Setia

AVIATION IMPACT ASSESSMENT REPORT
20-22 ATCHISON STREET ST LEONARDS NSW 2065

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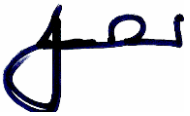
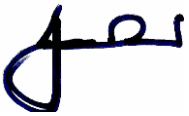
		Signature			
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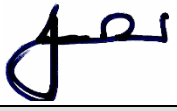
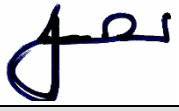
		Signature			
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This Report on the airspace implications, both during and following construction of the proposed development is prepared for Setia BHD Group, by Resolution Response Pty. Ltd. ABN: 94 154 052 883, trading as ‘AviPro’.

The Report relates to the coordination aspects associated with prescribed/protected airspace at Sydney (Kingsford-Smith) Aerodrome and the Helicopter Landing Site (HLS) at the Royal North Shore Hospital (RNSH) due to the establishment and site design of the proposed development at 20-22 Atchison St, St Leonards. It is intended to inform design and planning.

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1. PROJECT BACKGROUND

1.1. Introduction

This Aviation Impact Assessment Report has been prepared by AviPro to support a State Significant Development Application (SSDA) SSD-87486461 for the site at 20-22 Atchison Street, St Leonards (the site).

The Minister for Planning, or their delegate, is the consent authority for the SSDA and this application is lodged with the NSW Department of Planning, Housing and Infrastructure (DPHI) for assessment.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 9 July 2025 (SSD-87486461). Noting that an Aviation Impact Assessment is no longer mandatory for a "Housing" SEARs, this report has been prepared to respond to the following typical SEARs for a development in proximity to protected/prescribed airspace and a Strategically Important Helicopter Landing Site:

Item	SEARS 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.	*See Sections 4.1, 4.12 to 4.15*

Table 1: Typical Secretary's Environmental Assessment Requirements – Aviation

1.2. Project Description

The application seeks development consent for an SSDA which will facilitate the redevelopment of the site for a shop top housing development using the recently introduced provisions under the Transit Oriented Development (TOD) reforms.

The project seeks consent for:

- Demolition of existing buildings on site and tree removal.
- Construction of a 40-storey shop top housing development comprising:
  - Four-storey mixed-use (commercial, residential and retail) podium with a retail tenancy at ground level (Atchison Street frontage) and lower ground level (Atchison Lane frontage).
  - 36 levels of residential apartments and residential amenities within the tower.
  - Landscaping and public amenities along the Mitchell Street eastern elevation at ground level.
  - Consolidated vehicular and loading access from Atchison Lane.
  - Five-storey basement accommodating car, bicycle and motorcycle parking, storage, plant and end of trip facilities (EOTF) for the commercial component.
- Amalgamation of Lot 1 in DP740017 and Lot 120 DP564606.
- 10% of residential floor space to be used for affordable housing via monetary contribution.
- Storage areas, utilities and service provision.

Refer to Architectural Plans prepared by Cox Architecture appended to the Environmental Impact Statement.

1.3. The Site

The site occupies a strategic location in the St Leonards/Crows Nest precinct and is in close proximity to the St Leonards railway station and Crows Nest Metro station and town centre.

The site is located at 20-22 Atchison Street, St Leonards. The site has a primary frontage to Atchison Street to the south, Mitchell Street to the east and Atchison Lane to the north. The site is located within the North Sydney Local Government Area (LGA) and is located approximately 4.5km north of the Sydney CBD.

The site comprises two allotments described as Lot 1 in DP740017 and Lot 120 DP564606 with a total area of 1374.4sqm. The site is located near the crest of a high ridgeline point, with Mitchell Street falling in elevation towards the north of the site and Atchison Street falls towards the east. The site location is outlined in Figure 1.

Figure 1: The Site

Existing development on the site includes:

- 22 Atchison Street is currently occupied by six storey commercial office building and 18-20 Atchison Street comprises a three-storey commercial building which is currently vacant. The buildings were constructed in the 1980s and have a primary frontage to Atchison Street and secondary vehicular access from Atchison Lane.
- 22 Atchison Street accommodates additional vehicular access from Mitchell Street.

1.4. Background Material

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

1.5. Methodology

Criteria from all relevant references were assessed, with the Sydney Airport airspace overlays and Civil Aviation Safety Authority (CASA) Advisory Circular (AC) 139.R-01 Guidelines for heliports - design and operation used as the primary tools.

1.6. Explanation of Terms

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

Approach and Departure Path. The flight track helicopters follow when landing at or departing from the FATO of an HLS. The approach and departure path extends upwards and outwards from the edge of the FATO safety area with an obstacle free gradient of 2.6^0/4.5%/ 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 138m at 152m above the elevation of FATO surface at a distance of ~3,386 m.

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.

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.

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.

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 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 safety 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^2. 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.

Standard HLS. A place that may be used as an aerodrome for helicopter operations by day and night.

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.

1.7. Applicable Abbreviations

Acronym	Meaning
AC	US FAA Advisory Circular
ACC	Aeromedical Control Centre (HQ Eveleigh). Responsible for control and tasking of HEMS
CASA	Civil Aviation Safety Authority (Australia)
CASRs	Civil Aviation Safety Regulations (1998) Australia
DCP	Development Control Plan
DDO	Design and Development Overlay
FAA	Federal Aviation Administration, USA
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
LEP	Local Environment Plan
MoH	Ministry of Health NSW
MRI	Magnetic Resonance Imagers
MTOW	Maximum Take Off Weight
NOTAM	Notice to Airmen. Issued by Airservices in relation to airspace and navigation warnings
NVG	Night Vision Goggle(s)
OIS	Object Identification Surface(s) (Heliport/HLS)
OLS	Obstacle Limitation Surface(s) (Aerodrome)
PC1	Performance Class 1
PC2	Performance Class 2
PC2(WE)	Performance Class 2 (With Exposure)
PC3	Performance Class 3
RD	Main Rotor Diameter
RNSH	Royal North Shore Hospital
RTCC	Radar Terrain Clearance Chart
SACL	Sydney Airports Corporation Limited
SARPS	Standards and Recommended Practices developed by ICAO and promulgated in the Annexes to the Convention of International Civil Aviation
TLOF	Touch Down and Lift Off Area. Load bearing min. 1 x main rotor diameter.
VFR	Visual Flight Rules
VHF	Very High Frequency radio
VMC	Visual Meteorological Conditions - allowing flight under VFR
V_{TOSS}	Take off Safety Speed

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17	RNSH HLS Approach and Departure Paths
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2. EXECUTIVE SUMMARY

The aim of this report is to provide insights into the impacts of the proposed development at 20-22 Atchison Street, St Leonards on the aviation operations into and out of Sydney (Kingsford-Smith) Aerodrome and of the Royal North Shore Hospital (RNSH) HLS. The report analyses the likely impact of the proposed building envelope, and any associated, future construction cranes, on aviation activities.

The following key outcomes arose from the analysis:

- The proposed development **will** intrude into the Sydney (Kingsford-Smith) Aerodrome OLS, and will require permission to do so.
- The proposed development will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The proposed development will not protrude into the Sydney RTCC.
- The proposed development will not impact the approach and departure paths of the RNSH HLS.
- The proposed development's construction crane(s) **will** intrude into the Sydney (Kingsford-Smith) Aerodrome OLS, and will require permission to do so.
- The proposed development's future construction crane(s) will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces provided they remain below RL340.
- The proposed development's future construction crane(s) will not intrude into the Sydney RTCC provided they remain below RL335.
- The proposed development's future construction crane(s) will not intrude into the approach and departure paths of the RNSH HLS.
- The proposed development's future construction crane(s) will require HLS-specific aviation obstacle lighting.

The proposed building, including its future construction cranes, will marginally impact aviation safety in relation to Sydney (Kingsford-Smith) Aerodrome. This will require approval from aviation safety and airspace protection authorities/agencies, but will not be contentious.

The proposed development, including any future construction cranes, will not impact adversely on the RNSH HLS. Appropriate HLS-specific aviation obstacle lighting as required by the NSW Ministry of Health Guidelines for Hospital Helicopter Landing Sites will be necessary on a construction crane if it is going to be operated at night or in very low visibility weather.

3. GENERAL AIRSPACE REQUIREMENTS AND CONSIDERATIONS

3.1. 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.

