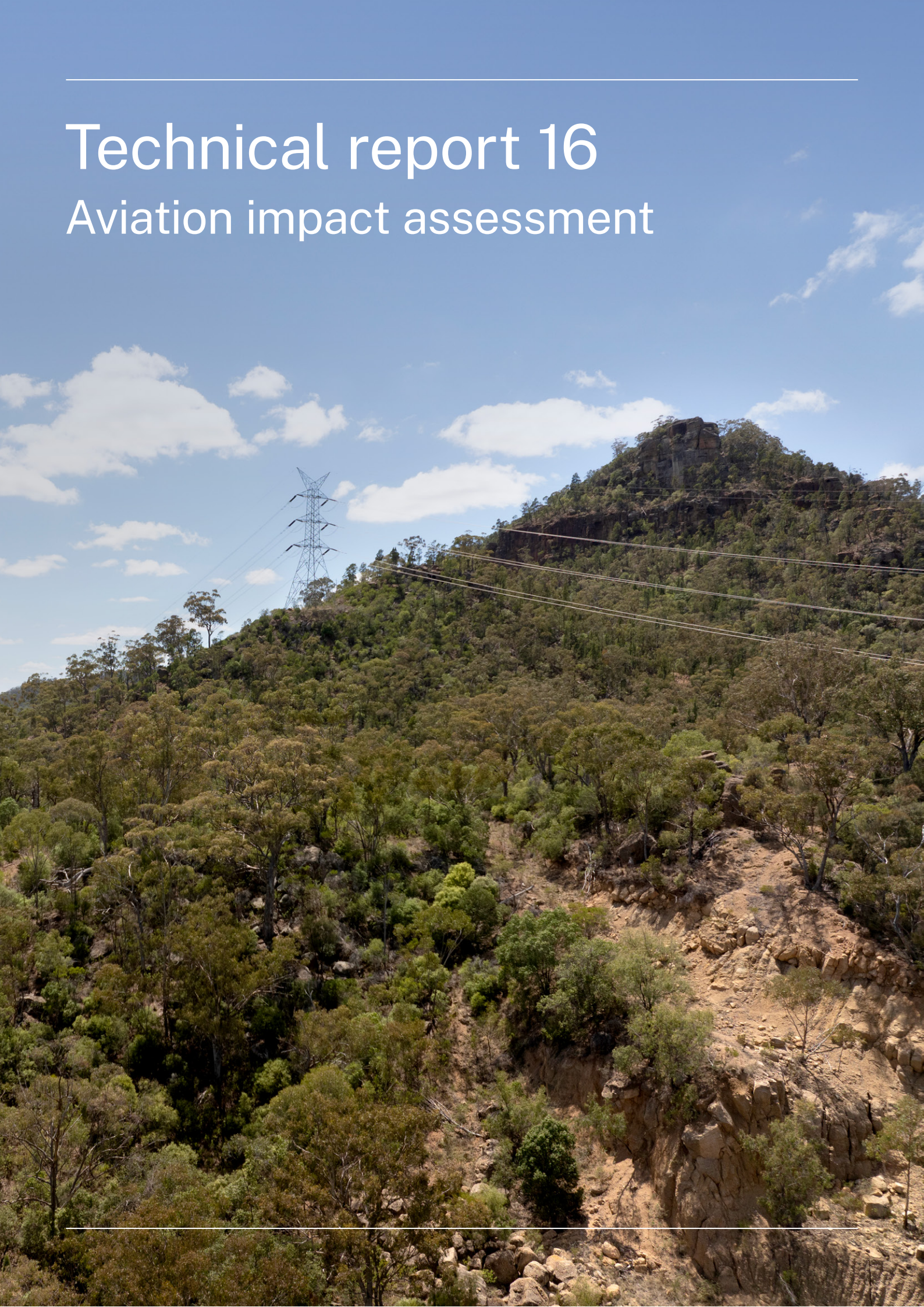
Technical report 16

Aviation impact assessment



AVIATION PROJECTS

July 2025

AVIATION IMPACT ASSESSMENT

HUNTER TRANSMISSION PROJECT

Prepared for EnergyCo

AVIATION PROJECTS

DOCUMENT CONTROL

Document Title: Hunter Transmission Project – Aviation Impact Assessment

Reference: 067601-01

Prepared by: P White

Released by: P White

REVISION HISTORY

Version	*Description*	*Transmitted*	*Reviewed by*	*Date*
0.1	First draft EnergyCo Preliminary Draft	13 June 2024	EnergyCo/EMM	July 2024
0.2	Second Draft	13 August 2024	DK/FM	15 August 2024
0.3	Third Draft **EnergyCo First Draft**	16 August 2024	Energy Co	16 October 2024
0.4	Fourth Draft	05 December 2024	FM	10 December 2024
0.5	Fifth Draft	10 December 2024	JK	9 January 2025
0.6	Sixth Draft **EnergyCo Second Draft**	13 January 2025	DK/EnergyCo	6 March 2025
0.7	Seventh Draft **EnergyCO Second Draft**	6 March 2025	DK/DH/EnergyCo	9 May 2025
1.0	Final Report EnergyCo Gold Aviation Study	15 May 2025	DK/TG/EnCo	24 June 2025
2..0	Updated Final Report EnergyCo Gold Aviation Study	8 July 2025	DK	9 July 2025
2.1	Updated Final Report EnergyCo Gold Aviation Study	9 July 2025	DK	11 July 2025

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Access tracks	Temporary and permanent tracks used to access the project. Refer to *Chapter 4 – Project description* of the EIS for further details.
Aerodrome	An area of land or water (including any buildings, installations and equipment), intended for use wholly or partly for the arrival, departure or movement of aircraft.
Aviation impact statement	A study required to be provided to Airservices Australia to allow them to efficiently assess development proposals, which contains a set standard of data related to their service provision and responsibilities. (https://www.airservicesaustralia.com/industry-info/airport-development-assessments/) It forms part of the overall Aviation Impact Assessment (AIA) which covers more information than just Airservices Australia requirements.
Aviation Impact Assessment	An aeronautical study that considers the impact of a proposed infrastructure development upon the safe conduct of aviation activity in the vicinity of the proposed development including aerodromes, flight paths, air routes, turbulence and other factors as discovered.
Bayswater Power Station	Existing power station at Bayswater owned by AGL.
Bayswater South switching station	The new switching station that would be constructed south of Bayswater Power Station
Certified aerodrome	An aerodrome certified by CASA under CASR Part 139.
Construction impact area	The area that would be directly impacted by the construction of the project, including (but not limited to) transmission towers and lines, stringing sites, access roads, access tracks, substations, switching stations, adjustments and upgrades to existing lines, communications infrastructure, workforce accommodation camps, construction compounds, laydown and utility adjustments.
Construction access routes	Roads used by construction vehicles (light and heavy).
Construction support site	An area used as the base for construction activities, usually for the storage of plant/equipment and materials, processing facilities (concrete batching, aggregate crushing, grinding and screening), maintenance facilities/workshops, staff facilities, firefighting equipment, helicopter landing pad and support facilities, access and parking, and wastewater treatment. Some construction support sites would also include temporary worker accommodation. Construction support sites are discussed in *section 4.3.5* of the EIS.

