

WSROC

Review of Western Sydney Airport Draft Environmental Impact Statement

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Glossary

ALC	Airport Lessee Company
ANECs	Australian Noise Exposure Concept
ANEF	Australian Noise Exposure Forecast
APU	Auxiliary Power Units
ATM	Annual Traffic Movements
DoE	Department of Environment (Commonwealth)
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Act 1999</i> (Commonwealth)
GBMA	Greater Blue Mountains Area
GBMWA	Greater Blue Mountains World Heritage Area
GHG	Greenhouse Gas
HIA	Health Impact Assessment
HRA	Health Risk Assessment
INM	Integrated Noise Model
KSA	Kingsford Smith Airport
LGA	Local Government Area
MACROC	Macarthur Regional Organisation of Councils
MAP	Million Annual Passengers
MDP	Major Development Plan
PPB	Parts Per Billion
SWRLe	South West Rail Link extension
TSC Act	<i>Threatened Species Conservation Act 1995</i> (NSW)
WSROC	Western Sydney Regional Organisations of Councils
Western Sydney Airport	Western Sydney Airport

Executive summary

The Western Sydney Airport Project

The proposed Western Sydney Airport project will be one of the largest and most complex infrastructure projects in Australia. The project is proposed on Commonwealth land known as Badgerys Creek in the Liverpool Local Government Area.

The project as proposed in the draft Environmental Impact Statement (EIS) is intended as a staged development. The draft EIS and its associated 'Airport Plan' considers an initial single-runway development capable of handling up to 185,000 aircraft movements (37 million passengers per annum) nominally by around 2050, following which a dual runway is proposed with a total theoretical maximum capacity of 370,000 aircraft movements per year (82 million passengers) assumed to be reached in 2063.

Stage 1 works include a single 3.7 kilometre runway in the north of the site, capable of handling a full range of international and domestic passenger and freight aircraft, a business park, parking and cargo facilities in addition to areas of environmental conservation. The stage 1 draft EIS includes operation of the airport until 2030 when it is anticipated that approximately 10 million passengers and 63,00 aircraft would use the airport annually.

The draft EIS provides a broad assessment of the eventual two-runway development, but acknowledges that given the long time horizon to full development, more detailed assessment will be required to fully understand the impacts of the project at that time. Instead the draft EIS focuses on the assessment of Stage 1.

The draft EIS also recognises that there is currently no operator (or Airport Lessee Company – ALC) nominated for the construction and operation of the airport, and as such the Airport Plan is considered to be a transitional document until an operator is on board and a detailed masterplanning and project development process can commence. Sydney Airports currently has a first right of refusal to be the operator of the airport under an agreement reached as part of the privatisation of Kingsford Smith Airport. This creates significant uncertainties for the draft EIS, which acknowledges that key aspects of the draft EIS are effectively indicative only.

Statutory approvals context

Stage 1 of the Western Sydney Airport project is being assessed under the *Environment Protection and Biodiversity Act 1999* (EPBC Act) through an Environmental Impact Statement, as all works are proposed on Commonwealth land (EPBC 2014/7391). The draft EIS was released on public exhibition on Monday 19 October and exhibition will close on Friday 18 December 2015.

The draft EIS contains an 'Airport Plan' which defines the proposed layout and land uses for Stage 1 and an associated 'Airspace Architecture and Operation', which defines operation and flight paths associated with the airport. The Airport Plan must be approved by the Infrastructure Minister under the Commonwealth *Airports Act 1996* (Airports Act) prior to the commencement of development. The approval of the Minister for the Environment is a prerequisite of any consent under the Airports Act, and the Minister for the Environment in deciding to approve the EIS would issue conditions of consent to be imposed through the Airports Act consent on the project. Further detail is provided in Section 1.6.1 of the EIS.

This process is untested in Australia, as to date the Airports Act has only ever been used to manage assessment and approvals relating to the expansion of existing federally leased airports. New legislation has

been granted (the *Airports Amendment Act 2015*) specifically to deal with the Western Sydney Airport, to accommodate the special circumstances of a greenfield airport with no lease in place.

Future expansion and approval of the airport beyond 2030 would be subject to further planning and assessment under the Airports Act.

The draft EIS peer review

WSP | Parsons Brinckerhoff were engaged by Western Sydney Regional Organisation of Councils (WSROC) and Macarthur Regional Organisation of Councils (MACROC) to project manage the Peer Review of the Western Sydney Airport draft EIS.

In this capacity WSP | Parsons Brinckerhoff was required to run a competitive tendering process to engage specialists in key areas of interest to the councils. WSP | Parsons Brinckerhoff reported to WSROC under the direction of a Steering Committee (of officers of the participating councils) to confirm which specialists should be engaged, the Steering Committee provided direction throughout the review process and reviewed draft inputs.

The key issues nominated for peer review (and the specialists engaged) were:

- Aviation planning (Arup)
- Overflight noise (Marshall Day)
- Ground based noise and vibration (WSP | Parsons Brinckerhoff)
- Traffic and transport (Arup)
- Air quality and greenhouse gas (Katestone)
- Human health impacts (CHETRE)
- Social and economic (Hill PDA)
- Biodiversity (EMM)
- Surface water and Groundwater (Cardno)
- Impact on Blue Mountains (WSP | Parsons Brinckerhoff)

In its role of project manager, WSP | Parsons Brinckerhoff undertook an overall review of the draft EIS to cover off issues not addressed by the specialists and developed the overarching findings of the peer review.

Key findings

General adequacy

The draft EIS was prepared on a very accelerated program, and it is apparent from media coverage to date that there has been significant Federal political pressure to progress the project rapidly. The draft EIS was prepared over a period of approximately 8 months from engagement of EIS consultants to provision of an initial draft for Commonwealth Department of Environment review. By way of comparison the previous EIS for the project prepared in the late 1990s was undertaken over well over two years. We are aware that the period whereby the Department of Environment reviews the adequacy of the draft EIS prior to approving it for public exhibition was similarly compressed. From our review it is apparent that this has resulted in a number of omissions and limitations, which are discussed throughout this report.

Airport Layout

The draft EIS nominates a preferred airport layout for both the Stage 1 and long term developments, noting that the layouts are indicative only and would be confirmed once an ALC has been appointed. Alternative layouts are presented for both the Stage 1 and long term layouts, however these are all based on a 50/230 degree runway orientation, in other words there has been no consideration of alternative runway orientations – a key determining factor of flight paths. This contrasts with the EIS undertaken in the late 1990s which examines multiple layouts and runway alignments, and gives little visibility of whether the chosen layout, and in particular the runway alignments, achieve the best environmental outcome. Given the time that has lapsed since the previous EIS we would have expected to see a thorough current option-evaluation process to explore alternatives.

Airspace architecture (flight paths)

Chapter 7 of the draft EIS describes the ‘Airspace Architecture and Operation’ of the proposed airport which includes the flight paths for the Stage 1 Scenario (2030), prepared by Air Services Australia on behalf of the Department of Infrastructure. Only one set of flight paths is provided for 2030 in the draft EIS, featuring a ‘merge point’ (a point at which all incoming flights converge) over Blaxland. The concept of merge points is relatively new, and is considered good practice as it allows for incoming flights to minimise thrust and so reduce noise.

The brief of Air Services Australia as outlined in the draft EIS was to develop a set of flight paths that avoids impacts on existing operations at Kingsford Smith at 2030 (although it was acknowledged that this would be impossible in the long term) and to ensure safety of operations. We have a number of concerns in regard to the flight paths presented in the draft EIS:

- The draft EIS makes clear that they have not been designed to minimise environmental (and in particular noise) impacts on communities.
- They have taken no account of the smaller airports (Camden, Richmond, Bankstown), other than to note that these would be impacted in the long term.
- There is no visibility in the draft EIS of how these contours were arrived at, and how they compare to alternatives considered.
- The contours are ‘proof of concept’ – in other words they are indicative only, and could be revised by a future ALC without recourse to the EPBC Act. As such there is considerable uncertainty over what actual impacts may eventuate.

We have the following recommendations in this regard:

- Greater consideration of alternative options is required, with an additional objective of minimising environmental impacts.
- A holistic review of flight paths taking account of all airports in the Sydney metropolitan area should be undertaken. As part of this, options that allow for flight paths at Kingsford Smith to be modified should be considered.
- In recognition that a future ALC may modify the flight paths from those presented in the EIS, sensitivity testing should have been presented to demonstrate the changes of noise impacts that would result if flight paths are modified.
- The case for a merge point should be further explored, and consideration of alternative merge points should be examined.

Our peer review was limited to an evaluation of the information presented, and did not extend to development of alternative flight paths by our peer review team. As such we cannot comment on whether the

flight paths nominated may in fact be the best outcome. In other words the key issue is lack of transparency around the nominated flight paths.

Draft EIS places no explicit limits on key impacts

In a number of areas the EIS does not provide assurances that acceptable environmental thresholds will not be breached, and does not set hard limits on environmental impacts. In the case of aircraft noise this is a reflection of the nature in which aircraft noise is managed in Australia, and this is explored further in Section 4.1.1. However the same is also largely true of other aspects of the draft EIS – the mitigation measures are generally not prescriptive, and there is little in the way of hard limits on impacts. This is no doubt in part due to the fact that the ALC has not yet been appointed, and that the Department of Infrastructure is seeking flexibility over management and mitigation. However this creates uncertainty over the likely future impacts.

Uncertainties over the way the approvals process will operate

As noted above, the project is subject to assessment under the EPBC Act, and the Environment Minister's agreement (and conditions) are a prerequisite of any subsequent approval under the Airports Act. The draft EIS notes that the future development and expansion of the airport will be subject to further assessment and approval under the Airports Act, and that the preparation of a masterplan will be required within five years of the commencement of the project. This would superseded the current Airport Plan, which is described in the draft EIS as a transitional document. In effect it is implied that once the airport is leased, all future approvals would be under the Airports Act.

What is less clear is:

- What the potential triggers would be for further referrals and potentially approvals under the EPBC Act.
- What further assessment and approval would be required for the construction and operation of Stage 1 (beyond the current EIS and associated Airport Plan approval) once an ALC is appointed and more is known about the actual airport layout and operations.
- What limitations any EPBC Act approval will place on the airport
- What level of community and stakeholder engagement will be accommodated in the process going forward.

We would like to have seen greater clarity in this regard.

Key issues raised by specialists

Table ES.1 identified the key issues raised by the specialists for each environmental issue reviewed.

Table ES.1 Summary of key issues raised

Environmental issue	Key issues raised
Noise (aircraft overflight)	<ul style="list-style-type: none"> ■ Assessment based on 2030 scenario which reflects early stage of airport operation only ■ Uncertainty around actual flight paths ■ Proposed mitigation measures are generic due to uncertainty of flight paths ■ Outline of mitigation process is not performance driven.
Noise (airport ground-based noise and vibration)	<ul style="list-style-type: none"> ■ Type and magnitude of impact, pre and post mitigation has not been included ■ A single rating background level has been assumed for all receptors, this generalisation has

Environmental issue	Key issues raised
	<ul style="list-style-type: none"> underestimated the magnitude of noise impacts at receptors close to the airport. ■ Luddenham sensitive receptors were not included in background noise monitoring. ■ No cumulative noise impact assessment has been considered ■ The M12 motorway and the realignment of the Northern Rd has been excluded from the assessment regarding operational road traffic noise in Stage 1.
Local air quality and greenhouse gas (GHG)	<ul style="list-style-type: none"> ■ Local air quality assessment has several long term exceedances NO₂, formaldehyde, PM_{2.5} and PM₁₀ ■ Effectiveness of proposed mitigation measures to achieve compliance was not quantified. ■ GHG emissions relatively small
Regional air quality	<ul style="list-style-type: none"> ■ Stage 1 assessment is acceptable ■ Ozone concentration significantly above allowable increment for longer term development
Community Health	
Aviation planning	<ul style="list-style-type: none"> ■ No real visibility in draft EIS of how flight paths were determined ■ No presentation of alternatives ■ No certainty over final outcome ■ No consideration of point merge – impacts on Blaxland
Surface transport and access	<ul style="list-style-type: none"> ■ STM3 model has not been effectively calibrated and validated as the model is still in development with TfNSW ■ No traffic intersection modelling undertaken ■ Did not consider assessment of rail ■ Traffic estimate is based on 2011 which may be an underestimate as it does not include recent land use developments ■ Traffic generation (outside of air cargo) is unknown and no consideration made for passengers transferring within the airport.
Human health	<ul style="list-style-type: none"> ■ Reviewed air quality, noise and water impacts however no discussion on implications of the distribution of effects for inequality and equality have been discussed. ■ No rationale or justification given on why a Health Risk Assessment (HRA) has been undertaken rather than a Health Impact Assessment (HIA) ■ Perceived health issues not considered ■ Social determinants of health have not been considered ■ Long term cumulative impacts were not considered.
Biodiversity and offset strategy	<ul style="list-style-type: none"> ■ Offset package has not been prepared and residual ecological risks have not been discussed ■ Mitigation measures are limited ■ Difficult to assess the biodiversity value of the site for the long term development.

Environmental issue	Key issues raised
Surface water and groundwater	<ul style="list-style-type: none"> ■ Duncan Creek and its tributaries have not been modelled to allow definition of baseline and hydraulic impacts ■ Draft EIS appears to dismiss any relevance of increased pollutant loads on the receiving environment ■ Groundwater assessment lacks qualification of data, no baseline time-series data collected ■ Two residual risks for groundwater were identified; soil and subsurface contamination from spill/release of chemical or contaminants and impact on groundwater dependant ecosystems from reduced water supply.
Social impact	<ul style="list-style-type: none"> ■ Balance of discussion on impacts – strong focus on economic benefits rather than a balanced discussion ■ Strong focus on regional benefits not local impacts ■ Many potential issues are stated with little assessment of their implications or level of significance or duration ■ No discussion on how mitigation measures will be co-ordinated or resourced or who the key accountability falls with ■ Claims being made by Commonwealth about economic generation and job creation have not been explicitly tested in the draft EIS ■ The draft EIS does not describe the economic or social impacts of any transfer of activity from other areas in Sydney or Australia.
Greater Blue Mountains	<ul style="list-style-type: none"> ■ A detailed assessment of significance under the Biodiversity Assessment for the Blue Mountains World Heritage Area has been deferred until a ‘multidisciplinary workshop’ is held to identify and assess potential impacts. ■ Limited assessment of wilderness value and high sensitivity ■ Noise levels predicted to be relatively low (below 50-55dB LAmax) however for a natural landscape is prediction is not justified and many impact the amenity values.

1. Introduction

WSP | Parsons Brinckerhoff were engaged by Western Sydney Regional Organisation of Councils (WSROC) and Macarthur Regional Organisation of Councils (MACROC) and to project manage the Peer Review of the Western Sydney Airport draft Environmental Impact Statement (EIS) (Commonwealth of Australia, 2015a). A list of councils forming this engagement is provided in section 2.1.1.

This report provides:

- an overview of the draft EIS
- a summary of the peer review results against each of the key technical areas included in the draft EIS
- an overview of the key issues of overall concern in relation to the draft EIS.

Detailed peer reviews of each of the assessed key technical areas have been appended to this report.

1.1 Background

The proposed Western Sydney Airport project will be one of the largest and most complex infrastructure projects in Australia. The EIS prepared in 1997–1999 for the project by WSP | Parsons Brinckerhoff faced substantial community opposition associated primarily with aircraft noise, and the EIS was subject to intensive scrutiny. The Government at that time decided in 1999 not to pursue the project any further.

The political landscape has changed in the intervening years, and media coverage since the remobilisation of the project in 2014 suggests there is growing support mainly as a result of the project's potential for local job creation. However, the project has some significant environmental and social impacts, with aircraft noise still being potentially the single biggest issue from the community's perspective.

This review of the draft EIS has focused on a number of key issues, including aircraft and ground noise, airspace planning, air quality, social, traffic and transport and human health.

The Western Sydney Airport project is being assessed under the *Environment Protection and Biodiversity Act 1999* (EPBC Act) as the proposal is being constructed solely on Commonwealth land (EPBC 2014/7391). The Commonwealth Department of Environment (DoE) issued *guidelines for the content of a draft environmental impact statement for the Western Sydney Airport* (EIS Guidelines) on the 22 of January 2015.

The draft EIS was released on public exhibition on Monday 19 October and will close on Friday 18 December 2015. Figure 1.1 illustrates the current status of the project in relation to the overall approval process.

