



AERONAUTICAL IMPACT ASSESSMENT

**Centre of Excellence - Vines Drive,
Richmond NSW**



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Aeronautical Impact Assessment: Centre of Excellence - Vines Drive, Richmond NSW

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Executive Summary

Executive Summary

This Aeronautical Impact Assessment (AIA) has been prepared by Avlaw Pty Ltd, trading as Avlaw Aviation Consulting (Avlaw), to address the aviation-related Secretary's Environment Assessment Requirements (SEARs) issued by the Department of Planning, Industry and Environment (DPIE) for the proposed new Centre of Excellence in Agricultural Education at the Western Sydney University Hawksbury Campus, and mobile cranes that will be used during construction.

The proposed development is made up of eight single story buildings, with administration facilities, general and Science, Technology, Engineering and Maths (STEM) learning spaces, dining and conference hall, accommodation building, aboriginal and technology enterprise areas, stock yards and agricultural plots within the development at Vines Drive, NSW ("the site"). The tallest of the eight buildings is Block E which will be 29.35m AHD once constructed. Only mobile cranes will be used during construction and will reach a maximum height of 55.5m AHD for Mobile Crane (MC) 1, 103.5m AHD for MC2, 129.5m AHD for MC3, and 168.5m AHD for MC4.

Avlaw's assessment has found that the critical (i.e. lowest) airspace protection surface covering the site is the Inner Horizontal Surface of the RAAF Base Richmond Obstacle Limitation Surfaces (OLS) at a height of 65.12m AHD. This surface will not be penetrated either by the building development or by MC1, however, MC2, MC3 and MC4 will penetrate this surface, therefore requiring controlled activity approval for the development to proceed. All aviation approval should be sought through the Royal Australian Air Force (RAAF) Richmond.

Mitigation for the use of the three temporary construction cranes MC2, MC3 and MC4 can be provided by only utilising these cranes by negotiation with the RAAF Richmond if necessary, which should include the issuing of a Notice to Airmen (NOTAM).

With respect to helicopter operations, neither operational airspace or that which is protected under Guideline H of the NASF (i.e. hospital helipads) is penetrated by any of the proposed buildings or crane activity at the site and therefore there is no adverse impacts to mitigate with respect to rotary wing aircraft.

The assessment of lighting and animal hazards conducted as part of this AIA has not raised any concerns that would prevent the proposed development from proceeding as currently planned. Also, relevant standards for aircraft noise when applied to RAAF Base Richmond identifies the Australian Noise Exposure Forecast (ANEF) is below 20 ANEF over the entire site and not a concern for development of schools or universities.

The conclusion of this AIA is that no applications seeking aviation approvals for the buildings and associated crane MC1 is required, however controlled activity approval is required for MC2, MC3 and MC4 because they penetrate the OLS. Buildings and cranes (by mitigation) will not, however, penetrate any protected airspace or defined flight operational surfaces and therefore, will not adversely affect the safety, efficiency or regularity of operations of aircraft at RAAF Base Richmond.



1

Background

Background

The NSW Government is investing \$7 billion over the next four years, continuing its program to deliver more than 200 new and upgraded schools to support communities across NSW. This is the largest investment in public education infrastructure in the history of NSW.

The NSW Department of Education is committed to delivering new and upgraded schools for communities across NSW. The delivery of these important projects is essential to the future learning needs of our students and supports growth in the local economy.

The Centre of Excellence in Agricultural Education (CoE) is project that was announced by the Minister of Education on 10 December 2019. The Centre is proposed to be co-located on the Western Sydney University (WSU) Hawkesbury campus. The Centre is currently in a pilot phase operating without premises, on a smaller scale with no residential accommodation.

In 2015, there was a previous announcement to move Hurlstone Agricultural High School from its existing site in Glenfield, to Hawkesbury, and build a new agriculturally focused, boarding, selective high school on the WSU site. This project did not progress, and the new Centre of Excellence project has superseded this previous announcement.

The current proposal for the Centre of Excellence will involve farming enterprises, learning facilities and a residential facility to support teaching and learning to students in agricultural education. In addition, the Centre will support teaching and learning for industry, overseas students, and educators in NSW. This will be delivered through programs facilitated directly through the Centre with other high schools in NSW.

The Centre of Excellence in Agricultural Education, alongside a neighbouring project at Richmond High School (RHS) will establish “Richmond Agricultural College”. An operational model that will encompass the educational streams at RHS and the new CoE. For students wishing to access the educational streams at RHS, they will enrol directly through RHS and will access the CoE on the WSU campus on a tailored basis through their course of study. Students from other schools across the State will access the CoE through their school initiating engagement in an agricultural program or project based learning opportunity managed by the CoE.

