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ROYAL PRINCE ALFRED HOSPITAL AVIATION REPORT FOR STATE SIGNIFICANT DEVELOPMENT (SSD)

27 Oct 2022	**HELICOPTER LANDING SITES**
Prepared for	Health Infrastructure

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		Name	J.W. Stark	S.J Graham	S.J Graham
		Signature			

This Report is prepared for Health Infrastructure, as instructed by TSA Management in relation to a new permanent, rooftop Helicopter Landing Site (HLS) and a temporary HLS (for use during construction) at Royal Prince Alfred Hospital by Resolution Response Pty. Ltd. ABN: 94 154 052 883, trading as ‘AviPro’.

The Report relates to the aviation aspects associated with the establishment and site design of the proposed permanent and temporary HLSs to inform consideration of a State Significant Development Application.

Contents

1. DESCRIPTION OF THE PROPOSAL

1.1. Site Description

The Royal Prince Alfred (RPA) Hospital campus is located in Sydney's inner west suburb of Camperdown, within the City of Sydney Local Government Area. The campus is situated between the University of Sydney to the east and the residential area of Camperdown to the west. A north-south arterial road (Missenden Road) divides the campus into two distinct portions, known as the East and West Campuses. The northern boundary of the campus is defined by the Queen Elizabeth II Rehabilitation Centre and the southern extent of the campus is defined by Carillon Avenue.

The works are proposed to both the East and West Campuses, as well as some off-site works occurring within the University of Sydney.

The site comprises the following land titles (see Image 1 below):

- East campus:
    - Lot 1000 DP 1159799 (12 Missenden Road, Camperdown, 2050).
- West campus:
    - Lot 11 DP 809663 (114 Church Street, Camperdown, 2050);
    - Lot 4 DP 880430 (23-33 Carillon Avenue, Camperdown, 2050).

Off-site works are proposed on University of Sydney land, known as Lot 1 DP 1171804 (3 Parramatta Road, Camperdown, 2050) and Lot 1001 DP 1159799 (12A Missenden Road, Camperdown, 2050).

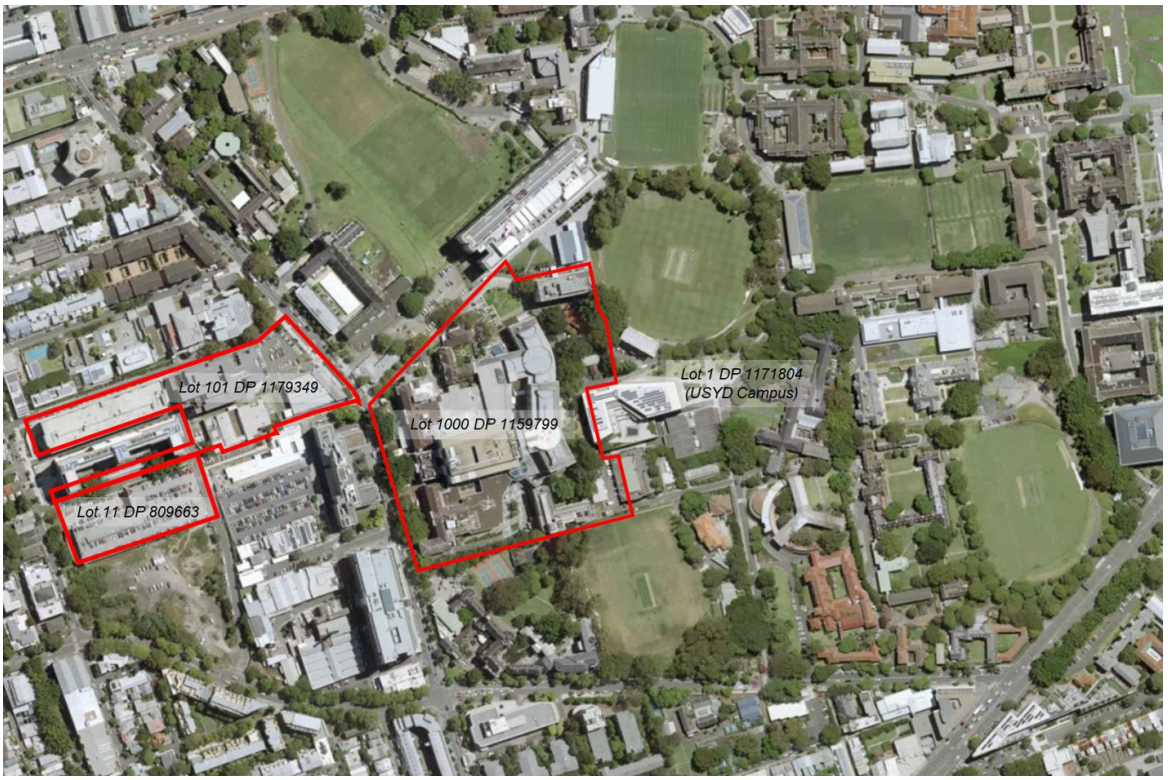

Image 1: The Site

1.2. Project Background

In March 2019, the NSW Government announced a significant $750 million investment for the redevelopment and refurbishment of the RPA Hospital campus. The Project will include the development of clinical and non-clinical services infrastructure to expand, integrate, transform and optimise current capacity within the hospital to provide contemporary patient centred care, including expanded and enhanced facilities.

The last major redevelopment of RPA Hospital was undertaken from 1998 to 2004 projected to 2006 service needs. Since then, significant growth has been experienced in the volume and complexity of patients, requiring significant investment to address projected shortfalls in capacity and to update existing services to align with leading models of care.

The redevelopment of RPA Hospital has been the top priority for the Sydney Local Health District since 2017 through the Asset Strategic Planning process, to achieve NSW Health strategic direction to develop a future focused, adaptive, resilient and sustainable health system.

1.3. Description of Development

Alterations and additions to the RPA Hospital East Campus, comprising:

- Eastern wing: A new fifteen (15) storey building with clinical space for Inpatient Units (IPU's), Medical Imaging, Delivery, Neonatal and Women's Health Services connecting to the existing hospital building, and a rooftop Helicopter Landing Site (HLS);

- Eastern extension: A three (3) storey extension to the east the existing clinical services building to accommodate new operating theatres and associated plant areas;

- Northern expansion: A two (2) storey vertical expansion over RPA Building 89 accommodating a new Intensive Care Unit and connected with the eastern wing;

- Internal refurbishment: Major internal refurbishment to existing services including Emergency Department and Imaging, circulation and support spaces;

- Enhanced Northern Entry/ Arrival including improved pedestrian access and public amenity;

- Demolition of affected buildings, structures and trees;

- Changes to internal road alignments and paving treatments; and

- Landscaping works including tree removal, tree pruning, and compensatory compensatory tree planting including off-site to University of Sydney land.

Ancillary works to the RPA Hospital West Campus, comprising:

- Temporary helicopter landing site above existing multi storey carpark;

- Re-routing of existing services, and

- Associated tree removal along Grose Street.