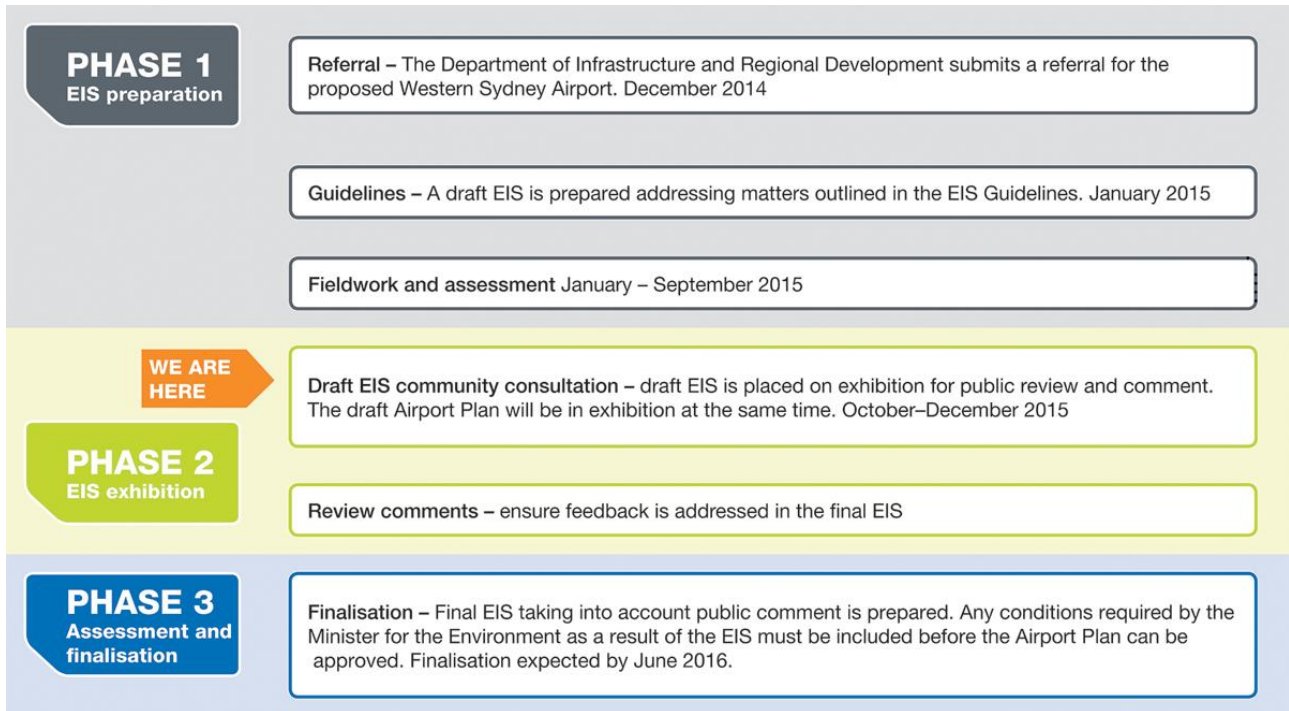


Figure 1.1 Program of assessment

2. Approach to peer review

2.1 Governance arrangements

WSP | Parsons Brinckerhoff was engaged by WSROC and MACROC to undertake the peer review, and worked throughout the duration of the peer review process under the direction of a Steering Committee. A brief summary of the roles and arrangements for the governance of the peer review project is provided below.

2.1.1 Role of WSROC

The peer review has been managed by WSROC, acting on behalf of 11 councils from the WSROC and MACROC region. The participating councils, who have provided funding and guidance throughout the peer review, are as follows:

- WSROC
 - ▶ Auburn City Council
 - ▶ Blacktown City Council
 - ▶ Blue Mountains City Council
 - ▶ Fairfield City Council
 - ▶ Holroyd City Council
 - ▶ Liverpool City Council
 - ▶ Parramatta City Council
 - ▶ Penrith City Council
- MACROC:
 - ▶ Camden Council
 - ▶ Campbelltown City Council
 - ▶ Wollondilly Shire Council.

WSROC's primary role is the overall management of the peer review on behalf of the councils, including managing the financial contributions from the participating councils, and the engagement and management of the peer review consultant (WSP | Parsons Brinckerhoff).

A dedicated WSROC project manager was engaged to undertake the following functions in relation to the project:

- To manage the procurement process leading to the engagement of WSP | Parsons Brinckerhoff as the EIS Peer Review project managers.
- To manage the financial contributions of the participating authorities in order to fund the consultant's fees associated with the peer review.
- To manage all ongoing contractual matters between WSP | Parsons Brinckerhoff and WSROC (including invoicing, scope management and project program).

- To manage and facilitate the Steering Committee established for the EIS peer review (refer section 2.1.2 below) including convening Steering Committee meetings, and communication with the Steering Committee on relevant issues.

2.1.2 Role of the Steering Committee

The project has been managed under the direction of a Steering Committee comprising officer representation from each of the participating councils within WSROC/MACROC. The functions of the Steering Committee have been to:

- Review and endorse the proposed scopes for technical specialists as part of a tendering process run by Parsons Brinckerhoff for the engagement of technical specialists.
- Review and endorse the recommendations of WSP | Parsons Brinckerhoff in the selection of technical specialists (following receipt of submissions).
- Discuss and agree any scope changes to the peer review following the appointment of WSP | Parsons Brinckerhoff
- Review and provide feedback on the draft peer review report.

The Steering Committee met regularly during the peer review process.

2.2 Methodology

The methodology adopted for this peer review of the draft EIS has been determined through a collaborative process between WSROC/MACROC and WSP | Parsons Brinckerhoff, under the general direction of the Steering Committee.

2.2.1 Project inception and early tasks

At the inception of the peer review, WSP | Parsons Brinckerhoff undertook a review the EPBC Referral, EIS Guidelines and previous EIS to identify topics for peer review (incorporating those topics identified by the brief).

These findings were presented to the WSROC Steering Committee in July 2015, which outlined the proposed program, proposed approach to scoping of peer reviews, proposed studies to be undertaken and appreciation of issues.

2.2.2 Preparation of the consultant briefs and nomination of potential specialists

WSP | Parsons Brinckerhoff prepared consultant briefs for a number of technical issues which were reviewed by the by the Steering Committee. These documents were written to ensure that submitted tenders were comparable with each other and are consistent in terms of general approach, terminology and language within the provided documentation.

Evaluation criteria were developed to allow a robust and transparent evaluation to occur.

In parallel with this, three suitable consultants for each topic were identified where possible by WSP | Parsons Brinckerhoff to bid for the review role. Consultants were identified based on their track record of similar projects with a particular focus on local experience where possible), their ability to deliver to challenging timeframes and their experience in peer review roles.

2.2.3 Evaluation and engagement of specialist proposals

Following Steering Committee endorsement of proposed scopes and shortlisted consultants, briefs were finalised and issued. The draft recommendations report was issued to the Steering Committee in August 2015 for review and the specialists listed in Table 2.1 were engaged to undertake their review:

2.2.4 Scope of the specialist peer reviews

The peer reviews were desk-based with no fieldwork, and no direct communication between the study authors and peer reviewers to ensure independence. The peer reviews for each technical issue evaluated whether the:

- study meet the requirements of the EIS Guidelines and relevant other guidelines and methodologies;
- conclusions reached in the studies are valid in accordance with published standards and guidelines, and whether the conclusions of the assessment are a realistic reflection of the actual impacts;
- underlying assumptions are plausible;
- mitigation and management measures proposed are adequate or have limitations in mitigating the impact;
- level of uncertainty over impacts and the environmental risks; and
- approach to the assessment of the long term development was appropriate.

The peer reviews provided a 'plain English' summary of the key impacts and opportunities associated with the project in relation to each specialist topic, so that the key findings could be readily understood by a broad audience.

Each of the draft peer reviews were reviewed by WSP | Parsons Brinckerhoff, before issuing these to the Steering Committee for review and discussion. Following the Steering Committee meeting to review the peer reviews, the draft peer reviews were finalised by the specialists.

2.2.5 Preparation of overarching review report

The focus of this review is on key environmental issues supported by specialist peer review reports which are included in Volume 4 of the draft EIS. To supplement and draw together the findings of the specialist peer reviews, his overarching review report has been prepared to:

- Review the broader draft EIS including undertaking a gap analysis to identify aspects of the EIS that were not addressed by the specialist peer reviews – generally this includes the early chapters of the EIS that describe matters such as the project background, need and objectives, options considered, stakeholder consultation and project description and management frameworks.
- To prepare an overarching review report that draws together the findings of the individual specialist reviews (including a summary of the most significant issues identified), incorporates the findings of the review of other aspects of the EIS (as described above) and provides an overview commentary on the results of the process.

2.3 Draft EIS review team

Table 2.1 below identifies the peer review team chosen to review the draft EIS for the Western Sydney Airport.

Table 2.1 EIS review team

Environmental issue	Peer reviewer	Primary EIS Section for Review
Noise (aircraft overflight)	Marshall Day	Volume 4 – E1
Noise (airport ground-based noise and vibration)	WSP Parsons Brinckerhoff	Volume 4 – E2
Local air quality and greenhouse gas	Katestone	Volume 4 – F1
Regional air quality	Katestone	Volume 4 – F2
Community Health	CHETRE	Volume 4 - G
Aviation planning	Arup, supported by The Airport Planning Group	Volume 4 – H Volume 4 – I
Surface transport and access	Arup	Volume 4 – J
Biodiversity	EMM	Volume 4 – K1
Offset strategy	EMM	Volume 4 – K2
Surface water hydrology and geomorphology	Cardno	Volume 4 – L1
Surface water quality	Cardno	Volume 4 – L2
Groundwater	Cardno	Volume 4 – L3
Social impact	Hill PDA	Volume 4 – P1
Property values	Hill PDA	Volume 4 – P2
Greater Blue Mountains	WSP Parsons Brinckerhoff	Volume 2, Chapter 26

The qualifications of each reviewer is provided in the relevant peer review provided in Appendix A–I of this report.

2.4 Limitations

Due to the limited exhibition period of the draft EIS (which required specialists to prepare their draft peer review reports within three weeks of the start of exhibition), and the agreed approach to the peer review (Chapter 2 – Approach to peer review) several limitations were identified in undertaking the review including:

- The peer review included a desktop assessment only. No site inspections were undertaken as part of the review by WSP | Parsons Brinckerhoff or the peer reviewers.
- No consultation has been undertaken between the peer reviewers and the project team involved in preparing the draft EIS.
- The results of several of the specialist reports (noise, air quality, transport) relied on results generated from a project specific model. These models were not made publically available, despite a direct request from WSROC to the Department of Infrastructure and Regional Development, and therefore a detailed review was not possible.
- No additional modelling was undertaken to verify the results of any of the technical reports.

- A detailed review of the draft airport plan was not undertaken, however, it was referred to ensure consistency with the draft EIS.

2.4.1 Technical reports excluded from review

Not all of the technical reports presented in the draft EIS were reviewed. This was generally because certain issues, while locally important, were not considered to be key issues for the broader region covered by the WSROC and MACROC LGAs, and so did not represent value for money for the project. It was also understood that individual member authorities could choose to undertake additional review work outside the scope of this project. As a result the following technical reports have been excluded from this peer review:

- Aboriginal cultural heritage
- European and other heritage
- Landscape character and visual
- Other 'non-key' issues such as contamination, resources and waste and topography, geology and soils (Separate review on waste will be prepared by WSROC and MACROC).

3. Review of the overall draft EIS

WSP | Parsons Brinckerhoff undertook a preliminary review of the broader EIS and its compliance with the *Guidelines for the content of a draft environmental impact assessment, Western Sydney Airport*. Table 3.1 below provides a summary of the compliance of the draft EIS.

Table 3.1 Summary of compliance with EIS guidelines

	Comments
General content	<p>Volume 1, Section 8 described an EIS summary report which was to have been prepared to assist the general public to understand the key issues of the draft EIS without having to read.</p> <p>The draft EIS seeks approval only for the construction and operation of the Western Sydney Airport until 2030. The draft EIS doesn't fully consider all the impacts on the environment during this period as it uses indicative flight paths. The long term environmental impacts (beyond 2030) are also unclear.</p>
Format and style	<p>The draft EIS is generally compliant with the format and style required.</p> <p>It would be useful to have an overall table of contents at the start of each volume. The draft EIS only has a table of contents for each Volume which makes it difficult to find specific information across the four volumes.</p>
General information	<p>This section is generally compliant however, more discussion could be made around how the action relates to other actions in the region, including significant state road and rail projects and urban development projects and their associated impacts.</p>
Description of the action	<p>This section is generally compliant. The inclusion and description of development beyond 2030 is at times confusing for the reader as not all impacts are known and it does not form part of the works to be assessed under Stage 1 of the draft EIS or the draft airport plan.</p>
Feasible alternatives	<p>More details could be provided about the feasible alternatives, especially in relation to airspace planning and the short, medium and long term advantages and disadvantages of the options.</p>
Description of the environment	<p>The description of the environment is generally compliant however, it is noted that not all sensitive receivers have been considered.</p>
Relevant impacts	<p>A key concern of the draft EIS is the description of impacts and residual impacts. As the airspace planning is based on indicative flight paths a detailed assessment of the nature and extent of likely short-term and long-term relevant impacts is not able to be undertaken with any certainty.</p> <p>It is recommended that prior to the determination of the EIS and airport plan more certainty is provided around airspace planning so a more robust assessment of impacts such as noise, air quality and health can be undertaken.</p>
Avoidance and mitigation measures	<p>A consolidated list of mitigation measures has been provided in section 28.4 of the draft EIS however a detailed description of the expected or predicted effectiveness has not been included. Refer to section 3.3 of this report for more detail.</p>
Residual impacts and offsets	<p>The residual impacts and offsets are not clearly defined or summarised in the draft EIS and are scattered throughout Volume 2. This does not give the community any certainty as to the predicted short and long term impacts.</p>

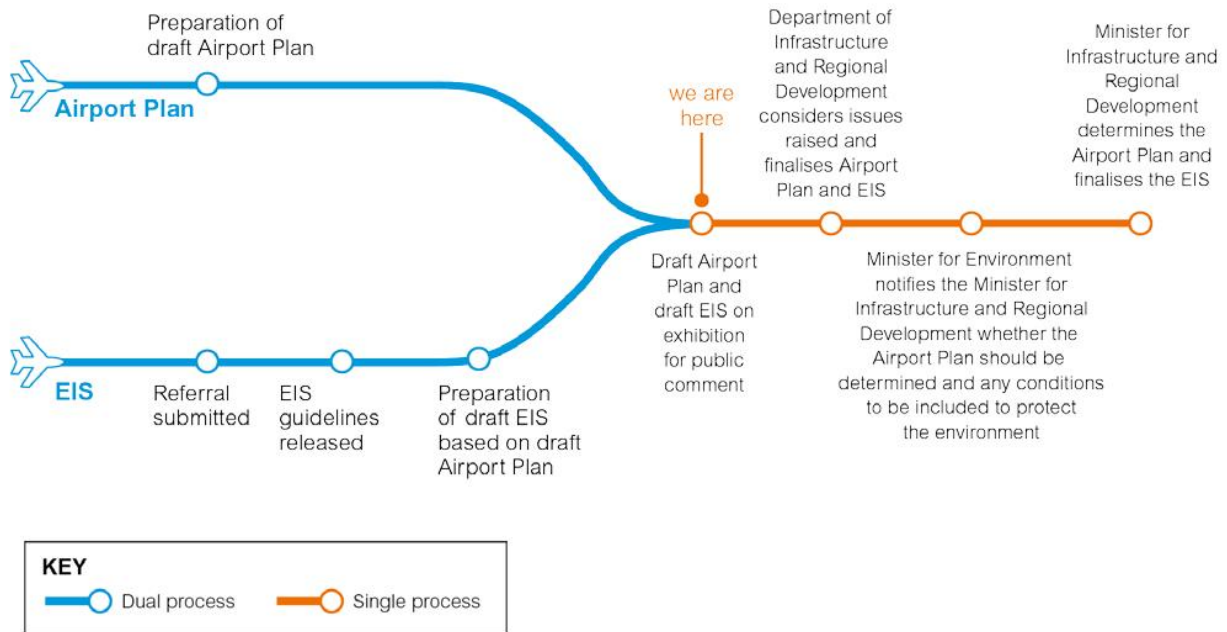
	Comments
	As described in section 4.9 and Appendix I of this report, a Biodiversity Offset package has not been formalised.
Environmental record of person(s) proposing to take the action	The draft EIS has adequately addressed this component.
Other approvals and conditions	The draft EIS has adequately addressed this component.
Economic and social matters	Refer to Section 4.6 below
Information sources provided in the EIS	The draft EIS has adequately addressed this component.
Conclusion	This section of the draft EIS generally complies however given the uncertainty surrounding the airspace planning and indicative flight paths a more precautionary approach is recommended in section 29.5 – Consideration of the principles of ecologically sustainable development.

3.1 Planning and land use statutory approvals context

The Western Sydney Airport will be subject to Commonwealth environment and development approvals framework as the project occurs solely within Commonwealth land.

Development at existing federally leased airports require approval under the *Airports Act 1996* (Airports Act). As the Western Sydney Airport site is a greenfields site and there is no current airport lease, the Airports Act was amended in June 2015 to allow planning, environment and development approval for the Stage 1 development of the proposed airport. The Airports Amendment Act (July 2015) allowed for the preparation of an Airport Plan as a transitional planning instrument to describe the initial development of the site and be supported by an EIS to assess the first stage of the airport development. Prior to the determination of the final Airport Plan the Minister for the Environment is required to give notice stating if the draft Airport Plan should be determined or not and under what conditions , considering the outcomes of the final EIS.

A draft EIS has now been prepared to support the draft Airport Plan which is also currently on exhibition as part of the overall EIS package of documents (http://westernsydneyairport.gov.au/airport_plan/index.aspx). Following the exhibition period both these documents will be finalised and considered by the Minister for Environment and the Minister for Infrastructure and Regional Development for determination (refer to Figure 3.1).



Source: Commonwealth of Australia 2015a

Figure 3.1 Approval process

As the proposed Western Sydney Airport is to be located solely on Commonwealth land, the Airports Act and the EPBC Act authorises development and excludes the operation of any New South Wales (NSW) state law. A range of NSW and local government planning documents have been considered in the preparation of the draft EIS and draft Airport Plan.

3.1.1 Draft Airport Plan

The draft Airport Plan primarily describes the proposed Stage 1 works for the construction and initial operations of a single 3,700 metre runway located in the north-western portion of the site and a range of aviation support facilities including passenger terminals, cargo and maintenance areas, car parks and navigational aids is the subject of this draft EIS. Part 3 of the draft Airport Plan describes the construction works and operational needs to cater for the predicted demand for the first five years of operation to around 2030 of approximately 10 million passengers per year as well as freight traffic. Site preparation activities are proposed to commence in mid-2016.

Development beyond Stage 1, will be undertaken under the existing planning framework in Part 5 of the Airports Act, including the preparation of a major development plan for any significant development at the airport. Significant future works, such as a second runway, which may have an impact on matters of National Environmental Significance may require a Referral under the EPBC Act. Table 3.2 provides a summary of the activity forecast for Stage 1 and beyond.

Section 3.2.3 of this report provides further detail on the approval process for the longer term development of the airport.

