

Aeronautical Impact Assessment, Westfield Eastgardens redevelopment

Prepared for Scentre Group

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Prepared by Consultants:



Strategic Airspace Pty Limited
ABN: 60 097 857 415

PO Box 253, Bondi Junction NSW 1355
Australia

Tel: +61.2.9211.0085

Email - Attn: Cathy.PakPoy@StrategicAirspace.com

Client:

Scentre Group

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1. Introduction & Executive Summary

Scentre Group is submitting a Planning Proposal to enable a mixed-use redevelopment of Westfield Eastgardens. The proposed scheme consists of an expansion of the existing retail centre at Westfield Eastgardens, plus two new commercial towers above and adjacent to the retail mall. The proposed scheme is being presented to Bayside Council to amend the LEP for additional height and density to deliver the scheme. The two towers included in the Planning Proposal will have heights of 94.4m AHD (tower over the existing retail centre) and 64.4m AHD (tower adjacent to existing retail centre).

A further two towers have been identified as future stage development in order to demonstrate a masterplan for a cohesive approach to developing the Bunnerong Road frontage of the site. Scentre Group is not seeking approval for these towers in this Planning Proposal submission. These further towers are proposed to be lower than the 94.4m AHD tower included in this assessment.

Strategic Airspace has been engaged to provide an aeronautical impact assessment for the first two towers of the proposed expansion. This assessment provides details on the maximum building heights allowable as a result of the aviation-related airspace constraints, guidance concerning crane height impacts, and the likelihood of gaining approvals under the Airports (Protection of Airspace) Regulations (APARs).

Figure 1-1: The Proposed Development



The relevant limiting airspace restrictions are shown in the following table.

Table 1-1: Summary Hierarchy of Aviation-Related Height Constraints

<i>Height Limits (m AHD)</i>	<i>Limit Detail</i>	<i>Comment</i>
51m	OLS Inner Horizontal Surface	Under the Airports (Protection of Airspace) Regulations the penetration of the OLS may be permitted. Such a penetration requires that the developer seek approval under the regulations for the proposed development. This approval is likely to be granted if the proposed development, and the cranes required to construct it, does not penetrate any of the overhead PANS-OPS surfaces. In this situation the proposal and cranes do not penetrate the PANS-OPS of AHD 126.4m so there is no impediment to approval. Penetration of the OLS may also cause certain provisions to be imposed upon the development (these generally involve the installation of aviation hazard lights on the extremities of the building and on cranes).
126.4m	PANS-OPS: Category A & B Circling Area	The Category A & B Circling Area is the most restrictive PANS-OPS surface overhead the proposed site. This is a horizontal surface covering the whole of the Westfield Eastgardens development. There is sufficient airspace beneath this surface and above the proposed towers for cranes to construct the towers.
>126.4m	Other PANS-OPS and RTCC Surfaces related to various procedures for RWY 16L, 34R and 07	There is sufficient airspace beneath these surfaces and above the proposed towers for cranes to construct the towers.

The aeronautical assessment has shown that:

- The proposed buildings would penetrate the Inner Horizontal Surface (IHS) of the OLS by up to 43m;
- The maximum height of the proposed buildings would be 32m beneath the most constraining PANS-OPS surface; and
- The 32m metres provides sufficient airspace to erect cranes to construct the towers without infringing any PANS-OPS surface.