1.4. HLS Locations

The locations of the existing, proposed temporary, and proposed new permanent HLSs are show in Figure 1 below:

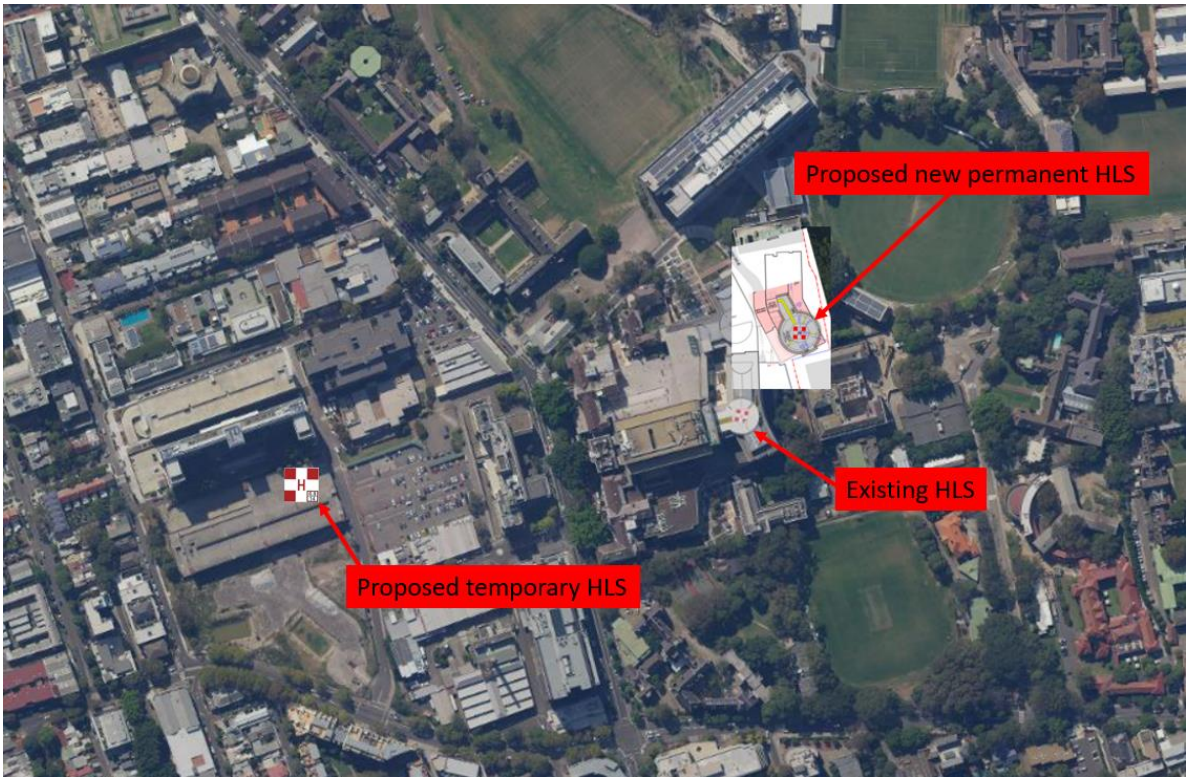

Figure 1: Existing and Proposed HLS Locations

1.5. Anticipated HLS Activity Timeline

It is necessary to ensure that one HLS always remains operational during the RPAH Redevelopment. To that end, Table 1 below shoes anticipated dates where various milestones occur in relation to HLS activity.

Item	HLS	Activity	Date(s)	Remarks
1.	Temp	Closed to parking	May 2023	Prepare for temp HLS development.
2.	Temp	Construction	May-November 2023	Includes commissioning and trial flights.
3.	Temp	Go live	December 2023	Requires procedures and staff training.
4.	Existing	Close	December 2023	Operations move to temp HLS.
5.	New	Construction	December 2023–September 2026	Includes commissioning and trial flights.
6.	Existing	Reopen	September 2026	If considered safe and viable.
7.	New	Go live	September 2026	Requires procedures and staff training.
8.	Temp	Close	September 2026	Once either existing or new HLS in use.
9.	Existing	Assess viability	September 2026	May either close permanently or become a secondary/alternate HLS.

Table 1: Anticipated HLS activity timeline

1.6. SEARs Reporting

In preparing this report, the following SEARs General Requirements and Key Issues have been addressed. Table 2 below sets out the reference or location of these matters within this report.

Item	SEARS Requirement	Relevant Section of Report
24.1	If the development proposes a helicopter landing site (HLS), assess its potential impacts on the flight paths of any nearby airport, airfield or HLS.	*See Section 4.3*
24.2	If the site contains or is adjacent to an HLS, assess the impacts of the development on that HLS.	*See Section 5.1*

Table 2: Secretary's Environmental Assessment Requirements – Aviation

2. TERMS AND ABBREVIATIONS

2.1. 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 2.6^0/4.5%/ 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 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 2.6^0/4.5%/ 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 expands uniformly, laterally at an angle of 8.7^0/15%/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^o (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 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) HLS. An HLS for the exclusive use of the owner and persons authorised 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 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, paved area, normally located on the centreline and at the edge of the TLOF, from which the helicopter departs. Typically, there are two such positions at the edge of the TLOF, one for each of two departure 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.

2.2. Applicable Abbreviations

Acronym	Meaning
AC	Advisory Circular (US FAA)
ACC	Aeromedical Control Centre (HQ Eveleigh). Responsible for control and tasking of HEMS
ACMA	Australian Communication and Media Authority
ADS-B	Automated Dependent Surveillance - Broadcast
AsA	Airservices Australia
ASB	Acute Services Building
A-SMGCS	Advanced Surface Movement Guidance & Control System
ATC	Air Traffic Control
CAAP	Civil Aviation Advisory Publication (Australia)
CASA	Civil Aviation Safety Authority (Australia)
CAOs	Civil Aviation Orders (Australia)
CARs	Civil Aviation Regulations (1988) Australia
CASRs	Civil Aviation Safety Regulations (1998) Australia
CTAF	Common Traffic Advisory Frequency
D	Helicopter D value - (also referred to as Overall Length) - the total distance between the main rotor and tail rotor tip path planes when rotating
DA	Development Application
DDO	Design and Development Overlay
DIFFS	Deck Integrated Fire Fighting System
DPIE	Department of Planning, Industry and Environment (NSW)
FAA	Federal Aviation Administration, USA
FATO	Final Approach and Take-Off Area (1.5 x helicopter length)
FARA	Final Approach Reference Area
FMS	Fixed Monitor System (foam fire-fighting system)
GPS	Global Positioning System
HEMS	Helicopter Emergency Medical Service
HF	High Frequency
HI	Health Infrastructure
HLS	Helicopter Landing Site
HLSRO	HLS Reporting Officer (Airservices Australia requirement)
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions – requiring IFR flight
L	Helicopter fuselage length
LDP	Landing Decision Point (Category A/Performance Class 1 operations)
LGA	Local Government Area
LHD	Local Health District