Table 3.2 Summary of activity forecasts

	Stage 1 (c. 2030)	First runway at capacity (c.2050)	Long-term (c.2063)
Annual passengers (arrivals and departures)	10 Million Annual Passengers (MAP)	37 MAP	82 MAP
Busy hour passengers (international and domestic)	3,300	9,500,	18,700
Total annual aircraft traffic movements (ATM) (passenger and freight)	63,000	185,000	370,000
Total busy hour ATM	21	49	85

Source: Commonwealth of Australia (2015) Draft Airport Plan

3.2 General observations

WSP | Parsons Brinckerhoff broad review of the draft EIS, in consultation with the WSROC and MADROC Steering Committee has identified several key areas of concern, the most significant being the lack of detail and certainty around airspace planning (or ‘airspace architecture’). Other key concerns relate to the decision to define Phase 1 (i.e. the scenario for which the EIS seeks approval) as the level of operational activity at 2030. This results in an assessment of a level of airport activity well below the theoretical maximum that the initial single runway development could accommodate (63,000 air movements annually, compared to an theoretical maximum of 185,000) Other concerns relate to the high level traffic assessment, adequacy of the health impact assessment and the uncertainty over the longer term development of the airport.

3.2.1 Airspace planning (Airspace architecture)

A key concern of the draft EIS relates to the approach to determining the flight paths (or airspace architecture) and the indicative nature of the flight paths. This section provides a brief overview of the key issues relating to airspace planning, a detailed review is provided in section 4.5 and Appendix C of this report.

Key technical reports which support the draft EIS including aircraft noise and air quality assess impacts of the project over a wide area have undertaken their assessment based on indicative flight paths. The draft EIS notes that it is expected that these flight paths would be ‘*progressively refined during a detailed design process which would provide the opportunity to optimise safety, efficiency, noise and environmental impacts before operations begin at the proposed airport*’. The draft EIS is not clear on the process for these reviews and assessments to occur except to say that they ‘*may require further environmental assessment processes to assist decision making and may be the subject of a future referral under the EPBC Act following detailed design*’. It is not clear if a future EPBC referral would be required for a change in flight paths, the Airports Act notes that this can be assessed under a major development plan (MDP) which would not need approval from the Minister for the Environment, only that the Minister for Infrastructure needs to obtain and consider advice from the Minister for the Environment.

The EIS additionally makes clear that the flight paths presented in the EIS were determined based solely on operational and aviation safety considerations, and that minimising noise impacts was not a consideration in establishing the flight paths presented (other than the fact that the proposed flight paths were then subject to noise impact assessment).

As the flight paths relate directly to the Stage 1 assessment, the uncertainty associated with the flight paths that might ultimately eventuate would ideally need to occur prior to determination of this current assessment

to ensure the environmental impacts and risks are properly assessed and the local community informed. We are well aware that in the absence of a future airport operator, the Commonwealth will be reluctant to give more certainty in relation to flight paths.

Specific issues associated with the uncertainties around flight paths, and which are considered further in section 4.5, include:

- Location of the merge point at Blaxland is also indicative until the flight paths are finalised. Currently Blue Mountains City Council and Penrith City Council are very affected by aircraft noise associated with this merge point, however, this is also only indicative.
- Lack of consideration of alternative flight paths including greater consideration of Kingsford Smith, Camden, Richmond and Bankstown airports. In particular it is thought that the impacts on Bankstown airport have not been fully addressed.
- The draft EIS lacks sufficient detail in airspace architecture including a detailed description as what the underlying principles were, how was it developed and any alternatives which were considered.
- The draft EIS did not look at any scenarios beyond the normal/scheduled operation of the airport such as queuing in the event of unscheduled interruption.
- Further analysis of the proposed fleet mix is required. It is not considered suitable to adopt the fleet mix used from Kingsford Smith Airport (KSA) and that further analysis of the preferred fleet mix at the Western Sydney Airport should be undertaken.
- A detailed discussion to determine whether a curfew is required. We recognise that this is a substantial political issue, we sought to investigate the level of night time impacts that might provide a clear basis for the need or otherwise for a curfew. Based on current information, there is not enough information to determine if a curfew is required (from the perspective of compliance with noise standards for sleep disturbance) or not.

3.2.2 Short term assessment within the draft Airport Plan

Whilst the draft EIS and associated technical reports provide some detail and assessment on the longer term development of the Western Sydney Airport, the draft EIS is seeking approval only for the construction and operation of Stage 1 until approximately 2030.

The draft EIS notes that by 2050 the single runway will have reached capacity (refer to Figure 3.2 of this report) and a second runway will be required. A general recommendation is that the draft EIS should consider the operation of the airport at 2045 (approaching full capacity of the single runway infrastructure) so the community and stakeholders have a greater understanding of the impacts of a single runway airport.

3.2.3 High level traffic and transport assessment

The traffic and transport assessment assessed in the EIS for Stage 1 works provides a high level assessment of traffic directly relating to the construction and operation of the Stage 1 works until 2030. Whilst it appears that by using the data discussed, the assessment undertaken is largely correct however it is considered that all the impacts are not able to be validated as the following information is not provided or considered:

- freight traffic generation within the Airport precinct (outside of air cargo)
- private vehicle traffic generation from land uses within the Airport precinct (outside of air passengers)
- vehicle travel time comparison (as predicted by strategic modelling)
- intersection performance (as predicted by intersection modelling)
- intersection layout requirements (as predicted by intersection modelling).

It is noted that the proposed Western Sydney Airport is supported by the Western Sydney Infrastructure Plan (WSIP) which is a 10 year project investing in major road infrastructure upgrades in Western Sydney. As the Western Sydney Airport is not going through the NSW state approvals there are no mechanisms to ensure the upgrades proposed in the WSIP occur, or occur in the timeframe required for the Western Sydney Airport project. Also, as described above and in section 4.3 of this report, the draft EIS did not undertake any assessments of intersections to determine if the proposed upgrades are adequate (refer to section 4.3 for more detail).

3.2.4 Uncertainty over longer term development and cumulative impact

The draft EIS provides a discussion on the long term development of the airport. This discussion generally focuses on the development of a second runway and the associated impacts, however at this stage all the impacts are indicative and will not form part of the Stage 1 approval process.

The long term development discussion presented in the draft EIS does not provide a comprehensive evaluation of impacts. We consider that it is reasonable not to attempt a full and detailed assessment of the airport at 2030, as there will be too many variables that are not known at that stage (such as aircraft types, the conditions of the receiving environment, and the pattern of urban development in Western Sydney).

However, we consider that the draft EIS could have been bolder in its assumptions about the long term development of Sydney. The draft EIS is largely limited to identifying known development plans, such as the urban development associated with the growth centres and Western Sydney Employment Area. More discussion on the long term strategic planning initiatives within the region and the impact these future land uses may have on the airport would be beneficial.

3.2.5 Lack of State integration

The proposed Western Sydney Airport occurs solely within Commonwealth land and therefore does not require approval from the New South Wales (NSW) government (i.e. it is exempt from state planning laws). Despite this, there are several significant infrastructure projects such as the WSIP and South West Rail Link Extension which the Western Sydney Airport rely on to be able to operate effectively and reduce the impact on the local community and stakeholders. In addition to these infrastructure projects, the long term strategic planning and future land uses of the greater South Western Sydney region needs to be considered.

Ordinarily, for a major project being assessed under the NSW planning approvals regime, the various other state agencies, including the infrastructure delivery agencies (such as Councils, Roads and Maritime Services and Transport for NSW) would be an integral part of the assessment process (generally led by the NSW Department of Planning and Environment and Minister for Planning). In this capacity they would be actively involved in the development of planning conditions governing a range of matters including, for example, the management of road capacity for major traffic generating developments. Planning contribution mechanisms (requiring financial contributions to upgrade infrastructure associated with the project) would also be established through state legislation.

We are aware that Federal funding has been agreed for a substantial package of road upgrades in the vicinity of the project (the Western Sydney Infrastructure Plan - WSIP). However, as discussed above and in more detail in Chapter 4 of this report, there is no mechanism discussed to ensure that these projects are approved and completed in a timeframe complimentary to the development of the Western Sydney Airport. There is also no certainty around the mechanisms for infrastructure funding beyond the provisions of the WSIP.

3.3 Management and mitigation measures

Once an airport lease has been granted, the Airports Act and the Airports (Environment Protection Regulations 1997) determine the management of activities at airports that have the potential to cause environmental harm. As no airport lease has been granted, the management and mitigation measures for Stage 1 of the proposed Western Sydney Airport have been described in the draft EIS and it is assumed that they would be implemented as proposed.

The draft EIS provides a range of management and mitigation measures for Stage 1 of the Western Sydney Airport for each of the key impacts. A general concern amongst all specialist reviews was that the mitigation measures are generic in nature, primarily due to the uncertainty of the impacts assessed. The effectiveness of achieving compliance through the mitigation measures is also generally not quantified. The type and magnitude pre and post mitigation is often not described.

No specific social management and mitigation measures have been adopted, rather referencing any measures referred to in the technical reports were relevant. A key management and mitigation approach for aircraft noise includes insulation of existing dwellings however there are no details on what this would entail.

Generally, the management and mitigation measures beyond 2030 are not known. The management of the airport beyond 2030 will be described in the Environment Strategy prepared by the lessee in accordance with the Airports Act and the Airports Regulations. The Environment Strategy is not likely to require the same level of scrutiny or approval by Minister for the Environment as does the works described under Stage 1 of the draft EIS. It is again recommended that the works proposed under Stage 1 EIS is extended to include works to allow the full capacity of the single runway so management and mitigation measures can be developed more long term and greater certainty given to the community and key stakeholders.

3.4 Consultation activities

DoE's guidelines for the draft EIS do not specially state any requirements for consultation except that the proponent is required to make the draft EIS available for public exhibition. Community and stakeholder engagement undertaken during the preparation of the draft EIS is discussed in Part C, Volume 1 of the draft EIS and generally appears to be adequate for the level of consultation expected for a major project.

The following items have been raised in regards to the consultation section:

- The Community and Engagement Strategy for the Project addressed the needs of the target audience based on initial community research and stakeholder consultation which included 11 focus groups and an online survey. The online survey was undertaken for residents within a 20 kilometre radius around Badgerys Creek, which excludes most of the Lower Blue Mountains which may be impacted by aircraft noise and amenity of low flying planes. There is also some confusion in the number of residents which were surveyed, Section 8.2.2 – Community and Engagement Strategy refers to 2,041 however Table 8-1 in Section 8.3 – Phase 1 – draft EIS and draft Airport Plan preparation mention 3,041.
- Table 8-7 of Section 8.4.1 – Stakeholder and community engagement programme refers to a plain English EIS summary being developed for the stakeholders and community which would be available at community events, online and at static display locations. The Western Sydney Airport website does not contain this summary paper so it is unclear whether it has been prepared.
- Section 8.5 – assessment and determination refers to an online mapping tool which is not discussed anywhere else in the document. Further discussion on what this tool does would be beneficial.

4. Review of technical reports

4.1 Noise

4.1.1 Aircraft overflight noise

4.1.1.1 Approach

The peer review has been primarily based on information presented in the noise chapters for the Stage 1 proposal and long term developments, in conjunction with the technical noise report presented in Appendix E1 of the draft EIS.

Consideration has also been given to other related sections of the draft EIS to review the broader assessment of noise impacts. The review of these additional sections has been concerned solely with matters related to the aircraft noise assessment. Reference should be made to the separate peer reviews commissioned by WSP Parsons Brinckerhoff for the review of specialist matters directly concerning aviation, fauna, health, planning and social issues.

This peer review addresses the following key elements of the aircraft noise assessment:

- The noise prediction methodology and the associated inputs and assumptions;
- The type of noise level information that has been produced;
- The operational scenarios that have been considered in the noise predictions;
- The noise sensitive receptors that have been identified and considered in the assessment;
- The methods used to assess the impact of the predicted noise levels;
- The proposed noise mitigation and management measures; and
- The level of uncertainty concerning the predicted noise impacts and environmental risks.

In reviewing these aspects of the draft EIS, consideration has been given to the document *Guidelines for the content of a draft Environmental Impact Statement – Western Sydney Airport* (Reference: EPBC 2014/7391 and subsequently referred to as the *EIS guidelines*).

4.1.1.2 Review findings – Stage 1 Development

The noise modelling is considered to generally provide a reasonable representation of the extent of noise impacts for the specific flight tracks and operating scenarios that have been proposed. Specifically, predicted noise levels have been determined for a range of operating scenarios. Aircraft noise information has also been produced in a range of formats that are generally consistent with current federal government guidelines for identifying areas potentially affected by aircraft noise.

All noise predictions have been determined using the latest version of the US Federal Aviation Authority's Integrated Noise Model (INM). This software is used widely in Australia and internationally for aircraft noise predictions and is the appropriate choice for this application. However, the use of this software to calculate short noise levels, which is the main form of noise data used in the draft EIS to identify the extent of affected areas, requires careful consideration. Specifically, the INM supporting documentation notes:

INM is not designed for single-event noise prediction, but rather for estimating long-term average noise levels using average input data. Comparisons between measured data and INM calculations must be considered in this context.

Accordingly, while the use of the INM is reasonable, information has not been provided as part the draft EIS to verify the reliability of the short term noise level data (presented as maximum noise levels and Number Above ratings). This is particularly important for this proposed airport, because of the increased uncertainty associated with the predictions at the lower noise thresholds used in the draft EIS for the assessment of night-time operations and impacts in quiet areas such as the Greater Blue Mountains World Heritage Area.

Notwithstanding the general suitability of the noise modelling data, there are however a number of limitations to the assessment. These relate to the uncertainty surrounding the airspace management design, and the limited assessment of the noise modelling outcomes. These matters are summarised as follows:

Low Stage 1 movement numbers

The total aircraft movement numbers for the Stage 1 development are relatively low when compared to other international airports in Australia. The low movement numbers cast doubt over the suitability of the 5 year time horizon as the primary assessment scenario for the purpose of obtaining approval for a major international airport. In this context, it is unclear how the incremental and periodic approvals that would need to occur as part of the ongoing expansion of the airport provide a sufficient basis for considering the initial 5 years of operation as the primary period for the assessment of noise impacts.

These comments are provided primarily in relation to the plausibility of the movement numbers represented in the noise modelling, based on comparisons with movement numbers documented in the noise modelling for other Australian international airports and similar time horizons. Aircraft traffic forecasts are however outside of our area of expertise and therefore the suitability of the specific movement numbers provided for the noise assessment are considered in further detail in separate aviation peer review commissioned by WSP | Parsons Brinckerhoff.

Airspace management strategy uncertainties

The draft EIS states that the airspace management strategy used as the basis for noise modelling is a proof-of concept design, and that further work is required to determine the actual flight paths which would be flown in practice. Information about the extent of potential change in flight paths is limited. The uncertainty surrounding the final airspace management design that would be implemented represents a significant source of uncertainty in the noise assessment. The potential significance of this source of uncertainty has not been quantified and, with exception of alternative merge points for Stage 1, there has not been any sensitivity analysis carried out to assess the implications of potential flight path changes.

Assessment of community annoyance

The draft EIS includes exposed population statistics which provide a useful indication of the potential scale of the community who may be affected by aircraft noise to varying degrees. However, in isolation, this data does not provide an indication of the scale or significance of potential community reaction to aircraft noise levels as a result of annoyance. The Health Risk Assessment in the draft EIS provides the most discussion of community annoyance, including references to research concerning the relationship between noise exposure and community annoyance. However, the Health Risk Assessment ultimately states that no quantitative assessment of annoyance was conducted as part of the study.

Dose-response relationships of the types referenced in the Health Risk Assessment can be used with noise levels and population data to provide a quantitative measure of the potential reaction. The use of these established relationships to represent the reaction of a separate community exposed to aircraft noise must be used with caution. In particular, due consideration must be given to the increased reaction that may be expected from a newly exposed community. However, this type of analysis provides an objective basis for

comparing the impacts of alternative operating strategies and, more broadly, establishing the risk of community noise impacts relative to other established international airports in Australia.

While the assessment of the risk of community annoyance is complex, the scale of the proposed airport and the number of people potentially affected warrant further evaluation of the subject. The introduction of a new 24-hour international airport at a greenfield development site introduces a risk of widespread and prolonged community annoyance. A quantitative analysis of this potential risk would be prudent to inform the environmental impact assessment process and the extent to which operational noise mitigation should be prioritised relative to other non-safety related airspace management considerations. Updated social surveys of the type originally carried out as part of the development of the Australian Noise Exposure metric used in Australia also warrant some consideration, given the significant nature of the proposed development and the availability of detailed aircraft noise information for other existing Australian airports.

Land use impacts

The draft EIS includes calculated Australian Noise Exposure Concept (ANEC) contours for the Stage 1 operating scenarios. ANECs are often presented as an indication of the extent of a potential future Australian Noise Exposure Forecast (ANEF) contour which would be used to guide land use planning for noise-sensitive developments in the vicinity of airports.

However, the ANEC contours presented for the Stage 1 proposal provide limited guidance for the purpose of land use planning. The reason for this is that the ANEF is normally derived from ANECs calculated for long term operations or ultimate capacity scenarios, rather than short term ANECs related to an initial phase of operation. Evaluation of land use planning impacts must therefore be primarily based on the ANEC contours presented for the long term development of the airport, rather than initial Stage 1 development contours.

Greater Blue Mountains World Heritage Area

The draft EIS presents information to evaluate the potential impacts of aircraft operations on the acoustic amenity of the Greater Blue Mountains World Heritage Area (GBMWA). The assessment indicates the potential for a large number of audible aircraft events within the GBMWA.