3.2. Airspace Regulation in Australia - Federally-Leased Aerodromes

At Australia's 21 Federally-leased aerodromes, approvals will be required if prescribed or protected airspace could be impinged. The normal contact for this process is through the owner or operator of the relevant aerodrome upon which the airspace is centred.

Prescribed 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.

The Airports (Protection of Airspace) Regulations (APARs) 1996 differentiate between "short-term" (less than 3 months) and "long-term" controlled activities. The APARs 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.

3.3. Airspace Regulation in Australia – Non-Federally-Leased Aerodromes

A similar but more abbreviated system applies at all Australian aerodromes that are not Federally-leased. CASA and Airservices Australia still make assessments of the impacts on protected airspace, but the aerodrome owner/operator is the sole decision-maker (with advice from the two agencies/authorities).

3.4. Civil Aviation (Buildings Control) Regulations 1988

The Civil Aviation (Buildings Control) Regulations 1988, known as the BCRs, have been largely superseded by the APARs in the guidance they provide, however they still exist and any building that is planned to be erected in the vicinity of Sydney, Bankstown, Melbourne, Moorabbin, Essendon or Adelaide aerodromes is subject to them. The BCRs provide three different levels for which notifications must be made – 25 ft (7.5m) above ground level, 50 ft (15m) above ground level and 150ft (45m) above ground level.

3.5. Airspace Management in Australia – Heliports and Helicopter Landing Sites

Rules or regulations applicable to the design, construction or placement of HLSs within Australia are contained in Advisory Circular (AC) 139.R-01 Guidelines for heliports - design and operation and AC 91-29 Guidelines for helicopters – suitable places to takeoff and land. These ACs work in tandem with Civil Aviation Safety Regulation (CASR) 91.410 which places the onus on the helicopter pilot to determine the suitability of a landing site. CASA continues to aim towards publishing CASR Sub-part 139.R which will eventually regulate heliports and HLS' in Australia.

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.

3.6. Helicopter Routes

In addition to considering the impacts on heliports, HLSs and their associated approach and departure paths (see paragraph 3.5) 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 Sydney (Kingsford-Smith) Aerodrome entry of the Enroute Supplement Australia (ERSA).

3.7. Tall Structures

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.

3.8. 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.

3.9. Local Government Requirements

For Federally-leased aerodromes, requirements emanate from the Airports Act 1996 and the Airports (Protection of Airspace) Regulations 1996.

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 and Communications 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 intrusions to the Department for approval. Long term intrusions of the PANS-OPS surface are prohibited.

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.

3.10. 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 2 below:

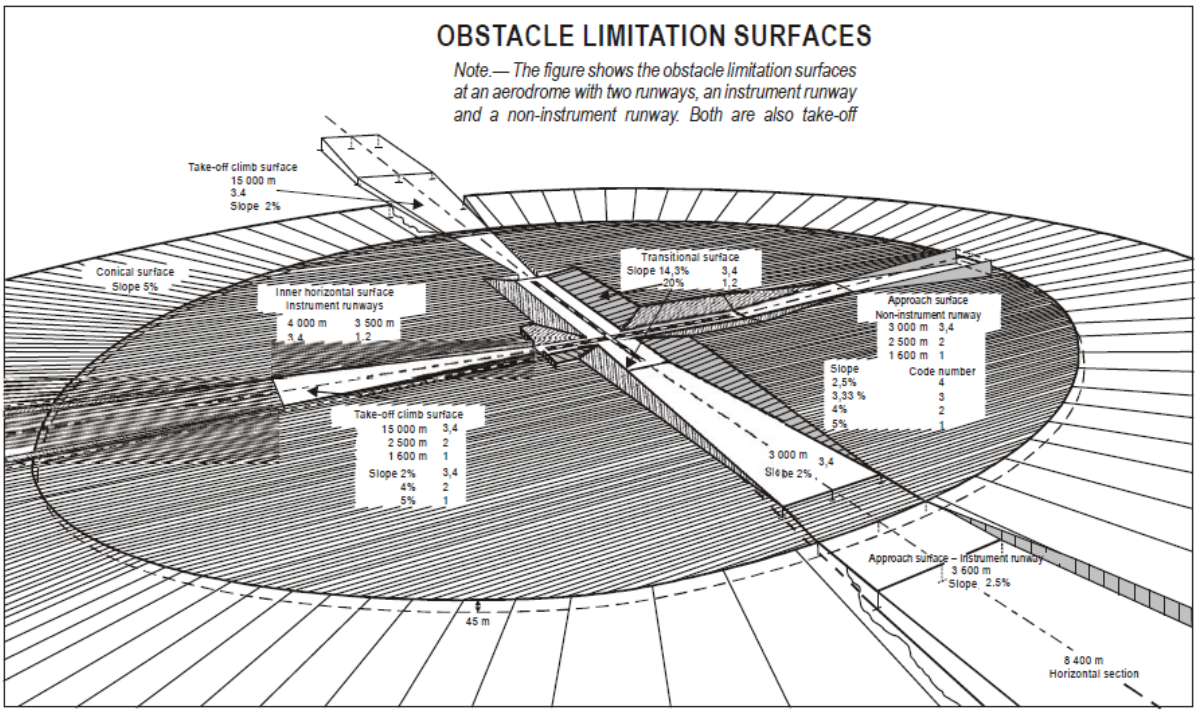

Figure 2: Example of Obstacle Limitation Surfaces

3.11. 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 3 below:

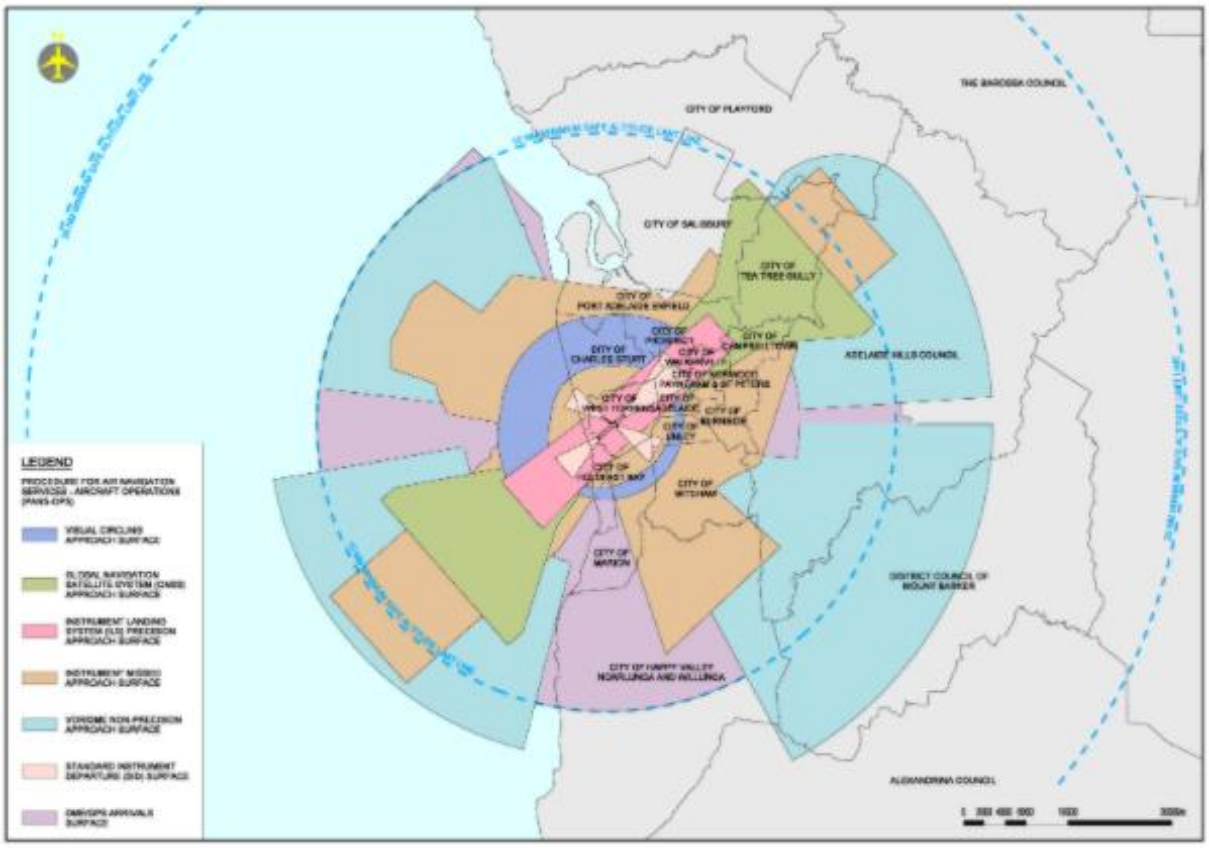

Figure 3: Example of PANS-OPS Surfaces

3.12. 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 4 below:

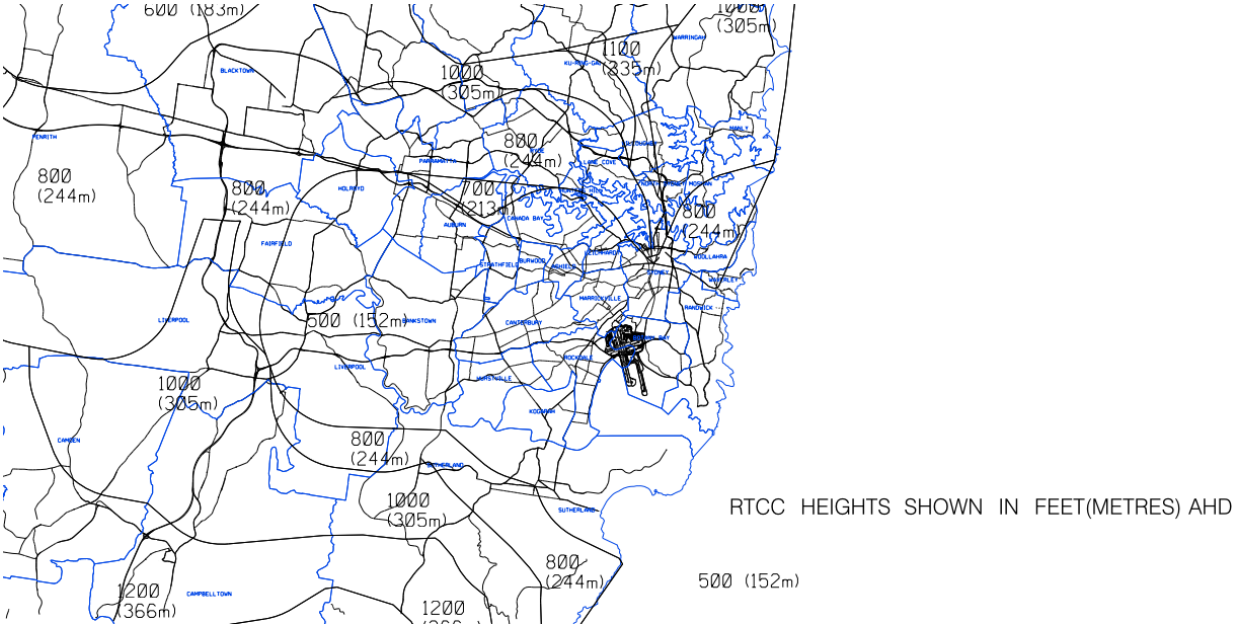

Figure 4: Example of a Radar Terrain Clearance Chart (RTCC)

3.13. Approach and Departure Paths

The purpose of approach and departure path is to provide a portion of airspace sufficiently clear of hazards to allow safe approaches to, and departures from, the HLS. Approach and departure paths can be designed for both visual (VFR) use by day and by night using different criteria; and for instrument (IFR) flight (also by day and night, albeit there are no differences in design requirements).

VFR approach and departure paths should be such that there are no downwind operations and crosswind operations are kept to a minimum. To accomplish this, an HLS must have more than one path which provides an additional safety margin and operational flexibility.

The preferred flight approach and departure path should where possible, be aligned with the predominant, prevailing wind when taking account of potential obstacles. Other approach and departure paths should also be based on an assessment of the average, prevailing winds and potential obstacles. The separation between approach and departure paths should not be less than 135°, and should preferably be 180°.

3.14. VFR Approach and Departure (Take-off Climb) Surface

VFR approach and departure surfaces can be designed for both day and night operations. Because all NSW hospital HLSs are required to be capable of both day and night use, the night tolerances are always used. A (day and) night approach and departure surface starts at the forward edge of the FATO safety area and slopes upward at 2.6^0/4.5%/1:22.2 (22.2 units horizontal in 1 unit vertical) for a distance of ~3,386 m. The approach and departure path commences at a width of 34 m and expands uniformly, laterally at an angle of 8.7^0/15%/1:12.8 to a width of 140 m, then remains parallel to a distance of 3,386 m, where the height is 152 m above the elevation of FATO surface. The VFR approach and departure paths are to be obstacle free. It is important to achieve the 2.6^0/4.5%/1:22.2 obstacle free slope to account for the performance requirements of one engine inoperative (OEI) flight following an emergency. See Figures 5 and 6 below.

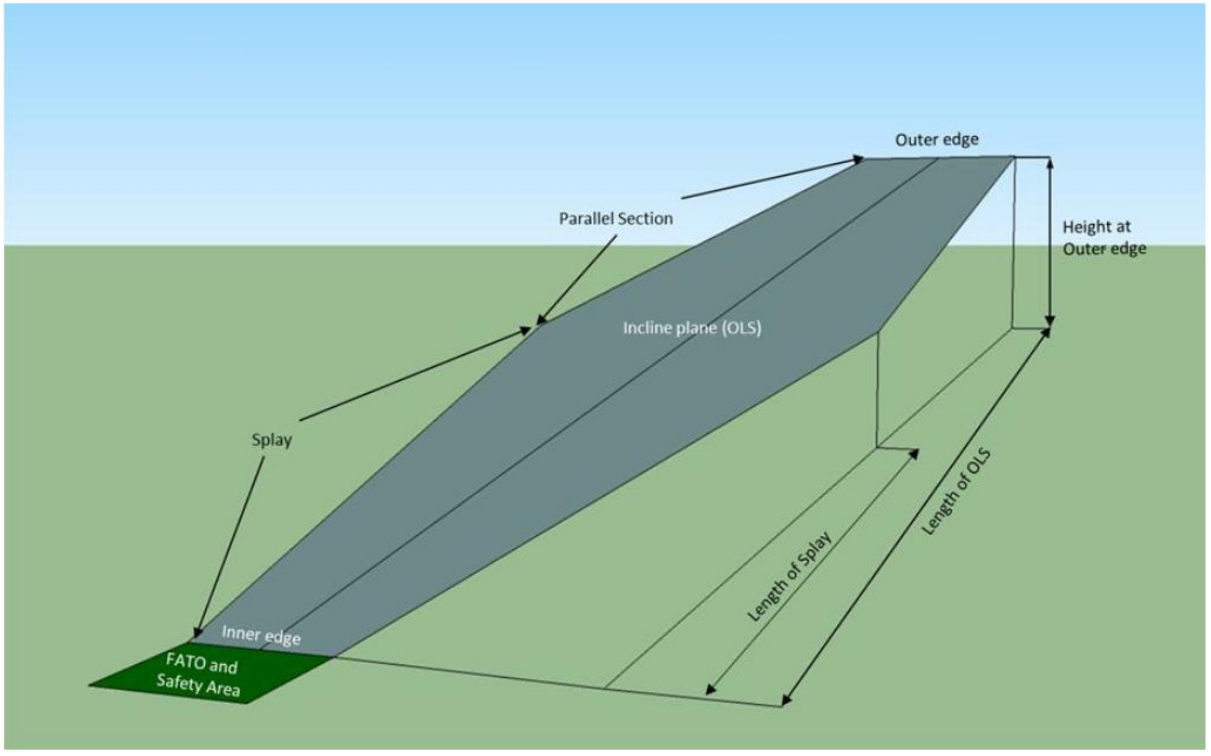

Figure 5: HLS VFR Approach and Departure Surfaces (1)

