrees higher than the outskirts of the city due to the cumulative effect of the large amount of heat energy generated in the city from motor vehicles, industry, machinery, electrical equipment, air-conditioning and even people.

The overall contribution from aircraft exhaust emissions to the heat island effect is negligible due to the relatively small number of aircraft and the fact that the aircraft are for most of the time above the vertical extent of the heat island.

6.4.8 Aircraft Air Pollution will Diminish Quality of Life

The Draft EIS/MDP air assessment found that the contribution of emissions from aircraft on Brisbane air quality in 2015 and 2035 will be relatively minor to negligible and well within the acceptable air quality goals for Brisbane without allowances for future technology improvements.

6.4.9 Fuel Dumping

Chapter D6, Section 6.4.5.10 of the Draft EIS/MDP discusses fuel dumping. In the course of normal operation aircraft do not dump fuel. Dumping of fuel is permitted in emergency situations when aircraft have to reduce weight to enable an immediate safe landing. In these circumstances, fuel dumping occurs at high altitude where the fuel vaporises. Fuel dumping is not permitted over populated areas.

Since the opening of the current Brisbane Airport in 1988, approval to dump fuel has never been sought or granted.

6.4.10 Aviation Emissions in NPI Database and Air Pollution

One submission claimed that air pollution is worse from aviation because the total emissions stated in the National Pollutant Inventory database is higher compared with emission from other industries.

One submission quotes National Pollutant Inventory (NPI) data and claims that as the total annual aircraft emissions of PM10 in South East Queensland (SEQ) are three times greater than in some industrial areas then people living in suburbs close to the airport are exposed to three times the exposure level than a worker in these industrial areas.

This assertion is incorrect. The ambient air quality and individual exposure to pollutants at any given time and location is determined by a combination of factors including the level of emissions from all emission sources close to the location, the prevailing winds and dispersion conditions, the distance of the individual from the source(s) and the background air pollutant concentrations.

The air assessment methodology has been explained in Chapter D6 and the results of the study concluded that the relative contribution of aircraft emissions to individual exposure in suburbs surrounding the airport is minor to negligible.

The relative contributions of aviation emissions in SEQ as reported in the NPI are shown in Chapter D6, Tables 6.5b and 6.5c. These data represent all emissions at all airports in SEQ for the year 2000.

6.4.11 Wind Data Used in Air Modelling is Incorrect

One submission asserted the wind data used is incorrect and there is a capacity for higher air pollution than that modelled.

This assertion is incorrect. Full details are provided of the wind data used in the air assessment provided in Chapter D6. Several years of meteorological data from various locations at and around Brisbane Airport have been used in the assessment and detailed in Chapter D6, Appendix B in the Draft EIS/MDP. All data has been checked and validated.

Addition/Omission to Draft EIS/MDP:

No additions or omissions are considered necessary for Chapter D6 in the Draft EIS/MDP.

6.5 D6 - Aircraft Emissions - Greenhouse *(13 of 196 submissions)*

Draft EIS/MDP reference: Chapter D6 – Greenhouse Gas Emissions / Climate Change

13 of the 196 submissions voice concerns about greenhouse gas emission from aviation (Chapter D6 in the Draft EIS/MDP).

Submitter Issues –

Specific comments regarding greenhouse gas emissions (GGE) from aircraft and the growth of the aviation industry and the related potential impacts these emissions may have on climate change and sea level rising include:

- A perception that construction of the NPR will cause a growth in air traffic and subsequent rise in GGE and that BAC is responsible for reducing GGE from aviation (5/13);
- Concerns that climate change and global warming will cause sea level rises and the NPR and Airport will be flooded (4/13);
- Claims that the Draft EIS/MDP did not adequately address GGE and climate change issues (3/13);
- Questions on what GGE off-set or mitigation measures are being proposed for planes, ground vehicles, energy supply, and all airport related goods and food (1/13);
- Claims that new technology and more efficient aircraft won't reduce growth in GGE because increase in movements will be greater (1/13);
- Reference to a Nature and Transport report that GGE from aircraft at night will have a greater impact because of more contrails (1/13);
- Climate change and subsequent tidal surges will have an impact on Boondall wetlands (1/13).

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	6, 43, 47, 77, 89, 124, 138, 164, 219, 220	153	113, 166	
Total	10	1	2	0

BAC response:

BAC has addressed the aviation greenhouse gas emission issues and climate change in Chapter D6. Greenhouse gas emissions associated with the land clearing and construction has been dealt with in Chapter B12.

6.5.1 The NPR Will Cause a Growth in Air Traffic and GGE

There were claims that the construction of the NPR and expansion of the airport will cause a growth in air traffic and subsequent rise in GGE.

Air traffic at Brisbane Airport will continue to grow at Brisbane Airport and across Australia irrespective of whether the NPR is built or not. The NPR is being built to accommodate this growth in traffic. If the NPR is not built, then the growth in air traffic will increasingly result in the delay and holding of aircraft into and out of Brisbane Airport, which would in turn burn more fuel and hence increase GGE above what would be generated with the NPR.

In fact, the efficient movement of aircraft in and out of airports and reduction in delays is recognised by the International Civil Aviation Organisation (ICAO), which is the international aviation industry's governing body, as a key strategy in reducing current and future aviation GGE emissions.

6.5.2 BAC is Responsible for Reducing GGE from Aviation

Aviation GGE emissions occur at a national and global level and as such are outside the control and responsibility of individual airports as stated in the Draft EIS/MDP, Chapter D6, Section 6.4.5.5. The Australian Government is responsible for policies to manage and reduce aviation GGE at a national level. At an international level, aviation GGE policy is being developed and managed by ICAO.

6.5.3 The Draft EIS/MDP Did Not Adequately Address GGE

The Draft EIS/MDP undertook a comprehensive assessment of aircraft emissions, both now and in the future (2015 and 2035) The flood analysis also addressed the issue of potential sea level rises and increased cyclonic activity. BAC would argue that the Draft EIS/MDP has adequately addressed GGE and climate change.

6.5.4 Climate Change Will Cause Airport Flooding

There were concerns in some submissions that climate change and global warming will cause sea-level rise, which will cause flooding on the NPR and the Airport in general because of its low coastal location.

The elevation of the NPR and Brisbane Airport have been designed to take into consideration the potential of floods and sea level rise – refer section 3.11 of this Supplementary Report.

6.5.5 GGE Off-sets or Mitigation Measures

One submission questioned what GGE off-set or mitigation measures are being proposed for planes, ground vehicles, energy supply, and all airport related goods and food.

BAC can only legally take responsibility for emissions generated by BAC activities. To this end, as stated in the Draft EIS/MDP, BAC is a member of the Australian Government's voluntary Greenhouse Challenge Plus (GCP) program. BAC was the first airport to join the program and is one of only three Airports in Australia that is currently a member of GCP. Through the GCP, BAC submits annual reports to the Australian Greenhouse Office indicating GGE and savings for the year and continually looks for ways to reduce its emissions.

The implementation of greenhouse mitigation measures associated with aircraft and other airport activities is the responsibility of each of the airport users that generate the emissions. Through the GCP program, BAC will continue to encourage airport tenants to reduce their emissions. It is understood some airlines, fuel companies and car rental companies have already put in place programs to off-set and mitigate emissions.

6.5.6 New Technology Aircraft Won't Reduce Growth in GGE

There were claims in a couple of submissions that new technology and more efficient aircraft won't reduce growth in GGE because increase in movements will be greater.

As stated previously, aircraft movements contribute only a small percentage of emissions. The Draft EIS/MDP shows that this will still be the case in 2035.

6.5.7 Aircraft Contrails at Night will Increase Global Warming

One submission made reference to a Nature and Transport report that emissions from aircraft at night will have a greater impact on global warming because the aircraft create more contrails in the atmosphere at night.

BAC's understanding of the report quoted refers to the large movement of aircraft at night across high traffic areas over North America, the north Atlantic and Western Europe, particularly in the cooler winter months. In these higher latitudes in winter with long nights, there is a greater occurrence of contrails (or vapour trails) from aircraft. These contrails build up to create a high level cirrus-type cloud cover, which according to the report may contribute to global warming.

This phenomenon of contrail build-up is poorly understood and has not been observed to occur in the warmer latitudes of Australia, which has comparatively very low air traffic volumes at night over a very large area.

6.5.8 Climate Change and Tidal Surges on Boondall Wetlands

One submission claimed that climate change will increase tidal surges and this will have an impact on Boondall wetlands.

Tidal surges and storm surges already occur as part of the natural climate cycle. Predictions of the impacts of any additional tidal surges associated with GGE and climate change are still very uncertain. In future years, if such events brought on by climate change are observed to be occurring, then this would be more than just a Boondall wetland issue and a result of global GGE not just emissions at Brisbane Airport.

Addition/Omission to Draft EIS/MDP:

No additions or omissions are considered necessary for Chapter D6 in the Draft EIS/MDP.

6.6 D7 – Health Air Quality (5 of 196 submissions)

Draft EIS/MDP reference: (D7.11 to D7.15)

5 of the 196 submissions raised concerns for health with respect to aircraft air emissions.

Submitter Issues:

Submitters raised concerns as follows –

- Residues from aircraft emissions contaminating rainwater tanks and therefore any plant/vegetables which are watered from the tanks (1 of 5);
- Aircraft emissions have similar pollutants to cigarettes (1 of 5);
- Findings of the Health Impact Assessment are inconclusive (1 of 5)
- Health effects to vulnerable sectors of the community (eg. asthma or emphysema sufferers (1 of 5);
- Toxic emissions will result in adverse health impacts (2 of 5) – new runway flight paths.

These will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	113, 162, 165, 180, 182	nil	nil	nil
Total	5	0	0	0

BAC response:

6.6.1 Introductory Summary

Airport operations are not a major source of local air pollution in a city such as Brisbane, where air quality is largely dominated by motor vehicle emissions. The NPR will not substantially change the air quality in the environs of the Airport and the differences with or without the NPR are considered to be small. Compliance with State and National air quality goals at the nearest sensitive receptors is anticipated for all future operational scenarios both with and without the new runway.

6.6.2 Dark Residues

Draft EIS/MDP Chapter D6, page D6-199 explains that dark residues can be caused from a number of sources including:

- Pollutants combining with dust and other particulate matter;
- Incomplete combustion of fuels which can relate to bushfires and burn offs as well as incomplete combustion from vehicle and other engines;
- Biological residues as a result of release by some plants and fungi.

The composition of aircraft emissions is similar to other forms of transport engine emissions like cars, trucks and buses. The contribution by aircraft to the overall volumes of these emissions is very small by comparison. The contribution by aircraft emissions in comparison to the emissions from all other sources (eg. cars, industry etc) ranges from 0.1% for methane and volatiles (CH₄ and VOC) to 0.2% for carbon monoxide (CO) to a maximum of 2.0% for oxides of nitrogen (NO_x). Refer to Chapter D6 of the Draft EIS/MDP, Table 6.5b, page D6-201.

Chapter D6, page D6-199 also provides clarification about commonly held beliefs regarding the dark residues from aircraft, particularly with respect to water quality. It explains that, aircraft at lower heights may contribute to a very small proportion of residues (see discussion above), however, by comparison with emissions from cars and other industry, the emissions from aircraft are negligible.

6.6.3 Comparison to Cigarettes

The air pollutants relevant to aircraft emissions that can potentially cause adverse health or nuisance effects are identified in the Draft EIS/MDP Chapter D6, Table 6.3, page D6-185. Many of these pollutants are found in cigarette smoke as is the case with most forms of combustion irrespective of the fuel being tobacco or petrochemicals. However, whether these pollutants cause adverse health effects is due to a range of factors like concentration, point of inhalation, persistence in the atmosphere, as well as other sources of the pollutants. The air quality study for the Draft EIS/MDP modelled all relevant aspects of aircraft emissions. The findings of the study concluded that in the worst possible case there was a negligible increase in health risk by 2035.

6.6.4 Vulnerable Sections of the Community

The findings of the health impact assessment concluded that the increased risk of an acute adverse health event, such as hospital admission or mortality, were small - in the order of 1 in 3 million to 1 in 167 million on the day and at the location where the worst case occurs. In the instance of the NPR the worst case is an increase in the order of 1 in 3 million for nitrogen dioxide concentrations at Nudgee Beach in 2035.

6.6.5 Health Effects Under New Runway Flight Paths

The air quality modelling predicts in 2015 with the opening of the NPR that generally pollutant concentrations are slightly lower. This is due to the emissions being spread over two runways instead of concentrated on one. The predicted concentrations in 2035 with the NPR become marginally higher because of the facilitation of increased aircraft traffic.

Addition/Omission to Draft EIS/MDP:

No new wording to be inserted for this issue.

6.7 D7 - Health – Noise & General *(16 of 196 submissions)*

Draft EIS/MDP reference: (D7.2 to D7.10)

16 of the 196 submissions raised concerns about health with respect to aircraft noise emissions. These submissions refer to the health impacts of noise generally. Other submissions refer to specific aspects of health effects due to noise. Specific issues such as the impact on cognitive performance in schools (see Section 6.11 **D9 – Schools**) and sleep disturbance (see Section 6.8 **D7 – Sleep Disturbance**) are addressed in separate sections.

Submitter Issues:

Submitters raised general concerns about the health effects of noise as follows:

- Some submitters expressed concern for the communities under current flight paths and the prospect of it getting worse with the NPR (8 of 16);
- Some submitters north and south of the river expressed concern about the NPR affecting them (3 of 16);
- A couple of elected representatives were concerned that the findings of the health impact assessment were questionable or unable to determine long term effects (2 of 16);
- One submitter was concerned about the vulnerable groups, particularly sufferers of depression (1 of 16);
- Another submitter expressed concern as they had formerly been a resident of Newtown, Sydney when the third runway began operations (1 of 16); and
- The Queensland Government described the Health Impact Assessment as comprehensive but wanted greater description of mitigation measures and the complaints handling process (1 of 16).

These will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	9, 37, 45, 46, 130, 134, 135, 136, 180, 181, 182, 197, 234	242	nil	184, 188
Total	13	1	0	2

BAC response:

6.7.1 Introductory Summary

As the Health Impact Assessment (HIA) in Chapter D7 outlined, human disturbance effects and the health effects of noise are multidimensional and complex, and the scientific evidence is still not complete. The HIA summarised the various effects in light of the current state of knowledge. Sufficient evidence for the estimation of human disturbance and health effects from aircraft noise is primarily in terms of:

- annoyance in residential settings (refer to Draft EIS/MDP Chapter D7, Section 7.6);
- chronic sleep disturbance (see D7 – Sleep disturbance, Section 6.8 of this report); and
- cognitive performance in schools (see D9 – Schools, Section 6.11 of this report).

Other indicators raised by some of the submitters cannot be used with the same level of confidence as the research in these areas is as yet incomplete.

6.7.2 Communities Under Existing Flight Paths

The types of concern raised in these (8 of 16) submissions relate to health effects which centre around constant annoyance and disturbance leading in some cases to high levels of distress or anxiety. The noise metric used to measure annoyance that has found widespread adoption in the European Union (EU), primarily for reasons of consistency across the EU States is L_{den} . This noise measure has weightings for evening and night time noise. The L_{den} most closely associates with the ANEC noise metric in Australia. It was on this basis that the impacts on the Brisbane community were assessed which concluded that there was an overall minor net reduction in people annoyed and highly annoyed. The noise assessment looked at suburb level effects of the NPR in Draft EIS/MDP Chapter D5 - Table 5.4 (page D5-143/4) and page D5-149 which indicated which individual suburbs (and parts thereof) were expected to improve and worsen.

At a general level the communities under the existing flight paths are predicted to decrease in the number of overflights (for day and evening 6am – 10pm) based on the splitting of the airspace to have arrivals and departures from the south and east continue to use the main runway while arrivals and departures to the north and west will use the NPR.

6.7.3 Communities Under New Runway Flight Paths

Some submitters raised that the NPR was going to introduce noise in areas where it wasn't currently experienced and that there would be subsequent health effects in the newly exposed areas.

The Draft EIS/MDP outlined that there is going to be increased noise effects in some areas, particularly areas to the south of the extended new runway centerline. These areas are listed at the suburb level in Chapter D5 - Table 5.4 (page D5-143/4) and page D5-149.