The Centre of Excellence in Agricultural Excellence will support high-quality educational outcomes to meet the needs of its students and deliver:

- » Agriculture labs and science labs
- » Aboriginal farming enterprise (in partnership with community and industry)
- » Pods for partnership work with industry (e.g. vertical farming)
- » Flexible learning and collaborative spaces
- » Food technology space
- » Short term accommodation facilities for visiting students and teachers
- » Administrative facilities
- » Agricultural enterprises

1.1 Project description

The EIS seeks development consent for the following works and a Site Plan Overlay is provided as Figure 1.

- » Three academic blocks (Block B, C and D).
- » Short-term, dormitory site accommodation with capacity for 62 patrons (Block F).
- » Dining hall, Conference space and canteen (Block E).
- » Administrative building (Block A).
- » Support facilities for management and maintenance of site.
- » External works to accommodate circulation and covered walkways between buildings.
- » Pedestrian walkways.
- » Student and staff amenities.
- » Covered Outdoor Learning Areas.
- » Staff car parking area and mini-bus drop off and pick up area. The parking located in front of block A is for visitors.
- » Short-term accommodation car parking area. The parking near block F is for staff.
- » Green house.
- » Various agricultural and animal plots and associated agricultural workshop.

1.2 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development were received on 19 March 2021. The aviation-related items (Item 20) are the focus of this report and included the following:

- » Identify 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 and 25
 - or <25
- » Providing details of any flight paths that may be impacted by the proposed development
- » Identifying and assessing the potential impacts of the future development on aviation operations of any nearby airports and affected flight paths of any existing Helicopter Landing Site (HLS) in accordance with the relevant sections of the National Airports Safeguarding Framework (NASF).



2

Regulatory Framework

Regulatory Framework

2.1 Airspace Height Controls

Protection of airspace surrounding an airport is a critical component of maintaining requisite safety standards that facilitate the efficient use of runways, whilst also managing the associated impacts of their use on other critical infrastructure (e.g. taxiways), the environment and the general public. As a signatory to the *Chicago Convention 1944*, Australia adopts International Civil Aviation Organisation (ICAO) Standards and Recommended Practices (SARPs) with respect to airspace which define sets of invisible surfaces above the ground around an airport. The airspace above these surfaces forms the airport's prescribed airspace. RAAF Base Richmond is not included in the list of ["declared" airports under specific regulation](#), however, the Obstacle Limitation Surfaces (OLS) and protection of prescribed instrument flight procedure surfaces, Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS), are addressed by [Defence Aviation Safety Regulation \(DASR\) 139 Aerodromes](#) requiring protection of airspace to be covered in their Aerodrome Manual.

Advice provided by the Australian Government Department of Infrastructure, Transport, Regional Development and Communication specifies that development that infringes on the airport's protected airspace is called a controlled activity and can include, but is not limited to:

- » permanent structures, such as buildings, intruding into the protected airspace;
- » temporary structures such as cranes intruding into the protected airspace;
- » or 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.

These activities can equally be applied to RAAF Base Richmond.

2.2 Airspace Approval Process

The [Defence Aviation Safety Authority has been established and is progressively implementing regulations](#) with respect to coverage of their Defence Aerodromes.

Part 12 of the *Airports Act 1996* (Act) and the *Airports (Protection of Airspace) Regulations 1996* (Regulations) establish a framework for the protection of airspace at and around airports. The Act defines any activity resulting in an intrusion into an airport's prescribed airspace to be a "controlled activity" and requires that controlled activities cannot be carried out without approval.

RAAF Base Richmond has arrangements in place for assessment and approval of structures in the vicinity of the airport. Applications for approval should be sent to "RAAF Base Richmond Base Command Post" email RIC.ABCP@defence.gov.au with a cc to the "Base Aviation Safety Officer" email RIC.BASO@defence.gov.au. A crane application form is required and is can be requested through this same email.



3

**Proposed
Development**

Proposed Development

3.1 Location

The site is located 2,675m SW of threshold 10 of RWY 10/28 at RAAF Base Richmond. The coordinates at the tallest building (Block E) on the site are 290988m E, 6278095m S.

