

475 Badgerys Creek Rd

Aeronautical Impact Assessment Report

D – November 2023

PREPARED FOR Ingham Property PRESENTED BY Landrum & Brown Worldwide Australia Pty Ltd



Version and Use Information:

Version Letter	Date	Author(s)	Approver	Comments
А	3 rd Oct 2022	S Yang, L Wang	l Guy	Draft
В	28 th Oct 2022	S Yang, L Wang	l Guy	Draft
С	13 th July 2023	l Guy	l Guy	Final – Amendments shown in green text. Amendments are to correct introduction components, location and LGA statements and on typographical error only,
D	23 rd Nov 2023	I Guy, G Acasio	l Guy	Updated final report incl. revised land layout and build height documentation.

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1 Executive Summary

Landrum & Brown (L&B) have reviewed the proposed development for compliance with relevant national (federal) and / or local regulations as shown below for the purposes of preparing this Aeronautical Impact Assessment (AIA).

L&B's review has reached the conclusions set out in the following pages. Full information on the assessment approach leading to the development of the conclusions is contained with the body of this report.

1.1 Aeronautical Impediments to the Proposed Development

In L&B's opinion the following aeronautical / action related impediments exist in relation to the proposed development:

Name of Proposed	475 Badgerys Creek, Bradfield
Development:	
Location / Address of Proposed Development:	475 Badgerys Creek, Bradfield - Lots 99 and 100 in DP1287207 (Liverpool Council Local Government Area)
Name of Developer / Project Proponent:	Ingham Property

- In general, proposed development of buildings (including any roof mounted equipment and / or temporary cranage) up to
 125.5m AHD is permissible within the site. However, certain areas of the proposed development site are subject to lower height restrictions that need to be noted in planning future development.
- The maximum proposed building height in these areas subject to lower height restrictions is **96.2m AHD** (this applies to an area extending south from the northern-most trip of the site), with an assumption that no plant or permanent objects on the roof exceed this height. In addition, any craneage to erect the building should be kept below this height. However, if construction is undertaken prior to the eastern (second) runway at SWZ being put into operation, cranage could exceed this height limit on a temporary basis. (See 4.3 Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports)

In L&B's opinion the developer should undertake the following actions upon receipt of this report:

 Consultation with Airservices with regard to CNS equipment to be installed for both the first and second runways at SWZ is required.

1.2 Basis of L&B's Opinion

L&B's review as presented in this report has been based on information provided by the developer / project proponent as set out in this report. Should the proposed development alter from that set out in this report then the findings of the report may be subject to change. Particular attention should be paid to any changes in size, scale, nature, and location of the proposed development.

1.2.1 Key Assessment Input Information

In addition to the location information shown above the following key inputs from the Developer / Project Proponent were relied upon in undertaking the assessment described in this report.

Development Height (m AHD):	No specific building heights have been provided. However, maximum heights for each area (Lot) of the site were provided have been used for the assessment as detailed in Section 2 Introduction. We have examined the maximum available height (in m AHD) that could be available for development. Heights considered were 24m or 52.5m depending on location.
Temporary Height (m AHD) incl. Cranage etc.:	It has been assumed that any plant will be no more than 1m higher than the base building. Craneage head room (additional height above the building) were not assessed but available head room has been recorded in Section 4.7.2.
Proposed Development's Function / Purpose:	It is assumed that all buildings on the site will be of light industrial nature or commercial as shown in the provided masterplan.
Additional Information:	It is assumed that all buildings will not include any facilities that emit smoke, dust, or other plumes into the atmosphere.
	We would note that WSA Co have informally advised us through work for another client that the published levels for both runways will be amended as a result of design and construction changes. The northern runway (23R/05L will be raised slightly and the southern runway (23L/05R) lowered. Until information is made available and incorporated into published information and / or requirements we are unable to take account of this potential change.

1.3 Conclusions: National Airports Safeguarding Framework (NASF)

Assessment Principle	Conclusion / Action	Reference Page / Section
NASF Guideline A: Measures for Managing Impacts of Aircraft Noise	No impact.	Page: 14 Section: 4.2.2
NASF Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports	No impact provided the height limits stated in this report are complied with. It may be possible to exceed the height limits on a permanent or temporary basis even after opening of the second runway.	Page: 23 Section: 4.3.2
NASF Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports	No impact.	Page: 27 Section: 4.4.2
NASF Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation	No impact.	Page: 28 Section: 4.5
NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports	No impact.	Page: 30 Section: 4.6.2
NASF Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports	No impact provided the height limits stated in this report are complied with.	Page: 34 Section: 4.7.2
NASF Guideline G: Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS)	Consultation with Airservices with regard to CNS equipment at SWZ airport is required.	Page: 38 Section: 4.8.2
NASF Guideline H: Protecting Strategically Important Helicopter Landing Sites (HLS)	No impact.	Page: 48 Section: 4.9.2
NASF Guideline I: Public Safety Areas (PSAs)	No impact.	Page: 50 Section: 4.10.2

1.4 Conclusions: State and Local Planning Requirements

1.4.1 NSW State Environmental Planning Policy (Western Parkland City) 2021

Assessment Principle	Conclusion	Reference
	/ Action	Page / Section
Clause 4.17: Aircraft Noise	No impact.	Page: 53 Section: 5.1.2
Clause 4.18: Building Windshear and Turbulence	No impact provided the height limits stated in this report are complied with. It may be possible to exceed the height limits on a permanent or temporary basis even after opening of the second runway.	Page: 53 Section: 5.2.2
Clause 4.19: Wildlife Hazards	No impact.	Page: 54 Section: 5.3.2
Clause 4.20: Wind Turbines	No impact.	Page: 55 Section: 5.4.2
Clause 4.21: Lighting	No impact.	Page: 56 Section: 5.5.2
Clause 4.22: Airspace Operations	No impact provided the height limits stated in this report are complied with.	Page: 57 Section: 5.6.2
Clause 4.23: Public Safety	No impact.	Page: 59 Section: 5.7.2

1.4.2 NSW State Environmental Planning Policy (Industry and Employment) 2021

Assessment Principle	Conclusion / Action	Reference Page / Section
Clause 2.36: Development in areas subject to aircraft noise	No impact.	Page: 61 Section: 6.1.2
Clause 2.37: Airspace Operations	No impact provided the height limits stated in this report are complied with.	Page: 62 Section: 6.2.2
Clause 2.38: Development of land adjacent to Airport	Covered under Item 4 NASF Requirements and Assessment and 5 NSW State Environment Planning Policy (Western Parkland City) 2021	Page: 63 Section: 6.3.2

1.4.3 Liverpool Local Environmental Plan (LEP) 2008

Assessment Principle	Conclusion / Action	Reference Page / Section
Clause 7.17: Airspace Operations	No impact provided the height limits stated in this report are complied with.	Page: 64 Section: 0
Clause 7.17A Hospital Helicopter Airspace	No impact.	Page: 67 Section: 7.2.2
Clause 7.18 Development in areas subject to potential airport noise	No impact.	Page: 68 Section: 7.3.2

2 Introduction

The Ingham Property Group (IPG) site is located at 475 Badgerys Creek Road, Bradfield, legally known as Lots 99 and 100 in DP1287207 and comprises a total area of 182 ha along Badgerys Creek Road, centrally located within Western Parkland City. Lot 99 comprises of the zone substation and Lot 100 comprises of the remainder of the site. The site forms part of the Aerotropolis Core Precinct within the Western Sydney Aerotropolis and is predominately zoned for ENT Enterprise use under the State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (WPC SEPP).

The site comprises a total area of 182 hectares along Badgerys Creek Road, strategically located within the heart of the Western Parkland City. The large majority of the site is under the ownership of IPG, with a small portion of land earmarked for the North Bradfield Zone Substation to be owned by Endeavour Energy. The site is largely defined by grass land and is largely clear of vegetation as it is currently used for agricultural purposes. There is also an internal road network within the site which had previously connected the now demolished sheds and ancillary structures dispersed across the site. The site is suitable for development and free of contamination which has been confirmed by environmental testing and site investigations.

The site is situated within the Western Sydney Aerotropolis, with a direct interface with the Western Sydney International Airport (WSI). The site is bound by two significant riparian corridors which define Western Sydney, with South Creek to the east and Badgerys Creek to the north-west. The immediate surroundings of the site are characterised by large rural landholdings used predominately for agricultural and light manufacturing purposes, all of which will redeveloped in accordance with the Aerotropolis Precinct Plan vision.

IPG is currently undertaking the Master Plan pathway with the Technical Assurance Panel (TAP), which is an optional design process established under the WPC SEPP to amend the Aerotropolis Precinct Plan as it applies to the site. IPG is in the process of preparing a Master Plan, as part of a co-design process with the TAP, for the site which will be formally lodged to the Department of Planning and Environment (DPE) in accordance with the Western Sydney Aerotropolis Master Plan Guidelines.

The IPG Master Plan was informed by a detailed assessment of the site-specific considerations through preliminary site investigations. The Master Plan breaks down the general application of the Enterprise zone across the site and provides a more granular approach to land use planning with considerations made to the opportunities and constraints of the site. The structure plan is made up of four key land uses which include enterprise and light industry, business and enterprise and employment zone centres.

IPG has engaged L&B Worldwide Australia Pty Ltd (L&B / Landrum & Brown) to prepare an Aeronautical Impact Assessment (AIA) to inform on the aviation impacts of the master plan and co-design process. The site is shown Figure 1.



Figure 1 Masterplan layout (Source Ingham Property)

It is understood that final planning of the various specific buildings within the overall site is still being developed. This report is therefore prepared to indicate the maximum building height above Australian Height Datum (AHD) that can be constructed and the assessment is aligned with the information contained in Figure 2 Height of Building Map (Source Urbis).

Once planning for any specific lots or buildings within the overall 475 Badgerys Creek Road, Badgerys Creek site has progressed to a sufficient level, then such plans should be subject to review against the parameters within this report in order to determine compliance with the aeronautical input assumptions.



Figure 2 Height of Building Map (Source Urbis)



Figure 3 Land Contours (Source at&I)

For the purposes of developing this report a virtual building covering each shaded portion of site (as shown in Figure 2) and with reference to the prevailing land levels (as shown in Figure 3) has been assumed as set out in the table below.