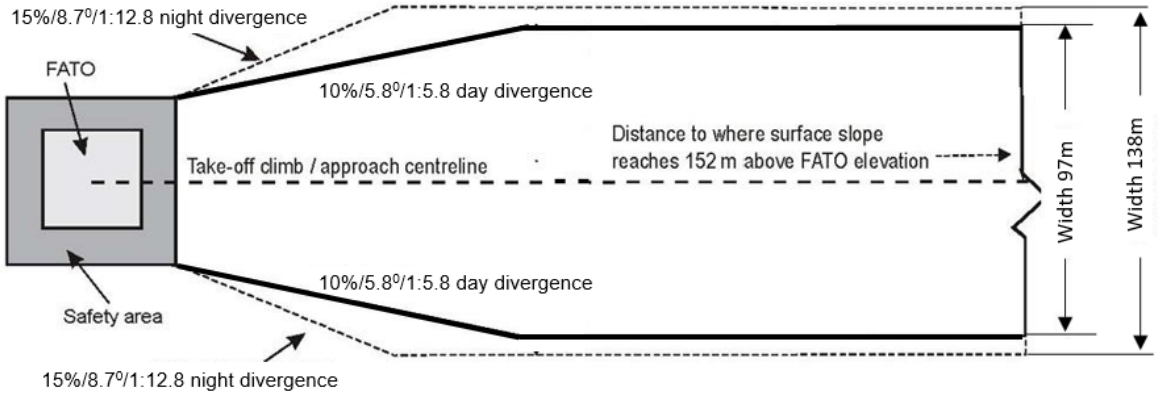

Figure 6: HLS VFR Approach and Departure Surfaces (2)

3.15. Protected Side Slope

A VFR-only HLS is to be provided with at least one, and preferably two, protected side slopes, rising at 45^0 from the edge of the safety area and extending to a distance of 10m. See Figure 7 below. Due to the proximity of lift lobbies and other infrastructure, it is often difficult to provide the second protected side slope.

The surface of a protected side slope must not be penetrated by obstacles.

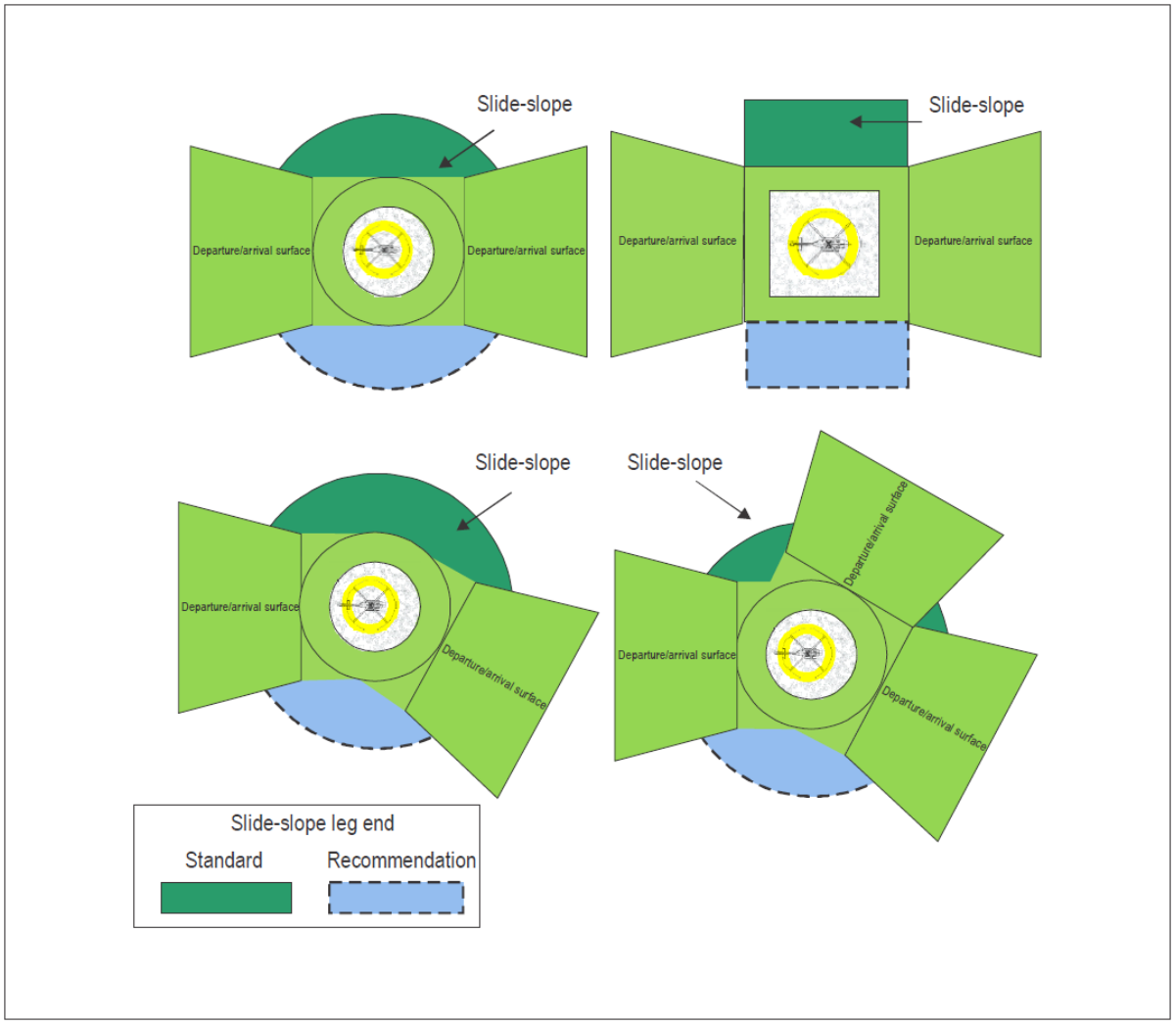

Figure 7: Protected Side Slopes

3.16. Category A Backup Procedure

A Category A back-up procedure, i.e. without a lateral component, is one of the PC1 HLS profiles provided in RFMs along with the dimensions of the backup area. Category A The backup procedure is depicted in Figure 8 below.

