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From: FOWSA@infrastructure.gov.au
Sent: Thursday, 25 July 2019 2:38 PM
To: s47F

Subject: FOWSA@infrastructure.gov.au
Attachments: FOWSA - Draft Record of Meeting 8 [SEC=UNCLASSIFIED]
DRAFT - FOWSA - Record of Meeting 8.pdf

Dear FOWSA members

Please see attached the draft Record of FOWSA Meeting 8, held at the Liverpool Catholic Club on Friday, 7 June 2019.

We would welcome any feedback on the draft record by Thursday, 1 July 2019. After members' feedback has been collated and the final record cleared by the Chair, it will be published on the Department's website.

Kind regards

FOWSA Secretariat
Department of Infrastructure, Transport, Cities and Regional Development



Australian Government

**Department of Infrastructure, Transport,
Cities and Regional Development**

Forum on Western Sydney Airport

Draft Record of Meeting 8
9:00 am – 2:00 pm, Friday 7 June 2019
Ballroom 2 & 3, Liverpool Catholic Club
Chair: Professor Peter Shergold AC

Item	Description	Key Discussion Points	Action Items
1.	Welcome from the Chair and confirmation of agenda	<p>The Chair, Professor Peter Shergold AC, welcomed members to the second meeting of the Forum on Western Sydney Airport (FOWSA) for 2019.</p> <p>The Chair noted the following important changes and events:</p> <ul style="list-style-type: none"> • Western Sydney Airport signed Memorandums of Understanding with both Qantas and Virgin Australia • on the airport site, the TransGrid towers have been removed fully and construction has started on the Badgerys Creek Road Bridge. <p>The Chair acknowledged apologies received (see Appendix B of this meeting record) and welcomed delegates representing FOWSA members unable to attend the meeting.</p> <p>Dr Freeland asked if the shadow Minister for Infrastructure could receive a briefing on FOWSA, and the Chair said he would arrange that.</p> <p><u>Meeting 7 records and actions</u></p> <ul style="list-style-type: none"> • The FOWSA Secretariat prepared a record of the Meeting 7, which was emailed to members on 4 June 2019. • Following feedback from the Chair and members, the Secretariat will finalise the meeting record and make it publicly available on the Department's website. • The Chair recognised that the Meeting 7 record was sent out late due to the caretaker period and suggested that meeting records could be shorter so that they could be turned around more quickly. • There were <u>six</u> Action Items outstanding from the last meeting: 	

		<ul style="list-style-type: none"> ○ FOWSA Meeting 7, Item 1 (Secretariat to collate the meeting date preference forms completed by members) – this action is complete and has set the next 12 months of meeting dates <ul style="list-style-type: none"> ▪ Saturday, 7 September 2019 (open to the public) ▪ Friday, 6 December 2019 ▪ Friday, 20 March 2020 ▪ Friday, 19 June 2020 ○ FOWSA Meeting 7, Item 2 (FOWSA Secretariat will investigate to confirm if a second 'Jobs for the West' report has been released) – this action has been completed and the Secretariat advised that no secondary report has been made publicly available as yet. ○ FOWSA Meeting 7, Item 3 (Secretariat to arrange a future presentation by Sydney Water on water management in the Western Sydney Parkland City) – this action is covered under item 3 of the Agenda for this meeting. ○ FOWSA Meeting 7, Item 4 (Secretariat to arrange a future presentation on the agencies and organisations responsible for strategic planning and project delivery across the region) – this action item is covered under item 7 of the Agenda for this meeting. ○ FOWSA Meeting 7, Item 5 (Secretariat to arrange a presentation to FOWSA in 2020 on the Future Food Systems Cooperative Research Centre) – this action item is ongoing. ○ FOWSA Meeting 7, Item 6 (Secretariat to consider future presentations to FOWSA on the state of air and water quality in Western Sydney, and on the use of alternative fuels and technologies at WSA, including bioenergy) – this action item is ongoing. 	
2.	Departmental Update	<p>Ms Sarah Leeming from the Department of Infrastructure, Transport, Cities and Regional Development (the Department) provided an update on the Department's work on the Western Sydney Airport project.</p> <p>Ms Leeming began by providing an overview of the Ministerial appointments relating to the Department's portfolio, post the May 2019 Federal Election. She</p>	

		<p>noted, in particular, Minister Tudge’s continuing responsibility for the development of Western Sydney Airport. She confirmed with members that there had been no ‘machinery of government’ changes for the Department. She also noted that the new shadow minister for Infrastructure was the Hon Catherine King MP.</p> <p>Ms Leeming provided members with an update on the meeting she had attended recently with Blue Mountains Council. She acknowledged that while the council remained opposed to the airport, it asked that the Department engage proactively with the Blue Mountains community.</p> <p>Ms Leeming updated members on the airspace design process:</p> <ul style="list-style-type: none"> • Planning (2017 to 2019) – this phase includes establishment of FOWSA, an aviation Expert Steering Group and investigation of Sydney basin airspace requirements and constraints. • Preliminary design and environmental assessment (2019 to 2022) – this phase will occur over approximately three years. A mature airspace and flight path design will be developed and referred to the Environment Minister at this time. This phase also includes extensive public exhibition and community consultation, expected to take place in 2021. • Detailed design (2022 to 2023) – this phase will take approximately one year. It will involve comprehensive validation and refinement of the detailed design. An Australian Noise Exposure Forecast (ANEF) chart based on long-term airport operations will be confirmed to inform land use planning around the site. • Implementation (2023 to 2024) – during this phase the final airspace design will need to be approved by Civil Aviation Safety Authority (CASA) prior to the commencement of airport operations. This process may take up to two years. <p>Ms Leeming provided an update on current activities stemming from the Department’s Biodiversity Offset Delivery Plan (BDOP) which included:</p> <ul style="list-style-type: none"> • over 4000 biodiversity credits already purchased from six vendors (approximately \$48.6 million); • on 2 July 2019, a meeting will be held to finalise the purchase of credits from another two vendors; and 	
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	<ul style="list-style-type: none"> engagement with the Biodiversity Conservation Trust to source biodiversity offsets. <p>Ms Leeming briefly discussed the role of the Airport Environmental Officer (AEO). She explained that the AEO's main role is to inspect, consult with and assist Western Sydney Airport to manage their environmental responsibilities under the <i>Airports Act 1996</i>. The AEO is also able to exercise appropriate monitoring powers and provide advice to the Airport Building Controller as required, as well as order remedial work where needed, and direct an undertaking through an environment protection order. Ultimately, the AEO is to ensure regulations are followed whilst considering what is reasonable and practicable.</p> <p>Ms Leeming noted other regulatory obligations that the Department has completed recently, including:</p> <ul style="list-style-type: none"> approval of variations to nine Construction Environmental Management Plans (CEMPs) for the next phase of bulk earthworks; approval of variations to Western Sydney Airport's Sustainability Plan and Community Stakeholder Engagement Plan for the next phase of bulk earthworks; and comments provided on other plans, such as the Remediation Action Plan. <p>Ms Leeming advised members of a technical report by Dr Eric Ancich and Mr Don Carter that had attracted local media attention. The report compares noise levels from aircraft arriving and departing Kingsford Smith Airport to those presented in the 2016 Environmental Impact Assessment (EIS) for Western Sydney Airport, which were based on indicative flight paths. She noted that the Department had been in contact with the authors, who had provided a copy to the Department. Ms Leeming confirmed to members that the Department is currently conducting a technical review of the report. Members indicated that it would be good to be aware of the report and the Department's review, should they encounter queries from their communities on the matter. Ms Leeming offered to ask the authors for permission to share the report with FOWSA members.</p> <p>Cr Paul Rasmussen, in reference to airspace design, asked whether video simulations depicting take-offs and landings would be made available to the</p>	<p>1. Secretariat to distribute the aircraft noise report and the Department's review to FOWSA members.</p>
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		<p>public. Ms Leeming advised this would be something that could be considered once flight paths are developed, and also gave some examples of other community engagement occurring for Brisbane's new parallel runway. She noted plans to engage with the community on expected noise exposure levels before the airport is operational. She also noted that the Department would like to provide education on interpreting different aircraft noise measures to assist community engagement.</p>	
3.	Western Sydney Airport Update	<p>The Chair invited Mr Scott MacKillop, General Manager Media and Government Relations from Western Sydney Airport, to provide an update on the Airport.</p> <p>Mr MacKillop updated members airport construction activities, noting that:</p> <ul style="list-style-type: none"> • 830,000 cubic meters of earth has already been moved. Approximately 21.17 million cubic meters remains to be moved; • 50% of the work on realigning Badgerys Creek Road Bridge has been completed; • the Western Sydney Airport project is on track and on budget; and • the first bulk earthworks will begin early 2020. <p>Mr MacKillop advised members about the construction of the site office. Western Sydney Airport's head office will remain in Liverpool, and the office located on the airport site will cater for employees involved more directly with the construction. The site office is planned to house 100 employees.</p> <p>Mr MacKillop briefly discussed plans for the Visitor Centre, noting that it was:</p> <ul style="list-style-type: none"> • due to open in the third quarter of 2019; • aimed at school groups, community groups and interested members of the public; • strategically located to maximise views of the airport construction; • to operate as a digital exhibition encompassing: <ul style="list-style-type: none"> ○ Indigenous history in the region ○ History of the Western Sydney region ○ Why the airport is being built ○ How the airport is being built ○ What benefits are being generated from the airport; 	

		<ul style="list-style-type: none"> • to have an augmented reality section which will allow visitors to use an iPad to see what the airport and related facilities will look like; and • planned to be available for event booking. <p>Mr MacKillop also provided an update on procurement activities:</p> <ul style="list-style-type: none"> • Major Works Package 1A <ul style="list-style-type: none"> ◦ this contract is expected to be awarded by mid-2019 • Terminal Precinct Architect (design competition) <ul style="list-style-type: none"> ◦ a global search is being conducted for an architecture firm to design the terminal; ◦ if an international firm puts in a bid, it will need to be in collaboration with an Australian architecture firm; ◦ the bid must involve university students with a link to Western Sydney; ◦ Western Sydney Airport is reviewing the bids received. • The Business Park Master Planner contract was awarded in October 2018 and planning will be completed by the end of 2019. <p>The Chair asked whether the top terminal designs would be shown to the public before a final is chosen. Mr MacKillop responded that this decision had not yet been made but that he would update members at future meetings.</p> <p>On community engagement matters, Mr MacKillop listed various activities being undertaken in the area including:</p> <ul style="list-style-type: none"> • community bus tours to the site; • meeting with councils involved in the Western Sydney City Deal to present planning overview and considerations; • electoral office meetings throughout June and July; • bookings are being taken for the use of the Visitor Center for events; • new website will be launched mid-year; and • next Stakeholder Planning Forum is planned for 13 June 2019. <p>Mr MacKillop updated members of the recent Memorandums of Understanding (MOUs) that Western Sydney Airport has signed with both Qantas and Virgin</p>	
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		<p>Australia. The signing of the MOUs was an event attended by the CEO of Qantas and Minister Tudge. He noted that this was a significant achievement for the airport, and that it kick starts conversations between Western Sydney Airport and airlines on items such as preferred routes and services. Mr MacKillop concluded by stating that further partnerships would be announced in the coming months within the regional and freight sectors.</p> <p>Mr Borger asked when the business park would be opened on the airport site, and whether there would be additional information supplied on the type of business park that it will be. Mr MacKillop advised that the business park would be located on the north end of the site, with the possibility that it may open before airport operations commence.</p> <p>The Chair noted that investors seemed confused about the difference between the Western Sydney Airport business park and the Aerotropolis. Mr MacKillop noted that the two will be complementary and that different businesses may be attracted to each.</p> <p>The Chair suggested a brochure could be produced on investment opportunities in Western Parkland City.</p> <p>Cr Paul Ramussen asked whether more details would be released about the onsite business park and whether the process of selecting businesses would be 'first in best dressed'. Mr MacKillop noted that the master planning for the business park is currently being undertaken by Architectus. They aim to have the plan completed towards the end of 2019, at which point he expected he would be able to provide more clarity to members on the matter.</p>	
4.	Reimagining Water in Western Sydney	<p>The Chair invited Mr Paul Higham from Sydney Water to speak to members about the possibilities of an integrated and adaptive water future for Western Sydney.</p> <p>Mr Higham began his presentation by discussing the challenges that arise when servicing a growing city. These include:</p> <ul style="list-style-type: none"> • water infrastructure nearing capacity. Without smarter management of water, demand will exceed sustainable system yield in 15 years; 	

		<ul style="list-style-type: none"> • heat, noting the Western Parkland City can be between 5-10 degrees hotter than the rest of Sydney; • an inefficient and single use of water threatens long-term water security; • the need to maintain and improve the health of rivers and waterways with long-term thinking; and • increasing uncoordinated development, which could increase the impact of weather extremes on communities and the economy. <p>Mr Higham noted that the traditional way of delivering water and wastewater will no longer be adequate. A liveable, sustainable and resilient city needs to be a water sensitive city. He noted that drinking water capacity needs to be increased and land use planning and water planning needs to be aligned.</p> <p>Mr Higham provided members with a brief overview of likely future water demand in the Western Parkland City.</p> <ul style="list-style-type: none"> • 72% increase in drinking water demand. • 60% increase in wastewater flow. • 26% increase in stormwater run-off. <p>He also noted the potential to reuse the more than 600 gigalitres of wastewater and stormwater predicted to be produced by 2056.</p> <p>Mr Higham presented to members three pathways to a water sensitive city:</p> <ul style="list-style-type: none"> • Water Cycle City <ul style="list-style-type: none"> ○ Supports both Parkland City and agricultural development ○ Conventional drinking water ○ Reuse of 75% wastewater and stormwater for non-portable uses (homes, businesses and green spaces) ○ Coordinated governance of waterways and stormwater management. • Water Centric City <ul style="list-style-type: none"> ○ Tailored levels of service. Best support of integrated “grids” ○ Conventional drinking water ○ Reuse of 70% wastewater with a greater number of permanent decentralised schemes 	
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		<ul style="list-style-type: none"> ○ Increased stormwater harvesting ○ Coordinated governance of waterways and stormwater management • Circular Economy City <ul style="list-style-type: none"> ○ Potable reuse of wastewater and stormwater, offsets reliance on existing drinking water systems ○ Coordinated governance of waterways and stormwater management <p>Mr Higham noted that the Water Cycle City is the preferred pathway. He briefly discussed potential aspects of the plan for Western Sydney:</p> <ul style="list-style-type: none"> • creation of a resource recovery facility to treat wastewater and manage organic waste. Servicing the Aerotropolis and opening around 2024, the facility could also provide recycled water for residential, commercial, agricultural and green space irrigation; and • integrating greenspace at WSA airport to reduce temperatures. <p>Mr Higham concluded his presentation by speaking to members about the importance of coordination in land use planning activities and collaboration to achieve water in the western landscape. Matters to stay front of mind, include:</p> <ul style="list-style-type: none"> • collaborative planning for the Aerotropolis; • smarter urban water investment; • modernising regulation around land use planning and the water industry; and • boosting innovation and resilience. <p>The Chair thanked Mr Higham for his presentation and invited questions.</p> <p>Cr Rasmussen raised the issue of the health of the Hawksbury/Nepean river and the impact that recycling water would have on it for future capacity. Mr Higham noted that Sydney Water acknowledges the issue and understands how important it is to ensure sufficient water is sent back in to the Hawksbury/Nepean river to maintain the flow and health of the river.</p>	
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		<p>A subsequent question was raised about the role of the desalination for the future of water capacity in Western Sydney. Mr Higham noted that desalination is a consideration that will be taken into account.</p> <p>Mr Higham was asked if he was aware of anywhere else recycled water had been used for potable water. He noted that countries such as Singapore and regions in the USA had already implemented water reuse schemes successfully.</p> <p>The Chair queried how consumption of reused water as drinking water would be communicated to the public. Mr Higham discussed how public consultations in San Diego on this issue had provided valuable insights. He noted that informative public consultations were essential.</p> <p>Dr Mike Freeland expressed concerns about new commercial and residential developments not being sufficiently water-efficient and the implications this has for water storage in Western Sydney, including Warragamba Dam.</p>	
5.	Aircraft Noise Metrics 101	<p>The Chair invited Mr Matt Shepherd from to70 Aviation to present on Aircraft Noise Measurement and Metrics.</p> <p>Mr Shepherd provided members with an insight into factors that contribute to various aircraft noise sensitivities, including:</p> <ul style="list-style-type: none"> • aircraft type; • the flight procedure; • speed and altitude of an aircraft; • frequency of operations; • community experience and attitude to noise; • terrain; • ambient noise; and • meteorological conditions. <p>Mr Shepherd spoke to members about his background as an Air Traffic Controller (ATC) in the Sydney area and how the above factors can alter a person's perception of how much noise they are actually hearing.</p>	

	<p>Mr Shepherd provided a brief overview of national and international noise standards that govern the types of aircraft that are permitted to operate in Australia. He also discussed Australian Standard 2021-2015, which provides advice on the siting and construction of buildings near airports. He noted that:</p> <ul style="list-style-type: none"> • AS2021 is used to guide strategic land use planning in the vicinity of airports, thereby limiting the number of residential and noise-sensitive facilities that are built in the highest noise exposure zones. The assessment of aircraft noise exposure at a site under AS2021 is based on the Australian Noise Exposure Forecast (ANEF) system; • An Australian Noise Exposure Forecast (ANEF) chart is an official forecast of noise exposure levels for an airport. It depicts cumulative noise exposure levels for an average annual day of operations and is included in an airport's master plan; • An Australian Noise Exposure Contour (ANEC) chart depicts aircraft noise exposure levels for indicative flight path options; and • An Australian Noise Exposure Index (ANEI) shows aircraft noise exposure levels based on actual historic airport operations. <p>Mr Shepherd briefly discussed a few technical aspects of aircraft noise measurement, including:</p> <ul style="list-style-type: none"> • Australian authorities are transitioning from the Integrated Noise Model to the Aviation Environmental Design Tool for forecasting aircraft noise exposure levels; • the use of single-event noise contours is very useful in determining the sound generated from specific aircraft on specific runways; and • N-Metrics (number above metrics) can be used to predict the number of times each day a person will experience aircraft noise levels exceeding a certain decibel level (e.g. 70 decibels). <p>Mr Shepherd spoke to members about the International Civil Aviation Organization's (ICAO) 'Balanced approach to aircraft noise management'. He noted that these guidelines are adopted by most Australian agencies. The guidelines reference four steps to manage aircraft noise:</p> <ol style="list-style-type: none"> 1. reduce sound at the source; 	
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		<ol style="list-style-type: none"> 2. implement effective land use planning to prevent incompatible land uses in high noise exposure areas; 3. implement noise abatement procedures (e.g. noise-preferred routes); and 4. implement operating restrictions (e.g. noise quotas, movement caps, curfews etc.). The guideline indicates that these measures are to be used only after the benefits of the other steps have been considered. <p>Mr Shepherd noted that ICAO's balanced approach prioritises steps one to three over step 4, which could be considered as a last resort should the other measures not be effective in addressing aircraft noise problems at an airport. He highlighted that Western Sydney Airport was in a fortunate position of being able to incorporate steps 1-3 in multiple ways due to it being in a 'greenfields' site.</p> <p>The Chair thanked Mr Shepherd and invited questions.</p> <p>A question was posed about how an ANEF might change. Mr Shepherd responded by stating that changes to the performance of aircraft (e.g. future technology allowing for quieter engines) and the evolution of noise exposure modelling (i.e. new technology that allows more precise forecasting) can lead to changes in an ANEF.</p> <p>The Forum discussed how planning restrictions for residential developments around Western Sydney Airport within the ANEC 20 contour are more stringent than those in place around other Australian airports, owing to the fact this airport is a greenfield airport.</p> <p>The Chair noted that there seemed to be a lack of connection between where the ANEC extended and where the current vocal opposition for the WSA airport was coming from. Mr Shepherd remarked that this was not unusual, and referred to the 1995 review of the Sydney (Kingsford Smith) Airport in which it was found that the majority of complaints about noise from the airport came from areas outside the noise contours.</p>	
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		<p>The Chair suggested that the Department could do more to educate people about other airports that have curfews and suggested this be added to future pop-ups and FOWSA meetings.</p> <p>Mr Borger asked whether residents around Western Sydney Airport would be considered for a noise insulation program, similar to other airports in the country. Mr Shepherd remarked that houses within the 30 ANEF contour at Sydney (Kingsford Smith) Airport were insulated, along with public buildings within the 25 ANEF contour. Mr Sutherland noted that the Department would be developing a noise amelioration policy for Western Sydney Airport prior to operations commencing at the airport.</p>	
6.	Communication Strategy and Drop-In Session Planning	<p>The Chair invited Ms Louise O'Donnell from the Department to update members on the FOWSA Communication Strategy and planning for the upcoming community drop-in session and open FOWSA meeting.</p> <p>Ms O'Donnell provided an overview of the methods that had been used to date to communicate with members of the community. These methods included:</p> <ul style="list-style-type: none"> • Community pop-up stalls <ul style="list-style-type: none"> ○ Cobbitty Markets (1 June 2019) ○ Multicultural EID Festival and Fair, Fairfield (9 June 2019) ○ Westpoint Blacktown (27 June 2019) • Western Sydney Airport community newsletters • Information sessions and open meetings • Information kiosks/ face-to-face discussions • Social media • General media coverage • Emails • Community Forums / Group sessions <p>Ms O'Donnell noted that FOWSA members were welcome to attend these events. She also noted that the Department and Western Sydney Airport regularly attend each other's pop-up stalls, thereby making a full range of information available to the public.</p>	

		<p>Ms O'Donnell discussed how the communications focus for FOWSA in its first two years had been on raising public awareness of the airport project, building knowledge and establishing trust. She advised that communication methods will need to be reviewed in the future to ensure that activities best meet the needs of FOWSA members, the community and stakeholders.</p> <p>Ms O'Donnell briefly discussed findings from independent research commissioned by the Department. The research was conducted to gain an understanding of community attitudes towards the WSA project. The findings show that:</p> <ul style="list-style-type: none"> • 90% of people are aware of the development of the new major airport; • over 60% of people agreed that the positive benefits will outweigh the negative impacts; • 77% agreed the airport will bring jobs to the region; and • overall awareness of FOWSA's role is limited. <p>Ms O'Donnell advised members that initial planning had begun for the upcoming information session and FOWSA meeting (7 September 2019) which will be open for public viewing. She identified some initial planning issues including:</p> <ul style="list-style-type: none"> • Drop-in public information session <ul style="list-style-type: none"> ○ members of the community can attend and personally ask questions about the airport and related projects; and ○ creates an opportunity for FOWSA members to engage directly with the community and hear their issues. • FOWSA meeting to be held in the afternoon, after the information session <ul style="list-style-type: none"> ○ it will be a regular meeting, however also provides the opportunity for public observation; ○ the meeting will include a question and answer session. Community members will be able to submit their questions in advance and receive answers on the day; ○ community members will be able to pre-register for the meeting via the Department, through an expression of interest process; ○ venue is to be advised. 	
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		<ul style="list-style-type: none"> • The event will be promoted from early August through a range of different channels including: <ul style="list-style-type: none"> ○ advertisements in local, metropolitan and all language newspapers; ○ newsletters delivered by direct mail to 40,000 Western Sydney residences; ○ emails to over 1,700 registered stakeholders and subscribers ○ general media coverage; ○ content provided to each Western Sydney Council for newsletters, mayoral columns, social media and websites; and ○ content provided to other agencies for social media and newsletter distribution. <p>The Chair thanked Ms O'Donnell and invited questions. He noted that he would like to see the public information session catering for a multi-cultural attendance, to ensure the entire cross section of Western Sydney is being included.</p> <p>Members discussed whether a different location in Western Sydney should be considered each time a meeting is made open to the public, to encourage attendance from all areas. Interest was expressed in the Department developing individual plans and opportunities for each member to facilitate their interaction with the community. Ms O'Donnell noted that the Department would look into this.</p> <p>Ms Nicole Ryan, Western Sydney Airport, encouraged members to follow the Western Sydney Airport social media, as this is their most regularly updated platform with content related to the construction of the airport.</p>	
7.	Planning Partnership	<p>The Chair invited Mr Andrew Jackson from the Western Sydney Planning Partnership to discuss the work of the partnership.</p> <p>Mr Jackson provided a brief overview of the origins of the Western Sydney Planning Partnership, informing members that it:</p> <ul style="list-style-type: none"> • was formed as part of the Western Sydney City Deal; • had an objective to deliver better outcomes for the people of Western Sydney; 	

		<ul style="list-style-type: none"> • is a council-led initiative, with nine councils on board; • includes key NSW agencies; and • is located in Parramatta, to maximise collaboration with state government agencies in that area. <p>Mr Jackson noted the main priorities of the partnership are to develop:</p> <ul style="list-style-type: none"> • uniform council engineering and design standards; • common planning assumptions – i.e. ensuring that State and local governments are working with the same planning assumptions; and • planning for the Aerotropolis Growth Area. <p>Mr Jackson discussed the Western Sydney Land Use and Infrastructure Implementation Plan (LUIIP) with members. Of note, he mentioned:</p> <ul style="list-style-type: none"> • the NSW Department of Planning and Environment started the planning and consultation for the Stage 1 LUIIP; • 600 submissions were received and around 80% were concerned with South Creek; • the submissions will be available online in the near future; • the Planning Partnership is responsible for finalising the LUIIP; • there will be a response to the submissions in quarter three 2019; • the Planning Partnership is investigating Agribusiness as a priority precinct. <p>Mr Jackson stated that a few of the submissions raised issues around the airport, specifically whether a curfew will be instated. He noted that the Planning Partnership is currently planning in a way that takes 24/7 operations into account, and referred back to Mr Shepherd's comments regarding the first three steps that ICAO recommend before a curfew is considered. He noted the range of factors that are included in planning considerations, including noise, height of buildings, wildlife strike zones and public safety zones.</p> <p>Mr Jackson also spoke to members about the Aerotropolis development. He noted that the Planning Partnership is currently working to finalise broad zoning areas to allow for development to begin over the coming years.</p>	
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		<p>The Chair thanked Mr Jackson for his presentation and invited questions from members.</p> <p>Mr Willmington noted community concerns over property prices in certain areas, which did not match expectations as a result of the introduction of the LUIIP. Residents in his area are concerned that they do not know what the value of their land is, and cannot make firm decisions due to a lack of information flowing back to them. Mr Jackson discussed how the Planning Partnership was hoping to increase the information flow, noting that he had personally sat down with residents who have genuine concerns about rezoning. He added that Liverpool Council had set up a reference group in response to the many queries in this area.</p> <p>The Chair remarked that he is often asked about flight path development and rezoning. Members asked the Department to provide them with regular updates on the airspace design process to assist in responding to questions from the community. On rezoning, members agreed that even if answers aren't available as yet, the community would appreciate knowing when they could expect their questions to be answered.</p> <p>Mr Borger commented that the multiple levels of planning and agencies are confusing. He asked whether there was a specific model being implemented for the Agribusiness Precinct. Mr Jackson said the Planning Partnership is considering how the various organisations and levels of government involved could be communicated in a simple way. Regarding the agribusiness precinct, Mr Jackson advised members that there was a lot of market interest in the Agribusiness Precinct. He noted that the planning for the precinct was progressing.</p> <p>Dr Freeland raised a concern over the lack of transport and freight connectivity to Western Sydney Airport, specifically the lack of a rail line from Leppington to the airport.</p>	
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		<p>Ms Stanley asked to be informed when planning information is communicated to her community, so she can assist members of her electorate. Mr Jackson noted that he would take the suggestion back to the Planning Partnership to look into setting up a Local - State - Federal Government network to facilitate this form of information sharing.</p> <p>In response to a question from Councillor Rasmussen, Mr Jackson said that the Planning Partnership was in the process of finalising the timeline.</p> <p>The Chair asked where funding for the Planning Partnership was coming from. Mr Jackson responded that:</p> <ul style="list-style-type: none"> • the NSW Department of Planning and Environment provided funding for the work of finalising the LUIIP; and • partnered Councils are contributing to the uniform engineering initiative. 	
8.	Other Business	<p>The Chair provided his update to members, which included an overview of meetings he had represented FOWSA at since March.</p> <p>He advised that he had attended the Western Sydney Airport Board meeting and noted that this was an important connection between the Western Sydney Airport and FOWSA. He said that he expected he would attend Board meetings on an annual basis, which would ensure sure that the Board was hearing directly from FOWSA representatives.</p> <p>Professor Shergold also advised members that he had met with Mr Borger and Sydney Water, as planned at the last meeting, due to the interest FOWSA has in water management in Western Sydney. The Chair asked members if they felt they had a better grasp on the matter after Agenda Item 4, and confirmed that he felt this was likely a subject that would arise again as Sydney Water continues planning for the area. Members expressed interest in hearing from Sydney Water again as planning progresses.</p> <p>The Chair advised that he had been requested by some members to consider whether upcoming meeting(s) should be held in the evening. After discussion, the</p>	

		<p>general consensus from the members was that they preferred daytime meetings, and the Chair confirmed this would continue.</p> <p>The Chair noted that he would like to invite Mr Sam Sangster (CEO Western City and Aerotropolis Authority) to speak at the open meeting, with the rest of the agenda to be settled in August. Members agreed with this approach to selecting the FOWSA agenda, noting that the information on projects in Western Sydney was useful, as the questions being asked by members of the community were not limited to the construction of the airport itself.</p> <p>Finally, the Chair asked for the Secretariat to take members' feedback on location suggestions for future meetings.</p>	<p>2. Secretariat to seek feedback from members on venues for future meetings.</p>
9.	Upcoming Meetings	<ul style="list-style-type: none"> • Meeting 9 – Saturday, 7 September 2019 (open to the public) • Meeting 10 – Friday, 6 December 2019 • Meeting 11 – Friday, 20 March 2020 • Meeting 12 – Friday, 19 June 2020 	

Status of Outstanding Action Items

Meeting 1, 26 May 2017

Action Item Number	Action Item	Status
4	FOWSA Secretariat to distribute meeting papers to members electronically one week in advance of FOWSA.	Ongoing

Meeting 6, 26 October 2018

Action Item Number	Action Item	Status
3	WSA to provide FOWSA with a briefing on the Visitor Centre design once finalised.	Completed

Meeting 7, 29 March 2019

Action Item Number	Action Item	Status
5	Secretariat to arrange a presentation to FOWSA in 2020 on the Future Food Systems Cooperative Research Centre.	Ongoing
6	Secretariat to consider future presentations to FOWSA on the state of air and water quality in Western Sydney, and on the use of alternative fuels and technologies at WSA, including bioenergy.	Ongoing

Attendees

Professor Peter Shergold AC (Chair) – Chancellor, Western Sydney University
Ms Karen Correy – Office of Senator the Hon Marise Payne
Ms Anne Stanley MP - Federal Member for Werriwa
Ms Alison Morgan – Director, Sydney Region, New South Wales Department of Premier and Cabinet
Ms Joanne Bromilow – Resident of Blaxland
Mr John Walton – Resident of Silverdale
Mr Wayne Willmington – Resident of Luddenham
Mr Bob Germaine – Regional Development Australia Sydney
Cr Paul Rasmussen – Hawkesbury City Council
Mr Kevin Lynch – Campbelltown City Council
Mr David Borger – Western Sydney Director, Sydney Business Chamber
Dr Mike Freelander MP – Federal Member for Macarthur
Mr Tim Moore – Liverpool City Council
Ms Jane Lambert – Blue Mountains City Council
Mr Jacob Idiculas – Resident of Bossley Park
Ms Lee de Winton – CEO, Sydney Metro Airports Bankstown and Camden
Mr Jim Davis – Chairman, Regional Aviation Association Australia
Cr Ross Fowler OAM – Mayor, Penrith City Council
Ms Lindy Deitz – General Manager, Campbelltown City Council

Ex Officio Members

Nicole Ryan – Western Sydney Airport
Scott MacKillop – Western Sydney Airport

Apologies

Senator the Hon Marise Payne – Senator for New South Wales
Mr Matthew Hudson – Qantas
Ms Kiersten Fishburn – CEO, Liverpool City Council
Mr Gordon Henwood – Resident of Mulgoa
Mr Paul Chevalier – Virgin Australia
Ms Adriana Care – Resident of Camden-Narellan
Ms Britt Walters – Qantas
Dr Rosemary Dillon – General Manager, Blue Mountains City Council

Cc:

This email provides information for members ahead of the FOWSA drop-in community information session and open FOWSA meeting on **Saturday, 7 September 2019** and seeks to confirm members' attendance at both events. Further information to support your attendance at these events will be provided early next week.

1. Information session and FOWSA meeting

Saturday 7 September 2019
10am-1pm
Campbelltown RSL – Carberry Lane, Campbelltown (map attached)

Saturday 7 September 2019
2pm-4pm (followed by afternoon tea for FOWSA members and the public)
Campbelltown RSL – Carberry Lane, Campbelltown

Western Sydney Airport has extended an invitation to FOWSA members to attend a preview of the Western Sydney International Airport Experience Centre, ahead of its opening to the public. The preview will occur between **3-4pm, Monday, 2 September 2019**. See the attached invitation for further information including registration details.

3. Ancich/Carter report

At the June FOWSA Meeting, the Department advised that it was undertaking a technical review of a report by Dr Eric Ancich and Mr Don Carter which compares noise levels from aircraft arriving and departing Kingsford Smith Airport to those presented in the 2016 Environmental Impact Assessment (EIS) for Western Sydney Airport. The Department has now completed its review and obtained permission from the authors of the original report to share it with FOWSA members. A copy of the report and the Department's review document is attached. As we have a full agenda for the upcoming meeting, it is expected that FOWSA will address in detail the issues raised in the report at its December meeting.

Feel free to contact the Secretariat should you have any queries or require further information (FOWSA@infrastructure.gov.au or 02 6274 6908).

FOWSA Secretariat
Department of Infrastructure, Transport, Cities and Regional Development



Australian Government

**Department of Infrastructure, Transport,
Cities and Regional Development**

Western Sydney International Airport Experience Centre

I am delighted to invite you to preview the Western Sydney International Airport Experience Centre, ahead of its opening to the public.

This interactive centre has been developed to inform our many partners, friends and community of the history of the Airport site, along with the vision for its future. The Experience Centre will also provide a bird's eye view of the Airport construction as it develops over the coming years.

When: Monday 2 September. The Experience Centre will be open to you to drop in between 3-4pm. Please come at your convenience during this time.

Where: Western Sydney International Airport Experience Centre, 100 Eaton Road, Luddenham (see adjacent map)

RSVP: mmccullough@wsaco.com.au

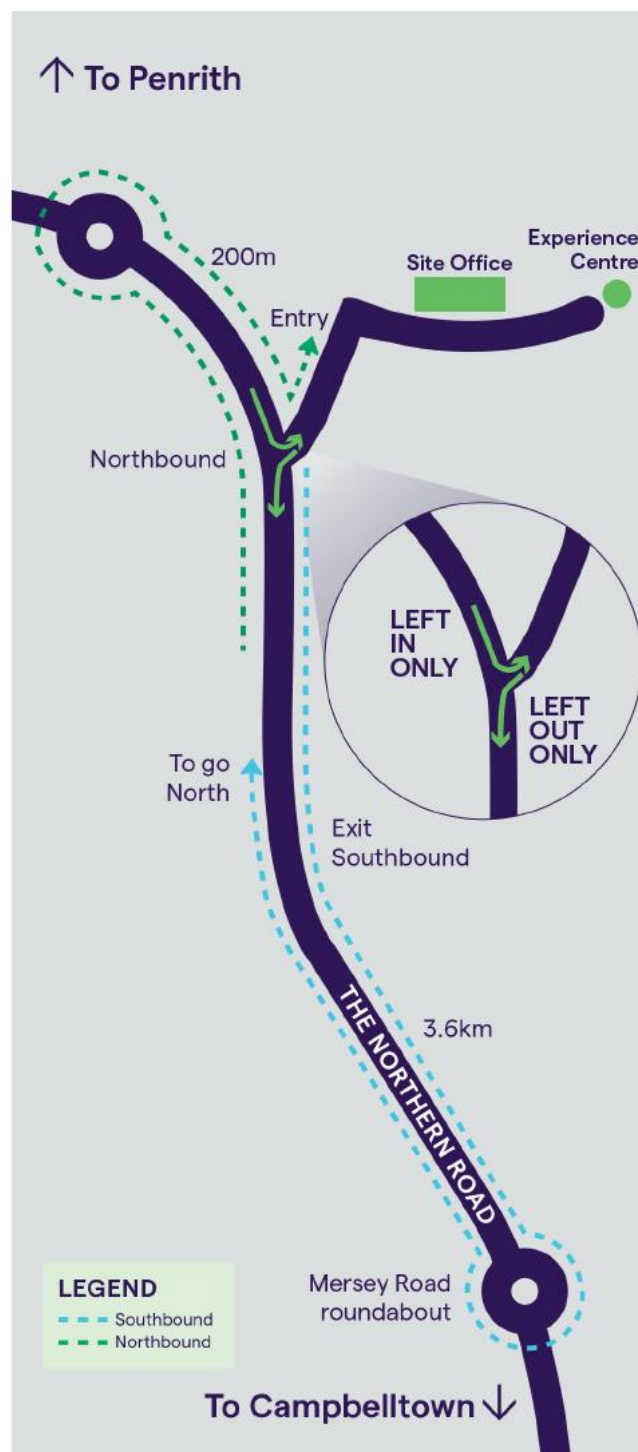
Please join us for a tour of the Centre and light refreshments.

Due to available space at the Experience Centre, this invitation is non-transferrable, and only those guests who have registered will be given access to the site. Flat, covered shoes are recommended.

Yours sincerely,

Graham Millett
Chief Executive Officer

Please be aware that the Experience Centre has extensive audio visual content that includes flashing lights. This may have an impact on visitors who are susceptible to photosensitive epilepsy or other photosensitivities.



Access to the Centre can only be made southbound from The Northern Road with a left hand turn into Eaton Road (south) as shown on the map above.

ERIC J. ANCICH
Chartered Professional Engineer

35 Prince Edward Street Blackheath NSW 2785
Phone: 4787-8411 Mobile: 0427 470 474



REPORT No.9173 - R1

ASSESSMENT OF MEASURED AIRCRAFT NOISE LEVELS UNDER
THE EXISTING FLIGHT PATHS OF SYDNEY KINGSFORD SMITH
AIRPORT WITH REFERENCE TO WESTERN SYDNEY AIRPORT

EJA/DJC

March, 2019

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2.0	ASSESSMENT CRITERIA	1
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4.0	ACOUSTIC ASSESSMENT	1
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6.0	CONCLUSION	2

REFERENCES

APPENDICES

1.0 INTRODUCTION

This report presents the results of measured aircraft noise levels under the approach and departure flight paths of Sydney Kingsford Smith Airport (KSA) and the comparison of these noise levels with those predicted in the Environmental Impact Statement (EIS) for equivalent residential locations under likely approach and departure flight paths for the proposed Western Sydney Airport.

The report was prepared to present to Blacktown City Council following meetings and discussions with representatives of Council. The author is grateful that Council made available, free of charge, noise monitoring instrumentation which was used for the purposes of this report.

2.0 ASSESSMENT CRITERIA

The noise predictions in the Western Sydney Airport EIS are set out in “Volume -2a Chapter 10 Noise Aircraft”¹ and “Appendix E1 Aircraft Overflight Noise”².

The assessment criteria was to compare the noise generated by aircraft in flight on approach and landing to/from KSA with noise levels predicted in the EIS for WSA.

Sound Level Meters (SLM) were set up under two approach flight paths in Pymble and under a departure flight path in Mays Hill. The Pymble and Mays Hill locations are 23 km and 21 km respectively from KSA.

A total 330 of flights were tracked over the locations of the SLM using Flightradar24 to determine the flight details, origin and destination, time, airline, flight number, aircraft type, altitude, height above ground level. The Flightradar24 UTC time (Universal Time Coordinated) and the ESDST for each event was used co-ordinated the corresponding data from each data set. The SLM data were time and date stamped permitting direct comparison with the Flightradar24 records.

The results of the noise study at each location are set out in the Appendices A1-A6, B1-B3 and C1-C3 as follows:

- a. Data in chronological order by day
- b. Data sorted in ascending order with respect to height of aircraft above ground level at the respective location
- c. Data sorted in descending order with respect to $L_{A\text{Max}}$

3.0 INSTRUMENTATION

Two separate Brüel & Kjær. Model 2250 Sound Level Meters were used to measure sound pressure levels. For the two Pymble locations, a Brüel & Kjær “Sentinel On Demand” system was used and for the Mays Hill measurements, a Brüel & Kjær. Model 2250 based noise logger was used. These instruments satisfy the requirements of Australian Standard AS 1259-1990 for Type 1 instrumentation.

The instruments were operated using the A-weighted pre-amplifier input and RMS detector time constant “Fast”.

The instruments were field calibrated before and after measurements with a Bruel & Kjaer Type 4231 acoustic calibrator. The field calibration levels were within the acceptable limit of variation of ± 0.5 dBA. Unless stated otherwise in this report, the reference pressure for all sound pressure level measurements is 20 μ Pa.

4.0 ACOUSTIC ASSESSMENT

4.1 EIS Appendix E1 Page 3– Departures 70 dBA Contour

“The predicted departure noise contours of the B747 are significantly larger than those of the A320 aircraft; for example, the 70 dBA contour extends approximately 15 km from the runway end to St Marys for a B747, whilst the same contour extends only 5 kms for an A320 aircraft.”

4.1.1 Noise Study Data

- Departure -23 January 2019 Mays Hill A320 at 6089 ft 67.9 dBA at 21 km from KSA equivalent to 19.28 km from WSA to Blacktown. The 70 dBA contour for an A320 aircraft on departure extends to 19.28 km not 5km
- Departure -29 January 2019 Mays Hill 14 out of 33 flights generated noise levels between 65 and 72.2 dBA

4.1.2 Analysis of Results

- The 70 dBA contour for an A320 aircraft on departure extends to 19.28 km not 5 km
- The 70 dBA contour for an 747D on departure extends to 19.28 km not 15 km
- The 70 dBA noise contour extends further than that predicted by the EIS for most aircraft

4.2 EIS Appendix E1 Page 3- Arrivals Noise Contour for B747 and A320

“In the case of arrivals, the noise contours follow arrival tracks from a merge point over the lower Blue Mountains. The arrival noise contours of the B747 are also significantly larger than the same contours for the A320 aircraft; for example the 70 dBA contour extends approximately 15-17 km from the runways ends for a B747, whilst the same contour extends only 8-10 kms for an A320.”

4.2.1 Noise Study Data

- Arrival-10 November 2018 Avondale Golf Course 747-4D7 at 2788 ft: 81.9 dBA at 23 km from KSA equivalent to 19.28 km from WSA to Blacktown.
- Arrival-8 November 2018 Avondale Golf Course 320-232 at 2788 ft: 75.3 dBA at 23 km from KSA equivalent to 19.28 km from WSA to Blacktown.

4.2.2 Analysis of Results

The 70 dBA contour for a 747-4D7 aircraft on arrival extends to 23 km compared to the distance in the EIS of 15-17 km

The 70 dBA contour for an A320 aircraft on departure extends to 19.28 km compared to the distance in the EIS of 5 km

4.3 EIS Appendix E1 Page 5 – Arrivals Lower Blue Mountains

- *“At locations directly under the indicative flight tracks, the number of audible aircraft overflights (typically at levels of 55 dBA or below) could be over 70 per day in Stage 1. Worst-case locations would be under one of two approach paths that emanate from a “merge point” in the area of the lower Blue Mountains.*
- *The nominal location of this merge point based on the indicative flight tracks would be almost directly over the township of Blaxland, meaning that in Stage 1, residents could expect to experience aircraft overflights at significant altitude (typically over 5000 ft above ground level) almost 100 times per day, with maximum noise levels ranging up to 55 dBA.”*

4.3.2 Noise Study Data

- Arrival-28 October 2018 Pymble Ladies College 737-838 at 4113 ft 73.6 dBA equivalent height quoted for flights over Blaxland.
- Arrival-28 October 2018 Pymble Ladies College 737-838 at 4888 ft 70.4dBA equivalent height quoted for flights over Blaxland
- Arrival-8 November 2018 Avondale Golf Course 737-838 at 4738 ft 71.9 dBA equivalent height quoted for flights over Blaxland
- Arrival-8 November 2018 Avondale Golf Course 380-841 at 3988 ft 72.4 dBA equivalent height quoted for flights over Blaxland

4.3.3 Analysis of Results

- The EIS predicted that the maximum noise levels would range up to 55 dBA over Blaxland at 5000 ft (actual height above ground level is 4232 ft). The study data indicates the noise level would reach 73.6 dBA.
- An A380-841 at 3988 ft generated a noise level of 72.4 dBA
- Monitoring 263 flights on approach to KSA at Pymble Ladies College and Avondale Golf Course (at 23 km) showed for flights around 5000 ft noise levels averaged around 70 dBA.

4.4 EIS Appendix E1 Page 9 – Continuous Descent Approach

“With respect to the first point, the use of continuous descent approaches has already been adopted in noise assessments for this report and, at this time, there appear to be no other feasible options by which noise emissions from aircraft in flight could be reduced through alternative operating procedures”.

4.4.1 Noise Study Data

Figure 10-7 of Volume -2a Chapter 10 Noise Aircraft “Concept Diagram of Continuous Descent Approach Zone of Noise Benefit” shows there is no benefit within approximately 20 km of the end of the runway. On this basis the noise level data recorded at Pymble Ladies College and Avondale Golf Course at 23 km from KSA equivalent to 19.28 km from WSA to Blacktown can be adopted as is.

4.5 EIS Appendix E1 Page 9 – Noise Levels and Variable Height of Aircraft

”Options for Noise Mitigation

There are three fundamental options for mitigation of aircraft noise:

- reduce noise emissions from the aircraft themselves;*
- plan flight paths and airport operating modes to achieve lower impacts over noise-sensitive areas; and*
- develop land use planning or other controls to ensure that future noise-sensitive uses are not located in noise-affected areas”.*

4.5.1 Noise Study Data

Monitoring 263 flights on approach to KSA at Pymble Ladies College and Avondale Golf Course (at 23 km) showed there was a large variability of aircraft heights.

- Avondale GC 7,8 and 10 November 2018 1288- 5388 ft
- Pymble Ladies College 27, 29 October 2018 1663-6138 ft
- For example for a 737-8FE, the level was 79.1 dBA at 1663 ft compared to 62.2 dBA at 4638 ft.

4.5.2 Analysis of Results

- The noise study shows the noise level generated by a particular aircraft is a function of the height above ground level for a particular event
- On this basis a noise level predicted for a particular location needs to specify the aircraft and the corresponding height above ground level.
- The variability of the height above ground level of aircraft results in a commensurate variability in recorded receiver noise levels.

4.6 EIS Appendix E1 Page 9 – Noise Levels over Blacktown

“Figure 3-3 and Figure 3-4 show L noise levels from a 747 arrival on any track. In this case, noise levels of 60 – 70 dBA can be expected over sections of Erskine Park and St Marys, extending to parts of Blacktown. Noise levels from this event also reach 60 dBA at Blaxland, beneath the “merge point” for arrivals. In Stage 1, there are expected to be five such arrivals per day”

“Arrivals by A320 aircraft, when they occur in the 23 direction, are predicted to produce levels exceeding 60 L_{AMax} over areas between Erskine Park, St Marys and Blacktown, and also (when they occur in the 05 direction) over areas in the Blue Mountains National Park and GBMWhA”.

4.6.1 Noise Study Data

The flight paths over Blacktown are shown in Figure A-1 “Flight Tracks Modelled for Initial Development (Single Runway- All Operating Modes Combined)” of Appendix E1³. On this basis the height of aircraft over Blacktown for aircraft on approach to WSA on a glide slope 18.52 km (10 nautical miles) long on a 3 degree glide slope.

“Page 47 Western Sydney Airport Plan, Note 31 “Aircraft on final approach to the airport are on straight line descent to the runway from 10 nautical miles (18.52 km)”

This results in aircraft heights above ground level as follows:-

- Intersection Great Western Highway and Flushcombe Rd -2800ft at 17 km from WSA
- Intersection Prospect Highway and Lancelot St -3101 ft at 18.52 km from WSA
- Haynes St Seven Hills – 3582 ft at 21.34 km from WSA
- Arrival-10 November 2018 Avondale Golf Course 747-4D7 at 2788 ft: 81.9 dBA at 23 km from KSA equivalent to 19.28 km from WSA to Blacktown.
- Arrival-8 November 2018 Avondale Golf Course 320-232 at 2763 ft: 75.3 dBA at 23 km from KSA equivalent to 19.28 7km from WSA to Blacktown
- Arrival-8 November 2018 Avondale Golf Course 330-343 at 2838 ft: 75.2 dBA at 23 km from KSA equivalent to 19.28 km from WSA to Blacktown
- Arrival-7 November 2018 Avondale Golf Course 737-8FE at 2863 ft: 74.6 dBA at 23 km from KSA equivalent to 19.28 km from WSA to Blacktown

4.6.2 Analysis of Results

- Based on the study results popular aircraft types including 320-232, 330-343 and 737-8FE will generate noise levels up to 75.3 dBA over Blacktown
- The L_{AMax} recorded in the study Avondale Golf Course was 81.9 dBA for a 747D. This will apply to Blacktown compared to a prediction of 70 dBA.
- The prediction of an L_{AMax} of 60 for an A320 over Blacktown is low compared to the L_{AMax} of 75.3 recorded over Avondale Golf Course.
- For Avondale Golf Course on 8 November 2018 there were 39 flights (60% of all flights) between 70- 77.2 dBA on single runway. This is applicable to the planned flights over Blacktown.

- For Avondale Golf Course on 8 November 2018 there were 59 flights (92% of all flights) between 65-77.2 dBA on single runway. This is applicable to the planned flights over Blacktown.

5.0 RESULTS & DISCUSSION

5.1 Noise Study

The noise study measured noise generated by aircraft in flight and compared them with those predicted by computer modelling used for the EIS.

5.2 Noise Study Recording Sites

The sites at which the SLMs were set up at Pymble and Mays Hill make the results applicable to Blacktown and Lower Blue Mountains under WSA operating conditions.

5.3 Variability in Height of Aircraft

The study has highlighted the fact that height of aircraft results in variability in noise levels. It appears that the variability in height of arriving and departing aircraft was not considered in the EIS.

5.4 Noise Impact over Blacktown

The study results indicate that the noise impact over Blacktown will be significantly higher than the levels predicted in the EIS.

Table 1 Blacktown

Parameter	EIS Prediction	Noise Study	Perceived Loudness Increase
70dBA contour departure	A320 - 5 km from WSA	A320-19.28km from WSA	
70dBA contour departure	747D - 15 km from WSA	747D 19.28 km from WSA	
70dBA contour arrival	A320 - 5 km from WSA	A320 - 23 km from WSA	
70 dBA contour arrival	747- 15-17 km from WSA	747D - 23 km from WSA	
Variability aircraft height	No information	1288 – 6138 ft	
L _{AMax} 747D	60-70	81.9	2-4 times
L _{AMax} A320	> 60	75.3	3 times
Number of flights 70-77.2 L _{AMax}	1 off 747D	39 (60%) recorded in one day for a range of aircraft	Multiple events 2-3 times
Number of flights 65-77.2 L _{AMax}	1 off 747D	59 (90%) recorded in one day for a range of aircraft	Multiple events 2-3 times

5.5 Noise Impact Lower Blue Mountains

Notwithstanding that the merge point over Blaxland may be moved in the design of the final flight paths, the study results indicate that the noise impact over Blaxland will be significantly higher than the levels predicted in the EIS.

Table 2 Lower Blue Mountains

Parameter	EIS Prediction	Noise Study	Perceived Loudness Increase
Noise level at height above ground 4200 ft	Up to 55 dBA	73.6 dBA	3-4 times
Noise level at height 5000 ft	Up to 55 dBA	70.4	3 times
Noise level 747D 4938 ft	60 dBA	73.2	3 times
Noise level A380-841 at 3988 ft	Up to 55 dBA	72.4	3 times

6.0 CONCLUSION

A total of 330 flights (263 approach and 67 departure) were tracked over locations considered to be representative of locations under the flight paths of the proposed Western Sydney Airport (WSA). The conclusion of this study is that measurement of noise generated by aircraft in flight has demonstrated that variability in the height of aircraft will result in a wide range of receiver noise levels. This variability in height and the commensurate variability in noise levels will increase the noise impact over Blacktown and the Lower Blue Mountains compared to that predicted in the EIS.

The study raises questions as to the reliability of noise level predictions in the EIS for aircraft noise impacts on other areas affected by the WSA as it appears that the variability in height of arriving and departing aircraft was not considered in the EIS.