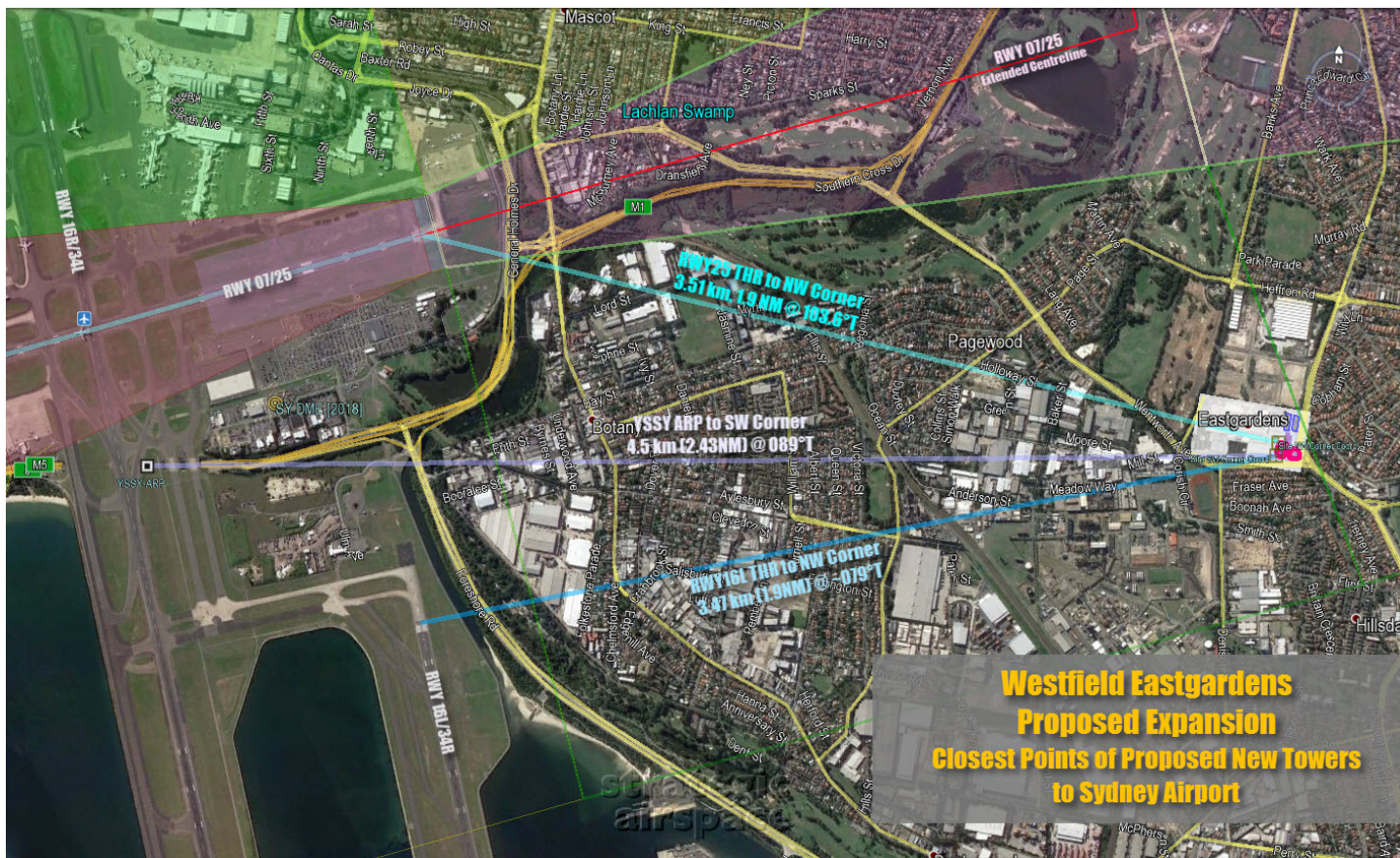
Penetrating the IHS does not limit the approvability of the towers as the APARs allow for such infringements. Consequently, there are many existing buildings that penetrate the IHS by a greater amount. However, the APARs require that when a proposed structure would penetrate the OLS an application for approval of the structure as a Controlled Activity must be made to the Department of Infrastructure, Regional Development and Cities (DIRDC) prior to the commencement of construction of the structure. The cranes required to construct the towers would also require approval under the APARs. Such approval is generally granted provided neither the buildings nor the cranes infringe any PANS-OPS surface. This is the case for Westfield Eastgardens expansion so there is **no technical impediment to the granting of an approval of the proposed development as a Controlled Activity as defined under the APARs.**

Application for airspace height approval for the towers does not need to be made until the DA is ready to be submitted. The airspace height approval for cranes does not need to be made until about 2 months prior to the commencement of construction. However, either or both applications may be made prior to those events.

2. The Project

2.1 Site Location & Context

Figure 2-1: The Expansion Project in relation to Sydney Airport



2.1.1 Coordinates & Relation to Sydney Airport

The site coordinates have been digitised based on received plans geo-referenced in GoogleEarth™. (See diagram above.)