6.7.4 Limitations of the Health Impact Assessment (HIA)

The health impact assessment presented in the Draft EIS/MDP has examined the most recent and scientifically robust research available. The science is still incomplete in some areas which is stated at the outset of the assessment.

6.7.5 Depression

The evidence concerning the relationship between noise exposure and mental illness including depression is inconclusive but that individuals with existing mental illness may be more sensitive to other effects of noise exposure such as annoyance or sleep disturbance.

6.7.6 Comparison to Newtown, Sydney

Newtown in Sydney is mostly located approximately 1 to 2 kilometres north of the Runway 16 R threshold in the 25 to 30 ANEF contour for 2023/24 for Sydney Airport. At Brisbane the 25 to 30 ANEF contour for Ultimate Development at Brisbane Airport (published in BAC's approved 2003 Master Plan) is almost completely contained on Brisbane Airport land and where marginally off airport land is over industrial areas south of the existing main runway to the river. Brisbane's generous buffer areas surrounding the airfield afford far better noise amelioration than Sydney whose nearest residence is less than 600 m off the extended runway centerline compared to Brisbane's 6.4 km distance to the closest residence with the NPR.

6.7.7 Mitigation Measures and Complaint Process

The mitigation measures for noise amelioration are essentially contained in the Draft Operating Plan found in Chapter D10 of the Draft EIS/MDP. The operating plan outlines that whenever possible due to weather and aircraft numbers the operating modes where both arrivals and departures are over Moreton Bay will be the preferred operating mode. For more detail refer to Section 6.13 - D10 - Draft Parallel Runway Operating Plan.

A complaints handling process is already in place for Brisbane Airport. Noise complaints are handled by Airservices Australia and is discussed in more detail in Section 6.13 D10 - Draft Parallel Operating Plan of this report.

Addition/Omission to Draft EIS/MDP:

No new wording to be inserted for this issue.

6.8 D7 - Sleep Related Issues *(14 of 196 submissions)*

Draft EIS/MDP reference: (D7.6 and D7.10)

14 of the 196 submissions commented that due to the NPR providing capacity for a greater number of aircraft in the future that this would result in greater noise at night and therefore increased sleep disturbance for residents.

Issues of potential sleep disturbance were raised in relation to:

- Communities to the west of the new parallel runway due to lateral noise (i.e. noise emanating from the side of aircraft taking off and landing (4/14);
- Communities under flight paths for the new runway (6/14);
- Communities under existing flight paths to the south of the existing main runway (3/14); and
- One submitter raised a concern about the difference in overall benefit at night between Summer and Winter scenarios (1/14).

These will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	23, 66, 81, 102, 116, 126, 176, 180, 182, 190, 214	nil	nil	137, 141, 184
Total	11	0	0	3

BAC response:

6.8.1 Introductory Summary

In developing the methodology for assessing noise impacts, each day was broken into three separate time periods:

1. Day (6am to 6pm) - the period of the day when the majority of people are at work, travelling to and from work or at home;
2. Evening (6pm to 10pm) - the period of the day when most people are preparing dinner, watching television, or relaxing after work; and
3. Night (10pm to 6am) - this is the period when most people are sleeping and then rising in the morning.

The night time period (10pm to 6am) was considered the most appropriate when considering the potential effects on sleep disturbance within the general community.

Ahead of addressing individual comments, it is important to point out that when the NPR becomes operational:

1. Communities which will be subject to new overflights during the day and evening periods (6am - 10pm) due to the NPR will not have overflights in the night time period (10pm - 6am) as well; and
2. Communities which are currently subject to overflights in the night time period will have noise reductions in both Winter and Summer when the NPR becomes operational due to the increased capacity to maximise flights to and from the airport over the bay.

Below are the detailed responses to individual submitters on the issue of sleep disturbance.

6.8.2 Communities to the West of Kedron Brook Floodway

The Draft EIS/MDP shows the N70 footprints for the night time period (10pm to 6am) for Summer/Winter, Weekday/Weekend for 2015 and 2035.

In both 2015 and 2035 the modelling shows there are no homes to the west of the NPR which will be subject to 70 decibels or greater overflights in the night time period once the NPR is operational.

Communities to the west of the new runway will be buffered from night time noise due to the implementation of the Draft Parallel Runway Operating Plan which is outlined in Chapter D10 of the Draft EIS/MDP. This plan details, that in the night time hours (10pm to 6am), in the event that the preferred over bay operations which have all flights arrive and depart over the bay is not possible due to unfavourable weather conditions (either winds too strong or a wet runway), the existing main runway which is located approximately 4 km from the suburbs to the west will be used for any flights which must take off or land over the city.

The use of over-bay operations modes at night is dependent on three main factors:

- Weather (wind speed and direction, rain, cloud height etc)
- Runway demand (the number of aircraft arriving or departing Brisbane Airport and
- The length of time that the over bay operating modes can be kept continually in use.

For the purposes of noise abatement for the Brisbane community during the night time period, the Draft Operating Plan outlines protocols for maximising the use of over-bay operations. Where the number of aircraft arriving or departing Brisbane Airport is increasing to the point where the threshold for ceasing the use of over-bay operations is likely to be reached, the Plan states that the smaller, quieter turbo engine aircraft will depart from the new runway. This practice will serve to extend the period during which over-bay operations for the noisier jets may be used. It may also allow over bay operations to be implemented earlier in the evening than 10pm.

The noise generated by turbo engine aircraft is considerably less than the noise generated by jet aircraft and therefore noise levels reaching residences to the west of the Kedron Brook Floodway will be generally lower than 60 decibels. As the Draft EIS/MDP states, an indication of the extent of immediate sleep effects caused by overflights can approximately be identified from the extent and frequency of occurrence of flights whose maximum noise levels exceed 60 decibels. It must be remembered that 60 decibels outside equates to 50 decibels inside if the doors and windows are open, and therefore quieter again if the doors and windows are closed.

The following Figures (1 and 2) are TNIP outputs which show the Summer Weekday Night N70 contour and the noise footprint of the loudest of the turbo engine aircraft which may at times take off over the city as described above.

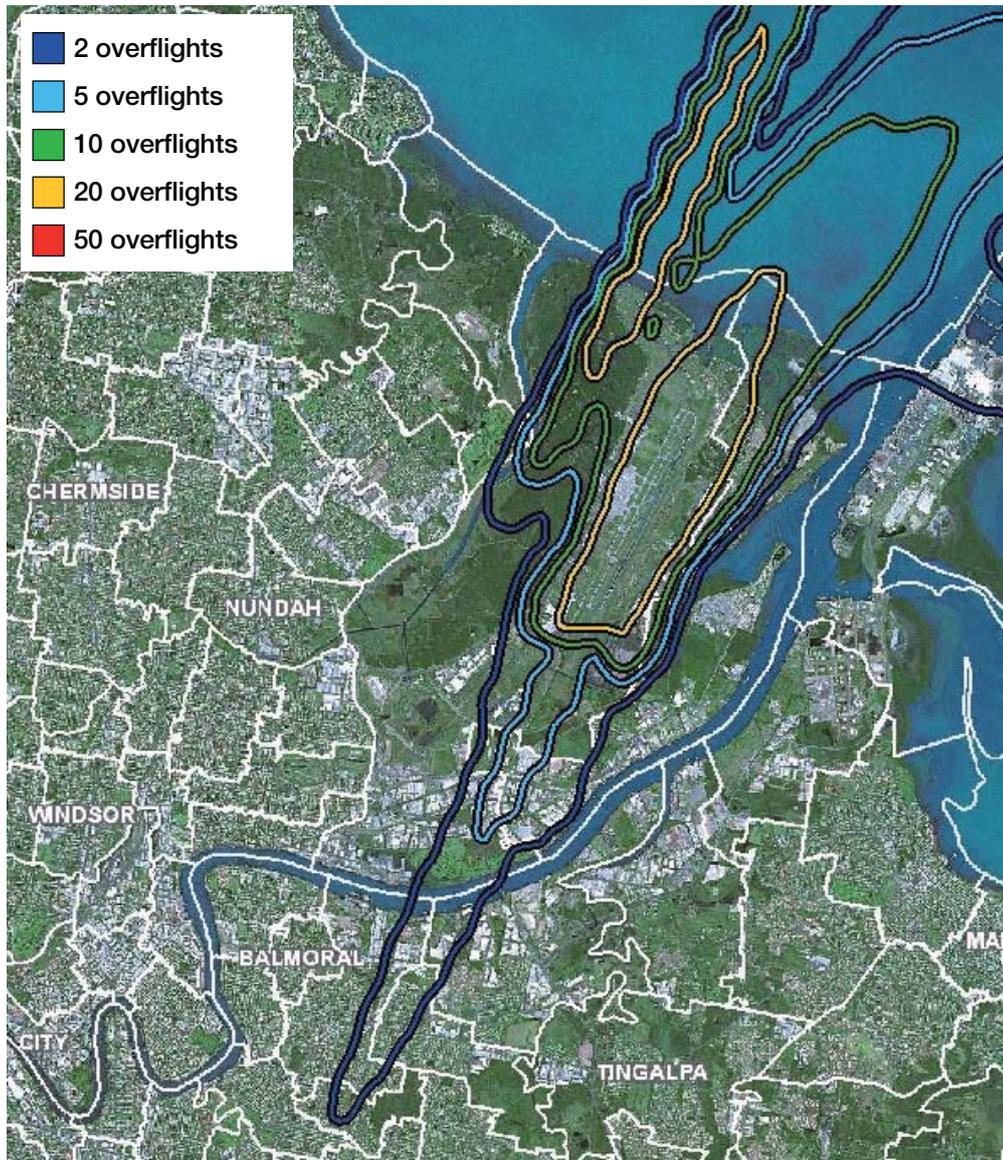


Figure 1: 2015 Summer Weekday Night N70 (2, 5, 10, 20, 50 overflights) contour

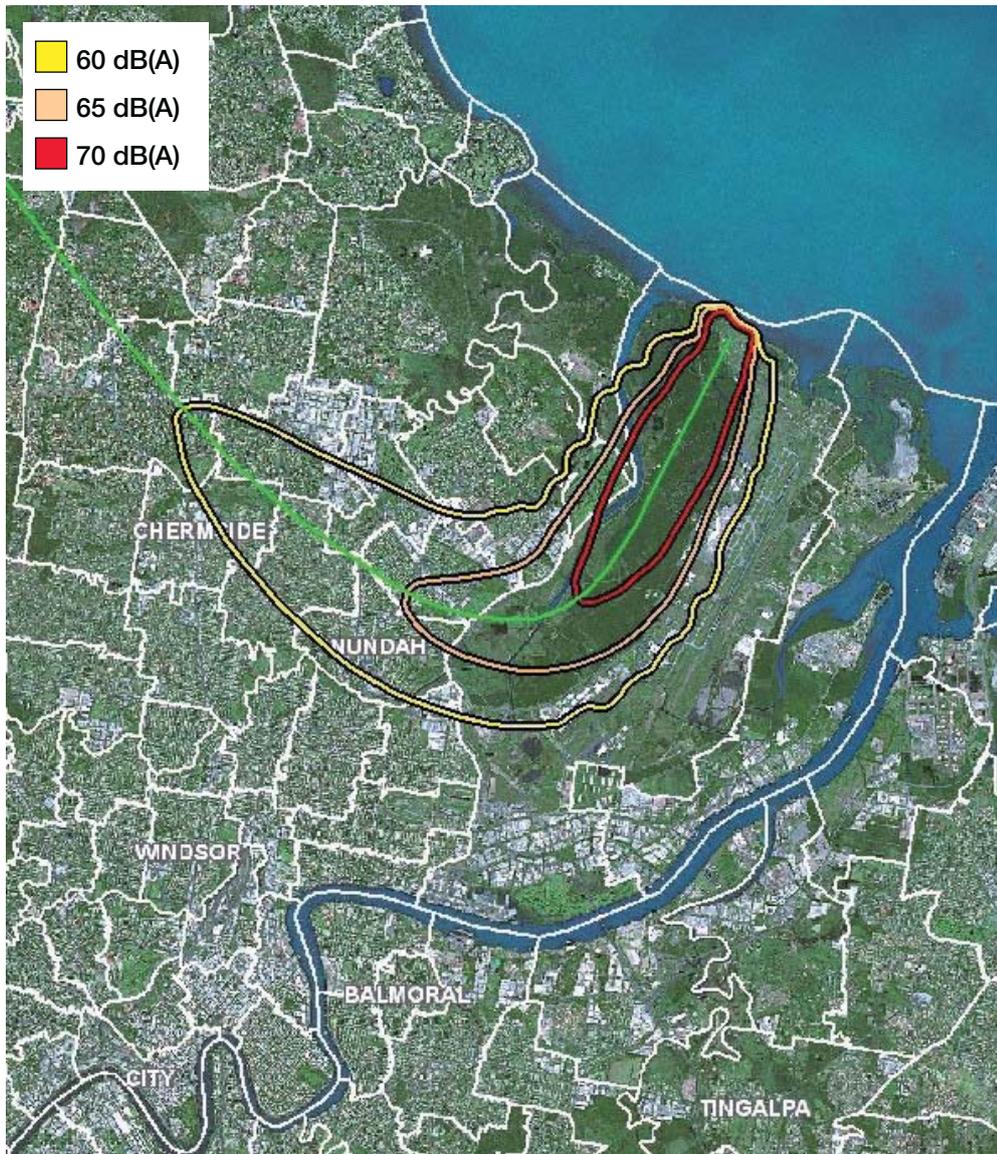


Figure 2: Turbo prop engine aircraft noise footprint (60, 65, 70 decibels) departure off Runway 19R at night .

6.8.3 Communities Under Flight Paths for New Runway at Night

Sleep related issues are not expected to be an issue for communities affected by the new parallel runway. Noise at night will be minimised for communities under the new parallel runway flight paths in the same way that noise will be minimised at night for the residents west of the Kedron Brook Floodway. This will occur through the implementation of the Draft Parallel Runway Operating Plan as described in the previous section. The previous Figures show communities south of the new runway (runway on the left hand side of the figure) at night, are not subject to any overflights of 70 decibels or greater due to the new parallel runway. This should not, however, be confused with noise due to the existing runway which is addressed in the section below.

6.8.4 Communities Under Existing Flight Paths to Main Runway

Three submissions expressed concern about the existing situation. Reference was made to the following specific issues:

- occasional awakenings due to specific aircraft (possibly heavy internationals or the older freighter (Boeing (hush kitted) 727) aircraft on certain nights (by submitter under current arrivals and departures - Coorparoo);
- on busy days planes fly day and night (by submitter positioned directly under existing arrivals and departures - Morningside) ; and
- critical of the assessment with respect to sleep disturbance suggesting the Heathrow Airport curfew as a remedy along with the curfewed airports of Australia - Sydney, Coolangatta, Essendon and Adelaide.

The findings of the health impact assessment study for noise in the Draft EIS/MDP state that there would be an overall net reduction in sleep disturbance at opening of the NPR in 2015. The NPR provides the potential to maximise over-bay operations. Notwithstanding the expected increase in the number of flights, if the NPR was not built the areas that are currently subject to aircraft noise in both the late evening (9pm -10pm) and night (10pm - 6am) periods would be greater than with the NPR.

The older noisier freighter aircraft of which one is currently still operating out of Brisbane are being phased out in 2007 and will not be flying in 2015 when the NPR is due to open. The heavy long haul internationals, which tend to be noisier due to their increased weight from passengers and fuel, are not scheduled to grow significantly in the period 2015 to 2035 as supported by the NPR forecasts. (eg. the number of international flights between 11pm and 6am increases from 6 to 7 departures which all occur in the 11pm to 1am period) from 2015 to 2035; no internationals are forecast to be operating between 1am and 5am).

With respect to parts of the community that are subject to aircraft noise from the current runway configuration, in the absence of a new runway, the distribution of noise will continue in its current pattern. However, with the NPR in place there is a reduction in night noise to areas which currently have aircraft over them. This is shown in Figure 3 for a comparison of before and after the NPR opens in 2015 in the night time period for 5 overflights at 70 decibels or more overlaid with contours which show the improvements by 1 flight and worsening by 1 flight for a Summer Weekday night. With the new runway operating in accordance with Draft Parallel Runways Operating Plan (refer Chapter D10 of the EIS/MDP) the majority of the noise shrinks back to affect only the industrial areas on the north side of the river.

