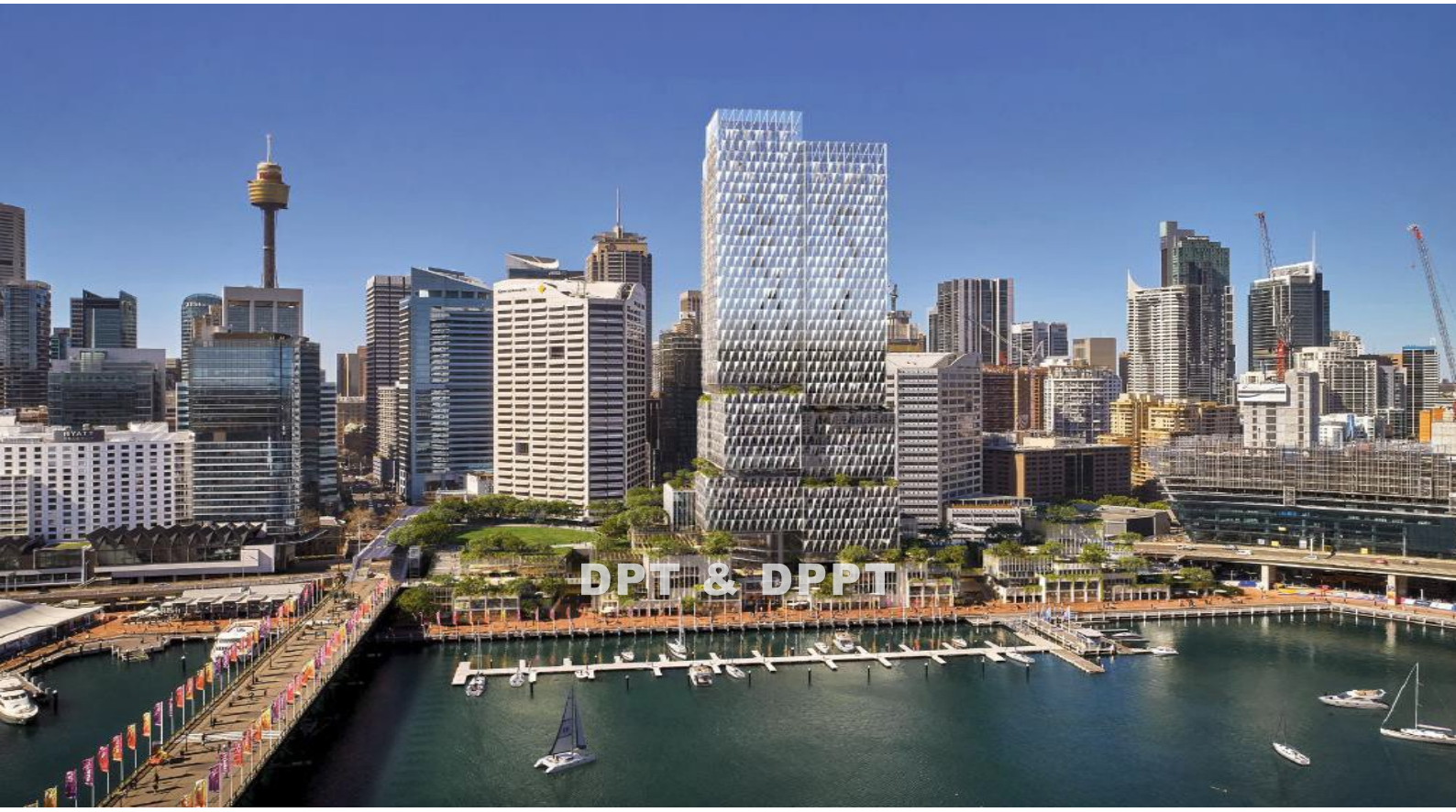


Cockle Bay Park Redevelopment — Appendix E Aeronautical Impact Assessment

State Significant Development, Development Application (SSD DA)

Prepared for DPT Operator Pty Ltd & DPPT Operator Pty Ltd

Revision B

2-Sep-2021

strategic airspace

Prepared by Consultants:

Strategic Airspace Pty Limited
ABN: 60 097 857 415

PO Box 253, Bondi Junction NSW 1355
Australia

Tel: +61 2 **8957 2278**

Email - Attn: Cathy.PakPoy@StrategicAirspace.com

Client:

DPT Operator Pty Ltd & DPPT Operator Pty Ltd
c/- Jones Lang LaSalle (NSW) Pty Ltd
Darling Park Management
Shop 204, Balcony Level
Cockle Bay Wharf
201 Sussex St
Sydney NSW 2000
Australia

Document Control

Document Number: **21.005-01-001** *Version:* **B**

Document Title: **Cockle Bay Park Redevelopment — Appendix E Aeronautical Impact Assessment**

Purpose / Abstract: *This report has been prepared to accompany a detailed State Significant Development (SSD) Development Application (DA) (Stage 2) for a commercial mixed use development, Cockle Bay Park. The development is being submitted in stages: this Stage 2 SSD DA (Design, Construction & Operation) is pursuant to the Stage 1 (Concept Proposal) which was determined on 13 May 2019. This Aeronautical Impact Assessment report has also been prepared for use as the basis of an airspace height application for the development under the Airports (Protection of Airspace) Regulations 1996 (APAR). Approval under the APAR for the buildings and cranes is a consent condition of the Stage 1 approval*

This report examines the potential impact of the proposed development on the Prescribed Airspace of Sydney Airport, as defined in the Airports (Protection of Airspace) Regulation 1996 (APAR). In doing so, existing flight operations and forecasted changes are examined to determine effective height limits over the site.

The proposed maximum height of the tower building envelope used for aeronautical impact assessment is 186.0m Australian Height Datum (AHD). This value includes an allowance for the rooftop Building Maintenance Units (BMUs). Two tower cranes (TC4 and TC5) are proposed for the construction of the tower building. The proposed maximum height of these cranes is 253.5m AHD.

The findings are:

- *The building development and associated cranes would infringe Sydney Airport's Obstacle Limitation Surfaces (OLS) — triggering a requirement under the APAR to seek approval of the development as Controlled Activities from the Commonwealth Department of Infrastructure, Transport, Regional Development & Communications (DITRDC).*
- *The top heights of the development and cranes would be clear of (below) the most constraining of the prescribed airspace surfaces — in this case the PANS-OPS protection surface for the missed approach leg of the precision ILS approach to Runway (RWY) 34R — by substantial margins. The building would be clear by ~140m AHD, and the cranes when at their maximum height would be clear by ~72m AHD.*

Given the above, the development as proposed in the SSD DA would not adversely affect the safety, regularity or efficiency of current and future air transport operations to and from Sydney Airport, and thus APAR applications for this project as proposed can be approved.

Contract: - *StratAir Ref:* 21.005

Change History

Version	*Versn Date*	*Version By*	*QA By*	*Version / Change Description*
Drafts to v0.9	17-Jul-2021	P. Haubourdin	C. Pak-Poy	Initial draft for review
A / Draft	28-Jul-2021	P. Haubourdin, C. Pak-Poy	J. McCarthy	Amendment to suit SSDA template v3.0 info provided
Rev B	02-Sep-2021	P. Haubourdin, C. Pak-Poy	J. McCarthy	Amendments following feedback & updates from new info (including CMP)

Distribution Control

Legend:				
	Uncont	Uncontrolled Document	*StratAir*	Strategic Airspace
	Client	DPT Operator Pty Ltd & DPPT Operator Pty Ltd	*AsA*	Airservices Australia
	APT, SACL	Sydney Airport Sydney Airport Corporation Ltd	*DITRDC*	Department of Infrastructure, Transport, Regional Development & Communications
	CASA	Civil Aviation Safety Authority		

Issue Version	*Issue Date*	*Issue Purpose / Description*	*Copy No*	*Copy Recipient*
Rev A Draft	28-Jul-2021	Distribution to the client & project managers for review	Uncont	StratAir Intranet, Client
Rev B	02-Sep-2021	Distribution for final review	Uncont	StratAir Intranet, Client

Contents

Tables

Figures

Appendices

1. Executive Summary

This report has been prepared to accompany a detailed State Significant Development (SSD) Development Application (DA) (Stage 2) for a commercial mixed use development, Cockle Bay Park, which is to be submitted to the Minister for Planning and Public Spaces pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The development is being submitted in stages: this Stage 2 SSD DA (Design, Construction & Operation) is pursuant to the Stage 1 (Concept Proposal) which was determined on 13 May 2019. This Aeronautical Impact Assessment report has also been prepared for use as the basis of an airspace height application for the development under the Airports (Protection of Airspace) Regulations 1996 (APAR). Approval under the APAR for the buildings and cranes is a consent condition of the Stage 1 approval.

Located at the western side of the Sydney CBD at 241-249 Wheat Road, Sydney, the site is located approximately 8.55 km (4.6 Nautical Miles (NM)) north-north-east of Sydney Airport and therefore located within the extent of the prescribed airspace of the airport. The report examines the current and forecast airspace height constraints overhead the site which would:

a) trigger the requirement to apply for an airspace height approval,
b) constrain the maximum building envelope height, and
c) limit the maximum heights for the cranes that will be required for construction.

Figure 1 — Site Location in relation to Sydney Airport (Small Format)

The maximum assessment height of the proposed tower building — 186.0m Australian Height Datum (AHD) — includes a provision for the rooftop Building Management Units (BMUs). Imagery depicting the tower in elevation and the details of the multiple roof levels can be found in section 3.1 (p7). The two luffing tower cranes proposed for construction of the tower (TC4 and TC5) will operate at an elevation no higher than 253.5m AHD. For further details refer to section 5 (p19).

The critical airspace constraints over the site are summarised in the table below and illustrated in Figure 2.

Table 1 — Summary — Airspace Height Constraints

Height Limits (AHD)	*Height Limit Detail*	*Comment*
186.0	**Max Envelope Height**	The tower building envelope, as defined for this report, contains all rooftop features, including the planned Building Maintenance Units (BMUs). Refer Section 3.1 (p7) and Section 3.2 (p8)
253.5	Max Crane Height	Refer Section 3.2 (p8) and Section 5 (p19)
156.0	**Obstacle Limitation Surface (OLS) — Outer Horizontal Surface**	**APAR THRESHOLD HEIGHT** As the proposed envelope would infringe the OLS, it will require a height application under the APAR to be approved by the Commonwealth Department of Infrastructure, Transport, Regional Development & Communications (DITRDC). The same applies to cranes. Infringement of the OLS in this case is not considered a barrier to approval of an application under the APAR.
≥325.6	PANS-OPS surface RWY 34R ILS MA	**MAXIMUM EFFECTIVE HEIGHT CONSTRAINT** This is the calculated height limit for the missed approach (MA) surface of the precision ILS approach procedure to Sydney Airport's Runway (RWY) 34R. As the lowest of all PANS-OPS surfaces over the site, this is the most restrictive height for the proposed development. At this height, neither the proposed building nor the cranes will infringe this surface.