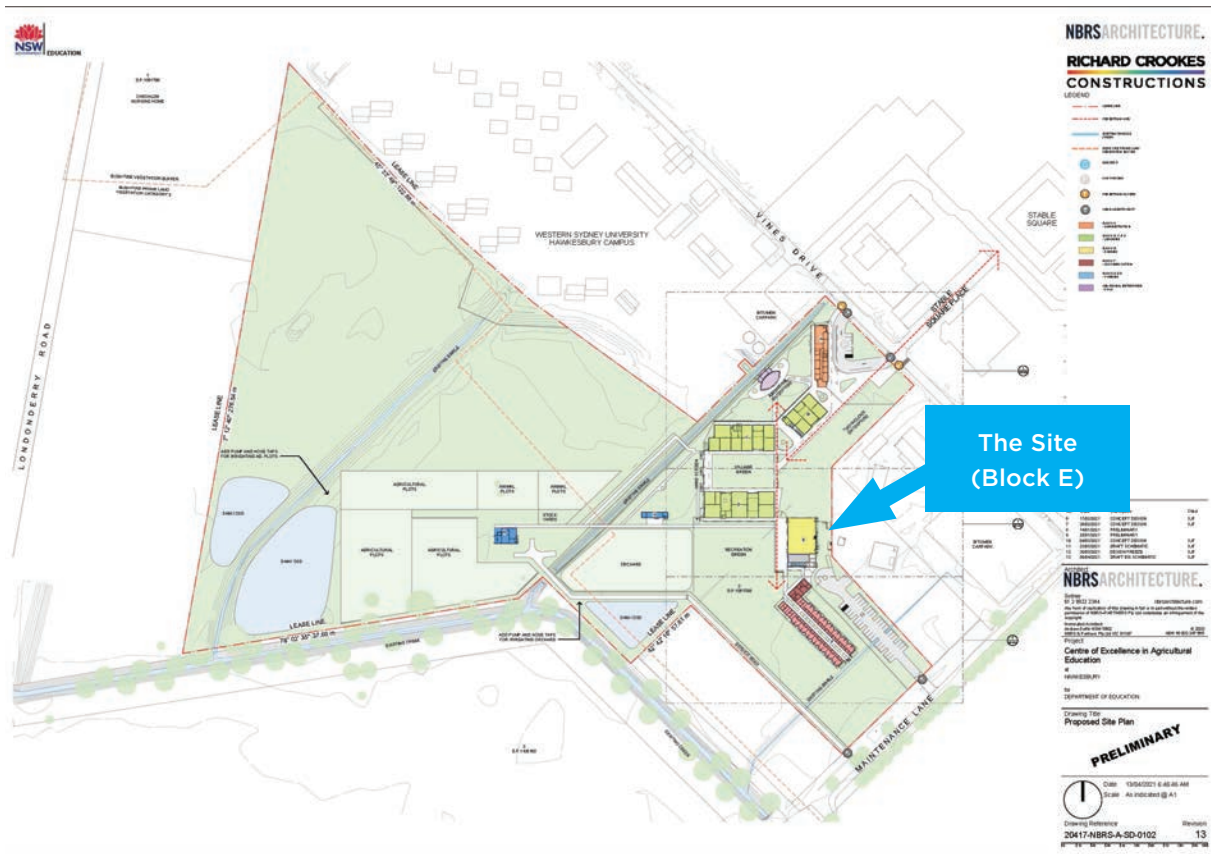


Figure 1: Site highlighted green with boundary indicated in red

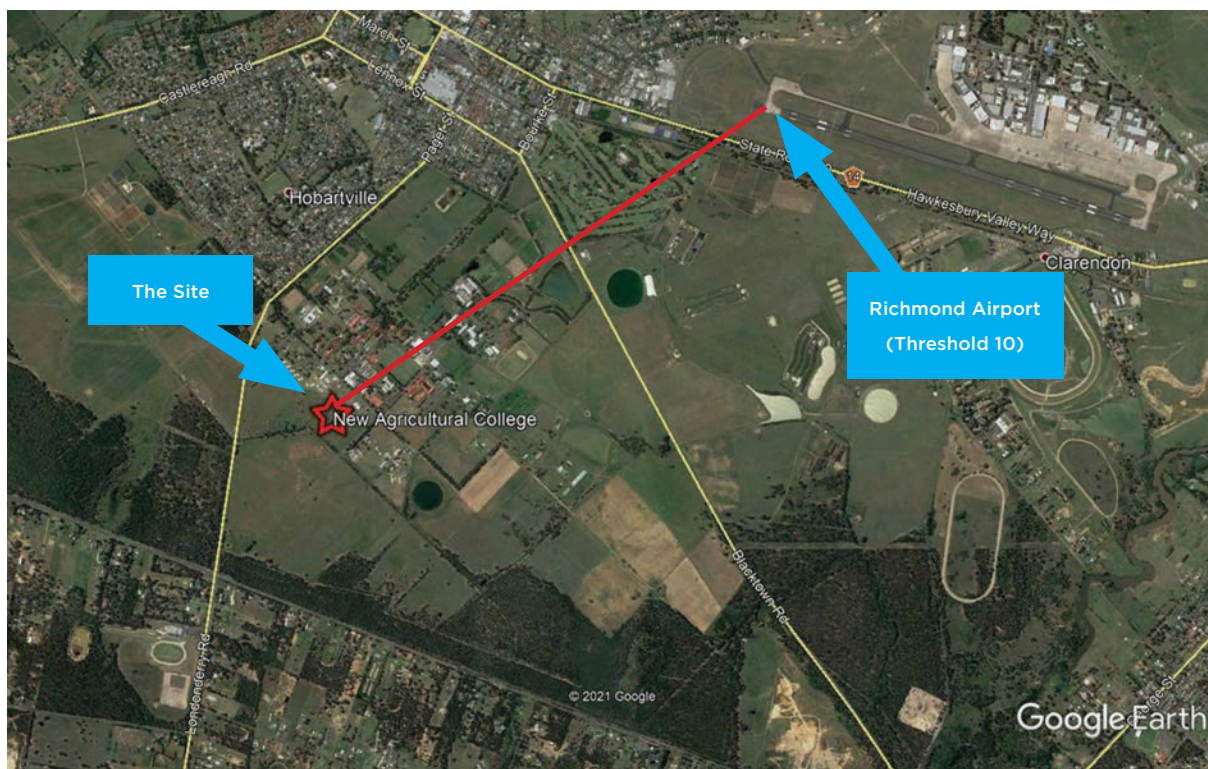


Figure 2: Site location in relation to RAAF Base Richmond

3.2 Permanent Structure

Eight single story buildings are proposed to be constructed at the site, the tallest of which will be 29.35m AHD once constructed, with all plant and ancillary features captured within this envelope. An elevation view image of the proposed Block E is provided at Figure 3.

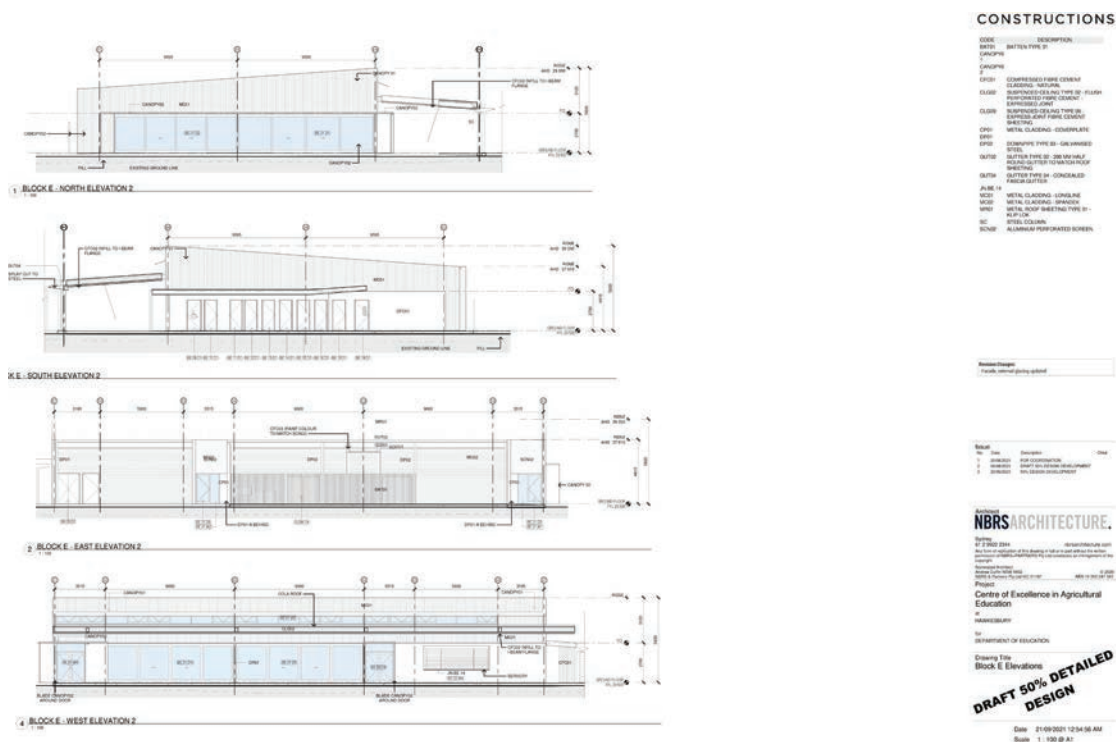


Figure 3: Elevation view of the proposed development Block E (29.35m AHD)

3.3 Crane Activity

Four temporary mobile cranes will be used to complete construction of the proposed development. Temporary crane activity will reach a maximum height of 96.5m AHD for MC1, 144.5m AHD for MC2, 170.5m AHD for MC3, and 209.5m AHD for MC4.

Figures 4 and 5 illustrate the height of the four cranes as well as their movement arc during construction. All four cranes will be used at different locations across the site.

Crane Type	Crane Reference	Maximum Tip Height (m AGL)	Maximum Tip Height (m AHD)	Use
Franna (25t)	MC1	32	55.5	Lift general building materials across site
Mobile (60t)	MC2	80	103.5	Lift general building materials across site
Mobile (130t)	MC3	106	129.5	Lift heavy building elements across site
Mobile (400t)	MC4	145	168.5	Lift prefabricated building elements across site

Figure 4: Table showing cranes to the highest point of 168.5m AHD (highest GL 23.5m AHD)

