Appendix A

Consistency with Airports Act

Appendix A provides an overview of the BPSO MDP in relation to the relevant sections of the Airports Act – specifically Sections 89(1), 90 and 91 of the Airports Act.

Section 90 of *Airports Act 1996* - Requirements		**Relevance to the BPSO MDP**
90	Major airport development must not be carried out except in accordance with an approved major development plan etc.	
	ca) if: i. the airport is Sydney West Airport; and ii. the development is covered by Part 3 of an airport plan for the airport the carrying out of the development is in accordance with Part 3 of the airport plan	The proposed BPSO development triggers an MDP assessment pursuant to Section 89 of the Airports Act because it is not authorised under Part 3 of the Western Sydney Airport Plan and because the development cost exceeds $25 Million.

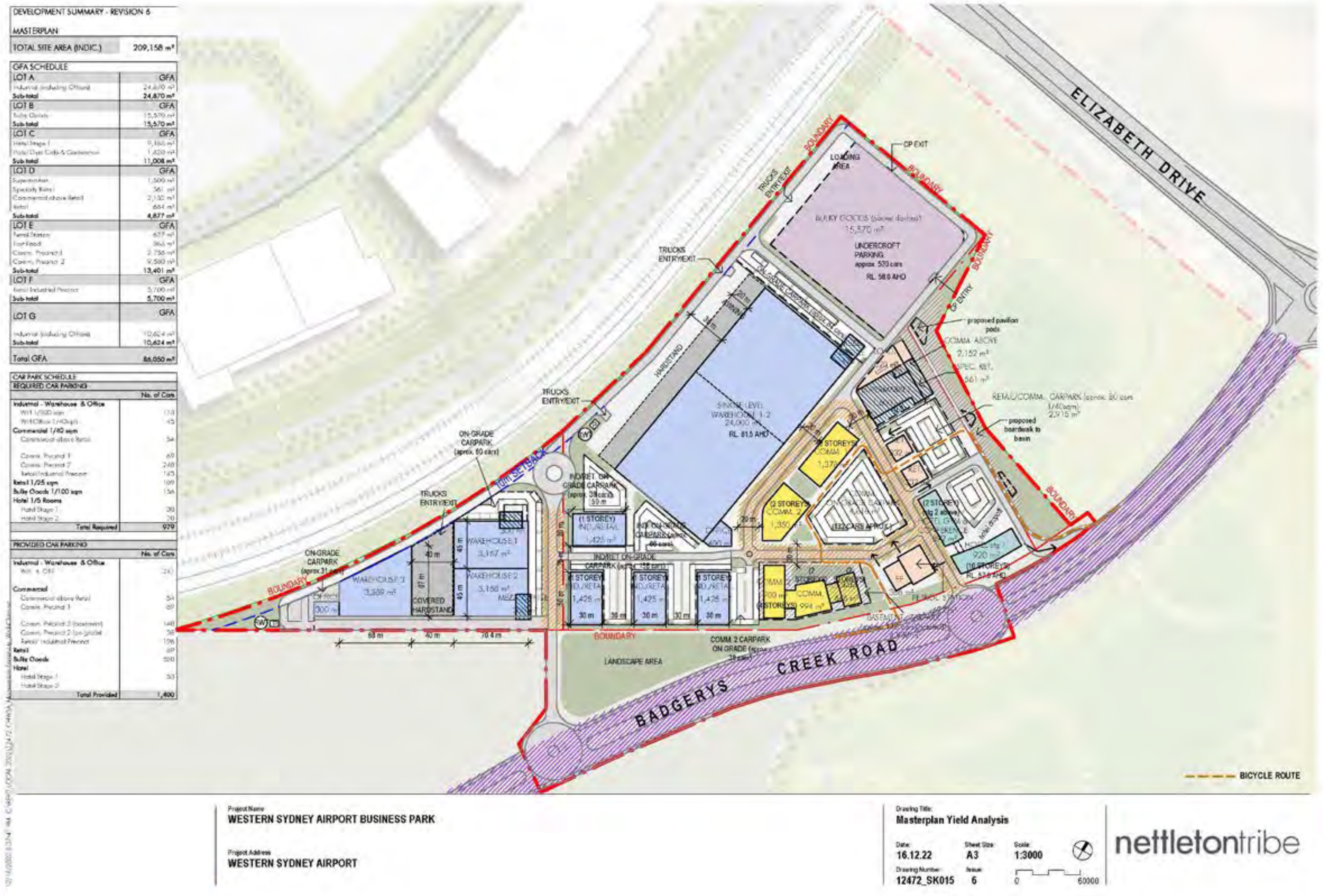
Section 91 of *Airports Act 1996* - Requirements		**Relevance to the BPSO MDP**
1A	The purpose of a major development plan in relation to an airport is to establish the details of a major airport development that:	
	a) relates to the airport; and	Section 1, 2 and 3
	b) is consistent with the airport lease for the airport and the final Master Plan for the airport.	Section 2.2 and 9 (relates to Airport Plan)
1	A major development plan, or a draft of such a plan, must set out:	
	a) the airport lessee company's objectives for the development; and	Section 3.3
	b) future needs of civil aviation users of the airport, and other users of the airport, will be met by the development; and	Section 3
	c) a detailed outline of the development; and	Section 4
	ca) whether or not the development is consistent with the airport lease for the airport; and	Section 2.3
	d) if a final Master Plan for the airport is in force, whether or not the development is consistent with the final Master Plan; and	Section 2.2 and 9 (relates to Airport Plan)
	e) if the development could affect noise exposure levels at the airport, the effect that the development would be likely to have on those levels; and	Sections 6 and 8.4
	ea) if the development could affect flight paths at the airport, the effect that the development would be likely to have on those flight paths; and	Sections 6
	f) the airport lessee company's plans developed following consultations with the airlines that use the airport, local government bodies in the vicinity of the airport and – if the airport is a joint user airport – the Defence Department for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant Australian noise exposure forecast (ANEF) levels; and	Sections 6
	g) an outline of the approvals that the airport lessee company, or any other person, has sought, is seeking, or proposes to seek under Division 5 or Part 12 in respect of elements of the development; and	Division 5 – Sections 1, 2 and 3 Part 12 – Sections 6

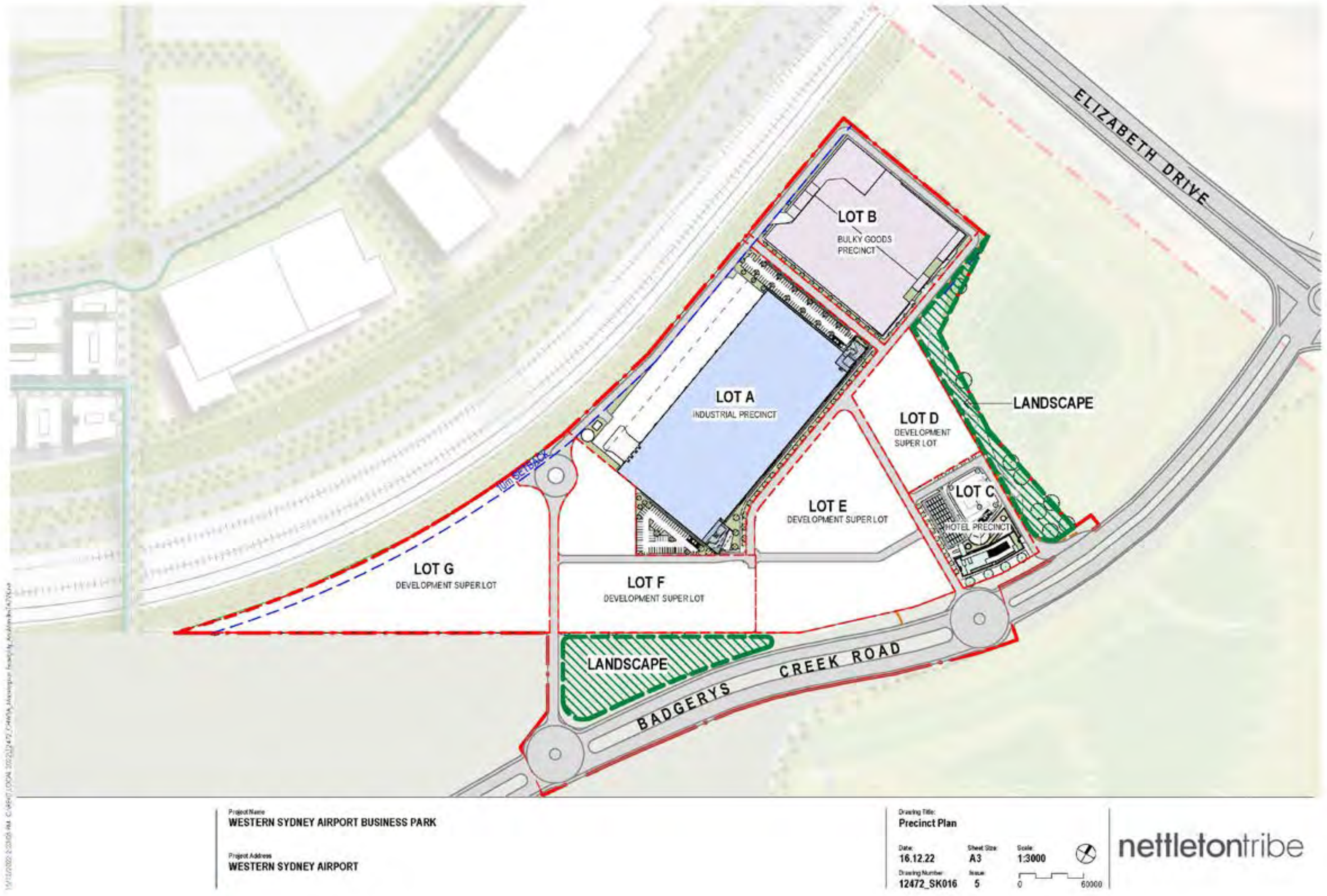
Section 91 of *Airports Act 1996* - Requirements		Relevance to the BPSO MDP
1	ga) the likely effect of the proposed developments that are set out in the major development plan, or the draft of the major development plan, on:	
	i) traffic flows at the airport and surrounding the airport; and	Section 7
	ii) employment levels at the airport; and	See Section 3.2
	iii) the local and regional economy and community, including an analysis of how the proposed developments fit within the local planning schemes for commercial and retail development in the adjacent area; and	See Sections 3.2 and 10
	h) the airport lessee company's assessment of the environmental impacts that might reasonably be expected to be associated with the development; and	Section 8
	j) the airport lessee company's plans for dealing with the environmental impacts mentioned in paragraph (h) (including plans for ameliorating or preventing environmental impacts); and	Section 8
	k) if the plan relates to a sensitive development, the exceptional circumstances that the airport lessee company claims will justify the development of the sensitive development at the airport; and	Not applicable Should a child care centre be considered on subsequent super-lot sites, consideration will be given whether such a use triggers 'sensitive development'
	l) such other matters (if any) as are specified in the regulations.	None
2	Paragraphs (1) (a) to (k) (inclusive) do not, by implication, limit paragraph (1) (l).	Noted
3	The regulations may provide that, in specifying a particular objective, assessment, outline or other matter covered by Subsection (1), a major development plan, or a draft of such a plan, must address such things as are specified in the regulations.	Noted
4	In specifying a particular objective or proposal covered by paragraph (1) (a), (c) or (ga), a major development plan, or a draft of a major development plan, must address: a) the extent (if any) of consistency with planning schemes in force under a law of the state in which the airport is located; and b) if the major development plan is not consistent with those planning schemes, the justification for the inconsistencies.	Section 10 Not applicable
5	Subsection (4) does not, by implication, limit Subsection (3).	Noted
6	In developing plans referred to in Paragraph (l)(f), an airport lessee company must have regard to *Australian Standard AS 2021-2000 (Acoustics – Aircraft noise intrusion – Building Siting and Construction)* as in force or existing at that time.	Section 6 and 8.4
7	Subsection (6) does not, by implication, limit the matters to which regard may be had.	Noted

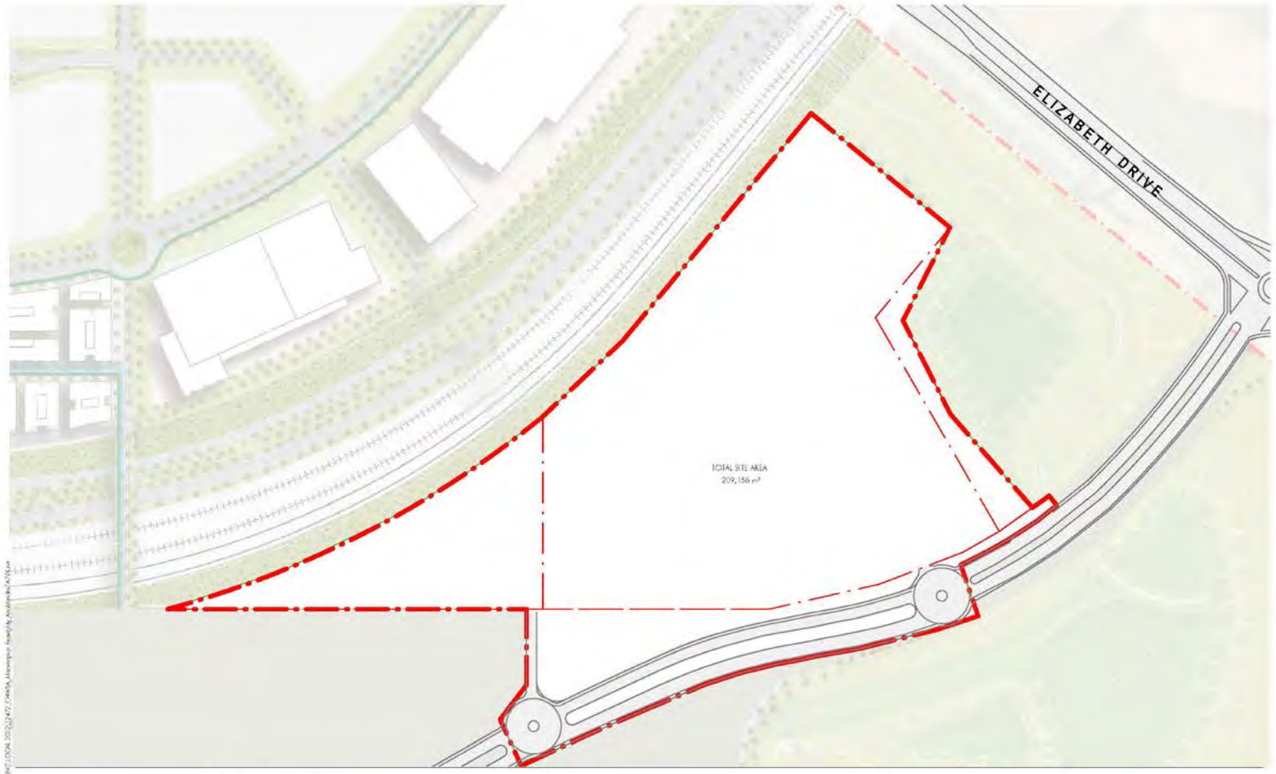
Major Airport Development triggers (Section 89(1) of the *Airports Act 1996*		BPSO MDP Elements
(a)	Constructing a new runway	Not applicable
(b)	Extending the length of a runway	Not applicable
(ba)	Altering a runway (other than in the course of maintenance works) in any way that significantly changes: i. flight paths; or ii. the patterns or levels of aircraft noise	Not applicable
(c)	Constructing a new building wholly or principally for use as a passenger terminal, where the building's gross floor space is greater than 500 square metres	Not applicable
(d)	Extending a building that is wholly or principally for use as a passenger terminal, where the extension increases the building's gross floor space by more than 10%	Not applicable
(e)	Constructing a new building, where: i. the building is not wholly or principally for use as a passenger terminal; and ii. the cost of construction exceeds $25 million or such higher amount as is prescribed	Yes – the development costs for the BPSO Site Works, Warehouse, Bulky Goods Development and Hotel is approximately $120 million (see Section 3.2)
(f)	Constructing a new taxiway, where: i. the construction significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft; and ii. the cost of construction exceeds $20 million or such higher amount as is prescribed	Not applicable
(g)	Extending a taxiway, where: i. the extension significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft; and ii. the cost of construction exceeds $20 million or such higher amount as is prescribed	Not applicable
(h)	Constructing a new road or new vehicular access facility, where: i. the construction significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft; and ii. the cost of construction exceeds $20 million or such higher amount as is prescribed	Not applicable
(j)	Extending a road or vehicular access facility, where: i. the extension significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft; and ii. the cost of construction exceeds $20 million or such higher amount as is prescribed	Not applicable
(k)	Constructing a new railway or new rail handling facility, where: i. the construction significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft ii. the cost of construction exceeds $20 million or such higher amount as is prescribed	Not applicable
(l)	Extending a railway or rail handling facility, where: i. the extension significantly increases the capacity of the airport to handle movements of passengers, freight or aircraft; and ii. the cost of construction exceeds $20 million or such higher amount as is prescribed	Not applicable
(m)	A development of a kind that is likely to have significant environmental or ecological impact	The Project will not likely have any significant environmental or ecological impact
(n)	A development which affects an area identified as environmentally significant in the environment strategy	The Project is not located within an area which is identified as environmentally significant
(na)	A development of a kind that is likely to have a significant impact on the local or regional community	The Project is likely to have a positive impact on the local and regional community, providing jobs and additional services.
(nb)	A development in relation to which the Minister has given an approval under section 89A	Not applicable
(o)	A development of a kind specified in the regulations	Not applicable

Appendix B

Precinct concept plans







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WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

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Site Area PLan

Date: 16.12.22 | Sheet Size: A3 | Scale: 1:3000
Drawing Number: 12472_SK017 | Issue: 4

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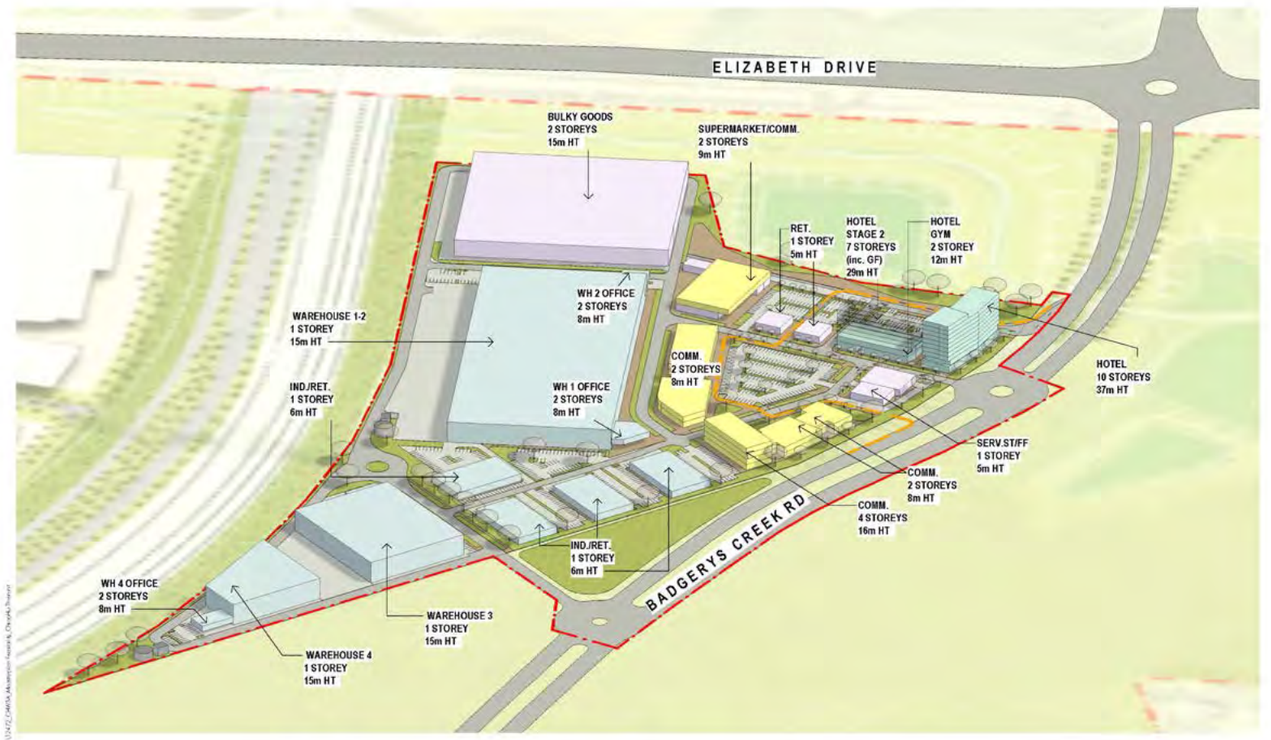

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WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

Drawing Title:
Masterplan 3D 2

Date: 16.12.22 | Sheet Size: A3 | Scale: 1:3000
Drawing Number: 12472_SK019 | Issue: 3

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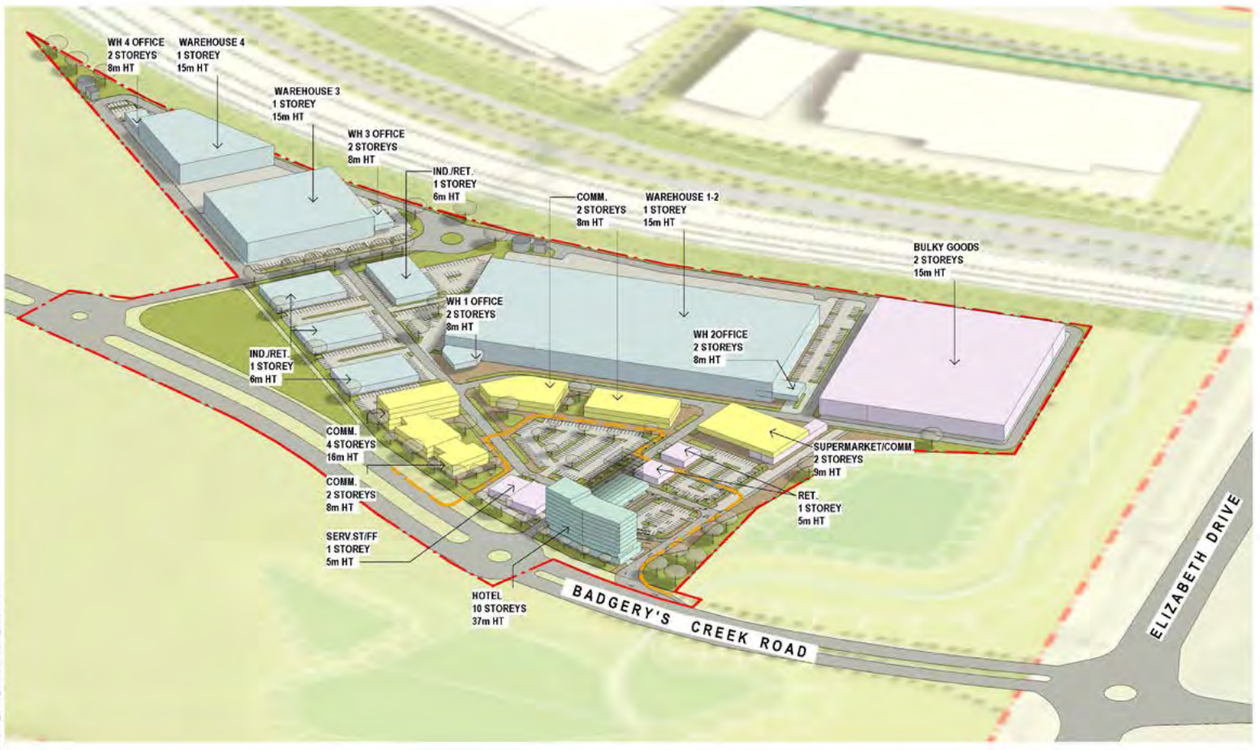

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

Drawing Title:
Masterplan 3D

Date: 16.12.22 | Sheet Size: A3 | Scale: 1:3000
Drawing Number: 12472_SK018 | Issue: 3

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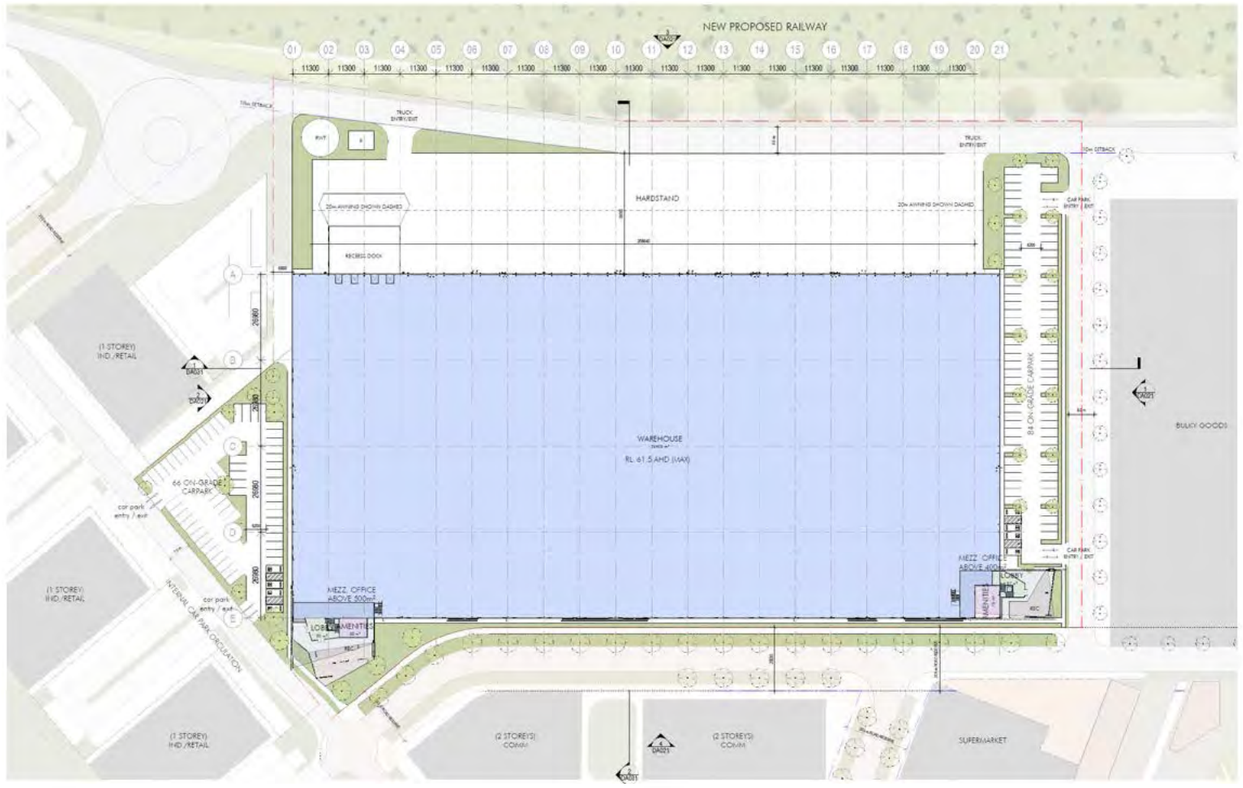
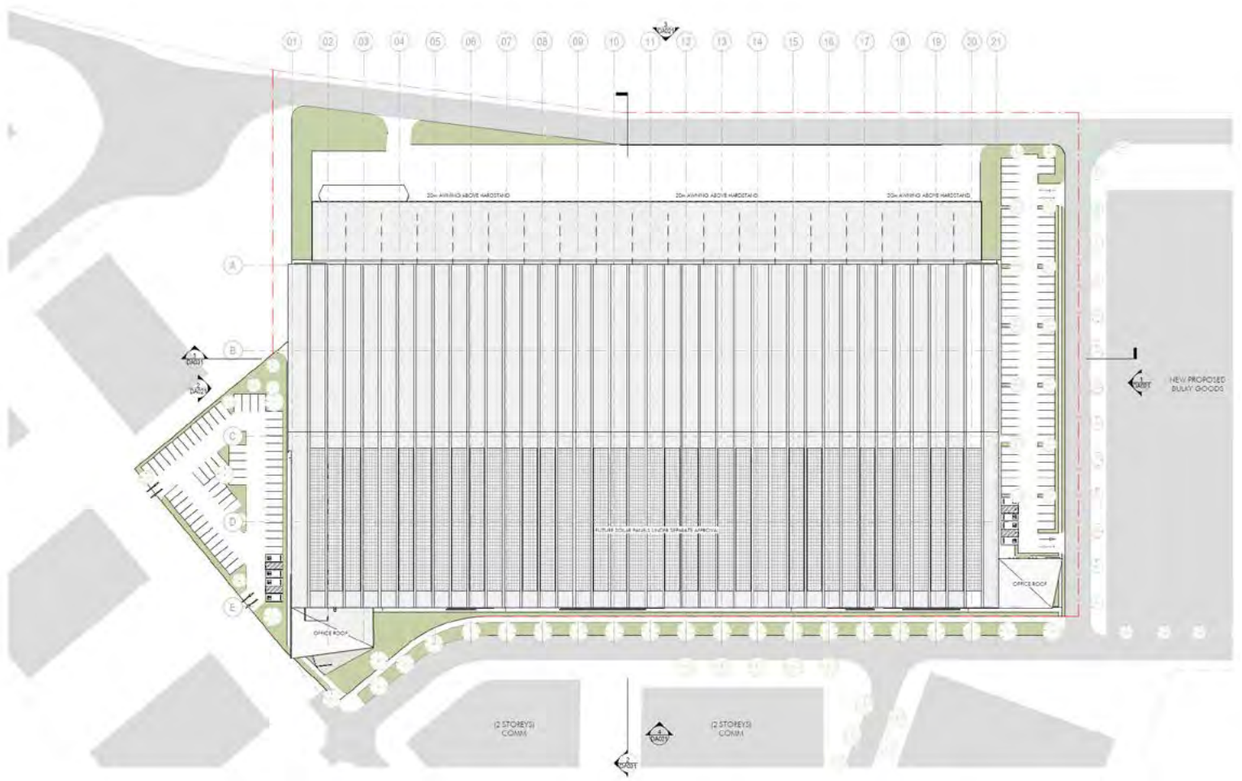
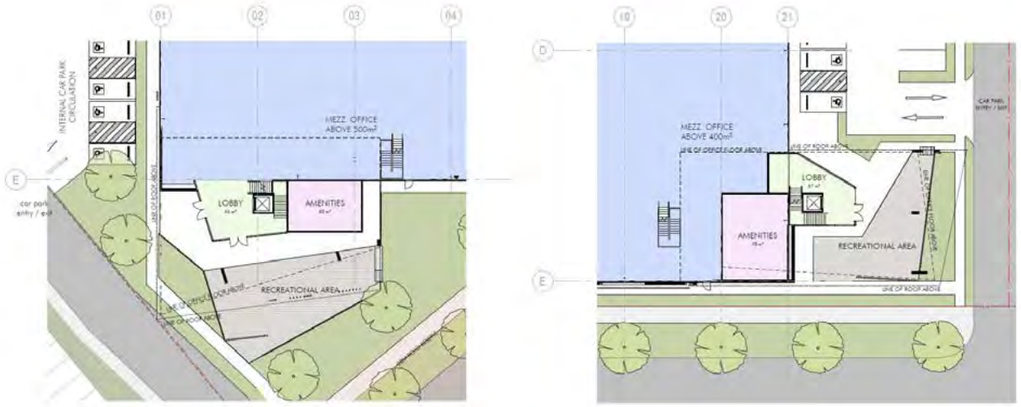
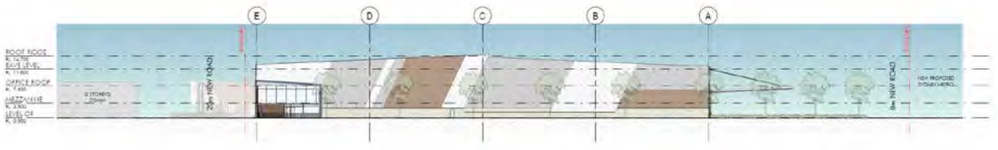
Appendix C

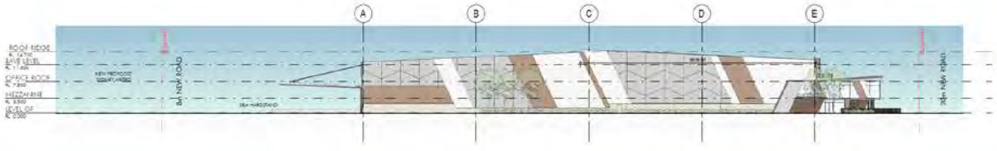
Architectural plans





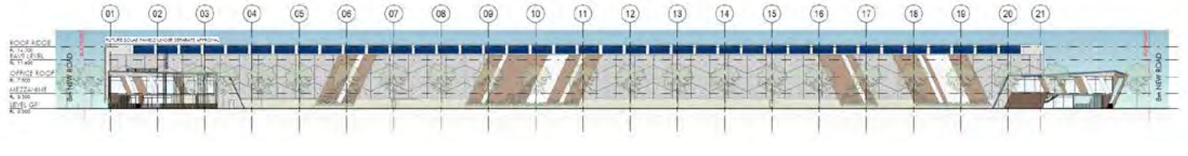


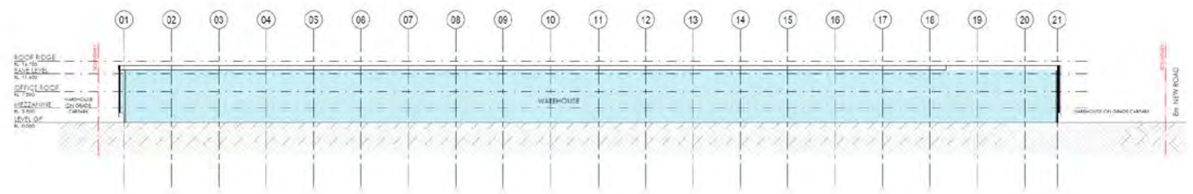


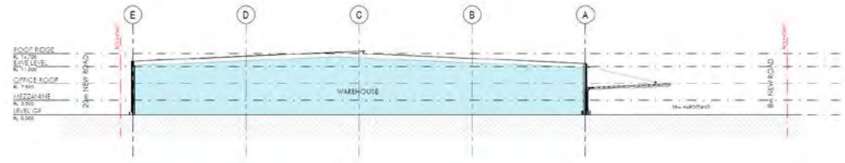


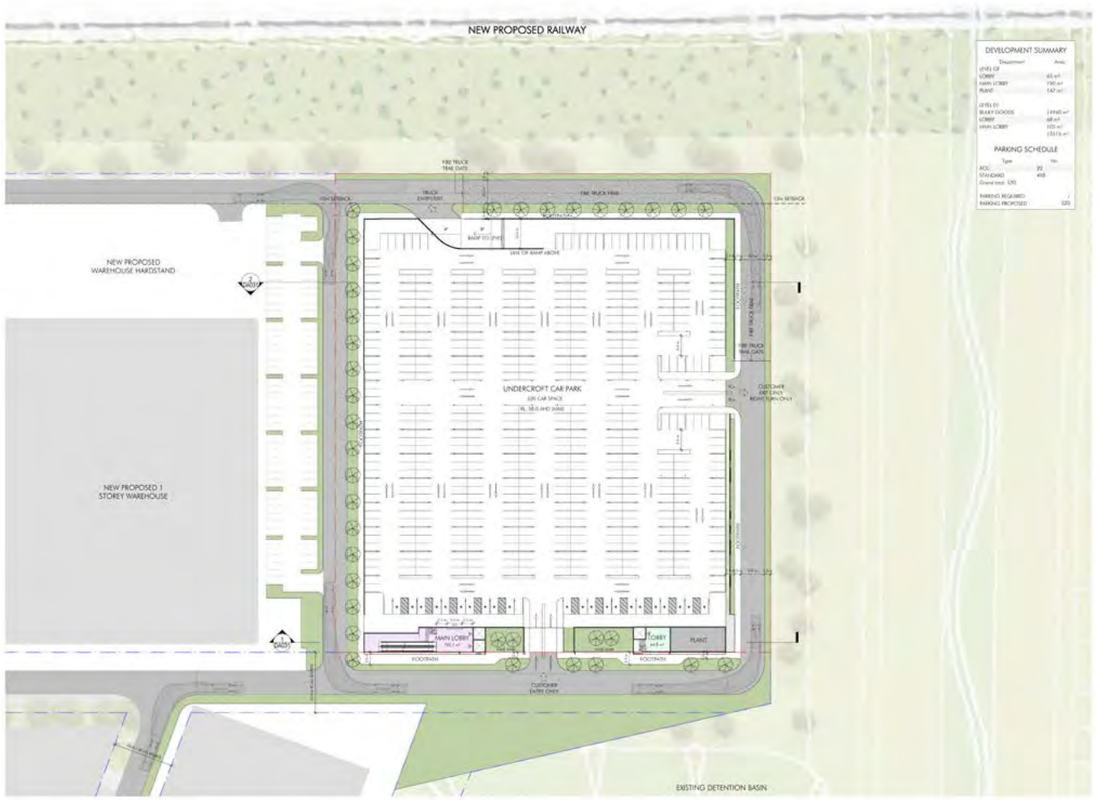
EXTERNAL FINISHES SCHEDULE

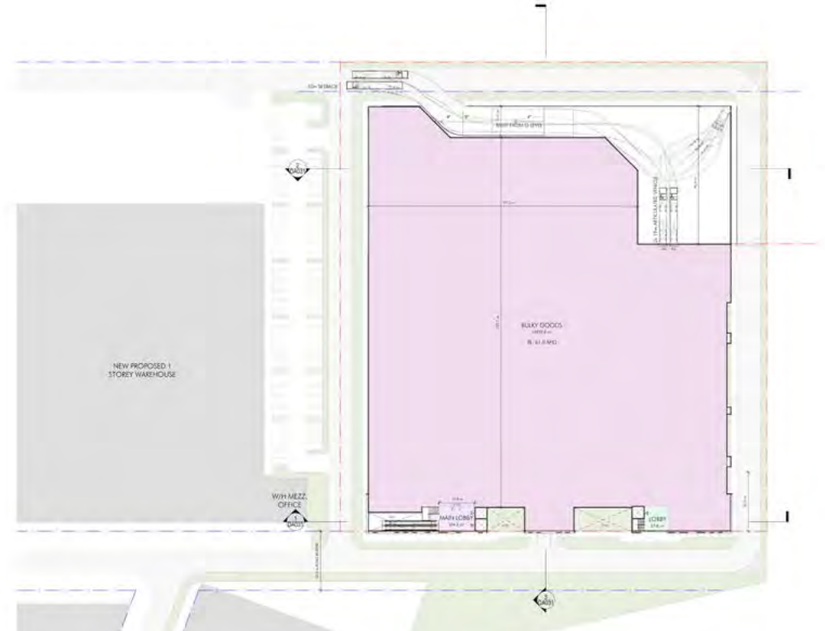
1. Matte Cladding - Light Grey
2. Matte Cladding - Light Brown
3. Dampalon
4. Concrete with Beige Undertone White
5. Steel Powdercoated
6. Bricks - Grey
7. Bricks - Brown
8. Aluminium Screen - Natural Timber Look Batten
9. Fence - Natural Timber Look Batten
10. Black Powdercoated Mullion
11. Clear Vision Glazing - Grey
12. Sunshade Panel - Light Grey
13. Sunshade Panel - Dampalon in Powdercoated Aluminium Frame
14. Roller Shutter Door
15. Colorbond Roof Sheeting - White
16. Skylight
17. Green Wall
18. Solar PV Panel (Under Separate Approval)









