April 2021

AVIATION IMPACT ASSESSMENT

BUDAWANG SCHOOL

Prepared for NSW Department of Education

AVIATION PROJECTS

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DOCUMENT CONTROL

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GLOSSARY

AGL	above ground level
AHD	Australian Height Datum
AIP	aeronautical information package (Airservices Australia)
AMSL	above mean sea level
CAAP	Civil Aviation Advisory Publication
CAR	Civil Aviation Regulations (1988)
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations (1998)
ERSA	En Route Supplement Australia (Airservices Australia)
ICAO	International Civil Aviation Organisation
HLS	Helicopter Landing Site
LSALT	lowest safe altitude
MSA	minimum safe altitude
MOC	minimum obstacle clearance
MOS	Manual of Standards Part 139—Aerodromes
NAS	Naval Air Station
NASF	National Airports Safeguarding Framework
OLS	obstacle limitation surface(s)
RAN	Royal Australian Navy
SSR	secondary surveillance radar

UNITS OF MEASUREMENT

ft	feet	(1 ft = 0.3048 m)
km	kilometres	(1 km = 0.5399 nm)
m	metres	(1 m = 3.281 ft)
nm	nautical miles	(1 nm = 1.852 km)

1. INTRODUCTION

1.1. Situation

Schools Infrastructure NSW is currently in the design phase of the Budawang School in Milton, NSW. The project comprises the relocation of the existing Budawang in Ulladulla to a dedicated and fit for purpose facility at the recently acquired site at Croobyar Road in Milton. This new location is on the former Shoalhaven Anglican School site. The project will deliver new purpose-built learning spaces for the Budawang School to cater for students with moderate or severe intellectual disabilities from years K-12.

The project has requested the Secretary's Environmental Assessment Requirements (SEARs), and the Department of Planning, Industry and Environment (DPIE) has assessed the project and advised the studies that need to be included as part of the State Significant Development Application (SSDA) leading to additional stakeholder consultation. Due to the proximity of the project site to the Milton Helipad an Aviation Impact Assessment is required as part of the SEARs.

Aviation Projects has been engaged to provide an Aviation Impact Assessment for the proposed development, and to assess any impacts and mitigation measures for current operations at Milton Heliport.

1.2. Purpose and scope of task

The scope of this task included the following:

- Review the site against all associated regulatory and airspace authorities
- Prepare an Aviation Impact Assessment that identifies and assesses the potential operation or construction impacts of the development on the aviation operations of any nearby on shore helicopter landing sites (HLS) and associated flight paths in accordance with the relevant sections of the National Airports Safeguarding Framework (NASF)
- Propose any potential mitigation strategies.

1.3. Methodology

The task was performed according to the method outlined below:

1. Review client material
2. Review relevant regulatory requirements and information sources including Aeronautical Information Package and Civil Aviation Safety Authority (CASA) Manual of Standards Part 139 – Aerodromes
3. Consider the National Airports Safeguarding Framework Guidelines, including Guideline H: Protecting Strategically Important Helicopter Landing Sites
4. Consider the Civil Aviation Advisory Publications (CAAPs) guidelines, including CAAP 92-2(2): *Guidelines for the establishment and operation of onshore Helicopter Landing Sites*
5. Provide 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)

6. Identify operational impacts and provide advice on the hospital's airspace and protection of the hospital's nearby HLS flight paths
7. Assess any crane or any temporary construction structure against helicopter flight paths servicing the nearby HLS
8. Prepare a draft letter report with the preliminary aviation planning assessment and advice on safeguarding airspace and send to the client for comment
9. Finalise the letter report for Client acceptance.

1.4. Client material

The following material was provided by SJA for the purpose of this Aviation Impact Assessment:

- 20201124_Budawang_SRDP Pre-Briefingv3.pdf dated 25 November 2020
- Group GSA, Budawang Relocation Site Plan, Project No 190941, Drawing No A2000, dated 11 May 2020.
- SSDA-200D Drawing, dated 8 April 2021

1.5. References

References used or consulted in the preparation of this report include:

- Airservices Australia, *Aeronautical Information Package; including AIP Book, Departure and Approach Procedures and En Route Supplement Australia,* effective 05 November 2020
- Airservices Australia, Designated Airspace Handbook (DAH), effective 05 November 2020
- Civil Aviation Safety Authority, Civil Aviation Regulations 1998 (CAR)
- Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 (CASR)
- Civil Aviation Safety Authority, *Part 139 (Aerodromes) Manual of Standards 2019*, dated 5 September 2019
- 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, *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
- Department of Infrastructure and Regional Development, Australian Government, National Airport Safeguarding Framework, *Guideline B Managing the Risk of Building Generated Windshear and Turbulence at Airports*, dated May 2018, and *Guideline H: Protecting Strategically Important Helicopter Landing Sites* dated May 2018
- International Civil Aviation Organization, Aircraft Operations Volume II – *Construction of Visual and Instrument Flight Procedures*, 6th edition, 2014
- NSW Department of Health, NSW Government, Guidelines for Hospital Helicopter Landing Sites in NSW, dated 2020
- New South Wales Government, State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017
- New South Wales Government, Shoalhaven Local Environmental Plan 2014
- OzRunways, accessed 01 February 2021.

2. BACKGROUND

2.1. Project description

The Project consist of multiple single storey buildings. All are to similar scale to existing educational buildings on the site. The core facilities (library, hall, administration, etc.) and the hydrotherapy building are aligned with Croobyar Road, creating a public façade for the educational facility. Two wings of learning spaces are located to the south away from the road. This creates a central courtyard space that will create privacy for students, whilst maximising passive surveillance.