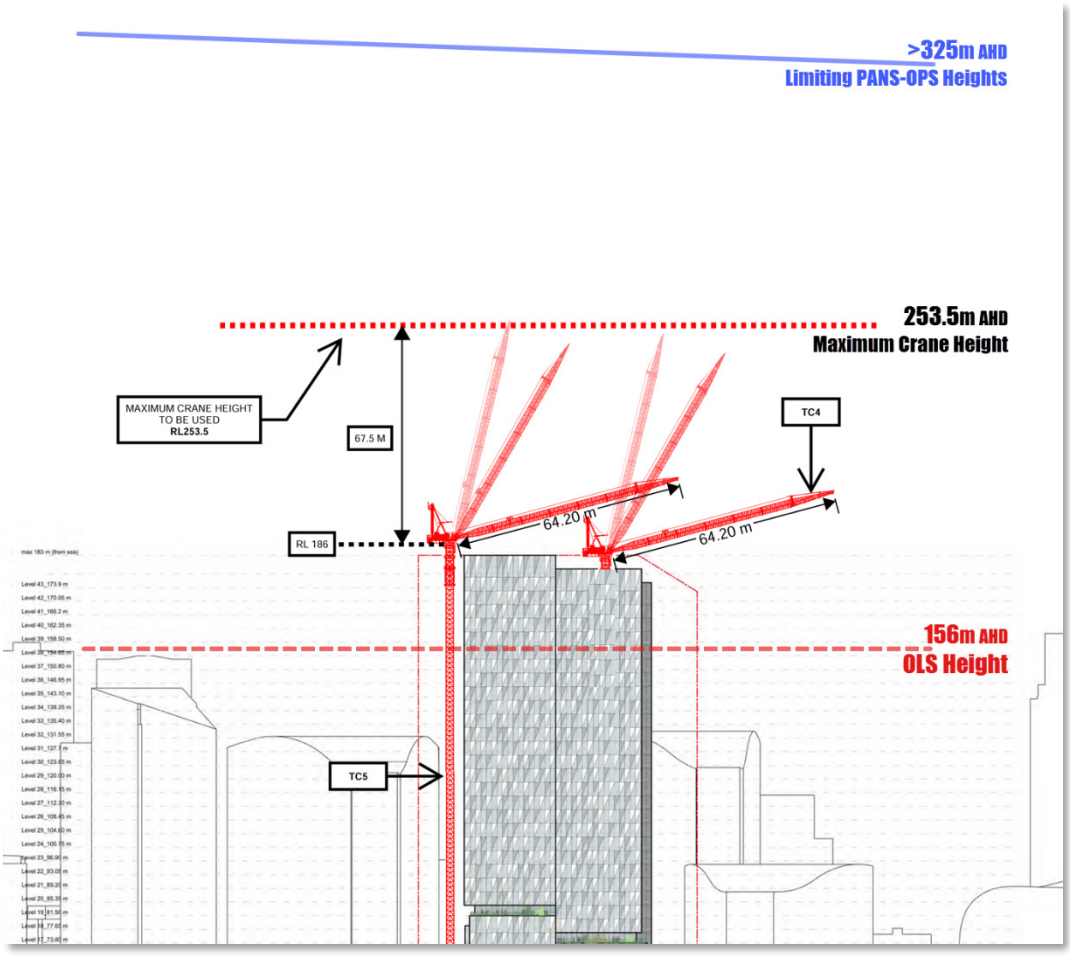


Figure 2 — Visual Height Impact Summary

To conclude:

- An "*airspace height application*" for the approval of the development as a *Controlled Activity* under the Airports (Protection of Airspace) Regulations 1996 must be submitted to DITRDC, via Sydney Airport, because the proposed building envelope would exceed the Airport's OLS.
- An application is technically approvable under the APAR, because the maximum development height would not infringe — and would in fact be substantially lower than— the most constraining PANS-OPS surface height.
- Similarly, an application for tower cranes TC4 and TC5 is also considered technically approvable under the APAR because the maximum crane heights proposed would not infringe the constraining PANS-OPS surface.

Given the vertical clearances from airspace protection surfaces, and the fact that the cranes proposed will also be well below critical surfaces, one can say with certainty that **the proposed building development will not adversely affect the safety, efficiency or regularity of current or future air transport operations at Sydney Airport**.

In summary, we anticipate no barrier to approval under the APAR of an application for proposed building envelope at the maximum planned height and the associated cranes. This also applies to the proposed cranes.

2. Introduction

This report has been prepared to accompany a detailed State Significant Development (SSD) Development Application (DA) (Stage 2) for a commercial mixed use development, Cockle Bay Park, which is to be submitted to the Minister for Planning and Public Spaces pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The development is being submitted in stages comprising the following planning applications:

- Stage 1 – Concept Proposal setting the overall 'vision' for the redevelopment of the site including the building envelope and land uses, as well as development consent for the carrying out of early works including demolition of the existing buildings and structures. This stage was determined on 13 May 2019, and is proposed to be modified to align with the Stage 2 SSD DA.
- Stage 2 – detailed design, construction, and operation of Cockle Bay Park pursuant to the Concept Proposal.

This Aeronautical Impact Assessment report has also been prepared for use as the basis of an airspace height application for the development under the Airports (Protection of Airspace) Regulations 1996 (APAR). Approval under the APAR for the buildings and cranes is a consent condition of the Stage 1 approval.

The site, located on the eastern side of the Darling Harbour precinct and on the western fringe of the Sydney Central Business District (CBD) (refer section 2.1 for more detail), is within the coverage extent of the prescribed airspace of Sydney Airport.

This report examines the current and forecast regulated airspace height limits above the site that are related to aviation airspace protection requirements under the APAR, and which would:

a) trigger the requirement to apply for an airspace height approval for the proposed building development,
b) constrain the maximum permissible building envelope height, and
c) limit the maximum heights for the cranes that will be required for construction.

2.1 The Site

The site is located at 241-249 Wheat Road, Sydney to the immediate south of Pyrmont Bridge, within the Sydney CBD, on the eastern side of the Darling Harbour precinct. The site encompasses the Cockle Bay Wharf development, parts of the Eastern Distributor and Wheat Road, Darling Park and Pyrmont Bridge.

The Darling Harbour Precinct is undergoing significant redevelopment as part of the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) including Darling Square and the IMAX renewal (The Ribbon) projects. More broadly, the western edge of the Sydney CBD has been subject to significant change following the development of the Barangaroo precinct.

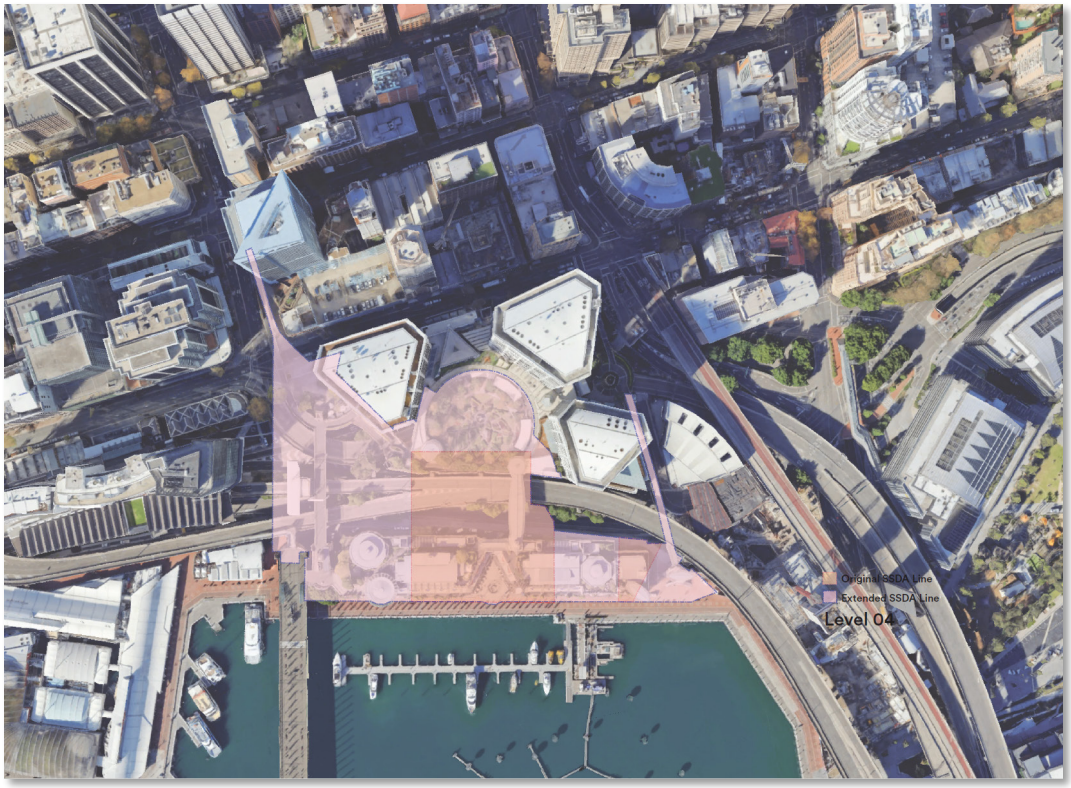


Figure 3 — Location Plan

The extent of the site covered by this aeronautical assessment (the Project Site) is defined by the building envelope of the proposed new commercial tower, as depicted in Figure 4 below. Other parts of the development do not require addressing in this report because they are not high enough to affect the prescribed airspace.

