



# School Infrastructure

## AVIATION IMPACT ASSESSMENT REPORT



### AIRSPACE IMPLICATIONS DUE TO THE CONSTRUCTION OF THE RICHMOND AGRICULTURAL CENTRE

PREPARED BY:



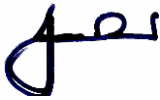
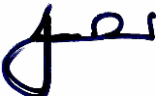
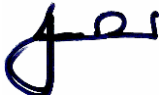
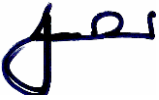
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ABN: 94 154 052 883

Revision 1.2

Job title: Aviation Impact Assessment Report: School Infrastructure NSW:  
Richmond Agricultural Centre

Document title: AIA – SINSWRAC

Document ref: SINSW RAC 1.2

| Revision | Date      | File name   |                                                                                     |                                                                                      |                                                                                       |
|----------|-----------|-------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| V1.0     | 28 Feb 25 | Description | Initial issue AIA - DRAFT                                                           |                                                                                      |                                                                                       |
|          |           |             | <b>Prepared by</b>                                                                  | <b>Checked by</b>                                                                    | <b>Approved by</b>                                                                    |
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| Revision | Date      | File name   |                                                                                     |                                                                                      |                                                                                       |
| V1.1     | 30 Apr 25 | Description | Final version post client review.                                                   |                                                                                      |                                                                                       |
|          |           |             | <b>Prepared by</b>                                                                  | <b>Checked by</b>                                                                    | <b>Approved by</b>                                                                    |
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| Revision | Date      | File name   |                                                                                     |                                                                                      |                                                                                       |
| V1.2     | 26 May 25 | Description | Final version post SINSW review.                                                    |                                                                                      |                                                                                       |
|          |           |             | <b>Prepared by</b>                                                                  | <b>Checked by</b>                                                                    | <b>Approved by</b>                                                                    |
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| Revision | Date      | File name   |                                                                                     |                                                                                      |                                                                                       |
|          |           | Description |                                                                                     |                                                                                      |                                                                                       |
|          |           |             | <b>Prepared by</b>                                                                  | <b>Checked by</b>                                                                    | <b>Approved by</b>                                                                    |
|          |           | Name        |                                                                                     |                                                                                      |                                                                                       |
|          |           | Signature   |                                                                                     |                                                                                      |                                                                                       |
| Revision | Date      | File name   |                                                                                     |                                                                                      |                                                                                       |
|          |           | Description |                                                                                     |                                                                                      |                                                                                       |
|          |           |             | <b>Prepared by</b>                                                                  | <b>Checked by</b>                                                                    | <b>Approved by</b>                                                                    |
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This Report on the airspace implications, both during and following construction of the Richmond Agricultural Centre (RAC) development is prepared for the School Infrastructure NSW (SINSW), by Resolution Response Pty. Ltd. ABN: 94 154 052 883, trading as 'AviPro'.

The Report relates to the coordination aspects associated with protected airspace at RAAF Base Richmond due to the establishment and site design of the RAC. It is intended to inform design and planning.

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## 1. EXECUTIVE SUMMARY

The aim of this report is to provide insights into the impacts of constructing the Richmond Agricultural Centre on the aviation operations into and out of Royal Australian Air Force (RAAF) Base Richmond. The report analyses the likely impact of the completed building and any associated construction cranes on aviation activities.

The following key outcomes arose from the analysis:

- The Richmond Agricultural Centre, once constructed, will not intrude into the RAAF Base Richmond PANS-OPS surfaces.
- The Richmond Agricultural Centre, once constructed, will not intrude into the RAAF Base Richmond OLS.
- The Richmond Agricultural Centre, once constructed, will not intrude into the RAAF Base Richmond RTCC.
- The Richmond Agricultural Centre, once constructed, will not impact the approach and departure paths of any strategically important Helicopter Landing Site (HLS).
- The Richmond Agricultural Centre construction crane(s) will not intrude into the RAAF Base Richmond PANS-OPS surfaces.
- The Richmond Agricultural Centre construction crane(s) is unlikely (if below RL64) to intrude into the RAAF Base Richmond OLS; but if it does, it will require approval to do so.
- The Richmond Agricultural Centre construction crane(s) will not intrude into the RAAF Base Richmond RTCC.
- The Richmond Agricultural Centre construction crane(s) will not intrude into the approach and departure paths of any strategically important HLS.
- The Richmond Agricultural Centre, once constructed, will not require aviation-standard obstacle lighting.
- The Richmond Agricultural Centre construction crane(s) will not require aviation-standard obstacle lighting unless they go above RL64.
- The Richmond Agricultural Centre, and any associated construction crane(s) will only require formal assessment by RAAF Base Richmond if exceeding RL64.

The Richmond Agricultural Centre, including its construction cranes, will not adversely impact aviation safety RAAF Base Richmond or at any strategically important HLS. Approvals will not be required for the construction crane(s) to intrude into the the RAAF Base Richmond OLS unless it/they are planned to be above approximately RL64. The construction crane(s) will only require aviation standard obstacle lighting if they go above RL64. The completed building will not be notifiable to Airservices Australia as a tall structure.

## 2. BACKGROUND

### 2.1. Short Project Description

Aviation Impact Assessment (AIA) Report has been prepared by AviPro on behalf of the Department of Education (DoE) (the Proponent) to assess the potential environmental impacts that could arise from the activities associated with the Richmond Agricultural Centre development at 2 College Street Richmond (Part Lot 2 DP1051798) (the site).

The report has been prepared to provide insights into the impacts of constructing the Richmond Agricultural Centre on the aviation operations into and out of Royal Australian Air Force (RAAF) Base Richmond.

This report accompanies a Review of Environmental Factors (REF) that seeks approval for the construction and operation of the agricultural centre which will provide facilities for a specialist agricultural curriculum at the site. The activities associated with establishing the Richmond Agricultural Centre involves the following works:

- The removal of trees and fencing;
- Construction of a general learning hub;
- Construction of a science hub;
- Construction of a multipurpose hall;
- Construction of an administration building;
- Construction of a canteen and amenities building;
- Construction of a new parking area (including accessible spaces), driveway and kiss and drop facilities;
- The provision of outdoor agricultural learning areas comprising:
  - Agricultural plots;
  - Aboriginal enterprise;
  - Agricultural shed and greenhouse;
  - Animal plots with associated stock yard, animal shelters, troughs and stock lane; and
  - Gravel access road with wash bay.
- Landscaping including new trees, entry forecourt, village green and kitchen garden;
- Ancillary services and infrastructure upgrades including new substation and HV works, sewer pump station, water booster, dual carriage vehicle access and pedestrian paths;
- Wayfinding and school identification signage.

For a detailed project description, please refer to the REF prepared by EPM Projects.

### 2.2. Site Description

The Site is located on 2 College Street, Richmond (Part Lot 2 DP 1051798). The site is located within the Hawkesbury City Council area and is zoned SP1 Special Activities (the SP1 zone) by the *Hawkesbury Local Environmental Plan 2012* (the LEP).

