Mr Ben Selwood
Project Manager
Erilyan Pty Ltd
1/27 Hotham Parade
Artarmon NSW 2064

By email: bselwood@erilyan.com.au

Our ref: 062901-01

Dear Mr Ben Selwood,

Re: Extension to Westmead Private Hospital with Additional Height – Aviation Advice

Please find in this correspondence preliminary aviation advice for the proposed Stage 4 development of Westmead Private Hospital (WPH).

1.1. Project background

Erilyan Pty Ltd (Erilyan) is preparing a Planning Proposal for the extension to Westmead Private Hospital (WPH) (the Project) with additional height and floor space ratio (FSR) located within the development site at 12, 12A, 14 and 14B Mons Road and 13 Darcy Road, Westmead, New South Wales.

The project area located on the south eastern portion of the site comprises part of Lot 1 DP1022392, Lot 1 DP213094 and Lot 5 DP515289.

The Planning Proposal Report for the extension of Westmead Private Hospital prepared by Willowtree Planning Pty Ltd on behalf of Ramsay Health Care, dated 15 October 2019, outlines the case for the future expansion of the site for additional health service facilities which requires additional building height and FSR - significantly exceeding the maximum currently allowed, on the pursuant to the Parramatta Local Environmental Plan 2011.

The WPH Master Plan revision F dated June 2019 describes the WPH development stages indicating that Stage 4 has generally been developed in reference to the urban planning recommendations of having the Darcy Road elevation at a lower height, and the Mons Road elevation stacked higher to create a gateway for Mons Road.

The highest building of the proposed WPH stage 4 development will be up to 80.9 m Australian Height Datum (AHD).

Figure 1 is the conceptual south elevation – Darcy Road of the proposed development (source: Ramsay Health Care), showing an overall Stage 4 height limit of 81.95 m AHD and a Stage 4 Roof Plan height of 80.90 m AHD.

Figure 1 Stage 4 – Conceptual South Elevation – Darcy Road

A close up of the overall heights is provided at Figure 2 (source: Ramsay Health Care).

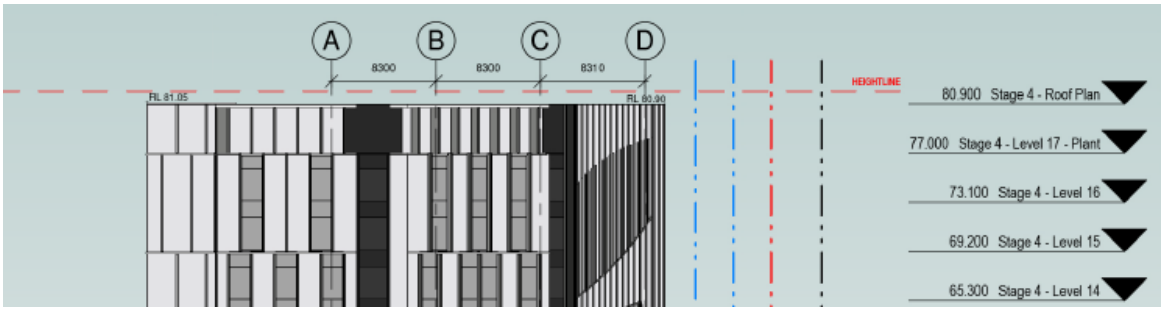


Figure 2 Stage 4 - Conceptual South Elevation - Darcy Road - height limits

The project site is located near Westmead Public Hospital and approximately 13.4 km (7.3 nm) from Bankstown Airport aerodrome reference point (ARP).

Westmead Public Hospital (Westmead Public) has 4 existing helicopter landing sites (HLS) located within the hospital precinct.

Figure 3 shows the location of the project site relative to the existing HLSs at Westmead Public (in a red coloured circle) (source: Google Earth).

Figure 3 Project site relative to Westmead Public helipads

Erilyan has requested Aviation Projects to evaluate the proposal for potential impacts on aviation safety and provide recommendations to address any highlighted areas of concern.

1.2. Scope

The scope of work of the preliminary aviation advice was to:

- Review the site against all associated regulatory and airspace authorities
- Assess the proposed developments impact
- Propose any potential mitigation strategies
- Assess the impact on Westmead Public's HLS flight paths.

1.3. Methodology

The engagement was generally conducted as follows:

1. Reviewed client material
2. Reviewed relevant regulatory requirements and information sources including Aeronautical Information Package and Civil Aviation Safety Authority (CASA) *Manual of Standards Part 139 – Aerodromes* and *Part 173 – Instrument Flight Procedures Design* to identify potential impacts to the obstacle limitation surface (OLS), procedures for air navigation services – aircraft operations (PANS-OPS) for Bankstown Airport and *Airports (Protection of Airspace) Regulations 1996* (APAR)
3. Considered the National Airports Safeguarding Framework Guidelines, including Guideline F: *Managing the Risk of Intrusions into the Protected Airspace of Airports*
4. Provided advice on exhaust plumes that may originate at the top of the proposed building, which may impact OLS airspace, including the need for a Plume Rise Assessment (CASA Advisory Circular AC 139-05 version 3.0 date 03 January 2019)
5. Identified operational impacts and provide advice on Bankstown Airport's airspace, including any construction cranes
6. Prepared a draft letter report with preliminary aviation planning assessment and advice on safeguarding airspace and send to Erilyan Pty Ltd for comment
7. Finalised the letter report for Client acceptance.

1.4. References

- Airservices Australia, *Aeronautical Information Package; including AIP Book, Departure and Approach Procedures and En Route Supplement Australia,* dated 05 November 2020
- Airservices Australia, *Designated Airspace Handbook,* dated 05 November 2020
- Bankstown Airport Limited, *Bankstown Airport Master Plan 2014*
- Bankstown Airport Limited, *Bankstown Airport Preliminary Master Plan 2019*
- Civil Aviation Safety Authority, *Civil Aviation Regulations 1998 (CAR*)
- Civil Aviation Safety Authority, *Civil Aviation Safety Regulations 1998* (CASR)
- Civil Aviation Safety Authority, *Manual of Standards Part 173 – Standards Applicable to Instrument Flight Procedure Design,* version 1.5, dated March 2016
- Civil Aviation Safety Authority, *Part 139 (Aerodromes) Manual of Standards 2019*, dated 5 September 2019
- Civil Aviation Safety Authority, *Advisory Circular (AC) 139-8(2): Reporting of Tall Structures,* dated March 2018

- Civil Aviation Safety Authority, *Advisory Circular (AC) 139-05(3.1): Plume Rise Assessment*, dated 03 January 2019
- Children's Hospital at Westmead, Helicopter Landing Site, Operations Manual, version 1.1
- Department of Infrastructure and Regional Development, Australian Government, NASF Guideline E: *Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports;* and *Guideline F: Managing the Risk of Intrusions into the Protected Airspace of Airports*, dated 15 July 2012
- Department of Planning and Environment, NSW Government, Parramatta Local Environmental Plan 2011
- International Civil Aviation Organization (ICAO), *Doc 8168 Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS)*
- ICAO Standards and Recommended Practices, Annex 14—Aerodromes
- OzRunways, aeronautical navigation charts, dated 4 November 2020
- NSW Government, Health Infrastructure, *Guidelines for Hospital Helicopter Landing Sites in NSW*, version GL2020_014, published 01 July 2020
- PDA Surveyors, Westmead Adult Hospital, Design Development Overlay, job number 40364, drawing 2A, dated 15 April 2020.

1.5. Client material

Erilyan provided the following materials for the purposes of this preliminary aviation advice:

- Planning Proposal Report, prepared by Willowtree Planning Pty Ltd, dated 15 October 2019
- WPH Master Plan, Stage 4 drawings, dated June 2019, received 05 July 2019
- Westmead Private Hospital Stage 4 Planning Proposal Conceptual Plans, dated 03 February 2021.

1.6. Site overview

An overview of the project site located at the intersection of Darcy Road and Mons Road is provided in Figure 4 (source: Planning Proposal Report and Google Earth).

Figure 4 Project site overview

1.7. Planning context – land zoning, building height

The Project site is located within the City of Parramatta Council local government area (LGA). Therefore, the Project site is subject to the provisions of the Parramatta Local Environmental Plan 2011.

The Projects site zone is B4 Mixed Use.

The proposed increase in height and FSR is consistent with the B4 zone objectives as it seeks to extend and rationalise the existing Westmead Private Hospital. The proposed development would protect and enhance the Westmead Health and Education Precinct.

Figure 5 shows the project site location indicating the site zoning (source: Planning Proposal Report).

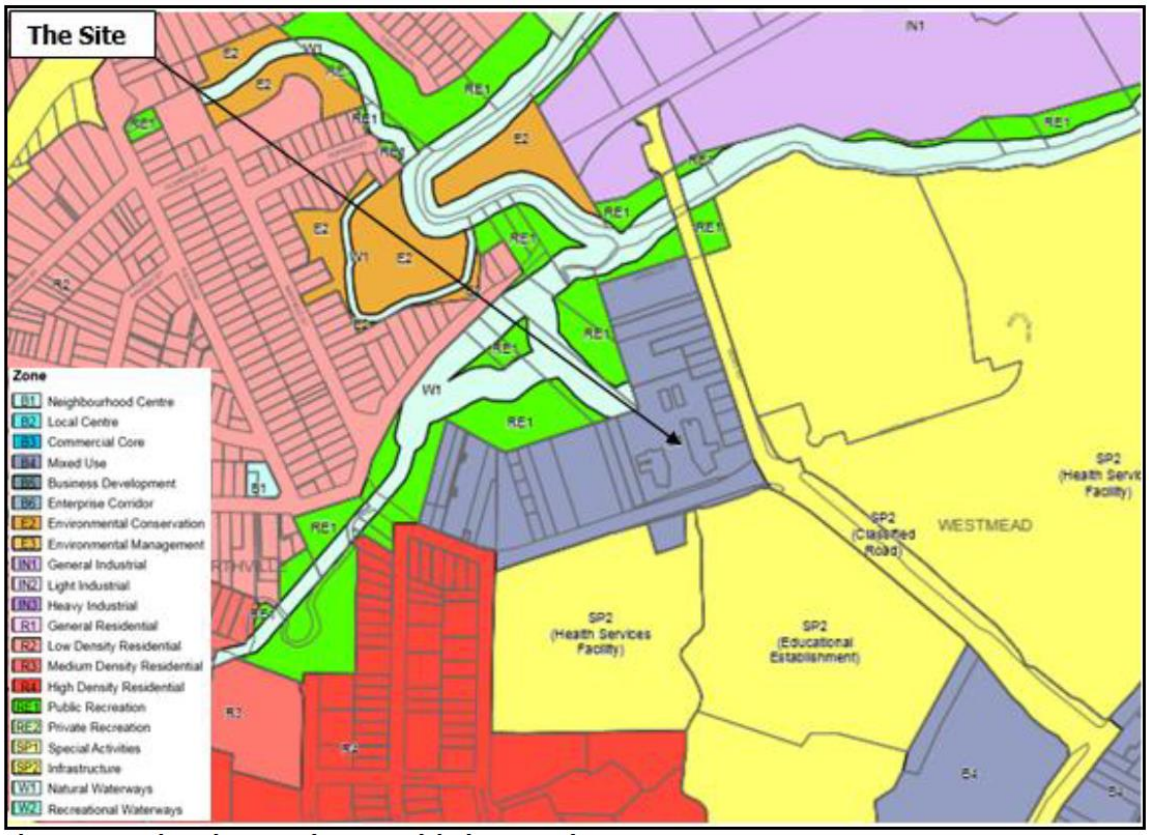


Figure 5 Location of site and land zoning

The Parramatta Local Environmental Plan 2011 (PLEP 2011) sets out the heights of buildings and includes the following objective.