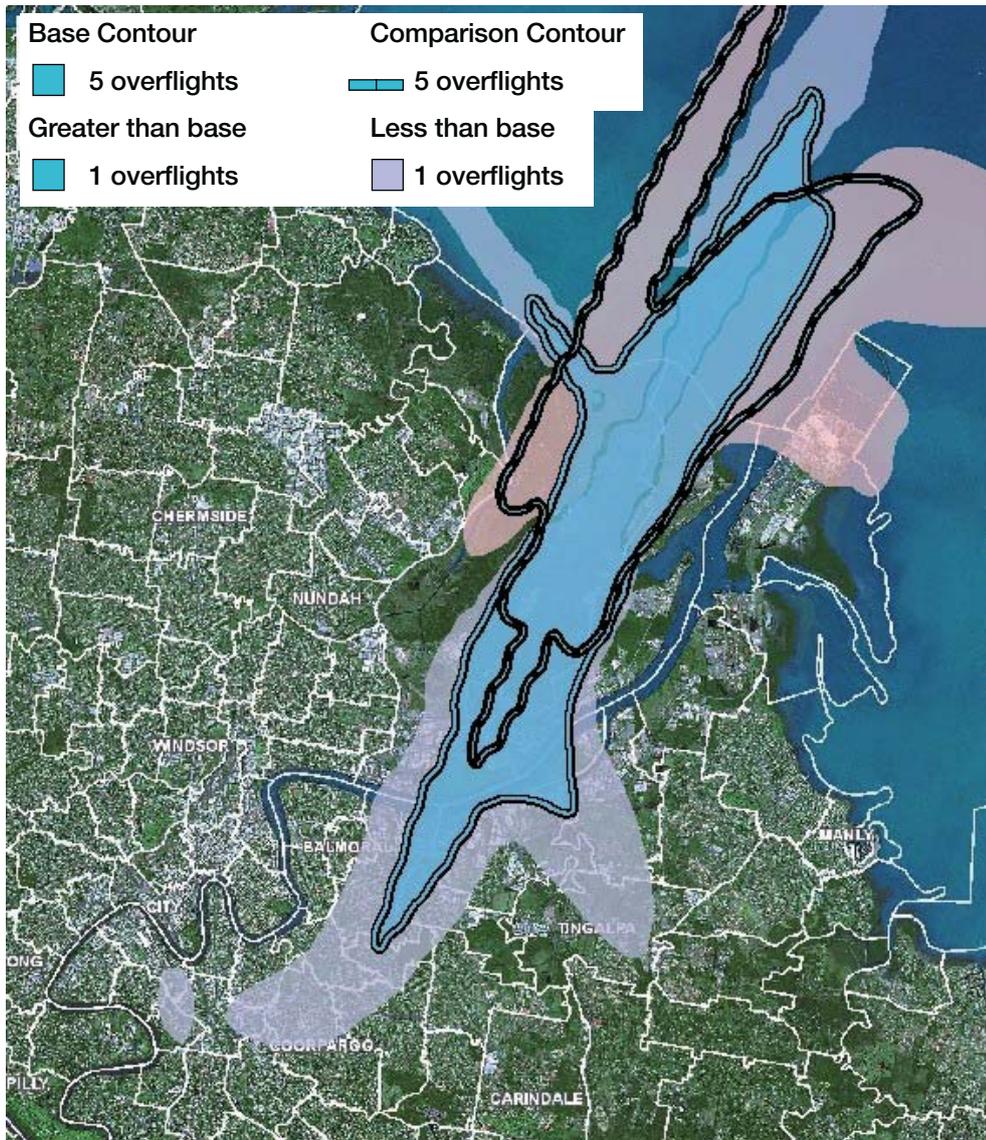


Figure 3: A comparison between the Summer Week Day Night N70 (5 overflights) for before (block sky blue) and after (dashed sky blue) the NPR in 2015 (sky blue contour) underlaid by difference (+pale blue/-pale pink) of up to 1 flight

6.8.5 Night Noise in Summer Versus Winter

One submitter commented that the analysis presented for Summer as the example did not show the impact of noise in the night hours for Winter. Figure 4 shows the comparison of the before and after case in 2015 for Winter nights. It shows that the N70 (5 overflights) contour for when the NPR is operational in 2015 is much smaller than the contour for the Winter nights before the NPR becomes operational. Weather conditions which favour over-bay operations are more prevalent in the Winter months than the Summer months and therefore presenting the Summer case invariably shows the worst case scenario. The Draft EIS/MDP consistently aimed to illustrate the worst case conditions in order to present the effects of the NPR as transparently as possible.

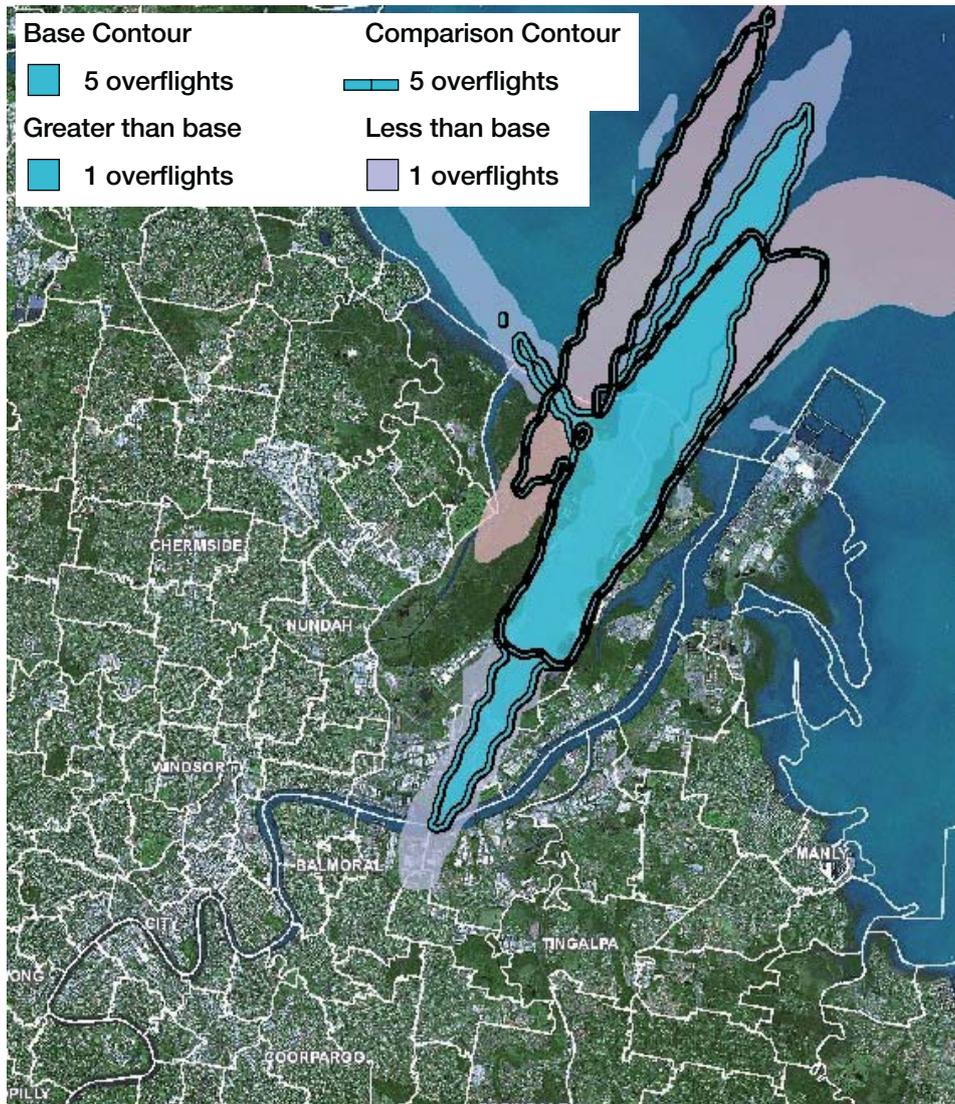


Figure 4: A comparison between N70 (5 overflights) for 2015 before NPR as Base Contour (block sky blue) and 2015 after NPR as the Comparison contour (dashed line sky blue) for the Winter Weekday Night period. This is underlain by difference contours which show up to 1 flight difference (+pale pink / - pale blue)

With the NPR in place the night time noise contour (the dashed line above) for a Winter week day is considerably reduced and contained almost wholly on airport land.

Addition/Omission to Draft EIS/MDP:

No new wording to be inserted for this issue.

6.9 D8 – Hazards and Risk (15 of 196 submissions)

Draft EIS/MDP reference: (D8)

15 of the 196 submissions raised concerns about public safety due to the new runway.

Submitter Issues:

Submitters raised the following concerns about the potential risk to public safety:

- Some submitters expressed general concern about safety referring quite often to the increase in flights therefore there must be an increase in risk (5 of 15);
- Some government and non-government organisations expressed concern on any impacts the new runway would have on the prescribed airspace (PANS-OPS and OLS surfaces) (4 of 15);
- A couple of submissions commented the NPR would present an increased risk due to birdstrike (2 of 15);
- A couple of submitters offered alternative locations for the NPR based on public safety (2 of 15);
- The Queensland Government submission raised the issue of rescue response at the bay end of the runway (1 of 15).
- Airservices Australia raises a number of operational issues which will need further consultation as the project progresses (1 of 15).

These will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	105, 113, 165, 181, 190, 194, 216, 232,	153,203, 242	183, 195, 228	188
Total	8	3	3	1

BAC response:

6.9.1 General Concerns Regarding Safety

Many community submitters were concerned that the increase in the number of aircraft would lead to an increase in the risk of air crashes. The findings of the Hazard and Risk study (refer to Chapter D8 of the Draft EIS/ MDP) conclude that the risk of aircraft crashes is extremely low at Brisbane Airport. The assessment took into account the operation of overseas airports which handle significantly larger volumes of aircraft than is projected for Brisbane.

6.9.2 Prescribed Airspace Issues

There were three categories of issue which arose with respect to prescribed airspace and each will be addressed separately below:

- A range of issues including building heights and protection of airspace in the CBD was raised by Brisbane City Council;
- Airspace implications for the Port were raised by Port of Brisbane Corporation; and
- Energex and Powerlink commented on existing OLS issues regarding nearby electricity towers.

6.9.3 BCC Issues

BCC issues consist of the following:

- Recognition of the CBD as a “tall building obstacle zone”;
- Tall building areas in other parts of Brisbane; and
- Clarification of EIS Volume D, Figure 8.3 (Prescribed Airspace).

These issues are discussed below.

Recognition of the CBD as a “Tall Building Obstacle Zone”

BCC requested that the CBD be recognized as a special area or a “tall building obstacle zone” with the intent that airspace design allow aircraft to avoid airspace, as much as possible, over and in close proximity to the CBD.

BAC and BCC have agreed to discuss the issue of CBD building heights and existing prescribed airspace limitations. The following is relevant to this issue.

Brisbane’s current prescribed airspace

Airspace is regulated by the Australian Government under the Airports Act 1996, and the Airports (Protection of Airspace) Regulations.

Under that legislation, the prescribed airspace for Brisbane Airport is established in two ways:

1. The obstacle limitation surfaces (OLS) and PANS-OPS surfaces for the existing runway system are determined by reference to the procedures set out in Annex 14 to the Chicago Convention and in procedures published by the International Civil Aviation Organisation (ICAO); and
2. By a process for the declaration (and subsequent gazettal) of additional airspace, which declaration is made by the Department of Transport & Regional Services (following consultation with agencies such as the Civil Aviation Safety Authority).

In the case of Brisbane Airport, additional airspace to take account of the NPR in its staggered location was declared by a delegate of the Secretary to the Department of Transport & Regional Services in July 2001.

The protection of airspace is fundamental to facilitating the safe and efficient movement of aircraft into, out of and around Brisbane Airport.

Essentially, airspace protection is designed to achieve safe separation of aircraft from obstacles (tall structures either natural or man-made) and other aircraft in both visual and instrument conditions during take-off, landing or when manoeuvring in the vicinity of an airport. This includes taking account of clearance requirements when aircraft undertake emergency manoeuvres (e.g. engine failure on take-off) or when a landing has to be aborted.

Protected airspace at Brisbane consists of:

1. Obstacle Limitation Surfaces (OLS) – determined by reference to the level and location of the runway itself; and
2. Obstacle assessment or accountability requirements for instrument flight (known as PANS-OPS Surfaces) – designed by reference to the obstacles that exist around an airport (including a minimum clearance between the surface and the closest obstacle).

The request to have the CBD declared a tall building obstacle zone is inconsistent with Brisbane Airport's current (gazetted) prescribed airspace. Currently, the prescribed airspace affects different parts of the CBD area in different ways. However, the whole of the CBD has prescribed airspace above it, and the Airports Act requires approval of any CBD structure above 152.5m AHD. Further, the Commonwealth legislation prohibits any permanent structure that penetrates the PANS-OPs surfaces for Brisbane Airport.

In relation to the suggestion that aircraft should avoid the airspace over the CBD, it should be noted that Airservices Australia, a Commonwealth agency, is charged with ensuring the safe and efficient management of air traffic and there are safety and operational reasons why aircraft must fly in the vicinity of the CBD (and in some cases this is unavoidable).

The detailed technical drawings for the OLS, the PANS-OPS and the combined surfaces were provided to BCC upon their gazettal in July 2001, as well as following the approval of the 2003 Master Plan and on several occasions since then in the course of normal assessment processing.

Long term planning which accounts for CBD

The original planning task force for the current airport, which began in the early 1970s, comprised representatives of the Commonwealth and State governments as well as Brisbane City Council. The major constraints which were taken into account included the location of the CBD and building height restrictions.

Since BAC assumed control of the airport in 1997 and released its plans for the airport in successive Master Plans in 1998 and 2003, the preferred western parallel runway of earlier Master Plans has been staggered a further 2350 metres north away from the CBD.

Tall buildings in other parts of Brisbane

The reference by BCC to multi-storey buildings in parts of Brisbane other than the CBD would require consideration on a location by location basis to understand the prescribed airspace surfaces affected and the types of height limitations which may be possible. These considerations are expected to form part of the combined BAC/BCC investigation which is currently in its initial stages of building heights in the CBD and other areas.

Clarification of Draft EIS/MDP Volume D, Figure 8.3

Figure 8.3 in Volume D of the Draft EIS/MDP represents the PANS-OPS surfaces for the proposed NPR system. It is the same as Figure 14.2 of the approved 2003 Master Plan (page 213) except it has been updated to reflect the retained length of runway 14/32 on airport land. As the representation of these surfaces can be extremely technical the Draft EIS/MDP figure has been presented in the same stylised format as for most general public publications which do not show all possible surfaces at all possible heights and locations.

It should be noted that BCC has been previously provided with the technical drawings and briefed of Brisbane's gazetted prescribed airspace for the NPR system. The technical drawings consist of the OLS and PANS-OPS drawings which both clearly indicate coverage of the CBD. For all prescribed airspace applications, BAC is required to consult with BCC under the Airports (Protection of Airspace) Regulations 1996. BAC has consistently provided BCC with a copy of the PANS-OPS, OLS and combined PANS-OPS/OLS charts which include airspace protections for the NPR.

In the interests of greater technical detail Figure 8.3 in Volume D of the Draft EIS/MDP will be replaced with Schedules A and B, OLS and PANS-OPS drawings respectively, to the declaration of prescribed airspace for Brisbane Airport which was declared on 5 July 2001 under the Airports (Protection of Airspace) Regulations 1996.

Insufficient detail has been provided by BCC in order to address comments with respect to claims of inconsistency between BAC drawings and published Airservices Australia approach minima. As this is an extremely technical issue and the comments appear to relate to current runway system airspace protection issues it is considered best dealt with in the combined BAC/BCC investigation previously referred to which has been recently initialized.

6.9.4 Port of Brisbane Issues

The Port of Brisbane made comments in connection with port development heights particularly in relation to future container cranes at Fisherman Islands and the redevelopment of the Hamilton Northshore precinct.