[Figure 1](#) is a site plan showing the location of the proposed Richmond Agricultural Centre within its regional context. [Figure 2](#) is an aerial image of the site and its immediate surrounds.





Figure 1: Location of the proposed RAC

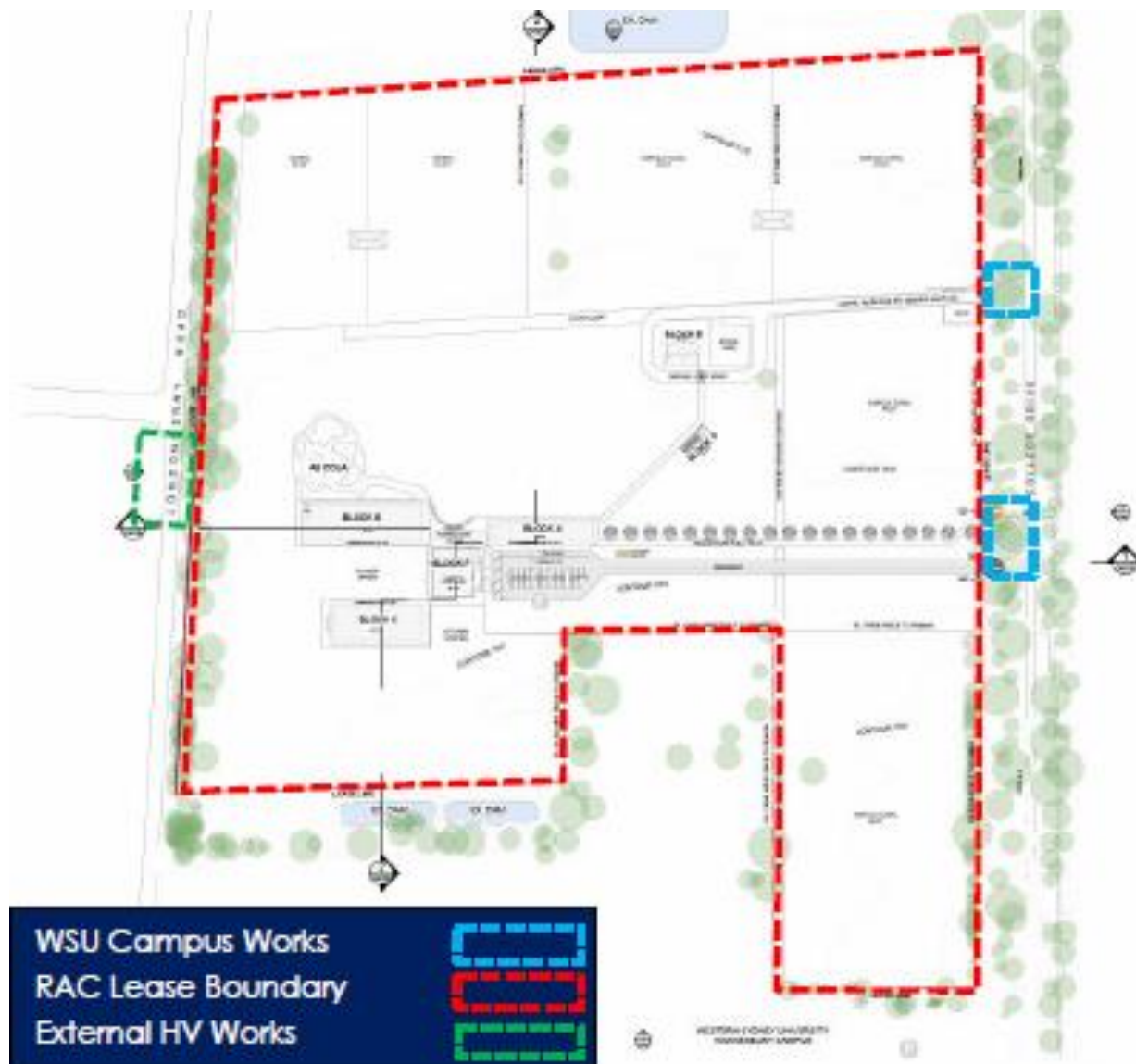


Figure 2: Aerial image of the site showing the location of the proposed RAC



The boundary of the REF works is shown in [Figure 3](#) and comprises:

- Leased area: This is the area of land leased by the Department of Education from Western Sydney University (WSU) for the proposed Richmond Agricultural Centre. This area comprises 14.25 ha of land with frontage to College Drive of 480 meters. The future school site comprises existing agricultural land within the WSU campus bound by College Drive to the east, Londonderry Road to the west, WSU facilities to the south and vacant WSU agricultural land to the north.
- WSU Campus: This the area of land between the leased area and College Drive.



**Figure 3: Extent of proposed works at RAC**

This AIA Report addresses the anticipated aviation-specific project requirements, as well as additional aviation considerations not typically required in an REF.

AviPro has been engaged to provide advice regarding the aviation specific impacts that the RAC will have on the protected airspace at RAAF Base Richmond and any relevant strategically important Helicopter Landing Sites (HLS), as defined in National Airports Safeguarding Framework (NASF) Guideline H: Protecting Strategically Important Helicopter Landing Sites, in the vicinity.

### 2.3. Review of Environmental Factors (REF) Compliance

In preparing this report, the REF Compliance requirements have been addressed as described in [Table 1](#) below. Other important aviation considerations have been addressed as well.

| Item | REF Requirement                                                                                                                                       | Relevant Section of Report |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 1    | If the development proposes a helicopter landing site (HLS), assess its potential impacts on the flight paths of any nearby airport, airfield or HLS. | N/A                        |
| 2    | If the site contains or is adjacent to an HLS, assess the impacts of the development on that HLS.                                                     | N/A                        |

**Table 1:** REF Requirements - Aviation

### 2.4. Background Material

Reference material drawn and provided by NBRS in support of the report include early planning designs and concept drawings.

### 2.5. Methodology

Criteria from all relevant references were assessed, with advice from staff at RAAF Base Richmond used as the primary tool.

### 2.6. Explanation of Terms

**Aircraft.** Refers to both aeroplanes (fixed wing) and helicopters (rotorcraft).

**Approach and Departure Path (IFR).** The flight track helicopters follow when landing at or departing from the FATO of an HLS under the Instrument Flight Rules. The IFR approach and departure path extends upwards and outwards from the edge of the FATO safety area with an obstacle free gradient of 2.6°/4.5%/ 1:22.2 (22.2 units horizontal in 1 unit vertical), to a height of 152m above the FATO at a distance of ~3,386 m. The approach and departure path commences at the forward edge of the FATO safety area at a width of 34m, and increases in width uniformly to 152m m above the elevation of FATO surface at a distance of ~3,386 m.

**Approach/Departure Path (VFR).** The flight track helicopters follow when landing at or departing from the FATO of an HLS. Updated standards to align with ICAO requirements now has the VFR (day and) night approach and departure path extending upwards from the forward edge of the FATO safety area with an obstacle free gradient of 2.6°/4.5%/ 1:22.2 (22.2 units horizontal in 1 unit vertical), to a height of 152m above the FATO at a distance of ~3,386 m. The approach and departure path commences at the forward edge of the FATO safety area at a width of 34m, and expands uniformly, laterally at an angle of 8.7°/15%/1:12.8 to a total width of 140 m, then remains parallel to a distance of ~3,386m, where the height is 152 m above the elevation of FATO surface.