Lot Numbers	Lot Numbers Building Height as per Figure 1		Highest Building Point (m) AHD	Highest Building Point incl. Plant (m) AHD	
1 – 4 inclusive	24m (pink shading)	72.5m	96.5m	97.5m	
5 – 10 inclusive 52.5m (yellow hatched shading)		70.5m 123.0		124.0m	
11 24m (pink shading)		61.0m	85.0m	86.0m	
12 – 18 inclusive, and 23 24m (pink shading)		71.5m	95.5m	96.5m	
19 – 22 inclusive 52.5m (yellow hatcher shading)		68.0m	120.5m	121.5m	
24 – 25 inclusive	52.5m (yellow shading)	71.0m	123.5m	124.5m	

Table 1: Height Inputs & Assumptions

It is assumed that any roof mounted plant will be no more than **1m** higher than the height of the virtual building resulting in a height, for permanent objects, shown in the table above. In addition, following assessment, the additional available height for temporary craneage to operate above the permanent objects can be calculated.

The location information for the proposed development is shown in Section 3.

This report considers:

- National Airports Safeguarding Framework Principles and Guidelines (NASF).
 - Guideline A: Measures for Managing Impacts of Aircraft Noise
 - Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports
 - Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports
 - Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation
 - Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports
 - Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports
 - Guideline G: Protecting Aviation Facilities Communication, Navigation and Surveillance (CNS)
 - Guideline H: Protecting Strategically Important Helicopter Landing Sites (HLS)
 - Guideline I: Public Safety Areas (PSAs)
- NSW State Environment Planning Policy (Western Parkland City) 2021:

- Clause 4.17: Aircraft Noise
- Clause 4.18: Building Generated Windshear and Turbulence
- Clause 4.19: Wildlife Hazard
- Clause 4.20: Wind Turbines
- Clause 4.21: Lighting
- Clause 4.22: Airspace Operations
- Clause 4.23: Public Safety
- NSW State Environmental Planning Policy (Western Sydney Employment Area) 2021;
 - Clause 2.36: Clause 2.36: Development in areas subject to aircraft noise
 - Clause 2.37: Airspace Operations; and
 - Clause 2.38: Development of land adjacent to Airport
- Liverpool Local Environmental Plan (LEP) 2008
 - Clause 7.17: Airspace Operations
 - Clause 7.17A Hospital Helicopter Airspace
 - Clause 7.18 Development in areas subject to potential airport noise

3 Location and Proposed Form of the Proposed Development

3.1 Location

The location of the proposed development is shown in Figure 4 below.



Figure 4: Location of Proposed Development (Source: Nearmap & L&B modification)

The site is located approximately 3.4 km and 2.7 km from the Western Sydney Airport runway 23 end and the airfield reference point (ARP).

4 NASF Requirements and Assessment

4.1 Introduction to NASF

The National Airports Safeguarding Framework (NASF) is issued by the Department of Infrastructure, Transport, Regional Development and Communications. The stated purpose of the NASF is to "enhance the current and future safety, viability, and growth of aviation operations, by supporting and enabling:

- the implementation of best practice in relation to land use assessment and decision making in the vicinity of airports and strategic helicopter landing sites;
- assurance of community safety and amenity near airports and strategic helicopter landing sites;
- better understanding and recognition of aviation safety requirements and aircraft noise
- impacts in land use and related planning decisions;
- the provision of greater certainty and clarity for developers and landowners;
- improvements to regulatory certainty and efficiency; and
- the publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports and strategic helicopter landing sites."

L&B uses the NASF to provide a baseline for the consideration of safeguarding issues in Australia under a common framework. This aligns with the Departments view that the NASF should "drive improvements in planning outcomes consistently across all jurisdictions and contribute to the improvement of the safety and viability of aviation in Australia."

The following sections set out the requirements under NASF and the impact assessment related to the proposed development.

4.2 Guideline A: Measures for Managing Impacts of Aircraft Noise

This guideline principally provides recommendations to local planning authorities on the implementation of noise policies within their legislative frameworks using principles set out in Australian Noise Exposure Forecast (ANEF) System and the Australian Standard AS 2021-2015 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction (AS2021). The "requirements" set out below are extracted from those recommendations. Note: Any local implementation of noise requirements is covered under Section 4 of this document.

4.2.1 Requirements

4.2.1.1 Greenfield Areas

No noise sensitive developments within a 20 ANEF where that land was previously rural or for non-urban purposes.

- Avoid noise sensitive development where ultimate capacity or long-range noise modelling for the airport indicates either:
 - 20 or more daily events greater than 70 dB(A);
 - 50 or more daily events of greater than 65 dB(A); or
 - 100 events or more daily events of greater than 60 dB(A).
- Consider likely night-time aircraft movements (11pm to 6am) with 60 dB(A) or greater noise impact.

4.2.1.2 Brownfield Areas (Urban Land)

- Consider balance of aircraft noise impacts against strategic planning outcomes.
- Manage implications of aircraft noise through construction and / or disclosure processes to residents / occupants.
- Consider if new development improves existing noise issues through improved management of implications.
- Consider dB(A) level guidelines shown elsewhere.

4.2.1.3 New Noise Sensitive Developments within Residential Areas

- Physically reduce aircraft noise through construction and / or AS2021 processes)
- Ensure disclosure processes to residents / occupants if one or more of the criteria in shown in section 3.2.1.1 (Points 2 and 3) apply.

4.2.1.4 Airports without an ANEF

- Consider application of 4.2.1.1 requirements for the airport based on the following zones of influence;
 - Within 15 km of an international airport, major domestic airport, or major military aerodrome.
 - Within 10 km of a domestic airport with regular scheduled public transport services
 - Within 5 km of any other type of aerodrome for which an ANEF chart is unavailable.

4.2.2 Assessment and Conclusions

4.2.2.1 Greenfield Areas

Australian Standard AS 2021:2015 – Acoustics – Aircraft Noise Intrusion – Building Siting and Construction, provides guidance on the siting and construction of buildings in the vicinity of airports to minimise aircraft noise intrusion. It also describes the process that should be followed in producing ANEF charts for use in applying this standard,

The projected ANEF contours for Western Sydney Airport are described in the Western Sydney Airport Plan Section 2.3.3 and shown in Figure 5 to Figure 7 below.

DITRDC provides a Noise Modelling Tool on its Western Sydney Airport website. Table 2 and the associated figures shows the ANEC contour levels for each particular stage of development of the airport and the particular runway in use.

Building Type	Acceptable	Conditionally Acceptable	Unacceptable
House, home unit, flat, Caravan Park	< 20 ANEF	20 < 25 ANEF	> 25 ANEF
Hotel, motel, hostel	< 25 ANEF	25 < 30 ANEF	> 30 ANEF
School, university	< 20 ANEF	20 < 25 ANEF	> 25 ANEF
Hospital, nursing home	< 20 ANEF	20 < 25 ANEF	> 25 ANEF
Public building	< 20 ANEF	20 < 30 ANEF	> 30 ANEF
Commercial building	< 25 ANEF	25 < 35 ANEF	> 35 ANEF
Light industrial	< 30 ANEF	30 < 40 ANEF	> 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Table 2: Building Type Acceptability Table (AS2021-2015)

The following noise contour diagrams are sourced from **The Department of Infrastructure, Transport, Regional Development and Communications** (DITRDC) noise modelling tool for Western Sydney Airport.

Stage 1 (Year 2030)

Noise predictions for Stage 1 (2030) represent the anticipated noise exposure levels associated with an airport handling about 10 million annual passengers (similar to the size of Adelaide Airport). A single runway would be constructed initially. Refer to Figure 5.

"Prefer 05 Direction" refers to the primary mode of operation; i.e., prioritising the use of runway direction "05". This mode would result in the majority of departures to the northeast and arrivals from the southwest.

"Prefer 23 Direction" refers to the primary mode of operation; i.e., prioritising the use of runway direction "23". This mode would result in the majority of departures to the southwest and arrivals from the northeast.

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Stage 1 Additional Capacity (One Runway Year 2050)

Noise predictions for the year 2050 consider the anticipated growth of SWZ. This scenario considers noise exposure levels at a time when the initial single runway would likely be approaching its capacity (approximately 37 million annual passengers). Refer to Figure 6.

"Prefer 05 Direction" refers to the primary mode of operation; i.e., prioritising the use of runway direction "05". This mode would result in the majority of departures to the northeast and arrivals from the southwest.

"Prefer 23 Direction" refers to the primary mode of operation; i.e., prioritising the use of runway direction "23". This mode would result in the majority of departures to the southwest and arrivals from the northeast.





Long term (Year 2063)

Noise predictions for the long-term development (approx. year 2063). The long-term development would operate with two runways. Refer to Figure 7.

"Prefer 05 Direction" refers to the primary mode of operation, i.e., prioritising the use of Runways "05L" (left) (northern runway) and "05R" (right) (southern runway). This mode would result in the majority of departures to the northeast and arrivals from the southwest.

"Prefer 23 Direction" refers to the primary mode of operation, i.e., prioritising the use of runway directions "23L" (left) (northern runway) and "23R" (right) (southern runway). This mode would result in the majority of departures to the southwest and arrivals from the northeast.



Figure 7: ANEC One Runway (Yr 2050), (Source DITRDC Noise Modelling Tool)

Based on above analysis, the development site falls within following ANEC contour. Refer to Table 3.

Airport Runway Development Stages	Prefer 05 Direction	Prefer 23 Direction
Stage 1 (Year 2030)	Outside the ANEC Zone	Outside the ANEC Zone
Stage 1 Additional Capacity (One Runway Year 2050)	Outside the ANEC Zone	Outside the ANEC Zone
Long term (Year 2063)	ANEC=20-25	ANEC=20-25

Table 3: Northern Gateway Industrial Estate Development (SSDA 01) Proposed Building Site ANEC Inclusion Contour

Conclusion:	The development site is planned for business enterprise and light industrial use. This allows it to be considered as "commercial
	building" and "Light Industrial" within the ANEF guidelines. The development is acceptable within all the ANEF zones as per the
	Australian Standard AS 2021:2015 Acoustics - Aircraft Noise

4.2.2.2 Brownfield Areas (Urban Land)

The proposed development site is not classified as a Brownfield Area.

Conclusion:	No action required.

4.2.2.3 New Noise Sensitive Developments within Residential Areas

The proposed development site is not classified as a Residential Area.

Conclusion:	No action required.

4.2.2.4 Airports without an ANEF

DITRDC provides a Noise Modelling Tool on its Western Sydney Airport website. Therefore, this requirement does not apply.

Conclusion:	No action required

4.3 Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports

This guideline principally provides recommendations for a risk-based approach to the consideration of influences on the wind conditions on runways. The "requirements" set out below are extracted from those recommendations. Note: Any local implementation of wind related requirements is covered under Section 4 of this document.