Figure 1 shows an aerial view of the Project site (source: SSDA-2000[D].pdf, dated 8 April 2021).

Figure 1 Aerial view of Project site

Figure 2 shows a side elevation view from the south of the proposed development (source: 20201124_Budawang_SRDP Pre-Briefingv3.pdf dated 25 November 2020).

Figure 2 Side view from the south towards Croobyar Road

Figure 3 shows a side elevation view of the proposed development (source: 20201124_Budawang_SRDP Pre-Briefingv3.pdf dated 25 November 2020).

Figure 3 Side view from the west towards Princess Highway

2.2. Site overview

An overview of the Project site and heliport located at Croobyar Road, Milton, is provided in Figure 4 and Figure 5, the two sites are approximately 140m from each other (source: 20201124_Budawang_SRDP Pre-Briefingv3.pdf dated 25 November 2020 and OzRunways).

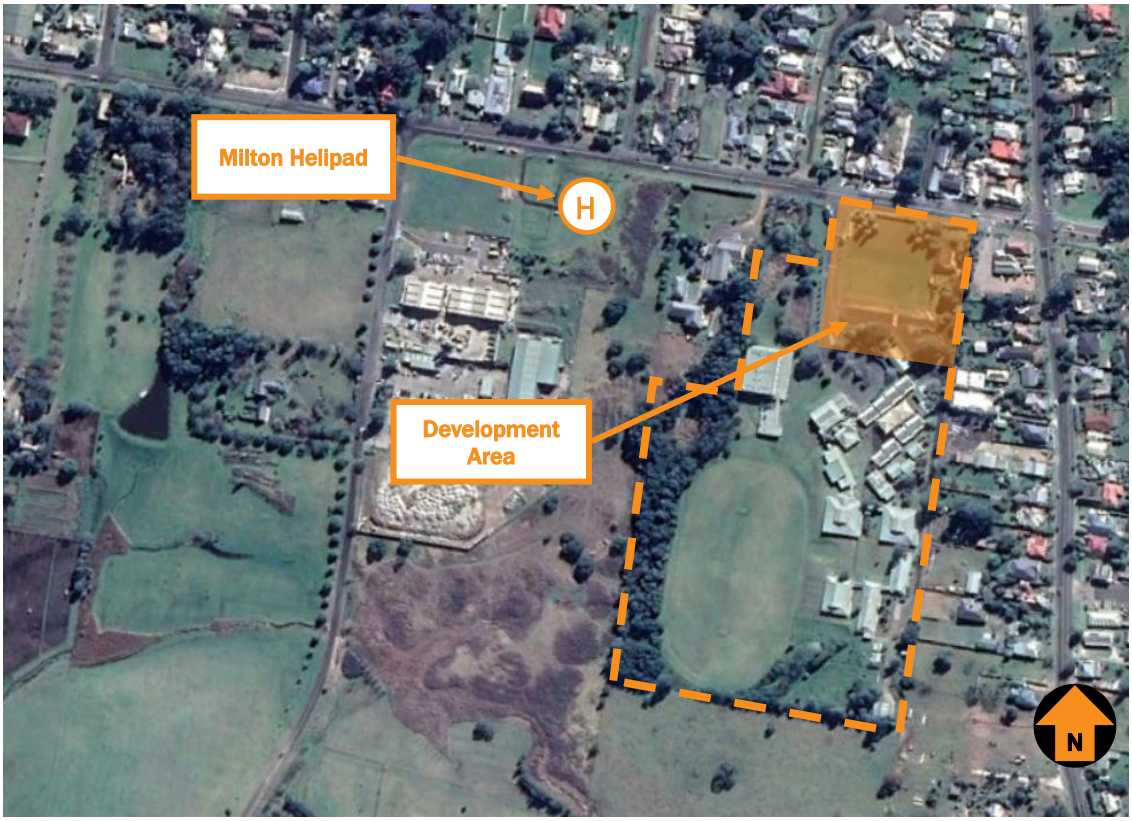

Figure 4 Project site relative to Milton helipad

Figure 5 Project site relative to Milton Heliport

A search was conducted to identify nearby certified or military airports. The airports that are located closest to the Project site are the Naval Air Stations (NAS) at Jervis Bay (30 km / 16 nm) and Nowra (HMAS Albatross) (42 km /22.5 nm) operated by the Royal Australian Navy (RAN). However, as the Project is located 30 km (16 nm) from NAS Jervis Bay, there may be impacts on operations at the airport and has therefore been assessed as part of this AIA.

Figure 6 identifies the project in proximity to NAS Jervis Bay (Source: OzRunways).