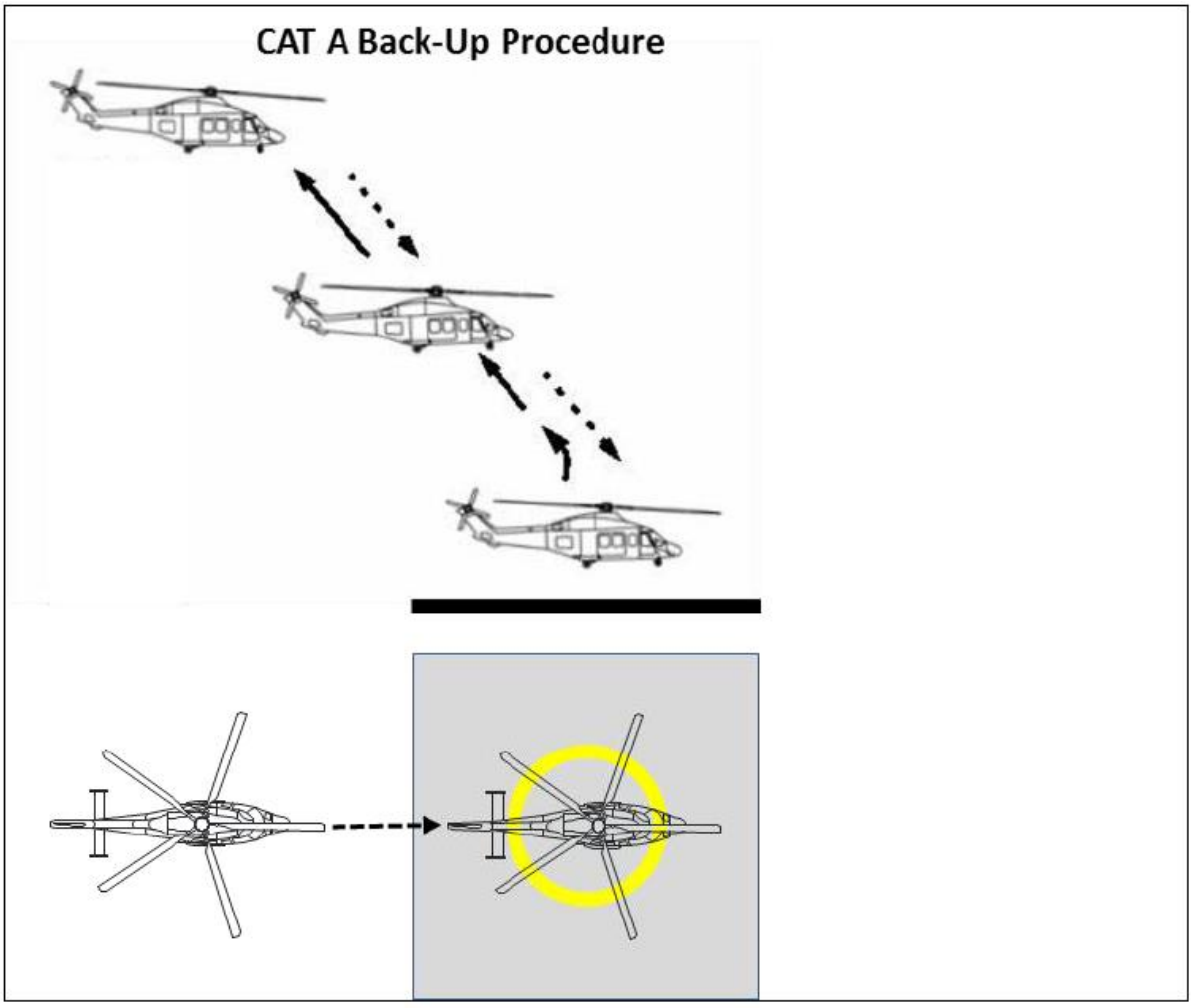

Figure 8: Category A Backup Procedure Profile

The back-up area should consist of two elements: an ascent/descent path/surface and an obstacle limitation surface. The dimensions of these are normally contained in tabular form in the Category A supplement of the RFM. For NSW hospitals which are to be both day and night capable, the splay is to be 15%. Where the backup area is coincident with a reciprocal VFR approach and departure surface, no additional airspace protection measures will be required. Where the back-up area does not overlay the VFR approach and departure surface, a specific ascent/descent path/surface and obstacle limitation surface will need to be surveyed. See Figure 9 below.

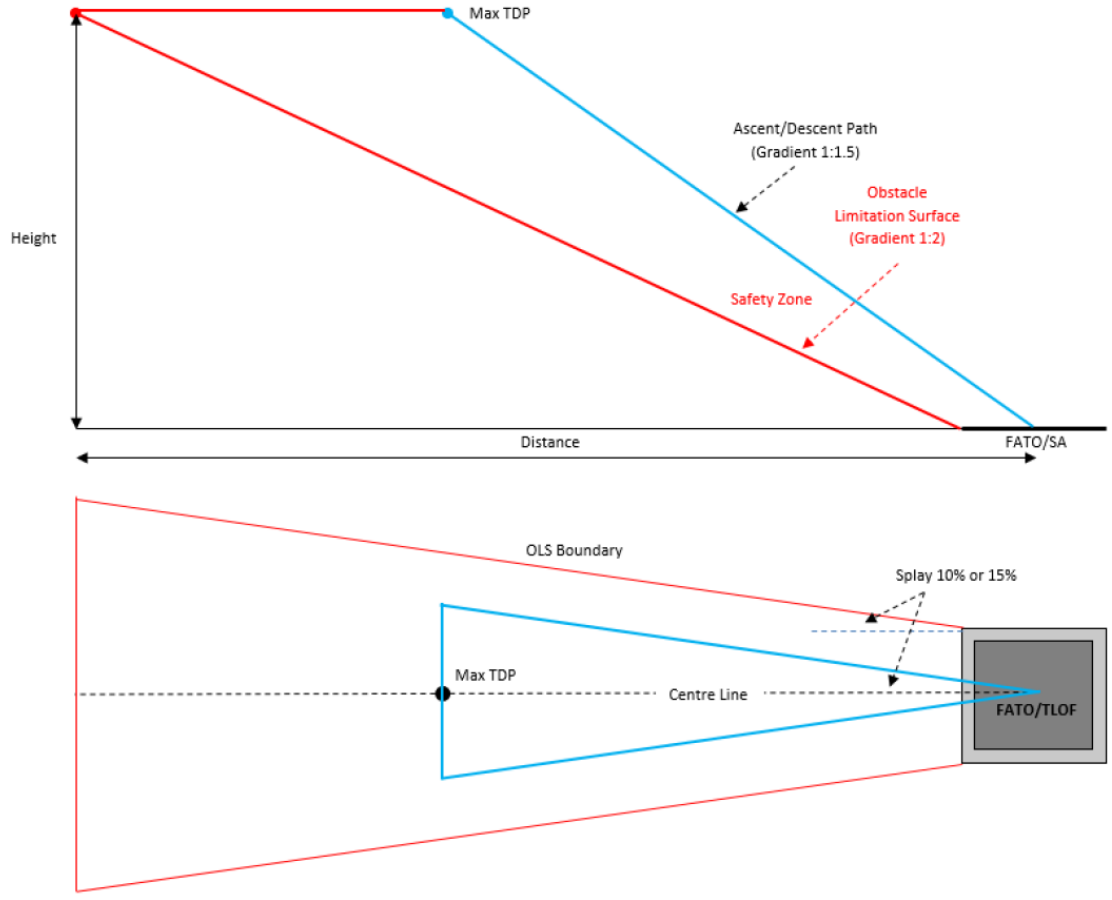

Figure 9: Category A Backup Procedure Surfaces

3.17. Obstructions on or in the Vicinity of the HLS

The adverse effect of an object presumed or determined to be a hazard to air navigation may be mitigated by:

- Removing the object.
- Altering the object, e.g. reducing its height.
- Marking and/or lighting the object, provided that the object would not be a hazard to air navigation if it were marked and lit.

An example of an obstruction light required close to the HLS would be that required to be positioned on the top of the windsock. Other obstacles in close proximity to the HLS deck may include radio aerials or exhaust stacks etc. attached to the main building, other buildings in the vicinity such as a lift lobby, or stand alone. All such obstacles are required to have red obstacle lights fitted.

3.18. Obstructions in close Proximity but Outside/Below the Approach/Departure Surface

Unmarked wires, antennas, poles, mobile phone towers, and similar objects are often difficult to see even in the best daylight weather, and in time for a pilot to successfully take evasive action. While pilots can avoid such objects during enroute operations by flying well above them, approaches and departures require operations near the ground where obstacles may be in close proximity. Where possible obstructions are to be moved, however if this is impractical, markings and/or obstruction lighting is to be placed upon them.

4. SPECIFIC PROPOSED DEVELOPMENT CONSIDERATIONS

4.1. The Proposed Development Location

The location of the lot of the proposed development footprint is shown in Figures 10 and 11 below. It is approximately 13km from Sydney (Kingsford-Smith) Aerodrome and 430m from the Royal North Shore Hospital (RNSH) Helicopter landing Sites (HLS).

Figure 10: Location of the Proposed Development (1)

Figure 11: Location of the Proposed Development (2)

4.2. The Proposed Development Elevation

The ground level in the vicinity of the proposed development is around 92m AHD. The proposed building envelope is up to RL 230.2 (see Figure 12 below) which is approximately 138m above ground level. Airspace assessment will need to be undertaken up to RL 230.2 or approximately 138m above ground level.