Acronym	Meaning
LLA	Landing and Lift Off Area. Solid surface meeting dynamic loading requirements, with undercarriage contact points + I metre in all directions
MoH	Ministry of Health NSW
MOS	Manual of Standards (CASA)
MRI	Magnetic Resonance Imagers
MTOM	Maximum Take Off Mass
MTOW	Maximum Take Off Weight
NOTAM	Notice to Airmen. Issued by Airservices Australia 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
PC2WE	Performance Class 2 With Exposure
PC3	Performance Class 3
PRM	Precision Runway Monitoring
RD	Main Rotor Diameter
RPA(H)	Royal Prince Alfred (Hospital)
RTCC	Radar Terrain Clearance Chart
SARPS	Standards and Recommended Practices developed by ICAO and promulgated in the Annexes to the Convention of International Civil Aviation
SEARs	Secretary's Environmental Assessment Requirements
SLHD	Sydney Local Health District
SSD	State Significant Development
SSDA	State Significant Development Application
TDP	Takeoff Decision Point (Category A/Performance Class 1 operations)
TLOF	Touch Down and Lift Off Area. Load bearing min. 1 x main rotor diameter.
UHF	Ultra High Frequency
VFR	Visual Flight Rules
VHF	Very High Frequency radio
VMC	Visual Meteorological Conditions - allowing flight under VFR
V_{TOSS}	Take off Safety Speed
WAM	Wide Area Multilateration

3. SSD GENERAL REQUIREMENTS – AVIATION REGULATION

3.1. Regulatory Review

Clause 7.16 of the Sydney Local Environment Plan 2012 states that one objective of the Clause is “to provide for the effective and on-going 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.”

In this case, the term “Limitation or Operations Surface” means “the Obstacle Limitation Surface [OLS] or the Procedures for Air Navigation Services Operations Surface as shown on the Obstacle Limitation Surface Map or the Procedures for Air Navigation Services Operations Surface Map for the Sydney (Kingsford-Smith) Airport.”

Further, Clause 7.16. states that “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.”

Engagement with the “relevant Commonwealth body” is initiated through Sydney Airport Corporation Limited (SACL). The “relevant Commonwealth body” is the Commonwealth Department of Infrastructure, Transport, Regional Development, Communication and the Arts.

3.2. Civil Aviation Safety Authority (CASA)

CASA will be engaged by the SACL as part of the assessment process. In the event that buildings or cranes are likely to penetrate “prescribed airspace”, CASA will advise on relevant safety enhancements required to minimise risk e.g., obstacle lighting requirements.

3.3. AirServices Australia (AsA)

AsA will be engaged by the SACL as part of the assessment process to review:

- the effect on any civil sector or circling altitude, any civil instrument approach or any civil departure procedure at Sydney (Kingsford-Smith) Airport;
- the effect on any civil Radar Terrain Clearance Chart (RTCC); and
- the impact on the performance of any Precision/Non-Precision Navigation Aids, Anemometers, HF/VHF/UHF Communications, Advanced Surface Movement Guidance & Control System (A-SMGCS), Radar, Precision Runway Monitoring (PRM), Automated Dependent Surveillance - Broadcast (ADS-B), Wide Area Multilateration (WAM) systems or Satellite/Links.

A set of reliable drawings outlining the building envelope are required before engagement with SACL, AsA and CASA can be initiated.

4. SSD SPECIFIC REQUIREMENTS – NEW PERMANENT HLS

4.1. HLS Approach and Departure Path Considerations

Primary considerations in selection of HLS approach and departure paths include:

- Avoidance of airspace restrictions and limitations,
- Avoidance of high terrain;
- Avoidance of vertical structures and obstacles/hazards (including the building lift core/overrun),
- Alignment with direction of prevailing winds,
- Availability of emergency landing areas,
- Avoidance of flying animal/bird camps/colonies,
- Avoidance of areas sensitive to noise and vibration,
- Avoidance of culturally sensitive areas, and
- Avoidance of ecologically and environmentally sensitive areas.

Important criteria for approach/departure paths is that there be a minimum of two that are at least 135° apart.

4.2. Wind

The Bureau of Meteorology has a weather office and station at Sydney (Kingsford-Smith) Aerodrome, approximately 5km from the RPAH campus. The RPAH would be subject to very similar wind exposure as Sydney (Kingsford-Smith) Aerodrome.

The wind roses for this location show data based on annual, average wind readings at 0900 and 1500. The wind data points towards preferred approach and departure paths to/from the north-east, the east and the south or south-west. Refer to Figure 2 below. This information is relevant during planning to account for any obstructions along the paths.

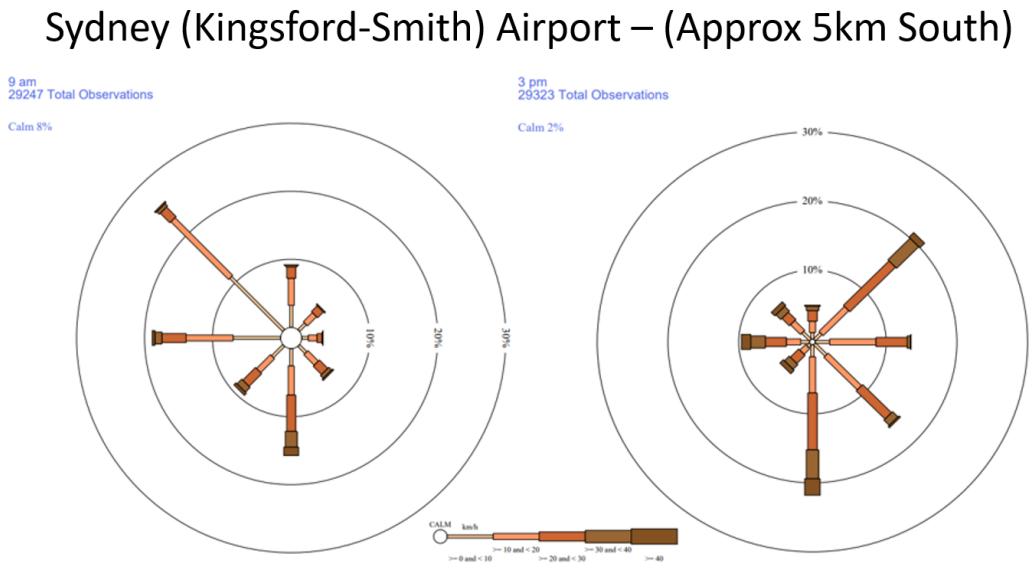

Figure 2: Sydney Airport Wind Roses – Annual Averages

4.3. Airspace

As the RPA Redevelopment is located within controlled airspace and there is “prescribed airspace” as defined in the Airports (Protection of Airspace) Regulations 1996 above the site, approvals will be required from relevant Commonwealth aviation/airspace authorities. The RPA Redevelopment, its HLS, and the cranes used to construct it will enter “prescribed airspace”, namely the OLS. Approvals need to be made through Sydney Airport Corporation Limited (SACL). This will be initiated as soon as suitable drawings containing a “frozen” building envelope can be provided. Early discussions with SACL reveal no noteworthy issues.