Guideline B sets out a clear process map for the assessment of the risk presented by development. This is replicated below. L&B assessment methodology follows the process map.



Figure 8: Assessment Methodology (Guideline B – May 2018)

4.3.1 Requirements

4.3.1.1 Step 1: Assessment Trigger Area

• Buildings falling within the "Assessment Trigger Area" shown below must be considered.



Figure 9: Assessment Trigger Area (Guideline B – May 2018)

4.3.1.2 Step 2: Building Height Assessment

• Buildings within the Assessment Trigger Area must be considered for any infringement of a 1:35 slope from the centreline (or extended centreline) of the applicable runway. Diagrams of the 1:35 slope and its application are shown below.



Figure 10: 1:35 Slope Diagrams (Guideline B – May 2018)

4.3.1.3 Step 3: Risk Assessment / Safety Case (incl BWD Check)

- Buildings that infringe the 1:35 slope should be risk assessed and a safety case prepared.
- Initial consideration should be through use of the building-induced wind speed deficit (BWD) approach as outlined in Guideline B. This approach uses wind rose information combined with building size and location in conjunction with the table below.

PWD	W/H Ratios =					
BWD	1	2	4	6	8	
0.48 Vh	1.7 H	3.4 H	6.5 H	9.5 H	12.5 H	
0.35 Vh	2.2 H	4.2 H	8 H	11.5 H	15 H	
0.22 Vh	3 H	5.5 H	10 H	14 H	18 H	
0.11 Vh	5 H	9 H	17 H	24.5 H	32 H	

Figure 11: BWD Check Table (Guideline B – May 2018)

- The criteria to be considered using BWD are;
 - 7 knots (3.6 m/s) parallel to the runway centreline (or extended runway centreline) at heights below 61m AGL. Any speed deficit change of 7 knots or greater must take place over a distance of at least 100m. The "7 knot along-wind windshear criterion".
 - 6 knots (3.1 m/s) perpendicular to the runway centreline (or extended runway centreline) at heights below 61m AGL. Any speed deficit change of 6 knots or greater must take place over a distance of at least 100m. The "6 knot across-wind windshear criterion".
- Further consideration, after BWD, should include; wind directions, wind speeds, runway operating modes, shielding from surrounding buildings and features.
- Turbulence criteria set in Guideline B is not assessable via the BWD approach which may result in Step 3 approach being deemed unacceptable by approving authorities.

4.3.1.4 Step 4: Wind Engineering Assessment

• Proposed development (buildings) that are not able to be evaluated via the process outlined in Step 3, or where approval authorities require further study, should be assessed using wind tunnel or computational fluid dynamics (CFD) modelling. Note: L&B favours the CFD approach.

4.3.1.5 Step 5: Modifications and Mitigations

• Should the proposed development (building) be proven in Step 4 not to meet the requirements of Guideline B then the proponent and approving authorities may wish to discuss modifications to the proposed development and / or operational mitigations.

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4.3.2 Assessment and Conclusions

4.3.2.1 Step 1: Assessment Trigger Area

The "red star" shown in the diagram below indicates the approximate location of the proposed development in the context of the Assessment Triger Area. Note: Where the proposed development is well outside the trigger area the distance and location of the star is indicative only.



Figure 12: Approximate Location of Proposed Development against Assessment Trigger Area (L&B)

Any building (or part thereof) falling within the shaded windshear assessment trigger areas in the diagram above must be considered for wind effects. The blue bar is the applicable runway. The indicative location of the proposed development within the assessment zone is shown on Figure 12.

Conclusion: Portions of Lots 9 and 10 within the proposed development are within the Assessment Trigger Area. These areas are shown bounded in Red in Figure 12. This area is referred to as the "red triangle" in this report.

4.3.2.2 Step 2: Building Height Assessment

The asterisk (*) shown in the diagram below indicates the approximate location of the proposed development in the context of the Assessment Triger Area. Note: Where the proposed development is well outside the trigger area the distance and location of the asterisk is indicative only.



Figure 13: Approximate Location of Proposed Development against 1:35 Slope Diagrams (Guideline B – May 2018)

Any building (or part thereof) falling within the contours in the diagram above (Figure 13) must be considered for wind effects. The applicable runway is shown in both plan and section. The indicative location of the proposed Airport Substation development within the assessment zone is shown on Figure 13. To be sure he proposed development is underneath 1:35 slope, Building Height for the area indicated in orange highlight area.

Conclusion:	A simple application of Guideline B would result in the height of any proposed development in the red triangle within the Assessment
	Trigger Zone needing to be lower than 96.2m AHD. The Guideline would also suggest that each individual building within the zone
	should require assessment when detailed finalised drawings are available. Consideration of temporary cranage may also be
	required, especially after opening of the second runway.
	Further Discussion

The first stage to assess an infringing building would be a building-induced wind speed deficit (BWD) check as set out in Guideline B. Until such time as a defined building (or buildings) are described on the land such a check is not possible. If any infringing building fails, the BWD check then further complex assessment is required. Our opinion is that a BWD check will not be possible given the complexity of the environment. This would lead to a the more complex assessment which is best done using Computational Fluid Dynamics (CFD) modelling. Such CFD modelling (or the alternative; a full-scale wind tunnel testing) requires a number of inputs including; Upwind ground conditions (i.e., what is the nature of the land and development on the far side of the infringing building from the runway in question), • Downwind ground conditions (i.e., what is the nature of the land and development on the land between the infringing building and the runway in question.) • The size, shape, and nature of the infringing building, and The context of the infringing building in amongst its immediate environment. (Considerations would include the building; being standalone / being part of a run of buildings. If a run, what are the size of gaps between the buildings. Is the building proximate to any heavily wooded areas) As with the simple "BWD" check it is not possible to undertake this analysis until both the proposed building but also the surrounding environment context is more developed. A single large building developed in open fields close to a live runway could have an immediate impact. The same large building built in advance of the runway being operational and then having other buildings constructed around it could end up not have an impact on the runway once it becomes operational. Given that that upwind and land surrounding the highlighted area are all zoned for enterprise development it could be reasonable to assume that wind arriving at any infringing building in the highlighted zone could be reasonably turbulent. Turbulent in this context means that the wind is not uniform over a distance before reaching the infringing building. Further, given the presence of both further development land and a landscaped area downwind it could also be reasonable to assume that there will be a degree of development and / or tree planting between the infringing building and the runway. Such development and / or planting would influence the wind flow from the building before it reaches the runway. It is therefore entirely possible that the individual or combined effects of the upwind and downwind conditions could result in a position where a building higher than the Guideline B protection surface has no impact on the wind conditions experienced on the runway. Even if an infringing building initially has a potential impact (as determined by analysis or modelling) then amendments to the design of the building (or buildings around it) could potentially mitigate the wind flow effects such that there is no impact. It would be possible to find examples of development equivalent in nature to that bring sought at numerous airports in Australia and globally. Further Conclusion

There is no aeronautical reason where the possibility of buildings within the windshear assessment trigger area and above the protection surface should be subject to a blanket prohibition. Guideline B clearly sets out a process for assessing and authorising development that exceeds the height limits.

It is our opinion that all structures above 96m AHD in the windshear assessment trigger area (the "red triangles" should be subject to more considered evaluation (potentially including CFD modelling) prior to any specific planning decision being made on each structure / building.

4.4 Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports

This guideline principally provides recommendations to local planning authorities on the implementation of policies to limit the impact of (generally flying) wildlife on aircraft operations within their legislative frameworks using principles set out in International Civil Aviation Organisation (ICAO) documentation. The "requirements" set out below are extracted from those recommendations. Note: Any local implementation of wildlife requirements is covered under Section 4 of this document.

4.4.1 Requirements

• Proposed development should not increase the risk of wildlife strikes at airports. Land uses that present a risk of attracting wildlife should be controlled (and mitigated) within 3km, 8km and 13km of an airport as set out below.

		Actions for Existing Developments			Actions for Proposed Developments/		
					Ch	anges to Existing Dev	elopments
Land Use	Wildlife	3 km radius	8 km radius	13 km radius	3 km radius	8 km radius	13 km radius
	Attraction Risk	(Area A)	(Area B)	(Area C)	(Area A)	(Area B)	(Area C)
Agriculture							
Turf farm	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Piggery	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Fruit tree farm	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Fish processing /packing plant	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Cattle /dairy farm	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Poultry farm	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Forestry	Low	Monitor	Monitor	No Action	Monitor	Monitor	No Action
Plant nursery	Low	Monitor	Monitor	No Action	Monitor	Monitor	No Action
Conservation		•	•	•	•	•	•
Wildlife sanctuary / conservation area - wetland	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Wildlife sanctuary / conservation area - dryland	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Recreation							
Showground	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Racetrack / horse riding school	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Golf course	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Sports facility (tennis, bowls, etc)	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Park / Playground	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Picnic / camping ground	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Commercial							•
Food processing plant	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Warehouse (food storage)	Low	Monitor	Monitor	No Action	Monitor	Monitor	No Action
Fast food / drive-in / outdoor restaurant	Low	Monitor	Monitor	No Action	Monitor	Monitor	No Action
Shopping centre	Low	Monitor	Monitor	No Action	Monitor	Monitor	No Action
Office building	Very Low	Monitor	No Action	No Action	Monitor	No Action	No Action
Hotel / motel	Very Low	Monitor	No Action	No Action	Monitor	No Action	No Action
Car park	Very Low	Monitor	No Action	No Action	Monitor	No Action	No Action
Cinemas	Very Low	Monitor	No Action	No Action	Monitor	No Action	No Action
Warehouse (non-food storage)	Very Low	Monitor	No Action	No Action	Monitor	No Action	No Action
Petrol station	Very Low	Monitor	No Action	No Action	Monitor	No Action	No Action
Utilities			I		I	I	I
Food / organic waste facility	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Putrescible waste facility - landfill	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Putrescible waste facility - transfer station	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Non-putrescible waste facility - landfill	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Non-putrescible waste facility - transfer station	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Sewage / wastewater treatment facility	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Potable water treatment facility	Low	Monitor	Monitor	No Action	Monitor	Monitor	No Action

Figure 14: Wildlife Control Zones and Mitigations (Guideline C – October 2014)

4.4.2 Assessment and Conclusions

The proposed development is 3 km from the ARP and is within Area A. Within the 3km zone there are "incompatible" uses that would not normally align with an industrial precinct of the type understood to be foreseen at proposed development site. Specific building / lot uses may need to ensure that any "mitigate", and "monitor" actions are included.

