



AERONAUTICAL IMPACT ASSESSMENT

NEW PRIMARY SCHOOL IN GOOGONG

Prepared for Hansen Yuncken Pty Ltd

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GLOSSARY

AAE	above aerodrome elevation
AGL	above ground level
AHD	Australian Height Datum
AIP	aeronautical information package (Airservices Australia)
AMSL	above mean sea level
ARP	aerodrome reference point
CAAP	Civil Aviation Advisory Publication
CAR	Civil Aviation Regulations (1988)
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations (1998)
CNS	Communications, Navigation and Surveillance
DAH	Designated Airspace Handbook
DME	distance measuring equipment
ERSA	En Route Supplement Australia (Airservices Australia)
FAC	Facilities Information Chart
ICAO	International Civil Aviation Organisation
LSALT	lowest safe altitude
MSA	minimum safe altitude
MOC	minimum obstacle clearance
MOS	Manual of Standards Part 139—Aerodromes
OLS	obstacle limitation surface(s)
RAAF	Royal Australian Air Force
RPT	regular public transport
SID	standard instrument departures
SSR	secondary surveillance radar
VSS	visual segment surface

UNITS OF MEASUREMENT

ft	feet	(1 ft = 0.3048 m)
km	kilometres	(1 km = 0.5399 nm)
m	metres	(1 m = 3.281 ft)
nm	nautical miles	(1 nm = 1.852 km)

1. INTRODUCTION

1.1. Situation

This Aeronautical Impact Assessment accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of an application for a State Significant Development (SSD-10326042).

The development is for a new primary school located on land bound by Gorman Drive, Aprasia Avenue, Wilkins Way and McPhail Way in Googong.

This report addresses the relevant Secretary's Environmental Assessment Requirements (SEARs), namely:

20. Aviation

- Identify if the proposal would affect or be affected by aviation operations associated with Canberra Airport. Where required, provide a report prepared by a suitably qualified person that:
 - identifies whether the proposed school is located within any of the following Australian Noise Exposure Forecast (ANEF) contours as specified in Table 2.1 of Australian Standard 2021:2015 Acoustics - Aircraft noise intrusion - Building siting and construction (AS 2021:2015):
 - <20
 - Between 20 - 25
 - or >25.
 - provides details of any flight paths that may be impacted by the proposed development.
 - provides details of impact of the proposed development on Aviation and Airspace protection considering the Obstacle Limitation Surface (OLS) for Canberra Airport.

Relevant Policies and Guidelines:

- National Airports Safeguarding Framework and associated guidelines
- Airspace Regulations 2007.

1.2. The Proposal

The proposed development is for construction and operation of a new primary school in Googong that will accommodate up to 700 students.

The proposed development is a Core 35 school and includes:

- A collection of 1-2 storey buildings containing 30 home base units, 3 special education learning units, canteen, hall, library and administrative facilities
- On-site carpark with 60 spaces and on-street kiss-and-ride facilities
- Outdoor sports court and play area
- Integrated landscaping, fencing and signage.

1.3. Methodology

The engagement was generally delivered as outlined below:

1. Review client material
2. Review relevant regulatory requirements and information sources including Aeronautical Information Package and Civil Aviation Safety Authority (CASA) Manual of Standards Part 139 – Aerodromes, NASF Guidelines and Airspace Regulations 2007.
3. Assess any crane or any temporary construction structure against flight paths
4. Prepare a draft letter report and send to the client for comment
5. Finalise the letter report for Client acceptance.

1.4. Client material

The following material was provided by Hansen Yuncken Pty Ltd for the purpose of this assessment:

- Aviation consultant plans&drawings.pdf (issued: 01 April 2021)
- C2.7_Googong PS – Detail Contour Survey Plan (issued: 30 April 2020)
- C3.5.1_SEARs Final – Googong (issued: 20 November 2020).

1.5. References

References used or consulted in the preparation of this report include:

- Airport Planning, Environment, Planning and Sustainable Development Directorate – Planning, ACT Government
- Airservices Australia, Aeronautical Information Package (AIP); including En Route Supplement Australia (ERSA) effective 25 March 2021
- Airservices Australia, Designated Airspace Handbook (DAH), effective 05 November 2020
- Canberra Airport 2020 Master Plan (January 2020)
- Civil Aviation Safety Authority, Civil Aviation Regulations 1998 (CAR)
- Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 (CASR)
- Civil Aviation Safety Authority, *Manual of Standards Part 139 – Aerodromes*, dated 5 September 2019
- Civil Aviation Safety Authority, *Manual of Standards Part 173 – Standards Applicable to Instrument Flight Procedure Design*, version 1.5, dated March 2016
- Department of Infrastructure and Regional Development, Australian Government, *National Airport Safeguarding Framework, Guideline B Managing the Risk of Building Generated Windshear and Turbulence at Airports*

- International Civil Aviation Organization, Aircraft Operations Volume II – *Construction of Visual and Instrument Flight Procedures*, 6th edition, 2014
- OzRunways, dated 9 February 2020
- Queanbeyan Local Environmental Plan 2012 (version 1 February 2021)
- State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 (version 22 January 2021)
- State Environmental Planning Policy (Infrastructure) 2007 (version 22 January 2021).

2. BACKGROUND

2.1. Project description

The new primary school in Googong is located along Aprasia Avenue, approximately 13.5 km (7.3 nm) southeast of Canberra Airport's Aerodrome Reference Point (ARP).

Canberra Airport is a leased Commonwealth Airport and is protected under the Airports Act 1996 and the Airports (Protection of Airspace) Regulations 1996. Therefore, any Controlled Activity that infringes an airport's protected airspace requires approval before it can be carried out.

Canberra Airport is currently a Code 4, instrument precision airport.

Figure 1 shows a schematic view of the Project Development (source: Pedavoli Architects – Aviation consultant plans&drawings).



Figure 1 Project Overview

Hansen Yuncken has advised that the highest point of the development is approximately 11 m above ground level (AGL). The elevation of the site is estimated to be approximately 750 m AHD (Australian Height Datum), based on e-Topo data made available by the NSW government. This gives an approximate development height of 761 m AHD.

2.2. Site overview

An overview of the Project site located along Aprasia Avenue and Gorman Drive Figure 2 (source: Google Earth).



Figure 2 Project site

Figure 3 shows the location of the Project site relative to Canberra Airport (source: Google Earth).

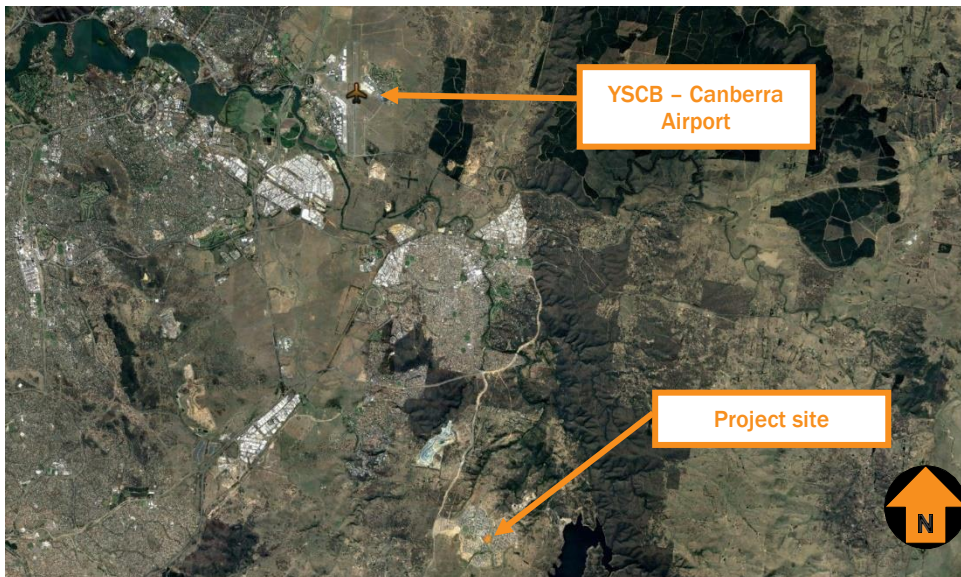


Figure 3 Project site relative to Canberra Airport

The following details for the school building are relevant to the assessment herein:

- natural ground level is 750 m Australian Height Datum (AHD)
- building height is 11 m above ground level (AGL)
- maximum overall height is 761 m AHD (2496 ft above mean sea level (AMSL)).