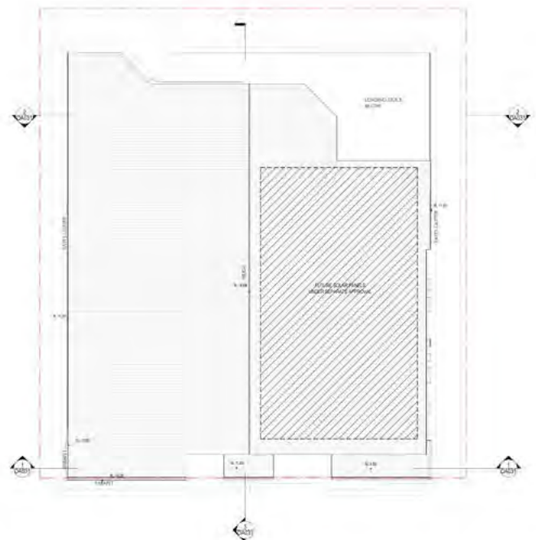


DEVELOPMENT SUMMARY

Department	Area
LEVEL 00	
LOBBY	65 m²
MAIN LOBBY	190 m²
PLANT	147 m²
LEVEL 01	
BULKY GOODS	14948 m²
LOBBY	68 m²
MAIN LOBBY	500 m²
	15415 m²

PARKING SCHEDULE

Type	No.
ACC.	22
STANDARD	448
Grand total: 570	
PARKING REQUIRED	/
PARKING PROPOSED	570



ROOF RIDGE

Western Sydney Airport
Charter Hall

Rev	Description	Date
A	FOR INFORMATION	08.10.21
B	DRAFT DA	08.11.21
C	ISSUED FOR DEVELOPMENT APPLICATION	09.12.21

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
GROUND FLOOR PLAN - LOT B

Drawn	Checked	Size	Scale
CR	CHT	A1	1:500

Drawing Number: **12472_B_DA011** Rev: **3**

Drawing Title
LEVEL 1 PLAN - LOT B

Drawn	Checked	Size	Scale
CR	CHT	A1	1:500

Drawing Number: **12472_B_DA012** Rev: **3**

Drawing Title
ROOF PLAN - LOT B

Drawn	Checked	Size	Scale
CR	CHT	A1	1:500

Drawing Number: **12472_B_DA013** Rev: **1**

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e. sydney@nettletontribe.com.au e. nettletontribe.com.au

EXTERNAL FINISHES SCHEDULE

1. Profiled Metal Sheeting - Colorbond Dune
2. Profiled Metal Sheeting - Colorbond Monument
3. Profiled Metal Sheeting - Colorbond Southerly
4. Perforated Brick Screen
5. Perforated Corten Look Aluminium Screen
6. Clear Vision Glazing - Grey

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
ELEVATIONS - LOT B
Author: CR | Checker: CHT | Sheet Size: A1 | Scale: 1:250
Drawing Number: **12472_B_DA021** | Issue: **2**

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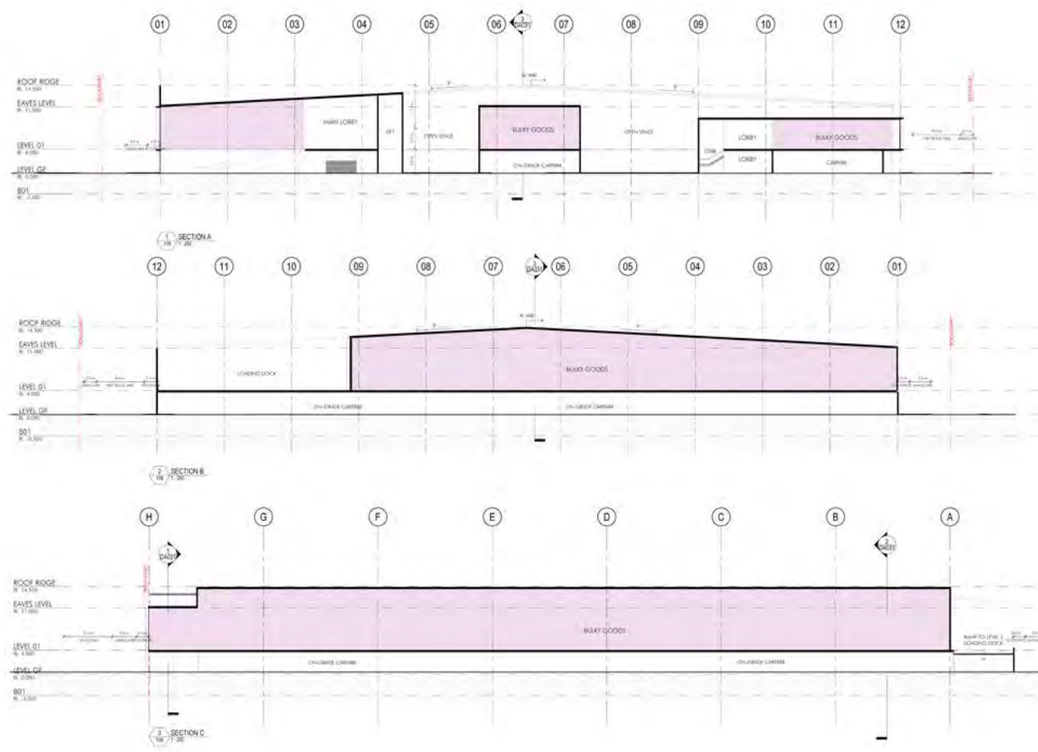
NORTH WEST VIEW



Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
SECTIONS - LOT B
Author: CR | Checker: CHT | Sheet Size: A1 | Scale: 1:250
Drawing Number: **12472_B_DA031** | Issue: **2**

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SOUTH EAST VIEW

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
PRESPECTIVES - LOT B - SHEET 1
Author: CR | Checker: CHT | Sheet Size: A1 | Scale: N/A
Drawing Number: **12472_B_DA041** | Issue: **1**

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Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
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Drawing Number: **12472_B_DA042** | Issue: **1**

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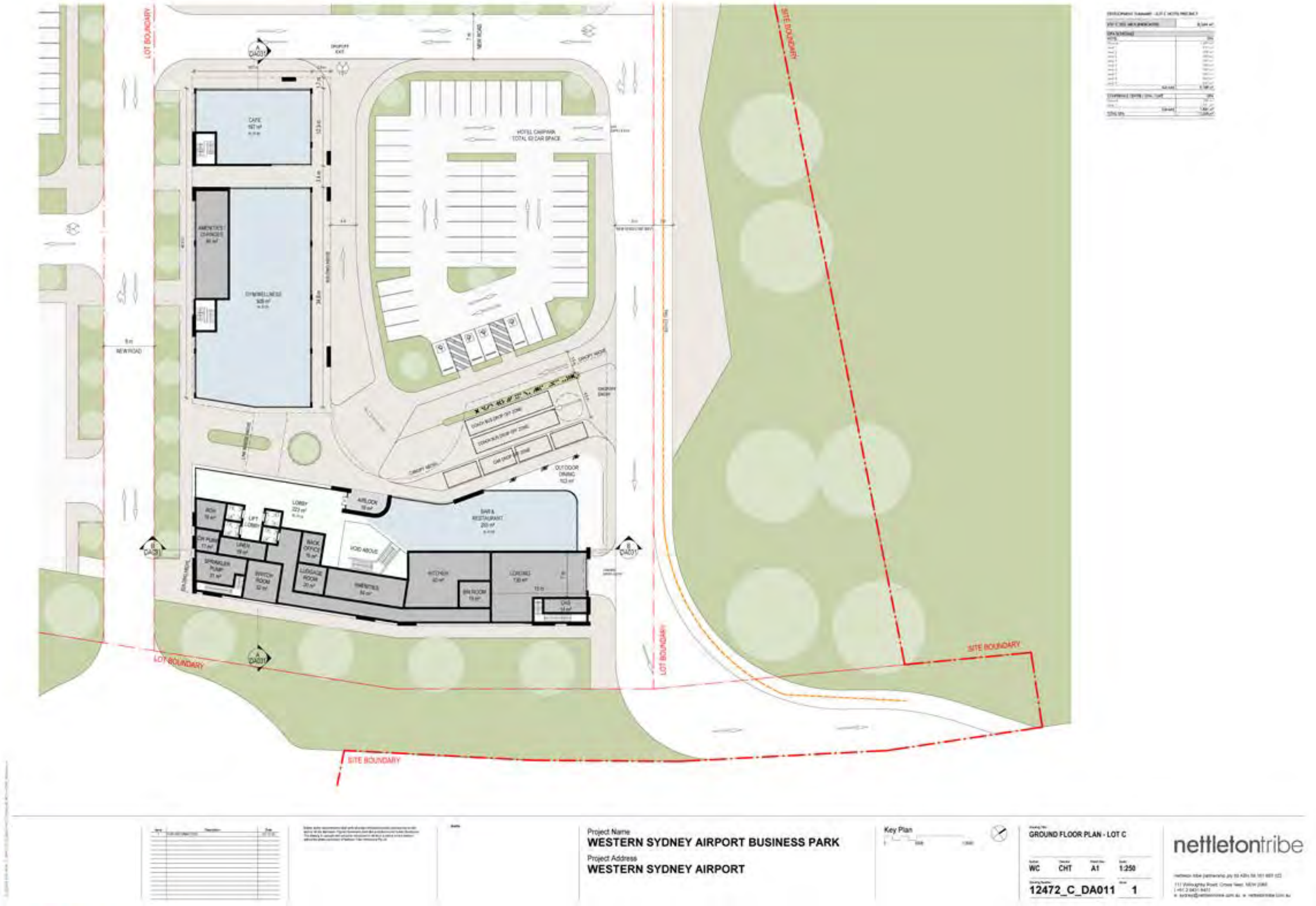

LOT BOUNDARY
SITE BOUNDARY
Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT
Key Plan
GROUND FLOOR PLAN - LOT C
WC
CHT
A1
1:250
12472_C_DA011
1
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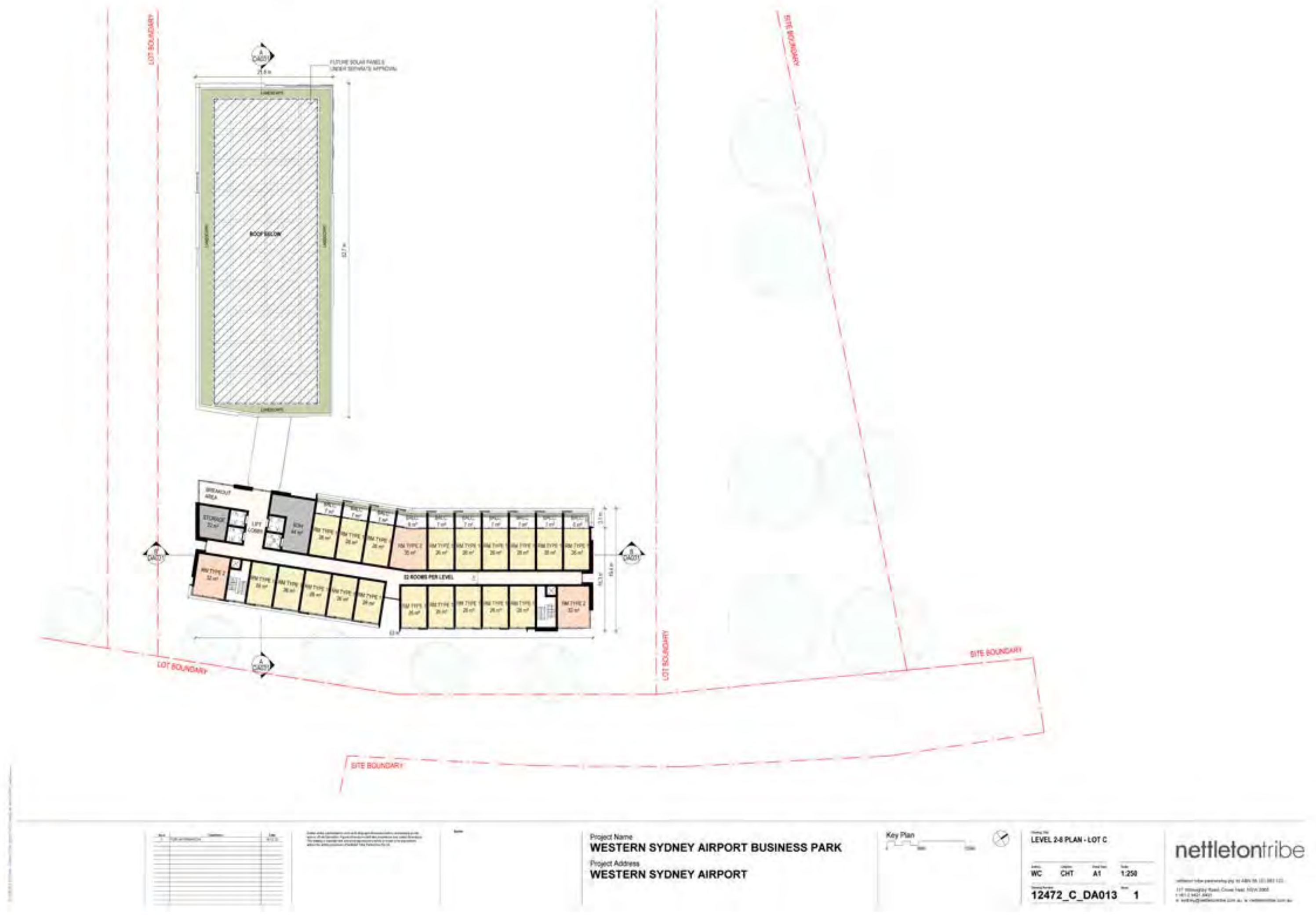

LOT BOUNDARY
SITE BOUNDARY
Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT
Key Plan
LEVEL 2-8 PLAN - LOT C
WC
CHT
A1
1:250
12472_C_DA013
1
nettletontribe

LOT BOUNDARY
SITE BOUNDARY
Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT
Key Plan
LEVEL 1 PLAN - LOT C
WC
CHT
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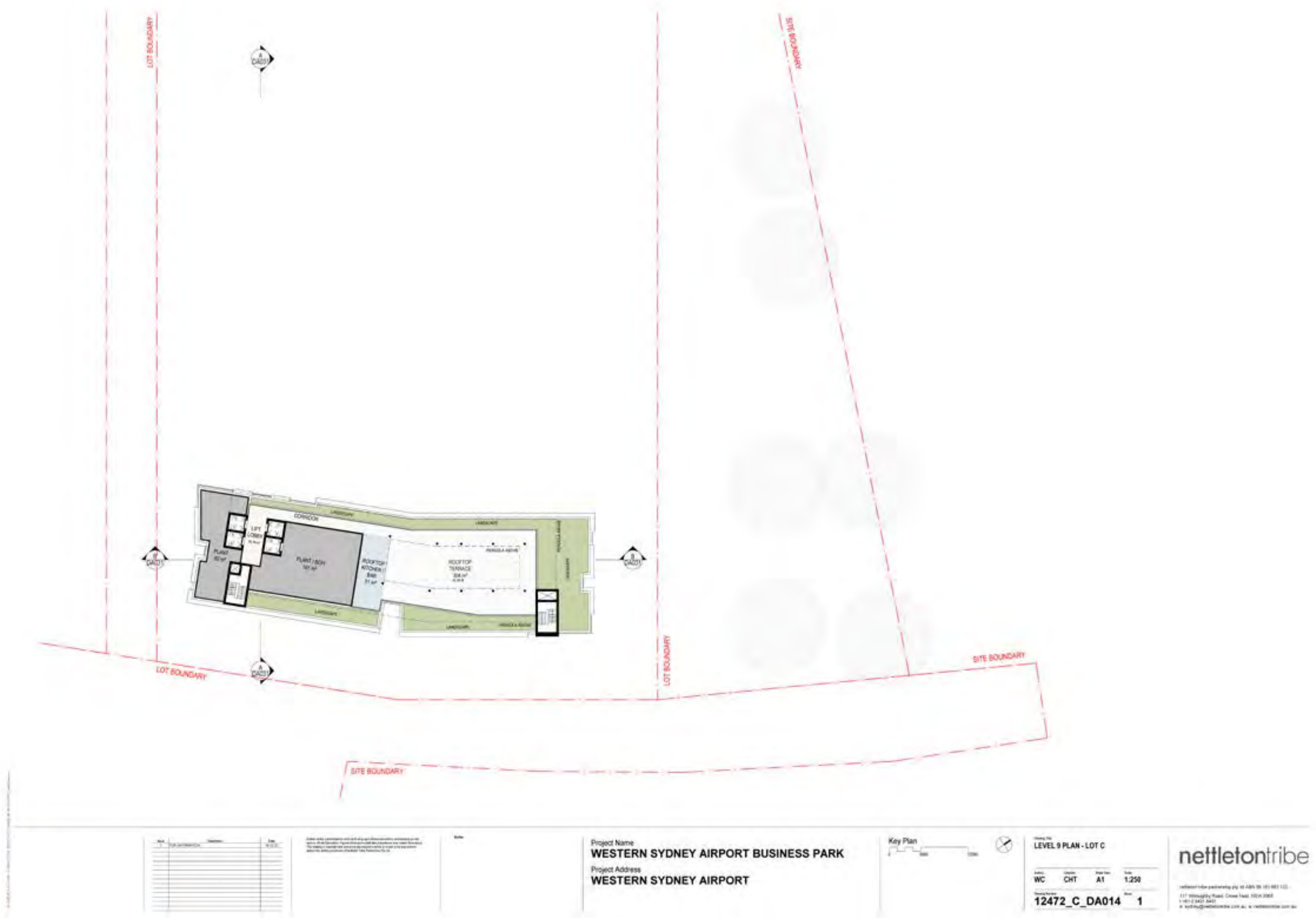

LOT BOUNDARY
SITE BOUNDARY
Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK
Project Address
WESTERN SYDNEY AIRPORT
Key Plan
LEVEL 9 PLAN - LOT C
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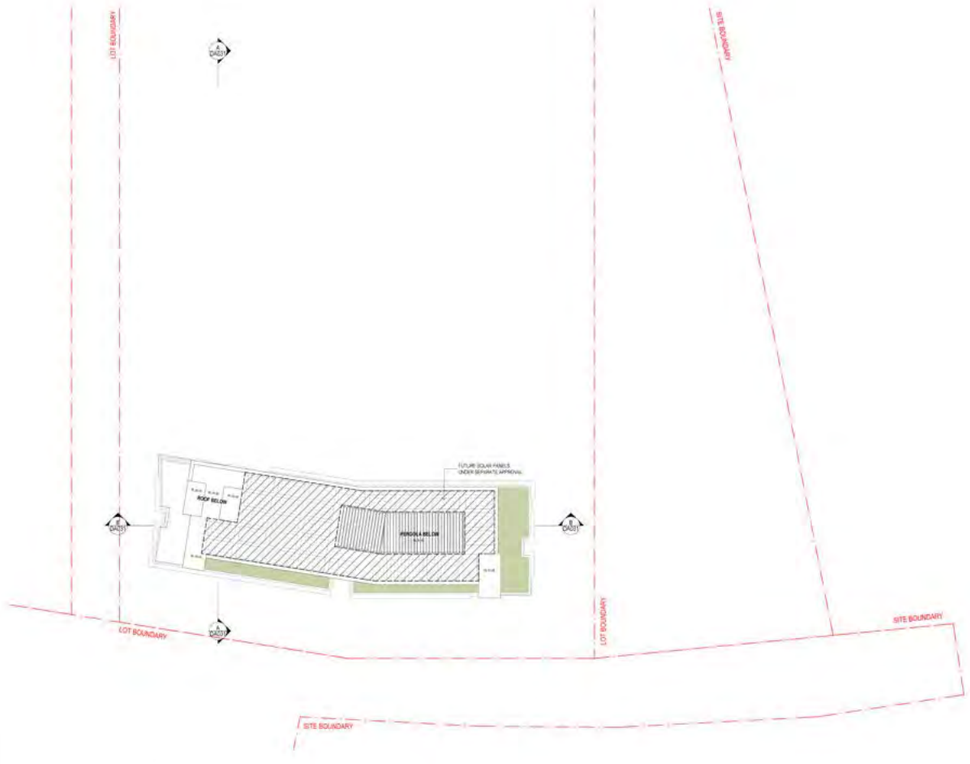

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Project Address	WESTERN SYDNEY AIRPORT		
Drawing No.	ROOF PLAN - LOT C		
Author	WC	Checker	CHT
Sheet Size	A1	Scale	1:250
Drawing Number	12472_C_DA015	Issue	1

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1 EAST ELEVATION
1 : 250

2 WEST ELEVATION
1 : 250

EXTERNAL FINISHES SCHEDULE

1. Stone Cladding - Beige
2. Stone Cladding - Grey
3. FC Cladding - Dark
4. Dark Painted Wall
5. Powdercoated Dark Frame / Column
6. Dark Powdercoated Screen
7. Powdercoated Brass Column
8. Clear Vision Glazing - Light Grey
9. Clear Vision Glazing - Dark Grey
10. Roller Shutter Door
11. Dark Mechanical Louvres

Project Name	WESTERN SYDNEY AIRPORT BUSINESS PARK	Key Plan	
Project Address	WESTERN SYDNEY AIRPORT		
Drawing No.	ELEVATIONS - LOT C - SHEET 2		
Author	WC	Checker	CHT
Sheet Size	A1	Scale	1:250
Drawing Number	12472_C_DA022	Issue	1

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1 NORTH ELEVATION
1 : 250

EXTERNAL FINISHES SCHEDULE

1. Stone Cladding - Beige
2. Stone Cladding - Grey
3. FC Cladding - Dark
4. Dark Painted Wall
5. Powdercoated Dark Frame / Column
6. Dark Powdercoated Screen
7. Powdercoated Brass Column
8. Clear Vision Glazing - Light Grey
9. Clear Vision Glazing - Dark Grey
10. Roller Shutter Door
11. Dark Mechanical Louvres

2 SOUTH ELEVATION
1 : 250

Project Name	WESTERN SYDNEY AIRPORT BUSINESS PARK	Key Plan	
Project Address	WESTERN SYDNEY AIRPORT		
Drawing No.	ELEVATIONS - LOT C - SHEET 1		
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Sheet Size	A1	Scale	1:250
Drawing Number	12472_C_DA021	Issue	1

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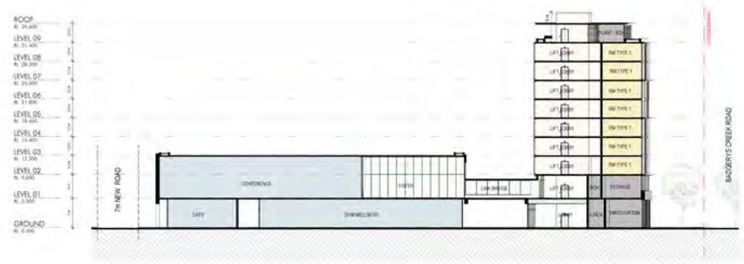

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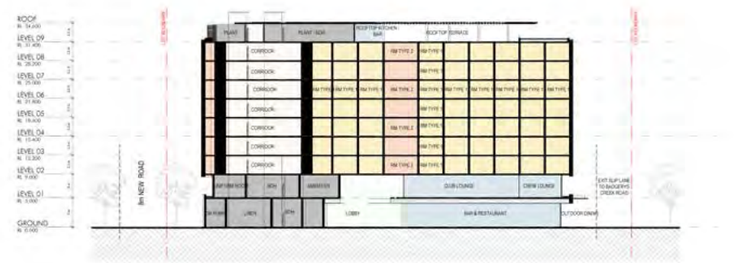

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Project Name	WESTERN SYDNEY AIRPORT BUSINESS PARK	Key Plan	
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Drawing No.	SECTIONS - LOT C		
Author	WC	Checker	CHT
Sheet Size	A1	Scale	1:250
Drawing Number	12472_C_DA031	Issue	1

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No.	Revision	Date
A	FOR ARCHITECTS	30.10.20

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
PRESPECTIVES - LOT C - SHEET 1

Scale	Drawn	Sheet Size	Task
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Drawing Number: **12472_C_DA041** Issue: **1**

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No.	Revision	Date
A	FOR ARCHITECTS	30.10.20

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
PRESPECTIVES - LOT C - SHEET 3

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Drawing Number: **12472_C_DA043** Issue: **1**

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No.	Revision	Date
A	FOR ARCHITECTS	30.10.20

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
PRESPECTIVES - LOT C - SHEET 2

Scale	Drawn	Sheet Size	Task
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Drawing Number: **12472_C_DA042** Issue: **1**

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No.	Revision	Date
A	FOR ARCHITECTS	30.10.20

Project Name
WESTERN SYDNEY AIRPORT BUSINESS PARK

Project Address
WESTERN SYDNEY AIRPORT

Key Plan

Drawing Title
PRESPECTIVES - LOT C - SHEET 4

Scale	Drawn	Sheet Size	Task
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Drawing Number: **12472_C_DA044** Issue: **1**

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Appendix D

Aviation assessment

Prepared for
Western Sydney Airport
ABN: 81618989272

AECOM

Western Sydney Airport BPSO MDP

Aviation Assessment

21-Dec-2022

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Western Sydney Airport BPSO MDP

Aviation Assessment

Client: Western Sydney Airport

ABN: 81618989272

Prepared by

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21-Dec-2022

AECOM Western Sydney Airport BPSO MDP – Aviation Assessment

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1.0 Introduction

This report provides a summary of the aviation considerations and related constraints for the Western Sydney Airport Business Park Stage One (BPSO) Major Development Plan (MDP).

The Western Sydney Airport – Airport Plan (Airport Plan) was originally prepared in 2016 to provide the authorisation for Stage 1 design and development of Western Sydney International Airport. There have been subsequent variations to the Airport Plan in 2020 and 2021.

The BPSO must take into consideration the potential impacts that any development of sites will pose on future aviation operations at Western Sydney Airport. This is for both the first stage of the Western Sydney Airport opening with a single runway, and at its ultimate capacity with dual parallel runways. Such considerations include building height limitations (OLS), navigational aids, noise, public safety risk, ground lighting, bird hazard management, and reflectivity and glare.

International regulatory requirements are currently implemented by the *Commonwealth Airports (Protection of Airspace) Regulations 1996* (Airspace Protection Regulations), *Civil Aviation Safety Regulations 1998*, the *Civil Aviation (Building Control) Regulations 1988* and the *Civil Aviation Safety Authority's Manual of Standards Part 139*.

In addition, airport safeguarding and amenity mechanisms have been incorporated into NSW State Environmental Planning Policy through the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*.

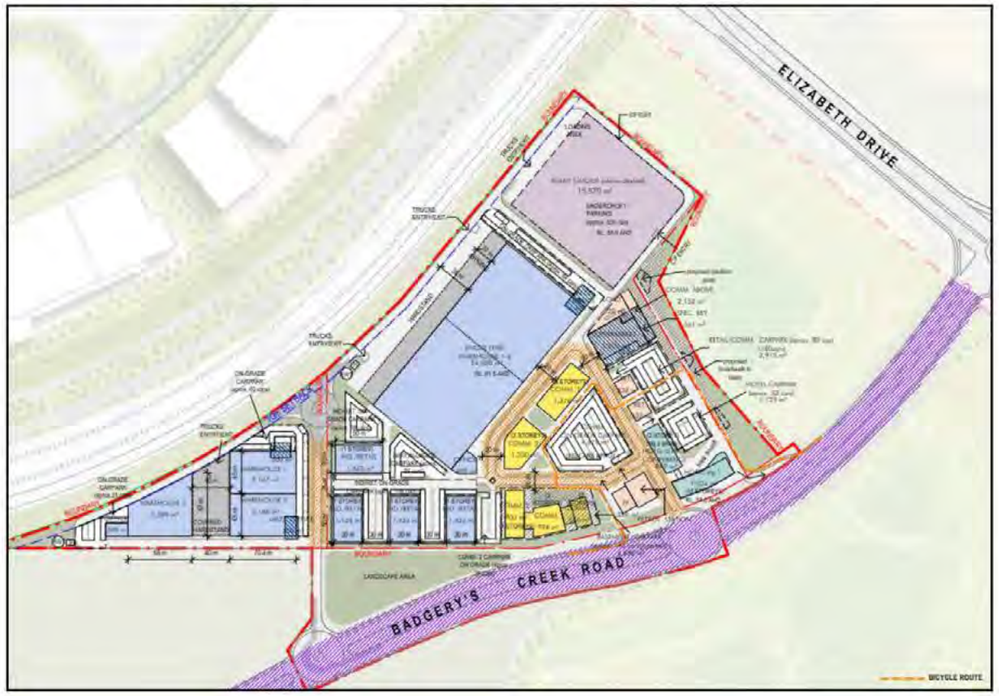
Guidance is also provided by the National Airports Safeguarding Advisory Group (NASAG) in the National Airports Safeguarding Framework (NASF).

Aside from the modelling of potential windshear and turbulence, which is being addressed separately, each of the NASF guidelines and how they apply to the proposed development has been addressed in this report.

2.0 BPSO Concept Plan

The aviation assessment is based on the following Concept Plan prepared to inform the development of the BPSO (see Figure 1, below).

Figure 1 BPSO Concept Plan



The BPSO MDP is a 'precinct based' MDP which includes the following elements of the Concept Plan:

- New road connections to Badgerys Creek Road
- Construction of an internal road network
- Site works and stormwater connections
- Formation of super lots, indicative land uses, building envelopes and heights for the proposed super lots
- Construction of a 24,000 square metre warehouse and associated offices formed of two tenancies
- Construction of a 10 level, 154 room hotel and two-storey gym café and conference facility and associated shared car park
- Construction of a 16,800 square metres bulky goods building with undercroft car parking area
- Landscape concept

3.0 National Airports Safeguarding Framework

The National Airports Safeguarding Advisory Group (NASAG), consisting of representatives from the Commonwealth, State and Territory Governments, and the Australian Local Government Association, has produced the National Airports Safeguarding Framework (NASF).

NASF is a national land use planning framework which aims to:

- Improve community amenity by minimising noise sensitive developments near airports, including through the use of additional noise metrics and improved noise-disclosure mechanisms
- Improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted on various safety-related issues.

It applies to all airports in Australia and affects planning and development around airports, including development activity that might penetrate operational airspace and/or affect navigational procedures for aircraft.

The NASF includes nine guidelines for the operation of Airports and related land use planning measures associated with Airports in Australia, as detailed in **Figure 2**.

Figure 2 NASF Guidelines

Guideline A	Guideline B	Guideline C	Guideline D	Guideline E	Guideline F	Guideline G	Guideline H	Guideline I
Managing Impacts of Aircraft Noise	Managing the risk of Building Generated Windshear & Turbulence	Managing the risk of Wildlife Strikes in the vicinity of Airports	Managing the risk of Wind Turbines Farms	Managing the risk of distraction to pilots from Lighting	Managing the risk of intrusions into Prescribed Airspace	Protection of Aviation Facilities – Communications, Navigation & Surveillance	Protecting strategically important Helicopter Landing Sites	Public Safety Areas

An assessment of the proposed development identified in the BPSO MDP against the NASF Guidelines is provided in the following section.

3.1 Guideline A: Aircraft Noise

Aircraft noise can negatively impact on community amenity and may result in constraints on airport operations.

The established Australian Noise Exposure Forecast (ANEF) System and the *Australian Standard AS 2021-2015 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction* (AS2021) are recognised by a number of jurisdictions in their land use planning regimes.

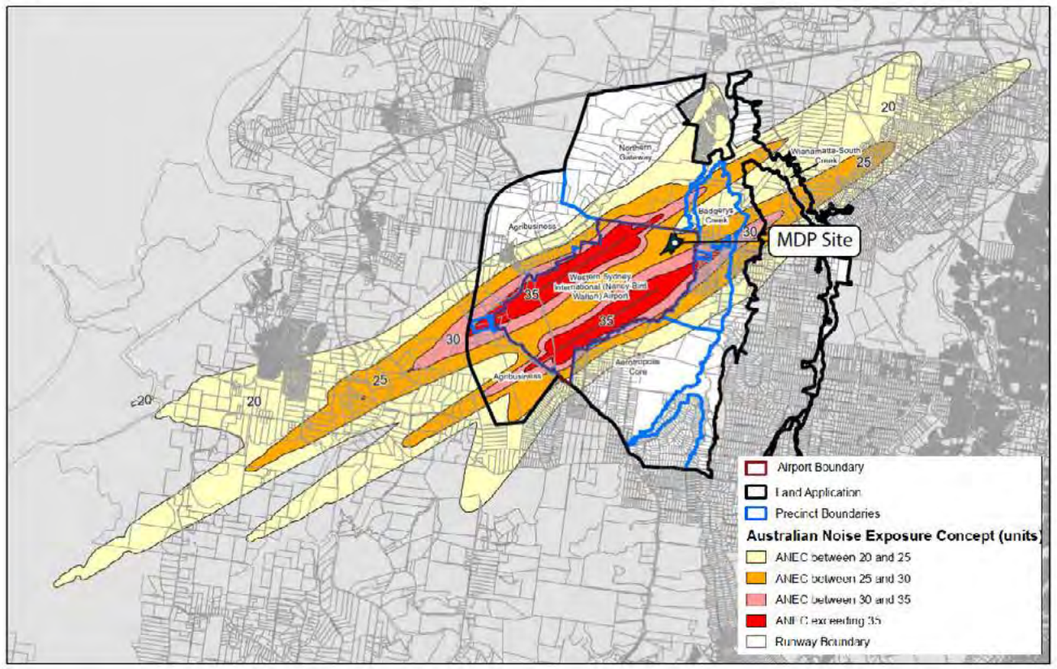
Western Sydney Airport has obtained endorsement for Aircraft Noise Exposure Capacity (ANEC), considering the long term (20 year+) or ultimate capacity of the new Airport – which is used as a land use planning tool to identify areas that are likely to be impacted by future aircraft noise.

The final airspace design is expected to be confirmed by the Australian Government closer to the opening of the airport in 2026.

As described in the SEPP (Western Sydney Aerotropolis) (Part 3 Development Controls – Airport Safeguards – 19 Aircraft noise), development that will impact upon the aviation operations of the Airport will not be supported. New residential and other noise sensitive development will not be located within the ANEC/ANEF 20 and above contours.

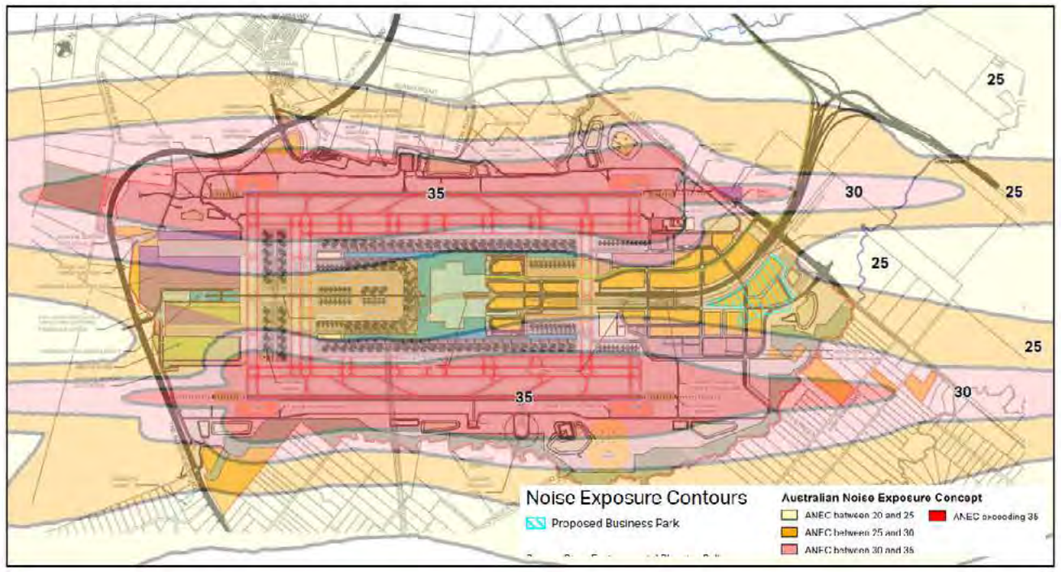
As can be seen in **Figures 3 and 4**, the BPSO is located within the 25 to 30 ANEF noise contour.