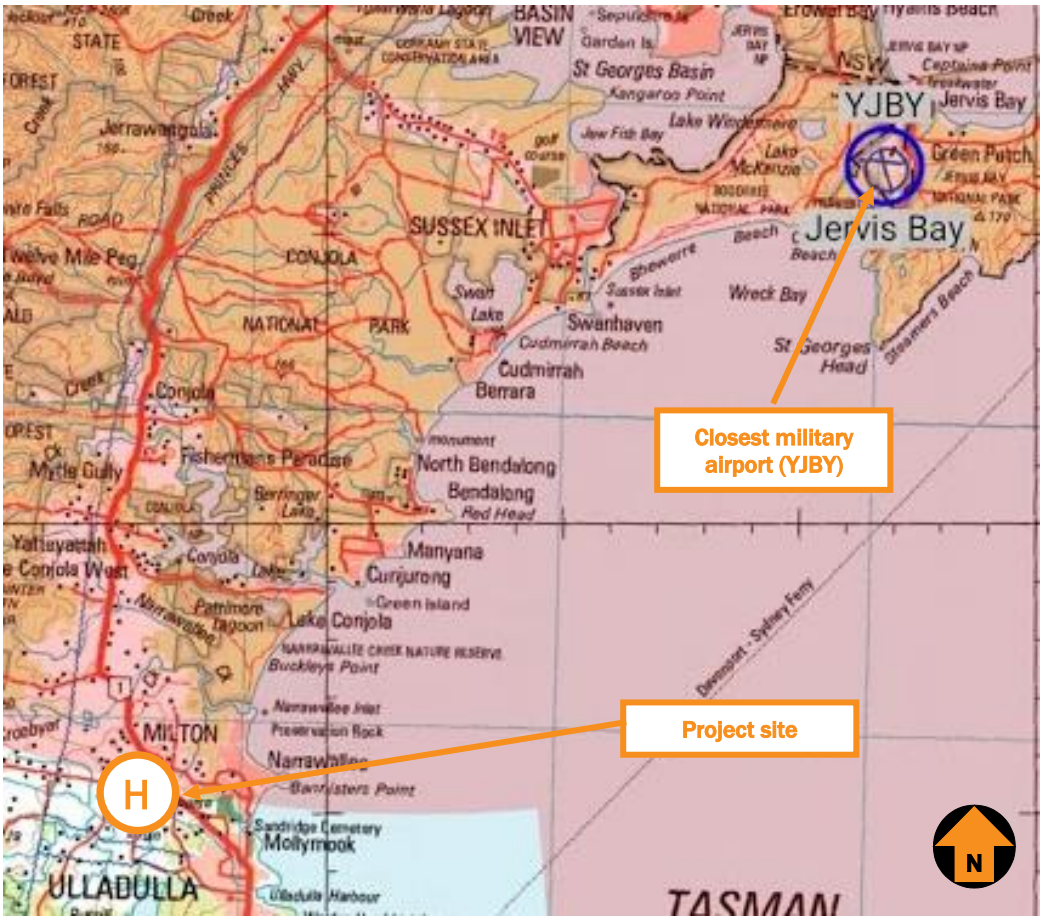

Figure 6 Project proximity to NAS Jervis Bay

For the purposes of this analysis, the following details of Budawang School are relevant to the assessment herein:

- natural ground level is 57 m (187 ft) (AHD)
- building height is a maximum of 6.2 m above ground level (AGL)
- maximum overall height is 63.2 m in AHD (207 ft above mean sea level (AMSL)).

The Project site falls east to west, from 57 m AHD down to 53 m AHD along Croobyar Road, after which the ground elevation rises again to 58 m AHD at the Milton Heliport (source: ICSM – Elvis Application & Google Earth) see Figure 7 (Source: Google Earth).

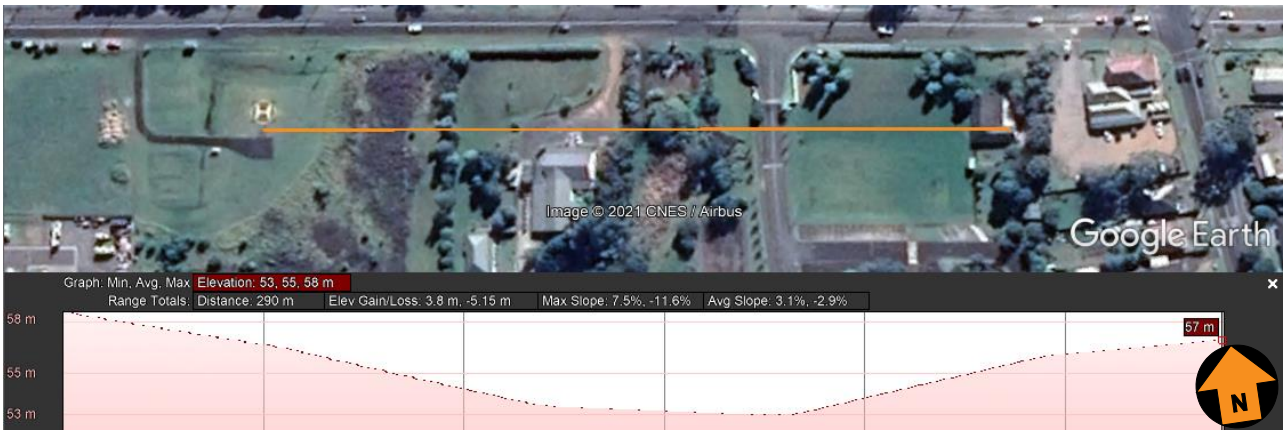

Figure 7 Elevation Profile of the Project Site

Figure 8 illustrates Block C of Budawang School in comparison to the adjacent Heritage Bakery on the intersection of Croobyar Road and the Princess Highway. The planned development does not exceed the building height of the existing structure in the surrounding area (Heritage Bakery) (source: 20201124_Budawang_SRDP Pre-Briefingv3.pdf dated 25 November 2020).