RWY25 THR to NW Corner 3.51 km, 1.9 NM @ 103.6°T

ARP to SW Corer 4.5 km 2.43NM @ 089°T (089.54°T)

RWY16L THR to SW Corner: 3.47 km = 1.9NM (1.88NM) @ ~079°T

Table 2-1: Project Site Coordinates

Feature	Latitude S	Longitude E
NW	33° 56' 42.73"	151° 13' 32.98"
SW	33° 56' 44.42"	151° 13' 32.65"

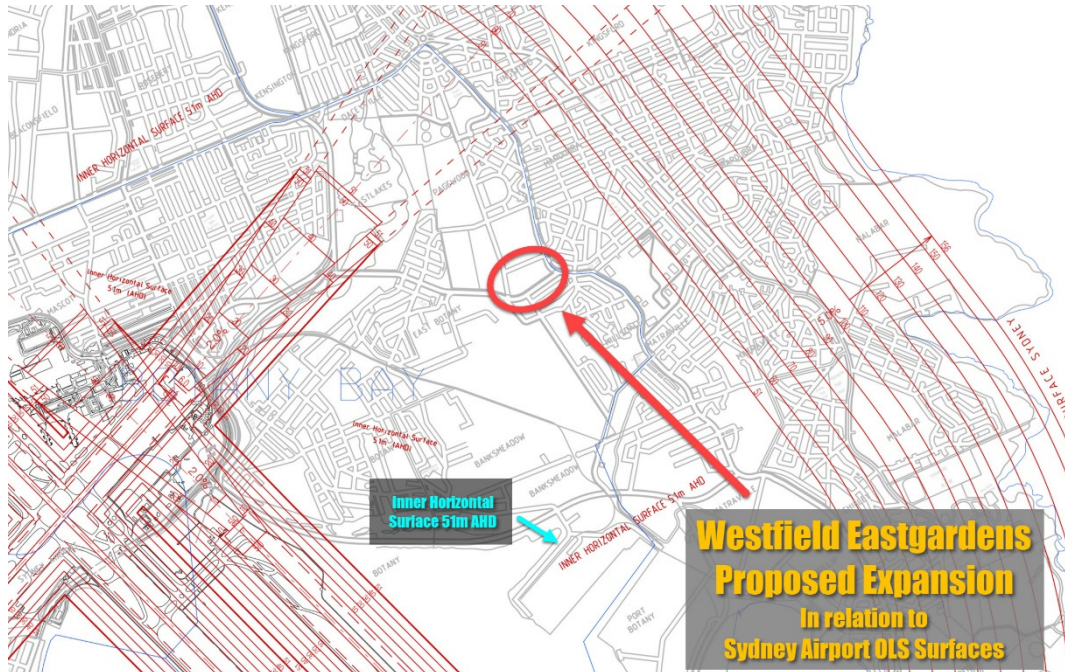
In relation to the airport reference point (ARP) the project site is:

- 2.43 NM (4.5 km) at 089°T

3. Aeronautical Height Analysis

3.1 Obstacle Limitation Surfaces (OLS)

Figure 3-1: Site in relation to the Sydney Airport OLS



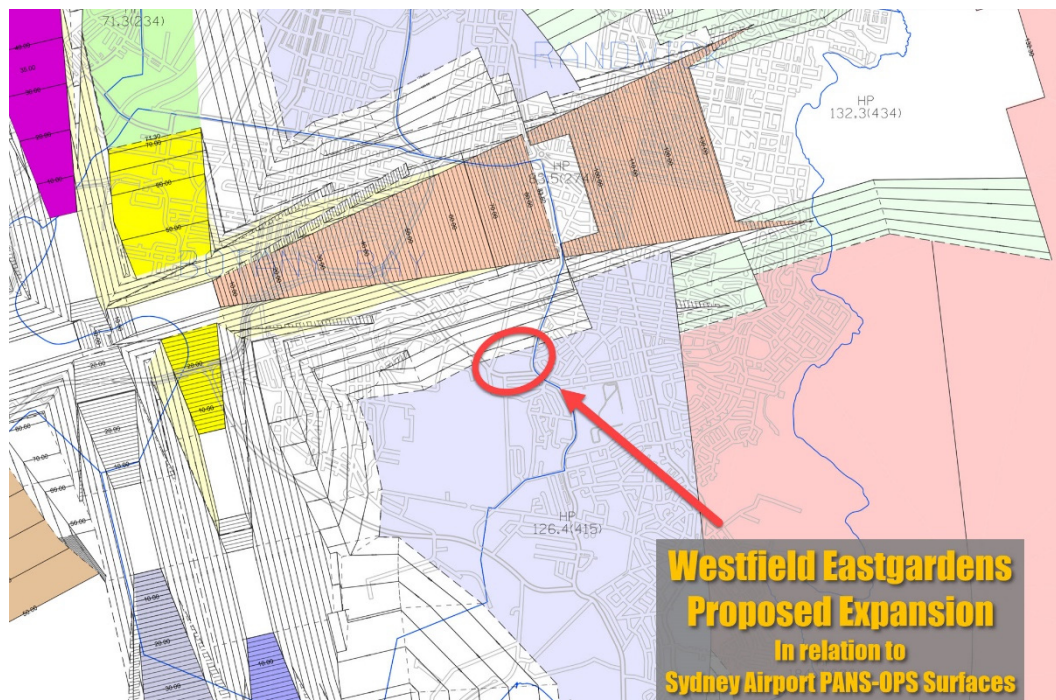
The OLS surface above the site is the Inner Horizontal Surface (IHS). This surface is flat and has a height of 51m AHD. The location of the site in relation to the OLS is depicted in Figure 3-1.