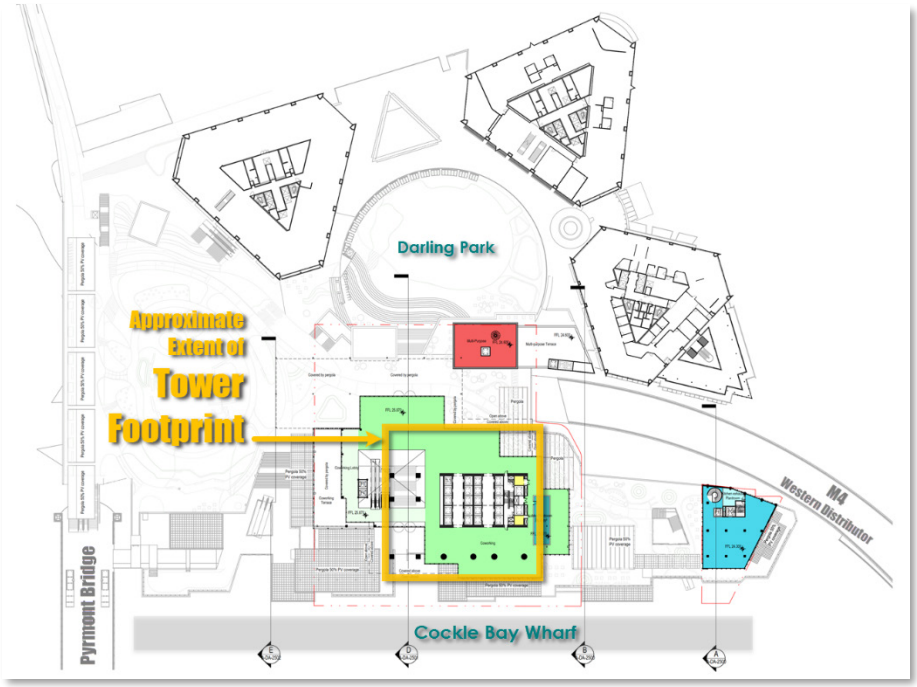


Figure 4 — Tower Building Envelope, Extent of the Aeronautical Impact Assessment

2.2 Planning Consent Terms of Approval

The approval of the SSD 7684 Stage 1 Concept Proposal granted by the Independent Planning Commission (IPC) on 13th May 2019 contained a set of conditions as part of the Terms of Approval.

Condition A19 related to Airspace Protection:

> *A19. Prior to the lodgement of any Future Development Application(s), and for the purposes of controlled activities within the protected airspace of Sydney Airport, a separate approval must be obtained from the Commonwealth Department of Infrastructure, Regional Development and Cities under the Airports (Protection of Airspace) Regulations 1996 for the part of the building or any construction cranes that penetrate the Obstacle Limitation Surface (156 metres Australian Height Datum).*

It is noted that approvals under the APAR are required for both the building, and for cranes, as a precondition for future DAs for the project.

2.3 Secretary's Environmental Assessment Requirements (SEARs)

The Secretary's Environmental Assessment Requirements (SEARs) dated 12 November 2020 for SSD-9978934, which were issued following the Stage 1 approval, do not include any items relating to aviation, airspace or the Prescribed Airspace of Sydney Airport — most likely, we contend, because of the pre-existing Condition A19 (Airspace Protection) of the Stage 1 Concept Approval.

In lieu of specific SEARs requirements related to aeronautical impact assessment, we have itemised in Table 2 below the standard minimum requirements normally addressed in NSW planning applications relating to major projects in the vicinity of key aviation facilities such as Sydney Airport and those relevant to the making of an application under the APAR.

Table 2 — Standard Requirements Cross-Reference

Key Issue	*Standard Requirement*	*Section Reference (This Report)*
Identify any impacts of the proposal on the Prescribed Airspace of Sydney Airport & issues requiring addressing in an Airspace Height Application	Confirm whether or not the proposed development & cranes would infringe Sydney Airport's OLS. If infringed, confirm that an infringement would be considered approvable by the aviation authorities.	Section 4.2 OLS Analysis, p12 Table 6 — OLS Height Impact & APAR Application Implications, p13 Section 6 Conclusion, p21
	Confirm the top of the proposed development & cranes are below the limiting PANS-OPS surface height?	Section 4.3 PANS-OPS Analysis, p13 Section 6 Conclusion, p21 Table 12— Summary of Constraining Surface Heights over the Key Reference Points, p21
	Confirm there are no other limiting airspace factors that would prevent approval of the development & cranes at the proposed maximum heights.	Section 4.4 Other Assessment Considerations, p16 Section 5 Crane , p19 Section 6 Conclusion, p21

3. Aeronautical Impact Context

3.1 The Proposed Tower

The top of the proposed tower has different roof levels, as illustrated in the figures below. The north-west quadrant is the tallest, reaching up to a maximum height of 183.0m AHD. The taller of the two planned Building Maintenance Units (BMUs) will increase the top assessable height (rounded up) to 186.0m AHD (refer Figure 6). The location and heights of key reference points used for the aeronautical assessment are highlighted in Figure 7 below and detailed in in Table 3 (p8).

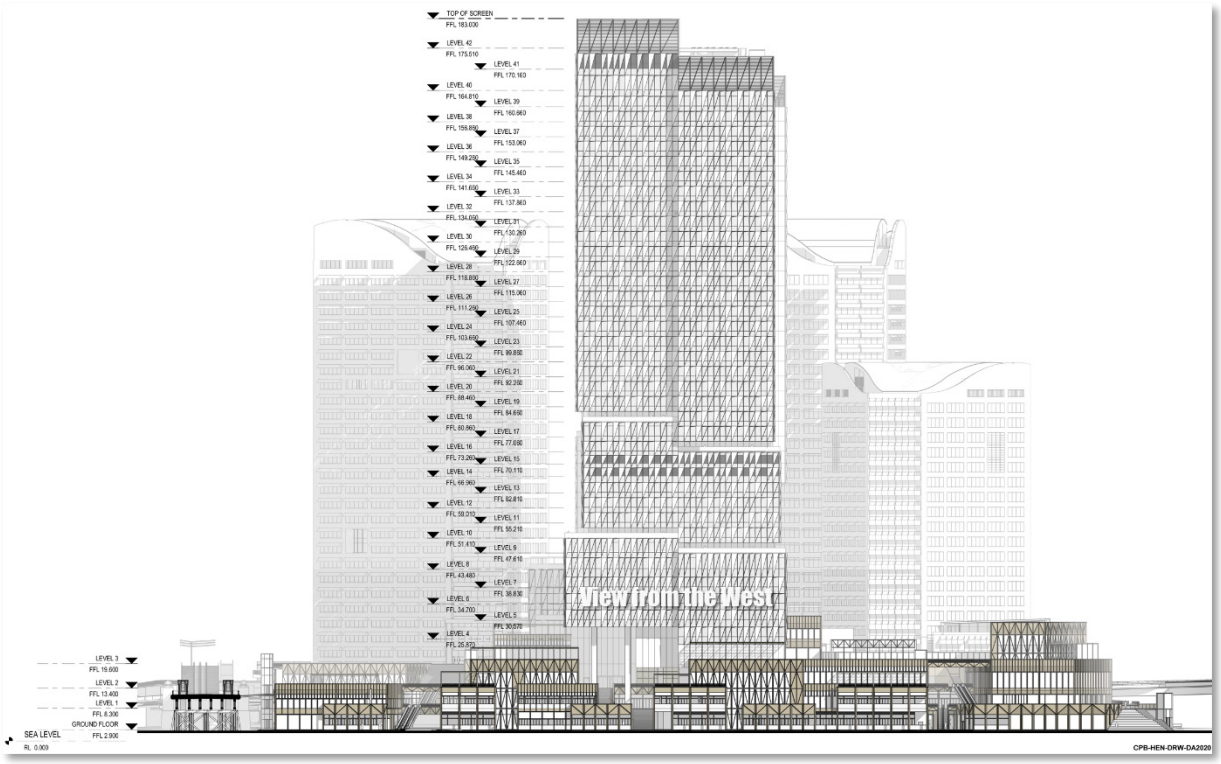


Figure 5 — Western Elevation

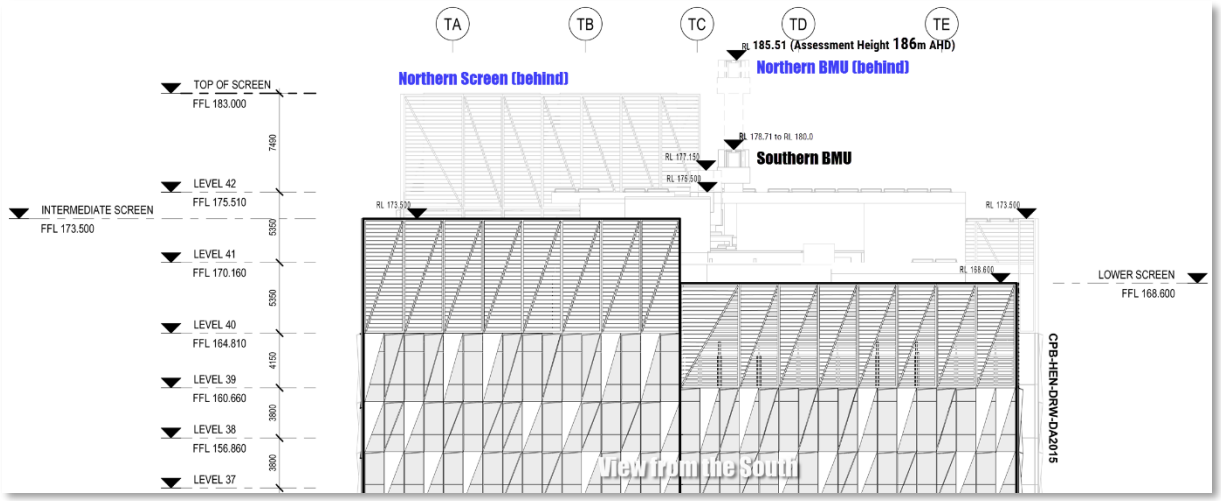


Figure 6 — South Elevation: BMUs in relation to the Roof Profile

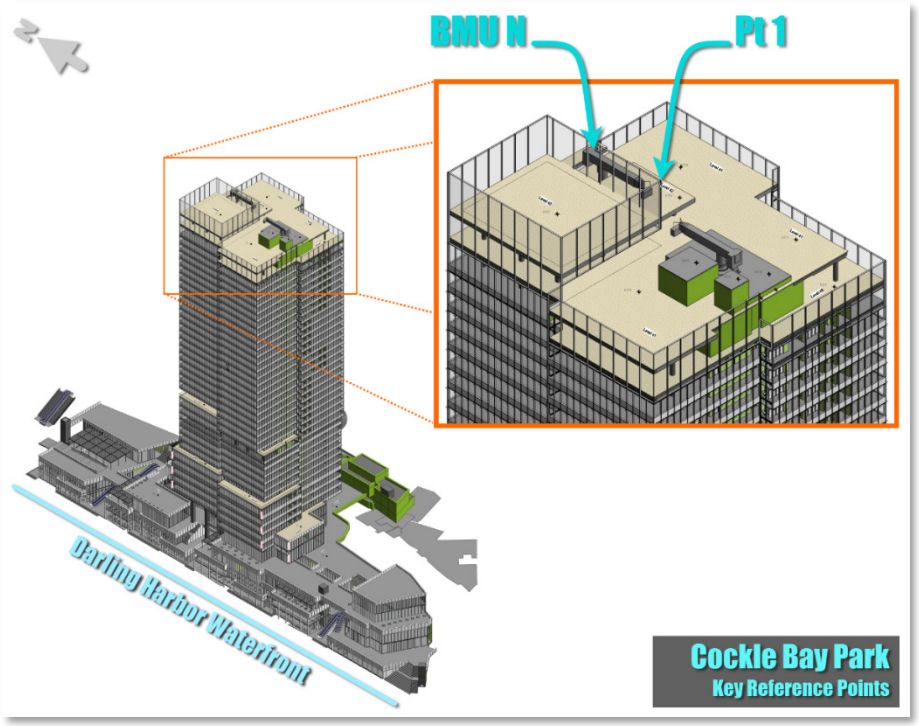


Figure 7 — Key Reference Points Shown on 3D View of the Tower (Aerial View from the South-West)