Figure 3 ANEF Noise Contours



Source: SEPP (Precincts – Western Parkland City) 2021 Noise Exposure Contour Map (and AECOM – MDP Site Boundary)

Figure 4 ANEF Noise Contours - Enlargement



Source: SEPP (Precincts – Western Parkland City) 2021 Noise Exposure Contour Map (and AECOM – MDP Site Boundary)

Australian Standard AS 2021-2015 "*Acoustics – Aircraft Noise Intrusion – Building Siting and Construction*" governs Australian Noise Exposure Forecast (ANEF) contours as outlined in **Table 1** below.

Building Type	ANEF Zone of Site		
	Acceptable	Conditionally Acceptable	Unacceptable
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF

Table 1 Extract from Australian Standard 2021-2015 Aircraft Noise Intrusion

The MDP site falls within the 25 to 30 ANEF range. Based on Table 1 above, the proposed hotel would be considered conditionally acceptable in relation to the aircraft noise. Under the 'Commercial' and 'Light industrial' building type classifications, the warehouse and bulky goods developments are considered acceptable. However, the office components of these buildings would be considered a 'Commercial building' type and therefore conditionally acceptable.

Further noise assessment and acoustic design treatments are required for the hotel and office components of the warehouse and bulky goods developments at the detailed design phase of the project.

3.2 Guideline B: Building Generated Windshear and Turbulence

Building-induced windshear may adversely impact on aviation operations where structures are situated close to airport runways. Further, discharge from vent stacks can significantly impact aviation operations.

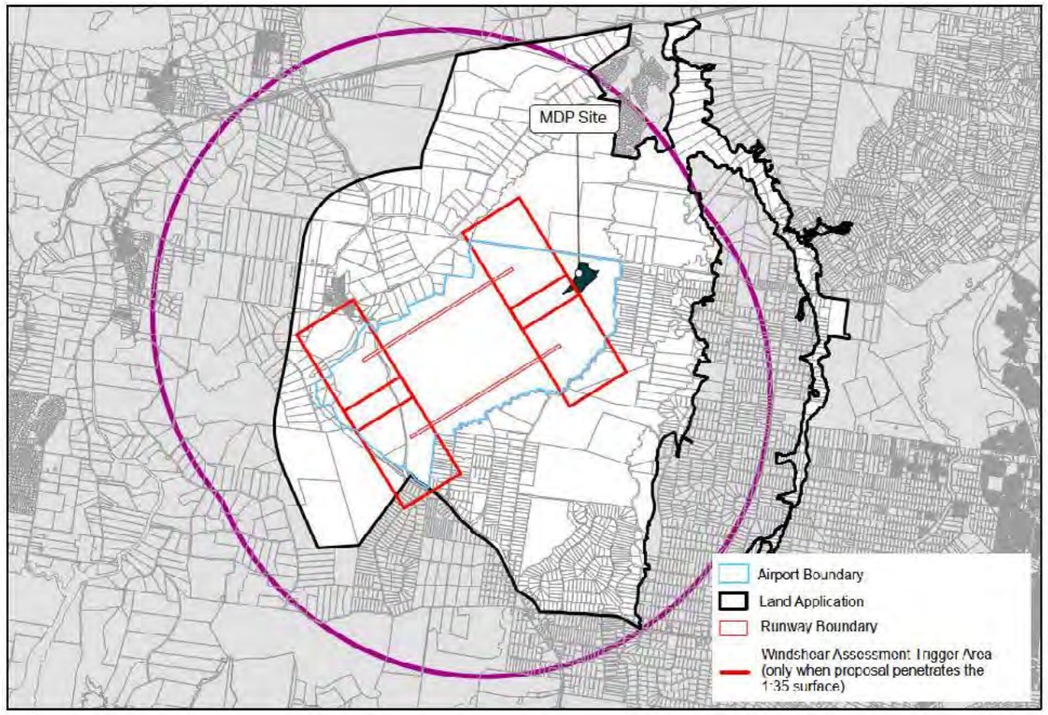
NASF Guideline B presents a layered risk approach to the siting and design of buildings near airport runways to reduce the risk of building-generated windshear and turbulence.

The effects of windshear and turbulence in relation to proposed development within the MDP site have been assessed by ARUP (see report – Attachment A). ARUP have concluded that the proposed warehouse, bulky goods development and hotel would not cause any windshear issues during operation of either Runways 23R or 23L.

The following overview is provided.

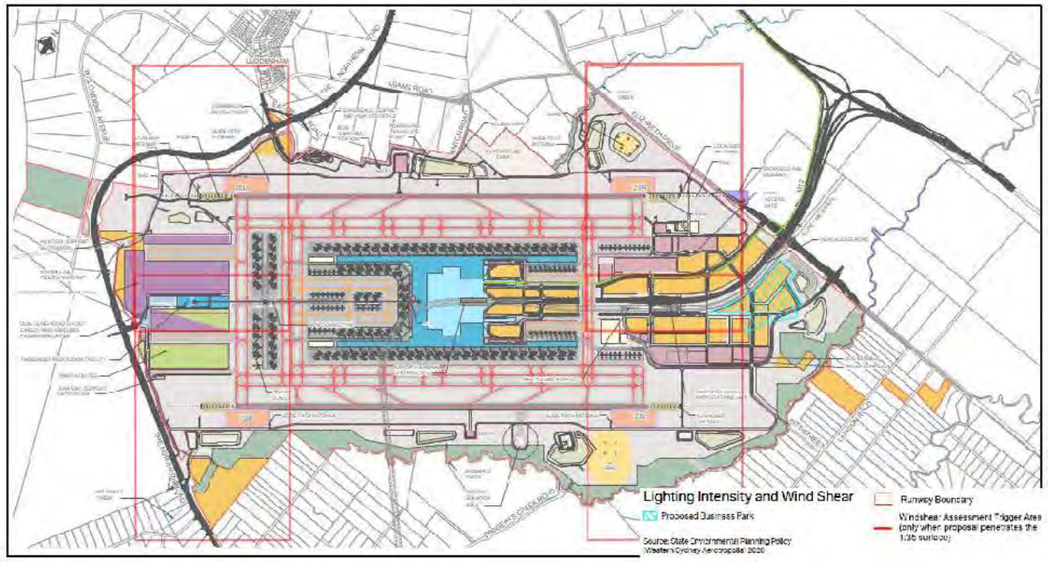
The Airport's windshear assessment envelopes, as shown in **Figure 5 and 6**, identify an 'envelope' at the end of each runway where structures situated close to the runway may impact on wind flow and cause the crosswind speed to vary along the runway.

Figure 5 Windshear Assessment Trigger Area



Source: SEPP (Precincts – Western Parkland City) 2021 Lighting Intensity & Wind Shear Map (and AECOM – MDP Site Boundary)

Figure 6 Windshear Assessment Trigger Area – Enlargement



Source: SEPP (Precincts – Western Parkland City) 2021 Lighting Intensity & Wind Shear Map (and AECOM – MDP Site Boundary)

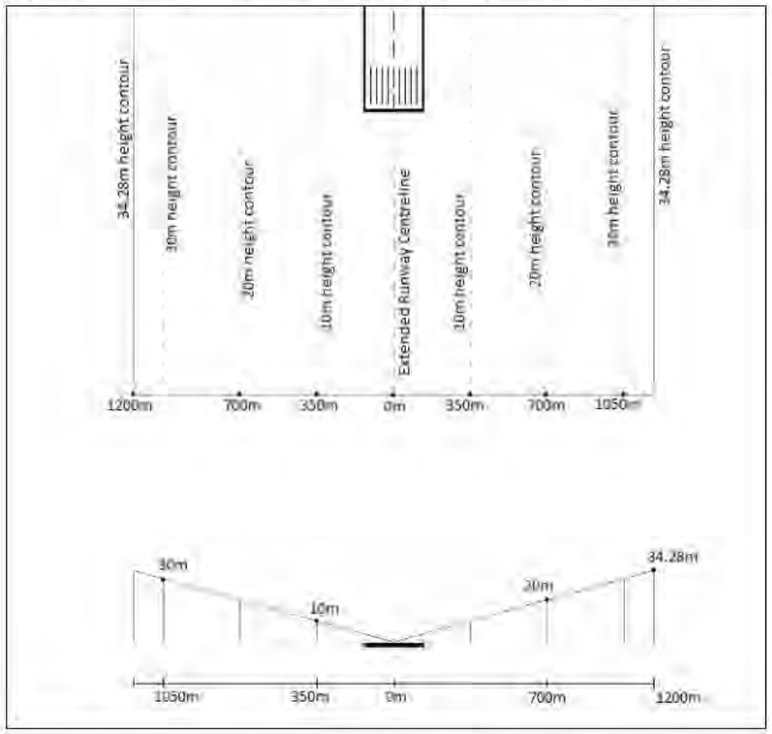
The windshear assessment envelopes provide a means of consideration of the location and design of any structure within such areas to minimise the impacts of building-induced windshear.

As can be seen in **Figures 5 and 6**, only the western section of the MDP site is located within the 1:35 plane from each of the Western Sydney Airport runways.

Figure 7 is an extract from NASF Guideline B showing the 1:35 plane surface within the elevation assessment trigger area looking down the runway. The closest point of the western section of the MDP site is approximately 850 metres from the centreline of the future second (southern) runway. At this point, building heights below approximately 24m (parallel to the runway) will not penetrate the 1:35 plane surface. Due to topographic conditions, this section of the MDP site is well below the AHD level of the runways

Future development within the western section of the MDP will be subject to a detailed assessment of the potential to impact on building windshear. However, based on the above, and the anticipated single storey warehouse development proposed for this part of the MDP site, no development will penetrate the 1:35 plane surface.

Figure 7 Windshear Assessment Trigger Area (NASF Guideline B)



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

Air turbulence due to vertical exhaust plumes from chimney stacks may pose a hazard to aviation. This may be controlled under the Airspace Protection Regulations, subject to a plume rise assessment (CASA Draft Advisory Circular 139.E-02 v1.0). Currently, there are no vertical exhaust systems proposed within the MDP site which will create plumes which will impact airport operations.

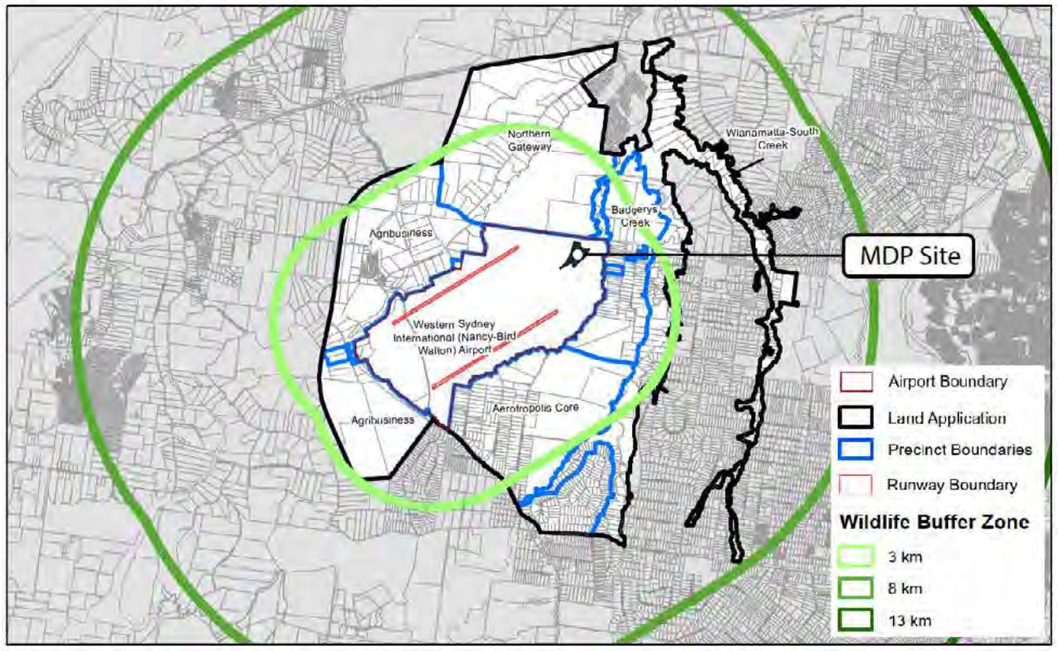
3.3 Guideline C: Wildlife Strikes

Wildlife strikes can cause major damage to aircraft and/or compromise aircraft safety. Western Sydney Airport, like many other Airports, is surrounded by areas that are attractive to wildlife, especially birds.

A key aspect of reducing the wildlife hazard risk is building design, appropriate waste management strategies, and ensuring that new landscaping is designed, and plant species are selected that reduce the attractiveness of the Airport to bird species.

Figures 8 identifies the buffer zones as outlined in NASF Guideline C and included in the SEPP (Western Sydney Aerotropolis) (Sheet WBZ_001 Wildlife Buffer Zone Map).

Figure 8 Wildlife Buffer Zone



Source: SEPP (Precincts – Western Parkland City) 2021 Wildlife Buffer Map (and AECOM – MDP Site Boundary)

The MDP site is located within the 3 km wildlife buffer zone around each of the runways proposed for Western Sydney Airport.

Detailed landscaping guidelines are contained within the Western Sydney Airport Design Guidelines (Volume 2). The planting and landscaping considerations include objectives and design guidelines to reduce the wildlife attraction and minimise the risk of wildlife strikes.

Planting and landscaping within the MDP area will be undertaken in accordance with the Design Guidelines.

Further, the waste management arrangements associated with the three initial buildings within the MDP (i.e. hotel, warehouse and bulky goods developments) will include secure waste storage areas to minimise wildlife attraction.

3.4 Guideline D: Wind Turbine Farms

Guideline D provides guidance on the development of wind farms to manage the risk to civil aviation. This guideline is not applicable to the proposed development.

3.5 Guideline E: Lighting in the Vicinity of Airports

Pilots rely on specific patterns of aeronautical ground lights during inclement weather, low light and at night. Aeronautical ground lights, such as runway lights and approach lights, play a vital role in enabling pilots to align their aircraft with the runway in use. They also enable the pilot to land the aircraft on the appropriate part of the runway. Adverse impacts from ground lighting can often be associated with outdoor advertising displays, sports field lighting and street lighting.

Guideline E provides guidance on managing the risk of lighting or light fixtures near airports that may distract pilots. CASA Manual of Standards 139 sets out standards for the maximum intensity of light sources around airports.

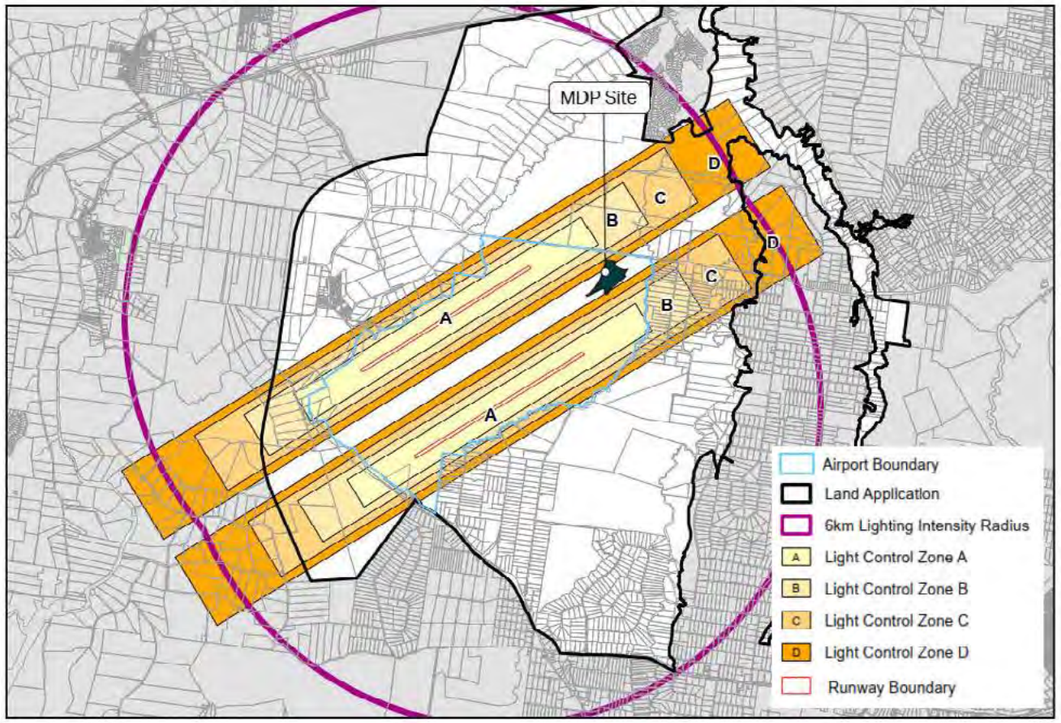
SEPP (Western Sydney Aerotropolis) (Part 3 Development Controls – Airport Safeguards – 23 Lighting) is aligned with NASF Guideline E.

The Civil Aviation Safety Authority (CASA) has powers under the *Civil Aviation Act 1988* to regulate potential sources of distractions from lighting. Under Regulation 94 of the *Civil Aviation Regulations 1988*, CASA can require lights which may cause confusion, distraction or glare to pilots in the air, to be extinguished or modified.

The Lighting Plan (see **Figures 9 and 10)** has been prepared to highlight the maximum lighting intensities in areas surrounding the Western Sydney Airport.

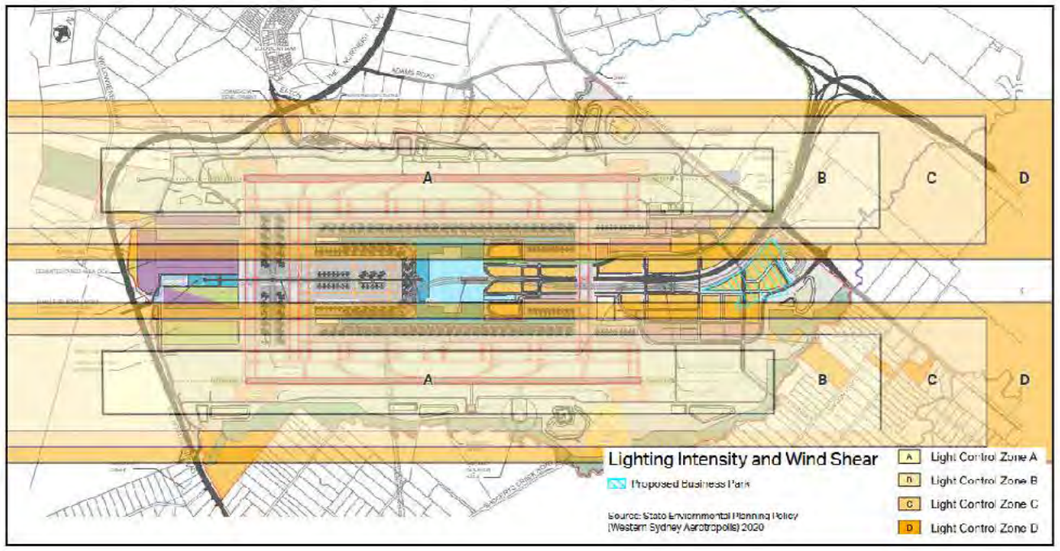
There is a primary area which aligns with each of the proposed runways for the Airport, and a wider area within a 6 km buffer radius from the centre point of each runway. The wider area is not likely to be the subject of Regulation 94 of the *Civil Aviation Regulations 1988*.

Figure 9 Lighting Intensity



Source: SEPP (Precincts – Western Parkland City) 2021 Lighting Intensity & Wind Shear Map (and AECOM – MDP Site Boundary)

Figure 10 Lighting Intensity – Enlargement



Source: SEPP (Precincts – Western Parkland City) 2021 Lighting Intensity & Wind Shear Map (and AECOM – MDP Site Boundary)

As can be seen in **Figure 10**, there is a small area in the northern section of the BPSO (containing the proposed bulky goods development) that is located within Light Control Zone C (maximum 150cd). There is also a section in the north and south of the BPSO located within Light Control Zone D (maximum 450cd).

The remainder of the BPSO is not located within a Light Control Zone but falls within the 6 km lighting intensity radius (wider area). Therefore, consideration needs to be given to the potential impacts of lighting and reflectivity distractions for pilots, with the Commonwealth needing to be consulted on the installation and operation of external lighting associated with construction lighting.

All lighting being constructed as part of the MDP will be designed and constructed in accordance with the standards set in CASA Manual of Standards 139.

3.6 Guideline F: Protected Airspace

Guideline F provides guidance for managing intrusions into the operational airspace of airports by buildings, cranes, trees and other tall structures.

The operational airspace of Airports is the volume of airspace above a set of imaginary surfaces, the design of which is determined by criteria established by the International Civil Aviation Organisation.

Under the *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996*, the airspace around specific Airports may be declared as Prescribed Airspace. This protects the airspace to allow aircraft to arrive and depart safety.

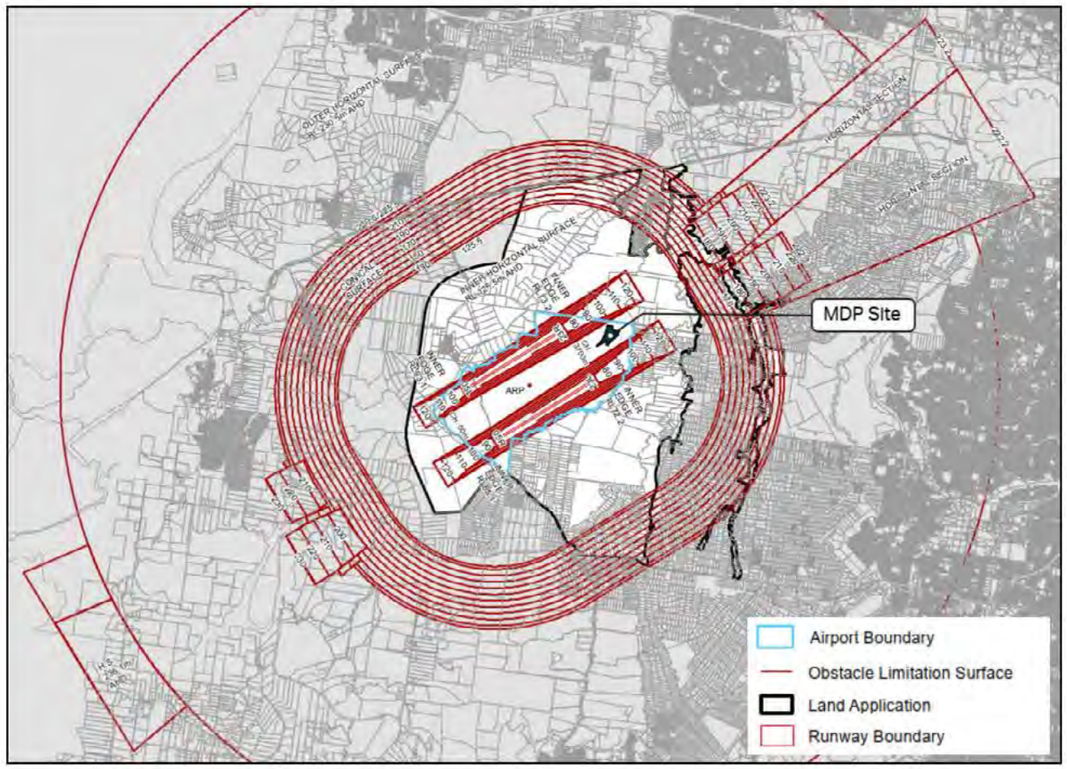
Prescribed Airspace is the airspace above either an Obstacle Limitation Surface (OLS) or Procedures for Air Navigational Services – Aircraft Operations (PANS-OPS) surface.

A discussion on the OLS and PANS-OPS is provided in the subsequent sections.

3.6.1 Obstacle Limitation Surface

The Western Sydney Airport OLS is shown in **Figure 11**. The OLS is required and defined under the CASA MOS Part 139 – Aerodromes (Chapter 7 Division 2). These are established in accordance with International Civil Aviation Organization (ICAO) specifications.

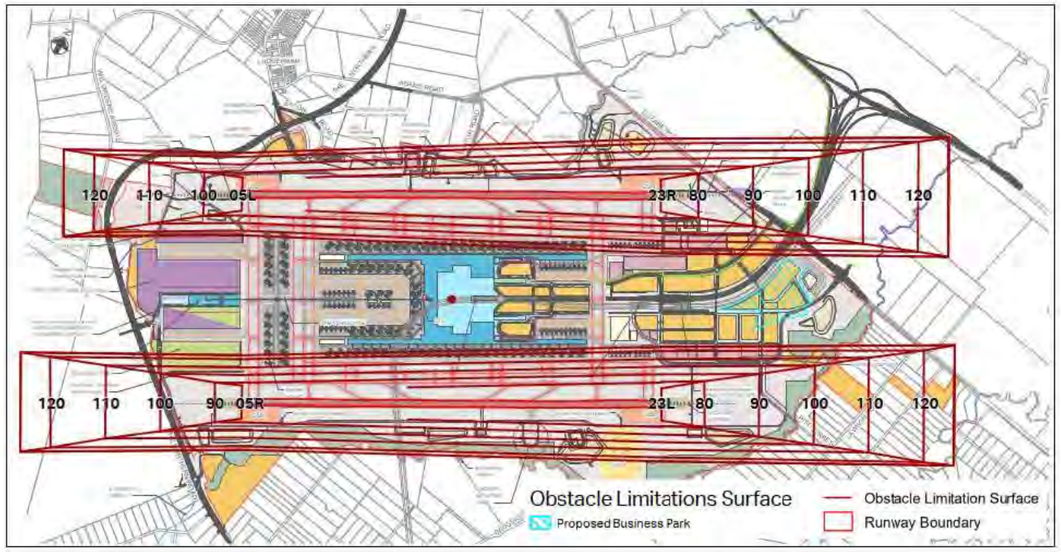
Figure 11 Obstacle Limitation Surface



Source: SEPP (Precincts – Western Parkland City) 2021 Obstacle Limitation Surface Map (and AECOM – MDP Site Boundary)

The OLS is also shown in the State Environmental Planning Policy (Western Sydney Aerotropolis) 2020. An enlargement from this plan showing the location of the MDP Site is included in **Figure 12**, below.

Figure 12 Obstacle Limitation Surface – Enlargement



Source: SEPP (Precincts – Western Parkland City) 2021 Obstacle Limitation Surface Map (and AECOM – MDP Site Boundary)

Under Section 182 of the *Airports Act 1996*, activities that result in intrusions into an Airport's Prescribed Airspace are called 'controlled activities' and cannot be carried out without approval. The airport operator or the Commonwealth must assess applications for controlled activities, and may impose conditions on approval. It is an offence to carry out a controlled activity without approval, or to breach a condition of a controlled activity approval.

The OLS comprises a series of imaginary surfaces in the airspace surrounding the Airport, which must be kept free and clear of obstructions that could be hazardous to aircraft during take-off or landing. It is intended that these surfaces prevent development of obstructions within the airspace, which could adversely impact air navigation or Airport usability.

Height restrictions imposed by the OLS are determined based on the following factors:

- The intended use of the runway, such as take-off, landing or both
- The runway code, as determined by the runway length and type of aircraft using the runway
- The type of approach, either non-instrument or non-precision, or precision instrument approach.

As can be seen in **Figures 11 and 12**, the BPSO is within the Inner Horizontal Surface – which has an RL of 125.5 metres AHD. Any development proposed above this height must be considered and assessed by the Commonwealth.

In relation to building heights within BPSO, any new buildings or structures which project above 125.5 metres AHD will require referral and consideration in relation to the impacts of aviation operations (SEPP (Western Sydney Aerotropolis) – Sheet OLS_001 – Obstacle Limitation Surface Map).

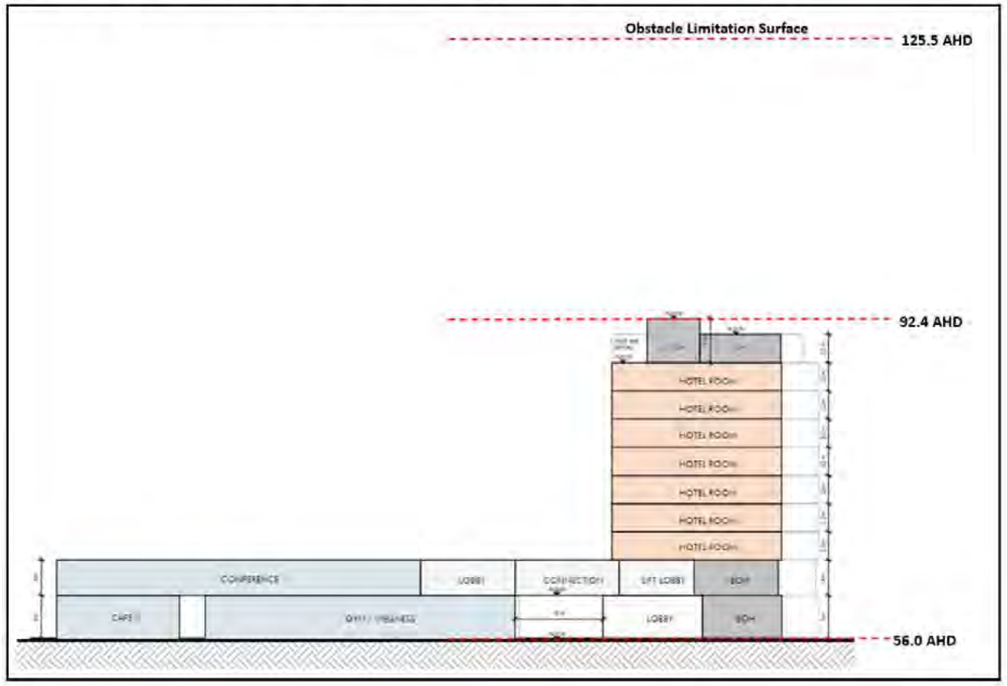
Table 2 below outlines the ground elevations, heights and distances below the OLS for the initial buildings contained within the BPSO MDP. All buildings proposed are well below the OLS.

Building	Ground Elevation (metres AHD)	Height (metres)	Maximum Elevation (metres AHD)	Distance below OLS (metres)
Warehouse	58.9	14.7	73.6	**52.0**
Bulky goods warehouse	57.5	13.5	71.0	**54.5**
Hotel	56.0	36.4	92.4	**33.1**

Table 2 BPSO MDP Building Heights and OLS Comparison

Figure 13 below shows a comparison of the hotel (the tallest structure proposed in the BPSO MDP) and the OLS. As shown in the table and figure the proposed site works, hotel, warehouse and bulky goods developments are below the OLS.

Figure 13 Proposed Hotel Elevation – indicating Obstacle Limitation Surface



Source: Nettleton Tribe Architects (and AECOM OLS Notation)

In addition to assessing permanent structures that may impact the OLS, temporary obstacles during construction need to be considered. As the BPSO development is proposed to be constructed prior to the commencement of aviation operations at Western Sydney Airport, construction impacts on airport operations are not likely to be a consideration. However, approval may be required for construction activities for future stages of the BPSO when the airport is operational or during the ORAT (Operational Readiness and Airport Transfer) process for the new Airport – preparing for opening day of the Airport.

3.6.2 PANS-OPS

The design of a full set of PANS-OPS for Western Sydney Airport 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.

As the PANS-OPS has not been developed, it has not been considered as part of this assessment.

3.7 Guideline G: Protecting Aviation Facilities

Communication, navigation and surveillance facilities are crucial to the safety of aviation. Airservices rely on these to ensure the safety of aircraft operations.

NASF Guideline G provides land use planning guidance to better protect such facilities. These include the control tower and wind indicators.

The Western Sydney Airport Plan recognises that other safety-critical surfaces are expected to be defined and protected to prevent interference to, or distortion of, signals from ground-based air navigation equipment.

The indicative airport layouts set out in the Airport Plan allow for all other necessary onsite protections as currently envisaged. No facilities are identified within close proximity to the MDP Site Boundary.

3.8 Guideline H: Helicopter Landing Sites

Guideline H provides guidance on protecting strategically important Helicopter Landing Sites (HLS) from proposed development. The guideline defines an HLS as "an area (not located on an aerodrome) wholly or partly used for the arrival or departure of helicopters."

There are no existing or proposed Helipads within the vicinity of the BPSO development site.

3.9 Guideline I: Public Safety Areas

Public Safety Areas are areas of land at the end of a runway within which development should be restricted to control the number of people on the ground at risk of death or injury in the event of an aircraft accident on take-off or landing. These generally cover an area where the risk per year resulting from an aircraft crash to a representative individual ('individual risk') is of the order of 1 in 100,000.

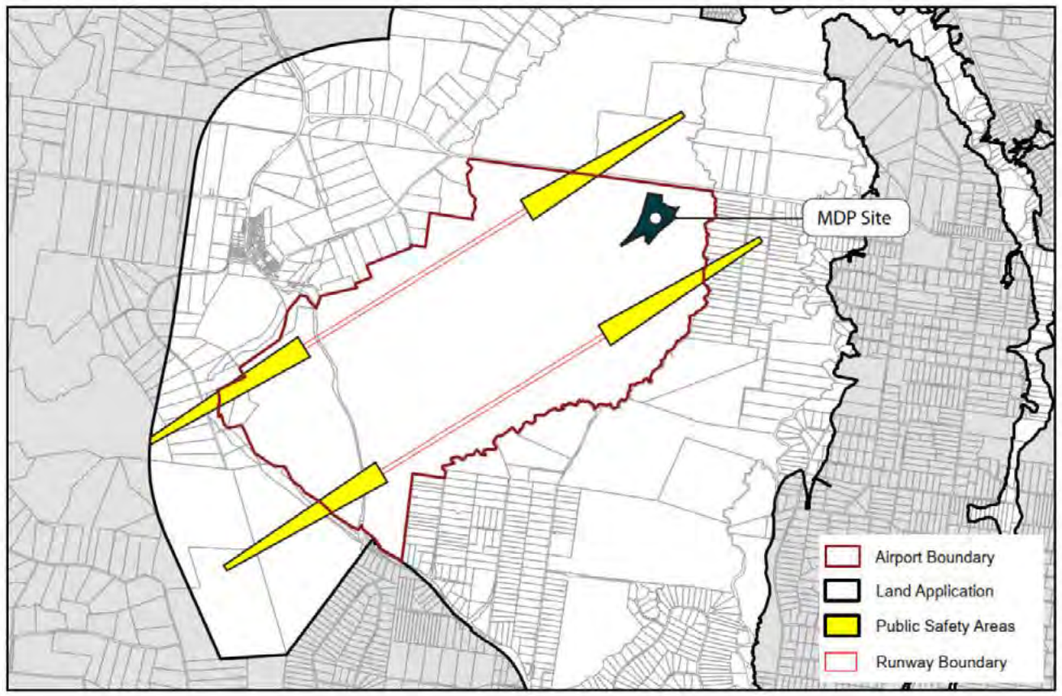
NASF Guideline I, Managing the Risk in Public Safety Areas at the Ends of Runways, has recently been endorsed. The Guideline suggests two methods suitable for a planning-led approach to the assessment of the PSA:

- UK NATS Methodology
- Queensland State Planning Policy.

Initially, Western Sydney Airport utilised the Queensland State Planning Policy method, for restricting development at the end of each runway in the Initial Indicative Airport Layout for Stage 1 (Airport Plan). This has been updated in the SEPP (Precincts – Western Parkland City) 2021 Public Safety Area Map (see **Figure 14**) to represent the PSA risk contours (UK NATS Methodology).

Detailed guidelines are contained within the SEPP (Western Sydney Aerotropolis) (Part 3 Development Controls – Airport Safeguards – 25 Public Safety).

Figure 14 Public Safety Areas



Source: SEPP (Precincts – Western Parkland City) 2021 Public Safety Area Map (and AECOM – MDP Site Boundary)

The proposed MDP site is completely outside of the runway Public Safety Areas and therefore development does not impact on this constraint.

4.0 Conclusion

The MDP site, including the initial development of a hotel, warehouse and bulky goods development, will not adversely impact on the aviation operations at Western Sydney Airport.

As part of the detailed design of the hotel, warehouse and bulky goods development, further consideration will be needed noise attenuation measures to minimise potential impacts from aircraft noise, along with consideration of any lighting to the road network and hardstand/loading areas of the warehouse and bulky goods development.

Future stages of the Business Park will require further assessment in relation to any impacts on aviation operations. However, the current site layout and proposed land uses are unlikely to adversely impact aviation operations.

Attachment A

ARUP Windshear Assessment Report

Note: Ground elevations have been further refined since the ARUP windshear assessment report was completed.

The proposed warehouse, bulky goods development and hotel precinct are still well below the OLS.

21-Dec-2022
Prepared for – Western Sydney Airport – ABN: 81618889272

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By e-mail
09 December 2022

Mr. Kirk Osborne
Western Sydney Airport (WSA Co)

Our ref 265290

Western Sydney Airport

Business Park Stage 1 MDP - wind shear assessment

Dear Kirk,

Further to our recent correspondence, please find herein a brief report detailing the impact of the three proposed buildings (Bulky Goods, Warehouse, and Hotel) in Stage 1 of the Business Park to the north-east of the Western Sydney Airport on wind shear to Runway 23R and 23L. This report follows on from a review of the current drawings and analysis in accordance with NASF Guideline B. It is concluded that the proposed buildings would not cause any wind shear issue during to either Runways 23R or 23L.

1. Introduction

The primary aim of this section of the report is to determine the influence of the proposed buildings on the wind characteristics for landing aircraft in accordance with NASF (2018). Landing aircraft are decelerating and moving slower than departing aircraft, and are more susceptible to changes in the relative wind speed between the aircraft and the wind. Departing aircraft are generally accelerating, and ascend more rapidly than landing aircraft descend, further reducing their susceptance to changes in wind conditions. The point of most interest for aircraft operations is therefore on the immediate approach to the touchdown point and subsequent deceleration along the runway.