Report prepared by:

Eric J. Ancich
PhD, FIEAust, CPEng, MIABSE
Chartered Professional Engineer

REFERENCES

Western Sydney Airport EIS

1. <https://westernsydneyairport.gov.au/files/eis/WSA-EIS-Volume-2a-Chapter-10-Noise-aircraft.pdf>
2. <https://www.google.com/search?q=WSA-EIS-Volume-4-Appendix-E1-Aircraft-overflight-noise+2&ie=utf-8&oe=utf-8&client=firefox-b-ab>
3. https://westernsydneyairport.gov.au/files/Western_Sydney_Airport_Plan.pdf. Page 47
4. Figure A-1 “Flight Tracks Modelled for Initial Development (Single Runway- All Operating Modes Combined) of Appendix E1.

APPENDICES

- A1 Monitoring Of Flights Over Avondale Golf Course Nov 2018–Data Cronologically
- A2 Monitoring Of Flights Over Avondale Golf Course Nov 2018–Data Sort WRT to Height
- A3 Monitoring Of Flights Over Avondale Golf Course Nov 2018–Data Sort WRT $L_{A_{Max}}$
- A4 Monitoring Of Flights Over Avondale Golf Course Nov 2018– 8 November 2018 Data Cronologically
- A5 Monitoring Of Flights Over Avondale Golf Course Nov 2018– 8 November 2018 Data Sort WRT to Height
- A6 Monitoring Of Flights Over Avondale Golf Course Nov 2018– 8 November 2018 Data Sort WRT to $L_{A_{Max}}$
- B1 Monitoring Of Flights Over Pymble Ladies College dale Golf Course Oct 2018–Data Cronologically
- B2 Monitoring Of Flights Over Pymble Ladies College Nov 2018–Data Sort WRT to Height
- B3 Monitoring Of Flights Over Pymble Ladies College Nov 2018–Data Sort WRT to $L_{A_{Max}}$
- C1 Monitoring Of Flights Over Mays Hill Jan 2019–Data Cronologically
- C2 Monitoring Of Flights Over Mays Hill Jan 2019–Data Sort WRT to Height
- C3 Monitoring Of Flights Over Mays Hill Jan 2019–Data Sort WRT to $L_{A_{Max}}$

APPENDIX A5

MONITORING OF FLIGHTS OVER AVONDALE GOLF COURSE NOV 18 NOVEMBER ONLY

DAT SORT WRT TO HEIGHT

												ELEVATION FT		387		64 FLIGHTS	A5
SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO LOGGER	DATA LAMax	DATA TIME ESDST		
8	ADEL	SYD	7	23	25	10	25	QANTAS	QF740	737-838	2300	1913	OVER	64	1024		
8	ADL	SYD	8	1	35	12	35	QANTAS	QF738	737-838	2575	2188	OVER	66.2	1237		
8	DENPASAR	SYD	7	19	55	6	55	GARUDA	GA417	330-343	2725	2338	OVER	71	656		
8	LAUNSCN	SYD	8	11	17	22	17	JETSTAR	JO750	320-232	2800	2413	OVER	67.5	2218		
8	HONOLULO	SYD	8	8	29	19	29	HAWAIIAN	HA451	330-243	2825	2438	OVER	72.4	1929		
8	CHRISTCH	SYD	8	8	59	19	59	EMERITES	EK413	380-861	2850	2463	OVER	72.8	1958		
8	PERTH	SYD	8	5	3	16	3	QANTAS	QF642	737-838	2875	2488	OVER	74.5	1604		
8	KL	SYD	7	23	13	10	13	ASIA	D7222	330-343	2900	2513	OVER	70.6	1013		
8	GOLDC	SYD	8	0	19	11	19	TIGER	TT607	320-232	2925	2538	OVER	74.6	1119		
8	MEL	SYD	7	21	34	8	34	VIRGIN	VA813	787-8	2925	2538	OVER	70.2	834		
8	ADEL	SYD	7	22	12	9	12	VIRGIN	VA407	737-8FE	2950	2563	OVER	71.6	913		
8	PEKING	SYD	8	2	49	13	49	QANTAS	QF108	330-303	2950	2563	OVER	71.4	1350		
8	HOBART	SYD	7	22	41	9	41	JETSTAR	JO718	320-232	2950	2563	OVER	70.2	944		
8	SINGAPORE	SYD	7	20	11	7	11	QANTAS	QF82	330-303	2950	2563	OVER	64.1	711		
8	LAX	SYD	7	21	32	8	32	AMERICAN	AA73	787-9	2950	2563	OVER	64.1	832		
8	SHANGHAI	SYD	7	22	18	9	18	CHINA E	MU561	330-243	2975	2588	OVER	73.7	918		
8	DENPASAR	SYD	7	20	36	7	36	JETSTAR	JO38	787-8	2975	2588	OVER	69.3	736		
8	HK	SYD	7	20	34	7	34	CATHAY	CX111	330-343	3000	2613	OVER	70.1	733		
8	VANCOUVER	SYD	7	23	19	10	19	CANADA	AC33	777-233	3000	2613	OVER	67.8	1018		
8	MELB	SYD	7	22	34	9	34	QANTAS	QF414	737-838	3025	2638	OVER	71.3	934		
8	NANJING	SYD	7	21	42	8	42	CHINA E	MU727	330-243	3050	2663	OVER	73.5	843		
8	DUBAI	SYD	7	19	49	6	49	EMERITES	EK412	380-861	3075	2688	OVER	70.8	650		
8	MELB	SYD	8	8	19	19	19	VIRGIN	VA875	737-8FE	3125	2738	OVER	71.8	1919		
8	SUNSHINE	SYD	7	22	39	9	39	JETSTAR	JO781	320-232	3150	2763	OVER	75.3	939		
8	PEKING	SYD	8	5	10	16	10	CHINA	CA173	330-343	3225	2838	OVER	75.2	1610		
8	BANGKOK	SYD	7	19	41	6	41	THAI	747-4D7	747-4D7	3275	2888	OVER	77.2	641	LAMax	77.2
8	GUANZHOU	SYD	8	9	33	20	33	CHINA S	CZ301	330-323	3275	2888	OVER	71.3	2033		
8	DOHA	SYD	8	7	47	18	47	QATAR	QR908	380-861	3300	2913	OVER	72	1847		
8	SEOUL	SYD	7	19	53	6	53	KOREAN	KE121	380-861	3350	2963	OVER	73.3	654		
8	PERTH	SYD	7	19	21	6	21	VIRGIN	VA570	737-8FE	3350	2963	OVER	69.2	622	29 FLIGHTS <3000 FT	
8	TONATAPU	SYD	7	22	26	9	26	VIRGIN	VA94	737-8FE	3400	3013	OVER	69.8	926	45%	
8	BRISB	SYD	8	2	21	13	21	QANTAS	QF525	737-838	3550	3163	OVER	68.4	1321		
8	DARWIN	SYD	8	0	31	11	31	HIFLY	AST045	340-313	3557	3170	OVER	70.7	1131		
8	HK	SYD	8	0	59	11	59	CATHAY	CX101	777-367	3575	3188	OVER	74.1	1158		
8	GOLDC	SYD	8	9	15	20	15	VIRGIN	VA540	737-8FE	3575	3188	OVER	68.3	2017		
8	TOKYO	SYD	7	19	29	6	29	JAPAN	JL771	787-8	3600	3213	OVER	73.4	629		
8	MELB	SYD	8	11	15	22	15	QANTAS	QF494	737-838	3600	3213	OVER	64.7	2216		
8	GOLDC	SYD	8	3	59	14	59	JETSTAR	JO411	320-232	3800	3413	OVER	75.4	1459	LAMax	75.4
8	SHANGHAI	SYD	7	22	57	9	57	QANTAS	QF130	330-202	3800	3413	OVER	72.2	958		
8	SEOUL	SYD	7	21	0	8	0	ASIANA	OZ601	380-841	3800	3413	OVER	71.3	759		

8	BRISB	SYD	8	11	13	22	13	QANTAS	QF555	737-838	3875	3488	OVER	67.6	2213
8	XIAMEN	SYD	7	23	33	10	33	XIAMEN	MF801	787-8	3925	3538	OVER	70	1034
8	TOKYO	SYD	7	22	6	9	6	QANTAS	QF26	747-438	3925	3538	OVER	69.4	905
8	HK	SYD	7	19	47	6	47	QANTAS	QF128	747-438	4000	3613	OVER	74.1	646
8	BANGKOK	SYD	7	21	24	8	24	EMERITES	EK418	380-861	4050	3663	OVER	72.2	824
8	XIY	SYD	7	20	13	7	13	HAINAN	HU7993	330-243	4075	3688	OVER	71.7	713
8	SINGAPORE	SYD	7	19	37	6	37	BRITISH	BA15	777-336	4100	3713	OVER	69.1	638
8	BANGKOK	SYD	7	20	20	7	20	QANTAS	QF24	330-303	4100	3713	OVER	66	720
8	WUHAN	SYD	8	0	1	11	1	CHINA E	MU749	330-243	4125	3738	OVER	77	1100
8	BRISB	SYD	8	10	29	21	29	VIRGIN	VA986	737-8FE	4175	3788	OVER	74.2	2128
8	BRISB	SYD	8	11	15	22	15	JETSTAR	JQ823	320-232	4175	3788	OVER	65	2215
8	BRISB	SYD	8	11	23	22	23	QANTAS	QF559	737-838	4250	3863	OVER	65.1	2224
8	BRISB	SYD	8	8	43	19	43	TIGER	TT381	320-232	4275	3888	OVER	71.8	1943
8	MANILA	SYD	7	19	59	6	59	QANTAS	QF20	330-202	4325	3938	OVER	70.2	658
8	SINGAPORE	SYD	7	20	7	7	7	SING	SQ221	380-841	4375	3988	OVER	72.4	707
8	CHENGDU	SYD	8	4	17	15	17	CHINA	CA429	330-343	4450	4063	OVER	74.1	1518
8	HERVEY B	SYD	8	2	59	13	59	VIRGIN	VA1556	737-8FE	4450	4063	OVER	67	1400
8	GOLDC	SYD	8	11	5	22	5	VIRGIN	VA544	737-8FE	4500	4113	OVER	65	2204
8	GOLDC	SYD	8	5	31	16	31	VIRGIN	VA526	737-8FE	4700	4313	OVER	67.6	1432
8	TAIPEI	SYD	8	0	55	11	55	CHINA	C151	350-941	4850	4463	OVER	71.6	1154
8	LAX	SYD	7	21	38	8	38	UNITED	UA839	787-9	4850	4463	OVER	68.7	839
8	HAMILTON	SYD	8	4	5	15	5	VIRGIN	VA1280	737-81D	4875	4488	OVER	68.7	1507
8	SANFRAN	SYD	7	21	28	8	28	UNITED	UA863	787-9	5100	4713	OVER	71.5	828
8	TOKYO	SYD	8	10	33	21	33	POLAR	PO241	767-3JH	5100	4713	OVER	69.8	2133
8	GOLDC	SYD	8	6	9	17	9	QANTAS	QF865	737-838	5250	4863	OVER	67.4	1707

25 FLIGHTS 3000-4000

39%

54 FLIGHTS <4000 FT

84%

APPENDIX A1

MONITORING OF FLIGHTS OVER AVONDALE GOLF COURSE NOV 2018

DATA CRONOLOGICALLY

SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	ELEVATION FT		DATA LAMax	DATA TIME ESDST
												HEIGHT ABOVE GL	LOCATION REF TO LOGGER	387	
7	NANDI	SYD	7	0	16	11	16	FIJI	FJ911	330-243	4000	3613	OVER	65.8	1116
7	HK	SYD	7	0	37	11	37	CATHAY	CX101	777-367	4175	3788	OVER	69.6	1137
7	TAIPEI	SYD	7	0	59	11	59	CHINA	C151	359-941	3650	3263	OVER	67.2	1158
7	HANOI	SYD	7	1	39	12	39	VIETNAM	VN787	787-9	3875	3488	OVER	72.1	1238
7	SHANGHAI	SYD	7	1	43	12	43	CHINA E	MU735	777-39P	3175	2788	OVER	67.7	1243
7	MELB	SYD	7	1	45	12	45	QANTAS	QF428	737-838	3150	2763	OVER	67	1245
7	KUMIMG	SYD	7	2	47	13	47	CHINA E	MU777	330-243	3200	2813	OVER	76.7	1347
7	honolulu	SYD	7	4	3	15	3	JETSTAR	JQ4	787-8	3125	2738	OVER	67.4	1503
7	CAIRNS	SYD	7	4	28	15	28	QANTAS	QF923	737-838	3800	3413	OVER	71.8	1528
7	CHRISTCH	SYD	7	7	38	18	38	EMERITES	EK413	380-861	3750	3363	OVER	67.8	1839
7	SINGAPORE	SYD	7	7	2	18	2	SING	SQ288	777-312	2650	2263	OVER	66.6	1802
7	CHRISTCH	SYD	7	9	8	20	8	EMERITES	EK413	380-861	3750	3363	OVER	73.1	2005
7	HK	SYD	7	9	18	20	18	CATHAY	CX139	777-367	4100	3713	OVER	66.5	2018
7	GUANGZOU	SYD	7	9	22	20	22	CHINA S	CZ301	330-323	3250	2863	OVER	71.2	2022
7	BRISB	SYD	7	9	28	20	28	QANTAS	QF551	737-838	4500	4113	OVER	60.1	2029
7	SINGAPORE	SYD	7	9	52	20	52	SING	SQ211	777-312	3200	2813	OVER	70.4	2054
7	ADELAIDE	SYD	7	10	14	21	14	TOLL	TFR34	737-476	3125	2738	OVER	74.6	2113
7	MELB	SYD	7	10	26	21	26	TIGER	TT264	320-232	3175	2788	OVER	74	2126
7	MELB	SYD	7	10	40	21	40	VIRGIN	VA891	737-8FE	3250	2863	OVER	74.6	2140
7	MELB	SYD	7	10	46	21	46	QANTAS	QF7354	737-376	2175	1788	OVER	72.8	2145
7	MELB	SYD	7	10	48	21	48	JETSTAR	JQ518	320-232	3200	2813	OVER	73.3	2148
7	TOKYO	SYD	7	10	58	21	58	POLAR	PO241	767-3	5725	5338	OVER	78.6	2158
8	PERTH	SYD	7	19	21	6	21	VIRGIN	VA570	737-8FE	3350	2963	OVER	69.2	622
8	TOKYO	SYD	7	19	29	6	29	JAPAN	JL771	787-8	3600	3213	OVER	73.4	629
8	SINGAPORE	SYD	7	19	37	6	37	BRITISH	BA15	777-336	4100	3713	OVER	69.1	638
8	BANGKOK	SYD	7	19	41	6	41	THAI	747-4D7	747-4D7	3275	2888	OVER	77.2	641
8	HK	SYD	7	19	47	6	47	QANTAS	QF128	747-438	4000	3613	OVER	74.1	646
8	DUBAI	SYD	7	19	49	6	49	EMERITES	EK412	380-861	3075	2688	OVER	70.8	650
8	SEOUL	SYD	7	19	53	6	53	KOREAN	KE121	380-861	3350	2963	OVER	73.3	654
8	DENPASAR	SYD	7	19	55	6	55	GARUDA	GA417	330-343	2725	2338	OVER	71	656
8	MANILA	SYD	7	19	59	6	59	QANTAS	QF20	330-202	4325	3938	OVER	70.2	658
8	SINGAPORE	SYD	7	20	7	7	7	SING	SQ221	380-841	4375	3988	OVER	72.4	707
8	SINGAPORE	SYD	7	20	11	7	11	QANTAS	QF82	330-303	2950	2563	OVER	64.1	711
8	XIY	SYD	7	20	13	7	13	HAINAN	HU7993	330-243	4075	3688	OVER	71.7	713
8	BANGKOK	SYD	7	20	20	7	20	QANTAS	QF24	330-303	4100	3713	OVER	66	720
8	HK	SYD	7	20	34	7	34	CATHAY	CX111	330-343	3000	2613	OVER	70.1	733
8	DENPASAR	SYD	7	20	36	7	36	JETSTAR	JQ38	787-8	2975	2588	OVER	69.3	736
8	SEOUL	SYD	7	21	0	8	0	ASIANA	OZ601	380-841	3800	3413	OVER	71.3	759
8	BANGKOK	SYD	7	21	24	8	24	EMERITES	EK418	380-861	4050	3663	OVER	72.2	824
8	SANFRAN	SYD	7	21	28	8	28	UNITED	UA863	787-9	5100	4713	OVER	71.5	828

8	LAX	SYD	7	21	32	8	32	AMERICAN	AA73	787-9	2950	2563	OVER	64.1	832
8	MEL	SYD	7	21	34	8	34	VIRGIN	VA813	787-8	2925	2538	OVER	70.2	834
8	LAX	SYD	7	21	38	8	38	UNITED	UA839	787-9	4850	4463	OVER	68.7	839
8	NANJING	SYD	7	21	42	8	42	CHINA E	MU727	330-243	3050	2663	OVER	73.5	843
8	TOKYO	SYD	7	22	6	9	6	QANTAS	QF26	747-438	3925	3538	OVER	69.4	905
8	ADEL	SYD	7	22	12	9	12	VIRGIN	VA407	737-8FE	2950	2563	OVER	71.6	913
8	SHANGHAI	SYD	7	22	18	9	18	CHINA E	MU561	330-243	2975	2588	OVER	73.7	918
8	TONATAPU	SYD	7	22	26	9	26	VIRGIN	VA94	737-8FE	3400	3013	OVER	69.8	926
8	MELB	SYD	7	22	34	9	34	QANTAS	QF414	737-838	3025	2638	OVER	71.3	934
8	SUNSHINE	SYD	7	22	39	9	39	JETSTAR	JQ781	320-232	3150	2763	OVER	75.3	939
8	HOBART	SYD	7	22	41	9	41	JETSTAR	JQ718	320-232	2950	2563	OVER	70.2	944
8	SHANGHAI	SYD	7	22	57	9	57	QANTAS	QF130	330-202	3800	3413	OVER	72.2	958
8	KL	SYD	7	23	13	10	13	ASIA	D7222	330-343	2900	2513	OVER	70.6	1013
8	VANCOUVER	SYD	7	23	19	10	19	CANADA	AC33	777-233	3000	2613	OVER	67.8	1018
8	ADEL	SYD	7	23	25	10	25	QANTAS	QF740	737-838	2300	1913	OVER	64	1024
8	XIAMEN	SYD	7	23	33	10	33	XIAMEN	MF801	787-8	3925	3538	OVER	70	1034
8	WUHAN	SYD	8	0	1	11	1	CHINA E	MU749	330-243	4125	3738	OVER	77	1100
8	GOLDC	SYD	8	0	19	11	19	TIGER	TT607	320-232	2925	2538	OVER	74.6	1119
8	DARWIN	SYD	8	0	31	11	31	HIFLY	AST045	340-313	3557	3170	OVER	70.7	1131
8	TAIPEI	SYD	8	0	55	11	55	CHINA	C151	350-941	4850	4463	OVER	71.6	1154
8	HK	SYD	8	0	59	11	59	CATHAY	CX101	777-367	3575	3188	OVER	74.1	1158
8	ADL	SYD	8	1	35	12	35	QANTAS	QF738	737-838	2575	2188	OVER	66.2	1237
8	BRISB	SYD	8	2	21	13	21	QANTAS	QF525	737-838	3550	3163	OVER	68.4	1321
8	PEKING	SYD	8	2	49	13	49	QANTAS	QF108	330-303	2950	2563	OVER	71.4	1350
8	HERVEY B	SYD	8	2	59	13	59	VIRGIN	VA1556	737-8FE	4450	4063	OVER	67	1400
8	GOLDC	SYD	8	3	59	14	59	JETSTAR	JQ411	320-232	3800	3413	OVER	75.4	1459
8	HAMILTON	SYD	8	4	5	15	5	VIRGIN	VA1280	737-81D	4875	4488	OVER	68.7	1507
8	CHENGDU	SYD	8	4	17	15	17	CHINA	CA429	330-343	4450	4063	OVER	74.1	1518
8	PERTH	SYD	8	5	3	16	3	QANTAS	QF642	737-838	2875	2488	OVER	74.5	1604
8	PEKING	SYD	8	5	10	16	10	CHINA	CA173	330-343	3225	2838	OVER	75.2	1610
8	GOLDC	SYD	8	5	31	16	31	VIRGIN	VA526	737-8FE	4700	4313	OVER	67.6	1432
8	GOLDC	SYD	8	6	9	17	9	QANTAS	QF865	737-838	5250	4863	OVER	67.4	1707
8	DOHA	SYD	8	7	47	18	47	QATAR	QR908	380-861	3300	2913	OVER	72	1847
8	MELB	SYD	8	8	19	19	19	VIRGIN	VA875	737-8FE	3125	2738	OVER	71.8	1919
8	HONOLULO	SYD	8	8	29	19	29	HAWAIIAN	HA451	330-243	2825	2438	OVER	72.4	1929
8	BRISB	SYD	8	8	43	19	43	TIGER	TT381	320-232	4275	3888	OVER	71.8	1943
8	CHRISTCH	SYD	8	8	59	19	59	EMERITES	EK413	380-861	2850	2463	OVER	72.8	1958
8	GOLDC	SYD	8	9	15	20	15	VIRGIN	VA540	737-8FE	3575	3188	OVER	68.3	2017
8	GUANZHOU	SYD	8	9	33	20	33	CHINA S	CZ301	330-323	3275	2888	OVER	71.3	2033
8	BRISB	SYD	8	10	29	21	29	VIRGIN	VA986	737-8FE	4175	3788	OVER	74.2	2128
8	TOKYO	SYD	8	10	33	21	33	POLAR	PO241	767-3JH	5100	4713	OVER	69.8	2133
8	GOLDC	SYD	8	11	5	22	5	VIRGIN	VA544	737-8FE	4500	4113	OVER	65	2204
8	BRISB	SYD	8	11	13	22	13	QANTAS	QF555	737-838	3875	3488	OVER	67.6	2213
8	BRISB	SYD	8	11	15	22	15	JETSTAR	JQ823	320-232	4175	3788	OVER	65	2215
8	MELB	SYD	8	11	15	22	15	QANTAS	QF494	737-838	3600	3213	OVER	64.7	2216
8	LAUNSCN	SYD	8	11	17	22	17	JETSTAR	JQ750	320-232	2800	2413	OVER	67.5	2218
8	BRISB	SYD	8	11	23	22	23	QANTAS	QF559	737-838	4250	3863	OVER	65.1	2224

10	QINGDAO	SYD	9	20	0	7	0	CAPITAL	JD479	330-243	4825	4438	OVER	68.5	700
10	SINGAPORE	SYD	9	20	10	7	10	SING	SQ221	380-841	3175	2788	OVER	69.1	711
10	HK	SYD	9	20	6	7	6	CATHAY	CX111	330-342	4325	3938	OVER	71.5	706
10	MANILA	SYD	9	20	16	7	16	QANTAS	QF20	330-202	3950	3563	OVER	74.1	715
10	DENPASR	SYD	9	20	18	7	18	JETSTAR	JQ38	787-8	2175	1788	OVER	66.9	718
10	SHENZEN	SYD	9	20	19	7	19	CHINA S	CZ3071	330-343	3175	2788	OVER	73.8	719
10	BANGKOK	SYD	9	20	28	7	28	THAI	TG475	747-4D7	3175	2788	OVER	81.9	727
10	TOKYO	SYD	9	20	36	7	36	POLAR	PO241	767-3JH	3600	3213	OVER	64.7	735
10	SEOUL	SYD	9	20	38	7	38	ASIANA	OZ601	380-841	5325	4938	OVER	73.2	738
10	HK	SYD	9	21	2	8	2	VIRGIN	VA82	330-243	3575	3188	OVER	69.4	802
10	MEL	SYD	9	21	46	8	46	VIRGIN	VA815	737-8FE	3500	3113	OVER	70.1	846
10	BRISBN	SYD	9	21	52	8	52	QANTAS	QF507	737-838	3525	3138	OVER	69.2	852
10	TOKYO	SYD	9	22	0	9	0	QANTAS	QF26	747-438	3925	3538	OVER	78.7	900
10	SHANGHAI	SYD	9	22	6	9	6	QANTAS	QF130	330-303	2625	2238	OVER	72.7	906
10	LA	SYD	9	22	12	9	12	VIRGIN	VA2	777-3ZG	2350	1963	OVER	60.9	912
10	HK	SYD	9	22	20	9	20	CATHAY	CX161	777-367	5125	4738	OVER	71.9	920
10	JAKARTA	SYD	9	22	24	9	24	GARUDA	GA712	330-343	2850	2463	OVER	73.3	923
10	MEL	SYD	9	22	26	9	26	JETSTAR	JQ504	320-232	2650	2263	OVER	68.4	927
10	HO CHI MINH	SYD	9	22	30	9	30	VEITNAM	VN773	787-9	3125	2738	OVER	64.5	930
10	NANJING	SYD	9	22	34	9	34	CHINA E	MU727	330-243	3050	2663	OVER	68.5	935
10	XIAMEN	SYD	9	23	30	10	30	XIAMEN	MF801	787-8	5775	5388	OVER	69.8	1030
10	HO CHI MINH	SYD	9	23	40	10	40	JETSTAR	JQ62	787-8	4275	3888	OVER	74.3	1040
10	GOLD C	SYD	9	23	48	10	48	JETSTAR	JQ12	787-8	3600	3213	OVER	69.6	1048
10	WUHAN	SYD	10	0	16	11	16	CHINA E	MU749	330-243	2900	2513	OVER	78.1	1116
10	HK	SYD	10	0	40	11	40	QANTAS	QF118	330-303	3250	2863	OVER	69.7	1139
10	HK	SYD	10	0	45	11	45	CATHAY	CX101	777-367	3325	2938	OVER	66.1	1145
10	MELB	SYD	10	0	40	11	40	QANTAS	QF424	737-838	2975	2588	OVER	68.9	1141
10	NADI	SYD	10	0	46	11	46	FIJI	FJ911	330-343	2875	2488	OVER	71.1	1146
10	TAIPEI	SYD	10	0	55	11	55	CHINA	C151	350-941	3875	3488	OVER	72.7	1155
10	PROSERPINE	SYD	10	1	17	12	17	TIGER	TT393	320-232	4500	4113	OVER	68.8	1215

APPENDIX A2

MONITORING OF FLIGHTS OVER AVONDALE GOLF COURSE NOV 2018

HEIGHT DATA SORT

SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	ELEVATION FT		DATA LAMax	DATA TIME ESDST
												HEIGHT ABOVE GL	LOCATION REF TO LOGGER		
7	MELB	SYD	7	10	46	21	46	QANTAS	QF7354	737-376	2175	1788	OVER	72.8	2145
10	DENPASR	SYD	9	20	18	7	18	JETSTAR	JQ38	787-8	2175	1788	OVER	66.9	718
8	ADEL	SYD	7	23	25	10	25	QANTAS	QF740	737-838	2300	1913	OVER	64	1024
10	LA	SYD	9	22	12	9	12	VIRGIN	VA2	777-3ZG	2350	1963	OVER	60.9	912
8	ADL	SYD	8	1	35	12	35	QANTAS	QF738	737-838	2575	2188	OVER	66.2	1237
10	SHANGHAI	SYD	9	22	6	9	6	QANTAS	QF130	330-303	2625	2238	OVER	72.7	906
7	SINGAPORE	SYD	7	7	2	18	2	SING	SQ288	777-312	2650	2263	OVER	66.6	1802
10	MEL	SYD	9	22	26	9	26	JETSTAR	JQ504	320-232	2650	2263	OVER	68.4	927
8	DENPASAR	SYD	7	19	55	6	55	GARUDA	GA417	330-343	2725	2338	OVER	71	656
8	LAUNSCN	SYD	8	11	17	22	17	JETSTAR	JQ750	320-232	2800	2413	OVER	67.5	2218
8	HONOLULO	SYD	8	8	29	19	29	HAWAIIAN	HA451	330-243	2825	2438	OVER	72.4	1929
8	CHRISTCH	SYD	8	8	59	19	59	EMERITES	EK413	380-861	2850	2463	OVER	72.8	1958
10	JAKARTA	SYD	9	22	24	9	24	GARUDA	GA712	330-343	2850	2463	OVER	73.3	923
8	PERTH	SYD	8	5	3	16	3	QANTAS	QF642	737-838	2875	2488	OVER	74.5	1604
10	NADI	SYD	10	0	46	11	46	FIJI	FJ911	330-343	2875	2488	OVER	71.1	1146
8	KL	SYD	7	23	13	10	13	ASIA	D7222	330-343	2900	2513	OVER	70.6	1013
10	WUHAN	SYD	10	0	16	11	16	CHINA E	MU749	330-243	2900	2513	OVER	78.1	1116
8	MEL	SYD	7	21	34	8	34	VIRGIN	VA813	787-8	2925	2538	OVER	70.2	834
8	GOLDC	SYD	8	0	19	11	19	TIGER	TT607	320-232	2925	2538	OVER	74.6	1119
8	SINGAPORE	SYD	7	20	11	7	11	QANTAS	QF82	330-303	2950	2563	OVER	64.1	711
8	LAX	SYD	7	21	32	8	32	AMERICAN	AA73	787-9	2950	2563	OVER	64.1	832
8	ADEL	SYD	7	22	12	9	12	VIRGIN	VA407	737-8FE	2950	2563	OVER	71.6	913
8	HOBART	SYD	7	22	41	9	41	JETSTAR	JQ718	320-232	2950	2563	OVER	70.2	944
8	PEKING	SYD	8	2	49	13	49	QANTAS	QF108	330-303	2950	2563	OVER	71.4	1350
8	DENPASAR	SYD	7	20	36	7	36	JETSTAR	JQ38	787-8	2975	2588	OVER	69.3	736
8	SHANGHAI	SYD	7	22	18	9	18	CHINA E	MU561	330-243	2975	2588	OVER	73.7	918
10	MELB	SYD	10	0	40	11	40	QANTAS	QF424	737-838	2975	2588	OVER	68.9	1141
8	HK	SYD	7	20	34	7	34	CATHAY	CX111	330-343	3000	2613	OVER	70.1	733
8	VANCOUVER	SYD	7	23	19	10	19	CANADA	AC33	777-233	3000	2613	OVER	67.8	1018
8	MELB	SYD	7	22	34	9	34	QANTAS	QF414	737-838	3025	2638	OVER	71.3	934
8	NANJING	SYD	7	21	42	8	42	CHINA E	MU727	330-243	3050	2663	OVER	73.5	843
10	NANJING	SYD	9	22	34	9	34	CHINA E	MU727	330-243	3050	2663	OVER	68.5	935
8	DUBAI	SYD	7	19	49	6	49	EMERITES	EK412	380-861	3075	2688	OVER	70.8	650
7	honolulu	SYD	7	4	3	15	3	JETSTAR	JQ4	787-8	3125	2738	OVER	67.4	1503
7	ADELAIDE	SYD	7	10	14	21	14	TOLL	TFR34	737-476	3125	2738	OVER	74.6	2113
8	MELB	SYD	8	8	19	19	19	VIRGIN	VA875	737-8FE	3125	2738	OVER	71.8	1919
10	HO CHI MINH	SYD	9	22	30	9	30	VEITNAM	VN773	787-9	3125	2738	OVER	64.5	930
7	MELB	SYD	7	1	45	12	45	QANTAS	QF428	737-838	3150	2763	OVER	67	1245
8	SUNSHINE	SYD	7	22	39	9	39	JETSTAR	JQ781	320-232	3150	2763	OVER	75.3	939
7	SHANGHAI	SYD	7	1	43	12	43	CHINA E	MU735	777-39P	3175	2788	OVER	67.7	1243

7	MELB	SYD	7	10	26	21	26	TIGER	TT264	320-232	3175	2788	OVER	74	2126
10	SINGAPORE	SYD	9	20	10	7	10	SING	SQ221	380-841	3175	2788	OVER	69.1	711
10	SHENZHEN	SYD	9	20	19	7	19	CHINA S	CZ3071	330-343	3175	2788	OVER	73.8	719
10	BANGKOK	SYD	9	20	28	7	28	THAI	TG475	747-4D7	3175	2788	OVER	81.9	727
7	KUMIMG	SYD	7	2	47	13	47	CHINA E	MU777	330-243	3200	2813	OVER	76.7	1347
7	SINGAPORE	SYD	7	9	52	20	52	SING	SQ211	777-312	3200	2813	OVER	70.4	2054
7	MELB	SYD	7	10	48	21	48	JETSTAR	JQ518	320-232	3200	2813	OVER	73.3	2148
8	PEKING	SYD	8	5	10	16	10	CHINA	CA173	330-343	3225	2838	OVER	75.2	1610
7	GUANGZOU	SYD	7	9	22	20	22	CHINA S	CZ301	330-323	3250	2863	OVER	71.2	2022
7	MELB	SYD	7	10	40	21	40	VIRGIN	VA891	737-8FE	3250	2863	OVER	74.6	2140
10	HK	SYD	10	0	40	11	40	QANTAS	QF118	330-303	3250	2863	OVER	69.7	1139
8	BANGKOK	SYD	7	19	41	6	41	THAI	747-4D7	747-4D7	3275	2888	OVER	77.2	641
8	GUANZHOU	SYD	8	9	33	20	33	CHINA S	CZ301	330-323	3275	2888	OVER	71.3	2033
8	DOHA	SYD	8	7	47	18	47	QATAR	QR908	380-861	3300	2913	OVER	72	1847
10	HK	SYD	10	0	45	11	45	CATHAY	CX101	777-367	3325	2938	OVER	66.1	1145
8	PERTH	SYD	7	19	21	6	21	VIRGIN	VA570	737-8FE	3350	2963	OVER	69.2	622
8	SEOUL	SYD	7	19	53	6	53	KOREAN	KE121	380-861	3350	2963	OVER	73.3	654
8	TONATAPU	SYD	7	22	26	9	26	VIRGIN	VA94	737-8FE	3400	3013	OVER	69.8	926
10	MEL	SYD	9	21	46	8	46	VIRGIN	VA815	737-8FE	3500	3113	OVER	70.1	846
10	BRISBN	SYD	9	21	52	8	52	QANTAS	QF507	737-838	3525	3138	OVER	69.2	852
8	BRISB	SYD	8	2	21	13	21	QANTAS	QF525	737-838	3550	3163	OVER	68.4	1321
8	DARWIN	SYD	8	0	31	11	31	HIFLY	AST045	340-313	3557	3170	OVER	70.7	1131
8	HK	SYD	8	0	59	11	59	CATHAY	CX101	777-367	3575	3188	OVER	74.1	1158
8	GOLDC	SYD	8	9	15	20	15	VIRGIN	VA540	737-8FE	3575	3188	OVER	68.3	2017
10	HK	SYD	9	21	2	8	2	VIRGIN	VA82	330-243	3575	3188	OVER	69.4	802
8	TOKYO	SYD	7	19	29	6	29	JAPAN	JL771	787-8	3600	3213	OVER	73.4	629
8	MELB	SYD	8	11	15	22	15	QANTAS	QF494	737-838	3600	3213	OVER	64.7	2216
10	TOKYO	SYD	9	20	36	7	36	POLAR	PO241	767-3JH	3600	3213	OVER	64.7	735
10	GOLD C	SYD	9	23	48	10	48	JETSTAR	JQ12	787-8	3600	3213	OVER	69.6	1048
7	TAIPEI	SYD	7	0	59	11	59	CHINA	C151	359-941	3650	3263	OVER	67.2	1158
7	CHRISTCH	SYD	7	7	38	18	38	EMERITES	EK413	380-861	3750	3363	OVER	67.8	1839
7	CHRISTCH	SYD	7	9	8	20	8	EMERITES	EK413	380-861	3750	3363	OVER	73.1	2005
7	CAIRNS	SYD	7	4	28	15	28	QANTAS	QF923	737-838	3800	3413	OVER	71.8	1528
8	SEOUL	SYD	7	21	0	8	0	ASIANA	OZ601	380-841	3800	3413	OVER	71.3	759
8	SHANGHAI	SYD	7	22	57	9	57	QANTAS	QF130	330-202	3800	3413	OVER	72.2	958
8	GOLDC	SYD	8	3	59	14	59	JETSTAR	JQ411	320-232	3800	3413	OVER	75.4	1459
7	HANOI	SYD	7	1	39	12	39	VEITNAM	VN787	787-9	3875	3488	OVER	72.1	1238
8	BRISB	SYD	8	11	13	22	13	QANTAS	QF555	737-838	3875	3488	OVER	67.6	2213
10	TAIPEI	SYD	10	0	55	11	55	CHINA	C151	350-941	3875	3488	OVER	72.7	1155
8	TOKYO	SYD	7	22	6	9	6	QANTAS	QF26	747-438	3925	3538	OVER	69.4	905
8	XIAMEN	SYD	7	23	33	10	33	XIAMEN	MF801	787-8	3925	3538	OVER	70	1034
10	TOKYO	SYD	9	22	0	9	0	QANTAS	QF26	747-438	3925	3538	OVER	78.7	900
10	MANILA	SYD	9	20	16	7	16	QANTAS	QF20	330-202	3950	3563	OVER	74.1	715
7	NANDI	SYD	7	0	16	11	16	FIJI	FJ911	330-243	4000	3613	OVER	65.8	1116
8	HK	SYD	7	19	47	6	47	QANTAS	QF128	747-438	4000	3613	OVER	74.1	646
8	BANGKOK	SYD	7	21	24	8	24	EMERITES	EK418	380-861	4050	3663	OVER	72.2	824
8	XIY	SYD	7	20	13	7	13	HAIRAN	HU7993	330-243	4075	3688	OVER	71.7	713

7	HK	SYD	7	9	18	20	18	CATHAY	CX139	777-367	4100	3713	OVER	66.5	2018
8	SINGAPORE	SYD	7	19	37	6	37	BRITISH	BA15	777-336	4100	3713	OVER	69.1	638
8	BANGKOK	SYD	7	20	20	7	20	QANTAS	QF24	330-303	4100	3713	OVER	66	720
8	WUHAN	SYD	8	0	1	11	1	CHINA E	MU749	330-243	4125	3738	OVER	77	1100
7	HK	SYD	7	0	37	11	37	CATHAY	CX101	777-367	4175	3788	OVER	69.6	1137
8	BRISB	SYD	8	10	29	21	29	VIRGIN	VA986	737-8FE	4175	3788	OVER	74.2	2128
8	BRISB	SYD	8	11	15	22	15	JETSTAR	JQ823	320-232	4175	3788	OVER	65	2215
8	BRISB	SYD	8	11	23	22	23	QANTAS	QF559	737-838	4250	3863	OVER	65.1	2224
8	BRISB	SYD	8	8	43	19	43	TIGER	TT381	320-232	4275	3888	OVER	71.8	1943
10	HO CHI MINH	SYD	9	23	40	10	40	JETSTAR	JQ62	787-8	4275	3888	OVER	74.3	1040
8	MANILA	SYD	7	19	59	6	59	QANTAS	QF20	330-202	4325	3938	OVER	70.2	658
10	HK	SYD	9	20	6	7	6	CATHAY	CX111	330-342	4325	3938	OVER	71.5	706
8	SINGAPORE	SYD	7	20	7	7	7	SING	SQ221	380-841	4375	3988	OVER	72.4	707
8	HERVEY B	SYD	8	2	59	13	59	VIRGIN	VA1556	737-8FE	4450	4063	OVER	67	1400
8	CHENGDU	SYD	8	4	17	15	17	CHINA	CA429	330-343	4450	4063	OVER	74.1	1518
7	BRISB	SYD	7	9	28	20	28	QANTAS	QF551	737-838	4500	4113	OVER	60.1	2029
8	GOLDC	SYD	8	11	5	22	5	VIRGIN	VA544	737-8FE	4500	4113	OVER	65	2204
10	PROSERPINE	SYD	10	1	17	12	17	TIGER	TT393	320-232	4500	4113	OVER	68.8	1215
8	GOLDC	SYD	8	5	31	16	31	VIRGIN	VA526	737-8FE	4700	4313	OVER	67.6	1432
10	QINGDAO	SYD	9	20	0	7	0	CAPITAL	JD479	330-243	4825	4438	OVER	68.5	700
8	LAX	SYD	7	21	38	8	38	UNITED	UA839	787-9	4850	4463	OVER	68.7	839
8	TAIPEI	SYD	8	0	55	11	55	CHINA	C151	350-941	4850	4463	OVER	71.6	1154
8	HAMILTON	SYD	8	4	5	15	5	VIRGIN	VA1280	737-81D	4875	4488	OVER	68.7	1507
8	SANFRAN	SYD	7	21	28	8	28	UNITED	UA863	787-9	5100	4713	OVER	71.5	828
8	TOKYO	SYD	8	10	33	21	33	POLAR	PO241	767-3JH	5100	4713	OVER	69.8	2133
10	HK	SYD	9	22	20	9	20	CATHAY	CX161	777-367	5125	4738	OVER	71.9	920
8	GOLDC	SYD	8	6	9	17	9	QANTAS	QF865	737-838	5250	4863	OVER	67.4	1707
10	SEOUL	SYD	9	20	38	7	38	ASIANA	OZ601	380-841	5325	4938	OVER	73.2	738
7	TOKYO	SYD	7	10	58	21	58	POLAR	PO241	767-3	5725	5338	OVER	78.6	2158
10	XIAMEN	SYD	9	23	30	10	30	XIAMEN	MF801	787-8	5775	5388	OVER	69.8	1030

9 NOV ARRIVALS STH

APPENDIX A3

MONITORING OF FLIGHTS OVER AVONDALE GOLF COURSE NOV 2018

DATA SORT WRT LAMax

SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	ELEVATION FT		DATA LAMax	DATA TIME ESDST
												HEIGHT ABOVE GL	LOCATION REF TO LOGGER		
10	BANGKOK	SYD	9	20	28	7	28	THAI	TG475	747-4D7	3175	2788	OVER	81.9	727
10	TOKYO	SYD	9	22	0	9	0	QANTAS	QF26	747-438	3925	3538	OVER	78.7	900
7	TOKYO	SYD	7	10	58	21	58	POLAR	PO241	767-3	5725	5338	OVER	78.6	2158
10	WUHAN	SYD	10	0	16	11	16	CHINA E	MU749	330-243	2900	2513	OVER	78.1	1116
8	BANGKOK	SYD	7	19	41	6	41	THAI	747-4D7	747-4D7	3275	2888	OVER	77.2	641
8	WUHAN	SYD	8	0	1	11	1	CHINA E	MU749	330-243	4125	3738	OVER	77	1100
7	KUMIMG	SYD	7	2	47	13	47	CHINA E	MU777	330-243	3200	2813	OVER	76.7	1347
8	GOLDC	SYD	8	3	59	14	59	JETSTAR	JQ411	320-232	3800	3413	OVER	75.4	1459
8	SUNSHINE	SYD	7	22	39	9	39	JETSTAR	JQ781	320-232	3150	2763	OVER	75.3	939
8	PEKING	SYD	8	5	10	16	10	CHINA	CA173	330-343	3225	2838	OVER	75.2	1610
8	GOLDC	SYD	8	0	19	11	19	TIGER	TT607	320-232	2925	2538	OVER	74.6	1119
7	ADELAIDE	SYD	7	10	14	21	14	TOLL	TFR34	737-476	3125	2738	OVER	74.6	2113
7	MELB	SYD	7	10	40	21	40	VIRGIN	VA891	737-8FE	3250	2863	OVER	74.6	2140
8	PERTH	SYD	8	5	3	16	3	QANTAS	QF642	737-838	2875	2488	OVER	74.5	1604
10	HO CHI MINH	SYD	9	23	40	10	40	JETSTAR	JQ62	787-8	4275	3888	OVER	74.3	1040
8	BRISB	SYD	8	10	29	21	29	VIRGIN	VA986	737-8FE	4175	3788	OVER	74.2	2128
8	HK	SYD	8	0	59	11	59	CATHAY	CX101	777-367	3575	3188	OVER	74.1	1158
10	MANILA	SYD	9	20	16	7	16	QANTAS	QF20	330-202	3950	3563	OVER	74.1	715
8	HK	SYD	7	19	47	6	47	QANTAS	QF128	747-438	4000	3613	OVER	74.1	646
8	CHENGDU	SYD	8	4	17	15	17	CHINA	CA429	330-343	4450	4063	OVER	74.1	1518
7	MELB	SYD	7	10	26	21	26	TIGER	TT264	320-232	3175	2788	OVER	74	2126
10	SHENZHEN	SYD	9	20	19	7	19	CHINA S	CZ3071	330-343	3175	2788	OVER	73.8	719
8	SHANGHAI	SYD	7	22	18	9	18	CHINA E	MU561	330-243	2975	2588	OVER	73.7	918
8	NANJING	SYD	7	21	42	8	42	CHINA E	MU727	330-243	3050	2663	OVER	73.5	843
8	TOKYO	SYD	7	19	29	6	29	JAPAN	JL771	787-8	3600	3213	OVER	73.4	629
10	JAKARTA	SYD	9	22	24	9	24	GARUDA	GA712	330-343	2850	2463	OVER	73.3	923
7	MELB	SYD	7	10	48	21	48	JETSTAR	JQ518	320-232	3200	2813	OVER	73.3	2148
8	SEOUL	SYD	7	19	53	6	53	KOREAN	KE121	380-861	3350	2963	OVER	73.3	654
10	SEOUL	SYD	9	20	38	7	38	ASIANA	OZ601	380-841	5325	4938	OVER	73.2	738
7	CHRISTCH	SYD	7	9	8	20	8	EMERITES	EK413	380-861	3750	3363	OVER	73.1	2005
7	MELB	SYD	7	10	46	21	46	QANTAS	QF7354	737-376	2175	1788	OVER	72.8	2145
8	CHRISTCH	SYD	8	8	59	19	59	EMERITES	EK413	380-861	2850	2463	OVER	72.8	1958
10	SHANGHAI	SYD	9	22	6	9	6	QANTAS	QF130	330-303	2625	2238	OVER	72.7	906
10	TAIPEI	SYD	10	0	55	11	55	CHINA	C151	350-941	3875	3488	OVER	72.7	1155
8	HONOLULO	SYD	8	8	29	19	29	HAWAIIAN	HA451	330-243	2825	2438	OVER	72.4	1929
8	SINGAPORE	SYD	7	20	7	7	7	SING	SQ221	380-841	4375	3988	OVER	72.4	707
8	SHANGHAI	SYD	7	22	57	9	57	QANTAS	SQ130	330-202	3800	3413	OVER	72.2	958
8	BANGKOK	SYD	7	21	24	8	24	EMERITES	EK418	380-861	4050	3663	OVER	72.2	824
7	HANOI	SYD	7	1	39	12	39	VEITNAM	VN787	787-9	3875	3488	OVER	72.1	1238
8	DOHA	SYD	8	7	47	18	47	QATAR	QR908	380-861	3300	2913	OVER	72	1847

10	HK	SYD	9	22	20	9	20	CATHAY	CX161	777-367	5125	4738	OVER	71.9	920
8	MELB	SYD	8	8	19	19	19	VIRGIN	VA875	737-8FE	3125	2738	OVER	71.8	1919
7	CAIRNS	SYD	7	4	28	15	28	QANTAS	QF923	737-838	3800	3413	OVER	71.8	1528
8	BRISB	SYD	8	8	43	19	43	TIGER	TT381	320-232	4275	3888	OVER	71.8	1943
8	XIY	SYD	7	20	13	7	13	HAINAN	HU7993	330-243	4075	3688	OVER	71.7	713
8	ADEL	SYD	7	22	12	9	12	VIRGIN	VA407	737-8FE	2950	2563	OVER	71.6	913
8	TAIPEI	SYD	8	0	55	11	55	CHINA	C151	350-941	4850	4463	OVER	71.6	1154
10	HK	SYD	9	20	6	7	6	CATHAY	CX111	330-342	4325	3938	OVER	71.5	706
8	SANFRAN	SYD	7	21	28	8	28	UNITED	UA863	787-9	5100	4713	OVER	71.5	828
8	PEKING	SYD	8	2	49	13	49	QANTAS	QF108	330-303	2950	2563	OVER	71.4	1350
8	MELB	SYD	7	22	34	9	34	QANTAS	QF414	737-838	3025	2638	OVER	71.3	934
8	GUANZHOU	SYD	8	9	33	20	33	CHINA S	CZ301	330-323	3275	2888	OVER	71.3	2033
8	SEOUL	SYD	7	21	0	8	0	ASIANA	OZ601	380-841	3800	3413	OVER	71.3	759
7	GUANGZOU	SYD	7	9	22	20	22	CHINA S	CZ301	330-323	3250	2863	OVER	71.2	2022
10	NADI	SYD	10	0	46	11	46	FIJI	FJ911	330-343	2875	2488	OVER	71.1	1146
8	DENPASAR	SYD	7	19	55	6	55	GARUDA	GA417	330-343	2725	2338	OVER	71	656
8	DUBAI	SYD	7	19	49	6	49	EMERITES	EK412	380-861	3075	2688	OVER	70.8	650
8	DARWIN	SYD	8	0	31	11	31	HIFLY	AST045	340-313	3557	3170	OVER	70.7	1131
8	KL	SYD	7	23	13	10	13	ASIA	D7222	330-343	2900	2513	OVER	70.6	1013
7	SINGAPORE	SYD	7	9	52	20	52	SING	SQ211	777-312	3200	2813	OVER	70.4	2054
8	MEL	SYD	7	21	34	8	34	VIRGIN	VA813	787-8	2925	2538	OVER	70.2	834
8	HOBART	SYD	7	22	41	9	41	JETSTAR	JQ718	320-232	2950	2563	OVER	70.2	944
8	MANILA	SYD	7	19	59	6	59	QANTAS	QF20	330-202	4325	3938	OVER	70.2	658
8	HK	SYD	7	20	34	7	34	CATHAY	CX111	330-343	3000	2613	OVER	70.1	733
10	MEL	SYD	9	21	46	8	46	VIRGIN	VA815	737-8FE	3500	3113	OVER	70.1	846
8	XIAMEN	SYD	7	23	33	10	33	XIAMEN	MF801	787-8	3925	3538	OVER	70	1034
8	TONATAPU	SYD	7	22	26	9	26	VIRGIN	VA94	737-8FE	3400	3013	OVER	69.8	926
8	TOKYO	SYD	8	10	33	21	33	POLAR	PO241	767-3JH	5100	4713	OVER	69.8	2133
10	XIAMEN	SYD	9	23	30	10	30	XIAMEN	MF801	787-8	5775	5388	OVER	69.8	1030
10	HK	SYD	10	0	40	11	40	QANTAS	QF118	330-303	3250	2863	OVER	69.7	1139
10	GOLD C	SYD	9	23	48	10	48	JETSTAR	JQ12	787-8	3600	3213	OVER	69.6	1048
7	HK	SYD	7	0	37	11	37	CATHAY	CX101	777-367	4175	3788	OVER	69.6	1137
10	HK	SYD	9	21	2	8	2	VIRGIN	VA82	330-243	3575	3188	OVER	69.4	802
8	TOKYO	SYD	7	22	6	9	6	QANTAS	QF26	747-438	3925	3538	OVER	69.4	905
8	DENPASAR	SYD	7	20	36	7	36	JETSTAR	JQ38	787-8	2975	2588	OVER	69.3	736
8	PERTH	SYD	7	19	21	6	21	VIRGIN	VA570	737-8FE	3350	2963	OVER	69.2	622
10	BRISBN	SYD	9	21	52	8	52	QANTAS	QF507	737-838	3525	3138	OVER	69.2	852
10	SINGAPORE	SYD	9	20	10	7	10	SING	SQ221	380-841	3175	2788	OVER	69.1	711
8	SINGAPORE	SYD	7	19	37	6	37	BRITISH	BA15	777-336	4100	3713	OVER	69.1	638
10	MELB	SYD	10	0	40	11	40	QANTAS	QF424	737-838	2975	2588	OVER	68.9	1141
10	PROSERPINE	SYD	10	1	17	12	17	TIGER	TT393	320-232	4500	4113	OVER	68.8	1215
8	LAX	SYD	7	21	38	8	38	UNITED	UA839	787-9	4850	4463	OVER	68.7	839
8	HAMILTON	SYD	8	4	5	15	5	VIRGIN	VA1280	737-81D	4875	4488	OVER	68.7	1507
10	NANJING	SYD	9	22	34	9	34	CHINA E	MU727	330-243	3050	2663	OVER	68.5	935
10	QINGDAO	SYD	9	20	0	7	0	CAPITAL	JD479	330-243	4825	4438	OVER	68.5	700
10	MEL	SYD	9	22	26	9	26	JETSTAR	JQ504	320-232	2650	2263	OVER	68.4	927
8	BRISB	SYD	8	2	21	13	21	QANTAS	QF525	737-838	3550	3163	OVER	68.4	1321