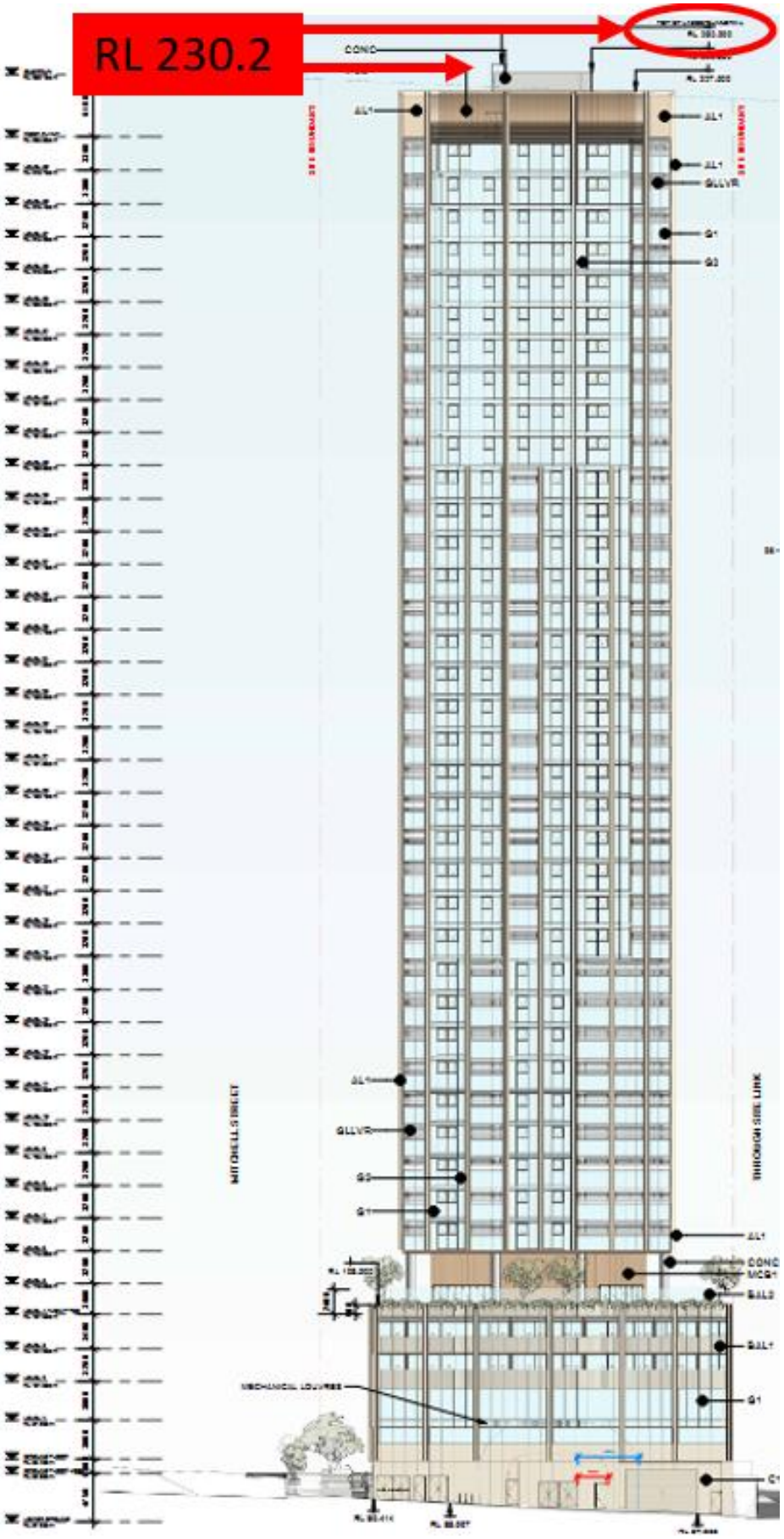

Figure 12: Elevation of the Proposed Development

4.3. General Airspace Overhead the Proposed Development Site

The proposed development sits underneath the 500 ft lower-level step of Sydney (Kingsford-Smith) Aerodrome's Control Zone (CTR). See Figure 13 below. Media, emergency services and aeromedical helicopters frequently operate in this general area.

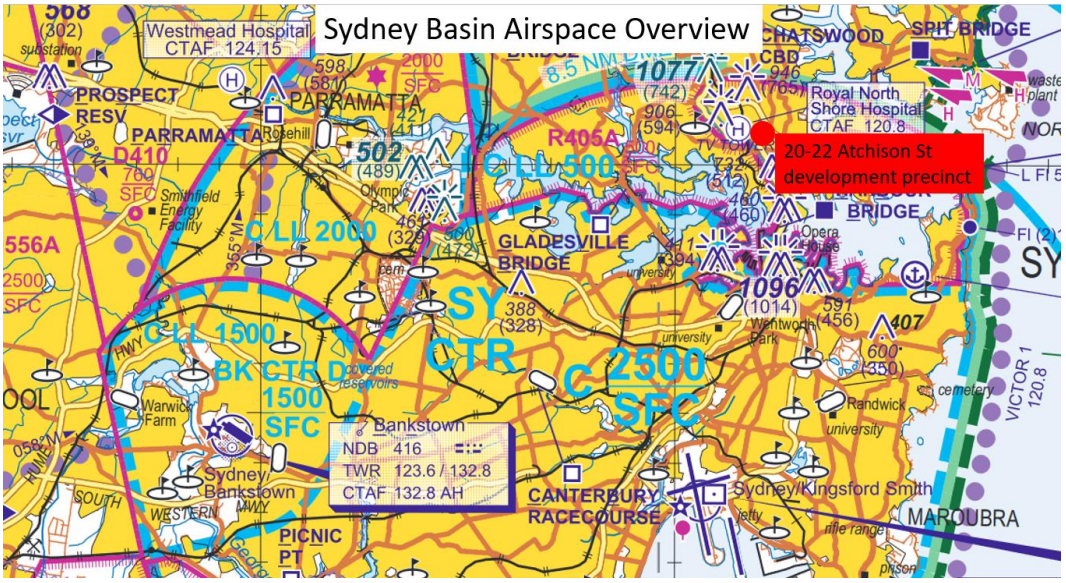

Figure 13: Sydney (Kingsford-Smith) Aerodrome General Airspace

4.4. North Sydney Local Environment Plan (LEP) 2013

Clause 6.15 of the North Sydney Local Environment Plan 2013 states that one of the objectives of this clause is to "to provide for the effective and ongoing operation of the Sydney (Kingsford Smith) Airport by ensuring that such operation is not compromised by proposed development that penetrates the Limitation or Operations Surface for that airport".

Clause 6.15 states: "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." The relevant Commonwealth bodies are Airservices Australia, CASA and the Commonwealth Department of infrastructure, Transport, Regional Development, Communication and The Arts.

Clause 6.15 further states: "The consent authority may grant development consent for the development if the relevant Commonwealth body advises that - the development will penetrate the Limitation or Operations Surface but it has no objection to its construction, or the development will not penetrate the Limitation or Operations Surface."

Additionally, Clause 6.15 states: "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."

The process for consultation and obtaining agreement to proceed is explained in more detail in Part 5 of this report. No impediments are anticipated.

4.5. The Sydney (Kingsford-Smith) Aerodrome OLS Overlay

The Sydney (Kingsford-Smith) Aerodrome OLS is depicted in Figure 14 below. The approximate location of the RNSH HLS is also indicated. Above the proposed development, the Sydney (Kingsford-Smith) Aerodrome OLS lower limit is 156m above mean sea level (RL156 or 156m AHD).

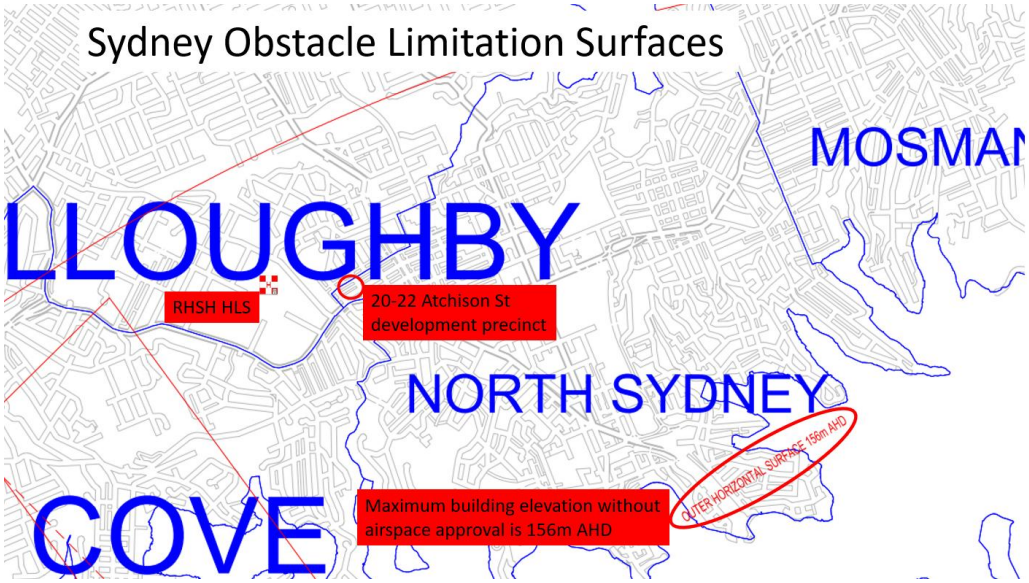

Figure 14: Sydney (Kingsford-Smith) Aerodrome Obstacle Limitation Surfaces

4.6. Proposed Building within the Sydney (Kingsford-Smith) Aerodrome OLS

The proposed building will be within the Sydney (Kingsford-Smith) Aerodrome OLS.