The preservation of quiet areas and tranquil landscapes has been a topical subject of research and policy consideration in Europe and the US. For example, US publication (Transportation Research Board, Airport Cooperative Research Program, Mestre 2008) on the effects of aircraft noise includes a chapter which discusses research and US legislation (National Parks Overflight Act of 1987) concerning the effects of aviation noise on parks, open space and wilderness areas. These publications do not provide definitive guidance on assessment techniques, but highlight the complexity and importance of assessing aircraft overflight noise in sensitive wilderness areas.

While the noise levels in the draft EIS are predicted to be relatively low (below 50–55 dB L_{Amax}), aircraft over flights would be expected to be audible and represent a significant and widespread impact for a World Heritage Area where natural soundscapes are likely to be a valued feature of the areas amenity. The complexities and sensitivities of this area warrant further consideration in the draft EIS. Specifically, the assertion within the draft EIS chapter concerning the GBMWA that noise levels below 50 and 55 dB L_{Amax} are 'not significant' is not considered to have been sufficiently justified, and the assessment may therefore not adequately reflect the potential impact to the values of tranquillity within the World Heritage Area.

Mitigation measures and residual noise impacts

The draft EIS noise modelling is based on an indicative proof-of concept air traffic management design which does not present a comprehensive airspace and final air route design. Given the uncertainties concerning the final form of the airspace design, the final form of noise mitigation measures to be implemented is not yet known. Accordingly, the mitigation measures that have been referred to in the aircraft noise assessment are generic in nature.

This is a particularly important point for an airport development as, unlike other forms of infrastructure development, the policies used to manage aircraft overflight noise do not generally stipulate noise limits that airport operations must adhere to at surrounding noise-sensitive locations.

Accordingly, without a defined airspace design, a defined noise mitigation strategy or defined noise criteria to adhere to in practice, the residual impacts and the location of these impacts is subject to considerable uncertainty. Further, without defined noise criteria, it is unclear how noise considerations would be prioritised among other non-safety related airspace management and operational considerations associated with the proposed airport site. These uncertainties may therefore warrant consideration of performance criteria as part of the approval process for the proposed airport.

In addition to the generic operational measures for the mitigation of noise, the draft EIS also refers to mitigation related to dwelling acquisition or dwelling insulation upgrades. There is however no detail provided in terms of the circumstances in which these measures would be implemented, other than a general reference to the guidance of AS 2021. It is unclear if this is intended to infer that such measures would only be considered within certain Australian Noise Exposure areas, or if such measures would be considered at all locations where internal levels may be expected to exceed AS 2021 internal design criteria as a result of the proposed aircraft operations.

4.1.1.3 Review Findings – Long Term Development

A number of the considerations identified from the peer review of the Stage 1 development are directly relevant to the assessment of the long term development scenarios. For example, matters related to the noise prediction methodology are identical for the Stage 1 and long term development scenarios.

In terms of assumptions about operational capacity, the movement numbers for the 2050 single runway scenario and 2063 dual runway scenario are comparable to the range of movement numbers documented for other similar Australian international airports. On this basis, the values appear to be plausible for noise assessment purposes. Aircraft traffic forecasts are however outside of our area of expertise and therefore the suitability of the specific movement numbers provided for the noise assessment are considered in further detail in separate aviation peer review commissioned by WSP | Parsons Brinckerhoff.

The following limitations are however noted for the long term assessment scenarios.

Land Use Impacts

The draft EIS presents ANECs for a range of operating scenarios in 2050 and 2063 as part of a discussion of the potential land use impacts which may result from a future ANEF for the proposed airport.

However, the latest Australian Standard (AS 2021) which defines how Australian Noise Exposure data should be used to inform land use planning, includes guidance on how ANECs for multiple operating scenarios may be combined to define an overall area where planning controls should apply. The draft EIS does not refer to this guidance and it is therefore unclear how the various ANECs should be interpreted when assessing land use impacts.

Further, while the draft EIS provides population counts for the various ANEC bands, no assessment is provided of the extent to which land use controls may change as a result of a future ANEF prepared as part of the detailed airspace design for the project. Specifically, the draft EIS does not quantify the potential extent of changes to land use controls relative to the measures which have been in place since the original EIS was undertaken in 1985. Furthermore, the discussion of land use planning impacts in the draft EIS notes that the National Airports Safeguarding Framework would '*be instrumental in managing potential future operational noise impacts for future land use planning and development around the airport*'. The Framework could potentially translate to the creation of land use planning controls which extend over significantly greater areas than either the current land use planning controls (based on the 1985 EIS) or the 2063 ANEC contours provided in the draft EIS. This has however not been discussed or assessed in the draft EIS.

Cumulative Impacts

The draft EIS notes that the parallel runway scenario (2063) would introduce a number of issues which would need to be addressed in the final airspace design. In particular, the chapter concerning airspace architecture notes the following issues that would need to be addressed:

- Changes to Sydney Airport flight paths;
- Changes to flight paths serving Bankstown Airport; and
- Resolution of a potential constraint associated with the restricted airspace over Defence Establishment Orchard Hills.

The EIS guidelines establish a requirement to '*identify and address cumulative impacts, where potential project impacts are in addition to existing impacts of other activities*'.

The above issues concerning the airspace architecture are considered to represent potential cumulative impacts which have not been quantified in the draft EIS. Further information concerning this issue is therefore considered necessary to address the requirements of the EIS guidelines.

4.1.1.4 Key Impacts and Opportunities

The findings of the peer review indicate that noise level information of the form required by the EIS guidelines has generally been provided in the draft EIS. However, the peer review has also identified a number of limitations concerning the content of the draft EIS, and therefore further information and assessments are considered necessary to address the general and noise-specific requirements of the EIS guidelines.

Based on the review of the draft EIS, the key noise impacts associated with the proposed airport are:

- Community annoyance, and related impacts such as speech interference and changes to the way individuals use outdoor spaces.
- Sleep disturbance associated with night-time operations, and related impacts such as the potential need for some residents to sleep with windows closed to achieve a suitable internal amenity.
- Degradation of the acoustic amenity of the World Heritage Area within the Greater Blue Mountains area.

In terms of land use impacts, the existing planning instruments that have been used to control development around the proposed airport site would generally be expected to limit the extent of the potential impacts. However, the draft EIS reference to the National Airports Safeguarding Framework as an instrumental tool for guiding future land planning around the proposed airport site introduces the potential for significantly enlarged development controls. This could translate to land use impacts also being a key impact associated with the proposed development.

Other noise related impacts cornering matters such as health, property values and social impacts are addressed in separate peer reviews commissioned by WSP | Parsons Brinckerhoff.

Aircraft noise impacts are ultimately an unavoidable consequence of aircraft operations in urban environments. The creation of a new international airport therefore requires a balance to be achieved between the protection of amenity for neighbouring sensitive land uses and the development of infrastructure to respond to the growing demands of a major city.

Determining whether this balance has been achieved is ultimately a matter for regulatory authorities. While this peer review has identified a number of limitations to the present assessment, this is not intended to infer that the proposed development and development site are unsuitable. Rather, in light of the residual uncertainties in the assessment, further information and assessments are considered necessary before stakeholders can reach an informed view on the potential scale and significance of aircraft overflight noise impacts associated with the proposed airport site.

Conducting these further assessments as part of the environmental impact assessment process represents an opportunity to:

- provide clarity to affected communities and stakeholders about the nature of the noise impacts;
- provide clarity to regulators about the form of noise controls which will be needed in the project approval to ensure that noise is appropriately managed; and
- reduce the potential for unforeseen impacts and the associated risk of reactionary noise management procedures which could subsequently jeopardise the operational flexibility of the proposed airport.

4.1.2 Ground based noise and vibration

4.1.2.1 Approach

This review identified uncertainties and unknowns within the ground noise assessment, provided in the EIS and identified what further assessment would be required to provide an indication of impacts. The limitations of this review are as follows:

- Noise modelling or review of noise modelling files has not been completed as part of this review. Therefore, it was not possible to verify the noise contour plots from ground-based activities presented in the draft EIS. However, comment has been included based on a visual inspection of the plots.
- The review relies on the source noise data that has been included in the ground noise assessment. The review is a desktop exercise and therefore, independent source noise measurements have not been conducted to confirm the noise levels used for taxiing and engine ground running as presented in the EIS.

The components of the review are follows:

- The review comments on the draft EIS chapters relevant to ground noise in addition to Appendix E2 – Airport ground-based noise and vibration. This appendix is the technical basis for all other ground noise related documents, including the relevant draft EIS chapters.
- A document review is contained within Appendix A of Appendix B this report, and provides references and comment on specific sections of the draft EIS.

4.1.2.2 1st stage airport

A summary of the findings for the 1st stage airport is as follows:

- The assessment does not fulfil the requirements of the Guidelines for the Content of a Draft Environmental Impact Statement – Western Sydney Airport 2015 (EIS Guidelines). These guidelines state that the type and magnitude of impact, both pre-mitigation and post-mitigation should be presented. The ground noise assessment should be updated to include this assessment.
- There is insufficient detail to satisfy the EIS Guidelines on the source of the noise data and assumptions used in noise predictions. As these assumptions form the basis for the noise assessment, changes to the source noise data could potentially lead to a significantly different outcome.

- The assessment does not provide sufficient justification to support the assessment being performed based on the year 2030 (5 years after opening) and not 2050 when the airport is expected to be approaching capacity for the single runway configuration with potentially increased noise impacts.
- The report does not provide sufficient detail in the assessment of the ground-based power supply to aircraft when they are parked. The assessment excludes the use of Auxiliary Power Units (APU), however it does not provide sufficient detail of alternative ground-based power supplies. As an alternative power supply method is not presented, there is potential for additional noise sources being introduced that have not been considered.
- Background noise monitoring was conducted at 10 locations in the region, however a single background level has been assumed for all receptors, rather than several location-specific values. This generalisation has underestimated the assessment noise criteria and therefore the magnitude of noise impacts at receptors close to the airport that are currently exposed to low levels of environmental noise.
- The nearest noise sensitive receptors in Luddenham were not included in the background noise monitoring and therefore, there is uncertainty if noise impacts have been adequately assessed at this location.
- No consideration has been given to the cumulative noise impact from all ground noise sources at the nearest noise sensitive receptors both with and without mitigation measures as required by the EIS Guidelines. Additional assessment should also be undertaken for other ground noise sources, such as the compass calibration pad.
- It is recommended that the mitigation measures identified in the assessment, including the restriction of APUs and the limitation of engine ground run-ups during the night, are formalised as part of the project approval.
- The assessment does not provide sufficient evidence that all reasonable and feasible mitigation measures have been considered to reduce noise impacts from taxiing and ground run-ups.
- Semi-enclosed pens and bunded areas to reduce noise impacts from engine ground run-up noise are considered in the assessment. It is recommended that these measures are considered further as part of the approvals and subsequent design stages.
- No comment has been made on the potential cumulative noise impact from the new M12 Motorway and realignment of The Northern Road that are being developed to accommodate the airport.
- The EIS contains misleading statements relating to operational road traffic noise which do not acknowledge the limitations of the assessment. The development of the M12 Motorway and realignment of The Northern Road have been excluded from the assessment and statements regarding operational road traffic noise should include these limitations.

4.1.2.3 Long term development review findings

- The assessment is considered to contain an appropriate level of detail for the long term development as the potential noise impacts are predicted for a considerable time in the future (into 2063). It is acknowledged that the noise environment may change over time.
- The comments raised in this review for the 1st stage airport assessment should be addressed and applied to the long term development assessment. Where this occurs, the current framework for further assessment of the long term development is considered appropriate.
- The EIS does not include ground-based noise in the summary or conclusion for the long term development. It is recommended that the outcomes of the revised long-term development ground-based noise assessment are included in these sections so that all impacts are clearly presented.

4.1.2.4 Key impacts and opportunities

It is considered that the ground-based noise assessment does not provide an appropriate level of detail on a number of key aspects including:

- the derivation and allocation of assessment criteria
- noise impacts at the nearest sensitive receptors in Luddenham
- noise source levels and modelling assumptions
- the type and magnitude of impacts with and without mitigation
- evidence that all reasonable and feasible mitigation has been considered
- cumulative noise impacts from operational activities and road traffic projects.

As a result, without further clarification or justification, it is uncertain that the draft EIS has adequately presented and addressed the noise impacts associated with the proposed development.

It is recommended that these items are addressed to reduce the level of uncertainty, increase the accuracy of the assessment and to satisfy the requirements of the EIS Guidelines.

4.2 Air quality and greenhouse gas

Katestone Environmental Pty Ltd (Katestone) was commissioned to undertake a peer review on the air quality and greenhouse gas assessment of the Western Sydney Airport draft EIS. This section provides a summary of their review whilst Appendix C of this report Their review did not include a health risk assessment which was undertaken separately and presented in section 4.4 Human Health.

To assist with its review, access to all relevant input and output files that were integral to the air quality assessment studies was requested as this information was not contained in the EIS. The provision of such information is a routine expectation and is a minimum requirement of the NSW Environment Protection Authority (EPA) for such studies. For a peer review the data is integral to demonstrating the integrity of the assessment. However, this information was not made available and consequently, Katestone has relied only upon the information contained in the relevant chapters of the EIS to complete its review.

Where apparent errors and inconsistencies were found within and between documents, Katestone has noted these, but in most cases has not been able to discern the full significance of these on the assessment outcomes.

4.2.1 Overall comments on air quality study

The air quality study is contained in Volume 2 Chapter 12, Volume 3 Chapter 32 and Volume 4 Appendix F1 of the Western Sydney Airport EIS. It is noted that these documents contain many typographical errors and inconsistencies that undermine the credibility of the air quality assessment. These sections require a thorough technical and editorial review by its authors to address the issues outlined in this review to improve transparency and credibility of the air quality assessment. To enable confidence in the assessment, all information and data used in the emission estimation, model inputs and outputs should be made available to any interested party.

The air quality study did not adequately address the sensitive receptors as it:

- Failed to identify all sensitive receptors;
- Failed to identify a representative subset of sensitive receptors - whilst a small subset of sensitive receptors was identified, the subset does not appear to be representative of potential air quality impacts at all existing locations of sensitive receptors;
- Did not identify future sensitive receptors; and
- Incorrectly classified community receptors separately and as having a lesser importance than residential receptors. Community receptors included various land-uses such as schools, parks, childcare facilities, churches and shopping centres.

4.2.2 Stage 1 development

4.2.2.1 Local Air Quality

The assessment results are taken as presented in Tables F1 to F8 and Table G1 to G5 (Volume 4, Appendix F1) of the draft EIS, they indicate the following:

- The maximum 1-hour average concentration of NO₂ was predicted to exceed the EPA's impact assessment criterion of 246 µg/m³ at one receptor. Three other receptors have maximum 1-hour average concentrations of NO₂ that are 92% to 98% of the EPA's impact assessment criterion.
- The annual average concentrations of PM_{2.5} were rounded to one significant figure. A number of receptors were predicted to have an annual concentration of PM_{2.5} of 8 µg/m³ – equal to the Air NEPM Advisory Reporting Standard. These results are potentially indicative of minor exceedances (<0.4 µg/m³) of the Advisory Reporting Standard.
- The 99.9th percentile 1-hour average concentration of formaldehyde was predicted to exceed the EPA's impact assessment criterion at two receptors.
- The predicted concentrations of all other air pollutants were below their respective assessment criteria.
- The major contributor to elevated levels of air pollutants is aircraft emissions. However, for receptors close to existing or new roads, the major contributor is external roadways.
- Mitigation measures were recommended. However, the effectiveness of the measures in achieving compliance was not quantified.

4.2.2.2 Regional air quality

The methods used to assess the regional air quality are acceptable. The assessment of regional air quality showed that only marginal increases in ozone concentrations would result from Stage 1 Development.

4.2.2.3 Greenhouse gases

The methods used to estimate greenhouse gas (GHG) emissions are acceptable. The estimates of greenhouse gas emissions are reliable and the contribution of greenhouse gas emissions from the project will be relatively small with Stage 1 Development emissions approximately 0.11% of Australia's projected 2030 transport-related GHG inventory.

4.2.2.4 Overall comments

The Stage 1 Development assessment was based on the annual throughput of the airport would be 63,302 ATM in 2030. The stated maximum capacity of the airport following completion of Stage 1 is three times higher at 185,000 ATM in 2050. The local air quality assessment, regional air quality and greenhouse gas assessment all use this assumption in the generation of the emissions and resultant impacts. Consequently, the assessment has underestimated the potential impact of the Stage 1 Development by a considerable margin.

4.2.3 Longer term development

4.2.3.1 Local Air Quality

The assessment results are taken as presented in Tables F9 to F11 (Volume 4, Appendix F1) of the EIS, they indicate the air quality assessment of the Longer Term Development shows:

- The maximum 1-hour average concentration of NO₂ was predicted to exceed the EPA's impact assessment criterion of 246 µg/m³ at 41 of the 96 receptors.
- The maximum 24-hour average PM₁₀ concentrations was predicted to exceed the EPA's impact assessment criterion at three receptors.
- The maximum 24-hour average concentrations of PM_{2.5} were predicted to exceed the NEPM Advisory Reporting Standard at three receptors.
- The annual average concentrations of PM_{2.5} were rounded to one significant figure. The annual average concentrations of PM_{2.5} were predicted to exceed the Air NEPM Advisory Reporting Standard at 13 receptors (concentrations are reported as 9 µg/m³ or higher). A number of receptors were predicted to have an annual concentration of PM_{2.5} of 8 µg/m³ – equal to the Air NEPM Advisory Reporting Standard.
- These results are potentially indicative of minor exceedances (<0.4 µg/m³) of the Advisory Reporting Standard.
- Whilst a number of mitigation and management measures were listed within the Western Sydney Airport EIS, the effectiveness of the measures was not quantified and therefore the air quality assessment failed to demonstrate that compliance with the relevant air quality criteria could be achieved.

4.2.3.2 Regional air quality

The assessment of regional air quality showed:

- The change in daily maximum 1-hour ozone concentration from the addition of the airport was 4.5 ppb which is significantly above the maximum allowable increment of 1 ppb defined in the NSW EPA's tiered approach.
- The change in daily 4-hour average ozone concentration from the addition of the airport was 3.7 ppb which is significantly above the maximum allowable increment of 1 ppb defined in the NSW EPA's tiered approach.