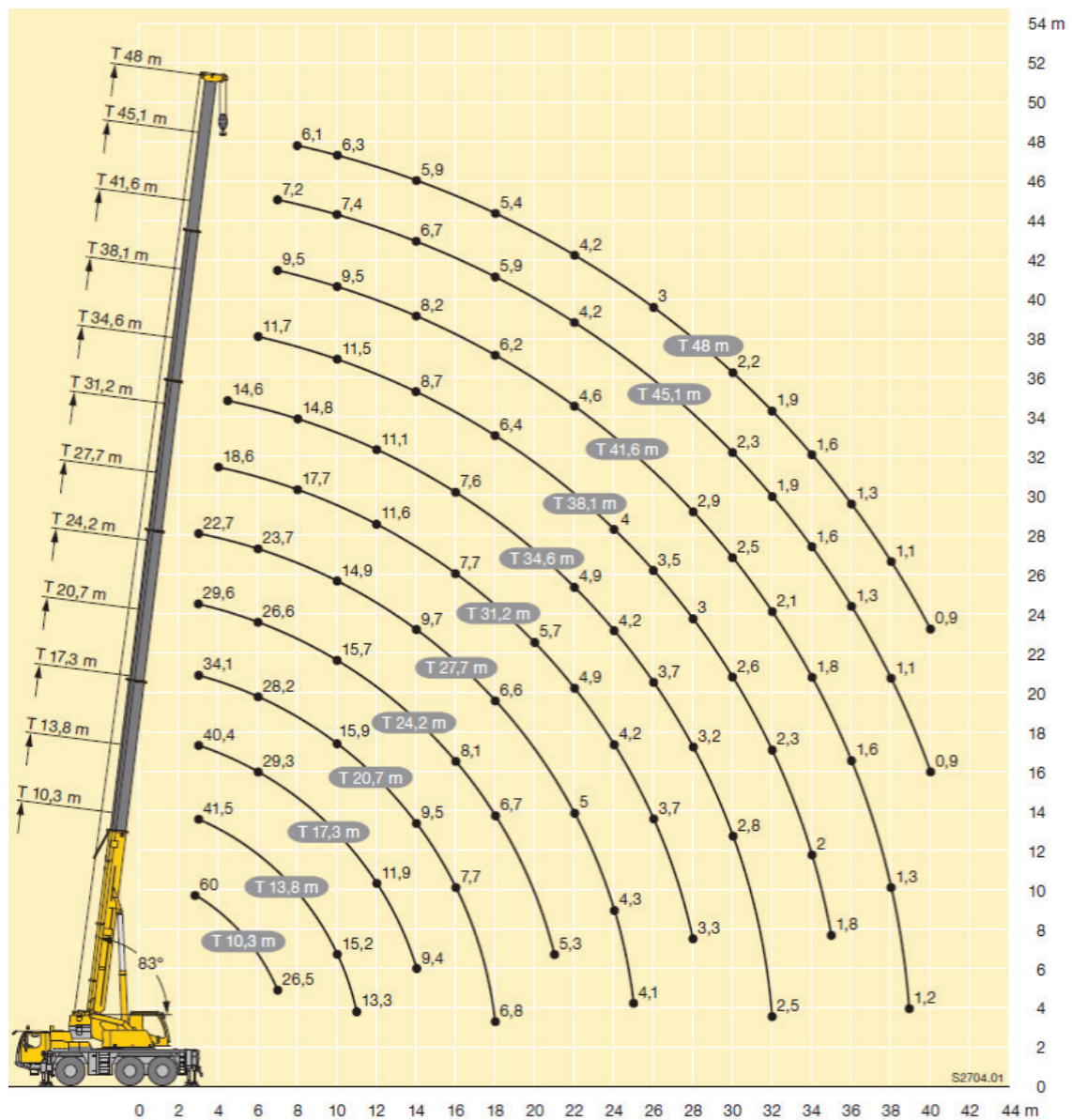


Figure 5: Movement arc of temporary construction cranes

In terms of timing, it is anticipated the first mobile crane will be utilised on site in November 2021, with construction works continuing up to and including Jan 2023.



4

**Prescribed
Airspace
Assessment**

Prescribed Airspace Assessment

No published prescribed airspace charts are available so calculation of airspace requirements from ICAO SARPS provides the basis upon which the aeronautical impact of any proposed development activity will have on the safety, efficiency and regulatory of aircraft operations. With respect to the proposed development at the site, Avlaw has determined that the OLS is the only airspace restrictive surface.

4.1 Obstacle Limitation Surfaces

The site lies under the 65.12m AHD Inner Horizontal Surface of the OLS for RAAF Base Richmond as calculated 45 meters above the aerodrome reference of 20.12m AHD taken from [Type A Chart data on the Defence website](#). The proposed maximum building height of 29.35m AHD will **remain 35.77 metres clear of the OLS**. Temporary construction cranes at the maximum height of 168.5.5m AHD will **penetrate the OLS by up to 103.38 metres**.

Discussion between the RAAF and Avlaw on 16 April 2021 identified some mitigation may be necessary to accommodate crane activity. Avlaw is familiar with mitigation arrangements for crane activity at other sites where procedures are put in place to only raise the cranes on specific daily approval or more simply to issue of a NOTAM. RAAF Richmond will determine what if any mitigation is required when assessing the application for crane approval. As all eight buildings are below the OLS, no specific approval should be required for the buildings.