BAC and the Port of Brisbane work very closely together on operational issues and BAC is committed to ongoing consultation with respect to crane heights on Fisherman Islands. The two organisations also consult regularly on other developments like the Northshore precinct and will continue to do so.

6.9.5 Energex and Powerlink Issues

The issue specifically referred to by both parties is their proposal to increase the height of an existing tower which already penetrates the OLS on the eastern most corner of the Nudgee Golf Course. On airspace safety grounds, BAC has indicated that it does not support further penetration of the OLS by increasing the tower heights. BAC will continue to work through the issue with Energex and Powerlink.

6.9.6 Birdstrike Issues

A couple of submitters have raised the issue of the potential increased risk of birdstrike with respect to the location of the NPR in relation to the surrounding environment, which includes a number of known migratory and other important bird species habitats.

As detailed in EIS Chapters D8 Hazards and Risk and B5 Terrestrial and Marine Ecology, it is well documented which birds are found on or near the airport site and which bird species feature in birdstrike incidences. A comprehensive risk analysis has also been undertaken for bird species at Brisbane Airport the most important being listed in Volume D, Section 8.7.2 (page D8-345). The higher risk bird species tend to be resident birds which are managed for on a daily basis at Brisbane Airport. The list does not, however, include any migratory wader species as, according to field surveys, they tend to be undisturbed by aircraft and stage activities from their main roosting sites north and south of the airport in a non-threatening manner to aircraft.

Brisbane Airport has been safely managed in its current location for the past 19 years and bird management is part of the everyday operational management routine. NPR Fact Sheet #11 Bird Management at Brisbane Airport has further information on this matter and is available on the Brisbane Airport website.

As stated in the Draft EIS/MDP (page D8-348) no increase in birdstrike rate is expected due to the NPR. This is because the extended airfield is expected to attract the same composition of grassland species as currently occurs. Bird management will continue to be carefully managed as part of normal operations at Brisbane Airport.

One of the submitters suggests that the NPR will increase the risk of birdstrike due to its proximity to waterways. BAC would argue in view of the extensive bird studies and observations, that this will not be the case. The threshold of the NPR, while closer to the bay than the existing main runway, is in the same position as the threshold of the current cross runway. Also, the position of the NPR in relation to Kedron Brook Floodway to the west is comparable to the proximity of the existing main runway to Boggy Creek and the Brisbane River to its east.

The same submitter refers to several specific bird species including the White-bellied sea eagle, eastern grass owls and the Lewin's Rail as a concern for increased risk of birdstrike. As outlined in Draft EIS/MDP Volume B, Chapter B5 (page B5-284) a specific management plan has been developed to establish an alternative roost site for the white-bellied sea eagle. Its current site is within the NPR development footprint and will be relocated as part of the clearance works for the NPR. With respect to the Lewin's rail and the Eastern grass owl, both species are

ground-based extremely shy birds which do not present a risk in terms of birdstrike. As part of BAC's Biodiversity Management Strategy, further research (a Masters study) has been commissioned to investigate the specific habitat requirements of the Lewin's rail and the potential of expanding its current area further north to the proposed Kedron Brook Floodway Drain.

6.9.7 Alternative Locations for the NPR due to Safety

Two submitters suggested alternative locations for the NPR based on safety. One submitter suggested the risk to communities on the ground would decrease if the new runway was aligned north/south so that all aircraft could approach and depart over Moreton Bay.

The north/south alignment parallel to the existing main runway is the proposed alignment for the NPR. However, if the new runway was constructed parallel to the current 14/32 runway (commonly referred to as the cross or east-west runway) approaches would largely be over Wynnum and Manly to the south of the river and over Bramble Bay to the north. This would still result in overflights of residential areas.

The other suggestion was to have the runway staggered back to a location at least 500 metres from Moreton Bay with the intention of making it safer for overseas pilots who may not be familiar with the details of the Brisbane Airport. All pilots are required to follow designated approach and departure paths assisted by a number of navigational aids. Moving the runway south would not in any way alter the ability of international pilots to achieve a safe approach or departure at Brisbane Airport but would reduce the buffer distance between the runway's northern threshold and the nearest residence.

6.9.8 Rescue and response in Moreton Bay

The Queensland Government provided comment regarding an inability to access an aircraft should it come down in Moreton Bay at low tide given there is up to 500 metres of tidal mud flats.

Incidents of such a serious nature are the responsibility of the State Disaster Management framework, which BAC has mechanisms in place to support in the event of an incident. Brisbane conducts regular training exercises of its Airport Emergency Plan (AEP) which integrates all emergency services in the event of an incident at the airport.

An aircraft crash in Moreton Bay will present a range of challenges (low and high tide and water borne recovery) that the State Disaster Management framework will have to deal with utilising available resources as they would in any other emergency situation either on or off airport.

The location of the NPR does not, in BAC's opinion, present any additional rescue requirements over those for the existing two runways at Brisbane Airport. The existing main and cross-runways require take-offs and landings over these inter-tidal flats and Moreton Bay.

6.9.9 Airservices Functions

Airservices Australia provides the Aviation Rescue and Fire Fighting (ARFF) Service on airport and seeks further consultation on the details for a new fire station.

BAC will be working closely with Airservices Australia through final design and construction to ensure continued safe and efficient operations of Brisbane Airport. Further consultations have already commenced.

Addition/Omission to Draft EIS/MDP:

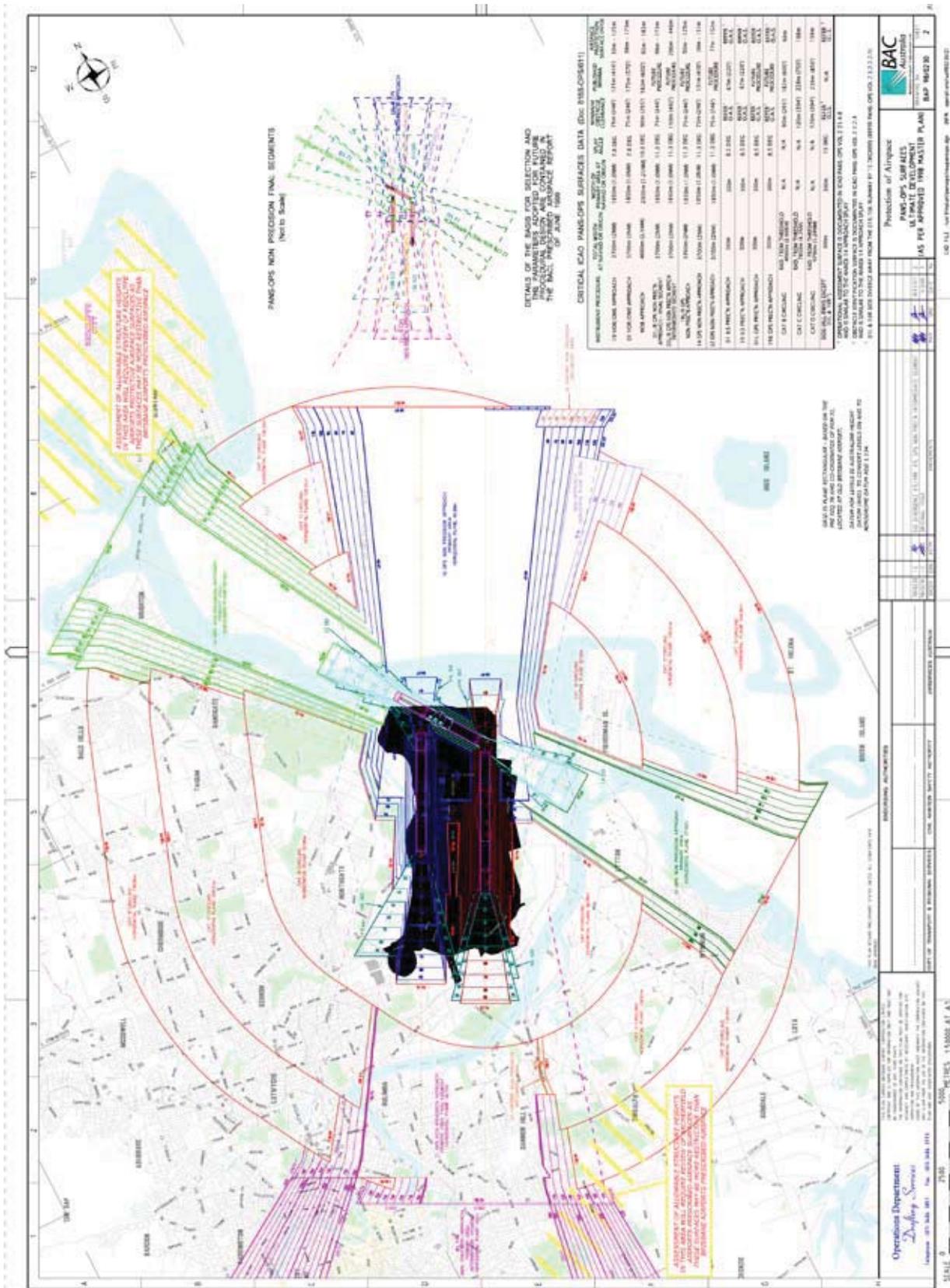
Amend Draft EIS/MDP Chapter D8 as follows:

Delete Figure 8.3 and replace with:

Declaration of Prescribed Airspace for Brisbane Airport:

1. Schedule A - Obstacle Limitation Surfaces (OLS) and
2. Schedule B (PANS-OPS)

Please note these are technical drawings designed to be reproduced at A1 size but have been included here for completeness of the issue in discussion.



Schedule B – (PANS-OPS)

6.10 D9 – Social Impacts – Amenity and Lifestyle *(22 of 196 submissions)*

EIS reference: Chapter D9

22 of the 196 submissions raised concerns about the effects the existing and future airport operations, particularly noise, is having or will have on their amenity and quality of life.

Submitter Issues:

Concerns raised about the effects of aircraft on lifestyle and amenity included:

- General concerns that quality of life will be reduced by aircraft noise (12/22);
- Loss of enjoyment of homes, not possible to watch television, listen to the radio or have a conversation due to aircraft noise (7/22),
- Community concerns and social cost are dismissed by BAC (5/22);
- Brisbane outdoor lifestyle affected (3/22);
- Impact on community facilities (places of worships, hospitals, etc) (2/22);
- Aircraft air emissions will reduce quality of life (1/22).

These will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	17, 37, 45, 56, 81, 107, 116, 131, 134, 135, 136, 148, 180, 182, 197, 199, 234			114, 137, 141, 184, 188
Total	17	0	0	5

BAC response:

6.10.1 General Concerns About Quality of Life

A number of submissions expressed concern about existing and future aircraft overflights and noise exposure interfering with their quality of life.

Impact on individual amenity with respect to aircraft overflights and noise (or any other external activity for that matter) is subjective. What people will tolerate and accept is also subjective and lack of information and understanding of the real nature of an activity also often increases the concerns of individuals and decreases what they will tolerate.

Many people in Brisbane currently live under or in close proximity to the current and future flight paths for Brisbane Airport. BAC acknowledges that some members of the community may feel their quality of life is or will be affected by aircraft overflights. It is also inevitable there will be disagreement within the community with regard to what level of noise exposure from aircraft (or any other activity for that matter) is acceptable given the different sensitivities of each individual.

The aircraft noise assessment undertaken in the Chapter D5 and the TNIP software has been provided to assist people in understanding the nature of current and future aircraft noise exposure in Brisbane. The noise metrics used in the aircraft noise assessment do not represent levels that are “acceptable” or “unacceptable”, but instead they are provided to assist members of the community understand their current and potential exposure to aircraft noise.

Chapter D10 provides a Draft Parallel Runway Operating Plan (PROP) for the management of aircraft noise. In preparing the Draft PROP, the interests of all stakeholders was considered to provide a balanced outcome with respect to safe and efficient airport operations and aircraft noise mitigation.

From a broader perspective Brisbane Airport is an important piece of Brisbane's transport infrastructure network providing vital air transport services to the people of Brisbane. Brisbane Airport is owned by the Australian Government and BAC is the lessee and operator of Brisbane Airport. Under the terms of the lease, BAC is obligated to ensure the current and future operations of the Airport so that Brisbane and South East Queensland continue to prosper and enjoy the high quality of life provided by this prosperity.

6.10.2 Impact on Home Activities (e.g. watching television, conversation)

As discussed in Chapter D4 and D5 in the Draft EIS/MDP communication interference while watching television or having a conversation can occur inside a building with the doors and windows open when outside noise is 70 dBA.

Noise from a passing aircraft is intermittent and may be heard for up to 30 seconds as the aircraft passes directly over a particular location with the intrusive noise impinging for typically less than 5 to 10 seconds above 70 dBA. The level and duration of intrusive noise is less if the aircraft is not directly overhead but passes to the side and the further one is from the airport.

The assessment demonstrated that some areas will have an increase in the number of overflight noise events (N70s) that could from time to time impinge briefly on communication. How often this occurs and what impact it will have on lifestyle will depend on the individual circumstances and sensitivities of each residence. The large buffer zone at Brisbane Airport significantly reduces the frequencies of noisy overflights in residential areas compared with other major cities in Australia.

However, there will also be areas that will benefit from the opening of the NPR as result of a decrease in overflight noise events on existing flight paths. The potential impacts on home activities and amenity have been summarised in Chapter D9, Table 9.9.

6.10.3 Community Concerns and Social Cost are Dismissed by BAC

Community concerns and potential social impacts were recognised by BAC at the outset of the NPR proposal. It was for this reason that TNIP was developed in addition to the Draft EIS/MDP to provide sufficient information so that individual members of the community had the ability to assess the current and future potential impacts of aircraft noise exposure on their particular circumstance.

Chapter D10 provides a Draft Parallel Runway Operating Plan (PROP) for the management of aircraft noise. In preparing the Draft PROP, the interests of all stakeholders, including the community, was considered in order to provide a balanced outcome with respect to safe and efficient airport operations and aircraft noise mitigation, but some level of noise exposure is inevitable.

However, there will always be disagreement within the community with regard to what level of noise exposure (from aircraft or other activity) is acceptable given the different sensitivities of each individual.

6.10.4 Brisbane Outdoor Lifestyle Affected

Communication interference while enjoying an outdoor lifestyle (such as barbeques, al fresco dining at restaurants and playing sport) can occur above 60 dBA when aircraft fly over.

The noise of passing aircraft is intermittent and may be heard for up to 30 seconds as the aircraft passes directly over a particular location with the intrusive noise impinging for typically less than 10 to 15 seconds above 60 dBA. The level and duration of intrusive noise is less if the aircraft is not passing directly overhead but to the side and the further one is from the airport.

The assessment demonstrated that some areas will have an increase in the number of overflight noise events that could from time to time impinge briefly on outdoor activities. How often this occurs and what impact it will have on outdoor activities will depend on the individual sensitivities and the circumstances in each outdoor situation. For example, at a barbeque with several people talking and children playing an aircraft passing overhead may not be noticed above the ambient background noise.

As stated previously, the Social Impact Assessment concluded some areas will have an increase in aircraft noise exposure and some areas will benefit from the opening of the NPR, with a decrease in overflight noise exposure.

6.10.5 Impact on Community Facilities (places of worships, hospitals, etc)

The Social Impact Assessment in Chapter D9 included mapping of community facilities (including schools, child care, health and aged facilities, recreational facilities and places of worship), which occurred within the N70 (5 overflight) contours for the before and after new runway cases.

The assessment concluded there are facilities that will have an increase in aircraft noise exposure and facilities that will benefit from the opening of the NPR, with a decrease in overflight noise exposure. What impact it will have will depend on the individual sensitivities and circumstances at each facility. For example, facilities with air conditioning or recreational activities, such as sports fields, may not notice the aircraft noise.

6.10.6 Aircraft Air Emissions Will Reduce Quality of Life

One submission expressed concern about the impact air emissions will have on their well-being and quality of life. The issue of air quality and well-being has been addressed in the Air Assessment in Chapter D6 and the Health Impact Assessment, Chapter D7. The assessments concluded that aircraft emissions will have a negligible impact on air quality and thus is unlikely to reduce quality of life.