4.7. The Sydney (Kingsford-Smith) Aerodrome PANS-OPS Overlay

The Sydney (Kingsford-Smith) Aerodrome PANS-OPS is depicted in Figure 15 below. The approximate location of the proposed development is also indicated.

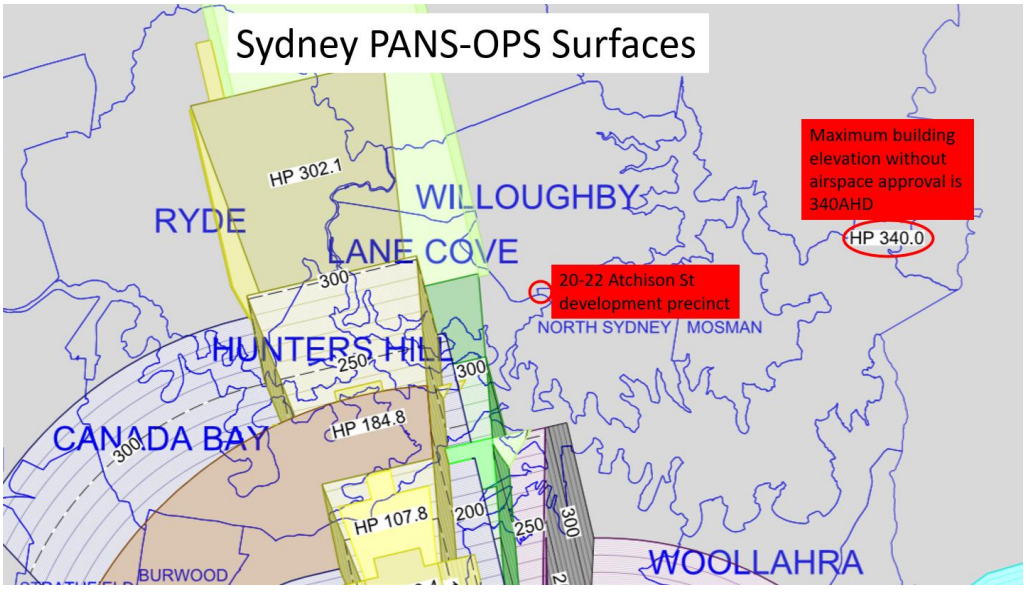

Figure 15: Sydney (Kingsford-Smith) Aerodrome PANS-OPS Surfaces

4.8. Proposed Building within the Sydney (Kingsford-Smith) Aerodrome PANS-OPS Surfaces

Above the proposed development, the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surface lower limit is 340m above mean sea level (RL340 or 340m AHD). The proposed development (including future construction cranes) will be well below the PANS-OPS surface lower limit.

4.9. The Sydney Aerodrome Radar Terrain Clearance Chart (RTCC) Overlay

The Sydney Aerodrome RTCC overlay is depicted in Figure 16 below. The approximate location of the proposed development is also indicated.

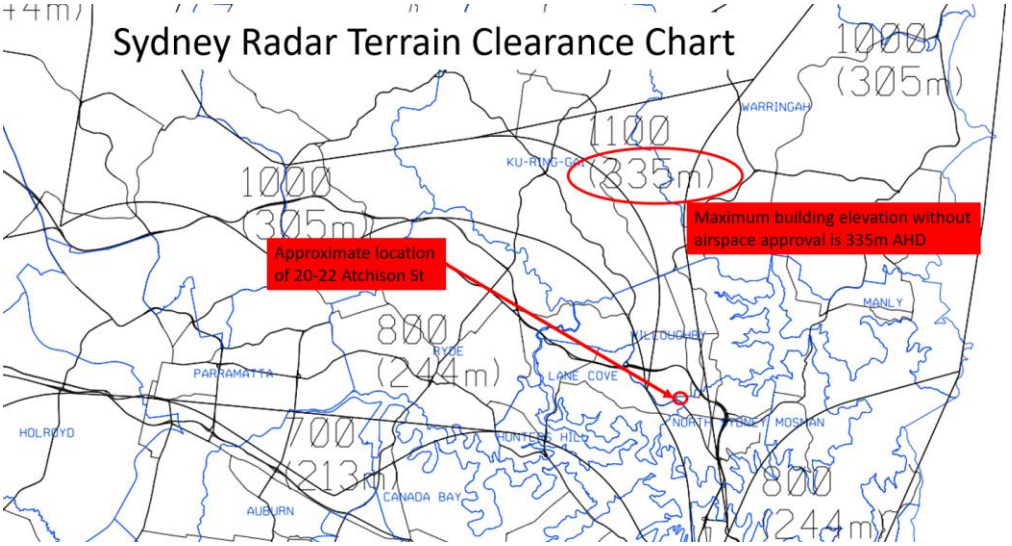

Figure 16: The Proposed Building within the Sydney RTCC

4.10. Proposed Building within the Sydney Aerodrome RTCC

Above the proposed development, the Sydney (Kingsford-Smith) Aerodrome RTCC lower limit is 355m above mean sea level (RL355 or 355m AHD). At its current proposed maximum elevation plus allowance for rooftop protrusions, the development (including construction cranes) will be well below the RTCC lower level of 355m AHD.

4.11. Proposed Building Impacts on Sydney (Kingsford-Smith) Aerodrome OLS, PANS-OPS and RTCC

The proposed development (and any associated, future construction cranes), will not intrude into the relevant OLS, PANS-OPS or RTCC surfaces.

4.12. Location of the Proposed Building in Relation to the RNSH HLSs

The location of the proposed development in relation to the RNSH HLS is shown in Figure 11 above.

4.13. Elevation of the RNSH HLS

The elevation of the RNSH HLS is listed in the Ozrunways HLS database at an elevation of 422 ft above mean sea level - estimated at 129m AHD and will therefore be approximately 100m below the maximum elevation of the proposed building's rooftop.

4.14. RNSH HLS Approach and Departure Paths

There are no surveyed or defined approach and departure paths for the RNSH HLS, however Figure 17 below shows the most used directions.

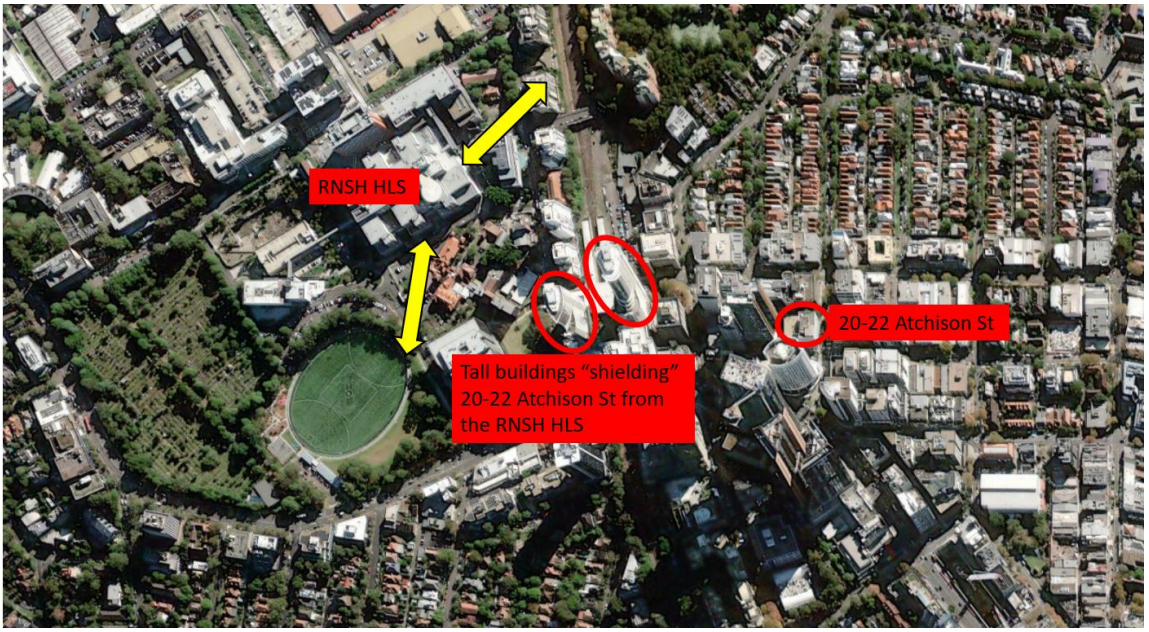

Figure 17: RNSH HLS Approach and Departure Paths

There are tall buildings directly between the RNSH HLS and the proposed development site which necessitate helicopters avoiding an approach or departure direction from or toward it. See Figure 18 below.