The general airspace arrangement over the RPAH campus is depicted in Figure 3 below. The RPAH is on the extended centreline of the two parallel runways at Sydney (Kingsford-Smith) Aerodrome. To this end, Sydney ATC is required to deconflict air traffic end ensure aviation safety. This happens with the existing HLS and there will be no change for the potential new rooftop HLS.

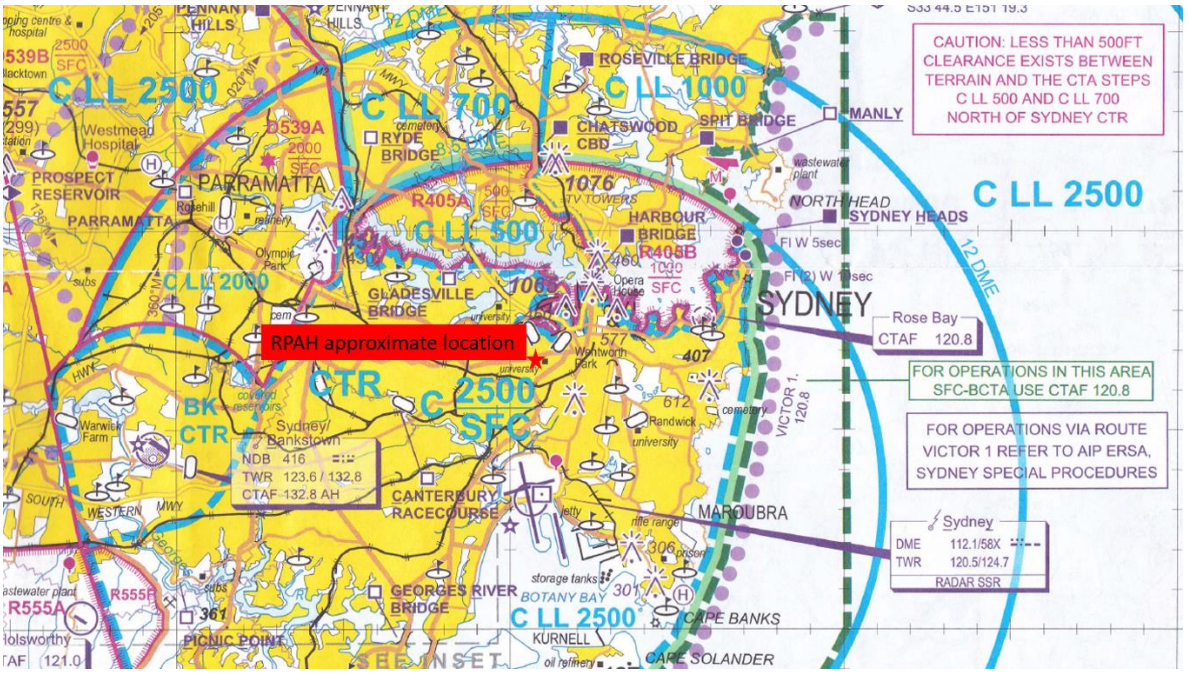

Figure 3: Airspace layout for as Sydney (Kingsford-Smith) Aerodrome

As can be seen in Figure 4, the Sydney OLS Conical Surface varies from approximately 70m to 95m AHD across the RPAH campus but is approximately 80m AHD overhead the RPA redevelopment site. A development in the vicinity of RPAH could be built to a maximum height of approximately RL80 before it enters the Sydney Aerodrome OLS. The evolving design exceeds this elevation, therefore approval for airspace intrusion will be required. Preparation for the airspace application activity is in place. It must be noted that airspace-related agencies are reluctant to embark on detailed discussions on airspace issues until a firm, frozen building envelope (footprint coordinates and elevations) can be provided.

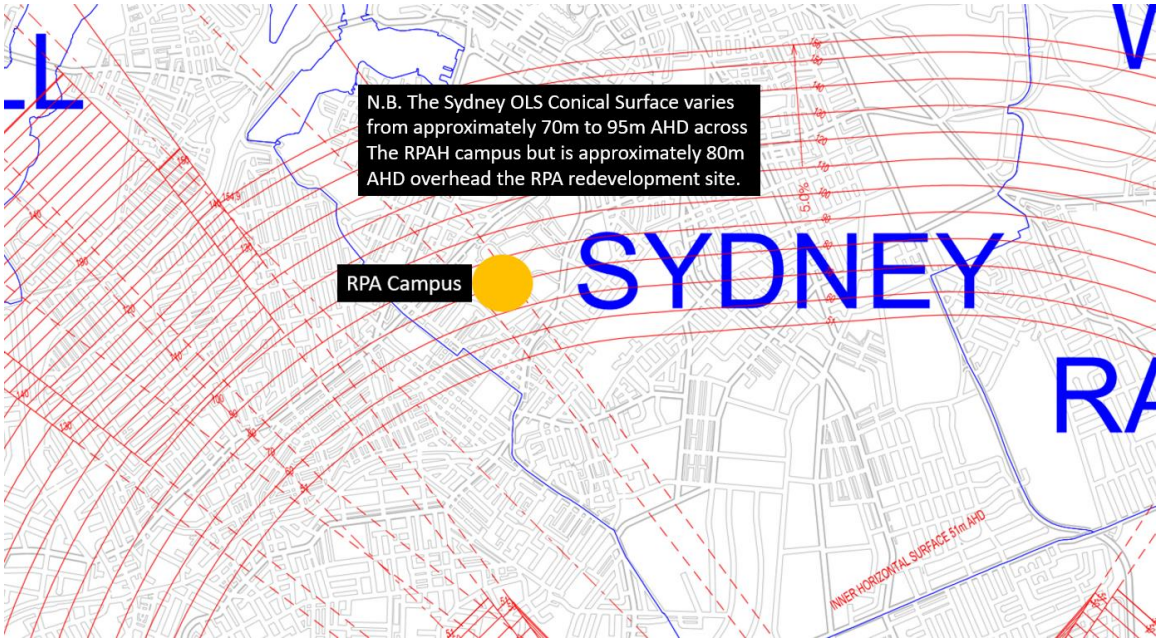

Figure 4: The RPAH Campus within the Sydney OLS

As can be seen in Figure 5 below, the Sydney PANS-OPS surfaces vary from approximately 135m to 150m AHD across The RPAH campus but is approximately 140m AHD overhead the RPA redevelopment site. A development in the vicinity of RPAH could be built to a maximum height of approximately RL140 before it enters the Sydney Aerodrome Procedures for Air Navigation – Aircraft Operations (PANS-OPS) surface lower limit. Approval for (temporary) airspace intrusion would be required above this elevation.