The nature of the proposed development site does not include large dams, large waterbodies, wastewater treatment plants, parks, or biodiversity conservation sites. Any stormwater evaporation ponds required under DCP Stormwater Strategy will be covered with netting in accordance with DCP Stormwater requirements.

The land where the proposed development site is planned to be located is currently farm allotments and open vegetation paddocks. The development will consume a significant amount of this grassland and farming activity, effectively reducing the amount of wildlife present in the area that could cause a hazard to overflying aircraft.

The developer is assessing the appropriate types of flora that will enhance the visual features of the estate without being an attractant for birds or bats and not encouraging fauna such as rats and mice, being recognised as food, that would attract birds to the site.

Conclusion:	The proposed development site will not impact the risk of wildlife strikes in the vicinity of Western Sydney Airport, however "mitigate"
	or "monitor" actions may be required depending on final building use.

4.5 Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation

This guideline principally provides recommendations to local planning authorities and proponents of wind farm developments on the implementation of policies to limit the impact of such development on aircraft operations. The "requirements" set out below are extracted from those recommendations.

As the proposed development is not a wind farm nor includes a single wind turbine this Guideline does not apply. Requirements and assessment approach are therefore not included in this report.

 Conclusion:
 Proposed development is compliant. No action required.

4.6 Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports

This guideline principally provides recommendations to local planning authorities and airport operators on the implementation of policies to address the risk of distractions to pilots of aircraft from lighting and light fixtures near airports. The "requirements" set out below are extracted from those recommendations. Note: Any local implementation of lighting requirements is covered under Section 4 of this document.

4.6.1 Requirements

- In the context of this Guidelines proposed developments should include;
 - motorway/freeway lighting
 - sea container yards
 - wharves
- refinery flare plumes
- stadium flood lighting
- construction lighting.
- Lighting within a 6km radius of the centre of each runway at an airport should be assessed under this Guideline. The diagram below shows the application of this radius and the four lighting control zones within it.



Lighting Zone Reference	Distance in m zone extends from runway end	Distance in m zone extends from runway centreline / extended centreline	Max 3° Upward Light Intensity (Candela)
A	1000	300 (600m total width)	0
В	2000	450 (900m total width)	50
C	3000	600 (1200m total width)	150
D	4500	750 (1500m total width)	450

Figure 15: Lighting Control Zones (Guideline E – October 2014) with added explanatory table (L&B)

• In addition, proponents should note that coloured lights should not be considered for use, and that lighting may be potentially referred to CASA for consideration.

4.6.2 Assessment and Conclusions

The proposed development is within 6km of the centre of an applicable runway but lies outside Zone D, and is therefore not covered by Guideline E.



Figure 16 Airport Safeguarding Tool / Western Sydney Airport - Lighting Intensity

Conclusion:

The proponent need take no specific actions in respect of lighting.

4.7 Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports

This guideline principally provides recommendations to local planning authorities and airport operators on the implementation of policies to address the risk of distractions to pilots of aircraft from lighting and light fixtures near airports. The "requirements" set out below are extracted from those recommendations. Note: Any local implementation of lighting requirements is covered under Section 4 of this document.

4.7.1 Requirements

- In the context of this Guidelines proposed developments should include;
 - Activities that could cause air turbulence, where the turbulence could affect the normal flight of aircraft operating in the prescribed airspace; and
 - Activities that could cause the emission of steam, other gas, smoke, dust, or other particulate matter, where the smoke, dust or particulate matter could affect the ability of aircraft to operate in the prescribed airspace in accordance with Visual Flight Rules (VFR).

4.7.1.1 Protection of visual operations - Obstacle limitation surfaces

The first group of criteria are used to determine the obstacle limitation surfaces (OLS) for a runway. Criteria for determining these surfaces are established by the International Civil Aviation Organisation (ICAO). In Australia, CASA publishes these criteria in the Manual of Standards for Part 139 of the Civil Aviation Safety Regulations.

Structures, trees, or other activities that intrude into the OLS could constitute obstacles to aircraft taking off or approaching to land. The OLS for an airport charts the volume and dimensions of operational airspace that should be kept free of obstacles to aircraft operations being conducted under VFR or during the visual stages of IFR operations.

It is important to note that the OLS does not prohibit all intrusions. The aim is to ensure that all objects that intrude into the OLS can be identified and assessed for their potential impact on aircraft operations. The assessment will enable a determination on whether the intrusion is permissible, and if so, a determination on whether any risk mitigation requirements should be imposed.

The requirements to protect operational airspace will be enforced most rigorously along the extended centrelines of runways in the approach and take-off areas. This could extend up to 15 kilometres from the ends of runways at major airports. Other OLS surfaces that protect aircraft circling to land may also extend up to 15 kilometres from major airports.



Figure 17 Isometric view of OLS

4.7.1.2 Protection of instrument operations – Procedures for Air Navigation Services – Operations (PANS-OPS) Surfaces

A second group of criteria is used to determine the volumes and dimensions of airspace required to protect the safety of IFR operations. Under IFR operations, pilots fly aircraft relying on instruments for navigation. Airspace protection for IFR operations cannot allow for any long-term penetrations.

ICAO established these criteria which are published in a document titled 'Procedures for Air Navigation Services – Operations (PANS-OPS)'. The surfaces determined by using the criteria in the PANS-OPS publication are called PANS-OPS surfaces.

The PANS-OPS surfaces are used in the construction of take-off, landing and approach procedures based entirely on navigation with sole reference to aircraft instruments. They are designed to protect aircraft from colliding with obstacles when flying on instruments. Minimum safe altitudes are established for each segment of an instrument procedure.

If it is agreed by all stakeholders that a long-term penetration of the PANS-OPS surfaces is essential, the PANS-OPS surfaces must be raised so they are clear of the development causing the penetration. However, this may also have operational penalties for airport operations and could have community impacts, such as re-design of flight paths that increase the population exposed to high levels of aircraft noise.



Figure 18 an example of a PANS-OPS chart

4.7.1.3 Roof Top Exhaust Plumes

Part 139 of the Civil Aviation Safety Regulations 1988 (CASR 1988) provides that CASA may determine that a gaseous efflux having a velocity in excess of 4.3 m/s is, or will be, a hazard to aircraft operations because of the velocity of the efflux. In this case, any exhaust plume with a velocity in excess of 4.3 m/s from any vent on top of the building is unlikely to reach the height of the lowest PANS OPS or OLS.

4.7.2 Assessment and Conclusions

4.7.2.1 Obstacle limitation surfaces

The proposed development is within 15km of the centre of airport, it is located beneath the Inner Horizontal Surface with a height of **125.5m AHD**.

Figure 19 shows Western Sydney airport Obstacle Limitation Surface Map and the location of the proposed development.



Figure 19 Western Sydney airport OLS surface and proposed development location

For the purposes of developing this report a virtual building covering each shaded portion of site (as shown in Figure 2 has been assumed as set out in the table below.

Lot Numbers	Building Height as per Figure 1	Highest Ground Level in Lots (AHD)	Highest Building Point (m) AHD	Highest Building Point incl. Plant (m) AHD	Available Head Room for Temporary Craneage**
1 – 4 inclusive	24m (pink shading)	72.5m	96.5m	97.5m	28.0m
5 – 10 inclusive*	52.5m (yellow hatched shading)	70.5m	123.0	124.0m	1.5m
11	24m (pink shading)	61.0m	85.0m	86.0m	39.5m
12 – 18 inclusive, and 23	24m (pink shading)	71.5m	95.5m	96.5m	29.0m
19 – 22 inclusive	52.5m (yellow hatched shading)	68.0m	120.5m	121.5m	4.0m
24 – 25 inclusive	52.5m (yellow shading)	71.0m	123.5m	124.5m	0.5m

Table 4: Height Assumptions & Craneage Headroom

* Excludes the impact of Guideline B.

** Value shown is headroom available without additional aeronautical impact considerations. Additional head room for temporary craneage may be available subject to discussions and approval from WSA Co and / or CASA once construction methodology and exact durations are known. Permits for any craneage use may be required from WSA Co subject to their procedures once airport operations commence.

Conclusion:	The proposed development will not infringe the OLS of the aerodrome provided completed buildings (and any temporary cranage used after runway opening) are kept below 125.5m AHD. This needs to be set as a design constraint on the development.
	Each individual building within the proposed development may require assessment when detailed finalized drawings are available.

4.7.2.2 Operations (PANS-OPS) Surfaces

Certified aerodromes have flight protection (PANS-OPS) surfaces associated with them. The PANS OPS surfaces associated with a 25 nm Minimum Safe Altitude (MSA) include a 5 nm buffer and therefore exist out to a maximum of 55.5 km (30 nm) from an airport with instrument approach procedures.

The nearest certified aerodrome is 2.7 km away, within the 30nm (55.5 km) MSA.

The lowest Basic ILS surface is related to the Runway 23R ILS and is at a height of **156.3 m AHD**.

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The SID procedures have PANS OPS surfaces determined by the Procedure Design Gradient (PDG) that is the minimum climb gradient that aircraft are required to perform to in order to ensure obstacle clearance during the initial climb after take-off.

The lowest SID PANS OPS surface above the development site is **188.2 m AHD**, based on an estimated turn height of 800 ft AMSL and PDG of 3.3%. Any increase in the turn height will increase the height of the associated PANS OPS surface.

Other instrument approach procedures will be promulgated for SWZ once construction of the first runway, Runway 05L/23R, nears completion. RNAV (GNSS) and RNP-AR (see Appendix C) approached are likely to be implemented for both runways. Given that the minimum obstacle clearance level between terrain/obstacles is 75 m for the final approach segment of an instrument approach, there is adequate clearance available above the Aldington South Estate Development site to not interfere with any future instrument approach procedures that may be implemented.

Calculating PANS-OPS surfaces is complex because of the highly technical nature of the design and interaction of procedures. The design of a full set of PANS-OPS for Stage 1 and long-term operations will be required following the formal flight path design before the start of operations. Once designed, the PANS-OPS will be protected under the Airspace Protection Regulations.

Note: PANS-OPS surfaces are subject to review before the final version.

The proposed development site's PANS-OPS Height is needed to lower than 156.3 m.

Conclusion:	With maximum building heights assumed to be limited by the OLS height limit of 125.5m AHD, the proposed development does not
	infringe the PANS OPS of the aerodrome. No action is required.
	Each individual building within the proposed development may require assessment when detailed finalized drawings are available.