**Design Helicopter.** The Agusta AW139 contracted to the NSW Ambulance. The type reflects the latest generation Performance Class 1 capable helicopters used in HEMS and reflects the maximum weight and maximum contact load/minimum contact area. The design helicopter has a maximum all up mass of 7 tonnes, however for HLS design purposes it is assumed the helicopter will never exceed 6.8 tonnes on the HLS.

**D Value (Overall Length).** The distance from the tip of the main rotor tip plane path to the tip of the tail rotor tip plane path or the fin if further aft, of the Design Helicopter.

**Elevated Helicopter Landing Site.** An HLS located on a roof top or some other elevated structure where the Ground Effect Area/Touchdown and Lift-off Area (TLOF) is at least 2.5m above ground level.

**Final Approach.** The reduction of height and airspeed to arrive over a predetermined point above the FATO of an HLS.

**Final Approach and Takeoff Area (FATO).** A defined area over which the final phase of the approach to a hover, or a landing is completed and from which the takeoff is initiated. For the purposes of these guidelines, the specification of 1.5 x D Value or Overall Length of the Design Helicopter is used and equates to 25m. diameter. Area to be load bearing.

**Ground Taxi.** The surface movement of a wheeled helicopter under its own power with wheels touching the ground.

**Hazard to Air Navigation.** Any object having a substantial adverse effect upon the safe and efficient use of the navigable airspace by aircraft, upon the operation of air navigation facilities, or upon existing or planned airport/heliport capacity.

**Helicopter Landing Site (HLS).** One or more may also be known as a **Heliport**. The area of land, water or a structure used or intended to be used for the landing and takeoff of helicopters, together with appurtenant buildings and facilities.

**Helicopter Landing Site Elevation.** At an HLS without a precision approach, the HLS elevation is the highest point of the FATO expressed as the distance above mean sea level.

**Helicopter Landing Site PC1 Survey Reference Point.** A position at the forward edge of the FATO safety area in the centre of the approach and departure path, from which the PC1 survey at 2.6° (4.5%) is initiated.

**Helicopter Landing Site Reference Point (HRP).** The geographic position of the HLS expressed as the latitude and longitude at the centre of the FATO.

**Hospital Helicopter Landing Site.** HLS limited to serving helicopters engaged in air ambulance, or other hospital related functions.

**Note:**

*A designated HLS located at a hospital or medical facility is an emergency services HLS and **not** a medical emergency site.*

**Heliport.** Two or more co-existing helicopter landing sites (HLS). There are no implications for operating a heliport as opposed to an HLS, other than having a “Heliport Operations Manual” rather than an “HLS Operations Manual” which would address the various interactions and interoperability (aviation, clinical etc.) at the dual sites.

**Hover Taxi.** The movement of a helicopter above the surface, generally at a wheel/skid height of approximately one metre. For facility design purposes, a skid-equipped helicopter is assumed to hover-taxi.

**Landing and Lift Off Area (LLA).** A load-bearing, nominally paved area, normally located in the centre of the TLOF, on which helicopters land and lift off. Minimum dimensions are based upon a 1 x metre clearance around the undercarriage contact points of the Design Helicopter.

**Lift Off.** To raise the helicopter into the air.

**Movement.** A landing or a lift off of a helicopter.

**Object Identification Surface.** The OIS are a set of imaginary surfaces associated with a heliport. They define the volume of airspace that should ideally be kept free from obstacles in order to minimise the danger to a helicopter during an entirely visual approach.

**Obstacle Limitation Surface.** The OLS are a set of imaginary surfaces associated with an aerodrome. They define the volume of airspace that should ideally be kept free from obstacles in order to minimise the danger to aircraft during an entirely visual approach.

**Obstruction to Air Navigation.** Any fixed or mobile object, including a parked helicopter, which impinges the approach/departure surface or the transitional surfaces.

**Parking Pad.** The paved centre portion of a parking position, normally adjacent to an HLS.

**Performance Class 1 (PC1).** Similar to Category A requirements. For a rotorcraft, means the class of rotorcraft operations where, in the event of failure of the critical power unit, performance is available to enable the rotorcraft to land within the rejected take-off distance available, or safely continue the flight to an appropriate landing area, depending on when the failure occurs. For an elevated HLS, the reject area is that area within the FATO (25 m. diameter) and therefore this area is to be load bearing. PC1 also requires Civil Aviation Safety Authority (CASA) approved flight path surveys to/from the HLS.

**Performance Class 2 (PC2).** For a rotorcraft, means the class of rotorcraft operations where, in the event of failure of the critical power unit, performance is available to enable the rotorcraft to safely continue the flight, except when the failure occurs early during the take-off manoeuvres, in which case a forced landing may be required. PC2 also requires CASA approved flight path surveys to/from the HLS.

**Performance Class 2 With Exposure (PC2WE).** PC2WE is very similar to PC2 as mentioned above. The primary difference is that there need not be any provision for a suitable forced landing area during the take-off and landing phases of flight, within the designated exposure period for the rotorcraft. PC2WE offers operators alternative mitigation strategies based on: a defined exposure time limit, demonstrated engine reliability, engine maintenance standards, pilot procedures and training, and operator risk assessments. Specific approval to operate with exposure is required from CASA and will require a number of mitigation strategies from the operator to gain that approval.

**Performance Class 3 (PC3).** For a rotorcraft, means the class of rotorcraft operations where, in the event of failure of the critical power unit at any time during the flight, a forced landing:

- in the case of multi-engine rotorcraft – may be required; or
- in the case of single-engine rotorcraft – will be required.

**Pilot Activated Lighting (PAL).** A PAL system utilises a hospital-based VHF radio and timed switching device, activated by the pilot via a radio transmission on a pre-set frequency, to turn on the associated HLS lighting.

**Prior Permission Required (PPR) HLSs.** An HLS developed for exclusive use of the owner and persons authorized by the owner, i.e. a hospital-based emergency services HLS.

**Note:**

*The HLS owner and the HEMS operator are to ensure that all pilots are thoroughly knowledgeable with the HLS (including such features as approach/departure path characteristics, preferred heading, facility limitations, lighting, obstacles in the area, size of the facility, etc.). This is addressed as part of the HLS commissioning process.*

**Rotor Downwash.** The volume of air moved downward by the action of the rotating main rotor blades. When this air strikes the ground or some other surface, it causes a turbulent outflow of air from beneath the helicopter.

**Safety Area.** A defined area on an HLS surrounding the FATO intended to reduce the risk of damage to helicopters accidentally diverging from the FATO. This area should be free of objects, other than those frangible mounted objects required for air navigation purposes. The Safety Area for the Design Helicopter extends 4.5 m. beyond the FATO perimeter forming a 34 m. X 34 m. square or a 34m. diameter circle.