> *(2) The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.*
>
> *(2A) Despite subclause (2), any development on land identified with a thick blue line and labelled "Area 1" on the Height of Buildings Map is not to exceed the height determined in accordance with the Table to this clause.*

Clause 4.3 of the PLEP 2011 states that the site is currently subject to a 12 m maximum building height. The height of the building for the proposed project site has a maximum building height of 64.5 m AGL (south eastern portion of the site comprising part of Lot 1 DP1022392, Lot 5 DP515289 and Lot 1 DP213094) (source: PLEP 2011 and Conceptual Plans).

The proposed project concept incorporates buildings up to 18 storeys on part of the site and 4 storeys on the remaining site area, and therefore the maximum building height would need to be amended to 64.5 m AGL and 18 m AGL respectively.

The required extent of the LEP amendment for additional building height is shown in Figure 6 (source: Planning Proposal Report).

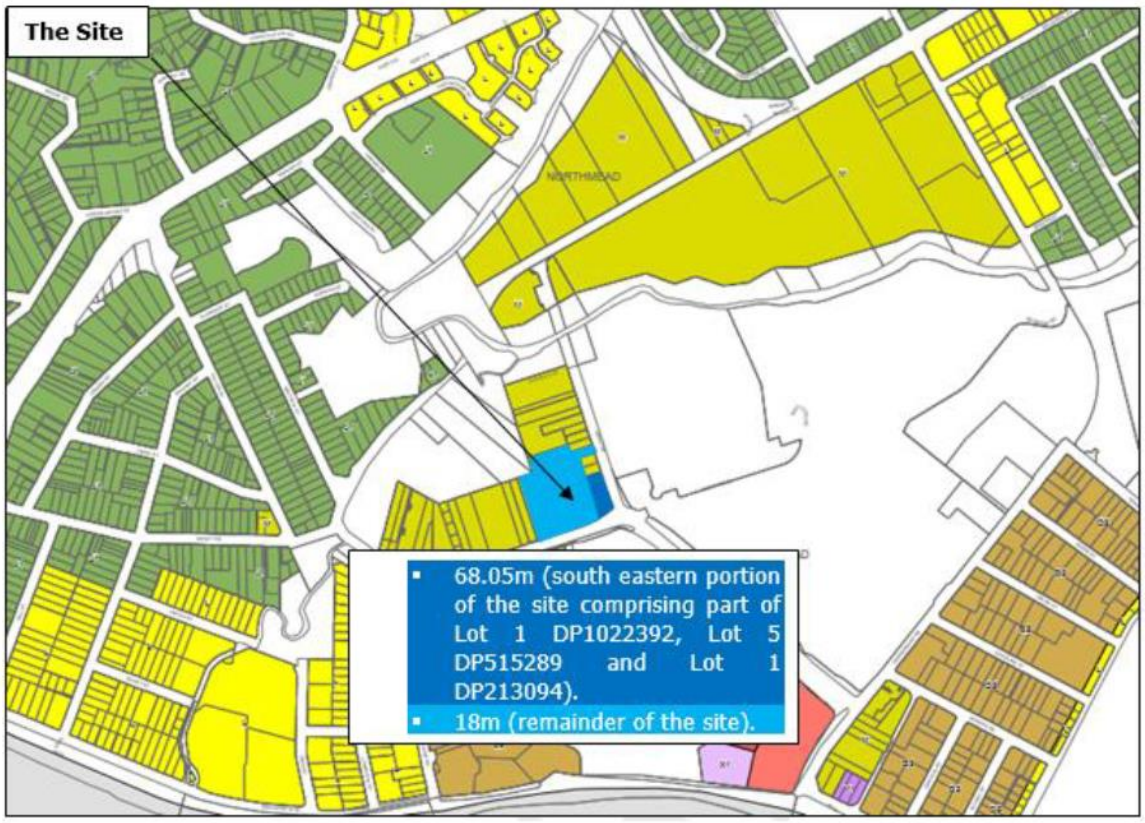


Figure 6 LEP amendment for additional building height

1.8. Planning context - airspace operations

The PLEP 2011 sets out the airspace operations in clause 7.6 and includes the following objective:

> *(1) The objective of this clause is to protect airspace around airports.*
>
> *(2) This clause applies to land identified as "Area 3", "Area 6" or "Area 7" on the Special Provisions Area Map.*
>
> *(3) The consent authority must not grant development consent to development that is a controlled activity within the meaning of Division 4 of Part 12 of the Airports Act 1996 of the Commonwealth on land to which this clause applies unless the applicant has obtained approval for the controlled activity under regulations made for the purposes of that Division.*

*Note. **Controlled activities** include the construction or alteration of buildings or other structures that cause an intrusion into prescribed airspace (being generally airspace around airports). Controlled activities cannot be carried out without an approval granted under regulations made for the purposes of Division 4 of Part 12 of the Airports Act 1996 of the Commonwealth.*

1.9. Airports Act 1996 and Airports (Protection of Airspace) Regulations

Bankstown Airport is a Federal Leased Airport and is regulated by the *Airports Act 1996* (Cth) and the *Airports (Protection of Airspace) Regulations 1996* (APAR).

The Airports Act 1996 and the APAR establish a system for the protection of airspace at, and around nominated airports. A prescribed airspace is an airspace specified in, or ascertained in accordance with the Regulations, where it is in the interests of the safety, efficiency or regularity of existing or future air transport operations into or out of an airport for the airspace to be protected under Part 12 of the *Airports Act 1996* (protection of airspace around airports).

The APAR specifies a prescribed airspace as the airspace above any part of either an OLS or a PANS-OPS surface for the airport and which is declared in a written declaration by the Secretary relating to the APAR. Details of the prescribed airspace are provided by the related airport authorities.

Activities, such as building construction projects that intrude into the prescribed airspace are controlled activities (Airports Act 1996 (182)). To carry out a controlled activity, an approval must be granted in accordance with the Regulations (Airports Act 1996 (183)), which are obtained by the Secretary.

In accordance with the Regulations, an application for the Secretary's approval must be given to the airport-operator company for the airport, or each airport, concerned at least 28 days before the proponent's intended commencement of the controlled activity and must set out:

- the proposed controlled activity
- its proposed location
- if the proposed controlled activity consists of the erection of a building, structure or thing:
    - the proposed maximum height (above the AHD) of the proposed building, structure or thing
    - the proposed maximum height (above the AHD) of any temporary structure or equipment intended to be used in the erection of the proposed building, structure or thing
- the purposes of the controlled activity.

Section 3 of the APAR requires the proponent to give the application to the airport-operator. For the proposed project site in Parramatta, the airport-operator company is Bankstown Airport Ltd (BAL).

1.10. Civil Aviation Safety Regulations (1998) Part 139-Aerodromes

The Civil Aviation Safety Authority (CASA) regulates aviation activities in Australia. Applicable requirements include the Civil Aviation Regulations 1988 (CAR), Civil Aviation Safety Regulations 1998 (CASR) and associated Manuals of Standards (MOS) Part 139—*Aerodromes* and other guidance material.

1.10.1. Civil Aviation Safety Regulations 1998, Part 139--*Aerodromes*

CASR 139.365 requires the owner of a structure (or proponents of a structure) that will be 110 m or more above ground level (AGL) to inform CASA. This is to allow CASA, under CASR 139.370, to assess the effect of the structure on aircraft operations and determine whether or not the structure will be a hazardous object because of its location, height, or lack of marking or lighting.

Manual of Standards 139--*Aerodromes*

Chapter 7 of MOS 139 sets out the standards applicable to Obstacle Restriction and Limitation. Section 7.19 deals with objects and structures that could become obstacles in the obstacle limitation surfaces (OLS):

> *If a proposed object or structure is identified as likely to be an obstacle, details of the relevant proposal must be referred to CASA for CASA to determine, in writing:*
>
> > *(a) whether the object or structure will be a hazard to aircraft operations; and*
> >
> > *(b) whether it requires an obstacle light that is essential for the safety of aircraft operations*

Chapter 9 sets out the standards applicable to Visual Aids Provided by Aerodrome Lighting.

Section 9.01 provides some general guidance on minimum lighting system requirements.

> *(1) If an aerodrome is available for night operations, lighting systems must be provided for:*
>
> *.....*
>
> *(c) if an obstacle within the applicable obstacle limitation surface (OLS) area of the aerodrome is determined by CASA as requiring obstacle lighting — that obstacle; and*
>
> *.....*

Section 9.27 provides some general guidance on obstacle lighting for Artificial objects and structures.

> *(1) Subject to subsection (2), for a runway intended to be used at night, the following artificial objects or structures are hazardous obstacles and must be provided with obstacle lighting:*
>
> > *(a) an object or structure that extends above the take-off climb surface within 3 000 m of the inner edge of the take-off climb surface;*
> >
> > *(b) an object or structure that extends above the approach or transitional surface within 3 000 m of the inner edge of the approach surface;*
> >
> > *(c) an object or structure that extends above the applicable inner, conical or outer horizontal surfaces;*
> >
> > *(d) an object or structure that extends above the obstacle assessment surface of a T-VASIS or PAPI;*

(e) an object or structure in the vicinity of a taxiway, an apron taxiway or a taxilane, that is a hazard to aircraft using the taxiway, apron taxiway or taxilane, except that obstacle lights must not be installed on elevated ground lights or MAGS.

(2) For paragraph (1) (e):

in the vicinity of means in the 5% plane:

(a) originating laterally from the edge of the graded section of the taxiway strip or the edge of the graded portion of the runway strip; and

(b) whose origin is ground level at the edge of the graded portion of the runway or taxiway strip.

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

(a) shielded by another object or structure that is already lit; or

(b) does not present a significant hazard to aviation safety.

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

(a) that an object or structure on, or within the immediate vicinity of, the aerodrome is a hazardous obstacle; and

(b) what, if any, lighting is required for that hazardous obstacle.

Note Owners of tall buildings or structures whose summit is below the obstacle limitation surfaces, or that is less than 100 m above ground level, may, of their own volition, provide obstacle lighting to indicate the presence of such buildings or structures at night. To ensure consistency, avoid confusion to pilots, and further the interests of safety both in the air and on the ground, such obstacle lighting should conform with the standards specified in this MOS.

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

Section 9.30 provides guidance on Types of Obstacle Lighting and Their Use:

(3) Medium-intensity obstacle lights must be:

(a) flashing white lights; or

(b) flashing red lights; or

(c) steady red lights.