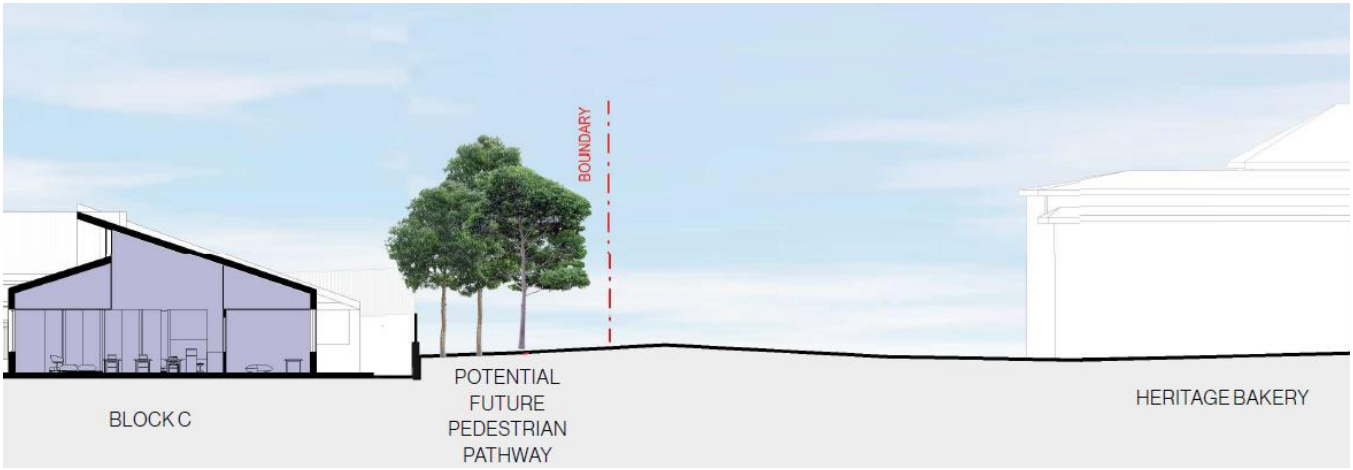

Figure 8 Height of Budawang School in comparison to neighbouring Heritage Bakery.

2.3. Temporary crane operations

Temporary crane details will be made available prior to construction.

3. PLANNING CONTEXT

In the absence of formal Australian legislation for the protection of airspace and flight paths around HLS, the following planning documents, and guidelines have been used or referenced as a basis for the aviation impact statement.

3.1. Shoalhaven Local Environmental Plan (2014)

The Project is located within the City of Shoalhaven local government area (LGA). The Project is subject to the provisions of the Shoalhaven Local Environmental Plan (2014).

Aims of Plan:

(1) This Plan aims to make local environmental planning provisions for land in Shoalhaven in accordance with the relevant standard environmental planning instrument under section 3.20 of the Act.

(2) The particular aims of this Plan are as follows—

(aa) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,

(a) to encourage the proper management, development and conservation of natural and man-made resources,

(b) to facilitate the social and economic wellbeing of the community,

(c) to ensure that suitable land for beneficial and appropriate uses is made available as required,

(d) to manage appropriate and essential public services, infrastructure and amenities for Shoalhaven,

(e) to minimise the risk of harm to the community through the appropriate management of development and land use.

The Shoalhaven Local Environmental Plan, does not contain any provisions for the Milton Heliport, nor does it contain any information relating to plume rise assessments, aviation impacts or protecting the airspace around the Milton Heliport.

The Project is located in zone RU1, refer to Figure 9 (source: NSW Department of Planning and Environment). This zone is a Primary Production zone, the objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To conserve and maintain productive prime crop and pasture land.

- To conserve and maintain the economic potential of the land within this zone for extractive industries.

The development of Educational Establishments on this site is only permitted with consent of the state government.

Based on the Shoalhaven Local Environmental Plan 2014 – Height of Buildings Map – Sheet HOB_016C the maximum height of the development should not exceed 11 m AGL.

Figure 9 Location of site and land zoning

3.2. State Environmental Planning Policy (Educational Establishments and Child Care Facilities)

The Project is also subject to State Environmental Planning Policy for Educational Establishments and Child Care Facilities (2017). The aim of this Policy is to facilitate the effective delivery of educational establishments and early education and care facilities across the State. The two planning policies should be read in conjunction, but as specified in clause 8:

"if there is an inconsistency between this Policy and another environmental planning instrument, whether made before or after the commencement of this Policy, this Policy prevails to the extent of the inconsistency."

This planning policy does not contain any provisions regarding aerodromes, nor does it contain any information relating to plume rise assessments, aviation impacts or protecting the airspace around aerodromes. However, this planning document does provide a maximum building height which School developments should meet.

"The building height of a building (whether a new building, or an existing building as a result of an addition or alteration)

(a) must not exceed 4 storeys, and

(b) must not exceed 22 m from ground level (mean).

3.3. 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.

3.3.1. 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. As the development of Budawang School is lower than 110 m AGL, it is not subject to this requirement.

3.3.2. Manual of Standards 139--Aerodromes

Chapter 7 of MOS 139 sets out the standards applicable to Obstacle Restriction and Limitation. Section 7.1 introduces which areas on and surrounding an aerodrome need to be kept clear of obstacles.

7.1 Introduction

(1) Both of the following must be monitored and maintained free from obstacles in accordance with this MOS:

(a) the airspace around an aerodrome;
(b) the manoeuvring area of an aerodrome.

In section 7.3 the Obstacle Limitation Surfaces (OLS) are introduced:

7.03 Introduction

(1) An aerodrome operator must establish and monitor the obstacle limitation surfaces (OLS) applicable to the aerodrome.

(4) As far as possible, the aerodrome operator must ensure that the OLS within the aerodrome boundary is maintained clear of obstacles.
Note: If third parties propose to erect structures likely to infringe the OLS outside the aerodrome boundary, it is in the interests of aerodrome operators to liaise as soon as possible with the proponents and the relevant planning authorities, with a view to ensuring the preservation of the OLS and limiting the introduction of new obstacles.

MOS 139 does not specify any OLS surfaces associated with heliport infrastructure.

3.3.3. 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) *Guidelines for the establishment and operation of onshore Helicopter Landing Sites* 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 Touchdown and Lift-Off Area (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 10.