**Safety Net.** Surrounds the outer edge of a rooftop HLS. It is to be a minimum of 1.5 m. wide and have a load carrying capacity of not less than 122 kg/m<sup>2</sup>. The outer edge is not to project above the HLS deck, and slope back and down to the deck edge at approximately 10 degrees, and not more than 20 degrees. Both the inside and outside edges of the safety net are to be secured to a solid structure.

**Shielded Obstruction.** A proposed or existing obstruction that does **not** need to be marked or lit due to its close proximity to another obstruction whose highest point is at the same or higher elevation.

**Take off.** To accelerate and commence climb at the relevant climb speed.

**Take off Position.** A load bearing, generally paved area, normally located on the centreline and at the edge of the TLOF, from which the helicopter takes off. Typically, there are two such positions at the edge of the TLOF, one for each of two takeoff or arrival directions.

**Touchdown and Lift-off Area (TLOF).** A load bearing, generally paved area, normally centred in the FATO, on which the helicopter lands or takes off, and that provides ground effect for a helicopter rotor system. Size is based on 1 x main rotor diameter of Design Helicopter, and is 14m diameter.

**Transitional Surfaces.** Starts from the side edges of the FATO safety area parallel to the approach and departure path centre line, and extends upwards and outwards (to the sides) at a slope of 2:1 (two-units horizontal in one-unit vertical or 26.6°) to a height of 45m above the elevation of the FATO surface. Further, from the forward edge of the side transitional surfaces, the transitional surface joins the outer edges of the approach and departure surface, and proceeds upwards and outwards until the outer edges are 152m wide at ~3386m which corresponds with the end of the approach and departure surface.

**Unshielded Obstruction.** A proposed or existing obstruction that may need to be marked or lit since it is **not** in close proximity to another marked and lit obstruction whose highest point is at the same or higher elevation.

## 2.7. Applicable Abbreviations

| Acronym | Meaning                                                                                 |
|---------|-----------------------------------------------------------------------------------------|
| AC      | Advisory Circular (from Aviation Regulator)                                             |
| ARP     | Aerodrome Reference Point                                                               |
| BDAR    | Biodiversity Assessment Report                                                          |
| CASA    | Civil Aviation Safety Authority (Australia)                                             |
| CASRs   | Civil Aviation Safety Regulations (1998) Australia                                      |
| CTR     | Control Zone (Air Traffic)                                                              |
| DCP     | Development Control Plan                                                                |
| DDO     | Design and Development Overlay                                                          |
| ERSA    | Enroute Supplement Australia                                                            |
| FATO    | Final approach and Take-Off Area (1.5 x helicopter length)                              |
| GPS     | Global Positioning System                                                               |
| HEMS    | Helicopter Emergency Medical Service                                                    |
| HLS     | Helicopter Landing Site                                                                 |
| ICAO    | International Civil Aviation Organisation                                               |
| IFR     | Instrument Flight Rules                                                                 |
| IMC     | Instrument Meteorological Conditions - requiring flight under IFR                       |
| LEP     | Local Environment Plan                                                                  |
| MTOW    | Maximum Take Off Weight                                                                 |
| NOTAM   | Notice to Airmen. Issued by Airservices in relation to airspace and navigation warnings |

| Acronym | Meaning                                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------------------|
| NVG     | Night Vision Goggle(s)                                                                                                                 |
| OLS     | Obstacle Limitation Surface(s) (Aerodrome)                                                                                             |
| RTCC    | Radar Terrain Clearance Chart                                                                                                          |
| RAAF    | Royal Australian Air Force                                                                                                             |
| RAC     | Richmond Agricultural Centre                                                                                                           |
| SINSW   | School Infrastructure NSW                                                                                                              |
| SARPS   | Standards and Recommended Practices developed by ICAO and promulgated in the Annexes to the Convention of International Civil Aviation |
| UAS     | Unmanned Aircraft Systems                                                                                                              |
| VFR     | Visual Flight Rules                                                                                                                    |
| VHF     | Very High Frequency radio                                                                                                              |
| VMC     | Visual Meteorological Conditions - allowing flight under VFR                                                                           |

## 2.8. List of Figures

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# **1. GENERAL AIRSPACE REQUIREMENTS AND CONSIDERATIONS**

## **1.1. Purpose of this Section**

It is important that the reader has a good understanding of the fundamentals of airspace protection for aerodromes and heliports/HLSS in order to be able to understand the analysis later in this report. Section 3 provides this general overview.

## **1.2. Civil Airspace Regulation in Australia - Aerodromes**

Approvals will be required if prescribed airspace could be impinged. The normal contact for this process is through the operator of the relevant airport.

Protected airspace includes an airport's Obstacle Limitation Surfaces (OLS) involving a set of imaginary surfaces associated with an aerodrome that should be kept free of obstacles. Additionally, the Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) surfaces that takes account of the airspace associated with aircraft instrument procedures, and the airspace associated with the Radar Terrain Clearance Chart (RTCC) must be considered.

At Federally-leased aerodromes, the Airports Act 1996 and the Airports (Protection of Airspace) Regulations 1996 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 that penetrate the OLS, and for the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts for approval of long-term controlled activities and those short-term controlled activities referred to it by the airport operator. However, the airport operator must refer short-term PANS-OPS infringements to the Department for approval. Long term intrusions of the PANS-OPS surface are prohibited.

CASA Advisory Circular (AC) 139.E-01 Reporting of Tall Structures provides guidance on what needs to be reported.

Regulation 139.165 (Notifying CASA of certain proposed objects or structures) of Civil Aviation Safety Regulations Part 139 states: "This regulation applies if a person proposes to construct or erect an object or structure that...will have a height of 100 metres or more above ground level...or is of a kind prescribed by the Part 139 Manual of Standards." This is done through Airservices Australia.

## **1.3. Military Airspace Regulation in Australia – Aerodromes**

Military airspace in Australia is regulated under Part 11A of Defence Regulation 2016 which is in turn authorized under the Defence Act 1903. Part 11 A pertains to Defence aviation areas. The key information relevant is found in Division 2, Subdivision A, Clause 68C - Construction of buildings, structures and objects in Defence aviation areas above specified height restrictions. The clause states that:

- (1) A person commits an offence if:
  - (a) the person constructs a building, structure or object within an area; and
  - (b) the area is a defence aviation area; and
  - (c) the building, structure or object exceeds the height restriction applying to the building, structure or object within the defence aviation area as specified in a Ministerial declaration for the defence aviation area; and
  - (d) the person does not have a valid approval under section 68F to construct the building, structure or object at a height that exceeds the height restriction applying to the building, structure or object.

A crane entering protected airspace would be considered a "structure or object" and entry into protected airspace would be considered to "exceed the height restriction".

#### **1.4. Airspace Management in Australia – Heliports and Helicopter Landing Sites**

Currently within Australia, there are no set rules or regulations applicable to the design, construction or placement of HLS'. The appropriate national regulatory guidance at present for the use of HLS' is Civil Aviation Safety Regulation (CASR) 91-410 which places the onus on the helicopter pilot to determine the suitability of a landing site. CASA, as the regulator of aviation in Australia divested itself of direct responsibility for regulating HLS' in the early 1990s and currently provides only basic operating guidelines via CASA Advisory Circular (AC) 91-29 Guidelines for helicopters – suitable places to takeoff and land.