4.2 Assessment of Instrument Flight Procedures

Avlaw has contacted RAAF Richmond for advice on applicable PANS-OPS. No specific detail is available, however published instrument flight procedures available through the Aeronautical Information Publication (AIP) Departure and Approach Procedures (DAP) have been assessed by Avlaw as follows:

Procedure	Assessment
SID RICHMOND THREE DEPARTURE	Not over site so nil impact
ILS-Z OR LOC-Z RWY 28	Not over site so nil impact
NDB-B OR NDB RWY 28	For category C & D aircraft the flight path is 2,500ft (762m AHD) to the E of the site so nil impact

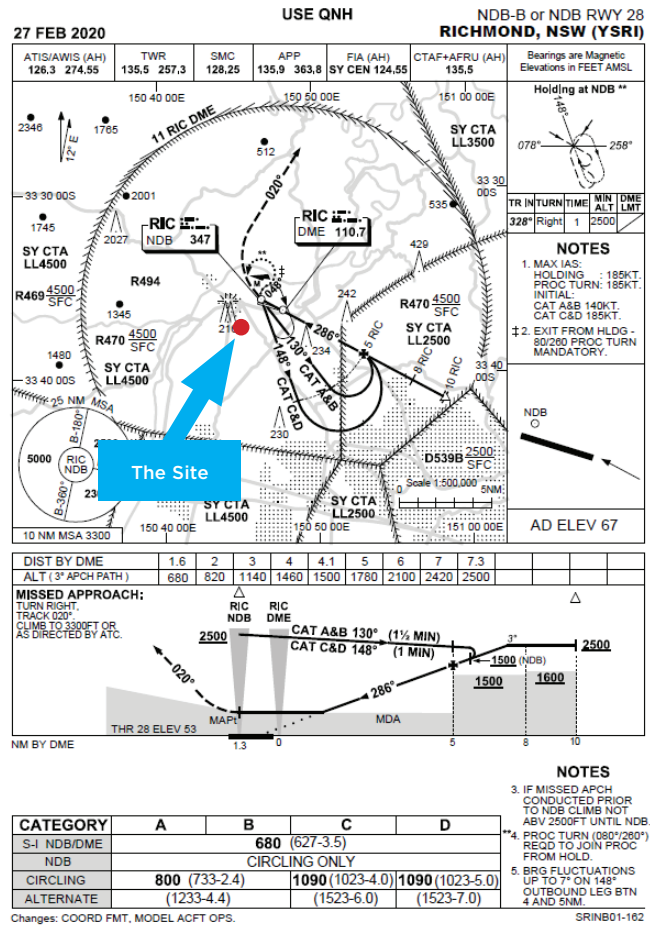


Figure 6: NDB Approach Procedure

Therefore, Avlaw's assessment is that there will be no impact by the PANS-OPS with the buildings and temporary construction cranes remaining clear and below the instrument flight procedure protected surfaces.

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5

Lighting and Glare

Lighting and Glare

Dazzle to pilots can occur from bright lights and reflected sunlight. CASA has previously advised Avlaw that they do not have any guidance on wall or roof materials with regard to material selection which might cause reflectivity or glare issues. The Department of Infrastructure, Transport, Regional Development and Communication has published [Guideline E](#) to assist local governments, airport operators and construction industry stakeholders to jointly address the risk of distractions to pilots of aircraft from lighting and light fixtures near airports.

The National Airports Safeguarding Framework (NASF) Guideline is advisory material and therefore also does not have any regulatory backing. It is there for the advice of the developer/planning authority when considering developments on or near airports or helipads. Specific reference in Guideline E states:

20. The potential for glare caused by reflected sunlight from structures such as buildings has been raised in some quarters as a potential source of distraction to pilots. However, CASA has advised that glare from buildings tend to be momentary and therefore unlikely to be a source of risk. The potential for risk from building glare is further attenuated by the use of sunglasses which pilots normally wear in bright daylight.

With respect to lighting over the site, Guideline E provides specific locations of concern with the site falling within a 6 km radius. The site does not fall within maximum intensity Zones A, B, C, or D.

Avlaw's assessment is therefore that there is no specific limitation on the style or colour of roofing materials or local area lighting at the site.



6

**Bird and
Animal Hazard**

Bird and Animal Hazard

The Department of Infrastructure, Transport, Regional Development and Communication has published [Guideline C](#) to provide advice to States and Territories as well as local government decision makers on how to best manage the risk of collisions between wildlife and aircraft at or near airports where that risk may be increased by the presence of wildlife-attracting land used.