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 10 Figure 3 CAAP 92-2(2)

It is assumed that the Milton Heliport is predominantly used for medical flights operated by Ambulance NSW. The 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 and therefore subject to an Approach and Take-off Climb Surface with a slope of 4.5% - see Figure 11.

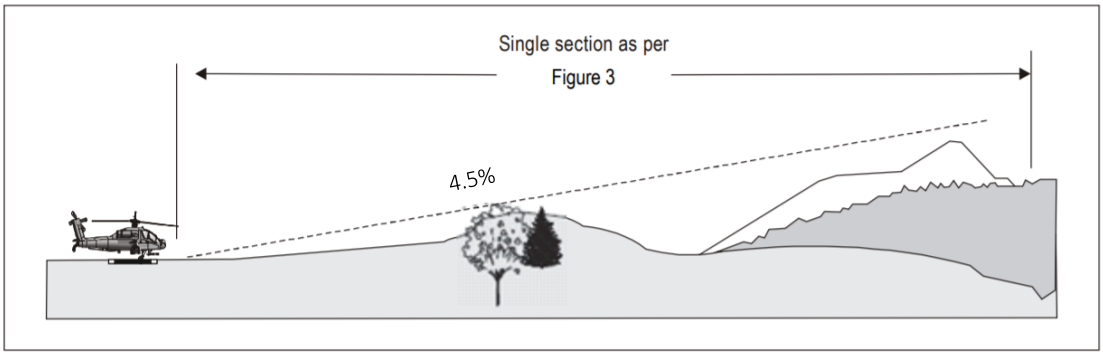

Figure 11 Figure 4 CAAP 92-2(2)

3.4. 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.

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.*

During a workshop hosted by ICAO on the topic of Annex 14, Volume II between 18-22 April 2016 in Bangkok Thailand, the following recommendation was made regarding OLS surfaces:

> *For heliports that have an approach/take-off climb surface with a 4.5 per cent slope design, objects shall be permitted to penetrate the obstacle limitation surface, if the results of an aeronautical study approved by an appropriate authority have reviewed the associated risks and mitigation measures.*

3.5. National Airports Safeguarding Framework

The National Airports Safeguarding Advisory Group (NASAG) was established by Commonwealth Department of Infrastructure and Transport to develop a national land use planning framework called the National Airports Safeguarding Framework (NASF). The purpose of this framework is to enhance the current and future safety, viability and growth of aviation operations at Australian airports through:

- the implementation of best practice in relation to land use assessment and decision making in the vicinity of airports;

- assurance of community safety and amenity near airports;
- better understanding and recognition of aviation safety requirements and aircraft noise impacts in land use and related planning decisions;
- the provision of greater certainty and clarity for developers and land owners;
- improvements to regulatory certainty and efficiency; and
- the publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports.

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 ...*

Additionally:

> *All development/activity applications in the vicinity of an identified SHLS should be reviewed to determine if there is any conflict in respect to:*
>
> *a) intrusions into the flight path (buildings, cranes, gaseous plumes);*
>
> *b) operational hazards (reflective glare, dust, smoke, electromagnetic interference);*
>
> *c) lighting that may cause distraction;*
>
> *d) lighting installed to illuminate obstructions that is not visible when using night vision goggles;*
>
> *e) wildlife/bird strikes;*
>
> *f) drone operations/strikes; and*
>
> *g) building induced windshear/turbulence.*
>
> ***Cranes***
>
> *36. Where development, including temporary structures ancillary to that development (for example, cranes) has the potential to impact upon the safe operation of SHLS, it is important that the relevant helipad owner is notified and has an opportunity to make a meaningful contribution to the outcome of the development proposal.*
>
> *45. Any development proposal located within/beneath the flight path to a HLS must be required to indicate:*
>
> > *a) whether a crane is to be erected during the construction of that development;*
> >
> > *b) the maximum height of the crane;*
> >
> > *c) the height and swing radius of the crane with the jib stowed when not in operation; and*
> >
> > *d) the period in which the crane is anticipated to remain on site.*

46. Regardless of whether the proposed development extends into the flight path, if the crane to be used during construction is anticipated to extend into the flight path, CASA and the SHLS asset owner should be contacted for advice. Advice received during that referral must be taken into consideration in the assessment of the application.

Lighting

48. Where a SHLS is to be used in association with night time operations, all lighting is to comply with CAAP 92-2 (2) Guidelines for the Establishment and Operation of Onshore Helicopter Landing Sites, except where certified by a suitably qualified and experienced aviation professional.

49. Lighting erected onto any obstruction (building, crane, or telecommunication tower for example) within the flight path or above 110 metres in height (whether it is located within a flight path or not), must be able to be detected by Night Vision Goggles (or equivalent). It is understood that lighting that is red in colour and low intensity steady light is preferable. Additionally, any buildings, cranes, etc above 110 metres in height (regardless of their location) should be referred to CASA as part of the assessment process. helipad owner is notified and has an opportunity to make a meaningful contribution to the outcome of the development proposal.

Milton Helipad HLS could be considered a SHLS, so NASF Guideline H has been considered as part of this assessment.

3.6. Guidelines for Hospital Helicopter Landing Sites in NSW

Within New South Wales, all hospital-based HLS operations are subject to the document '*Guidelines for Hospital Helicopter Landing Sites in NSW*'. The guidelines define a hospital-based HLS as a helicopter landing area located within the grounds of a hospital with easy trolley access to and from the hospital's critical care areas. These critical care areas are the emergency department, intensive care units (adult and neonatal), operating and selected procedural suites.