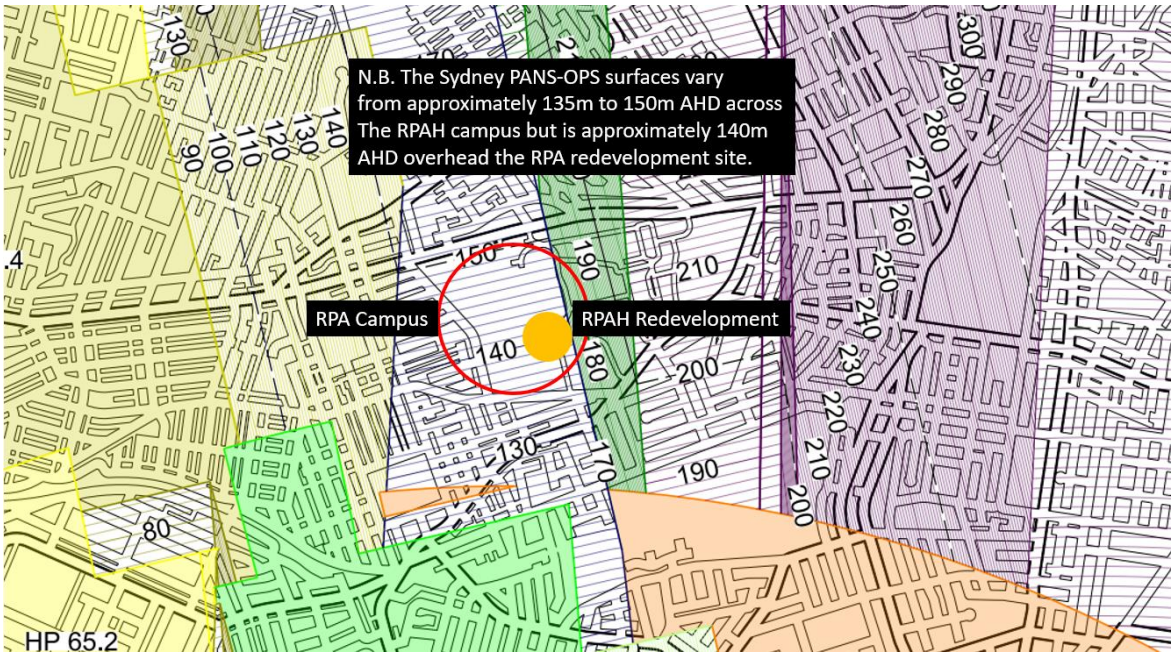

Figure 5: The RPAH Campus within the Sydney PANS-OPS Surfaces

The Sydney Aerodrome RTCC overlay is depicted in Figure 6 below. The approximate location of the RPAH campus is also indicated. A development in the vicinity of RPAH could be built to a maximum height of RL152 before it enters the Sydney Aerodrome RTCC.

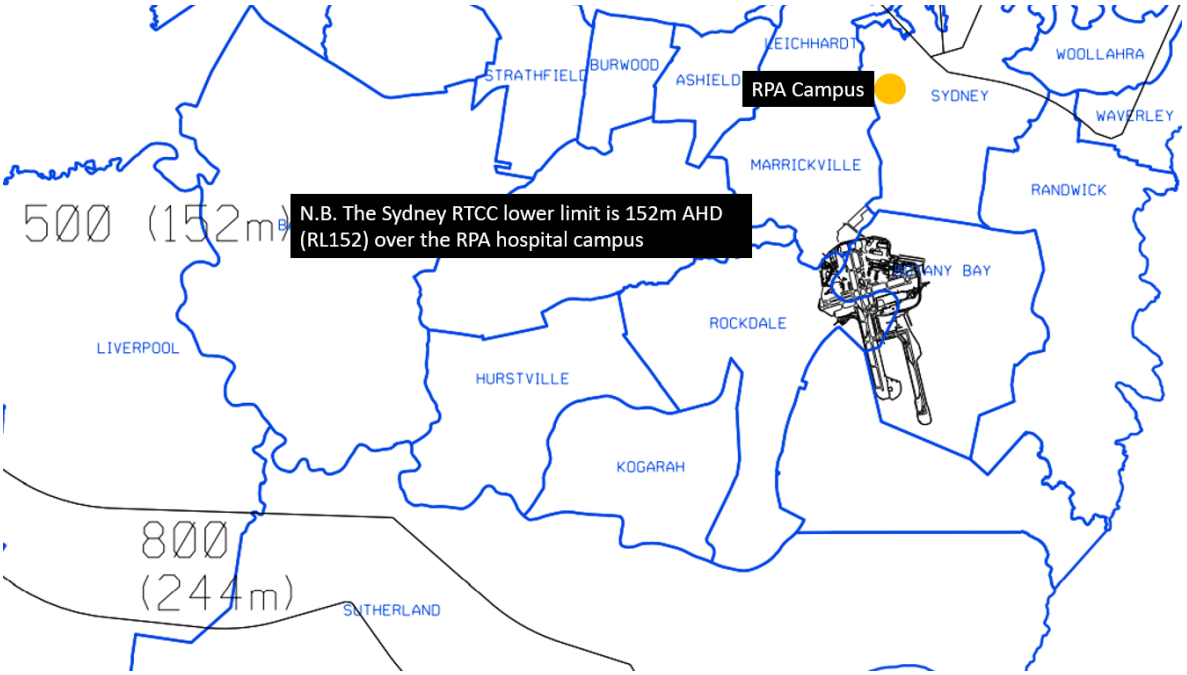

Figure 6: The RPAH Campus within the Sydney RTCC

4.4. Impacts on Sensitive Receivers

There are no known areas of sensitive environmental or ecological concern in the preferred approach and departure zones. The impacts will be very similar to those for the existing HLS. Consideration was given to avoiding extended overflight of buildings and of the campus generally. As the potential new rooftop HLS is higher than the existing HLS, impacts on surrounding residential areas will be reduced.

4.5. HLS Air Traffic Management

Aircraft arriving and departing from the RPA HLS require an ATC clearance. There will be regular occurrences where Sydney air traffic management interferes with efficient helicopter operations. This occurs now with the existing HLS, and cannot be avoided.

4.6. Effects of Helicopter Operations on Buildings, Infrastructure and People

Figure 7 below illustrates the planned flight paths to the potential new rooftop RPA HLS (small scale). The approach and departure paths avoid extended overflight of the new eastern wing. They do, however, transit very closely to occupied buildings and working areas of the hospital. This is an unavoidable outcome of overall campus design. There will be unavoidable occasions when occupants of nearby buildings experience negative impacts of helicopter noise and/or vibration. There should not, however, be any occasions when an individual experiences negative impacts of helicopter main rotor downwash.