Figure 4 illustrates the Project's natural ground level and building heights (source: Pedavoli Architects – Aviation consultant plans&drawings).

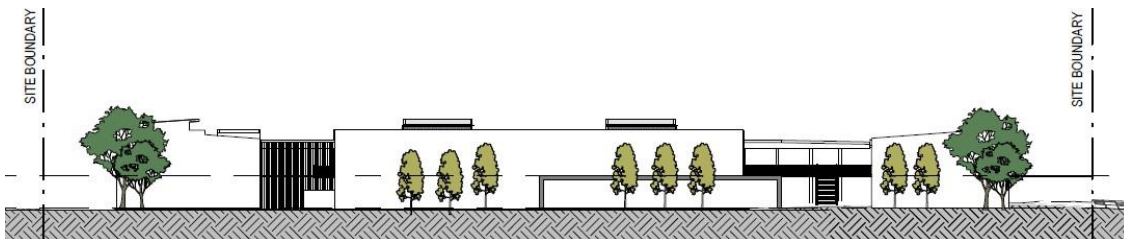


Figure 4 Northern Elevation

2.3. Temporary crane operations

Hansen Yuncken Pty Ltd has advised that, based on previous experience with modular schools, it plans to use a 300 tonne mobile crane. Details of temporary crane details will be advised prior to construction.

3. PLANNING CONTEXT

3.1. Airports (Protection of Airspace) Regulations 1996

Part 12 of the *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996* establish a framework for the protection of airspace at and around airports. The following summary of these requirements is provided on the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications website.

The *Airports Act 1996* defines any activity resulting in an intrusion into an airport's protected airspace to be a "controlled activity", and requires that controlled activities cannot be carried out without approval.

The Regulations provide for the Department or the airport operator to approve applications to carry out controlled activities, and to impose conditions on an approval.

Carrying out a controlled activity without approval is an offence under Section 183 of the *Airports Act 1996*, and is punishable by a fine of up to 250 penalty units. It is an offence under Section 185 of the Act to contravene any conditions imposed on an approval. Under Section 186 of the Act it is an offence not to give information to the airport operator that is relevant to a proposed controlled activity.

Any activity that infringes an airport's protected airspace is called a controlled activity, and requires approval before it can be carried out. Controlled activities include the following:

- permanent structures, such as buildings, intruding into the protected airspace;
- temporary structures such as cranes intruding into the protected airspace; and
- any activities causing intrusions into the protected airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

The Regulations differentiate between *short-term* (less than 3 months) and *long-term* controlled activities. The Regulations provide for the airport operator to approve *short-term* controlled activities, excluding PANS-OPS infringements, and for the Department to approve long-term controlled activities, or *short-term* controlled activities referred to it by the airport operator, including short-term infringements of the PANS-OPS surface. However, long term intrusions of the PANS-OPS surface are prohibited.

Applications to carry out a controlled activity are to be made to the airport operator in writing. The information required in the application must include:

1. a description of the proposed controlled activity (building construction, crane operation etc);
2. its precise location (street directory grid references are suitable);
3. if the controlled activity consists of the erection of a building or structure:
 - a. the proposed maximum height of the structure above the Australian Height Datum (including any antennae or towers), and
 - b. the proposed maximum height of any temporary structure or equipment (e.g. cranes) intended to be used in the erection of the structure.

4. the purpose of the controlled activity.

The airport operator will conduct the initial assessment of the application in terms of:

- whether the activity results in an intrusion into the OLS or PANS-OPS surface;
- the extent of the intrusion; and
- the precise location of the development or activity.

The airport operator is required to invite the following organisations to assess or comment on an application:

- the Civil Aviation Safety Authority (CASA) for an assessment of the impact on aviation safety;
- Airservices Australia for assessments of proposals resulting in a penetration of the PANS-OPS surface or temporary redirection of flight paths;
- the local council authority responsible for building approvals; and
- the Department of Defence in the case of joint-user airports.

For short term controlled activities, comments are only required from CASA and Airservices.

The approval process varies depending on the type of controlled activity:

- short-term controlled activities which penetrate the OLS can be approved/refused by the airport operator after consultation with CASA and Airservices, or referred by the airport to the Department for a decision. However, if the short term controlled activity penetrates the PANS-OPS airport operators are required to consult with CASA and Airservices and then refer applications to the Department for a decision. This referral is to include advice about whether the short-term penetration of the PANS-OPS has the support of the airport operator;
- long-term controlled activities penetrating the OLS are referred by the airport to the Department for a decision after consultation with CASA, Airservices and the relevant building authority; and
- long-term controlled activities penetrating the PANS-OPS airspace are not permitted, and the airport operator can notify the refusal of such controlled activities.

The Regulations require any decision by the airport operator to be made in the interests of the *safety, efficiency or regularity* of existing or future air transport operations into or out of the airport.

3.2. Queanbeyan Local Environmental Plan 2012

The Project is subject to the Queanbeyan Local Environmental Plan 2012. The policy incorporates policies that aim to protect airspace operations and regulates developments in areas that are subject to aircraft noise. In terms of the projecting airspace operations, the policies can be found in section 7 clause 6:

7.6 Airspace operations

1) *The objectives of this clause are as follows—*

- (a) *to provide for the effective and ongoing operation of Canberra Airport by ensuring that such operation is not compromised by proposed development that penetrates the Limitation or Operations Surface for that airport,*
- (b) *to protect the community from undue risk from that operation.*

- 2) *If a development application is received and the consent authority is satisfied that the proposed development will penetrate the Limitation or Operations Surface, the consent authority must not grant development consent unless it has consulted with the relevant Commonwealth body about the application.*
- 3) *The consent authority may grant development consent for the development if the relevant Commonwealth body advises that—*
 - (a) *the development will penetrate the Limitation or Operations Surface but it has no objection to its construction, or*
 - (b) *the development will not penetrate the Limitation or Operations Surface.*
- 4) *The consent authority must not grant development consent for the development if the relevant Commonwealth body advises that the development will penetrate the Limitation or Operations Surface and should not be constructed.*
- 5) *In this clause—*

Limitation or Operations Surface means the Obstacle Limitation Surface or the Procedures for Air Navigation Services Operations Surface as shown on the Obstacle Limitation Surface Map or the Procedures for Air Navigation Services Operations Surface Map for the Canberra Airport.

relevant Commonwealth body means the body, under Commonwealth legislation, that is responsible for development approvals for development that penetrates the Limitation or Operations Surface for the Canberra Airport.

Section 7.7 addresses the development in areas that are subject to aircraft noise:

7.7 Development in areas subject to aircraft noise

- 1) *The objectives of this clause are as follows—*
 - (a) *to prevent certain noise sensitive developments from being located near the Canberra Airport and its flight paths,*
 - (b) *to assist in minimising the impact of aircraft noise from that airport and its flight paths by requiring appropriate noise attenuation measures in noise sensitive buildings,*
 - (c) *to ensure that land use and development in the vicinity of that airport do not hinder or have any other adverse impacts on the ongoing safe and efficient operation of that airport.*
- 2) *This clause applies to development that—*
 - (a) *is on land that—*
 - i. *is near the Canberra Airport, and*
 - ii. *is in an ANEF contour of 20 or greater, and*
 - (b) *the consent authority considers is likely to be adversely affected by aircraft noise.*
- 3) *Before determining a development application for development to which this clause applies, the consent authority—*
 - (a) *must consider whether the development will result in an increase in the number of dwellings or people affected by aircraft noise, and*

- (b) *must consider the location of the development in relation to the criteria set out in Table 2.1 (Building Site Acceptability Based on ANEF Zones) in AS 2021–2000, and*
 - (c) *must be satisfied the development will meet the indoor design sound levels shown in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021–2000.*
- 4) *In this clause—*

ANEF contour means a noise exposure contour shown as an ANEF contour on the Noise Exposure Forecast Contour Map for the Canberra Airport prepared by the Department of the Commonwealth responsible for airports.