3.2 Heights & Key Reference Point used for Analysis

In addition to the maximum building height, cranes to be used for construction are also considered for aeronautical impact. Two tower cranes (TCs) will be used for construction of the tower, with an operational height cap of 253.5m AHD. For further information on cranes refer to section 5 and Figure 13 (p20).

For simplicity of presenting the analysis results, a single coordinate has been used in this report — that of the highest point, the centre of the northern BMU (BMU N).

Table 3 — Assessment Reference Points & Coordinates

Key Reference Points	*Point*	*Assessment Heights (m AHD*)*	*WGS84 Geographic Coordinates*	*GDA94 Coordinates (Zone 56)*
Building Envelope				
Northern Building Maintenance Unit	**BMU N**	**186.0**	**33° 52' 18.82" S 151° 12' 08.80" E**	**333740.45 E 6250594.11 S**
South-East corner of tallest tower screen	PT1	183.0	For assessment, refer BMU N	
Southern Building Maintenance Unit	BMU S	177.15	For assessment, refer BMU N	
Cranes				
Tower Crane South (TC4)	TC S	253.5	For assessment, refer BMU N	
Tower Crane North (TC5)	TC N	253.5	For assessment, refer BMU N	

* *Assessment Heights — Indicative Max RLs for of the Proposed Tower Envelope & Crane*
m AHD = RL Heights expressed in Metres Australian Height Datum (AHD)

3.3 Site Location relative to Sydney Airport

The site is located approximately **8.55** km (**4.6** Nautical Miles (NM)) north-north-east of the Aerodrome Reference Point (ARP) of Sydney Airport, as shown in Figure 8 below.

The distance and bearing to the ARP and the northern ends of Runways 07/25 and 16L/34R are detailed in Table 4 below. Procedures to/from the western parallel runway, RWY 16R/34L, are considered irrelevant because those procedures must stay safely to the west of those for the eastern parallel runway — and therefore remain clear of the project site.

Figure 8 — Proposed Development Site in relation to Sydney Airport (Large Format)

Table 4 — Project Reference Point BMU N Location in Relation to Sydney Airport

Airport Feature	*Distance (Km)*	*Dist (NM)*	*Bearing (°T)*	*Brg (°M)*
Aerodrome Reference Point (ARP)	**8.55**	**4.6**	**015.9**	**003**
RWY25 Threshold	7.42	4.0	009.7	357
RWY16L Threshold	8.94	4.8	008.1	355

3.4 Methodology

The report considers the airspace of the closest major airport, Sydney International Airport.

With regard to the influence on the proposed development, the following elements of the airport's prescribed airspace have been considered.

3.4.1 Airspace Regulations

The proposed development site is subject to the Airports (Protection of Airspace) Regulations (APAR), under the Commonwealth's Airports Act, 1996), because of its proximity to Sydney Airport and because of its proposed height. These regulations define both: how building height limitations due to airspace safety can be determined; and the process for gaining approval of the proposed development under the regulations.

The Prescribed Airspace Regulations, and their impact upon building height limitations, are described below.

Where a proposed development would infringe the Prescribed Airspace, a height approval must be obtained from DITRDC prior to the intrusion into the airspace. A permanent intrusion, such as a building, is termed a *controlled activity*, and temporary intrusions that are not expected to continue longer than 3 months, such as cranes, are termed *short-term controlled activities*.

Applications are usually submitted via the nearest relevant airport (in this case, Sydney Airport), which then contacts relevant stakeholders and ultimately forwards the application to DITRDC for the final determination.

Height approvals under APAR are not required for rezoning applications. They are however usually required by local planning authorities prior to, or as consent conditions of, approval of Development Applications (DAs).

3.4.2 Prescribed Airspace

Prescribed airspace, under these regulations, includes at minimum:

- **Obstacle Limitation Surfaces (OLS)**
  - The OLS surfaces are used to identify buildings and other structures that may have an impact upon the safety or regularity of aircraft operations at an airport. This impact depends upon both the type of operations at the aerodrome and which OLS surfaces are penetrated by a (proposed) building or structure.
  - The OLS are flat and rising (invisible) surfaces around the airport. They are based on the geometry of the airport and its runways and therefore they rarely change.
  - If a permanent building development (or temporary crane) that is proposed at a height that will penetrate (exceed) the height limit of an OLS surface, then an application must be made to the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) — via the closest airport, and with copies to any other potentially affected airport — for an airspace height approval prior to construction of the permanent development &/or erection of the temporary crane obstacle. Such applications should demonstrate the proposed building does not penetrate or adversely affect surfaces protecting the instrument flight procedures (PANS-OPS surfaces); radar vectoring; navigation infrastructure; or anything else that might affect the safety or regularity of operations at the airport.
- **PANS-OPS Surfaces**
  - PANS-OPS surfaces represent the protection surfaces for published instrument flight procedures to and from the airport. These surfaces comprise flat, sloping and complex surface components.
  - PANS-OPS surfaces must not be penetrated by permanent buildings or structures. However, for a variety of reasons, PANS-OPS surfaces can and do change over time. Approval may be granted, under certain conditions, for temporary obstacles (such as cranes) which at their maximum height would infringe the limiting PANS-OPS surface, and in such cases operation at such

heights would most likely be capped by the RTCC surface constraint (see below) and limited to 3 months duration.

- As flight procedures are changed from time to time (usually by Airservices), the PANS-OPS Surface Plan published by an airport may not reflect the current situation — which is why we not only reference the airport's plans but also review the published charts for current (or pending) instrument flight procedures and evaluate the associated PANS-OPS height limits.
- The regulations also make a provision for any factor which may be deemed to adversely affect the safety, regularity or efficiency of aircraft operations at an airport. In light of this, it is necessary to consider the following factors.

- **Other Considerations**
  - **Sydney Airport's Declared Airspace Plans** additionally include:
    - Radar Terrain Clearance Charts (RTCC), which depict the areas and height limits related to the Minimum Vector Altitude (MVA) sectors used by Air Traffic Controllers when vectoring aircraft.
    - Lighting and visual guidance protection plans — used for approach guidance by aircraft, especially at night and in times of poor visibility.
    - Navaid and radar evaluation / protection surface plans.
  - **Sydney Airport's 2039 Master Plan**
  - **Other Factors**
    - Airline Engine-Out (Contingency) Take-Off Splays
      (as per Civil Aviation Order 20.7 1b)
      These are generally assessed independently by the airlines as part of their own evaluations of any given airspace height application, but in certain cases it may be prudent to evaluate any potential impact in advance.
    - Proximity to the critical parts of flight paths to/from Strategic Helicopter Landing Sites (SHLS), which are usually limited to the helipads used by Helicopter Emergency Management Services (HEMS) at major trauma hospitals.
    - Other miscellaneous factors that may be considered as potential safety issues by any of the key stakeholders, and the Civil Aviation Safety Authority (CASA) in particular.
  - Note: Airspace that is approved by DITRDC as Declared Airspace is considered part of an airport's Prescribed Airspace.

3.4.3 Note about Heights: Australian Height Datum (AHD) vs Above Ground Level (AGL)

All "heights" provided in this document are elevations expressed in metres in the Australian Height Datum (AHD) — and thus they are true elevations, and NOT heights above ground level (AGL).

For estimating maximum development heights AGL, the ground elevation^{AHD} should be subtracted from the airspace height limits^{AHD}.

Note also for aviation-related airspace height limits, any building height approval under the Airports (Protection of Airspace) Regulations is regarded as inclusive of the building itself, plus all rooftop furniture and overruns (plant buildings, lift risers, building management units, antennae, etc).

4. Analysis

4.1 Summary

The impact of the various building height limitations, from lowest to highest, is summarised in the following table.

Table 5 — Analysis Summary — Airspace Height Constraints

Height Limits (m AHD)	*Height Limit Detail*	*Comment*
156.0	**Obstacle Limitation Surface (OLS) — Outer Horizontal Surface**	The site is under the OLS Outer Horizontal Surface, which is a flat surface extending around the aerodrome up to 15km radius with the intention of protecting the aerodrome from uncontrolled developments. As **the proposed envelope would infringe the OLS**, it **will require a height application under the APAR to be approved by the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) prior to construction**. The same applies to cranes. Infringement of the OLS in this case is not considered a barrier to approval of an application under the APAR.
325.6	PANS-OPS Surface — ILS RW34R Missed Approach	The missed approach of the RWY 34R ILS procedure is the lowest PANS-OPS surface over the site. See Table 12 (p21) for details. This PANS-OPS procedure surface is the most constraining on development heights The surface heights would most likely also be considered the absolute maximum height for crane operations used for construction of the building, subject also to consent by Sydney Airport, the aviation stakeholders and DITRDC. Separate applications under APAR for crane operations would need to be submitted and approved prior to operations of cranes (noting that approvals for cranes are not essential to secure an approval under APAR for a proposed building development itself).
335	Radar Terrain Clearance Chart (RTCC) / Minimum Vector Altitude (MVA) 2100 Sector	The site lies within the lateral limits of an RTCC surface which has an effective height limit of 335m AHD. See 4.4.1 (p16) for details. This surface protects the 2100ft MVA sector which is used by Air Traffic Controllers (ATCs) to vector aircraft. This surface typically cannot be breached by any obstacle, permanent or temporary, at night or during times of low visibility. Cranes operating above this height, if approved, would also be subject to various operational constraints, including a maximum duration of 3 contiguous months.
N/A or Higher	Other Surfaces	The site is outside the extent of other protection surfaces or the height limits are higher, and so considered Not Applicable.