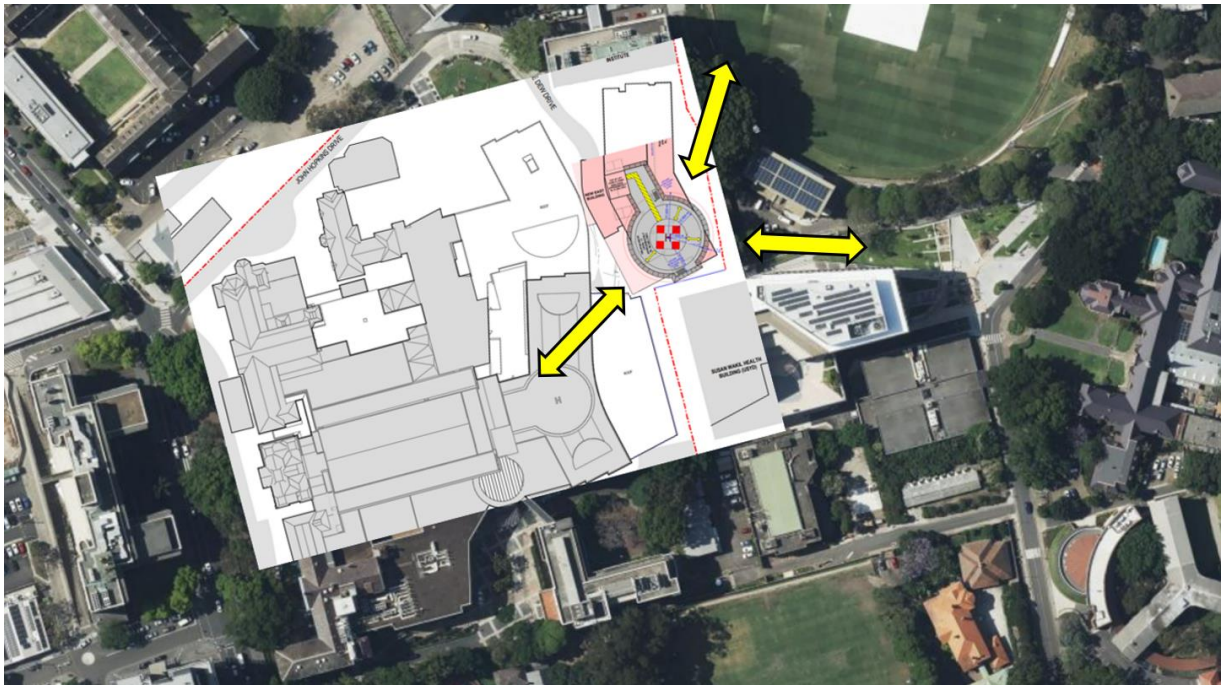

Figure 7: Approach and departure paths at the new permanent RPA HLS (small scale)

4.7. Acoustic Mapping

Acoustic mapping for the new permanent HLS has been completed. Refer to the Acoustic and Vibration Impact Assessment.

4.8. Requirement for HLS Survey

There should be few occasions when wind direction alone would lead to the HLS being unusable. The primary wind risk is a very strong southerly wind that creates turbulence as it flows across and around the lift core/overrun. Data shows that this is likely to be a reasonably common occurrence. Such a risk has been treated by avoiding a direct approach path into the south, and providing an offset departure path to the south-east. Prior to acceptance by NSW Ambulance, a VFR Approach and Departure Surface (Performance Class 1) survey combined with a Design Development Overlay (DDO) survey will need to be completed.

The primary purpose of a DDO survey is to provide a baseline for the protection of airspace around the HLS as defined in the National Airports Safeguarding Framework Guideline H – Protecting Strategically Important Helicopter Landing Sites.

4.9. Obstructions and VFR Approach/Departure Paths

Two pairs of proposed VFR Approach and Departure paths run: north-west/south-east; and east/west. The selection of these paths aims to achieve an obstacle free gradient of 2.6º (4.5%, 1:22.2 vertical to horizontal), measured from the forward edge of a 34m diameter safety area, and expand uniformly, laterally at an angle of 8.7^0/15%/1:12.8 to a width of 140 m to a height of 152m above the FATO at a distance of ~3,386m.

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.

4.10. Crane Management

Engagement with AsA for any impact of the cranes supporting the development will be required. The following information, as a minimum, needs to be supplied to the Aviation Consultant for such consultation:

- The dates of crane erection and disassembly,
- The location (in MGA94 reference) of the crane base,
- The type of crane
- The RL of the base,
- The RL of the top of the crane,
- The RL of the highest point of the JHHIP development

5. SSD SPECIFIC REQUIREMENTS – TEMPORARY HLS

5.1. Reason for a Temporary HLS

The reason that a temporary HLS is required is that the new eastern wing in the east campus is being built too close (see Figure 1) to the existing HLS as to allow continued, safe HEMS operations to that site. The construction cranes for the new eastern wing would constitute unacceptable hazards to safe helicopter flight. Construction of the northern expansion will bring workers, their equipment and building supplies dangerously close to the existing HLS such that helicopter operations could not continue. At the conclusion of construction of the RPA Redevelopment, the temporary HLS will close and helicopter operations will return to the existing HLS and also to the new HLS on the eastern wing building.

5.2. Purpose of this Section

This section addresses those different or additional matters pertaining to the temporary HLS as opposed to the new permanent rooftop HLS on the eastern wing.

5.3. HLS Siting and Approach and Departure Path Considerations

The site chosen for the temporary HLS was the only feasible, safe option available, either within the RPA campus or nearby. Sub-section 4.1 above remains extant for the temporary HLS. As a temporary HLS is subject to a number of legacy constraints, it is not always possible to develop a facility which is fully compliant with all relevant guidance. To this end, a risk assessment is required to be undertaken by HEMS operators to ensure they are able to accommodate any shortcoming of the temporary site. In the case of the temporary HLS, the design is unable to avoid having a number of obstructions on preferred approach and departure paths. HEMS operators have all advised that this limitation is acceptable for the temporary period of HLS operation.

5.4. Wind

Sub-section 4.2 above remains extant for the temporary HLS.

5.5. Airspace

Sub-section 4.3 above remains extant for the temporary HLS.

5.6. Impacts on Sensitive Receivers

The temporary HLS is much closer to residential buildings than either the existing HLS or the potential new rooftop HLS. To this end, noise, vibration, exhaust odours and main rotor downwash will be more impactful. The cooperation of HEMS operators will be important in attempting to ensure that impacts are minimised. Awareness information for HEMS operators and neighbourly advice to local residents will be developed as part of the “go live” process for the temporary HLS.

5.7. HLS Air Traffic Management

Sub-section 4.5 above remains extant for the temporary HLS.

5.8. Effects of Helicopter Operations on Buildings, Infrastructure and People

Figure 8 below shows the location of the temporary HLS. It will be necessary to develop strong local procedures for the arrival and departure of helicopters. Some main rotor downwash and harmless exhaust odours will be evident on the ground as helicopters operate to and from the HLS. This situation will be very similar to that experienced at the Prince of Wales HLS at Randwick, the HLS at Wollongong Hospital and the HLS at John Hunter Hospital. The hazards are manageable.