However, the regional air quality assessment for the Longer Term Development is hypothetical as:

- the impacts had to be assessed in context of the 2030 base case emissions as a base case inventory has not been projected for 2063;
- changes in emissions to other existing sources had not been accounted for; and
- assumes that the rail network exists.

4.2.3.3 Greenhouse gases

The methods used to estimate greenhouse gas emissions are acceptable.

4.2.3.4 Overall comments

The Longer Term Development contained in the Western Sydney Airport draft EIS includes a second runway, which relies upon the existence of rail services to be feasible. The Western Sydney Airport draft EIS states 'As it is not possible for the longer term development to achieve the project passenger numbers without the rail network the traffic scenario that does not include the rail network was disregarded'.

Air quality associated with Stage 1 is critically dependent on the traffic volumes generated by the airport. Consequently, the impact on air quality due to the Longer Term Development is critically dependent on the existence of the assumed rail services to the airport. The Western Sydney Airport EIS is not seeking approval for the rail infrastructure that is necessary for its feasibility and the EIS does not contain a detailed proposal for the rail infrastructure. As a consequence, the air quality assessment of the Longer Term Development is speculative at best and does not provide a sufficiently robust basis to support approval of the Longer Term Development at this stage.

4.3 Traffic, transport and access

4.3.1 Approach

Arup has undertaken the peer review of the Traffic and Transport sections within the draft EIS. The peer review has been intended to assess the merits of the proposal as presented in the draft EIS – it has not been intended that the peer review will develop recommendations for alternative designs for the project.

In relation to Arup's comments regarding any short comings of this assessment, it should be noted that Arup has not been privy to any specific requirements above and beyond those described in the Guidelines for the Content of a Draft Environmental Impact Assessment Statement, Western Sydney Airport, *Environment Protection and Biodiversity Conservation Act, 1999*. It is understood traffic and transport is likely one of the key environmental issues associated with the Airport. Arup has provided independent traffic and transport reviews relating to the adequacy of the documentation provided and the appropriateness of the mitigation measures proposed in:

- 'Western Sydney Airport draft EIS 19 Volume 2 Chapter 15'
- 'Western Sydney Airport draft EIS 39 Volume 3 Chapter 33'
- 'Western Sydney Airport draft EIS Volume 4 Appendix J Surface transport and access'.

4.3.2 Stage 1 development

Issues identified in terms of predicted traffic impacts as a result of the Stage 1 airport include:

- limitation of the strategic traffic model's (STM3) ability to capture traffic impacts at a detailed level
- detailed intersection traffic modelling not undertaken
- intersection operations and performance not assessed
- future land take impacts as a result of intersection operations
- freight traffic generation and associated impacts (outside of specific air cargo) not assessed

- traffic generation and associated impacts caused by the zoned lands within the Airport precinct not assessed
- impact to public transportation operations (bus network) not assessed.

The above issues and limitations are considered significant. Further information would need to be provided to enable Arup to reach a firm opinion as to whether the conclusions reached in the study are valid. Until these comments are addressed or further information supplied, Arup is unable to comment on the validity of the traffic impact conclusions reached in this draft EIS.

4.3.3 Long term Airport development

The predicted traffic impacts of the long term development of the Western Sydney Airport largely followed the Stage 1 assessment. A number of the issues identified for Stage 1 are also apparent in the longer term development including:

- limitation of the strategic traffic model's (STM3) ability to capture traffic impacts at a detailed level
- detailed intersection traffic modelling not undertaken
- intersection operations and performance not assessed
- future land take impacts as a result of intersection operations
- freight traffic generation and associated impacts (outside of specific air cargo) not assessed
- traffic generation and associated impacts caused by the zoned lands within the Airport precinct not assessed
- impact to public transportation operations (bus network) not assessed.

Additionally, a number of issues identified in the longer term development (above and beyond Stage 1) include:

- The local road network adjacent to the Airport reaches capacity by 2063. No road planning mitigation measures were provided.
- Airport Access Drive (from M12) reaches capacity by 2050, 13 years before long term development year of 2063. Capacity is predicted to be reached for approximately 15 hours a day.
- Insufficient information was provided to determine how air passenger demands would access and egress the Airport beyond 2050 (when the Airport Access Road reaches capacity).
- No assessment was included to understand what impact the air passenger demands using the South West Rail Link extension (SWRLe) would have on the wider Sydney Rail Network.

Prior to the long term development of the airport being constructed, a major development plan (managed in accordance with the Commonwealth *Airports Act 1996*) will be required with final approval provided by the Minister for Infrastructure and Regional Development.

As such, Arup believes the above issues and limitations should be viewed in conjunction with this additional assessment being undertaken.

4.3.4 Key impacts and opportunities

The traffic impacts caused by Stage 1 of the Airport is predicted to be relatively low. With consideration to the methodology used, the draft EIS states the future road network is able to accommodate the predicted Airport traffic demand.

Nonetheless, it was difficult for Arup to confirm the validity of these impacts with confidence. Arup has identified further information that could be provided to quantify the potential impacts, including:

- freight traffic generation within the Airport precinct (outside of air cargo)
- private vehicle traffic generation from land uses within the Airport precinct (outside of air passengers)
- vehicle travel time comparison (as predicted by strategic modelling)
- intersection performance (as predicted by intersection modelling)
- intersection layout requirements (as predicted by intersection modelling).

The following describes the predicted traffic impacts caused by the long term development of the Airport as described in the draft EIS:

- The traffic impacts caused by the Airport is predicted to be significant. The airport Access Drive from the M12 is predicted to fail in 2050. This is approximately 13 years before the ultimate long term airport development year (2063).
- The traffic impacts also affect the wider road network with significant congestion predicted on key road links in 2063. The assessment acknowledges this is a result of significant background growth in conjunction with unknown road infrastructure commitments past 2041.
- The Airport also impacts wider transport modes. The assessment suggests additional rail link capacity (above and beyond the SWRL_e) would be required to accommodate both the Airport trips and background growth trips by 2063.

With consideration to the above potential impacts, it is recommended that detailed transport network planning including road and rail network planning be undertaken.

4.4 Human health

A peer review of the human health sections of the Western Sydney Airport draft Environmental Impact Statement (EIS) was undertaken by a team of international reviewers, led by the Centre for Health Equity Training, Research and Evaluation (CHETRE) at the University of New South Wales (UNSW).

4.4.1 Approach

The review team developed a peer review framework based upon existing best practice review guidelines for evaluating health impact assessment (HIA). The framework incorporated key elements, processes, and requirements that should be included in the health assessment of an EIS. Additionally, the review team reviewed existing HIAs of airport developments to establish the range of health effects that are relevant to airport health assessments. This framework allowed the review team to assess the quality of the health assessment that was included in the draft EIS, and also determine important health effects that were not included.

4.4.2 Limitations

The review team were only able to conduct a review of the health impacts included in the health chapters (Human Health Chapter and Community Health Appendix). These were limited to noise, air quality, and water impacts, therefore the review team were not able to further review the assessment of other potential significant health impacts associated with airport development, such as changes to employment, transportation, amenity, and housing.

Although the review team assessed the methods used we were not able to assess the validity of the calculations used in predicting health outcomes. Validity of the findings in the health risk assessment (HRA) were based upon what was included in the health appendix, which did not include all necessary methods and formulas to test the findings. It is assumed that the calculations were carried out correctly.

As there was not a comprehensive HIA included in the draft EIS, the review team were limited in the range of recommendations we could make.

4.4.3 Components of draft EIS Reviewed

- Primary:
 - ▶ Part D – Human Health Chapter
 - ▶ Appendix G – Community Health
- Secondary:
 - ▶ Volume 1:
 - Executive Summary
 - Part A – Project Background
 - Part B – Airport Plan
 - ▶ Volume 2
 - Chapter 9 – Approach to Impact Assessment
 - Chapter 27 – Cumulative Impact Assessment
 - Part E – Environmental Management
 - Part F – Conclusions
 - ▶ Volume 3
 - Chapter 39, Section 8 – Human Health
 - Part H – Conclusion and recommendations
 - ▶ Volume 4
 - Appendix E – Noise
 - Appendix F – Air quality
 - Appendix P1 – Social impact
 - Appendix P3 – Economic analysis.

4.4.4 1st Stage Airport findings

Compliance with EIS Guidance:

- Overall, the Health Chapters of the draft EIS comply with most of the EPBC Guidelines.
- The impacts that are considered in the Health Chapters are those associated with changes in air quality, water quality and noise. Generally, these are assessed in detail in terms of nature and extent of short and long-term impacts.
- Some of the information is presented in a way that makes it difficult for interested stakeholders to fully understand the scope and scale of the potential health impacts. The information provided is not always, clear, succinct and supported by maps or other accessible materials. Technical jargon is generally avoided without losing technical precision or the validity of the statements made. Cross-referencing is used however summaries of the findings of other chapters often do not fully explain key issues. Not all sensitive population sub-groups or receptors have been considered in the areas assessed.
- The rationale and justification for why a HRA has been undertaken rather than an HIA are not discussed. There is national and state level guidance on HIA that should have been consulted in the development of the scope and methodology of the health assessment of the draft EIS. Key guidance documents include Health Impact Assessment Guidelines (enHealth, 2001), and Health Impact Assessment: A practical guide (UNSW and NSWHealth, 2007). Ideally the health assessment would have used an HIA framework incorporating an HRA approach.
- Ecologically sustainable development in relation to health is not considered. EPBC guidance states that ecologically sustainable development should ensure that the *health*, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- Considering the most significant health impacts/effects/risks considered in the draft EIS are those related to changes in air quality, noise and water quality, the level of analysis and detail presented in the Health Chapters is reflective of the potential significance of these descriptors. However, the potential inequality/inequity impacts have not been sufficiently assessed or discussed. This is a significant gap.

Recommendations for the Health Chapters of the draft EIS to better comply with EPBC guidelines are provided:

- The Health Chapters of the draft EIS should assess the health impacts/effects of changes in the full range of environmental and social determinants of health and the potential inequalities/equity issues due to the proposed development. The level of analysis and detail should be reflective of their likely significance. Examples are changes to road traffic movements and their potential health consequences (community severance, risk of road traffic accident and injury), changes in qualities and characteristics of the surrounding areas (including land values and other economic impacts) and changes in recreational use, amenity of natural areas and access to greenspace and nature and their associated health and wellbeing impacts through, for example, changes to levels of physical activity; effects on services and amenities.
- Findings should be presented in a way that helps to communicate the scale of the population affected, by determinant of health, and also what the synergistic (combined) impacts are likely to be to various communities from exposure to the combined hazards.
- Not all unknown variables, assumptions, and limitations are included in the assessment. A specific comment relates to certain health impacts (e.g. air quality-related health impacts on children, other chronic effects such as incidence of chronic bronchitis in adults) known to occur from exposure to air pollution but for which the level (extent/magnitude) of the health impact associated with a certain level of pollution exposure is uncertain or unknown. These additional health impacts, for which quantification is uncertain or unknown, are not discussed. The Health Chapters should consider and discuss health impacts where quantification is not currently recommended by national guidance (e.g. Australian Government *Guidelines for Health Risk Assessment*) such as air quality impacts on children, other

chronic effects, and other additional morbidity effects of short-term exposure but for which there is a widely acceptable evidence base supporting their likely occurrence.

Assessment of Air Quality:

- The assessment of air quality-related health impacts follows a health risk assessment approach, focussing on quantification of health endpoints from exposure to a range of air pollutants. The methodology used is adequate. The range of air pollutants addressed is adequate. The range of health endpoints considered is also adequate and follows Australian evidence and guidance.
- However, the range of health endpoints addressed could be expanded to include others for which solid exposure-response coefficients exist, for example, group A coefficients provided in the WHO HRAPIE Project report¹.
- It is also not clear what baseline incidence rates were used (Sydney average or Liverpool/suburb rates). If Sydney rates are used, this may have resulted in a small underestimation of risks.
- Risks are estimated for 2030 and 2063 snapshots and separately for each pollutant. An overview of the expected scale of impacts resulting from the combined effect of all pollutants should be provided to provide a picture of the total risk to the exposed communities. It would also have been useful to include stage 1 predictions at full capacity (2050).
- Risks could also have been provided for the entire assessment period e.g. 30 years and not just for the snapshots. Discussion of the uncertainty around estimates could be enhanced, for example through the use of the upper and lower 95% confidence interval values of the exposure-response coefficients used. This would provide a better understanding of the likely range of actual impacts (for the worst-case unmitigated scenario).
- A general level of acceptability for estimated risks is used, stated to be accepted by regulatory agencies. This is for a risk between 1×10^{-6} (1 in a million) and 1×10^{-5} (1 in 100,000). The regulatory agencies should be named and references for this statement should be provided. Consideration should also be given to stakeholder perceptions of acceptability of risk.
- There is no discussion of the implication of the distribution of effects for inequality and equity although baseline information on sensitive/vulnerable groups is provided.
- Community feedback and any potential perceptions or concerns of local residents are not discussed. Community feedback on health concerns should be described and how this feedback was considered and addressed in the assessment should be discussed. Where community comments have not been incorporated or addressed an explanation justifying this should be presented. If there were no specific comments or concerns about health impacts/effects or some determinants of health then this should also be stated explicitly. There should also be a discussion of how communities were consulted.
- Perception effects are different from biological or epidemiological risks, can cause stress and anxiety, and should be considered separately from mortality and morbidity effects.
- Mitigation measures are not discussed, readers are cross-referred to the air quality chapter. An outline of proposed measures (i.e. an air quality management framework or plan) should be provided in the health chapter and an explanation provided for how and to what extent these measures will mitigate the identified health impacts.

¹ Table 1. CRFs recommended by the HRAPIE project, p5–11

Assessment of Noise:

- The assessment of noise-related health impacts follows a health risk assessment approach, focussing on quantification of health endpoints from exposure to a range of noise. The quantitative methodology used is adequate. The range of noise metrics used is adequate. The range of health endpoints considered is also adequate and follows Australian and international evidence and guidance, namely the enHealth Guidance *Health Effects of Environmental Noise other than Hearing Loss* (enHealth, 2004). Risks are estimated for 2030, 2050 and 2063 periods for three different operation phase scenarios.
- A qualitative analysis and discussion of impacts/risks/effects on vulnerable/sensitive groups and on health inequality/equity issues has not been undertaken.
- There is no discussion of the implication of the distribution of effects for inequality and equity.
- Community feedback and any potential perceptions or concerns of local residents are not discussed. Community feedback on health concerns should be described and how this feedback was considered and addressed in the assessment should be discussed. Where community comments have not been incorporated or addressed an explanation justifying this should be presented. If there were no specific comments or concerns about health impacts/effects or some determinants of health then this should also be stated explicitly. There should also be a discussion of how communities were consulted.
- Perception effects are different from biological or epidemiological risks, can cause stress and anxiety and should be considered separately from mortality and morbidity effects.
- Mitigation measures are only discussed in passing and readers are cross-referred to the noise chapter. An outline of proposed measures (i.e. a noise management framework or plan) should be presented in the Health Chapters and an explanation provided for how and to what extent these measures will mitigate the identified health impacts.

Assessment of Water Quality:

A complete health risk assessment is not provided for water quality due to the limitations in water quality sampling (i.e. only 1997 data was available; no new data was collected for this EIS). A more complete assessment is required that includes a clear list of assumptions, a description of population affected, and an assessment of impacts on vulnerable receptor population groups.

Review of Overall Report:

The description of the context and requirements for the HRA are generally sufficient. It would have been advantageous to understand why only an HRA was undertaken and not a full HIA, considering that the Health Chapters recognize the significance of the social determinants of health. The population health profile was very limited in scope and is missing clarification for why only certain information is provided. Consideration of vulnerable populations is based around SEIFA scores only and again, it should be explained why only these scores, and not additional indicators of disadvantage are included. Any further information that is included in other chapters in the draft EIS should be referenced within the Health chapters.

Coverage of Health Topics:

The health risks described in the Health Chapter (air quality, noise and water) shows that some key determinants of health have been considered in reasonable detail. However, the potential inequality/inequity impacts have not been sufficiently assessed or discussed. This is a significant gap.

Some key determinants either do not seem to have been considered anywhere in the draft EIS or have not been considered and discussed in relation to health impacts in the Human Health Chapter and appendix. The approach taken to considering health impacts in the Health Chapters is narrow and does not take into account the findings of other health-relevant assessments, such as in the social impact assessment (SIA).

This has resulted in key environmental and social determinants of health not being considered. The scoping process whereby the decision to focus on air quality, noise and water is unclear so it is not possible to assess whether the narrow focus is justified. However given the current level of evidence on the effects of airports on health as well as the more general evidence base around the social determinants of health, it is likely that relevant health impacts are missing from the Health Chapters. The 'non health' sections of the draft EIS do however contain information about a number of significant impacts on the determinants of health (e.g. housing affordability, visual amenity). The majority of these relevant health determinants are covered within the SIA. These have not been identified as health impacts and the range and magnitude of potential health outcomes resulting from these impacts have not been assessed.

4.4.5 Long term development findings

The long-term development section (Chapter 39, Section 8) provides a summary of the long term health impacts that are discussed in more detail in the appendix. While the report does, at times, make reference back to the appendix, there is a lot of pertinent detail that is missing that should be referenced to the appendix. This section also lacks core components for clarity – such as discussing the methods used or mitigation measures - that would make this section acceptable as a standalone piece of work without having first read the appendix. This section also misses any discussion of long term cumulative impacts. Cumulative impacts are considered elsewhere in the report however this report does not make clear if the cumulative impact assessments were used in this assessment. It would be particularly relevant to include discussion of cumulative impacts here as there is no mention of health impacts in the cumulative impacts chapter. This section should also provide better characterisation of health impacts or otherwise provide a reference to where it is located in the appendix.