4.2 OLS Analysis

The location of the proposed re-development, with respect to the OLS of Sydney Airport, is shown in Figure 9 below. The image shows that the site is located under the Outer Horizontal Surface, which has a height of 156.0m AHD.

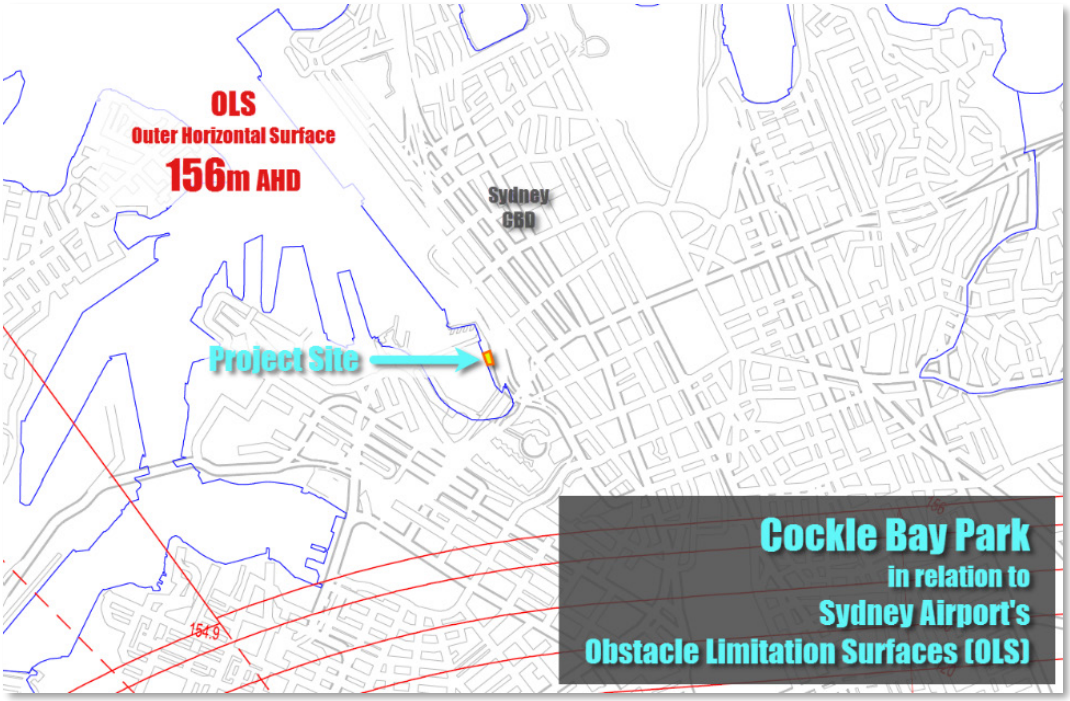


Figure 9 — Site in relation to Sydney Airport's OLS

Table 6 — OLS Height Impact & APAR Application Implications

		OLS Height		
Location	*Assessment Height (m AHD)*	*Surface Height (m AHD)*	*Clearance / Infringement*	*Approvability Comment*
BMU N	186.0	156.0	- 30.0	The Tower building & cranes requires prior approval under APAR; approval being subject to the maximum height being below the most limiting PANS-OPS or RTCC surface height.
TC S	253.5	As above	- 97.5	

4.3 PANS-OPS Analysis

In addition to reviewing the PANS-OPS (Approach) Surfaces chart of Sydney Airport's Prescribed Airspace (current at 2017, but published by the airport in 2019), assessment was conducted of the following instrument procedure types for Sydney Airport, as published in the Australian Aeronautical Information Publication (AIP) Departure and Approach Procedures (DAP), up to Amendment 167 (effective 17-Jun-2021 to 8-Sep-2021). Following items were checked against applicable criteria in ICAO PANS-OPS Doc 8168 Vol II (Construction of Visual and Instrument Flight Procedures) and Doc 9905 (Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual):

- The Circling Minima and Minimum Sector Altitudes (MSAs) for existing PANS-OPS procedures
- The discrete minima for the Instrument Approach Procedures.
- Missed Approaches — as part of the evaluation of Approach Procedures
- The existing Standard Instrument Departure Procedures (SIDs)
- Minimum Sector Altitude — 10 NM Sector

The site in relation to the PANS-OPS surfaces shown on Sydney Airport's 2017 chart (the most recent) is shown for information in Figure 10 below. Note that this chart does not include any surfaces for Departure Procedures.

Sydney Airport's PANS-OPS chart shows that the RWY34R PAOAS surface is the most constraining at just under 300m AHD. The StratAir analysis of current flight procedures determined that the PAOAS is actually not applicable over the site and instead the RWY34R ILS Missed Approach protection surface is the most constraining over the site. — refer Table 7. Summaries of the analysis of these procedures can be found further below.

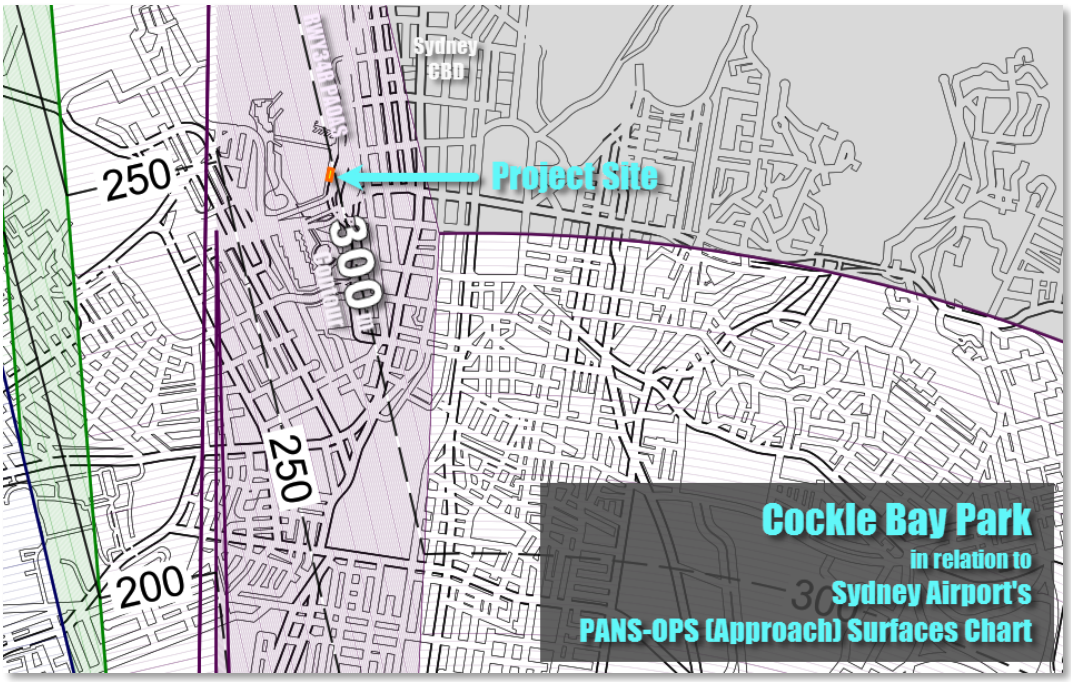


Figure 10 — Site in relation to Sydney Airport's PANS-OPS (Approach) Surfaces Chart

Table 7 — Sydney (YSSY) PANS-OPS Height Limit Summary

Procedure	*Height Limit (m AHD)*	*Description*
Approaches and Missed Approaches to all Runways	**≥ 325.6**	**Under the protection area for the turn in the missed approach coming off the ILS procedure for RWY 34R.**
Departures	≥ 339.3	Analysis indicates that most limiting surface constraint for the Omnidirectional Radar departure from RWY07 is applicable.
Circling Area	N/A	Outside the extent of the circling procedures.
Minimum Sector Altitude (MSA)	340	The 10 NM Minimum Sector Altitude of 2100 ft imposes this surface height constraint across the entire site.
STARs	≥ 340	Outside the lateral protection areas or too high overhead to have any impact on the proposed development.

4.3.1 "Area" Procedures

A Minimum Sector Altitudes (MSAs)

The relevant sector is the inner 10 NM sector around the airport which has a 2100ft (~640m) minimum flight altitude.

Table 8 — Summary of Limiting Surface Heights over the Key Reference Points

Procedure	*Feature / Restriction*	*Description*
10NM MSA	Horizontal Surface: • **340m**	Covers the entire site. This surface height is based on the ICAO minimum obstacle clearance of 300m, giving a calculated value of 340.08m AHD. The value published in Sydney Airport's PANS-OPS chart is 340m AHD.

B Circling Minima

Not applicable: the site is outside the extent of the circling procedures.

C STARs

The minimum segment altitude on any of the STARs surrounding Sydney Airport is 2,100ft, which would have a protection surface of 340m AHD or higher. A detailed study of the extent of impact by STARs is not included.

4.3.2 Instrument Approaches & Missed Approaches

The impact of each of the relevant PANS-OPS protection surfaces for current approach and departure procedures for Sydney Airport were evaluated.

The site is laterally clear of the protection surfaces of all approach procedures, except for the missed approach for the RWY34R ILS precision approach procedure. It is under the protection area for the right-hand turn in the missed approach.

The site is under the protection area for the right hand turn in the missed approach segment of the RWY 34R ILS precision procedure. StratAir analysis has shown that this missed approach procedure's protection is the most limiting of all PANS-OPS procedures. The limiting heights and the impact in relation to the building and cranes are summarised in Table 9 below.

Note that there is a substantial clearance between the limiting heights and the maximum heights of the proposed building and cranes.

Table 9 — Summary of Limiting PANS-OPS Approach Surface Heights & Height Clearances

		PANS-OPS Approach Surfaces		
Reference Point	*Assessment Height (m AHD)*	*Procedure*	*Surface Height*	*Clearance / Infringement*
BMU N	186.0	RWY 34R ILS MA	325.6	139.6
TC S	253.5	RWY 34R ILS MA	As above	72.1

4.3.3 Departures

The departure procedures from RWY 07 and RWY 34R were evaluated for potential impact. Based on the data published in the Omnidirectional Radar Departures All Runways chart, the RWY 34R departure procedure was determined to be the most limiting of the PANS-OPS departure procedures, noting that these are less restrictive than the missed approach procedure. The limiting departure surface heights and the impact in relation to the Tower and the cranes are summarised in Table 10 below.