AS 2021–2000 means AS 2021–2000, “Acoustics—Aircraft noise intrusion—Building siting and construction.”

3.3. NSW State Environmental Planning Policy (Educational Establishments and Child Care Facilities)

The Project is subject to State Environmental Planning Policy for Educational Establishments and Child Care Facilities (2017). The aim of this Policy is to facilitate the effective delivery of educational establishments and early education and care facilities across the State. The two planning policies should be read in conjunction, but as specified in clause 8:

“if there is an inconsistency between this Policy and another environmental planning instrument, whether made before or after the commencement of this Policy, this Policy prevails to the extent of the inconsistency.”

This planning policy does not contain any provisions regarding aerodromes, nor does it contain any information relating to plume rise assessments, aviation impacts or protecting the airspace around aerodromes. However, this planning document does provide a maximum building height which School developments should meet.

“The building height of a building (whether a new building, or an existing building as a result of an addition or alteration)

- (a) *must not exceed 4 storeys, and*
- (b) *must not exceed 22 m from ground level (mean).*

3.4. National Airports Safeguarding Framework

The National Airports Safeguarding Advisory Group (NASAG) was established by Commonwealth Department of Infrastructure and Transport to develop a national land use planning framework called the National Airports Safeguarding Framework (NASF). The purpose of this framework is to enhance the current and future safety, viability and growth of aviation operations at Australian airports through:

- the implementation of best practice in relation to land use assessment and decision making in the vicinity of airports;
- assurance of community safety and amenity near airports;
- better understanding and recognition of aviation safety requirements and aircraft noise impacts in land use and related planning decisions;
- the provision of greater certainty and clarity for developers and land owners;
- improvements to regulatory certainty and efficiency; and

- the publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports.

3.5. Civil Aviation Safety Regulations 1998 Part 139—Aerodromes

The Civil Aviation Safety Authority (CASA) regulates aviation activities in Australia. Applicable requirements include the Civil Aviation Safety Regulations 1998 Part 139—Aerodromes (CASR 139), the associated Manuals of Standards Part 139—Aerodromes (MOS 139) and other guidance and advisory material.

3.6. Canberra Airport Master Plan

The Canberra Airport Master Plan 2020, and in particular Chapter 11, addresses current and future requirements for a prescribed airspace. In particular:

Airspace management and protection is an essential part of Canberra Airport's operations. So too is the safe movement of aircraft.

....

The purpose of the OLS is to define the volume of airspace at and around the Airport which should be kept free of obstacles in order to minimise danger to aircraft arriving or departing the Airport. Infringements of the OLS may be approved by the Secretary of the Department of Infrastructure, Transport, Regional Development and Communications [the Secretary], following assessments on the potential safety, regularity, and efficiency impacts of the proposed obstacle.

The purpose of the PANS-OPS is to safeguard an aircraft from collision with obstacles when the pilot is flying on avionic instruments. The PANS-OPS establishes minimum clearances between approach and departure paths of aircraft and obstacles. A PANS-OPS surface cannot be infringed in any circumstances except for short term structures with the approval of the Secretary.

Canberra Airport is responsible for the assessment of temporary or permanent structures for infringements of the OLS or PANS-OPS. In the event an infringement into the OLS is detected, Canberra Airport is responsible for ensuring this information is communicated to CASA, Airservices Australia and aircraft operations.

CASA requires where facilities are constructed at or in the vicinity of the Airport that:

- *Sensible cladding and roofing materials are used to minimise the possibility of glare effects;*
- *Solar Farms planned, designed and located in a manner so as not to cause reflection or glare to aircraft;*
- *Glass for buildings is used in a manner to minimise reflection and glare; and*
- *All external lighting will be lit downward from a horizontal level to minimise impact on aircraft operations at night.*

Regulation 5 of the Airports [Protection of Airspace] Regulations 1996 ultimately provides that the Secretary can declare specified airspace around Canberra Airport to be prescribed to safeguard future Airport operations. The future declared OLS and PANS-OPS surfaces are shown in Figure 5 and Figure 6.

The future declared OLS and PANS-OPS surfaces allow for some future growth of the Airport, including development considered under this 2020 Master Plan. These surfaces may be changed, if necessary, when operations, facilities, or plans change. Other operation, policy, planning, or regulatory changes may also necessitate amendment to these surfaces by Canberra Airport at any time including in relation to developments which may interfere with the safety, efficiency, or regularity of existing development services or future air transport operations.

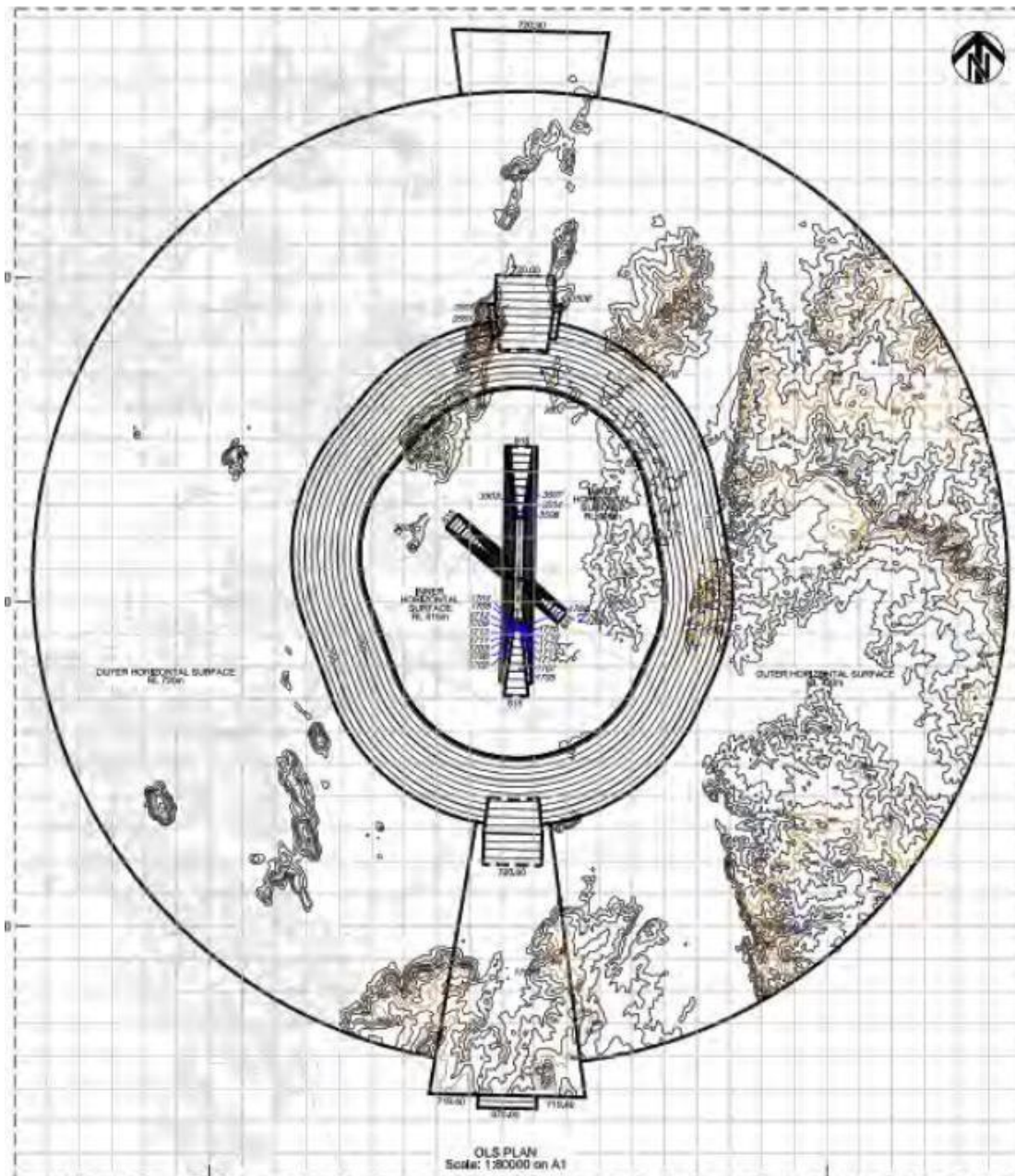


Figure 5 Canberra Airport – Obstacle Limitation Surfaces (OLS) Obstacle Control Chart