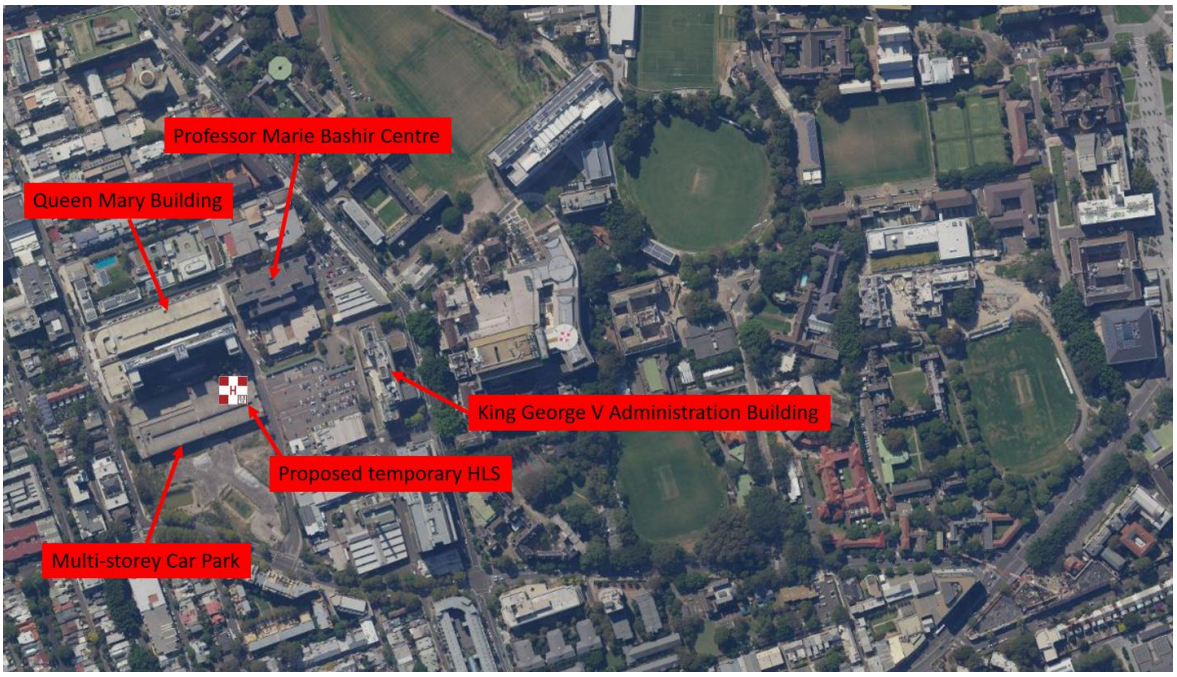

Figure 8: Location of the temporary RPA HLS (small scale)

Figure 9 below illustrates the planned approach and departure paths to/from the temporary RPA HLS (small scale) in the west campus. The approach and departure paths include an option over the residential buildings on Church St. They also transit very close to the Queen Mary Building. This is an unavoidable outcome of overall campus design. There will be unavoidable occasions when occupants of nearby buildings experience negative impacts of helicopter noise and/or vibration. There may also be some occasions when an individual experiences negative impacts of helicopter main rotor downwash. This will be further detailed in a separate into main rotor downwash effects. Detailed procedures will be developed to clear hazardous areas of people when a helicopter is planned to arrive or depart.

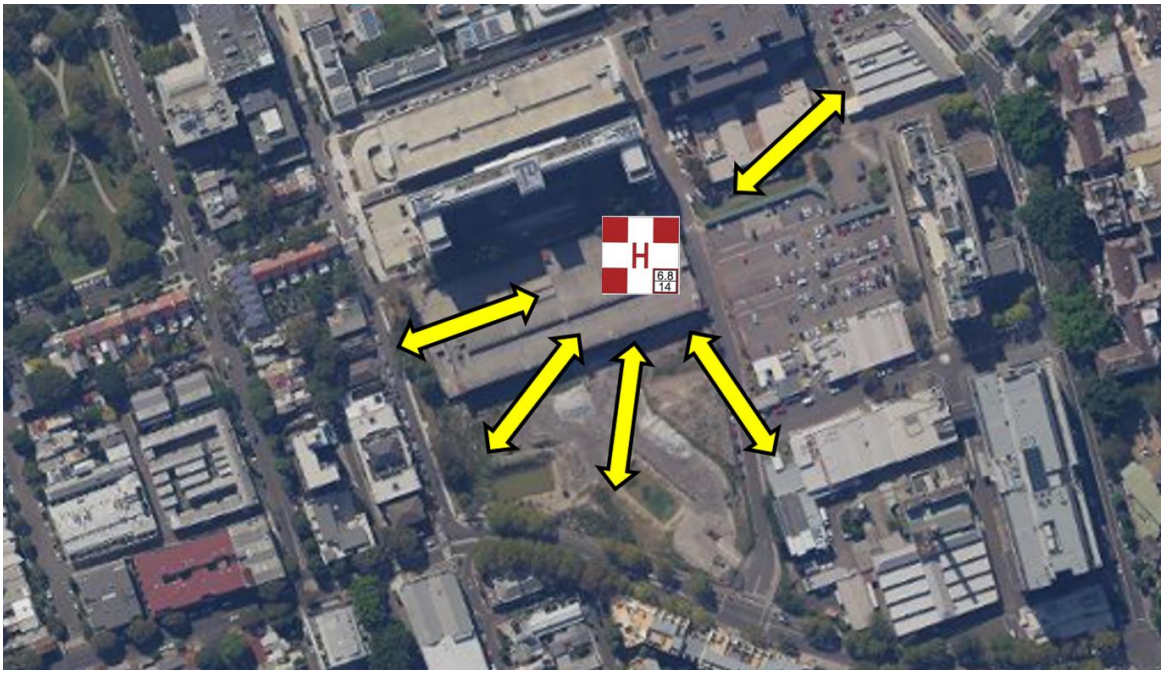

Figure 9: Approach and departure paths at the temporary RPA HLS (small scale)

5.9. Acoustic Mapping

Refer to the Acoustic and Vibration Impact Assessment for the temporary HLS. Fully ameliorating noise and vibration is not always practical for a temporary site.

5.10. Requirement for HLS Survey

The survey requirements for Performance Class 1 operations will not be met for the temporary HLS. HEMS operators have advised that this is an acceptable proposition for a temporary site. It is impractical, if not impossible to create a temporary HLS with existing surrounding obstructions to meet the specified survey standards and recommended practices. HEMS operators will conduct their own risk assessments and apply appropriate compensatory measures to ensure safety in the event of an engine failure upon approach to, or departure from, the temporary HLS. An operational brief will be prepared for the HEMS operators to provide all available detail on approach and departure angles and preferred directions assessed as part of the design of the temporary HLS.