8	GOLDC	SYD	8	9	15	20	15	VIRGIN	VA540	737-8FE	3575	3188	OVER	68.3	2017
8	VANCOUVER	SYD	7	23	19	10	19	CANADA	AC33	777-233	3000	2613	OVER	67.8	1018
7	CHRISTCH	SYD	7	7	38	18	38	EMERITES	EK413	380-861	3750	3363	OVER	67.8	1839
7	SHANGHAI	SYD	7	1	43	12	43	CHINA E	MU735	777-39P	3175	2788	OVER	67.7	1243
8	BRISB	SYD	8	11	13	22	13	QANTAS	QF555	737-838	3875	3488	OVER	67.6	2213
8	GOLDC	SYD	8	5	31	16	31	VIRGIN	VA526	737-8FE	4700	4313	OVER	67.6	1432
8	LAUNSCN	SYD	8	11	17	22	17	JETSTAR	JQ750	320-232	2800	2413	OVER	67.5	2218
7	honolulu	SYD	7	4	3	15	3	JETSTAR	JQ4	787-8	3125	2738	OVER	67.4	1503
8	GOLDC	SYD	8	6	9	17	9	QANTAS	QF865	737-838	5250	4863	OVER	67.4	1707
7	TAIPEI	SYD	7	0	59	11	59	CHINA	C151	359-941	3650	3263	OVER	67.2	1158
7	MELB	SYD	7	1	45	12	45	QANTAS	QF428	737-838	3150	2763	OVER	67	1245
8	HERVEY B	SYD	8	2	59	13	59	VIRGIN	VA1556	737-8FE	4450	4063	OVER	67	1400
10	DENPASR	SYD	9	20	18	7	18	JETSTAR	JQ38	787-8	2175	1788	OVER	66.9	718
7	SINGAPORE	SYD	7	7	2	18	2	SING	SQ288	777-312	2650	2263	OVER	66.6	1802
7	HK	SYD	7	9	18	20	18	CATHAY	CX139	777-367	4100	3713	OVER	66.5	2018
8	ADL	SYD	8	1	35	12	35	QANTAS	QF738	737-838	2575	2188	OVER	66.2	1237
10	HK	SYD	10	0	45	11	45	CATHAY	CX101	777-367	3325	2938	OVER	66.1	1145
8	BANGKOK	SYD	7	20	20	7	20	QANTAS	QF24	330-303	4100	3713	OVER	66	720
7	NANDI	SYD	7	0	16	11	16	FIJI	FJ911	330-243	4000	3613	OVER	65.8	1116
8	BRISB	SYD	8	11	23	22	23	QANTAS	QF559	737-838	4250	3863	OVER	65.1	2224
8	BRISB	SYD	8	11	15	22	15	JETSTAR	JQ823	320-232	4175	3788	OVER	65	2215
8	GOLDC	SYD	8	11	5	22	5	VIRGIN	VA544	737-8FE	4500	4113	OVER	65	2204
8	MELB	SYD	8	11	15	22	15	QANTAS	QF494	737-838	3600	3213	OVER	64.7	2216
10	TOKYO	SYD	9	20	36	7	36	POLAR	PO241	767-3JH	3600	3213	OVER	64.7	735
10	HO CHI MINH	SYD	9	22	30	9	30	VEITNAM	VN773	787-9	3125	2738	OVER	64.5	930
8	SINGAPORE	SYD	7	20	11	7	11	QANTAS	QF82	330-303	2950	2563	OVER	64.1	711
8	LAX	SYD	7	21	32	8	32	AMERICAN	AA73	787-9	2950	2563	OVER	64.1	832
8	ADEL	SYD	7	23	25	10	25	QANTAS	QF740	737-838	2300	1913	OVER	64	1024
10	LA	SYD	9	22	12	9	12	VIRGIN	VA2	777-3ZG	2350	1963	OVER	60.9	912
7	BRISB	SYD	7	9	28	20	28	QANTAS	QF551	737-838	4500	4113	OVER	60.1	2029

9 NOV ARRIVALS STH

APPENDIX A4

MONITORING OF FLIGHTS OVER AVONDALE GOLF COURSE NOV 18 NOVEMBER ONLY

DATA CHRONOLOGICALLY

SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	ELEVATION FT		DATA LAMax	DATA TIME ESDST
												HEIGHT ABOVE GL	LOCATION REF TO LOGGER	387	
8	PERTH	SYD	7	19	21	6	21	VIRGIN	VA570	737-8FE	3350	2963	OVER	69.2	622
8	TOKYO	SYD	7	19	29	6	29	JAPAN	JL771	787-8	3600	3213	OVER	73.4	629
8	SINGAPORE	SYD	7	19	37	6	37	BRITISH	BA15	777-336	4100	3713	OVER	69.1	638
8	BANGKOK	SYD	7	19	41	6	41	THAI	747-4D7	747-4D7	3275	2888	OVER	77.2	641
8	HK	SYD	7	19	47	6	47	QANTAS	QF128	747-438	4000	3613	OVER	74.1	646
8	DUBAI	SYD	7	19	49	6	49	EMERITES	EK412	380-861	3075	2688	OVER	70.8	650
8	SEOUL	SYD	7	19	53	6	53	KOREAN	KE121	380-861	3350	2963	OVER	73.3	654
8	DENPASAR	SYD	7	19	55	6	55	GARUDA	GA417	330-343	2725	2338	OVER	71	656
8	MANILA	SYD	7	19	59	6	59	QANTAS	QF20	330-202	4325	3938	OVER	70.2	658
8	SINGAPORE	SYD	7	20	7	7	7	SING	SQ221	380-841	4375	3988	OVER	72.4	707
8	SINGAPORE	SYD	7	20	11	7	11	QANTAS	QF82	330-303	2950	2563	OVER	64.1	711
8	XIY	SYD	7	20	13	7	13	HAINAN	HU7993	330-243	4075	3688	OVER	71.7	713
8	BANGKOK	SYD	7	20	20	7	20	QANTAS	QF24	330-303	4100	3713	OVER	66	720
8	HK	SYD	7	20	34	7	34	CATHAY	CX111	330-343	3000	2613	OVER	70.1	733
8	DENPASAR	SYD	7	20	36	7	36	JETSTAR	JQ38	787-8	2975	2588	OVER	69.3	736
8	SEOUL	SYD	7	21	0	8	0	ASIANA	OZ601	380-841	3800	3413	OVER	71.3	759
8	BANGKOK	SYD	7	21	24	8	24	EMERITES	EK418	380-861	4050	3663	OVER	72.2	824
8	SANFRAN	SYD	7	21	28	8	28	UNITED	UA863	787-9	5100	4713	OVER	71.5	828
8	LAX	SYD	7	21	32	8	32	AMERICAN	AA73	787-9	2950	2563	OVER	64.1	832
8	MEL	SYD	7	21	34	8	34	VIRGIN	VA813	787-8	2925	2538	OVER	70.2	834
8	LAX	SYD	7	21	38	8	38	UNITED	UA839	787-9	4850	4463	OVER	68.7	839
8	NANJING	SYD	7	21	42	8	42	CHINA E	MU727	330-243	3050	2663	OVER	73.5	843
8	TOKYO	SYD	7	22	6	9	6	QANTAS	QF26	747-438	3925	3538	OVER	69.4	905
8	ADEL	SYD	7	22	12	9	12	VIRGIN	VA407	737-8FE	2950	2563	OVER	71.6	913
8	SHANGHAI	SYD	7	22	18	9	18	CHINA E	MU561	330-243	2975	2588	OVER	73.7	918
8	TONATAPU	SYD	7	22	26	9	26	VIRGIN	VA94	737-8FE	3400	3013	OVER	69.8	926
8	MELB	SYD	7	22	34	9	34	QANTAS	QF414	737-838	3025	2638	OVER	71.3	934
8	SUNSHINE	SYD	7	22	39	9	39	JETSTAR	JQ781	320-232	3150	2763	OVER	75.3	939
8	HOBART	SYD	7	22	41	9	41	JETSTAR	JQ718	320-232	2950	2563	OVER	70.2	944
8	SHANGHAI	SYD	7	22	57	9	57	QANTAS	QF130	330-202	3800	3413	OVER	72.2	958
8	KL	SYD	7	23	13	10	13	ASIA	D7222	330-343	2900	2513	OVER	70.6	1013
8	VANCOUVER	SYD	7	23	19	10	19	CANADA	AC33	777-233	3000	2613	OVER	67.8	1018
8	ADEL	SYD	7	23	25	10	25	QANTAS	QF740	737-838	2300	1913	OVER	64	1024
8	XIAMEN	SYD	7	23	33	10	33	XIAMEN	MF801	787-8	3925	3538	OVER	70	1034
8	WUHANN	SYD	8	0	1	11	1	CHINA E	MU749	330-243	4125	3738	OVER	77	1100
8	GOLDC	SYD	8	0	19	11	19	TIGER	TT607	320-232	2925	2538	OVER	74.6	1119
8	DARWIN	SYD	8	0	31	11	31	HIFLY	AST045	340-313	3557	3170	OVER	70.7	1131
8	TAIPEI	SYD	8	0	55	11	55	CHINA	C151	350-941	4850	4463	OVER	71.6	1154
8	HK	SYD	8	0	59	11	59	CATHAY	CX101	777-367	3575	3188	OVER	74.1	1158
8	ADL	SYD	8	1	35	12	35	QANTAS	QF738	737-838	2575	2188	OVER	66.2	1237

APPENDIX A6

MONITORING OF FLIGHTS OVER AVONDALE GOLF COURSE NOV 18 NOVEMBER ONLY

DATA SORT WRT dBA

												ELEVATION FT	387	64 FLIGHTS	
SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO LOGGER	DATA LAMax	DATA TIME ESDST
8	BANGKOK	SYD	7	19	41	6	41	THAI	747-4D7	747-4D7	3275	2888	OVER	77.2	641
8	WUHAN	SYD	8	0	1	11	1	CHINA E	MU749	330-243	4125	3738	OVER	77	1100
8	GOLDC	SYD	8	3	59	14	59	JETSTAR	JQ411	320-232	3800	3413	OVER	75.4	1459
8	SUNSHINE	SYD	7	22	39	9	39	JETSTAR	JQ781	320-232	3150	2763	OVER	75.3	939
8	PEKING	SYD	8	5	10	16	10	CHINA	CA173	330-343	3225	2838	OVER	75.2	1610
8	GOLDC	SYD	8	0	19	11	19	TIGER	TT607	320-232	2925	2538	OVER	74.6	1119
8	PERTH	SYD	8	5	3	16	3	QANTAS	QF642	737-838	2875	2488	OVER	74.5	1604
8	BRISB	SYD	8	10	29	21	29	VIRGIN	VA986	737-8FE	4175	3788	OVER	74.2	2128
8	HK	SYD	8	0	59	11	59	CATHAY	CX101	777-367	3575	3188	OVER	74.1	1158
8	HK	SYD	7	19	47	6	47	QANTAS	QF128	747-438	4000	3613	OVER	74.1	646
8	CHENGDU	SYD	8	4	17	15	17	CHINA	CA429	330-343	4450	4063	OVER	74.1	1518
8	SHANGHAI	SYD	7	22	18	9	18	CHINA E	MU561	330-243	2975	2588	OVER	73.7	918
8	NANJING	SYD	7	21	42	8	42	CHINA E	MU727	330-243	3050	2663	OVER	73.5	843
8	TOKYO	SYD	7	19	29	6	29	JAPAN	JL771	787-8	3600	3213	OVER	73.4	629
8	SEOUL	SYD	7	19	53	6	53	KOREAN	KE121	380-861	3350	2963	OVER	73.3	654
8	CHRISTCH	SYD	8	8	59	19	59	EMERITES	EK413	380-861	2850	2463	OVER	72.8	1958
8	HONOLULU	SYD	8	8	29	19	29	HAWAIIAN	HA451	330-243	2825	2438	OVER	72.4	1929
8	SINGAPORE	SYD	7	20	7	7	7	SING	SQ221	380-841	4375	3988	OVER	72.4	707
8	SHANGHAI	SYD	7	22	57	9	57	QANTAS	QF130	330-202	3800	3413	OVER	72.2	958
8	BANGKOK	SYD	7	21	24	8	24	EMERITES	EK418	380-861	4050	3663	OVER	72.2	824
8	DOHA	SYD	8	7	47	18	47	QATAR	QR908	380-861	3300	2913	OVER	72	1847
8	MELB	SYD	8	8	19	19	19	VIRGIN	VA875	737-8FE	3125	2738	OVER	71.8	1919
8	BRISB	SYD	8	8	43	19	43	TIGER	TT381	320-232	4275	3888	OVER	71.8	1943
8	XIY	SYD	7	20	13	7	13	HAINAN	HU7993	330-243	4075	3688	OVER	71.7	713
8	ADEL	SYD	7	22	12	9	12	VIRGIN	VA407	737-8FE	2950	2563	OVER	71.6	913
8	TAIPEI	SYD	8	0	55	11	55	CHINA	C151	350-941	4850	4463	OVER	71.6	1154
8	SANFRAN	SYD	7	21	28	8	28	UNITED	UA863	787-9	5100	4713	OVER	71.5	828
8	PEKING	SYD	8	2	49	13	49	QANTAS	QF108	330-303	2950	2563	OVER	71.4	1350
8	MELB	SYD	7	22	34	9	34	QANTAS	QF414	737-838	3025	2638	OVER	71.3	934
8	GUANZHOU	SYD	8	9	33	20	33	CHINA S	CZ301	330-323	3275	2888	OVER	71.3	2033
8	SEOUL	SYD	7	21	0	8	0	ASIANA	OZ601	380-841	3800	3413	OVER	71.3	759
8	DENPASAR	SYD	7	19	55	6	55	GARUDA	GA417	330-343	2725	2338	OVER	71	656
8	DUBAI	SYD	7	19	49	6	49	EMERITES	EK412	380-861	3075	2688	OVER	70.8	650
8	DARWIN	SYD	8	0	31	11	31	HIFLY	AST045	340-313	3557	3170	OVER	70.7	1131
8	KL	SYD	7	23	13	10	13	ASIA	D7222	330-343	2900	2513	OVER	70.6	1013
8	MEL	SYD	7	21	34	8	34	VIRGIN	VA813	787-8	2925	2538	OVER	70.2	834
8	HOBART	SYD	7	22	41	9	41	JETSTAR	JQ718	320-232	2950	2563	OVER	70.2	944
8	MANILA	SYD	7	19	59	6	59	QANTAS	QF20	330-202	4325	3938	OVER	70.2	658
8	HK	SYD	7	20	34	7	34	CATHAY	CX111	330-343	3000	2613	OVER	70.1	733
8	XIAMEN	SYD	7	23	33	10	33	XIAMEN	MF801	787-8	3925	3538	OVER	70	1034

LAMax 77.2

39 FLIGHTS 70-77.2 dBA

8	TONATAPU	SYD	7	22	26	9	26	VIRGIN	VA94	737-8FE	3400	3013	OVER	69.8	926	60%
8	TOKYO	SYD	8	10	33	21	33	POLAR	PO241	767-3JH	5100	4713	OVER	69.8	2133	
8	TOKYO	SYD	7	22	6	9	6	QANTAS	QF26	747-438	3925	3538	OVER	69.4	905	
8	DENPASAR	SYD	7	20	36	7	36	JETSTAR	JQ38	787-8	2975	2588	OVER	69.3	736	
8	PERTH	SYD	7	19	21	6	21	VIRGIN	VA570	737-8FE	3350	2963	OVER	69.2	622	
8	SINGAPORE	SYD	7	19	37	6	37	BRITISH	BA15	777-336	4100	3713	OVER	69.1	638	
8	LAX	SYD	7	21	38	8	38	UNITED	UA839	787-9	4850	4463	OVER	68.7	839	
8	HAMILTON	SYD	8	4	5	15	5	VIRGIN	VA1280	737-81D	4875	4488	OVER	68.7	1507	
8	BRISB	SYD	8	2	21	13	21	QANTAS	QF525	737-838	3550	3163	OVER	68.4	1321	
8	GOLDC	SYD	8	9	15	20	15	VIRGIN	VA540	737-8FE	3575	3188	OVER	68.3	2017	
8	VANCOUVER	SYD	7	23	19	10	19	CANADA	AC33	777-233	3000	2613	OVER	67.8	1018	
8	BRISB	SYD	8	11	13	22	13	QANTAS	QF555	737-838	3875	3488	OVER	67.6	2213	
8	GOLDC	SYD	8	5	31	16	31	VIRGIN	VA526	737-8FE	4700	4313	OVER	67.6	1432	
8	LAUNSCN	SYD	8	11	17	22	17	JETSTAR	JQ750	320-232	2800	2413	OVER	67.5	2218	
8	GOLDC	SYD	8	6	9	17	9	QANTAS	QF865	737-838	5250	4863	OVER	67.4	1707	
8	HERVEY B	SYD	8	2	59	13	59	VIRGIN	VA1556	737-8FE	4450	4063	OVER	67	1400	
8	ADL	SYD	8	1	35	12	35	QANTAS	QF738	737-838	2575	2188	OVER	66.2	1237	
8	BANGKOK	SYD	7	20	20	7	20	QANTAS	QF24	330-303	4100	3713	OVER	66	720	
8	BRISB	SYD	8	11	23	22	23	QANTAS	QF559	737-838	4250	3863	OVER	65.1	2224	
8	BRISB	SYD	8	11	15	22	15	JETSTAR	JQ823	320-232	4175	3788	OVER	65	2215	
8	GOLDC	SYD	8	11	5	22	5	VIRGIN	VA544	737-8FE	4500	4113	OVER	65	2204	20 FLIGHTS 65 -70 dBA
8	MELB	SYD	8	11	15	22	15	QANTAS	QF494	737-838	3600	3213	OVER	64.7	2216	31%
8	SINGAPORE	SYD	7	20	11	7	11	QANTAS	QF82	330-303	2950	2563	OVER	64.1	711	59 FLIGHTS 65-77.2 dBA
8	LAX	SYD	7	21	32	8	32	AMERICAN	AA73	787-9	2950	2563	OVER	64.1	832	92%
8	ADEL	SYD	7	23	25	10	25	QANTAS	QF740	737-838	2300	1913	OVER	64	1024	

APPENDIX B1

MONITORING OF FLIGHTS OVER PYMBLE LADIES COLLEGE OCT 2018

DATA CRONOLOGICALLY

													ELEVATION FT	387	
SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO LOGGER	DATA LAMax	DATA TIME ESDST
27	DARWIN	SYD	26	19	0	6	0	QANTAS	QF829	737-838	4125	3738	5 BLCKS A1 A3	71	6:00
27	DALLAS	SYD	26	19	6	6	6	QANTAS	QF8	380-842	3250	2863	AVDALE PATH 1 KM	68.7	6:05
27	SINGAPORE	SYD	27	8	45	19	45	SING	SQ288	777-312	4100	3713	AVDALE PATH 1 KM	66.1	19:45
27	BRISBANE	SYD	27	8	48	19	48	TIGER	TT379	320-232	4500	4113	OVER LOGGER	66.3	19:49
27	BRISBANE	SYD	27	8	54	19	54	JETSTAR	JQ821	320-232	4150	3763	OVER LOGGER	68.5	19:52
27	BRISBANE	SYD	27	9	6	20	6	TIGER	TT381	320-232	4575	4188	OVER LOGGER	65.4	20:06
27	MELBOURNE	SYD	27	9	12	20	12	QANTAS	QF462	737-838	3550	3163	AVDALE PATH 1 KM	63.4	2012
27	BRISBANE	SYD	27	9	18	20	18	VIRGIN	VA978	737-8FE	4275	3888	AVDALE PATH 1 KM	63.4	2019
27	KL	SYD	27	9	20	20	20	MALAYSIAN	MH141	330-323	3100	2713	AVDALE PATH 1 KM	61.6	2020
27	PERTH	SYD	27	9	24	20	24	QANTAS	QF582	737-838	3100	2713	AVDALE PATH 1 KM	70.8	2025
27	GUANGZHOU	SYD	27	9	27	20	27	CHINA STH	CZ301	330-343	3850	3463	AVDALE PATH 1 KM	67.7	2028
27	PERTH	SYD	27	9	30	20	30	QANTAS	QF582	737-838	3100	2713	AVDALE PATH 1 KM	?	
27	GOLD C	SYD	27	9	54	20	54	JETSTAR	JQ419	320-232	4100	3713	OVER LOGGER	68.8	2052
27	GOLD C	SYD	27	10	6	21	6	TIGER	TT623	320-232	3850	3463	OVER LOGGER	68.3	2104
27	BRISBANE	SYD	27	10	12	21	12	QANTAS	JQ1725	717-BL	4250	3863	OVER LOGGER	72.4	2115
27	BRISBANE	SYD	27	10	18	21	18	VIRGIN	VA986	738-8FE	4300	3913	5 BLOCKS WEST	64.3	2118
27	CAIRNS	SYD	27	10	24	21	24	JETSTAR	JQ959	321-231	3825	3438	5 BLOCKS WEST	68.1	2124
27	SUNSHINE	SYD	27	10	36	21	36	JETSTAR	JQ789	320-232	4100	3713	OVER LOGGER	66.7	2134
27	BRISBANE	SYD	27	10	48	21	48	QANTAS	QF553	737-838	4875	4488	OVER LOGGER	66.1	2149
27	BRISBANE	SYD	27	11	0	22	0	JETSTAR	JQ819	320-232	4050	3663	OVER LOGGER	68.1	2157
27	HONG K	SYD	27	11	6	22	6	CATHAY	CX139	777-367	4700	4313	5 BLOCKS WEST	66.8	2202
27	BRISBANE	SYD	27	11	18	22	18	VIRGIN	VA992	737-8FE	4375	3988	OVER LOGGER	61.6	2222
28	DALLAS	SYD	27	19	0	6	0	QANTAS	QF8	380-842	3250	2863	AVDALE PATH 1 KM	71.1	600
28	PERTH	SYD	27	19	6	6	6	VIRGIN	VA570	737-8FE	2950	2563	2 BLOCKS EAST	69	605
28	SINGAPORE	SYD	27	19	7	6	7	SINGAPORE	BA15	777-36N	3775	3388	AVDALE PATH 1 KM	64.2	606
28	ABU DHABI	SYD	27	19	12	6	12	ETIHAD	EY450	777-3FX	3000	2613	AVDALE PATH 1 KM	67.8	612
28	HK	SYD	27	19	12	6	12	VIRGIN	VA82	330-243	3975	3588	AVDALE PATH 1 KM	68.8	613
28	PERTH	SYD	27	19	18	6	18	JETSTAR	JQ989	320-232	3600	3213	AVDALE PATH 1 KM	66	618
28	SINGAPORE	SYD	27	19	36	6	36	SINGAPORE	SQ221	380-841	3650	3263	AVDALE PATH 1 KM	67.8	634
28	JAKARTA	SYD	27	19	36	6	36	QANTAS	QF42	330-202	3025	2638	AVDALE PATH 1 KM	66.6	636
28	TOKYO	SYD	27	19	48	6	48	JAPAN	JL771	787-9	2950	2563	AVDALE PATH 1 KM	71.3	648
28		SYD	27	19	36	6	36	QANTAS	QF20	330-303	3750	3363	AVDALE PATH 1 KM	72.8	6.36
28	MANILA	SYD	27	19	48	6	48	CATHAY	CX111	330-343	3225	2838	0.5 KM WEST	64.5	648
28	DELHI	SYD	27	19	54	6	54	AIR INDIA	AI302	787-8	2950	2563	AVDALE PATH 1 KM	67.4	655
28	MELBOURNE	SYD	27	20	0	7	0	JETSTAR	JQ602	320-232	2950	2563	AVDALE PATH 1 KM	65.1	700
28	CHRISTCH	SYD	27	20	6	7	6	QANTAS	QF7528	767-381	2950	2563	OVER LOGGER	69.6	706
28	BANGCOCK	SYD	27	20	12	7	12	QANTAS	QF24	330-303	4350	3963	OVER LOGGER	73.7	712
28	DUBAI	SYD	27	20	30	7	30	EMERITES	EK412	380-861	2800	2413	AVDALE PATH 1 KM	66.2	730
28	XIAN	SYD	27	20	36	7	36	HIANAN	HU7993	330-343	3525	3138	AVDALE PATH 1 KM	70.9	736
28	LA	SYD	27	20	36	7	36	UNITED	UA839	787-9	2975	2588	500 M EAST	71.4	737
28	CHRISTCH	SYD	27	20	48	7	48	JETSTAR	JQ140	320-232	2950	2563	OVER LOGGER	71.3	748
28	WELLINGTN	SYD	27	20	54	7	54	ANZ	NZ845	320-232	2925	2538	OVER LOGGER	68	754

28	CANBERRA	SYD	27	21	0	8	0	VIRGIN	VA629	ATR 72-600	3575	3188	OVER LOGGER	70.1	800
28	SAN FRAN	SYD	27	21	6	8	6	UNITED	UA863	787-9	2950	2563	OVER LOGGER	74.4	806
28	WELLINGTN	SYD	27	21	12	8	12	QANTAS	QF162	737-838	2900	2513	OVER LOGGER	70	811
28	BRISBANE	SYD	27	21	12	8	12	VIRGIN	VA908	737-7FE	4150	3763	OVER LOGGER	67.1	812
28	BRISBANE	SYD	27	21	18	8	18	QANTAS	QF505	737-838	4350	3963	OVER LOGGER	68.7	818
28	AUKLAND	SYD	27	21	24	8	24	ANZ	NZ101	777-219	2925	2538	AVDALE PATH 1 KM	70.1	824
28	GOLD C	SYD	27	21	30	8	30	JETSTAR	JQ401	320-232	3975	3588	OVER LOGGER	68.2	830
28	AUCKLAND	SYD	27	21	42	8	42	LATAM CHIL	LA801	787-9	2950	2563	0.5 KM WEST	66.8	841
28	AUCKLAND	SYD	27	21	48	8	48	JETSTAR	JQ202	320-232	2925	2538	950M EAST	71.9	848
28	TOKYO	SYD	27	21	54	8	54	QANTAS	QF26	747-438	2750	2363	AVDALE PATH 1 KM	72.5	855
28	SHANGHAI	SYD	27	22	0	9	0	AIR CHINA	CA175	330-243	2900	2513	AVDALE PATH 1 KM	67.8	900
28	GOLD C	SYD	27	22	6	9	6	JETSTAR	JQ403	320-232	4075	3688	OVER LOGGER	70	906
28	SHANGHAI	SYD	27	22	6	9	6	QANTAS	QF130	330-202	3875	3488	AVDALE PATH 1 KM	63.1	907
28	GOLD C	SYD	27	22	6	9	6	QANTAS	QF861	737-838	4525	4138	OVER LOGGER	71.2	903
28	BRISBANE	SYD	27	22	6	9	6	JETSTAR	JQ811	320-232	3775	3388	OVER LOGGER	63	908
28	HO CI MINH	SYD	27	22	18	9	18	VEITNAM	VN773	787-9	3150	2763	AVDALE PATH 1 KM	63	918
28	BRISBANE	SYD	27	22	18	9	18	QANTAS	QF509	737-838	4550	4163	OVER LOGGER	70.3	919
28	HK	SYD	27	22	24	9	24	CATHAY	CX161	777-367	3750	3363	AVDALE PATH 1 KM	66.6	925
28	TOKYO	SYD	27	22	30	9	30	NIPPON	NH879	787-9	2950	2563	AVDALE PATH 1 KM	70.6	930
28	CAIRNS		27	22	24	9	24	VIRGIN	VA1408	737-8FE	3225	2838	AVDALE PATH 1 KM	65.2	926
28	VANCOUVER	SYD	27	22	36	9	36	CANADA	AC33	777-233	4275	3888	AVDALE PATH 1 KM	68.9	935
28	BRISBANE	SYD	27	22	42	9	42	JETSTAR	JQ813	321-231	4025	3638	OVER LOGGER	69.3	942
28	SHANGHAI	SYD	27	22	42	9	42	CHINA	MU561	330-243	2975	2588	AVDALE PATH 1 KM	66.5	944
28	JAKARTA	SYD	27	22	31	9	31	GARUDA	GA712	330-243	2350	1963	AVDALE PATH 1 KM	75.5	931
28	VANCOUVER	SYD	27	22	34	9	34	CANADA	AC 33	777-233	4275	3888	AVDALE PATH 1 KM	73.1	934
28	BRISB	SYD	27	22	42	9	42	TIGER	TT357	320-232	4500	4113	OVER LOGGER	69.4	944
28	CAIRNS	SYD	27	22	45	9	45	VIRGIN	VA1408	737-8FE	4075	3688	OVER LOGGER	66.9	944
28	SHANGHAI	SYD	27	22	54	9	54	QANTAS	QF130	330-202	3875	3488	AVDALE PATH 1 KM	69	954
28	XIAMMEN	SYD	27	22	58	9	58	XIAMEN	MF801	787-8	3300	2913	AVDALE PATH 1 KM	69.1	958
28	AUCKLAND	SYD	27	23	6	10	6	ANZ	NZ103	787-9	3025	2638	OVER LOGGER	76.5	1007
28	GOLDCST	SYD	27	23	11	10	11	VIRGIN	VA506	737-8FE	3725	3338	OVER LOGGER	71.8	1011
28	MELB	SYD	27	23	15	10	15	QANTAS	QF418	737-838	2875	2488	AVDALE PATH 1 KM	66.1	1015
28	MANILA	SYD	27	23	17	10	17	CEBU	5J41	330-343	3400	3013	AVDALE PATH 1 KM	69.2	1017
28	GOLDCST	SYD	27	23	19	10	19	JETSTAR	JQ405	320-232	4125	3738	OVER LOGGER	69.7	1019
28	BALLINA	SYD	27	23	30	10	30	JETSTAR	JQ457	320-232	3150	2763	OVER LOGGER	71.7	1030
28	CAIRNS	SYD	27	23	38	10	38	JETSTAR	JQ953	320-232	3675	3288	OVER LOGGER	73.4	1038
28	HK	SYD	27	23	59	10	59	QANTAS	QF118	330-202	3874	3487	OVER LOGGER	70.7	1100
28	SING	SYD	28	0	21	11	21	SINGAPORE	SQ231	380-841	600	213	AVDALE PATH 1 KM	74.9	1119
28	GOLDCST	SYD	28	0	23	11	23	TIGER	TT607	320-232	4550	4163	OVER LOGGER	65.9	1124
28	BRISB	SYD	28	0	25	11	25	VIRGIN	VA932	737-8FE	4700	4313	OVER LOGGER	68.9	1126
28	BRISB	SYD	28	0	26	11	26	QANTAS	QF517	738-838	4400	4013	OVER LOGGER	62.6	1128
28	GOLDCST	SYD	28	0	33	11	33	QANTAS	QF1565	717-2BL	4750	4363	OVER LOGGER	72.9	1133
28	FIJI	SYD	28	0	50	11	50	FIJI	FJ1915	737-8X2	2975	2588	OVER LOGGER	70.9	1150
28	BRISB	SYD	28	1	22	12	22	QANTAS	QF521	737-838	4400	4013	OVER LOGGER	67.3	1222
28	GOLDCST	SYD	28	1	26	12	26	VIRGIN	VA516	737-8FE	4025	3638	OVER LOGGER	71.7	1226
28	GOLDCST	SYD	28	1	29	12	29	JETSTAR	JQ409	320-232	3600	3213	OVER LOGGER	73.3	1229
28	GOLDCST	SYD	28	1	38	12	38	TIGER	TT609	320-232	5100	4713	OVER LOGGER	71.8	1239
28	SUNSHINE C	SYD	28	2	1	13	1	VIRGIN	VA482	737-8FE	3875	3488	OVER LOGGER	72.2	1301
28	BALLINA	SYD	28	2	4	13	4	JETSTAR	JQ459	320-232	4200	3813	OVER LOGGER	70	1305

28	BRISB	SYD	28	2	6	13	6	JETSTAR	JQ815	320-232	4675	4288	OVER LOGGER	68.4	1306
28	CAIRNS	SYD	28	2	18	13	18	JETSTAR	JQ517	320-232	4200	3813	OVER LOGGER	63.1	1319
28	BRISB	SYD	28	2	28	13	28	QANTAS	JQ1717	717-2BL	4975	4588	OVER LOGGER	71.2	1327
28	CAIRNS	SYD	28	2	44	13	44	TIGER	TT677	320-232	3900	3513	OVER LOGGER	71.5	1344
28	CAIRNS	SYD	28	2	58	13	58	QANTAS	QF925	737-838	5275	4888	OVER LOGGER	70.4	1358
28	HERVEY B	SYD	28	3	26	14	26	VIRGIN	VA1556	737-8FE	4700	4313	OVER LOGGER	70.8	1426
28	GOLDCST	SYD	28	3	36	14	36	JETSTAR	JQ411	320-232	4725	4338	OVER LOGGER	68	1435
28	GOLDCST	SYD	28	3	45	14	45	QANTAS	QF859	737-838	4150	3763	OVER LOGGER	70.6	1444
28	CAIRNS	SYD	28	4	5	15	5	VIRGIN	VA1418	737-8FE	4825	4438	OVER LOGGER	67.2	1506
28	SUNSHINE C	SYD	28	4	20	15	20	JETSTAR	JQ787	320-232	4475	4088	OVER LOGGER	66.1	1521
28	SUNSHINE C	SYD	28	4	24	15	24	VIRGIN	VA484	737-8FE	3875	3488	OVER LOGGER	70.2	1525
28	TOWNESVILLE	SYD	28	4	28	15	28	VIRGIN	VA1520	737-8FE	2050	1663	OVER LOGGER	79.1	1528
28	BRISB	SYD	28	4	36	15	36	VIRGIN	VA950	737-8KG	4700	4313	OVER LOGGER	68.1	1536
28	PROSERPINE	SYD	28	4	42	15	42	TIGER	TT397	320-232	4100	3713	OVER LOGGER	69.6	1542
28	JOBURG	SYD	28	4	50	15	50	QANTAS	QF64	747-438	3450	3063	AVDALE PATH 1 KM	68.7	1551
28	HAMILTON	SYD	28	4	56	15	56	QANTAS	QF867	737-838	4800	4413	OVER LOGGER	73.6	1556
28	BRISB	SYD	28	5	16	16	16	VIRGIN	VA954	737-8FE	4400	4013	OVER LOGGER	67.3	1616
28	BRISB	SYD	28	5	30	16	30	QANTAS	QF537	737-838	4500	4113	OVER LOGGER	73.6	1630
28	QTOWN	SYD	28	5	36	16	36	ANZ	NZ831	320-232	2925	2538	OVER LOGGER	69.2	1635
28	GOLD C	SYD	28	5	44	16	44	JETSTAR	JQ415	320-232	5200	4813	OVER LOGGER	68.7	1644
28	BALLINA	SYD	28	6	8	17	8	VIRGIN	VA1142	737-8FE	4400	4013	OVER LOGGER	77.5	1708
28	COFFSHBR	SYD	28	6	14	17	14	VIRGIN	VA1166	737-8FE	4625	4238	OVER LOGGER	73.3	1714
28	BRISB	SYD	28	6	24	17	24	QANTAS	QF541	737-838	5150	4763	OVER LOGGER	72.2	1724
28	TOWNESVILLE	SYD	28	6	26	17	26	JETSTAR	JQ913	320-232	4075	3688	OVER LOGGER	66.7	1727
28	BRISB	SYD	28	6	40	17	40	VIRGIN	VA958	737-8FE	4750	4363	OVER LOGGER	65	1740
28	BRISB	SYD	28	6	52	17	52	TIGER	TT377	320-232	6525	6138	OVER LOGGER	62.4	1752
28	GOLD C	SYD	28	6	58	17	58	QANTAS	QF1567	717-2BL	5550	5163	OVER LOGGER	69	1757
28	CAIRNS	SYD	28	7	2	18	2	ALLIANCE	QQ515	FOKKER 70	4975	4588	OVER LOGGER	64.3	1802
28	GOLD C	SYD	28	7	22	18	22	JETSTAR	JQ413	320-232	4850	4463	OVER LOGGER	65.5	1822
28	GOLD C	SYD	28	7	35	18	35	VIRGIN	VA532	737-8FE	4550	4163	OVER LOGGER	66.8	1835
28	BALLINA	SYD	28	7	43	18	43	JETSTAR	JQ461	320-232	3675	3288	OVER LOGGER	66.7	1843
28	DARWIN	SYD	28	7	53	18	53	VIRGIN	VA1354	737-8FE	4550	4163	OVER LOGGER	70.5	1853
28	MORESBY	SYD	28	8	7	19	7	NUIGINI	PX1	767-341	5900	5513	OVER LOGGER	68.5	1906
28	GOLD C	SYD	28	8	13	19	13	TIGER	TT623	320-232	3550	3163	OVER LOGGER	69.8	1913
28	BRISB	SYD	28	8	17	19	17	QANTAS	QF547	737-838	5200	4813	OVER LOGGER	65.3	1917
28	BRISB	SYD	28	8	27	19	27	QANTAS	QF549	737-838	5850	5463	OVER LOGGER	69.3	1926
28	CHRISTCH	SYD	28	8	31	19	31	EMERITES	EK413	380-861	2875	2488	500 M EAST	68.9	1931
28	BRISB	SYD	28	8	33	19	33	VIRGIN	VA970	737-8FE	3925	3538	OVER LOGGER	65.4	1933
28	BRISB	SYD	28	8	52	19	52	QANTAS	QF551	737-838	4725	4338	OVER LOGGER	65.2	1951
28	GOLD C	SYD	28	8	55	19	55	JETSTAR	jq423	321-231	3425	3038	OVER LOGGER	69.1	1955
28	GOLD C	SYD	28	9	30	20	30	JETSTAR	JQ425	320-232	4200	3813	OVER LOGGER	66.3	2030
28	BRISB	SYD	28	9	39	20	39	VIRGIN	VA978	737-8FE	4950	4563	OVER LOGGER	64.3	2040
28	BRISB	SYD	28	9	55	20	55	VIRGIN	VA892	737-8FE	4800	4413	OVER LOGGER	66.2	2054
28	BRISB	SYD	28	9	59	20	59	QANTAS	QF553	737-838	4525	4138	OVER LOGGER	64.5	2058
28	SUNSHINE	SYD	28	10	5	21	5	JETSTAR	JQ791	320-232	4675	4288	OVER LOGGER	61	2106
28	GOLD C	SYD	28	10	25	21	25	VIRGIN	VA544	737-8FE	5025	4638	OVER LOGGER	62.2	2126
28	BRISB	SYD	28	10	35	21	35	TIGER	TT387	320-232	3825	3438	OVER LOGGER	67.8	2135
28	GOLD C	SYD	28	10	46	21	46	JETSTAR	JQ427	321-231	3900	3513	OVER LOGGER	68.9	2146
28	BRISB	SYD	28	10	43	21	43	VIRGIN	VA988	737-8FE	3850	3463	OVER LOGGER	63	2139

28	BRISB	SYD	28	10	49	21	49	V	VA988	737-8FE	3875	3488	OVER LOGGER	65.8	2149

DEPARTING NTH 29/10

APPENDIX B2

MONITORING OF FLIGHTS OVER PYMBLE LADIES COLLEGE OCT 2018

DATA SORT WITH RESPECT HEIGHT ABOVE GROUND LEVEL

													ELEVATION FT	387	
SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO LOGGER	DATA LAMax	DATA TIME ESDST
28	TOWNESVILLE	SYD	28	4	28	15	28	VIRGIN	VA1520	737-8FE	2050	1663	OVER LOGGER	79.1	1528
28	JAKARTA	SYD	27	22	31	9	31	GARUDA	GA712	330-243	2350	1963	AVDALE PATH 1 KM	75.5	931
28	TOKYO	SYD	27	21	54	8	54	QANTAS	QF26	747-438	2750	2363	AVDALE PATH 1 KM	72.5	855
28	DUBAI	SYD	27	20	30	7	30	EMERITES	EK412	380-861	2800	2413	AVDALE PATH 1 KM	66.2	730
28	MELB	SYD	27	23	15	10	15	QANTAS	QF418	737-838	2875	2488	AVDALE PATH 1 KM	66.1	1015
28	CHRISTCH	SYD	28	8	31	19	31	EMERITES	EK413	380-861	2875	2488	500 M EAST	68.9	1931
28	WELLINGTN	SYD	27	21	12	8	12	QANTAS	QF162	737-838	2900	2513	OVER LOGGER	70	811
28	SHANGHAI	SYD	27	22	0	9	0	AIR CHINA	CA175	330-243	2900	2513	AVDALE PATH 1 KM	67.8	900
28	WELLINGTN	SYD	27	20	54	7	54	ANZ	NZ845	320-232	2925	2538	OVER LOGGER	68	754
28	AUKLAND	SYD	27	21	24	8	24	ANZ	NZ101	777-219	2925	2538	AVDALE PATH 1 KM	70.1	824
28	AUCKLAND	SYD	27	21	48	8	48	JETSTAR	JQ202	320-232	2925	2538	950M EAST	71.9	848
28	QTOWN	SYD	28	5	36	16	36	ANZ	NZ831	320-232	2925	2538	OVER LOGGER	69.2	1635
28	PERTH	SYD	27	19	6	6	6	VIRGIN	VA570	737-8FE	2950	2563	2 BLOCKS EAST	69	605
28	TOKYO	SYD	27	19	48	6	48	JAPAN	JL771	787-9	2950	2563	AVDALE PATH 1 KM	71.3	648
28	DELHI	SYD	27	19	54	6	54	AIR INDIA	AI302	787-8	2950	2563	AVDALE PATH 1 KM	67.4	655
28	MELBOURNE	SYD	27	20	0	7	0	JETSTAR	JQ602	320-232	2950	2563	AVDALE PATH 1 KM	65.1	700
28	CHRISTCH	SYD	27	20	6	7	6	QANTAS	QF7528	767-381	2950	2563	OVER LOGGER	69.6	706
28	CHRISTCH	SYD	27	20	48	7	48	JETSTAR	JQ140	320-232	2950	2563	OVER LOGGER	71.3	748
28	SAN FRAN	SYD	27	21	6	8	6	UNITED	UA863	787-9	2950	2563	OVER LOGGER	74.4	806
28	AUCKLAND	SYD	27	21	42	8	42	LATAM CHIL	LA801	787-9	2950	2563	0.5 KM WEST	66.8	841
28	TOKYO	SYD	27	22	30	9	30	NIPPON	NH879	787-9	2950	2563	AVDALE PATH 1 KM	70.6	930
28	LA	SYD	27	20	36	7	36	UNITED	UA839	787-9	2975	2588	500 M EAST	71.4	737
28	SHANGHAI	SYD	27	22	42	9	42	CHINA	MU561	330-243	2975	2588	AVDALE PATH 1 KM	66.5	944
28	FIJI	SYD	28	0	50	11	50	FIJI	FJ1915	737-8X2	2975	2588	OVER LOGGER	70.9	1150
28	ABU DHABI	SYD	27	19	12	6	12	ETIHAD	EY450	777-3FX	3000	2613	AVDALE PATH 1 KM	67.8	612
28	JAKARTA	SYD	27	19	36	6	36	QANTAS	QF42	330-202	3025	2638	AVDALE PATH 1 KM	66.6	636
28	AUCKLAND	SYD	27	23	6	10	6	ANZ	NZ103	787-9	3025	2638	OVER LOGGER	76.5	1007
27	KL	SYD	27	9	20	20	20	MALAYSIAN	MH141	330-323	3100	2713	AVDALE PATH 1 KM	61.6	2020
27	PERTH	SYD	27	9	24	20	24	QANTAS	QF582	737-838	3100	2713	AVDALE PATH 1 KM	70.8	2025
27	PERTH	SYD	27	9	30	20	30	QANTAS	QF582	737-838	3100	2713	AVDALE PATH 1 KM	?	
28	HO CI MINH	SYD	27	22	18	9	18	VEITNAM	VN773	787-9	3150	2763	AVDALE PATH 1 KM	63	918
28	BALLINA	SYD	27	23	30	10	30	JETSTAR	JQ457	320-232	3150	2763	OVER LOGGER	71.7	1030
28	MANILA	SYD	27	19	48	6	48	CATHAY	CX111	330-343	3225	2838	0.5 KM WEST	64.5	648
28	CAIRNS		27	22	24	9	24	VIRGIN	VA1408	737-8FE	3225	2838	AVDALE PATH 1 KM	65.2	926
27	DALLAS	SYD	26	19	6	6	6	QANTAS	QF8	380-842	3250	2863	AVDALE PATH 1 KM	68.7	6:05
28	DALLAS	SYD	27	19	0	6	0	QANTAS	QF8	380-842	3250	2863	AVDALE PATH 1 KM	71.1	600
28	XIAMMEN	SYD	27	22	58	9	58	XIAMEN	MF801	787-8	3300	2913	AVDALE PATH 1 KM	69.1	958
28	MANILA	SYD	27	23	17	10	17	CEBU	5J41	330-343	3400	3013	AVDALE PATH 1 KM	69.2	1017
28	GOLD C	SYD	28	8	55	19	55	JETSTAR	jq423	321-231	3425	3038	OVER LOGGER	69.1	1955
28	JOBURG	SYD	28	4	50	15	50	QANTAS	QF64	747-438	3450	3063	AVDALE PATH 1 KM	68.7	1551
28	XIAN	SYD	27	20	36	7	36	HIANAN	HU7993	330-343	3525	3138	AVDALE PATH 1 KM	70.9	736
27	MELBOURNE	SYD	27	9	12	20	12	QANTAS	QF462	737-838	3550	3163	AVDALE PATH 1 KM	63.4	2012

28	GOLD C	SYD	28	8	13	19	13	TIGER	TT623	320-232	3550	3163	OVER LOGGER	69.8	1913
28	CANBERRA	SYD	27	21	0	8	0	VIRGIN	VA629	ATR 72-600	3575	3188	OVER LOGGER	70.1	800
28	PERTH	SYD	27	19	18	6	18	JETSTAR	JQ989	320-232	3600	3213	AVDALE PATH 1 KM	66	618
28	GOLDCST	SYD	28	1	29	12	29	JETSTAR	JQ409	320-232	3600	3213	OVER LOGGER	73.3	1229
28	SINGAPORE	SYD	27	19	36	6	36	SINGAPORE	SQ221	380-841	3650	3263	AVDALE PATH 1 KM	67.8	634
28	CAIRNS	SYD	27	23	38	10	38	JETSTAR	JQ953	320-232	3675	3288	OVER LOGGER	73.4	1038
28	BALLINA	SYD	28	7	43	18	43	JETSTAR	JQ461	320-232	3675	3288	OVER LOGGER	66.7	1843
28	GOLDCST	SYD	27	23	11	10	11	VIRGIN	VA506	737-8FE	3725	3338	OVER LOGGER	71.8	1011
28		SYD	27	19	36	6	36	QANTAS	QF20	330-303	3750	3363	AVDALE PATH 1 KM	72.8	6.36
28	HK	SYD	27	22	24	9	24	CATHAY	CX161	777-367	3750	3363	AVDALE PATH 1 KM	66.6	925
28	SINGAPORE	SYD	27	19	64.2	6	64.2	SINGAPORE	BA15	777-36N	3775	3388	AVDALE PATH 1 KM	64.2	606
28	BRISBANE	SYD	27	22	6	9	6	JETSTAR	JQ811	320-232	3775	3388	OVER LOGGER	63	908
27	CAIRNS	SYD	27	10	24	21	24	JETSTAR	JQ959	321-231	3825	3438	5 BLOCKS WEST	68.1	2124
28	BRISB	SYD	28	10	35	21	35	TIGER	TT387	320-232	3825	3438	OVER LOGGER	67.8	2135
27	GUANGZHOU	SYD	27	9	27	20	27	CHINA STH	CZ301	330-343	3850	3463	AVDALE PATH 1 KM	67.7	2028
27	GOLD C	SYD	27	10	6	21	6	TIGER	TT623	320-232	3850	3463	OVER LOGGER	68.3	2104
28	BRISB	SYD	28	10	43	21	43	VIRGIN	VA988	737-8FE	3850	3463	OVER LOGGER	63	2139
28	HK	SYD	27	23	59	10	59	QANTAS	QF118	330-202	3874	3487	OVER LOGGER	70.7	1100
28	SHANGHAI	SYD	27	22	6	9	6	QANTAS	QF130	330-202	3875	3488	AVDALE PATH 1 KM	63.1	907
28	SHANGHAI	SYD	27	22	54	9	54	QANTAS	QF130	330-202	3875	3488	AVDALE PATH 1 KM	69	954
28	SUNSHINE C	SYD	28	2	1	13	1	VIRGIN	VA482	737-8FE	3875	3488	OVER LOGGER	72.2	1301
28	SUNSHINE C	SYD	28	4	24	15	24	VIRGIN	VA484	737-8FE	3875	3488	OVER LOGGER	70.2	1525
28	BRISB	SYD	28	10	49	21	49	V	VA988	737-8FE	3875	3488	OVER LOGGER	65.8	2149
28	CAIRNS	SYD	28	2	44	13	44	TIGER	TT677	320-232	3900	3513	OVER LOGGER	71.5	1344
28	GOLD C	SYD	28	10	46	21	46	JETSTAR	JQ427	321-231	3900	3513	OVER LOGGER	68.9	2146
28	BRISB	SYD	28	8	33	19	33	VIRGIN	VA970	737-8FE	3925	3538	OVER LOGGER	65.4	1933
28	HK	SYD	27	19	12	6	12	VIRGIN	VA82	330-243	3975	3588	AVDALE PATH 1 KM	68.8	613
28	GOLD C	SYD	27	21	30	8	30	JETSTAR	JQ401	320-232	3975	3588	OVER LOGGER	68.2	830
28	BRISBANE	SYD	27	22	42	9	42	JETSTAR	JQ813	321-231	4025	3638	OVER LOGGER	69.3	942
28	GOLDCST	SYD	28	1	26	12	26	VIRGIN	VA516	737-8FE	4025	3638	OVER LOGGER	71.7	1226
27	BRISBANE	SYD	27	11	0	22	0	JETSTAR	JQ819	320-232	4050	3663	OVER LOGGER	68.1	2157
28	GOLD C	SYD	27	22	6	9	6	JETSTAR	JQ403	320-232	4075	3688	OVER LOGGER	70	906
28	CAIRNS	SYD	27	22	45	9	45	VIRGIN	VA1408	737-8FE	4075	3688	OVER LOGGER	66.9	944
28	TOWNESVILLE	SYD	28	6	26	17	26	JETSTAR	JQ913	320-232	4075	3688	OVER LOGGER	66.7	1727
27	SINGAPORE	SYD	27	8	45	19	45	SING	SQ288	777-312	4100	3713	AVDALE PATH 1 KM	66.1	19:45
27	GOLD C	SYD	27	9	54	20	54	JETSTAR	JQ419	320-232	4100	3713	OVER LOGGER	68.8	2052
27	SUNSHINE	SYD	27	10	36	21	36	JETSTAR	JQ789	320-232	4100	3713	OVER LOGGER	66.7	2134
28	PROSERPINE	SYD	28	4	42	15	42	TIGER	TT397	320-232	4100	3713	OVER LOGGER	69.6	1542
27	DARWIN	SYD	26	19	0	6	0	QANTAS	QF829	737-838	4125	3738	5 BLCKS A1 A3	71	6:00
28	GOLDCST	SYD	27	23	19	10	19	JETSTAR	JQ405	320-232	4125	3738	OVER LOGGER	69.7	1019
27	BRISBANE	SYD	27	8	54	19	54	JETSTAR	JQ821	320-232	4150	3763	OVER LOGGER	68.5	19.52
28	BRISBANE	SYD	27	21	12	8	12	VIRGIN	VA908	737-7FE	4150	3763	OVER LOGGER	67.1	812
28	GOLDCST	SYD	28	3	45	14	45	QANTAS	QF859	737-838	4150	3763	OVER LOGGER	70.6	1444
28	BALLINA	SYD	28	2	4	13	4	JETSTAR	JQ459	320-232	4200	3813	OVER LOGGER	70	1305
28	CAIRNS	SYD	28	2	18	13	18	JETSTAR	JQ517	320-232	4200	3813	OVER LOGGER	63.1	1319
28	GOLD C	SYD	28	9	30	20	30	JETSTAR	JQ425	320-232	4200	3813	OVER LOGGER	66.3	2030
27	BRISBANE	SYD	27	10	12	21	12	QANTAS	JQ1725	717-BL	4250	3863	OVER LOGGER	72.4	2115
27	BRISBANE	SYD	27	9	18	20	18	VIRGIN	VA978	737-8FE	4275	3888	AVDALE PATH 1 KM	63.4	2019
28	VANCOUVER	SYD	27	22	36	9	36	CANADA	AC33	777-233	4275	3888	AVDALE PATH 1 KM	68.9	935