Table 10 — Summary of Limiting PANS-OPS Departure Surface Heights & Height Clearances

Location	Assessment Height (m AHD)	PANS-OPS Departure Surfaces		
		Procedure	Surface Height	Clearance / Infringement
BMU N	186.0	Radar Dep RWY34R	339.3	153.3
TC S	253.5	Radar Dep RWY34R	As above	85.8

4.4 Other Assessment Considerations

The following table provides a brief assessment of other considerations.

Table 11 — Other Assessable Height Limitations — including the RTCC MVA Limit

Procedure	Height Limit (m AHD)	Description
Radar Terrain Clearance Chart (RTCC)	**335**	This height constraint is applicable over the entire site. Refer 4.4.1 below.
Navigation Infrastructure Surfaces	N/A	The proposed development is too far from the airport to affect any ground-based navigation infrastructure.
Approach Lighting & VGSI Surfaces	N/A	The site is outside the lateral extent of published approach lighting surfaces.
Airlines Engine Out Procedures	N/A	The Engine Out procedures from RWY 34R (the most relevant take-off runway end), are designed and maintained by each of the passenger transport aircraft operators in accordance with the relevant regulations. All such procedures necessarily take into account Sydney Tower Eye in the Sydney CBD, which given its relevant proximity and taller height, will take precedence. As such this proposal will not adversely affect any contingency procedures.
Helicopter Procedures related to the Nearest Strategic Helicopter Landing Site (SHLS)	N/A	There are currently no nearby SHLSs that would be adversely affected by the development. Further, the Harbour Bridge 5 Helicopter Route permits helicopter traffic to fly over the Cockle Bay / Darling Harbour waterways, between the Harbour Bridge's southern pylon and Central Station, but no lower than 1000ft (304.8m AHD), which is substantially higher than the proposed building and cranes. More generally, helicopter traffic that traverses the CBD must maintain visual clearance from any obstacles, including existing tall buildings — some of which are higher than the proposed development. Therefore, the proposal will not adversely affect helicopter traffic in the region.

There are no other considerations that might limit the building height at the project site.

4.4.1 Radar Terrain Clearance Chart (RTCC) / Minimum Vector Altitude (MVA) Surface

The Radar Terrain Clearance Chart (RTCC) overhead the site protects the airspace used by air traffic controllers as the lowest Minimum Vector Altitude (MVA) they can use for vectoring aircraft. With an MVA of 2100ft over the site,

the RTCC surface height limit is 335m AHD* as shown on Sydney Airport's RTCC chart.

* *The MSA for the same area, at the same 2100ft altitude, has a protection area published at 340m AHD. For this project, the discrepancy is irrelevant.*

4.4.2 Communication/Navigation/Surveillance (CNS) Facilities

This proposal will not adversely impact the performance of any Airservices Precision/Non-Precision Navigation Aids, Anemometers, HF/VHF/UHF Communications, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite links.

4.4.3 Shielding

Whilst perhaps not strictly shielded (as per the specifications in the Civil Aviation Safety Regulations Manual of Standards (CASR MOS) Part 139) by other taller developments, this development would be neither the tallest in the CBD, nor would it be the closest to Sydney Airport for its size. In this sense the development is functionally shielded by existing buildings and other developments either already approved or seeking approval, which are taller and/or more critical to operations at Sydney Airport. These include:

- Sydney Tower Eye, the existing controlling obstacle in the Sydney CBD, charted at 1085ft (~330m AHD), approximately 650m to the ENE.
- One Barangaroo (Crown Casino), just over 272m high, approximately 1km to the north on the eastern side of the entrance to Cockle Bay.
- 505 George St, Sydney, APAR approval up to a maximum height of 289.9m AHD, approximately 570m to the SE, somewhat closer to Sydney Airport.
- The Atlassian development at Sydney Central, currently registered as a DA with the City of Sydney, seeking a maximum height of 171m AHD. Although lower, this development is ~1.38km to the south, significantly closer to Sydney Airport and the RWY34R departure procedures.

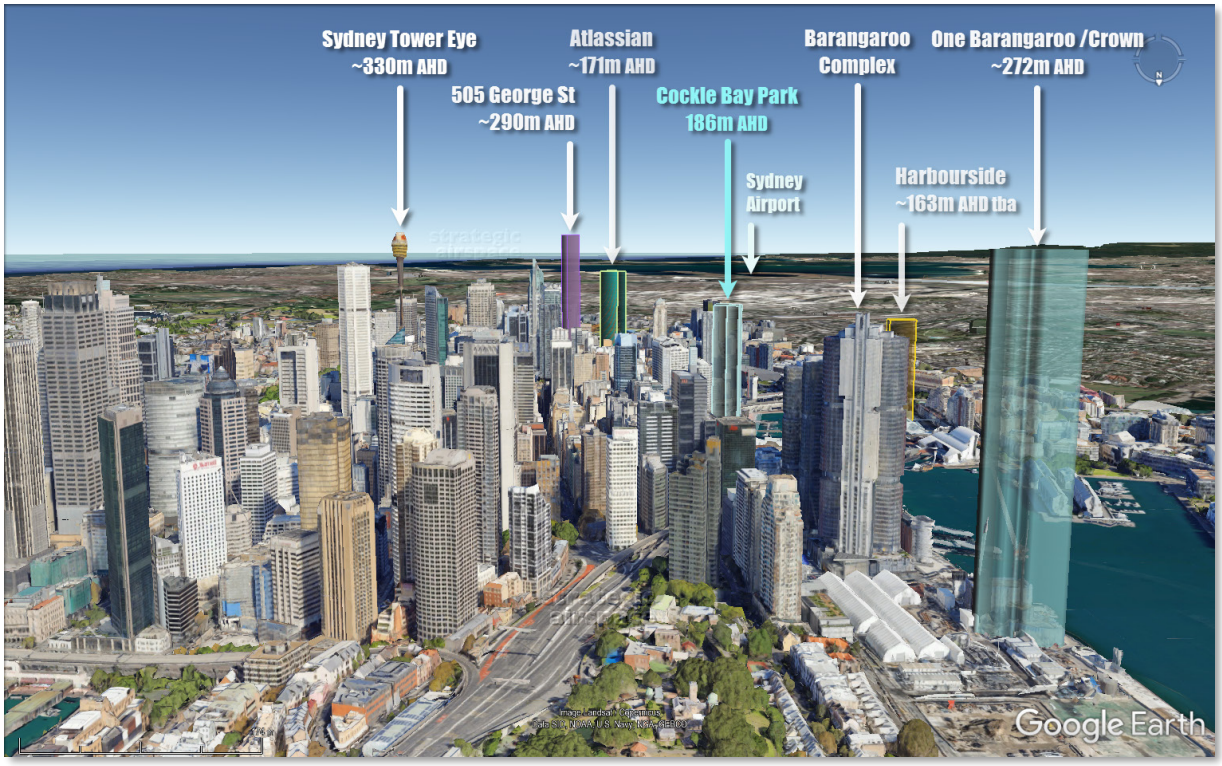


Figure 11 — Site in relation to other Taller Buildings and Developments within a 1km Radius (Functional Shielding)

4.4.4 Obstacle Lighting Considerations

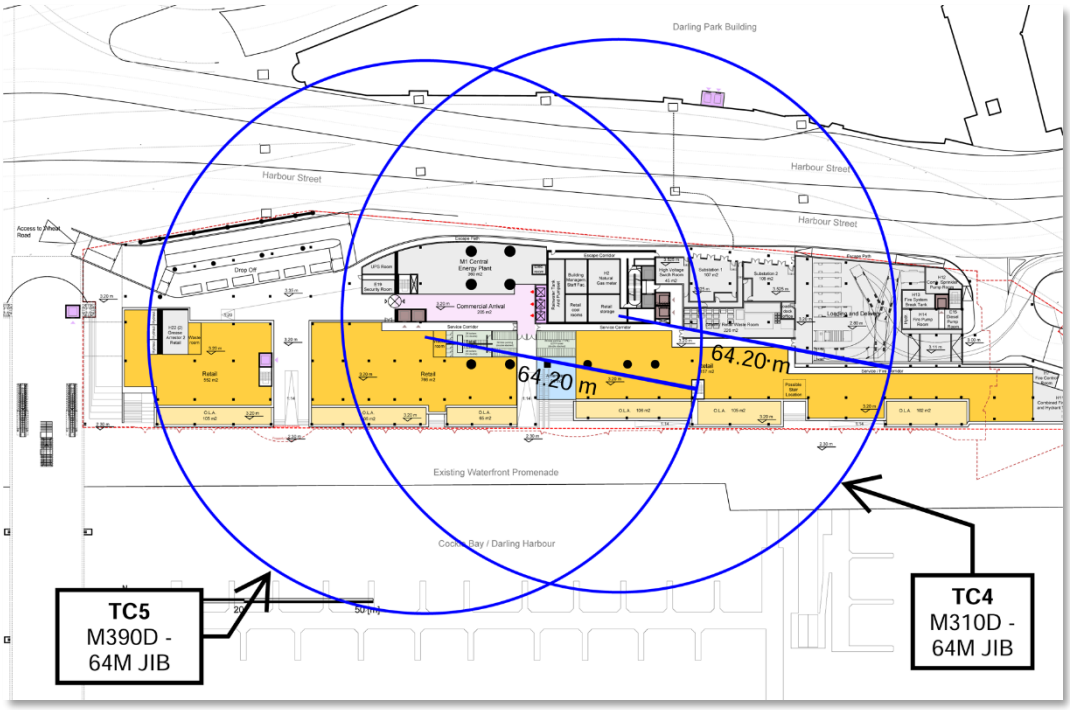
The requirement for obstacle lighting will be determined by CASA in accordance with MOS Part 139, section 9.4 (Obstacle Lighting). Considering other nearby developments (refer also section 4.4.3 and Figure 11 above), obstacle warning lights may not be considered relevant to airplane traffic in and out of Sydney Airport. However, CASA may consider that obstacle warning lighting may be beneficial to helicopter traffic using the Harbour Bridge 5 over the Cockle Bay / Darling Harbour waterways between the Sydney Harbour Bridge and Central Station. As noted in Table 11 (p16), the minimum altitude for this route is 1000ft altitude (~305m AHD), ~119m above the maximum building height and ~51m higher than the maximum height of the cranes.