Critical State significant infrastructure (CSSI) application area	The critical State significant infrastructure (CSSI) application for the HTP covers 5 local government areas (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie).
Cumulative impact	The combined impacts of the project on a matter with other relevant future projects.
Disturbance area	This is used primarily to assess potential impacts on biodiversity values in *Technical Report 1 – Biodiversity development assessment report*. Includes the following categories: • Disturbance area A • Disturbance area A (centreline) • Disturbance area B • Disturbance area HZ.
Disturbance area A	The area where vegetation would be completely removed. It includes areas at and around transmission towers (including tower pads and batters), stringing sites, laydown areas, switching stations, substation upgrades, construction support sites, new and upgraded access tracks and road upgrades. Impacts within this area would include sub-surface disturbance from construction activities such as grading, excavation, and full tree removal. With the exception of areas that only require temporary disturbance (i.e. temporary access tracks and stringing sites), this area would also be subject to ongoing maintenance during operation (including vegetation removal to ground level) for operational and safety requirements (including bushfire).
Disturbance area A (centreline)	A 20 m wide centreline area between transmission towers where all vegetation would be removed to ground level during construction. This area would also be subject to ongoing maintenance during operation (i.e. removal to maintain vegetation clearance requirements) for operational and safety requirements (including bushfire).
Disturbance area B	The area within the transmission line easement, excluding disturbance area A and disturbance area A (centreline), where partial clearing would be undertaken. Removal of vegetation (including trees) would be required if there is a risk of vegetation exceeding the designated clearance heights. These heights are set for operational and safety requirements, including bushfire risk management (indicatively 13.5m below the conductors at maximum operating temperature). This area would be subject to ongoing maintenance during operation.
Disturbance area hazard tree zone (HZ)	Hazard trees are those that have the potential to pose a risk to safe operation of the transmission line by falling onto the transmission towers, conductors and associated infrastructure within the easement. A hazard tree zone has been identified in limited areas on either side of the transmission line easement through LiDAR analysis of tree heights and topography. Hazard tree management would occur during operation to maintain safe operating clearances for the conductors and tower structures. The hazard tree zone will be inspected for trees in the height range of 20 m or more, which is typically in the high-risk category. High-risk category trees will be assessed for structural instability and managed according to the risk present, including tree removal if required.
Eraring Power Station	Existing power station at Eraring operated by Origin Energy.

EnergyCo	The Energy Corporation of New South Wales constituted by section 7 of the *NSW Energy and Utilities Administration Act 1987* as the NSW Government-controlled statutory authority appointed as the infrastructure planner under the *NSW Electricity Infrastructure Investment Act 2020* responsible for the delivery of NSW's REZs. The proponent for the HTP.
Enroute Chart (ERCL)	A chart published in various scales to accommodate significant air traffic route areas and shows controlled airspace, Special Use Airspace, air routes, air traffic services and radio navigation services.
Exclusion zone	A safe clearance area around the transmission line and towers to protect public safety, the network and to maintain access to the asset. It delineates the area where most land use activities are prohibited. The zone is located within the easement and is defined according to the operational voltage and design of the infrastructure.
Hunter Transmission Project (HTP) or project	The HTP as described in *Chapter 4 (Project description)* of the EIS and identified in the overview figures in of the EIS.
HTP corridor	Comprises: • the transmission line corridor connecting Bayswater South switching station to Olney switching station • the transmission line corridor connecting the Bayswater South switching station to the existing 500 kV transmission line near Bayswater Power Station • the transmission line corridor connecting the Olney switching station to the existing 500 kV transmission line between Eraring and Kemps Creek The HTP corridor is around 140 metres wide.
Instrument Flight Procedures	Rules that govern the use of instrumentation to navigate an aircraft. Aircraft operation under Instrument Flight Rules occurs when meteorological conditions, or other conditions, prohibit a pilot from operating an aircraft by visual reference to the surrounds such as land and water. To fly under these conditions a pilot must rely on instrumentation.
Laydown areas	Established to allow for flexibility in construction and to minimise the need for vehicle movements to and from the construction support sites. These would act as temporary staging, storage, and complex plant/equipment setup areas. They would also act as traffic control nodes during construction of the HTP.
No clearing zone	Areas within the transmission line easement where vegetation removal is not required. These areas would occur where there is sufficient separation of 10m or more between the maximum operating temperature conductor position and the existing vegetation. This area is excluded from the disturbance area.
Olney switching station	The new switching station that would be constructed in Olney State Forest

Operation impact area	This is a subset of construction impact area. The area that would be occupied by permanent components of the project and/or maintained, including transmission line easements, transmission lines and towers, substations, switching stations, communications infrastructure, maintenance facilities, permanent access roads to substations and switching stations and access tracks to easement.
Pre-construction minor works	Activities with a low potential to impact the environment that may be permissible in advance of construction and without the requirement for an approved environmental management strategy/construction management plan.
(the) proponent	The Energy Corporation of NSW (EnergyCo).
Project impact area	The area that has been assumed for the purpose of the EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
Refinement	A change that fits within the limits set by the project description contained in the EIS for the HTP and does not change what the proponent is seeking approval for and/or does not require an amendment to the application for the HTP.
Renewable Energy Zone (REZ)	A geographic area identified and declared by the NSW Government as a Renewable Energy Zone.
Stringing site	Used for the preparation, assembly and operation of stringing equipment to connect the transmission line to the towers. Stringing sites would be positioned along the HTP corridor. On other transmission projects, they may be referred to as 'brake and winch' sites.
Substation	A facility used to increase or decrease voltages between incoming and outgoing lines (e.g. 330 kV to 500 kV).
Switching station	A facility used to connect 2 or more distinct transmission lines of the same designated voltage.
Transgrid	Preferred network operator for the HTP.
Transmission tower	For 500kV transmission lines, this is typically a free-standing steel lattice tower structure (suspension or tension tower). Transmission towers for the HTP would generally be up to 85 m high. A free-standing steel lattice tower (suspension or tension tower). Transmission towers would generally be up to 85 m high.
Transmission line easement	An area surrounding and including the transmission lines which is a legal proprietary right and allows for ongoing access and maintenance of the transmission lines. Landowners can typically continue to use most of the land within transmission line easements, subject to some restrictions for safety and operational reasons.
Temporary worker accommodation	Temporary accommodation that would be erected and used during construction to house the construction workforce. Worker accommodation would be located at some construction support sites.
Visual Flight Rules	Rules that govern when an aircraft may be operated by sight. Aircraft operation under Visual Flight Rules occurs when meteorological conditions allow an aircraft to be operated by visual reference to the surrounds such as land and water.