Milton Heliport, although used for medical flights, does not qualify as a hospital-based HLS as it requires an ambulance to transfer passengers between the HLS and the hospital. Therefore, Milton Heliport can be classified as an off-site HLS. The guideline defines an off-site HLS as a helicopter landing area designed for Helicopter Emergency Medical Service (HEMS) use that requires the use of a vehicle to convey a patient between the landing area and the hospital.

As Milton Heliport is classified as an off-site HLS the provisions within the guidelines are informative but not strictly applicable.

4. AVIATION IMPACT STATEMENT

The proposed Project site is located within proximity to the Milton Heliport.

4.1. Milton Heliport Helicopter Landing Site

Milton Heliport HLS (YILT) is the closest HLS to the Project site and is the only HLS that is of concern regarding the impact on aviation operations as a result of the Project development.

YILT is operated by New South Wales Department of Health and is located approximately 200 m west of the Project site.

4.2. Instrument flight

The proposed development will be lower than other existing development and natural features within the vicinity of the HLS and will not affect minimum safe altitudes for flight under the instrument flight rules.

4.3. Visual approach and departure flight paths

As published on the Milton Heliport HLS OzRunways Helipads page, approach/departure to/from the HLS is conducted to the west and east, with an alternate to the south east. Refer to Figure 12 (source: NSW ePlanning Viewer, OzRunways). The project site is located under the flight paths to/from YILT HLS as published on OzRunways, but will not impact the approach or departure procedures for the HLS due to the relative heights of the proposed development with respect to surrounding development and the HLS itself.

Figure 12 Published flight paths for YILT HLS

4.4. Obstacle Limitations Surfaces (OLS)

As per CAAP 92-2(2), the approach and take-off climb surface starts at the edge of the safety area and extends up at a slope of 4.5%. Figure 13 shows a schematic overview of the situation. The heliport and the edge of the development area are approximately 200 m from each other. The design helicopter for this AIA is the AW139, which has a D-Value of 16.66 m. Calculating the FATO and Safety areas, leaves approximately 183.3 m between the start of the approach and take-off climb surface and the development area. Over this distance the surface increases 8.24 m in height, and the elevation is 1 m lower, which leaves sufficient vertical height for the Budawang School development.

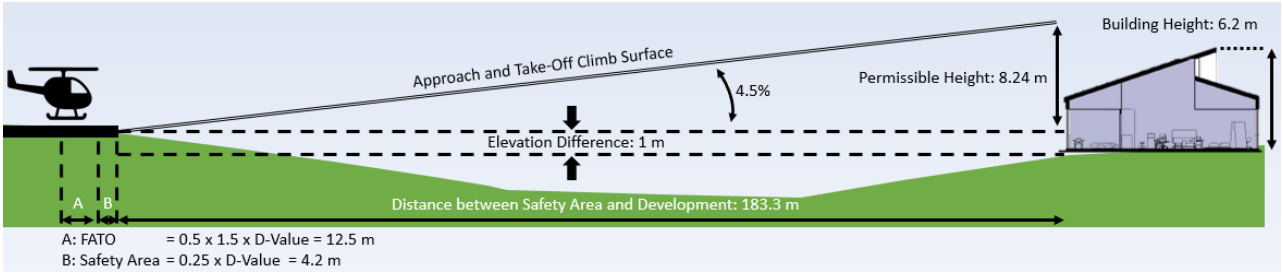

Figure 13 Schematic overview: approach and take-off climb surface over project site

4.5. Air routes and LSALT

MOS 173 requires that a minimum obstacle clearance of 1000 ft below the published lowest safe altitude (LSALT) is maintained along each air route.

The Project site is wholly located in the area with a grid lowest safe altitude of 1555 m AHD (5100 ft AMSL) with a minimum obstacle clearance (MOC) surface of 1250 m AHD (4100 ft AMSL). With a maximum assumed height of 60 m AHD (197 ft AMSL) for Budawang School, the Project will not impact the grid LSALT.

Figure 14 shows the grid LSALT and the air routes in the vincinity of the Project site (source: AsA, AIP Charts, En Route Chart Low National, 30 January 2020).