Note CASA recommends the use of flashing red medium-intensity obstacle lights.

(4) Medium-intensity obstacle lights must be used if:

(a) the object or structure is an extensive one; or

(b) the top of the object or structure is at least 45 m but not more than 150 m above the surrounding ground; or

(c) CASA determines in writing that early warning to pilots of the presence of the object or structure is desirable in the interests of aviation safety.

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

1.10.2. Civil Aviation Advisory Publications - CAAP 92-2(2)

Civil Aviation Advisory Publications (CAAPs) provide guidance, interpretation and explanation on complying with the Civil Aviation Regulations 1988 (CAR) or Civil Aviation Orders (CAO).

Section 7 of CAAP 92-2(2) provides guidance on the recommended criteria for a helicopter landing site including requirements to the obstacle limitation surfaces.

7.1.3 A Basic HLS should:

- *be determined, by way of the helicopter operator's risk assessment, to be large enough to accommodate the helicopter and have additional operator-defined safety areas (or buffers) to allow the crew to conduct the proposed operation safely at the location;*
- *have a TLOF with suitable surface characteristic for safe operations and strong enough to withstand the dynamic loads imposed by the helicopter.*
- *have sufficient obstacle free approach and departure gradients to provide for safe helicopter operations into and out of the site under all expected operational conditions.*
- *have approach and departure paths that minimise the exposure of the helicopter to meteorological phenomena which may endanger the aircraft and provide escape flight paths, if a non-normal situation arises, which maximise the potential for using suitable forced landing areas.*

Section 7 of CAAP 92-2(2) sets up recommendations for final approach and take-off area (FATO) which define dimensions of the FATO.

7.2.2 The FATO should, at minimum, be capable of enclosing a circle [2] with a diameter equal to one-and-a-half times the D-value (1.5 x D) of the largest helicopter intended to use the site and be free of obstacles likely to interfere with the manoeuvring of the helicopter.

7.2.3 It is recommended that a safety area extend a distance of at least 0.25 x D or 3 m around the FATO, whichever is the larger, or a greater distance if considered necessary for a particular HLS.

[2] A FATO may be any shape provided it meets this requirement. Orthogonal shapes may provide better visual cues.

CAAP 92-2(2) also provides guidelines for the establishment and operation of onshore Helicopter Landing Sites (HLS).

> *Approach and departure paths*
>
> *7.2.18 The approach and departure paths should be in accordance with the Annex 14 recommendations as illustrated in Figures 3 to 8. The decision on which slope is appropriate for the HLS should be based on which is the most suitable for the performance class of the operations at the site.*
>
> *7.2.19 CASA recommends application of these standards for RPT, Charter and future Air Transport operations, including emergency medical service (EMS) operations at metropolitan hospital sites. Some helicopters may however require even greater approach and departure path protection dependant on their performance capability.*
>
> *A minimum of two approach and departure paths should be assigned. These should be separated by a minimum angle of 150° and may be curved left or right to avoid obstacles or to take advantage of a more advantageous flight paths. This does not preclude one-way HLSs, provided adequate provisions are made for turning, limitations are notified to aircraft operators and any operational risks are suitably mitigated. Any curvature should comply with recommendations contained in ICAO Annex 14 Volume II.*
>
> *....*
>
> *7.2.20 The slope design categories in Figure 3 may not be restricted to a specific performance class of operation and may be applicable to more than one performance class of operation. The slope design categories depicted in Figures 3 and 4 represent recommended minimum design slope angles and not operational slopes:*
>
> - *slope category "A" generally corresponds with helicopters operated in performance class 1*
> - *slope category "B" generally corresponds with helicopters operated in performance class 3*
> - *slope category "C" generally corresponds with helicopters operated in performance class 2*

A copy of Figure 3 of CAAP 92-2(2) which shows *Slope design categories* to three classes of performance class of operation is provided in Figure 7.

SURFACE and DIMENSIONS	SLOPE DESIGN CATEGORIES		
	A	B	C
APPROACH and TAKE-OFF CLIMB SURFACE:			
Length of inner edge	Width of safety area	Width of safety area	Width of safety area
Location of inner edge	Safety area boundary (Clearway boundary if provided)	Safety area boundary	Safety area boundary
Divergence: (1st and 2nd section)			
Day use only	10%	10%	10%
Night use	15%	15%	15%
First Section:			
Length	3 386 m	245 m	1 220 m
Slope	4.5% (1:22.2)	8% (1:12.5)	12.5% (1:8)
Outer Width	(b)	N/A	(b)
Second Section:			
Length	N/A	830 m	N/A
Slope	N/A	16% (1:6.25)	N/A
Outer Width	N/A	(b)	N/A
Total Length from inner edge (a)	3 386 m	1 075 m	1 220 m
Transitional Surface: (FATOs with a PinS approach procedure with a VSS)			
Slope	50% (1:2)	50% (1:2)	50% (1:2)
Height	45 m	45 m	45 m

Figure 7 Figure 3 CAAP 92-2(2)

1.11. International Civil Aviation Organisation Annex 14 – Volume 2 Heliports

International Civil Aviation Organisation (ICAO) Annex 14 Aerodromes (Volume 2, Heliports) sets out the Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided at heliports, and certain facilities and technical services normally provided at a heliport.

Chapter 3 Section 3.2 Elevated heliports

ICAO Annex 14 (Chapter 4) – *Obstacle limitation surfaces and sectors* – provides guidance with respect to obstacle environment.

Section 4.2 *Obstacle limitation requirements* provides the following guidance:

> *Note 1. — The requirements for obstacle limitation surfaces are specified on the basis of the intended use of a FATO, i.e. approach manoeuvre to hover or landing, or take-off manoeuvre and type of approach, and are intended to be applied when such use is made of the FATO. In cases where operations are conducted to or from both directions of a FATO, then the function of certain surfaces may be nullified because of more stringent requirements of another lower surface.*

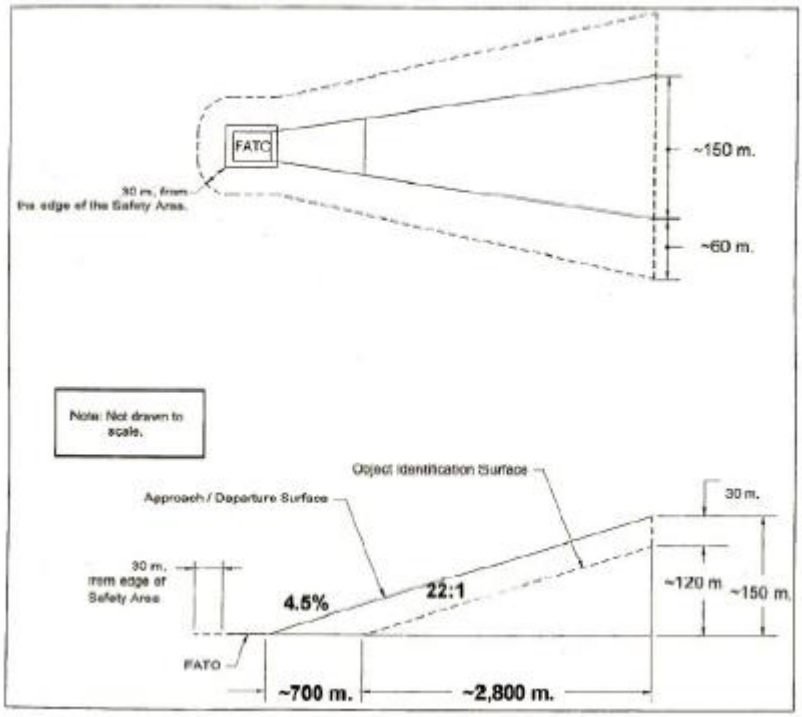
1.12. Guidelines for Hospital Helicopter Landing Sites in NSW

Helicopter Landing Sites (HLS) Guideline was first developed in 2005 to establish best practice of hospital-based HLS both at ground level and on elevated structures. The updated version *Guidelines for Hospital Helicopter Landing Sites in NSW* (version GL2020_014, published on 01 July 2020) is currently in effect.

The relevant clauses from this guidelines are copied below:

> *3.13 Object Identification Surfaces*
>
> *The object identification surfaces (OIS) can be described as:*
>
> - *in all directions from the safety area, except under the approach/departure paths, the object identification surface starts at the safety area perimeter and extends out horizontally for a distance of ~30m*
> - *under the approach/departure surface, the object identification surface starts from the FATO outside edge and extends horizontally out for a distance of ~700. From this point, the object identification surface extends out for an additional distance ~2,800m while rising on a 2.5° or 22:1 slope (22 units horizontal in one unit vertical). From the point ~700m from the FATO perimeter, the object identification surface is ~30m beneath the approach/ departure surface*
> - *the width of the safety surface increases as a function of distance from the Safety Area. From the safety area perimeter, the object identification surface extends laterally to a point ~30m outside the safety area perimeter. At the upper end of the surface, the object identification surface extends laterally ~60m on either side of the approach/departure path.*

Figure 11: Airspace Where Marking and Lighting are recommended



Source: AviPro

Figure 8 Copy of Figure 11 from *Guidelines for Hospital Helicopter Landing Sites in NSW*

For the purpose of the Design Development Overlay (DDO), the OIS below the VFR approach and departure paths are the limit for the penetration of obstructions. That is, there should be no future development penetrating the OIS, which extends out to 3.5km from the forward edge of the FATO.

3.6 Planning Approval

....

Early approval from Airservices Australia (Airport.Developments@AirservicesAustralia.com) should also be sought for sites that may be in or around aerodromes, under the approach and departure paths of existing airports, or at hospital HLS that have an associated instrument approach procedure attached. Notification periods of a minimum of eight weeks apply for gaining approval for obstructions near hospital HLS such as tower cranes or luffing cranes.

3.12.7 Cranes in the vicinity of the Helicopter Landing Site

Most sites will experience the requirement for a crane within the vicinity of the HLS during a hospital or adjacent development. The significance of this, on service delivery impact cannot be understated and

there will be positioning and lighting requirements that need to be addressed in addition to the Civil Aviation Safety Authority (CASA) Manual of Standards (MOS) Part 139 requirements.

The illumination requirements for cranes in the vicinity of a Hospital HLS are detailed below.

As a minimum for all tower cranes:

- *top of crane A frame or cabin: medium intensity flashing red obstruction light.*
- *both ends of Jib: medium intensity flashing 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).*

As a minimum for all luffing cranes:

- *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*

3.14.5 Approach and Departure Path Protection/Design Development Overlay

…

In the absence of formal legislation, it is recommended that a DDO be prepared at the time of the PC1 VFR approach and departure path and the transitional surface survey. Subsequently, the survey report is to be passed to the local government authority with advice that the approach and departure paths require protection and that any proposed development in the vicinity be referred to NSW Health Ministry of Health (Ministry). In essence, the DDO provides for a 30 m buffer below the approach and departure path and transitional surface, through which no obstructions are to penetrate.