4.4.6 Key impacts and opportunities

The Health Chapter contains predictions of the attributable health outcomes from air and noise exposures in communities near the airport. The majority of outcomes for air quality were below accepted thresholds, however there were some exceedances for Particulate Matter 10, Particulate Matter 2.5, and Nitrogen Dioxide. Impacts from noise were also mostly below standards, however, impacts varied widely for different communities, with Luddenham likely to experience the most impacts associated with noise. Sufficient data was not available to conduct a complete HRA for ground water and surface water, therefore there are no predicted health impacts.

The Health Chapter and appendix utilises a Health Risk Assessment approach. This is a quantitative methodology that takes changes to these environmental determinants and estimates their risk to health (i.e. the chances or risk of a disease or fatality occurring). This narrow approach does not address the full range of determinants of health and makes no use of the large evidence base on the association between health determinants, particularly social, and health outcomes.

There are two major weaknesses in relation to the assessment of health impacts that the review team strongly recommend be addressed in order to ensure that health effects are not overlooked or not taken into account when mitigation/enhancement is being considered. These are: the reporting of the identified health impacts; and the scope of the impacts included in the health chapter.

4.5 Aviation planning

4.5.1 Approach

The approach to aviation planning has been to review the four volumes of the draft EIS as well as the draft Airport Plan provided on the Western Sydney Airport website (www.westernsydneyairport.gov.au).

This review is based on a desktop study and a literature review of the four volumes of the draft EIS and the draft Airport Plan, comparison of these against the EIS guidelines, identification of potential opportunities or inconsistencies and a comparison against available benchmarks.

4.5.2 Stage 1 development

Issues identified in terms of aviation planning for the Stage 1 airport include:

Airport planning

- No vocation or aviation purpose is described for Western Sydney Airport.
- There is a degree of variability in the forecasts and demand information used in the draft EIS and draft Airport Plan. In addition, the forecast passenger loads per aircraft for Western Sydney Airport as presented in the draft EIS appear to be high.
- It is unclear what benchmarks or planning decisions sit behind the 1900m runway separation shown for Western Sydney and it is noted that other airports in Australasia are proposing wider runway separation.
- Benchmarking indicates that passenger throughput per aircraft stand is potentially high for Western Sydney Airport. This would imply that the number of aircraft stands shown is less than one might typically expect.

Airspace and flight tracks

- The proposed airspace model is noted as a “proof of concept” and not the subject of exhaustive analysis. This indicative airspace design was not developed with consideration to potential noise or other environmental impacts.
- A single airspace model is presented for Stage 1 development. The basis of the model is that operations at Sydney Kingsford Smith Airport are unaffected. Other than minor flight path displacement, feasible alternatives are not presented or evaluated. However, presenting alternatives is a requirement of the EIS guidelines provided by the Department of Infrastructure and Regional Development.
- Departures track to 'exit gates', concentrating aircraft on several defined routes. This is a common tool used to improve air traffic flow. The impact of concentration and location of turn points has not been tested for environmental impact.
- Modes of operation (flight paths based on runways in use) are mentioned, but not how they affect surrounding areas.
- Noise abatement procedures, commonly implemented at other major airports, have not been developed.

Bird and bat strike

- The bird and bat strike assessment concludes that the overall risk for the airport is low. However the assessment is preliminary.

Fuel dumping

- Fuel dumping is concluded to be low risk and it is considered that the information presented in the draft EIS is appropriate.

4.5.3 Long term development

A number of the issues identified for Stage 1 are also apparent in the longer term planning of Western Sydney Airport.

- The lack of vocation or purpose for Western Sydney Airport and its relationship to the ongoing operation at Sydney Kingsford Smith Airport and, in particular, that potential long-term growth forecasts are very high.
- The variability in the number of stands and the apparent lack of consistency in terms of a base set of planning parameters used in developing the airport.
- Narrow runway separation to achieve all the proposed aviation uses.
- Lack of a full and thorough assessment of the interaction of aircraft traffic in the Sydney Basin which requires an airspace and flight path review not considered as part of Stage 1. The Stage 1 flight paths proposed in the draft EIS are not considered appropriate for the long term plan.

4.5.4 Key impacts and opportunities

Key impacts and opportunities from an airport planning perspective for the above issues are as follows:

- Vocation or purpose of Western Sydney Airport – One might expect that, certainly in its early stages of development, the Western Sydney Airport would potentially be a predominantly domestic, low-cost carrier airport with a significant cargo operation, reflecting lower charges and the lack of noise curfew. Premium international flights would continue to use Sydney Kingsford Smith as the primary airport in New South Wales and the one which provides proximity to the tourist and business centre of Sydney CBD. This vocational aspect is important in influencing how the future airport will operate, peak periods of activity and the type of traffic that will use the airport.
- Forecasts – There is potential that the forecasts understate the number of aircraft movements required, which has knock-on impacts on dependent analysis such as noise modelling. This is a potential area for further assessment or clarification to confirm that findings in the draft EIS and draft Airport Plan based on these forecasts are robust.
- Runway separation – Any wider runway spacing would increase land take, with downstream environmental impacts on biodiversity, surface water and groundwater, landscape and visual amenity. In addition, wider spacing for the future two runway airport will impact on flight tracks and noise given changes to runway thresholds.
- Aircraft stand provision – The number of aircraft stands shown is potentially less than one might typically expect, which has implications for land take and therefore related environmental impacts, though it is noted that the Land Use plan for Stage 1 shows a large area available for development.
- Airspace, OLS and PANS-OPS – In terms of requirements, the evaluation of protection volumes for flight paths and airspace containment is in accordance with normal methods mentioned in the Airports (Protection of Airspace) Regulations and under the Airports Act 1996. Whilst analysis of Obstacle Limitation Surfaces (OLS) and Instrument Flight Procedure protection volumes (known as PANS-OPS surfaces) indicates that, operationally, the Western Sydney airport can operate unrestricted from terrain and artificial obstacles.

However, the following impacts are identified which are either unresolved or which require further clarification:

1. The proposed airspace architecture is 'indicative' and has not been rigorously tested. The draft EIS proposes that another airspace model is tested closer to commencement of operations.
2. Flight paths appear to fly over water storages such as Warragamba Dam and Prospect Reservoir. The environmental impact is unclear.
3. The requirement under the Guidelines, produced by the Department of Infrastructure and Regional Development (DIRD), for feasible alternatives to be included has not been met. This is particularly important in consideration of concentration of approaching traffic over the township of Blaxland for the Stage 1 development and departure tracks.
4. There is no consideration of community sentiment regarding changes to flight paths, proposed in the draft EIS, when the Airport operates with two runways.
5. An alternative Stage 1 airspace model, based on the long term proposal but operating with a single runway, is not tested.
6. Except for Sydney Kingsford Smith, flight paths for aerodromes, affected by the Western Sydney Airport are not evaluated.
7. The draft EIS suggests that Western Sydney Airport will detrimentally affect the operations at Bankstown and Camden, and affect Richmond (military). The environmental impact is not quantified.
8. Relocation of light aircraft traffic to other airports, the definition of new training airspace and consequent environmental impact, is not assessed.

Given the above, it is considered that the information on airspace presented in the draft EIS does not meet requirements.

- Bird and bat strike – the bird and bat strike assessment is preliminary and therefore further works in the airport site and study area are required to confirm the level of bird and bat strike risk and to refine the mitigation strategies, in parallel with design development.
- Fuel dumping – It is considered that the information presented in the draft EIS is appropriate.

4.6 Social and Economic

4.6.1 Approach

In undertaking this review we have had particular regard to the requirements established by Section 10 of the Guidelines for the Content of the Draft EIS – Western Sydney Airport issued in January 2015 by the DoE.

We have also considered the implications of both the Stage 1 Airport and longer term development with regards to:

- Potential gaps in the preparation of the Social and Economic Specialist Studies;
- Any concerns regarding the validity of assumptions and conclusions; and
- Suggestions to improve the effectiveness of the proposed mitigation measures.

4.6.2 Components of the draft EIS reviewed

The following components of the draft EIS have been reviewed in relation to Social and Economic impacts:

- Relevant sections of the Executive Summary
- Volume 2—Stage 1 development – Chapters 23 and 24 – Social and economic
- Volume 3—Long term development – Chapter 37
- Volume 4—Specialist studies in appendix P1, P2 and P3.

The social and economic review support the draft EIS's summation that the main benefits of the Western Sydney Airport relate to the generation of jobs in Western Sydney and associated economic activity. The importance of this contribution to Sydney represents an important policy shift since the preparation of the earlier EIS's for a second airport on the site as Western Sydney has become a greater focus for economic growth and activity.

In drawing this conclusion however we maintain the need for a balanced assessment across positive and negative social and economic impacts, both at a local and regional level, over the short and longer term. To this effect six overarching issues have been identified in relation to the current draft EIS and its assessment of impacts during Stage 1 of the Airport and a further four regarding its assessment over the longer term as discussed on the following pages of this Executive Summary.

4.6.3 Stage 1 development

4.6.3.1 Balance of discussion – Impacts

We identify a strong focus in the EIS on the economic benefits of Stage 1 of the Western Sydney Airport as distinct from a balanced discussion of economic and social costs and benefits. For example the economic Chapter (24) in Vol. 2 focuses entirely on the regional (Western Sydney) and broader (Sydney, NSW and Australian) employment and economic benefits of the Western Sydney Airport with only one general reference to potential adverse economic impacts as follows.

'However there would be some negative impacts in the immediate vicinity of the airport site due to combination of the airport development and the changing land uses' Vol. 2, Chapter 23, Pg. 504

A more balanced discussion of costs and benefits is therefore encouraged. For example in relation to matters such as impacts to local business activity during construction or the potential impacts of a new business park (with retail as a permissible use) to existing and proposed centres in the South West (i.e. Leppington, Edmondson Park and Liverpool).

4.6.3.2 Balance of discussion – Geography

Our comments regarding the balance of discussion also relate to the EIS's strong focus on the regional and Australian economic benefits of the Western Sydney Airport as distinct from any prospective local impacts. For example the economic benefits and costs to centres within close proximity to the Western Sydney Airport (i.e. Luddenham or within the South West Growth Centre) are little, if at all discussed. Whilst the impacts may be positive or minimal, it is appropriate that they are considered and where possible quantified.

4.6.3.3 Translation of issues within the EIS

The Specialist Social Impact Study in Appendix P identifies a number of likely adverse impacts to the local communities. Despite the significance of these impacts and their potential to raise notable social concerns,

many are given relatively minor reference in the relevant Chapter (23) with no reference in the Executive Summary.

This results in an ill-informed view of social issues for readers of the EIS who may not progress to read Chapter 23 or Appendix P in detail.

4.6.3.4 Statements without assessment

In the Stage 1 social and economic chapters (23 and 24) many of the potential issues are stated with little assessment of their implications to communities, their degree of significance or duration and alternative approaches that may be applied to alleviate them. For example the provision of alternative open spaces to communities during the construction process, the severity of noise impacts to recreational areas, the degree of noise disturbance for different locations over the short and longer terms.

This approach weakens the appreciation of the issues and the means to mitigate them. It could also result in greater angst by the community as to the likely degree, duration and severity of impacts.

4.6.3.5 Direct response to Stakeholder Engagement

The initial stakeholder engagement programme for the Western Sydney Airport identified a range of social and economic concerns (Vol.1, Chapter 8). A number of these concerns are listed by the specialist studies yet are not specifically addressed by Vol. 2 or 3 of the EIS. Furthermore the consultation chapter (Vol 1, Chapter 8) refers to an EIS summary paper being prepared however it is understood that this paper was not made available.

It is recommended that a summary consultation paper is prepared and made publically available and that each issue raised by stakeholders is considered and responded to by the specialist studies. In turn the body of the EIS should identify the most appropriate mitigation measures and minimise community concerns.

4.6.3.6 Transfer and redistribution effects

Much of the draft EIS's discussion regarding the economic value add as a consequence of the Western Sydney Airport recognises its '....role in attracting economic activity to the Region' at the expense of others i.e. 'There is a reduction in value-add in the Rest of Australia' (Pg. 139) and 'The model assumed the future regional employment growth would be redistributed across Sydney...' (Pg. 141).

Whilst the generation of jobs in Western Sydney is a strong positive of the Western Sydney Airport, the draft EIS does not discuss the economic or social implications of this transfer of activity from the other areas in Sydney or 'the rest of Australia'. Whilst any such impact might be negligible or acceptable, the potential impact should be recognised and considered in the assessment.

4.6.4 Long term development

The longer term assessment of impacts by the EIS is generally an extension of those identified upon operation for Stage 1. Our review finds that if left unmitigated, these impacts would generally be exacerbated on account of the significant increase in flights and passengers owing to the introduction of the second runway.

Key issues relate to:

9. How potential social and economic impacts could be managed and mitigated with such a significant and relatively quick increase in the number of passengers and associated on site employment (+120%) over the 13 year period between 2050 and 2063;

10. The potential impact of additional flight paths and operations to regional amenity and the impacts to the longer term development potential of affected areas in Western Sydney and more specifically in the South West Growth Centre i.e. height and noise restrictions to increasing residential density;
11. The degree to which the Western Sydney Airport could ‘...lead to the reduction in social amenity and impacts on the existing lifestyle of people living and working....’ (Pg. 138) identified by the EIS; and
12. The economic costs or implications of the Western Sydney Airport’s ‘....role in attracting economic activity to the Region’ at the expense of others i.e. ‘There is a reduction in value-add in the Rest of Australia’ (Pg. 139).

4.6.4.1 Mitigation of Longer Term impacts

A review of the discussion concerning mitigation measures over the longer term focuses heavily on planning mechanisms (i.e. zoning of land to exclude residential uses) together with local and State Government investment to address broader traffic, transport and infrastructure issues.

There is no discussion, however, of how this would be co-ordinated or resourced to address specific impacts resonating from the Western Sydney Airport. Further there is no discussion as to who the key accountability would fall with.

This results in a potential risk that some mitigation measures and impacts would be missed or forgotten over time.

4.6.4.2 Setting a framework for further assessment

To improve the longer term assessment and give some comfort to its approach, we suggest:

- Further assessment of the potential social and business impacts and the information gaps with some parameters or ranges of assessment; and
- The identification of the main body responsible for managing and mitigating these impacts and risks over time or how the mitigation framework will be managed.

4.6.5 Key impacts and opportunities

A review of the EIS has identified the following potential impacts and opportunities during Stage 1 and over the long term development.

Table 4.1 Summary of impacts and opportunities

	Stage 1	Longer term
Impacts	<p>Social</p> <ul style="list-style-type: none"> ■ Improved employment opportunities ■ Reduced travel time to work opportunities ■ Increases in average wages ■ Improved retail and business service choice and price competition ■ Changes to semi-rural lifestyle ■ Changed access to spaces and community facilities on the Western Sydney Airport site ■ Impacts to community cohesion ■ Impacts to social service provision 	<p>Social</p> <ul style="list-style-type: none"> ■ Improved employment opportunities ■ Reduced travel time to work opportunities ■ Increases in average wages ■ Improved retail and business service choice and price competition ■ Impacts to social service provision ■ Amenity and health impacts (noise, visual and air quality) owing to airport operation

	Stage 1	Longer term
	<ul style="list-style-type: none"> Perceived impacts and associated social anxiety Amenity impacts during construction (dust, noise, road closures) Amenity and health impacts (noise, visual and air quality) upon operation Housing affordability 	
	<p>Economic</p> <ul style="list-style-type: none"> Construction jobs Multiplier benefits of operational job generation Economic value add for the economy Increased customer base and business activity Redistribution of jobs to Western Sydney Local business impacts during construction and operation Land value changes Impact to retail and center viability Changes in traffic congestion Congestion impacts to WSEA and local and regional roads Decline in agriculture industries 	<p>Economic</p> <ul style="list-style-type: none"> Multiplier benefits of job generation Agglomeration benefits for Western Sydney businesses Economic value add for the Western Sydney economy Redistribution of jobs to Western Sydney Improved appeal of investing and operating airport related businesses in Western Sydney Land value changes Impact to retail viability and opportunities
Opportunities	<ul style="list-style-type: none"> Greater population growth and diversity (age and socio-economic) owing to employment opportunities Improved live/work connections Potential increase in tourism in the Blue Mountains Greater appeal of Western Sydney to business and investment 	<ul style="list-style-type: none"> Continued population growth and improvements in social diversity Improved balance of economic outcomes across Sydney Improved balance of social and community outcomes Enhanced local, Sydney and Australian economies

Key: Positive impacts, negative impacts/opportunities, neutral or positive impacts/opportunities dependant on stakeholder

4.7 Surface water and groundwater

4.7.1 Approach

Cardno have undertaken a desktop review of the draft EIS documents and have assessed the draft EIS with respect to the following items:

- An evaluation of whether the ground and surface water studies meets the requirements of the EIS Guidelines and relevant other guidelines and methodologies;
- An evaluation of whether the conclusions reached in the studies are valid;
- An evaluation of whether the underlying assumptions used to inform the assessment are plausible and credible;
- A review of the mitigation and management measures proposed and advice provided on their likely adequacy in mitigating impacts;

- An evaluation of the level of uncertainty over impacts and the environmental risks that will arise as a result of the project; and
- A summary of the key impacts and opportunities associated with the project in relation to the Surface water and groundwater studies.

Descriptions of methodologies and impacts have been cross-referenced across chapters and the technical reports and figures checked for whether they aid understanding. Limited spot checks on values presented in tables have been undertaken together with applying sanity checks to data and model results with expected outcomes.

Surface water and groundwater have been reviewed by separate specialists, except where there is an inter-connection between the two, such as with water quality.

Prior to release of the draft EIS, Cardno initially reviewed available background documents to gain an understanding of site settings and project history including EPBC documentation and the 1997–1999 draft EIS by PPK.