Visual Meteorological Conditions	Meteorological conditions that determine the minimum weather conditions for the safe conduct of visual flight in terms of clearance from cloud and minimum flight visibility that enable a pilot to navigate by visual reference to the ground or water.

ACRONYMS

Acronym	Definition
AAAA	Aerial Application Association of Australia
AC	Advisory Circular
AGL	above ground level
AHD	Australian Height Datum
AIA	aviation impact assessment
AIP	Aeronautical Information Package
AIS	aviation impact statement
ALARP	as low as reasonably practicable
AMSL	above mean sea level
ARP	Aerodrome Reference Point
AS	Australian Standards
ATC	Air Traffic Control
ATSB	Australian Transport Safety Bureau
BoM	Bureau of Meteorology
CAO	Civil Aviation Orders
CAR	Civil Aviation Regulation (1988)
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation (1998)
CNS	communications, navigation and surveillance
CTAF	common traffic advisory frequency
DAH	Designated Airspace Handbook
EIS	environmental impact statement
EnergyCo	Energy Corporation of NSW
ERC-H	en-route chart high
ERC-L	en-route chart low
ERSA	En Route Supplement Australia
HLS	helicopter landing sites
HTP	Hunter Transmission Project, the project
HVGC	Hunter Valley Gliding Club
kV	Kilovolt
IMC	Instrument Meteorological Conditions
LSALT	Lowest Safe Altitude
MOC	Minimum Obstacle Clearance
MOS	Manual of Standards
nm	nautical mile
RAAF	Royal Australian Air Force
RTCC	Radar Terrain Clearance Chart
REZ	Renewable Energy Zone

VFR	Visual Meteorological Conditions
VMC	Visual Meteorological Conditions

EXECUTIVE SUMMARY

1. INTRODUCTION

The Hunter Transmission Project (HTP) (the project) is a critical State significant infrastructure (CSSI). It must be built by the end of 2029 to protect energy security in NSW as the remaining coal-fired power stations close

The new transmission line will transport electricity generated in the Central-West Orana and New England Renewable Energy Zones (REZs). It will connect the existing 500 kilovolts (kV) transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring.

This will strengthen the State's core electricity grid and supply clean and reliable energy to NSW consumers for generations to come.

Aviation impact assessment (AIA)

Aviation Projects has been engaged to prepare an Aviation Impact Assessment (AIA) that responds to the aviation impact components of the NSW Planning Secretary's Environmental Assessment Requirements (SEARs) for the project.

The AIA concluded the following:

- 3 certified aerodromes are located within 30 nautical miles (55.5 kilometres) of the HTP:
    - RAAF Base Williamtown/Newcastle Airport
    - Cessnock Aerodrome
    - Maitland Aerodrome
- air route Lowest Safe Altitudes (LSALTs) in the vicinity of the HTP, and the overhead Grid LSALT would not be infringed by the project
- the HTP would be located within Class G airspace and is partly located within a military training area R564A, an Australian Army training area south of Singleton New South Wales (NSW). The HTP will impact the restricted area therefore, consultation with Department of Defence has been carried out
- the HTP is outside the clearance zones associated with aviation navigation aids, communication systems and Air Traffic Control (ATC) surveillance radars
- the following 4 uncertified aerodromes are located within 10 kilometres (5.4 nautical miles) of the HTP and would not be impacted by the project:
    - Warkworth aerodrome
    - Singelton aerodrome
    - Coolmore Stud aerodrome
    - Dochra military aerodrome
- 10 helicopter landing sites (HLS) were identified within 10 kilometres (5.4 nautical miles) of the HTP and would not be impacted by the project
- the proposed transmission line and transmission towers are not expected to present an unusual or unacceptable risk to agricultural spraying, aerial firefighting or emergency evacuation flight operations. As with all above-ground infrastructure, standard aviation risk management practices—

undertaken by pilots and landowners—will remain essential to ensuring safe operations in proximity to the transmission line

- temporary construction cranes are unlikely to present a hazard provided they are of a clearly visible colour against the background terrain and/or have an obstacle light fitted near the top of the crane
- helicopters and/or drones used during the construction and maintenance of HTP for stringing or transmission tower assembly would be operated in accordance with the applicable CASRs for such operations. Helicopter and/or drone use on HTP is not expected to cause an adverse risk.

Key Recommendations

Recommended actions resulting from the assessment are provided below.

1. The final design of the HTP with coordinates and elevations will be provided to the following stakeholders prior to construction:
    - Airservices Australia
    - Commonwealth Department of Defence
    - Hunter Valley Gliding Club
    - NSW Ambulance Service
    - NSW Parks and Wildlife Service
    - Forestry Corporation of NSW
    - NSW Rural Fire Service
    - mine complexes traversed by HTP
    - certified aerodromes within 30 kilometres of the HTP
    - uncertified aerodromes and HLS within 10kilometres of the HTP.

    Further notification will occur if the finalised design of the project alters the details supplied to the above listed stakeholders
2. To facilitate the flight planning of aerial application operators conducting flight operations on any property near to the proposed transmission line, details of the project, including location and height information of the finalised design of the HTP would be provided to landowners. This is so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.
3. The following stakeholders will be notified of the scheduling of the use of cranes, drones and helicopters for the construction of the project, prior to the commencement of relevant works:
    - Airservices Australia
    - Commonwealth Department of Defence
    - Hunter Valley Gliding Club
    - NSW Ambulance Service
    - NSW Parks and Wildlife Service
    - Forestry Corporation of NSW.
    - NSW Rural Fire Service
    - Mine complexes traversed by HTP.