The Current Design Development Overlay for Westmead Public's HLSs, dated 15 April 2020, based on optimal helicopter flights into and out of the Adults Accident and Emergency, Central Acute Services Building (CASB) and Children's Westmead Hospital, was reviewed in preparing this letter of advice.

1.13. NASF Guideline H

NASF Guideline H: *Protecting Strategically Important Helicopter Landing Sites* provides guidance to State/Territory and local government decision makers as well as the owners/operators of identified strategically important helicopter landing site (SHLS) to ensure:

c) new development (and associated activities) do not present a hazard to helicopters arriving or departing from those SHLS …

1.14. Bankstown Airport Master Plan 2019

The Bankstown Airport Master Plan 2019 provides information on OLS and PANS-OPS at Bankstown Airport.

Chapter 6.0 *Airport Safeguarding and Airspace Protection* addresses various guidelines of the National Airports Safeguarding Framework including:

- Prescribed airspace (OLS and Procedures for Air Navigation Services – Airspace operations (PANS-OPS)
- External lighting limitations
- Stack and vent efflux limitations.

The Bankstown Airport Master Plan states:

> *Long-term and effective protection and safeguarding of Bankstown Airport is critical to ensuring ongoing aviation operations and safety. Consideration therefore needs to be given to:*
>
> - *Land use planning around the Airport, to minimise development which may be impacted by aircraft noise and operations*
> - *Siting, location and design of buildings and structures which may impact windshear and turbulence, affecting aircraft operations*
> - *Managing wildlife on and surrounding the Airport*
> - *Minimising impacts from ground lighting that may distract or confuse aircraft pilots*
> - *Protecting the airspace surrounding the Airport from buildings and structures, which may impinge on the safe arrival and departure of aircraft*
> - *Protecting aviation facilities from development encroachment*
> - *Protecting areas at the end of runways, through public safety areas.*

1.15. Airspace protection

NASF Guideline F: *Managing the Risk of Intrusions into the Protected Airspace of Airports* addresses the intrusions into operational airspace of airports by tall structures, such as buildings and cranes. Key considerations in the protection of visual operations includes the protection of the OLS and PANS-OPS.

NASF Guideline F sets out the details of the assessment process. NASF Guideline F is available at the website: https://infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/nasf_principles_guidelines.aspx

1.16. Bankstown Airport – local airspace procedures

The proposed project site is located outside of controlled airspace (wholly within Class G airspace) with a vertical limit of 2500 ft.

The proposed project site is inside Lane of Entry D539A and D539B which regulates flights to Bankstown Airport from the north. The Lane of Entry has vertical limits of 2,000 ft for D539A and 2,500 ft for D539B and is restricted during operational hours from sunset to sunrise.

Figure 9 shows Bankstown Inset chart and airspace in the vicinity of the project site, including the Bankstown Lane of Entry D539A and D539B (within a purple-coloured dot line corridor) and Class G airspace (source: OzRunways, 05 November 2020).

Figure 9 Bankstown Inset chart and Bankstown Lane of Entry D539A and D539B

1.17. Bankstown Airport - instrument procedures

A check of the AIP via the Airservices Australia website showed that Bankstown Airport is served by non-precision terminal instrument flight procedures, as per Table 1 (source: Airservices Australia, 5 November 2020).

Airservices Australia (AsA) has designed all the instrument procedures for Bankstown Airport.

Table 1 Bankstown Airport aerodrome and procedures charts

Chart name (Procedure Designer)	*Effective date*
AERODROME CHART Page 1 (AsA)	27 February 2020 (SBKAD01-162)
AERODROME CHART Page 2 (AsA)	07 November 2019 (SBKAD02-162)
SID BANKSTOWN EIGHT DEPARTURE RWY 11C/29C (AsA)	09 November 2017 (SBKDP01-153)
NDB RWY 11C (AsA)	05 November 2020 (SBKNB03-165)
NDB – A (AsA)	05 November 2020 (SBKNB01-165)
RNAV-Z (GNSS) RWY 11C (AsA)	05 November 2020 (SBKGN01-165)

The minimum safe altitude (MSA) is applicable for each instrument approach procedure for Bankstown Airport. An image of the MSA published for the aerodrome is shown in Figure 10.

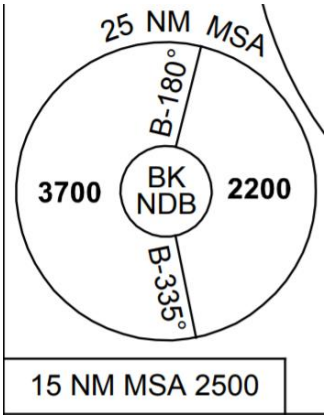


Figure 10 MSA at Bankstown Airport

The Bankstown Airport 10 nm MSA area of interest for obstacles extends to 15 nm (10 nm MSA plus 5 nm buffer) from the Bankstown Airport non-directional (radio) beacon (NDB), at which point aircraft are subject to a minimum altitude of 2500 ft above mean sea level (AMSL).

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

The MOC for the 10 MSA is 1500 ft (457 m), at the location of the project site regarding Bankstown Airport PANS-OPS surfaces.

The project site will be below the MSA MOC and have no impact on the 10 nm MSA of Bankstown Airport.

According to the Bankstown Airport Master Plan 2019, future PANS-OPS procedures for the airport are identified for protection, including the GNSS RNAV precision and non-precision approach surfaces.

The PANS-OPS surfaces for Bankstown Airport in relation to the proposed project site are shown in Figure 11 (source: Bankstown Airport Master Airport 2019).

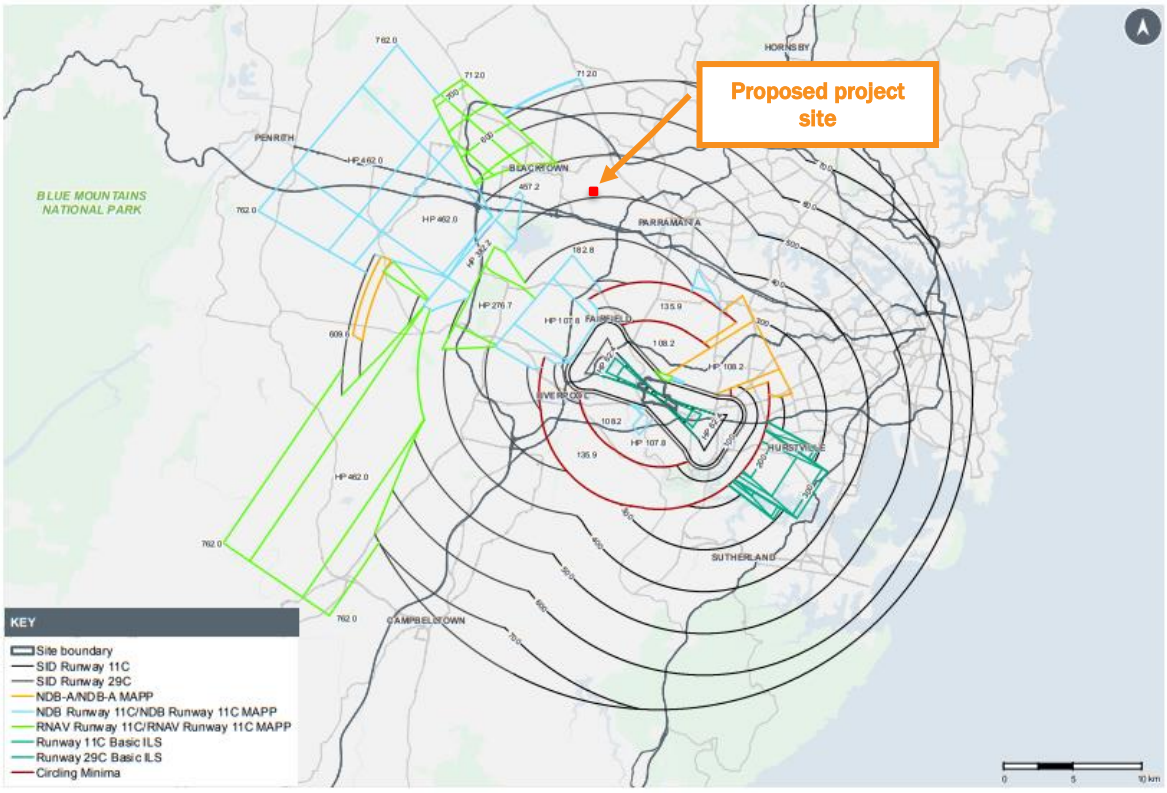


Figure 11 Bankstown Airport PANS-OPS and location of proposed project site

As a preliminary assessment, the project site is located within the path of RNAV and NDB approach procedures for runway 11C, however below the prescribed minimum altitudes associated with this PANS-OPS surface.

1.18. Bankstown Airport - obstacle limitation surfaces

Bankstown Airport's aerodrome elevation is 34 ft AMSL (10 m AHD).

Bankstown Airport ARP coordinates published in Airservices Australia's Designated Airspace Handbook, dated 05 November 2020 are Latitude 33°55'28"S and Longitude 150°59'18" E.

The maximum horizontal distance that an OLS may extend for an aerodrome in Australia is 15 km (8.1 nm) from the edge of a runway strip.

The development site is located approximately 13.4 km (7.3 nm) from Bankstown Airport's ARP and within the horizontal extent of Bankstown Airport's outer horizontal surface.

The outer horizontal surface is located 150 m above the reference elevation datum and extending from the upper edge of the extended conical surface to 15,000 m (radius) from the ARP.

The Bankstown Airport OLS and the location of the proposed project site is shown in Figure 12 (source: Figure 6.5 of Bankstown Airport Master Plan 2019).