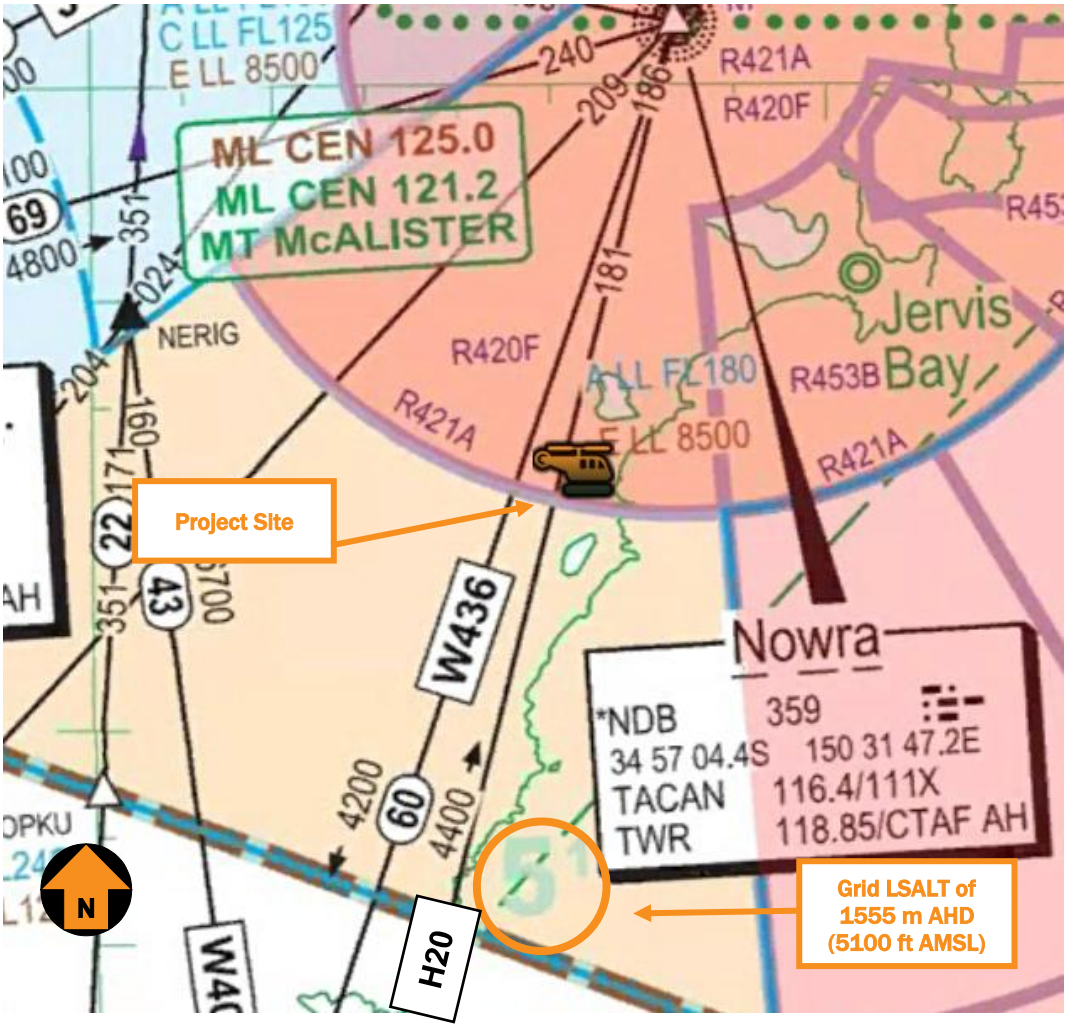

Figure 14 En Route Chart Low National in the vicinity of the Project site

An impact analysis of the surrounding air routes is provided at Table 1.

Table 1 Air route impact analysis

Air route	*Waypoint pair*	*Route LSALT*	*MOC*	*Impact on airspace design*	*Potential solution*	*Impact on aircraft ops*
W436	URBOB and NOWRA	4200 ft AMSL	975 m AHD 3200 ft AMSL	Nil	NA	NA
H20	OTKED to NOWRA	4400 ft AMSL	1036 m AHD 3400 ft AMSL	Nil	NA	NA

Note: MOC is the height above which obstacles would impact on LSALTS or air routes.

The Project will not impact LSALTs of the surrounding air routes.

4.6. Airspace

The Project site is located wholly within Class G airspace, and is not located in any Prohibited, Restricted and Danger areas. It is unlikely that there will be any impact to military aviation activity.

Therefore, the Project will not have an impact on controlled or designated airspace.

4.7. Nearby Aerodromes

The closest airports are RAN NAS Nowra (HMAS Albatross) (YSNW) (42 km / 22.5 nm) and Jervis Bay Airport (YJBY) (30 km / 16 nm). Because the project site is located within the area considered for the minimum safe altitude, these require to be assessed for both airports. Obstacles within 15 nm (10 nm MSA + 5 nm buffer) and within 30 nm (25 nm MSA + 5 nm buffer) of YSNW and YJBY ARP define the height at which an aircraft can fly when within 10 nm and 25 nm.

It should be noted that both airports have ground elevations which are higher than that of the project site. NAS Nowra (HMAS Albatross) has a declared ground elevation of 400 ft (122 m) AMSL and Jervis Bay Airport has a declared ground elevation of 200 ft (61 m) AMSL (source: Airservices Australia). The project site has a ground elevation of 187 ft (57m) AMSL, with the project height being 6.2 m (20 ft) tall. It can therefore be concluded that the development of the Budawang School will not impact on the MSA for these airports.

4.8. Aviation facilities

A search on OzRunways, which sources its data from Airservices Australia (AIP), was conducted to identify any aviation facilities that may be affected by the project. The closest aviation facilities to the Project site are located at the RAN NAS Nowra (HMAS Albatross) (YSNW) (a non-directional (radio) beacon (NDB)).

According to National Airports Safeguarding Framework Guideline G *Protecting Aviation Facilities - Communications, Navigation and Surveillance (CNS),* the navigation facilities have areas restricted to developments.

The Project site is located approximately 42 km (22.5 nm) south of NAS Nowra and outside the areas restricted to developments for noted aviation facilities, and therefore will not interfere with these facilities.

4.9. Radar

There are no aviation radars located close to the Project site. The closest radar is Sydney Primary Surveillance Radar (PSR) and Sydney Secondary Surveillance Radar (SSR) located approximately 167 km (90 nm) north from the Project site. Given there are much higher obstacles located north of the Project, especially building in Sydney and Wollongong, the Project will not impact Sydney PSR or SSR.

The closest weather radar is the Canberra (Captain's Flat) radar located at Captain's Flat (latitude 35.66°S, longitude 149.51°E). The Project is unlikely impact the Canberra (Captain's Flat) radar facility.

4.10. Reporting of tall structures

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 maximum development height is 6.7 m (22 ft) AGL. Therefore, the proponent is not required to report details about this building to Airservices Australia.

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

4.11. Plume rise

Exhaust plumes that may originate at the top of the Budawang School, which may impact airspace and if required, may need a Plume Rise Assessment in accordance with CASA Advisory Circular AC 139-05 (v3.0) Plume rise assessments.