4. Helicopters and/or drones used for stringing will be operated in accordance with the applicable CASR for their operations

5. Obstacle lighting and marking of the HTP are not considered to be required outside of the lateral limits of the certified airport's obstacle limitation surfaces (OLS). While not currently a requirement, this would need to be confirmed by the Civil Aviation Safety Authority (CASA) after being provided with project details from the applicable planning authority. The provision of markers on cables and structures within 3 nautical miles of the HTP corridor will be discussed with the appropriate stakeholders and installed as required.

1. INTRODUCTION

The Hunter Transmission Project (HTP, the project) involves the construction of a new overhead 500 kilovolt (kV) transmission line of around 110 kilometres connecting the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring in the Hunter region of New South Wales (NSW).

Due to its strategic importance, the NSW Minister for Planning and Public Spaces has declared the HTP to be critical State significant infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Under this process, the Energy Corporation of NSW (EnergyCo, the proponent) is required to prepare an environmental impact statement (EIS) in accordance with the NSW Environmental Planning and Assessment Regulation 2021.

This Aviation Impact Assessment (AIA) accompanies the EIS for the HTP and addresses the Secretary's environmental assessment requirements (SEARs) issued on 13 August 2024 (see **Table 1**).

In addition to the SEARs, advice from several government agencies was received on the HTP. Agency advice relevant to and considered in this AIA is provided on the Major Projects website maintained by the NSW Department of Planning, Housing and Infrastructure (DPHI).

Table 1 NSW HTP SEARs – aviation

Requirement	*Where addressed in this report*
Assess potential impacts on aviation safety, including:	
• **defined air traffic routes,**	*Section 5.1.4*
• **aircraft operating heights,**	*Section 5.1.2*
• **approach / departure procedures,**	*Section 5.1.2*
• **radar interference, communication systems, navigation aids,**	*Section 5.3* and *Section 5.4*
• **use of emergency helicopter access, aerial baiting and culling in the National Parks, safe and efficient aerial application of agricultural fertilisers and pesticide, and aerial fire control**	*Section 5.9*
• **identify aviation marking requirements**	*Section 5.8*
• **identify certified aerodromes within 30 km of the transmission line and uncertified aerodromes and landing areas within 10 km of the transmission line, and consider the impact to nearby aerodromes and aircraft landing areas; and**	*Section 5.1 and Section 5.6*
• **address impacts on obstacle limitation surfaces (OLS)**	*Section 5.1.3*

2. THE HUNTER TRANSMISSION PROJECT

The Hunter Transmission Project (HTP, 'the project') is critical State significant infrastructure (CSSI). It must be built by the end of 2029 to protect energy security in NSW as the remaining coal-fired power stations close.

The HTP includes:

- a new overhead 500 kilovolt (kV) double circuit transmission line of around 110 kilometres
- 2 new switching stations (Bayswater South and Olney)
- upgrades to the existing Bayswater and Eraring substations
- adjustments and upgrades to existing transmission lines
- property adjustment works to facilitate access to the transmission lines and switching stations
- utility adjustments required for the construction of the transmission network infrastructure
- ancillary works to support construction including road upgrades, establishment of new access tracks and upgrades to existing access tracks, construction support sites (some with temporary worker accommodation), and other construction facilities such as laydown areas.

The new transmission line would transport electricity generated in the Central-West Orana and New England Renewable Energy Zones (REZs). It would connect the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring. This would strengthen the State's core electricity grid and supply clean and reliable energy to NSW consumers for generations to come.

The HTP involves development across 5 local government areas (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie). Most of this development will be concentrated in and around the HTP corridor.

An overview of the HTP is provided in **Table 2**. The HTP is shown in **Figure 1** to **Figure 5**.

Further details are provided in *Chapter 4 (Project Description)* of the HTP environmental impact statement (EIS).