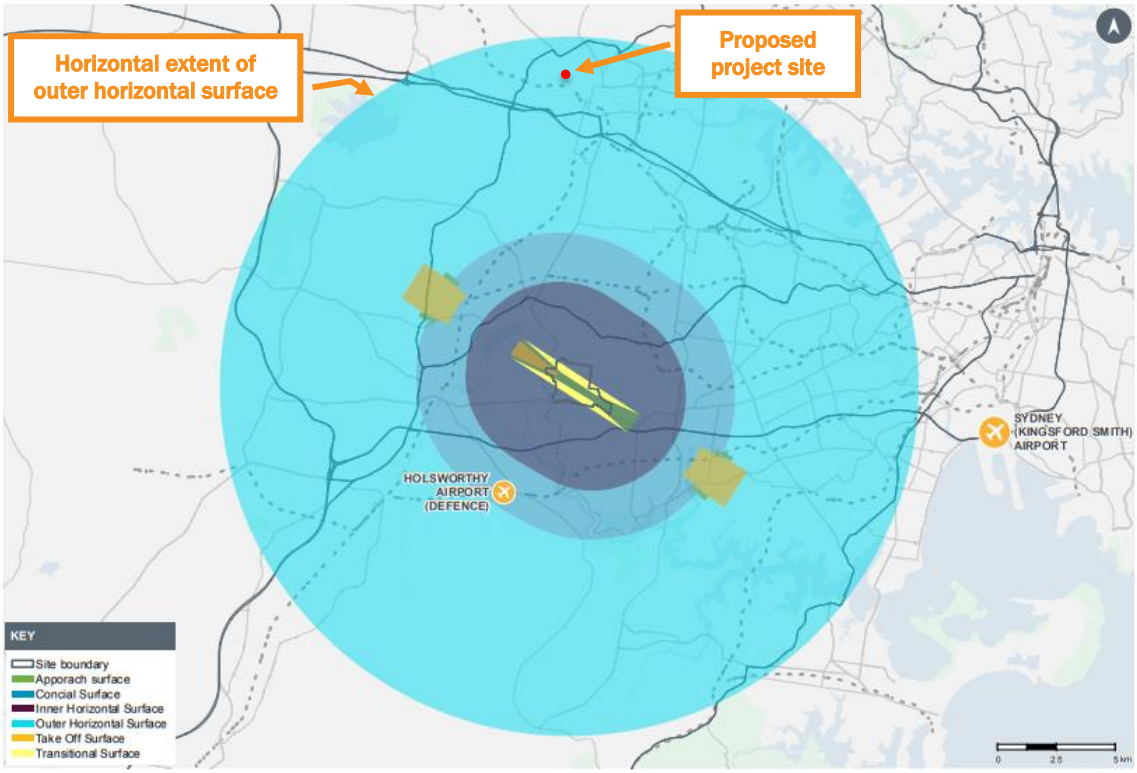


Figure 12 Figure 6.5 – Bankstown Airport OLS

The proposed project site is constrained by the outer horizontal surface at a height of approximately 157 m AHD. The maximum proposed building height of the project is 80.9 m AHD. At this height, the building will be approximately 76.1 m below the outer horizontal surface.

1.19. Bankstown Airport circling areas

Bankstown Airport has Category A, B and C circling areas (source: AsA, RNAV-Z GNSS RWY 11C, dated 05 November 2020).

These circling areas have the following maximum radii extension from Bankstown Airport:

- 1.68 nm (3.1 km) for Category A
- 2.66 nm (4.9 km) for Category B
- 4.2 nm (7.8 km) for Category C.

The project site is located outside circling areas of Bankstown Airport.

1.20. Helicopter design criteria

The design helicopter for the HLS at Westmead Hospital is the Agusta Westland AW139 (source: Children's Hospital at Westmead (CHW), Helicopter Landing Site Operations Manual, version 1.1).

AW139 is the primary helicopter type in use with Ambulance NSW. AW139 reflects the maximum weight, maximum contact load/minimum contact area, and has a similar overall length, rotor diameter, and footprint to the older Bell 412 models.

Under Category A, AW139 is certified for operations and can operate with a working load which meets Performance Class 1 operational requirements from all HLS types and when the gross weight is within Category A limits.

1.21. Westmead Hospital's helipads

A search on OzRunways was conducted to identify HLS near the project site. The following three HLS were identified:

- Westmead Adults Hospital – YWST
- Children's Hospital at Westmead – YXWM
- CareFlight Helicopter Base at Westmead Hospital – CareFlight HLS Base.

There is also a HLS on the Central Acute Service Building (extension to the Westmead Adults Hospital building), but no details are published.

Ambulance Service of New South Wales manages YWST and YXWM HLS.

Note: A check of En Route Supplement Australia (ERSA) showed that only YWST HLS has published aeronautical information.

Details of identified HLS are provided in Table 2.

Table 2 HLS details

HLS ID	*ICAO Code*	*Description*
Westmead Adults Hospital	YWST	• Uncertified • Lat 33°48.18'S /Long 150°59.18'E • Elevated concrete helipad (rooftop) on the southern side of Hospital (Hawkesbury Road) above Emergency Department and Ambulance entry point • Dimensions of the HLS are 27 m by 31 m • Approved approach and departure paths north east and south west (052 magnetic to 232 magnetic)
Children's Hospital at Westmead	YXWM	• Uncertified • Lat 33°48.08.49'S/ Long 150°59.37.10'E • Elevated helideck above a multi-level carpark • FATO is 25 m • Two VFR approach/departure paths are marked on the HLS deck between the TLOF and FATO boundary markings with yellow double headed arrows. Paths in the northern sector are 180°/360° and in the southern sector 360°/180°
CareFlight Helicopter Base	OZHJD	• Uncertified • Lat 33° 48.00'S / Long 150° 59.36'E • Non-precision instrument approaches service this HLS • The flight paths are along Toongabbie Creek, to the west and to the north
Central Acute Service Building	N/A	• Uncertified • Lat 33° 48.00'S / Long 150° 59.36'E • Non-precision instrument approaches service this HLS • The flight paths are along Toongabbie Creek, to the west and to the north

A closer view of the various Westmead Public HLS is provided in Figure 13 (source: Google Earth).

Figure 13 Westmead Public Hospital's helipads

For information purposes, Figure 14 shows the locations of Westmead Public's helicopter landing sites (source: OzRunways, 02 October 2017).

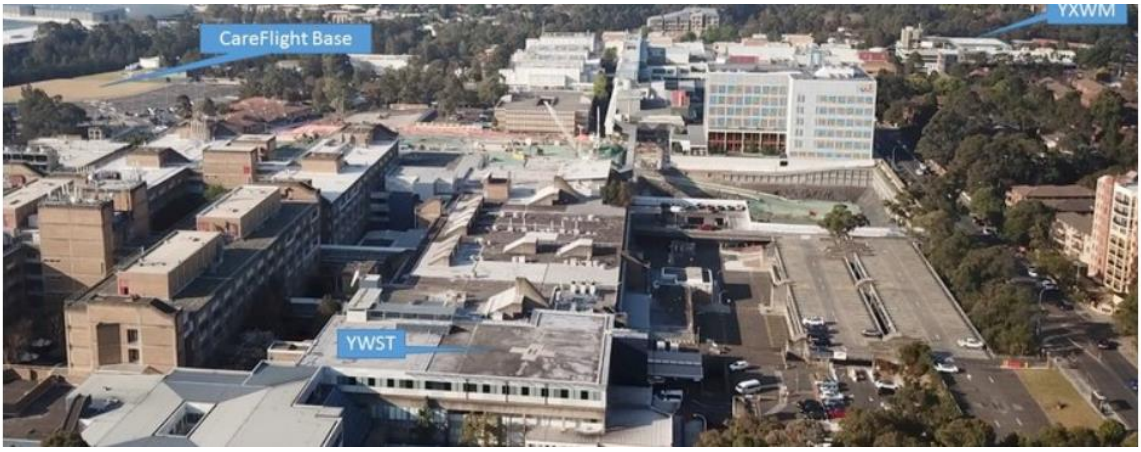


Figure 14 An image of Westmead Public Hospital's HLS

1.22. Westmead Adults Hospital helipad (YWST)

The approved approach and departure paths to the HLS, located on the southern side of Westmead Adults Hospital (Hawkesbury Road), relative to the project site are illustrated in Figure 15 (source: PDA Surveyors).

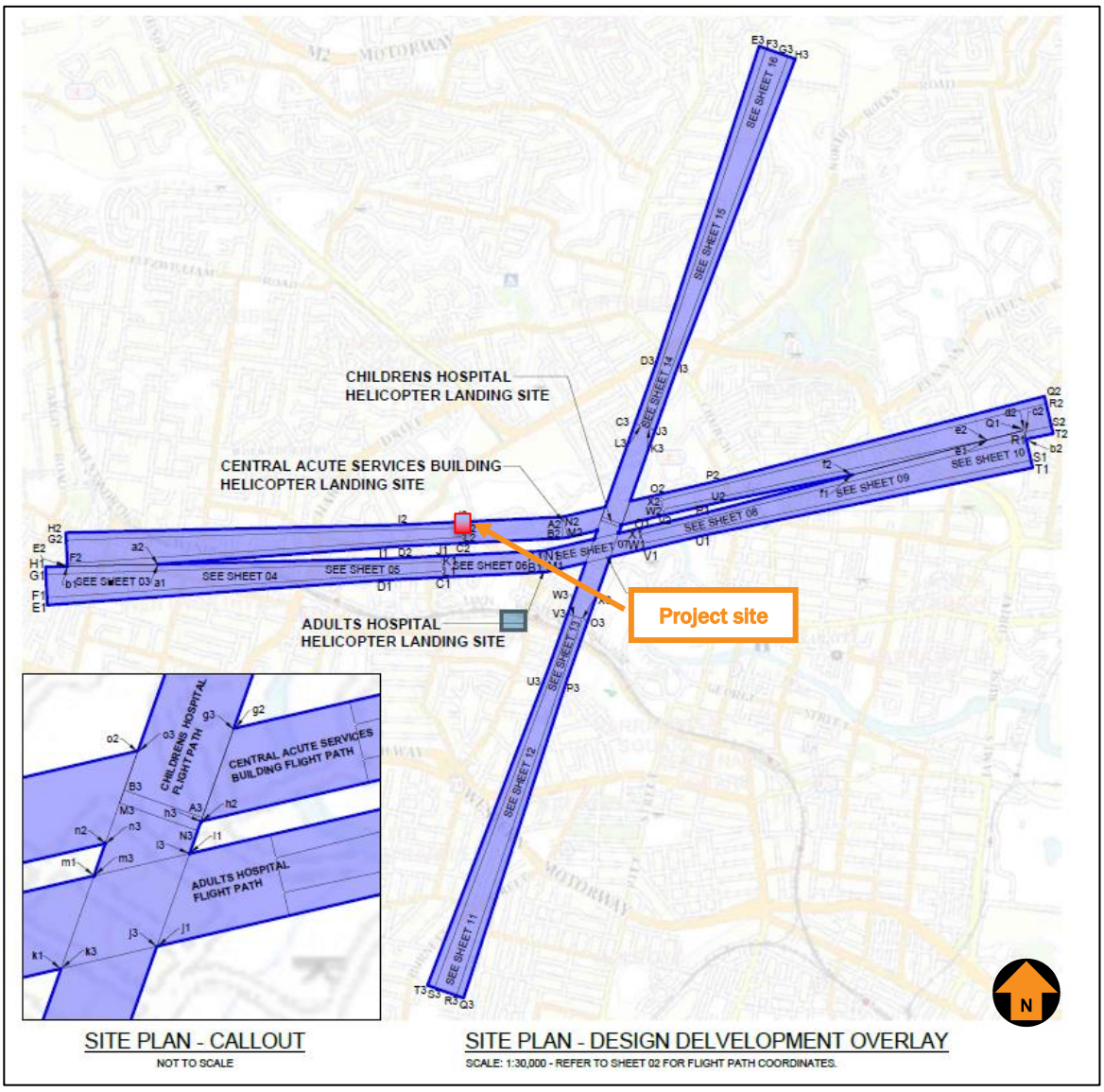


Figure 15 Approved approach and departure paths to Westmead Adults Hospital (YWST) HLS

The project site is located outside the approved flight paths to/from Westmead Adults Hospital (YWST) HLS.

1.23. Westmead Adults Hospital helipad (YWST) - instrument approach procedures

A check of the AIP via the Airservices Australia website showed that YWST HLS is served by non-precision instrument approach procedures as detailed in Table 3 (source: Airservices Australia, 05 November 2020).