28	VANCOUVER	SYD	27	22	34	9	34	CANADA	AC 33	777-233	4275	3888	AVDALE PATH 1 KM	73.1	934
27	BRISBANE	SYD	27	10	18	21	18	VIRGIN	VA986	738-8FE	4300	3913	5 BLOCKS WEST	64.3	2118
28	BANGCOCK	SYD	27	20	12	7	12	QANTAS	QF24	330-303	4350	3963	OVER LOGGER	73.7	712
28	BRISBANE	SYD	27	21	18	8	18	QANTAS	QF505	737-838	4350	3963	OVER LOGGER	68.7	818
27	BRISBANE	SYD	27	11	18	22	18	VIRGIN	VA992	737-8FE	4375	3988	OVER LOGGER	61.6	2222
28	BRISB	SYD	28	0	26	11	26	QANTAS	QF517	738-838	4400	4013	OVER LOGGER	62.6	1128
28	BRISB	SYD	28	1	22	12	22	QANTAS	QF521	737-838	4400	4013	OVER LOGGER	67.3	1222
28	BRISB	SYD	28	5	16	16	16	VIRGIN	VA954	737-8FE	4400	4013	OVER LOGGER	67.3	1616
28	BALLINA	SYD	28	6	8	17	8	VIRGIN	VA1142	737-8FE	4400	4013	OVER LOGGER	77.5	1708
28	SUNSHINE C	SYD	28	4	20	15	20	JETSTAR	JQ787	320-232	4475	4088	OVER LOGGER	66.1	1521
27	BRISBANE	SYD	27	8	48	19	48	TIGER	TT379	320-232	4500	4113	OVER LOGGER	66.3	19:49
28	BRISB	SYD	27	22	42	9	42	TIGER	TT357	320-232	4500	4113	OVER LOGGER	69.4	944
28	BRISB	SYD	28	5	30	16	30	QANTAS	QF537	737-838	4500	4113	OVER LOGGER	73.6	1630
28	GOLD C	SYD	27	22	6	9	6	QANTAS	QF861	737-838	4525	4138	OVER LOGGER	71.2	903
28	BRISB	SYD	28	9	59	20	59	QANTAS	QF553	737-838	4525	4138	OVER LOGGER	64.5	2058
28	BRISBANE	SYD	27	22	18	9	18	QANTAS	QF509	737-838	4550	4163	OVER LOGGER	70.3	919
28	GOLDCST	SYD	28	0	23	11	23	TIGER	TT607	320-232	4550	4163	OVER LOGGER	65.9	1124
28	GOLD C	SYD	28	7	35	18	35	VIRGIN	VA532	737-8FE	4550	4163	OVER LOGGER	66.8	1835
28	DARWIN	SYD	28	7	53	18	53	VIRGIN	VA1354	737-8FE	4550	4163	OVER LOGGER	70.5	1853
27	BRISBANE	SYD	27	9	6	20	6	TIGER	TT381	320-232	4575	4188	OVER LOGGER	65.4	20:06
28	COFFSHBR	SYD	28	6	14	17	14	VIRGIN	VA1166	737-8FE	4625	4238	OVER LOGGER	73.3	1714
28	BRISB	SYD	28	2	6	13	6	JETSTAR	JQ815	320-232	4675	4288	OVER LOGGER	68.4	1306
28	SUNSHINE	SYD	28	10	5	21	5	JETSTAR	JQ791	320-232	4675	4288	OVER LOGGER	61	2106
27	HONG K	SYD	27	11	6	22	6	CATHAY	CX139	777-367	4700	4313	5 BLOCKS WEST	66.8	2202
28	BRISB	SYD	28	0	25	11	25	VIRGIN	VA932	737-8FE	4700	4313	OVER LOGGER	68.9	1126
28	HERVEY B	SYD	28	3	26	14	26	VIRGIN	VA1556	737-8FE	4700	4313	OVER LOGGER	70.8	1426
28	BRISB	SYD	28	4	36	15	36	VIRGIN	VA950	737-8KG	4700	4313	OVER LOGGER	68.1	1536
28	GOLDCST	SYD	28	3	36	14	36	JETSTAR	JQ411	320-232	4725	4338	OVER LOGGER	68	1435
28	BRISB	SYD	28	8	52	19	52	QANTAS	QF551	737-838	4725	4338	OVER LOGGER	65.2	1951
28	GOLDCST	SYD	28	0	33	11	33	QANTAS	QF1565	717-2BL	4750	4363	OVER LOGGER	72.9	1133
28	BRISB	SYD	28	6	40	17	40	VIRGIN	VA958	737-8FE	4750	4363	OVER LOGGER	65	1740
28	HAMILTON	SYD	28	4	56	15	56	QANTAS	QF867	737-838	4800	4413	OVER LOGGER	73.6	1556
28	BRISB	SYD	28	9	55	20	55	VIRGIN	VA892	737-8FE	4800	4413	OVER LOGGER	66.2	2054
28	CAIRNS	SYD	28	4	5	15	5	VIRGIN	VA1418	737-8FE	4825	4438	OVER LOGGER	67.2	1506
28	GOLD C	SYD	28	7	22	18	22	JETSTAR	JQ413	320-232	4850	4463	OVER LOGGER	65.5	1822
27	BRISBANE	SYD	27	10	48	21	48	QANTAS	QF553	737-838	4875	4488	OVER LOGGER	66.1	2149
28	BRISB	SYD	28	9	39	20	39	VIRGIN	VA978	737-8FE	4950	4563	OVER LOGGER	64.3	2040
28	BRISB	SYD	28	2	28	13	28	QANTAS	JQ1717	717-2BL	4975	4588	OVER LOGGER	71.2	1327
28	CAIRNS	SYD	28	7	2	18	2	ALLIANCE	QQ515	FOKKER 70	4975	4588	OVER LOGGER	64.3	1802
28	GOLD C	SYD	28	10	25	21	25	VIRGIN	VA544	737-8FE	5025	4638	OVER LOGGER	62.2	2126
28	GOLDCST	SYD	28	1	38	12	38	TIGER	TT609	320-232	5100	4713	OVER LOGGER	71.8	1239
28	BRISB	SYD	28	6	24	17	24	QANTAS	QF541	737-838	5150	4763	OVER LOGGER	72.2	1724
28	GOLD C	SYD	28	5	44	16	44	JETSTAR	JQ415	320-232	5200	4813	OVER LOGGER	68.7	1644
28	BRISB	SYD	28	8	17	19	17	QANTAS	QF547	737-838	5200	4813	OVER LOGGER	65.3	1917
28	CAIRNS	SYD	28	2	58	13	58	QANTAS	QF925	737-838	5275	4888	OVER LOGGER	70.4	1358
28	GOLD C	SYD	28	6	58	17	58	QANTAS	QF1567	717-2BL	5550	5163	OVER LOGGER	69	1757
28	BRISB	SYD	28	8	27	19	27	QANTAS	QF549	737-838	5850	5463	OVER LOGGER	69.3	1926
28	MORESBY	SYD	28	8	7	19	7	NUIGINI	PX1	767-341	5900	5513	OVER LOGGER	68.5	1906
28	BRISB	SYD	28	6	52	17	52	TIGER	TT377	320-232	6525	6138	OVER LOGGER	62.4	1752

APPENDIX B3

MONITORING OF FLIGHTS OVER PYMBLE LADIES COLLEGE OCT 2018

DATA SORT WITH RESPECT TO dBA

													ELEVATION FT	387	DATA TIME ESDST
SYD DAY	FROM	TO	UTC DAY	UTC HR	UTC MIN	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO LOGGER	DATA LAMax	
28	TOWNESVILLE	SYD	28	4	28	15	28	VIRGIN	VA1520	737-8FE	2050	1663	OVER LOGGER	79.1	1528
28	BALLINA	SYD	28	6	8	17	8	VIRGIN	VA1142	737-8FE	4400	4013	OVER LOGGER	77.5	1708
28	AUCKLAND	SYD	27	23	6	10	6	ANZ	NZ103	787-9	3025	2638	OVER LOGGER	76.5	1007
28	JAKARTA	SYD	27	22	31	9	31	GARUDA	GA712	330-243	2350	1963	AVDALE PATH 1 KM	75.5	931
28	SING	SYD	28	0	21	11	21	SINGAPORE	SQ231	380-841	600	213	AVDALE PATH 1 KM	74.9	1119
28	SAN FRAN	SYD	27	21	6	8	6	UNITED	UA863	787-9	2950	2563	OVER LOGGER	74.4	806
28	BANGCOCK	SYD	27	20	12	7	12	QANTAS	QF24	330-303	4350	3963	OVER LOGGER	73.7	712
28	BRISB	SYD	28	5	30	16	30	QANTAS	QF537	737-838	4500	4113	OVER LOGGER	73.6	1630
28	HAMILTON	SYD	28	4	56	15	56	QANTAS	QF867	737-838	4800	4413	OVER LOGGER	73.6	1556
28	CAIRNS	SYD	27	23	38	10	38	JETSTAR	JQ953	320-232	3675	3288	OVER LOGGER	73.4	1038
28	GOLDCST	SYD	28	1	29	12	29	JETSTAR	JQ409	320-232	3600	3213	OVER LOGGER	73.3	1229
28	COFFSHBR	SYD	28	6	14	17	14	VIRGIN	VA1166	737-8FE	4625	4238	OVER LOGGER	73.3	1714
28	VANCOUVER	SYD	27	22	34	9	34	CANADA	AC 33	777-233	4275	3888	AVDALE PATH 1 KM	73.1	934
28	GOLDCST	SYD	28	0	33	11	33	QANTAS	QF1565	717-2BL	4750	4363	OVER LOGGER	72.9	1133
28		SYD	27	19	36	6	36	QANTAS	QF20	330-303	3750	3363	AVDALE PATH 1 KM	72.8	6.36
28	TOKYO	SYD	27	21	54	8	54	QANTAS	QF26	747-438	2750	2363	AVDALE PATH 1 KM	72.5	855
27	BRISBANE	SYD	27	10	12	21	12	QANTAS	JQ1725	717-BL	4250	3863	OVER LOGGER	72.4	2115
28	SUNSHINE C	SYD	28	2	1	13	1	VIRGIN	VA482	737-8FE	3875	3488	OVER LOGGER	72.2	1301
28	BRISB	SYD	28	6	24	17	24	QANTAS	QF541	737-838	5150	4763	OVER LOGGER	72.2	1724
28	AUCKLAND	SYD	27	21	48	8	48	JETSTAR	JQ202	320-232	2925	2538	950M EAST	71.9	848
28	GOLDCST	SYD	27	23	11	10	11	VIRGIN	VA506	737-8FE	3725	3338	OVER LOGGER	71.8	1011
28	GOLDCST	SYD	28	1	38	12	38	TIGER	TT609	320-232	5100	4713	OVER LOGGER	71.8	1239
28	BALLINA	SYD	27	23	30	10	30	JETSTAR	JQ457	320-232	3150	2763	OVER LOGGER	71.7	1030
28	GOLDCST	SYD	28	1	26	12	26	VIRGIN	VA516	737-8FE	4025	3638	OVER LOGGER	71.7	1226
28	CAIRNS	SYD	28	2	44	13	44	TIGER	TT677	320-232	3900	3513	OVER LOGGER	71.5	1344
28	LA	SYD	27	20	36	7	36	UNITED	UA839	787-9	2975	2588	500 M EAST	71.4	737
28	TOKYO	SYD	27	19	48	6	48	JAPAN	JL771	787-9	2950	2563	AVDALE PATH 1 KM	71.3	648
28	CHRISTCH	SYD	27	20	48	7	48	JETSTAR	JQ140	320-232	2950	2563	OVER LOGGER	71.3	748
28	GOLD C	SYD	27	22	6	9	6	QANTAS	QF861	737-838	4525	4138	OVER LOGGER	71.2	903
28	BRISB	SYD	28	2	28	13	28	QANTAS	JQ1717	717-2BL	4975	4588	OVER LOGGER	71.2	1327
28	DALLAS	SYD	27	19	0	6	0	QANTAS	QF8	380-842	3250	2863	AVDALE PATH 1 KM	71.1	600
27	DARWIN	SYD	26	19	0	6	0	QANTAS	QF829	737-838	4125	3738	5 BLCKS A1 A3	71	6:00
28	FIJI	SYD	28	0	50	11	50	FIJI	FJ1915	737-8X2	2975	2588	OVER LOGGER	70.9	1150
28	XIAN	SYD	27	20	36	7	36	HIANAN	HU7993	330-343	3525	3138	AVDALE PATH 1 KM	70.9	736
27	PERTH	SYD	27	9	24	20	24	QANTAS	QF582	737-838	3100	2713	AVDALE PATH 1 KM	70.8	2025
28	HERVEY B	SYD	28	3	26	14	26	VIRGIN	VA1556	737-8FE	4700	4313	OVER LOGGER	70.8	1426
28	HK	SYD	27	23	59	10	59	QANTAS	QF118	330-202	3874	3487	OVER LOGGER	70.7	1100
28	TOKYO	SYD	27	22	30	9	30	NIPPON	NH879	787-9	2950	2563	AVDALE PATH 1 KM	70.6	930
28	GOLDCST	SYD	28	3	45	14	45	QANTAS	QF859	737-838	4150	3763	OVER LOGGER	70.6	1444
28	DARWIN	SYD	28	7	53	18	53	VIRGIN	VA1354	737-8FE	4550	4163	OVER LOGGER	70.5	1853
28	CAIRNS	SYD	28	2	58	13	58	QANTAS	QF925	737-838	5275	4888	OVER LOGGER	70.4	1358
28	BRISBANE	SYD	27	22	18	9	18	QANTAS	QF509	737-838	4550	4163	OVER LOGGER	70.3	919

28	SUNSHINE C	SYD	28	4	24	15	24	VIRGIN	VA484	737-8FE	3875	3488	OVER LOGGER	70.2	1525
28	AUKLAND	SYD	27	21	24	8	24	ANZ	NZ101	777-219	2925	2538	AVDALE PATH 1 KM	70.1	824
28	CANBERRA	SYD	27	21	0	8	0	VIRGIN	VA629	ATR 72-600	3575	3188	OVER LOGGER	70.1	800
28	WELLINGTN	SYD	27	21	12	8	12	QANTAS	QF162	737-838	2900	2513	OVER LOGGER	70	811
28	GOLD C	SYD	27	22	6	9	6	JETSTAR	JQ403	320-232	4075	3688	OVER LOGGER	70	906
28	BALLINA	SYD	28	2	4	13	4	JETSTAR	JQ459	320-232	4200	3813	OVER LOGGER	70	1305
28	GOLD C	SYD	28	8	13	19	13	TIGER	TT623	320-232	3550	3163	OVER LOGGER	69.8	1913
28	GOLDCST	SYD	27	23	19	10	19	JETSTAR	JQ405	320-232	4125	3738	OVER LOGGER	69.7	1019
28	CHRISTCH	SYD	27	20	6	7	6	QANTAS	QF7528	767-381	2950	2563	OVER LOGGER	69.6	706
28	PROSERPINE	SYD	28	4	42	15	42	TIGER	TT397	320-232	4100	3713	OVER LOGGER	69.6	1542
28	BRISB	SYD	27	22	42	9	42	TIGER	TT357	320-232	4500	4113	OVER LOGGER	69.4	944
28	BRISBANE	SYD	27	22	42	9	42	JETSTAR	JQ813	321-231	4025	3638	OVER LOGGER	69.3	942
28	BRISB	SYD	28	8	27	19	27	QANTAS	QF549	737-838	5850	5463	OVER LOGGER	69.3	1926
28	QTOWN	SYD	28	5	36	16	36	ANZ	NZ831	320-232	2925	2538	OVER LOGGER	69.2	1635
28	MANILA	SYD	27	23	17	10	17	CEBU	5J41	330-343	3400	3013	AVDALE PATH 1 KM	69.2	1017
28	XIAMMEN	SYD	27	22	58	9	58	XIAMEN	MF801	787-8	3300	2913	AVDALE PATH 1 KM	69.1	958
28	GOLD C	SYD	28	8	55	19	55	JETSTAR	jq423	321-231	3425	3038	OVER LOGGER	69.1	1955
28	PERTH	SYD	27	19	6	6	6	VIRGIN	VA570	737-8FE	2950	2563	2 BLOCKS EAST	69	605
28	SHANGHAI	SYD	27	22	54	9	54	QANTAS	QF130	330-202	3875	3488	AVDALE PATH 1 KM	69	954
28	GOLD C	SYD	28	6	58	17	58	QANTAS	QF1567	717-2BL	5550	5163	OVER LOGGER	69	1757
28	CHRISTCH	SYD	28	8	31	19	31	EMERITES	EK413	380-861	2875	2488	500 M EAST	68.9	1931
28	GOLD C	SYD	28	10	46	21	46	JETSTAR	JO427	321-231	3900	3513	OVER LOGGER	68.9	2146
28	VANCOUVER	SYD	27	22	36	9	36	CANADA	AC33	777-233	4275	3888	AVDALE PATH 1 KM	68.9	935
28	BRISB	SYD	28	0	25	11	25	VIRGIN	VA932	737-8FE	4700	4313	OVER LOGGER	68.9	1126
28	HK	SYD	27	19	12	6	12	VIRGIN	VA82	330-243	3975	3588	AVDALE PATH 1 KM	68.8	613
27	GOLD C	SYD	27	9	54	20	54	JETSTAR	JQ419	320-232	4100	3713	OVER LOGGER	68.8	2052
27	DALLAS	SYD	26	19	6	6	6	QANTAS	QF8	380-842	3250	2863	AVDALE PATH 1 KM	68.7	6:05
28	JOBURG	SYD	28	4	50	15	50	QANTAS	QF64	747-438	3450	3063	AVDALE PATH 1 KM	68.7	1551
28	BRISBANE	SYD	27	21	18	8	18	QANTAS	QF505	737-838	4350	3963	OVER LOGGER	68.7	818
28	GOLD C	SYD	28	5	44	16	44	JETSTAR	JQ415	320-232	5200	4813	OVER LOGGER	68.7	1644
27	BRISBANE	SYD	27	8	54	19	54	JETSTAR	JQ821	320-232	4150	3763	OVER LOGGER	68.5	19.52
28	MORESBY	SYD	28	8	7	19	7	NUIGINI	PX1	767-341	5900	5513	OVER LOGGER	68.5	1906
28	BRISB	SYD	28	2	6	13	6	JETSTAR	JO815	320-232	4675	4288	OVER LOGGER	68.4	1306
27	GOLD C	SYD	27	10	6	21	6	TIGER	TT623	320-232	3850	3463	OVER LOGGER	68.3	2104
28	GOLD C	SYD	27	21	30	8	30	JETSTAR	JQ401	320-232	3975	3588	OVER LOGGER	68.2	830
27	CAIRNS	SYD	27	10	24	21	24	JETSTAR	JQ959	321-231	3825	3438	5 BLOCKS WEST	68.1	2124
27	BRISBANE	SYD	27	11	0	22	0	JETSTAR	JQ819	320-232	4050	3663	OVER LOGGER	68.1	2157
28	BRISB	SYD	28	4	36	15	36	VIRGIN	VA950	737-8KG	4700	4313	OVER LOGGER	68.1	1536
28	WELLINGTN	SYD	27	20	54	7	54	ANZ	NZ845	320-232	2925	2538	OVER LOGGER	68	754
28	GOLDCST	SYD	28	3	36	14	36	JETSTAR	JQ411	320-232	4725	4338	OVER LOGGER	68	1435
28	SHANGHAI	SYD	27	22	0	9	0	AIR CHINA	CA175	330-243	2900	2513	AVDALE PATH 1 KM	67.8	900
28	ABU DHABI	SYD	27	19	12	6	12	ETIHAD	EY450	777-3FX	3000	2613	AVDALE PATH 1 KM	67.8	612
28	SINGAPORE	SYD	27	19	36	6	36	SINGAPORE	SQ221	380-841	3650	3263	AVDALE PATH 1 KM	67.8	634
28	BRISB	SYD	28	10	35	21	35	TIGER	TT387	320-232	3825	3438	OVER LOGGER	67.8	2135
27	GUANGZHOU	SYD	27	9	27	20	27	CHINA STH	CZ301	330-343	3850	3463	AVDALE PATH 1 KM	67.7	2028
28	DELHI	SYD	27	19	54	6	54	AIR INDIA	AI302	787-8	2950	2563	AVDALE PATH 1 KM	67.4	655
28	BRISB	SYD	28	1	22	12	22	QANTAS	QF521	737-838	4400	4013	OVER LOGGER	67.3	1222
28	BRISB	SYD	28	5	16	16	16	VIRGIN	VA954	737-8FE	4400	4013	OVER LOGGER	67.3	1616
28	CAIRNS	SYD	28	4	5	15	5	VIRGIN	VA1418	737-8FE	4825	4438	OVER LOGGER	67.2	1506

28	BRISBANE	SYD	27	21	12	8	12	VIRGIN	VA908	737-7FE	4150	3763	OVER LOGGER	67.1	812
28	CAIRNS	SYD	27	22	45	9	45	VIRGIN	VA1408	737-8FE	4075	3688	OVER LOGGER	66.9	944
28	AUCKLAND	SYD	27	21	42	8	42	LATAM CHIL	LA801	787-9	2950	2563	0.5 KM WEST	66.8	841
28	GOLD C	SYD	28	7	35	18	35	VIRGIN	VA532	737-8FE	4550	4163	OVER LOGGER	66.8	1835
27	HONG K	SYD	27	11	6	22	6	CATHAY	CX139	777-367	4700	4313	5 BLOCKS WEST	66.8	2202
28	BALLINA	SYD	28	7	43	18	43	JETSTAR	JQ461	320-232	3675	3288	OVER LOGGER	66.7	1843
28	TOWNESVILLE	SYD	28	6	26	17	26	JETSTAR	JQ913	320-232	4075	3688	OVER LOGGER	66.7	1727
27	SUNSHINE	SYD	27	10	36	21	36	JETSTAR	JQ789	320-232	4100	3713	OVER LOGGER	66.7	2134
28	JAKARTA	SYD	27	19	36	6	36	QANTAS	QF42	330-202	3025	2638	AVDALE PATH 1 KM	66.6	636
28	HK	SYD	27	22	24	9	24	CATHAY	CX161	777-367	3750	3363	AVDALE PATH 1 KM	66.6	925
28	SHANGHAI	SYD	27	22	42	9	42	CHINA	MU561	330-243	2975	2588	AVDALE PATH 1 KM	66.5	944
28	GOLD C	SYD	28	9	30	20	30	JETSTAR	JQ425	320-232	4200	3813	OVER LOGGER	66.3	2030
27	BRISBANE	SYD	27	8	48	19	48	TIGER	TT379	320-232	4500	4113	OVER LOGGER	66.3	19:49
28	DUBAI	SYD	27	20	30	7	30	EMERITES	EK412	380-861	2800	2413	AVDALE PATH 1 KM	66.2	730
28	BRISB	SYD	28	9	55	20	55	VIRGIN	VA892	737-8FE	4800	4413	OVER LOGGER	66.2	2054
28	MELB	SYD	27	23	15	10	15	QANTAS	QF418	737-838	2875	2488	AVDALE PATH 1 KM	66.1	1015
27	SINGAPORE	SYD	27	8	45	19	45	SING	SQ288	777-312	4100	3713	AVDALE PATH 1 KM	66.1	19:45
28	SUNSHINE C	SYD	28	4	20	15	20	JETSTAR	JQ787	320-232	4475	4088	OVER LOGGER	66.1	1521
27	BRISBANE	SYD	27	10	48	21	48	QANTAS	QF553	737-838	4875	4488	OVER LOGGER	66.1	2149
28	PERTH	SYD	27	19	18	6	18	JETSTAR	JQ989	320-232	3600	3213	AVDALE PATH 1 KM	66	618
28	GOLDCST	SYD	28	0	23	11	23	TIGER	TT607	320-232	4550	4163	OVER LOGGER	65.9	1124
28	BRISB	SYD	28	10	49	21	49	V	VA988	737-8FE	3875	3488	OVER LOGGER	65.8	2149
28	GOLD C	SYD	28	7	22	18	22	JETSTAR	JQ413	320-232	4850	4463	OVER LOGGER	65.5	1822
28	BRISB	SYD	28	8	33	19	33	VIRGIN	VA970	737-8FE	3925	3538	OVER LOGGER	65.4	1933
27	BRISBANE	SYD	27	9	6	20	6	TIGER	TT381	320-232	4575	4188	OVER LOGGER	65.4	20:06
28	BRISB	SYD	28	8	17	19	17	QANTAS	QF547	737-838	5200	4813	OVER LOGGER	65.3	1917
28	CAIRNS		27	22	24	9	24	VIRGIN	VA1408	737-8FE	3225	2838	AVDALE PATH 1 KM	65.2	926
28	BRISB	SYD	28	8	52	19	52	QANTAS	QF551	737-838	4725	4338	OVER LOGGER	65.2	1951
28	MELBOURNE	SYD	27	20	0	7	0	JETSTAR	JQ602	320-232	2950	2563	AVDALE PATH 1 KM	65.1	700
28	BRISB	SYD	28	6	40	17	40	VIRGIN	VA958	737-8FE	4750	4363	OVER LOGGER	65	1740
28	MANILA	SYD	27	19	48	6	48	CATHAY	CX111	330-343	3225	2838	0.5 KM WEST	64.5	648
28	BRISB	SYD	28	9	59	20	59	QANTAS	QF553	737-838	4525	4138	OVER LOGGER	64.5	2058
27	BRISBANE	SYD	27	10	18	21	18	VIRGIN	VA986	738-8FE	4300	3913	5 BLOCKS WEST	64.3	2118
28	BRISB	SYD	28	9	39	20	39	VIRGIN	VA978	737-8FE	4950	4563	OVER LOGGER	64.3	2040
28	CAIRNS	SYD	28	7	2	18	2	ALLIANCE	QQ515	FOKKER 70	4975	4588	OVER LOGGER	64.3	1802
28	SINGAPORE	SYD	27	19	64.2	6	64.2	SINGAPORE	BA15	777-36N	3775	3388	AVDALE PATH 1 KM	64.2	606
27	MELBOURNE	SYD	27	9	12	20	12	QANTAS	QF462	737-838	3550	3163	AVDALE PATH 1 KM	63.4	2012
27	BRISBANE	SYD	27	9	18	20	18	VIRGIN	VA978	737-8FE	4275	3888	AVDALE PATH 1 KM	63.4	2019
28	SHANGHAI	SYD	27	22	6	9	6	QANTAS	QF130	330-202	3875	3488	AVDALE PATH 1 KM	63.1	907
28	CAIRNS	SYD	28	2	18	13	18	JETSTAR	JQ517	320-232	4200	3813	OVER LOGGER	63.1	1319
28	HO CI MINH	SYD	27	22	18	9	18	VEITNAM	VN773	787-9	3150	2763	AVDALE PATH 1 KM	63	918
28	BRISBANE	SYD	27	22	6	9	6	JETSTAR	JQ811	320-232	3775	3388	OVER LOGGER	63	908
28	BRISB	SYD	28	10	43	21	43	VIRGIN	VA988	737-8FE	3850	3463	OVER LOGGER	63	2139
28	BRISB	SYD	28	0	26	11	26	QANTAS	QF517	738-838	4400	4013	OVER LOGGER	62.6	1128
28	BRISB	SYD	28	6	52	17	52	TIGER	TT377	320-232	6525	6138	OVER LOGGER	62.4	1752
28	GOLD C	SYD	28	10	25	21	25	VIRGIN	VA544	737-8FE	5025	4638	OVER LOGGER	62.2	2126
27	KL	SYD	27	9	20	20	20	MALAYSIAN	MH141	330-323	3100	2713	AVDALE PATH 1 KM	61.6	2020
27	BRISBANE	SYD	27	11	18	22	18	VIRGIN	VA992	737-8FE	4375	3988	OVER LOGGER	61.6	2222
28	SUNSHINE	SYD	28	10	5	21	5	JETSTAR	JQ791	320-232	4675	4288	OVER LOGGER	61	2106

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DEPARTING NTH 29/10

APPENDIX C1

MONITORING OF FLIGHTS OVER DOROTHY ST MAYS HILL JANUARY 2019

ELEVATION ON FT 161 DATA CRONOLOGICALLY

DAY	FROM	TO	UTC DAY	TIME UTC HR	TIME UTC MIN	TIME ESDST HR	TIME ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	DATA LAMax	DATA TIME ESDST
22	SYD	PERTH	22	3	25	14	25	VIRGIN	VA559	737-8FE	4450	4289	2 BLOCKS STH	71.41	14:26
22	SYD	PERTH	22	4	7	15	7	QANTAS	QF557	330-202	4025	3864	2 BLOCKS NTH	70.12	15:07
22	SYD	ADL	22	4	36	15	36	QANTAS	QF761	737-838	6325	6164	4 BLOCKS STH	64.5	15:43
22	SYD	SING	22	5	16	16	16	SINGAPORE	SQ222	380-841	3650	3489	2 BLOCKS NTH M4	65.76	16:15
22	SYD	DOHA	22	5	40	16	40	QATAR	QR907	777-3DZ	3525	3364	3 BLOCKS NTH	71.96	16:41
22	SYD	ABU DHAB	22	5	58	16	58	ETIHAD	EY451	777-3FX	4457	4296	2 BLOCKS STH	68.6	16:56
22	SYD	DENPASAR	22	6	10	17	10	QANTAS	QF43	330-203	4300	4139	2 BLOCKS STH	69.06	17:10
22	SYD	ADL	22	6	14	17	14	QANTAS	QF765	737-838	4350	4189	3 BLOCKS STH	67.47	17:09
22	SYD	DUBAI	22	6	20	17	20	EMIRATES	EK417	777-31	4350	4189	M4 END COLEMAN ST	68.68	17:20
22	SYD	PERTH	22	7	7	18	7	QANTAS	QF571	330-202	5725	5564	1 BLOCKS STH	72.58	18:12
22	SYD	PERTH	22	8	2	19	2	QANTAS	QF743	737-838	5125	4964	1 BLOCK STH	67.35	19:00
22	SYD	PERTH	22	8	31	19	31	VIRGIN	VA569	330-243	5550	5389	1 BLOCK NTH	68.69	19:30
22	SYD	SING	22	8	34	19	34	SINGAPORE	SQ242	777-312	4050	3889	M4 END COLEMAN ST	65.07	19:33
22	SYD	SING	22	8	50	19	50	SINGAPORE	SQ242	777-312	4050	3889	M4 END COLEMAN ST	62.03	19:50
22	SYD	SING	22	8	49	19	49	SINGAPORE	TR13	787-9	4275	4114	3 BLOCKS NTH	61.26	19:48
22	SYD	ADEL	22	8	52	19	52	QANTAS	QF783	737-838	8225	8064	2 BLOCKS STH	60.13	19:50
22	SYD	ADEL	22	9	18	20	18	QANTAS	QF583	330-202	4875	4714	2 BLOCKS STH	66.87	20:18
22	SYD	DENPASAR	22	9	31	20	31	JETSTAR	JQ37	787-8	5325	5164	2 BLOCKS STH	65.44	20:30
22	SYD	ADEL	22	9	34	20	34	VIRGIN	VA444	737-8FE	5375	5214	4 BLOCKS STH	69.22	20:37
22	SYD	BANGKOK	22	9	39	20	39	EMIRATES	EK419	777-36	5325	5164	3 BLOCKS NTH	67.87	20:38
22	SYD	SING	22	10	31	21	31	FEDEX	FX5283	MD11F	2925	2764	5 BLOCKS STH	67.1	21:28
22	SYD	DUBAI	22	11	3	22	3	EMIRATES	EK413	380-861	4775	4614	M4 END COLEMAN ST	68.72	22:03
22	SYD	DOHA	22	11	7	22	7	QATAR	QR909	380-861	3200	3039	2 BLOCKS NTH M4	67.64	22:06
22	SYD	ABU DHAB	22	11	22	22	22	ETIHAD	EY455	380-861	4300	4139	2 BLOCKS NTH M4	68.85	22:21
22	SYD	KUL	22	11	34	22	34	MALAYSIAN	MH140	330-323	3225	3064	1 BLOCK STH	67.24	22:33
23	SYD	DUBAI	22	19	17	6	17	EMERITES	EK415	380-861	4325	4164	5 BKS NTH M4 COLEMA	64.54	6:16
23	SYD	PERTH	22	19	51	6	51	QANTAS	QF565	330-202	3800	3639	1 BLOCK STH	65.1	6:51
23	SYD	ADEL	22	19	56	6	56	QANTAS	QF	330-202	4400	4239	4 BLOCKS STH	63.45	6:55
23	SYD	ADEL	22	20	20	7	20	JETSTAR	JQ762	320-232	6250	6089	4 BLOCKS STH	67.79	7:19
25	SYD	DUBAI	24	19	14	6	14	EMIRATES	EK415	380-861	3050	2889	6 BLOCKS NTH M4	65.25	6:13
25	SYD	PERTH	24	19	49	6	49	QANTAS	QF565	737-838	5875	5714	2 BLOCKS NTH	65.25	6:51
25	SYD	ADEL	24	20	0	7	0	QANTAS	QF735	737-838	5500	5339	1 BLOCK STH	60.34	6:59
25	SYD	ADEL	24	20	24	7	24	JETSTAR	JQ762	320-232	6550	6389	5 BLOCKS STH	60.53	7:24
25	SYD		24	20	30	7	30	VIRGIN	VA 551	330- 243	5000	4839	3 BLOCKS NTH	66.13	7:29
25	SYD	AYERS R	24	23	12	10	12	VIRGIN	VA627	737-8FE	5900	5739	OVER DOROTHY	64.47	10:13
25	SYD	ADL	24	23	48	10	48	QANTAS	JQ741	737-838	6000	5839	OVER DOROTHY	63.86	10:48
25	SYD	PERTH	25	0	30	11	30	QANTAS	QF581	330-202	3100	2939	6 BLOCKS STH	66.09	11:29
25	SYD	DENPASAR	25	0	36	11	36	VIRGIN	VA33	737-8FE	4300	4139	6 BLOCKS STH	66.89	11:35
25	SYD	PERTH	25	1	15	12	15	QANTAS	QF567	747-438	4725	4564	6 BLOCKS STH	66.1	12:13
25	SYD	SING	25	1	30	12	30	SINGAPORE	SQ232	380-841	4575	4414	M4 END COLEMAN ST	62.32	12:30
25	SYD	JAKARTA	25	3	15	14	15	QANTAS	QF41	330-303	4275	4114	6 BLOCKS STH	68.52	14:13

25	SYD	PEKNG	25	3	0	14	0	QANTAS	QF107	330-202	4725	4564		66.95	14:01
25	SYD	JAKATA	25	3	6	14	6	QANTAS	QF41	330-303	3350	3189		63.49	14:05
25	SYD	PRTH	25	3	30	14	30	QANTAS	QF577	737-838	5300	5139	OVER DOROTHY	63.39	14:30
25	SYD	NA	25	4	0	15	0	QANTAS	QF6011	380-842	3825	3664	2 BKS NTH M4 COLEMA	64.56	15:00
25	SYD	DOHA	25	4	36	15	36	QATAR	QR907	777-3DZ	2575	2414	3 BLOCKS STH	63.84	15:36
25	SYD	ADL	25	6	0	17	0	JETSTAR	JQ770	320-232	4225	4064	M4 END COLEMAN ST	64.83	16:59
25	SYD	PERTH	25	6	18	17	18	QANTAS	QF569	737-838	4300	4139	1 BLOCK STH	73.14	17:19
25	SYD	PERTH	25	7	30	18	30	QANTAS	QF571	330-202	3750	3589	6 BLOCKS STH	67.05	7:40
25	SYD	DENPASAR	25	7	54	18	54	VIRGIN	VA37	737-8FE	2150	1989	M4 END COLEMAN ST	63.51	18:57
25	SYD	PERTH	25	10	0	21	0	TIGER	TT755	320-232	4475	4314	3 BLOCKS STH	61.44	21:04
25	SYD	KL	25	11	0	22	0	AIRASIA	DV221	330-343	2050	1889	5 BLOCKS STH	68.74	21:55
25	SYD	DOHA	25	11	12	22	12	QANTAS	QR909	380-861	3750	3589	M4 END COLEMAN ST	68.99	22:15
25	SYD	DUBAI	25	11	18	22	18	EMIRATES	EK413	380-861	1800	1639	M4 END COLEMAN ST	66.84	22:21
25	SYD	ABU DHAB	25	11	24	22	24	ETIHAD	EY455	380-861	5425	5264	5 BLOCKS NTH M4	62.21	22:24
29	SYD	DUBAI	28	19	18	6	18	EMIRATES	EK415	380-861	4375	4214	1 BLOCK NORTH	70.57	6:19
29	SYD	ADEL	28	20	12	7	12	JETSTAR	JQ762	320-232	7425	7264	4 BLOCKS STH	61.14	7:12
29	SYD	SINGA	28	22	28	9	28	SINGAPORE	SQ212	777-312	4450	4289	OVER DOROTHY ST	63.46	9:28
29	SYD	PERTH	28	23	0	10	0	VIRGIN	VA 555	330-243	5150	4989	2 BLOCKS NORTH	63.27	10:00
29	SYD	ALICE	28	23	36	10	36	QANTAS	QF790	737-838	2450	2289	OVER DOROTHY ST	64.13	10:35
29	SYD	PERTH	28	24	0	11	0	QANTAS	QF581	737-838	4025	3864	5 BLOCKS STH	62.76	11:00
29	SYD	AIRS ROCK	29	0	5	11	5	JETSTAR	JST660	320-232	5575	5414	1 BLOCK STH	63.47	11:06
29	SYD	DENPASAR	29	0	42	11	42	VIRGIN	VA33	737-8FE	6850	6689	5 BLOCKS STH	62.55	11:42
29	SYD	JAKARTA	29	1	1	12	1	GARUDA	GA713	330-343	3650	3489	3 BLOCKS STH	61.53	12:06
29	SYD	JOHHASBO	29	1	11	12	11	QANTAS	QF63	747-438	4075	3914	WESTMEAD HOSP	71.01	12:10
29	SYD	DENPASAR	29	1	11	12	11	GARUDA	GA 735	330-343	5475	5314	1 BLOCK NORTH		
29	SYD	KUALA	29	1	23	12	23	AIRASIA	D7223	330-343	4150	3989	3 BLOCKS STH	69.49	12:23
29	SYD	SINGA	29	1	36	12	36	SINGAPORE	SQ232	380-841	4575	4414	1 BLOCK NTH M4	65.21	12:36
29	SYD	ADL	29	2	0	13	0	QANTAS	QF1557	717-2K9	5825	5664	OVER DOROTHY ST	64.82	12:59
29	SYD	ADL	29	2	1	13	1	VIRGIN	VA418	737-8FE	6075	5914	3 BLOCKS STH	59.45	13:00
29	SYD	PERTH	29	3	8	14	8	VIRGIN	VA 559	737-8FE	5275	5114	OVER DOROTHY ST	65.52	14:07
29	SYD	JAKATA	29	3	0	14	0	QANTAS	QF41	330-202	3875	3714	4 BLOCKS STH	66.58	14:00
29	SYD	PERTH	29	3	30	14	30	QANTAS	QF577	330-202	3075	2914	2 BLOCKS STH	66.58	14:30
29	SYD	ADL	29	4	40	15	40	JETSTAR	JQ764	320-232	5425	5264	6 BLOCKS SOUTH	63.22	15:40
29	SYD	SINGA	29	5	14	16	14	SINGAPORE	SQ222	380-841	3350	3189	OVER DOROTHY ST	69.54	16:14
29	SYD	DOHA	29	5	36	16	36	QATAR	QR907	777-3DZ	4125	3964	M4 COLEMAN	72.24	16:36
29	SYD	ADEL	29	5	42	16	42	JETSTAR	JQ770	320-232	6800	6639	4 BLOCKS STH	61.79	16:42
29	SYD	ABU	29	5	54	16	54	ETIHAD	EY451	777-3FX	5625	5464	6 BLOCKS NTH M4	64.22	16:54
29	SYD	DUBAI	29	6	24	17	24	EMIRATES	EK417	777-31H	4425	4264	M4 COLEMAN	64.68	17:25
29	SYD	ADEL	29	8	0	19	0	QANTAS	QF743	737-838	4700	4539	OVER DOROTHY ST	67.74	19:02
29	SYD	SINGA	29	8	25	19	25	SINGAPORE	SQ242	777-312	3752	3591	OVER DOROTHY ST	63.47	19:25
29	SYD	SINGA	29	8	35	19	35	SCOOT	TR13	787-9	3825	3664	OVER DOROTHY ST	65.88	19:43
29	SYD	ADEL	29	8	48	19	48	QANTAS	QF783	737-838	2700	2539	2 BLOCKS STH	63.25	19:48
29	SYD	SINGA	29	10	42	21	42	FEDEX	FX5283	MD-11F	8750	8589	OVER DOROTHY ST	63.88	21:39
29	SYD	DOHA	29	11	0	22	0	QATAR	XR909	380-861	2700	2539	2 BLOCKS NORTH	67.41	22:00
29	SYD	DUBAI	29	11	0	22	0	EMIRATES	EK413	380-861	2525	2364	M4 COLEMAN	67.41	22:00
29	SYD	ABUDHABI	29	11	7	22	7	ETIHAD	EY55	380-861	4100	3939	M4 COLEMAN	68.06	22:05
29	SYD	KL	29	11	30	22	30	MALAYSIAN	MH140	330-323	4950	4789	2 BLOCKS NORTH	64.64	22:25
30	SYD	DUBAI	29	19	18	6	18	EMIRATES	EK415	380-861	4125	3964	4 BLOCKS NTH M4	62.75	6:20

30	SYD	SINGA	29	22	18	9	18	SINGAPORE	SQ212	777-312	6675	6514	2 BLOCKS NTH M4	60.77	9:23
30	SYD	AYERS	29	23	48	10	48	JETSTAR	JQ660	320-232	5775	5614	6 BLOCKS STH	60.26	10:48
30	SYD	ADL	29	23	55	10	55	QANTAS	QF741	737-838	5000	4839	2 BLOCKS STH	65.78	10:53
30	SYD	QTWN	29	23	57	10	57	VIRGIN	VA163	737-8FE	6525	6364	3 BLOCKD NTH	68.41	10:57
30	SYD	PERTH	29	24	0	11	0	QANTAS	QF581	737-838	6450	6289	1 BLOCK NORTH	71.64	11:01
30	SYD	JAKARTA	30	0	48	11	48	QANTAS	GA713	330-343	3650	3489	3 BLOCKS STH	63.44	11:48
30	SYD	DENPASAR	30	0	45	11	45	VIRGIN	VA33	737-8FE	6850	6689	OVER DOROTHY	68.21	11:46
30	SYD	PERTH	30	0	49	11	49	QANTAS	QF567	737-838	4800	4639	1 BLOCK STH	60.68	11:49
30	SYD	DENPASAR	30	1	12	12	12	GARUDA	GA735	330-343	4025	3864	3 BLOCKS STH	66.99	12:15

NOTES

THE DEPARTURE FLIGHT DISTANCE OF DOROTHY ST MAYS HILL FROM KSA IS 21 KM. THE STRAIGHTLINE DEPARTURE DISTANCE FROM WSA IS 19.28 KM

ON THIS BASIS THE HEIGHT OF AIRCRAFT AND NOISE LEVELS RECORDED AT DOROTHY ST MAYS HILL ARE APPLICABLE TO BLA

ELEVATION MAIN ST BLACKTOWN 57 M =187 FT

SUMMARY OF LAMax

COMPARISON WITH NATS DATA FOR AIRCRAFT TYPE AND HEIGHT

NOTE: SOME AIRCRAFT FLIGHT PATHS NOT OVER DATA LOGGER LOCATION

AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	RECORDED LAMax	NATS DATA dBA FOR HEIGHT
747-438	4725	4564	6 BLOCKS STH	66.1	75-72
380-861	4375	4214	1 BLOCK NORTH	70.57	76-73
787-8	5325	5164	2 BLOCKS STH	65.44	67-64
777-3DZ	3525	3364	3 BLOCKS NTH	71.96	75-71
737-838	4300	4139	1 BLOCK STH	73.14	66-63
737-838	6450	6289	1 BLOCK NORTH	71.64	60-59
737-8FE	4450	4289	2 BLOCKS STH	71.41	66-63
737-8FE	5375	5214	4 BLOCKS STH	69.22	63-60
330-343	4150	3989	3 BLOCKS STH	69.49	73-69
330-323	3225	3064	1 BLOCK STH	67.24	77-73
330-202	3875	3714	4 BLOCKS STH	66.58	77-73
320-232	4225	4064	M4 END COLEMAN ST	64.83	66-63

APPENDIX C2

MONITORING OF FLIGHTS OVER DOROTHY ST MAYS HILL JANUARY 2019

ELEVATION FT

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DATA SORT dBA

DAY	FROM	TO	UTC DAY	TIME UTC HR	TIME UTC MIN	TIME ESDST HR	TIME ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	DATA LAMax	DATA TIME ESDST
25	SYD	PERTH	25	6	18	17	18	QANTAS	QF569	737-838	4300	4139	1 BLOCK STH	73.14	17:19
22	SYD	PERTH	22	7	7	18	7	QANTAS	QF571	330-202	5725	5564	1 BLOCKS STH	72.58	18:12
29	SYD	DOHA	29	5	36	16	36	QATAR	QR907	777-3DZ	4125	3964	M4 COLEMAN	72.24	16:36
22	SYD	DOHA	22	5	40	16	40	QATAR	QR907	777-3DZ	3525	3364	3 BLOCKS NTH	71.96	16:41
30	SYD	PERTH	29	24	0	11	0	QANTAS	QF581	737-838	6450	6289	1 BLOCK NORTH	71.64	11:01
22	SYD	PERTH	22	3	25	14	25	VIRGIN	VA559	737-8FE	4450	4289	2 BLOCKS STH	71.41	14:26
29	SYD	JOHHASBO	29	1	11	12	11	QANTAS	QF63	747-438	4075	3914	WESTMEAD HOSP	71.01	12:10
29	SYD	DUBAI	28	19	18	6	18	EMIRATES	EK415	380-861	4375	4214	1 BLOCK NORTH	70.57	6:19
22	SYD	PERTH	22	4	7	15	7	QANTAS	QF557	330-202	4025	3864	2 BLOCKS NTH	70.12	15:07
29	SYD	SINGA	29	5	14	16	14	SINGAPORE	SQ222	380-841	3350	3189	OVER DOROTHY ST	69.54	16:14
29	SYD	KUALA	29	1	23	12	23	AIRASIA	D7223	330-343	4150	3989	3 BLOCKS STH	69.49	12:23
22	SYD	ADEL	22	9	34	20	34	VIRGIN	VA444	737-8FE	5375	5214	4 BLOCKS STH	69.22	20:37
22	SYD	DENPASAR	22	6	10	17	10	QANTAS	QF43	330-203	4300	4139	2 BLOCKS STH	69.06	17:10
25	SYD	DOHA	25	11	12	22	12	QANTAS	QR909	380-861	3750	3589	M4 END COLEMAN ST	68.99	22:15
22	SYD	ABU DHABI	22	11	22	22	22	ETIHAD	EY455	380-861	4300	4139	2 BLOCKS NTH M4	68.85	22:21
25	SYD	KL	25	11	0	22	0	AIRASIA	DV221	330-343	2050	1889	5 BLOCKS STH	68.74	21:55
22	SYD	DUBAI	22	11	3	22	3	EMIRATES	EK413	380-861	4775	4614	M4 END COLEMAN ST	68.72	22:03
22	SYD	PERTH	22	8	31	19	31	VIRGIN	VA569	330-243	5550	5389	1 BLOCK NTH	68.69	19:30
22	SYD	DUBAI	22	6	20	17	20	EMIRATES	EK417	777-31	4350	4189	M4 END COLEMAN ST	68.68	17:20
22	SYD	ABU DHABI	22	5	58	16	58	ETIHAD	EY451	777-3FX	4457	4296	2 BLOCKS STH	68.6	16:56
25	SYD	JAKARTA	25	3	15	14	15	QANTAS	QF41	330-303	4275	4114	6 BLOCKS STH	68.52	14:13
30	SYD	QTWN	29	23	57	10	57	VIRGIN	VA163	737-8FE	6525	6364	3 BLOCKD NTH	68.41	10:57
30	SYD	DENPASAR	30	0	45	11	45	VIRGIN	VA33	737-8FE	6850	6689	OVER DOROTHY	68.21	11:46
29	SYD	ABUDHABI	29	11	7	22	7	ETIHAD	EY55	380-861	4100	3939	M4 COLEMAN	68.06	22:05
22	SYD	BANGKOK	22	9	39	20	39	EMIRATES	EK419	777-36	5325	5164	3 BLOCKS NTH	67.87	20:38
23	SYD	ADEL	22	20	20	7	20	JETSTAR	JQ762	320-232	6250	6089	4 BLOCKS STH	67.79	7:19
29	SYD	ADEL	29	8	0	19	0	QANTAS	QF743	737-838	4700	4539	OVER DOROTHY ST	67.74	19:02
22	SYD	DOHA	22	11	7	22	7	QATAR	QR909	380-861	3200	3039	2 BLOCKS NTH M4	67.64	22:06
22	SYD	ADL	22	6	14	17	14	QANTAS	QF765	737-838	4350	4189	3 BLOCKS STH	67.47	17:09
29	SYD	DUBAI	29	11	0	22	0	EMIRATES	EK413	380-861	2525	2364	M4 COLEMAN	67.41	22:00
29	SYD	DOHA	29	11	0	22	0	QATAR	XR909	380-861	2700	2539	2 BLOCKS NORTH	67.41	22:00
22	SYD	PERTH	22	8	2	19	2	QANTAS	QF743	737-838	5125	4964	1 BLOCK STH	67.35	19:00
22	SYD	KUL	22	11	34	22	34	MALAYSIAN	MH140	330-323	3225	3064	1 BLOCK STH	67.24	22:33
22	SYD	SING	22	10	31	21	31	FEDEX	FX5283	MD11F	2925	2764	5 BLOCKS STH	67.1	21:28
25	SYD	PERTH	25	7	30	18	30	QANTAS	QF571	330-202	3750	3589	6 BLOCKS STH	67.05	7:40
30	SYD	DENPASAR	30	1	12	12	12	GARUDA	GA735	330-343	4025	3864	3 BLOCKS STH	66.99	12:15
25	SYD	PEKNG	25	3	0	14	0	QANTAS	QF107	330-202	4725	4564		66.95	14:01
25	SYD	DENPASAR	25	0	36	11	36	VIRGIN	VA33	737-8FE	4300	4139	6 BLOCKS STH	66.89	11:35
22	SYD	ADEL	22	9	18	20	18	QANTAS	QF583	330-202	4875	4714	2 BLOCKS STH	66.87	20:18
25	SYD	DUBAI	25	11	18	22	18	EMIRATES	EK413	380-861	1800	1639	M4 END COLEMAN ST	66.84	22:21
29	SYD	PERTH	29	3	30	14	30	QANTAS	QF577	330-202	3075	2914	2 BLOCKS STH	66.58	14:30