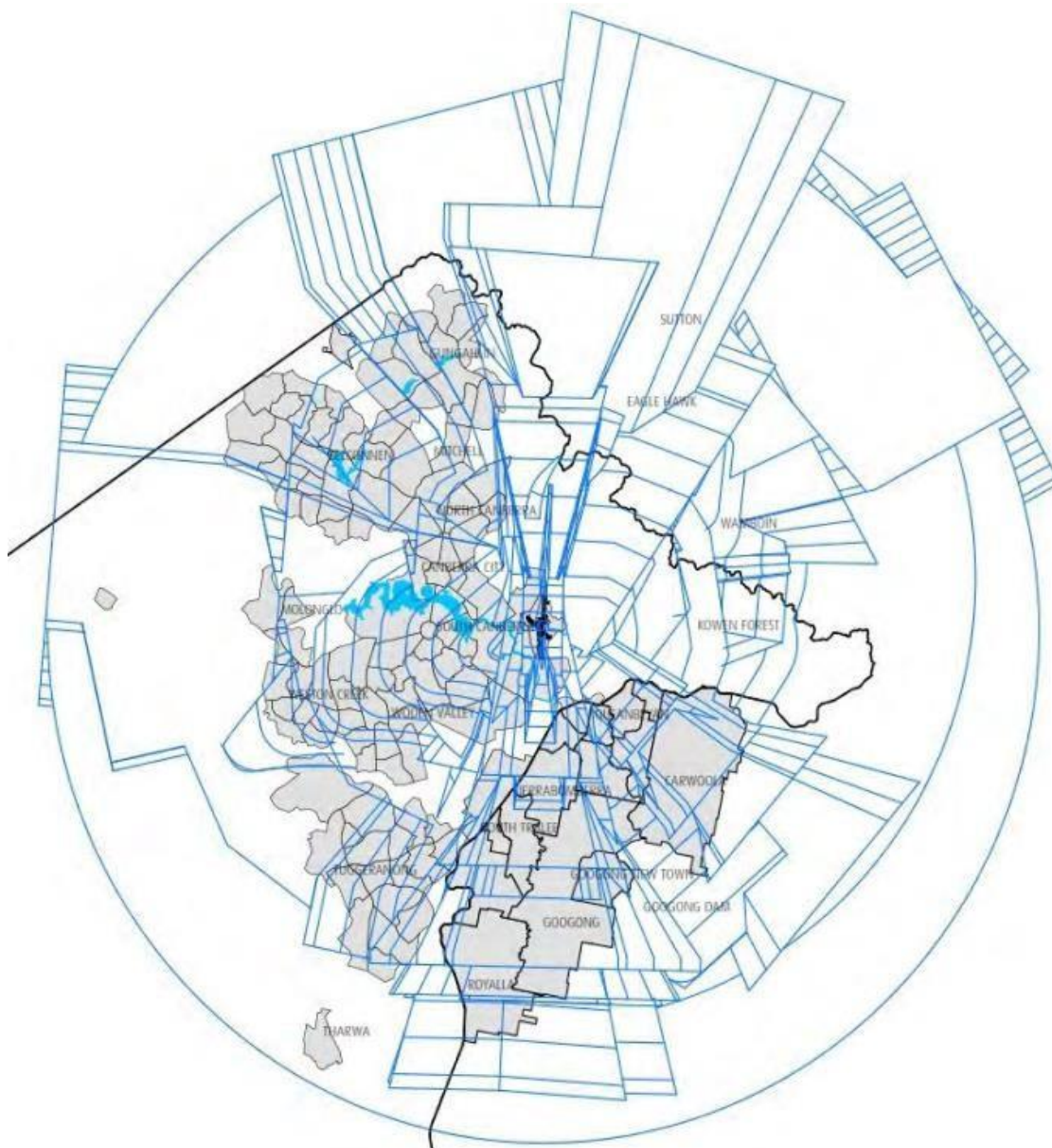


Figure 6 Canberra Airport – Procedures for Air Navigation Services – Aircraft Operations Surfaces

4. AVIATION IMPACT STATEMENT

The proposed Project site is located under the OLS of Canberra Airport.

4.1. Canberra Airport

Canberra Airport (YSCB) is the closest certified aerodrome to the Project site and is the only aerodrome that is of concern regarding the impact on aviation operations as a result of the development.

Canberra Airport is managed by Capital Airport Group Pty. Ltd (CAG), which leased the Airport from the Commonwealth Government in May 1998.

A check of Airservices Australia's Aeronautical Information Package (AIP), dated 17 June 2021, shows that airspace procedures are measured from the aerodrome reference point (ARP). The coordinates published in Airservices Australia's Designated Airspace Handbook (DAH) dated 17 June 2021, as follows:

- ARP coordinates: Latitude 35° 18'25"S and Longitude 149° 11'42"E.

According to En Route Supplementary Australia (ERSA) facilities information chart (FAC) for YSCB, Canberra Airport has an aerodrome elevation of 575 m AHD (1886 ft AMSL). and the reference elevation datum is 14 m AHD (46 ft AMSL).

Canberra Airport has two runways:

- Runway 12/30 is a Code 2, asphalt, non-precision instrument runway 1679 m x 30 m (runway strip: 90m)
- Runway 17/35 is a Code 4, asphalt, precision instrument runway 3283 m x 45 m (runway strip: 300m)

The details of the aerodrome are shown in Figure 7 (dated 25 March 2021) (source: Airservices Australia, YSCB Aerodrome Chart).