Because no Federal or State (NSW) legislation is in place to protect VFR approach and departure paths and the transitional surfaces associated with hospital HLSs, in May 2018, the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications issued Guideline H: Protecting Strategically Important Helicopter Landing Sites under the National Airports Safeguarding Framework (NASF). Whilst this publication has no legal effect in NSW as yet, its content is gradually being aligned within the NSW MoH Guidelines for Hospital Helicopter Landing Sites in NSW.

#### **1.5. Helicopter Routes**

In addition to considering the impacts on heliports, HLSs and their associated approach and departure paths (see [paragraph 3.3](#)) it is also necessary to consider special routes designed for, and used by, helicopters to navigate the complex airspace around major aerodromes. These routes are typically associated with key destinations such as aerodromes, heliports and hospitals. Details of these routes can be found in the Enroute Supplement Australia (ERSA) entry for the related aerodrome.

#### **1.6. State Government Requirements**

There are no specific articles of legislation for aerodromes in NSW. Matters pertaining to aerodromes are governed under the guise of State environmental legislation. The various legislative/regulatory requirements relating to HLSs in NSW are complex. Current regulation excludes emergency service landing sites from the definition of “designated development” in the Environmental Planning and Assessment Regulation (which otherwise includes most HLSs). Generally, hospital HLSs are considered “ancillary-uses” to hospital purposes and are thus not separate “development”. The same cannot necessarily be said about off-site emergency medical HLSs, e.g. local sports fields.

Whilst not an aviation requirement, cranes may need access to airspace above neighbouring properties in which case the NSW Access to Neighbouring Land Act 2000 may apply.

#### **1.7. Local Government Requirements**

Where an aerodrome is owned or operated by a Local Government Authority (LGA) or other entity, local government requirements for airspace protection are normally included in a Local Environment Plan (LEP), Development Control Plan (DCP) or similar document. The Civil Aviation Safety Regulations 1988 provide jurisdiction over allowable construction activities in the vicinity of non-Federally leased aerodromes. The LGA will require a proponent to obtain an assessment from CASA as to the hazard presented by such development, and will require compliance with that CASA assessment.

#### **1.8. Unmanned Aircraft Systems Operations**

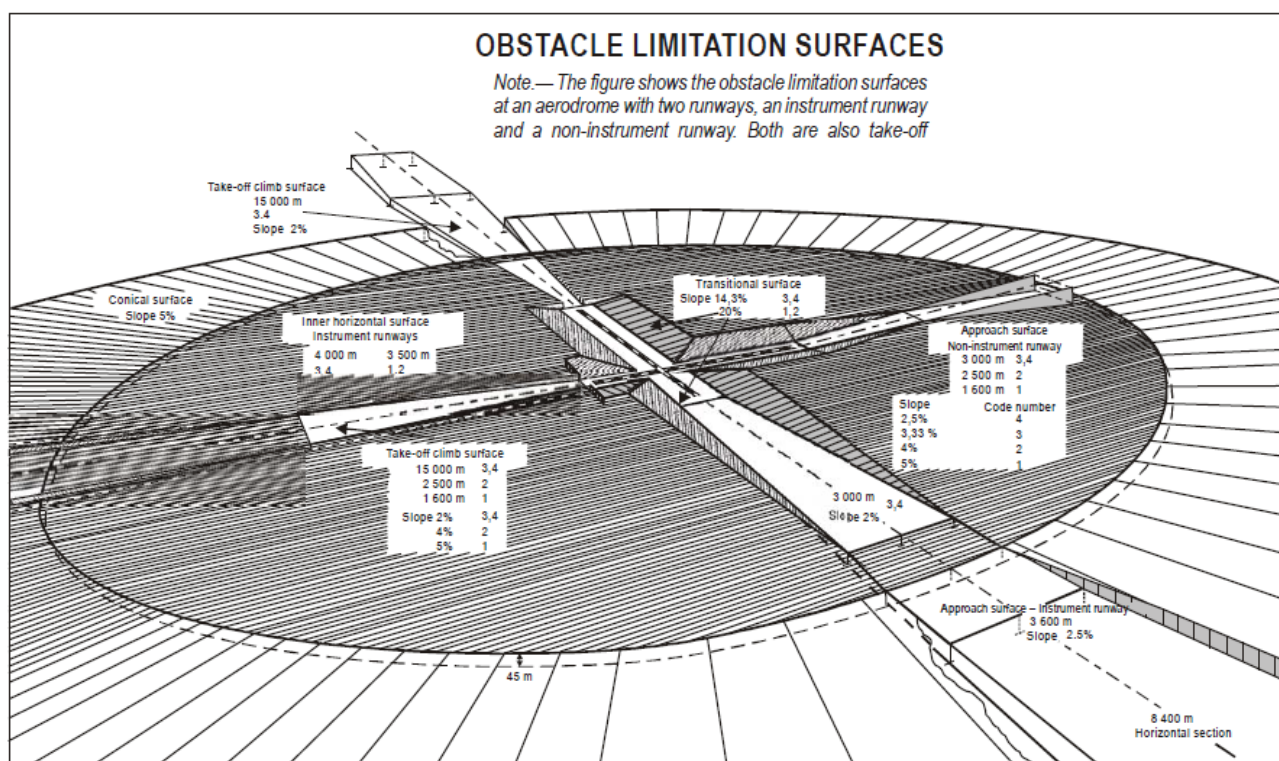
If the proposed development is in proximity to an aerodrome or a strategically important HLS, Unmanned Aircraft Systems (UAS) operations will ordinarily be restricted. Various requirements to operate within such proximity will need to be met.

## 1.9. Obstacle Limitation Surfaces

The objective of the OLS is to define a volume of airspace in proximity to the airport which should be kept free of obstacles that may endanger aircraft in visual operations, or during the visual stages of an instrument approach.

The intention is not to restrict or prohibit all obstacles, but to ensure that either existing or potential obstacles are examined for their impact on aircraft operations and that their presence is properly taken into account. Since they are relevant to visual operations, it may sometimes be sufficient to ensure that the obstacle is conspicuous to pilots, and this may require that the obstacle be marked or lit.