29	SYD	JAKARTA	29	3	0	14	0	QANTAS	QF41	330-202	3875	3714	4 BLOCKS STH	66.58	14:00
25	SYD		24	20	30	7	30	VIRGIN	VA 551	330- 243	5000	4839	3 BLOCKS NTH	66.13	7:29
25	SYD	PERTH	25	1	15	12	15	QANTAS	QF567	747-438	4725	4564	6 BLOCKS STH	66.1	12:13
25	SYD	PERTH	25	0	30	11	30	QANTAS	QF581	330-202	3100	2939	6 BLOCKS STH	66.09	11:29
29	SYD	SINGA	29	8	35	19	35	SCOOT	TR13	787-9	3825	3664	OVER DOROTHY ST	65.88	19:43
30	SYD	ADL	29	23	55	10	55	QANTAS	QF741	737-838	5000	4839	2 BLOCKS STH	65.78	10:53
22	SYD	SING	22	5	16	16	16	SINGAPORE	SQ222	380-841	3650	3489	2 BLOCKS NTH M4	65.76	16:15
29	SYD	PERTH	29	3	8	14	8	VIRGIN	VA 559	737-8FE	5275	5114	OVER DOROTHY ST	65.52	14:07
22	SYD	DENPASAR	22	9	31	20	31	JETSTAR	JQ37	787-8	5325	5164	2 BLOCKS STH	65.44	20:30
25	SYD	DUBAI	24	19	14	6	14	EMIRATES	EK415	380-861	3050	2889	6 BLOCKS NTH M4	65.25	6:13
25	SYD	PERTH	24	19	49	6	49	QANTAS	QF565	737-838	5875	5714	2 BLOCKS NTH	65.25	6:51
29	SYD	SINGA	29	1	36	12	36	SINGAPORE	SQ232	380-841	4575	4414	1 BLOCK NTH M4	65.21	12:36
23	SYD	PERTH	22	19	51	6	51	QANTAS	QF565	330-202	3800	3639	1 BLOCK STH	65.1	6:51
22	SYD	SING	22	8	34	19	34	SINGAPORE	SQ242	777-312	4050	3889	M4 END COLEMAN ST	65.07	19:33
25	SYD	ADL	25	6	0	17	0	JETSTAR	JQ770	320-232	4225	4064	M4 END COLEMAN ST	64.83	16:59
29	SYD	ADL	29	2	0	13	0	QANTAS	QF1557	717-2K9	5825	5664	OVER DOROTHY ST	64.82	12:59
29	SYD	DUBAI	29	6	24	17	24	EMIRATES	EK417	777-31H	4425	4264	M4 COLEMAN	64.68	17:25
29	SYD	KL	29	11	30	22	30	MALAYSIAN	MH140	330-323	4950	4789	2 BLOCKS NORTH	64.64	22:25
25	SYD	NA	25	4	0	15	0	QANTAS	QF6011	380-842	3825	3664	2 BKS NTH M4 COLEMAN	64.56	15:00
23	SYD	DUBAI	22	19	17	6	17	EMIRATES	EK415	380-861	4325	4164	5 BKS NTH M4 COLEMAN	64.54	6:16
22	SYD	ADL	22	4	36	15	36	QANTAS	QF761	737-838	6325	6164	4 BLOCKS STH	64.5	15:43
25	SYD	AYERS R	24	23	12	10	12	VIRGIN	VA627	737-8FE	5900	5739	OVER DOROTHY	64.47	10:13
29	SYD	ABU	29	5	54	16	54	ETIHAD	EY451	777-3FX	5625	5464	6 BLOCKS NTH M4	64.22	16:54
29	SYD	ALICE	28	23	36	10	36	QANTAS	QF790	737-838	2450	2289	OVER DOROTHY ST	64.13	10:35
29	SYD	SINGA	29	10	42	21	42	FEDEX	FX5283	MD-11F	8750	8589	OVER DOROTHY ST	63.88	21:39
25	SYD	ADL	24	23	48	10	48	QANTAS	JQ741	737-838	6000	5839	OVER DOROTHY	63.86	10:48
25	SYD	DOHA	25	4	36	15	36	QATAR	QR907	777-3DZ	2575	2414	3 BLOCKS STH	63.84	15:36
25	SYD	DENPASAR	25	7	54	18	54	VIRGIN	VA37	737-8FE	2150	1989	M4 END COLEMAN ST	63.51	18:57
25	SYD	JAKARTA	25	3	6	14	6	QANTAS	QF41	330-303	3350	3189		63.49	14:05
29	SYD	SINGA	29	8	25	19	25	SINGAPORE	SQ242	777-312	3752	3591	OVER DOROTHY ST	63.47	19:25
29	SYD	AIRS ROCK	29	0	5	11	5	JETSTAR	JST660	320-232	5575	5414	1 BLOCK STH	63.47	11:06
29	SYD	SINGA	28	22	28	9	28	SINGAPORE	SQ212	777-312	4450	4289	OVER DOROTHY ST	63.46	9:28
23	SYD	ADEL	22	19	56	6	56	QANTAS	QF	330-202	4400	4239	4 BLOCKS STH	63.45	6:55
30	SYD	JAKARTA	30	0	48	11	48	QANTAS	GA713	330-343	3650	3489	3 BLOCKS STH	63.44	11:48
25	SYD	PRTH	25	3	30	14	30	QANTAS	QF577	737-838	5300	5139	OVER DOROTHY	63.39	14:30
29	SYD	PERTH	28	23	0	10	0	VIRGIN	VA 555	330-243	5150	4989	2 BLOCKS NORTH	63.27	10:00
29	SYD	ADEL	29	8	48	19	48	QANTAS	QF783	737-838	2700	2539	2 BLOCKS STH	63.25	19:48
29	SYD	ADL	29	4	40	15	40	JETSTAR	JQ764	320-232	5425	5264	6 BLOCKS SOUTH	63.22	15:40
29	SYD	PERTH	28	24	0	11	0	QANTAS	QF581	737-838	4025	3864	5 BLOCKS STH	62.76	11:00
30	SYD	DUBAI	29	19	18	6	18	EMIRATES	EK415	380-861	4125	3964	4 BLOCKS NTH M4	62.75	6:20
29	SYD	DENPASAR	29	0	42	11	42	VIRGIN	VA33	737-8FE	6850	6689	5 BLOCKS STH	62.55	11:42
25	SYD	SING	25	1	30	12	30	SINGAPORE	SQ232	380-841	4575	4414	M4 END COLEMAN ST	62.32	12:30
25	SYD	ABU DHABI	25	11	24	22	24	ETIHAD	EY455	380-861	5425	5264	5 BLOCKS NTH M4	62.21	22:24
22	SYD	SING	22	8	50	19	50	SINGAPORE	SQ242	777-312	4050	3889	M4 END COLEMAN ST	62.03	19:50
29	SYD	ADEL	29	5	42	16	42	JETSTAR	JQ770	320-232	6800	6639	4 BLOCKS STH	61.79	16:42
29	SYD	JAKARTA	29	1	1	12	1	GARUDA	GA713	330-343	3650	3489	3 BLOCKS STH	61.53	12:06
25	SYD	PERTH	25	10	0	21	0	TIGER	TT755	320-232	4475	4314	3 BLOCKS STH	61.44	21:04
22	SYD	SING	22	8	49	19	49	SINGAPORE	TR13	787-9	4275	4114	3 BLOCKS NTH	61.26	19:48
29	SYD	ADEL	28	20	12	7	12	JETSTAR	JQ762	320-232	7425	7264	4 BLOCKS STH	61.14	7:12

30	SYD	SINGA	29	22	18	9	18	SINGAPORE	SQ212	777-312	6675	6514	2 BLOCKS NTH M4	60.77	9:23
30	SYD	PERTH	30	0	49	11	49	QANTAS	QF567	737-838	4800	4639	1 BLOCK STH	60.68	11:49
25	SYD	ADEL	24	20	24	7	24	JETSTAR	JQ762	320-232	6550	6389	5 BLOCKS STH	60.53	7:24
25	SYD	ADEL	24	20	0	7	0	QANTAS	QF735	737-838	5500	5339	1 BLOCK STH	60.34	6:59
30	SYD	AYERS	29	23	48	10	48	JETSTAR	JQ660	320-232	5775	5614	6 BLOCKS STH	60.26	10:48
22	SYD	ADEL	22	8	52	19	52	QANTAS	QF783	737-838	8225	8064	2 BLOCKS STH	60.13	19:50
29	SYD	ADL	29	2	1	13	1	VIRGIN	VA418	737-8FE	6075	5914	3 BLOCKS STH	59.45	13:00
29	SYD	DENPASAR	29	1	11	12	11	GARUDA	GA 735	330-343	5475	5314	1 BLOCK NORTH		

NOTES
 THE DEPARTURE FLIGHT DISTANCE OF DOROTHY ST MAYS HILL FROM KSA IS 21 KM. THE STRAIGHTLINE DEPARTURE DISTANCE OF BLACKTOWN FROM WSA IS 19.28 KM
 ON THIS BASIS THE HEIGHT OF AIRCRAFT AND NOISE LEVELS RECORDED AT DOROTHY ST MAYS HILL ARE APPLICABLE TO BLACKTOWN

ELEVATION MAIN ST BLACKTOWN 57 M = 187 FT

SUMMARY OF LAMax

COMPARISON WITH NATS DATA FOR AIRCRAFT TYPE AND HEIGHT

NOTE: SOME AIRCRAFT FLIGHT PATHS NOT OVER DATA LOGGER LOCATION

AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	RECORDED LAMax	NATS DATA dBA FOR HEIGHT
747-438	4725	4564	6 BLOCKS STH	66.1	75-72
380-861	4375	4214	1 BLOCK NORTH	70.57	76-73
787-8	5325	5164	2 BLOCKS STH	65.44	67-64
777-3DZ	3525	3364	3 BLOCKS NTH	71.96	75-71
737-838	4300	4139	1 BLOCK STH	73.14	66-63
737-838	6450	6289	1 BLOCK NORTH	71.64	60-59
737-8FE	4450	4289	2 BLOCKS STH	71.41	66-63
737-8FE	5375	5214	4 BLOCKS STH	69.22	63-60
330-343	4150	3989	3 BLOCKS STH	69.49	73-69
330-323	3225	3064	1 BLOCK STH	67.24	77-73
330-202	3875	3714	4 BLOCKS STH	66.58	77-73
320-232	4225	4064	M4 END COLEMAN ST	64.83	66-63

WSA EIS PREDICTED A 747 ON ARRIVAL WOULD GENERATE 60-70 dBA
 BASED ON NATS DATA A 747 AND A380 PRODUCE UP TO 75 AND 76 dBA AT 4000 FT
 RESPECTIVELY. HOWEVER NATS DATA SHOWS AN A330 AT 3714 FT GENERATES
 77 dBA THIS WAS CONFIRMED BY RECORDED DATA.
 NOTE THAT A LARGE NUMBER OF SMALLER AIRCRAFT EXCEEDED 70 dBA WITH
 A PEAK AT 73.14 dBA

AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	MAX LAMax DATA OR NATS
747-438	4725	4564	6 BLOCKS STH	75-72
380-861	4375	4214	1 BLOCK NORTH	76-73
787-8	5325	5164	2 BLOCKS STH	67-64
777-3DZ	3525	3364	3 BLOCKS NTH	71.96
737-838	4300	4139	1 BLOCK STH	73.14
737-838	6450	6289	1 BLOCK NORTH	71.64
737-8FE	4450	4289	2 BLOCKS STH	71.41
737-8FE	5375	5214	4 BLOCKS STH	69.22
330-343	4150	3989	3 BLOCKS STH	73-69
330-323	3225	3064	1 BLOCK STH	77-73
330-202	3875	3714	4 BLOCKS STH	77-73
320-232	4225	4064	M4 END COLEMAN ST	66-63

APPENDIX C3

MONITORING OF FLIGHTS OVER DOROTHY ST MAYS HILL JANUARY 2019

ELEVATION FT

161

DATA SORT HEIGHT

DAY	FROM	TO	UTC DAY	TIME UTC HR	TIME UTC MIN	TIME ESDST HR	TIME ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	DATA LAMax	DATA TIME ESDST
25	SYD	DUBAI	25	11	18	22	18	EMIRATES	EK413	380-861	1800	1639	M4 END COLEMAN ST	66.84	22:21
25	SYD	KL	25	11	0	22	0	AIRASIA	DV221	330-343	2050	1889	5 BLOCKS STH	68.74	21:55
25	SYD	DENPASAR	25	7	54	18	54	VIRGIN	VA37	737-8FE	2150	1989	M4 END COLEMAN ST	63.51	18:57
29	SYD	ALICE	28	23	36	10	36	QANTAS	QF790	737-838	2450	2289	OVER DOROTHY ST	64.13	10:35
29	SYD	DUBAI	29	11	0	22	0	EMIRATES	EK413	380-861	2525	2364	M4 COLEMAN	67.41	22:00
25	SYD	DOHA	25	4	36	15	36	QATAR	QR907	777-3DZ	2575	2414	3 BLOCKS STH	63.84	15:36
29	SYD	ADEL	29	8	48	19	48	QANTAS	QF783	737-838	2700	2539	2 BLOCKS STH	63.25	19:48
29	SYD	DOHA	29	11	0	22	0	QATAR	XR909	380-861	2700	2539	2 BLOCKS NORTH	67.41	22:00
22	SYD	SING	22	10	31	21	31	FEDEX	FX5283	MD11F	2925	2764	5 BLOCKS STH	67.1	21:28
25	SYD	DUBAI	24	19	14	6	14	EMIRATES	EK415	380-861	3050	2889	6 BLOCKS NTH M4	65.25	6:13
29	SYD	PERTH	29	3	30	14	30	QANTAS	QF577	330-202	3075	2914	2 BLOCKS STH	66.58	14:30
25	SYD	PERTH	25	0	30	11	30	QANTAS	QF581	330-202	3100	2939	6 BLOCKS STH	66.09	11:29
22	SYD	DOHA	22	11	7	22	7	QATAR	QR909	380-861	3200	3039	2 BLOCKS NTH M4	67.64	22:06
22	SYD	KUL	22	11	34	22	34	MALAYSIAN	MH140	330-323	3225	3064	1 BLOCK STH	67.24	22:33
25	SYD	JAKARTA	25	3	6	14	6	QANTAS	QF41	330-303	3350	3189		63.49	14:05
29	SYD	SINGA	29	5	14	16	14	SINGAPORE	SQ222	380-841	3350	3189	OVER DOROTHY ST	69.54	16:14
22	SYD	DOHA	22	5	40	16	40	QATAR	QR907	777-3DZ	3525	3364	3 BLOCKS NTH	71.96	16:41
22	SYD	SING	22	5	16	16	16	SINGAPORE	SQ222	380-841	3650	3489	2 BLOCKS NTH M4	65.76	16:15
29	SYD	JAKARTA	29	1	1	12	1	GARUDA	GA713	330-343	3650	3489	3 BLOCKS STH	61.53	12:06
30	SYD	JAKARTA	30	0	48	11	48	QANTAS	GA713	330-343	3650	3489	3 BLOCKS STH	63.44	11:48
25	SYD	PERTH	25	7	30	18	30	QANTAS	QF571	330-202	3750	3589	6 BLOCKS STH	67.05	7:40
25	SYD	DOHA	25	11	12	22	12	QANTAS	QR909	380-861	3750	3589	M4 END COLEMAN ST	68.99	22:15
29	SYD	SINGA	29	8	25	19	25	SINGAPORE	SQ242	777-312	3752	3591	OVER DOROTHY ST	63.47	19:25
23	SYD	PERTH	22	19	51	6	51	QANTAS	QF565	330-202	3800	3639	1 BLOCK STH	65.1	6:51
25	SYD	NA	25	4	0	15	0	QANTAS	QF6011	380-842	3825	3664	2 BKS NTH M4 COLEMA	64.56	15:00
29	SYD	SINGA	29	8	35	19	35	SCOOT	TR13	787-9	3825	3664	OVER DOROTHY ST	65.88	19:43
29	SYD	JAKARTA	29	3	0	14	0	QANTAS	QF41	330-202	3875	3714	4 BLOCKS STH	66.58	14:00
22	SYD	PERTH	22	4	7	15	7	QANTAS	QF557	330-202	4025	3864	2 BLOCKS NTH	70.12	15:07
29	SYD	PERTH	28	24	0	11	0	QANTAS	QF581	737-838	4025	3864	5 BLOCKS STH	62.76	11:00
30	SYD	DENPASAR	30	1	12	12	12	GARUDA	GA735	330-343	4025	3864	3 BLOCKS STH	66.99	12:15
22	SYD	SING	22	8	34	19	34	SINGAPORE	SQ242	777-312	4050	3889	M4 END COLEMAN ST	65.07	19:33
22	SYD	SING	22	8	50	19	50	SINGAPORE	SQ242	777-312	4050	3889	M4 END COLEMAN ST	62.03	19:50
29	SYD	JOHHASBO	29	1	11	12	11	QANTAS	QF63	747-438	4075	3914	WESTMEAD HOSP	71.01	12:10
29	SYD	ABUDHABI	29	11	7	22	7	ETIHAD	EY55	380-861	4100	3939	M4 COLEMAN	68.06	22:05
29	SYD	DOHA	29	5	36	16	36	QATAR	QR907	777-3DZ	4125	3964	M4 COLEMAN	72.24	16:36
30	SYD	DUBAI	29	19	18	6	18	EMIRATES	EK415	380-861	4125	3964	4 BLOCKS NTH M4	62.75	6:20
29	SYD	KUALA	29	1	23	12	23	AIRASIA	D7223	330-343	4150	3989	3 BLOCKS STH	69.49	12:23
25	SYD	ADL	25	6	0	17	0	JETSTAR	JQ770	320-232	4225	4064	M4 END COLEMAN ST	64.83	16:59
22	SYD	SING	22	8	49	19	49	SINGAPORE	TR13	787-9	4275	4114	3 BLOCKS NTH	61.26	19:48
25	SYD	JAKARTA	25	3	15	14	15	QANTAS	QF41	330-303	4275	4114	6 BLOCKS STH	68.52	14:13
22	SYD	DENPASAR	22	6	10	17	10	QANTAS	QF43	330-203	4300	4139	2 BLOCKS STH	69.06	17:10

22	SYD	ABU DHAB	22	11	22	22	22	ETIHAD	EY455	380-861	4300	4139	2 BLOCKS NTH M4	68.85	22:21
25	SYD	DENPASAR	25	0	36	11	36	VIRGIN	VA33	737-8FE	4300	4139	6 BLOCKS STH	66.89	11:35
25	SYD	PERTH	25	6	18	17	18	QANTAS	QF569	737-838	4300	4139	1 BLOCK STH	73.14	17:19
23	SYD	DUBAI	22	19	17	6	17	EMERITES	EK415	380-861	4325	4164	5 BKS NTH M4 COLEMA	64.54	6:16
22	SYD	ADL	22	6	14	17	14	QANTAS	QF765	737-838	4350	4189	3 BLOCKS STH	67.47	17:09
22	SYD	DUBAI	22	6	20	17	20	EMIRATES	EK417	777-31	4350	4189	M4 END COLEMAN ST	68.68	17:20
29	SYD	DUBAI	28	19	18	6	18	EMIRATES	EK415	380-861	4375	4214	1 BLOCK NORTH	70.57	6:19
23	SYD	ADEL	22	19	56	6	56	QANTAS	QF	330-202	4400	4239	4 BLOCKS STH	63.45	6:55
29	SYD	DUBAI	29	6	24	17	24	EMIRATES	EK417	777-31H	4425	4264	M4 COLEMAN	64.68	17:25
22	SYD	PERTH	22	3	25	14	25	VIRGIN	VA559	737-8FE	4450	4289	2 BLOCKS STH	71.41	14:26
29	SYD	SINGA	28	22	28	9	28	SINGAPORE	SQ212	777-312	4450	4289	OVER DOROTHY ST	63.46	9:28
22	SYD	ABU DHAB	22	5	58	16	58	ETIHAD	EY451	777-3FX	4457	4296	2 BLOCKS STH	68.6	16:56
25	SYD	PERTH	25	10	0	21	0	TIGER	TT755	320-232	4475	4314	3 BLOCKS STH	61.44	21:04
25	SYD	SING	25	1	30	12	30	SINGAPORE	SQ232	380-841	4575	4414	M4 END COLEMAN ST	62.32	12:30
29	SYD	SINGA	29	1	36	12	36	SINGAPORE	SQ232	380-841	4575	4414	1 BLOCK NTH M4	65.21	12:36
29	SYD	ADEL	29	8	0	19	0	QANTAS	QF743	737-838	4700	4539	OVER DOROTHY ST	67.74	19:02
25	SYD	PERTH	25	1	15	12	15	QANTAS	QF567	747-438	4725	4564	6 BLOCKS STH	66.1	12:13
25	SYD	PEKNG	25	3	0	14	0	QANTAS	QF107	330-202	4725	4564		66.95	14:01
22	SYD	DUBAI	22	11	3	22	3	EMIRATES	EK413	380-861	4775	4614	M4 END COLEMAN ST	68.72	22:03
30	SYD	PERTH	30	0	49	11	49	QANTAS	QF567	737-838	4800	4639	1 BLOCK STH	60.68	11:49
22	SYD	ADEL	22	9	18	20	18	QANTAS	QF583	330-202	4875	4714	2 BLOCKS STH	66.87	20:18
29	SYD	KL	29	11	30	22	30	MALAYSIAN	MH140	330-323	4950	4789	2 BLOCKS NORTH	64.64	22:25
25	SYD		24	20	30	7	30	VIRGIN	VA 551	330- 243	5000	4839	3 BLOCKS NTH	66.13	7:29
30	SYD	ADL	29	23	55	10	55	QANTAS	QF741	737-838	5000	4839	2 BLOCKS STH	65.78	10:53
22	SYD	PERTH	22	8	2	19	2	QANTAS	QF743	737-838	5125	4964	1 BLOCK STH	67.35	19:00
29	SYD	PERTH	28	23	0	10	0	VIRGIN	VA 555	330-243	5150	4989	2 BLOCKS NORTH	63.27	10:00
29	SYD	PERTH	29	3	8	14	8	VIRGIN	VA 559	737-8FE	5275	5114	OVER DOROTHY ST	65.52	14:07
25	SYD	PRTH	25	3	30	14	30	QANTAS	QF577	737-838	5300	5139	OVER DOROTHY	63.39	14:30
22	SYD	DENPASAR	22	9	31	20	31	JETSTAR	JQ37	787-8	5325	5164	2 BLOCKS STH	65.44	20:30
22	SYD	BANGKOK	22	9	39	20	39	EMIRATES	EK419	777-36	5325	5164	3 BLOCKS NTH	67.87	20:38
22	SYD	ADEL	22	9	34	20	34	VIRGIN	VA444	737-8FE	5375	5214	4 BLOCKS STH	69.22	20:37
25	SYD	ABU DHAB	25	11	24	22	24	ETIHAD	EY455	380-861	5425	5264	5 BLOCKS NTH M4	62.21	22:24
29	SYD	ADL	29	4	40	15	40	JETSTAR	JQ764	320-232	5425	5264	6 BLOCKS SOUTH	63.22	15:40
29	SYD	DENPASAR	29	1	11	12	11	GARUDA	GA 735	330-343	5475	5314	1 BLOCK NORTH		
25	SYD	ADEL	24	20	0	7	0	QANTAS	QF735	737-838	5500	5339	1 BLOCK STH	60.34	6:59
22	SYD	PERTH	22	8	31	19	31	VIRGIN	VA569	330-243	5550	5389	1 BLOCK NTH	68.69	19:30
29	SYD	AIRS ROCK	29	0	5	11	5	JETSTAR	JST660	320-232	5575	5414	1 BLOCK STH	63.47	11:06
29	SYD	ABU	29	5	54	16	54	ETIHAD	EY451	777-3FX	5625	5464	6 BLOCKS NTH M4	64.22	16:54
22	SYD	PERTH	22	7	7	18	7	QANTAS	QF571	330-202	5725	5564	1 BLOCKS STH	72.58	18:12
30	SYD	AYERS	29	23	48	10	48	JETSTAR	JQ660	320-232	5775	5614	6 BLOCKS STH	60.26	10:48
29	SYD	ADL	29	2	0	13	0	QANTAS	QF1557	717-2K9	5825	5664	OVER DOROTHY ST	64.82	12:59
25	SYD	PERTH	24	19	49	6	49	QANTAS	QF565	737-838	5875	5714	2 BLOCKS NTH	65.25	6:51
25	SYD	AYERS R	24	23	12	10	12	VIRGIN	VA627	737-8FE	5900	5739	OVER DOROTHY	64.47	10:13
25	SYD	ADL	24	23	48	10	48	QANTAS	JQ741	737-838	6000	5839	OVER DOROTHY	63.86	10:48
29	SYD	ADL	29	2	1	13	1	VIRGIN	VA418	737-8FE	6075	5914	3 BLOCKS STH	59.45	13:00
23	SYD	ADEL	22	20	20	7	20	JETSTAR	JQ762	320-232	6250	6089	4 BLOCKS STH	67.79	7:19
22	SYD	ADL	22	4	36	15	36	QANTAS	QF761	737-838	6325	6164	4 BLOCKS STH	64.5	15:43
30	SYD	PERTH	29	24	0	11	0	QANTAS	QF581	737-838	6450	6289	1 BLOCK NORTH	71.64	11:01
30	SYD	QTWN	29	23	57	10	57	VIRGIN	VA163	737-8FE	6525	6364	3 BLOCKD NTH	68.41	10:57

25	SYD	ADEL	24	20	24	7	24	JETSTAR	JQ762	320-232	6550	6389	5 BLOCKS STH	60.53	7:24
30	SYD	SINGA	29	22	18	9	18	SINGAPORE	SQ212	777-312	6675	6514	2 BLOCKS NTH M4	60.77	9:23
29	SYD	ADEL	29	5	42	16	42	JETSTAR	JQ770	320-232	6800	6639	4 BLOCKS STH	61.79	16:42
29	SYD	DENPASAR	29	0	42	11	42	VIRGIN	VA33	737-8FE	6850	6689	5 BLOCKS STH	62.55	11:42
30	SYD	DENPASAR	30	0	45	11	45	VIRGIN	VA33	737-8FE	6850	6689	OVER DOROTHY	68.21	11:46
29	SYD	ADEL	28	20	12	7	12	JETSTAR	JQ762	320-232	7425	7264	4 BLOCKS STH	61.14	7:12
22	SYD	ADEL	22	8	52	19	52	QANTAS	QF783	737-838	8225	8064	2 BLOCKS STH	60.13	19:50
29	SYD	SINGA	29	10	42	21	42	FEDEX	FX5283	MD-11F	8750	8589	OVER DOROTHY ST	63.88	21:39

NOTES:

THE DEPARTURE FLIGHT DISTANCE OF DOROTHY ST MAYS HILL FROM KSA IS 21 KM. THE STRAIGHTLINE DEPARTURE DISTANCE OF BLACKTOWN FROM WSA IS 19.28 KM

ON THIS BASIS THE HEIGHT OF AIRCRAFT AND NOISE LEVELS RECORDED AT DOROTHY ST MAYS HILL ARE APPLICABLE TO BLACKTOWN

ELEVATION MAIN ST BLACKTOWN 57 M = 187 FT

SUMMARY OF LAMax

COMPARISON WITH NATS DATA UK FOR AIRCRAFT TYPE AND HEIGHT

NOTE: SOME AIRCRAFT FLIGHTPATH NOT OVER DATA LOGGER LOCATION

FOR NATS DATA UK GO TO:

AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	RECORDED LAMax	NATS DATA dBA FOR HEIGHT
747-438	4725	4564	6 BLOCKS STH	66.1	75-72
380-861	4375	4214	1 BLOCK NORTH	70.57	76-73
787-8	5325	5164	2 BLOCKS STH	65.44	67-64
777-3DZ	3525	3364	3 BLOCKS NTH	71.96	75-71
737-838	4300	4139	1 BLOCK STH	73.14	66-63
737-838	6450	6289	1 BLOCK NORTH	71.64	60-59
737-8FE	4450	4289	2 BLOCKS STH	71.41	66-63
737-8FE	5375	5214	4 BLOCKS STH	69.22	63-60
330-343	4150	3989	3 BLOCKS STH	69.49	73-69
330-323	3225	3064	1 BLOCK STH	67.24	77-73
330-202	3875	3714	4 BLOCKS STH	66.58	77-73
320-232	4225	4064	M4 END COLEMAN ST	64.83	66-63

<https://www.nats.aero/environment/aircraft-noise/representative-aircraft-lmax-data/>

WSA EIS PREDICTED A 747 ON ARRIVAL WOULD GENERATE 60-70 dBA
 BASED ON NATS DATA 747 AND A380 PRODUCE UP TO 75 AND 76 dBA AT 4000 FT
 RESPECTIVELY. HOWEVER NATS DATA SHOWS AN A330 AT 3714 FT GENERATES
 77 dBA THIS WAS CONFIRMED BY RECORDED DATA.
 NOTE THAT A LARGE NUMBER OF SMALLER AIRCRAFT EXCEEDED 70 dBA WITH
 A PEAK AT 73.14 dBA

AIRCRAFT	ALTITUDE	HEIGHT ABOVE GL	LOCATION REF TO DOROTHY ST	MAX LAMax DATA OR NATS
747-438	4725	4564	6 BLOCKS STH	75-72
380-861	4375	4214	1 BLOCK NORTH	76-73
787-8	5325	5164	2 BLOCKS STH	67-64
777-3DZ	3525	3364	3 BLOCKS NTH	71.96
737-838	4300	4139	1 BLOCK STH	73.14
737-838	6450	6289	1 BLOCK NORTH	71.64
737-8FE	4450	4289	2 BLOCKS STH	71.41
737-8FE	5375	5214	4 BLOCKS STH	69.22
330-343	4150	3989	3 BLOCKS STH	73-69
330-323	3225	3064	1 BLOCK STH	77-73
330-202	3875	3714	4 BLOCKS STH	77-73
320-232	4225	4064	M4 END COLEMAN ST	66-63



Review of the report ‘Assessment of Measured Aircraft Noise Levels under the Existing Flight Paths of Sydney Kingsford Smith Airport with Reference to Western Sydney Airport’, Report No. 9173 – R1, Eric, J. Ancich

August 2019

Purpose

To provide a summary of the matters raised by the report *Assessment of Measured Aircraft Noise Levels under the Existing Flight Paths of Sydney Kingsford Smith Airport with Reference to Western Sydney Airport*, Report No. 9173 – R1, Eric, J. Ancich (the Report), in the context of aircraft noise measurement and reporting in the *Western Sydney Airport Environmental Impact Assessment 2016* (the WSA EIS) and present the outcomes of a technical review of these claims.

Background

In early May 2019 the department received correspondence (from Mr Don Carter) stating that “... there was a lack of correlation between the noise predictions in the EIS for Western Sydney Airport and the noise monitoring I (he) had carried out on real aircraft using a professional noise meter”. Further, Mr Carter stated that he “and Dr Eric Ancich ..., both retired Engineers, have carried out a noise study of real aircraft arriving and departing from Kingsford Smith Airport as compared the noise levels predicted in the WSA EIS.... The results are alarming and have major implications for residents that will be impacted by noise generated by WSA airport.”

On request to Dr Ancich, the Department of Infrastructure, Transport, Cities and Regional Development (the Department) was provided with a copy of the Report. The conclusion of the Report is that “measurement of noise generated by aircraft in flight has demonstrated that variability in height of aircraft will result in a wide range of receiver noise levels. This variability in height and the commensurate variability in noise levels will increase the noise impact over Blacktown and the Lower Blue Mountains compared to that predicted in the WSA EIS. The study raises questions as to the reliability of noise level predictions in the WSA EIS for aircraft noise impacts on other areas affected by the WSA as it appears that the variability in height of arriving and departing aircraft was not considered in the WSA EIS.”

Further to the above, the Report also notes that variability in aircraft height results in the noise levels recorded being a perceived loudness increase of up to 3 to 4 times louder than those predicted in the WSA EIS for particular locations (refer the Report, Table 1 and Table 2).

Note: a doubling of perceived loudness is generally accepted to be experienced for every 10 dBA increase.

Following an internal review by the Department in June 2019, the Report was referred to Wilkinson Murray Acoustical Consultants, (who undertook the aircraft noise assessment and modelling for the 2015 WSA EIS). Wilkinson Murray Acoustical Consultants were asked to review the Report and provide advice to the Department.

Present consideration

In July 2019, the Department received advice from Wilkinson Murray Acoustical Consultants on the data and analysis presented in the Report. The advice noted four significant issues relating to the methodology employed in data collection, processing, and reporting:

1. Instrumentation settings (Chapter 3.0)

Issue: Noise measurement instrumentation was set to “Fast” time constant. Australian Standard 2021:2015 (and other standard references) indicate that maximum noise levels should be measured using “Slow” time constant.

Outcome: The “Fast” time constant setting tends to increase the measured noise results. Dependent upon the aircraft movement type, this could have the effect of increasing the predicted aircraft noise level by 3-5dB.

2. Application of ‘maximum noise levels’ for individual aircraft (Chapter 4.0)

Issue: Many of the reported maximum noise levels are the highest level measured. Standard procedures for reporting maximum aircraft noise levels apply the mean (average) of the maximum noise levels for overflights (Australian Standard AS2021:2015: Section 1.5.2 of this standard defines “aircraft noise level” as: *‘The arithmetic average of the maximum sound levels occurring during a series of flyovers by a specific aircraft type and load conditions ...’*)

Outcome: Use of the maximum highest level, rather than the mean level, may result in the reported level being a significant overestimate, by up to 5-10dB, depending on the range of measured levels.

3. Nominated Noise Logger sites (Chapter 4.0)

Issue: The selected noise logger sites for aircraft arrivals into Sydney Airport may not be capturing data that is representative of the flight procedures into Western Sydney Airport at similar distances from the runway threshold. Existing arrivals into Sydney Airport are typically at a stable height, or in the process of commencing their final descent. The process of maintaining stable height, and of transitioning to final descent, involves additional noise due to required thrust and flap settings. Noise levels at this distance from the airport therefore tend to be higher than may otherwise be the case. This is in contrast to the “continuous descent approach” procedures that were applied and modelled for all arrivals in the WSA EIS (refer EIS Volume 4, Appendix E, 2.9) and that are a requirement (where possible) under the provisions of Airport Plan ‘Future airspace design principle’ No. 5 for future use at Western Sydney Airport, specifically in order to reduce aircraft arrival noise.

Outcome: noise levels measured for Sydney Airport (as reported in the Report) may be over-estimates of those at the future Western Sydney Airport.

4. Noise measurement using unattended noise loggers.

Issue: The Report has indicated that noise loggers were left unattended in position for a number of days. At the significant distances from the airport, where measurements were carried out, the influence of extraneous noise may be significant. This effect would be exacerbated when the 'Fast' time constant is used (as opposed to the 'Slow' time constant). Simply aligning a recorded maximum noise level in time with an aircraft overflight does not guarantee that the recorded noise was due to the aircraft.

Outcome: It is possible that some of the recorded noise levels attributed to aircraft overflight were in fact caused by sources other than aircraft.

In addition to the above, Wilkinson Murray Acoustical Consultants also responded to two detailed claims in the Report:

1. EIS Predicted Noise Contours

Wilkinson Murray Acoustical Consultants have undertaken a systematic review of the Report claims regarding predicted noise levels presented in the WSA EIS. It has been found that the claims made are not supported once data is adjusted to account for the factors outlined in 1-4 above. Wilkinson Murray Acoustical Consultants maintain that the WSA EIS predicted noise contours are valid (including for all nominated aircraft types: arrivals and departures). It has also been noted that the Report references WSA 'EIS prediction' data that is at the lower end of predicted noise levels (i.e. Table 2 "Noise level 747D" reads 60 dBA but EIS indicates 60-65 dBA: reference WSA EIS Volume 4 Fig. 3.3). **Note:** details of the aircraft noise model specification (INM) and methodology applied in the preparation of the WSA EIS acoustic studies are at [Attachment A](#) below.

2. Aircraft Heights

The Report claims that the height of aircraft results in variability in noise levels, and that the variability in height of arriving and departing aircraft was not considered in the WSA EIS. This was not the case (*refer WSA EIS Volume 4, Appendix E, Ch. 2*). Wilkinson Murray Acoustical Consultants refute these claims, noting that aircraft noise levels for both arrivals and departures depend upon power and flap settings, and the procedure being flown. Further, details of flight levels for indicative flight path arrivals and departures below 10,000ft were presented in the WSA EIS (*refer WSA EIS Volume 2a Stage 1 Development, 26-4, 26-6, 26-7, 2015*). **Note:** details of the aircraft noise model specification (INM) and methodology applied in the preparation of the WSA EIS acoustic studies are at [Attachment A](#) below.

Note: the aircraft heights reported in the Report (relating to the operation of existing Sydney Airport flight paths) have been compared with Airservices Australia data for the nominated locations and dates, and are accepted by Wilkinson Murray Acoustical Consultants as generally correct – noting that aircraft on these routes may not be flying continuous descent approaches, or departure flight rules similar to those that may be proposed at WSA to manage community noise issues.

Conclusion

- The noise measurements presented in the Report do not invalidate the noise exposure levels reported in the context of the indicative flight paths presented in the WSA EIS – which are reliable and correct for forecast aircraft operations at Western Sydney Airport under the assumptions that applied at the time of preparation of that assessment.

Note: current work on airspace and flight path design for WSA will change the predicted noise levels presented in the WSA EIS, and this is the subject of ongoing work (*refer Environmental Assessment 2021 information on the Department's website*).

- It is noted that the future environmental assessment of potential aircraft noise at Western Sydney Airport will benefit from:
 - Clear understanding of existing ambient noise conditions under potential future flight paths (potential for noise data loggers in advance of airport operations).
 - Detailed attention to the modelling of forecast aircraft altitude (having regard to the potential variance in altitude above and below nominated tracks – in order to take account of potential height variation following implementation).
 - Noise modelling that clearly specifies flight procedure assumptions (including altitude and flight mode).

Extracts from the Western Sydney Airport EIS 2016

WESTERN SYDNEY AIRPORT EIS

PAGE 19

AIRCRAFT OVERFLIGHT & OPERATIONAL NOISE

REPORT NO. 14168 VERSION E

2.3 Aircraft Noise Calculation Procedures

Detailed calculation of future aircraft overflight noise levels at any airport requires estimates of the number of future aircraft operations, broken down by:

- aircraft type (as defined in the INM noise calculation program);
- flight track (including several flight tracks for arrivals and departures on each runway);
- stage length for departures (representing distance to destination); and
- time of day at which the operation occurs.

The number and mix of operations on each flight track will be different for each scenario considered. Given the above information, values of all the above noise descriptors can be calculated, either at specific points or in terms of contours, using noise levels calculated using the industry-standard INM calculation program (version 7d).

The INM is a computer model that evaluates aircraft noise impacts in the vicinity of airports. It was developed based on the algorithm and framework from the SAE AIR 1845 standard, which used noise-power-distance (NPD) data to estimate noise accounting for specific operation mode, thrust setting, and source-receiver geometry, acoustic directivity, and other environmental factors. The INM can output either noise contours for an area or noise level at pre-selected locations. The noise output can be exposure-based, maximum-level-based, or time-based.

The INM focusses mainly on aircraft overflight noise, but also includes departure noise and landing and reverse thrust noise when the aircraft is on the runway.

It is noted that the US Federal Aviation Administration, which developed the INM, has recently superseded the INM with the Aviation Environmental Design Tool (AEDT). At the time of writing of this report, AEDT had not been evaluated for Australian conditions. On this basis the INM was selected for the aircraft noise predictions in the current assessment. It is noted that the calculation and prediction algorithms relating to aircraft noise are understood to be equivalent in both calculation programs.

2.9 Calculation of Aircraft Noise Levels

The INM aircraft noise prediction program, produced by the U.S. Federal Aviation Administration, was used to predict noise levels from each of the 22 aircraft types on each of the 346 flight tracks (245 tracks for the initial development and 101 tracks for the long term development). INM Version 7d was used, as this was the latest available version at the time of performing the calculations.

Parameters used in the calculations are:

- temperature: 20 °C (reasonable and conservative value for most operations at the site);
- atmospheric pressure: 1017.2 hPa (standard, and typical);
- average headwind: 0 kts. This conservative setting was determined based on low average headwinds at the site, meaning that on most occasions, the actual headwind would be determined by the airport's mode priority; and
- topography: 10 m contours covering the area of interest – at least 25 NM to the north, east, south and west of the airport centre.

Predicted noise levels are not very sensitive to any of the above parameters – for example, reducing the temperature to 10 °C, increasing atmospheric pressure to 1030 hPa or increasing the average headwind to 5 kts all result in a change of less than 1 dB in the calculated noise level from typical operations.

The INM model does not allow for calculation of the effect of atmospheric conditions such as wind and temperature inversions on sound propagation. These factors are known to have a strong influence on noise generated at ground level. However, for sources that are significantly elevated, such as an aircraft in flight, their influence on sound propagation is much lower, and has not been as thoroughly studied. In many cases, the major impact of adverse wind and temperature gradient conditions on noise from ground level sources comes through the removal of intervening barriers. This can result in very significant enhancement of noise at the receiver location. However, this effect is obviously not relevant for noise from a source such as an aircraft in flight.

As described in Section 2.3, INM's "standard" height-vs-distance profiles were used for all departures, while a "continuous descent approach" was used for all arrivals. Departures by most aircraft types are defined for several "stage lengths", representing different distances to the destination, and hence different assumed fuel loads. Noise levels on departure were initially calculated for all possible stage lengths for each aircraft type.

For each aircraft type, each track and (for departures) each possible stage length, custom-designed software was used to control INM's operation, calculating noise levels at each point on a grid of size 185 m x 185 m, covering the area of interest. The unit that was calculated is L_{Amax} – the maximum noise level during the overflight in dBA, which is used in calculating N70 and similar units. The results from this calculation form the "library of noise levels" referred to in Figure 2-2.

For N70 and similar units, this library is then interrogated to determine the number of events at each grid point exceeding the relevant L_{Amax} threshold, and the results used to produce contours using standard procedures.

Unlike N70 and similar units, both ANEC and units derived from L_{Aeq} can be calculated directly in INM. These descriptors were calculated in this way, based on the average number of events per day during the relevant time periods, calculated as described above.

2.10 Sensitive Receivers & Noise Exposure Calculation

Noise-sensitive receivers in the area around the proposed airport include residences, schools and other educational facilities, and hospitals and other health care facilities. In this report, the potential impact of the proposal on these receivers is assessed in terms of a number of descriptors of noise exposure, as set out in Section 2.1. One indicator of impact is the number of receivers experiencing a given level of noise exposure, measured by the various descriptors.

Existing and forecast population estimates were developed by GHD, based on the September 2014 release of the NSW Bureau of Transport Statistics population forecasts. These forecasts take into account metropolitan planning development forecasts for future land use in Sydney as well as NSW Department of Planning and Environment population forecasts. The limit of these forecasts is currently 2041; therefore, in order to project to 2063 and beyond, Series B population growth rates estimates used by the Australian Bureau of Statistics in their long-term population forecasts were applied.

The forecast of existing and future populations potentially exposed to different levels of noise from the proposed airport utilised GIS databases and was developed by GHD. The databases were developed based on the above population forecasts and address point data provided by NSW Land and Property Information.

The address point dataset provided a set of co-ordinates for each registered address point within the area covered by the data and was therefore used to represent the spatial distribution of population. The address point data was then divided into subareas based on statistical local area (SLA) boundaries developed for the Census. By matching the population estimates and address points to a common SLA, a population per SLA and average population per address point was calculated.

The noise contours generated by this study were then overlaid with the address point population for each forecast year enabling a count of future population potentially affected by each airport operational scenario.

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FOWSA@infrastructure.gov.au: s47F

FOWSA Meeting 10 papers [SEC=OFFICIAL]

Meeting 10 Agenda.pdf; Map to WSIA Visitor Experience Centre.JPG; FOWSA - Record of Meeting 9.pdf

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Forum on Western Sydney Airport

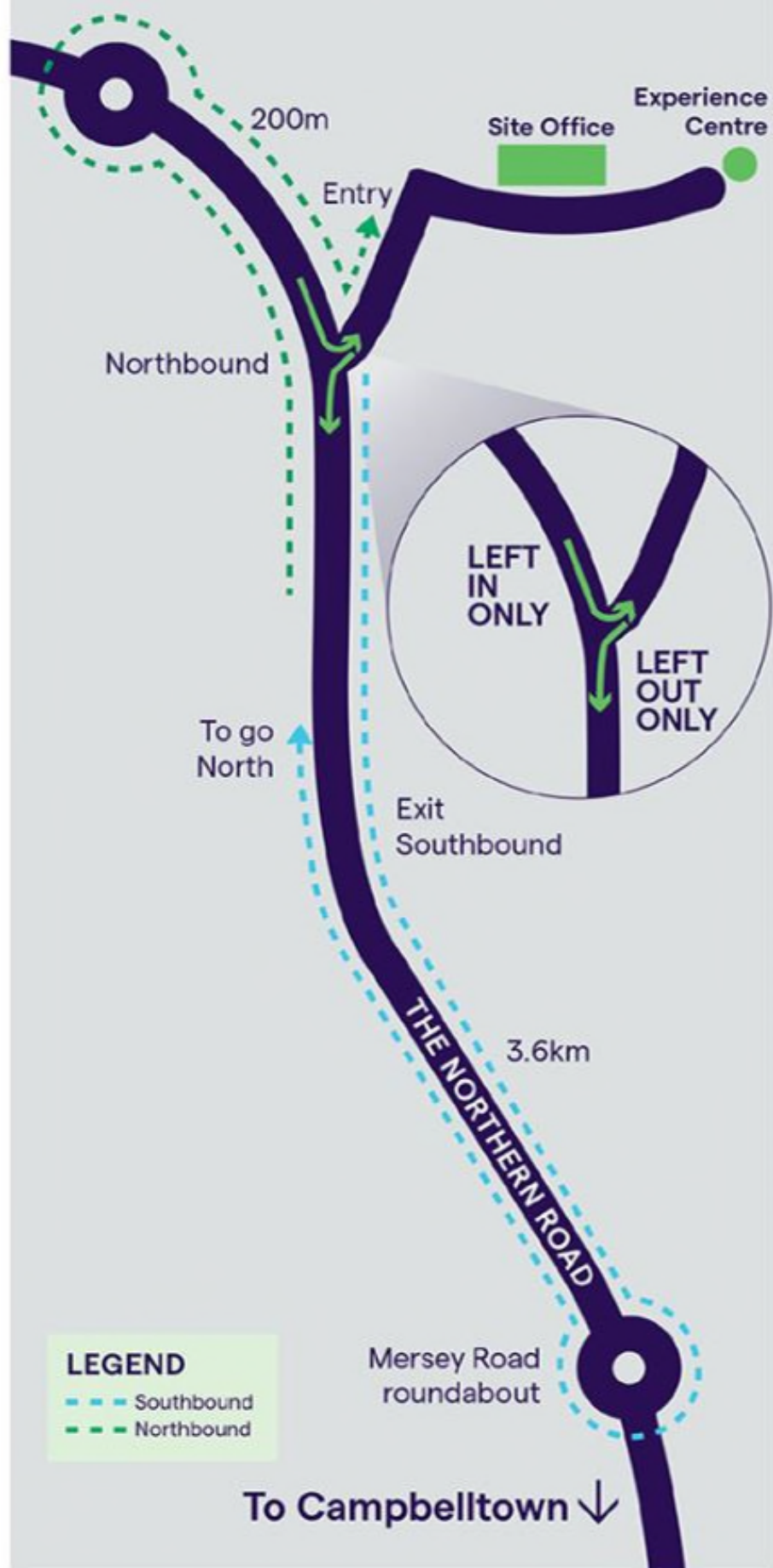
Meeting 10

9:15am – 2:00 pm, Friday 6 December 2019
Visitor Experience Centre, Western Sydney International (Nancy-Bird Walton) Airport
100 Eaton Road, Luddenham NSW 2745

AGENDA

1.	Welcome from the Chair and confirmation of Agenda	09:15 – 09:30 am
2.	Departmental Update (Ms Sarah Leeming, Western Sydney Unit)	09:30 – 09:45 am
3.	Western Sydney Airport Update (Mr Graham Millett, Western Sydney Airport)	09:45 – 10:00 am
4.	Bird and Bat Strike Risk Assessment (Mr Phil Shaw – Avisure Mr Kirk Osbourne – Western Sydney Airport)	10:00 – 10:40 am
Morning Tea and tour of the Experience Centre		10:40 – 11:10 am
5.	Technical discussion: <i>Assessment of Measured Aircraft Noise Levels under the Existing Flight Paths of Sydney Kingsford Smith Airport</i> Report (Dr Rob Bullen, Wilkinson Murray)	11:10 – 11:40 am
6.	Western City and Aerotropolis Authority update (Mr Sam Sangster, Western City and Aerotropolis Authority)	11:40 – 12:20 pm
7.	Communications Update (Ms Louise O'Donnell, Western Sydney Unit)	12:20 – 12:40 pm
8.	Other Business <ul style="list-style-type: none">J Harding correspondence	12:40 – 1:00 pm
Upcoming Meetings		
<ul style="list-style-type: none">Meeting 11 – Friday 20 March 2020Meeting 12 – Friday 19 June 2020		
Lunch		1:00 – 2:00 pm

↑ To Penrith



Map not to scale

Forum on Western Sydney Airport

Record of Meeting 9
2:00pm – 4:00pm, Saturday 7 September 2019
Campbelltown RSL, Campbelltown
Chair: Professor Peter Shergold AC

Item	Description	Key Discussion Points	Action Items
1.	Welcome from the Chair and confirmation of agenda	<p>The Chair, Professor Peter Shergold AC, introduced himself and welcomed members to the ninth meeting of the Forum on Western Sydney Airport (FOWSA). The Chair extended his welcome to members of the public viewing the meeting, noting that this was the second open meeting of FOWSA.</p> <p>Professor Shergold formally acknowledged the Traditional Owners of the land on which the meeting was being conducted.</p> <p>The Chair stated that the meeting was a general meeting of FOWSA, which would follow normal meeting procedures; the main exception being that additional time would be made available at the end of the meeting to address a number of questions submitted to FOWSA by the public. An overview of the role and objectives of FOWSA was provided for members of the public.</p> <p>Professor Shergold noted that two key areas of focus for FOWSA are to:</p> <ul style="list-style-type: none">• share information with the community as it becomes available regarding the planning and design of airspace arrangements and flight paths for the airport; and• assist the government to maximise the significant economic, social, business and job opportunities to be realised from this important piece of national transport infrastructure. He drew particular attention to the opportunities of developing an aerotropolis in the airport precinct, similar to those established in Korea, Amsterdam and Dallas. <p>The Chair provided an overview of FOWSA's membership and outlined the key approaches adopted by FOWSA to share information with the community, including through the Department of Infrastructure, Transport, Cities and Regional Development's Western Sydney Community Update Newsletter, which is sent to approximately 40,000 residences. He emphasised that FOWSA is continuing to seek ways to lift its public profile and broaden the avenues for community engagement. The Chair encouraged members of the community to send to FOWSA their questions and suggestions as to how things could be done better.</p>	

		<p><u>Apologies and welcome to new members</u></p> <p>The Chair acknowledged apologies received (see <u>Appendix B</u> of this meeting record) and welcomed delegates representing FOWSA members unable to attend the meeting. The Chair also welcomed first-time attendee, Mr Gregory Copeland (the newly appointed community representative for Camden), and noted that the former State Member for Camden, Mr Chris Patterson, had been replaced on FOWSA by Mrs Melissa McIntosh MP, the Federal Member for Lindsay, who would be attending her first FOWSA meeting in December.</p> <p><u>Action items</u></p> <p>The Chair reviewed action items from Meeting 8 and noted that:</p> <ul style="list-style-type: none"> • Item 1 – the Secretariat has distributed to members the aircraft noise report authored by Dr Eric Ancich and Mr Don Carter, along with the Department’s response to the report. <ul style="list-style-type: none"> ○ The Chair requested the Secretariat to add as an agenda item for the next FOWSA meeting a discussion on the report and the department’s response. He asked members to review and consider these documents prior to the next meeting. • Item 2 – the Secretariat received feedback from members on venues for future meetings. <ul style="list-style-type: none"> ○ The Chair thanked Dr Mike Freeland for suggesting the venue for the day’s information session and meeting. He also extended thanks to the Campbelltown RSL for hosting the FOWSA events. The Chair invited members to continue to suggest new locations to the Secretariat. 	<p><u>Action Item:</u> Secretariat to add to the next meeting agenda a discussion on the aircraft noise report authored by Dr Eric Ancich and Mr Don Carter, along with the Department’s response to the report.</p> <p><u>Action Item:</u> Members to review and consider these documents prior to the next meeting.</p>
2.	Department of Infrastructure update (Department)	<p>The Chair invited Ms Sarah Leeming from the Department of Infrastructure, Transport, Cities and Regional Development to provide an update on the Department’s activities in delivering those aspects of the airport development and associated initiatives for which it is responsible. Ms Leeming advised that the Department’s responsibilities extend to:</p> <ul style="list-style-type: none"> • biodiversity offsets and compliance with environmental conditions in the Western Sydney Airport Plan • flight path and airspace design • regulatory oversight of Western Sydney Airport • implementation and delivery of City Deal commitments in partnership with the NSW Government 	

		<ul style="list-style-type: none"> community and stakeholder engagement. <p><u>Biodiversity offsets</u></p> <p>Ms Leeming advised members that:</p> <ul style="list-style-type: none"> over 4000 biodiversity credits have been purchased from vendors in Western Sydney at a cost of approximately \$69 million <ul style="list-style-type: none"> of this total, 3805 HN528/529 credits (Cumberland Plain Woodland) and 254 HN526 credits (River Flat Eucalypt Forest) have been purchased a further \$70 million is being invested in restoring and managing at least 900 hectares of native vegetation, including Cumberland Plain Woodland, at the Defence Establishment Orchard Hills the Department is aligning with the NSW Government and the Biodiversity Conservation Trust (BCT) to deliver biodiversity offsets. <p>Ms Leeming advised that the Department has entered into a \$10 million funding agreement with Greening Australia for native seed collection and processing. This funding will support conservation replanting programs on the Cumberland Plain.</p> <p>Ms Leeming also provided an overview of the Department's collaboration with the Threatened Flora Propagation Plan at the Australian Botanic Garden – Mount Annan. This work will establish a scientific basis for regenerating three species found on the airport site, including the Spiked Rice-flower, <i>Pimelea spicata</i>. Actions being taken in relation to <i>Pimelea spicata</i> include:</p> <ul style="list-style-type: none"> purchasing biodiversity credits which might come on the market; working with Greening Australia to cultivate <i>Pimelea spicata</i> seed (harvested from plants on the Western Sydney Airport site) which will be made available for restoration and rewilding projects on the Cumberland plain; propagating <i>Pimelea spicata</i> from cuttings taken at the airport; and if necessary, considering the purchase of land with <i>Pimelea spicata</i> (and other threatened species) and securing it through a Biodiversity Stewardship Agreement (BSA) to be maintained by appropriate conservation groups. <p><u>Aboriginal Cultural Heritage</u></p> <p>Ms Leeming provided an update on the following Aboriginal Cultural Heritage activities:</p>	
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		<ul style="list-style-type: none"> the Survey and Salvage Program in the early earthworks area is now completed, including <ul style="list-style-type: none"> archaeological survey for surface cultural material recording of possible Aboriginal scarred tree & grinding grooves and collection of other artefacts consultation has commenced with the aim of establishing an Aboriginal cultural heritage “keeping place.” <p><u>Airspace and flight path design</u></p> <p>Ms Leeming stated that the development of the airspace and flight paths is complex work, requiring several years of planning, design, modelling and validation testing. She spoke briefly about the four phases of design described in the Western Sydney Airport Plan. The Chair noted that members are briefed on the design process at each meeting. Ms Leeming also observed that Professor Shergold represents FOWSA at meetings of the aviation Expert Steering Group, which has been established to oversee and provide advice to the Department about the airspace and flight path design for Western Sydney Airport.</p> <p>It was discussed that during the 2015 EIS consultation, the community provided feedback and highlighted areas of concern about the indicative flight paths presented in the draft EIS. Following finalisation of the EIS, the Department has consulted with current Sydney Basin airspace users, including major airlines, local airports, CASA, Airservices Australia and the Defence Department about their current and future airspace requirements. Issues identified through these consultation processes, together with the airspace design principles identified in the Airport Plan, are being taken into account in the design process.</p> <p>Ms Leeming spoke about the four key issues that would guide any design – safety, community and environment, capacity and technical efficiency.</p> <p>Ms Leeming confirmed that once developed, any airspace design will be formally referred to the Commonwealth Minister for the Environment for consideration under the Environment Protection and Biodiversity Conservation Act 1999. She also stated that extensive public consultation was expected to occur around 2021, and encouraged members of the public to engage in that process.</p>	
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		<p><u>Western Sydney City Deal</u></p> <p>Ms Leeming recapped the history of the Western Sydney City Deal, and updated members on recent activities. She noted that:</p> <ul style="list-style-type: none"> • the Western Sydney City Deal is an agreement between the Australian, New South Wales and eight local governments, signed on 4 March 2018; • the City Deal is a 20-year agreement between the three levels of government to deliver long-term prosperity for the Western Sydney region; • the City Deal will deliver, amongst other things: <ul style="list-style-type: none"> • a north-south rail link from St Marys to Badgerys Creek Aerotropolis via Western Sydney Airport (known as Greater West Sydney Metro) • an 'Aerotropolis' employment precinct with jobs in aviation, aerospace and other knowledge-intensive industries • an Investment Attraction Office to attract business investment to Western Sydney – the Office was established in late 2017 • new STEM-focused education facilities to train skilled workers needed for the new knowledge intensive sector • enduring governance between the three levels of government – better aligning planning, investment and policy decision making for Western Sydney. <p>Ms Leeming stated that one of the most visible components of the City Deal is the \$170 million Liveability Program, which is delivering community facilities in the Western Parkland city. She noted that the first round of Liveability Program projects have been approved, with the second round of projects expected to be approved later this year.</p> <p>Ms Leeming advised that the full list of successful Round 1 projects for each council area is available online at the program's website. It includes activities such as upgrades to parks, improved toilet facilities, improving accessibility to public facilities such as libraries, upgrades to sports fields, and rejuvenation of places and public squares.</p> <p><u>Community and stakeholder engagement</u></p> <p>Ms Leeming concluded by providing an overview of the various community engagement activities the Department was undertaking, including:</p> <ul style="list-style-type: none"> • community pop-ups <ul style="list-style-type: none"> ○ engaging 1652 people across 10 events so far in 2019 	
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		<ul style="list-style-type: none"> ○ Western Sydney Airport staff have attended a number of the events alongside the Department's consultants, which adds value for the community meaning they can get the full range of information when visiting the pop-up. • a quarterly Community update newsletter, which is distributed to about 39,000 households within an approximate 10 km radius of the airport site. • regular update emails to FOWSA members, which include links to news of interest and announcements relating to Western Sydney and the airport. <p>The Chair thanked Ms Leeming for her update and invited members' questions.</p> <p>The Chair noted that, although FOWSA members are regularly updated on the expected timeframes of the process and are aware of when the draft flight paths will be available for the public to view, it may be worth discussing again to inform the members of the public attending the open meeting. He asked Ms Leeming to elaborate on when the public could expect the flight paths to be developed and what makes it such a complex project.</p> <p>Ms Leeming stated that considerable planning needed to happen before the design work commenced, such as documenting and considering the future needs of aviation industry users and the development of functional requirements to ensure the design work meets project objectives. Airspace and flight path designs, once developed, need to be modelled and tested for safety, capacity, efficiency and environmental impacts.</p> <p>The Chair acknowledged the difficulty in getting airspace arrangements right, particularly in an already busy airspace which accommodates domestic and international flights, and general aviation flying training. He spoke about the importance of FOWSA being educated on the technical aspects of the process. Professor Shergold also referred to many conversations he had held with members of the public who wanted to know when the flight paths would be made available. He stated that even though the airport isn't expected to operate until 2026, it would be good to get the flight paths out for public viewing as early as possible.</p> <p>The Chair and Ms Leeming agreed it was important to take the time to get the design right, with Ms Leeming stressing the importance of the design being implementable.</p> <p>Ms Leeming reconfirmed to members that the public will be asked to provide feedback through a formal environmental assessment process, occurring around 2021.</p>	
3.	WSA Co update	The Chair introduced Mr Graham Millett, CEO of Western Sydney Airport corporation.	