The proposed maximum heights for the buildings at 94.4m AHD would penetrate the OLS by 43m — and thus the proposed development would require a prior airspace approval, by the Department of Infrastructure, Regional Development and Cities (DIRDC), as a Controlled Activity under the Airports (Protection of Airspace) Regulations (APARs).

The fact that a building would penetrate the OLS is not a barrier to approval of an airspace height application. It does mean however that any buildings that infringe the OLS may be required to install and operate one or more obstacle lights on the building. Obstacle lighting conditions would be recommended by the Civil Aviation Safety Authority (CASA) in their response to an airspace height application, and these would be stipulated as a condition of approval by DIRDC.

3.2 PANS-OPS Analysis

Figure 3-2: Site in relation to the Sydney Airport PANS-OPS Approach Surfaces



The closest runway ends are the Departure Ends of Runways 07 and 16L.

Sydney Airport's PANS-OPS surfaces chart (for approach procedures), from the currently published Declared Airspace for Sydney Airport (from 2015) is depicted in Figure 3-2 above.

These charts are now considered outdated — partly due to changes in criteria to be used in designing the procedures, and partly because of changes to the PANS-OPS flight procedures actually published for use — and so do not necessarily provide the correct guidance for applicable height constraints.

An assessment of the actual PANS-OPS flight procedures, as published by Airservices Australia (Amendment 158, effective 28-Feb-2019 to 22-May-2019), provides results shown in the table below. Note that in some cases the values in this table are conservative because the assessment calculations were conducted only to a level that provided sufficient guidance as to the lowest value overhead the site.