The site lies within a 3km radius of RAAF Base Richmond where sources of attraction for birds should be mitigated. The following table at Attachment 1 to Guideline C refers:

Prepared by the Australian Aviation Wildlife Hazard Group

Guideline C
Attachment 1 to Wildlife Strike Guidelines

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

Figure 7: NASF Guideline C Attachment 1

Wildlife management is the aerodrome operators' responsibility and in this case the RAAF have provided notification to pilots in the Enroute Supplement Australia (ERSA) warning of a bird hazard 2-3nm SE of RWY 28. Mitigation for bird hazard includes covering waste and not planting bird attracting plants. The site will contain land use as specified in the Attachment 1, however such land use will be of relatively small size plots but may be appropriate to monitor for any potential bird attractions. The RAAF Richmond can advise on management and mitigation measures specific to RAAF Base Richmond.



7

ANEF

ANEF

The Australian Noise Exposure Forecast ([ANEF](#)) for [RAAF Base Richmond](#) is available on the Department of Defence website. RAAF Richmond have confirmed that the 2014 version of the ANEF drawing is current at the time of preparing this AIA.

Australian Standard Acoustics-Aircraft Noise Intrusion-Building siting and Construction AS 2021:2015 provides advice at Table 2.1 per Figure 8 below identifying a school or university should not be located in an area with a ANEF greater than 25. The site is wholly located outside the 20 ANEF contour per Figure 9 and Figure 9a, so is therefore deemed compatible/acceptable land use.

TABLE 2.1
BUILDING SITE ACCEPTABILITY BASED ON ANEF ZONES
(To be used in conjunction with Table 3.3)