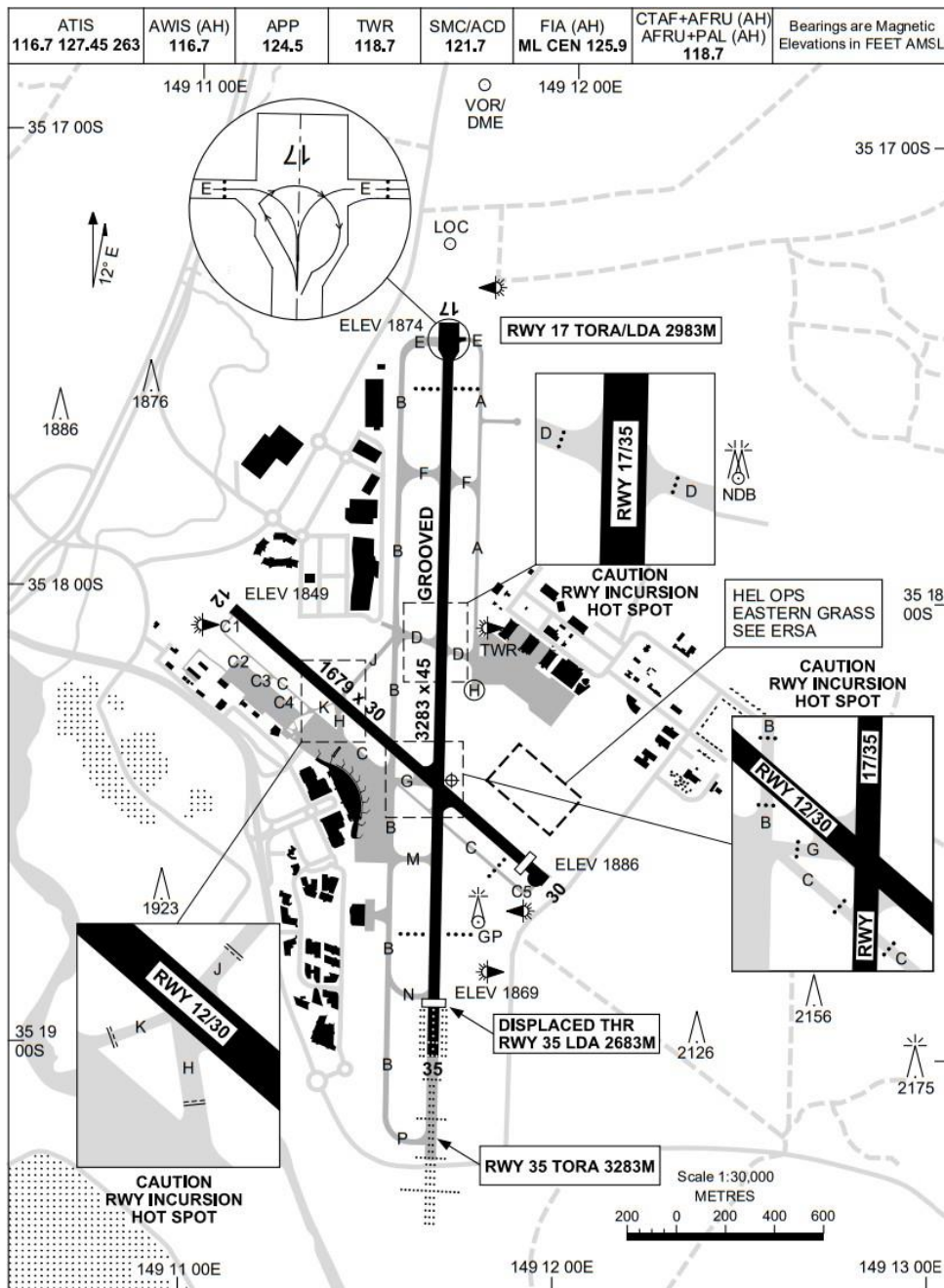


Figure 7 Aerodrome Chart for Canberra Airport (YSCB)

4.2. Minimum Safe Altitudes

The minimum safe altitude (MSA) is applicable for the instrument approach procedures at Canberra Airport from the airport's ARP. A copy of the MSA published for the airport in AIP DAP is shown in Figure 8 (Source: Airservices Australia).

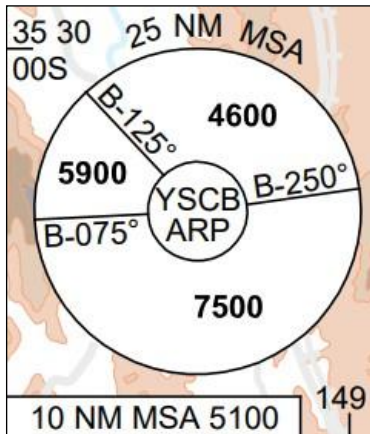


Figure 8 Canberra Airport's MSA

The Manual of Standards 173 Standards Applicable to Instrument Flight Procedure Design (MOS 173), requires that a minimum obstacle clearance (MOC) of 1000 ft below the published MSA is maintained.

Obstacles within 15 nm (10 nm MSA + 5 nm buffer) and within 30 nm (25 nm MSA + 5 nm buffer) of Canberra Airport's ARP define the height at which an aircraft can fly when within 10 nm and 25 nm.

The Project site is located within the 10 nm MSA of Canberra Airport. The MOC of the 10 nm MSA is 5100 ft AMSL. The overall height of the tallest building of the Project is 761 m (2496 ft) AHD. Therefore, the Project will not impact the MSA of Canberra Airport.

4.3. Instrument procedures

A check of the AIP via the Airservices Australia website showed that Canberra Airport (YSCB) is serviced by instrument precision flight procedures as per Table 1 (source: Airservices Australia).

Airservices Australia is designer of the instrument procedures for Canberra Airport.

Table 1 Canberra Airport (YSBC) aerodrome and procedure charts

<i>Chart name (Procedure Designer)</i>	<i>Effective date</i>	<i>Version</i>
AERODROME CHART PAGE 1 (AsA)	25 March 2021 (Am 166)	SCBAD01-166
AERODROME CHART PAGE 2 (AsA)	25 March 2021 (Am 166)	SCBAD02-166
APRON CHART – RPT – PAGE 1 (AsA)	27 February 2020 (Am 162)	SCBAP01-162
APRON CHART – RPT – PAGE 2 (AsA)	27 February 2020 (Am 162)	SCBAP04-162
APRON CHART – GENERAL AVIATION (HARDSTAND) (AsA)	23 May 2019 (Am 159)	SCBAP03-159
APRON CHART – FAIRBAIRN AND 34 SQN (AsA)	23 May 2019 (Am 159)	SCBAP02-159
NOISE ABATEMENT PROCEDURE PAGE 1 (AsA)	17 November 2011 (Am 129)	SCBNA01-129
NOISE ABATEMENT PROCEDURE PAGE 2 (AsA)	17 June 2021 (Am 167)	SCBNA02-167
NOISE ABATEMENT PROCEDURE PAGE 3 (AsA)	26 May 2016 (Am 147)	SCBNA03-147
NOISE ABATEMENT PROCEDURE PAGE 4 (AsA)	17 November 2011 (Am 129)	SCBNA04-129
SID CANBERRA TWO DEP (RADAR) – RWY 12 17 & 35 (AsA)	17 June 2021 (Am 167)	SCBDP01-167
SID RWYS 17/35 NORTH (JET) RNAV (AsA)	17 June 2021 (Am 167)	SCBDP05-167
SID RWYS 17/35 SOUTH & WEST (JET) RNAV (AsA)	17 June 2021 (Am 167)	SCBDP06-167
SID AKMIR TWO (NON-JET)(RNAV) (AsA)	17 June 2021 (Am 167)	SCBDP07-167
SID DUBUS TWO (NON-JET)(RNAV) (AsA)	17 June 2021 (Am 167)	SCBDP10-167
STAR AVBEG FOUR A ARRIVALS (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR05-167
STAR BUNGO THREE A ARR (NON-JET) (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR10-167
STAR BUNGO THREE V ARRIVALS (NON-JET) (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR01-167
STAR MANDA TWO A X ARRIVAL (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR06-167
STAR POLLI SEVEN A ARRIVAL (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR03-167
STAR POLLI SEVEN X ARRIVAL (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR07-167
STAR RAZZI SIX A ARRIVALS (JET) (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR04-167
STAR RAZZI SIX V ARRIVAL (JET) (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR11-167
STAR RAZZI SIX W Y ARR (JET) (RNAV) (AsA)	17 June 2021 (Am 167)	SCBSR13-167
DME OR GNSS ARRIVAL PAGE 1 (AsA)	17 June 2021 (Am 167)	SCBDG01-167
DME OR GNSS ARRIVAL PAGE 2 (AsA)	17 June 2021 (Am 167)	SCBDG02-167
VOR RWY 17 (AsA)	17 June 2021 (Am 167)	SCBV001-167
ILS-Z OR LOC-Z RWY 35 PAGE 1 (AsA)	17 June 2021 (Am 167)	SCBII01-167

ILS-Z RWY 35 PAGE 2 (AsA)	17 June 2021 (Am 167)	SCBII03-167
ILS-Y OR LOC-Y RWY 35 (AsA)	17 June 2021 (Am 167)	SCBII02-167
VOR RWY 35 (AsA)	17 June 2021 (Am 167)	SCBV002-167
NDB-A (AsA)	17 June 2021 (Am 167)	SCBNB01-167
RNAV-Z (GNSS) RWY 30 (AsA)	17 June 2021 (Am 167)	SCBGN01-167
RNAV-Z (GNSS) RWY 35 (AsA)	17 June 2021 (Am 167)	SCBGN02-167
RNAV-W (RNP) RWY 17 (AsA)	17 June 2021 (Am 167)	SCBGN11-167
RNAV-X (RNP) RWY 17 (AsA)	17 June 2021 (Am 167)	SCBGN12-167
RNAV-Y (RNP) RWY 17 (AsA)	17 June 2021 (Am 167)	SCBGN15-167
RNAV-W (RNP) RWY 35 (AsA)	17 June 2021 (Am 167)	SCBGN13-167
RNAV-X (RNP) RWY 35 (AsA)	17 June 2021 (Am 167)	SCBGN14-167
RNAV-Y (RNP) RWY 35 (AsA)	17 June 2021 (Am 167)	SCBGN16-167

4.4. Obstacle Limitation Surface (OLS) analysis

The Master Plan for Canberra Airport 2020 provides a map which shows the contours of the different OLS surfaces of Canberra Airport. The OLS surfaces of Canberra Airport are designed to accommodate future upgrade needs.