Table 3 YWST HLS procedure charts

Chart name (Procedure Designer)	*Effective date*
RNAV-Z GNSS 052 (AsA)	21 May 2020 (WSTGN02-163)
RNAV-Z GNSS 127 (AsA)	21 May 2020 (WSTGN01-163)

The instrument procedures of YWST HLS will not be impacted by the proposed Project.

The MSA is applicable for each instrument approach procedure at YWST HLS. An image of the MSA published for the RAAF Richmond is shown in Figure 16 (source: AsA, RNAV-Z GNSS 127 chart, 21 May 2020).

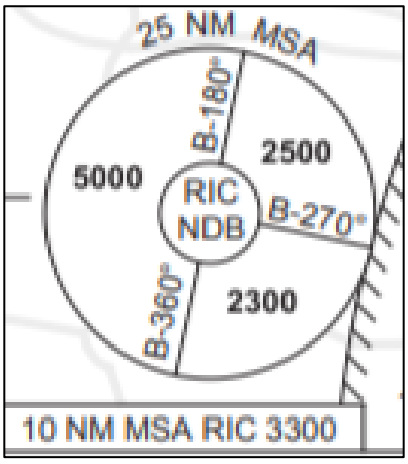


Figure 16 MSA at YWST

Within 15 nm (10 nm MSA + 5 nm buffer) of RIC NDB, helicopters are subject to the following minimum altitudes:

- 1500 ft AMSL between bearings 180° and 270°
- 1300 ft AMSL between bearings 270° and 360°
- 4000 ft AMSL between bearings 360° and 180°.

The project site is located approximately 30 km (16 nm) of Richmond NDB and between bearings 270° and 360° which has the MOC of 1300 ft AMLS. The project will not impact the 10 nm MSA of RAAF Richmond.

1.24. Central Acute Service Building

The approved approach and departure paths to the HLS, located on the Central Acute Service Building relative to the project site are illustrated in Figure 17 (source: PDA Surveyors).

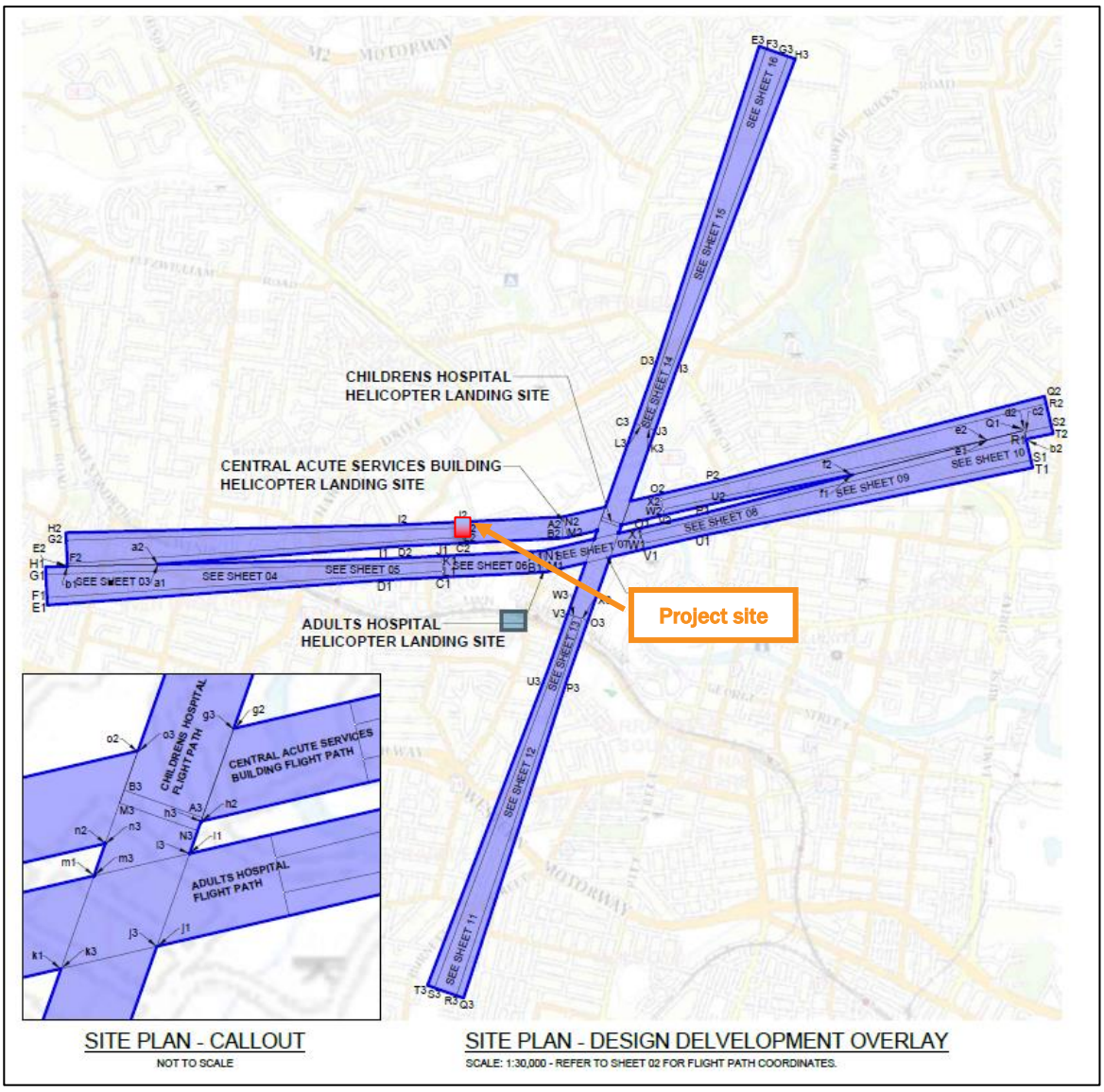


Figure 17 Approved approach and departure paths to Central Acute Service Building HLS

The project site is located within the horizontal extent of the approach and departure paths to Central Acute Service Building HLS from the west.

Figure 18 shows a close up of the approved flight paths to Central Acute Service Building HLS (source: PDA Surveyors).

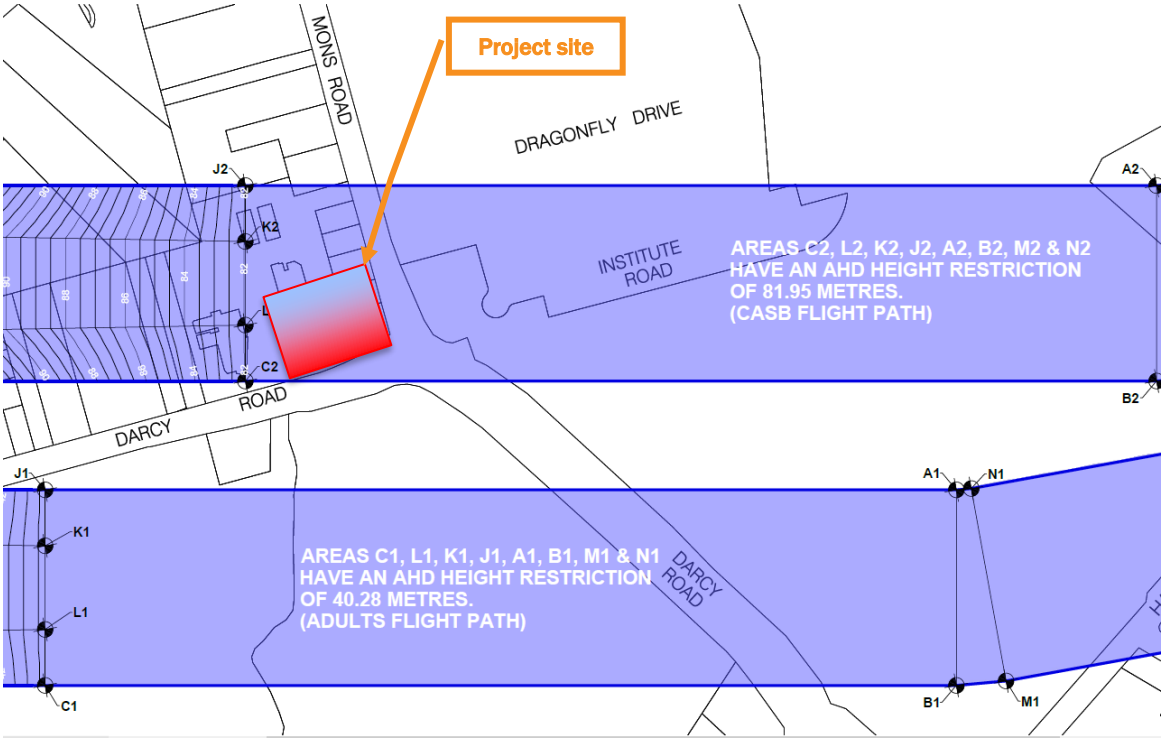


Figure 18 Close up of flight paths to Central Acute Service Building HLS

The project site is located in K2 and L2 areas for flight paths to Central Acute Service Building HLS approaching from the west. These areas have object identification surfaces (OIS) height of 81.95 m AHD.

Note: The OIS below the VFR approach and departure paths are the limit for the penetration of obstructions.

The highest building of the proposed WPH stage 4 development will be up to 80.9 m AHD (based on 16.4 m AHD ground level and 64.5 m AGL height), below the OIS of 81.95 m AHD.

According to *Guidelines for Hospital Helicopter Landing Sites in NSW*, the approach/departure surface is to be free of penetrations. Any penetration of the transitional surface is considered a hazard.

the Project will not impact on approved flight paths to/from Central Acute Service Building HLS at Westmead Public Hospital.

1.25. Children's Hospital at Westmead (YXWM)

According to the Children's Hospital at Westmead (CHW) HLS Operation Manual (version 1.1), flight paths in the northern sector are 180°/360° and 360°/180° in the southern sector.

The relevance and accuracy of the Operation Manual was confirmed by Ms Ziada Camdzic – Deputy HLO of the CHW.

Based on the information provided by Mr Matt Sydenham - A/Director, Redevelopment & Infrastructure Director, Capital Works & Asset Management at Western Sydney Local Health District, the flight paths to/from YXWM HLS will not be impacted by the Project.

Figure 19 shows approved flight paths to YXWM HLS (source: PDA Surveyors).