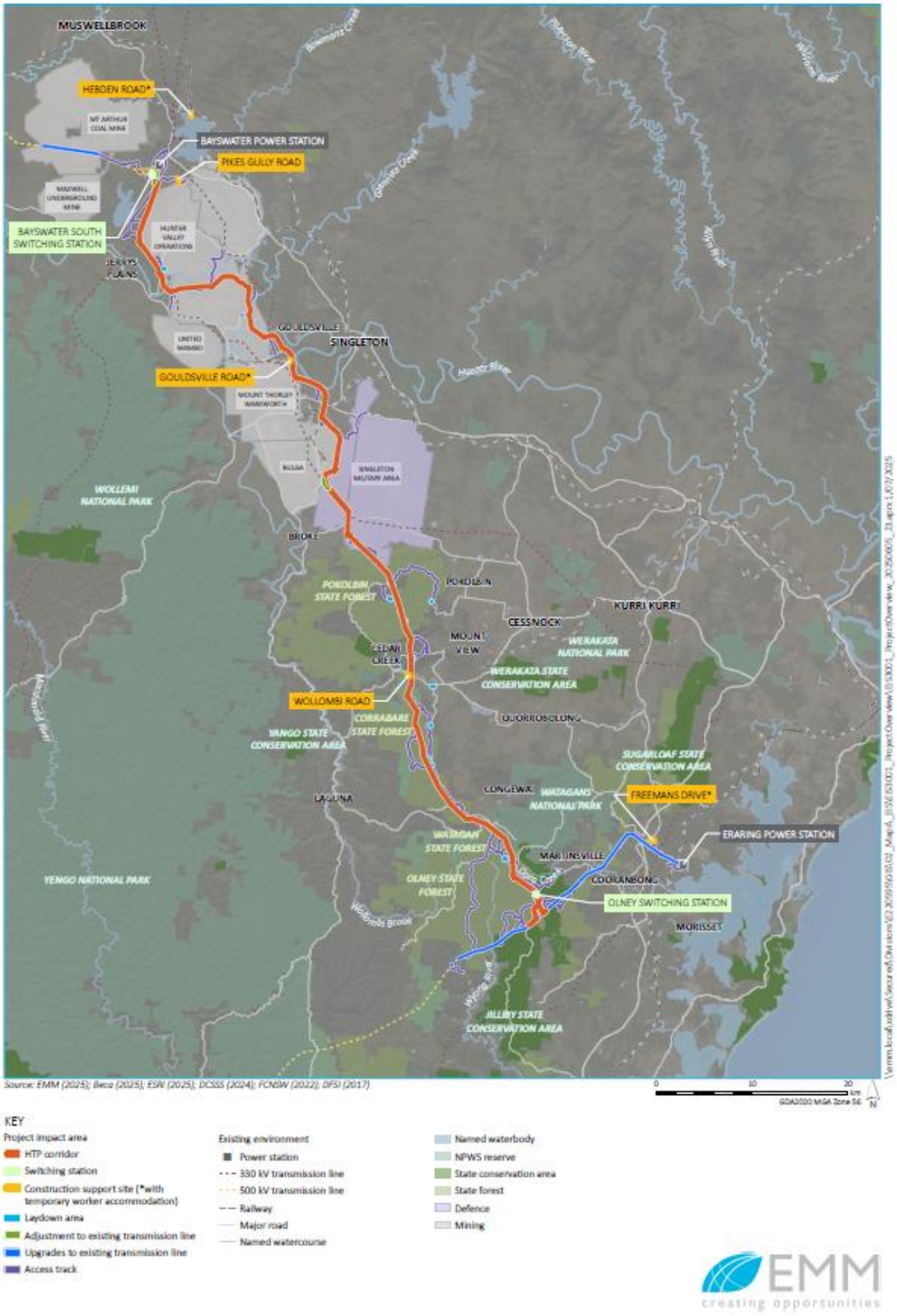

Figure 1 The Hunter Transmission Project Overview (HTP)