4.7.2 Limitations

The following limitations apply to the review of the surface water and groundwater:

- No site visit has been undertaken;
- No numerical models were available and hence no review of models or inputs has been undertaken other than what has been reported, nor have any models been run as part of the review;
- No data is available for review and assessment is limited to commentary on the data provided, however, data gaps have been identified;
- Cardno assumed the data used for the impact assessment had gone through a quality control process before use and therefore can be relied upon; and
- Similarly Cardno did not review the interpretation of the data, for example the attribution of a bore to a specific aquifer.

4.7.3 Components of the EIS reviewed

The following components of the draft EIS have been reviewed in relation to surface water and groundwater:

- Volume 1—Project Background:
 - ▶ Executive Summary
 - ▶ Part A— Project background
 - ▶ Part B— Airport Plan
- Volume 2—Stage 1 Development:
 - ▶ Part D — Environmental Impact Assessment:
 - Chapter 9: Approach to impact assessment
 - Chapter 17: Topography, geology and soils
 - Chapter 18: Surface water and groundwater
 - Chapter 27: Cumulative impact assessment
 - ▶ Part E— Environmental Management

- ▶ Part F —Conclusions
- Volume 3—Long Term Development:
 - ▶ Part G — Assessment of Long Term Development
 - Chapter 30: Approach to impact assessment
 - Chapter 34: Surface water and groundwater
 - Chapter 39: Other environmental matters
 - ▶ Part H — Conclusion and recommendations
- Volume 4—EIS Technical Reports
 - ▶ Appendix C: Western Sydney Airport EIS Guidelines
 - ▶ Appendix L:
 - L1 Surface water hydrology and geomorphology
 - L2 Surface water quality
 - L3 Groundwater.

4.7.4 Stage 1 airport

A summary of the assessment of compliance of the draft EIS with the EIS guidelines is provided in Table 2-1. In general the elements of the EIS Guidelines have been addressed, however, some gaps have been identified in the assessments.

Primarily, comment on how the reliability of the information was tested and what uncertainties (if any) are in the information is not presented. Further, figures and maps are provided, however, many figures and maps are not clear and could be improved to aid understanding. Mitigation and management measures are identified, however, are generally broad and do not necessarily target specific residual impacts or propose specific measures or targets.

The review has also identified some technically incorrect statements made in the EIS, however, Cardno has assessed that consequences for the outcomes of the impact assessment are limited.

4.7.4.1 Surface water

The overall outcome of the impact assessment is that there are minimal impacts to surface water, geomorphology and water quality as a result of the Stage 1 development including appropriate mitigation measures. Some specific residual impacts are noted in relation to changes to water level and geomorphology at Oaky Creek and on a tributary of Badgerys Creek.

The identified gaps in the assessment relate to:

- Flooding – Residual impacts in Cosgroves, Oaky and Badgerys Creek are identified. Cardno agree that the impacts may be relatively minor if the results as presented are correct. However, it is difficult to confirm whether the statements and conclusions are valid as there is a lack of supporting information and presentation of inputs and results are not clear and concise. Further, these impacts still require management to mitigate them to negligible levels.
- Duncans Creek and its tributaries have not been modelled to allow definition of baseline and relative hydraulic impacts in these locations. Such impacts have been assessed by the changes in the hydrology for these catchments. As such, all summary impacts do not fully consider impacts to the Duncans Creek downstream areas. Investigation of a basin at this location is proposed as a mitigation/management measure.

- Many of the figures/maps provided in both the main chapters of the EIS and in the technical reports are either not easy to understand or omit relevant information to aid ease of understanding.
- Cumulative impacts have been discussed, however, no assessment has been undertaken to quantify the potential impacts other than for climate change scenarios.
- Water quality has not been presented in terms of achieved pollutant load reduction or assessment against guideline pollutant reduction targets. The EIS seems to dismiss any relevance of increased pollutant loads on the receiving environment and instead determines that impacts are acceptable because there are general improvements in pollutant concentrations due to increased flow volumes.
- The EIS discusses the tributary of Badgerys Creek that joins Badgerys Creek approximately 300 metres downstream of Elizabeth Drive under existing conditions. It acknowledges that threatened ecological communities have not been mapped outside the site as part of the biodiversity assessment, but there is evidence of some remnant native vegetation along this reach of creek, which would be reliant on occasional flooding and would be impacted under the current proposals. Such impacts need to be assessed to ensure there are no impacts and any mitigation and management measures identified.

Surface water impact management is required to address the following residual risks to surface water:

- Outstanding localised increases to flood depths in Cosgroves, Oaky and Badgerys Creeks.
- Risks to erosion and geomorphological changes to the downstream creeks due to increases in bed shear stress at various locations.
- Undefined impacts and mitigation for runoff to Duncans Creek.
- Implications of increases in pollutant loads, particularly for cumulative impacts are not addressed.
- Ecological impacts in receiving waters are not clearly addressed.
- Impacts of potential use of stormwater to provide water supply for site preparation works has not been considered.

4.7.4.2 Groundwater

The overall outcome of the impact assessment is that there would be no impact to groundwater systems and associated values due to the presence of tight clay soils and limited groundwater presence directly below the site. Cardno does not concur fully with the assessment, this difference results from a key assumption made in the EIS by characterising the uppermost aquifer.

The identified gaps in the assessment relate to:

- Groundwater values are identified, however the groundwater dependent ecosystem lacks characterisation and conceptualisation with respect to water source.
- Sufficiently complete characterisation of the weathered rock (regolith) aquifer is not provided. For example, the aquifer composition, nature and thickness distribution is unknown (this could have been collated through a review of all drilling logs performed on site overtime), and the level of saturation of the aquifer is also unknown. This is a limitation in understanding the connectivity of the weathered rock (regolith) aquifer to the alluvium aquifer supporting groundwater dependent ecosystem.
- Similarly, no baseline time-series data has been collected. This is especially a limitation when it comes to characterisation of the weathered rock (regolith) aquifer and the contribution of this aquifer to the alluvium formations along the creek lines where groundwater dependent ecosystems are primarily located.
- The impacts are reasonably well identified, however some of the impact assessment is missing a clear outcome statement.

- Impact management and mitigation measures are only discussed generally with potential mitigation measures to be considered and monitoring to be implemented. Groundwater impact arising from contamination is suitably addressed. Groundwater impact arising from the development of the site is, in view of the lack of information on the uppermost aquifer, inappropriate especially when addressing impacts on groundwater dependent ecosystems.
- Consideration of groundwater recharge is discussed at length for the Bringelly Shale and overlying aquifer, however, the discussion does not extend to the alluvium aquifer.

Groundwater management is required to address the two residual risks to groundwater values:

- Risk of soil and subsurface contamination from spill/release of chemicals or contaminants. A discussion is suitably provided to this effect in the EIS documents. Cardno agrees that the details of the management program cannot be defined at this stage and should be incorporated in a site environmental management plan.
- Risk of impact on groundwater dependent ecosystems from reduced water supply to the creek alluvium system. In Cardno's view, the EIS documents do not provide a robust impact assessment of the risk to the Cumberland Plain Woodland along Badgerys Creek. Cardno suggest that the following management and mitigation approach could be considered to address the EIS guidelines requirements:
 - ▶ implementation of baseline data acquisition with an aim to document the contribution of recharge to the creek alluvial system from the weathered rock (regolith) aquifer, the Bringelly Shale and streamflow;
 - ▶ a review of the risk to the ground water dependent ecosystem; and
 - ▶ based on the outcome of the previous item, the management and mitigation will vary with the level of risk. A risk propagation based monitoring strategy and response plan may be suitable. In this case, a response plan would propose a suitable early warning indication of impact propagation and provide the management and mitigation measures if necessary to prevent adverse impact. If the risk is identified to be more significant, engineered solutions may need to be considered in the site design. Another management and mitigation solution could involve inputs into site design to prevent impact on streamflow and indirectly aquifer recharge or mitigate the loss of recharge.

4.7.5 Long term development

4.7.5.1 Surface water

For the long term development, the impact assessment builds on the assessment for Stage 1. The hydrologic, hydraulic and water quality models used in the assessment include representations of the drainage system incorporated into the concept design of the indicative long term development.

The concept design of the long term development includes expanding the drainage system to control the flow of surface water. An extension of the Stage 1 detention basins is proposed together with provision of an additional detention basin in the longer term.

The following risks to surface water for the long term development and their implications have been identified:

- Outstanding localised increases to flood depths in Cosgroves, Oaky and Badgerys Creeks.
- Risks to erosion and geomorphological changes to the downstream creeks due to increases in bed shear stress at various locations.
- Undefined impacts and mitigation for runoff to Duncans Creek.
- Implications of increases in pollutant loads, particularly for cumulative impacts are not addressed.

- Ecological impacts in receiving waters are not clearly addressed.
- Impacts of potential use of stormwater to provide water supply for site preparation works has not been considered.

It is believed that most of the above issues can be addressed through refinement of the drainage strategy to manage flows, velocities and water quality. There are some outstanding impact assessments which have not been considered and should be addressed such as ecological impacts, use of stormwater for construction and impacts on Duncans Creek.

A reasonably robust assessment of the long term development has been undertaken. There is no formal framework for further assessment established as part of the EIS. The EIS for the Long Term Development simply lists considerations for future development as part of future design stages to address the impacts to be minimised. While this list identifies some of the key items to be addressed, it does not recommend any specific measures or processes that must be adhered to so as to tie those activities back to this EIS and associated approvals.

4.7.5.2 Groundwater

The following risks to groundwater for the long term development and their implications have been identified:

- Risk associated with change of land use and decrease of groundwater recharge. The implication is possibly, a lack of groundwater supply to the groundwater dependent ecosystems (EPBC listed). If the studies highlighted in the data gap analysis confirm that there is a risk, an artificial groundwater supply scheme to the alluvial aquifer or designed streamflow release upstream of the ecosystem will possibly be required to support aquifer recharge. If the studies identify that there is no risk of impact to the groundwater dependent ecosystem water supply, then no further work will be required.
- Risk associated with the possible use of chemicals over irrigated areas. The level of risk will depend largely on locations and practices. The implication is possibly an impact to the health of groundwater dependent ecosystem through runoff and infiltration in the alluvial aquifer. Management of this risk implies best practices be followed for the use of fertilizer and pesticides, additionally, targeted analytes could be included in groundwater monitoring.
- Risk associated with the use of groundwater as a supply. A groundwater assessment will be required to establish whether the extraction of the required volume is feasible and the impact on nearby groundwater users. It should be noted that the target aquifer will be the deeper Hawkesbury Sandstone. The implications in terms of work required will depend on the volume required. At most, the studies for a groundwater assessment are likely to require the drilling of a few wells (at least one observation and one pumping well), pump testing and analysis and some groundwater modelling.

The EIS identifies some of the required assessments and activities especially in relation to water quality management. The EIS also identifies that additional assessments will be required would the project require to use groundwater as a water supply. However, the EIS did not identify the state and federal regulatory processes likely to be required for the management of the site groundwater values (liaison, review and approvals, licences for example), nor did it clearly identify the management plans and response plans required to be in place. The EIS did not identify assessment remaining to be performed to collect baseline data and confirm the hydrogeological conceptual model.

4.7.6 Key impacts and opportunities

Key project impacts and opportunities are as follows:

- Localised increases in flood depths are indicated at a number of locations.

- Impacts in Duncans Creek are not fully considered and additional modelling would be required to determine residual impacts and any proposed management measures.
- Potential erosion and geomorphology changes with increased flow volumes and isolated increases in shear stress.
- Increased pollutant loads for total suspended solids and nutrients, although pollutant concentration are equal or reduced compared to existing.
- Impacts on the groundwater dependent ecosystem associated with Badgerys Creek are not fully identified due to a lack of characterisation of the alluvium aquifer and in particular of:
 - ▶ The relationship between the alluvial aquifer and the weathered rock (regolith) aquifer; and
 - ▶ The characterisation of the recharge of the alluvium aquifer.
- These groundwater dependent ecosystems are declared a Matter of National and Environmental Significance under the EPBC Act. A review of the groundwater conceptual model would be required to enable characterisation of impacts on the Badgerys Creek groundwater dependent ecosystem.

There is an opportunity to improve the outcomes of the EIS to manage the residual impacts through refinement of the drainage strategy and management plans during future detailed design stages. It is recommended that the residual impacts are clearly defined in the EIS and appropriate specific management measures and targets be proposed or specified to ensure that these issues are addressed.

Given the complete redevelopment and earthworks taking place on site, there is opportunity to introduce even higher levels of stormwater management and water quality treatment to further minimise the impacts of the project and potentially improve the outcomes. This would assist in minimising cumulative impacts on the environment that may occur in combination with the surrounding South West Growth Centre and Western Sydney Employment Area development impacts.

With respect to groundwater impacts, there is an opportunity before site activities to acquire suitable baseline data and review the level of risk to the groundwater dependent ecosystem along the creeks. There is also an opportunity to define site design requirements to ensure recharge of the alluvium aquifer and, consequently, preservation of Badgerys Creek groundwater dependent ecosystem.

4.8 Greater Blue Mountains

4.8.1 Approach

This section of the draft EIS review focuses on the potential impacts of the proposed airport on the Greater Blue Mountains Area (GBMA). The Greater Blue Mountains are listed as a National Heritage place and as a declared World Heritage property. As such, this review takes into account the following matters of national environmental significance outlined in the EIS guidelines:

- the heritage values of a National Heritage place
- the world heritage values of a declared World Heritage property.

4.8.2 Components of draft EIS reviewed

The potential impacts of the proposed airport on the Greater Blue Mountains are addressed in Chapters 26 and 38 of the draft EIS. Technical reports for noise, social, biodiversity and air quality consider the Greater Blue Mountains as a sensitive receiver in the detailed assessments.

4.8.3 Findings

4.8.3.1 First stage airport

Chapter 26 of the Western Sydney Airport EIS draws on information from the environmental and social assessments undertaken for the first stage airport on the World Heritage and National Heritage values and other values of the Greater Blue Mountains World Heritage Area (GBMWH).

The methodology applied to the assessment World Heritage, National Heritage values and other values included:

- identification of the property’s World Heritage and National Heritage values, including attributes recognised in the Statement of Outstanding Universal Value;
- identification of key examples or attributes of other values that complement the property’s World Heritage and National Heritage values;
- collation of relevant baseline information on environmental factors and existing impacts including baseline noise levels and flight paths associated with Sydney Airport;
- assessment of significance of impacts on World Heritage values and the integrity of the world heritage property and the National Heritage values based on the Significant Impact Guidelines 1.1 (DoE 2013a) and the property’s Statement of Outstanding Universal Value; and
- assessment of the National Heritage area having regard to all environmental matters.

The draft EIS assessment of the potential impacts was limited to noise, air emissions and amenity impacts from overflight of aircraft, lighting and traffic.

The GBMA comprises eight protected areas. The GBMWH Strategic Plan (DECC, 2009) provides a framework for the integrated management, protection, interpretation and monitoring of these areas. Each park has a Plan of Management prepared by the NSW National Parks and Wildlife Services which provides the detailed management prescriptions for each reserve which have not been included in the draft EIS.

4.8.3.2 Compliance of the report with the (EPBC Act) EIS Guidelines

As the GBMA is listed as a National Heritage place and a declared World Heritage property, this review assesses compliance with the sections of the EIS Guidelines that relate to the requirements of controlling provisions (5(a), (d), 6(a), 6(b), 6(c)(ii), 7(a)) or MNES (5(c)) or make specific reference to the GBMWH (4(b), 5(g) and 6(b)(e)).

Table 4.2 Compliance of draft EIS with EPBC Act Guidelines

EIS Guideline		EIS Section	Comment
4	Description of the environment		
	<ul style="list-style-type: none"> ■ Description of the GBMWH world heritage values. ■ Description of the GBMWH national values. 	<p>26.3.2</p> <p>26.3.3</p>	<p>Description of the world heritage values adequately reflect the UNESCO 2015 information.</p> <p>The area and values of the GBMA are the same as the World Heritage Area so the EIS uses one assessment to address both sets of values. Peer review of the EIS confirms the Greater Blue Mountains Area meets the official values of criterion a, b, c and d due to meeting world heritage criterion ix and x and therefore one assessment is considered adequate.</p>

EIS Guideline		EIS Section	Comment
	<ul style="list-style-type: none"> ■ Reference to World Heritage criterion. ■ Reference to the integrity of the property. 	<p>26.3.2.1</p> <p>26.3.2.2</p>	<p>Reference to World Heritage criterion ix and x in Chapter 26.</p> <p>Reference to the integrity of the GBMA discussed in Chapter 26 and reflects the world heritage listing.</p>
5	<p>Relevant impacts:</p> <ul style="list-style-type: none"> ■ construction, operation and decommissioning phases ■ facilitated impacts on MNES ■ justification for no impact. 	<p>26.4</p> <p>26.5 & 38.3</p>	<p>Construction impacts mentioned but none identified that would affect the values of the GBMA due to distance and lack of direct connectivity this is a valid justification.</p> <p>Direct and indirect operational impacts discussed. Indirect impacts associated with noise, air quality and amenity.</p> <p>Facilitated impacts from increased tourism and associated economic development.</p> <p>Decommissioning impacts have not been discussed assessed, given that the likelihood of the airport being decommissioned is low this project phase is not considered relevant.</p>
6	<p>Avoidance and mitigation measures</p> <p>Take into account relevant agreements and plans that cover impacts or known threats.</p>	26.6 & 38.4	<p>Influence on existing threats (26.5.5 & 38.3.5).</p> <p>GBMWA Strategic Plan forms the basis of the other values and existing threats. It is noted that there are other management plans that cover the individual parks in the GBMA that have not been included in this assessment.</p>
7	Residual impacts and offsets	-	Residual impacts have not been discussed for impacts on the GBMWA.