The relative location of the proposed buildings to the closest runway (23R) is shown in Figure 1. Drawings of the three proposed buildings are presented in Figure 2 to Figure 4. The current threshold height for Runway 23R is RL 75.12 m, hence the Bulky Goods building is lower than the Runway threshold, and the Warehouse and Hotel are about 1 and 18 m above the threshold respectively.

There are two mechanisms of concern for aircraft operations: wind shear and turbulence. Wind shear is the difference in mean wind speed between two locations along the flight path, whereas turbulence is a measure of the temporal fluctuations in the wind at the same location. Typically, turbulence is generally significantly worse than wind shear on aircraft operations. A longer discussion is presented in Appendix 1. Generally, the greatest wind shear generated by a structure is during a cross-wind when the wind is coming directly over the structure perpendicular to the nominated runway. For turbulence, the impact of the structure is greatest directly downwind of the structure.

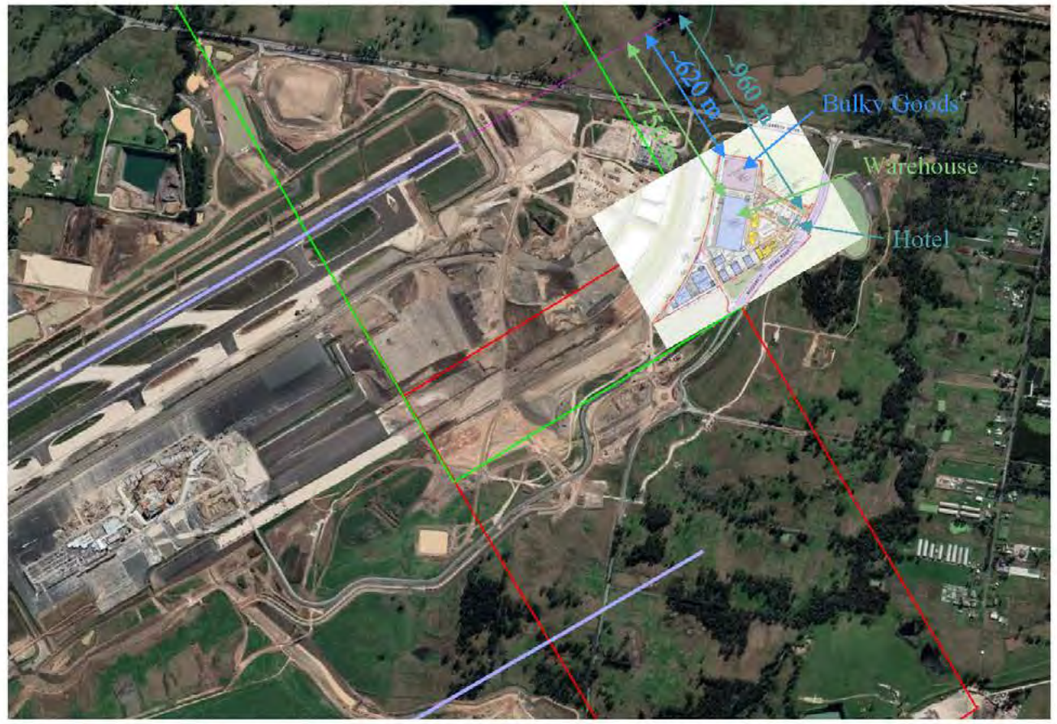

Figure 1: Aerial view (Google Earth 2022)

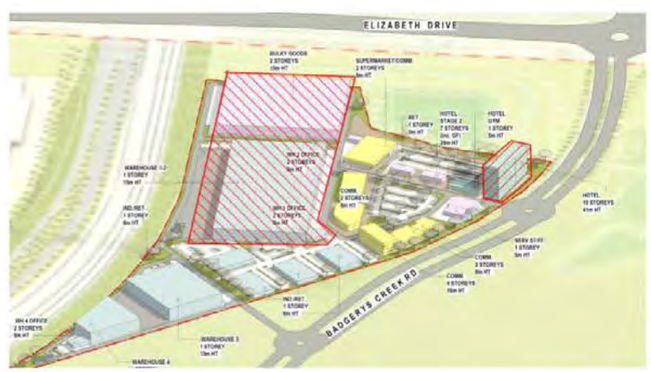

Figure 2: Bulky Goods facility

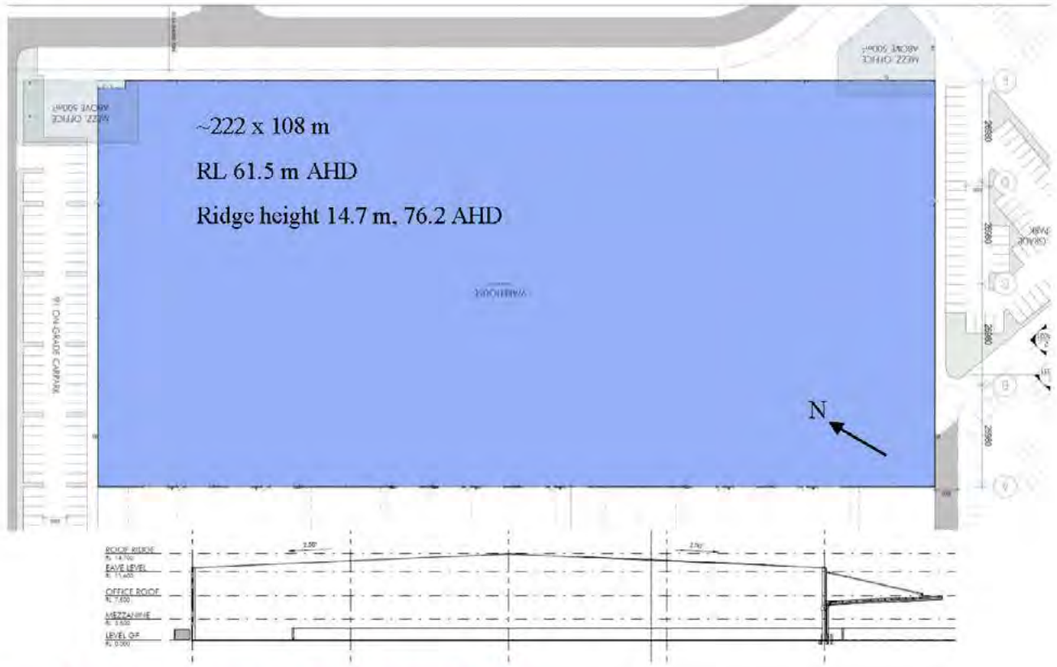

Figure 3: Warehouse plan and section looking south-east

Figure 4: Hotel ground floor plan and south-west elevation

2. Assessment

The National Airports Safeguarding Advisory Group (NASAG) has released Guideline B for the effect of buildings on wind shear and turbulence for aircraft, NASF (2018). This is based on an extensive study completed by the Dutch combining field studies, wind-tunnel testing, and flight simulator experiments on a range of plane sizes from a Fokker 100 to a Boeing 747 and described in Nieuwpoort (2010).

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The wind-shear criteria in NASF (2018) are as follows: over a distance of 100 m along the flight path, the change in wind-speed should be less than 7 knots (3.6 m/s) in the component of wind speed in the along-flight direction, and 6 knots (3.1 m/s) in the cross-flight direction, Figure 5. The turbulence criterion states that the standard deviation of building induced wind speed at any location should be less than 4 knots (2.1 m/s). These criteria do not give an indication of the size of, or energy level associated with the gusts as aircraft would comfortably land in natural turbulence levels in excess of 4 knots (2.1 m/s). A spectral analysis would be required to extract the frequency structure of the gusts from which a measure of the size could be inferred. This is beyond the scope of the current discussion and current research.

The National Airports Safeguarding Framework (NASF) Guideline B (NASF 2018) provides guidance on managing the risks posed by building-generated wind shear and turbulence at airports. The NASF assessment methodology is reproduced in Figure 6.

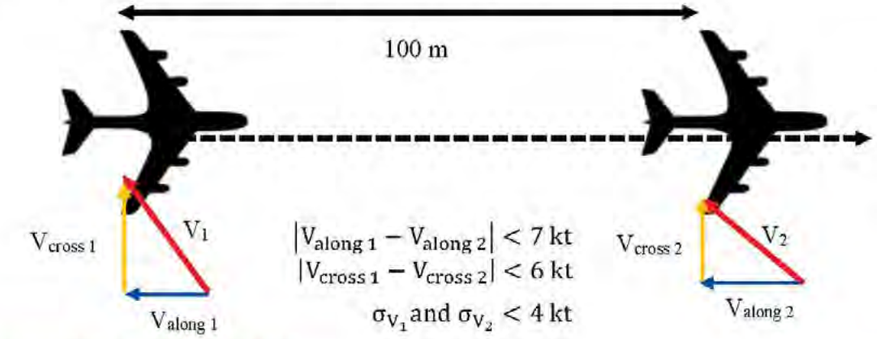

Figure 5: Interpretative sketch of NLR criteria

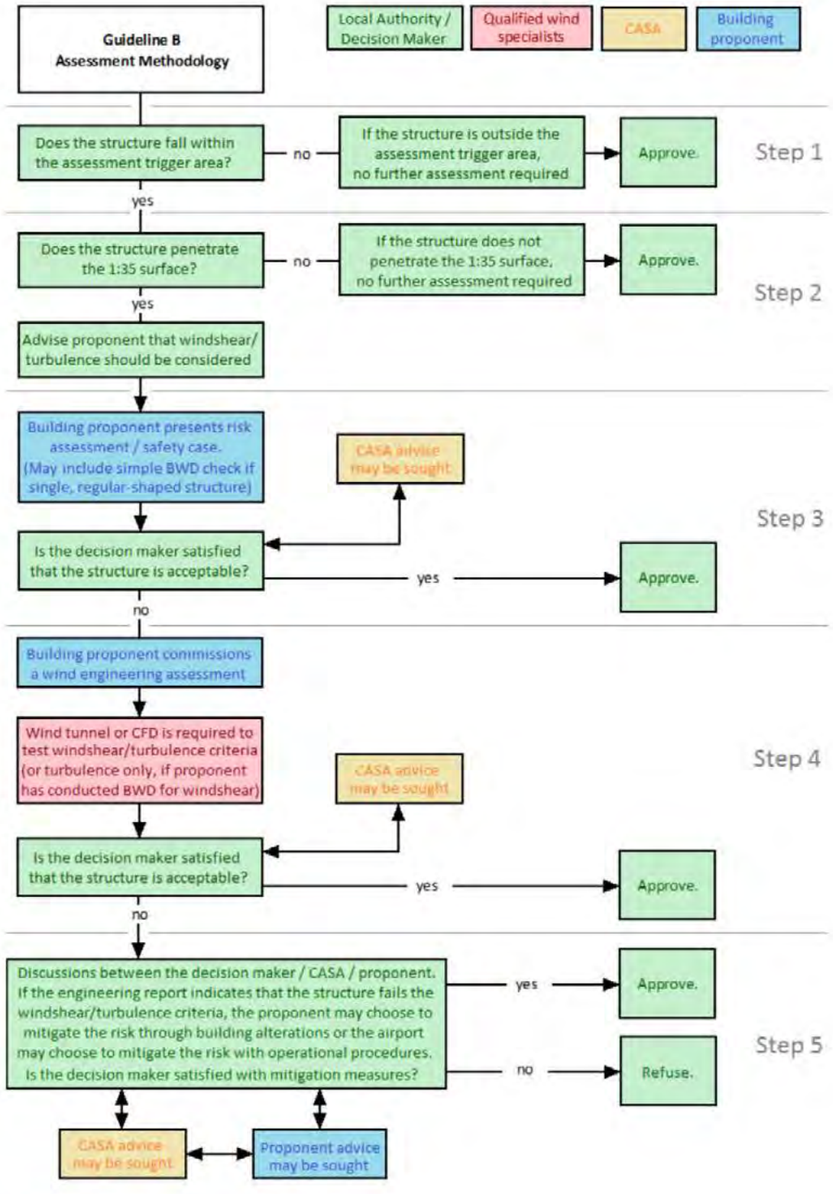

Figure 6: NASF (2018) assessment methodology

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Step 1

Buildings require assessment if they are within the assessment zones indicated in Figure 7 relative to the runway threshold. All three buildings lie outside the assessment zone, Figure 1. No additional analysis would be required for these buildings.

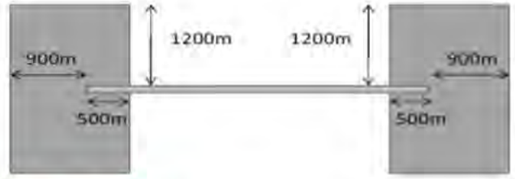

Figure 7: Runway assessment envelope (NASF, 2018)

Step 2

Step 2 in NASF (2018) is to assess the height of the structure relative to a height plane rising at a slope of 1:35 from the centreline of the Runway extension. All buildings are lower than the allowable height in NASF Guideline B. No additional analysis would be required for these buildings.

Building	Max building height above threshold /m	Distance from Runway centreline / m	Allowable height /m
Bulky Goods	-2.12	620	17.7
Warehouse	+1.08	750	21.4
Hotel	+18.28	960	27.4

Step 3

Step 3 is to assess the impact of the building for a cross-wind event producing wind shear through a building wake deficit (BWD) check. Buildings are further classified depending on the plan form shape and whether they are isolated or multiple (NASF 2012). An assessment using the Guideline B estimation procedure has been undertaken, including adoption of a "very conservative" safety margin due to the multiple sized building sections, Figure 8.

For the current assessment it was assumed the building was isolated. Based on the Guideline B methodology with the maximum estimated height, all buildings are located too far from the runways to cause any issues.

Case C	**Building Shape:** Complex Building Shape AND/ OR Multiple Buildings	In this instance, unless a very conservative safety margin is added to the mean velocity deficit data provided in **Table 1**, one of the following quantitative modelling techniques should be used: 1. Wind Tunnel using Hot-Wire Sensors, 2. Wind Tunnel using Particle Image Velocimetry (PIV), or 3. Computational Fluid Dynamics (CFD).

Figure 8: Extract from NASF (2012) Guideline B, Table 2

3. Discussion

Notwithstanding the above, for the proposed buildings to impact the wind conditions for landing aircraft, the wind would have to be coming from the south for Runway 23R and north-west for Runway 23L. For strong winds coming from the north-east, aircraft would typically be landing on Runways 05, and for the prevailing winds from the south-west, the building induced wake would be directed parallel to the aircraft. For the critical wind directions, landing aircraft to Runways 23L and 23R would be higher and therefore further from the wind shear generated by the relatively low-rise buildings.

Departing aircraft from Runways 05L and 05R, would be well above the wake generate by the proposed buildings.

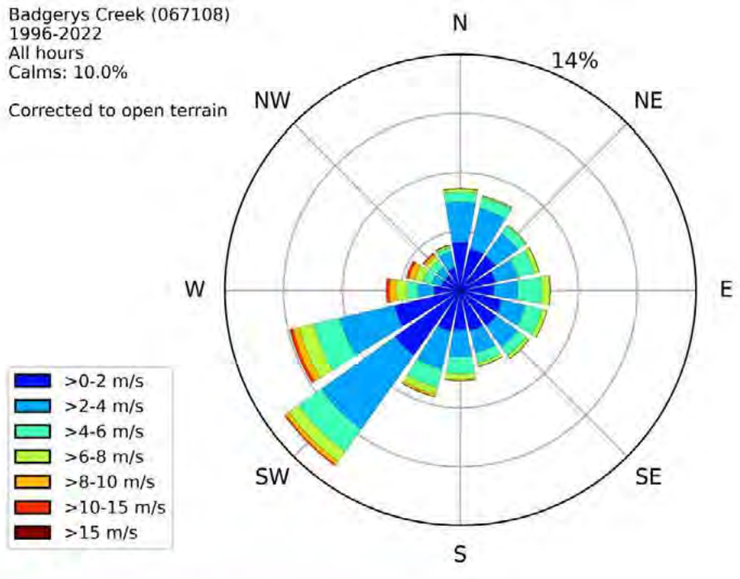

Figure 9: Annual wind rose of 10 minute mean wind speeds

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4. Conclusion

The proposed buildings are located outside the NASF (2018) Guideline B assessment zones, and below the height assessment plane for Runways 23L and 23R so does not require any further assessment. The difference in height between the touchdown point and the site is beneficial to remove the impact of the buildings on aircraft operations.

A more detailed assessment shows that buildings would not cause any wind shear issues at the proposed distance from the runway. There is no desktop assessment for the NASF B turbulence criterion, but buildings of this size would not be expected to cause any operational issues at this height, size, and distance from the runway.

Physical or numerical modelling would be required to quantify the advice contained within the report, but is not considered appropriate for this development.

I hope this is of assistance, please do not hesitate to contact me on numbers below if you have any questions regarding any aspect of this report.

Yours sincerely

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Associate Principal

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References

ICAO (International Civil Aviation Authority), 2005, Manual on low-level wind shear.

NASF, 2012, Managing the risk of building generated windshear and turbulence at airports, Guideline B.

NASF, 2018, Managing the risk of building generated windshear and turbulence at airports, Guideline B.

Nieuwpoort, A.M.H., J.H.M. Gooden, & J.L. de Prins, 2010, Wind criteria due to obstacles at and around airports, National Aerospace Laboratory, NLR-TP-2010-312.

Peterka, J.A., R.N. Meroney, and K.M. Kothari, 1985, Wind Flow Patterns About Buildings, Journal of Wind Engineering and Industrial Aerodynamics, Vol. 21, pp.21-38.

Appendix 1: Discussion on wind shear and mechanical turbulence

Paragraph 2.2.1 from ICAO (2005) states:

'In the explanation of wind shear given in Chapter 1, the changes in wind speed and/or direction concern changes in the mean (or prevailing) wind from one reference point in space to another. Short-term fluctuations of the wind about a mean direction and/or speed are normally referred to as "variations" from the prevailing wind. Such variations of the wind, individually at least, are temporary, like eddies; while eddies clearly involve wind shear; because they are on a much smaller scale than an aircraft, they tend to affect the aircraft as bumpiness or turbulence. The scale on which the wind shear operates, in relation to the overall size of the aircraft concerned, is therefore of fundamental importance.'

From the above, it can be appreciated that wind shear is based on a difference in mean wind speed between two locations, whereas turbulence is the variation in wind speed and direction at a location with respect to time.

The "variations" mentioned above are generally called turbulence in the wind engineering community and will be used in this document. Turbulence can be quantified with the standard deviation of wind speed at a location with time. This does not give an indication of the size of, or energy level associated with the gusts. A spectral analysis would be required to extract the frequency structure of the gusts from which a measure of the size could be inferred. This is beyond the scope of the current discussion, and would be impractical to monitor full-scale.

To emphasise the difference between wind shear and turbulence, a brief discussion on the driving mechanisms involved in generating turbulence, and low level wind shear in the form of a thunderstorm downburst is included. Low level in wind engineering terms is defined as below about 500 m.

The typical atmospheric boundary layer created by large synoptic wind events is created by friction at the ground surface, and therefore changes from the ground up. The boundary layer typically extends about 500 to 1000 m above ground level. Increasing friction caused by ground objects causes a decrease in the near ground mean wind speed and an increase in turbulence. During strong wind events, the ratio of mean wind speed at 500 m to that at 10 m is typically about 1.6 for winds over open terrain (scattered trees and uncut grass), and 2.1 times for winds over suburbia. The mean wind speed at 500 m over open terrain is about 10% higher than that over suburbia. During strong wind events, turbulence intensity ratios between 500 m and 10 m are typically about 0.4, with winds over suburbia having about 1.3 times the turbulence intensity of those created over open country terrain. Turbulence intensity is defined as the standard deviation normalised by the local mean wind speed. It should be noted that at lower wind speeds, less than 10 m/s, the standard deviation and hence turbulence intensity values can increase.

To develop ICAO (2005) defined moderate and strong wind shear in open country terrain from 40 m to 10 m above ground level, the mean wind speed at 10 m would have to be in excess of 18 m/s (36 kt), and 33 m/s (66 kt) respectively. However, paragraph 5.2.8 of ICAO (2005) indicates that an aircraft could withstand a wind shear of 1.67 m/s per s (3 kt/s); for an aircraft landing in

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open country terrain with a ground speed of 55 m/s on a 3° glide slope, this would relate to a mean wind speed at a height of 10 m of approximately 75 m/s (150 kt), which would evidently never occur.

Turbulence intensity is wind speed dependent and the lower the mean wind speed the higher the turbulence intensity. However, once the mean wind speed exceeds about 10 m/s, (20 kt) the turbulence statistics become relatively less sensitive to wind speed. At the lower wind speeds, turbulence intensity is not considered a significant issue to aircraft safety, as the change in relative air speed between the aircraft and the wind is negligible. Turbulence is also a function of the meteorological event; local pressure driven winds such as a summer onshore wind will contain much smoother flow than winds associated with a large frontal system, even if they come from the same direction. This report only deals with developed atmospheric boundary layer flows and does not deal with meteorological events such as frontal systems and thunderstorm events, which cannot be practically modelled.

It is evident from the above, and an appreciation of the different surrounding terrain roughness that the existing wind conditions at an Airport are diverse depending on wind speed and direction. Determining the cause of any wind related pilot complaints based on isolated Bureau of Meteorology data would be exceptionally difficult; especially if it could be proven there were a lack of complaints during similar wind event days. It would be considered necessary to investigate the number of similar meteorological events and determine whether similar complaints were received on those days. Discussions with pilots would also be considered important to determine the frequency and severity of turbulent events.

The most likely cause of low level wind shear at the Airport is caused by a frontal system, thunderstorm downdraft, or some form of temperature inversion. A mechanism for generating low level wind shear in thunderstorms is created by a descending column of cold air reaching the ground, then being turned by the ground plane, Figure 10. These events are called thunderstorm downbursts and have a central diameter of between 400 m and 4 km. The dashed white line starting on the left of Figure 10 at an elevation 1 k ft (300 m) is a typical glide slope for a landing aircraft. The concern for aviation is that a landing aircraft initially experiences a significant headwind in excess of 20 m/s (40 kt), which changes into a tailwind after passing through the centre of the descending column of air where the wind is coming vertically downward. The headwind causes the aircraft to rise, whereby the pilot will lower the throttle causing the aircraft to descend back to the glide slope, but then tailwind causes a reduction in lift causing the aircraft to land short of the runway. Thunderstorm downburst events typically last for only a few minutes and therefore have the spatial and temporal size to create localised wind shear.

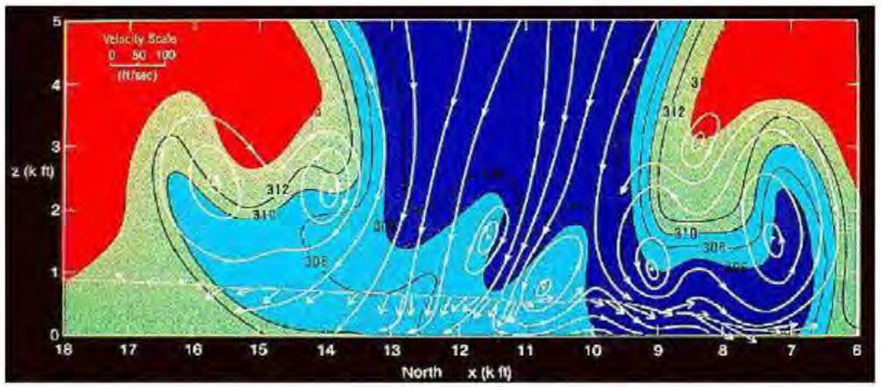

Figure 10: Radar image of a thunderstorm downburst

The wind flow patterns over a building Figure 11, are completely different in that there will be recirculation zones near the windward wall and roof edge, and in the immediate lee of the building. The typical extent of these recirculation zones relative to the height of the structure, h, is illustrated conservatively in Figure 11; for instance Peterka et al. (1985) describe the downstream recirculation zone extending 2 to 6 times the height of the structure. These regions are not fixed but fluctuate in time thereby increasing downstream turbulence, but wind shear would only be experienced in the recirculation zones. As the distance increases from the structure the flow pattern will resort to the undisturbed state. This distance is a function of the geometry of the building, and the roughness of the surrounding terrain, but the mean velocity and turbulence intensity at roof height would be expected to be within 10% of the free stream conditions at 10 times the height of the structure downwind from the building. The building will influence the wind pattern to a distance larger than this, but the magnitude of any change would be slight. The frequency of turbulence shed from the building would be expected to be fairly high and the spatial extend of a similar size to a large aircraft, therefore any effect would be expected to be of short duration.

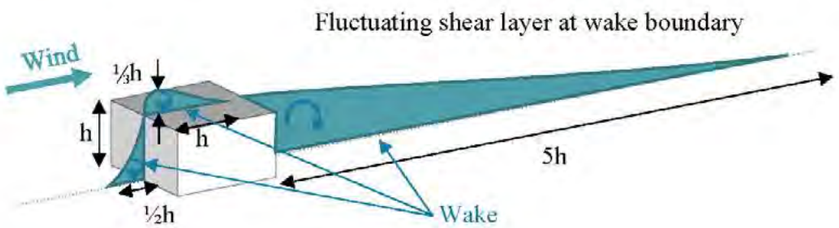

Figure 11: Sketch of the flow pattern over an isolated structure

It is evident from the above that the wind shear situation for flow over a structure is completely different to that for a thunderstorm. Unless the aircraft were to fly directly through one of the small wake regions, which are probably smaller in spatial extent than the aircraft itself, it would not

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Date 09 December 2022

experience any wind shear. The only concern would be if a large building were constructed right next to the runway and there were no provisions for using another runway during strong cross-wind events.

For oblique wind directions, flow around a large isolated regular structure has the potential to generate strong vortices that can extend for a significant distance downwind. These vortices have the potential to impact aircraft operations.

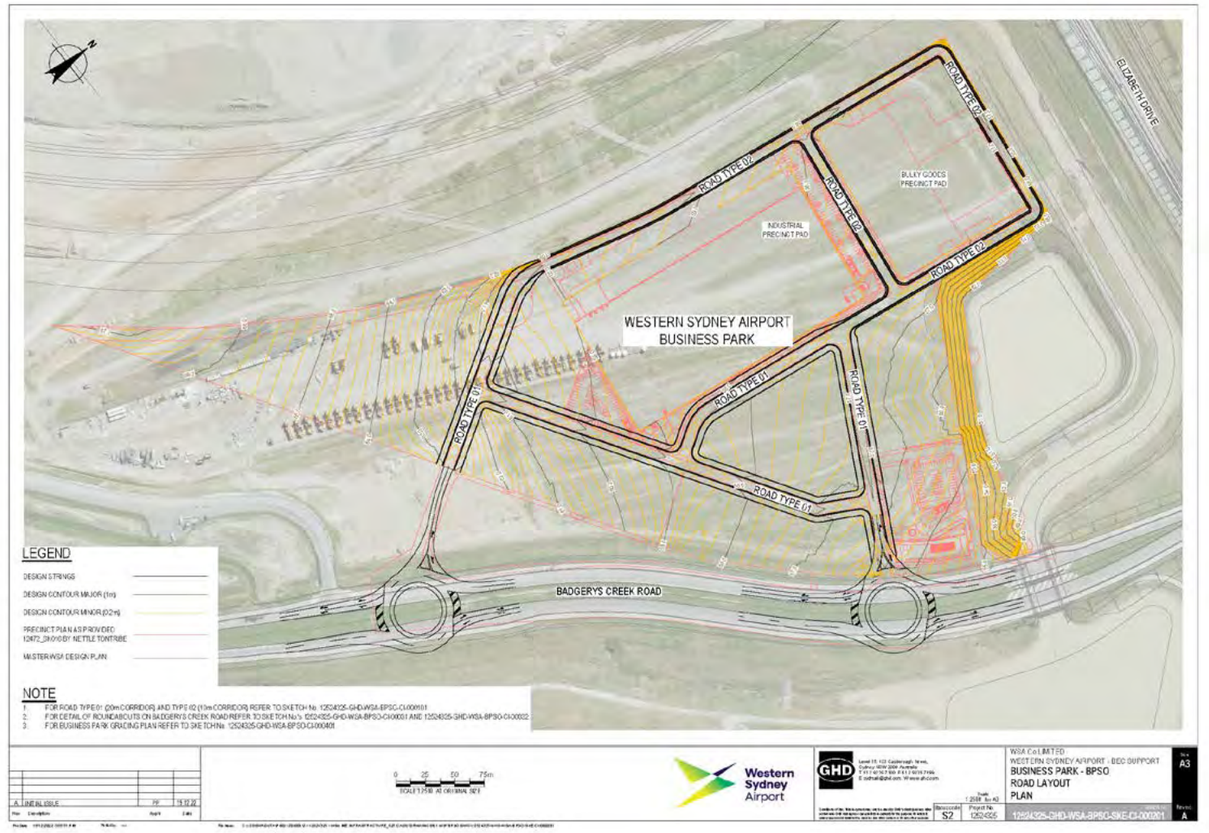
The wind flow pattern behind a group of buildings is significantly more complicated as the flow pattern is based on the compound shape. There is no method to analyse these complex flow pattern and physical or numerical modelling has to be adopted.

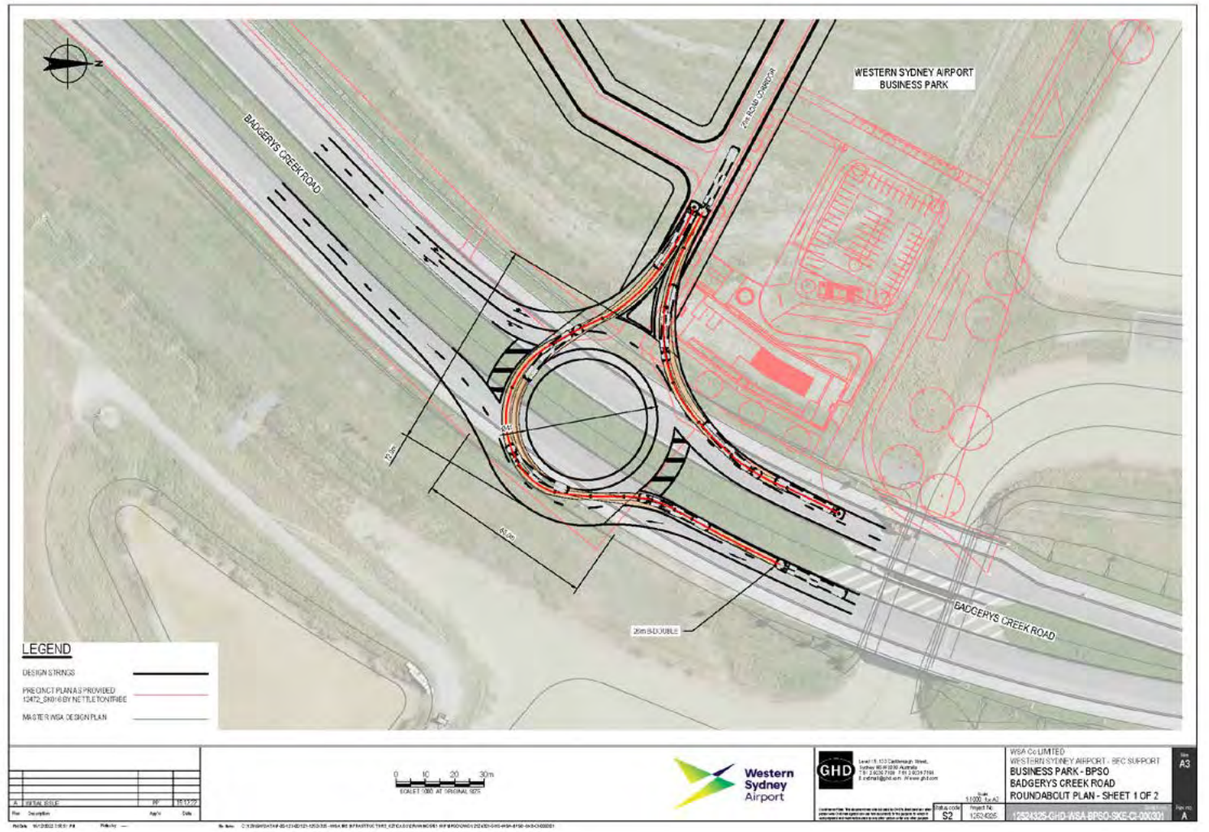
This discussion is in agreement with the ICAO Manual which in section 3.2.2 states:

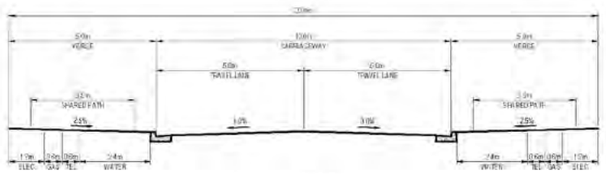
'... This means that while the buildings are comparatively low, they present a wide and solid barrier to the prevailing surface wind flow. The wind flow is diverted around and over the buildings causing the surface wind to vary along the runway. Such horizontal wind shear, which is normally very localised, shallow and turbulent, is of particular concern to light aircraft operating into smaller aerodromes, but has also been known to affect larger aircraft.'

Appendix E

Roadworks, Site Works and stormwater







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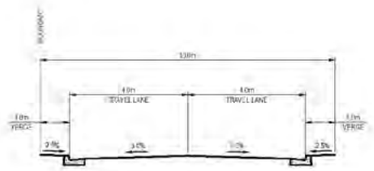
20m ROAD RESERVE
SCALE 1:100



TYPICAL ROAD TYPE 2
10m ROAD RESERVE
SCALE 1:100

A	INITIAL ISSUE	RP	18.12.20
Rev	Description	Appd	Date

0 1 2 3m
SCALE 1:100 AT ORIGINAL SIZE

Western Sydney Airport

GHD
Level 15, 133 Castlereagh Street, Sydney NSW 2000, Australia
T 61 2 9239 7100 F 61 2 9239 7199
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Status code: S2 | Scale: 1:100 @ A3 | Project No: 12524325

WSA Co LIMITED
WESTERN SYDNEY AIRPORT - BEC SUPPORT
BUSINESS PARK - BPSO
TYPICAL SECTIONS
SHEET 1 OF 1

Size: A3
Rev no: A

DEPTH LEGEND

LOWER VALUE TO UPPER VALUE	COLOUR
-22 to -20 m	
-20 to -18 m	
-18 to -16 m	
-16 to -14 m	
-14 to -12 m	
-12 to -10 m	
-10 to -08 m	
-08 to -06 m	
-06 to -04 m	
-04 to -02 m	
-02 to 00 m	
00 to 02 m	
02 to 04 m	
04 to 06 m	
06 to 08 m	
08 to 10 m	
10 to 12 m	
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32 to 34 m	
34 to 36 m	
36 to 38 m	
38 to 40 m	
40 to 42 m	
42 to 44 m	
44 to 46 m	
46 to 48 m	
48 to 50 m	
50 to 52 m	

NOTE
1. BULK EARTHWORKS QUANTITIES ARE BASED ON THE EXISTING LEVEL AND THE FINISHED DESIGN SURFACE.
2. QUANTITIES DO NOT TAKE BUILDINGS, SERVICES OR PAVEMENT THICKNESS INTO CONSIDERATION.
3. PAD LEVELS ADOPTED USING NETTLETONTRIBE PLANS AS REFERENCE
4. QUANTITIES:
   4.1 CUT = -4268
   4.2 FILL = +2842
   4.3 BALANCE = +234

D	EARTHWORKS PRECINCT RL REVISED	RP	20.12.20
E	INITIAL ISSUE	RP	18.12.20
Rev	Description	Appd	Date

0 25 50 75m
SCALE 1:2500 AT ORIGINAL SIZE

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GHD
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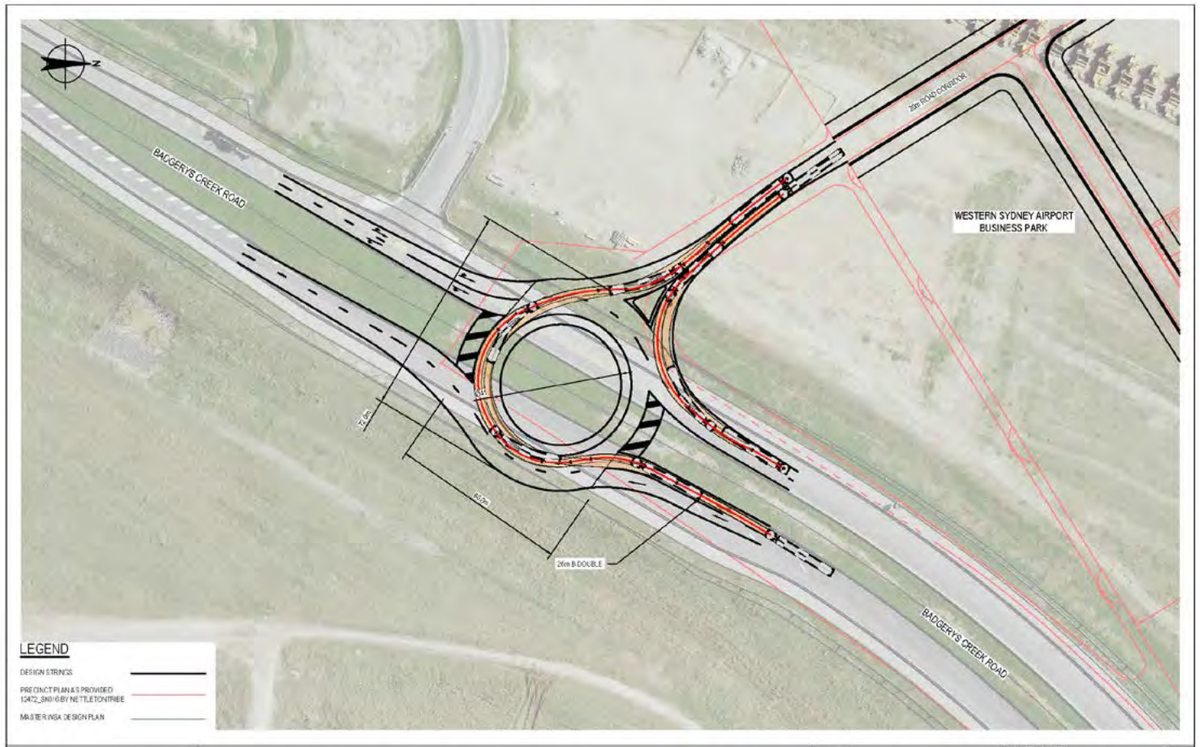
Status code: S2 | Scale: 1:2500 @ A3 | Project No: 12524325

WSA Co LIMITED
WESTERN SYDNEY AIRPORT - BEC SUPPORT
BUSINESS PARK - BPSO
EARTHWORKS
GRADING PLAN

Size: A3
Rev no: B

12524325-GHD-WSA-BPSO-SKE-CI-000401



LEGEND
DESIGN STRINGS
PRECINCT PLAN AS PROVIDED (CAT2_SMD-0-BY NETTLETONTRIBE
MASTER WSA DESIGN PLAN

A	INITIAL ISSUE	RP	18.12.20
Rev	Description	Appd	Date

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SCALE 1:300 AT ORIGINAL SIZE

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Level 15, 133 Castlereagh Street, Sydney NSW 2000, Australia
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Status code: S2 | Scale: 1:300 @ A3 | Project No: 12524325

WSA Co LIMITED
WESTERN SYDNEY AIRPORT - BEC SUPPORT
BUSINESS PARK - BPSO
BADGERYS CREEK ROAD
ROUNDABOUT PLAN - SHEET 2 OF 2

Size: A3
Rev no: A

12524325-GHD-WSA-BPSO-SKE-CI-000402

Appendix F

Western Sydney Airport Development Control Plan

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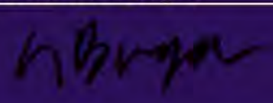
Project and report	WSA00-WSA-00010-AP-RPT-000002 – WSA Business Park Development Control Plan	
Date	November 18, 2021	
Client	WSA Co Limited	
Document no.	\\architectus.local\DFS\Projects\180429.00	
Version and date issued	Issue B Final to client - 26/09/19	Approved by: Jane Freeman
	Issue C Final to client - 08/11/21	Approved by: Nick Bucktin
	Issue D Final to client - 17/11/21	Approved by: Nick Bucktin
Report contact	Jane Freeman, Principal, Urban Planning Greg Burgon, Principal, Urban Design Nick Bucktin, Associate, Urban Designer Paris Wojcik, Senior Urban Planner Nick Cappetta, Senior Urban Designer	
This report is considered a draft unless signed by a Director or Principal	Approved by: 	

Acknowledgement of Country

Western Sydney Airport would like to acknowledge the Cabrogal Clan of the Darug Nation who are the traditional custodians of the land. We acknowledge that this land was also accessed by peoples of the Dhurawal and Darug Nations. We pay our respects to ancestors and Elders, past and present. Western Sydney Airport is committed to honouring Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land, waters and seas and their rich contribution to society.