AVIATION PROJECTS

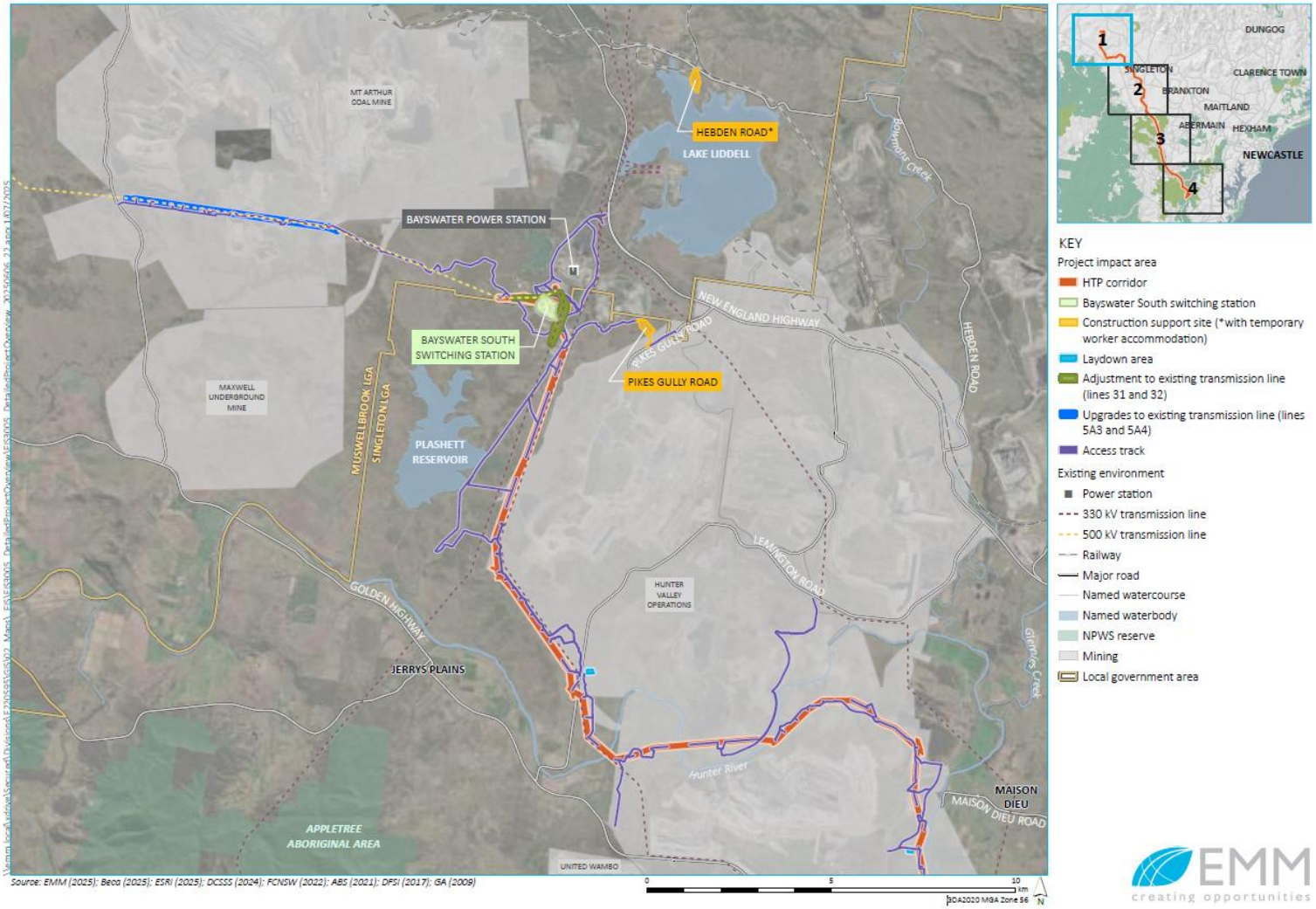

Figure 2 Detailed project overview Map 1

AVIATION PROJECTS

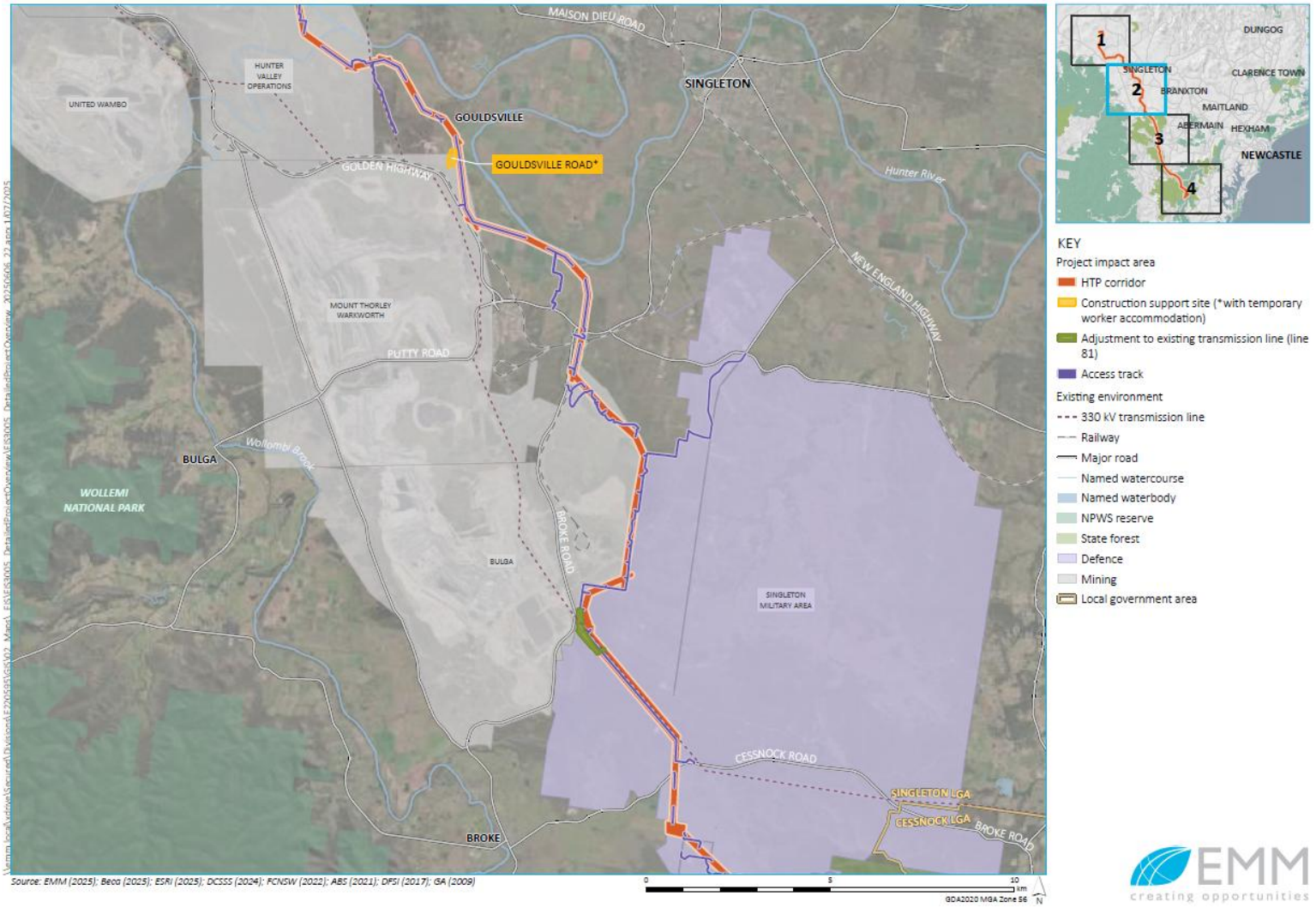

Figure 3 Detailed project overview Map 2

AVIATION PROJECTS

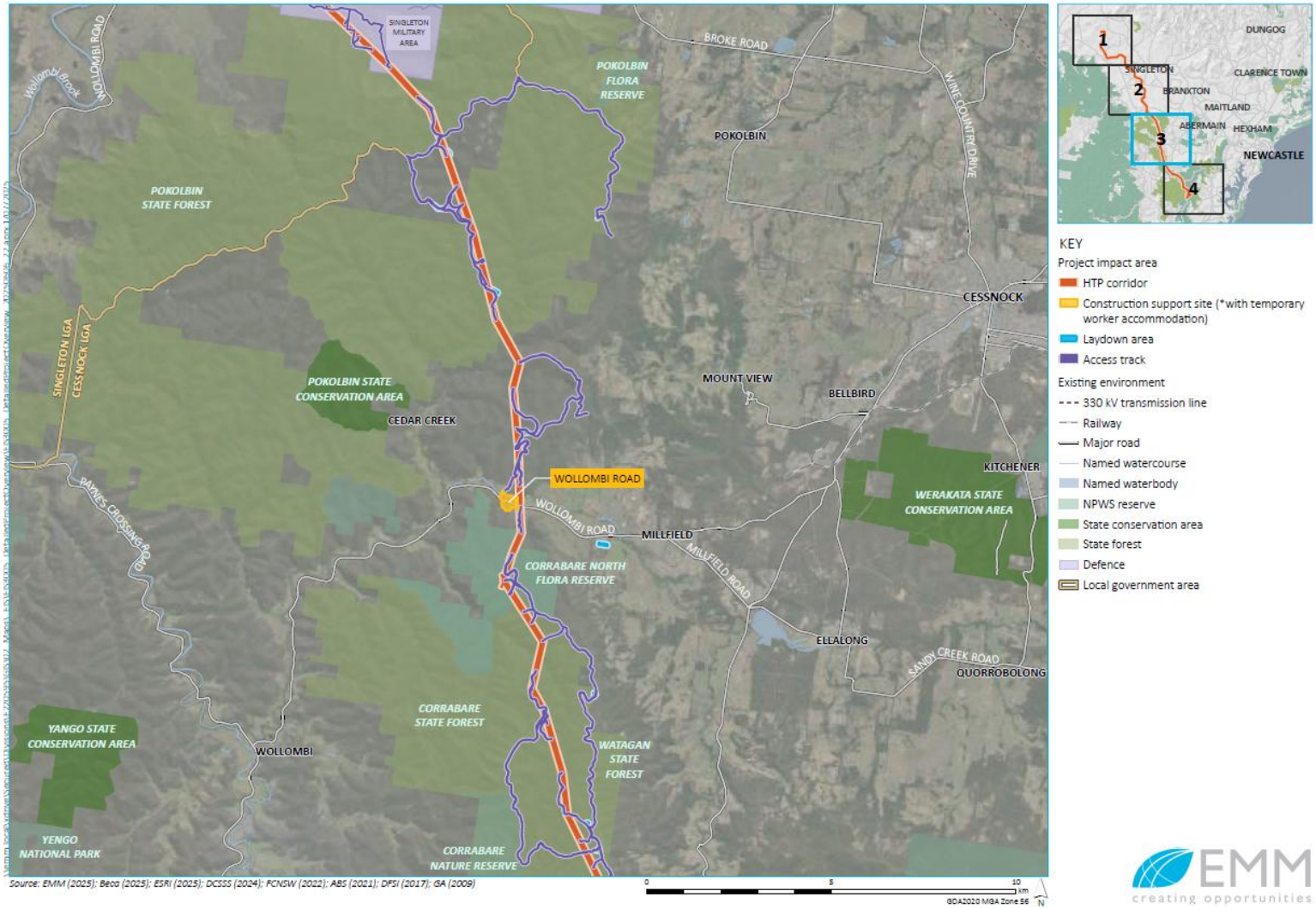

Figure 4 Detailed project overview Map 3

AVIATION PROJECTS

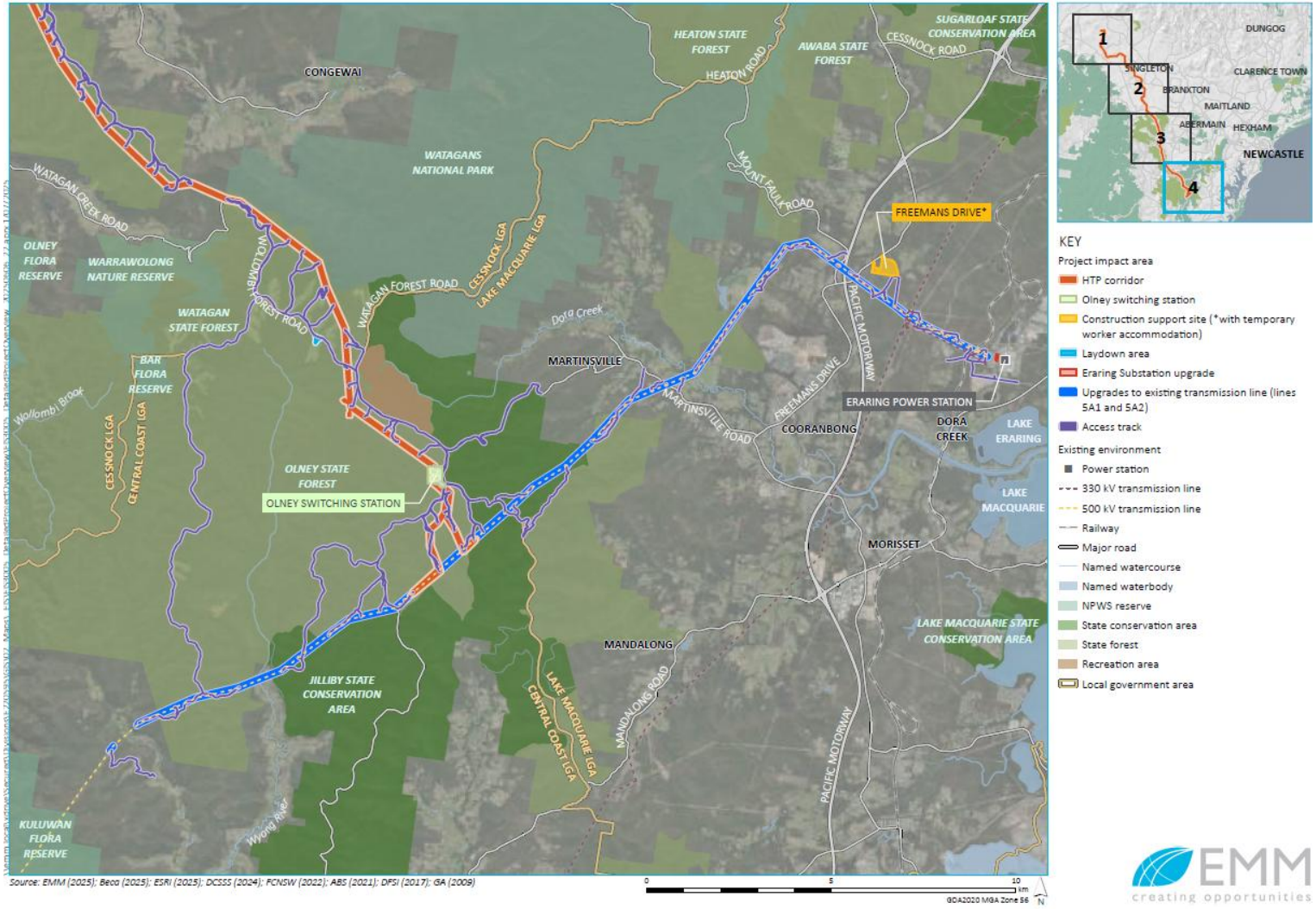

Figure 5 HTP Map 4

Table 2 Project Overview

The project	• The CCSI application for the HTP covers 5 local government areas • Most development will be concentrated in and around the HTP corridor. Some ancillary development such as construction support sites and worker accommodation, road upgrades and laydown areas would be outside the corridor
Project impact area	The area that has been assumed for the purpose of this EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
Construction and operation	• Construction impact area around 2351 ha • Operation impact area around 1261 ha
Disturbance area	• Disturbance area around 1266 ha • Disturbance area A around 683 ha • Disturbance area A (centreline) around 214 ha • Disturbance area B around 367 ha • Disturbance area HZ around 1.84 ha