Addition/Omission to Draft EIS/MDP:

No new wording to be inserted for this issue.

6.11 D9 – Social Impacts - Schools *(24 of 196 submissions)*

Draft EIS/MDP reference: (D9, D7.7)

24 of the 196 submissions raised concerns about the effects on schools and the implications for student’s learning. As part of the social impact assessment in Volume D, Chapter 9 of the DRAFT EIS/MDP, an assessment of the impacts to schools was undertaken. The assessment included mapping of educational facilities which occurred within the N70 (5 overflight) contours for the before and after new runway cases in 2015. The Health Impact Assessment (HIA) in Chapter D7 discussed the use of communication interference as a proxy effect for gauging cognitive performance of children in schools. As discussed in many parts of the Draft EIS/MDP communication interference can occur inside a building with the doors and windows open when outside noise is 70 decibels.

The findings were that 9 educational facilities were within the N70 for the NPR that were not within the N70 contour before the NPR opened. However, the assessment went on to demonstrate (refer EIS, Volume D Table 9.7b and Figure 9.4d – both reproduced below) that although there are newly affected schools there are also schools which benefit from the opening of the NPR.

Submitter Issues:

Submitters raised concerns about the effects on schools as follows:

- General concerns about impacts on schools and disruption to learning including schools affected by current flight paths (9 of 24);
- Concerns regarding the impact to schools as a result of the NPR (8 of 24);
- Need for air-conditioning or sound proofing to assist schools to reduce noise levels (4 of 24);
- The Draft EIS/MDP lacks full discussion of mitigation for impacts to schools (3 of 24); and
- Individual assessments for each school or facility affected was not undertaken (1 of 24).

These will be addressed in separate sections below.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	13, 19, 30, 37, 107, 116, 131, 134, 135, 136, 165, 174, 190, 197, 199	153, 242	41, 226	114, 137, 141, 184, 188
Total	15	2	2	5

BAC response:

6.11.1 General Concerns About Schools

A number of submitters expressed concerns about the potential for aircraft passing overhead to interrupt communication within the classroom which in turn could lead to lower educational achievements for students. Many schools currently operate under or in close proximity to the current flight paths but Brisbane Airport Corporation has not been made aware of any comment or evidence that the educational outcomes of these students are affected by aircraft noise.

The primary study referred to in the health impact assessment, the RANCH study (refer to Table 7.7 in Volume D, page D7-305), looked at cognitive outcomes generally and found some positive associations between increased

chronic aircraft noise and reading comprehension. It is important to note that this association is from chronic, that is constant unremitting, levels of noise. This is not reflective of the situation here at Brisbane where due to the large buffer zones schools are not exposed to this constant level of noise. These studies were conducted at three major European cities, Amsterdam, Madrid and London, where the communities are situated within hundreds of metres of the runway, not kilometers away as is the case here in Brisbane.

The noise from aircraft is intermittent with the noise lingering for up to 30 seconds with the intrusive noise usually lasting less than 5 seconds as the aircraft passes closest to a particular location. School hours are largely outside the peak periods which occur between 7am to 9am and 5pm to 7pm. Currently (2005) at Brisbane, schools under the current flight paths, on a Winter (April to October) weekday (6am to 6pm), may be exposed to up to approximately 40 overflights of 70 decibels or greater of which around 24 overflights occur in school hours (between 9am and 3pm). This means that around 4 flights per school hour will register 70 decibels or greater for around 5 seconds each time. This in no way correlates to the chronic noise levels discussed in the RANCH study.

Modern classrooms are vibrant spaces subject to a range of noise influences including activity and background noise created by students and teachers and noise in the direct vicinity of the buildings like roads, highways and other industrial sources.

6.11.2 Concerns for Newly Affected Schools NPR

Schools which will be affected by flights paths for the NPR will experience similar effects to those which are under the current paths. In contrast, in 2015 when the NPR opens, schools under the NPR flight paths will have slightly less traffic than schools under the current flight paths. North and west traffic which will account for approximately 40% of aircraft will use the new runway and south and east traffic which will account for approximately 60% will use the existing runway.

6.11.3 Building Acoustic Treatments

A number of submissions have suggested that acoustic treatments such as double glazing or air-conditioning should be installed in the schools at BAC's expense.

The tool used by all levels of government in determining the need for acoustic treatments for buildings is the Australian Standard AS2021 – Acoustics – Aircraft noise intrusion – Building siting and construction, which refers to the ANEF contours for the airport. Using the ANEF contours as reference boundaries the standard provides advice about the compatibility of certain land uses in the vicinity of airports with respect to aircraft noise and potential for acoustic treatments. The standard's advice is that schools should not be sited within the 25 ANEF contour and should they be located between the 20 ANEF and 25 ANEF land use authorities (Brisbane City Council in the case of areas surrounding Brisbane Airport, for example) may consider the requirement for the incorporation of noise control features in their construction appropriate. The ANEF for Brisbane Airport is included in this report in Section 6.13. The ANEF for Ultimate Development of the Brisbane Airport (up to 2035 and beyond) has the ANEF 20 associated with the new western runway extend to the north side of the Brisbane River.

6.11.4 Mitigation

Mitigation for noise for the project is contained in the Draft Parallel Runway Operating Plan included in the Draft EIS/MDP Volume D, Chapter 10. Essentially the plan outlines the preference of modes for operation at different times of the day which aims to maximize aircraft operations over the bay. When this is not possible and only 50% of operations over the bay can be achieved (which will be the case for most of the day and evening hours 6am to 10pm) aircraft traffic will be split between using the new and the existing runway. For further details refer to Chapter D10 in the Draft EIS/MDP and Section 6.13 of this document.

6.11.5 Individual Assessments for Every Facility

One submitter requested that all facilities like schools, childcare, aged care, hospitals etc likely to be affected by the new runway have individual noise assessments carried out. BAC considers that the level of assessment provided in the Draft EIS/MDP is adequate for each of the facilities to determine the effects, if any, of the new runway on each. Schools and the other types of facilities were given special attention in Draft EIS/MDP Chapter D9. Individual schools were identified and listed. Submissions were received from one of these school raising concerns. Submissions were received from one aged care facility and the Australian Catholic University in close proximity to the airport which were supportive of the New Parallel Runway.

Addition/Omission to Draft EIS/MDP:

No new wording to be inserted for this issue.

6.12 D10 – Curfew (59 of 196 submissions)

Draft EIS/MDP reference: (D10 & Flight Path and Noise Information Booklet and TNIP)

Brisbane Airport was planned as a 24 hour operating airport, with large buffer zones and provision for a parallel runway system (with two similar length runways) that would maximise the number of flights that can occur over Moreton Bay, particularly at night. BAC has prepared a fact sheet (as part of a series developed by BAC in relation to the Draft EIS/MDP) explaining the advantages of 24 hour operations.

59 submissions have specifically called for a night curfew or some form of restriction on night operations at Brisbane Airport and 6 submissions support a no curfew policy.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitters	14, 17, 19, 22, 27, 35, 37, 40, 56, 59, 61, 62, 81, 83, 90, 92, 102, 109, 110, 124, 130, 138, 126, 142, 148, 150, 156, 162, 174, 176, 177, 180, 182, 192, 194, 198, 197, 214, 215, 220, 230, 231, 232, 233, 234, 238, 239	153, 221	78, 125, 204, 225, 231	114, 141, 184, 188, 205
Total	47	2	5	5

The majority of the submissions (33/59) are from the suburbs south of the Brisbane River. Of these, 19 are under or close to the existing runway 01 STARs or 19SIDs (Morningside, Cannon Hill, Camp Hill, Norman Park, Seven Hills, Coorparoo, Greenslopes, Moorooka, Murarrie). The other 14 are under or near the extended centreline of the NPR at Balmoral, Bulimba, Hawthorne, Ascot, Hamilton and Hendra.

Sixteen of the submissions (16 of 59) are west of the NPR centreline and include Nudgee Beach, Nudgee, Banyo, Northgate and Nundah, where the concerns are related to the lateral noise of aircraft at night, particularly the use of reverse thrust.

The main points raised regarding the curfew issue include:

- In most cases, the request for a curfew appears to be based on the belief that noise levels at night will get worse as a result of the NPR and that a curfew would provide protection from this occurring.
- The responses vary in the type of curfew requested and when it should be imposed. There are some requests for a partial curfew – either on operations on the NPR at night or a restriction on the type of aircraft (i.e. all jets, large jets or old jets). Two submissions suggest there should be a curfew on the airport now.
- There are also suggestions that curfew be imposed on the airport now similar to other Australian Airports such as Sydney or Adelaide.

The six submissions that strongly support a no curfew policy are the Australian Catholic University to the west of the NPR, the BCC Councillor for Wynnum, and NGO's including AUSAC, Brisbane North Development Forum, Queensland Tourism Industry Council and the Air Freight Council of Queensland.

BAC response:

6.12.1 Curfew

Brisbane Airport was planned as a 24 hour operating airport, with large buffer zones and provision for a parallel runway system (with two similar length runways) that would maximise the number of flights that can occur over Moreton Bay, particularly at night. BAC has prepared a fact sheet (as part of a series developed by BAC in relation to the Draft EIS/MDP) explaining the advantages of 24 hour operations (see Fact sheet #17 in Appendix 5).

Many of the submissions requesting a curfew at Brisbane Airport appear to have been motivated by current impacts at night of older noisy jet aircraft, in particular the 727 freighters, and have not considered the reduction in noise at night as result of the proposed NPR.

6.12.2 Curfew at Night Because Noise Will Get Worse with NPR

This response suggests that many submitters do not accept or have not fully understood the conclusion in the Draft EIS/MDP in Chapter D5, that the NPR will reduce noise at night in all residential areas compared with the existing runway system.

This is especially the case for those residents south of the Airport under the existing runway arrival and departure flight paths (as demonstrated in Chapter D5 of the noise assessment and the TNIP model) because of the use of over bay operations.

The availability of parallel runways and the proposed Draft Parallel Runway Operating Plan (for the management of aircraft noise) in Chapter D10 will notably reduce night-time aircraft operations over residential Brisbane between 10pm and 6am, especially jet operations, by the preferred use of the over bay modes.

With respect to residents south of the Airport under the NPR flight path, the Draft Parallel Runway Operating Plan does not permit the use of Runway 19R departures or Runway 01L arrivals at night over these suburbs, so there will be no increase in noise from aircraft at night with the NPR.

The forecast percentage of over-bay operations for the different modes at night (10pm to 6am) was presented in Chapter D5 in Table 5.2j & 5.2k. The approximate forecast percentage of movements over the bay for the time periods in the Draft PROP for 2015 (when the NPR is operational) have also been calculated. The average percentage of night movements over the bay is approximately 80% to 90%, over the 6 months of the season (summer and winter).

Of the total movements that are forecast to occur during the night period 11pm to 6am, the majority of movements (approximately 85% to 90%) are non-jet aircraft (turbo props and small GA aircraft) and the smaller narrow body jets (737s, A320s, and regional jets).

In addition, by 2008 the noisy old 727 freighters, which are responsible for many of the complaints at night, will no longer be operating at Brisbane Airport.

6.12.3 Curfew Because of Lateral Noise and Reverse Thrust on the NPR

Requests for a night curfew from residences to the west of the airport appear to have been based on the potential threat of lateral aircraft noise impacts, particularly reverse thrust, on these suburbs.

The preferred use of over bay operations at night will mean that the NPR will be the arrival runway for a large percentage of the night-time period 10pm to 6am. BAC has recommended in Section D5.8 that for noise mitigation, limitations be placed on the use of reverse thrust for night time operations. It is understood that this measure is used at other airports and so should be possible at Brisbane Airport.

However, at night there may be occasions where operational or weather conditions require the use of reverse thrust for safety reasons. In these cases, it has been recommended in Section D5.8 that aircraft use the existing main runway with current Reciprocal Operation procedures.

In addition, when SODPROPS or DODPROPS is not available at night due to weather conditions, the Parallel Runway Operating Plan has recommended the use of the existing main runway for all jet take-off and landings (Modes 10a and 10b) as an option to mitigate lateral noise from the NPR.

There was a submission from the Australian Catholic University, identified in the Draft EIS/MDP as one of the closest sensitive receptors to the west of the NPR that strongly supports the no curfew policy at Brisbane Airport.

6.12.4 Full Curfew or Partial Curfew at Night

The request for a curfew varied between submissions. There were requests for either a full curfew or partial curfew, with restrictions either on certain operations, on just the NPR at night or a restriction on the type of aircraft (i.e. all jets, large jets or old jets) allowed to operate at night.

Many of the calls for a curfew from residences currently affected by existing aircraft operations have been motivated by the old noisy freighters (the 727 freighters in particular) that operate at Brisbane Airport. In fact some of the submissions suggested that if there was not going to be a curfew there should at least be a restriction on these old noisy aircraft.

Brisbane Airport is able to report that since the release of the Draft EIS/MDP, it has negotiated with the operators of the 727 freighters to cease operations of these aircraft by the end of 2007, when they will be replaced by 737-300 aircraft, a more modern and significantly quieter aircraft. The 727 aircraft will certainly not be operating when the NPR is built.

Some submissions under the NPR flight paths to the south of the airport have indicated that if a curfew on the airport does not happen there should at least be a curfew at night on movements to and from the south on the NPR over residential areas. The Draft PROP already fulfils this request with respect to the recommended night-time Modes 4, 9 (or 10a and 10b) at night when over-bay operations are not available. These modes do not permit the use of the NPR for 19R departures or 01L arrivals – that is, there will be no arrivals or departures on the NPR over residential areas south of the runway.

6.12.5 There Should be a Curfew on Brisbane Airport Now

At Brisbane Airport, even with the existing runway system, up to 80% of all movements in summer and over 90% in winter that arrive and depart from Brisbane Airport at night (11pm to 6am) do so over Moreton Bay and away from residential communities. Based on the 2015 traffic forecasts in the Draft EIS/MDP, the number of movements over Moreton Bay will decrease between now and 2015 before the opening of the NPR, particularly during the high traffic hour in the 5am to 6am night period. However, the number of over-bay operations will increase again once the NPR is open to accommodate the higher number of movements.

In addition, as stated previously it is the older 727 aircraft that has generated many of the complaints about night-time noise. This aircraft will cease operations by the end of 2007, when they will be replaced by 737-300 aircraft, a more modern and significantly quieter aircraft.

6.12.6 A Curfew at Brisbane Airport Similar to Other Australian Airports

There were some suggestions that a curfew be imposed on the airport similar to other Australian capital city airports such as Sydney or Adelaide.

Curfews are not the norm at other Australian capital city airports. Sydney and Adelaide Airports have residences as close as 600 metres from the end of the runway as well as residences located within the ANEF 30. The nearest community from the end of either runway at Brisbane Airport will be at least 6.4 kilometres and the nearest residences to the west of the runway will be at least 1.4 kilometres from the runway centreline.

Additionally, the curfew at the other Airports does not mean a total shutdown of the Airports, but rather restricted operations for night-time hours with respect to runway use and the number of movements. For example there are no restrictions on non-jet movements at Adelaide Airport at night.

Addition/Omission to Draft EIS/MDP:

Changes to The Draft Parallel Runway Operating Plan in Chapter D10 of the EIS/MDP are identified in the response to the Draft PROP in Section 6.13.

6.13 D10 – Draft Parallel Runway Operating Plan (85 of 196 submissions)

Draft EIS/MDP reference: Chapter D10 – Draft Parallel Runway Operating Plan

Comments received about aircraft noise management or mitigation have been addressed in D10. Comments ranged from suggestions on how to improve noise mitigation to requesting a curfew or at least some type of restriction on time operations. Comments relating to improvements in management of aircraft noise are handled in this section. Comments that relate to a curfew are addressed separately in Section 6.12.

85 of the 196 submissions made comments relating directly or indirectly to the Draft Parallel Runway Operating Plan (PROP) in Chapter D10 in the Draft EIS/MDP. Submitters raised the need for a noise management plan that includes requirements for aircraft noise mitigation.