Contents

Introduction

1.1 The WSA Business Park's role in the Western City Parkland

Western Sydney International (the Airport) will be transformational for the Western Parkland City, and Greater Sydney. The Airport will attract investment, business and new industries to Western Sydney. With 24-hour operation, it will deliver easy and efficient access to global markets and a new way of doing business in the Western Parkland City. It will connect the Western Parkland City to the world.

The WSA Business Park (Business Park), located at the front door to the Airport and with a dedicated station on the Greater Western Sydney Metro line, will leverage off its strategic location to provide a range of commercial, aviation support and employment uses, integrated with the Airport and with direct access to local and global markets. It will offer a range of employment and investment opportunities including a vibrant commercial core supporting premium and A-grade office space, extending to large lots for bulky goods and industrial uses at its periphery.

Not only will the Business Park deliver new jobs and investment in Western Sydney, it will set a benchmark for design, walkability, sustainability, business investment and amenity for workers and visitors.

In order to achieve this vision, the Business Park must be designed from the outset as a new urban place – a place that can evolve over time as the Airport expands, while delivering the highest level of amenity for visitors and workers from day one. It will be a place that promotes the delivery of jobs in the short-term without comprising its ability to respond to the Airport's growth, shifting business needs and emerging industries in the longer-term.

1.2 Purpose of this Plan

This Development Control Plan (DCP) has been prepared to provide a set of guidelines that will apply to future development of the Airport Business Park precinct.

This DCP includes objectives and controls for ensuring well designed, quality land use and development within the Business Park and provides guidance for development to supplement the provisions of the Airport Plan (December 2016) with regard to future character, built form and landscape in the Business Park.

This DCP should be read in conjunction with the Airport Plan.

1.3 Land to which this DCP applies

This DCP applies to the land within the Business Park precinct, generally located to the north of the future cross-field taxiway as shown at Figure 1.

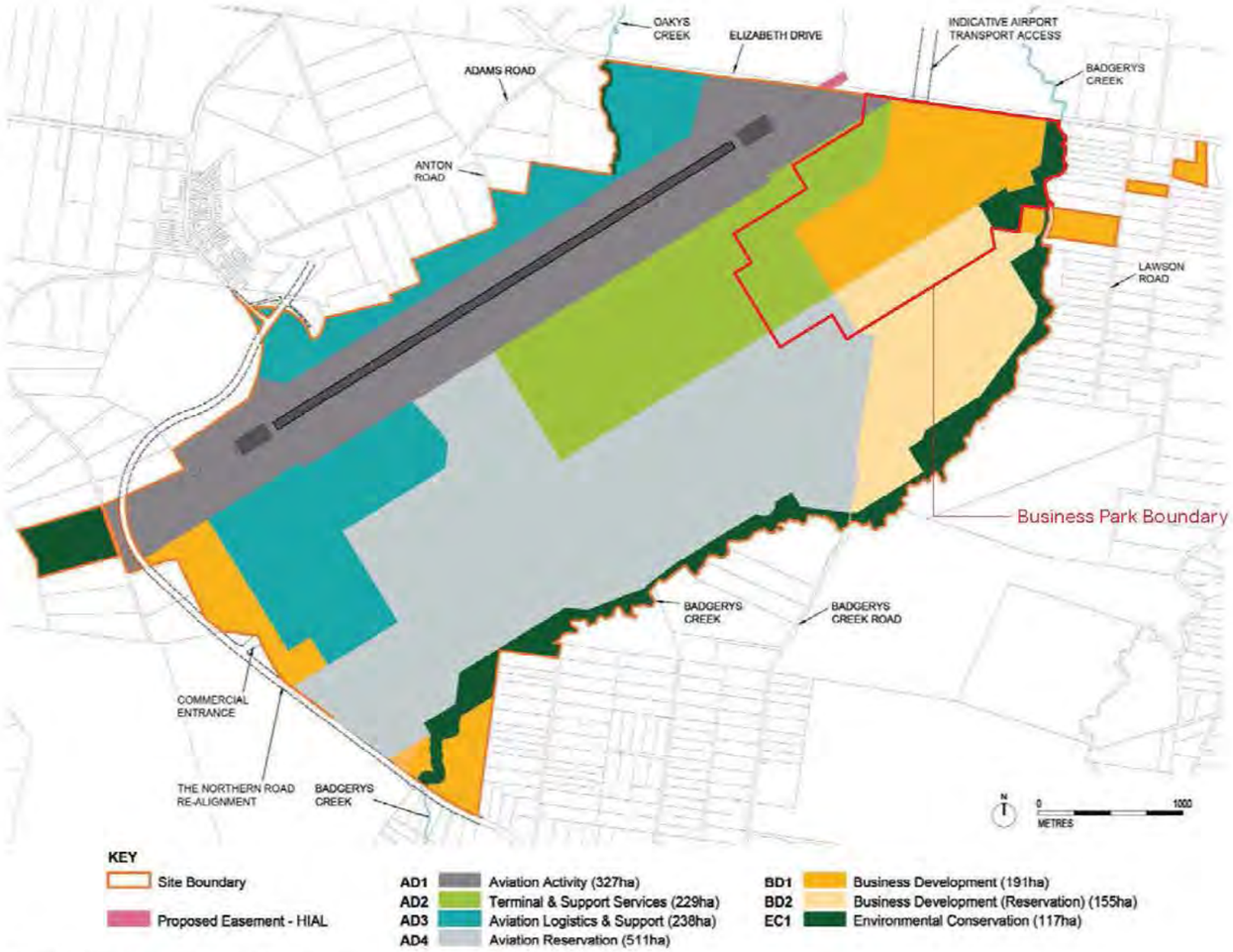


Figure 1- Land to which this DCP applies
The WSA Business Park boundary (outlined in solid red) is the area to which this DCP applies.

1.4 Aims and objectives

The aims and objectives of this DCP are:

1. To ensure all development in the Business Park precinct aligns with the Business Park Master Plan.
2. To ensure development complies with the Airport Plan, Sustainability Plan and relevant, federal legislation and planning policies, including the National Airports Safeguarding Framework
3. To provide a vision and design principles to guide future development of the Business Park.
4. To promote high quality design and public domain outcomes in the Business Park.
5. Ensure development is economically, socially and environmentally sustainable.
6. To provide opportunities for a range of development whilst ensuring that the operations of the Airport are not compromised.

1.5 How to use this document

This DCP should be used as a guide when designing development within the Business Park. It is intended that the provisions of this DCP will be implemented flexibly where appropriate to allow for innovative design and construction if the design meets the planning objectives of the Airport within this DCP and aviation safeguarding requirements.

1.6 Relationship to other master plans and planning instruments

This DCP supplements the Airport Plan (December 2016) and provides additional detailed development controls for the Business Park.

This DCP does not override any requirement or control in the Airport Plan or legislation. This DCP works in conjunction with Federal airport legislation governing development on airport sites including:

- Airports Act 1996
- Airports Regulations 1997
- Airports (Building Control) Regulations 1996
- Airports (Control of On-Airport Activities) Regulations 1997
- Airports (Environment Protection) Regulations 1997
- Airports (Protection of Airspace) Regulations 1996

If there is any inconsistency between this DCP and the Airport Plan, the Airport Plan prevails.

Development on the airport site must also have regard to the National Airports Safeguarding Framework Guidelines. The National Airports Safeguarding Framework (NASF) seeks to enhance the current and future safety, viability and growth of aviation operations at Australian airports. NASF comprises nine guidelines for development that may potentially affect aviation operations.

The following guidelines are of particular relevance to development within the Business Park;

- Guideline B: Managing Building Generated Windshear and Turbulence
- Guideline C: Managing Wildlife Strike Risk
- Guideline E: Managing Pilot Lighting Distraction
- Guideline F: Managing Protected Airspace Intrusion
- Guideline G: Communications, Navigation and Surveillance

State and Local Government land use planning policies and development controls do not apply to Airport land.

1.7 Variations to DCP Controls

Variation of any control in this DCP may be considered where an application demonstrates its conformity with the objectives that are specified by this DCP.

Any variation to the controls must be supported by a written statement demonstrating how the objectives of each relevant section of the DCP are fully satisfied.

Where, in the opinion of WSA, an application satisfies the objectives set out in this DCP, WSA may grant consent to the application notwithstanding that one or more of the controls are not complied with. However, a variation to the controls will not be supported if the variation is inconsistent with the planning objectives and requirements of the Airport Plan.

2 Vision

2.1 Vision

WSA Business Park has been designed with business in mind. A-grade office spaces addressing the main street and open space in the centre will be an impressive new home for company headquarters. Start-ups can find boutique spaces in a high-quality urban centre, and then bigger spaces nearby as their businesses evolve and grow. Logistics, transport and warehouse businesses will enjoy large sites with excellent truck access and visibility.

A great urban centre, walkable streets and open spaces make the **Business Park a great place to work and a joy to visit.** A variety of cafes and bars provide places to sit outside and enjoy the atmosphere and bustle of a 24-hour airport.

The approach from air and by ground will create a **Western City Parklands experience** – large open space areas, trees and planting, welcoming streets with shade and green roofs. Landscape, lighting, art and wayfinding will tell a story about Western Sydney, the land and the excitement of a new centre for business and innovation.

In order to meet this vision, future development must achieve the following key principles in Section 2.2.

High quality public connection to airport terminals

High value employment hub

Curated arrival experience

Recognising different user needs

Walkable and connected

Connect to landscape and open space

Future proof strategy for car parking

Flexible and Robust

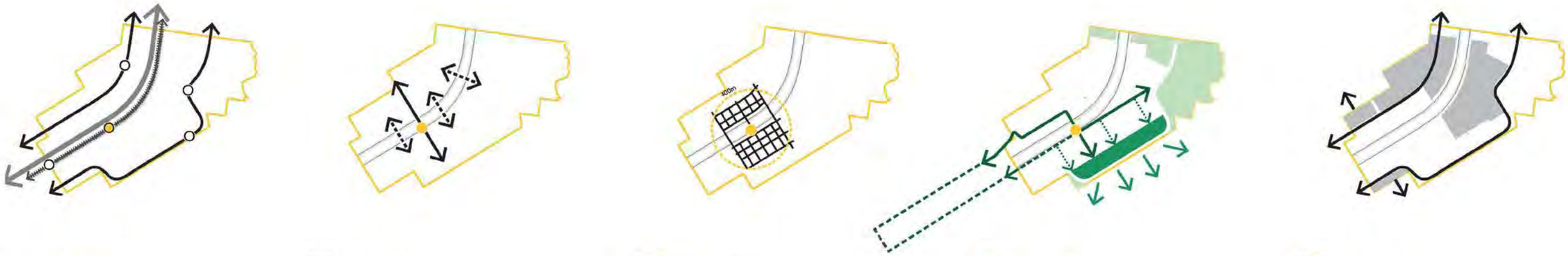
A 24 hour business park

Staging for day one activation

Active Urban Grain

An arrival

2.2 Principles



1

Create a memorable and attractive arrival experience to the Airport Business Park.
Clearly define gateway locations along main access roads, at the train station and at the airport. Gateway locations should be easily identifiable and provide opportunity for landscape features, public art or WSA branding to provide a sense of orientation and navigation throughout the Business Park and to the Airport.

2

Promote connectivity and active movement.
Connect both sides of the WSA Business Park with a new main street centred on a pedestrianised land bridge with clear and direct access to the Metro station and future rail station. Prioritise active transport to encourage walking and cycling for local trips and to enhance connectivity to the Airport and throughout the Business Park.

3

Create a compact and walkable centre.
Establish a dense, walkable commercial core within 400m of the Metro station. A pedestrianised main street, active ground floor retail uses, and high-quality landscaping and public domain will create a new place to do business and spend quality time.

4

Enhance connections to landscape and open space.
Deliver high quality green links and open spaces that provide outlook, maximise views to the Airport and provide green space for workers and visitors. A large publicly accessible park, along the south-eastern extents of the Business Park linked to the inner commercial core via the main street, will provide important recreational space for workers.

5

Locate large lot uses for Aviation Support Services and Industrial at the periphery.
Concentrate large lot industrial, freight, logistics, aviation support and bulky goods retail furthest away from the inner commercial core, to allow for easy vehicular access and high visibility from major arterial roads and to allow for secured access to the future runways.

2.3 Structure plan

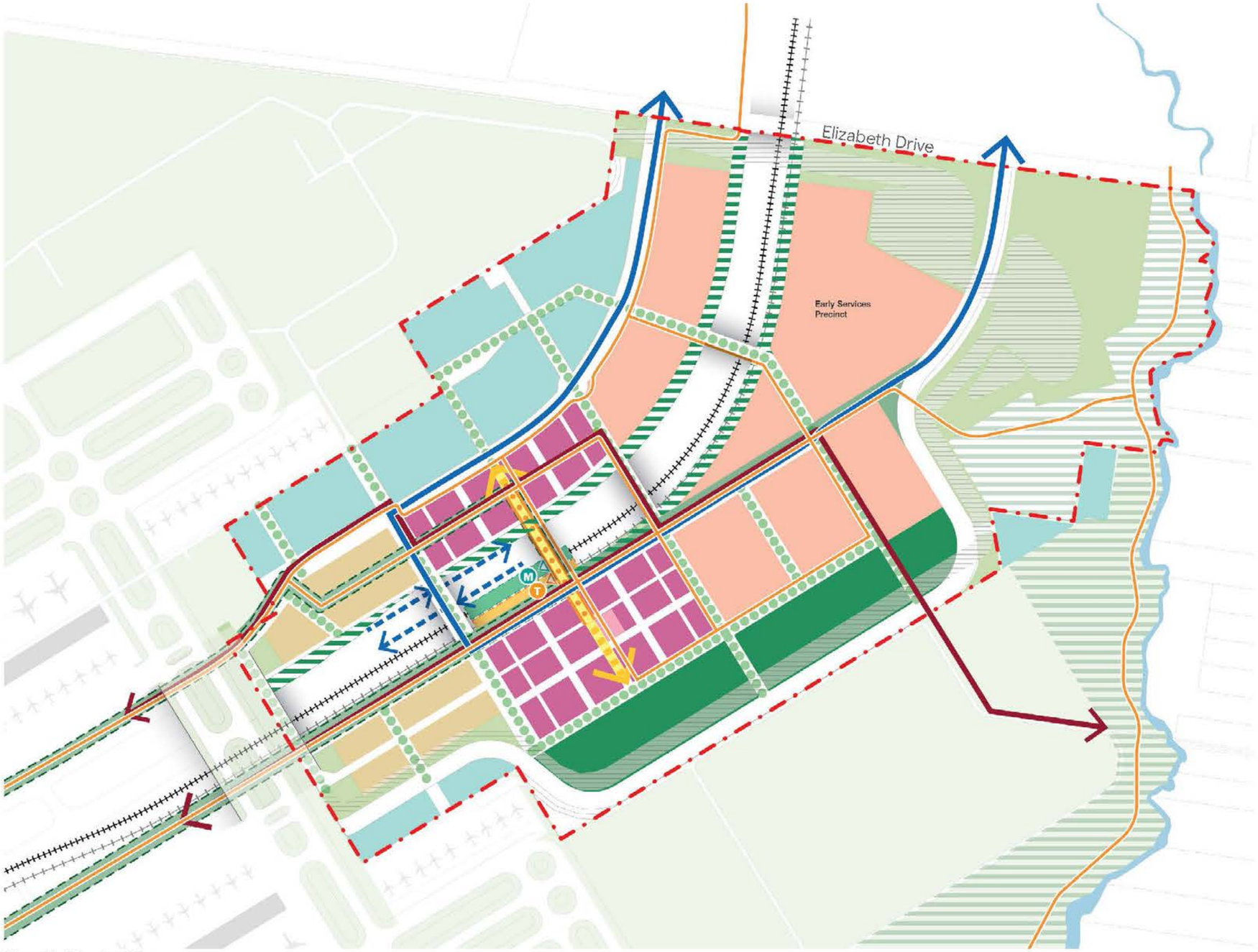


Figure 2 - Structure Plan

2.4 Master Plan

Airport passenger terminal

Up to 200,000 sqm GFA
campus style office park space potential within the outer commercial core

North-west runway

Rapid transit
range of rapid transit links including Metro Rail, buses, potential for trackless tram and automated people movers

Up to 1,100
short term accommodation beds

Station Square
A civic public space with active uses located at the entrance to the Metro station at the midpoint of the Main Street spine

Town Square
along the main street spine

Up to 300,000sqm GFA
office space potential within the inner commercial core

14.2ha
of **open space and parkland**

Main access road
entry with direct access to the proposed M12 motorway

50ha
land for large lot uses including aviation support services, light industrial and retail

Approximately **9km of active transport** routes including cycle and pedestrian paths

Figure 3 - Illustrative master plan

Image - Artists impression of pedestrian land bridge

A new pedestrian land bridge located above and adjacent to the train station will connect both sides of the Business Park.

The land bridge will be designed as a new pedestrian street providing a direct north-south line of sight with unimpeded access for pedestrians (and for emergency and maintenance vehicles).

The land bridge will feature high quality landscaping and shade structures for weather protection.

Image - Artists Impression of Airport Loop

An Airport Loop that connects the Business Park to WSA terminals and car parking areas will be capable of supporting a future automated people mover. It will be designed as a movement corridor with dedicated pedestrian and cycle paths and public spaces that will allow for a variety of activities and experiences along its length including play areas, fitness stations, bike hire nodes and cultural heritage interpretation.

2.5 Preferred land use strategy

Objectives

1. To provide for a range of land uses compatible with airport development.
2. To create a business park that supports the airport, promotes economic development and facilitates employment-generating land uses.
3. To adopt a transit-oriented development (TOD) approach with greater intensity of commercial uses located closest to the train station.
4. To provide a premium commercial offering and accommodate a range of floorplate sizes.
5. To ensure consistency with the Airport Plan and compliance with Sustainability Plan.

Design Guidance

The Western Sydney Airport Plan (December, 2016) identifies the permissible land uses in each zone within the Business Park. Table 1 illustrates the vision and desired land use outcomes for each precinct in the Business Park.

2.5.1 Development should generally be in accordance with the preferred land uses provided in Table 1 and Figure 4.

Zone	Preferred land uses
Inner Commercial Core	Commercial office buildings including offices, businesses, hotel and short-term accommodation, main street retail, big box retail and other business premises
Outer Commercial Core	Large floorplate and campus style office developments.
Large Lots	Big box retail, bulky goods retail, light industrial (with aviation support facilities to the northwest of the north-west access road), service stations, hotel and food and drink beverage premises.
Aviation Support Services	Aviation support facilities, freight, logistics, airline catering, various supplies and training facilities. Additional aviation support services can be accommodated within large lot areas.

Table 1 - Preferred land uses in the Business Park

In addition:

2.5.2 Big box retail should be positioned at the outer edges of the pedestrianised main street and act as key retail anchors at either end of the inner commercial core.

2.5.3 Fine grain retail and food and beverage uses are to be focussed along the main street and streets fronting the Airport Loop, or important intersections with high foot traffic.

2.5.4 Short-term and hotel accommodation should be located in clusters, within proximity to the Metro station, where possible or as part of the Business Precinct Stage One.

2.5.5 Larger business park and campus style office development should be located on larger lots between the inner commercial core and airport terminal.

2.5.6 Light industrial and aviation support and related uses should be located on larger land parcels off key arterial roads with good heavy vehicle access.

Figure 4 - Preferred land use diagram

2.6 Public Transport

The transport plan provisions for the Business Park are contained within this section and are illustrated at Figure 5.

Objectives

1. To accommodate for a range of planned and future public transport modes that will service the needs of the future working and visitor population of the Business Park (and wider Airport site).
2. To integrate development with the public transport network and improve low carbon and healthy transport options such as walking, cycling and public transport use.
3. To encourage safe and convenient public transport usage throughout the Business Park.
4. To establish a public transport network that is consistent with NSW Government strategic transport strategies such as the *Future Transport Strategy 2036*.

Design Guidance

Future development of the Business Park is to accommodate a range of public transport modes, as follows:

2.6.1 A future Metro corridor and Metro Station at the core of the Business Park in accordance with Figure 5 & 6.

2.6.2 A future rail corridor and station with possible connections to Parramatta and Sydney, in accordance with Figure 5 & 6.

2.6.3 A local and regional bus network along both the northern and southern side of the rail line to serve all areas of the Business Park. Indicative bus route location is provided at Figure 5.

2.6.4 A bus interchange adjacent to the Business Park station. In addition to the local and regional bus network, this is to provide set-down/pick-up zones for rail replacement buses when required. Refer to preferred location at Figure 5.

2.6.5 A dedicated transit corridor within the Airport Loop, capable of supporting an Airport automated people mover (APM) or similar service that provides a connection between the terminals, airport car parks and the Business Park.

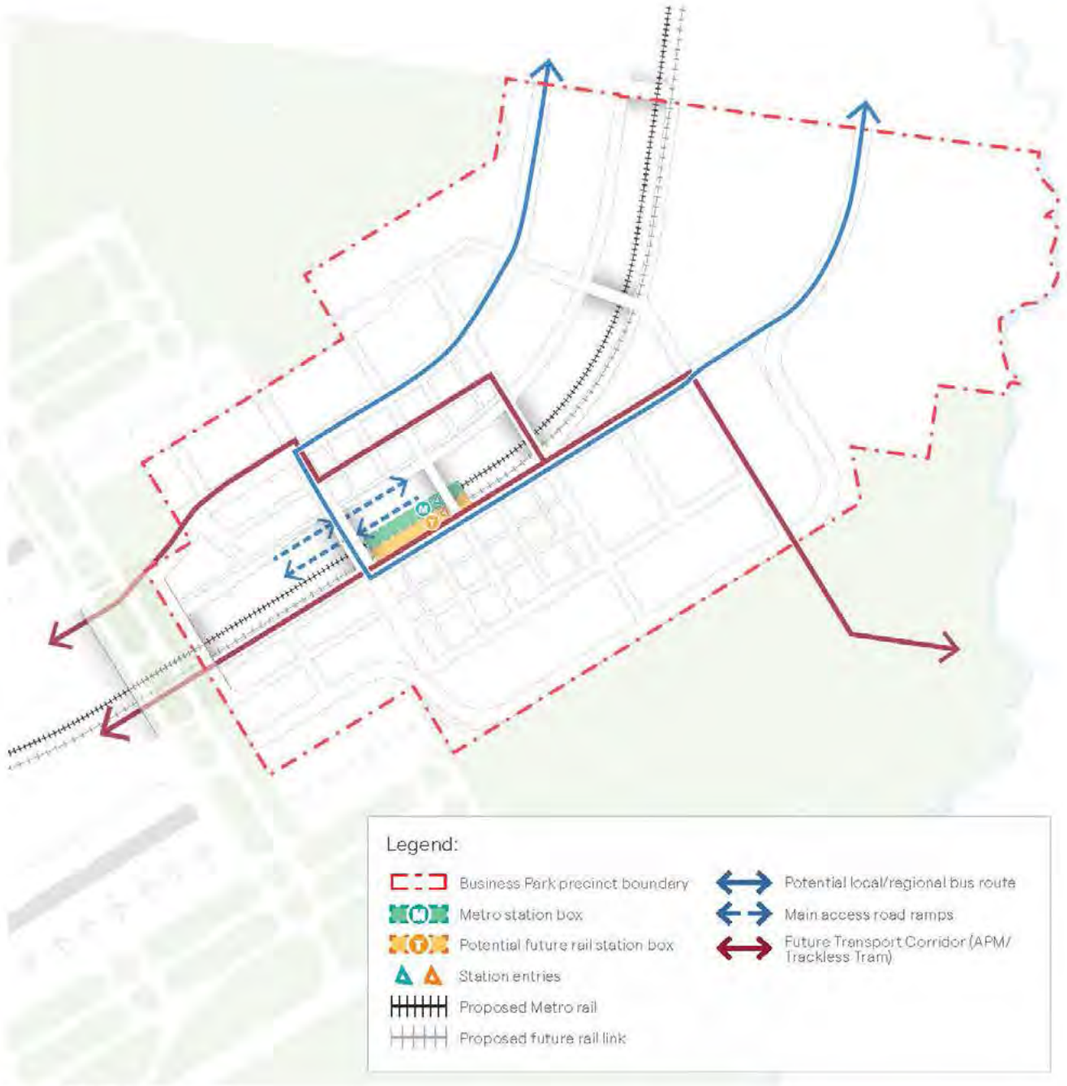


Figure 5 - Public Transport



Public Transport

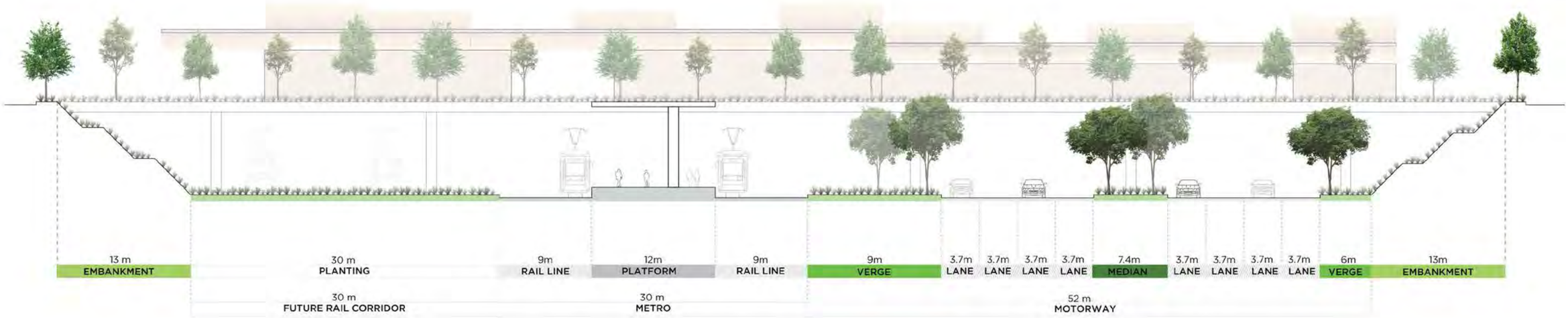


Figure 6 - Indicative Metro Corridor and Main Access Road Section Plan

Location plan

2.7 Active transport and activity

Objectives

1. To create a permeable pedestrian and cycle network throughout the Business Park and to the Airport.
2. To focus activity around key transport nodes and along main streets.
3. To promote a walkable and active pedestrian environment in the Inner Commercial Core and connectivity to the Outer Commercial Core and Large Lot areas.
4. To promote health and wellbeing for workers and visitors.
5. To minimise pedestrian, cyclist and vehicular conflict with major traffic movements.
6. To reduce carbon emissions and localised air pollution from transport.

Design Guidance

2.7.1 In general, the design of new active streets should be in accordance with Figure 7 and the following street network in Section 2.8.

Figure 7 - Active transport and activity



2.8 Street network

Objectives

1. To establish a clear and defined street hierarchy for pedestrian and traffic movement.
2. To provide a street network with a high level of amenity, safety and permeability for all users.
3. To ensure new local streets can accommodate buses, increased traffic movements and on-street car parking.
4. To introduce a main street to act as the main pedestrian spine through the urban centre of the Business Park.
5. To prioritise high pedestrian amenity over vehicle access within the commercial core.
6. To provide clear and direct access to the Airport and throughout the Business Park.
7. To ensure the design of the local road network serves for both localised traffic accessing the Business Park and through traffic destined for the terminals.
8. To provide laneways for basement and service vehicle access.
9. To create a street network that allows for views and access to large parks, the airport runway and landscape beyond.
10. To promote the use of bioswales within the streets to filter and treat water and provide high quality amenity.

Design Guidance

2.8.1 The new street network including new streets, laneways and through site links should generally be provided in accordance with the street hierarchy diagram at Figure 8 and as outlined in the Table 2.

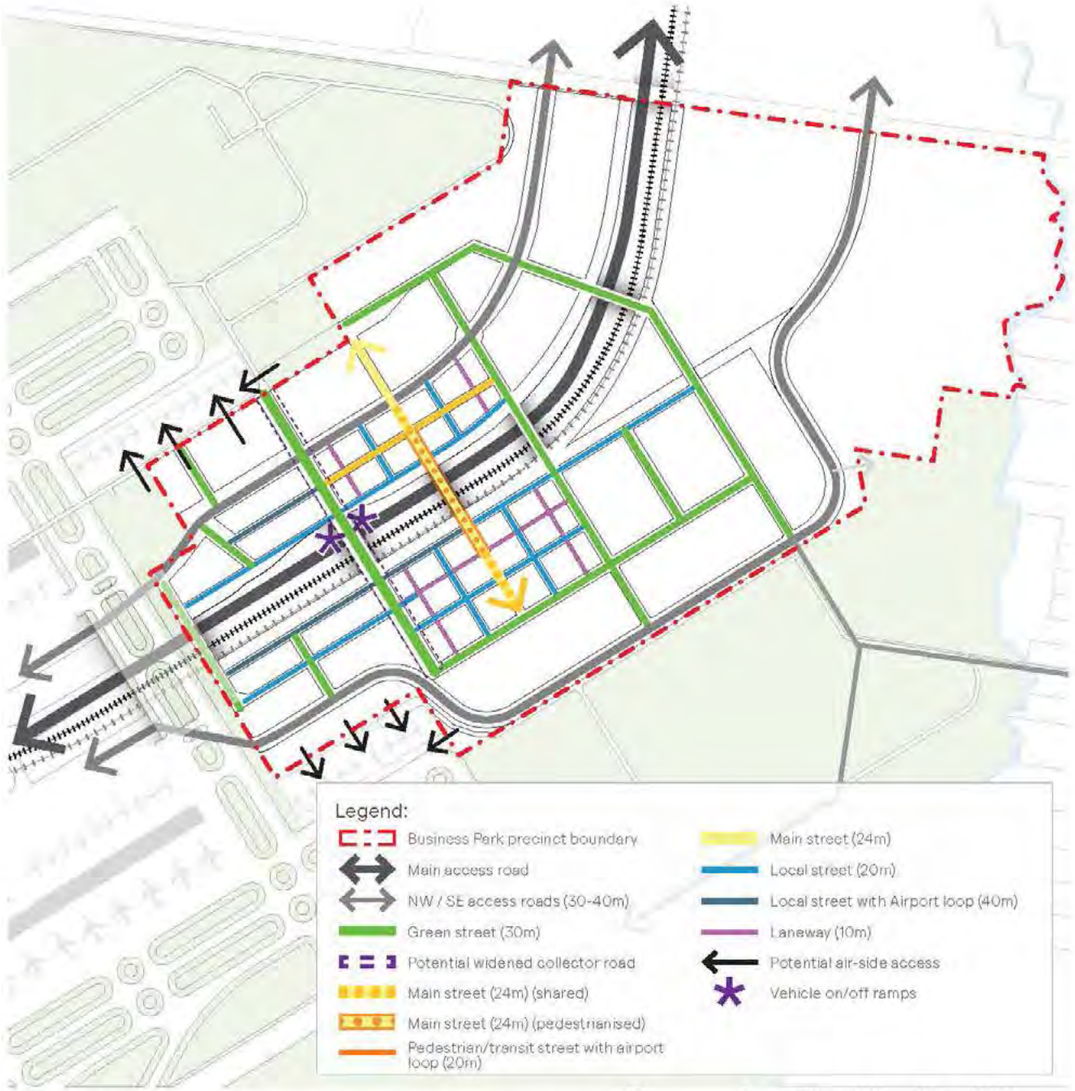


Figure 8 - Street hierarchy plan

Street network

Summary of street types

Street	Width (reserve)	Vehicle lanes	Pedestrian access	Cycle access	On-street car parking	Bus / APM/ trackless tram rapid transit lane	Pedestrian only
Main access road	60-80m	4/4	✗	✗	✗	✓ (Metro/Potential Rail)	✗
NW access road	30-40m	2/2	✓	✗	✓	✓ (Bus)	✗
SE access road	30-40m	2/2	✓	✓	✗	✓ (Bus)	✗
Green street	30m	1/1	✓	✓	✓	✓ (Bus)	✗
Main street (shared)	24m	1/1 (shared)	✓	✓	✗	✗	✗
Main street (pedestrianised)	24m	-	✓	✓	✓	✗	✓
Local street	20m	1/1	✓	✗	✓	✗	✗
Local street (with airport loop)	40m	1/1	✓	✓	✓	✓ (Bus/APM/Tram)	✗
Pedestrian/transit street with airport loop	20m	-	✓	✓	-	✓ (Bus/APM/Tram)	✓
Laneway	10m	1	✓	✗	✗	✗	✗
Station square (pedestrianised)	40m	-	✓	✓	✗	Access to Metro / Rail	✓

Table 2 - Summary of street types

Note. NW & SE access roads may have design capacity for three lanes each directions, subject to detailed design.

Street network

2.8.2 Establish a new South-East Entry Road in accordance with Figure 9. The design of the south-east entry road must:

- Provide a connection to the Business Park, Airport Terminal, and ancillary aviation functions.
- Have a minimum width of 36m.
- Include tree planting along either side of the street.
- Open views to detention basins, parklands and the runway.
- Provide Business Park gateway/branding opportunities at an appropriate location at the entry to the Business Park.
- Re-align the road over the longer term in accordance with the master plan.


Location plan

Figure 9 – South-East Entry Section Plan

2.8.3 Establish a new North-West Entry Road in accordance with Figure 10. The design of the north-west entry road must:

- Provide a connection to the Business Park, Airport Terminal, and aviation support services.
- Have a minimum width of 30m.
- Include tree planting on either side of the street.
- Provide business park gateway/branding opportunities at an appropriate location at the entry to the Business Park.


Location plan

Figure 10 – North West Entry Section Plan

Street network

Other Streets

2.8.4 Provide a new 24m pedestrianised main street in accordance with Figure 8 and Figure 11. Part of the main street may be a shared car and pedestrian zone, with traffic calming measures.

2.8.5 Provide a new local street connected to the Airport Green Link in accordance with Figure 8 and Figure 12. The Airport Green Link should have a minimum width of 20m.

2.8.6 Provide new 30m green streets in accordance with Figure 8 and Figure 13.

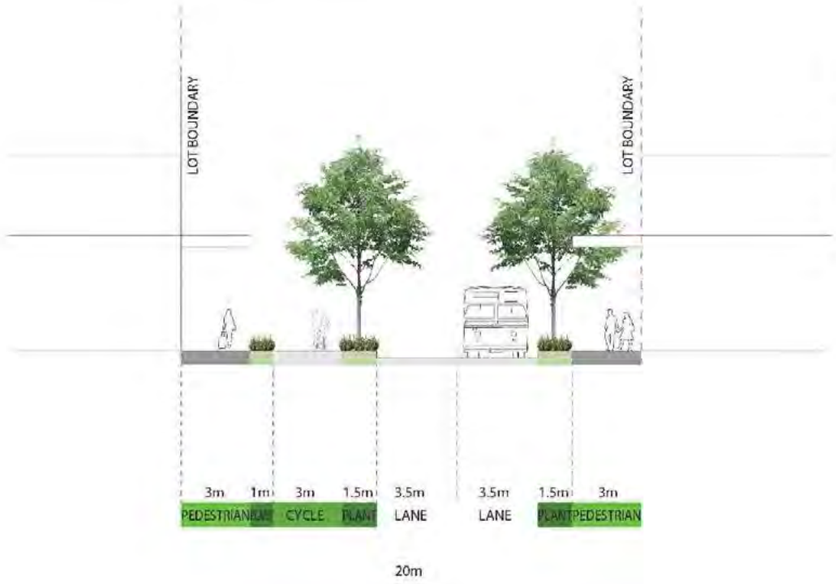
2.8.7 Provide new 20m local streets in accordance with Figure 8 and Figure 14.