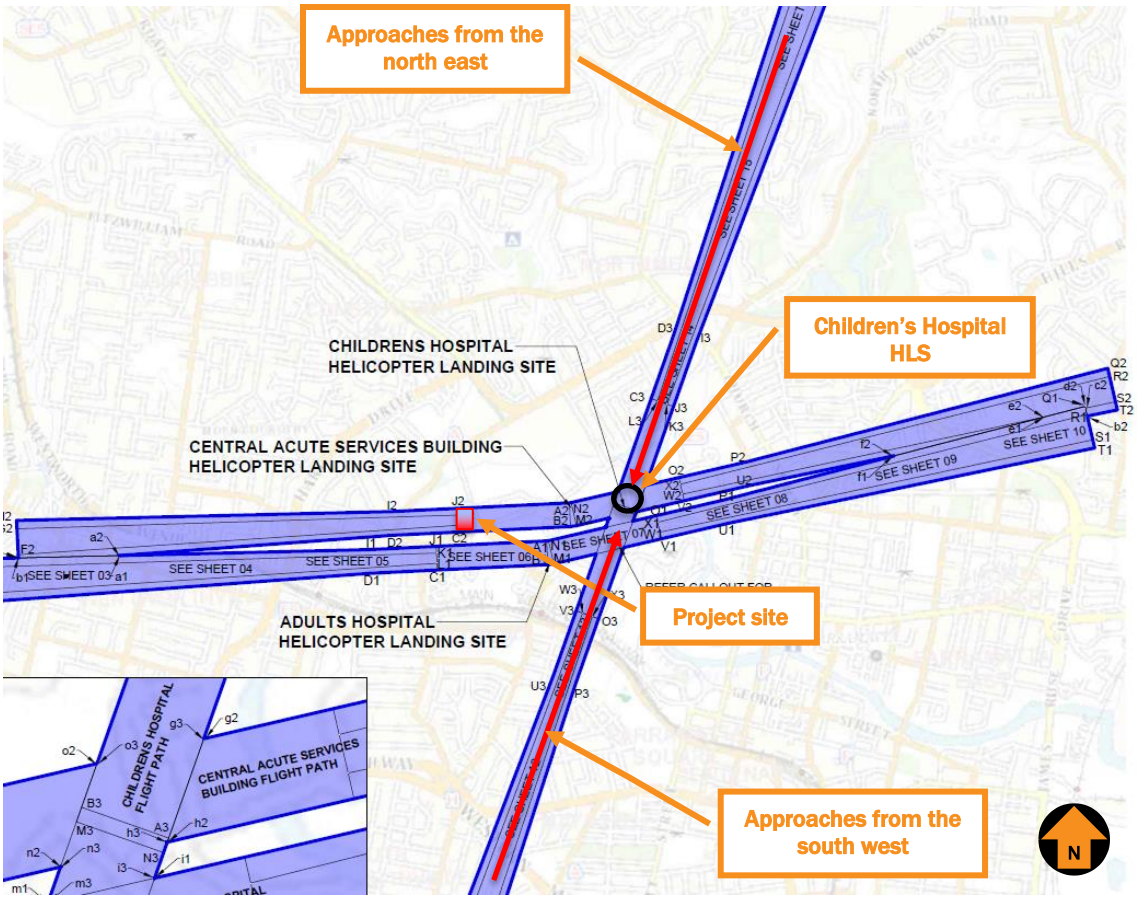


Figure 19 Approved flight paths to YXWM HLS

The project site is located outside the approved flight paths to/from YXWM HLS as per Helicopter Landing Site Operation Manual (v.1.1).

1.26. CareFlight operations to YXWM and YWST HLS

CareFlight performs flight operations to YWST HLS, YXWM HLS and to CareFlight HLS Base which is located approximately 600 m north east of the project site.

Mr Ian Smart, Senior Base Pilot at CareFlight, in his email dated 19 July 2019, advised that the flight paths to the YXWM HLS are generally to the east over Parramatta park and to the north.

Figure 20 shows indicative flight paths to YXWM HLS as per CareFlight operations.

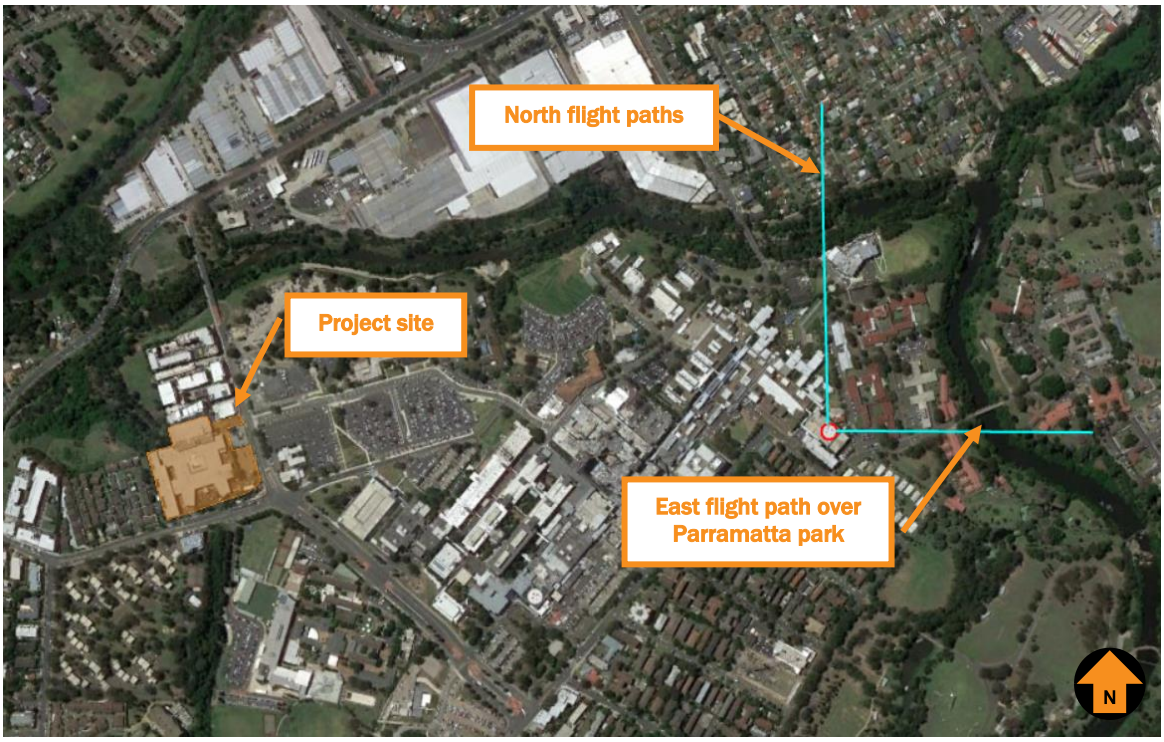


Figure 20 Indicative flight paths to YXWM HLS

The project site is located outside the flight paths to/from Children's Hospital at Westmead (YXWM) used by CareFlight.

Further, Mr Smart provided a map with flight paths to YWST HLS. Refer to Figure 21.

Figure 21 Flight paths to YWST HLS as per CareFlight operations

The project site is located outside the flight paths to/from YWST HLS used by CareFlight.

1.27. CareFlight operations to CareFlight HLS Base

There is no published information available in OzRunways and in ERSA on the CareFlight's HLS Base at Westmead Hospital.

CareFlight advised that the flight paths to CareFlight HLS Base are located along Toongabbie Creek to the west and the north. Refer to Figure 22 (source: CareFlight's email response from Mr Ian Smart, Senior Base Pilot, dated 19 July 2019).

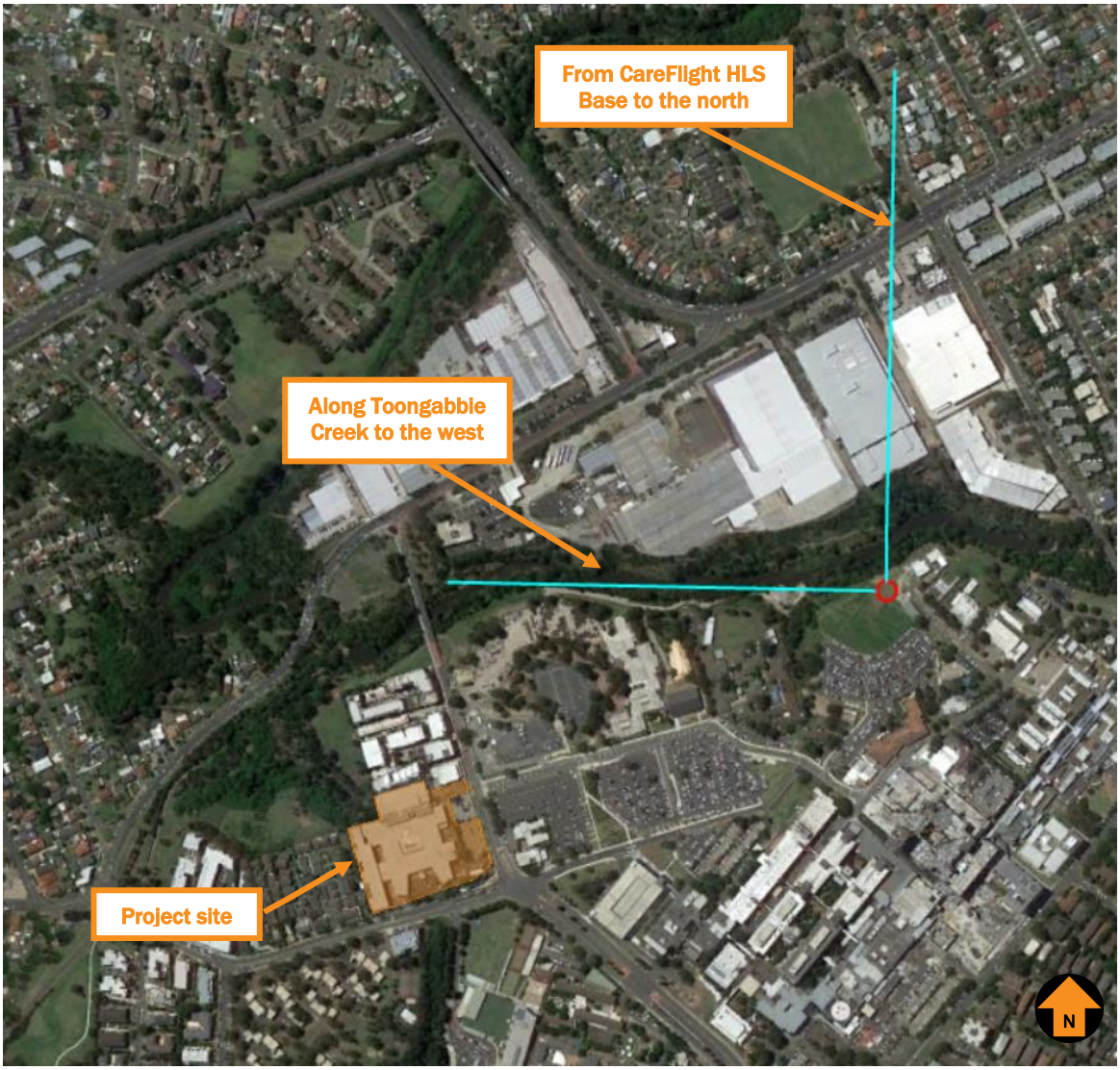


Figure 22 Approach and departure paths to/from the CareFlight HLS Base

The project site is located outside the approved flight paths to/from CareFlight HLS Base.

1.28. Toll ambulance rescue helicopter service

Toll ambulance rescue helicopter service (Toll) operates rescue helicopter service to YWST HLS and YXWM HLS.