		<p>Mr Millett provided a presentation on Western Sydney International Airport (WSIA), beginning with the following general statistics about Western Sydney:</p> <ul style="list-style-type: none"> • 10% of the Australian population live in Western Sydney – approximately 2.5 million people; • Western Sydney has the 3rd largest economy in Australia, following only Sydney and Melbourne; • Approximately 40% of the Western Sydney population were born overseas; • every day, 40% of Western Sydney residents travel east to their places of work. <p>He noted that many Australian cities with smaller populations than Western Sydney support an international airport, and that the airport will play a key role in keeping jobs in the West.</p> <p><u>Employment and Education</u></p> <p>Mr Millett advised that:</p> <ul style="list-style-type: none"> • 11,000 direct and indirect jobs will be generated in the construction phase; • a further 28,000 jobs will be generated after operations begin; • all workforce and diversity targets were expected to be exceeded. <p>Mr Millett stated that the aerotropolis was expected to provide an estimated 200,000 jobs within 20 years, which was half the time taken for Sydney's Macquarie Park to support approximately 65,000 workers.</p> <p><u>Progress on Airport Site</u></p> <p>Mr Millett provided an update on progress on the airport site, advising members that the early earthworks phase was nearing completion, with 1.5 million cubic metres of earth still to be moved by the end of year. He noted that bulk earthworks would commence in early 2020, and confirmed that the contract for this next phase of works had been awarded to CPB Lendlease.</p> <p>Mr Millett showed images of construction activities on the airport site, noting that what could be seen represented less than 6% of the whole site.</p> <p>Western Sydney Airport has shortlisted five architectural firms to participate in a design competition for the airport's terminal. Construction of the terminal is expected to start around 2022. Mr Millett updated members on other recent activities including:</p>	
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		<ul style="list-style-type: none"> • the signing of MOUs with various freight and aviation industry organisations; • MOU signing events with Qantas and Virgin (both of whom have agreed to work with the airport on the design of terminal and airfield). <p>Mr Millett discussed the various responsibilities of Western Sydney Airport and the Commonwealth in delivering the airport and associated developments and initiatives.</p> <p>Mr Millett also provided a breakdown of the company's community engagement activities. Members were advised there had been:</p> <ul style="list-style-type: none"> • 720 calls to the Western Sydney Airport hotline • 330 students had received school safety presentations • 488 residents had been doorknocked by staff from the company • 24 community updates had been distributed • 1,452 letterbox drops were made in surrounding area and 676 emails sent to residents • 200 residents had attended recent council community forums • 33 Aboriginal engagement meetings had occurred • 85 residents had attended contractor information sessions, and • 104 individual meetings had been held with local residents. <p>Mr Millett concluded his update by discussing the recently opened Visitor's Experience Centre and showing members images of the finished centre. He noted that the centre was open Monday to Thursday, 10am – 4pm.</p> <p>The Chair thanked Mr Millett for his presentation and opened the floor to members for questions.</p> <p>Members asked Mr Millett if it was possible for the Experience Centre to be open on weekends, as many interested members of the community have been unable to attend during the weekday opening hours. Mr Millett stated that this was under consideration, and that he expected the capability to extend opening hours would increase as the company's workforce grows.</p>	
4.	Sydney Metro Greater West	<p>The Chair introduced Ms Patries Twaalfhoven, Project Development Director of Sydney Metro Greater West.</p> <p>Ms Twaalfhoven said that her presentation would include a general update on the Sydney Metro project, with a focus on what used to be known as the North/South Rail but is now generally referred to as the Greater West Sydney Metro.</p>	

		<p>She discussed how a usual transport project was designed to solve problems such as congestion or to expand capacity as required, and described the Greater West project as a visionary project, focused on assisting to stimulate growth in the Western Parkland City.</p> <p>Ms Twaalfhoven provided an overview of the broader Sydney Metro program of works to members, noting it was biggest program of public transport in Australia.</p> <ul style="list-style-type: none"> • North West – has been in operation for over 100 days • City & South West – ongoing construction, with a recent media announcement on breakthroughs by tunnel boring machines • Sydney West – planned to double capacity in the corridor and is currently in the development phase • Greater West – first stage includes a line from St Marys to the airport and onto the planned aerotropolis. Possible future extensions include links from the airport to Macarthur and Parramatta and from Bankstown to Liverpool. <p>Ms Twaalfhoven noted that this program was different to anything Sydney Metro had done before, in that this project:</p> <ul style="list-style-type: none"> • is a partnership with both Federal and State governments – a 50/50 funded deal through the development and construction phases; • came from a City Deal commitment; and • includes rail on and through an airport site, which has to meet the airport project timeframes. <p>Ms Twaalfhoven explained that Sydney Metro focussed on customer needs, rather than just looking at the delivery of a piece of infrastructure. This philosophy set the foundation for the development of requirements, such as services have to be fast, frequent, safe, and well connected. She noted that easy accessibility is key, considering not only members of the community using wheelchairs or prams, but also first time travellers and their baggage travelling to/from an international airport.</p> <p>Sydney Metro are working closely with Western Sydney Airport, factoring similarities into both station and terminal environments. Stations are planned for St Marys, the aerotropolis, the airport site (two stations at the terminal and the business park), with intermediate stations being considered.</p>	
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		<p>Whilst the Greater West program is a commitment in the City Deal, Ms Twaalfhoven noted that it was also consistent with planning by Transport for NSW plans and for the creation of a third city. It is hoped that this work assists in creating an area that people can live and work in, rather than needing to travel east. Both the airport and the Greater West Sydney Metro are key to stimulate economic growth and development of the Western Parkland City.</p> <p>Key Greater West project objectives are:</p> <ol style="list-style-type: none"> 1. safe and customer-focussed transport service 2. successful airport and western Parkland City 3. attracting knowledge and internationally competitive jobs 4. realising the 30-minute city 5. great places with an increased housing supply 6. delivering a value for money solution <p>Ms Twaalfhoven spoke about the importance of working in collaboration with planning agencies (e.g. Greater Sydney Commission, Planning Partnership and the Western City & Aerotropolis Authority) to ensure the 20-year vision for developing the Western Parkland City is met. She provided an overview of the project development phases, noting that the business case for the project is currently being prepared for consideration by the Australian and NSW governments. Planning approvals and project delivery are expected to commence in the first quarter 2020.</p> <p>Ms Twaalfhoven provided an update on recent targeted industry engagement and confirmed that community consultation will continue as the project moves into the approvals phase next year. She also observed that sandstone spoil from the City South West project was being used for constructing the airport.</p> <p>The Chair thanked Ms Twaalfhoven for her presentation and invited members' questions.</p> <p>Ms Twaalfhoven was asked about possible additional links south of the airport, including provision of a heavy rail link from Leppington. She advised that the City Deal commitment and rail needs study mandated development of the first component (Sydney Metro Greater West), and that additional links to the south, such as a connection to Leppington, could be considered in the future .</p>	
5.	Aviation Noise Factors	The Chair introduced Mr Matt Shepherd, Senior Aviation Consultant with to70 Aviation Australia.	

		<p>Mr Shepherd spoke to members about the evolution of aircraft over the last 25 years. Amongst other changes, he noted that there have been large reductions in airframe and engine noise during this period. He also spoke about improvements in GPS navigation technologies which, depending on location relative to an airport, allow aircraft to be within 600 m to 200 m of a defined track both vertically and laterally.</p> <p>The design of airspace has also changed over time, with increased focus on flight paths that reduce the requirement for aircraft to level off during climb and descent. These procedures are known as continuous climb operations (CCO) and continuous descent arrivals (CDA) and they allow aircraft to fly quieter and more efficiently.</p> <p>Mr Shepherd discussed basic aircraft performance capability, advising members that aircraft generally climb at a 6% gradient and descend on a gradient of 3 degrees.</p> <p>He explained that a lot of the on-ground equipment at airports, such as navigation beacons, is now no longer needed except as a back-up, thanks to satellite technology.</p> <p>Mr Shepherd spoke to members about the complexities of the Sydney basin airspace. He showed images of current tracks from Kingsford Smith Airport and advised that within 80 km of the airport there were up to 12 Air Traffic Controllers plus supervisors managing the area at any one time.</p> <p>Mr Shepherd spoke about people's perception of noise, noting that this can be influenced by a variety of factors including aircraft height, weather, aircraft size, or location/terrain. An overview was provided on various forms of noise metrics used to assess and describe aircraft noise, including:</p> <ul style="list-style-type: none"> • the Australian Noise Exposure Forecast, which is based on a detailed forecast of airport usage and is used for land use planning; • the single event noise metric, which depicts the sound level in decibels that a person may expect to hear for a specified aircraft type on a specified flight path; and • N metrics, which describe the number of times a specific noise level may be heard on an average day. <p>Mr Shepherd described the four noise reduction approaches advocated in the International Civil Aviation Organization's balanced approach to managing aircraft noise. Noise is addressed :</p> <ul style="list-style-type: none"> • at source (i.e. technology improvements in engine design) 	
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		<ul style="list-style-type: none"> • through land use planning (i.e. restricting noise sensitive development within the areas of highest noise exposure) • by adopting noise abatement procedures • implementing operating restrictions (considered as a last resort measure). <p>The Chair thanked Mr Shepherd for his presentation and stated that it was beneficial for people to understand how complicated aircraft noise and aircraft airspace design are.</p>	
7.	Q & A Session (questions submitted from the community)	<p>The Chair updated FOWSA on the questions submitted to the FOWSA inbox in response to an invitation for members of the public to ask FOWSA about issues relating to the forum and the airport project more generally. Key points included:</p> <ul style="list-style-type: none"> • 14 questions had been submitted from 11 individuals; • only some questions can be addressed during this meeting, but all questions will be answered on the Department's project website; • members of the public can ask further questions using the submission forms that will be available at the end of the meeting; and • questions to be answered during the meeting were picked based on the volume of questions that were similar in nature. 	<p>Action Item: Questions submitted to FOWSA for the open general meeting are to be responded to and published on the department's website</p>
<p>Question 1 "I have not seen how aviation fuel will be delivered to the site, a very important component, can you provide an answer?"</p>		<p>Asked by Dr Mike Freelander MP, Federal Member for Macarthur.</p> <p>Ms Sarah Leeming of the Department provided the following response.</p> <ul style="list-style-type: none"> • Jet fuel is expected initially to be supplied to Western Sydney International by road tanker. This is consistent with how it is supplied to similar sized airports in Australia, like the Gold Coast and Adelaide airports. • The Department completed a report in December 2017 on a strategic assessment of corridor options for a fuel pipeline to supply the Airport. This was a condition of the Airport Plan. • The report found that a pipeline would not be commercially viable until jet fuel demand reaches around 2.5 million litres per day. This was projected to occur around 2034 when passenger numbers are expected to justify investment in the required infrastructure. • The report also found that when the airport is first operational, five fuel trucks a day will be required, which is a very small portion of the trucks on Sydney's roads. • The NSW Government is responsible for the identification and preservation of corridors for critical infrastructure such as fuel pipelines. It is planning to undertake a more detailed study of corridor options for supplying fuel to the airport in the next few years. 	

	<ul style="list-style-type: none"> A further condition of the Airport Plan is that, until such time as a fuel pipeline is in place, Western Sydney Airport must prepare and publish periodic reviews on aviation fuel supply that compare the social, economic and environmental costs, savings and benefits of supplying fuel to the airport by road with other alternatives including a fuel pipeline.
Question 2 “I understand Western Sydney Airport will embed digital infrastructure within its design to ensure a world-leading smart-airport and 21st-century customer experience. How could this government investment in digital infrastructure benefit Campbelltown?”	<p>Asked by Ms Lindy Deitz, General Manager Campbelltown City Council.</p> <p>Mr Graham Millett, CEO Western Sydney Airport, replied that Western Sydney International is expected to draw digital assets such as 5G into the Western Sydney region, including Campbelltown, faster than what would have otherwise been the case. Western Sydney Airport is a member of the Steering Group of the Digital Action Plan of the Western Sydney City Deal, along with Campbelltown City Council and other local councils, and together they are looking for opportunities and synergies to share digital assets and technologies.</p>
Question 3 “This question is about a report by Dr Eric Ancich and Mr Donald Carter entitled ‘ <i>Assessment of Measured Aircraft Noise Levels Under the Existing Flight Paths of Sydney Kingsford Smith Airport with Reference to Western Sydney Airport</i> ’. What measures does FOWSA intend to take to ensure the implications of the report are communicated to the community and to Western Sydney Airport?	<p>Asked by Ms Alison Morgan, Executive Director, Western Sydney City Deal Delivery Office.</p> <p>The Chair stated that the Department had informed FOWSA members of the report at the last meeting in June. He advised that FOWSA understood that the Department had conducted a technical review of the report in consultation with the acoustic consultant who undertook the noise assessment for the 2015-16 EIS.</p> <p>The Chair observed that FOWSA members were interested in understanding more about the report and its findings, and both the report and the Department’s technical review of the findings have been provided to all members.</p> <p>The Chair noted the Department’s finding that the approach to aircraft noise assessment in the EIS is sound and that the indicative airspace and flight paths were presented in similar format to that adopted for major development plans at Commonwealth-regulated airports.</p> <p>He also expressed his understanding that as part of the flight path design process further noise assessment will be undertaken and there will be a formal consultation process around 2021. Professor Shergold said that when this occurs, FOWSA will have a key role to play in ensuring that the flight path and noise assessment information is presented accurately and meaningfully to the community and that there is a genuine opportunity for community feedback on the proposal.</p>

	<p>The Chair stated his intention to discuss the report and associated matters at the next FOWSA meeting, and requested members read both reports before then.</p>
<p>Question 4 How will the airport and government deal with its local residents?</p>	<p>Asked by Mr Wayne Willmington, Resident of Luddenham.</p> <p>The Chair responded in the following terms.</p> <ul style="list-style-type: none"> • FOWSA is a key conduit between the community, Western Sydney Airport and the Government during the airport's construction and development. My attendance at meetings of the aviation Expert Steering Group helps to link the work of that body with FOWSA. • Communicating with the community is a regular topic of discussion at FOWSA meetings and we are always keen to examine how we can do it better. • An open meeting will be held each year as well as a drop-in session and over time, FOWSA members will look at what other activities FOWSA can undertake to respond to the community's needs. • This of course needs to be complemented by a range of other activities. • The Department holds regular pop-up information stalls at local events and shopping centres across Western Sydney and the Blue Mountains. These give a chance for people to stop and pick up information or talk to team members. <ul style="list-style-type: none"> ○ FOWSA members go along to these whenever possible, particularly when there is a pop-up in their local area. This gives a chance to hear directly from people on the ground their thoughts on the airport. ○ To date this year, there have been 11 pop-up stalls with around 1800 people visiting them. • The Department also issues a Community Update newsletter around once a quarter. This has the most recent information about the airport and updates on other projects. It is distributed to around 39,000 households, to email subscribers and to local councils and libraries, as well as being available online. <ul style="list-style-type: none"> ○ FOWSA has a regular segment in the newsletter to update on our activities and what we've heard. There are also other regular segments, including on the flight path design process and the Western Sydney City Deal. • The Department has free call 1800 number dedicated to the Western Sydney projects, so that people can ring and ask questions, as well as an email enquiry line. <p>Professor Shergold concluded by reiterating FOWSA's desire to be more visible and to get its communications out to the community in the most effective ways.</p> <p>Mr Millett advised that working with the local community is one of Western Sydney Airport's highest priorities, as they want to build an airport that Western Sydney is proud of. He stated that the company wanted the community to be involved every step of the way.</p>

	<p>Mr Millett identified numerous ways in which Western Sydney Airport is working with the community, including:</p> <ul style="list-style-type: none"> • airport shuttle tours for groups and organisations to take a guided trip around the site • the Experience Centre, which is open for all members of the public to drop in and learn about the airport as well as watch it being built • the Schools Safety Program, visiting schools in the local community to teach students about safety around roads and construction sites • stalls at local community events and attendance at community forums • a 24/7 1800 community feedback line so residents can get in touch with any questions or concerns • regular doorknocks and letters to local residents advising of construction updates, and a monthly column for local newspapers updating the community on progress at the airport.
<p>Question 5</p> <p>“Have FOWSA at any time considered safety in regard to bird and bat strike.....Is FOWSA prepared to wear any level of safety risk, or would they be prepared to make representations to the government that this site is unsafe for an airport and that the project should therefore be cancelled?”</p>	<p>Asked by Jacob Idiculas, Resident of Bossley Park.</p> <p>Addressed by Ms Sarah Leeming who provided the following response.</p> <ul style="list-style-type: none"> • Bird and bat strike is a safety consideration for all airports and was considered in detail as part of the Environmental Impact Statement (EIS) for Western Sydney International. • The EIS reviewed species’ presence and abundance; habitat available on the airport site and within the study area; projected aircraft movements; and staged construction. • The outcome of the assessment was that the risk of bird and bat strike is low relative to many other Australian airports, particularly those that are situated in coastal areas. The Western Sydney International site is not unique in having wildlife in proximity that may present strike risk. • The EIS identified design, construction and operation measures to maintain the bird and bat strike risk at an acceptable level, including through the development of a Wildlife Hazard Management Plan. It is mandatory that this plan be developed before airport operations commence. • The National Airports Safeguarding Advisory Group has developed the National Airports Safeguarding Framework (NASF), to guide land-use and planning in supporting aviation operations. • Guideline C of the framework covers ‘Managing the risk of wildlife strike in the vicinity of airports’. The Western Sydney Planning Partnership, who are preparing the land use planning framework (the Land Use and Infrastructure Implementation Plan, or LUIIP) for the Western Sydney Aerotropolis are being informed by Guideline C and a wildlife consultant in preparing the LUIIP. • This work is being undertaken in consultation with Western Sydney Airport and the Department of Infrastructure, Transport, Cities and Regional Development.

<p>Question 6</p> <p>“I read that groups or organisations can tour the site however if you are not a member of a club or organisation can individuals turn up at nominated times with others for a tour?</p>		<p>Asked by the Ms Anne Stanley MP, Federal Member for Werriwa</p> <p>Addressed by Mr Millett who confirmed that airport shuttle tours, specially designed for interested groups and organisations, such as Probus or Rotary Clubs, are available for guided tours of the airport site.</p> <p>He advised that:</p> <ul style="list-style-type: none">• the brand new Experience Centre is open to all members of the community to drop in and learn about the Airport and speak to Western Sydney Airport staff about any questions they may have;• the Centre is open to the public Monday to Thursday from 10am to 4pm, and it's free to visit (details can be found on the Western Sydney Airport website); and• visitors are taken through an interactive digital exhibition where they can learn about the airport and the region, finishing their tour at a viewing area with floor-to-ceiling glass panels which will eventually provide views of the terminal and runway being built.	
6.	Other Business	<p>The Chair confirmed the next FOWSA meeting would be 9am-2pm on 6 December 2019, and will include a discussion on dates for future meetings.</p> <p>Other agenda items being considered for the next meeting include:</p> <ul style="list-style-type: none">• an update from the Western Sydney Aerotropolis Authority• a presentation on the subject of aviation-related bird and bat strikes• a discussion on the report prepared by Dr Ancich and Mr Carter and the Department's response. <p>The Chair also noted that he'd like to hear more on the LUIPP once finalised, and expected that this would be on an agenda in the first half of 2020.</p> <p>The Chair thanked everyone for their attendance and invited members of the public to join FOWSA members at afternoon tea, where discussions could continue.</p>	<p><u>Action Item:</u> Secretariat to arrange presentation on LUIPP in early 2020.</p>

Status of Outstanding Action ItemsMeeting 1, 26 May 2017

Action Item Number	Action Item	Status
4	FOWSA Secretariat to distribute meeting papers to members electronically at least one week in advance of FOWSA.	Ongoing.

Meeting 9, 7 September 2019

Action Item Number	Action Item	Status
1a	Secretariat to add to the next meeting agenda a discussion on the aircraft noise report authored by Dr Eric Ancich and Mr Don Carter, along with the Department's response to the report.	
1b	Members to review and consider the above documents prior to the next meeting.	
2	Questions submitted to FOWSA for the open general meeting are to be responded to and published on the department's website.	
3	Secretariat to arrange presentation on LUIIP in early 2020.	

Attendees

Professor Peter Shergold AC (Chair) – Chancellor, Western Sydney University
Dr Mike Freelander MP – Federal Member for Macarthur
Ms Anne Stanley MP – Federal Member for Werriwa
Ms Alison Morgan – Director, Sydney Region, New South Wales Department of Premier and Cabinet
Ms Kiersten Fishburn – CEO, Liverpool City Council
Mr Jacob Idiculas – Resident of Bossley Park
Mr John Walton – Resident of Silverdale
Mr Wayne Willmington – Resident of Luddenham
Mr Gordon Henwood – Resident of Mulgoa
Mr Gregory Copeland – Resident of Camden
Mr Bob Germaine – Regional Development Australia Sydney
Ms Lee de Winton – CEO, Sydney Metro Airports Bankstown and Camden
Mr Will Spence – Office of Senator the Hon Marise Payne
Ms Tracy Burgess – Blue Mountains City Council
Mr Kevin Lynch – Campbelltown City Council
Mr Mustafa Agha – Sydney Business Chamber
Mr Jim Davis – Regional Aviation Association of Australia

Ex Officio Members

Graham Millett – Western Sydney Airport
Nicole Ryan – Western Sydney Airport
Scott MacKillop – Western Sydney Airport

Apologies

Senator the Hon Marise Payne – Senator for New South Wales (represented by proxy)
Ms Melissa McIntosh – Federal Member for Lindsay
Ms Joanne Bromilow – Resident of Blaxland
Mr David Borger – Western Sydney Director, Sydney Business Chamber (represented by proxy)
Mr Paul Chevalier – Virgin Australia
Ms Lindy Deitz – General Manager, Campbelltown City Council (represented by proxy)
Cr Paul Rasmussen – Hawkesbury City Council
Mr Matthew Hudson – Qantas Group
Cr Ross Fowler – Mayor, Penrith City Council
Dr Rosemary Dillon – CEO, Blue Mountains City Council (represented by proxy)

Cc: FOWSA@infrastructure.gov.au; S47F
Subject: FOWSA Meeting 10 - Action Item - Register of Correspondence
Attachments: Register of Correspondence & letter dated 20.12.19.pdf

FOWSA Meeting 10 (6 December 2019)

Agenda Item 5: Technical discussion: *Assessment of Measured Aircraft Noise*

Levels under the Existing Flight Paths of Sydney Kingsford Smith Airport Report

(Dr Rob Bullen, Wilkinson Murray)

Action Item 1 – Table of Departmental Engagement with Ancich & Carter (* excludes correspondence to FOWSA and other parties)

Date	Activity
April 2019	Department first aware of the Ancich report – as a result of a media query from the ABC.
19 April	Department provided with a copy of the report and technical appendices by Dr Ancich.
30 April	Ancich report and appendices passed to Wilkinson Murray (authors of the 2016 Aircraft Overflight & Operational Noise chapter of the EIS) for formal technical review (Dr Ancich informed of this in writing).
1 May	Wilkinson Murray provided their draft response to the Ancich report on 1 May (circulated across the department and to Airservices for review).
5 June	Dr Ancich wrote to the department and offered to present on his report.
7 June	FOWSA members were advised that : <ul style="list-style-type: none">○ a technical report by Dr Eric Ancich and Mr Don Carter had attracted local media attention.○ The report compares noise levels from aircraft arriving and departing Kingsford Smith Airport to those presented in the 2016 Environmental Impact Assessment (EIS) for Western Sydney Airport, which were based on indicative flight paths.○ the department had been in contact with the authors, who had provided a copy to the department.○ the department was currently conducting a technical review of the report.○ Members indicated that it would be good to be aware of the report and the department's review, should they encounter queries from their communities on the matter.○ The department offered to ask the authors for permission to share the report with FOWSA members.
28 June	Mr Carter confirmed that he and Dr Ancich were happy for the report to be circulated to FOWSA members.
2 August	Department shared the Wilkinson Murray review findings with Dr Ancich and Mr Carter and asked if they were available to meet and discuss them, Dr Ancich requested that the meeting be in person.
9 August	Departmental meeting in Canberra attended by Dr Ancich and Mr Carter
28 August	Email request from Mr Carter to attend and submit questions to 7 September. FOWSA (Departmental response sent 30 September – including confirmation that the Ancich report had been sent to FOWSA members).
30 August	<ul style="list-style-type: none">○ Departmental correspondence to Dr Ancich addressing issues raised at 9 August meeting.○ FOWSA members forwarded copies of the Ancich report and the Ancich Report Review (prepared by the department – attached below).

23 September	Dr Ancich wrote again reiterating earlier submissions and information contained in the Ancich report, and addressing the Wilkinson Murray review.
31 October	Mr Carter emailed seeking advice on the correspondence of 23 September
5 November	Departmental advice that matters would be discussed at the December 6 FOWSA
25 November & 5 December	Departmental invitation to Mr Carter and Dr Ancich for briefing on FOWSA presentation on Dr Rob Bullen's analysis of ' <i>Assessment of Measured Aircraft Noise Levels under the Existing Flight Paths of Sydney Kingsford Smith Airport Report</i> '. Meeting occurred at Penrith Panthers on 5 December
26 November & 2 December	Email request from Mr Carter to present to FOWSA meeting 10. On 2 December Department responded that the offer to present to a future FOWSA would be put to members at FOWSA meeting 10.
6 December	Dr Bullen presentation to FOWSA Dr Ancich wrote to the Department in connection with Dr Bullen's presentation.
17 December	Correspondence received from Dr Bullen further addressing claims made by Dr Ancich and Mr Carter (including in correspondence from Dr Ancich dated 6 December)
20 December	Department correspondence to Dr Ancich and Mr Carter stating that in its view the matter had been sufficiently addressed.



Australian Government

**Department of Infrastructure, Transport,
Cities and Regional Development**

Dr Eric Ancich

s47F

Dear Dr Ancich

Thank you for your correspondence of 6 December 2019.

The Department of Infrastructure, Transport, Cities and Regional Development is strongly committed to the application of best practice in the preparation of environmental assessment documentation for preferred airspace and flight path designs at Western Sydney Airport (WSA).

In your correspondence you have expressed dissatisfaction with the established convention and practice of undertaking noise assessments in Australia, including reference to Australian Standard 2021. We have sought advice on the matters you have raised and have been advised that work on the 2016 EIS is well founded, and that the information presented represents industry practice.

As you are aware, a response to your criticism of the 2016 EIS noise assessment was presented to the Forum on Western Sydney Airport (FOWSA) in December by Dr Rob Bullen (as previously presented to you and Mr Carter on 5 December). FOWSA members engaged in the matters raised and understood the challenges in presenting complex acoustic information to non-technical audiences. Members were invited to consider a future presentation from yourself and Mr Carter. This was not requested by FOWSA members, and there is currently no intention to revisit this matter.

Given our considerable engagement with you and Mr Carter over the past eight months we consider these matters have been sufficiently addressed. As previously noted, there will be future opportunities for you and Mr Carter to provide your views through the public exhibition process for the airspace and flight path Environmental Assessment. We will include you on the mailing list for the consultation process.

Please be assured that communities in Western Sydney will be provided with the best available modelling and reporting to support public understanding of the flight path designs.

Yours sincerely

Sarah Leeming
A/g Executive Director
Western Sydney Unit

Friday, 20 December 2019

s22

From: FOWSA@infrastructure.gov.au
Sent: Monday, 30 March 2020 4:57 PM
Subject: FOWSA - Record of Meeting 10 [SEC=OFFICIAL]
Attachments: FOWSA - Record of Meeting 10.pdf

OFFICIAL

Dear FOWSA members

Please find attached the Meeting 10 Record of FOWSA Meeting 6 December 2020.

Following recent Australian Government restrictions on public gatherings and avoiding all non-essential travel, we will be postponing the next FOWSA meeting until we receive further health advice from government.

The FOWSA Secretariat will continue to provide regular updates on the progress of the project.

Please contact us should you have any questions or comments on the attached record of the last FOWSA.

Kind regards

FOWSA Secretariat

OFFICIAL

Forum on Western Sydney Airport

Record of Meeting 10 10:00 am – 2:00 pm, Friday 6 December 2019 Board Room Western Sydney Airport Office, Liverpool Chair: Professor Peter Shergold AC

Item	Description	Key Discussion Points	Action Items
1.	Welcome from the Chair and confirmation of agenda	<p>The Chair, Professor Peter Shergold AC, welcomed members to the fourth and final meeting of the Forum on Western Sydney Airport (FOWSA) for 2019, and opened the meeting by formally acknowledging the Traditional Owners of the land on which the meeting was being conducted.</p> <p>Members were thanked for their flexibility and understanding with the late relocation of the meeting from the Western Sydney International Visitor's Experience Centre to the Western Sydney Airport (WSA) Office in Liverpool. It was noted that although the Experience Centre had been evacuated the previous afternoon by the Rural Fire Service (RFS), the safety of the site had now been confirmed.</p> <p>The Chair noted WSA's confirmation that the next meeting could be held at the Experience Centre.</p> <p>The Chair acknowledged apologies received (see Appendix B of this meeting record) and welcomed delegates representing FOWSA members who were unable to attend the meeting.</p> <p>The Chair provided an overview of the Information session and Open meeting held on 7 September 2019, noting the broad attendance of the public, who included Campbelltown locals, residents adjacent to the airport site, general aviators and residents from the wider Western Sydney and Blue Mountains area. He discussed the feedback received from the public who had attended the session, and noted he'd been advised they had found it informative and were glad to have the opportunity to be able to share their views with FOWSA members, as well as engaging directly with the Department and other agencies to ask questions and discuss issues of interest.</p>	<p>Action Item 1: Secretariat to arrange for next meeting to be held at WSA's Visitor Experience Centre</p>

		<p>The Chair thanked all FOWSA members who had been able to attend on the day.</p> <p><u>Meeting 9 records and actions</u></p> <ul style="list-style-type: none"> • The FOWSA Secretariat prepared a record of Meeting 9, which is available on the Department's website. • There were <u>three</u> Action Items arising from the last meeting: <ul style="list-style-type: none"> ○ FOWSA Meeting 9, Item 1 (Secretariat to add to the next meeting agenda a discussion on the aircraft noise report authored by Dr Eric Ancich and Mr Don Carter, along with the Department's response to the report) This Action Item is covered under Item 5 of the agenda ○ FOWSA Meeting 9, Item 2 (Members to review and consider the report prepared by Dr Ancich and Mr Carter and related documents prior to the next meeting) Members present confirmed they had read the report. ○ FOWSA Meeting 9, Item 3 (Questions submitted to FOWSA for the open general meeting are to be responded to and published on the department's website) This action item has been completed. The Chair noted that 14 questions were submitted by 11 people, which was fewer than submitted for the 2018 open meeting. <p>Members discussed how the questions received from the community continue to shape the future agendas for FOWSA, with issues such as bird and bat strike controls and the noise study developed by two members of the public being addressed in this meeting of FOWSA.</p>	
2.	Departmental Update	<p>The Chair invited Ms Sarah Leeming from the Department to provide an overview of recent departmental activities to progress the Western Sydney Airport project and related initiatives.</p>	

		<p>Ms Leeming began by providing an overview of recent announcements related to the Department, including:</p> <ul style="list-style-type: none"> • the Prime Minister's announcement that the Department of Communications and the Arts will merge with the Department of Infrastructure, Transport, Cities and Regional Development, in February 2020 • the merge included the Hon Paul Fletcher MP returning to the portfolio; he will continue to have responsibility for the Communications and the Arts. • Mr Simon Atkinson has been appointed as the new Secretary of the Department of Infrastructure, Transport, Regional Development and Communications. <p>Ms Leeming provided an update on the Department's airspace design process, and advised that progression into the Preliminary Design Phase is expected during 2020. She noted that this would mean work on the Environmental Assessment (EA) could be expected to commence on draft airspace designs, and she anticipated that the work would take at least 12 months.</p> <p>Ms Leeming mentioned that updating population figures for Western Sydney as part of the Environmental Assessment is a major piece of work that would require assistance from state and local governments.</p> <p>Ms Alison Morgan, Western Sydney City Deal Delivery Office, offered to brief the Department on recent activities undertaken to update NSW population and growth forecasts, noting that the last census didn't take into account the growth stimulated by the airport and the Western Sydney City Deal.</p> <p>Ms Leeming spoke about the Department's meeting with Brisbane Airport Corporation (BAC) about the community engagement activities undertaken for the new parallel runway, such as the mobile information centre and the online noise tool. Ms Leeming noted the Department would investigate some of these options .</p>	
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		<p>On environmental matters, Ms Leeming updated members on the progress of the biodiversity offset site at Orchard Hills (one of the biggest program of its type in Australia) and noted that Greening Australia have offered a tour of their seed production site near Hawkesbury.</p> <p>Ms Leeming advised the Western Sydney Unit was working closely with state and local governments on the City Deal Annual Report. She concluded her update by noting that the Western Sydney Land Use and Infrastructure Implementation Plan (LUIIP) is now in its second version as the Western Sydney Aerotropolis Plan, and that this would be discussed in more detail later in the agenda.</p>	
3.	Western Sydney Airport Update	<p>The Chair invited Mr Scott MacKillop, General Manager for Media and Government Relations at Western Sydney Airport, to provide a project update.</p> <p>Mr MacKillop provided members with an update on the progress of WSA's construction activities. He advised members that:</p> <ul style="list-style-type: none"> • Badgerys Creek Rd has now been realigned 200m east, with the movement of all paving completed; • Initial earthworks are on track and will be complete in early 2020, at which point 1.7 million cubic metres will have been moved; • Initial earthworks are occurring on 6% of the site; however, once the bulk earthworks phase is underway, the majority of the site will be under construction (the footprint of Stage 1); • At 1,780ha, the site is almost twice the area of Kingsford Smith Airport; • The runway will be 3.7km in length, with the current 12 story height difference found across hills on the site to be graded to a 0.2% difference; • Crushed sandstone from tunneling works on Sydney Metro projects is being brought in to serve as the base of the runway. <p>The Chair thanked Mr MacKillop for his presentation and called for any questions.</p> <p>Members queried whether the number of truck movements to the airport site would increase when transitioning from the initial earthworks to the bulk earthworks phase. Mr MacKillop noted that truck movements of spoil from</p>	

		<p>Sydney Metro's excavation had increased truck movements, as had the transport of earthmoving equipment to the site for the bulk earthworks phase; however, these movements had been primarily occurring at night and were almost complete.</p> <p>Mr MacKillop also advised members that the draft Master Plan for the business park to be built on the airport site is almost complete.</p> <p>Members were informed that international firm Zaha Hadid Architects and Australian firm Cox Architecture were selected to design the terminal precinct. discussed the outcome of the terminal design. The meeting viewed a video of the terminal concept design. Students from Western Sydney University participated in the concept design development.</p> <p>Members discussed the design of the public plaza and asked what distance passengers would have to walk in the terminal, noting the expansive layout. Mr MacKillop advised no more than 2-3 kilometers would be expected, and noted that assistance would be available if needed by customers.</p> <p>A FOWSA member asked about whether fast rail could be introduced to the airport in the future. Mr MacKillop noted that, as the rail will be built underground, there would be the ability to expand it in the future, though it would be a decision for the government of the day.</p> <p>Members offered comments on the video of the terminal design and suggested adding imagery of the rail connections.</p> <p>Members asked Mr MacKillop about the use of renewable energy and the airport's emissions targets. Mr MacKillop replied that a sustainability plan is currently being developed. He noted that planning is in the early stages as the airport is still seven years away from being operational. It was noted that this allowed time to investigate and implement the best possible plan.</p>	
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4.	Bird and Bat Strike Risk Assessment	<p>The Chair invited Mr Kirk Osbourne from WSA and Mr Philip Shaw from Avisure to present on Bird and Bat strike concerns raised by a member of the community in a submitted question to FOWSA.</p> <p>Mr Osbourne began by discussing current bird and wildlife works that WSA were undertaking. He advised that:</p> <ul style="list-style-type: none"> • the airport has been conducting monthly survey work since 2018 and this would continue; • considerations as to how a wildlife fence could be incorporated on site are underway; • current terminal designs are also looking into how to minimise roosting on site; • WSA is considering options to make further wildlife information and research available online over the next 6-12 months, and whether this could include an interactive 'safeguarding tool' for the community to use; • they are aware that as the area develops, communication with local authorities will be important to minimise wildlife and bird strikes through landscape design processes on and off the airport site. <p>The Chair thanked Mr Osbourne and invited Mr Shaw to continue.</p> <p>Mr Shaw discussed international case studies with members, and shared statistics on current bat and bird strikes in NSW.</p> <p>Members were advised that:</p> <ul style="list-style-type: none"> • in Vancouver, airports have used falcons, lasers and hovercraft to disrupt birds; • Generally, coastal areas can have bigger bird problems than inland regions; • Approximately 1,200 aviation-related bird strikes have occurred over the last 10 years and roughly 100 of these have caused damage - which is more than any other wildlife; • Sydney Airport is the busiest airport in the country, hence it has more bird strikes, with April and May recording the highest strike rate due to migration patterns in the area. 	
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		<p>Mr Shaw then discussed the situation at Western Sydney Airport and what activities were occurring. He noted that:</p> <ul style="list-style-type: none"> • WSA is in a rural setting that includes dams and will continue to be affected by wildlife with a NSW Government target to increase tree canopy over from the current level to 40 per cent across Greater Sydney. • There are seven camps of Grey Headed Flying Foxes surrounding the Airport site and the goal is to ensure safety of aircraft, while protecting wildlife where possible. • WSA is actively looking for solutions. As this is a greenfield airport, bird and bat strikes can be minimised through design and wildlife movements can be monitored and tracked by radar. • Management plans are being considered to minimise the impact on existing camps. • Monthly bird and wildlife surveys are being conducted, including seasonal surveys with a particular focus on the Flying-fox camps. • WSA is considering aviation radar options for implementation prior to and after aircraft operations commence. <p>Mr Shaw concluded his presentation by noting that the data collected has allowed for informed input into local planning documents, and plans for growth of certain vegetation. This would minimise the risk of future camps being established in unsuitable areas. By the time the airport commences operations, understanding flowering events in the region will allow more accurate prediction of camp movements, which will help mitigate bird and bat strike risk.</p> <p>The Chair thanked Mr Osbourne and Mr Shaw for their presentations, noting it was excellent to discuss another significant matter raised by members of the community in such detail. FOWSA members discussed the broad opportunities for planning and risk mitigation measures for a greenfield airport, and agreed that while there is still a lot of work to do on the matter before operations commence in 2026, it is wise that this work is highlighted as a key issue and good that WSA already had the work underway.</p>	
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5.	<p>Technical discussion: Assessment of Measured Aircraft Noise Levels under the Existing Flight Paths of Sydney Kingsford Smith Airport Report</p>	<p>The Chair reminded FOWSA members that in late August 2019 (just before the September FOWSA meeting) the Secretariat circulated a copy of a report prepared by Dr Eric Ancich and Mr Don Carter regarding noise levels from Sydney (Kingsford Smith) Airport and implications for the validity of the 2016 WSA EIS.</p> <p>The report - Report no.9173 - R1- Assessment of measured aircraft noise levels under the existing flight paths of Sydney Kingsford Smith Airport (KSA) with reference to Western Sydney Airport (the Ancich report) has generated much community interest, including interest from FOWSA members.</p> <p>The Chair invited Dr Rob Bullen from Wilkinson Murray to speak on the issues raised by the Ancich report. Dr Bullen holds a PhD (Acoustics) and is a member of the Australian Acoustical Society and the Australian Standards Committee EV-011 relating to Aircraft & Helicopter Noise. While working with Wilkinson Murray, Dr Rob Bullen was a lead author of the acoustic studies undertaken as part of the WSA 2016 EIS, and has subsequently undertaken many similar assessments for major airport development proposals across Australia. Members were invited to discuss whether they wanted Dr Ancich and Mr Carter to present on the Ancich report at FOWSA at the conclusion of Dr Bullen's presentation.</p> <p>Dr Bullen began by explaining that the Ancich report is critical of work done in the Environmental Impact Statement (EIS). It compared noise levels from KSA flight paths with noise levels predicted from indicative flight tracks in the 2016 WSA EIS. The report claimed measured levels from Sydney Airport are significantly higher than EIS predictions for similar locations around Western Sydney Airport.</p> <p>He noted that the Ancich report also criticises the use of L_{Amax} and the Integrated Noise model (INM), as reported in the 2016 WSA EIS, as the authors believe that this does not fully account for variability in aircraft heights on nominated flight paths. The authors have further suggested that this variability in height was not reported in the 2016 WSA EIS.</p> <p>Claim 1 - Criticism of EIS Measurements</p>	<p>Action Item 2: Secretariat to send members copy of correspondence register between the Department and Dr Ancich/Mr Carter</p>
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		<p>Dr Bullen advised that the noise level measurements presented in the Ancich report for individual aircraft movements were recordings of the modelled aircraft noise predicted in the 2016 WSA EIS, but reported differently. The individual aircraft movement noise recordings in the Ancich Report were reported using the fast setting on the noise recorder, rather than the slow setting as required in Australian Standard AS 2021.</p> <p>The difference of using the fast and the slow setting on the noise recorder is a 3 to 5 decibel (dBA) difference, as the average sound in the slow setting is measured over one second rather than an eighth of a second on the fast setting. Dr Bullen explained this accounts for some of the difference in aircraft departures recorded and presented in the 2016 WSA EIS and those presented in the Ancich report.</p> <p>In regards to the difference in reported decibels for aircraft arrivals into Sydney between the Ancich report and the 2016 WSA EIS, this can be largely explained by the difference in the approach procedure adopted at the two airports. Arrivals into Sydney Airport are generally 'stepped arrivals' as opposed to Continuous Descent Approach (CDA) tracks, which are 5-8 dBA quieter. The 2016 WSA EIS proposed CDA approaches into WSA in order to protect residential amenity. This combined with the 3-5 dBA difference in 'fast' vs 'slow' setting explains discrepancies in the aircraft noise levels presented in the 2016 WSA EIS and the Ancich report.</p> <p>Claim 2 – Criticism of Prediction Techniques</p> <p>Dr Bullen then explained how L_Amax is measured as the average of maximum noise levels from a specific aircraft type performing a specific operation over a number of flights, rather than a single absolute maximum noise event from a single event – being the 'noisiest possible'.</p> <p>Mr Bullen said that the Ancich report referred to the single maximum noise level (or noisiest single event), which did not give an accurate picture of what may generally be expected. Dr Bullen emphasised that the EIS shows the average of max noise levels as per the standard (Australian Standard AS 2021) to measure</p>	
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		<p>aircraft noise, and noted that this is established practice in undertaking acoustic assessment of aircraft noise for new flight paths.</p> <p>The Ancich report claims that the 2016 WSA EIS made no calibration of the Integrated Noise Model (INM), unlike at Brisbane Airport for their new parallel runway. Dr Bullen explained why benchmarking was not undertaken with the INM, as Western Sydney Airport is not yet operational. Dr Bullen explained that local conditions have a significant impact on noise benchmarking, and hence benchmarks undertaken at other airports would not be scientifically reliable if applied to WSA.</p> <p>Furthermore, Dr Bullen explained that pilots sometimes fly differently on published procedures, and that this can lead to variation from predicted noise levels derived from INM modelling.</p> <p>The Ancich report also criticised the EIS for having not accounting for the variable height of aircraft arrivals and departures. However, Dr Bullen explained a range of factors may influence noise settings more than height, including topography, meteorology and aircraft thrust and flap settings.</p> <p>Dr Bullen concluded that in his opinion there is no justification for the criticism regarding 'calibration' of the noise model, or handling of aircraft heights, and he noted that noise models for changes to airspace and flight paths require extensive public consultation to clarify matters such as these.</p> <p>Members added to the discussion, noting that the perception of seeing an underbelly of an airplane can make it seem louder than it really is.</p> <p>Cr Paul Rasmussen asked whether the noise abatement procedures had been looked at for Western Sydney Airport. Dr Bullen replied that some were considered on the indicative flight paths shown in the 2016 EIS, such as the Continuous Descent Approaches (CDA).</p> <p>Ms Jo Bromilow asked if a comparison between WSA and KSA would be useful to show any differences. It was explained that KSA is unique in the way aircraft</p>	
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		<p>fly in and out, with major variations in height and spread occurring. This type of operational difference doesn't allow for a viable comparison between KSA and any other airport in Australia.</p> <p>Mr Greg Copeland asked whether other airports use CDA and why KSA does not. It was confirmed that other airports in Australia do use CDA. It was noted that the reason KSA cannot is partly due to the technology and partly due to the location of the runway. Members discussed the use of historical tracks being added as KSA grew over the years, different to WSA now having the ability to create an airspace design from 'ground up', which allowed space for noise abatement procedures such as CDA.</p> <p>Members thanked Dr Bullen for his detailed presentation, and noted how important it would be to have this level of information available once draft flight paths for WSA have been developed, to ensure the community was well informed. No members present requested Dr Ancich and Mr Carter be invited to clarify any detail in their submission.</p>	
6.	Western City and Aerotropolis Authority update	<p>The Chair invited Mr Sam Sangster, CEO at Western City & Aerotropolis Authority (WCAA), to present on the WCAA and its key priorities. Mr Sangster opened his presentation by advising FOWSA members that the Western Sydney Aerotropolis Plan, Development Control Plan and State Environment Planning Policy (SEPP) have been released and are now progressing through their public consultation period.</p> <p>He compared Macquarie Park, which supports 85,000 jobs, to the expected 220,000 jobs to be created within the Aerotropolis.</p> <p>He noted that the Western City Aerotropolis Authority is planning for the Aerotropolis to have A-grade office accommodation, with similar density to Penrith, Liverpool and Campbelltown. He spoke to members about the plans for public transport needing to be as well connected within Western Sydney as it is to the east.</p>	

		<p>Mr Sangster then explained that industries are already looking to capitalise on the Airport, using the tourism industry as an example. The NSW Government is focused on competing with destinations such as Shanghai, rather than with Melbourne or Brisbane. As well as a strong educational focus, there is also a spotlight on space and aerospace industries, along with research/development and manufacturing.</p> <p>Mr Sangster mentioned that the Western Sydney Airport sits within an overnight flight of 6.4 billion people in the Asia-Pacific area, with a large market looking to import from Australia. He noted that less than 2% of Australian exports to this area is sent from Sydney Airport. He noted investigations occurring into block chain tracking, which is already occurring in the meat and livestock exports.</p> <p>Mr Sangster listed the partners who are interested in investing in the Western Parklands City, and noted that Hitachi has made a commercial commitment.</p> <p>He spoke about planning for a 22nd century city and made comparisons to how Japan plans its cities in 100- and 200-year cycles, and how land use planning is ensuring that no development would affect the 24/7 operations of the airport.</p> <p>Mr Sangster then spoke about the next steps in the Precinct Plan and Master Planning, which include the Mamre Road area (industrial land demand), the aerotropolis core, and agribusiness and storage land uses. He noted that plans for North Luddenham, Rosemore and Kemps Creek areas would be expected to done later.</p> <p>The Chair thanked Mr Sangster for his presentation and asked members for questions.</p> <p>Members discussed access to water in the area, with a focus on the Hawkesbury region. It was mentioned that new ways to approach water management need to be considered and that now was the time to start. Members noted that the media rarely mentions anything positive about recycled water opportunities.</p>	
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		<p>Mr Jacob Idiculus noted that Western Sydney should be a centre from which expertise can be exported and that connectivity is very important in making this happen.</p> <p>Cr Paul Rasmussen noted he would like to see jobs growth throughout the region, and not limited to the Aerotropolis. Mr Sangster replied jobs will be created throughout the whole Western Parkland City.</p> <p>Mr Bob Germaine said in 2016, Regional Development Australia conducted a survey with outcomes that may be relevant for the WCAA to consider.</p> <p>Mr Sangster noted said that when he talked to manufacturers in Mascot they said they cannot afford expand in their current location. Brisbane Airport has recently had expansions that include such things as expansive ripening facilities which are attractive to exporters; however, there is simply no room for this in Mascot.</p> <p>The Chair mentioned that the development of Western Sydney allows for incredible opportunities, but noted that care was needed when talking to overseas investors as confusion can be created between projects. He also reiterated a member's earlier comment, noting that it was important not to forget the areas of Western Sydney outside of the Western Sydney Aerotropolis Plan area.</p>	
7.	Communications Update	<p>Ms Sarah Leeming provided an update on the Department's communication and engagement activities. She noted that:</p> <ul style="list-style-type: none"> • there is 90% awareness of the Airport among the Western Sydney community; • following feedback from FOWSA and the community, the Department had undertaken evaluative research at the Local Government Authority (LGA) level • the Blue Mountains and Campbelltown LGAs displayed the lowest levels of favourability. For Campbelltown, members suggested this is because better transport links have not yet eventuated. 	