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

Figure 8: Table 2.1 of AS 2021:2015

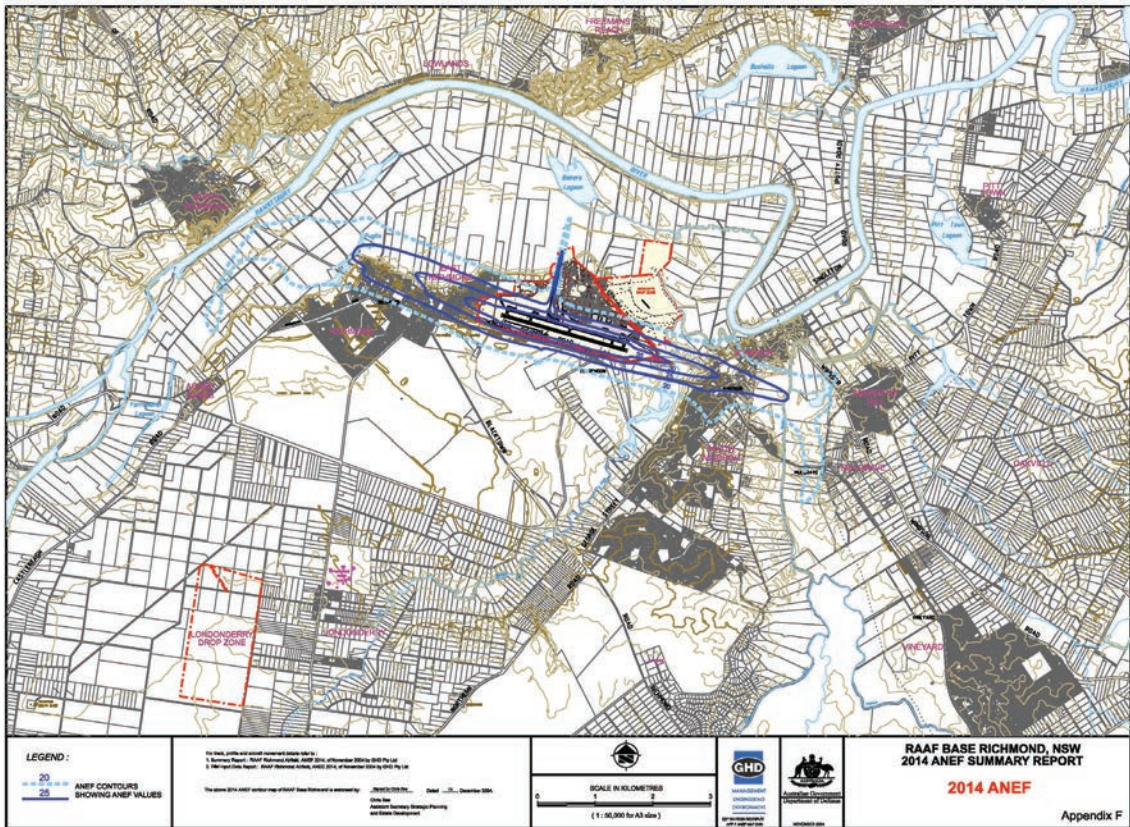


Figure 9: ANEF for RAAF Base Richmond

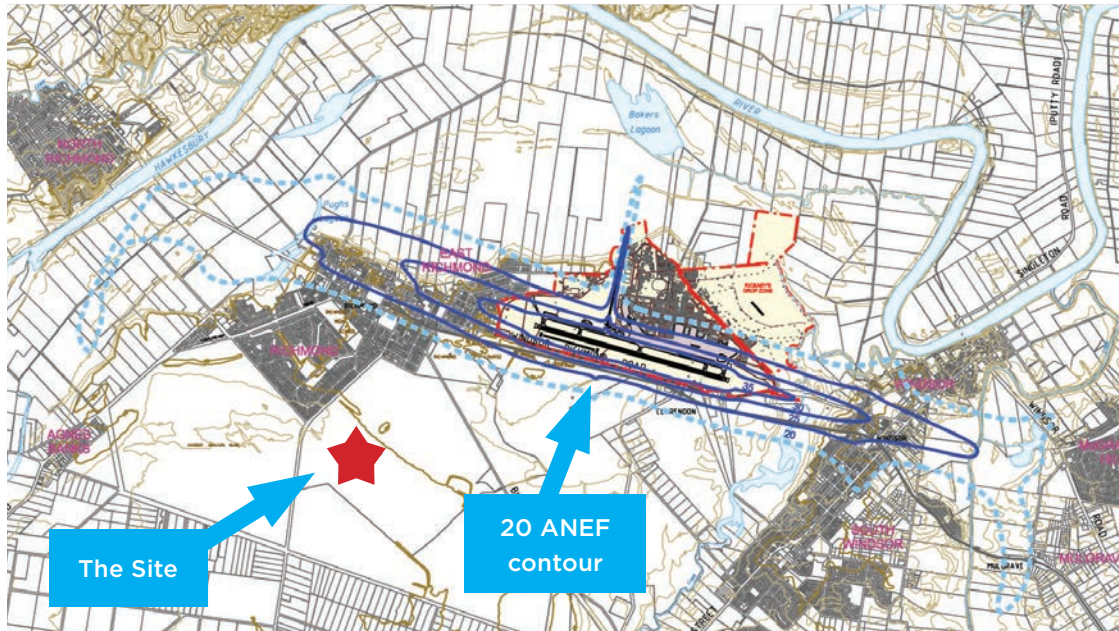


Figure 9a: ANEF for RAAF Base Richmond



8

Helicopter Operations

Helicopter Operations

Civil Aviation Regulation (CAR) 92 requires the pilot of a helicopter to determine the safe take-off and landing approach taking into account all factors including aircraft performance, wind direction, obstacles, and emergency landing in the event of engine failure. The helicopter operations relevant to development at the site and are by visual flight rules and have been assessed, the findings of which are summarised below.

Hospital Helipads

The [NASF](#) Guideline H has been issued regarding protection of what are being termed strategically important Helicopter Landing Sites (SHLSs). Under the guideline, hospital helipads would be considered as SHLSs and therefore protected from obstacles being erected in close proximity to it. The guideline defines 140m wide rectangular steps in the direction of the approach/take-off area in 500m long increments until reaching 125m above the SHLS. The steps, rising in 15m increments, are shown in Figure 10 below that has been sourced from Guideline H and illustrates the protection of SHLS and the heights above which further assessment is triggered.



Figure 10: Referral trigger for SHLS

The nearest identified hospital helipad to the site is the Nepean Hospital rooftop helipad, which is approximately 16km to the S of the site. This places the site outside the horizontal limit of the assessment area. Apart from visual flight reference during approach and departure covered by the NASF Guideline H, no instrument flight procedures are established for the Nepean Hospital Helipad to be impacted by the proposed development at the site.

A large circular graphic with a thick black border. A segment of the border, located at the bottom right, is highlighted in light blue. Two thin black curved lines arc around the top and bottom of the circle.

9

Conclusions

Conclusions

Permanent building development at the site is proposed to reach a maximum height of 29.35m AHD, with all plant and ancillary features captured within this envelope whilst temporary crane activity will reach a maximum height of 168.5m AHD. The only airspace protection surface that is applicable is the Inner Horizontal Surface of the RAAF Base Richmond OLS at 65.12m AHD. All permanent building development activity will be clear of the OLS. However, as three of the four temporary mobile construction cranes (MC2, 3, and 4) will penetrate the OLS then formal approval from RAAF Base Richmond (ric.abcp@defence.gov.au) will be required.

The site is located in accordance with AS2021:2015 for a school or university being well clear of the 20 ANEF.

Helicopter operations are required to be conducted by visual rules unless following a prescribed instrument flight procedure prior to final approach. Helicopter operations are well clear of building and crane activity at the site.

Mitigation of bird attracting activities at the site may be required upon advice from RAAF Base Richmond, however land use will be of relatively small plot sizes but may be appropriate to monitor for any potential bird attractions.

This AIA concludes that the proposed building heights up to 29.35m AHD and temporary crane activity to a maximum height of 168.5m AHD are clear of all aircraft operational surfaces, and the development will not adversely affect safety, efficiency or regularity of operations of aircraft (aeroplanes and helicopters) and is compatible with AS 2021:2015 siting for schools and universities.



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