2.8.8 Provide new 10m laneways in accordance with Figure 8 and Figure 15.

2.8.9 On street parking should be provided in accordance where indicated on Section Plans below. On street parking should be reviewed in subsequent stage of the Airport master plan. Note. Subject to detailed road design, there may be opportunities for tree planting in the parking lanes as illustrated by the shaded trees in the following street sections.


Location plan

Figure 11 - Local Street typical section (connected to Airport Loop)




Location plan

Figure 11a - Pedestrian/transit street with Airport Loop

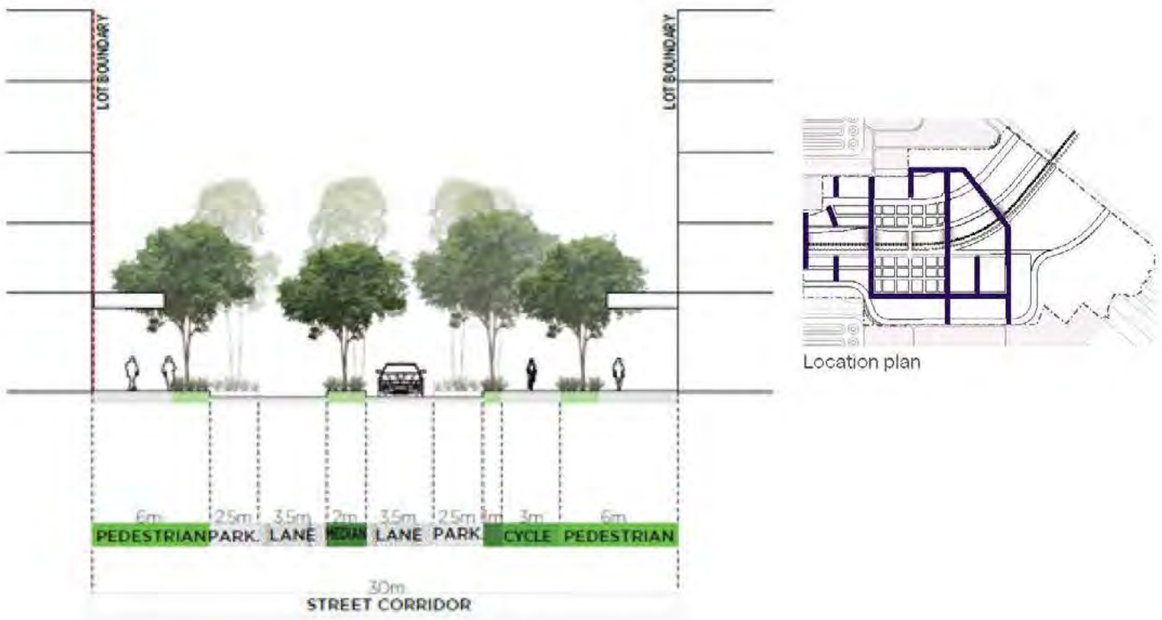


Figure 13 – Green Street Section Plan

Location plan

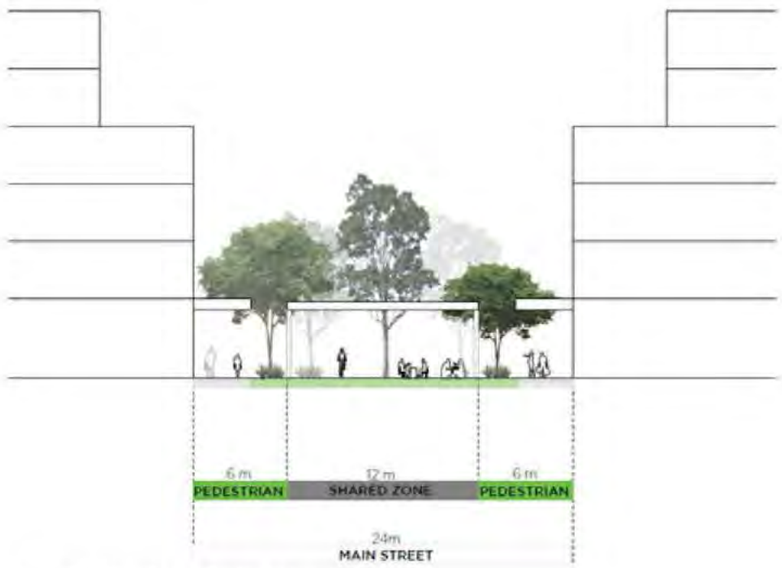


Figure 14 - Main Street Section Plan

Location plan

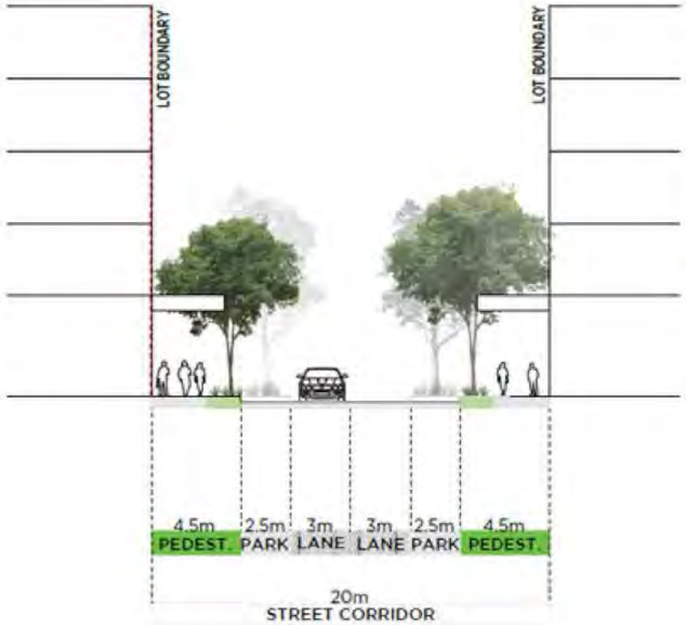


Figure 15 – Local Street Section Plan

Location plan

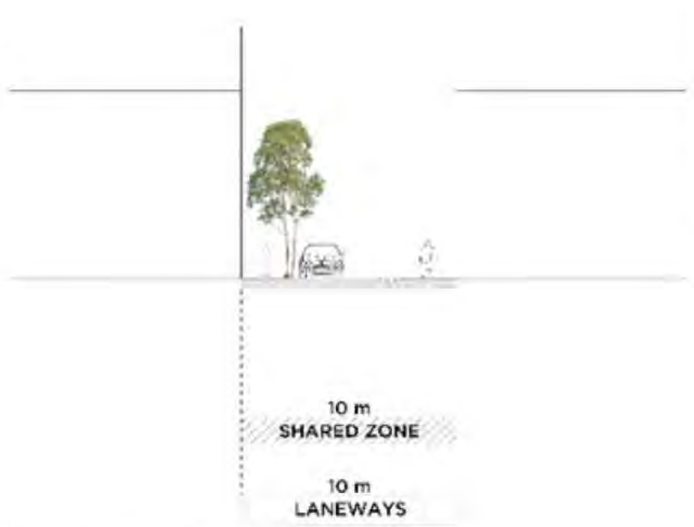


Figure 16 – Laneway Section Plan

2.9 Arrival, public art and wayfinding

Objectives

1. To create a memorable and attractive arrival experience to the Business Park and Airport.
2. To create a sense of place unique to the environment of Western Sydney, NSW and indigenous cultural heritage of Western Sydney.
3. To provide clear arrival points when entering the Business Park by air, public / active transport and road.
4. To establish a Business Park that is legible and easy to navigate.
5. To provide opportunities for public art in public places.

Design Guidance

2.9.1 Clearly define gateway locations along main access roads, at the train station and at the Airport in accordance with Figure 16.

2.9.2 Provide a high level of amenity and landscape treatment along key arrival corridors and major access routes.

2.9.3 Provide a landscape embankment (outside rail corridor) in accordance with Figure 16.

2.9.4 Gateway locations should be easily identifiable and provide opportunity for landscape features, public art or branding to provide orientation and memorable points for navigation throughout the Business Park.

2.9.5 Wayfinding signage should be legible and consistent throughout the Business Park and Airport.

2.9.6 A public art design should be undertaken in consultation with WSA. Public art should draw upon elements from the both the urban and broader Western Sydney natural landscape. It should also consider opportunities for heritage interpretation including Indigenous Aboriginal cultural heritage.

Figure 17 - Active transport and activity



2.10 Staging and delivery

Objectives

1. To ensure the orderly development of the land including the delivery of necessary infrastructure and public domain.
2. To provide key open space and new connections in the early stages of development.
3. To provide flexibility for future development and the delivery of the Business Park and future proof for future expansion to maximise the full potential of the developable land.

Design Guidance

2.10.1 The following should be provided in the first stages of development:

- Select development lots (as required) on the northern side of the rail corridor.
- Large lots associated with land available from early earthworks in the east of the site adjacent to the south-east access road (Business Precinct Stage One).
- The first section to an Airport Loop along the northern side of the rail corridor.
- Land dedicated for air-side services at the western-most corner of the Business Park.
- A transit corridor for a potential trackless tram/APM.

2.10.2 Temporary landscaping of spaces and lots should be considered to provide additional amenity and green spaces until lots are developed.

2.10.3 Future stages are to be determined by market demand, development viability and future servicing and infrastructure considerations.

2.10.4 Any development proposal submitted within this area must demonstrate how infrastructure and servicing works relate to the overall Business Park.

3 Built Form

The character of the Business Park will vary between the commercial development in the Inner Commercial Core and larger business, industrial, aviation support and bulky retail related uses located on the periphery. Each precinct has a distinct character resulting from the natural and physical constraints, transport and road network and allotment sizes.

3.1 Desired future character

Inner Commercial Core – A vibrant centre for people and business

Future Character statement

Located within 400m walking distance of the rail station, the inner commercial core is the urban heart of the Business Park, providing a defined, urban character, with zero building setbacks and active ground floor uses in high pedestrian use zones.

The Inner Commercial Core will be the centre of business with commercial office space, visitor accommodation and hotels, a main street with fine grain retail, and a range of supporting services such as medical centres and other business premises.

The Inner Commercial Core will be defined by its fine grain urban character and pedestrian focused streets. Any larger format retail will be located at the outer edges of the centre.

Compact street blocks and a new, active main street flanked by open space at either end will better connect the precinct on either side of the rail corridor. The Inner Commercial Core will be more than a place to do business, it will be an arrival destination and a place to spend time. The urban design will encourage connection to the outdoors by promoting daylight, shelter from harsh wind and sun and enhancing comfortable human connection with nature.

Priorities

1. Establish a dense, commercial core around the station which prioritises commercial uses including businesses and offices, supported by a range of supporting uses including short term accommodation, retail and local services.
2. Create a compact street grid that focuses on walkability and active ground floor uses in the centre of the Business Park.
3. Introduce a new, active main street and dedicated pedestrian connections that will provide an important link across both sides of the Business Park.
4. Create a comfortable outdoor environment to encourage business park users to connect with nature to enhance their health and wellbeing.

Refer to Inner Commercial Core area in Figure 17 overleaf.






Figure 18 - Inner Commercial Core

Key Plan

Desired Future Character

Outer Commercial Core – A business park in the landscape

Future Character statement

Located between 400m to 800m walking distance of the rail station, the outer core sits adjacent to the Inner Commercial Core. While the Inner Commercial Core has a pedestrian focus, with a strongly defined street and laneway network, the outer core has a strong landscaped character, relating to building setbacks and interface to the streetscape.

The Outer Commercial Core is to provide supporting commercial uses to the Inner Commercial Core and is suitable for development with larger commercial floorplates such as campus style development suitable for a variety of uses.

Buildings in a landscape setting should be prioritised to reduce overall building bulk and scale. New street trees and landscaping can help define the character of the Outer Commercial Core area which will be important in creating the overall landscape setting for the Business Park.

The urban design will encourage connection to the outdoors by promoting daylight, shelter from harsh wind and sun and enhancing comfortable human connection with nature.

Priorities

1. Provide a mix of employment uses that support business park and office uses in the Inner Commercial Core, whilst limiting larger industrial type uses.
2. Allow for larger commercial floor plates to provide viable and usable commercial floor space suitable for a variety of commercial uses.
3. Prioritise buildings in a landscape setting, with generous setbacks and communal open space to reduce overall building bulk and scale.
4. Create a comfortable outdoor environment to encourage business park users to connect with nature to enhance their health and wellbeing.

Refer to Outer Commercial Core area in Figure 18 overleaf.





Key Plan

Figure 19 - Outer Commercial Core

Desired Future Character

Large lots – Well serviced lots for diverse business and industry

Future Character statement

The large lots precinct is located on the periphery of the Business Park, with good exposure to Elizabeth Drive and main access roads. The large lots precinct is positioned furthest away from the core to allow for easy access to major arterial roads with good heavy vehicle access.

The large lots precinct is characterised by light industrial, aviation, big box retail and bulky goods uses including warehouses, distribution centres and freight uses. It should also contain some ground floor retail / café uses to provide convenience products to workers in the area.

Light industrial sites are characterised by a range of small, and medium to large warehouse typologies with office space located along the primary street frontage. Front and side building setbacks are increased to allow for perimeter landscaping and mitigate any potential and noise and odour impacts.

This precinct will also contain the Business Precinct Stage One , which will provide early development opportunities for services that support the development of the airport and surrounding infrastructure. The ESP will likely contain a range of uses including logistics warehouses, light industrial units, service station, other related large format retail services, medical services, hotel accommodation and fast food outlets.

Priorities

1. Prioritise access and servicing to support diverse businesses and industry types in the Business Park.
2. Provide a mix of lower scale employment and light industrial uses such as aviation support services, big box and bulky goods retail and potential long-term car parking to support the growth of the Business Park and the Airport, generally.
3. Ensure large lot development contributes towards enhancing connectivity, visual amenity and the quality of landscape in the Business Park.

Refer to Inner Commercial Core area in Figure 19 overleaf.

Key Plan

Legend

- Large lots
- Large lots (Aviation support services)
- Future Metro rail station
- Public open space
- Outline of large lots
- WSA Business Park boundary

Figure 20 - Large Lots Precinct

3.2 Built Form

This chapter sets out the preferred building typologies across the three precincts.

Objectives

1. To guide preferred building envelopes and typologies.
2. To achieve attractive streetscapes and reduce overall bulk and scale.
3. To provide sufficient area for open space and landscaping.
4. To encourage creative, resource efficient and innovative building design of a high architectural standard.

Design Guidance

Precinct	Site Provisions	Maximum site Coverage	Height	FSR
Inner Commercial Core	Typical street blocks 75m long x 60m wide Maximum floor plate size 3,900 sqm GFA 75m maximum street frontage size	85-100%	Between 5-6 storeys	Typical FSR 2:1 – 4.5:1
Outer Commercial Core	Typical street blocks 125m long x 60m wide	50%	Between 5-6 storeys	Typical FSR 2:1-2.3:1
Large Lots	Typical street blocks varies	60-70% For regular shaped lots	Up to 20-30m within wind shear zone Up to 25-35m outside of wind shear zone	Typical FSR 0.5:1 – 1.5:1

Table 3 - Site provisions

Indicative development typologies are provided overleaf and provide an illustration of anticipated and desirable building types in each of the character areas throughout the Business Park.

Definitions

Gross Floor Area (GFA) has the same meaning as in Liverpool Local Environmental Plan 2008.

Note. The term is defined as the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:

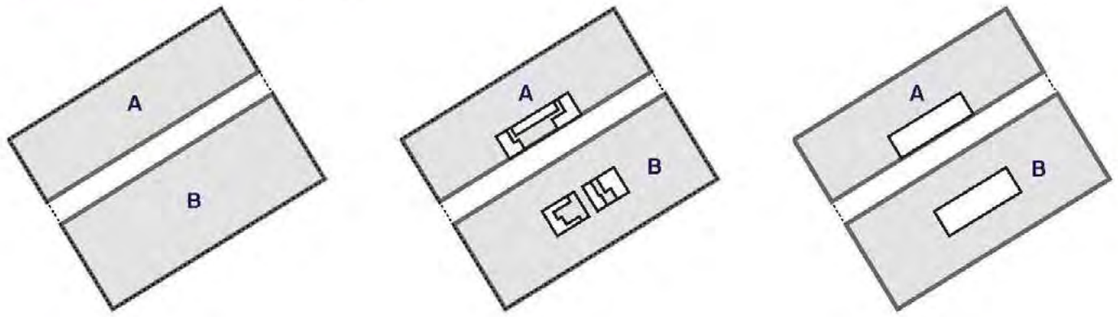
(a) the area of a mezzanine, and
(b) habitable rooms in a basement or an attic, and
(c) any shop, auditorium, cinema, and the like, in a basement or attic,

but excludes
(d) any area for common vertical circulation, such as lifts and stairs, and
(e) any basement
(i) storage, and
(ii) vehicular access, loading areas, garbage and services, and
(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and
(g) car parking to meet any requirements of the consent authority (including access to that car parking), and
(h) any space used for the loading or unloading of goods (including access to it), and
(i) terraces and balconies with outer walls less than 1.4 metres high, and voids above a floor at the level of a storey or storey above.

The **Floor Space Ratio (FSR)** of buildings on a site is the ratio of gross floor area of all buildings within the site to the site area.

Example of indicative typologies in the Inner Commercial Core

Typology 1 - Commercial Office



A: BEA = 1,650 sqm
B: BEA = 2,250 sqm

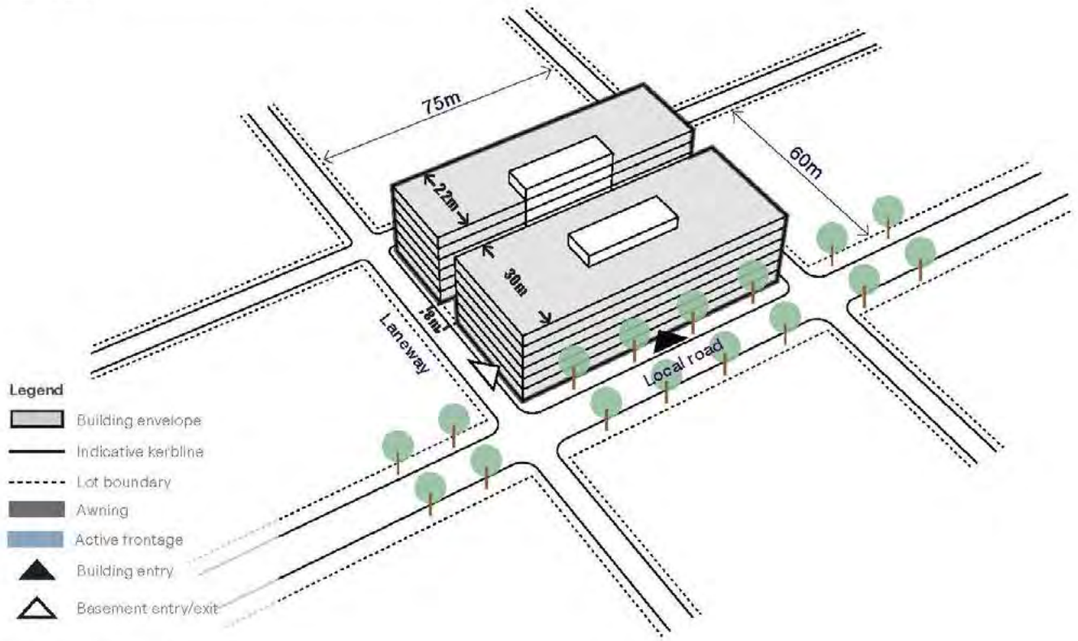
A: GFA = 1,525 sqm
B: GFA = 2,125 sqm

A: NLA = 1,450 sqm
B: NLA = 2,000 sqm

BEA = Building Envelope Area
GFA = Gross Floor Area

Indicative floorplate area potential

*The above areas have been calculated from specific floorplate examples, and assume a very efficient floorplate use with minor building articulation

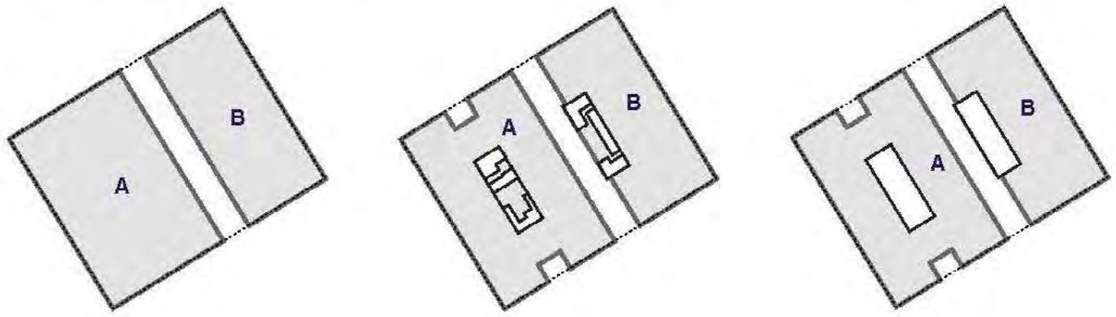


Indicative 3D model

Image: 152 Fanshawe Street, Auckland (Photo by Simon Devitt)

Example of indicative typologies in the Inner Commercial Core

Typology 2 - Commercial Office



A: BEA = 2,300 sqm
B: BEA = 1,650 sqm

A: GFA = 2,100 sqm
B: GFA = 1,500 sqm

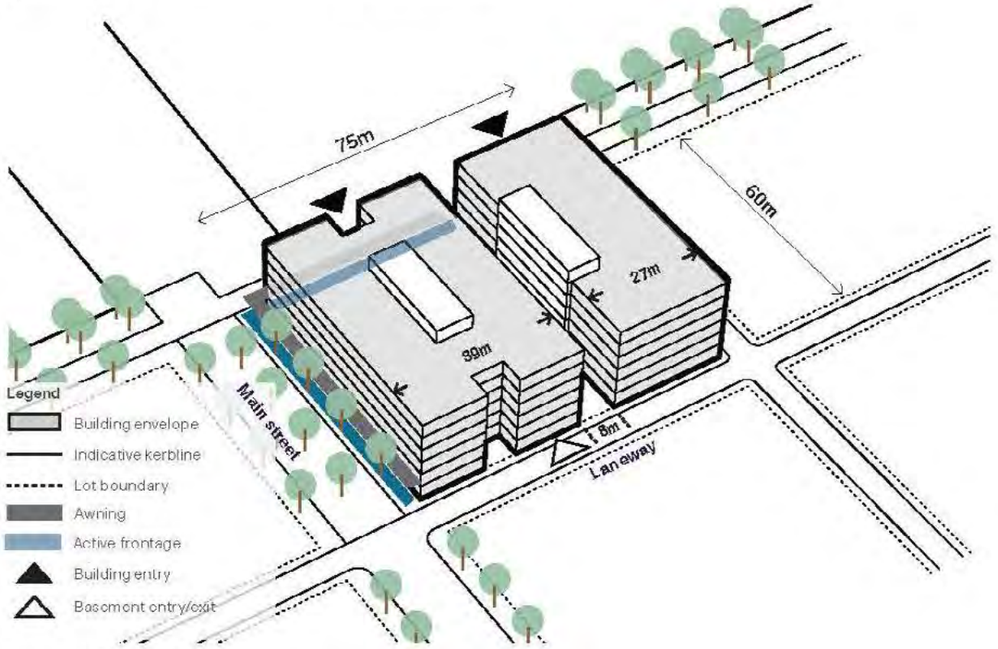
A: NLA = 2,000 sqm
B: NLA = 1,450 sqm

Indicative floorplate area potential

BEA = Building Envelope Area
GFA = Gross Floor Area

*The above areas have been calculated from specific floorplate examples, and assume a very efficient floorplate use with minor building articulation

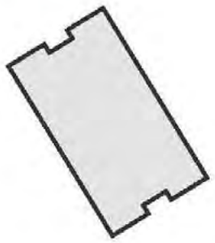
Image: Industry Business Hub, Plus Architecture
Source: www.plusarchitectus.com.au



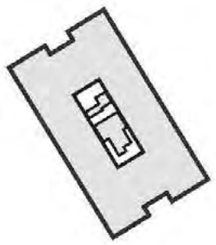
Indicative 3D model

Example of indicative typologies in the Inner Commercial Core

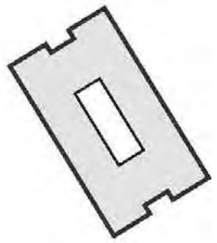
Typology 3 - Commercial Office



BEA = 1,900 sqm



GFA = 1750 sqm

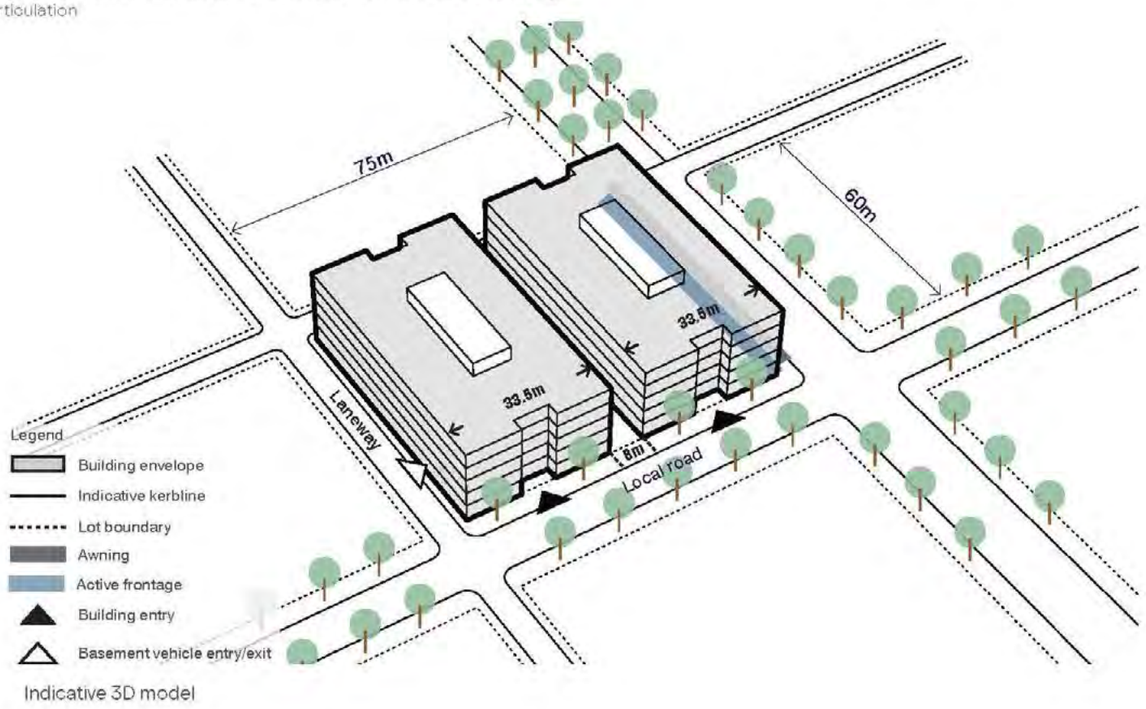


NLA = 1,700 sqm

BEA = Building Envelope Area
GFA = Gross Floor Area

Indicative floorplate area potential

*The above areas have been calculated from specific floorplate examples, and assume a very efficient floorplate use with minor building articulation



Indicative 3D model

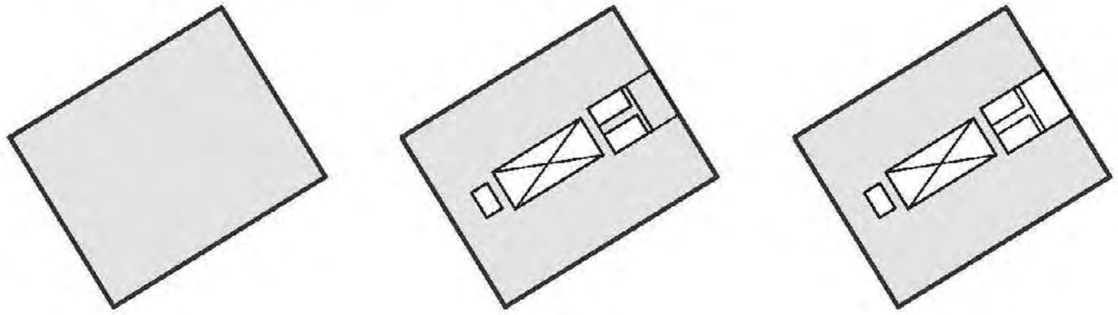
Image: Example precedent at 6 Eden Park Drive, North Ryde Source:: Brett Boardman

Image: Example precedent at 6 Eden Park Drive, North Ryde Source: Sutton Anderson, Property Consultants

Image: Example precedent at 6 Eden Park Drive, North Ryde Photography: Brett Boardman

Example of indicative typologies in the Inner Commercial Core

Typology 4 - Commercial Office



BEA = 4,500 sqm

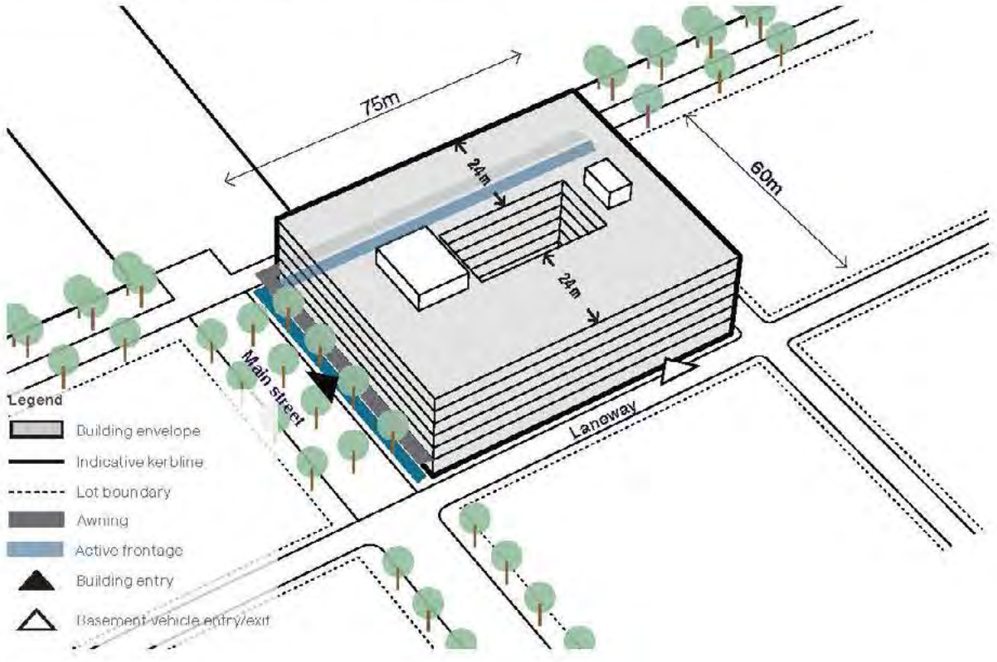
GFA = 3,900 sqm

NLA = 3,700 sqm

Indicative floorplate area potential

BEA = Building Envelope Area
GFA – Gross Floor Area

*The above areas have been calculated from specific floorplate examples, and assume a very efficient floorplate use with minor building articulation



Indicative 3D model

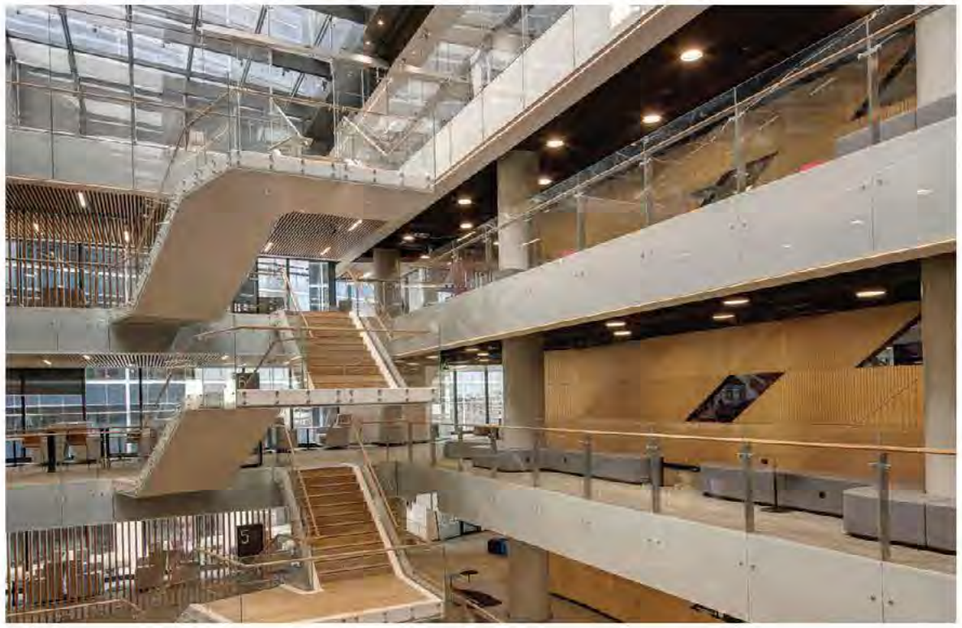


Image: Example internal atrium with interconnected floors: 1 Parramatta Square
Source: Brett Boardman

Example of indicative typologies in the Inner Commercial Core

Typology 5 - Short term accommodation

BEA = 880 sqm

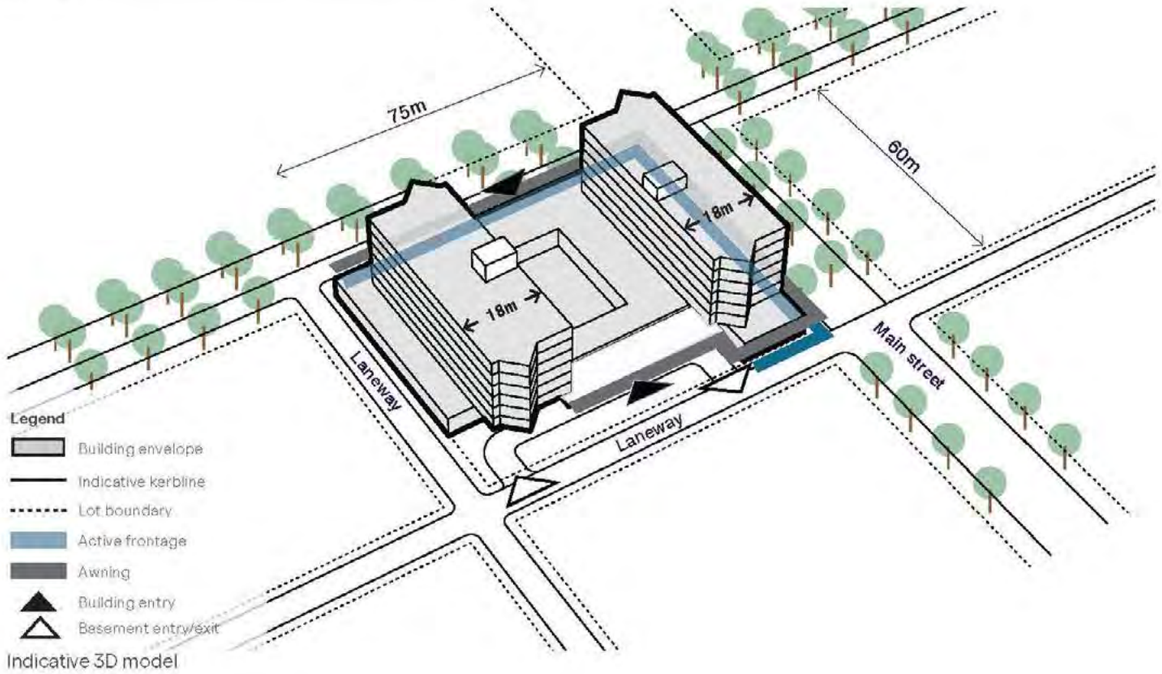
GFA = 830 sqm

Number of rooms / floor = 22

BEA = Building Envelope Area
GFA = Gross Floor Area

Indicative floorplate area potential

*The above areas have been calculated from specific floorplate examples, and assume a very efficient floorplate use with minor building articulation