Raised by:

	Community	Govt Agency	NGO	Elected Reps
Submitter ID Numbers	3, 11, 14, 17, 19, 22, 23, 25, 27, 29, 35, 37, 40, 46, 56, 59, 60, 61, 62, 71, 81, 83, 90, 91, 92, 102, 109, 110, 116, 122, 124, 126, 128, 130, 132, 133, 138, 142, 147, 148, 150, 156, 160, 161, 162, 171, 174, 175, 176, 177, 180, 182, 187, 192, 194, 197, 198, 201, 203, 208, 210, 214, 215, 220, 230, 232, 233, 234, 238, 239	153, 221, 242	78, 125, 204, 225 231	114, 127, 141, 184, 188, 201, 205
Total = 85	70	3	5	7

Draft Parallel Runway Operating Plan for aircraft noise management

51 of the 85 submissions on noise management required the provision of a noise management plan (NMP) and aircraft noise mitigation procedures at Brisbane Airport to be defined, but did not request a curfew.

Some of the specific comments on aircraft noise management included:

- Comments on how noise should be mitigated – e.g. restricted night operations on NPR, noise sharing through alternating flight path at different times, spreading noise over flight paths zones, restrictions on noisy aircraft at night, noise limits for aircraft and fines for exceeding limit; no large heavy aircraft should use NPR (32/85);
- Request for a NMP for aircraft noise mitigation or claims that Draft EIS/MDP did not appear to provide comprehensive NMP (22/85);
- Request for noise insulation and/or compensation (10/85);
- Most or all flights should be over the bay or unpopulated areas (8/85);
- Mitigation of lateral noise and reverse thrust from NPR (7/85);

- Request for an improved noise monitoring program and/or a transparent complaints register and response procedure (5/85);
- Endorsement of Draft PROP that NPR not be used at night for arrivals and departures over Brisbane (3/85);
- No timetable for evaluation of RNP (1/85);
- Effects of daylight saving should be considered especially with respect to early morning night operations between 5am and 6pm (1/85);

The above comments are addressed below.

BAC Response:

6.13.1 Draft Parallel Runway Operating Plan for Aircraft Noise Management

Noise Management Plan for Aircraft Noise Mitigation

Several submissions requested that a noise management plan (NMP) for aircraft noise mitigation or there were claims that the Draft EIS/MDP did not appear to provide a comprehensive NMP.

The Draft Parallel Runway Operating Plan (PROP) in Chapter D10, Section 10.4 in the Draft EIS/MDP was designed for the purpose of aircraft noise management and is in effect a NMP. Future reference to the Draft PROP will include reference to it being a plan for the management of aircraft noise.

The Draft PROP listed for different times of the day, differentiating for weekdays and weekends, the preferred modes of operation and is reproduced below. The different modes of operation are described and shown diagrammatically in the Draft EIS/MDP in Section 10.3 and the runway configuration is shown in Section 10.2 in the Draft EIS/MDP. These figures are also reproduced below.

The modes of operation and the “active” or “passive” choice of modes for the different times of the day are described in detail in Section 10.3 and Section 10.4 respectively.

The Tables 10.4a and 10.4b in Chapter D10 provide a summary of the Draft Parallel Runway Operating Plan (for the management of aircraft noise). In preparing this plan, the interests of all stakeholders was considered to provide a balanced outcome with respect to safe and efficient airport operations and aircraft noise mitigation. However, BAC acknowledges that the Draft PROP will not provide the ideal outcome to all stakeholders at all times.

The noise mitigation measures provided by the Draft PROP will include:

- The “active” use of over-bay operations at night and other noise sensitive times when traffic volumes and weather conditions permit;
- Extending the time of over-bay operations for jets at night and other noise sensitive times by allowing departures of quieter non-jet aircraft off Runway 19R;
- The use of the existing runway operations only at night when over-bay operations are not available, i.e. there will be no arrivals from or departures to the south off the NPR over the residential areas.
- The use of reverse thrust will not be permitted at night on the NPR, unless deemed necessary for safety. If an aircraft requires the use of reverse thrust, then the arrival will be directed to the existing runway where operating conditions permit and safety is not compromised.

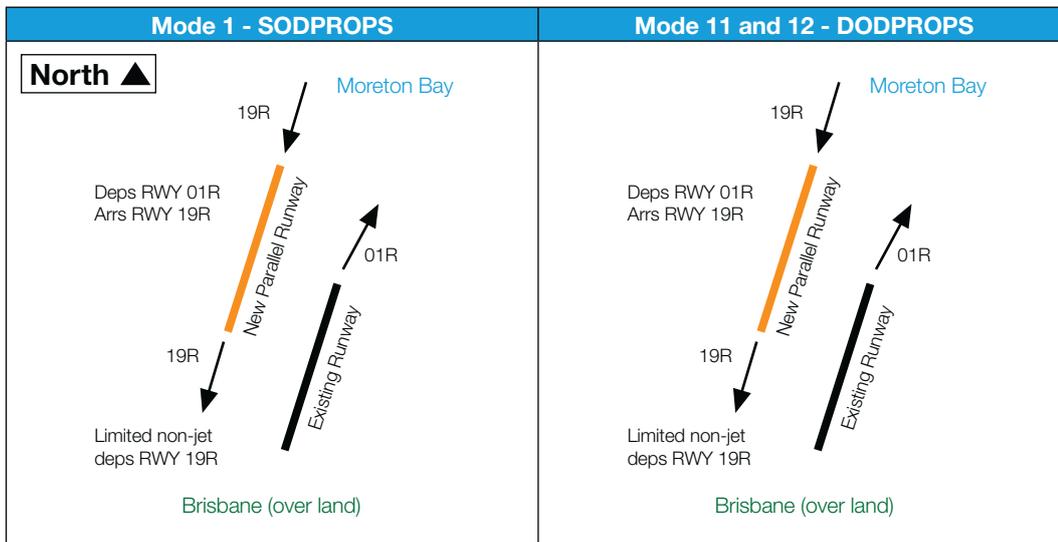
Table 10.4a: Weekday Operations – Monday to Friday.

WEEKDAY OPERATIONS – Monday to Friday		
Day Mode (6am to 8pm)	1. 2. 3.	Mode 1: SODPROPS (downwind up to 5 knots) – ‘passive’ i.e. at Airservices Australia discretion to be used if air traffic are low for an extended period Mode 6: RWY19 Mixed Parallel Mode 2: RWY01 Mixed Parallel
Evening Mode (8pm to 10pm)	1. 2. 3.	Mode 1: SODPROPS (downwind up to 5 knots) – ‘active’ i.e. to be used if available Mode 6: RWY19 Mixed Parallel Mode 2: RWY01 Mixed Parallel
Night Mode (10pm to 6am)	1. 2. 3. 4. 5.	Mode 1: SODPROPS (downwind up to 5 knots) – ‘active’ Mode 11: DODPROPS (downwind 5 to 10 knots) – ‘active’ Mode 12: DODPROPS + 19R non-jet departures Mode 9: RWY19 Semi-mixed Parallel – departures RWY19L only (or Mode10b) Mode 4: RWY01 Semi-mixed Parallel – arrivals RWY01R only (or Mode 10a)

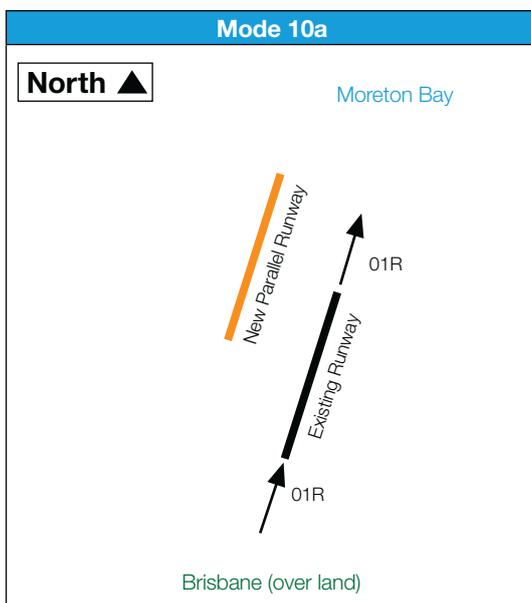
Table 10.4b: Weekend Operations – Saturday and Sunday.

WEEKEND OPERATIONS – Saturday and Sunday		
Day Mode (8am to 8pm)	1. 2. 3.	Mode 1: SODPROPS (downwind up to 5kts) – ‘passive’ i.e. at Airservices Australia discretion Mode 6: RWY19 Mixed Parallel Mode 2: RWY01 Mixed Parallel
Evening Mode (8pm to 10pm)	1. 2. 3.	Mode 1: SODPROPS (downwind up to 5kts) – ‘active’ i.e. must be used if available Mode 6: RWY19 Mixed Parallel Mode 2: RWY01 Mixed Parallel
Night Mode (10pm to 6am)	1. 2. 3. 4. 5.	Mode 1: SODPROPS (downwind up to 5 knots) – ‘active’ Mode 11: DODPROPS (downwind 5 to 10 knots) – ‘active’ Mode 12: DODPROPS + 19R non-jet departures Mode 9: RWY19 Semi-mixed Parallel – departures RWY19L only (or Mode10b) Mode 4: RWY01 Semi-mixed Parallel – arrivals RWY01R only (or Mode 10a)
Early Morning (6am to 8am)	1. 2. 3.	Mode 1: SODPROPS (5 knots) – ‘active’ i.e. must be used if available Mode 6: RWY19 Mixed Parallel Mode 2: RWY01 Mixed Parallel

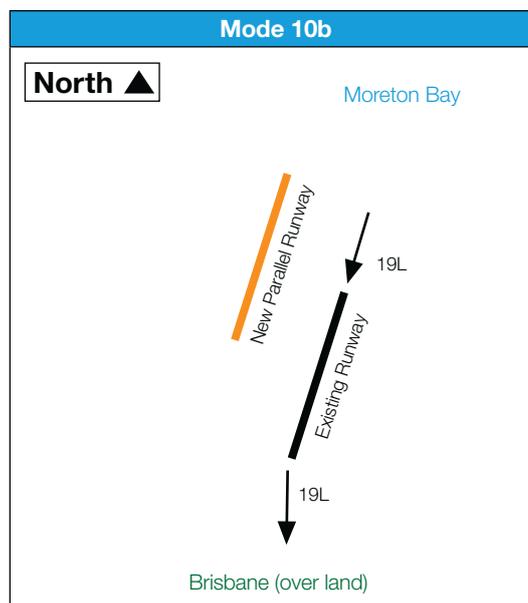
Figure 10.3b: Proposed Duty Runways for Modes 1, 11 and 12.



Mode 10a – 01 Existing Runway Only*



Mode 10b – 19 Existing Runway Only*



* These Figures are referred to in 6.13.5 and 6.13.8

Figure 10.3d: Proposed Duty Runways for Modes 3, 4 and 5.

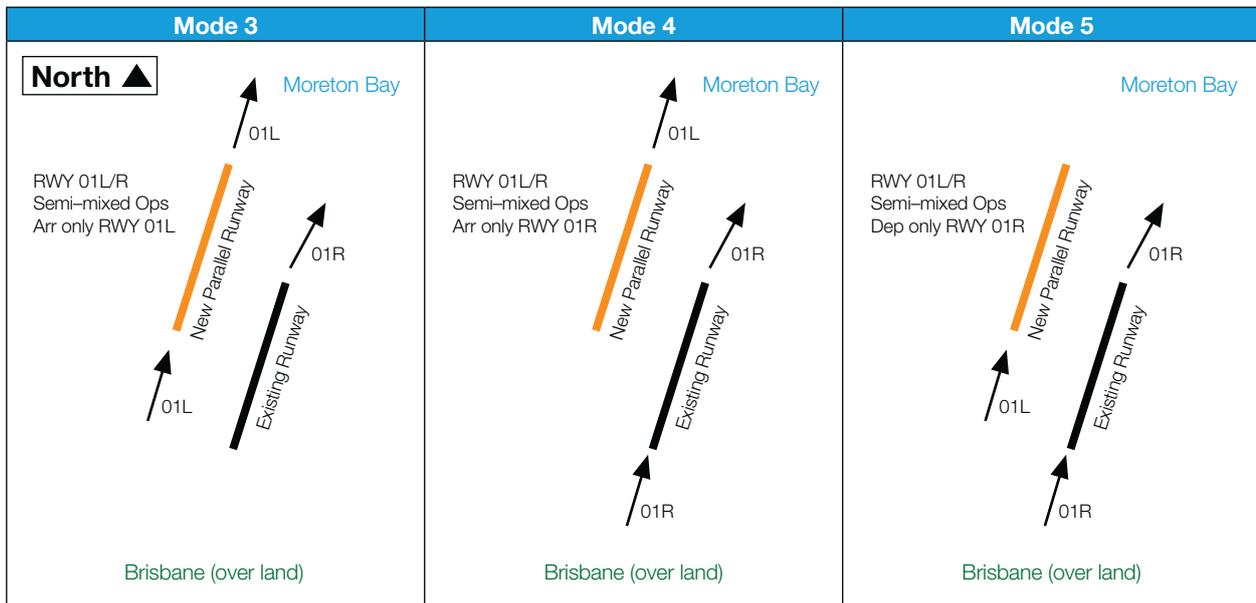


Figure 10.3f: Proposed Duty Runways for Modes 7, 8 and 9.