The maximum horizontal distance that an OLS may extend for an aerodrome in Australia is 15 km (8.1 nm) from the edge of a runway strip. The project is located approximately 13.5 km (7.3 nm) southeast of the airport's ARP and is therefore constrained by the outer horizontal surface as shown in Figure 9 (source: Google Earth, Canberra Airport).

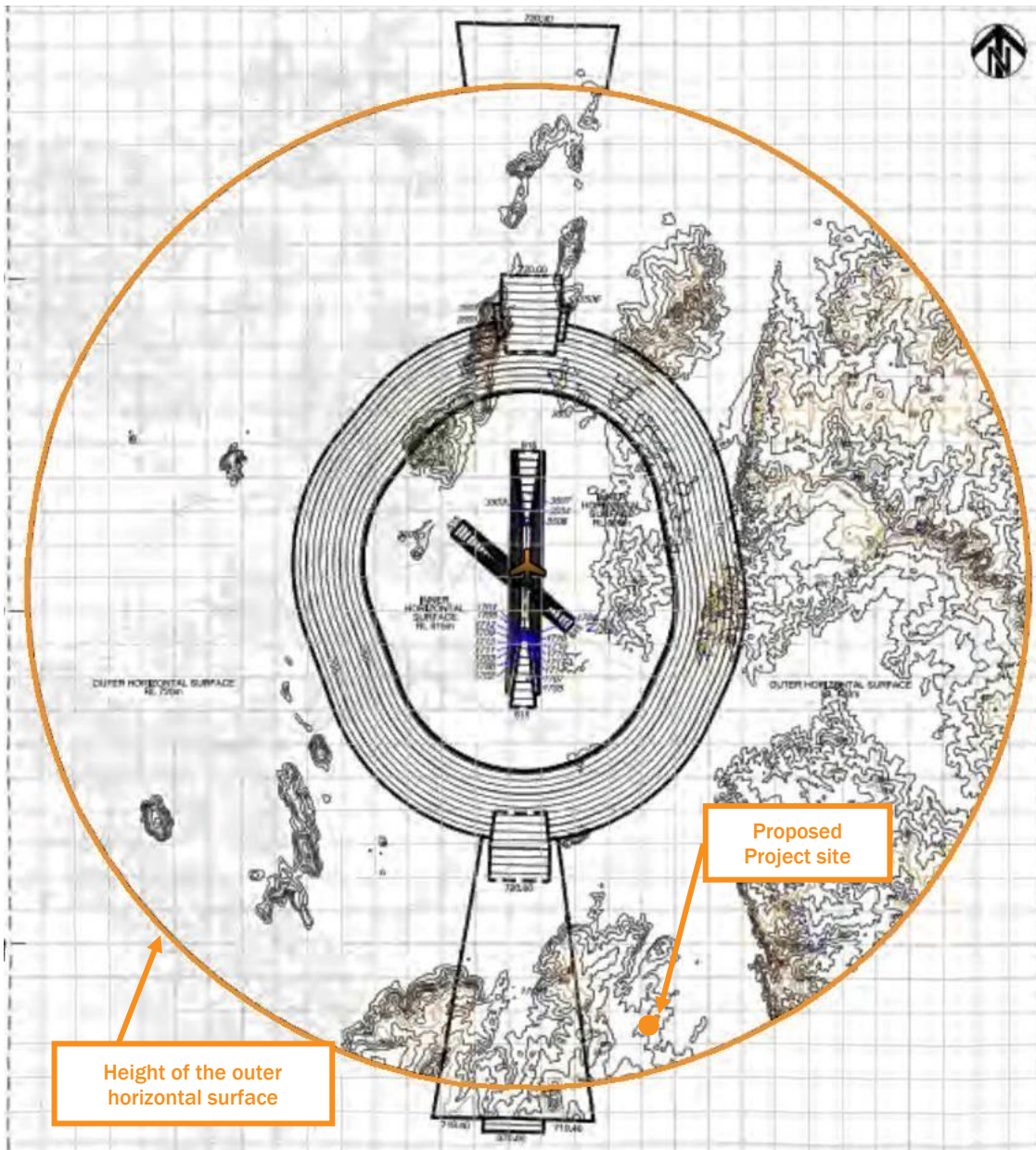


Figure 9 Canberra Airport OLS contours and Project site

The OLS published in the Canberra Airport Master Plan 2020, is based on Code 4 instrument, precision approach runway for runway 17/35 in accordance with CASA MOS 139.

The development of the new primary school in Googong is constrained by the outer horizontal surface. MOS 139 stipulates that the outer horizontal extends 15 km from the ARP and has a height of 150 m above the

Aerodrome Reference Elevation Datum (ARED). The ARED for Canberra Airport is approximately 1868 ft AMSL (569.5 m AHD). This means that the Outer Horizontal surface will be at a height of 2361 ft AMSL (719.5 m)

The new primary school in Googong is proposed on a site with a natural ground elevation of approximately 750 m (2460 ft), which infringes on the Outer Horizontal Surface. This means that the development with a height of 11 m AGL automatically also penetrates the OLS surface. The elevation profile between the Project site and Canberra Airport is shown in Figure 10 (source: Google Earth).

In this profile it can be seen that there is a higher terrain between the Project and the airport, with an elevation of 767 m AHD (2516 ft AMSL). This point is located along Old Cooma Road next to Cooma Road Quarry. This terrain effectively shields the development from impacting the Outer Horizontal Surface as the height of the terrain exceeds the height of the proposed development by 6 m (20 ft).

It should also be noted that the new primary school in Googong will be developed in a built-up area, with residential and commercial properties which all penetrate the Outer Horizontal. Adjacent to the location of the new primary school in Googong, there is a commercial and residential development with a similar height to the Project. There are also communications towers and flood light poles on a nearby sporting field. It can therefore be concluded that although the Project will infringe on the Outer Horizontal surface of the OLS of Canberra Airport, it will not compromise the operations of Canberra Airport. It will therefore satisfy the requirement as set out in the Queanbeyan Local Environmental Plan 2012 (see Chapter 3.2).

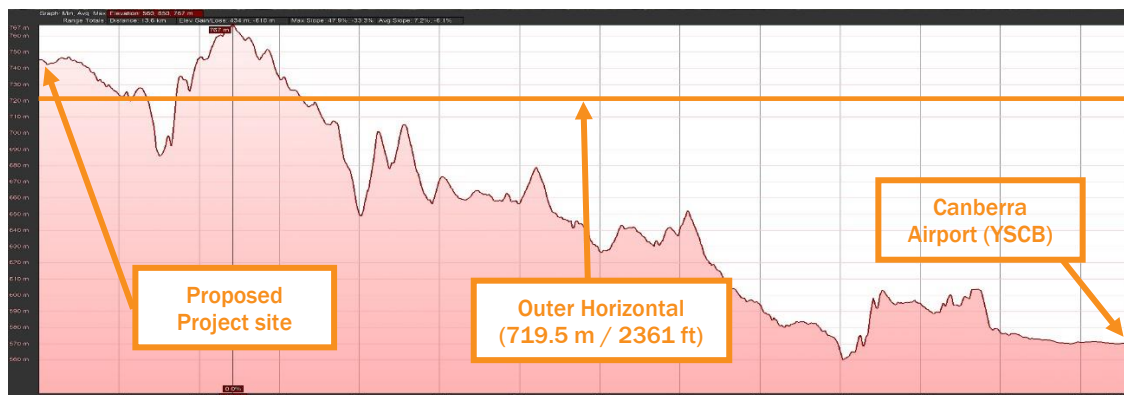


Figure 10 Elevation Profile from Project site to Canberra Airport

4.5. Air routes and LSALT

MOS 173 requires that a minimum obstacle clearance of 1000 ft below the published lowest safe altitude (LSALT) is maintained along each air route.

The Project site is wholly located in the area with a grid lowest safe altitude of 2042 m AHD (6700 ft AMSL) with a MOC surface of 1737 m AHD (5700 ft AMSL). With the proposed height of 761 m AHD (2496 ft AMSL), the Project will not impact the grid LSALT.

Figure 11 shows the grid LSALT and the air routes in the vicinity of the Project site (source: AsA, AIP Charts, En Route Chart Low National, 17 June 2021).