4.7.2.3 Roof Top Exhaust Plumes

Planned activity within the proposed development assumed not to produce exhaust plumes.

Conclusion:	The proposed development will not have an impact upon the airport.
	Each individual building within the proposed development may require assessment when usage and designs are available

4.8 NASF Guideline G: Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS)

To guideline provides land use planning information to enable protection of CNS facilities which support the systems and processes in place by Airservices Australia (Airservices), the Department of Defence (Defence) or other agencies under contract with the Australian Government, to safely manage the flow of aircraft into, out of and across Australian airspace.

4.8.1 Requirements

- To consider if the proposed development (or any part therefore) is within the Building Restricted Area (BRA) of any Airservices or Defence CNS equipment and what notification requirements exist. The full details for each type of CNS facility are extensive and are provided in Attachment 3 to Guideline G.
- CNS equipment provides one or more of the following;
 - Communications to or from aircraft; or
 - Communications to or from centres established for air traffic control; or
 - Navigational aids; or
 - Surveillance systems
- Generally, a BRA should be kept clear of permanent or temporary:
 - Obstructions (e.g., buildings, other structures, or trees) to the 'line of sight' between transmitting and receiving devices;
 - Objects (e.g., wind turbines) which act as reflectors or deflect signals used by aviation facilities;
 - radio frequency interference;
 - Electromagnetic emissions (e.g., such as those emitted by arc welding associated with steel fabrication); or
 - Plume rises (as defined in the Airports (Protection of Airspace) Regulations 1996.



Figure 20 Two dimensional representation three dimensional zones in BRA (Guideline G)

Facility Type	Zone A	Zone A/B	Area of Interest (metre
	(metre radius)	(metre radius)	radius)
High Frequency (HF)	0 - 100	100 - 6000	6000 - 10000

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Very High Frequency (VHF)	0 - 100	100 - 600	100 – 2000
Satellite Ground Station (SGS)	0 - 30	30 - 150	n/a
Non-Directional Beacon (NDB)	0 - 60	60 – 300	n/a
Distance Measuring Equipment (DME)	0 - 100	100 – 1500	n/a
VHF Omni-Directional Range (VOR)	0 - 100	100 – 1500	n/a
Conventional VHF Omni-Directional Range (CVOR)	0 – 200	200 – 1500	n/a
Doppler VHF Omni-Directional Range (DVOR) - Elevated	0 - 100	150 – 1500	n/a
Doppler VHF Omni-Directional Range (DVOR) – Ground Mounted	0 – 150	150 – 1500	n/a
Middle and Outer Marker	0 – 5	5 – 50	n/a
Glide path	n/a	n/a	n/a
Localiser	n/a	n/a	n/a
Automatic Dependent Surveillance Broadcast (ADS-B)	0 - 100	100 – 1500	n/a
Wide Area Multilateration (WAM)	0 - 100	100 - 1500	n/a
Primary Surveillance Radar (PSR)	0 - 500	500 - 4000	4000 – 15000
Secondary Surveillance Radar (SSR)	0 - 500	500 - 4000	4000 – 15000
Ground Based Augmentation System (GBAS) - RSMU	0-155	155-3000	n/a
GBAS - VDB	0-200	200-3000	n/a
Link Dishes	30m		
Radar Site Monitor – Type A	30m	0 - 500	n/a
Radar Site Monitor – Type B	70m	0 – 500	n/a

 Table 5 Summary of BRA for CNS Facilities (Guideline G)

4.8.2 Assessment and Conclusions

4.8.2.1 Airport CNS Equipment

Based on Western Sydney Airport Key-Functional Specifications as published, Navaids at the airport will include:

- Precision Approach Path Indicator
- Instrument Landing System CAT IIIB incl. Glide Path and Localiser
- Far Field Monitor
- Distance Measuring Equipment
- Advanced Surface Movement Guidance and Control System

Ground Based Augmentation System

Instrument Landing System (ILS), Distance Measuring Equipment (DME) and a Ground Based Augmentation System (GBAS) are planned at Western Sydney Airport.

Instrument Landing System – CAT IIIB (ILS)

Based on Guideline G Attachment 3, The Instrument Landing System is a precision navigation aid that consists of a Localizer, Glide Path, markers, and monitors. Beams emanate from the antennas to provide:

- Horizontal Guidance (Localizer), and
- Vertical Guidance (Glide Path).

Aircraft are guided down the horizontal and vertical beams towards the antennas to arrive at the touchdown point.

Middle and Outer Marker beacon:

General guidance - within 5 metres of the marker beacon, grass and other vegetation should be less than 60cm tall.

If application within Zone A, all applications must be referred to Airservices Australia for assessment. No action required within Zone B.

Zone A: If development is located,

- Within 5 meters of the marker beacon antenna; or
- Between 5 -10 meters of the marker beacon antenna and the development will cross the zone boundary (defined as an elevation angle of 50° from ground level at the marker beacon antenna).

Zone B: If development is located between 5-50 metres of the marker beacon antenna and the development will not cross the zone boundary.

Ingham Property



Figure 21 Middle and Outer Marker Beacon BRA (Source: Guideline G Attachment 3)

Glide Path:

If application within Zone A, all applications must be referred to Airservices Australia for assessment. No action required within Zone B.

Zone A: If development is located,

- Within the area defined as greater than 0.5° elevation longitudinally and 2° elevation laterally from the edges of the vehicle critical area (runway) (measured from the ground level at the Glide Path Antenna Tower); and
- Within 40 metres either side of the extended glide path centreline to a distance of 50 metres behind the Glide Path Antenna Tower.

Zone B: All other areas not described by Zone A.



Figure 22 Glide Path BRA (Source: Guideline G Attachment 3)

Localizer:

General guidance - all buildings within 1,000 metres of the runway centreline, which have a vertical wall facing the runway that exceeds 2,000 square metres in area and a height more than 20 metres above the Localizer ground level (e.g., hangars/office blocks) will require assessment by Airservices Australia.

If application within Zone A, all applications must be referred to Airservices Australia for assessment. No action required within Zone B.

Zone A: If development is located,

- With the area defined as greater than 0.5° elevation longitudinally and 2° elevation laterally from the edges of the vehicle critical area (runway) (measured from the ground level at the Localizer antenna); and
- Within 45 metres either side of the extended runway centreline to a distance of 50 metres behind the Localizer antenna within 40 metres either side of the extended glide path centreline to a distance of 50 metres behind the Glide Path Antenna Tower.

Zone B: All other areas not described by Zone A.



Figure 23 Localizer BRA (Source: Guideline G Attachment 3)

Distance Measuring Equipment (DME)

Distance Measuring Equipment measures the slant range between an aircraft and the Distance Measuring Equipment antenna.

If application within Zone A, all applications must be referred to Airservices Australia for assessment. No action required within Zone B.

Zone A: If development is located,

- Within 100 metres of the Distance Measuring Equipment antenna and above a horizontal plane located 4 metres below the centre of the Distance Measuring Equipment antenna; or
- Between 100–1500 metres from the Distance Measuring Equipment antenna and the development will cross the zone boundary (defined as an elevation angle of 2°, measured from the above horizontal plane beneath the Distance Measuring Equipment antenna).

Zone B: If development is located between 100-1500 metres from the centre of the Distance Measuring Equipment antenna and the development will not cross the zone boundary.



Figure 24 Distance Measuring Equipment BRA (Source: Guideline G Attachment 3)

GBAS

Based on Error! Reference source not found. The GBAS BRA extend to 3 km from the facility which is planned to be based in the middle of the airport but m ay move to the north side of the airport as the second runway is developed.

The proposed development site is located within both the Localizer BRA. Figure 25 show substation locate within the BRA area.

The GBAS BRA extend to 3 km from the facility which is planned to be based in the middle of the airport but may move to the north side of the airport as the second runway is developed. And The DME BRA extend to 1500 m from the facility which is planned in the middle of the airport.

The closest part of the Airport Substation proposed development site is 3.4 km from the Runway 23R end and 2.7 km from the centre of SWZ development or APR and will therefore be:

- Within the ILS BRA at 1000m;
- Within the GBAS BRA at 3000m;

We are unable to confirm any specifics as to the potential impacts as public information on the planned equipment and final locations are not available.



Figure 25 Development Site lactation related to BRA (Source LB CAD and google Map)

Conclusion: Consultation with Airservices with regard to CNS equipment at SWZ airport is required.

4.8.2.2 Non-Airport CNS System Identification

Primary and Secondary Surveillance Radar

There should no temporary or permanent obstructions should infringe on Zone A or Zone B. And any sharp discontinuity protruding into the area of interest such as single metal light towers, power pylons and city buildings, will impact on performance and should be avoided where possible.

If development is within Zone A, B, and area of interested, they must be referred to Airservices Australia for assessment.

Zone A: If development is located:

- Within 500 metres of the antenna; and
- Above a horizontal plane located 4 metres below the base of the antenna.

Zone B: If development is located:

- Within 4000 metres of the antenna; and
- The development will cross the zone boundary (defined as an elevation angle of 0.5° measured from 8 metres below the height of the radar antenna)

Area of interest: If development is located:

- Within 15 km of the antenna; and
- The height of the development will cross the zone boundary (defined as an angle of elevation of 0.25° measured from the height of the antenna)



Zone B



Area of Interest



Figure 26 Primary and Secondary Surveillance Radar Area

The nearest PSR and SSR is located at Cecil Park. The proposed development site is within 15km Area of Interest area. The antenna elevation at Cecil Park is assumed 180 m (150 m elevation + assume 30m tower height). The height of development will beneath **223.98m AHD**.

Surveillance System	Distance from	Antenna Elevation	Clearance Plane Elevation at development site
	development	(AHD)	Distance x Tan 0.25 + TAR elevation
Cecil Park TAR	10,080 m	180 m	223.98 m AHD

Table 6 Surveillance System Clearance Plane

The systems shown above do not give rise to any CNS concerns or need for notification.

Conclusion:	No action in respect of CNS equipment at aerodromes is required.

4.9 NASF Guideline H: Protecting Strategically Important Helicopter Landing Sites (HLS)

The purpose of this document is to protect important Helicopter Landing Sites (HLS) from infringements. An HLS is a specific nominated area (not located on an aerodrome) wholly or partly used for the arrival or departure of helicopters for strategically important purposes.