		<ul style="list-style-type: none"> the Department will give a presentation on this research at the next FOWSA meeting. <p>Ms Alison Morgan noted that work on the City Deal commitment for rapid buses to Campbelltown is being progressed.</p> <p>A number of members said that other surveys and research was being conducted, eg at the Council level, on community attitudes and it would be useful to discuss these at a future meeting.</p>	
8.	Other Business	<p>Ms Leeming noted that she'd like to speak to members about the design of tools or graphics for flight paths (once developed) to the community to ensure that tools were created to answer any questions they may have.</p> <p>The Chair asked members to consider what type of information would be useful to answer community queries.</p> <p>The Chair asked members for any final questions on Dr Bullen's earlier presentation, and also members' views on how they're waiting on your technical presentation could be summarised to present to the community. Members discussed that it was important to clarify that operations at WSA could not be compared to KSA.</p> <p>Ms Leeming noted that Simone Concha, WSA's Sustainability Manager, has offered to speak to FOWSA about the WSA sustainability plan.</p> <p>Mr John Walton confirmed he had seen the correspondence responding to Mr John Harding's query about permissible development within the ANEC and that he believed the matter has been addressed.</p>	<p>Action Item 3: Secretariat to arrange Ms Concha to speak at future meeting</p>
9.	Upcoming Meetings	<ul style="list-style-type: none"> Meeting 11 – Friday, 24th April 2020 	

Status of Outstanding Action Items

Meeting 1, 26 May 2017

Action Item Number	Action Item	Status
4	FOWSA Secretariat to distribute meeting papers to members electronically one week in advance of FOWSA.	Ongoing

Meeting 7, 29 March 2019

Action Item Number	Action Item	Status
5	Secretariat to arrange a presentation to FOWSA in 2020 on the Future Food Systems Cooperative Research Centre.	Ongoing
6	Secretariat to consider future presentations to FOWSA in 2020 on the state of air and water quality in Western Sydney, and on the use of alternative fuels and technologies at WSA, including bioenergy.	Ongoing

Meeting 10, 6 December 2019

Action Item Number	Action Item	Status
1	Secretariat to arrange for next meeting to be held at WSA's Visitor Experience Centre	
2	Secretariat to send members a list of the engagement the Department has had with Dr Ancich/Mr Carter	
3	Secretariat to arrange for Ms Concha, Sustainability Manager WSA Co, to speak at a future meeting	

Attendees

Professor Peter Shergold AC (Chair) – Chancellor, Western Sydney University
Mr Wayne Wilmington – Resident of Luddenham
Mr Gregory Copeland – Resident of Camden
Mr John Walton – Resident of Silverdale
Ms Joanne Bromilow – Resident of Blaxland
Mr Jacob Idiculas – Resident of Bossley Park
Ms Kiersten Fishburn – CEO, Liverpool City Council
Cr Ross Fowler OAM – Mayor, Penrith City Council
Ms Lindy Deitz – General Manager, Campbelltown City Council
Mr Bob Germaine – Regional Development Australia Sydney
Mr Jim Davis – Regional Aviation Association of Australia
Ms Lee de Winton – CEO, Sydney Metro Airports Bankstown and Camden
Ms Alison Morgan – Director, Sydney Region, New South Wales Department of Premier and Cabinet
Mr Mustafa Agha – Sydney Business Chamber
Mr Will Spence – Office of Senator the Hon Marise Payne

Ex Officio Members

Nicole Ryan – Western Sydney Airport
Scott MacKillop – Western Sydney Airport

Apologies

Senator the Hon Marise Payne – Senator for New South Wales
Ms Melissa McIntosh MP – Federal Member for Lindsay
Ms Anne Stanley MP – Federal Member for Werriwa
Dr Mike Freelander – Federal Member for Macarthur
Mr Gordon Henwood – Resident of Mulgoa
Mr Paul Chevalier – Virgin Australia
Ms Britt Walters – Qantas
Dr Rosemary Dillon – General Manager, Blue Mountains City Council
Mr David Borger – Western Sydney Director, Sydney Business Chamber



1 May 2019

WM Project Number: 14168

Our Ref: DIRDC010519 RB

Email: phil.hambly@infrastructure.gov.au

Mr Phil Hambly
Environmental Conditions & Approvals | Western Sydney Unit
Department of Infrastructure, Regional Development and Cities
111 Alinga Street
CANBERRA ACT 2600

Dear Mr Hambly

Re: Comments on Report by Eric Ancich

This letter sets out comments on the report *"Assessment Of Measured Aircraft Noise Levels Under The Existing Flight Paths of Sydney Kingsford Smith Airport With Reference To Western Sydney Airport"* by Eric J. Ancich ("the Ancich report").

The Ancich report includes measured noise levels from aircraft approaching and departing Sydney Airport at three locations and compares these with previously predicted levels from aircraft using Western Sydney Airport (now Nancy-Bird Walton Airport). The previously predicted levels are taken from the Environmental Impact Statement for Western Sydney Airport ("the EIS").

There are four separate issues with regard to the measurements presented in the Ancich report, each of which tends to increase the reported noise levels compared with those in the EIS.

1. Measurement instrumentation was set to "Fast" time-constant. All standard references for aircraft noise measurement, including Australian Standard 2021, indicate that maximum noise levels should be measured using "Slow" time-constant. The fast setting tends to increase the measurement result.
2. Maximum noise levels quoted in summary discussion in the Ancich report represent the highest levels measured during any overflight. Standard procedures for reporting maximum aircraft noise levels are that the reported level should be the mean of maximum noise levels for overflights for that aircraft type.

Points 1 and 2 are explicitly covered in Australian Standard 2021, which represents the most authoritative reference for aircraft noise measurement in Australia. Section 1.5.2 of AS 2021:2015, headed "Aircraft Noise Level" reads:

"The arithmetic average of the maximum sound levels occurring during a series of flyovers by a specific aircraft type and load conditions measured in A-weighted decibels [dB(A)] using the S time-weighting of a sound level meter."

Note 2 to that section reads:

"Internationally, aircraft noise is measured using slow (S) time-weighting, and the extensive databases and programming algorithms used in determining aircraft noise exposure levels use data based on S time-weighted measurements. Consistent with these practices, aircraft noise measurements and assessments in Australia use S time-weighting and an average of the maximum noise levels."

In combination, points 1 and 2 could easily result in an overestimation of 5-10 dB in reported noise levels.

3. Noise levels from aircraft on approach as reported in the Ancich report were recorded at two locations approximately 23 km north of the airport. At this point, aircraft approaching Sydney Airport will typically be at a stable height, or else be in the process of commencing their final descent. The process of maintaining stable height, and of transitioning to final descent, involves additional noise due to required thrust and flap settings.

At Western Sydney Airport, the EIS proposed that all aircraft would adopt "continuous descent approach" procedures which eliminate this additional noise. This proposal is incorporated in all predicted noise levels.

The Ancich report states (Section 4.4.1) with reference to the EIS document:

"Figure 10-7 of Volume -2a Chapter 10 Noise Aircraft "Concept Diagram of Continuous Descent Approach Zone of Noise Benefit" shows there is no benefit within approximately 20 km of the end of the runway. On this basis the noise level data recorded at Pymble Ladies College and Avondale Golf Course at 23 km from KSA equivalent to 19.28 km from WSA to Blacktown can be adopted as is."

The figure referred to is reproduced below.

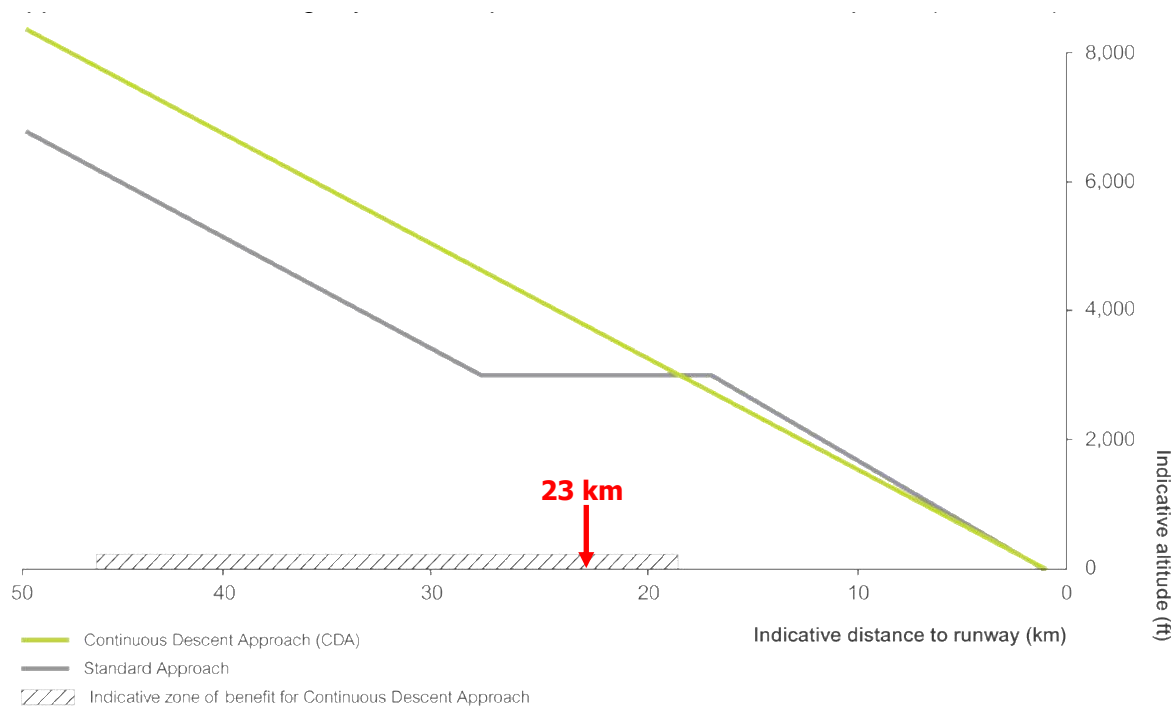


Figure 10-7 Concept diagram of continuous descent approach showing zone of noise benefit

At 23 km from the runway threshold, the figure clearly indicates a benefit from continuous descent approach, and hence that noise levels measured for Sydney Airport will be overestimates of those at Western Sydney Airport. In fact, in this area, the benefit is likely to be greatest because aircraft at Sydney are commencing the transition to final descent.

4. The Ancich report does not specifically indicate whether noise measurements were attended or unattended, nor does it provide a map or other indication of the exact measurement locations. The use of a "Sentinel On Demand" system at the two Pymble locations indicates that they were unattended. At the Mays Hill location it is not clear, although describing the measurement system as a "Brüel & Kjær Model 2250 based noise logger" suggests they were unattended.

At distances from the airport similar to those adopted in the Ancich report, the influence of extraneous noise may be very significant, and this would be exacerbated when Fast speed time constant is used. Simply aligning a recorded maximum noise level in time with an aircraft overflight does not guarantee that the recorded noise was due to the aircraft. Airservices Australia operates a sophisticated network of unattended noise monitors, using Slow speed time constant and incorporating pattern-matching algorithms to further sort aircraft from non-aircraft noise, but this group has found its system to be unreliable at distances greater than about 10 km from the airport (largely due to extraneous noise).

Figures in the Appendix to this report show noise levels, taken from the Ancich report, for two common aircraft types recorded at all three measurement locations. The range of recorded noise levels from the same aircraft type at the same location is very large – up to 15 dBA – and the difference between the highest level and the mean level is 4 – 8 dB. In addition, contrary to the statement in the conclusion of the Ancich report that "*measurement of noise generated by aircraft in flight has demonstrated that variability in the height of aircraft will result in a wide range of receiver noise levels*", there is no discernible correlation between recorded noise level and aircraft height.

These results strongly suggest the influence of extraneous noise in the higher readings recorded.

Finally, it is interesting to compare the results in the Ancich report with those from Airservices noise monitors located much closer to the airport. (Data are for the most recently-available period, October-December 2018.) Results are shown in Table 1 and Table 2. In the case of data from the Ancich report, the mean maximum levels are shown, which removes the influence of factor 2 above and reduces levels by 4-8 dBA compared with those quoted in the report.

For arrivals, even after removing the effect of factor 2, reported noise levels at 23 km are similar to or higher than those reported from the Airservices monitor at 10 km. This indicates significant additional overestimation in values in the Ancich report, presumably due to factors 1, 3 and 4 above.

For departures (for which factor 3 above is not relevant), the remaining discrepancy is less obvious, which may mean that factors 1 and 4 are less important in these results.

Table 1 Mean Maximum Aircraft Noise Levels from Arrivals

Location	Approximate distance from runway, km	L _{Amax} noise level, dBA and number of recorded operations	
		A320-232	737-838
Pymble Ladies College	23	69 ⁽¹⁾ (38)	69 ⁽¹⁾ (19)
Avondale Golf Course	23	71 ⁽¹⁾ (11)	68 ⁽¹⁾ (13)
Airservices Hunters Hill monitor	10	68 ⁽²⁾ (2684)	68 ⁽²⁾ (5772)

Note (1): Fast speed

Note (2): Slow speed

Table 2 Mean Maximum Aircraft Noise Levels from Departures

Location	Approximate distance from runway, km	L _{Amax} noise level, dBA and number of operations	
		A320-232	737-838
Mays Hill	21	63 ⁽¹⁾ (9)	65 ⁽¹⁾ (16)
Airservices Croydon monitor	8	69 ⁽²⁾ (304)	72 ⁽²⁾ (749)

Note (1): Fast speed

Note (2): Slow speed

Results from the Airservices monitors are consistent with the statements quoted from the EIS that:

- for arrivals, the 70 dBA contour for an A320 extends 8-10 km from the runway end; and
- for departures, the 70 dBA contour for an A320 extends 5 km from the runway end.

In conclusion, the effect of the four factors listed above is that noise levels quoted in the Ancich report are not comparable with predictions in the EIS for Western Sydney Airport. Noise levels in the Ancich report were not measured or reported in the standard way, ignore proposed procedural changes at Western Sydney Airport, and are likely to be affected by extraneous noise. The report offers no reason to question the validity of noise level predictions in the EIS.

Yours sincerely

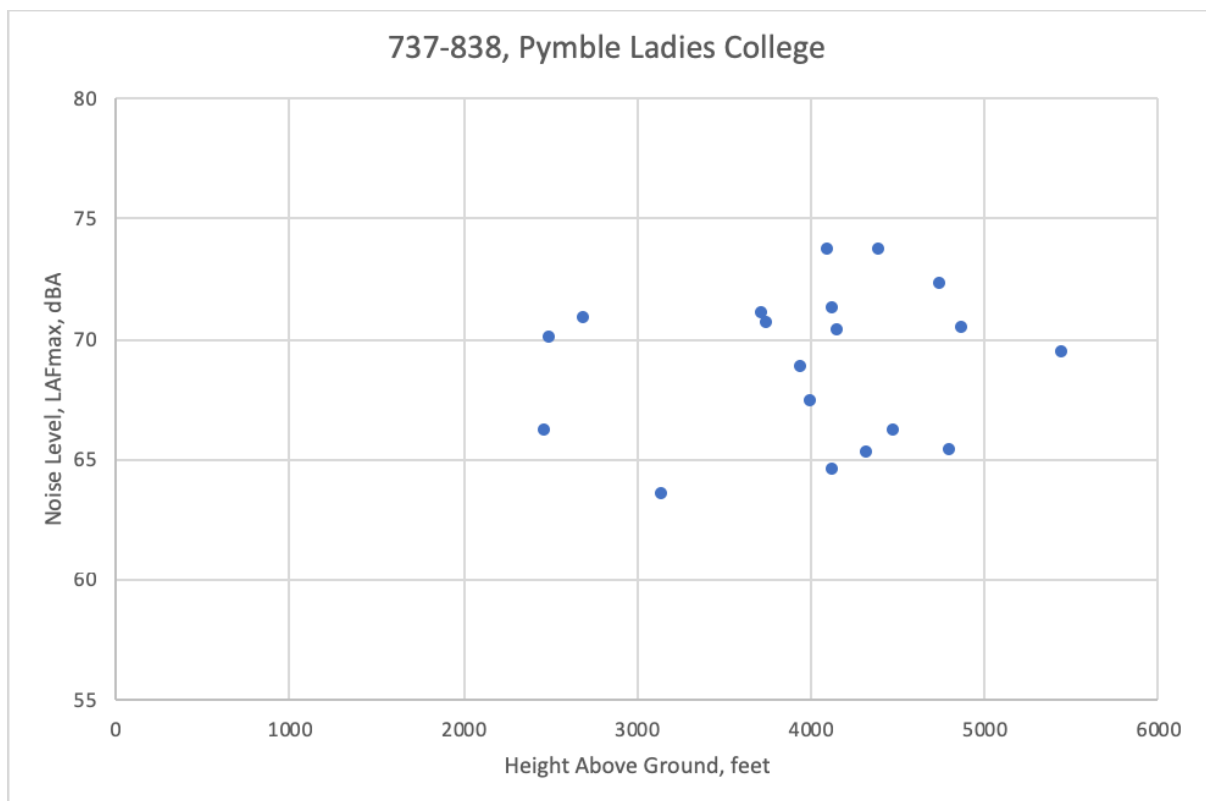
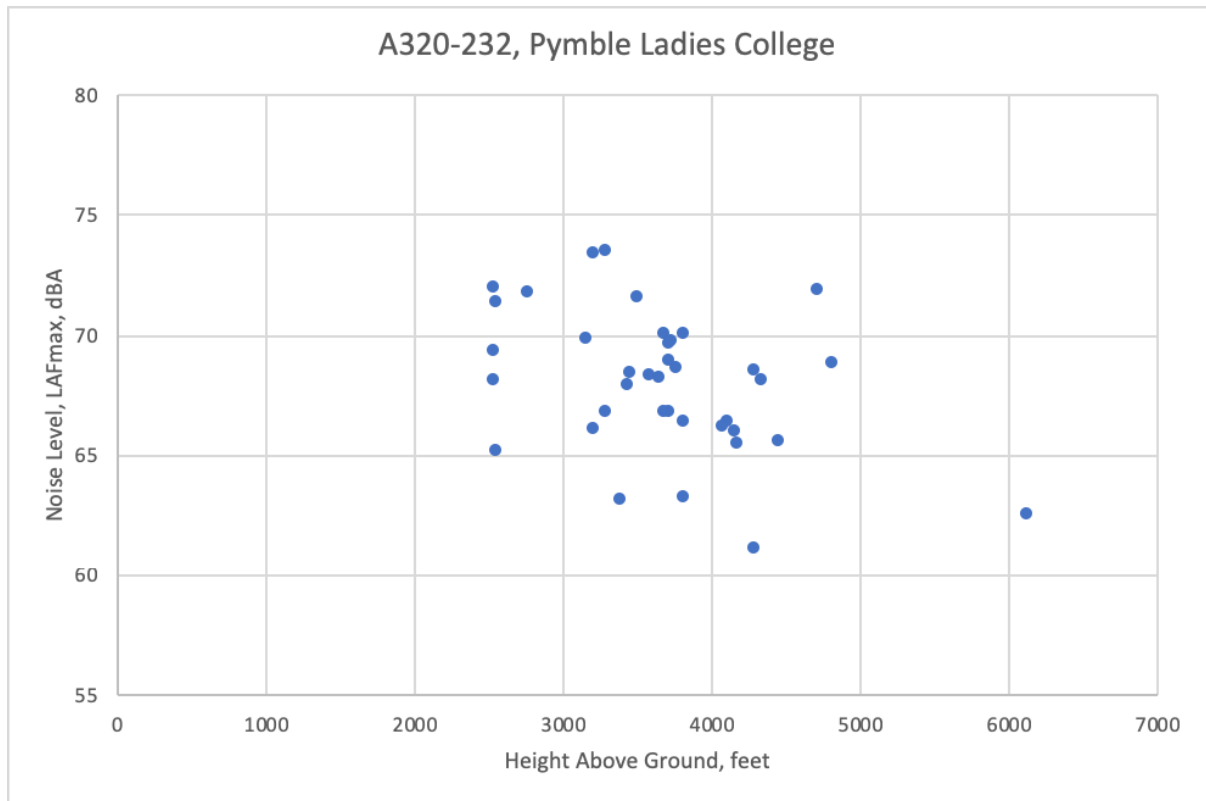
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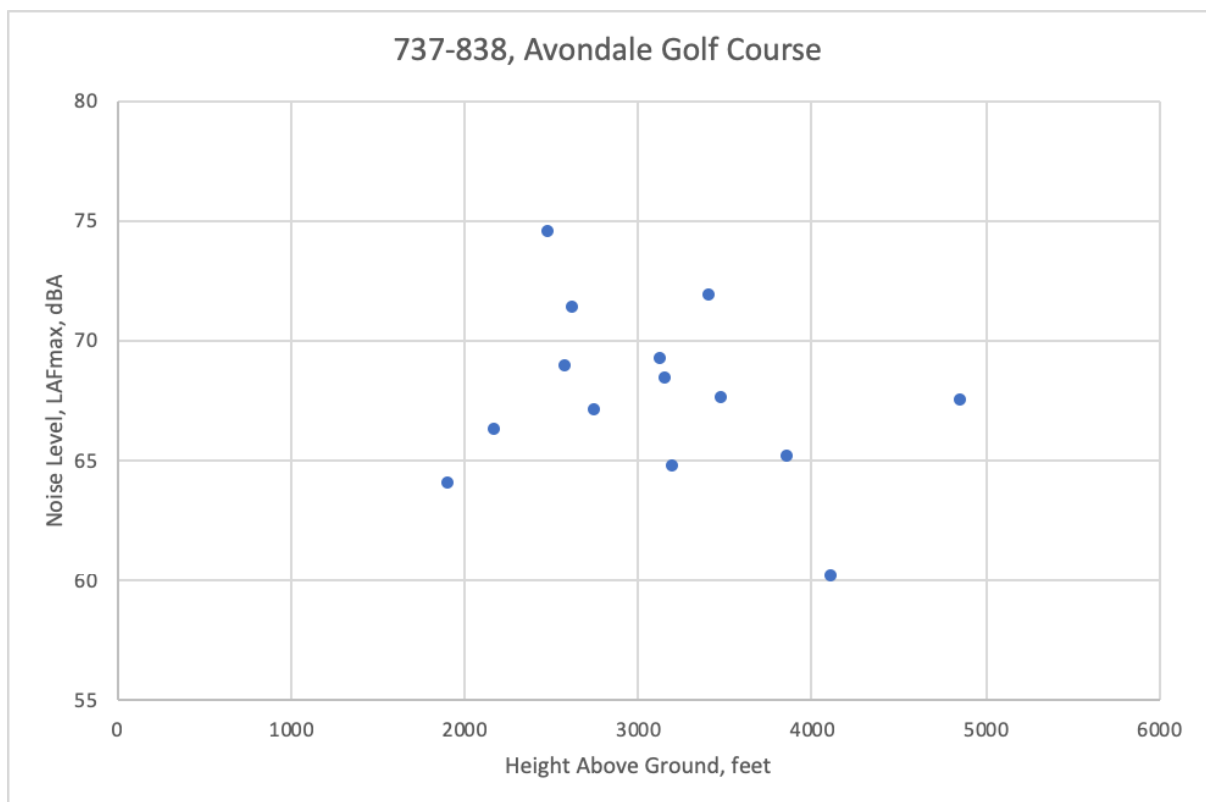
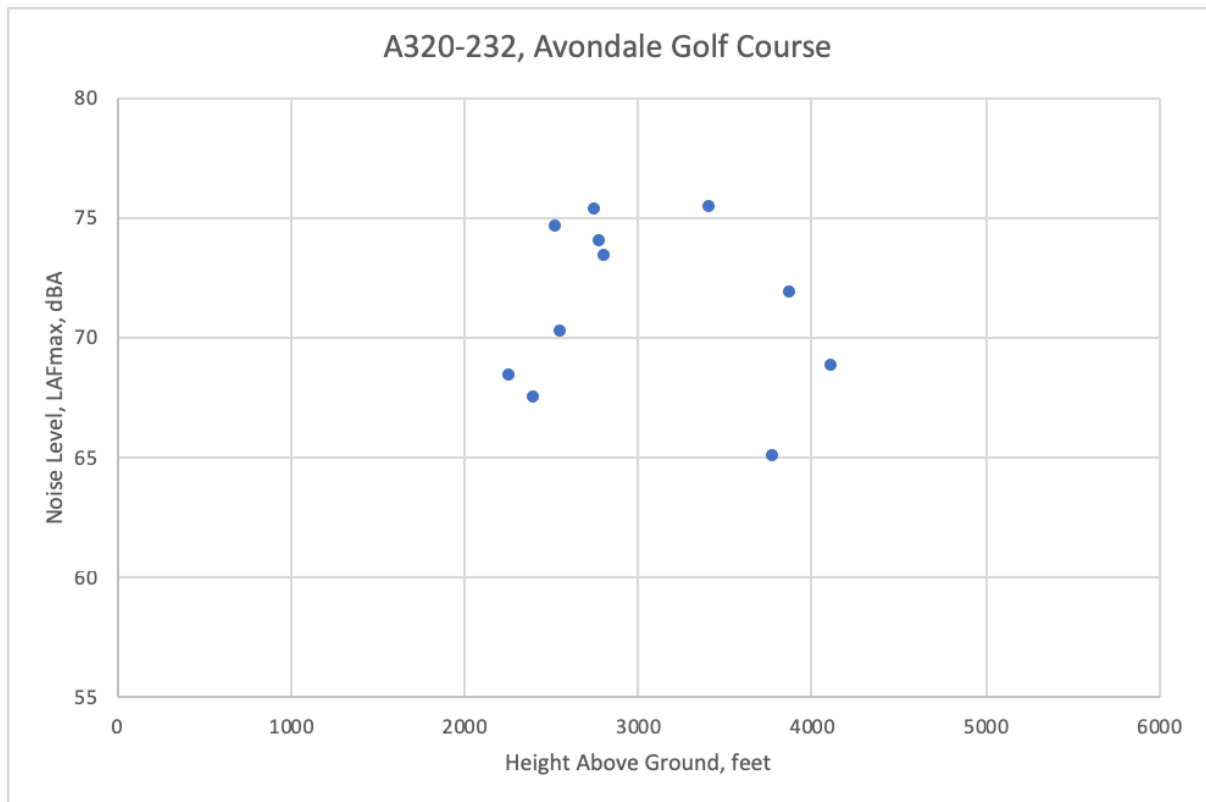
A handwritten signature in black ink, appearing to be 'Rob Bullen', with a stylized, flowing script.

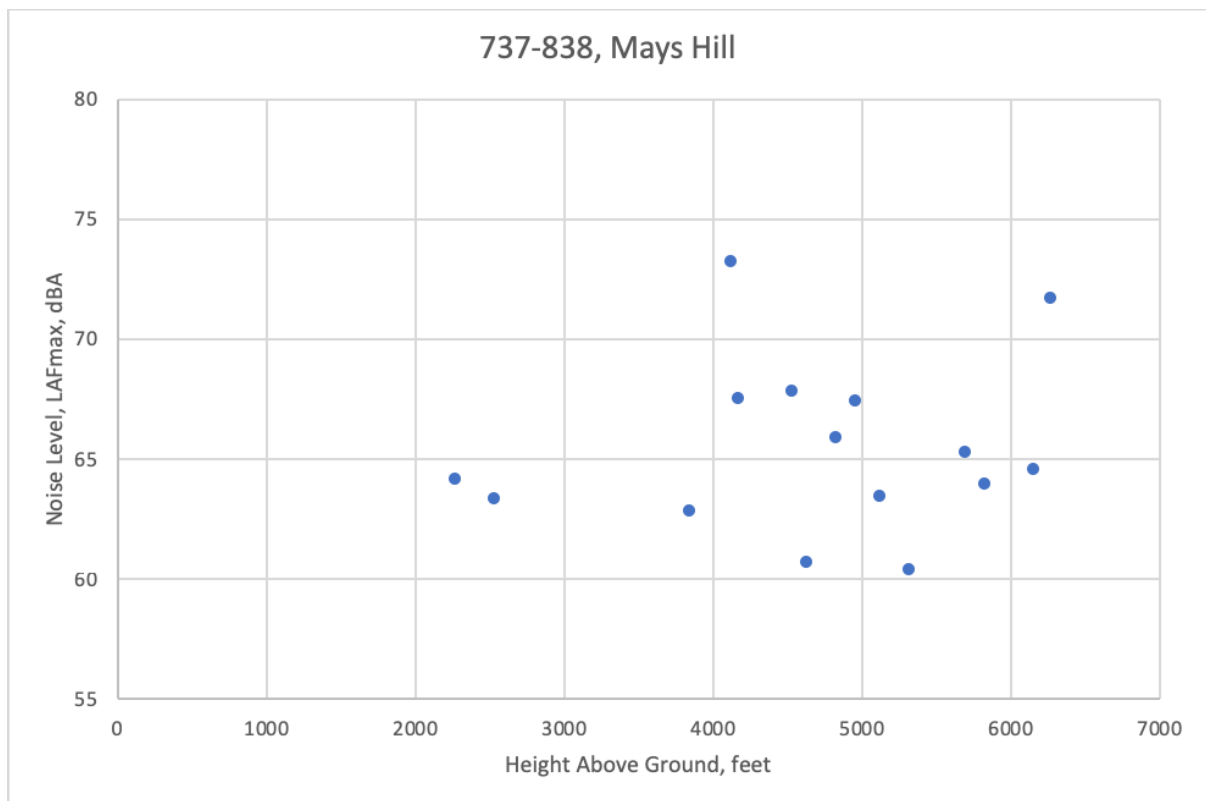
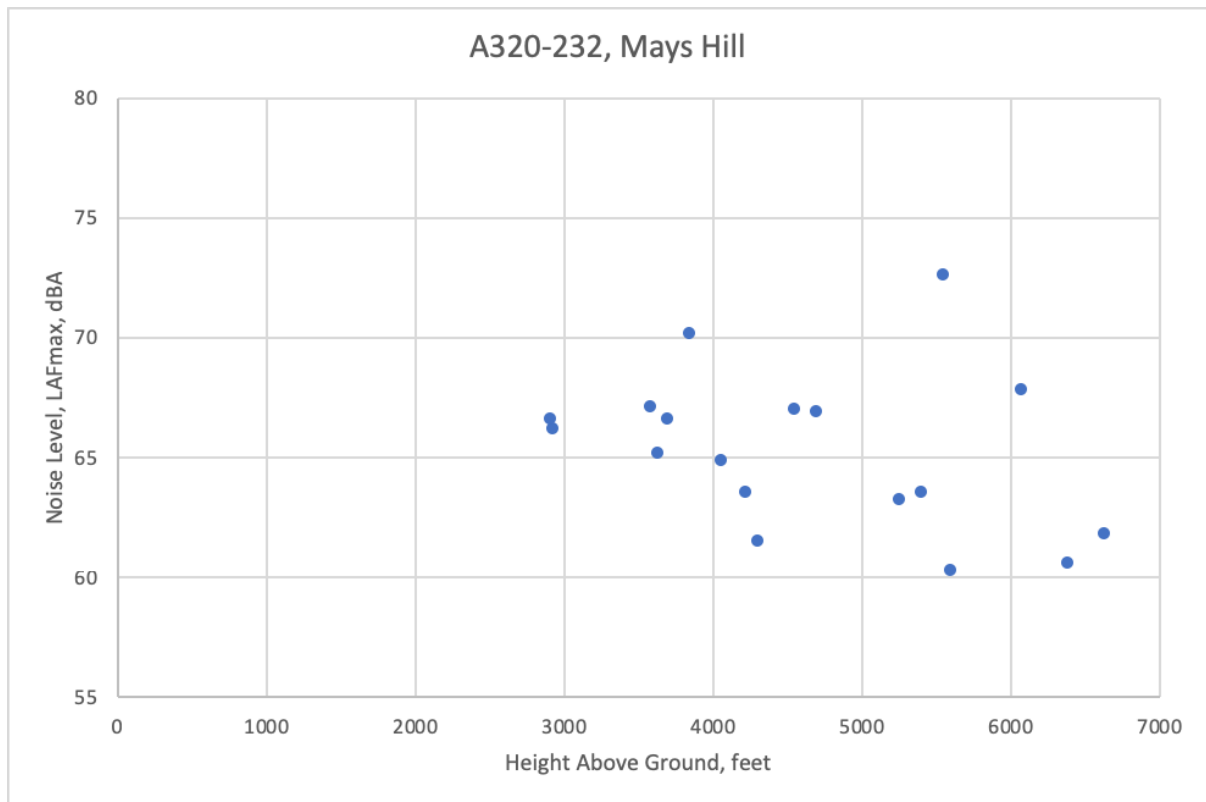
Rob Bullen

Principal

APPENDIX A







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17 December 2019

s22

Airspace Design & Environmental Approvals; Western Sydney Unit
Department of Infrastructure, Transport, Cities and Regional Development
GPO Box 594
Canberra ACT 2601

s22

COMMENTS ON THE MEASUREMENT OF AIRCRAFT NOISE IN RELATION TO MEASUREMENTS UNDERTAKEN BY DR ERIC ANCICH AND MR DOM CARTER

Dear s22

Report 9173-R1 by Dr Eric Ancich describes aircraft noise measurements undertaken by Dr Ancich and Mr Dom Carter. It claims that the measurements contradict results presented in the Environmental Impact Statement for Western Sydney Airport ("the EIS"). This letter provides comments on those results, taking account of subsequent discussion with Dr Ancich and Mr Carter.

Also included in this letter is a brief summary of documents relating to the assessment of aircraft noise in Australia.

Response to Report 9173-R1

The Western Sydney Airport EIS showed predicted noise levels in terms of a number of descriptors including L_{Amax} , N70, N60 and ANEF. The emphasis in evaluation was on N70 and N60, for reasons described below. The comments in Dr Ancich's report relate only to the L_{Amax} descriptor.

Briefly, I believe discrepancies between the measurements and EIS results are due to three factors:

1. The measurements used the "Fast" speed setting on the measurement equipment whereas the EIS predictions are for "Slow" speed (as required in standard aircraft measurement procedures);
2. The measurements quote the absolute maximum noise level recorded whereas the EIS predictions are based on an average of maximum noise levels for a specific aircraft type and operation;
3. For approaches, measurements were made at a location where aircraft procedures are not equivalent to the "continuous descent approaches" proposed for Western Sydney Airport.

With respect to point 1, I believe there is agreement that “Slow” speed setting is the appropriate measurement procedure for aircraft noise, although there is disagreement about the difference between maximum noise levels that would be obtained using “Fast” and “Slow” speed. The size of the difference could be demonstrated relatively simply using existing or newly-obtained audio recordings of aircraft operations. My experience indicates that the difference would be 2 – 5 dBA.

With respect to point 3, I believe there is also agreement that noise levels from approaches at Western Sydney Airport should be measured or calculated using the operating procedures that will be used at WSA. Demonstrating the likely noise levels at WSA would require measurements from aircraft executing continuous descent approaches (while keeping in mind that differences occur between measurement sites). A recent well-documented study at Louisville Airport, U.S.A. indicates that introducing continuous descent approaches resulted in a reduction of 4-7 dBA in maximum noise levels.

This leaves point 2, which is related to the meaning of the maximum noise level descriptor identified as L_{Amax} in the EIS. I can confirm that in this EIS and others, maximum noise levels are described in terms of an average of maximum noise levels from a specific aircraft type performing a specific operation, and not by the highest maximum level that would be measured during any such operation. A remaining question is whether wording in the EIS made this sufficiently clear.

The EIS indicates (Section 10.5.3):

Single-event noise contours depict the maximum (L_{Amax}) noise levels resulting from a single operation of a specific aircraft type on all applicable arrival or departure flight paths.

This is admittedly unclear – single operations by a specific aircraft type will result in a range of maximum noise levels, and exactly how this range is “depicted” is not stated. If the intention had been to describe only the highest of these maximum levels the wording would presumably have been “...the **highest** maximum (L_{Amax}) noise **level** resulting from **any** single operation ...”. However it would certainly have been clearer if the process of averaging these maximum levels had been explicitly stated. Confusion could have been avoided by the insertion of two words –

*“Single-event noise contours depict the **average of** maximum (L_{Amax}) noise levels ...”*

Nevertheless, the following paragraph and other text in the EIS indicates that the maximum levels presented result from use of the INM model, and as pointed out by Dr Ancich this model predicts average maximum noise levels. (Prediction of absolute maximum noise levels within reasonable error bonds would not be possible.)

This usage is also consistent with the description of maximum aircraft noise levels in AS 2021, as described below, and I believe it is consistent with generally-understood usage in cases where a series of different maxima are to be combined.

In summary, I do not believe there is any contradiction between Dr Ancich's results and those in the EIS when the three factors listed above are considered, although I concede that in future reports the definition of the L_{Amax} noise descriptor should be clarified.

Documents Describing the Assessment of Aircraft Noise in Australia

Australian Standard 2021

This Standard is concerned with land use planning – that is, with bringing new residents to existing aircraft noise – rather than with assessment of the impact of new aircraft noise, as required in the EIS. The acceptability of building sites is assessed using the ANEF descriptor. I regard the advice in this Standard as definitive for land use planning, but of only marginal significance in the assessment of proposed new or altered aircraft noise. (It is useful only insofar as it delineates which land areas would be available for new development in the future.)

AS 2021 also makes use of a descriptor called the “aircraft noise level”, for purposes unrelated to the description of noise impacts. The descriptor is defined as:

The arithmetic average of the maximum sound levels occurring during a series of flyovers by a specific aircraft type and load conditions measured in A-weighted decibels (dB(A)) using the S time-weighting of a sound level meter.

The “aircraft noise level” is often identified with the L_{Amax} descriptor, although AS 2021 does not use that term.

Standards Australia Handbook : “Acoustics—Guidance on producing information on aircraft noise”

This handbook provides a description of the information that should be provided to residents and potential residents to allow them to better understand aircraft noise impacts. The most important recommended descriptors are N60 and N70, and this is reflected in the prominence given to those units in the EIS. However, other units are also discussed, including a unit called L_{Amax} . This is described very similarly to the description in the EIS, and unfortunately the lack of clarity in its definition, as described above for the EIS, remains in this document.

Expanding ways to describe and assess aircraft noise

This report, dating from 2000, represents the first attempt to document alternative noise descriptors to ANEF and similar units, for use in the assessment of new or changing aircraft noise. It describes the N70 and N60 descriptors, which still form the basis of assessments today, as well as other units which are not now in common use. It does not mention a descriptor of single-event aircraft noise levels.

National Airports Safeguarding Framework, Guideline A

This more recent document describes land use planning guidelines that are intended to extend the range of areas covered under the guidelines in AS 2021. The metrics used are ANEF, N70, N65 and N60. While I strongly support the provision of information using those descriptors to potential residents over a wide area, I do not support the use of the criteria in this document as formal land use planning guidelines. The document makes no mention of $L_{A\text{Max}}$ noise levels.

Environmental Impact Statements

Since the release of the “Expanding ways ...” document, the practice of aircraft noise assessment in Australia has grown up through the production of Environmental Impact Statements for major projects. These include:

- runway extension at Gold Coast Airport;
- additional runway assessments for Brisbane, Perth and Melbourne airports;
- runway lengthening and re-configuration at Sunshine Coast Airport; and
- new Western Sydney Airport.

All these documents use (at least) N60 and N70 descriptors to investigate both overall noise impacts and differential impacts between various airport use options. Most also include a single-event noise descriptor (always an average of maximum noise levels from similar events).

More recent documents also include increasingly sophisticated measures of noise exposure, including representations of daily and seasonal variation in numbers of movements, in response to public concerns. These concerns typically relate to numbers and times of operations rather than to absolute noise levels. Other recent innovations include on-line provision of information for specific locations, and I expect that further additions will also be made to the information available to residents in forthcoming assessments.

I trust that this information is helpful. If you require further information or clarification, please do not hesitate to contact me.

Yours sincerely,

ROB BULLEN CONSULTING



Rob Bullen
Principal

WESTERN SYDNEY AIRPORT NOISE ASSESSMENT

RESPONSE TO ANCICH REPORT

REPORT NO. 14168-10
VERSION B

JULY 2019

PREPARED FOR

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DOCUMENT CONTROL

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APPENDIX A – COMPARISON OF AIRCRAFT HEIGHTS

1 INTRODUCTION

A report prepared by Eric Ancich^(R1) is critical of the noise assessment included in the Environmental Impact Statement for Western Sydney Airport.

This current report responds to the Ancich Report and concludes that the EIS noise report is valid. This current report provides general comment on the noise measurement procedures adopted by Mr Ancich and also responds specifically to claims made in the Ancich Report.

2 COMMENT ON ANCICH MEASUREMENTS

Before addressing specific claims in the Ancich Report, it is important to understand the measurement procedure adopted by Mr Ancich.

The Ancich Report includes measured noise levels from aircraft approaching and departing Sydney Airport at three locations and compares these with previously predicted levels from aircraft using Western Sydney Airport. The previously predicted levels are taken from the Environmental Impact Statement for Western Sydney Airport (the EIS).

There are four separate issues with regard to the measurements presented in the Ancich Report, each of which tends to increase the reported levels compared with those in the EIS.

- 1) The noise measurement instrumentation was set to "Fast" time constant. All standard references for aircraft noise measurement, including Australian Standard 2021:2015, indicate that maximum noise levels should be measured using "Slow" time constant. The Fast setting tends to increase the measurement results. Depending on the aircraft movement type, this could have the effect of increasing the aircraft noise level by 3-5dB.
- 2) The maximum noise levels quoted in the summary discussions in the Ancich Report represent the highest levels measured during any overflight for particular aircraft. Standard procedures for reporting maximum aircraft noise levels are that the reported level should be the mean (average) of the maximum noise levels for overflights. The most authoritative reference for aircraft noise measurement in Australia is Australian Standard AS2021:2015. Section 1.5.2 of this standard defines "aircraft noise level" as follows:

The arithmetic average of the maximum sound levels occurring during a series of flyovers by a specific aircraft type and load conditions measured in A-weighted decibels [dB(A)] using the S-time weighting of a sound level meter.

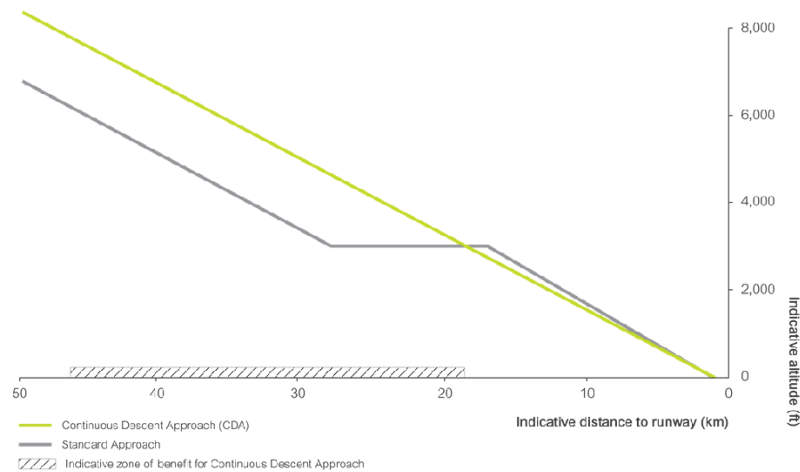
Note 2 to that section reads:

Internationally, aircraft noise is measured using Slow (S) time weighting and the extensive databases and programming algorithms used in determining aircraft noise exposure levels use database on S-time weighted measurements. Consistent with these practices, aircraft noise measurement and assessments in Australia use S-time weighting and an average of the maximum noise levels.

The use of the highest level, rather than the mean level, may result in the reported level being a significant overestimate, by up to 5-10dB depending on the range of measured levels.

- 3) Noise levels from aircraft on approach as reported in the Ancich Report were recorded at two locations approximately 23km north of Sydney Airport. At this point, aircraft approaching Sydney Airport will typically be at a stable height, or else be in the process of commencing their final descent. The process of maintaining stable height, and of transitioning to final descent, involves additional noise due to required thrust and flap settings. Noise levels at this distance from the airport therefore tend to be higher than would otherwise be expected. This is in contrast to the "*continuous descent approach*" procedure adopted for Western Sydney Airport, specifically to eliminate this additional noise. In the EIS, all approaches have been taken as continuous descent approaches. The difference between the current Sydney Airport approach (standard approach) and the EIS assumed continuous descent approach is demonstrated in Figure 2-1.

Figure 2-1 Comparison of Sydney Airport standard approach & Western Sydney Airport continuous descent approach



Note: Figure taken from the EIS

At 23km from the runway threshold (where approaches were measured by Mr Ancich) the figure clearly indicates a benefit in height and noise from continuous descent approach and hence that noise levels measured for Sydney Airport will be over-estimates of those at Western Sydney Airport. In fact, at this distance, the benefit of the proposed continuous descent approach would be greater than indicated in the graph because the aircraft at Sydney Airport would be commencing the transition to final descent and generating higher noise levels.

- 4) Based on information provided by Mr Ancich in a recent radio interview, the noise measurements were carried out using unattended procedures. Noise loggers were left in position for a number of days and data recorded by the loggers was later analysed. At the significant distances from the airport where Mr Ancich carried out his measurements, the influence of extraneous noise may be very significant, and this would be exacerbated when Fast time constant is used (as opposed to slow time constant). Simply aligning a recorded maximum noise level in time with an aircraft overflight does not guarantee that the recorded noise was due to the aircraft. It is possible that some of the recorded noise levels attributed to aircraft overflight were in fact caused by sources other than aircraft.

The four factors discussed here are significant in relation to the aircraft noise levels reported in the Ancich Report. Factors 1 and 2 combined could result in an over-estimation of the reported noise levels by at least 5-10dB. The over-estimation as a result of factor 3 is difficult to determine, as is any over-estimation relating to factor 4.

3 RESPONSE TO SPECIFIC ANCICH CLAIMS

This section of the report addresses specific claims made by Mr Ancich in the Ancich Report.

3.1 Claim regarding measurement sites

Section 5.2 of the Ancich Report indicates that the sites at which the sound level meters were set up at Pymble and Mays Hill make the results applicable to Blacktown and Lower Blue Mountains under Western Sydney Airport operating conditions.

Given that the two Pymble measurement locations are higher than Sydney Airport and that Blacktown is lower than Western Sydney Airport, it is correct that the Pymble measurement locations generally represent the Blacktown area.

The measurement location at Mays Hill was selected to measure aircraft departure over this area. Given the uncertainty of departure flight paths, it is less clear that the Mays Hill location generally represents the lower parts of the Blue Mountains in respect of Western Sydney Airport. However, it is reasonable to interpret the measurement results at Mays Hill as generally applying to the lower parts of the Blue Mountains.

3.2 Claims regarding aircraft noise levels and comparison with noise levels quoted in the EIS

Three claims are made regarding noise levels of aircraft departing in Section 4.1.2 of the Ancich Report.

The 70dBA contour for an A320 aircraft on departure extends to 19.28km not 5km.

Analysis of the measurement results indicate that the mean level of an A320 at Mays Hill (incorrectly using Fast time response) is 63dBA. Since this level is less than 70dBA, the 70dBA noise contour does not extend to 19.28km.

The 70dBA contour for a 747D on departure extends to 19.28km not 15km.

Analysis indicates that the mean fast time response level for a 747D on departure is 68dBA at Mays Hill, indicating that the 70dBA noise contour would fall well short of 19.28km.

The 70dBA noise contour extends further than that predicted by the EIS for most aircraft.

For the reasons described in Section 2 above, the noise levels measured by Mr Ancich are erroneous and this statement is incorrect.

The responses indicated in relation to A320 and 747D aircraft on departure only address factor 2 of the four factors discussed in Section 2 above. The other three factors would have the effect of reducing the noise levels at Mays Hill, and therefore reducing the extent of the 70dBA noise contour.

Section 4.2.2 makes two claims which are here responded to.

The 70dBA contour for a 747-4D7 aircraft on arrival extends to 23km compared to the distance in the EIS of 15-17km.

The mean noise level measured at Avondale Golf Course for a 747-400 on approach was 75dBA. This finding appears not inconsistent with the statement above. However, the mean level reported only takes into account factor 2 as discussed in Section 2 above and factors 1, 3 and 4 are expected to reduce the actual noise level at Avondale Golf Course which may render the statement incorrect.

The 70dBA contour for an A320 aircraft on departure extends to 19.28km compared to the distance in the EIS of 5km.

The mean level determined for an A320 is 63dBA. The 70dBA contour therefore does not extend to 19.28km.

Section 4.3.3 stated that the EIS predicted that the maximum noise levels would range up to 55dBA over Blaxland at 5,000 feet (actual height above ground level is 4,232 feet). The study data indicates that the noise level would reach 73.6dBA.

This comment appears to assume that aircraft departing Western Sydney Airport would fly over Blaxland, as aircraft departing from Sydney Airport fly over Mays Hill. This is not correct. The level of 55dBA referred to in the EIS for Blaxland is based on aircraft flying over Blaxland, largely arriving at Western Sydney Airport.

The same section also indicates that an A380-841 at 3,988 feet generated a noise level of 72.4dBA. Monitoring 263 flights on approach at KSA at Pymble Ladies College and Avondale Golf Course (23km) showed for flights around 5,000 feet noise levels averaged around 70dBA.

This statement is generally correct, on the assumption of measurements being made using the Fast time response. Lower levels would be expected using the Slow time response.

A number of claims are made in the Ancich Report in Section 4.6.2.

Based on the study results popular aircraft types including 320-232, 330-343 and 737-8FE would generate noise levels up to 75.3dBA over Blacktown.

The L_{Amax} recorded in the study Avondale Golf Course was 81.9dBA for a 747D. This will apply to Blacktown compared to a prediction of 70dBA.

The prediction of an L_{Amax} of 60dBA for an A320 over Blacktown is low compared to the L_{Amax} of 75.3 recorded over Avondale Golf Course.

For Avondale Golf Course on 8 November 2018 there were 39 flights (60% of all flights) between 70-77.2dBA on single runway. This is applicable to the planned flights over Blacktown.

For Avondale Golf Course on 8 November 2018 there were 59 flights (82% of all flights) between 65-77.2dBA on single runway. This is applicable to the planned flights over Blacktown.

The mean level measured by Mr Ancich at Avondale Golf Course was 70dBA. This level is less than the highest level of 75.3dBA indicated by Mr Ancich over Blacktown. Allowing for factors 1, 3 and 4 in Section 2, the correctly measured levels over Avondale Golf Course would be below 70dBA and even lower levels would be expected at Blacktown from Western Sydney Airport.

3.3 Claim regarding continuous descent approach

Section 4.4.1 of the Ancich Report states that Figure 10.7 of Volume 2A Chapter 10 noise aircraft "concept diagram of continuous descent approach zone of noise benefit" shows there is no benefit within approximately 20km of the end of the runway. On this basis the noise level data recorded at Pymble Ladies College and Avondale Golf Course at 23km from KSA equivalent to 19.28km from WSA to Blacktown can be adopted as is.