Figure 18: RNSH HLS Looking Towards the Proposed Development Site

4.15. Impact of the Proposed Building on the RNSH HLS Approach and Departure Paths

The possible approach and departure paths for the RNSH HLS will not be impacted by the position of the proposed development. The proposed development will comfortably accommodate any type of construction crane without significantly impacting the RNSH HLS.

4.16. 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 at approximately 137m above ground level, will therefore need to be notified to Airservices Australia as a tall structure. This will happen automatically as part of the airspace assessment process.

4.17. Construction Crane Considerations

The illumination requirements for cranes in the vicinity of a Hospital HLS are detailed below. It should be noted that there are no specified lighting requirements for mobile cranes however a similar level of safety should be applied for these as would be applied for tower cranes.

<u>As a minimum for all tower [hammerhead] cranes:</u>

- top of crane A frame or cabin: medium intensity red obstruction light.
- both ends of Jib: medium intensity red obstruction light
- along Jib: line of white LED fluoro on a PE cell along the full length of the jib, and
- tower section: stairway lights or spot lights attached to the top of the tower pointing down and onto the tower (not up into pilot eyes).

<u>As a minimum for all luffing cranes:</u>

- top of crane A-frame or cabin: medium intensity red obstruction light
- end of Jib: medium intensity red obstruction light
- along Jib: line of white LED fluoro on a PE cell along the full length of the jib
- tower section: stairway lights or spot lights attached to the top of the tower pointing down and onto the tower (not up into pilot eyes)

The LED jib fluoro lights are to be LED weather proof emergency fluoros controlled via a PE cell with a minimum 90 minute battery back-up.

4.18. Deductions: Airspace, Cranes, Obstructions and HLSs

The following key deductions can be made:

- The proposed development will intrude into the Sydney (Kingsford-Smith) Aerodrome OLS, and will require permission to do so.
- The proposed development will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The proposed development will not protrude into the Sydney RTCC.
- The proposed development will not impact the approach and departure paths of the RNSH HLS.
- The proposed development's construction crane(s) will intrude into the Sydney (Kingsford-Smith) Aerodrome OLS, and will require permission to do so.
- The proposed development's future construction crane(s) will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces provided they remain below RL340.
- The proposed development's future construction crane(s) will not intrude into the Sydney RTCC provided they remain below RL335.
- The proposed development's future construction crane(s) will not intrude into the approach and departure paths of the RNSH HLS.
- The proposed development's future construction crane(s) will require HLS-specific aviation obstacle lighting.

4.19. Cumulative Impacts

Consent authorities are increasingly cognisant of the cumulative impacts of developments. From an airspace perspective, if a development poses no hazard to aviation operations e.g. to a hospital helicopter landing site, it is preferable that they are concentrated into smaller areas rather than being spread out. This is often the opposite of what is good from a terrestrial perspective, e.g. with respect to not overburdening local streets with excess traffic or obstructions to traffic flow. The proposed development is in an area of ongoing residential development which helps concentrate cranes which in turn improves their overall visibility. There will be no cumulative aviation impacts from the proposed development.

4.20. Mitigations

Aviation-standard obstacle lighting for the completed building(s) and construction crane(s) are routine issues that are considered on all projects in the vicinity of aerodromes, helicopter landing sites or helicopter routes. CASA will also recommend crane lighting. See Table 2 below. Once a crane strategy (quantity, type, locations, elevations, coverage) is finalised, this area may be reviewed.

Project Stage	Mitigation Measures	Relevant Section
C	Crane lighting to NSW MoH standards.	4.17-4.18

Table 2: Mitigation Measures

4.21. Conclusion

The proposed building envelope, and any future construction cranes on the site, will marginally impact aviation safety in relation to Sydney (Kingsford-Smith) Aerodrome. This will require approval from aviation safety and airspace protection authorities/agencies, but will not be contentious.

The proposed development, including any future construction cranes, will not impact adversely on the RNSH HLS. Appropriate HLS-specific aviation obstacle lighting as required by the NSW Ministry of Health Guidelines for Hospital Helicopter Landing Sites will be necessary on a construction crane if it is going to be operated at night or in very low visibility weather.

4.22. Recommendations

Ensure that the proposed development construction tower crane(s) is/are fitted with HLS-specific aviation obstacle lighting. If operating at night or in low visibility, ensure that the proposed development construction mobile crane(s) is/are fitted with HLS-specific aviation obstacle lighting.

5. SUPPORTING INFORMATION

5.1. Process to Follow in Order to Obtain Relevant Approvals

Once precise crane details are known, the approval process can begin. Sydney Airport Corporation Limited (SACL) is the organisation that acts as the agent for all prescribed airspace applications associated with Sydney Aerodrome and its airspace. Links to relevant forms are below. On receipt of the Application Forms SACL seeks comment and assessment from:

- Sydney Aerodrome based airlines
- Air Services Australia
- Civil Aviation Safety Authority

Once stakeholders have reviewed the impact of the requested penetration of the prescribed airspace, the responses are submitted to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts by SACL's airspace protection team (point of contact details are below).

5.2. Links to Relevant Forms

Application for Development Approval (link)
https://assets.ctfassets.net/v228i5y5k0x4/5ANcgf7qFiakke6SUYASSU/a5d8915cfbdb8f18e95eedde9a8d685f/Airspace_Protection_Form.pdf

Application for Approval of Crane Operation (link)
https://assets.ctfassets.net/v228i5y5k0x4/2ID4yo6olW4Y8oUiQ4eIu8/80cabbc2d221eda3a35723c4385f1e14/Crane_Enquiry_Form.pdf

Once completed, the forms can be submitted online. Ensure all attachments are sent through to the SACL point of contact.

5.3. SACL Point of Contact

The SACL Point of contact is detailed below. It is well worth a call prior to submission of the application to ensure the correct information is provided.

Airfield Design Manager
Sydney Airport
Tel: +61 2 9667 9246

Email: airspaceprotection@syd.com.au

Regular follow-up is advised. SACL receives hundreds of applications every year and difficult cases can often be held up.

5.4. Supporting Information for Penetration of Prescribed Airspace

Supporting details will be required to remove ambiguity and delays in the assessment of the submission. It is recommended drawings showing the following are created:

- Building information:
  - Site coordinates (MGA94)
  - Date the building will progress into prescribed airspace (if applicable)
  - Building coordinates (the corners of the 'as built' building in prescribed airspace)
  - Elevations of the buildings
  - Drawing of the building with the above information is recommended
- Crane information:
  - Centre of the base coordinates (MGA 94)
  - Date the crane/s will progress into prescribed airspace (if applicable)
  - Crane types (tower/luffing)
  - Crane elevations
  - Ensure the stages into prescribed airspace are drawn with accompanying dates
- Mobile crane information:
  - Dates (timings essential for notification of airspace users)
  - Location
  - Height of lift

5.5. Decisions on Temporary Intrusions into Protected Airspace

Approvals for temporary penetration of the PANS-OPS surface (less than three months) and long-term penetrations of the OLS (over three months) can only be given by the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts. They act under the Airports Act 1996 and the Airports (Protection of Airspace) Regulations 1996 and will take into account advice from CASA, Airservices Australia and SACL.

There is significant lag in gaining approvals for cranes planned to penetrate PANS-OPS surfaces for up to three months and for OLS penetrations of more than three months. To minimise the time taken for a decision, it is important that the exact type, location, heights and jib lengths of cranes intended to be used in the development are determined very early in the planning process; as well as the period during which they will intrude into the relevant airspace.

5.6. Principle of Shielding not Applicable for Temporary Structures

"Shielding" is a principle whereby one tall structure acts as a barrier for another tall structure such that the level of hazard or risk to aviation safety is not actually increased. It is used in some cases by the relevant Regulators and Delegates involved in granting approvals for OLS and PANS-OPS penetrations, however, the CASR Part 139 (Aerodromes) Manual of Standards 2019 (MOS 139) states in a note to Chapter 7, Division 4 Part 7.25 General that: "A new obstacle, located in the vicinity of an existing obstacle, and assessed as not being a hazard to aircraft, would be considered to be shielded. Only existing permanent obstacles may be considered in assessing the applicability of shielding of new obstacles."