4.9.1 Requirements

- Development that infringes the height limits of the HLS are not permitted.
- Any development that exceeds the heights shown in Figure 27, which is consistent with the highest level of HLS classification (Performance Class 1), must be referred to the asset owner and CASA.
- Any development within the Referral Trigger zone or above 100m height (above ground level) needs to be light with a steady low intensity light.
- Windshear and turbulence impact on HLS should be considered. (L&B uses the wind turbulence information from Guideline B for this purpose.)



Figure 27 Referral Trigger for SHLS (Guideline H)

4.9.2 Assessment and Conclusions

The proposed development is located more than 3.5km from any relevant helicopter landing sites.

Conclusion:	No action in respect of HLS is required.

4.10 NASF Guideline I – Public Safety Areas (PSAs)

Guideline I provides guidance to Australian Government, state, territory and local government decision makers on the assessment and treatment of potential increases in risk to public safety which could result from an aircraft incident or development proposal in areas near the end of an airport runway. Guideline informs a more consistent approach to the application of Public Safety Areas (PSAs) at and near Australian airports.

4.10.1 Requirements

This Guideline suggests a balanced approach with the PSA made up of two different areas:

• Outer area = 1 in 100,000 (1 x 10-5) risk level per year

This identifies the area (or risk contour) within which, any person living or working for a period of a year, has approximately a 1 in 100,000 chance per year of being killed as a result of an aircraft incident (see Figure 28).

• Inner area = 1 in 10,000 (1 x 10-4) risk level per year

This identifies the higher risk area (or risk contour) immediately adjoining the end of the runway within which, any person living or working for a period of a year, has approximately a 1 in 10,000 chance per year of being killed as a result of an aircraft incident (see Figure 28).

The dimensions of the two areas are dependent on a range of airport specific factors (such as forecasts about the numbers and types of aircraft movements).



Figure 28 Example of PSA showing inner area and outer area.

As a general guide, the types of new or changed development considered compatible and incompatible within the outer (1 in 100,000) and inner (1 in 10,000) areas include those listed in Figure 29.

PSA	COMPATIBLE USES	INCOMPATIBLE USES/ACTIVITIES
OUTER AREA - 1 in 100,000	 Long stay and employee car parking (where the minimum stay is expected to be in excess of six hours) Shorter stay car parking (with a safety case – depends on intensity of use) Built development for the purpose of housing plant or machinery and would require no people on site on a regular basis, such as electricity switching stations or installations associated with the supply or treatment of water Golf courses, but not club houses (provided appropriate mitigation measures are in place to reduce wildlife attraction risk - see NASF Guideline C) Open storage and types of warehouses with a very small number of people on site. The planning authority could consider imposing conditions to prevent future intensification of the use of the site and limit the number of people to be present on the site Developments which require few or no people on site on a regular basis such as buildings housing plant or machinery Low intensity public open space 	 Accommodation activities: This includes dwelling houses, multiple dwellings, resort complexes, tourist park, hostels, retirement villages or other residential care buildings Community activities: educational establishment, community centres, hospitals, theatres, childcare and playgrounds, detention facilities, place of worship Recreation activities: This includes parks, outdoor recreation and sport, major sport and entertainment facilities Entertainment and centre activities: Shopping centres, service stations, showrooms, markets, hotels, theatres, tourist attraction, garden centres Industrial and commercial uses involving large numbers of workers or customers: Intensive uses such as high impact, medium and low impact industry, warehousing, services industry Manufacture or bulk storage of flammable, explosive or noxious materials Public passenger transport infrastructure: This includes bus, train and light rail stations
INNER AREA – 1 in 10,000	 Long stay and employee car parking (where the minimum stay is expected to be in excess of six hours) Built development for the purpose of housing plant or machinery and would require no people on site on a regular basis, such as electricity switching stations or installations associated with the supply or treatment of water Golf courses, but not club houses (provided appropriate mitigation measures are in place to reduce wildlife attraction risk - see NASF Guideline C) 	 Accommodation activities: This includes dwelling houses, multiple dwellings, resort complexes, tourist park, hostels, retirement villages or other residential care buildings Community activities: educational establishment, community centres, hospitals, theatres, childcare and playgrounds, detention facilities, place of worship Recreation activities: This includes parks, outdoor recreation and sport, major sport and entertainment facilities Entertainment and centre activities: Shopping centres, service stations, showrooms, markets, hotels, theatres, tourist attraction, garden centres Industrial and commercial uses involving large numbers of workers or customers: Intensive uses such as high impact, medium and low impact industry, warehousing, services industry Manufacture or bulk storage of flammable, explosive or noxious materials Public passenger transport infrastructure: This includes bus, train and light rail stations

Figure 29 General guidance for new/proposed developments on compatible and incompatible activities within PSA risk contours

4.10.2 Assessment and Conclusions

The proposed development is located outside PSAs area associated with runways at 23L.



Figure 30 Western Sydney Airport Public Safety Area (PSA) (Source: L&B drawing & Google Map)

Conclusion: No action in respect of PSAs.

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5 NSW State Environment Planning Policy (Western Parkland City) 2021

The report assesses the site against the relevant clauses (19 to 25 inclusive) of the NSW State Environmental Planning Policy (Western Sydney Aerotropolis) 2020, Part 3 Development Controls – Airport Safeguarding

Additional diagrams are included in the Appendix A.

5.1 Clause 4.17: Aircraft Noise

5.1.1 Requirement

The objectives of this clause are:

- to prevent certain noise sensitive development on land near the Airport, and
- to minimise the impact of aircraft noise for other noise sensitive development, and
- to ensure that land use and development near the Airport do not hinder or have other adverse impacts on the ongoing, safe, and efficient 24 hours a day operation of the Airport.

Development consent must not be granted to noise sensitive development if the development is to be located on land that is in an ANEF or ANEC contour of 20 or greater.

Subsection applies despite the following:

- Part 2, Divisions 7 and 8 of State Environmental Planning Policy (Affordable Rental Housing) 2009,
- Chapter 3 of State Environmental Planning Policy (Housing for Seniors or People with Disability) 2004,
- State Environmental Planning Policy (Educational Establishments and Childcare Facilities) 2017.

Despite subsection, development consent may be granted to development for the purposes of dwelling houses on land that is in an ANEF or ANEC contour of 20 or greater if:

- Immediately before the commencement of this Chapter:
 - There were no dwellings on the land, and
 - Development for the purposes of dwelling houses was permitted on the land, and
- The consent authority is satisfied that the development will meet the indoor design sound levels.

Subsection does not apply to development for the purposes of subdivision of land in an ANEF or ANEC contour of 20 or greater if the development application was made before 1 October 2020.

5.1.2 Assessment and Conclusions

The development Site is located inside ANEF and ANEC Zones.

Conclusion:	The development site is planned for business enterprise and light industrial use. This allows it to be considered as "commercial building" and "Light Industrial" within the ANEF guidelines. The development is acceptable within all the ANEF zones as per the Australian Standard AS 2021:2015 Acoustics - Aircraft Noise
	Covered under Item 4.2 Guideline A: Measures for Managing Impacts of Aircraft Noise

5.2 Clause 4.18: Building Generated Wind Shear and Turbulence

5.2.1 Requirement

The objective of this clause is to safeguard Airport operations from wind shear and turbulence generated by buildings.

Development consent must not be granted to the following development unless the consent authority has consulted the relevant Commonwealth body.

- development on land shown on the Lighting Intensity and Wind Shear Map,
- development that penetrates the 1:35 surface

Development consent must not be granted to the development unless the consent authority has consulted the relevant Commonwealth body.

• For the purposes of this section, development penetrates the 1:35 surface if the distance from the runway centreline to the closest point of the building is less than or equal to 35 times the height above runway level of the building.

5.2.2 Assessment and Conclusions

The development Site is located within of the Windshear Assessment Trigger Area Partial area and protruding the height slope (1:35) contour and must be considered for wind effects.

Conclusion:	The height of any proposed development in the impacted areas within the Assessment Trigger Zone will need to be lower than
	96.21m AHD. Each individual building within the zone will require assessment when detailed finalized drawings are available.
	Consideration of temporary cranage may also be required, especially after opening of the second runway.
	Covered under Item 4.3 Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports

5.3 Clause 4.19: Wildlife Hazards

5.3.1 Requirement

The objective of this clause is to regulate development on land surrounding the Airport where wildlife may present a risk to the operation of the Airport.

Development consent must not be granted to relevant development on land in the 13 km wildlife buffer zone unless the consent authority-

- Has consulted the relevant Commonwealth body, and
- Has considered a written assessment of the wildlife that is likely to be present on the land and the risk of the wildlife to the operation of the Airport
 provided by the applicant, which includes:
 - Species, size, quantity, flock behaviour and the particular times of day or year when the wildlife is likely to be present, and
 - Whether any of the wildlife is a threatened species, and
 - A description of how the assessment was carried out, and
- Is satisfied that the development will mitigate the risk of wildlife to the operation of the Airport, including, for example, measures relating to:
 - Waste management, landscaping, grass, fencing, stormwater, or water areas, or
 - The dispersal of wildlife from the land by the removal of food or the use of spikes, wire, or nets.

Despite subsection, development for the following purposes is prohibited on land in the 3 km wildlife buffer zone:

- Livestock processing industries,
- Turf farming,
- Waste or resource management facilities that consist of outdoor processing, storage, or handling of organic or putrescible waste.

5.3.2 Assessment and Conclusions

The development Site is located inside 3km zone there are "incompatible" uses that would not normally align with an industrial precinct of the type understood to be foreseen at the proposed development site. Specific building / lot uses may need to ensure that any "mitigate", and "monitor" actions are included.

Conclusion:	The proposed development site will not impact the risk of wildlife strikes in the vicinity of Western Sydney Airport, however "mitigate" or "monitor" actions may be required depending on final building use.
	Covered under Item 4.4 Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports

5.4 Clause 4.20: Wind Turbines

5.4.1 Requirement

The objective of this clause is to regulate the construction of wind turbines and wind monitoring towers on land within 30 kilometres of the Airport.

Development for the following purposes is prohibited on land in the 3 km zone.

- Electricity generating works comprising a wind turbine, wind monitoring towers that are not ancillary or incidental to the Airport.
- Wind monitoring towers that are not ancillary or incidental to the Airport.

Development consent must not be granted to development for the purposes of a large wind monitoring tower in the 3–30 km zone unless the consent authority has consulted the relevant Commonwealth body.

Development consent must not be granted to development for the purposes of electricity generating works comprising a wind turbine on land in the 3–30 km zone unless the consent authority:

- Has consulted the relevant Commonwealth body, and
- Has considered a written assessment of the risk of the development to the safe operation of the Airport provided by the applicant, and
- Is satisfied that the development will adequately mitigate the risk to the safe operation of the Airport.