If obstacle lighting is deemed necessary by CASA, we propose that a single light, or maximum two lights, would be sufficient, preferably located near the highest point on the western side of the building. Given the local environment and the potential for nuisance impact on residents in nearby buildings in the CBD and on the western side of Darling Harbour, we would recommend that any obstacle lighting stipulated by CASA be medium-intensity red flashing lights.

5. Crane Details

Three luffing cranes (TC1 – TC3) will be used for construction of major civil works (the *landbridge*) early in the project, but these will operate below the OLS and therefore do not require prior approval under the APAR.

Two taller luffing tower cranes, TC4 and TC5, will be used for construction of the tower building. These cranes will exceed the OLS height, but when operating will not exceed a height of 253.5m AHD. These cranes are shown in elevation and plan view in the figures below.



Source: Multiplex

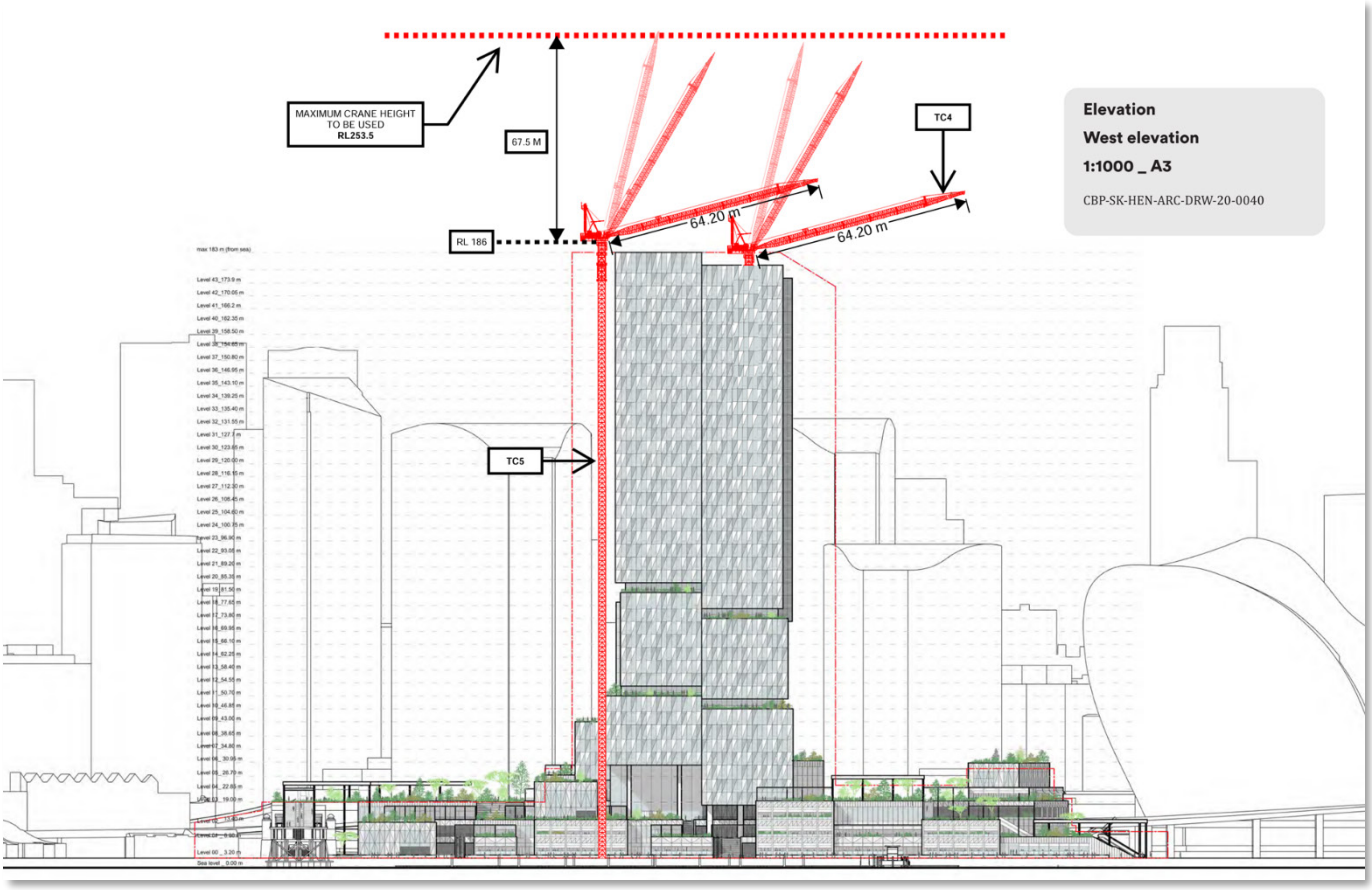
Figure 12 — Tower Cranes TC4 & TC5 Setout, Plan View

Table 12 — Crane Centre Coordinates for Height Application

Key Reference Points	*Point*	*Assessment Heights (m AHD*)*	*WGS84 Geographic Coordinates*	*GDA94 Coordinates (Zone 56)*
Tower Crane South (TC4)	TC S **TC4**	253.5	33° 52' 19.51" S 151° 12' 08.24" E	333726.514 E 6250572.597 S
Tower Crane North (TC5)	TC N **TC5**	253.5	33° 52' 18.04" S 151° 12' 08.40" E	333729.766 E 6250617.843 S

Table 13 — Summary of Crane Height Impact

Reference Point	*Assessment Height (m AHD)*	*Surface Type*	*Surface Height*	*Clearance / Infringement*
TC4 & TC5	253.5	**OLS**	156.0	- 97.5
		Limiting **PANS-OPS** RWY 34R ILS MA	325.6	72.1



Source: Multiplex

Figure 13 — Tower Cranes TC4 & TC5, Elevation View from the West

The tower cranes servicing the tower building (TC4 and TC5) will primarily operate during the approved working hours (as per the Construction Management Plan (CMP)), with exceptional use outside of these times. When not in use, the cranes will jib-up and weathervane. The CMP states that working hours are foreseen to be between 7am and 7pm Monday to Friday, and between 7am and 6pm Saturday. It is not anticipated that TC4 and TC5 would be operated at night, or on Sundays or public holidays.

Table 14 — Scheduled Dates of Crane Operation

	- Scheduled -	*- Scheduled -*		*- Latest / Contingency -*	
Crane	*Install Date*	*Dismantle Date*	*Duration*	*Dismantle Date (Gross)*	*Duration (Gross)*
TC4	22/10/2024	25/02/2025	126	15/03/2025	144.9
TC5	29/01/2025	19/01/2026	355	13/03/2026	408.25

Mobile cranes may also be used if absolutely necessary. They may be utilised to assist with erection and dismantling of tower cranes. When operating they would not exceed the maximum height sought for TC4 and TC5.

Both TC4 and TC5 are technically approvable as controlled activities under the APAR as they will not infringe any PANS-OPS surface — at the proposed maximum elevation of 253.5m AHD they would be more than 70m below (clear of) the most constraining of all Sydney Airport's prescribed airspace surfaces over the site (see also Table 13 above).

Further, given the clearance under the PANS-OPS they should not be considered approvable without a short-term operation duration constraint. The proponent understands that the crane approval may be subject to other conditions (eg, lighting), and is prepared to provide the necessary advance notice to Sydney Airport and Airservices prior to their erection.

6. Conclusion

The limiting OLS across the entire project site is the Outer Horizontal Surface at height of 156m AHD, which means that the proposed tower building and cranes required to construct that building would infringe the OLS. Consequently, prior airspace-related height approvals under the APAR are required for the building and the associated TC4 and TC5 cranes.

The limiting PANS-OPS surface is the RWY34R ILS Missed Approach (PANS-OPS) Surface at a height of at least 325m AHD. At this height, neither the building envelope nor the cranes at their maximum planned heights will infringe the most restrictive surface.

Table 15 — Summary of Constraining Surface Heights over the Key Reference Points

Location	*Assessment Height (m AHD)*	*Limiting Surface Type / Detail*	*Surface Height*	*Clearance / Infringement*
BMU N	186.0	PANS-OPS RWY34R ILS Missed APCH	325.6	**139.6**
TC S	253.5	PANS-OPS RWY34R ILS Missed APCH	As above	72.1

There are no other prescribed airspace surfaces or other operational factors that would be adversely affected by the proposed development.

The tower building is technically approvable as a controlled activity under the APAR. Given the height of the building above ground (~180m AGL) and its location on the western edge of Cockle Bay, obstacle lights may be recommended by CASA as a condition of approval. If so, it is proposed that medium-intensity red lights be stipulated to help reduce the potential adverse impact of the lights on residents in neighbouring buildings.

The TC4 and TC5 cranes are technically approvable as controlled activities and may be granted approval without any operating duration constraint. Standard crane

Given the vertical clearances from airspace protection surfaces, and the fact that the cranes proposed will also be well below critical surfaces, one can say with certainty that **the proposed building development will not adversely affect the safety, efficiency or regularity of current or future air transport operations at Sydney Airport**.

As such, there is no technical impediment to approval of the development under the APAR. The same applies to the cranes at the maximum height proposed.