In reality, there is little issue with breaching the OLS as pilots will be visual with the obstruction and can work on “see and avoid” principles. OLS at a multi-runway aerodrome look akin to [Figure 4](#) below:



**Figure 4:** Example of Obstacle Limitation Surfaces

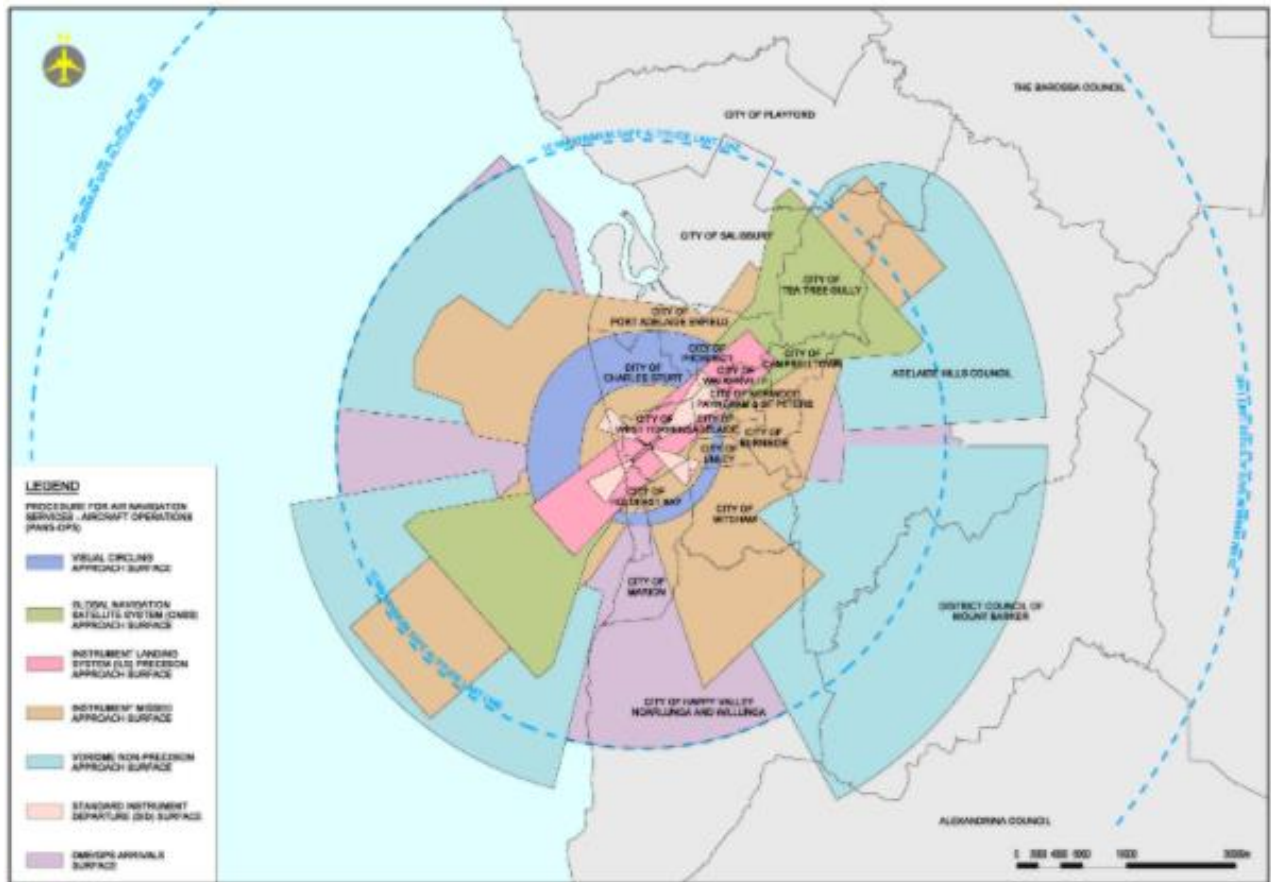
### 1.10. Procedures for Air Navigation – Aircraft Operations (PANS-OPS) Surfaces

PANS-OPS surfaces detail essential areas and obstacle clearance requirements for the achievement of safe, regular instrument flight operations.

The instrument flight procedures enable pilots to either descend from the high enroute environment of cruise type flight to establish visual contact with the landing runway, or climb from the runway to the enroute environment, with a prescribed safe margin above terrain and obstacles, by use of aircraft instruments and radio navigation aids or GPS in conditions where the pilot cannot maintain visual contact with the terrain and obstacles due to inclement weather conditions.

Pilots must be protected against protrusions into the PANS-OPS surfaces as they have no way of avoiding obstructions if they get off track and they cannot see such obstructions.

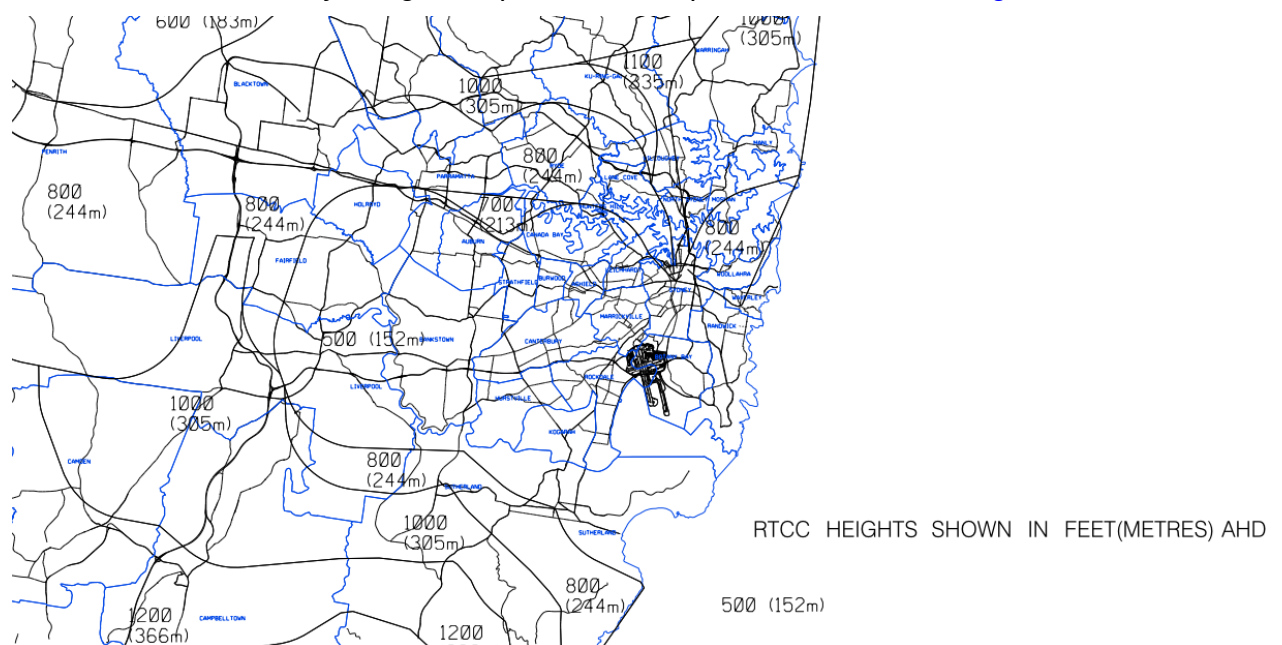
PANS-OPS surfaces are constructed differently to OLS however they serve a similar purpose. An example of PANS-OPS surfaces is in [Figure 5](#) below:



**Figure 5: Example of PANS-OPS Surfaces**

### 1.11. Radar Terrain Clearance Charts

The Radar Terrain Clearance Chart defines an area in the vicinity of an aerodrome, in which the minimum safe levels allocated by an Air Traffic Controller (ATC) vectoring Instrument Flight Rules (IFR) flights with Primary and/or Secondary Surveillance RADAR equipment have been predetermined. The figure shown on the chart is the lowest altitude which an ATC may assign to a pilot. An example of an RTCC is in [Figure 6](#) below:



**Figure 6:** Example of a Radar Terrain Clearance Chart (RTCC)



## 2. SPECIFIC RICHMOND AGRICULTURAL CENTRE DEVELOPMENT CONSIDERATIONS

### 2.1. The RAC Development Location

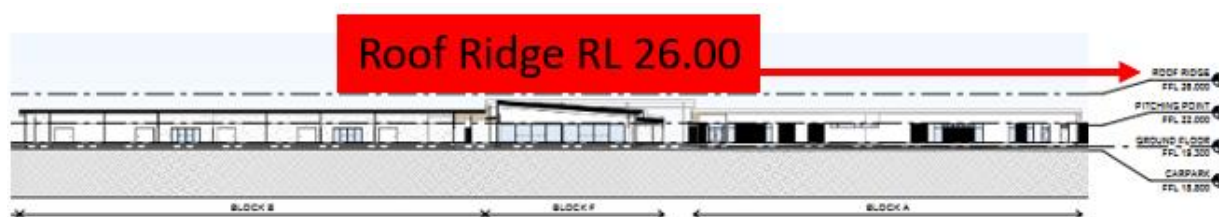
The location of the proposed RAC development footprint is shown in [Figures 2 and 3](#) and further at [Figure 7](#) below. It is approximately 2.5 km from the Aerodrome Reference Point (ARP) of the RAAF Base Richmond Aerodrome. The distance to the RAAF Base Richmond boundary is well under 2.0km from the RAC site. The RAC site is underneath the Inner Horizontal Surface (IHS) of the Richmond OLS. It is not in proximity to any strategically important HLS.



**Figure 7:** Location of the Proposed RAC development site

### 2.2. The RAC Development Elevation

The RAC development is planned to be built to approximately RL 26 (see [Figure 8](#) below).



**Figure 8:** Elevation of the Proposed RAC development buildings

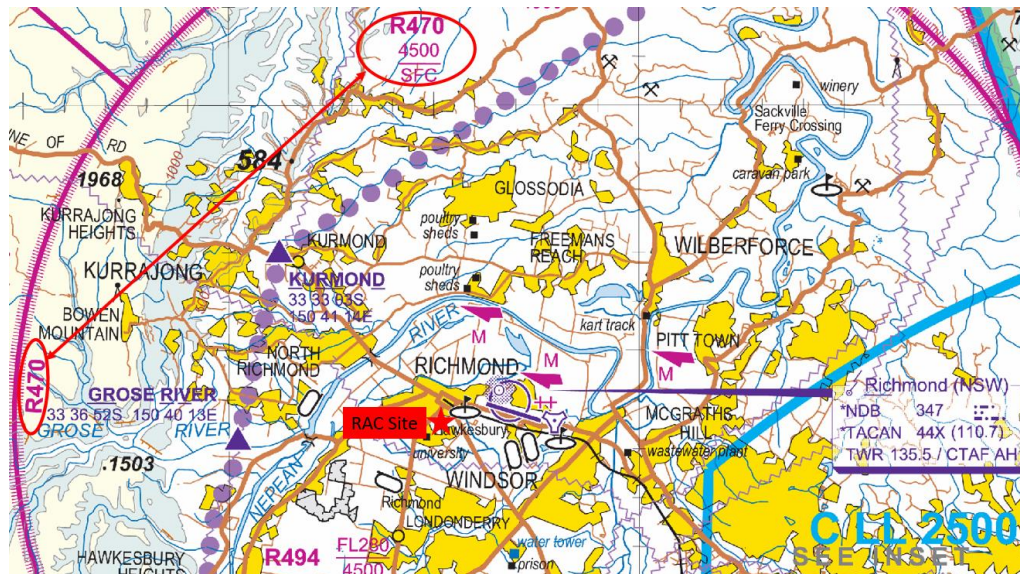
### 2.3. Local Government Requirements

Clause 6.6 of the Hawkesbury Local Environment Plan 2012 states that one objective of the Clause is “to ensure that land use and development in the vicinity of that airport do not hinder or have any other adverse impacts on the safe and efficient operation of that airport.”

The majority of Clause 6.6, however, is concerned with restricting development around the RAAF Base to areas outside the Aircraft Noise Exposure Forecast (ANEF) 20 contour.

## 2.4. General Airspace Overhead the RAC Development

The RAC development sits well within the RAAF Base Richmond Aerodrome's Control Zone (CTR). This airspace extends from ground level to 4500 feet above mean sea level or approximately RL 1371. This controlled airspace is not a driver of building restrictions. See Figure 9 below.



**Figure 9: RAAF Base Richmond Aerodrome General Airspace**

A Noise Abatement Procedure for RAAF Base Richmond is contained in the Enroute Supplement Australia (ERSA), an aviation planning resource, stating: "To avoid a stud farm and Hawkesbury (sic) University aircraft are not to fly below 1,000 feet (305 metres) above ground level, except in an emergency when operating within one nautical mile south of runway 10/28."

The implication of this Noise Abatement Procedure is that aircraft are already restricted from flying low over the RAC site and that no other special procedures would necessarily have to be developed by the RAAF Base in the event that construction cranes became obstacles in this part of the OLS.

## 2.5. The RAAF Base Richmond Aerodrome OLS Overlay

The RAAF Base Richmond Aerodrome OLS is not available for public release. The RAC site, however, sits under the HIS, the lower limit of which is 64AHD/RL64. There is approximately 38m of "free space" above the RAC development for crane erection and usage without requiring approval from the RAAF Base authorities.

## 2.6. The RAAF Base Richmond Aerodrome PANS-OPS Overlay

The RAAF Base Richmond Aerodrome PANS-OPS overlay is not available for public release. The AvLaw Aeronautical Impact Assessment dated 21 October 2021 investigated the PANS-OPS implications and determined 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." AviPro concurs with this assessment.



**2.7. The RAAF Base Richmond Aerodrome RTCC Overlay**

The RAAF Base Richmond Aerodrome RTCC overlay is not available for public release. The lower limit is estimated to be in the vicinity of 171AHD and thus well above the RAC site.

**2.8. Overall impacts on RAAF Base Richmond Aerodrome OLS, PANS-OPS and RTCC**

The RAC development will not intrude into any protected airspace. Any associated construction cranes must remain below RL64 in order to not penetrate protected airspace (the OLS).

**2.9. Impact on any Strategically Important HLS**

The requirement to protect strategically important HLSs e.g. hospital HLSs emanates from the document National Airports Safeguarding Framework (NASF) Guideline H: Protecting Strategically Important Helicopter Landing Sites. There are no strategically important HLSs anywhere near the RAC site.

**2.10. Impact on Helicopter Routes**

The RAC development will not impact any helicopter routes.

**2.11. Lighting and Glare Considerations**

The AvLaw Aeronautical Impact Assessment dated 21 October 2021 investigated the lighting and glare considerations and determined that “there is no specific limitation on the style or colour of roofing materials or local area lighting at the site.” AviPro concurs with this assessment.