There are no provisions or requirements regarding the need of a plume rise assessment within the Shoalhaven Local Environmental Plan 2014.

The client has advised that the development will not have a high velocity vertical plume and so no assessment is required.

5. STAKEHOLDER CONSULTATION

During the preparation of this AIS, Milton Hospital, Toll Helicopters and AviPro were consulted. The results of the consultation are noted in this section.

5.1. Milton Hospital

A representative of Milton Hospital advised that the authority for the HLS is Toll Bankstown (Air Ambulance).

5.2. Toll Helicopters

Mr Tim Frankel, Senior Contract Pilot – Helicopters for Toll was contacted by telephone.

He briefly reviewed the impact assessment and said the only real concern he had was if temporary cranes were likely to be used for construction.

He provided via email a link to a form for crane operators to nominate the details of their operations so that Toll helicopter pilots could be made aware of the crane ops.

The link is provided for reference:

https://docs.google.com/forms/d/e/1FAIpQLSe41HwB0cw9HdCxxJ0tPIIVg2DqyI00ZEbvrm36nGne4nXxkw/viewform

5.3. AviPro

Mr Steve Graham, Managing Director of AviPro provided the following input (copied verbatim):

> *I recommend you update the Guidelines (latest attached version 2020). Minor changes, flight path protection and dimensions etc remain the same.*
>
> *Obstruction lighting is important (your recommendation 2). The MOS 139 is not really applicable to this site as it is in reality, just a paddock used by Ambulance helicopters. There is however, a need to inform developers upfront of the preferred lighting for cranes that impact flight paths into/from HLS associated with hospitals. This is so the crane operator/developer can* ***price-in*** *the cost of additional illumination (over and above the red lights on the end of the jib) needed for safe helicopter operations under NVG and the Mark 1 eyeball. We have found significant pushback from developers/crane operators to provide additional illumination once the contract is executed when a provision (about 7K) has not been considered/made for additional lighting.*
>
> *Typically we recommend the following:*
>
> ***Lighting summary***
>
> *As a minimum for all tower cranes:*
>
> - *Top of crane A frame or cabin: medium intensity red obstruction light (night) and white by day*
> - *Both ends of Jib: medium intensity red obstruction light (night) and white by day*

- *Along Jib: line of white fluro on a PE cell along the full length of the jib, or Heliflex along the last 15m-20m of the jib (ensure this can be seen from all directions)*
- *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), unless the tower is against a building*

As a minimum for all luffing cranes:

- *Top of crane A frame or cabin: medium intensity red obstruction light (night) and white by day*
- *End of Jib: medium intensity red obstruction light (night) and white by day*
- *Along Jib: line of white fluro on a PE cell along the full length of the jib, or Heliflex along the last 15m-20m of the jib (ensure this can be seen from all directions)*
- *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 jib Fluro details are:

- *Lights used : WEATHER PROOF EMERGENCY FLUROS (minimum 90 minute battery back-up)*
- *Lights are controlled via a PE Cell*

The Heliflex details are:

- *A LED strip light developed in conjunction with NSW Ambulance helicopter contractor*
- *Night Vision Device compatible*
- *Available through Cameron Ivers (ACIA Electrical Services Pty Ltd 0416176166)*
- *Lights are controlled via a PE Cell.*

6. HAZARD LIGHTING AND MARKING

6.1. Civil Aviation Safety Authority

In considering the need for aviation hazard lighting, a preliminary feasibility analysis of the regulatory context was undertaken.

CASA regulates aviation activities in Australia. Applicable requirements include the *Civil Aviation Act 1988* (CAA), *Civil Aviation Regulations 1988* (CAR), *Civil Aviation Safety Regulations 1998* (CASR), associated Manuals of Standards (MOS) and other guidance material including *Civil Aviation Advisory Publication* (CAAP) and Advisory Circular (AC). The applicable legislations are extracted below:

6.1.1. Manual of Standards 139--*Aerodromes*

Chapter 7 of MOS 139 sets out the standards applicable to Obstacle Restriction and Limitation.

7.1.1.2 An obstacle is defined as:

(b) any object that penetrates the obstacle limitation surfaces (OLS), a series of surfaces that set the height limits of objects, around an aerodrome.

7.1.1.3 Obstacle data requirements for the design of instrument procedures need to be determined in liaison with flight procedure designers.

7.1.1.4 Non compliance with standards may result in CASA issuing hazard notification notices as prescribed in CASR Part 139.

As the proposed Budawang School does not penetrate any of the OLS surfaces for Milton Heliport, it is considered not to be an obstacle. However, if during construction of Budawang School a crane is used, this may well penetrate the OLS surface and will require additional lighting if it is operated at night.

7. CONCLUSIONS

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

1. The proposed Budawang School has the following characteristics:
    a. nominal ground level is 57 m AHD
    b. building height is 6.2 m AGL
    c. maximum overall height is 63.2 m AHD (207 ft AMSL).
2. The Project development:
    a. will not penetrate the obstacle identification surfaces of Milton Heliport HLS
    b. will not impact visual or instrument flight operations to/from the HLS or certified airports within the vicinity of the project
    c. will not impact any aviation facilities
    d. will not impact any aviation facilities or BoM radars
    e. will not involve high velocity vertical plume.

8. RECOMMENDATIONS

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

1. The Project as proposed can be supported without adversely affecting aviation safety.
2. Any crane used during construction should be appropriately marked, operated during daylight hours only and referred to NSW Health for consideration by users of the Milton HLS. If a crane is required to be operated at night, it should be lit with applicable obstacle lighting.

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