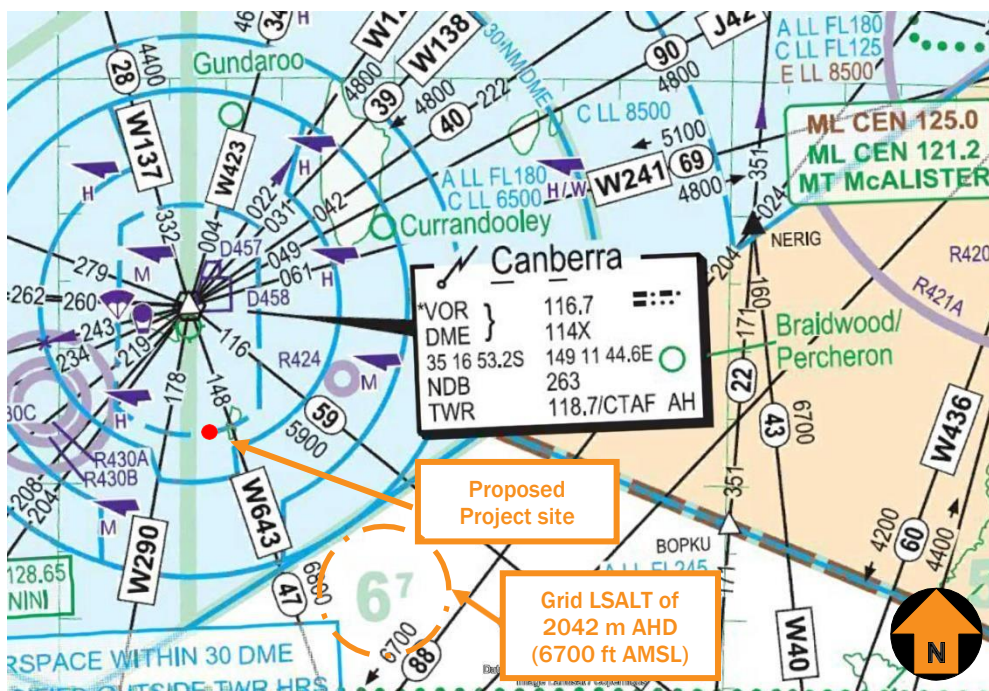


Figure 11 En Route Chart Low National in the vicinity of the Project site

An impact analysis of the surrounding air routes is provided at Table 2.

Table 2 Air route impact analysis

Air route	Waypoint pair	Route LSALT	MOC	Impact on airspace design	Potential solution	Impact on aircraft ops
W643	CB VOR and PEAKE	6800 ft AMSL	1768 m AHD 5800 ft AMSL	Nil	NA	NA
W290	CB VOR and COM NDB	7500 ft AMSL	1981 m AHD 6500 ft AMSL	Nil	NA	NA
W529	CB VOR and URB0B	5900 ft AMSL	1493 m AHD 4900 ft AMSL	Nil	NA	NA

Note: MOC is the height above which obstacles would impact on LSALTs or air routes.

The Project will not impact LSALTs of the surrounding air routes.

4.6. Airspace

The Project site is located inside Canberra controlled airspace (wholly within Class C airspace), and is not located in any Prohibited, Restricted and Danger areas. There is no impact from military aviation activity. Therefore, the Project will not have an impact on controlled or designated airspace.

4.7. Aviation facilities

A search on OzRunways, which sources its data from Airservices Australia (AIP) and AOPA National Airfield Directory datasets, was conducted to identify any aviation facilities that may be affected by the project. The closest aviation facilities to the Project site are located at Canberra Airport (YSCB) (VHF omnidirectional radio range (VOR)), distance measuring equipment (DME), an instrument landing system (ILS) and localiser (LOC)).

According to National Airports Safeguarding Framework Guideline G *Protecting Aviation Facilities - Communications, Navigation and Surveillance (CNS)*, the navigation facilities have areas restricted to developments.

The Project site is located approximately 13.5 km (7.3 nm) southeast of Canberra Airport and outside the areas restricted to developments for noted aviation facilities, and therefore will not interfere with these facilities.

4.8. Radar

With respect to aviation radar facilities, there are no aviation radars located close to the Project site. The closest radar is Mt Majura Secondary Surveillance Radar (SSR) located approximately 21.2 km (11.4 nm) north from the Project site. Given there is much higher terrain located north of the Project. It is concluded that the Project will not impact Brisbane SSR.

5. AIRCRAFT NOISE

As the Project is located within the vicinity of Canberra Airport, there is a risk that the new primary school in Googong will be exposed to aircraft noise. The Canberra Airport 2019 Australian Noise Exposure Forecast (ANEF) illustrates noise levels based on noise insulation standards outlined in AS2021. ANEF contours are not a reflection of noise experience, but rather a set of contours based on an average of aircraft noise when the airport is at capacity.

The 2019 ANEF is shown in Figure 12, as can be seen the new primary school in Googong will be outside of an ANEF 20 contour. This means the project satisfies clause 7.7 of the Queanbeyan Local Environmental Plan 2012.

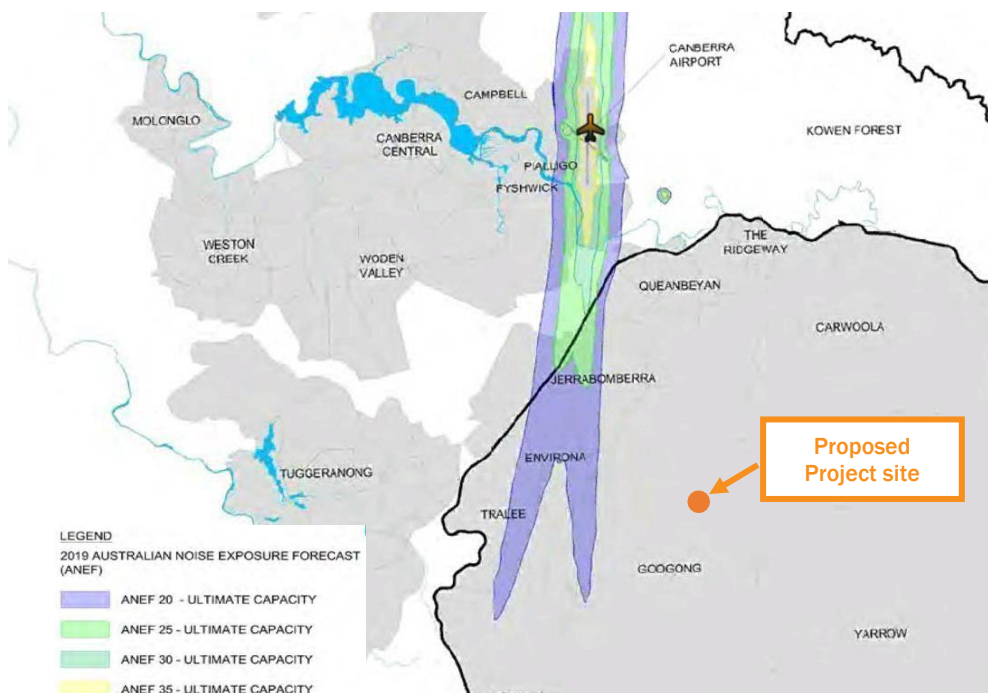


Figure 12 Aircraft Noise – Canberra Airport (ANEF 2019)

6. HAZARD LIGHTING AND MARKING

6.1. Civil Aviation Safety Authority

In considering the need for aviation hazard lighting, a preliminary feasibility analysis of the regulatory context was undertaken.

CASA regulates aviation activities in Australia. Applicable requirements include the *Civil Aviation Act 1988* (CAA), *Civil Aviation Regulations 1988* (CAR), *Civil Aviation Safety Regulations 1998* (CASR), associated Manuals of Standards (MOS) and other guidance material including *Civil Aviation Advisory Publication* (CAAP) and Advisory Circular (AC). The applicable legislations are extracted below:

6.1.1. Manual of Standards 139—Aerodromes

Chapter 7 sets out the standards applicable to Obstacle Restriction and Limitation

Division 1 General

7.01 Introduction

(1) Both of the following must be monitored and maintained free from obstacles in accordance with this MOS:

- (a) the airspace around an aerodrome;*
- (b) the manoeuvring area of an aerodrome.*

Note 1 Where the requirement to maintain the OLS and PANS-OPS airspace (protection surface) clear of obstacles cannot be fulfilled, some kinds of aerodrome operation may not be authorised or permitted.