**2.12. Bird and Animal Hazard**

The AvLaw Aeronautical Impact Assessment dated 21 October 2021 investigated the bird and animal hazard to be potentially introduced by the RAC development. AvLaw concluded that “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.” AviPro concurs with this advice but further recommends the Biodiversity Assessment Report (BDAR) or ecology report addresses any potential significant increase in birdlife numbers and whether there is a potentially increased hazard to aircraft operations at RAAF Base Richmond. AvLaw noted that a bird hazard already exists at RAAF Base Richmond at approximately 2-3 nautical miles east of the runway, so such hazards are not at all uncommon – they simply need to be considered, and where appropriate, managed.

**2.13. Aircraft Noise Exposure Forecast**

The AvLaw Aeronautical Impact Assessment dated 21 October 2021 investigated the ANEF for the original site and concluded that it was outside the ANEF 20 contour. The change of site location is also outside the ANEF 20 contour. Aircraft noise will not be a problem for the activities proposed to be undertaken at the RAC.

#### **2.14. UAS Operations as part of the School Curriculum**

There is potentially a requirement for RAC students to be taught, and to practice UAS operations. Close liaison with the RAAF Base will be necessary and operating approval should not be assumed. Normally, no-fly periods in Defence aviation can be forecast, and reasonable requests accommodated where UAS altitudes are very low, the operating radius is limited, and the operating period is relatively short.

#### **2.15. Tall Structure Considerations**

CASA AC 139.E-01 v1.0 Reporting of tall structures dated December 2021 states that "Any object that extends to a height of 100 m or more above local ground level, must be notified to CASA by the proponent or owner." At less than 100 m above ground level, this building need not be notified to CASA for assessment. AC 139.E-01 v1.0 also states that "the RAAF and Airservices Australia require information on structures that are 30 m or more above ground level - within 30 km of an aerodrome or 45 m or more above ground level elsewhere for the RAAF, or 30 m or more above ground level elsewhere for Airservices Australia." This building therefore will not need to be notified to Airservices Australia as a tall structure.

#### **2.16. Construction Crane Considerations**

If construction cranes are intended to enter protected airspace, they will be required to be marked and lit so as to minimise the impact on aviation operations at RAAF Base Richmond. Minor intrusions into the IHS of the OLS are likely to be approved but will likely carry, in addition to marking and lighting requirements, a number of specific coordination requirements with the RAAF Base that may inconvenience the construction program. It would be extremely wise to avoid erecting construction cranes above RL64.

#### **2.17. RAAF Base Richmond Advice**

Contact was made with RAAF Base Richmond and a reply received on Mon 17 Feb 25. The following is the text of the RAAF response:

"To answer your questions; A crane which is deemed to impact the OLS is regarded as a hazard to aviation operations. Depending on how significant the impact to the OLS is, we are able to give local approvals for crane operations following a formal assessment. You are required to input the operating times and dates in order for us to conduct an assessment. We will make sure an approval is granted for the intended period of operation. Typically, a NOTAM is released and conditions of operation are laid out depending on the significance of impact to the OLS.

We require a minimum of 6 weeks lead-time in order to process these requests.

I am afraid I am not able to send you a copy of the OLS overlay. In this instance, any crane you intend to operate (no matter how high) should be consulted with us prior to operation. When submitting the attached form, we also request a description of the crane's specs is provided separately which will assist us in conducting the assessment. Please forward these to [ric.aboc@defence.gov.au](mailto:ric.aboc@defence.gov.au) upon completion."

A crane application form was provided as an attachment.

## 2.18. Precedent for Crane Intrusion into the OLS

There is a comparable precedent for an approved permanent OLS intrusion by cranes not far from the RAC site. The site is known as the Western Sydney University/Hawkesbury Institute for the Environment “Eucalyptus Free Air Carbon Dioxide Experiment” (EucFACE). It is located approximately 4.5km south-west of the RAAF Base Richmond ARP. See [Figures 10 and 11](#) below.



**Figure 10: EucFACE Location**



**Figure 11: EucFACE Cranes**



## 2.19. Deductions: Airspace, Cranes, Obstructions and HLSs

The following key deductions can be made:

- The Richmond Agricultural Centre, once constructed, will not intrude into the RAAF Base Richmond PANS-OPS surfaces.
- The Richmond Agricultural Centre, once constructed, will not intrude into the RAAF Base Richmond OLS.
- The Richmond Agricultural Centre, once constructed, will not intrude into the RAAF Base Richmond RTCC.
- The Richmond Agricultural Centre, once constructed, will not impact the approach and departure paths of any strategically important Helicopter Landing Site (HLS).
- The Richmond Agricultural Centre construction crane(s) will not intrude into the RAAF Base Richmond PANS-OPS surfaces.
- The Richmond Agricultural Centre construction crane(s) is unlikely (if below RL64) to intrude into the RAAF Base Richmond OLS; but if it does, it will require approval to do so.
- The Richmond Agricultural Centre construction crane(s) will not intrude into the RAAF Base Richmond RTCC.
- The Richmond Agricultural Centre construction crane(s) will not intrude into the approach and departure paths of any strategically important HLS.
- The Richmond Agricultural Centre, once constructed, will not require aviation-standard obstacle lighting.
- The Richmond Agricultural Centre construction crane(s) will not require aviation-standard obstacle lighting unless they go above RL64.
- The Richmond Agricultural Centre, and any associated construction crane(s) will only require formal assessment by RAAF Base Richmond if exceeding RL64.

## 2.20. Mitigations

There is nothing presently to mitigate in relation to aviation impact and airspace protection matters for the proposed RAC development however some provisional mitigations are offered. Aviation-standard obstacle lighting for construction crane(s) are routine issues that are considered on all projects in the vicinity of aerodromes, helicopter landing sites or helicopter routes. No decision has yet been made as to whether or not any construction crane will intrude into protected airspace. See [Table 2](#) below.

| Project Stage | Mitigation Measures                                                                                                     | Relevant Section |
|---------------|-------------------------------------------------------------------------------------------------------------------------|------------------|
| D             | Provisional: Check ecology report to ascertain likelihood of any increase in birdlife numbers due to agricultural uses. | 2.12             |
| C             | Provisional: Aviation-standard crane lighting if crane(s) are planned to be above RL64.                                 | 2.16-2.17        |

**Table 2:** Mitigation Measures

### **2.21. Conclusion**

The RAC development, including any construction cranes, will not adversely impact aviation safety RAAF Base Richmond Aerodrome. Approvals will be required for any construction crane to intrude into the the RAAF Base Richmond Aerodrome OLS if it is/they are planned to be above approximately RL64. If within the RAAF Base Richmond Aerodrome OLS, a construction crane will require aviation standard obstacle lighting.

### **2.22. Recommendations**

Ensure that the proposed RAC development construction tower crane(s) is/are fitted with CASA-standard obstacle lighting if operating above RL64. If planning to erect a construction crane above RL64, further detailed coordination with RAAF Base Richmond will be required. It is further recommended that the ecology report addresses any potential significant increase in birdlife numbers and whether there is a potentially increased hazard to aircraft operations at RAAF Base Richmond.