A P P E N D I C E S

APPENDIX 1 — ABBREVIATIONS

Abbreviations used in this report and/or associated reference documents, and the meanings assigned to them for the purposes of this report are detailed in the following table:

Abbreviation	*Meaning*
AC	Advisory Circular (document supporting CAR 1998)
ACFT	Aircraft
AD	Aerodrome
ADS-B	Automatic Dependent Surveillance-Broadcast
AGL	Above Ground Level (Height)
AHD	Australian Height Datum
AHT	Aircraft Height
AIP	Aeronautical Information Publication
Airports Act	Airports Act 1996, as amended
AIS	Aeronautical Information Services
ALARP	As Low As Reasonably Practicable
ALC	Airport Lease Company
Alt	Altitude
AMAC	Australian Mayoral Aviation Council
AMSL	Above Minimum Sea Level
ANEF	Australian Noise Exposure Forecast
ANSP	Airspace and Navigation Service Provider
APACL	Australia Pacific Airports Corporation Limited, owner of Melbourne and Launceston Airports
APCH	Approach
APARs, or A(PofA)R	Airports (Protection of Airspace) Regulations, 1996 as amended
ARP	Aerodrome Reference Point
AsA	Airservices Australia
ASDA	Accelerated Stop Distance Available
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATC	Air Traffic Control(ler)
ATM	Air Traffic Management
BA (Planning)	Building Application or Building Approval (Planning)
BAC	Brisbane Airport Corporation
BCC	Brisbane City Council
CAAP	Civil Aviation Advisory Publication
CAO	Civil Aviation Order
CAR	Civil Aviation Regulation
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation
Cat	Category
CBCiy	City of Canterbury-Bankstown (Council)
CBD	Central Business District
CG	Climb Gradient
CMP	Construction Management Plan
CNS/ATM	Communications, Navigation, Surveillance / Air Traffic Management
CoM	City of Melbourne (Council)
CoS	City of Sydney (Council)
DA (Aviation)	Decision Altitude (Aviation)
DA (Planning)	Development Application or Development Approval (Planning)
DAH	Designated Airspace Handbook
DAP	Departure and Approach Procedures (published by AsA)
DEP	Departure
DER	Departure End of Runway
DEVELMT	Development
DH	Decision Height

Abbreviation	*Meaning*
DITRDC	Department of Infrastructure, Transport, Regional Development & Communications (Commonwealth) (former abbreviations include DIRD, DIRDC, DITCRD)
DME	Distance Measuring Equipment
Doc nn	ICAO Document Number nn
DoD	Department of Defence
DODPROPS	Dependent Opposite Direction Parallel Runway OPerations
DPIE	Department of Planning, Industry & Environment (NSW)
EIS	Environmental Impact Study
ELEV	Elevation (above mean sea level)
ENE	East North East
ERSA	EnRoute Supplement Australia
ESE	East South East
FAF	Final Approach Fix
FAP	Final Approach Point
Ft	Feet
GLS	GNSS Landing System – a precision landing system like ILS but based on augmented GNSS using ground and satellite systems.
GNSS	Global Navigation Satellite System
GP	Glide Path
HF	High Frequency
HIAL	High Intensity Approach Light
HLS	Helicopter Landing Site
IAS	Indicated Air Speed
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IHS	Inner Horizontal Surface, an Obstacle Limitation Surface
ILS	Instrument Landing System, a precision approach landing system
IMC	Instrument Meteorological Conditions
IPA	Integrated Planning Act 1997, Queensland State Government
ISA	International Standard Atmosphere
IVA	Independent Visual Approach
Km	Kilometres
Kt	Knot (one nautical mile per hour)
LAT	Latitude
LDA	Landing Distance Available
LEP	Local Environment Plan (Planning
LLZ	Localizer
LNAV	Lateral Navigation
LONG	Longitude
LSALT	Lowest Safe ALTitude
M	Metres
MAPt	Missed Approach Point
MDA	Minimum Descent Altitude
MDH	Minimum Descent Height
MDP	Major Development Plan
MGA94	Map Grid Australia 1994
MOC	Minimum Obstacle Clearance
MOCA	Minimum Obstacle Clearance Altitude
MOS	Manual Of Standards, published by CASA
MP	Master Plan
MSA	Minimum Sector Altitude
MVA	Minimum Vector Altitude
NASF	National Airports Safeguarding Framework
NDB	Non-Directional Beacon
NE	North East

Abbreviation	*Meaning*
NM	Nautical Mile (= 1.852 km)
nnDME	Distance from the DME (in Nautical Miles)
NNE	North North East
NNW	North North West
NOTAM	NOTice to AirMen
OAR	Office of Airspace Regulation
OCA	Obstacle Clearance Altitude (in this case, in AMSL)
OCH	Obstacle Clearance Height
ODPROPS	Opposite Direction Parallel Runway OPerations
OHS	Outer Horizontal Surface, an Obstacle Limitation Surface
OLS	Obstacle Limitation Surface, defined by ICAO Annex 14; refer also CASA MOS Part 139
PANS-OPS	Procedures for Air Navigation – Operations, ICAO Doc 8168; refer also CASA MOS Part 173
PAOAS	Parallel Approach Obstacle Assessment Surfaces
PAPI	Precision Approach Path Indicator (a form of VGSI)
PBN	Performance Based Navigation
PRM	Precision Runway Monitor
RAAF	Royal Australian Air Force
RAPAC	Regional AirsPace users Advisory Committee
REF	Reference
RL	Relative Level
RNAV	aRea NAVigation
RNP	Required Navigation Performance
RNP AR	Required Navigation Performance – Authorisation Required
RPT	Regular Public Transport
RTCC	Radar Terrain Clearance Chart (refer also MVA)
RWY	Runway
SACL	Sydney Airport Corporation Limited
SHLS	Strategic Helicopter Landing Site
SID	Standard Instrument Departure
SODPROPS	(Independent) Simultaneous Opposite Direction Parallel Runway OPerations
SPP	State Planning Policy, Queensland (specifically SPP 1/02: Development in the Vicinity of Certain Airports and Aviation Facilities)
SSDA	State Significant Development Application
SSP	State Significant Precinct
SSR	Secondary Surveillance Radar
STAR	STandard Arrival
TAR	Terminal Approach Radar
TAS	True Airspeed
TfNSW	Transport for NSW
THR	THReshold (of Runway)
TMA	TerMinal Area
TNA	Turn Altitude
TODA	Take-off Distance Available
TORA	Take-Off Runway Available
UHF	Ultra-High Frequency
VFR	Visual Flight Rules
VHF	Very High Frequency
VIS	Visual
VMC	Visual Meteorological Conditions
V_n	Aircraft critical velocity reference
VNAV	Vertical Navigation
VNC	Visual Navigation Chart
VOR	Very high frequency Omni-directional Range
VSS	Visual Segment Surface

Abbreviation	*Meaning*
VTC	Visual Terminal Chart
WAC	Westralia Airports Corporation, operators of Perth Airport
WAM	Wide-Area Multilateration
WNW	West North West
WSW	West South West
WGS84	World Geodetic System 1984
WSA	Western Sydney Airport

APPENDIX 2 — PANS-OPS PROCEDURES

The versions of the IFPs consulted were from the AIP Amendment 167, effective from 17-Jun-2021 to 8-Sep-2021, current as of the date of this report — as indicated in Table 15 below.

Table 16 — Appendix: PANS OPS Instrument Flight Procedure Charts for Sydney Airport (AIP Amendment 167 – Effective 17-Jun-2021 to 8-Sep-2021)

SYDNEY (YSSY)

Name of Chart	*Effective Date*	*(Amdt No)*
AERODROME CHART PAGE 1	25-Mar-2021	(Am 166)
AERODROME CHART PAGE 2	25-Mar-2021	(Am 166)
APRON CHART - INTERNATIONAL PAGE 1	17-Jun-2021	(Am 167)
APRON CHART - INTERNATIONAL PAGE 2	17-Jun-2021	(Am 167)
APRON CHART - DOMESTIC PAGE 1	7-Nov-2019	(Am 161)
APRON CHART - DOMESTIC PAGE 2	13-Aug-2020	(Am 164)
APRON CHART - DOMESTIC PAGE 3	13-Aug-2020	(Am 164)
STANDARD DOMESTIC TAXI ROUTES - ARRIVALS	7-Nov-2019	(Am 161)
STANDARD DOMESTIC TAXI ROUTES - DEPARTURES	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 1	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 2	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 3	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 4	21-May-2020	(Am 163)
NOISE ABATEMENT PROCEDURE PAGE 5	21-May-2020	(Am 163)
NOISE ABATEMENT PROCEDURE PAGE 6	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 7	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 8	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 9	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 10	7-Nov-2019	(Am 161)
AIRPORT EFFICIENCY PROCEDURES	7-Nov-2019	(Am 161)
IVA USER GUIDE PAGE 1	7-Nov-2019	(Am 161)
IVA USER GUIDE PAGE 2	7-Nov-2019	(Am 161)
PRM USER INSTRUCTIONS	17-Jun-2021	(Am 167)
SID SYDNEY TWO DEPARTURE (RADAR)	21-May-2020	(Am 163)
SID RWY 34L SOUTH WEST DEP (JET)	7-Nov-2019	(Am 161)
SID RWY 16R DEENA SEVEN (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 34R ENTRA FIVE (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 07 FISHA EIGHT (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 16R KAMPI FIVE (RNAV)	7-Nov-2019	(Am 161)
SID RWY 16L KEVIN SIX (RNAV)	21-May-2020	(Am 163)
SID RWY 16L ABBEY THREE (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 34R MARUB SIX (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 34L RICHMOND FIVE DEP (JET)	7-Nov-2019	(Am 161)

Name of Chart	*Effective Date*	*(Amdt No)*
STAR BOREE THREE A ARRIVAL (RNAV)	5-Nov-2020	(Am 165)
STAR BOREE THREE P ARRIVAL (RNAV)	5-Nov-2020	(Am 165)
STAR MEPIL THREE ARRIVAL (RNAV)	21-May-2020	(Am 163)
STAR MARLN FIVE ARRIVAL (RNAV)	21-May-2020	(Am 163)
STAR ODALE SEVEN ARRIVAL (RNAV)	21-May-2020	(Am 163)
STAR RIVET THREE ARRIVAL (RNAV)	21-May-2020	(Am 163)
ILS OR LOC RWY 07	7-Nov-2019	(Am 161)
ILS OR LOC RWY 16L PAGE 1	17-Jun-2021	(Am 167)
ILS RWY 16L PAGE 2	17-Jun-2021	(Am 167)
ILS OR LOC RWY 16R PAGE 1	17-Jun-2021	(Am 167)
ILS RWY 16R PAGE 2	17-Jun-2021	(Am 167)
ILS OR LOC RWY 25	17-Jun-2021	(Am 167)
ILS OR LOC RWY 34L PAGE 1	17-Jun-2021	(Am 167)
ILS RWY 34L PAGE 2	17-Jun-2021	(Am 167)
ILS OR LOC RWY 34R PAGE 1	17-Jun-2021	(Am 167)
ILS RWY 34R PAGE 2	17-Jun-2021	(Am 167)
RNAV-Z (GNSS) RWY 07	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 16L	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 16R	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 25	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 34L	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 34R	7-Nov-2019	(Am 161)
GLS RWY 07	7-Nov-2019	(Am 161)
GLS RWY 16L	17-Jun-2021	(Am 167)
GLS RWY 16R	17-Jun-2021	(Am 167)
GLS RWY 25	17-Jun-2021	(Am 167)
GLS RWY 34L	17-Jun-2021	(Am 167)
GLS RWY 34R	17-Jun-2021	(Am 167)

Source: AIP Book (17-Jun-2021 to 8-Sep-2021) via http://www.airservicesaustralia.com/aip/aip.asp?pg=10