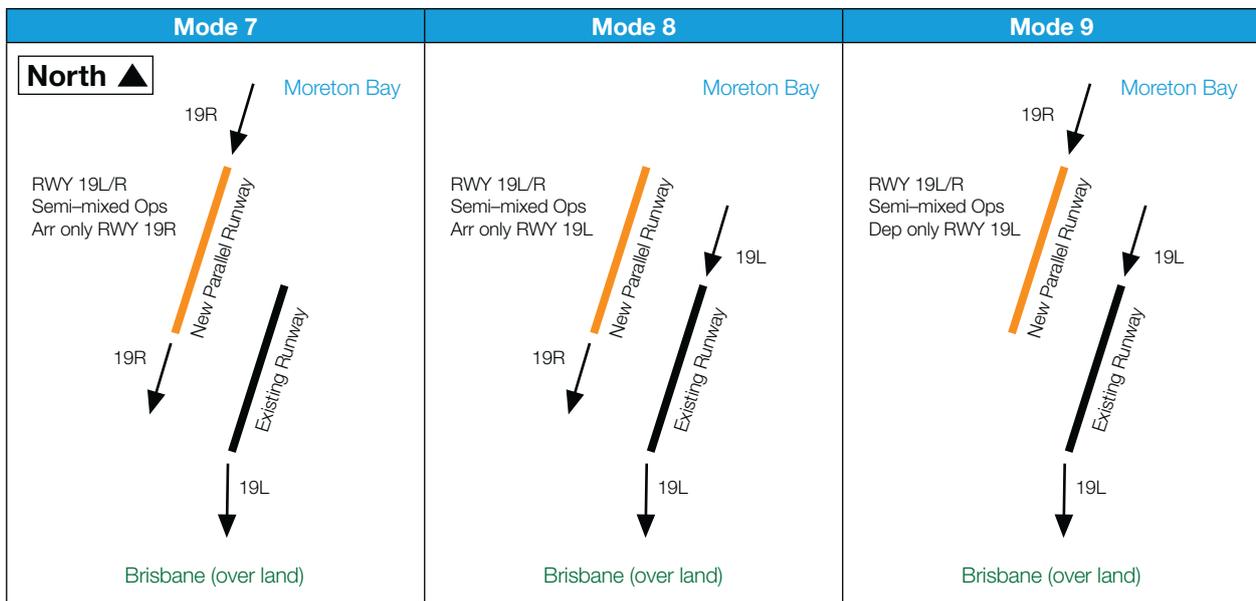
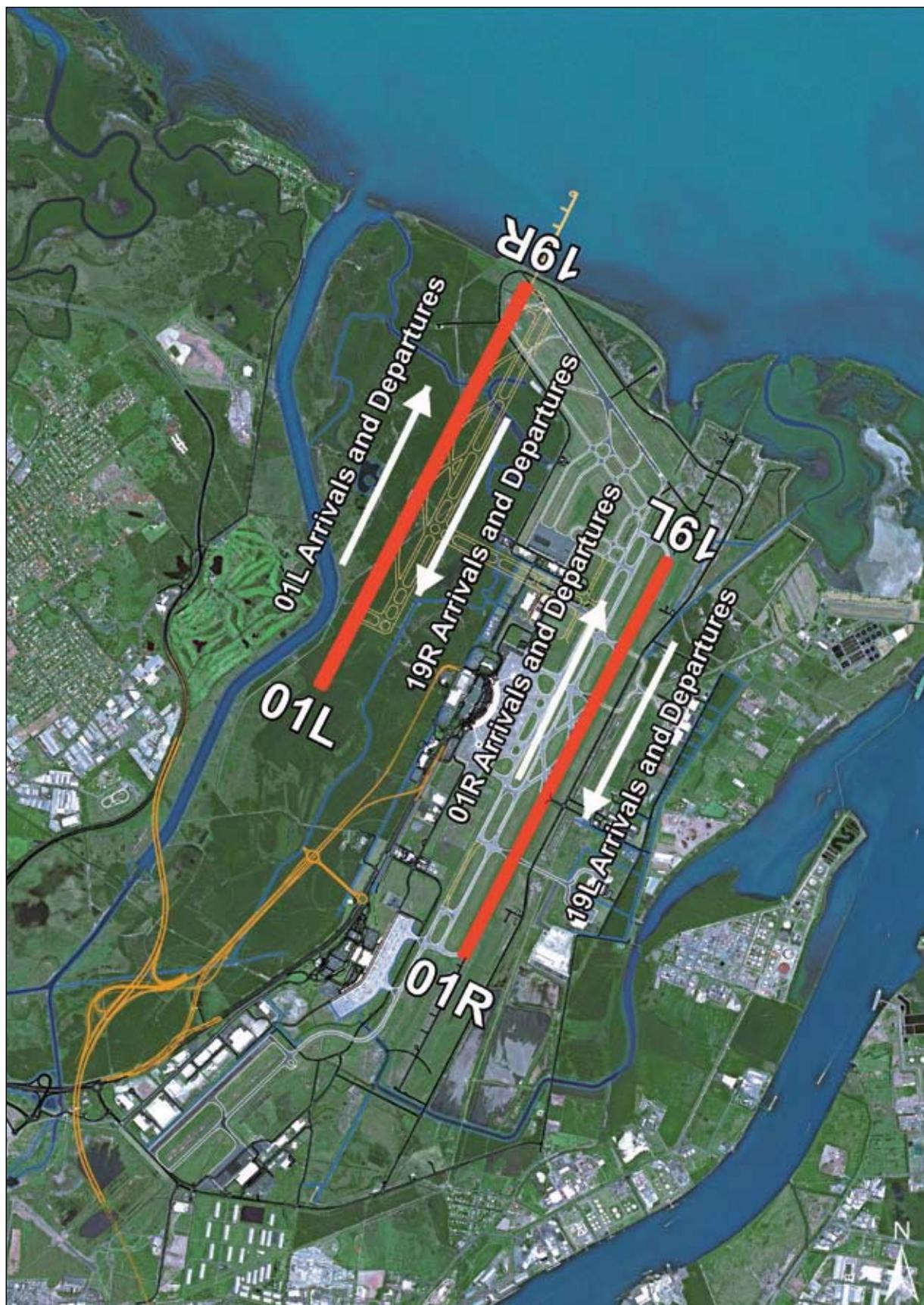


Figure 10.2: Runway Configuration.



Comments on how noise should be mitigated

As discussed in Chapter D10, Section 10.1, the safe and efficient movement of aircraft in and out of Brisbane Airport is a fundamental objective of airport and airspace operations. However, the aviation industry acknowledges that consideration of the community and the environment must also be a primary objective when designing the airspace, flight paths and air traffic management procedures. Therefore, many of the mitigation options suggested in the submissions are already being implemented at Brisbane Airport or are included in the Draft PROP for future parallel runway operations.

i) The restricted use of the NPR at night;

The Draft PROP preferred night-time modes (Modes 1, 4, 9, 10, 11 & 12) do not allow 01L arrivals or 19R departures off the NPR at night over the residential areas to the south. All arrivals and departures that cannot occur over-bay at night must use the existing runway (except on the rare occasion when the existing runway may be closed for emergencies or maintenance).

ii) Noise sharing through use of alternating flight paths

The NPR will provide a greater opportunity for noise sharing than currently possible with the availability of two main runways and flights being spread across the two runways. This allows a greater use of over-bay flight paths, particularly at the more noise sensitive times such as at night and the late evening and early morning periods when movement numbers are low.

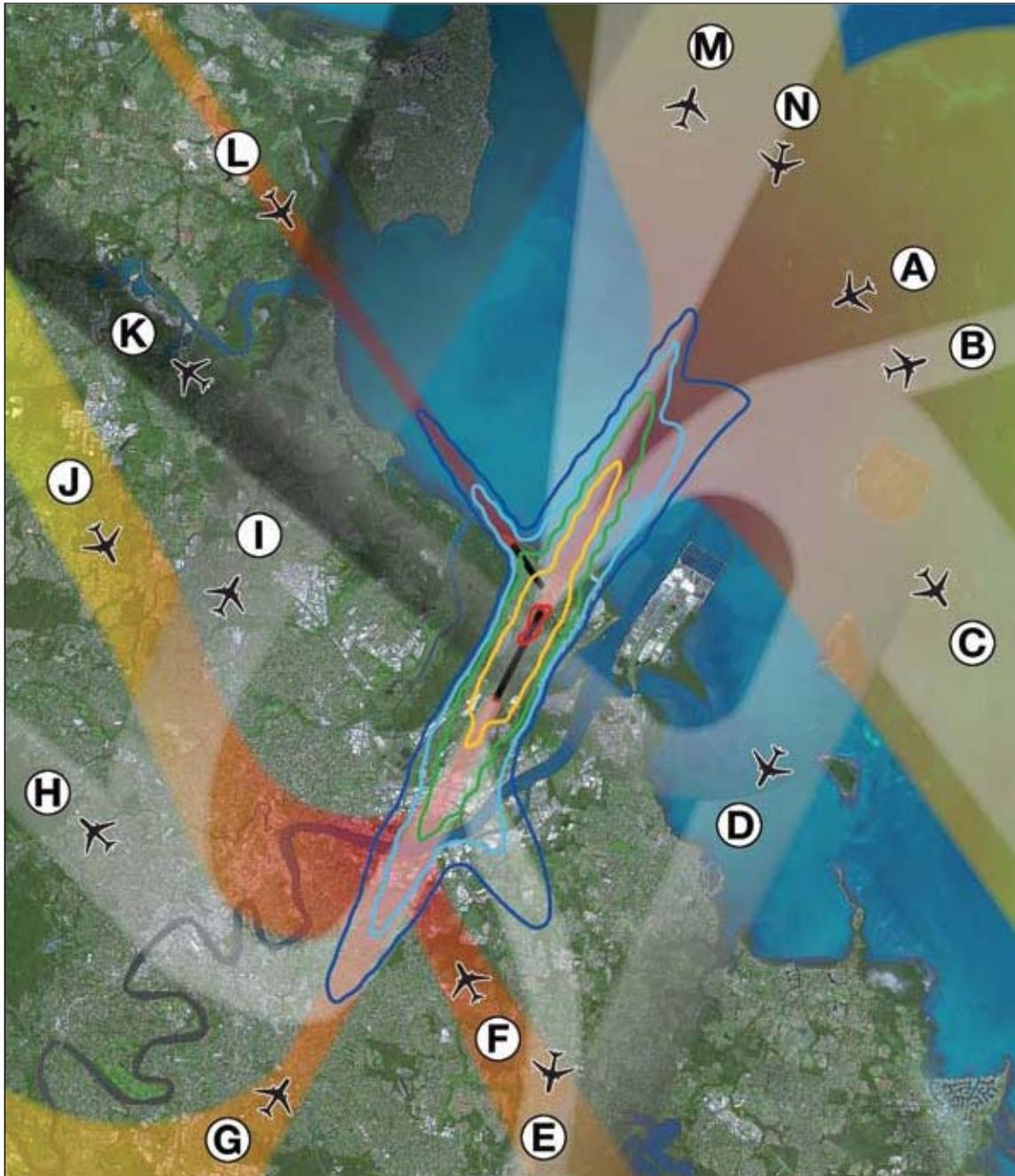
Further opportunity for alternating flight paths may be available in the future with improved navigation technology such as required Navigation Performance (as discussed in Chapter D5, Section 5.10). RNP trials commenced at Brisbane Airport in December 2006.

iii) Spread aircraft movements over the flight paths zones

The NPR will provide greater opportunity for noise sharing than is currently available with the vectoring of aircraft in the Chevron airspace for the arrivals on Runways 01L&R and departures off Runways 19L&R over Brisbane. The spreading of aircraft movements is demonstrated by the shaded flight path zones in the Figures in the noise assessment in Chapter D5 and the Flight Path and Noise Information Booklet.

Example figures of the existing runway system flight path zones and the NPR system flight path zones are provided here. The greater potential spread of flight paths is most obvious for the yellow/orange flight path zones south of the airport.

Figure 5.3d: 2015 Existing Runway System Flight Path Movement Chart – Summer Weekday Night.



Flight path	Flight path type	Average number of jet flights on flight path	Expected minimum and maximum numbers of jet flights on path	Percentage of Brisbane Airport's total jet flights on path	Percentage of days with no jet flights on path
A	Arrival	16	0 - 46	15%	55%
B	Departure	<1	0 - 1	<1%	34%
C	Departure	1	0 - 1	1%	34%
D	Departure	19	0 - 30	17%	31%
E	Departure	11	0 - 30	10%	55%
F	Arrival	15	0 - 34	13%	44%
G	Arrival	16	0 - 57	14%	31%
H	Departure	4	0 - 10	3%	55%
I	Departure	5	0 - 13	4%	56%
J	Arrival	6	0 - 14	6%	31%
K	Departure	3	0 - 5	3%	31%
L	Arrival	<1	0 - 1	<1%	55%
M	Departure	12	0 - 18	10%	31%
N	Arrival	5	0 - 15	4%	55%

Altitude Key

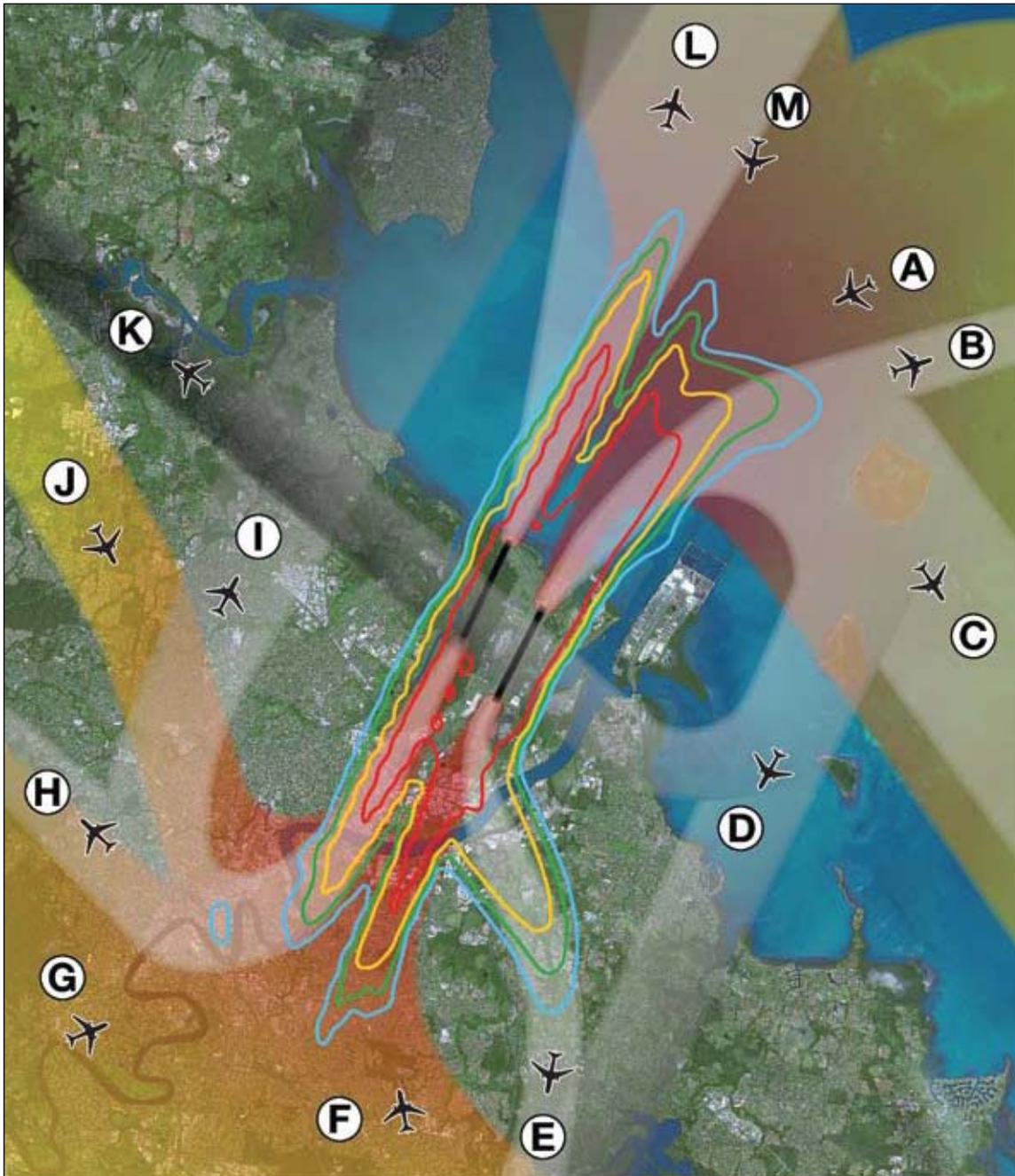
Arrivals
Mean Altitude
4,500 ft
0 ft

Departures
Mean Altitude
12,000 ft
0 ft

Contour Key
The number of overflights of 70dB(A) and above during the indicated time period

- 2 to 4 overflights
- 5 to 9 overflights
- 10 to 19 overflights
- 20 to 49 overflights
- 50 or more overflights

Figure 5.3e: 2015 NPR Flight Path Movement Chart – Summer Weekday Day.



Flight path	Flight path type	Average number of jet flights on flight path	Expected minimum and maximum numbers of jet flights on path	Percentage of Brisbane Airport's total jet flights on path	Percentage of days with no jet flights on path
A	Arrival	57	0 - 135	15%	22%
B	Departure	11	0 - 22	3%	7%
C	Departure	7	0 - 13	2%	9%
D	Departure	64	0 - 110	17%	7%
E	Departure	53	0 - 125	14%	22%
F	Arrival	62	0 - 126	17%	23%
G	Arrival	7	0 - 69	2%	23%
H	Departure	7	0 - 17	2%	23%
I	Departure	18	0 - 46	5%	23%
J	Arrival	22	0 - 53	6%	27%
K	Departure	5	0 - 10	1%	8%
L	Departure	22	0 - 42	6%	23%
M	Arrival	35	0 - 92	9%	17%

Altitude Key

Arrivals
Mean Altitude
4,500 ft
0 ft

Departures
Mean Altitude
12,000 ft
0 ft

Contour Key
The number of overflights of 70dB(A) and above during the indicated time period

- 5 to 9 overflights
- 10 to 19 overflights
- 20 to 49 overflights
- 50 or more overflights

iv) Restrictions on old noisy aircraft at night

The old 727 freighter aircraft that currently operate out of Brisbane Airport are responsible for many of the night-time noise complaints at Brisbane Airport. While these aircraft remain certified and registered by CASA, they are legally allowed to operate unrestricted at Brisbane Airport like all other aircraft. However, BAC has negotiated the discontinuance of the B727 freighter at Brisbane Airport by the end of 2007, when they will be replaced with more modern and significantly quieter 737-300 aircraft.

In addition, by 2015 it is expected that other older noisy aircraft that currently use Brisbane (such as the 747-300s) will have been phased out and replaced with more modern quieter aircraft.

v) Noise limits and penalties for aircraft and movement caps

There were some suggestions that noise limits and movement caps be set for aircraft. BAC believes that such measures are not necessary and will not be considered at Brisbane Airport, given the large buffer zones and relatively small level of impact from aircraft noise exposure compared with other major Airports.