5.4.2 Assessment and Conclusions

As the proposed development is not a wind farm nor includes a single wind turbine this Guideline does not apply. Requirements and assessment approach are therefore not included in this report.

 Conclusion:
 Proposed development is compliant. No action required.

 Covered under Item 4.5 Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation

5.5 Clause 4.21: Lighting

5.5.1 Requirement

The objective of this clause is to safeguard Airport operations from the risk of lighting and reflectivity distractions for pilots.

Development consent must not be granted to development for the following purposes on land shown on the Lighting Intensity and Wind Shear Map unless the consent authority has consulted the relevant Commonwealth body.

- installation and operation of external lighting (whether coloured or white lighting) in connection with development for the following purposes
 - classified roads,
 - freight transport facilities,
 - heavy industrial storage establishments,
 - recreation facilities (major),
 - recreation facilities (outdoor),
- installation and operation of external lighting in connection with construction works that is likely to be obtrusive or create light spill outside the land on which the construction works are carried out.

5.5.2 Assessment and Conclusions

The proposed development is within 6km of the centre of an applicable runway but lies outside Zone D, and is therefore not covered by Guideline E.

Conclusion:	The proponent need take no specific actions in respect of lighting.
	Covered under Item 4.6 Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports

5.6 Clause 4.22: Airspace Operations

5.6.1 Requirement

The objectives of this clause are:

- to provide for the effective and ongoing operation of the Airport by ensuring that its operation is not compromised by development that penetrates the prescribed airspace for the Airport, and
- to protect the community from undue risk from the operation of the Airport.

This section applies to development on land shown on the Obstacle Limitation Surface Map that is a controlled activity within the meaning of Part 12, Division 4 of the Airports Act 1996 of the Commonwealth.

Development consent must not be granted to development to which this section applies unless:

- The consent authority has consulted the relevant Commonwealth body, and
- The relevant Commonwealth body advises the consent authority that:
 - The development will penetrate the prescribed airspace, but it does not object to the development, or
 - The development will not penetrate the prescribed airspace.

The content of this Aeronautical Impact Assessment clearly shows that the Aldington South Estate Development site does not penetrate the prescribed airspace for Western Sydney Airport, or any other airport.

It should be noted that whilst the runway locations have been planned, and hence the Obstacle Limitation Surfaces can be drawn, the Instrument Landing System (Basic ILS) PANS OPS surfaces have been issued in a provisional format only for SWZ there is still the possibility that they may change slightly as the airport construction program progresses and consequently, the airport's Prescribed Airspace may also change slightly.

SWZ data used to determine the probable Prescribed Airspace above the Aldington South Estate Development site was derived from information published on SWZ's website - https://westernsydney.com.au/.

Major reports referenced are:

- Western Sydney Airport Airport Plan 2016;
- Western Sydney Aerotropolis State Environmental Planning Policy 2020 (SEPP 2020);
- Airservices Australia Western Sydney Airport Preliminary Airspace Management Analysis 10 April 2015.

5.6.2 Assessment and Conclusions

The proposed development is within 15km of the centre of airport, it is located beneath the Inner Horizontal Surface with a height of **125.5m AHD**.

The lowest Basic ILS surface is related to the Runway 23R ILS and is at a height of 156.3 m AHD.

The lowest SID PANS OPS surface above the development site is **188.2 m AHD**, based on an estimated turn height of 800 ft AMSL and PDG of 3.3%. Any increase in the turn height will increase the height of the associated PANS OPS surface.

used after runway opening) are kept below 125.5m AHD. This needs to be set as a design constraint on the development. It must be noted that the OLS height is higher than the limit in certain areas of the site imposed by the Guideline B. In such areas buildings will need to be lower than 96.2m AHD.
It must be noted that the OLS height is higher than the limit in certain areas of the site imposed by the Guideline B. In such areas buildings will need to be lower than 96.2m AHD.
buildings will need to be lower than 96.2m AHD.
With maximum building heights assumed to be limited by the OLS height limit of 125.5m AHD, the proposed development does not
infringe the PANS OPS of the aerodrome. No action is required.
Each individual building within the proposed development may require assessment when detailed finalized drawings are available.
Covered under Item 4.7 Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports

5.7 Clause 4.23: Public Safety Area

5.7.1 Requirement

The objective of this clause is to regulate development on land on which there is an appreciable risk to public safety from the operation of the Airport.

Development for the following purposes is prohibited on land shown as the "public safety area" on the Public Safety Area Map:

- Camping grounds;
- Caravan parks;
- Cemeteries;
- Centre-based childcare facilities;
- Commercial premises;
- Community facilities;
- Correctional centres;
- Crematoria;
- Eco-tourist facilities;
- Education establishments;
- Entertainment facilities;
- Function centres;
- Funeral homes;
- Health services facilities;
- Heavy industrial storage establishments;
- Industrial retail outlets;
- Industrial training facilities;
- Industries;
- Information and education facilities;
- Passenger transport facilities;
- Places of public worship;
- Recreation areas;
- Recreation facilities (indoor);
- Recreation facilities (major);
- Recreation facilities (outdoor);
- Registered clubs;
- Residential accommodation;

• Tourist and visitor accommodation

Development consent must not be granted to development for a purpose not specified in subclause (2) on land shown as the "public safety area" on the Public Safety Area Map unless the consent authority.

- has considered a written assessment of the risk of the development to persons provided by the applicant, which includes;
 - the risk to persons on the land in the event of an emergency or other incident at or around the Airport, including an incident involving an aircraft landing or taking off from the Airport, and
 - the likely number of people who will use or otherwise be present on the land, and
 - the compatibility of the development with the risk, including in relation to the number of people who will use or otherwise be present on the land, and
- is satisfied that the development will adequately mitigate the risk to persons on the land, including by limiting the number of people or vehicles.

5.7.2 Assessment and Conclusions

The proposed development is located outside PSAs area associated with runways at 23L.

Conclusion:	No action in respect of PSAs.
	Covered under Item 4.10 NASF Guideline I – Public Safety Areas (PSAs)

6 NSW State Environmental Planning Policy (Industry and Employment) 2021

The report assesses the site against the relevant clauses (2.36 to 2.38) of the NSW State Environmental Planning Policy (Industry and Employment) 2021.

6.1 Clause 2.36 Development in areas subject to aircraft noise

6.1.1 Requirement

The objects of this clause are as follows:

- to prevent certain noise sensitive developments from being located near the Airport and its flight paths,
- to assist in minimising the impact of aircraft noise from the Airport and its flight paths by requiring appropriate noise attenuation measures in noise sensitive buildings,
- to ensure that land use and development in the vicinity of the Airport do not hinder, or have other adverse impacts on, the ongoing, safe, and efficient
 operation of the Airport.

This section applies to development:

- on land that is
 - in the vicinity of the Airport and its flight paths, and
 - in either an ANEF contour of 20 or greater or an ANEC contour of 20 or greater, and
- that the consent authority considers is likely to be adversely affected by aircraft noise.

Before determining a development application for development to which this section applies, the consent authority.

- must consider whether the development will result in an increase in the number of dwellings or people affected by aircraft noise, and
- must consider the location of the development in relation to the criteria set out in Table 2.1 (Building Site Acceptability Based on ANEF Zones) in AS 2021:2015, and
- must be satisfied that the development will meet the indoor design sound levels set out in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021:2015.

Despite another provision of this Chapter, development consent must not be granted to development on land to which this section applies for the purposes of a place of public worship, a centre-based childcare facility, or a TAFE establishment or for residential development.

In this section, ANEC contour means a contour on the Australian Noise Exposure Concept Map for the Airport, published on the Department's website. ANEF contour means a noise exposure contour shown as an ANEF contour on the Noise Exposure Forecast Contour Map for the Airport prepared by the Department of the Commonwealth responsible for airports. AS 2021:2015 means AS 2021:2015, *Acoustics—Aircraft noise intrusion—Building siting and construction*.

For the purposes of this section, a reference to ANEF in AS 2021:2015 is taken to include a reference to ANEC.

6.1.2 Assessment and Conclusions

The development Site is located inside ANEF and ANEC Zones.

Conclusion:	The development site is planned for business enterprise and light industrial use. This allows it to be considered as "commercial
	building" and "Light Industrial" within the ANEF guidelines. The development is acceptable within all the ANEF zones as per the
	Australian Standard AS 2021:2015 Acoustics - Aircraft Noise
	Covered under Item 4.2 Guideline A: Measures for Managing Impacts of Aircraft Noise

6.2 Clause 2.37: Airspace operations

6.2.1 Requirement

The objectives of this clause are as follows:

- to provide for the effective and ongoing operation of the Airport by ensuring that such operation is not compromised by proposed development that penetrates the prescribed airspace for the Airport,
- to protect the community from undue risk from that operation.

If a development application is received and the consent authority is satisfied that the proposed development will penetrate the prescribed airspace, before granting development consent, the consent authority must consult with the relevant Commonwealth body about the application.

The consent authority may grant development consent for the development if the relevant Commonwealth body advises that:

- the development will penetrate the prescribed airspace, but it has no objection to its construction, or
- the development will not penetrate the prescribed airspace.

To avoid doubt, the consent authority must not grant development consent for the development if the relevant Commonwealth body advises that the development will penetrate the prescribed airspace and should not be constructed.

Ingham Property

In this clause, OLS and PANS-OPS surface have the same meanings as in the Airports (Protection of Airspace) Regulations 1996 of the Commonwealth.

Prescribed airspace means the airspace:

- above any part of either an OLS or a PAN-OPS surface for the Airport, and
- declared under regulation 5 of the Airports (Protection of Airspace) Regulations 1996 of the Commonwealth relating to the Airport, under section 181(1) of the Airports Act 1996 of the Commonwealth.

Relevant Commonwealth body means:

- the airport-operator company for the Airport (within the meaning of the Airports Act 1996 of the Commonwealth), or
- if there is no airport-operator company for the Airport—the Secretary of the body, under Commonwealth legislation, that is responsible for development approvals for development that penetrates the prescribed airspace.

6.2.2 Assessment and Conclusions

The proposed development is within 15km of the centre of airport, it is located beneath the Inner Horizontal Surface with a height of **125.5m AHD**.

The lowest Basic ILS surface is related to the Runway 23R ILS and is at a height of 156.3 m AHD.