5.11. Obstructions and VFR Approach/Departure Paths

See sub-section 5.9 above.

5.12. Crane Management

The requirements of sub-section 4.10 above are not applicable. Any cranes associated with the temporary HLS will remain below the height of surrounding buildings.

6. SSD KEY ISSUES

6.1. Key Issue: Policies

NSW Health Policy. The HLS will meet the compliance requirements of NSW Health GL2020_014 Guidelines for NSW Hospital HLS with some minor adjustments emanating from recent advice from CASA and ICAO. Whilst the Guidelines do not restrict flight over adjacent buildings, it is common practice in approach and departure path design to avoid such situations. It has been possible on this occasion to avoid extended overflight of the adjacent hospital buildings and to also avoid impacting any rooftop services e.g. cooling towers and vents, with rotor downwash.

6.2. Key Issue: Environmental Amenity

Acoustic Impacts. There will be acoustic impacts associated with the conduct of helicopter flight operations to/from the proposed temporary and new, permanent rooftop HLSs. Refer to the respective Acoustic and Vibration Impact Assessment reports for each site. Total avoidance of acoustic impacts on surrounding areas is impractical and cannot be guaranteed.

Ecological Impacts. There are no known areas of environmental or ecological significance that require specific protection from the impacts of helicopter operations. A search of data, reports and other sources did not reveal the existence of any additional, nearby, noteworthy habitats, nesting areas, breeding grounds or roosting colonies that might be impacted by helicopters.

6.3. Key Issue: Noise and Vibration

Noise. The typical helicopter “noise” event includes the following components:

Helicopter arrival:

- 1-minute approach and land, and
- 2 minutes engine idle (then shutdown).

Helicopter departure:

- 1-minute start-up,
- 1-minute hover and backup, and
- 1-minute departure.

Total elapsed noise event is approximately 6 minutes.

It should be noted that at “city” hospitals where the pilot is subject to Air Traffic Control (ATC), it may take several minutes longer as clearance may not be immediately available for the route that the pilot wishes to take. RPA is most definitely one of those sites. In such circumstances, ATC may keep a HEMS helicopter waiting for a long period before approval to depart is gained.

6.4. Key Issue: Contamination

The main contamination from an HLS is that of fuel product spillage. In the case of the RPA HLS, this risk is significantly mitigated by not conducting refuelling operations or maintenance on the HLS.

If there was a fuel leak of any sort from the helicopter, the installation of the fuel/water separator will mitigate the contamination risk.

6.5. Key Issue: Drainage

The HLS will have drainage to ensure standing water is drained from the deck. A slope of up to 2° will ensure water does not pool and helps maintain the integrity of the anti-slip surface. Contaminants in any runoff will be captured initially in the fuel/water separator.

6.6. Key Issue: Ongoing Operational HLS Capability

It is essential that an operational HLS capability is retained at RPAH at all times. The anticipated HLS operational activity timeline is at Table 1. Transition to the temporary HLS will be conditional on it being ready; and closure of the existing HLS being deemed appropriate. Return of patient transfer operations to the existing HLS and the new permanent HLS will be completed at the earliest time that safe operations can be transferred. The intent, upon going live on the new permanent HLS, is to retain the capability of the existing HLS.

It is possible that the RPA Redevelopment will severely degrade the viability of the existing HLS in which case its future may be questionable. The likelihood of one outcome or the other is unable to be determined at present. If the existing HLS retains some beneficial degree of capability, it will allow clinical choice of HLS to suit patient needs (ED or ICU), and will therefore result in a better level of care. It will also permit surge capability and facilitate longer-term aircraft turnarounds e.g. for outbound NETS cases. The second HLS can also be used for parking. In the event that a helicopter becomes unserviceable on an HLS, there will be a back-up option. Finally, if further, future development within the RPA campus impacts one HLS, there should be capacity to protect the other during construction. The value of a second HLS cannot be understated.

6.7. Key Issue: Management of Cranage during construction

There is a need to manage crane-helicopter interfaces during the construction phase of the RPA Redevelopment. It is important that cranes be lit in accordance with NSW Health GL2020_014 Guidelines for NSW Hospital HLS. These lighting standards also enhance safety for civil aviation operators within Sydney's airspace.

7. CONSULTATION, CONCLUSION AND SUMMARY

7.1. Consultation

AviPro has consulted with the following organisations with no reportable feedback:

- Sydney Airport Corporation Limited (SACL),
- NSW Ambulance aeromedical operations,
- Toll Helicopters (contracted helicopter operator),
- Westpac Helicopters (contracted helicopter operator), and
- CareFlight.

7.2. Future Consultation

AviPro will further engagement with the following organisations as appropriate:

- Sydney Airport Corporation Limited (SACL),
- Health Infrastructure (Program Management),
- TSA Management (Project Management),
- NSW Ambulance aeromedical operations, and
- Toll Helicopters (contracted helicopter operator).

AviPro may also engage with the following additional organisations:

- AsA – if issues arise with respect to penetration of prescribed airspace,
- CASA - if regulatory change occurs that materially impacts the program.

7.3. Conclusion

The new permanent RPA rooftop HLS on the new eastern wing building in the east campus is appropriately designed. The proximity to adjacent occupied buildings is not ideal, but is unavoidable. It will result in a minimal amount of overflight of occupied buildings. If it occurs, this overflight will be unavoidable.

The temporary HLS on the multi-story car park in the west campus, whilst not fully compliant NSW Health GL2020_014 Guidelines for NSW Hospital HLS dated 1 July 2020 and other relevant national and international guidelines will be capable of hosting safe helicopter operations and is acceptable to HEMS operators. There was no other feasible, safe siting option available. HEMS operators will undertake their own risk assessments to ensure that any specific hazards are removed or minimised so far as is reasonably practicable. Detailed procedures will also be developed to manage this HLS.

From an SSD perspective, in summary:

- Planned approach and departure paths for the new permanent rooftop HLS on the new RPA eastern wing provide for a range of wind directions whilst concurrently also avoiding building overflight to the maximum extent possible.
- The new RPA eastern wing, its new permanent rooftop HLS, and associated cranes used for construction will infringe prescribed airspace and will require permission to do so (SEARs 24.1).
- The permanent rooftop HLS on the new RPA eastern wing will be compliant with NSW Health GL2020_014 Guidelines for NSW Hospital HLS dated 1 July 2020, as supplemented by recently-released guidance from CASA and ICAO. Observance of recently-released CASA and ICAO advice ensures that the new permanent rooftop HLS design is in accordance with relevant national and international guidelines.
- The temporary HLS will provide some limitations for HEMS operators in that they will need to apply additional policy, procedures and considerations to the site than they would if the HLS was compliant. HEMS operators have advised that this approach is acceptable in the interests of ensuring the best standard of clinical care for high priority patients. (The only other option is to not use a local HLS at RPA, which from a clinical perspective was not an acceptable course of action.) (SEARs 24.2).
- RPA HLS operational activity is anticipated to be in accordance with Table 1.