In response to the suggestion that BAC impose penalties on noisy aircraft or fine aircraft that exceed noise limits, it is not possible for BAC to legally impose such measures.

vi) No large heavy aircraft should use the NPR

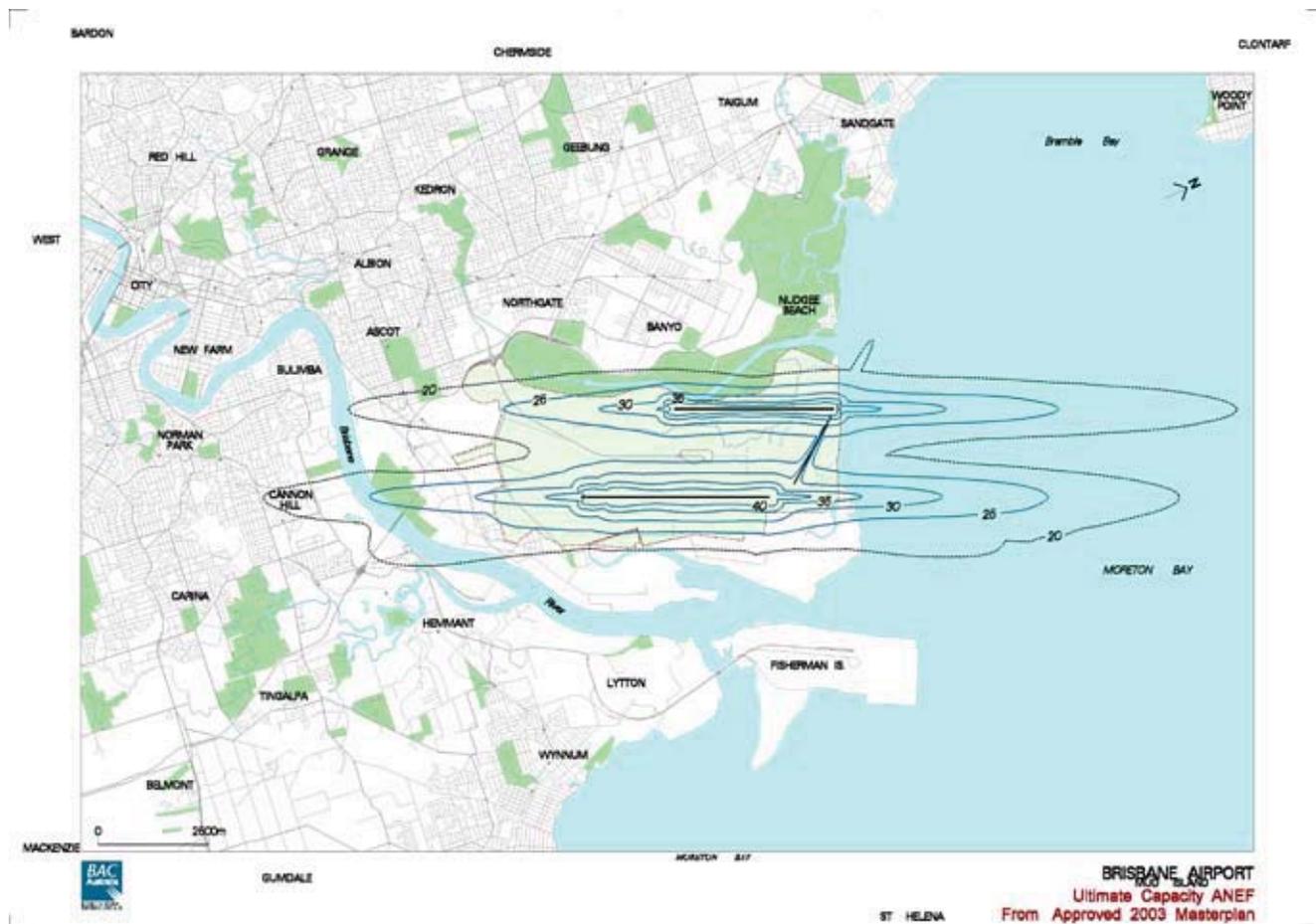
The Draft EIS/MDP states that the departure of large heavy aircraft on long haul routes (such as Brisbane to Dubai and Los Angeles direct) will continue to use the existing runway and not use the NPR. This is because these aircraft will require the longer runway for take-off but has the advantage of providing additional noise mitigation for NPR operations.

6.13.2 Noise Insulation or Compensation as a Mitigation Option

It has been suggested in some submissions that noise insulation or compensation be provided as a noise mitigation option. The Australian Government currently has a policy that insulation will be provided for all residences within the 30 ANEF. There is no policy for financial compensation.

No residential area in Brisbane is within the Brisbane Airport 30 ANEF (or the 25 ANEF) so there is no requirement for insulation programs or compensation. This will remain the case when the parallel runway is operational.

Ultimate Capacity ANEF



6.13.3 Most Or All Flights Should Be Over The Bay

The Draft PROP has been designed to maximise the number of flights over Moreton Bay. Most movements at night will be over the bay, however, due to weather conditions and traffic volumes, over-bay operations are only available for a small percent of the time during the day and early evening periods.

The operating requirements for the over-bay modes (SODPROPS, DODPROPS and existing Reciprocal Operations) are discussed in detail in Chapter D10, Section 10.3. Useful background information to assist understanding Airport operations and modes has also been provided in Chapter D2.

The forecast percentage of over-bay operations for the different modes and periods was presented in Chapter D5 in Table 5.2j and 5.2k and reproduced below. The approximate predicted percentage of movements over the bay with the NPR for the time periods in the Draft PROP for the 2015 traffic forecasts have been calculated and are summarised as follows:

At present, the permissible operating standard for independent simultaneous over-bay operations (i.e. the SODPROPS mode) is a dry runway with the downwind component being no greater than 5 knots. The permissible standard for dependent over-bay operations (i.e. the DODPROPS mode) is a dry runway with the downwind component being no greater than 10 knots. Under both the SODPROPS and DODPROPS mode, 100% of jet aircraft are over Moreton Bay.

There is a capacity limitation of 55 movements (combined arrivals and departures) per hour for the SODPROPS mode and 20 movements per hour for the DODPROPS mode. This means that when aircraft demand is greater than this, then over-bay operational modes would not be used as it would compromise flight safety and necessitate aircraft holding.

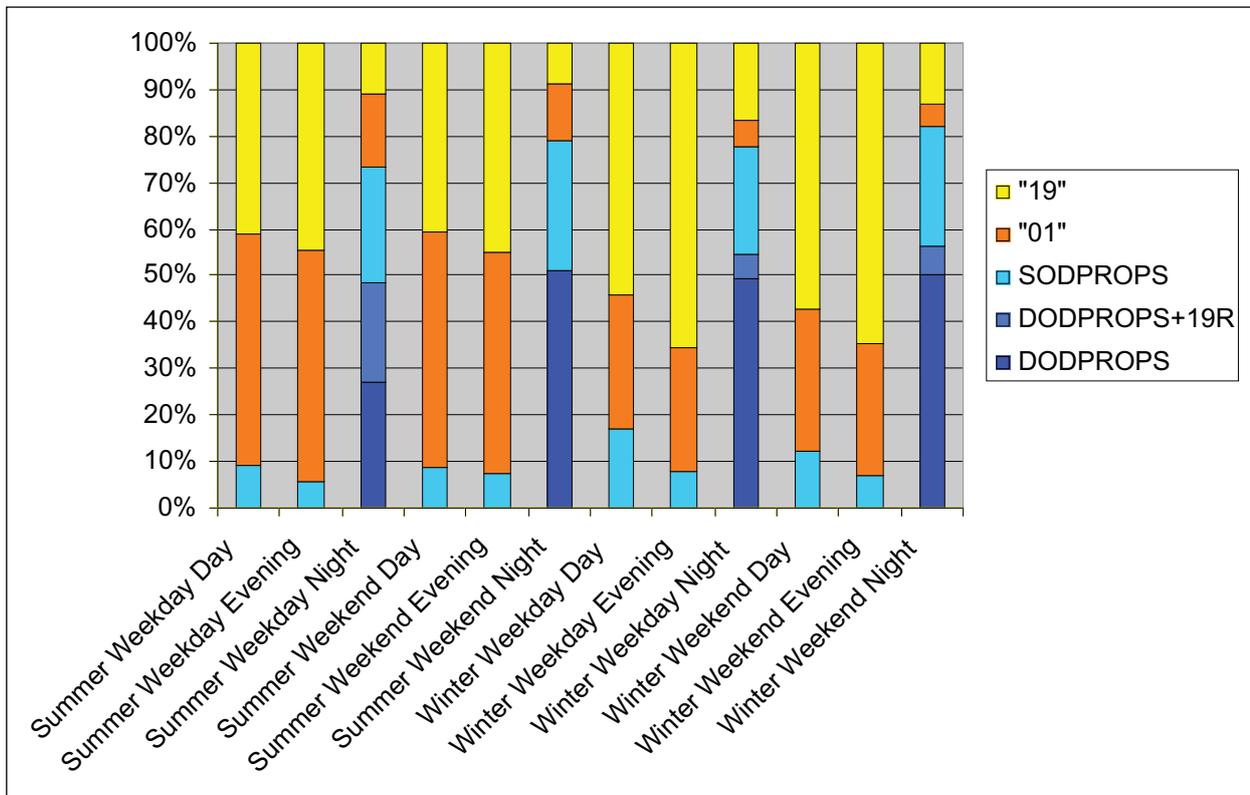
When the weather conditions or aircraft demand fall outside these permissible parameters, then normal parallel runway operations (i.e. landings over the bay and takeoffs over the city or vice versa) apply. Under this mode, this results in 50% of the flights being over the Bay.

Analysing of weather conditions over the last 10 years, and looking at the forecast aircraft demand for when the new runway becomes operational in 2015 shows that the percentage of flights that will be over the Bay will vary between 50% and 85% during summer on a weekday, and from 50% to 90% during winter on a weekday. In the case of weekends, these percentage ranges are 50% to 88% for summer and 50% to 90% for winter. The higher percentages relate to the night time hours of 10pm to 6am.

The main limiting factors for why over-bay operations cannot be used during the day and early evening is because winds are normally greater than the permissible 10 knot downwind and there is much greater aircraft traffic demand.

In the case of when the simultaneous (i.e. SODPROPS) over-bay mode can be used instead of the dependent (i.e. DODPROPS) over-bay mode, this is dependent on the downwind component (5 knots verse 10 knots). If the Civil Aviation Safety Authority could be persuaded to consider raising the SODPROPS standard from 5 knots to 10 knots, then this would assist in increasing the percentage of flights over the Bay as it could accommodate greater aircraft hourly demand. This percentage increase would occur mainly for the early evening hours (8pm – 10pm) and early morning hours (5am – 7am).

Figure 5.2j: Percentage Usage of Modes, Year 2015 with NPR.



Note: SODPROPS, DODPROPS and DODPROPS + 19R are full over-bay jet operations and are the preferred modes when weather and air traffic permits.

6.13.4 Flights Should Be Over Non-populated Areas

Flight paths over unpopulated (or non residential) areas are always preferred where possible when over-bay operations are not possible, as discussed in Chapter D3, Section 3.4. However, long corridors of non-residential land are typically not available in Brisbane for the whole extent of either the existing and future descent or arrival flight paths and therefore some element of flight over residential areas is inevitable. Individual flight paths must also be designed with regard to the total airspace requirements and potential conflicts with other flight paths.

6.13.5 Mitigation Of Lateral Noise And Reverse Thrust On The NPR

The preferred use of over-bay modes (SODPROPS or DODPROPS) at night will mean that the NPR will be the arrival runway for a large percentage of the night-time period 10pm to 6am. BAC has recommended in Chapter D5, section 5.8 that for noise mitigation, limitations be placed on the use of reverse thrust for night time operations. It is understood that this measure is used at other airports and so should be possible at Brisbane Airport.

However, at night there may be occasions where operational or weather conditions require the use of reverse thrust for safety reasons. In these cases, it has been recommended in Chapter D5, Section 5.8 that aircraft use the existing main runway with current Reciprocal Operation procedures.

In addition, when over-bay operations are not available at night due to weather conditions, the Parallel Runway Operating Plan has recommended the use of the existing main runway for all take-off and landings (Modes 10a and 10b) as an option to mitigate lateral noise from the NPR.

It is possible Mode 10 could be extended to the late evening period (8pm to 10pm) as the preferred mode when traffic volumes permit, and may be examined once the NPR is operational and the actual extent and nature of aircraft noise impacts associated with parallel runway operations has been determined.

6.13.6 Request For Improved Aircraft Noise Monitoring

Noise and flight path monitoring at Australia's major international airports is the responsibility of Airservices Australia (AsA). The Noise and Flight Path Monitoring System (NFPMS) at Brisbane Airport consists of 5 noise monitoring terminals (NMT).

The NFPMS was discussed in the Draft EIS/MDP in Chapter D2 and Chapter D4, Sections 4.4 and 4.5. Data from the NFPMS were used in the Draft EIS/MDP noise assessment for data validation and setting the flight paths for the INM modelling. The noise monitoring data from the NMTs for the year 2005 was included in the TNIP software provided with the Draft EIS/MDP.

The NFPMS provides information on the aircraft flight paths and noise. AsA produces comprehensive quarterly reports of activities at Brisbane Airport, which are publicly available on the internet. It is understood from discussions with AsA, that the current system is being reviewed and may be upgraded providing the public with access through the Internet to real-time data on aircraft movements and noise. Details of the NFPMS and quarterly reports can be found on the AsA website at: <http://www.airservices.gov.au/reports/nfpms/default.asp>

Requirements for a review and possible further upgrade of the existing NFPMS would need to be determined by the authority responsible for the NFPMS (currently AsA) closer to time when the NPR becomes operational.

6.13.7 Request For Improved Transparent Complaints Register

A noise inquiry line and complaints register (NILACR) currently exists at Brisbane Airport and is maintained by AsA. A process already exists where noise complaints and inquiries are registered and responded to by AsA and passed on to other relevant stakeholders for action where appropriate. There are no proposed changes to the existing process at this time but the process is currently reviewed by AsA from time to time.

6.13.8 Endorsement Of Draft Parallel Runway Operating Plan (Draft PROP)

Some submissions support the Draft PROP with respect to the recommended night-time Modes 4, 9, 10a and 10b, which does not permit the use of the NPR for 19R departures or 01L arrivals over Brisbane residential areas. There was a suggestion that these Modes could be extended to the evening period (8pm to 10pm).

It is possible these mode references could be extended to the late evening period (8pm to 10pm) as the preferred mode when traffic volumes permit, and may be examined once the NPR is operational and the actual nature and extent of aircraft noise impacts associated with parallel runway operations has been determined.

6.13.9 Timetable for Constant Descent Approaches (CDA) Trial

New navigation technology and procedures being developed that may provide noise mitigation are discussed in the Draft EIS/MDP in Chapter D5, Section 5.10. It was noted that AsA planned to start an RNP trial at Brisbane in November in 2006 on three of the existing visual tracks. This trial commenced in December 2006 and will continue through 2007.

BAC personnel are part of a working group that will review and evaluate the trial. One of the objectives of the review will be to determine what role these technologies (if successful) might play in future operations at the airport with respect to noise mitigation.

6.13.10 Effects of Daylight Saving

The effects of daylight saving have been considered in the Draft EIS/MDP and the Draft PROP. Mode 12 (DODPROPS plus non jet departures off RWY 19R) has been especially developed to maximise jet operations over the bay in the 5am to 6am period in response to the additional traffic during the daylight savings months.

Addition/Omission to Draft EIS/MDP:

In light of the discussion above, the following changes are proposed to Chapter D10 of the EIS/MDP:

The Draft Parallel Runway Operating Plan is to be referred to as:

The Draft Parallel Runway Operating Plan (for the management of aircraft noise)

Add footnote to Tables 10.4a&b noting:

- No reverse thrust to be used on the NPR at night
- Aircraft requiring reverse thrust at night to use existing runway
- If over bay modes at night not possible (Modes 1, 11 & 12) then existing runway mode to be next preferred option (Modes 10a & 10b)
- New Figures showing Mode 10a and Mode 10b