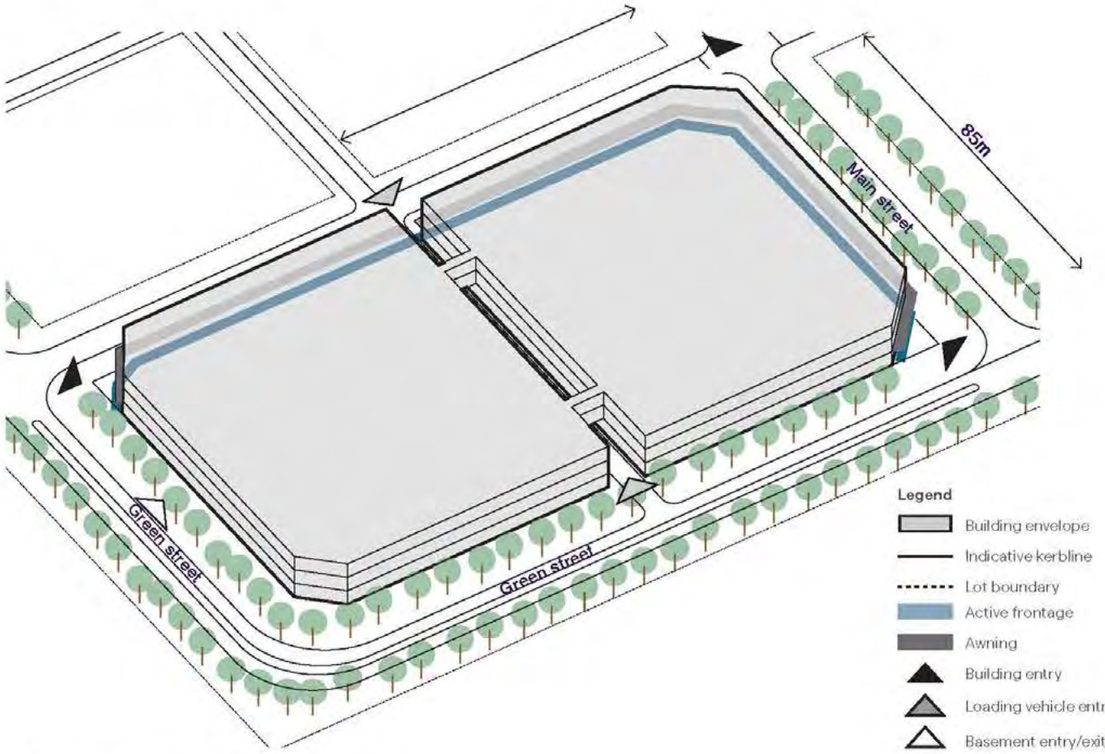


Indicative 3D model

Image: Example precedent: PARK-ROYAL, Parramatta
Source: Brett Boardman

Example of indicative typologies in the Inner Commercial Core

Typology 6 - Big Box Retail

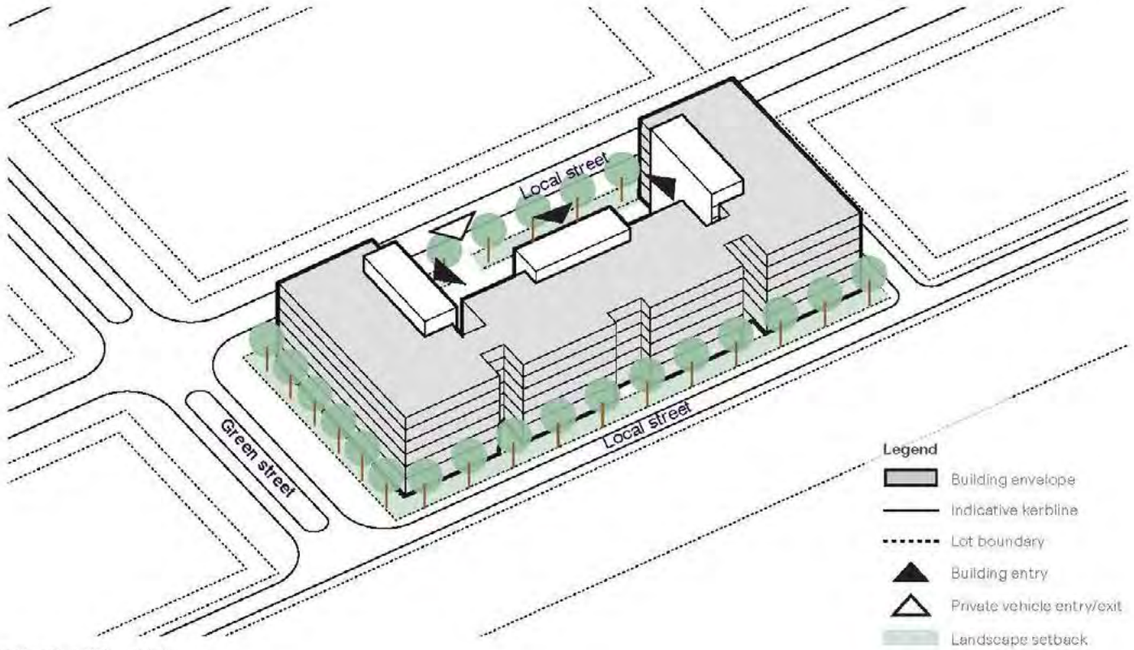


Indicative 3D model

Images above: Example precedents of Wollongong Centre, GPT
Source: Hansen Yuncken

Example of indicative typologies in the Outer Commercial Core

Typology 1 - Commercial Office

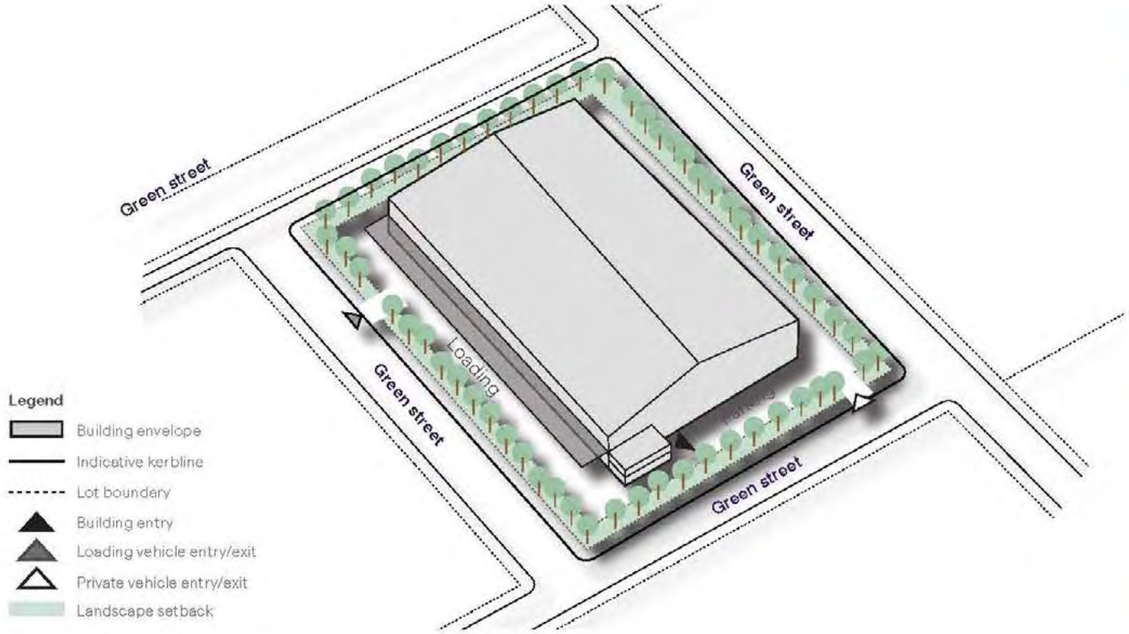


Indicative 3D model

Image: Example precedent: Allianz building, Theodor-Stern-Kai, Frankfurt Main, Germany
Source: Wikimedia Commons

Example of indicative typologies in the Large Lots area

Typology 1 - Large Warehouse

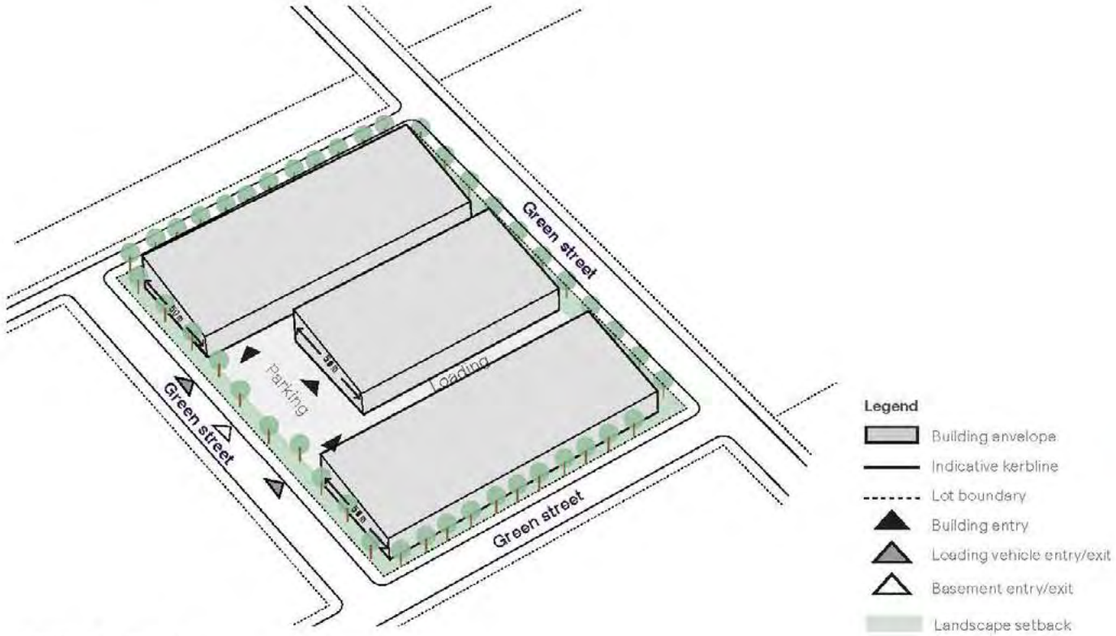


Indicative 3D model

Images above: Example precedents at 1 Litton Road, Greystanes
Source: www.dexus.com.au

Example of indicative typologies in the Outer Commercial Core

Typology 2 - Medium Warehouses

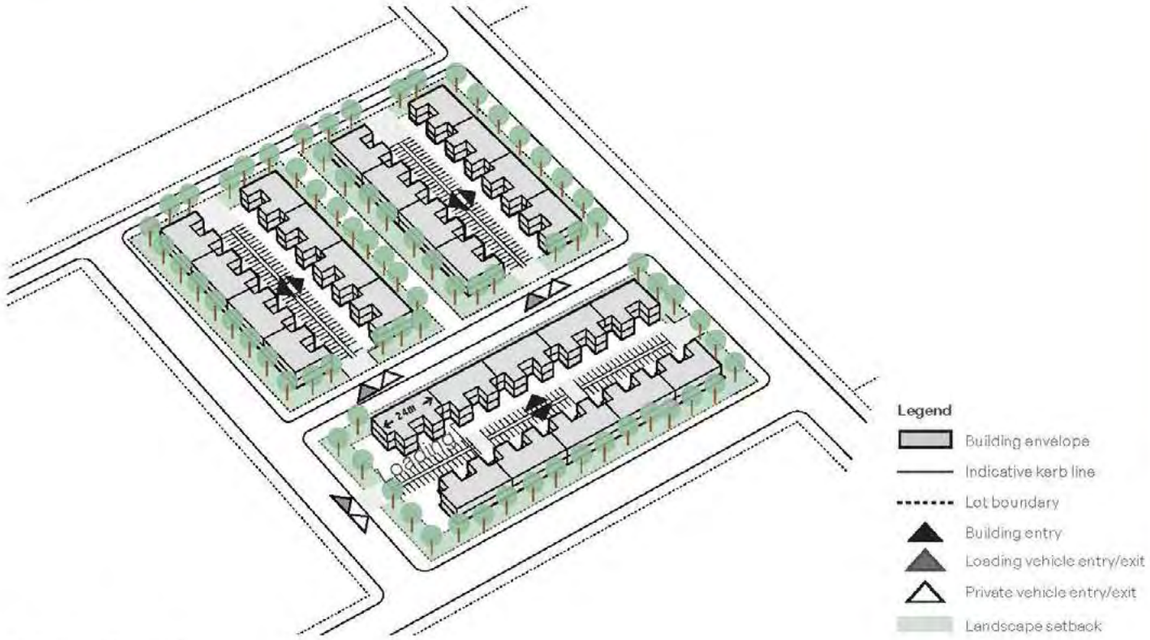


Indicative 3D model

Images above: Example precedents of Enterprise Industrial Estate, 8 Jullian Close Botany
Source: https://www.enterpriseindustrial.com.au/

Example of indicative typologies in the Large Lots area

Typology 3 - Small Warehouses

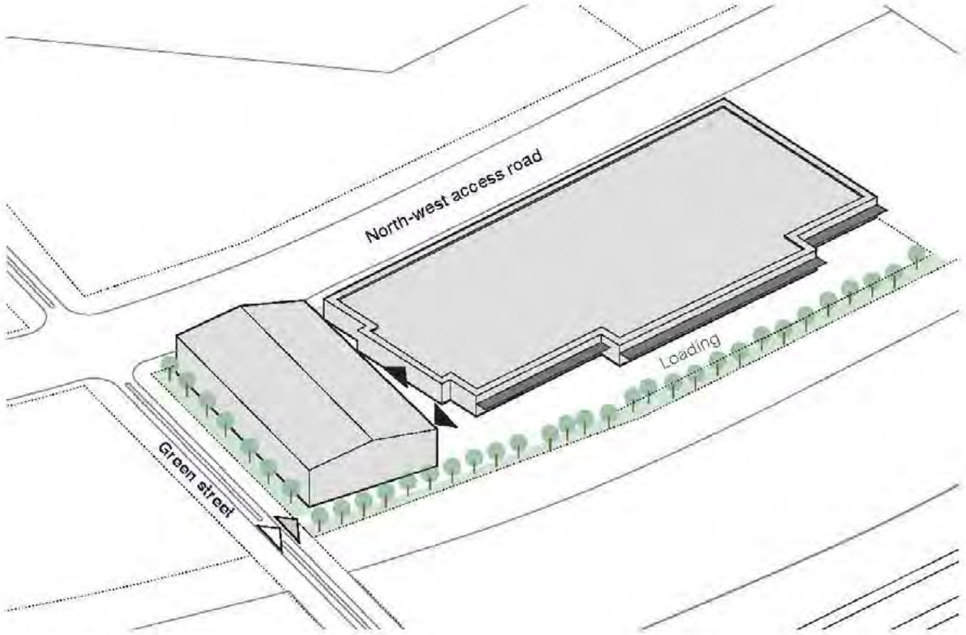


Indicative 3D model

Images above: Example precedents at 15 Meadow Way, Botany
Source: https://www.enterpriseindustrial.com.au

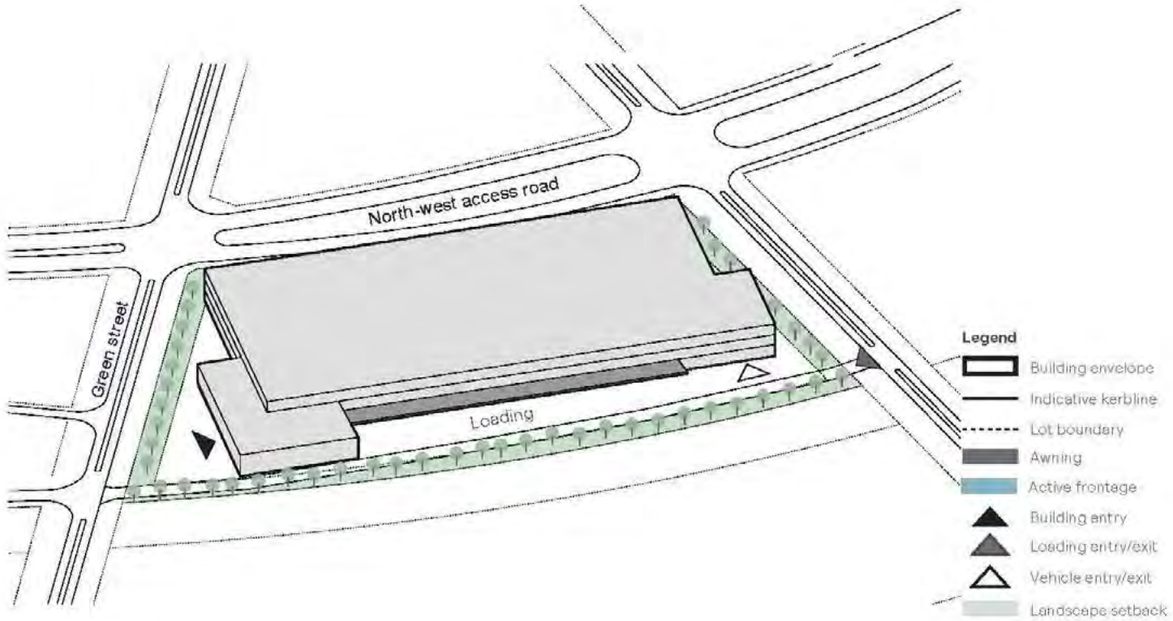
Example of indicative typologies in the Outer Commercial Core

Typology 5 - Bulky goods retail



Indicative 3D model

Typology 6 - Big box retail



Indicative 3D model

3.3 Building height

Objectives

1. To establish a comfortable building height which enhances pedestrian amenity, allows reasonable levels of daylight to streets and lessens wind impact at street levels.
2. To create a consistent street wall height and built form edge that frames the public domain.
3. To ensure the safety of the airport operations by compliance with the Obstacle Limitation Surface (OLS) and building induced wind shear.

Design Guidance

3.3.1 Maximum building height is limited to wind shear constraints and the OLS restrictions prescribed by WSA in accordance with the requirements of the Civil Aviation Safety Authority's Manual of Standards and National Airports Safeguarding Framework.

3.3.2 Maximum building heights for the Business Park are outlined in Table 4.

3.3.3 Opportunity for taller building heights in the Inner Commercial Core (to a maximum of 8 storeys) may be considered if it can be demonstrated that variation to the height strategy would achieve:

- Consistency with the objectives of the preferred building height strategy
- Consistency with the land use strategy outlined in Section 2.5
- An appropriate street wall condition that allows for an improved public domain and landscaping treatment
- A variation in building height and form, including upper level setbacks above 6 storeys, to reduce bulk and scale
- No adverse safety impacts to the operation of the Airport are created, including building generated wind shear (A wind shear assessment and wind tunnel modelling may be required).

Precinct	Design Guidance
Inner Commercial Core	– Maximum building heights range between: – 5 and 6 storeys (or 24 - 29 metres) at the inner edges of the Business Park fronting the rail line and motorway; and – 4 and 5 storeys (or 21 – 24 metres) at the outer edges fronting the runways.
Outer Commercial Core	– Maximum building heights range between 5 and 6 storeys (or 22 to 28 metres above ground).
Large Lots	– Maximum building heights range between 20-30m within wind shear zone. – Maximum building heights up to 35m outside of wind shear zone.

Table 4 - Building height

3.4 Setbacks

Objectives

1. To create an active and defined street edge in the inner commercial core.
2. To provide quality landscaped settings along primary and secondary streets.
3. To reduce bulk and scale and minimise streetscape impacts.
4. To provide a landscaped buffer to light industrial, manufacturing, loading, and blank façades.
5. To enhance the amenity of building occupants in terms of daylight, outlook, view sharing, ventilation and wind mitigation.

Design Guidance

3.4.1 Nil setbacks should be provided for development in the inner commercial core, in accordance with Figure 20.

3.4.2 A minimum setback of 5m applies to development in the outer commercial core, in accordance with Figure 20.

3.4.3 A minimum setback of 10m applies to development in the large lots precinct, in accordance with Figure 20.

3.4.4 Setback areas are to be landscaped and planted with appropriate species.

3.4.5 No buildings, structures, car parking or storage areas are permitted within the setback area.

Note. Building setbacks is measured from the lot boundary to the outermost wall of a building.

Figure 21 - Setbacks

3.5 Building design

Objectives

1. To encourage a high quality and contemporary architectural design.
2. To ensure the scale and character of the development is compatible with the vision for the Business Park and adjoining development.
3. To establish buildings that contribute to the Desired Future Character of each precinct.
4. To ensure development enhances the streetscape and visual quality of the Business Park.
5. To reduce the bulk and scale of buildings and ensure buildings provide an appropriate scale to the street.
6. To promote resource-efficient, passive design and sustainable development principles.

Design Guidance

Applicable to all development

3.5.1 All servicing and loading docks including roller shutters are not be located on the primary street frontage.

3.5.2 Building design should minimise opportunities for wildlife, particularly birds, to perch, nest, and roost on ledges, platforms, eaves etc.

3.5.3 Building design is to make allowance for infrastructure and services requirements including communications, sewer, water, recycled water, trade waste and other services.

3.5.4 Building materials selection should demonstrate low embodied carbon choices (eg. Timber, bamboo, recycled content materials, re-used materials).

3.5.5 Passive design solutions should be expressed in building design (eg. Daylight, shading, natural ventilation, mixed-mode ventilation, green roof).

Images above showing loading and servicing located away from primary street frontage.
Source: https://diadem.co/

Images above showing example of solar panel and green roof system
Source: https://zinco-greenroof.com/

Building design

Applicable to development in the Inner Commercial Core

3.5.6 Buildings are to be designed to address the primary street frontage.

3.5.7 On corner lots, the building should address both street frontages and be expressed by variation in architectural form.

3.5.8 Buildings are to be articulated with regular vertical breaks in the building to limit overall mass and sense of scale from the public domain.

3.5.9 Buildings are to have a maximum length of 75m measured across the front of the site. Where a building length is greater than 45m, it is to be separated into at least two parts by a recess or projection.

3.5.10 Treatment of building facades are to be articulated by variations in materials, finishes and colours, use of blade or fin walls, sun shading devices or by varying façade elements.

3.5.11 Building services such as mechanical ventilation, roof plant and lift overrun should be integrated with the façade and building design and screened from the public domain.

3.5.12 Buildings are to have a minimum floor to ceiling height of 4.5m on the ground floor to allow for flexibility of use.

3.5.13 Blank facades are not permitted along primary and secondary street frontages.

3.5.14 Continuous awnings must be provided to primary street frontages. Awnings must be a minimum of 3.6m above finished ground level.

Applicable to development in the Outer Commercial Core

3.5.15 Buildings are to be articulated with regular vertical breaks in the building to limit overall mass and sense of scale from the public domain.

3.5.16 Building length is to be no greater than 55m, by which it is then to be separated into at least two parts by a recess or projection or a building separation.

3.5.17 Buildings are to be located to frame the street. On corner lots, the building should be located to frame all street edges.

3.5.18 Treatment of building façades are to be articulated by variations in materials, finishes and colours, use of blade or fin walls, sun shading devices or by varying façade elements.

3.5.19 Building services such as mechanical ventilation, roof plant and lift overrun should be integrated with the façade and building design and screened from the public domain.

3.5.20 Buildings are to have a minimum floor to ceiling height of 4.5m on the ground floor to allow for flexibility of use.

3.5.21 Blank façades are not permitted along primary and secondary street frontages.

Applicable to development for Large Lot Uses

3.5.22 Buildings should not contain long, blank and unarticulated walls, particularly on primary street frontages. Use of a single colour or material should be avoided.

3.5.23 Development must use architectural elements to articulate the front and other façades visible from the public domain.

3.5.24 Where blank walls are unavoidable, landscape screen planting is to be utilised to reduce visual impact when viewed from the public domain and/or adjoining development.

3.5.25 The main entry to the building shall be easily identifiable and directly accessible from the street.

3.5.26 Office components of industrial development should be located at the front of the property with windows and entrances facing the street.

3.6 Materials and finishes

Objectives

1. To enhance the visual quality of the Business Park through the selection of appropriate high-quality materials and finishes
2. To encourage the use of materials that minimise impact on the environment.

Design Guidance

3.6.1 Any application for consent must include a schedule of external material and finishes.

3.6.2 External materials and finishes should be:

- High quality and robust
- Employed and detailed in ways that are innovative and distinctive
- Appropriate for the climate and reflective of the broader Western Sydney landscape
- Selected to improve heat island effect
- Selected to reduce impact on the environment
- Expressed through the use of texture, colour, material changes and other façade treatments

3.6.3 Use materials and colours that are predominately subtle, recessive and low or non-reflective.

3.6.4 Minimise variations in colour and use of strong/bold hues.

3.6.5 Roofs should feature defined architectural elements including reflective surfaces and colours to reduce heat island effect.

3.6.6 The following elements should be considered in building material selections for new development:

- Reduce waste
- Energy and water efficiency
- Use renewable resources
- Avoid toxic chemicals
- Low maintenance
- Recycled content
- Non-polluting
- Reduce heat island effect
- Low embodied carbon
- Third party certified sustainable

3.6.7 External finishes proposed along primary street frontages must create an attractive appearance to the façade of the building.

3.7 Business signage

Objectives

1. To ensure signage is compatible with the building design and landscaped character of the Business Park.
2. To ensure that signage does not detract from the visual appeal of development or the Business Park.
3. To promote signs which add character to the streetscape of the Business Park.
4. To encourage well designed and suitably located signs that contribute to the commercial vitality of the Business Park that promote active uses at the street level of buildings.

Design Guidance

Most sites will require signage for the efficient and safe operation of their business use. Any future development application must be accompanied with details of all signage and advertising proposed.

Design

3.7.1 Signage is to be compatible with the architecture, materials, finishes and colours of the building and the streetscape.

3.7.2 Signage is to be visually interesting and exhibit a high level of design quality.

3.7.3 Wall signage is not to occupy more than 10% of any façade or wall of a building in the inner and commercial core areas.

3.7.4 Wall signage is not to occupy more than 30% of any facade or wall of a building in the large lots precinct.

3.7.5 Where illuminated signage is proposed, signage must be internally illuminated. Up lighting of signage is not permitted.

3.7.6 Signs painted on or applied on the roof of a building are not permitted.

3.7.7 Signs shall be constructed and located in sympathy with landscaping and street planting. No trees should be felled or lopped to allow for greater sign visibility.

Location

3.7.8 The only signs to be used in car parks are those for vehicle and pedestrian directions and those required for Work Health and Safety.

3.7.9 One wall mounted business sign per street frontage is allowed per street frontage for commercial and industrial development.

Safety

3.7.10 Signs must be structurally and electrically safe.

3.7.11 Signage that will distract motorists, pilots or interrupt airport operations are not permitted.

3.7.12 Signage is not to incorporate sound, vibration, odour or other emissions.

Other requirements

3.7.13 The following information must be submitted with all signage proposals:

- Full working drawings showing dimensions, location in plan or position of a building or site and the method of attachment to the ground or to the building
- Graphic concept of the proposed signage showing outlining text, colours, materials
- Specifications of construction materials of the sign and its supporting structure

3.7.14 A signage strategy for 'big box' retail buildings is to be prepared.

3.7.15 Any proposed signaged should be in accordance with the NSW Transport Corridor Outdoor Advertising and Signage Guidelines.

3.7.16 Signs are to be maintained to a high standard and to WSA's satisfaction. A maintenance plan may be required to be submitted for approval prior to commencement of construction indicating the proposed methods of cleaning and a detailed maintenance schedule to ensure ongoing upkeep of the sign.

3.7.17 Signage is to be installed and secured in accordance with relevant Australian Standards.

Image: Example of wall signage for retail signage

Image: Example of wall signage for commercial development

4 Public domain and open space

Introduction

The airport site is located within the central western part of the Cumberland Plain, on the edge of the South Creek catchment. The public domain and landscape design of the Business Park has the opportunity to create a high quality, high amenity character and identity for the Business Park, drawing on the character of Western Sydney and the Cumberland Plain.

The original inhabitants of the airport site were the Darug people. The Cumberland Plain was an integral component of Darug territory and cultural identity. The landscape design has significant opportunities to recognise and celebrate indigenous cultural heritage that reveals and celebrates the unique Western Sydney landscape. The design of the landscape, public domain and parklands should incorporate the Ochre Grid principles. The Business Park Master Plan seeks to establish a network of public domain spaces and elements including:

- Land Bridge
- Airport Loop
- Runway Park
- Town Square
- Green Streets

The public domain and landscape design must also consider aviation safety, in particular, managing the potential for birds and other wildlife being hazardous to the Airport operations.

4.1 Public domain and open space

Objectives

1. To create high quality public domain and open spaces that are usable and delightful.
2. To celebrate connection to Country and the unique indigenous culture, heritage and setting of the Western Sydney landscape.
3. To enhance pedestrian connectivity to and from the Airport and throughout the Business Park.
4. To provide views across the airport runways from the parklands using landform.
5. To provide a legible public domain that connects highly walkable streets to parks.
6. To ensure landscaping is appropriately designed to minimise the risk of wildlife strikes on the airport site.
7. To reduce heat island effect by maximising shaded public domain, planted surfaces and heat reflective surfaces.
8. To provide opportunities for Business Park users to connect with nature and large parkland spaces, and by doing so improve health and wellbeing.
9. To provide an arrival experience into the airport that presents the unique beauty of Western Sydney and the Parkland City.
10. To deliver an open space network that connects beyond the site, to the local blue, green and ochre grids and beyond to the wider Sydney Green Grid.
11. To create a public domain that provides a water treatment train, which collects, treats and filters water from the Airport and the Business Park in line with the principles of the Parkland City model.

Design Guidance

4.1.1 Provide new open space in accordance with the public domain and open space strategy in accordance with Figure 21.

4.1.2 Provide a hierarchy of public domain and open spaces in accordance with the Public Domain Illustrative in Figure 22 (overleaf).

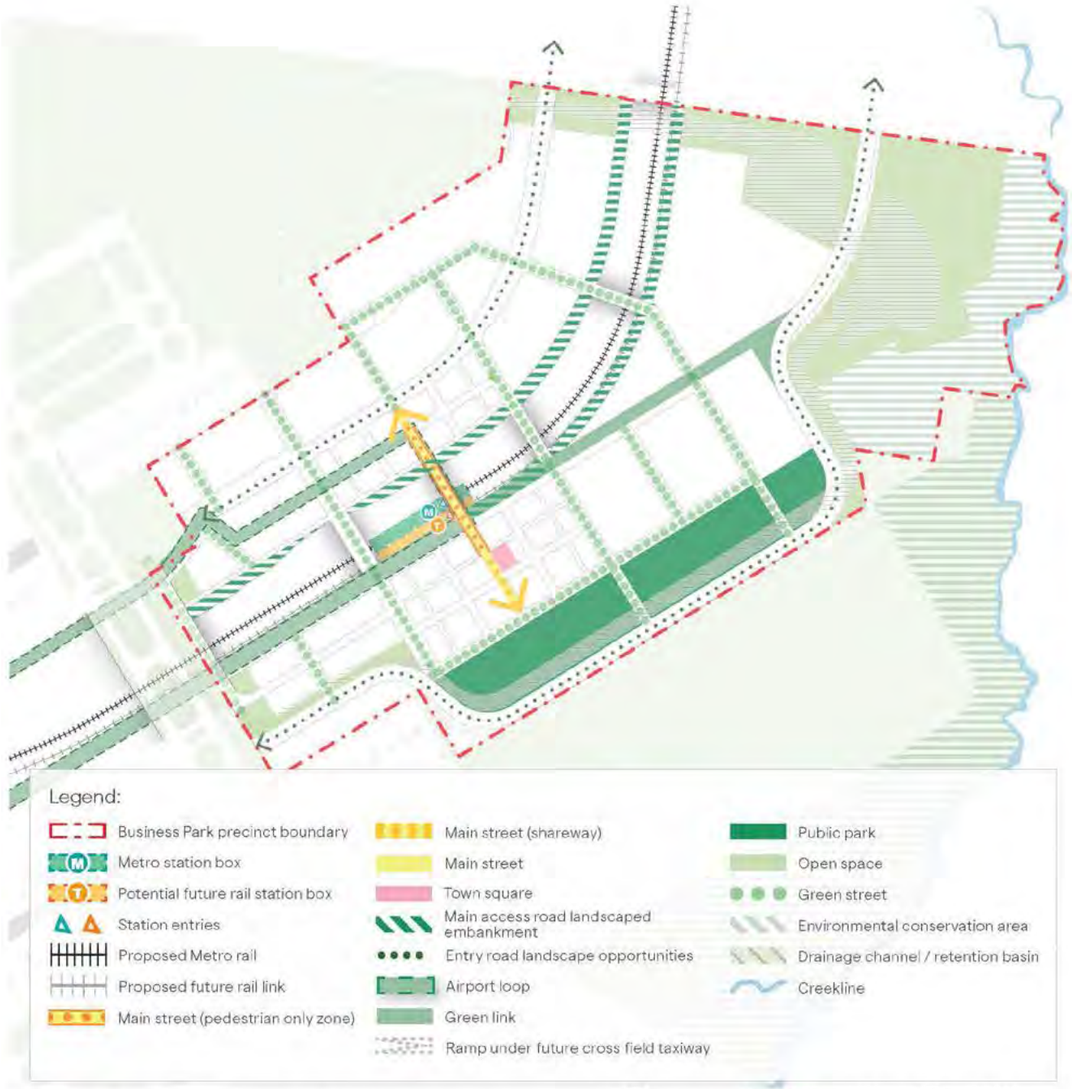


Figure 22 - Open space and public domain plan

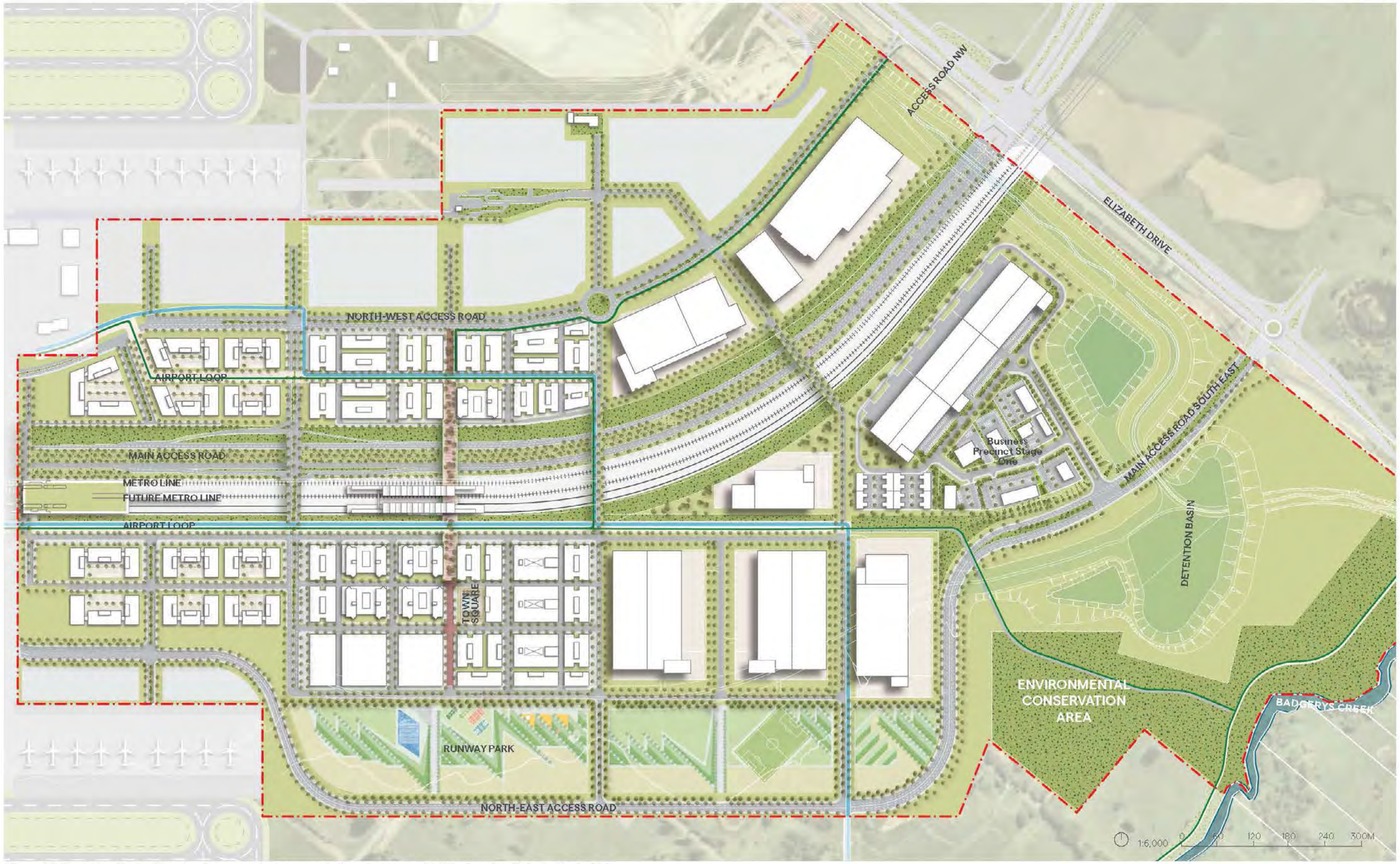


Figure 23 - Illustrative Master Plan showing general arrangement of open space and public domain with indicative built form

Public domain and open space

Land Bridge

The Land Bridge will be a high amenity pedestrian link that connects the two sides of the Business Park and the Business Park Metro/rail station.

4.1.3 The design of the Land Bridge should:

- Connect the two sides of the Business Park through an active pedestrian and cycle link (and provide access for emergency and maintenance vehicles)
- Provide direct access to the Metro station entry and concourse and allow a clear path of travel for circulation entering and exiting the Metro station
- Be activated with retail uses including cafes, kiosks, outdoor dining and community uses with outdoor seating and opportunities for bike/e-scooter hire
- Provide weather protection and shading for pedestrians
- Protect users visually and acoustically from the rail and motorway corridors.
- Provide consistent tree and shrub planting to improve amenity for pedestrians
- Be designed to incorporate the Ochre Grid principles
- Respond to indigenous cultural heritage and reveal and celebrate the unique Western Sydney landscape

Refer to Illustrative Master Plan extract in Figure 24.