In a phone conversation with Mr Tim Frankel, Managing Pilot at Toll, it was advised that Toll follows approved flight paths to YXWM HLS as per CHW's HLS Operation Manual.

In relation to flight paths to YWST HLS, Mr Franke advised that Toll's approach and departure paths to YWST HLS are 065° or 255° magnetic from the north east or south west. Refer to Figure 23.

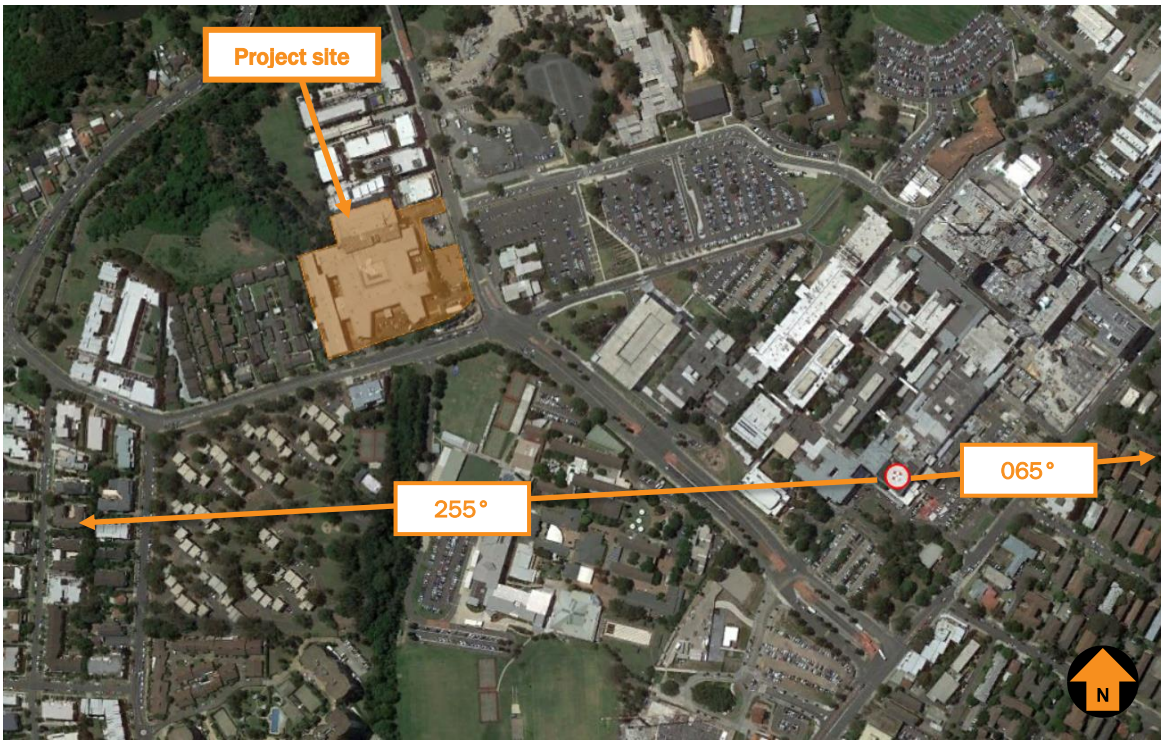


Figure 23 Toll's flight paths to YWST HLS

The project site is located outside the flight paths to/from YWST HLS flown by Toll.

1.29. Maximum external lighting intensities

The Bankstown Airport Master Plan 2019 provides guidance regarding lights that are installed within a 6 km radius of the airport. The lights within this area are to comply with Regulation 94 of the *Civil Aviation Regulations 1988* (CAR 1988). To assist developers in the vicinity of the Bankstown Airport, a plan was prepared highlighting the maximum lighting intensities in areas surrounding the airport.

NASF Guideline E: *Managing the risk of distractions to pilots from lighting in the vicinity of airports*, relates to lighting including construction lighting, to ensure lighting does not compromise aviation safety.

The project site is located outside the 6 km radius of the maximum external lighting intensities of Bankstown Airport and will have no impact on aircraft operations.

1.30. Navigational aids protection surfaces

According to the NASF Guideline G *Protecting Aviation Facilities - Communication, Navigation and Surveillance (CNS)*, navigation facilities have areas restricted to developments.

The closest aviation facility to the project site is the Bankstown Airport's NDB. For an NDB, the building restricted areas (Zone A and Zone B) are between 60 m and 300 m radius from the centre of the NDB antenna and exceeding an elevation angle of 5° from ground level at the centre of the NDB antenna.

The project site is located approximately 13.7 km (7.4 nm) north of the NDB and will not impact the NDB building restricted areas.

The closest aviation radars are Cecil Park Primary Surveillance Radar (PSR) and Cecil Park Secondary Surveillance Radar (SSR) located approximately 15.8 km (8.5 nm) south west of the project site.

Sydney Airport's PSR and SSR are located approximately 24.8 km (13.4 nm) south east of the project site.

The project site is unlikely to impact the serviceability of these radars. However, the proponent should seek Airservices Australia's advice in relation to potential impacts the Project might have on such radars.

1.31. Construction cranes

The highest building of the project will be approximately 76.1 m below the outer horizontal surface of Bankstown Airport.

Temporary cranes used during construction are unlikely to penetrate the OLS of Bankstown Airport.

Further details on the required information for construction crane assessment is provided on Sydney Metro Airports (Bankstown) website:

https://www.sydneymetroairports.com.au/property/development/#Guidelines

Given the overall height of the proposed development is close to the limiting obstacle identification surface height of 81.95 m, temporary cranes used during construction will likely penetrate the. Therefore, permission to operate a crane within the construction period should be sought from Western Sydney Local Health District.

Any crane or temporary construction structure penetrating 81.95 m AHD OIS should be reported to Airservices Australia and Western Sydney Local Health District for their assessment.

According to *Guidelines for Hospital Helicopter Landing Sites in NSW*, notification periods of a minimum of 8 weeks apply for gaining approval for obstructions near hospital HLS such as tower cranes or luffing cranes.

CASR 139/MOS 139 requires any crane that sits atop the building will require obstacle lighting and/or marking.

Depending on a crane structure the top of crane should be fitted with medium intensity flashing or steady red obstruction light.

1.32. Reporting of tall structures and plume rise

CASA's Advisory Circular AC 139-08 version 2.0 dated March 2018 provides some guidance to those authorities and persons involved in the planning, approval, erection, extension or dismantling of tall structures or sources of hazardous plumes so that they may understand the vital nature of the information they provide.

Paragraph 2.4 sets requirement to reporting tall structures. In particular, paragraph 2.4.2 states:

> *The Royal Australian Air Force (RAAF) has an additional requirement to know about the existence of low-level structures. The trigger height of these structures is:*
>
> *– 30 m or more above ground level, within 30 km of an aerodrome*
>
> *– 45 m or more above ground level elsewhere*

The project site is located within 30 km of Bankstown Airport. The maximum development height is 64.5 m AGL. Therefore, the proponent should report details about this building to Airservices Australia, using the following email address: vod@airservicesaustralia.com

The Tall Structure/Vertical Obstacle Notification Form for reporting a building is available at AsA's website: http://www.airservicesaustralia.com/wp-content/uploads/ATS-FORM-0085_ObstacleNotificationForm.pdf

1.33. Plume rise

The Bankstown Airport Master Plan 2014 sets out CASA's requirements for the need to assess the potential hazard to safe handling of aircraft in phases of flight from an exhaust plume.

Specially, the Bankstown Airport Master Plan 2014 requires:

> *Proponents of a facility to be located within 15 kilometres of an airport are to consult the airport operator if that facility includes a combustion source which generates an exhaust plume which has a vertical velocity greater than 4.3 meters/second at the OLS.*

The application should provide advice on exhaust plumes that may originate at the top of the proposed building, which may impact OLS airspace and if required, may need a Plume Rise Assessment (CASA Advisory Circular AC 139-05 (v3.0) and is available at CASA's website: https://www.casa.gov.au/sites/default/files/advisory-circular-ac-139-05-plume-rise-assessments.pdf

The Application for an Operational Assessment of a Proposed Plume Rise is available at CASA's website: https://www.casa.gov.au/sites/default/files/_assets/main/manuals/regulate/casr139/form1247.pdf

1.34. Summary

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

- The project site is subject to the provisions of the Parramatta Local Environmental Plan 2011.
- Parramatta Local Environmental Plan 2011 states that the site is currently subject to a 12 m maximum building height. The height of building for the proposed project site has a maximum building height of 64.5 m AGL.
- The proposed project will not impact on Bankstown Airport's OLS or PANS-OPS surfaces.
- The project site is located outside the 6 km radius of the maximum external lighting intensities of Bankstown Airport and will have no impact on aircraft operations.
- The closest aviation facility to the project site is the Bankstown Airport's NDB. The building restricted areas (Zone A and Zone B) of the Bankstown Airport's NDB will not be impacted.
- The proposed project site is located outside of controlled airspace (wholly within Class G airspace) with a vertical limit of 2500 ft.
- The project site is located outside the approved flight paths to/from Westmead Adults Hospital (YWST) HLS.
- The project site is located within the horizontal extent of the approach and departure paths to Central Acute Service Building HLS from the west.
- The highest building of the proposed WPH stage 4 development will be up to 80.9 m AHD (based on 16.4 m AHD ground level and 64.5 m AGL height), and below the OIS of 81.95 m AHD for flight paths to/from Central Acute Service Building HLS.
- The project site is located outside the approved flight paths to/from YXWM HLS as per Helicopter Landing Site Operation Manual (v.1.1)
- If helicopters approach the Children's Hospital Westmead (YXWM) HLS from the west, the tallest proposed building at 64.5 m AGL will be below OIS of 81.95 m AHD by approximately 1.05 m.
- CareFlight operations to YWST HLS, YXWM HLS, Central Acute Service Building HLS and CareFlight HLS Base at Westmead Hospital will not be impacted by the project.
- Toll operations to YWST HLS, YXWM HLS, Central Acute Service Building HLS will not be impacted by the project.
- Temporary construction cranes are unlikely to penetrate the OLS of Bankstown Airport.
- Temporary construction cranes located on the taller of the proposed buildings will likely penetrate the OIS of 81.95 m AHD for flight paths to/from Central Acute Service Building HLS from the west.
- CASR 139/MOS 139 requires any crane that sits atop a building will require obstacle lighting and/or marking.

- Depending on the crane structure, the top of the crane should be fitted with medium intensity flashing or steady red obstruction light.
- The project site is located within 30 km of Bankstown Airport. The maximum development height is 64.5 m AGL. Therefore, the proponent should report details about this building to Airservices Australia.
- The application should provide advice on exhaust plumes that may originate at the top of the proposed building, which may impact OLS airspace and if required, may need a Plume Rise Assessment
- The proponent should seek Ambulance Services of NSW advice in relation to potential impacts of the project on helicopter operations from/to YWST HLS, YXWM HLS, Central Acute Service Building HLS, and the use of temporary cranes.

If you wish to clarify or discuss the contents of this correspondence, please contact me on 0417 631 681.

Kind regards

Keith Tonkin

Managing Director

17 February 2021