Noise

The technical noise report provides an assessment of noise levels in the Greater Blue Mountains World Heritage Area (GBMWA). To provide a basis for assessing impacts to the GBMWA, the technical noise report presents information in the form of track density plots. While this form of data provides a useful and established form of information, the reason for reverting to overflight numbers in lieu of predicted noise levels is not stated. As per the discussion in section 2.3.2, this may be related to increased uncertainty in the predictions when considering low predicted noise levels. However, flight track density plots in isolation do not illustrate the full extent of potentially intrusive noise levels at locations to the side of the flight track.

The report notes aircraft are typically at an altitude of approximately 5000 ft, which corresponds to a noise level on the ground of approximately 55 dB L_{Amax} , consistent with INM predictions for the Airbus A320 or Boeing 737-800. Measurements at other airports have however demonstrated that aircraft at that altitude are generally higher than those predicted using the INM, and accordingly noise levels in practise could be higher.

The assessment of noise impacts in tranquil areas is complex and guidance on the subject is limited. As per the technical noise report, levels below 55 dB L_{Amax} could be considered intrusive by recreational visitors and other users. The natural soundscape in terms of sound press levels and sound characteristics are important attributes of high value wilderness areas. While levels below 55 dB L_{Amax} are likely to be comparable to typical levels associated with ambient noise sources in the GBMWA, it is not considered appropriate to assess aircraft noise intrusion by comparing sound pressure levels; the characteristics of aircraft noise and natural sound sources is very different, and are interpreted in very different ways.

The potential for a large number of audible events below 50–55 dB L_{Amax} is therefore considered to potentially represent a significant and widespread impact within the GBMWA. On this point, we note that the separate assessment of impacts to the GBMWA presented in Volume 2 of the draft EIS indicates noise levels below 50 and 55 dB L_{Amax} are ‘not significant’. Given the above, the assertion within draft EIS chapter that noise levels below 50 and 55 dB L_{Amax} are ‘not significant’ is not considered to have been sufficiently justified, and the assessment may therefore not adequately reflect the potential impact to the values of tranquillity within the World Heritage Area.

Given the status of the Blue Mountains as a World Heritage Area, and the potential for intrusive impacts, further assessment of this sensitive receiver location is considered to be warranted. In particular, further information should be provided to demonstrate the relative merits of alternative aircraft arrival management procedures which do not involve a concentration of aircraft movements over the GBMWA. This should include a discussion of the trade-offs between protection of amenity in residential areas and the protection of the GBMWA. Consideration should also be given to different areas within the GBMWA noting any areas of increased recreational use or areas where tranquillity and natural soundscapes may be more valuable.

In addition, the technical noise report considers the number of people potentially affected for alternative merge points in general terms. For the two alternative merge points considered, the technical noise reports notes that the flight densities over Blaxland are reduced, and the people affected are aligned to less populated rural residential areas outside the GBMWA. Track densities and number of aircraft overflights over Blue Mountains’ communities are still predicted to be high, while impacts on some areas within the GBMWA are increased for the two alternative merge points.

It is therefore unclear why preference has been given to the merge point that affects a greater population, i.e. over Blaxland, in lieu of reducing number of potential affected residences. This is perhaps due to conservation of the world heritage area, though should be confirmed.

Air quality

The air quality impacts relevant to the GBMA have been divided into three elements; regional air quality, climate change and emissions from fuel dumping.

A review of the regional air quality assessment found that the assessment adopted the NSW EPA’s tiered assessment approach which was considered appropriate for this project. All the relevant information regarding how the regional air quality assessment was undertaken, with the exception of detailing how the airport sources were parameterised within the model.

Whilst the change in the daily maximum 1-hour ozone concentration was marginally higher than the 1 ppb defined in the EPA’s tiered approach, the base concentration at the location of the incremental change was approximately 50 ppb (well below the EPA’s impact assessment criterion of 100 ppb). The maximum 1-hour concentrations within the region were not predicted to increase as a result of the Stage 1 Development. Mitigation measures that had a focus on reducing NO_x emissions were also recommended for consideration.

The EIS recognises that a challenge identified in world heritage listing (UNESCO, 2015) is the impact of human-enhanced climate change on the GBMA due to the potential for increased temperatures and alteration to the frequency and intensity of fires. A review of the GHG assessment by Katestone Environmental found that despite not specifying the emission factors used to quantify emissions, the greenhouse gas assessment appears to provide reliable estimates of greenhouse gas emissions with the proposed airport representing approximately 0.10% of Australia’s project 2030 transport related GHG emissions inventory.

A review by Katestone Environmental identified that the potential impacts from fuel dumping have not been quantified.

Biodiversity

A review of the biodiversity assessment undertaken for the project found that it generally complied with the EIS guidelines. A partial compliance was identified in relation to a detailed assessment of significance on the Greater Blue Mountains Heritage Area which notes that it will be included in the final draft of the report following a multidisciplinary workshop to assess potential impacts.

Social

The GBMWhA has been included in the social impact assessment as an area that provides a range of recreational pursuits that may be impacted by the proposed airport increasing the number of audible overflights to over 70/day in 2030. A review of this technical report has identified that there is a strong focus on the economic benefits at the regional and national levels however lacks the assessment of economic and social impacts at the local level.

4.8.3.3 Commentary on validity of assumptions

Identification of the sensitive receivers

Sensitive tourism and recreation areas used in the assessment were based on the identification of key attractions and associated viewing locations within the GBMA. The assessment considered the remoteness, accessibility and accommodation options as an indication of the type of tourism and recreational experiences available at each location.

Sensitive areas identified for amenity assessment in the EIS stage 1 were:

- Jamison Valley south of Echo Point lookout and the Scenic Cableway at Katoomba and Wentworth Falls lookout;
- Grose Valley east of Evans lookout and Govetts Leap lookout;
- Wilderness area between Deanes lookout and Crawfords lookout within Wollemi National Park;
- Nattai wilderness area;
- Kanangra Walls and wilderness area east of Kanagra-Boyd lookout; and
- Baal Bone Gap within Gardens of Stone National Park.

Other sensitive receivers not included in the assessment that add to the value of the area include towns located in the lower Blue Mountains e.g. Springwood and Leura, walking tours (Aboriginal Blue Mountains Walkabout tour near Falcon Bridge), sporting events (six foot track marathon, ultra-trail) canoe/kayak trails along Nepean River, Grose River and further north along the Colo River. Viewing locations that are outside the GBMA, but provide views of the area, for example Burragonang lookout near Oakdale could be impacted by the proposed airport. These areas should have been included in the assessments. It is suggested that further consultation with the Blue Mountains City Council or Tourism Board to understand the full range of users of the area.

World Heritage and National Heritage values

The EIS states that the values identified for the Greater Blue Mountains National Heritage Area and World Heritage Area are the same. A review of the National Heritage criteria for the purposes of this item and the *Environment Protection and Biodiversity Conservation Act 1999*, found that each world heritage value that the World Heritage Committee has identified for the property triggers the place to meet a National Heritage criterion.

In this regard the EIS has taken the heritage assessment to cover both the national and world heritage values of GBMA, which is considered a suitable approach.

4.8.3.4 Whether the conclusions reached in the studies are valid

The draft EIS concludes:

- *No direct impacts are expected World Heritage or National Heritage values from the construction or operation of the proposed Western Sydney Airport;*
- *Potential indirect impacts of airport operation would not result in an attribute of the property being lost, degraded or damaged, or notably altered, modified, obscured or diminished.*

It is noted that the detailed assessment of significance on the GBMHA has not been completed and will be included in the biodiversity technical report following a multidisciplinary workshop to assess the potential impacts.

4.8.3.5 Review the mitigation and management measures proposed

Mitigation measures referred to in the aircraft noise assessment are generic in nature due to the airspace design not being finalised. Design of airspace arrangements and flight paths for the proposed airport would take into account the potential impact on sensitive areas including GBMA.

The development of a detailed Environmental Management Plan for the project would take into consideration management plans already in place for GBMA; including the Strategic Plan.

4.8.3.6 The level of uncertainty over impacts and the environmental risks

Given the uncertainties concerning the final form of the airspace design, the final form of noise mitigation measures to be implemented is not yet known. Consequently, the mitigation measures that have been referred to in the aircraft noise assessment are generic in nature.

4.8.4 Long term development

4.8.4.1 Overview of approach to assessment to long term development taken by the EIS

Chapter 38 of the Western Sydney Airport EIS builds on the potential impacts considered for the proposed Stage 1 development (Chapter 26) and takes information from the environmental and social assessments completed for the proposal.

Seven sensitive tourism and recreation areas were identified in relation to the potential impacts from long term development of the airport in relation to noise, air quality and amenity.

- Jamison Valley south of Echo Point lookout and the Scenic Cableway at Katoomba and Wentworth Falls lookout;
- Grose Valley east of Evans lookout and Govetts Leap lookout;
- The wilderness area between Deanes lookout and Crawfords lookout within Wollemi National Park;
- The wilderness area between Mt Yengo lookout and Finchley lookout within Wollemi National Park;
- Nattai wilderness area;
- Kanagra Walls and wilderness area east of Kanangra-Boyd lookout; and
- Baal Bone Gap within Gardens of Stone National Park.

The Strategic Plan was used as the basis to form the additional values and existing threats on the GBMA national heritage listing and the outstanding universal value criterion used as to identify the values of the GBMWHa world heritage listing which is considered valid approach for this project.

Assessment of significance for the potential impact on the world heritage values of the GBMWHa was based on the requirements of the EPBC Act Significant Impact Guidelines 1.1. As noted in above in section 3.1.1, this assessment will be finalised following a multidisciplinary workshop.

Mitigation and management of potential noise impacts will be achieved through planning and implementation of flight paths, airspace design and airport operating procedures to support long term airport operations. The uncertainty of the final airspace design means that mitigation and management measures are generic and not accurately reflect the true noise impacts on the area.

4.8.4.2 Commentary on 'gaps' relative to a comprehensive/conventional assessment

Any decommissioning impacts have not been discussed assessed however given that the likelihood of the airport being decommissioned is low this project phase is not considered relevant.

Residual impacts have not identified in the EIS and therefore the effectiveness of the proposed management measures will be difficult to monitor.

4.8.4.3 Key impacts and opportunities

The key impacts on the GBMWHa considered during the review relate to the potential indirect impacts from noise and air quality.

The social impact assessment identifies an opportunity for increased tourism to the GBMWHa due to the closer proximity to an airport and the associated transport network. This opportunity has been assigned a high significance rating.

4.9 Biodiversity

The adequacy of the above documents was reviewed against the *Western Sydney Airport EIS guidelines* (the EIS guidelines), biodiversity survey and assessment guidelines and background data, where appropriate. The review criteria comprised:

- evaluate if the biodiversity study meets the requirements of the EIS guidelines and other relevant guidelines and methods;
- evaluate the validity of the data relied upon to inform the Biodiversity Assessment (draft EIS Appendix K1);
- evaluate the validity of the underlying assumptions of the Biodiversity Assessment (draft EIS Appendix K1);
- evaluate the validity of the conclusions reached in the Biodiversity Assessment (draft EIS Appendix K1);
- review the mitigation and management measures proposed and advise of the adequacy in mitigating impacts; and
- evaluate the level of uncertainty of biodiversity impacts and provide advice on the resulting environmental risks.

A summary of the key impacts and opportunities associated with the project has also been provided.

4.9.1 Stage 1 development review findings

The reports were found to be generally compliant with the EIS guidelines. However, a number of partial and non-compliances were identified. The assumptions and conclusions of the assessment were considered valid, with the exception of three criteria which were deemed 'partially compliant'. The proposed mitigation and management measures were deemed suitable for this stage of the project, with further information required prior to construction with respect to biodiversity and environmental management.

Data gaps were identified with respect to land access restrictions, threatened species locations, the assessment of threatened species, and a large deficit in the proposed offsets. The Biodiversity Assessment (draft EIS Appendix K1) does not clearly define the extent of land access restrictions. A key risk associated with insufficient access (if this is the case) is that biodiversity values and offsetting requirements may have been underestimated.

Assessments of significance were not completed for the Green and Golden Bell Frog, Australasian Bittern, Australian Painted Snipe and a number of migratory species listed under the EPBC Act. Key risks associated with the omission of these assessments are that the level of impact and the offsets required may have been underestimated. The large credit deficit, particularly for Cumberland Plain Woodland in the Sydney Basin Bioregion, listed as a critically endangered ecological community under the *Threatened Species Conservation Act 1995* (TSC Act) and *Environment Protection and Biodiversity Conservation Act 1999* is a key risk as it is not currently known if the quantum of offsets required is available.

4.9.2 Long-term development review findings

The Biodiversity Assessment (draft EIS Appendix K1) provides a general assessment of adverse the long-term development impacts of the project. However, it does not consider the potential impact of successful implementation of biodiversity management measures from the Stage 1 development, which may result in increased biodiversity values and therefore underestimate the longer-term development impacts. In addition, the Offsets Strategy (draft EIS Appendix K2) does not state how offsets will be identified and secured for the long-term development.

4.9.3 Key impacts and opportunities

Key impacts of the project comprise:

- the loss of 90 ha of Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest critically endangered ecological community; and
- the loss of 120 ha of habitat critical to the survival of the Grey-headed Flying-fox, a vulnerable species.

Key opportunities of the project comprise:

- location of the airport site on predominantly cleared land;
- identification of potentially suitable offset sites on private property that may have otherwise degraded, and been subject to key threatening processes; and
- in addition to the offsets, the creation of an on-site environmental conservation zone, containing native vegetation representative of the vegetation types to be cleared.

5. Conclusions

WSP | Parsons Brinckerhoff were engaged by WSROC and MACROC to project manage the peer review of the Western Sydney Airport draft EIS.

In this capacity WSP | Parsons Brinckerhoff ran a competitive tendering process to engage specialists in key areas of interest to the councils. WSP | Parsons Brinckerhoff reported to WSROC under the direction of a Steering Committee (of officers of the participating councils) to confirm which specialists should be engaged, the Steering Committee provided direction throughout the review process and reviewed draft inputs.

5.1 Key findings

The peer review of the draft EIS outlined five key findings as discussed below. A summary of each specialist reviews is provided in Chapter 4 whilst the detailed specialist peer reviews have been included as Appendix A - I and of this report.

General adequacy

The draft EIS was prepared over a period of approximately 8 months from engagement of draft EIS consultants to provision of an initial draft for Commonwealth Department of Environment review. By way of contrast the previous EIS for the project prepared in the late 1990s was undertaken over well over two years. From our review it is apparent that this has resulted in a number of omissions and limitations, which are discussed through Chapter 3 – Review of the overall draft EIS and Chapter 4 – Review of technical report of this report.

Airport Layout

The draft EIS nominates a preferred airport layout for both the Stage 1 and long term developments, noting that the layouts are indicative only and would be confirmed once an Airport Lease Company (ALC) has been appointed. Alternative layouts are presented for both the Stage 1 and the long term development however no consideration of alternative runway orientations has been undertaken. This contrasts with the EIS undertaken in the late 1990s which examines multiple layouts and runway alignments, and gives little visibility of whether the chosen layout, and in particular the runway alignments, achieve the best environmental outcome. Given the time that has lapsed since the previous EIS it would have been expected to see a thorough current option-evaluation process to explore alternatives.

Airspace architecture (flight paths)

Chapter 7 of the draft EIS describes the 'Airspace Architecture and Operation' of the proposed airport which includes the flight paths for the Stage 1 Scenario (2030), prepared by Air Services Australia on behalf of the Department of Infrastructure. Only one set of flight paths are provided in the draft EIS, featuring a 'merge point' (a point at which all incoming flights converge) over Blaxland. The concept of merge points is relatively new, and is considered good practice as it allows for incoming flights to minimise thrust and so reduce noise.

The brief of Air Services Australia as outlined in the draft EIS was to develop a set of flight paths that avoids impacts on existing operations at Kingsford Smith at 2030 (although it was acknowledged that this would be impossible in the long term) and to ensure safety of operations. We have a number of concerns in regard to the flight paths presented in the draft EIS specifically around the uncertainty of those described.

To reduce some of this uncertainty, we recommend the following:

- Greater consideration of alternative options is required, with an additional objective of minimising environmental impacts.
- A holistic review of flight paths taking account of all airports should be undertaken. As a minimum an option that allows for flight paths at Kingsford Smith to be modified should be considered.
- In recognition that a future ALC may modify the flight paths, sensitivity testing should have been presented to demonstrate the changes of noise impacts that would result if flight paths are modified.
- The case for a merge point should be further explored, and consideration of alternative merge points should be examined.

Draft EIS places no explicit limits on key impacts

In a number of areas the draft EIS does not provide assurances that acceptable environmental thresholds will not be breached, and does not set hard limits on environmental impacts. In the case of aircraft noise this is a reflection of the nature in which aircraft noise is managed in Australia. However the same is also largely true of other aspects of the draft EIS – the mitigation measures are generally not prescriptive, and there is little in the way of hard limits on impacts. This is largely a reflection of the fact that the ALC has not yet been appointed, and that the Department of Infrastructure is seeking flexibility over management and mitigation. However this creates uncertainty over the likely future impacts.

Uncertainties over the way the approvals process will operate

The project is subject to assessment under the EPBC Act, and that the Minister for the Environment's consent (and conditions) are a prerequisite of any subsequent approval under the Airports Act. The draft EIS notes that the future development and expansion of the airport will be subject to further assessment and approval under the Airports Act, and that the preparation of a masterplan will be required within five years of the commencement of the project. This would supersede the current Airport Plan, which is described in the draft EIS as a transitional document, in effect it is implied that once the airport is leased, all future approvals would be under the Airports Act.

What is less clear is:

- What the potential triggers would be for the need for further referrals and potentially approvals under the EPBC Act.
- What further assessment and approval would be required (beyond the current EIS and associated Airport Plan approval) once an ALC is appointed and more is known about the actual airport layout and operations.
- What limitations any EPBC Act approval will place on the airport.
- What level of community engagement will be provided in the process going forward.

6. References

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