New transmission line and transmission towers	• Overhead 500 kV double circuit transmission line of around 110 km between Bayswater South 500 kV switching station and Olney 500 kV switching station • Steel lattice towers up to 85 m high and that are spaced anywhere between 75 m to around 1.3 km apart (typically between 300 m and 600 m) • 500 kV transmission lines with a minimum ground clearance of 13.5 m • Ancillary infrastructure such as earth wire and communications systems • Construction easement of around 140 m wide • Operational easement around 70 m wide
Adjustments/upgrades and crossings – existing transmission lines	• Adjustments to existing double circuit 500 kV transmission lines: — Line 5A1 and 5A2: Eraring – Kemps Creek 500 kV at Ravensdale to connect to the new Olney 500 kV switching station — Line 5A3: Bayswater – Mt Piper 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station — Line 5A4: Bayswater – Wollar 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station • Adjustments to existing double circuit 330 kV transmission lines: — Line 31: Bayswater – Regentville 330 kV — Line 32: Bayswater – Sydney West 330 kV — Line 81: Newcastle – Liddell 330 kV • Crossing of existing double circuit 330 kV transmission lines: — Line 31: Bayswater – Regentville 330 kV at Bayswater — Line 32: Bayswater – Sydney West 330 kV at Bayswater — Line 81: 330 kV: Newcastle – Liddell 330 kV at Lemington and again at the Singleton Military Area • Line 82: 330 kV: Tomago – Liddell 300 kV at Warkworth and again at the Singleton Military Area