The lowest SID PANS OPS surface above the development site is **188.2 m AHD**, based on an estimated turn height of 800 ft AMSL and PDG of 3.3%. Any increase in the turn height will increase the height of the associated PANS OPS surface.

Conclusion:	The proposed development will not infringe the OLS of the aerodrome provided completed buildings (and any temporary cranage used after runway opening) are kept below 125.5m AHD. This needs to be set as a design constraint on the development.
	It must be noted that the OLS height is higher than the limit in certain areas of the site imposed by the Guideline B. In such areas buildings will need to be lower than 96.2m AHD.
	With maximum building heights assumed to be limited by the OLS height limit of 125.5m AHD, the proposed development does not infringe the PANS OPS of the aerodrome. No action is required.
	Each individual building within the proposed development may require assessment when detailed finalized drawings are available.
	Covered under Item 4.7 Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports

6.3 Clause 2.38: Development of land adjacent to Airport

6.3.1 Requirement

The objectives of this clause are as follows:

- to provide for the effective and ongoing operation of the Airport by ensuring that such operation is not compromised by proposed development in close proximity to the Airport,
- to protect the community from undue risk from that operation.

This clause applies to development on land, any part of which is less than 13 kilometres from a boundary of the Airport.

The consent authority must not grant consent for development to which this clause applies unless the consent authority is satisfied that the proposed development will not attract birds or animals of a kind and in numbers that are likely to increase the hazards of operating an aircraft.

6.3.2 Assessment and Conclusions

The development Site is located within 13 km from boundary of the Airport. Detail analysis reference to Item 4 NASF Requirements and Assessment and 5 NSW State Environment Planning Policy (Western Parkland City) 2021

Conclusion:	The development Site is located within 13 km from boundary of the Airport.
	Covered under Item 4 NASF Requirements and Assessment and 5 NSW State Environment Planning Policy (Western Parkland City) 2021

7 Liverpool Local Environmental Plan (LEP) 2008

7.1 Clause 7.17: Airspace Operations.

7.1.1 Requirement

The objective of this clause is to protect airspace around airports.

This clause does not apply to development on land to which <u>State Environmental Planning Policy (Precincts—Western Parkland City) 2021</u>, section 4.22 applies.

The consent authority must not grant development consent to development that is a controlled activity within the meaning of Division 4 of Part 12 of the *Airports Act 1996* of the Commonwealth unless the applicant has obtained approval for the controlled activity under regulations made for the purposes of that Division.

7.1.2 Assessment and Conclusions

The proposed development is within 15km of the centre of airport, it is located beneath the Inner Horizontal Surface with a height of **125.5m AHD**.

The lowest Basic ILS surface is related to the Runway 23R ILS and is at a height of 156.3 m AHD.

The lowest SID PANS OPS surface above the development site is **188.2 m AHD**, based on an estimated turn height of 800 ft AMSL and PDG of 3.3%. Any increase in the turn height will increase the height of the associated PANS OPS surface.

The proposed development will not infringe the OLS of the aerodrome provided completed buildings (and any temporary cranage used after runway opening) are kept below 125.5m AHD. This needs to be set as a design constraint on the development.
It must be noted that the OLS height is higher than the limit in certain areas of the site imposed by the Guideline B. In such areas buildings will need to be lower than 96.2m AHD.
With maximum building heights assumed to be limited by the OLS height limit of 125.5m AHD, the proposed development does not infringe the PANS OPS of the aerodrome. No action is required.
Each individual building within the proposed development may require assessment when detailed finalized drawings are available.
Covered under Item 4.7 Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports
7.2 Clause 7.17A Hospital Helicopter Airspace

7.2.1 Requirement

The objective of this clause is to protect hospital helicopter airspace.

Development consent must not be granted to development under, or that intrudes into, hospital helicopter airspace unless the consent authority;

- Refers the application for development consent to the chief executive of the relevant local health district, and
- Considers any submission to the consent authority by the chief executive made within 21 days of the referral, and
- Is satisfied the development does not present a hazard to helicopters using hospital helicopter airspace.

In this clause

- Hospital helicopter airspace means the airspace above the Helicopter OIS Contours shown for the land hatched red on the Key010 Sites Map.
- Relevant local health district means the local health district constituted in respect of the area above which hospital helicopter airspace is located.



Figure 31 Liverpool Local Helicopter Contours (Source: Liverpool Local Environmental Plan 2008 – Ky Sites Map – Sheet KYS_010)

7.2.2 Assessment and Conclusions

The proposed development is located within Key 004 area, is far away from any relevant helicopter contours which is within Key 010 area, shown in Figure 31..

Conclusion:	No action in respect of HLS is required.
	Covered under Item 4.9 NASF Guideline H: Protecting Strategically Important Helicopter Landing Sites (HLS)

7.3 Clause 7.18 Development in areas subject to potential airport noise

7.3.1 Requirement

The objectives of this clause are to ensure that development in the vicinity of Bankstown Airport and Western Sydney International (Nancy-Bird Walton) Airport

- Has regard to the use or potential future use of each site as an airport, and
- Does not hinder or have any other adverse impact on the development or operation of the airports on those sites.

This clause does not apply to development on land to which *State Environmental Planning Policy (Precincts—Western Parkland City)* 2021, Chapter 4 applies.

Development consent is required for the erection of a building on land where the ANEF exceeds 20 if it is erected for residential purposes or for any other purpose involving regular human occupation.

The following development is prohibited unless it meets the requirements of AS 2021–2015, Acoustics—Aircraft noise intrusion—Building siting and construction with respect to interior noise levels—

- Residential accommodation on land where the ANEF exceeds 20,
- Business premises, entertainment facilities, office premises, public administration buildings, retail premises and tourist and visitor accommodation on land where the ANEF exceeds 25.

The following development is prohibited.

- Educational establishments, hospitals, and places of public worship on land where the ANEF exceeds 20,
- Dwellings on land where the ANEF exceeds 25 (other than development consisting of the alteration, extension, or replacement of an existing dwelling house where the development is consistent with the objectives of this clause),

• Business premises, entertainment facilities, office premises, public administration buildings, retail premises and tourist and visitor accommodation on land where the ANEF exceeds 30.

7.3.2 Assessment and Conclusions

The development Site is located inside ANEF and ANEC Zones.

Conclusion:	The development site is planned for business enterprise and light industrial use. This allows it to be considered as "commercial
	building" and "Light Industrial" within the ANEF guidelines. The development is acceptable within all the ANEF zones as per the
	Australian Standard AS 2021:2015 Acoustics - Aircraft Noise
	Covered under Item 4.2 Guideline A: Measures for Managing Impacts of Aircraft Noise

8 Summary of Conclusions and Actions

8.1 Conclusions: National Airports Safeguarding Framework (NASF)

Assessment Principle	Conclusion / Action	Reference Page / Section
NASF Guideline A: Measures for Managing Impacts of Aircraft Noise	No impact.	Page: 14 Section: 4.2.2
NASF Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports	No impact provided the height limits stated in this report are complied with. It may be possible to exceed the height limits on a permanent or temporary basis even after opening of the second runway.	Page: 23 Section: 4.3.2
NASF Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports	No impact.	Page: 27 Section: 4.4.2
NASF Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation	No impact.	Page: 28 Section: 4.5
NASF Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports	No impact.	Page: 30 Section: 4.6.2
NASF Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports	No impact provided the height limits stated in this report are complied with.	Page: 34 Section: 4.7.2
NASF Guideline G: Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS)	Consultation with Airservices with regard to CNS equipment at SWZ airport is required.	Page: 38 Section: 4.8.2
NASF Guideline H: Protecting Strategically Important Helicopter Landing Sites (HLS)	No impact.	Page: 48 Section: 4.9.2

NASF Guideline I: Public Safety Areas (PSAs)	No impact.	Page: 50 Section: 4.10.2

8.2 Conclusions: State and Local Planning Requirements

8.2.1 NSW State Environmental Planning Policy (Western Parkland City) 2021

Assessment Principle	Conclusion	Reference
	/ Action	Page / Section
Clause 4.17: Aircraft Noise	No impact.	Page: 53 Section: 5.1.2
Clause 4.18: Building Windshear and Turbulence	No impact provided the height limits stated in this report are complied with. It may be possible to exceed the height limits on a permanent or temporary basis even after opening of the second runway.	Page: 53 Section: 5.2.2
Clause 4.19: Wildlife Hazards	No impact.	Page: 54 Section: 5.3.2
Clause 4.20: Wind Turbines	No impact.	Page: 55 Section: 5.4.2
Clause 4.21: Lighting	No impact.	Page: 56 Section: 5.5.2
Clause 4.22: Airspace Operations	No impact provided the height limits stated in this report are complied with.	Page: 57 Section: 5.6.2
Clause 4.23: Public Safety	No impact.	Page: 59 Section: 5.7.2

8.2.2 NSW State Environmental Planning Policy (Industry and Employment) 2021

Assessment Principle	Conclusion / Action	Reference Page / Section
Clause 2.36: Development in areas subject to aircraft noise	No impact.	Page: 61 Section: 6.1.2
Clause 2.37: Airspace Operations	No impact provided the height limits stated in this report are complied with.	Page: 62 Section: 6.2.2
Clause 2.38: Development of land adjacent to Airport	Covered under Item 4 NASF Requirements and Assessment and 5 NSW State Environment Planning Policy (Western Parkland City) 2021	Page: 63 Section: 6.3.2

8.2.3 Liverpool Local Environmental Plan (LEP) 2008

Assessment Principle	Conclusion / Action	Reference Page / Section
Clause 7.17: Airspace Operations	No impact provided the height limits stated in this report are complied with.	Page: 64 Section: 0
Clause 7.17A Hospital Helicopter Airspace	No impact.	Page: 67 Section: 7.2.2
Clause 7.18 Development in areas subject to potential airport noise	No impact.	Page: 68 Section: 7.3.2

Appendix A – State Environmental Planning Policy Maps

Noise Exposure Map (State Environmental Planning Policy (Precincts— Western Parkland City) 2021 Noise Exposure Contour Map)



Lighting Intensity and Wind Shear Map (State Environmental Planning Policy (Precincts— Western Parkland City) 2021 Lighting Intensity and Wind Shear Map)



Wildlife Buffer Zone Map (State Environmental Planning Policy (Precincts— Western Parkland City) 2021 Wildlife Buffer Zone Map)



Wind Turbine Buffer Zone Map (NSW DPIE WAS SEPP 2020)



Public Safety Area Map (NSW State Environment Planning Policy (Western Parkland City) 2021 Public Safety Area Map)