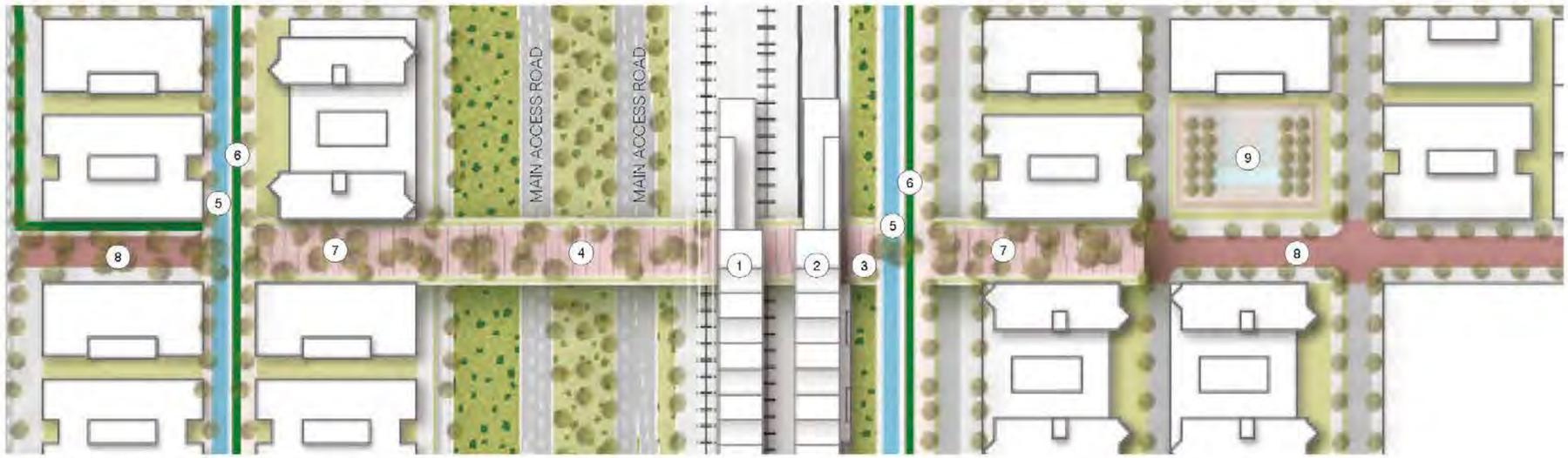


Figure 24 - Land Bridge concept (extract from the Illustrative Master Plan)

1. Business Park Metro station access
2. Future rail station access
3. High amentiy pedestrian land bridge connection to SE side of the Business Park
4. High amentiy pedestrian land bridge connection to NW side of the Business Park
5. Allowance for future transport corridor (APM/trackless tram)
6. Airport pedestrian/cycle green link
7. Continuation of the land bridge into a pedestrianised plaza space
8. Low speed/shared zone through the business park
9. Business Park Town square

Runway Park

The Runway Park provides an important large green open space for the Business Park that is located and designed in response to its proximity to the airport runway. This park also plays a fundamental role in the arrival sequence when entering the Business Park and a unique identifier when arriving by air.

4.1.4 Deliver a new large Runway Park along the southern edge of the Business Park. The design of the Runway Park should:

- Create an iconic landscaped entry marker when arriving to the Business Park both from the road and air
- Use landform solutions as noise protection
- Incorporate viewing mounds toward Badgery's Creek and the Airport runway.
- Be multi-purpose and include a range of recreational areas along the edge of the Business Park such as sports fields, sports courts, playgrounds, a plaza and café. Note. These uses should be protected from the runway and access road with large landform mounds
- Cluster recreation activities in the central location at the end of the main street.
- Provide clear pedestrian and cycling connections from the park to the surrounding street network
- Be designed to incorporate the Ochre Grid principles
- Respond to indigenous cultural heritage and reveal and celebrate the unique Western Sydney landscape

The Runway Park will be developed in stages.
Refer to indicative concept plan and section figures 25-26

Figure 25 - Runway Park concept (extract from the Illustrative Master Plan)

Public domain and open space

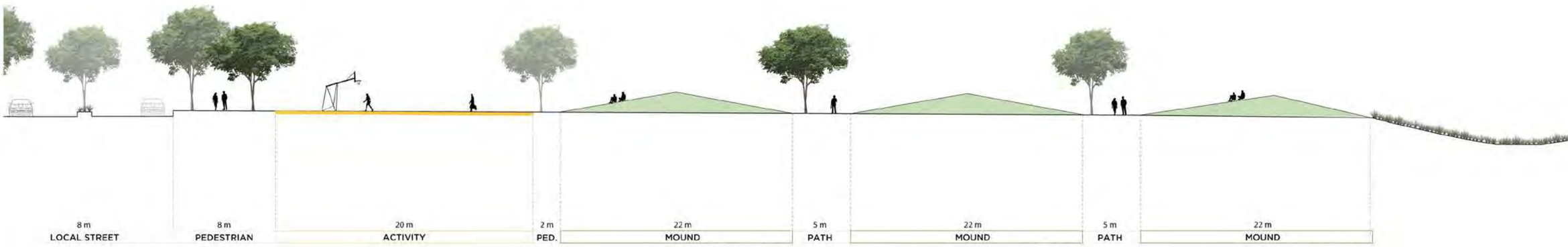


Figure 26 Runway Park Typical Section

Image - Artists impression of the Runway Park

The Runway Park is a monumental landscape that extends along the edge of the future 2nd runway and north-east access road. Set within the wider Western Parkland City, this space will become an iconic parkland that acts as a showcase of the Western Sydney undulating terrain and Cumberland Plain shrubs and grasses. A series of large landform mounds act as an acoustic buffer to the low frequency drone of planes taking off and landing. The Runway Park frames the Business Park with uses for local workers and airport visitors including sports fields, play spaces, a pool, passive recreation space and broad vistas across the airport runways.

4.2 Private and communal open space and landscaping

Objectives

The below objectives and design guidance applies to open space provision on development lots including but not limited to commercial office buildings and hotel accommodation.

1. To facilitate the provision of useable private and communal open space areas.
2. To provide workers and visitors within the inner commercial core opportunities for both passive and active recreation.
3. To encourage green roofs which reduce heat island effect, improve air quality, building efficiency and stormwater quality and run off, to provide communal open space for office workers in the inner commercial core, and enhance the view of the Business Park and Airport from the air.
4. To reduce heat island effect.

Design Guidance

4.2.1 A deep soil and landscape plan must be submitted with future development applications.

4.2.2 Communal open space should:

- Be located at grade or on rooftops of buildings
- Include appropriate landscaping in accordance with Section 4.3
- Include recreational facilities or features such as BBQ facilities, appropriate seating and furniture
- Include shelter from sun/wind, and mitigation for noise and odours.

4.2.3 Green roofs are encouraged for all commercial office development in the Business Park. Low cost, easy to maintain roofs are encouraged. Roofs do not have to be habitable, comprise significant soil depths or accommodate shrubs or trees.

4.2.4 Plants suitable for extensive green roofs include low growing succulents and herbaceous perennials originating from dry land habitats. Plant species should be non-bird attracting.

4.2.5 The design of green roofs should be designed by a specialised landscape architect and include:

- The location of proposed structures
- Drainage, irrigation and waterproofing details
- Selection of plant species and soil details
- An accessibility and management plan outlining accessibility requirements and the required and ongoing maintenance for the green roof.

4.2.6 Private open space should not include driveways, effluent drainage areas, rubbish bin storage areas, sites for rainwater tanks and other utilities areas.

Image showing an example of a communal green roof for a commercial development at Commonwealth Building at Eveleigh, NSW
Source: https://www.timeout.com/sydney/attractions/yerrabingin-rooftop-garden

Image: Example of a communal green roof for a commercial development at Kanngan Batman Tafe Docklands, Melbourne
Source: http://fytogreen.com.au/kangan-batman-tafe-roof-garden/

Image: Example of public domain and landscaping at Mascot
Source: Architectus

4.3 Planting species

Objectives

1. To encourage a diverse characterful species of planting throughout the public domain.
2. To avoid certain plant species (such as species that flower and bear fruit) to minimise the attraction of birds to the Airport.
3. To reduce heat island effect.

Design Guidance

4.3.1 Plant species types should generally be provided in accordance with WSA's planting guidelines and Sustainability Plan.

4.3.2 Any future development application must be accompanied by a landscape plan, prepared by a qualified landscape architect and reviewed by an aviation ecologist to ensure low risk species are selected.

4.3.3 Trees planted along roads should have a maximum mature height of 10m and no more than 5 trees planted in any one group.

4.3.4 Shrubs should not exceed 5m in mature height.

4.3.5 Use low prostrate ground cover plants, avoiding profusely fruiting or seeding species. Use ground cover species rather than grasses to reduce the wildlife attraction and minimise ongoing maintenance costs.

4.3.6 Avoid grasses and pasture legumes that produce a lot of seed for rough grass or soil stabilisation.

4.4 Fencing

Objectives

The design of fencing impacts significantly on the quality of the public domain and adjoining development. The design of front fencing should promote security and passive surveillance without compromising the amenity and quality of the streetscape and public domain.

1. To allow for security and passive surveillance of the street.
2. To ensure fencing is of a high-quality material finish and compatible with other development throughout the Business Park.

Design Guidance

4.4.1 Fencing shall be a maximum of 1.8 metres in height, unless required as part of an acoustic solution.

4.4.2 Despite the above, fencing is prohibited in the inner commercial core.

4.4.3 All fencing along the primary and secondary frontages of an allotment must:

- Be consistent in design and style with the building;
- Be constructed of high-quality materials that are transparent and of an 'open' style appearance e.g. decorative metal. Solid fencing is not permitted;
- Be complementary to streetscape, landscaping and the public domain.

4.4.4 Fencing within the minimum setback area is not permitted.

4.4.5 Proposed fencing is to be detailed on the Landscape Plan and submitted with the application.

Image: Example precedent Blair Athol Industrial Precinct, Campbelltown.

Image: Example precedent: Quarry Indutrial Estate Source: www.dexus.com

4.5 Safety and security

Objectives

1. To ensure developments are safe and secure for employees and visitors to the Business Park.
2. To minimise opportunities for crime through environmental design.
3. To maximise opportunities for passive surveillance and contribute to the safety of the public domain.

Design Guidance

4.5.1 Buildings should be designed and oriented towards the primary street frontage and to overlook the public domain.

4.5.2 Provide entrances to buildings which are visually prominent and are easily identifiable.

4.5.3 Avoid creating blind corners and dark alcoves that provide concealment opportunities.

4.5.4 Provide appropriate lighting along pedestrian paths between public spaces, car parking areas and building entries.

4.5.5 All development applications should address 'Safer by Design' principles to the design of the public and private domain outlined in the Crime Prevention Through Environmental Design (CPTED) guidelines.

4.6 Vehicular access

Objectives

1. To minimise vehicle and pedestrian conflict.
2. To design driveways that are safe and minimise disruption to the streetscape.
3. To locate basement entries off laneways.
4. To prioritise pedestrian safety and amenity within the commercial core.

Lower-level floors of the Gensler designed 84.51° Centre in Cincinnati are used for parking but designed to blend in with the rest of the building, with the intention of converting them to office space in the future.

Image: Example above of the 184.51° Centre , Cincinnati
Source: www.gensler.com

Design Guidance

4.6.1 All applications should be accompanied by a Traffic and Parking Impact Assessment prepared in accordance with the RMS Guide to Traffic Generating Developments.

4.6.2 Car parking areas should be located at the rear or side of the properties away from the primary street frontage.

4.6.3 Ensure the location and design of car park entries are efficient, safe and integrated into the overall design of the development.

4.6.4 Ensure car parks, driveways and loading areas are designed to allow vehicles to enter and exit the site in a forward movement.

With active uses at ground floor and commercial space prioritised on upper levels, this Goodman development uses lower floors for car parking with the potential for conversion to office space when demand is needed. By removing intermediate floors on the car park levels, additional commercial floor space can be achieved.

Image: Example above of the building at 185 O'Riordan St, Mascot
Source: Architectus

4.7 Parking

In the early stages of development, it is assumed that majority of the employees and visitors in the Business Park will use private cars as the main mode of transport. As such, in the first stage of development, parking standards on site will need to be sufficient in order to meet this demand. This may mean short term and temporary parking solutions in parts of the commercial core and large lots precincts.

WSA may provide temporary at-grade parking (unbundled from development) for a period of time until public transport links are fully established.

Overtime as the Business Park grows, it may be possible to reduce the rates as public transport (including the opening of the Metro Station) increases and private car use changes with autonomous vehicles.

Objectives

1. To ensure sufficient parking is provided for a variety of land uses.
2. To recognise a changing travel behaviour over time.
3. To encourage low carbon travel choices (car sharing, electric vehicles, motorcycles, bicycles).

Design Guidance

4.7.1 Car parking provision should generally be provided in accordance with Table 5.

4.7.2 Car parking design should include provision for electric vehicle recharge facilities.

Basement

4.7.3 Basement car parking is encouraged in the inner and outer commercial core and should generally be limited to 1-2 levels.

4.7.4 Basement parking areas are to be located primarily under building footprints to maximise opportunities for deep soil.

4.7.5 Above ground sleeved car parking is permitted but must be designed to be re-purposed for other uses. Ventilation grills or screen devices must be integrated into the overall façade and landscape design of the development.

4.7.6 Provision for car share spaces are to be provided in the basements in accordance with Table 5.

4.7.7 Provision of recharge facilities for electric vehicles must be provided in basement carparks.

4.7.8 Car parking areas are to be designed and constructed so that electric vehicle charging points can be installed at a later time.

At-grade

4.7.9 Permanent at-grade car parking is not permitted in the Inner Commercial Core.

4.7.10 At-grade parking is permitted outside the Inner Commercial Core.

4.7.11 Parking areas must not be located within the front setback.

4.7.12 All parking areas are to be landscaped and provide appropriate shade and screening.

4.7.13 All parking areas shall be constructed of hard standing surface, with parking bays and circulation aisles clearly marked.

4.7.14 Where appropriate and possible, the development of the public domain should include electric vehicle charging points or the capacity for electric vehicle charging points to be installed at a later time.

4.7.15 All parking areas shall be designed in accordance with Australian Standards.

On- street parking

4.7.16 On street parking should be provided where indicated on the indicative Street Sections in Section 2.8 of this DCP. On street parking should be reviewed in subsequent stage of the Airport master plan.

4.7.17 Short-term parking may be provided on the main street prior to conversion to shared way and pedestrianised zone.

4.7.18 Provision of on-street carparking to the North-West and South-East Access road may be provided subject to further detail road design.

4.7.19 Subject to detailed road design, there may be opportunities for tree planting in the parking lanes.

Precinct	Design Guidance	Maximum car parking requirements	Car share
Inner Commercial Core	Office	1 space per 40m² GFA	1/200 spaces
	Short term accommodation	1 space per 5 rooms	1/50 rooms
	Retail	On-street short term only	Nil
Outer Commercial Core	Business Park	1 space per 75m² GFA	1/200 spaces
	Light industrial	1 space per 75m² GFA	Nil
Large Lots	Retail - big box	1 space per 100m² GFA	10 spaces
	Retail - bulky goods	1 space per 100m² GFA	10 spaces
	Urban Services	To be determined based on the number of employees	Nil

Table 5 - Car parking provisions

Note: Urban Services includes uses such as concrete batching, waste recycling and transfer, construction and local and state government depots, sewerage, water supply, electricity construction yards

Parking

Bicycle parking

4.7.20 Bicycle parking and cycling facilities shall be provided in accordance with Table 6.

4.7.21 Bicycle parking and cycling facilities shall be clearly signposted and located in an area that is convenient to access from within the building(s) and from the street/public path.

4.7.22 In multi-storey developments, bicycle parking and cycling facilities for staff shall be located on the ground floor or first basement level close to entry/exit points, to ensure they are secure and easily accessible by staff and tenants. The design of buildings must ensure:

- areas between bicycle parking and the street have a courtesy ramp, if stairs are the primary means of access,
- paths between the entry point and bike parking and cycling facilities shall be wide enough to accommodate a person walking a bike (particularly around corners),
- paths adjacent to a driveway are visually or physically separated and marked,
- bike cages or lockers within basement car parks are not located in, or create, concealed spaces.

4.7.23 Any bicycle parking for visitors or customers shall be located adjacent to the main entry point. In developments with multiple entry/exit points, the share of bicycle parking can be divided between each entry point, as per expected demand and design of the development.

4.7.24 End-of-trip facilities (showers and change rooms) are to be provided at the rate of 1 per 10 employee bicycle spaces.

4.7.25 At least one personal locker is to be provided for each Class 1 or 2 bicycle parking space.

Precinct	Use	Minimum bicycle parking requirements	Customer / visitor
Inner Commercial Core	Office	1 space per 220m² GFA	1 space per 2,000m² GFA
	Short term accommodation	1 space per 10 staff	Nil
	Retail - main street	1 space per 300m² GFA	1 space per 1,000m² GFA
Outer Commercial Core	Business Park	1 space per 220m² GFA	1 space per 2,000m² GFA
	Light industrial	1 space per 600m² NFA	1 space per 5,000m² GFA
	Light manufacturing	1 space per 600m² GFA	1 space per 5,000m² GFA
Large Lots	Retail - big box	1 space per 1500m² GFA	1 space per 1,500m² GFA
	Retail - bulky goods	1 space per 1500m² GFA	1 space per 1,500m² GFA
	Urban Services	1 space per 220m² GFA	1 space per 2,000m² GFA

Table 6 - Bicycle parking and End of Trip Facilities
Note: Urban Services includes uses such as concrete batching, waste recycling and transfer, construction and local and state government depots, sewerage, water supply, electricity construction yards

Figure 27 - Proposed car parking strategy - early stages

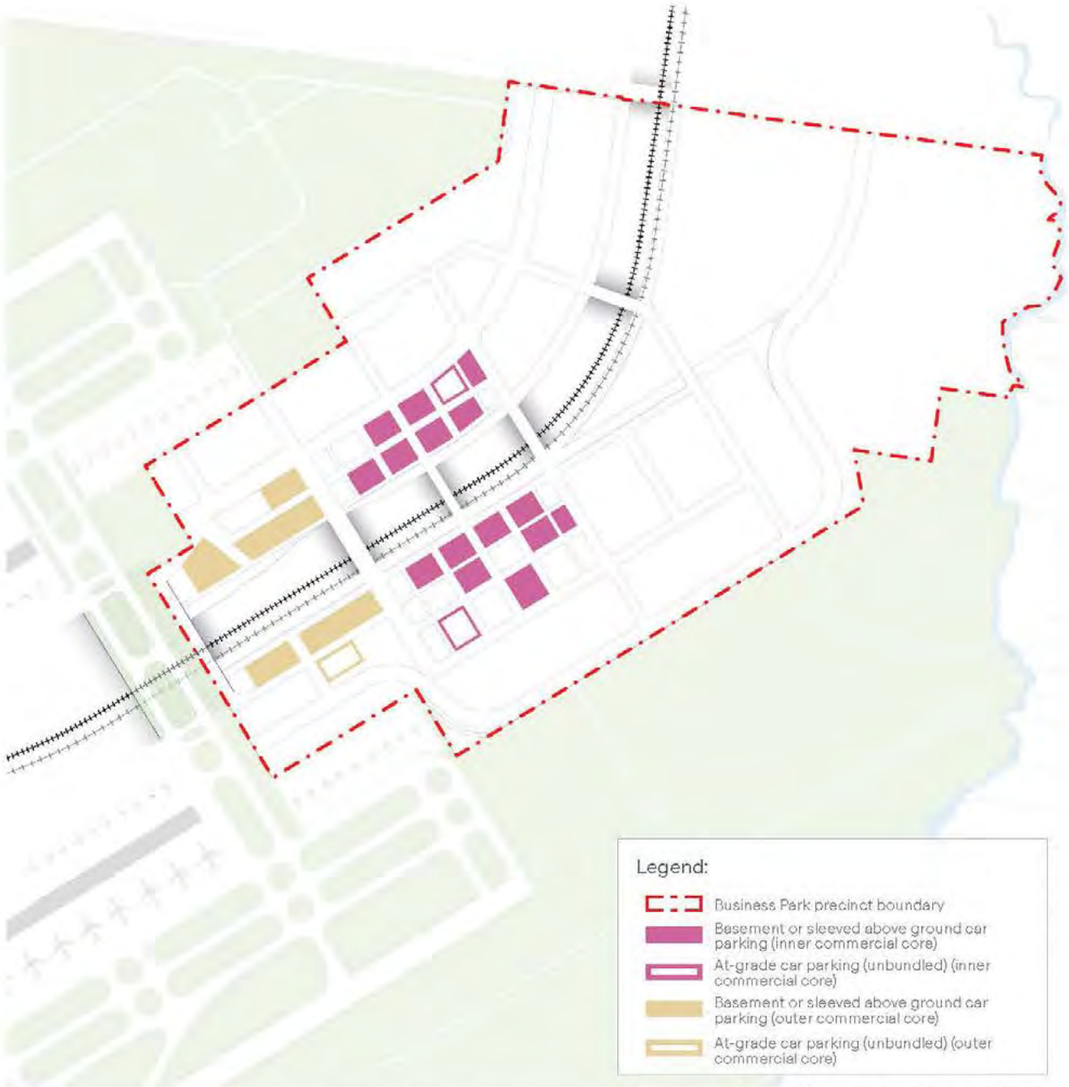
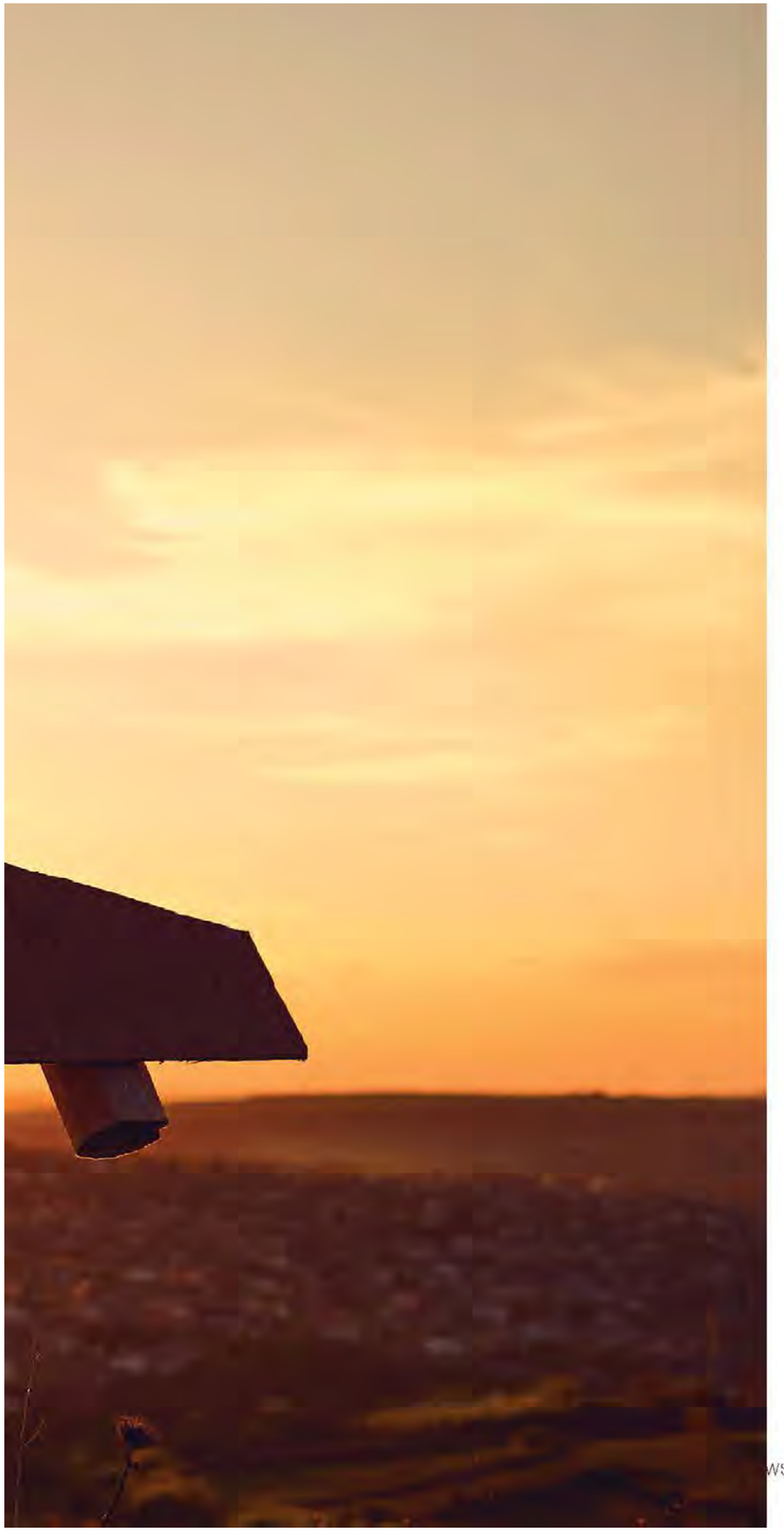


Figure 28 - Proposed car parking strategy - interim stages

Figure 29 - Proposed car parking strategy - ultimate stage

5 Utilities and Infrastructure



5.1 Essential Services

Objectives

1. To ensure that all development is adequately connected to essential services.

Design Guidance

5.1.1 All development must be adequately connected to supply of water, recycled water, supply of electricity, disposal and management of sewerage, stormwater drainage and suitable vehicular access.

5.1.2 Underground connections to essential services are preferred.

5.1.3 Fire hydrants and booster facilities are to be provided to all development in accordance with the requirements of the NSW Fire Brigade, Building Code of Australia and relevant Australian Standards.

5.1.4 Facilities (e.g. cooling towers, vents) that have the potential to cause air turbulence due to emission of steam, gas, smoke, dust or planes that could affect aircraft operations would require a plane rise assessment.

5.2 Telecommunications

Objectives

1. To minimise electromagnetic radiation (EMR)exposure to the public.
2. To ensure that the general public has access to telecommunications technology.
3. To provide a consistency of approach which benefits carriers and the local community.

Design Guidance

Basement

5.2.1 Antennae and supporting infrastructure must be designed in such a way as to minimise or reduce the visual impact from the public domain and community sensitive areas.

5.2.2 Infrastructure must be well designed, integrated with the existing building structure, have concealed cables where practical and appropriate, be unobtrusive where possible and be consistent with the character of the surrounding area.

5.2.3 Applications should demonstrate that a precautionary approach has been adopted with regards to minimising EMR exposures.

6 Environmental considerations

5.3 Stormwater and water sensitive urban design

The public domain of the Business Park has been designed with a water treatment train that collects, treats and filters stormwater from the source.

Bioswales in the major green streets are the basis of an integrated stormwater system that slow run-off and drain water through the Business Park to the drainage channels in the Runway Park South East and the corridor on the western edge of the Business Park. These channels have the opportunity to be landformed and planted as sculptural pieces of green infrastructure that are highly visible on arrival into the Airport. In large storm events, water is detained in ponds before being slowly released into Badgery's Creek.

Objectives

1. To create opportunities for drainage and water sensitive urban design.
2. To implement water management systems that are economically viable in the long run.
3. To minimise the potential of flooding impacts on development.
4. To maximise water re-use including wastewater and harvested stormwater.
5. To appropriately filter and slow stormwater before it enters the surrounding swales and creeks.
6. To avoid any ponding of water for more than 48 hours.
7. To reduce heat island effect.

Design Guidance

5.3.1 Stormwater is to be managed primarily through the street network and within the public domain.

5.3.2 Enhance social amenity by integrating water management measures in the street and lot landscape to increase visual, recreational, cultural, public health and ecological values.

5.3.3 Provide a water treatment train that collects, treats and filters stormwater from the source. This could include Water Sensitive Urban Design measures prior to discharge of stormwater off-site.

5.3.4 Drainage channels to be integrated into landscape features of the public domain.

5.3.5 Use vegetation for treatment purposes, water efficient landscaping and enhancing biodiversity.

5.3.6 Avoid the use of grass swales with gently-sloped non-vegetated edges. Where possible, swale vegetation should be maintained between 200-300mm to deter wildlife.

5.3.7 Design swale flow to ensure no standing water following rainfall events.

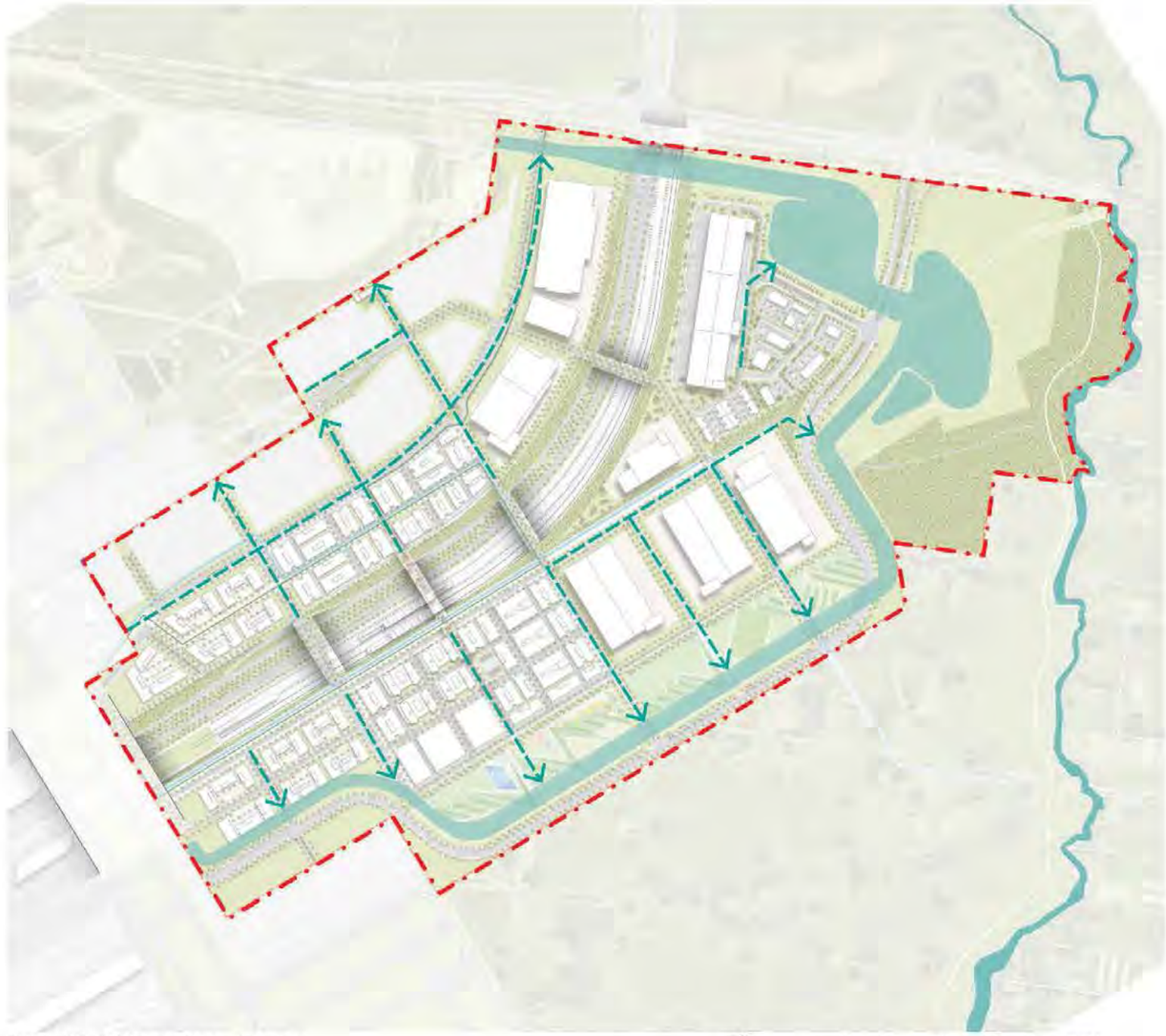


Figure 30 - Water drainage diagram

1:12,500 0 100 200 300 400 800M

6.1 Sustainable development

WSA aims to design, construct and operate the Western Sydney Airport in accordance with leading practice principles of sustainability. Our sustainability vision is to design, build and operate a thriving, safe, sustainable, leading Airport.

Building design is to be based on the foundational principles of circular economy and passive sustainable design. These principles are based on designing out waste and optimising the in-built efficiency of the building's structure, materials and services. These design principles will guide WSA's approach to greenhouse gas emissions and resource management for the Airport

Rating systems will be applied in the following way across Airport buildings. Table 7 below illustrates an example of the types of eligible buildings that each of the rating systems are able to certify.

Objectives

1. To encourage sustainable development to ensure buildings are environmentally responsible and resource efficient throughout their life cycle while reducing the overall impact on environment and enhancing human health.
2. To encourage use of building materials that minimise impact on environment.
3. To increase the resilience of development to the effects of climate change.
4. To reduce carbon emissions.
5. To reduce energy and water consumption.
6. To reduce waste.

Airport Area	ISCA Design, As Built, Operations	NABERS Energy and Water	Green Star Interiors	Green Star Design and As Built
Business Park - Infrastructure	●			
Business Park - Commercial		●	●	●
Business Park - Industrial			●	●
Business Park - Hotel		●	●	●
Business Park - Shopping Centre		●	●	●
Business Park - Data Centre		●	●	●

Table 7 - Rating systems

Sustainable development

Design Guidance

Basement

6.1.1 All development applications must include a NABERS commitment agreement (National Australian Built Environment Rating System) and Green Star scorecard to demonstrate the proposed environmental performance of a proposed development. As a minimum, all buildings must achieve:

- A 5-star Design Review and As Built Green Star Rating
- A 5-star Interior Green Star Rating
- A 5.5-star Energy Rating (NABERS)
- A 5-star Water Rating (NABERS)

6.1.2 Despite the above, development applications for Industrial development in the Business Park are excluded from achieving NABERS Energy and Water Ratings in accordance with the WSA Sustainability Plan 2019, until such time as NABERS releases an Industrial tool.

6.1.3 Buildings are to be oriented and designed to achieve optimum solar access and natural ventilation or mixed mode ventilation where practicable. Glazed façade must be designed to minimise heat load. Unshaded, large expanses of glazed façade must be avoided.

6.1.4 On site Photovoltaic systems are to be installed where practical. They should be effectively integrated to complement the overall building design.

6.1.5 Heating and cooling systems should be designed to be as efficient as possible and be integrated with passive building design solutions, mixed-mode or natural ventilation.

6.1.6 Energy efficient LED lighting, dimmers, motion detectors and/or automatic turn off switches are to be installed. Lighting systems should be integrated with natural daylight, to optimise energy efficiency and ensure that lighting is only used when natural daylight is insufficient.

6.1.7 Water efficient fittings and fixtures must be installed. Recycled water should be used for all non-potable uses such as toilet flushing, irrigation and wash-down.

6.1.8 Buildings material selection should demonstrate any of the following: low embodied carbon, reduced waste, low toxicity, circular economy principles, local supply chain procurement, third party sustainable certification.

6.1.9 Building design should enhance human health and wellbeing.

6.2 Air quality and odour

Objectives

1. To ensure air quality is maintained at acceptable levels.
2. To minimise the risk of dust or odour impacts on the Airport generally and on adjoining properties.
3. To ensure emissions are minimised from all plant, equipment and machinery.
4. To ensure that odours and emissions do not have a negative impact on public health.
5. To ensure that emissions do not have a negative impact on natural environment.

Design Guidance

6.2.1 Provide air quality control measures both during and post construction.

6.2.2 During construction implement appropriate mitigation measures such as truck washing bays and wetting of dirt roads.

6.2.3 Where a proposed development has the potential to adversely affect air quality, an air quality report must be prepared by an air quality/odour expert.

6.3 Waste management

Objectives

1. To reduce waste generation.
2. To maximise the percentage of recycled waste, recovered waste and waste diverted from landfill.
3. To maximise the reuse of building and construction materials and industrial/commercial waste.
4. To make design, construct and operation decisions that work towards a circular economy.

Design Guidance

All development must be accompanied by a Waste Management Plan. As a minimum the Waste Management Plan must:

6.3.1 Identify the type and classification of all waste that are likely to be generated during the development and post-development phases.

6.3.2 Identify initiatives for reusing and or recycling of waste including: co-mingled recyclables, organic waste, batteries and e-waste, and soft plastics as a minimum.

6.3.3 Identify waste management protocols during the development and post development phases including:

- Storage and handling of waste on-site
- Transportation of waste
- Record keeping and target setting
- Complying with obligations for notifying the Department of Environment and Conservation.

6.3.4 In addition to a Waste Management Plan the waste management facilities must be clearly illustrated on the plans accompanying the application.

6.3.5 All waste bins are to be lidded and inaccessible to wildlife.

6.3.6 Waste bins are to be stored in enclosed areas to restrict access to scavenging birds.

6.4 Acoustic impact

Objectives

1. To minimise the impact of noise and vibration.
2. To ensure appropriate noise mitigation measures are incorporated into the overall building design.

Design Guidance

6.4.1 An acoustic assessment will be required to ensure buildings meet noise intrusion standards.

6.4.2 Development is to be designed with noise control measures to minimise the possibility of noise transmission to adjoining development.

6.4.3 All development applications for noise generating uses are to be accompanied by an Acoustic Impact Report from a qualified acoustic engineer that certifies acoustic standards can be met in accordance with Australian Standards.

6.4.4 All development on the site must be designed to meet the requirements of AS 2021:2015 Acoustics - Aircraft noise intrusion - Building siting and construction.

Building type	ANEF Zone of site		
	Acceptable	Conditionally acceptable	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF (Note 1)	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF (Note 1)	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Table 8 - Building Site Acceptability Based on ANEF Zones - AS2021:2015

Notes.
1. The actual location of the 20 ANEF contours is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside by near to the 20 ANEF contour.

2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).

3. There will be cases where a building of a particular type will contain spaces used for activities which would generally be ground in a different type of building (e.g. an office in an industrial building). In these cases Table 2.1 should be used to determine suite acceptability, but internal design noise levels within the specific spaced should be determined by Table 3.3. 4. This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect if aircraft noise on outdoor areas associated with the buildings should be considered.

4. In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.

Appendix G

Western Sydney Airport Business Park Illustrative Master Plan

Western Sydney Airport

WSA Co Limited
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Western Sydney Airport
flyWSA
Western Sydney Airport
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