Figure 10.7 as referred to in the Ancich Report is shown as Figure 2-1 in Section 2 above. This figure shows that aircraft using the standard approach to Sydney Airport would be significantly lower (and noisier) than aircraft approaching Western Sydney Airport using the continuous descent approach at 23km from the runway. Since the measurements carried out by Mr Ancich at Pymble Ladies College and Avondale Golf Course are at 23km from Sydney Airport, the lower height of aircraft approaching at these measurement locations is relevant, even though these measurement locations are considered to be equivalent to 19.28km from the runway because of the elevated ground at Pymble.

It is not correct to assume that the measurement results at Pymble of aircraft approaching Sydney Airport indicate the levels at Blacktown for aircraft approaching Western Sydney Airport using continuous descent approach. Aircraft at Pymble would be expected to be lower in general and may be utilising higher thrust and flap settings consistent with commencing final descent.

3.4 Claims regarding aircraft heights

A number of claims regarding aircraft heights are made in Section 4.5.2 of the Ancich Report.

The noise study shows the noise level generated by a particular aircraft is a function of the height above ground level for a particular event. On this basis a noise level predicted for a particular location needs to specify the aircraft and the corresponding height above ground level.

The variability of the height above ground level of aircraft results in a commensurate variability in recorded receiver noise levels.

The study has highlighted the fact that height of aircraft results in variability in noise levels. It appears that the variability in height of arriving and departing aircraft was not considered in the EIS.

These statements are not correct. Figure 3-1 and Figure 3-2 below show plots of noise levels measured by Mr Ancich with heights reported by Mr Ancich. These figures, particularly Figure 3-2, show high variability of noise level for the same height and show poor correlation between aircraft height and measured noise level. The aircraft noise levels reported by Mr Ancich do not relate closely to the height of the aircraft as claimed. Aircraft noise levels will depend upon power and flap setting and the high variability also raises the question as to whether some of the reported levels relate to extraneous noise, rather than aircraft noise.

Figure 3-1 Mays Hill Noise Levels vs Height

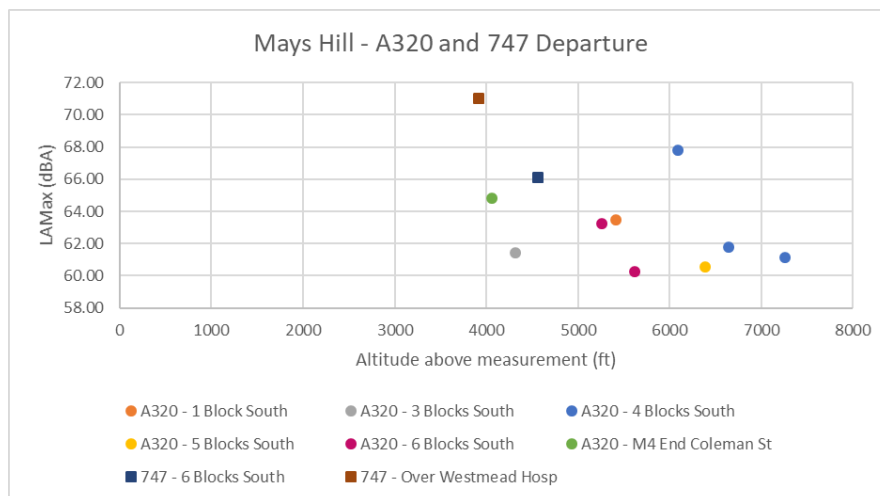
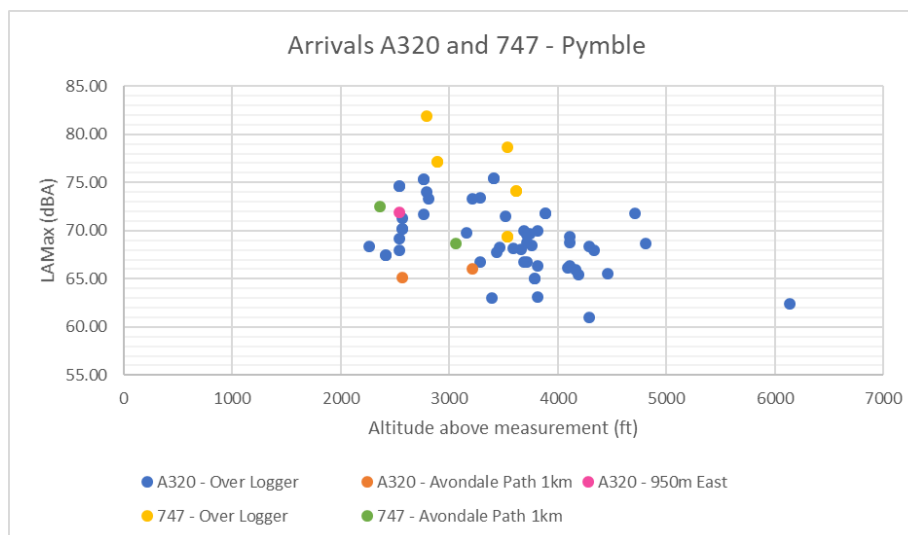


Figure 3-2 Pymble Noise Levels vs Height



As a check, the aircraft heights (in feet) were extracted from track points supplied by AirServices Australia and these have been added to the Ancich table and included in Appendix A. The appendix shows that the heights derived by Ancich are different from the AirServices heights, but are generally consistent with them. This means that the heights discussed in the Ancich report are generally correct.

Section 6.0 of the Ancich Report indicates that the conclusion of this study is that measurement of noise generated by aircraft in flight has demonstrated that variability in the height of aircraft will result in a wide range of receiver noise levels. The variability in height and the commensurate variability in noise levels will increase the noise impact over Blacktown and the Lower Blue Mountains compared to that predicted in the EIS.

Figure 3-1 and Figure 3-2 indicate poor correlation between measured noise level and aircraft height. This indicates that the first statement above is incorrect.

As indicated in Section 2 above, it is common practice to measure aircraft noise levels by taking the mean level, rather than the highest level. Even if noise levels were to vary at Blacktown and the Lower Blue Mountains, as a result of height or other reasons, it is the mean level that should be addressed and is addressed in the EIS.

4 CONCLUSION

It is concluded that the Ancich noise measurements and the Ancich Report conclusions are erroneous in a number of respects:

- The measurements were carried out using Fast time response on the sound level meter, rather than Slow time response as normally used and as recommended in Australian Standard 2021;
- Many of the maximum noise levels discussed in the body of the Ancich Report represent the highest level measured, rather than the mean level as commonly used and recommended in Australian Standard 2021;
- The noise levels reported for aircraft approaching Sydney Airport were measured at locations where aircraft are typically transitioning to final descent and generating atypically high noise levels. However, it is proposed to use continuous descent approach at Western Sydney Airport where such transitioning would not occur, and noise levels would be expected to be lower; and
- The measurement process adopted by Mr Ancich involved unattended noise measurement where measured maximum noise levels were later related to specific aircraft movements. The poor correlation between aircraft height and aircraft noise level tends to indicate that some of the reported levels related to extraneous noise events and not to aircraft movements.

Given the erroneous findings of the Ancich Report, it is concluded that the maximum noise levels reported in the EIS are valid and correct.

5 REFERENCES

- R1 Eric J Ancich, *Assessment of measured aircraft noise levels under the existing flight paths of Sydney Kingsford Smith Airport with reference to Western Sydney Airport*, Report No. 9173-R1, March 2019 (Ancich Report).

APPENDIX A

COMPARISON OF AIRCRAFT HEIGHTS

AVONDALE GOLF CLUB

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
7	NANDI	SYD	11	16	FIJI	FJ911	330-243	4000	OVER	3375	
7	HK	SYD	11	37	CATHAY	CX101	777-367	4175	OVER	3419	
7	TAIPEI	SYD	11	59	CHINA	C151	359-941	3650	OVER	END OF DATA	
7	HANOI	SYD	12	39	VIETNAM	VN787	787-9	3875	OVER		
7	SHANGHAI	SYD	12	43	CHINA E	MU735	777-39P	3175	OVER		
7	MELB	SYD	12	45	QANTAS	QF428	737-838	3150	OVER		
7	KUMIMG	SYD	13	47	CHINA E	MU777	330-243	3200	OVER		
7	HONOLULU	SYD	15	3	JETSTAR	JQ4	787-8	3125	OVER		
7	CAIRNS	SYD	15	28	QANTAS	QF923	737-838	3800	OVER		
7	CHRISTCH	SYD	18	38	EMERITES	EK413	380-861	3750	OVER		
7	SINGAPORE	SYD	18	2	SING	SQ288	777-312	2650	OVER		
7	CHRISTCH	SYD	20	8	EMERITES	EK413	380-861	3750	OVER		
7	HK	SYD	20	18	CATHAY	CX139	777-367	4100	OVER		
7	GUANGZOU	SYD	20	22	CHINA S	CZ301	330-323	3250	OVER		
7	BRISB	SYD	20	28	QANTAS	QF551	737-838	4500	OVER		
7	SINGAPORE	SYD	20	52	SING	SQ211	777-312	3200	OVER		
7	ADELAIDE	SYD	21	14	TOLL	TFR34	737-476	3125	OVER		
7	MELB	SYD	21	26	TIGER	TT264	320-232	3175	OVER		
7	MELB	SYD	21	40	VIRGIN	VA891	737-8FE	3250	OVER		
7	MELB	SYD	21	46	QANTAS	QF7354	737-376	2175	OVER		
7	MELB	SYD	21	48	JETSTAR	JQ518	320-232	3200	OVER		
7	TOKYO	SYD	21	58	POLAR	PO241	767-3	5725	OVER		
8	PERTH	SYD	6	21	VIRGIN	VA570	737-8FE	3350	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE⁽¹⁾	NOTES
8	TOKYO	SYD	6	29	JAPAN	JL771	787-8	3600	OVER		
8	SINGAPORE	SYD	6	37	BRITISH	BA15	777-336	4100	OVER		
8	BANGKOK	SYD	6	41	THAI	747-4D7	747-4D7	3275	OVER		
8	HK	SYD	6	47	QANTAS	QF128	747-438	4000	OVER		
8	DUBAI	SYD	6	49	EMERITES	EK412	380-861	3075	OVER		
8	SEOUL	SYD	6	53	KOREAN	KE121	380-861	3350	OVER		
8	DENPASAR	SYD	6	55	GARUDA	GA417	330-343	2725	OVER		
8	MANILA	SYD	6	59	QANTAS	QF20	330-202	4325	OVER		
8	SINGAPORE	SYD	7	7	SING	SQ221	380-841	4375	OVER		
8	SINGAPORE	SYD	7	11	QANTAS	QF82	330-303	2950	OVER		
8	XIY	SYD	7	13	HAINAN	HU7993	330-243	4075	OVER		
8	BANGKOK	SYD	7	20	QANTAS	QF24	330-303	4100	OVER		
8	HK	SYD	7	34	CATHAY	CX111	330-343	3000	OVER		
8	DENPASAR	SYD	7	36	JETSTAR	JQ38	787-8	2975	OVER		
8	SEOUL	SYD	8	0	ASIANA	OZ601	380-841	3800	OVER		
8	BANGKOK	SYD	8	24	EMERITES	EK418	380-861	4050	OVER		
8	SANFRAN	SYD	8	28	UNITED	UA863	787-9	5100	OVER		
8	LAX	SYD	8	32	AMERICAN	AA73	787-9	2950	OVER		
8	MEL	SYD	8	34	VIRGIN	VA813	787-8	2925	OVER		
8	LAX	SYD	8	38	UNITED	UA839	787-9	4850	OVER		
8	NANJING	SYD	8	42	CHINA E	MU727	330-243	3050	OVER		
8	TOKYO	SYD	9	6	QANTAS	QF26	747-438	3925	OVER		
8	ADEL	SYD	9	12	VIRGIN	VA407	737-8FE	2950	OVER		
8	SHANGHAI	SYD	9	18	CHINA E	MU561	330-243	2975	OVER		
8	TONATAPU	SYD	9	26	VIRGIN	VA94	737-8FE	3400	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE⁽¹⁾	NOTES
8	MELB	SYD	9	34	QANTAS	QF414	737-838	3025	OVER		
8	SUNSHINE	SYD	9	39	JETSTAR	JQ781	320-232	3150	OVER		
8	HOBART	SYD	9	41	JETSTAR	JQ718	320-232	2950	OVER		
8	SHANGHAI	SYD	9	57	QANTAS	QF130	330-202	3800	OVER		
8	KL	SYD	10	13	ASIA	D7222	330-343	2900	OVER		
8	VANCOUVER	SYD	10	19	CANADA	AC33	777-233	3000	OVER		
8	ADEL	SYD	10	25	QANTAS	QF740	737-838	2300	OVER		
8	XIAMEN	SYD	10	33	XIAMEN	MF801	787-8	3925	OVER		
8	WUHANN	SYD	11	1	CHINA E	MU749	330-243	4125	OVER		
8	GOLDC	SYD	11	19	TIGER	TT607	320-232	2925	OVER		
8	DARWIN	SYD	11	31	HIFLY	AST045	340-313	3557	OVER		
8	TAIPEI	SYD	11	55	CHINA	C151	350-941	4850	OVER		
8	HK	SYD	11	59	CATHAY	CX101	777-367	3575	OVER		
8	ADL	SYD	12	35	QANTAS	QF738	737-838	2575	OVER		
8	BRISB	SYD	13	21	QANTAS	QF525	737-838	3550	OVER		
8	PEKING	SYD	13	49	QANTAS	QF108	330-303	2950	OVER		
8	HERVEY B	SYD	13	59	VIRGIN	VA1556	737-8FE	4450	OVER		
8	GOLDC	SYD	14	59	JETSTAR	JQ411	320-232	3800	OVER		
8	HAMILTON	SYD	15	5	VIRGIN	VA1280	737-81D	4875	OVER		
8	CHENGDU	SYD	15	17	CHINA	CA429	330-343	4450	OVER		
8	PERTH	SYD	16	3	QANTAS	QF642	737-838	2875	OVER		
8	PEKING	SYD	16	10	CHINA	CA173	330-343	3225	OVER		
8	GOLDC	SYD	16	31	VIRGIN	VA526	737-8FE	4700	OVER		
8	GOLDC	SYD	17	9	QANTAS	QF865	737-838	5250	OVER		
8	DOHA	SYD	18	47	QATAR	QR908	380-861	3300	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE⁽¹⁾	NOTES
8	MELB	SYD	19	19	VIRGIN	VA875	737-8FE	3125	OVER		
8	HONOLULO	SYD	19	29	HAWAIIAN	HA451	330-243	2825	OVER		
8	BRISB	SYD	19	43	TIGER	TT381	320-232	4275	OVER		
8	CHRISTCH	SYD	19	59	EMERITES	EK413	380-861	2850	OVER		
8	GOLDC	SYD	20	15	VIRGIN	VA540	737-8FE	3575	OVER		
8	GUANZHOU	SYD	20	33	CHINA S	CZ301	330-323	3275	OVER		
8	BRISB	SYD	21	29	VIRGIN	VA986	737-8FE	4175	OVER		
8	TOKYO	SYD	21	33	POLAR	PO241	767-3JH	5100	OVER		
8	GOLDC	SYD	22	5	VIRGIN	VA544	737-8FE	4500	OVER		
8	BRISB	SYD	22	13	QANTAS	QF555	737-838	3875	OVER		
8	BRISB	SYD	22	15	JETSTAR	JQ823	320-232	4175	OVER		
8	MELB	SYD	22	15	QANTAS	QF494	737-838	3600	OVER		
8	LAUNSCN	SYD	22	17	JETSTAR	JQ750	320-232	2800	OVER		
8	BRISB	SYD	22	23	QANTAS	QF559	737-838	4250	OVER		
10	QINGDAO	SYD	7	0	CAPITAL	JD479	330-243	4825	OVER		
10	SINGAPORE	SYD	7	10	SING	SQ221	380-841	3175	OVER		
10	HK	SYD	7	6	CATHAY	CX111	330-342	4325	OVER		
10	MANILA	SYD	7	16	QANTAS	QF20	330-202	3950	OVER		
10	DENPASR	SYD	7	18	JETSTAR	JQ38	787-8	2175	OVER		
10	SHENZEN	SYD	7	19	CHINA S	CZ3071	330-343	3175	OVER		
10	BANGKOK	SYD	7	28	THAI	TG475	747-4D7	3175	OVER		
10	TOKYO	SYD	7	36	POLAR	PO241	767-3JH	3600	OVER		
10	SEOUL	SYD	7	38	ASIANA	OZ601	380-841	5325	OVER		
10	HK	SYD	8	2	VIRGIN	VA82	330-243	3575	OVER		
10	MEL	SYD	8	46	VIRGIN	VA815	737-8FE	3500	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE⁽¹⁾	NOTES
10	BRISBN	SYD	8	52	QANTAS	QF507	737-838	3525	OVER		
10	TOKYO	SYD	9	0	QANTAS	QF26	747-438	3925	OVER		
10	SHANGHAI	SYD	9	6	QANTAS	QF130	330-303	2625	OVER		
10	LA	SYD	9	12	VIRGIN	VA2	777-3ZG	2350	OVER		
10	HK	SYD	9	20	CATHAY	CX161	777-367	5125	OVER		
10	JAKARTA	SYD	9	24	GARUDA	GA712	330-343	2850	OVER		
10	MEL	SYD	9	26	JETSTAR	JQ504	320-232	2650	OVER		
10	HO CHI MINH	SYD	9	30	VEITNAM	VN773	787-9	3125	OVER		
10	NANJING	SYD	9	34	CHINA E	MU727	330-243	3050	OVER		
10	XIAMEN	SYD	10	30	XIAMEN	MF801	787-8	5775	OVER		
10	HO CHI MINH	SYD	10	40	JETSTAR	JQ62	787-8	4275	OVER		
10	GOLD C	SYD	10	48	JETSTAR	JQ12	787-8	3600	OVER		
10	WUHAN	SYD	11	16	CHINA E	MU749	330-243	2900	OVER		
10	HK	SYD	11	40	QANTAS	QF118	330-303	3250	OVER		
10	HK	SYD	11	45	CATHAY	CX101	777-367	3325	OVER		
10	MELB	SYD	11	40	QANTAS	QF424	737-838	2975	OVER		
10	NADI	SYD	11	46	FIJI	FJ911	330-343	2875	OVER		
10	TAIPEI	SYD	11	55	CHINA	C151	350-941	3875	OVER		
10	PROSERPINE	SYD	12	17	TIGER	TT393	320-232	4500	OVER		
8	PERTH	SYD	6	21	VIRGIN	VA570	737-8FE	3350	OVER		
8	TOKYO	SYD	6	29	JAPAN	JL771	787-8	3600	OVER		
8	SINGAPORE	SYD	6	37	BRITISH	BA15	777-336	4100	OVER		
8	BANGKOK	SYD	6	41	THAI	747-4D7	747-4D7	3275	OVER		
8	HK	SYD	6	47	QANTAS	QF128	747-438	4000	OVER		
8	DUBAI	SYD	6	49	EMERITES	EK412	380-861	3075	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE⁽¹⁾	NOTES
8	SEOUL	SYD	6	53	KOREAN	KE121	380-861	3350	OVER		
8	DENPASAR	SYD	6	55	GARUDA	GA417	330-343	2725	OVER		
8	MANILA	SYD	6	59	QANTAS	QF20	330-202	4325	OVER		
8	SINGAPORE	SYD	7	7	SING	SQ221	380-841	4375	OVER		
8	SINGAPORE	SYD	7	11	QANTAS	QF82	330-303	2950	OVER		
8	XIY	SYD	7	13	HAINAN	HU7993	330-243	4075	OVER		
8	BANGKOK	SYD	7	20	QANTAS	QF24	330-303	4100	OVER		
8	HK	SYD	7	34	CATHAY	CX111	330-343	3000	OVER		
8	DENPASAR	SYD	7	36	JETSTAR	JQ38	787-8	2975	OVER		
8	SEOUL	SYD	8	0	ASIANA	OZ601	380-841	3800	OVER		
8	BANGKOK	SYD	8	24	EMERITES	EK418	380-861	4050	OVER		
8	SANFRAN	SYD	8	28	UNITED	UA863	787-9	5100	OVER		
8	LAX	SYD	8	32	AMERICAN	AA73	787-9	2950	OVER		
8	MEL	SYD	8	34	VIRGIN	VA813	787-8	2925	OVER		
8	LAX	SYD	8	38	UNITED	UA839	787-9	4850	OVER		
8	NANJING	SYD	8	42	CHINA E	MU727	330-243	3050	OVER		
8	TOKYO	SYD	9	6	QANTAS	QF26	747-438	3925	OVER		
8	ADEL	SYD	9	12	VIRGIN	VA407	737-8FE	2950	OVER		
8	SHANGHAI	SYD	9	18	CHINA E	MU561	330-243	2975	OVER		
8	TONATAPU	SYD	9	26	VIRGIN	VA94	737-8FE	3400	OVER		
8	MELB	SYD	9	34	QANTAS	QF414	737-838	3025	OVER		
8	SUNSHINE	SYD	9	39	JETSTAR	JQ781	320-232	3150	OVER		
8	HOBART	SYD	9	41	JETSTAR	JQ718	320-232	2950	OVER		
8	SHANGHAI	SYD	9	57	QANTAS	QF130	330-202	3800	OVER		
8	KL	SYD	10	13	ASIA	D7222	330-343	2900	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE⁽¹⁾	NOTES
8	VANCOUVER	SYD	10	19	CANADA	AC33	777-233	3000	OVER		
8	ADEL	SYD	10	25	QANTAS	QF740	737-838	2300	OVER		
8	XIAMEN	SYD	10	33	XIAMEN	MF801	787-8	3925	OVER		
8	WUHANN	SYD	11	1	CHINA E	MU749	330-243	4125	OVER		
8	GOLDC	SYD	11	19	TIGER	TT607	320-232	2925	OVER		
8	DARWIN	SYD	11	31	HIFLY	AST045	340-313	3557	OVER		
8	TAIPEI	SYD	11	55	CHINA	C151	350-941	4850	OVER		
8	HK	SYD	11	59	CATHAY	CX101	777-367	3575	OVER		
8	ADL	SYD	12	35	QANTAS	QF738	737-838	2575	OVER		
8	BRISB	SYD	13	21	QANTAS	QF525	737-838	3550	OVER		
8	PEKING	SYD	13	49	QANTAS	QF108	330-303	2950	OVER		
8	HERVEY B	SYD	13	59	VIRGIN	VA1556	737-8FE	4450	OVER		
8	GOLDC	SYD	14	59	JETSTAR	JQ411	320-232	3800	OVER		
8	HAMILTON	SYD	15	5	VIRGIN	VA1280	737-81D	4875	OVER		
8	CHENGDU	SYD	15	17	CHINA	CA429	330-343	4450	OVER		
8	PERTH	SYD	16	3	QANTAS	QF642	737-838	2875	OVER		
8	PEKING	SYD	16	10	CHINA	CA173	330-343	3225	OVER		
8	GOLDC	SYD	16	31	VIRGIN	VA526	737-8FE	4700	OVER		
8	GOLDC	SYD	17	9	QANTAS	QF865	737-838	5250	OVER		
8	DOHA	SYD	18	47	QATAR	QR908	380-861	3300	OVER		
8	MELB	SYD	19	19	VIRGIN	VA875	737-8FE	3125	OVER		
8	HONOLULO	SYD	19	29	HAWAIIAN	HA451	330-243	2825	OVER		
8	BRISB	SYD	19	43	TIGER	TT381	320-232	4275	OVER		
8	CHRISTCH	SYD	19	59	EMERITES	EK413	380-861	2850	OVER		
8	GOLDC	SYD	20	15	VIRGIN	VA540	737-8FE	3575	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
8	GUANZHOU	SYD	20	33	CHINA S	CZ301	330-323	3275	OVER		
8	BRISB	SYD	21	29	VIRGIN	VA986	737-8FE	4175	OVER		
8	TOKYO	SYD	21	33	POLAR	PO241	767-3JH	5100	OVER		
8	GOLDC	SYD	22	5	VIRGIN	VA544	737-8FE	4500	OVER		
8	BRISB	SYD	22	13	QANTAS	QF555	737-838	3875	OVER		
8	BRISB	SYD	22	15	JETSTAR	JQ823	320-232	4175	OVER		
8	MELB	SYD	22	15	QANTAS	QF494	737-838	3600	OVER		
8	LAUNSCN	SYD	22	17	JETSTAR	JQ750	320-232	2800	OVER		
8	BRISB	SYD	22	23	QANTAS	QF559	737-838	4250	OVER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

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SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
27	DARWIN	SYD	6	0	QANTAS	QF829	737-838	4125	5 BLCKS A1 A3	4012	
27	DALLAS	SYD	6	6	QANTAS	QF8	380-842	3250	AVDALE PATH 1 KM	3468	
27	SINGAPORE	SYD	19	45	SING	SQ288	777-312	4100	AVDALE PATH 1 KM	3474	
27	BRISBANE	SYD	19	48	TIGER	TT379	320-232	4500	OVER LOGGER	3940	
27	BRISBANE	SYD	19	54	JETSTAR	JQ821	320-232	4150	OVER LOGGER	3947	
27	BRISBANE	SYD	20	6	TIGER	TT381	320-232	4575	OVER LOGGER	4009	
27	MELBOURNE	SYD	20	12	QANTAS	QF462	737-838	3550	AVDALE PATH 1 KM	3258	
27	BRISBANE	SYD	20	18	VIRGIN	VA978	737-8FE	4275	AVDALE PATH 1 KM	3455	
27	KL	SYD	20	20	MALAYSIAN	MH141	330-323	3100	AVDALE PATH 1 KM	6207	
27	PERTH	SYD	20	24	QANTAS	QF582	737-838	3100	AVDALE PATH 1 KM	-	DUPLICATE
27	GUANGZHOU	SYD	20	27	CHINA STH	CZ301	330-343	3850	AVDALE PATH 1 KM	3543	
27	PERTH	SYD	20	30	QANTAS	QF582	737-838	3100	AVDALE PATH 1 KM	2999	
27	GOLD C	SYD	20	54	JETSTAR	JQ419	320-232	4100	OVER LOGGER	3963	
27	GOLD C	SYD	21	6	TIGER	TT623	320-232	3850	OVER LOGGER	3629	
27	BRISBANE	SYD	21	12	QANTAS	JQ1725	717-BL	4250	OVER LOGGER	3881	
27	BRISBANE	SYD	21	18	VIRGIN	VA986	738-8FE	4300	5 BLOCKS WEST	3560	
27	CAIRNS	SYD	21	24	JETSTAR	JQ959	321-231	3825	5 BLOCKS WEST	3622	
27	SUNSHINE	SYD	21	36	JETSTAR	JQ789	320-232	4100	OVER LOGGER	3937	
27	BRISBANE	SYD	21	48	QANTAS	QF553	737-838	4875	OVER LOGGER	4035	
27	BRISBANE	SYD	22	0	JETSTAR	JQ819	320-232	4050	OVER LOGGER	3944	
27	HONG K	SYD	22	6	CATHAY	CX139	777-367	4700	5 BLOCKS WEST	3602	
27	BRISBANE	SYD	22	18	VIRGIN	VA992	737-8FE	4375	OVER LOGGER	4150	
28	DALLAS	SYD	6	0	QANTAS	QF8	380-842	3250	AVDALE PATH 1 KM	3468	

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
28	PERTH	SYD	6	6	VIRGIN	VA570	737-8FE	2950	2 BLOCKS EAST	2966	
28	SINGAPORE	SYD	6	7	SINGAPORE	BA15	777-36N	3775	AVDALE PATH 1 KM	3097	
28	ABU DHABI	SYD	6	12	ETIHAD	EY450	777-3FX	3000	AVDALE PATH 1 KM	3002	
28	HK	SYD	6	12	VIRGIN	VA82	330-243	3975	AVDALE PATH 1 KM	3593	2X ENTRIES IN ASA DATA - OTHER AT 2999FT
28	PERTH	SYD	6	18	JETSTAR	JQ989	320-232	3600	AVDALE PATH 1 KM	2979	
28	SINGAPORE	SYD	6	36	SINGAPORE	SQ221	380-841	3650	AVDALE PATH 1 KM	3638	
28	JAKARTA	SYD	6	36	QANTAS	QF42	330-202	3025	AVDALE PATH 1 KM	3035	
28	?	SYD	6	36	QANTAS	QF20	330-303	3750	AVDALE PATH 1 KM	3638	
28	TOKYO	SYD	6	48	JAPAN	JL771	787-9	2950	AVDALE PATH 1 KM	2972	
28	MANILA	SYD	6	48	CATHAY	CX111	330-343	3225	0.5 KM WEST	2995	
28	DELHI	SYD	6	54	AIR INDIA	AI302	787-8	2950	AVDALE PATH 1 KM	2986	
28	MELBOURNE	SYD	7	0	JETSTAR	JQ602	320-232	2950	AVDALE PATH 1 KM	2995	
28	CHRISTCH	SYD	7	6	QANTAS	QF7528	767-381	2950	OVER LOGGER	3012	
28	BANGCOCK	SYD	7	12	QANTAS	QF24	330-303	4350	OVER LOGGER	3934	
28	DUBAI	SYD	7	30	EMERITES	EK412	380-861	2800	AVDALE PATH 1 KM	3458	
28	XIAN	SYD	7	36	HIANAN	HU7993	330-343	3525	AVDALE PATH 1 KM	3402	
28	LA	SYD	7	36	UNITED	UA839	787-9	2975	500 M EAST	2982	
28	CHRISTCH	SYD	7	48	JETSTAR	JQ140	320-232	2950	OVER LOGGER	2989	
28	WELLINGTN	SYD	7	54	ANZ	NZ845	320-232	2925	OVER LOGGER	2982	
28	CANBERRA	SYD	8	0	VIRGIN	VA629	ATR 72-600	3575	OVER LOGGER	3243	
28	SAN FRAN	SYD	8	6	UNITED	UA863	787-9	2950	OVER LOGGER	2953	
28	WELLINGTN	SYD	8	12	QANTAS	QF162	737-838	2900	OVER LOGGER	2963	
28	BRISBANE	SYD	8	12	VIRGIN	VA908	737-7FE	4150	OVER LOGGER	3635	
28	BRISBANE	SYD	8	18	QANTAS	QF505	737-838	4350	OVER LOGGER	4068	
28	AUKLAND	SYD	8	24	ANZ	NZ101	777-219	2925	AVDALE PATH 1 KM	3012	

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
28	GOLD C	SYD	8	30	JETSTAR	JQ401	320-232	3975	OVER LOGGER	4042	
28	AUCKLAND	SYD	8	42	LATAM CHIL	LA801	787-9	2950	0.5 KM WEST	2963	
28	AUCKLAND	SYD	8	48	JETSTAR	JQ202	320-232	2925	950M EAST	2995	
28	TOKYO	SYD	8	54	QANTAS	QF26	747-438	2750	AVDALE PATH 1 KM	2992	
28	SHANGHAI	SYD	9	0	AIR CHINA	CA175	330-243	2900	AVDALE PATH 1 KM	3635	
28	GOLD C	SYD	9	6	JETSTAR	JQ403	320-232	4075	OVER LOGGER	3996	
28	SHANGHAI	SYD	9	6	QANTAS	QF130	330-202	3875	AVDALE PATH 1 KM	-	DUPLICATE - ACTUAL FLIGHT AT 9:55
28	GOLD C	SYD	9	6	QANTAS	QF861	737-838	4525	OVER LOGGER	4032	
28	BRISBANE	SYD	9	6	JETSTAR	JQ811	320-232	3775	OVER LOGGER	3996	
28	HO CI MINH	SYD	9	18	VEITNAM	VN773	787-9	3150	AVDALE PATH 1 KM	3117	
28	BRISBANE	SYD	9	18	QANTAS	QF509	737-838	4550	OVER LOGGER	4108	
28	HK	SYD	9	24	CATHAY	CX161	777-367	3750	AVDALE PATH 1 KM	3622	
28	CAIRNS		9	24	VIRGIN	VA1408	737-8FE	3225	AVDALE PATH 1 KM	-	DUPLICATE - ACTUAL FLIGHT AT 9:50
28	TOKYO	SYD	9	30	NIPPON	NH879	787-9	2950	AVDALE PATH 1 KM	2943	
28	JAKARTA	SYD	9	31	GARUDA	GA712	330-243	2350	AVDALE PATH 1 KM	2920	APPROX. 3KM WEST
28	VANCOUVER	SYD	9	34	CANADA	AC 33	777-233	4275	AVDALE PATH 1 KM	3661	
28	VANCOUVER	SYD	9	36	CANADA	AC33	777-233	4275	AVDALE PATH 1 KM	-	DUPLICATE
28	BRISBANE	SYD	9	42	JETSTAR	JQ813	321-231	4025	OVER LOGGER	3957	
28	SHANGHAI	SYD	9	42	CHINA	MU561	330-243	2975	AVDALE PATH 1 KM	3734	
28	BRISB	SYD	9	42	TIGER	TT357	320-232	4500	OVER LOGGER	4301	
28	CAIRNS	SYD	9	45	VIRGIN	VA1408	737-8FE	4075	OVER LOGGER	3442	
28	SHANGHAI	SYD	9	54	QANTAS	QF130	330-202	3875	AVDALE PATH 1 KM	3678	
28	XIAMMEN	SYD	9	58	XIAMEN	MF801	787-8	3300	AVDALE PATH 1 KM	3041	
28	AUCKLAND	SYD	10	6	ANZ	NZ103	787-9	3025	OVER LOGGER	3074	
28	GOLDCST	SYD	10	11	VIRGIN	VA506	737-8FE	3725	OVER LOGGER	3739	

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
28	MELB	SYD	10	15	QANTAS	QF418	737-838	2875	AVDALE PATH 1 KM	2979	
28	MANILA	SYD	10	17	CEBU	5J41	330-343	3400	AVDALE PATH 1 KM	3510	
28	GOLDCST	SYD	10	19	JETSTAR	JQ405	320-232	4125	OVER LOGGER	3970	
28	BALLINA	SYD	10	30	JETSTAR	JQ457	320-232	3150	OVER LOGGER	4127	
28	CAIRNS	SYD	10	38	JETSTAR	JQ953	320-232	3675	OVER LOGGER	3930	
28	HK	SYD	10	59	QANTAS	QF118	330-202	3874	OVER LOGGER	3970	
28	SING	SYD	11	21	SINGAPORE	SQ231	380-841	600	AVDALE PATH 1 KM	2972	APPROX. 3KM WEST
28	GOLDCST	SYD	11	23	TIGER	TT607	320-232	4550	OVER LOGGER	3901	
28	BRISB	SYD	11	25	VIRGIN	VA932	737-8FE	4700	OVER LOGGER	4131	
28	BRISB	SYD	11	26	QANTAS	QF517	738-838	4400	OVER LOGGER	4199	
28	GOLDCST	SYD	11	33	QANTAS	QF1565	717-2BL	4750	OVER LOGGER	4055	
28	FIJI	SYD	11	50	FIJI	FJ1915	737-8X2	2975	OVER LOGGER	2966	
28	BRISB	SYD	12	22	QANTAS	QF521	737-838	4400	OVER LOGGER	4140	
28	GOLDCST	SYD	12	26	VIRGIN	VA516	737-8FE	4025	OVER LOGGER	4121	
28	GOLDCST	SYD	12	29	JETSTAR	JQ409	320-232	3600	OVER LOGGER	END OF DATA	
28	GOLDCST	SYD	12	38	TIGER	TT609	320-232	5100	OVER LOGGER		
28	SUNSHINE C	SYD	13	1	VIRGIN	VA482	737-8FE	3875	OVER LOGGER		
28	BALLINA	SYD	13	4	JETSTAR	JQ459	320-232	4200	OVER LOGGER		
28	BRISB	SYD	13	6	JETSTAR	JQ815	320-232	4675	OVER LOGGER		
28	CAIRNS	SYD	13	18	JETSTAR	JQ517	320-232	4200	OVER LOGGER		
28	BRISB	SYD	13	28	QANTAS	JQ1717	717-2BL	4975	OVER LOGGER		
28	CAIRNS	SYD	13	44	TIGER	TT677	320-232	3900	OVER LOGGER		
28	CAIRNS	SYD	13	58	QANTAS	QF925	737-838	5275	OVER LOGGER		
28	HERVEY B	SYD	14	26	VIRGIN	VA1556	737-8FE	4700	OVER LOGGER		
28	GOLDCST	SYD	14	36	JETSTAR	JQ411	320-232	4725	OVER LOGGER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
28	GOLDCST	SYD	14	45	QANTAS	QF859	737-838	4150	OVER LOGGER		
28	CAIRNS	SYD	15	5	VIRGIN	VA1418	737-8FE	4825	OVER LOGGER		
28	SUNSHINE C	SYD	15	20	JETSTAR	JQ787	320-232	4475	OVER LOGGER		
28	SUNSHINE C	SYD	15	24	VIRGIN	VA484	737-8FE	3875	OVER LOGGER		
28	TOWNESVILLE	SYD	15	28	VIRGIN	VA1520	737-8FE	2050	OVER LOGGER		
28	BRISB	SYD	15	36	VIRGIN	VA950	737-8KG	4700	OVER LOGGER		
28	PROSERPINE	SYD	15	42	TIGER	TT397	320-232	4100	OVER LOGGER		
28	JOBURG	SYD	15	50	QANTAS	QF64	747-438	3450	AVDALE PATH 1 KM		
28	HAMILTON	SYD	15	56	QANTAS	QF867	737-838	4800	OVER LOGGER		
28	BRISB	SYD	16	16	VIRGIN	VA954	737-8FE	4400	OVER LOGGER		
28	BRISB	SYD	16	30	QANTAS	QF537	737-838	4500	OVER LOGGER		
28	QTOWN	SYD	16	36	ANZ	NZ831	320-232	2925	OVER LOGGER		
28	GOLD C	SYD	16	44	JETSTAR	JQ415	320-232	5200	OVER LOGGER		
28	BALLINA	SYD	17	8	VIRGIN	VA1142	737-8FE	4400	OVER LOGGER		
28	COFFSHBR	SYD	17	14	VIRGIN	VA1166	737-8FE	4625	OVER LOGGER		
28	BRISB	SYD	17	24	QANTAS	QF541	737-838	5150	OVER LOGGER		
28	TOWNESVILLE	SYD	17	26	JETSTAR	JQ913	320-232	4075	OVER LOGGER		
28	BRISB	SYD	17	40	VIRGIN	VA958	737-8FE	4750	OVER LOGGER		
28	BRISB	SYD	17	52	TIGER	TT377	320-232	6525	OVER LOGGER		
28	GOLD C	SYD	17	58	QANTAS	QF1567	717-2BL	5550	OVER LOGGER		
28	CAIRNS	SYD	18	2	ALLIANCE	QQ515	FOKKER 70	4975	OVER LOGGER		
28	GOLD C	SYD	18	22	JETSTAR	JQ413	320-232	4850	OVER LOGGER		
28	GOLD C	SYD	18	35	VIRGIN	VA532	737-8FE	4550	OVER LOGGER		
28	BALLINA	SYD	18	43	JETSTAR	JQ461	320-232	3675	OVER LOGGER		
28	DARWIN	SYD	18	53	VIRGIN	VA1354	737-8FE	4550	OVER LOGGER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
28	MORESBY	SYD	19	7	NUIGINI	PX1	767-341	5900	OVER LOGGER		
28	GOLD C	SYD	19	13	TIGER	TT623	320-232	3550	OVER LOGGER		
28	BRISB	SYD	19	17	QANTAS	QF547	737-838	5200	OVER LOGGER		
28	BRISB	SYD	19	27	QANTAS	QF549	737-838	5850	OVER LOGGER		
28	CHRISTCH	SYD	19	31	EMERITES	EK413	380-861	2875	500 M EAST		
28	BRISB	SYD	19	33	VIRGIN	VA970	737-8FE	3925	OVER LOGGER		
28	BRISB	SYD	19	52	QANTAS	QF551	737-838	4725	OVER LOGGER		
28	GOLD C	SYD	19	55	JETSTAR	jq423	321-231	3425	OVER LOGGER		
28	GOLD C	SYD	20	30	JETSTAR	JQ425	320-232	4200	OVER LOGGER		
28	BRISB	SYD	20	39	VIRGIN	VA978	737-8FE	4950	OVER LOGGER		
28	BRISB	SYD	20	55	VIRGIN	VA892	737-8FE	4800	OVER LOGGER		
28	BRISB	SYD	20	59	QANTAS	QF553	737-838	4525	OVER LOGGER		
28	SUNSHINE	SYD	21	5	JETSTAR	JQ791	320-232	4675	OVER LOGGER		
28	GOLD C	SYD	21	25	VIRGIN	VA544	737-8FE	5025	OVER LOGGER		
28	BRISB	SYD	21	35	TIGER	TT387	320-232	3825	OVER LOGGER		
28	BRISB	SYD	21	43	VIRGIN	VA988	737-8FE	3850	OVER LOGGER		
28	GOLD C	SYD	21	46	JETSTAR	JQ427	321-231	3900	OVER LOGGER		
28	BRISB	SYD	21	49	V	VA988	737-8FE	3875	OVER LOGGER		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

MAYS HILL

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
22	SYD	PERTH	14	25	VIRGIN	VA559	737-8FE	4450	2 BLOCKS STH	5509	
22	SYD	PERTH	15	7	QANTAS	QF557	330-202	4025	2 BLOCKS NTH	5089	
22	SYD	ADL	15	36	QANTAS	QF761	737-838	6325	4 BLOCKS STH	7362	
22	SYD	SING	16	16	SINGAPORE	SQ222	380-841	3650	2 BLOCKS NTH M4	4849	6 BLOCKS NTH OF M4
22	SYD	DOHA	16	40	QATAR	QR907	777-3DZ	3525	3 BLOCKS NTH	4311	
22	SYD	ABU DHABI	16	58	ETIHAD	EY451	777-3FX	4457	2 BLOCKS STH	4859	
22	SYD	DENPASAR	17	10	QANTAS	QF43	330-203	4300	2 BLOCKS STH	5230	
22	SYD	ADL	17	14	QANTAS	QF765	737-838	4350	3 BLOCKS STH	5692	
22	SYD	DUBAI	17	20	EMIRATES	EK417	777-31	4350	M4 END COLEMAN ST	5033	3 BLOCKS NTH M4
22	SYD	PERTH	18	7	QANTAS	QF571	330-202	5725	1 BLOCKS STH	5443	3 BLOCKS SOUTH
22	SYD	PERTH	19	2	QANTAS	QF743	737-838	5125	1 BLOCK STH	5387	
22	SYD	PERTH	19	31	VIRGIN	VA569	330-243	5550	1 BLOCK NTH	5479	
22	SYD	SING	19	34	SINGAPORE	SQ242	777-312	4050	M4 END COLEMAN ST	5344	3 BLOCKS NTH M4
22	SYD	SING	19	50	SINGAPORE	SQ242	777-312	4050	M4 END COLEMAN ST	-	DUPLICATE
22	SYD	SING	19	49	SINGAPORE	TR13	787-9	4275	3 BLOCKS NTH	6834	
22	SYD	ADEL	19	52	QANTAS	QF783	737-838	8225	2 BLOCKS STH	7969	
22	SYD	ADEL	20	18	QANTAS	QF583	330-202	4875	2 BLOCKS STH	5892	
22	SYD	DENPASAR	20	31	JETSTAR	JQ37	787-8	5325	2 BLOCKS STH	5351	
22	SYD	ADEL	20	34	VIRGIN	VA444	737-8FE	5375	4 BLOCKS STH	5643	
22	SYD	BANGKOK	20	39	EMIRATES	EK419	777-36	5325	3 BLOCKS NTH	5390	
22	SYD	SING	21	31	FEDEX	FX5283	MD11F	2925	5 BLOCKS STH	8104	
22	SYD	DUBAI	22	3	EMIRATES	EK413	380-861	4775	M4 END COLEMAN ST	4626	
22	SYD	DOHA	22	7	QATAR	QR909	380-861	3200	2 BLOCKS NTH M4	4370	8 BLOCKS NTH OF M4
22	SYD	ABU DHABI	22	22	ETIHAD	EY455	380-861	4300	2 BLOCKS NTH M4	4485	

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
22	SYD	KUL	22	34	MALAYSIAN	MH140	330-323	3225	1 BLOCK STH	4321	3 BLOCKS NTH
23	SYD	DUBAI	6	17	EMERITES	EK415	380-861	4325	5 BKS NTH M4 COLEMA	5079	
23	SYD	PERTH	6	51	QANTAS	QF565	330-202	3800	1 BLOCK STH	5928	
23	SYD	ADEL	6	56	QANTAS	QF	330-202	4400	4 BLOCKS STH	-	UNKNOWN
23	SYD	ADEL	7	20	JETSTAR	JQ762	320-232	6250	4 BLOCKS STH	7487	
25	SYD	DUBAI	6	14	EMIRATES	EK415	380-861	3050	6 BLOCKS NTH M4	5328	ALMOST WESTMEAD STATION
25	SYD	PERTH	6	49	QANTAS	QF565	737-838	5875	2 BLOCKS NTH	6030	DIRECTLY OVER
25	SYD	ADEL	7	0	QANTAS	QF735	737-838	5500	1 BLOCK STH	5331	
25	SYD	ADEL	7	24	JETSTAR	JQ762	320-232	6550	5 BLOCKS STH	7257	
25	SYD	?	7	30	VIRGIN	VA 551	330- 243	5000	3 BLOCKS NTH	-	NA
25	SYD	AYERS R	10	12	VIRGIN	VA627	737-8FE	5900	OVER DOROTHY	5722	
25	SYD	ADL	10	48	QANTAS	JQ741	737-838	6000	OVER DOROTHY	END OF DATA	
25	SYD	PERTH	11	30	QANTAS	QF581	330-202	3100	6 BLOCKS STH		
25	SYD	DENPASAR	11	36	VIRGIN	VA33	737-8FE	4300	6 BLOCKS STH		
25	SYD	PERTH	12	15	QANTAS	QF567	747-438	4725	6 BLOCKS STH		
25	SYD	SING	12	30	SINGAPORE	SQ232	380-841	4575	M4 END COLEMAN ST		
25	SYD	JAKATA	14	15	QANTAS	QF41	330-303	4275	6 BLOCKS STH		
25	SYD	PEKNG	14	0	QANTAS	QF107	330-202	4725			
25	SYD	JAKATA	14	6	QANTAS	QF41	330-303	3350			
25	SYD	PRTH	14	30	QANTAS	QF577	737-838	5300	OVER DOROTHY		
25	SYD	NA	15	0	QANTAS	QF6011	380-842	3825	2 BKS NTH M4 COLEMA		
25	SYD	DOHA	15	36	QATAR	QR907	777-3DZ	2575	3 BLOCKS STH		
25	SYD	ADL	17	0	JETSTAR	JQ770	320-232	4225	M4 END COLEMAN ST		
25	SYD	PERTH	17	18	QANTAS	QF569	737-838	4300	1 BLOCK STH		
25	SYD	PERTH	18	30	QANTAS	QF571	330-202	3750	6 BLOCKS STH		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
25	SYD	DENPASAR	18	54	VIRGIN	VA37	737-8FE	2150	M4 END COLEMAN ST		
25	SYD	PERTH	21	0	TIGER	TT755	320-232	4475	3 BLOCKS STH		
25	SYD	KL	22	0	AIRASIA	DV221	330-343	2050	5 BLOCKS STH		
25	SYD	DOHA	22	12	QANTAS	QR909	380-861	3750	M4 END COLEMAN ST		
25	SYD	DUBAI	22	18	EMIRATES	EK413	380-861	1800	M4 END COLEMAN ST		
25	SYD	ABU DHABI	22	24	ETIHAD	EY455	380-861	5425	5 BLOCKS NTH M4		
29	SYD	DUBAI	6	18	EMIRATES	EK415	380-861	4375	1 BLOCK NORTH		
29	SYD	ADEL	7	12	JETSTAR	JQ762	320-232	7425	4 BLOCKS STH		
29	SYD	SINGA	9	28	SINGAPORE	SQ212	777-312	4450	OVER DOROTHY ST		
29	SYD	PERTH	10	0	VIRGIN	VA 555	330-243	5150	2 BLOCKS NORTH		
29	SYD	ALICE	10	36	QANTAS	QF790	737-838	2450	OVER DOROTHY ST		
29	SYD	PERTH	11	0	QANTAS	QF581	737-838	4025	5 BLOCKS STH		
29	SYD	AIRS ROCK	11	5	JETSTAR	JST660	320-232	5575	1 BLOCK STH		
29	SYD	DENPASAR	11	42	VIRGIN	VA33	737-8FE	6850	5 BLOCKS STH		
29	SYD	JAKARTA	12	1	GARUDA	GA713	330-343	3650	3 BLOCKS STH		
29	SYD	JOHHASBG	12	11	QANTAS	QF63	747-438	4075	WESTMEAD HOSP		
29	SYD	DENPASAR	12	11	GARUDA	GA 735	330-343	5475	1 BLOCK NORTH		
29	SYD	KUALA	12	23	AIRASIA	D7223	330-343	4150	3 BLOCKS STH		
29	SYD	SINGA	12	36	SINGAPORE	SQ232	380-841	4575	1 BLOCK NTH M4		
29	SYD	ADL	13	0	QANTAS	QF1557	717-2K9	5825	OVER DOROTHY ST		
29	SYD	ADL	13	1	VIRGIN	VA418	737-8FE	6075	3 BLOCKS STH		
29	SYD	PERTH	14	8	VIRGIN	VA 559	737-8FE	5275	OVER DOROTHY ST		
29	SYD	JAKATA	14	0	QANTAS	QF41	330-202	3875	4 BLOCKS STH		
29	SYD	PERTH	14	30	QANTAS	QF577	330-202	3075	2 BLOCKS STH		
29	SYD	ADL	15	40	JETSTAR	JQ764	320-232	5425	6 BLOCKS SOUTH		

Note (1): Altitudes extracted from track points supplied by AirServices Australia

SYD DAY	FROM	TO	ESDST HR	ESDST MIN	AIRLINE	FLIGHT	AIRCRAFT	ALTITUDE	LOCATION REF TO LOGGER	ASA ALTITUDE ⁽¹⁾	NOTES
29	SYD	SINGA	16	14	SINGAPORE	SQ222	380-841	3350	OVER DOROTHY ST		
29	SYD	DOHA	16	36	QATAR	QR907	777-3DZ	4125	M4 COLEMAN		
29	SYD	ADEL	16	42	JETSTAR	JQ770	320-232	6800	4 BLOCKS STH		
29	SYD	ABU	16	54	ETIHAD	EY451	777-3FX	5625	6 BLOCKS NTH M4		
29	SYD	DUBAI	17	24	EMIRATES	EK417	777-31H	4425	M4 COLEMAN		
29	SYD	ADEL	19	0	QANTAS	QF743	737-838	4700	OVER DOROTHY ST		
29	SYD	SINGA	19	25	SINGAPORE	SQ242	777-312	3752	OVER DOROTHY ST		
29	SYD	SINGA	19	35	SCOOT	TR13	787-9	3825	OVER DOROTHY ST		
29	SYD	ADEL	19	48	QANTAS	QF783	737-838	2700	2 BLOCKS STH		
29	SYD	SINGA	21	42	FEDEX	FX5283	MD-11F	8750	OVER DOROTHY ST		
29	SYD	DOHA	22	0	QATAR	XR909	380-861	2700	2 BLOCKS NORTH		
29	SYD	DUBAI	22	0	EMIRATES	EK413	380-861	2525	M4 COLEMAN		
29	SYD	ABUDHABI	22	7	ETIHAD	EY55	380-861	4100	M4 COLEMAN		
29	SYD	KL	22	30	MALAYSIAN	MH140	330-323	4950	2 BLOCKS NORTH		
30	SYD	DUBAI	6	18	EMIRATES	EK415	380-861	4125	4 BLOCKS NTH M4		
30	SYD	SINGA	9	18	SINGAPORE	SQ212	777-312	6675	2 BLOCKS NTH M4		
30	SYD	AYERS	10	48	JETSTAR	JQ660	320-232	5775	6 BLOCKS STH		
30	SYD	ADL	10	55	QANTAS	QF741	737-838	5000	2 BLOCKS STH		
30	SYD	QTNW	10	57	VIRGIN	VA163	737-8FE	6525	3 BLOCKD NTH		
30	SYD	PERTH	11	0	QANTAS	QF581	737-838	6450	1 BLOCK NORTH		
30	SYD	JAKARTA	11	48	QANTAS	GA713	330-343	3650	3 BLOCKS STH		
30	SYD	DENPASAR	11	45	VIRGIN	VA33	737-8FE	6850	OVER DOROTHY		
30	SYD	PERTH	11	49	QANTAS	QF567	737-838	4800	1 BLOCK STH		
30	SYD	DENPASAR	12	12	GARUDA	GA735	330-343	4025	3 BLOCKS STH		

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