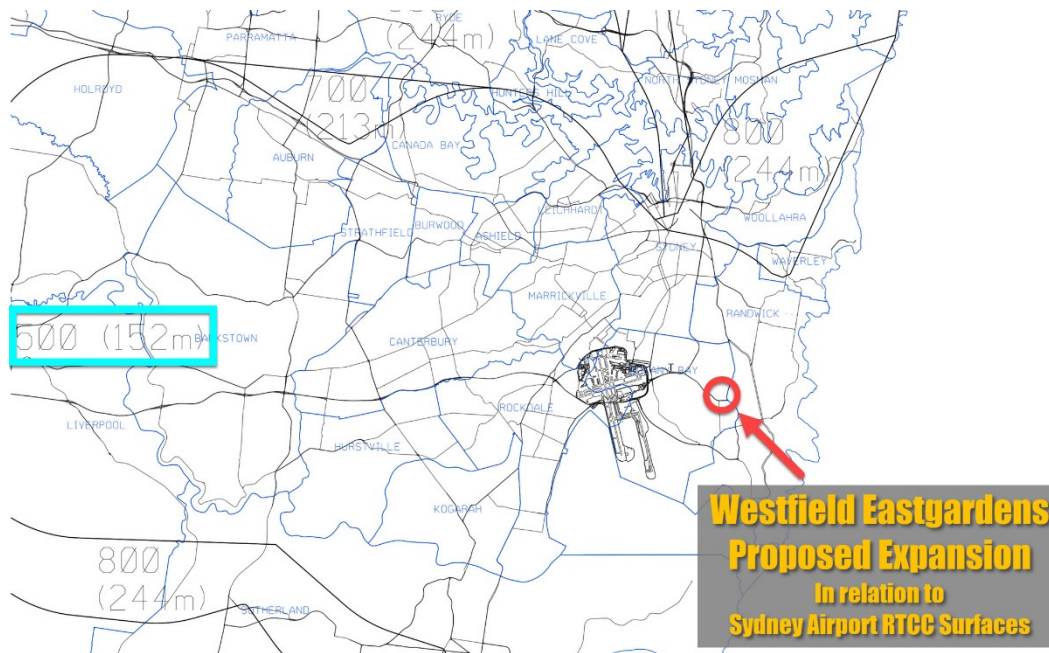
Table 3-1: PANS-OPS Height Limitations

<i>Procedure</i>	<i>Height Limit (m AHD)</i>	<i>Clearance Above Building</i>	<i>Description</i>
Circling	126.4m	32m	The proposed buildings are located within the Cat A & B Circling area. This imposes the most limiting restriction on the proposed buildings. The clearance above the proposed building maximum height provides sufficient room for cranes.
RWY 07 DEP	135.2m	40.8m	The most restrictive departure surface. The clearance above the proposed building maximum height provides sufficient room for cranes..
RWY 07 Basic ILS	>152m	>57.6m	The proposed development is beneath the Basic ILS Y-surface. The actual height of the surface is an estimate only. The clearance above the proposed building maximum height provides sufficient room for cranes.
RWY 34R DEP	223.1m	128.7m	The clearance above the proposed building maximum height provides sufficient room for cranes..
RWY 25 Basic ILS	~229m	~134.6m	The clearance above the proposed building maximum height provides sufficient room for cranes.
RWY 16L DEP	234.2m	139.8m	The clearance above the proposed building maximum height provides sufficient room for cranes..
RWY 07 LNAV APCH	>277.5 m	183.1m	The proposed development is located in the missed approach secondary area very near the primary area. The clearance above the proposed building maximum height provides sufficient room for cranes.
Other procedures	N/A		Protection areas for other procedures are either located away from the site or are far less restrictive than other surfaces identified.

3.3 Radar Terrain Clearance Chart (RTCC) Surfaces

The site lies under the RTCC (Radar Terrain Clearance Chart) / Minimum Vector Altitude (MVA) surface that would impose a height limitation of 152.4m AHD.

Figure 3-3: Site in relation to the Sydney Airport RTCC Surfaces



3.4 Other Standard Height Assessment Considerations

The following table provides a brief assessment of other considerations

Table 3-2: Other Assessable Height Limitations

Procedure	Height Limit (m AHD)	Description
Navigation Infrastructure	N/A	The proposed development, based on its location and maximum building height, should not affect any navigation infrastructure.
Other Sydney Airport Declared Airspace Surfaces	N/A	The proposed development is outside the charted protection surface areas such as the PAPI light planes and so forth.
Airlines Engine Out Procedures	N/A	Engine Out procedures (from RWY 34R, the most relevant take-off runway end for these procedures) are designed and maintained by each of the passenger transport aircraft operators in accordance with the relevant regulations. Though confirmation will need to be sought from the operators at the time of application for approval, the proposed site can be considered to be sufficiently distant from the track centreline that it will not adversely affect any contingency procedures.

4. Maximum Effective Heights for Buildings and Cranes

The PANS-OPS and RTCC surfaces overhead the site should be considered as hard limits.

Generally, PANS-OPS surface heights are considered as the maximum possible approvable height for buildings under the APAR, but this situation changes where the RTCC limit is lower. In that case, approval of buildings (as Controlled Activities, in the terminology of the APAR) would most likely be limited to the RTCC surface height limit.

Note that maximum heights approvals under APAR for buildings are deemed to be the absolute maximum heights for the entire built structure including overruns, rooftop furniture, signage and so forth.

4.1 Crane Considerations

The most constraining PANS-OPS surface is 32m above the maximum building height; this is sufficient height above the proposed buildings for most types of cranes. Therefore, the cranes needed to construct the proposed towers will not be an impediment to approval of the proposed development by DIRDC.

4.2 Airspace Height Application Considerations

Application for airspace height approval for the towers does not need to be made until the DA is ready to be submitted. The airspace height approval for cranes does not need to be made until about 2 months prior to the commencement of construction. However, either or both applications may be made prior to those events.

5. Conclusion

Both proposed tower buildings will penetrate the Inner Horizontal Surface of the OLS by significant amounts. Under the APARs structures may penetrate the OLS - there are many existing buildings that infringe the OLS around Sydney Airport. However, such a proposed infringement requires that an application for approval of the proposed development as a Controlled Activity be made to DIRDC.

Generally, this approval will be granted provided that the proposed buildings, and the cranes required to construct the buildings, do not infringe any PANS-OPS surface. This is the case for the proposed Westfield Eastgardens expansion – so there is no technical impediment to approval of the proposed development by DIRDC.

Whilst this analysis has been prepared for the two commercial towers included in the Planning Proposal, the two towers identified for *future stage* development along Bunnerong Road have heights that are lower than the tallest commercial tower proposed, and hence the conclusions reached in this report will be applicable to these future towers also.