Note 2 An aerodrome operator is responsible for monitoring the OLS and PANS-OPS airspace and must advise CASA in the event of an actual or proposed OLS penetration, and the terminal instrument flight procedure designer in the event of an actual or proposed penetration into the PANS-OPS airspace. Following CASA or designer assessment of any resulting hazard from the penetration, it is the responsibility of the aerodrome operator to advise the relevant planning authority of the result of the assessment and liaise with that authority to ensure that hazardous obstacles that are an unacceptable risk to aviation are not approved; or that hazardous objects or structures are appropriately mitigated, for example, through charting, markings or lighting.

Note 3 Obstacles within the aerodrome boundary are to be dealt with in accordance with section 7.03. To address obstacles either outside of the aerodrome boundary or otherwise outside of the control of the aerodrome operator, may require liaison with the relevant planning authority.

(2) Obstacle data requirements for terminal instrument flight procedure design must be determined by a certified designer under Part 173 of CASR.

7.18 Procedures for aerodrome operators to deal with obstacles in the OLS

(1) An aerodrome operator must:

- (a) monitor the OLS for the aerodrome; and*

(b) report to CASA, in writing, any infringement, or potential infringement, of the OLS.

(2) When a new obstacle is identified, the aerodrome operator must ensure that pilots are informed of it by NOTAM.

(3) For subsection (2), unless otherwise stated in the data product specification (DPS) for the aerodrome, the information must include the following:

(a) the nature of the obstacle;

Note For example, whether the obstacle is a structure or machinery or of another kind.

(b) the distance and bearing of the obstacle from:

(i) if the obstacle is within the take-off area — the start of the take-off end of the runway; or

(ii) the ARP;

(c) the height of the obstacle in relation to the aerodrome elevation;

(d) if it is a temporary obstacle — the time during which it is a temporary obstacle.

Note If CASA declares an obstacle within the aerodrome boundary as being hazardous, it may result in an operational limitation on the aerodrome from aircraft operators, or a relevant safety direction from CASA under regulation 11.245 of CASR, unless the hazardous obstacle is removed.

Chapter 8 Division 10 of MOS 139 specifies the standards for markings, including standards applicable to Obstacle Marking.

8.109 Obstacles and hazardous obstacles

(1) The following objects or structures at an aerodrome are obstacles and must be marked in accordance with this Division unless CASA determines otherwise under subsections (3) and (5):

(a) any fixed object or structure, whether temporary or permanent in nature, extending above the obstacle limitation surfaces;

Note An ILS building is an example of a fixed object.

(b) any object or structure on or above the movement area that is removable and is not immediately removed.

(2) An aerodrome operator must notify CASA in writing of all obstacles at the aerodrome.

(3) CASA must assess each obstacle notified under subsection (2), and may determine in writing:

(a) that an obstacle is a hazard to aircraft (a hazardous obstacle); and

(b) what, if any, marking is required for the hazardous obstacle.

(4) Details of hazardous obstacles, including their lighting and marking requirements, must

be included in the aerodrome operator's aerodrome manual, unless CASA has made a determination under subsection (5).

(5) CASA may determine in writing that a hazardous obstacle may remain unmarked because it is:

- (a) sufficiently conspicuous in shape, size or colour; or*
- (b) shielded by another obstacle that is already marked; or*
- (c) lit by high-intensity obstacle lights by day and night.*

(6) Despite subsection (1), CASA may determine in writing, following an assessment:

- (a) that an object or structure on, or within the immediate vicinity of, the aerodrome is a hazardous obstacle; and*
- (b) what, if any, marking is required for that hazardous obstacle*

Chapter 9 Division 4 sets out the standards applicable to visual aids provided by aerodrome lighting. Section 9.27 and 9.30 provides some general guidance on obstacle lighting:

9.27 Artificial objects and structures

(1) Subject to subsection (2), for a runway intended to be used at night, the following artificial objects or structures are hazardous obstacles and must be provided with obstacle lighting:

- (a) an object or structure that extends above the take-off climb surface within 3 000 m of the inner edge of the take-off climb surface;*
- (b) an object or structure that extends above the approach or transitional surface within 3 000 m of the inner edge of the approach surface;*
- (c) an object or structure that extends above the applicable inner, conical or outer horizontal surfaces;*

...

(3) Despite subsection (1), CASA may determine in writing, following an assessment, that a hazardous obstacle may remain unlit because it is:

- (a) shielded by another object or structure that is already lit; or*
- (b) does not present a significant hazard to aviation safety.*

(4) Despite subsection (1), CASA may determine in writing, following an assessment:

- (a) that an object or structure on, or within the immediate vicinity of, the aerodrome is a hazardous obstacle; and*
- (b) what, if any, lighting is required for that hazardous obstacle.*

Note Owners of tall buildings or structures whose summit is below the obstacle limitation surfaces, or that is less than 100 m above ground level, may, of their own volition, provide obstacle lighting to indicate the presence of such buildings or structures at night. To ensure consistency, avoid confusion

to pilots, and further the interests of safety both in the air and on the ground, such obstacle lighting should conform with the standards specified in this MOS.

(5) Obstacle lighting may be used during the day instead of obstacle marking.

(6) Obstacle lighting must operate throughout the hours of darkness unless it is within the aerodrome boundary and activated by a PAL.

9.30 Types of obstacle lighting and their use

(1) The following types of obstacle lights must be used, in accordance with this MOS, to light hazardous obstacles:

(a) low-intensity;

(b) medium-intensity;

(c) high-intensity;

(d) a combination of low, medium or high-intensity

(2) Low-intensity obstacle lights:

(a) are steady red lights; and

(b) must be used on non-extensive objects or structures whose height above the surrounding ground is less than 45 m.

Note For example, a group of trees or buildings is regarded as an extensive object.

Section 9.31 provides guidance on location of obstacle lights:

(2) Obstacle lights must be located:

(a) as close as possible to the top of the object or structure; and

(b) in such numbers, and in such arrangements, as to ensure that the lights clearly indicate at least the points or edges of the object or structure that are highest above the obstacle limitation surface.

Since the proposed new primary school in Googong will be situated amongst significant other elements of the built environment, and is essentially shielded from infringing the OLS of Canberra Airport's OLS, it is assessed that the development will not require specific aviation obstacle marking or lighting.

7. CONCLUSIONS

As a result of this aeronautical assessment, the following conclusions are made:

1. The proposed new primary school in Googong building has the following characteristics:
 - a. nominal ground level is 750 m AHD
 - b. building height is 11 m AGL
 - c. maximum overall height is 761 m AHD (2496 ft AMSL).
2. The Project development:
 - a. will not infringe the obstacle clearance heights applicable to any of the instrument procedures at Canberra Airport
 - b. will penetrate the outer horizontal surface of Canberra Airport by approximately 41.5 m (135 ft), but will be shielded by other buildings, structures and terrain between its location and the airport
 - c. will not impact air routes and is outside restricted areas
 - d. will not impact any aviation facilities
 - e. will not impact any aviation radars.
3. The Project satisfies the following sections of the Queanbeyan Local Environmental Plan 2012:
 - a. 7.7 Development in areas subject to aircraft noise
4. It is not necessary to provide specific aviation obstacle marking or lighting treatments to ensure an acceptable level of aviation safety.
5. The proposed Project will be a controlled activity under the Airports (Protection of Airspace) Regulations 1996. It will not adversely affect the safety, efficiency or regularity of existing or future air transport operations into or out of Canberra Airport.

8. RECOMMENDATIONS

As a result of this aeronautical assessment, the following recommendations are made:

1. The proposed Project can be supported without adversely affecting aviation safety.
2. If approved, details of the Project should be reported to Airservices Australia via this email address: vod@airservicesaustralia.com, and published in En Route Supplement Australia (ERSA) and other relevant aeronautical chart products.
3. Any crane used during construction should be referred to Canberra Airport for approval, appropriately marked, operated during daylight hours only and notified to pilots via NOTAM.



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