Switching stations/ substation works	• New Bayswater South 500 kV switching station – construction impact area around 26.6 ha • Modifications at the existing Bayswater 500 kV/330 kV substation within the existing footprint • New Olney 500 kV switching station – construction impact area around 20 ha • Augmentation and modifications at the existing Eraring 500 kV/330 kV substation, including installation of 2 new transformers
Upgrades – existing transmission lines and towers	• Upgraded earth wire on Line 5A3 and Line 5A4 • Upgraded earth wire and communications systems on Line 5A1 and Line 5A2 • Tower strengthening on various existing towers on Line 5A1, Line 5A2, Line 5A3 and Line 5A4
Road works	• Modifications to the existing public road network • New and upgraded access tracks for construction and operation
Construction support sites	• Five construction support sites: Hebden Road, Pikes Gully Road, Gouldsville Road, Wollombi Road and Freemans Drive • Helicopter pads (helipads) indicatively at: Hebden Road, Pikes Gully Road, Gouldsville Road and Freemans Drive
Ancillary sites	• Laydown areas, which would be established to allow for flexibility in construction and to minimise the need for vehicle movements to and from the construction support sites
Utility adjustments	• Third party utility works including gas, telecommunications, water, sewer and stormwater
Timing	• Construction to start in 2027 • Operation by end of 2029

3. ASSESSMENT METHODOLOGY

3.1. Legislation, policies, plans and guidelines

This AIA addresses the following key legislation, approvals, and guidance material:

- Civil Aviation Safety Authority (CASA)
  - Civil Aviation Regulations 1988 (CAR)
  - Civil Aviation Safety Regulations 1998 (CASR)
  - CASR Part 139 Manual of Standards - Aerodromes
  - CASR Part 173 Manual of Standards– Standards Applicable to Instrument Flight Procedure Design
- International Civil Aviation Organization (ICAO)
  - Doc 8168 Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS), Volume II
  - ICAO Standards and Recommended Practices, Annex 14—Aerodromes.
- National Airports Safeguarding Framework (NASF) Guideline F: *Managing the Risk of Intrusions into the Protected Operational Airspace of Airports*.

EUROCONTROL guidelines for assessing the potential impact by high-tension electricity transmission lines on radar surveillance sensors, adopted by CASA, stipulate the following assessment requirements:

- Primary Surveillance Radar (PSR)
  - Zone 1 0-500 m: Not permitted
  - Zone 2 500metres – 15 kilometres: Detailed assessment
  - Zone 3: Further than 15 kilometres but within maximum instrumented range and in radar line of sight: Simple assessment
  - Zone 4: Anywhere within maximum instrumented range but not in radar line of sight or outside the maximum instrumented range: No assessment.
- Secondary Surveillance Radar (SSR)
  - Zone 1: 0 - 500 m: Not permitted
  - Zone 2: 500metres - 16 kilometres but within maximum instrumented range and in radar line of sight: Detailed assessment
  - Zone 4: Further than 16 kilometres or not in radar line of sight: No assessment
  - (Zone 3 is not established for secondary surveillance radar).

A detailed summary of the legislative and policy context for this AIA is provided in Annexure 1.

3.2. Methodology

3.2.1. Overview

The AIA has been undertaken in accordance with Airservices Australia and other civil safety requirements as detailed in *section 3.1* and includes the following:

1. Conducting a desktop study to:
    a. Identify and assess the Obstacle Limitation Surfaces (OLS) and/or PANS-OPS surfaces at certified aerodromes within 30 nautical miles (55.56 kilometres) to determine if any infringements occur. If infringements occur, assess the likely impacts to the OLS and/or PANS-OPS surfaces and possible mitigations
    b. Identify non-certified aerodromes and helicopter landing sites (HLS) within 10 kilometres (5.4 nautical miles) of the project to determine likely impacts to flight operations at these aerodromes
2. Assessment of the likely impacts of infringements into air route and Grid lowest safe altitude (LSALT) protection surfaces
3. Assessment of the likely impacts to aeronautical navigation aids, communication systems and air traffic control surveillance radar systems
4. Identification of relevant civil aviation safety requirements/standards with respect to existing aerodrome conditions and whether these standards are met, particularly in relation to whether obstacle marking or lighting is required
5. An aviation impact statement (refer to *section 3.2.2* for further details)
6. Assessment of the impacts of construction and operation of the project on low-level flight operations, including agricultural spraying and aerial firefighting in the area
7. Consultation with aerodromes and aircraft operating agencies, including Airservices Australia, Department of Defence, and other relevant stakeholders.
8. Identification of mitigation measures to avoid or minimise identified impacts of the project on aviation safety.

3.2.2. Aviation impact statement

Airservices Australia is responsible for the assessment of airspace in Australia. All developments within airspace surrounding certified aerodromes must be assessed by Airservices Australia. This assessment requires an aviation impact statement (AIS) to be produced by an aviation consultant. The AIS in this AIA report includes the following specific requirements as advised by Airservices Australia (Source: Airservices Australia webpage: (Developments around airports)

Aerodromes:

- specify all certified aerodromes that are located within 55.56 kilometres (30 nautical miles) of the project
- nominate all instrument approach and landing procedures at these aerodromes
- review the potential effect of the project operations on the operational airspace of the aerodrome(s).

Air Routes:

- nominate air routes published in Enroute Chart ERC-L which are located near/over the project's impact area and review potential impacts of project operations on aircraft using those air routes.

Airspace:

- nominate the airspace classification – A, C, D, E, G etc where the project site is located
- nominate any Special Use Airspace – Restricted or Danger Areas, and usage.

Aviation Navigation/Communication/Radar:

- nominate ATC surveillance radar, communications and navigation systems with coverage overlapping the project.

To support the EIS development and project approval, a detailed description of the project was submitted to Airservices Australia on 18 March 2025 and included an Aviation Impact Statement (AIS) containing specific information to enable a complete assessment of the proposed project. The AIS is provided in *section 5.1* and is presented in a standard format. Consultation outcomes with Airservices Australia are presented in *section 6.*

4. EXISTING ENVIRONMENT

The HTP corridor runs mostly through power station, mining and government land between Bayswater and Broke in the upper Hunter region. It then traverses the Pokolbin, Corrabare, Watagan and Olney State forests in the lower Hunter region.

The proposed new transmission line would connect the new the Bayswater South switching station to the existing 500 kV transmission line near the Baywater power station and the new Olney switching station to the existing 500 kV transmission line between Eraring and Kemps Creek.

Relevant to this AIA and considered in detail in *Chapter 5*, the HTP corridor is located within Class G airspace and partly in Restricted Area R564A, an Australian Army training area south of Singleton, NSW (refer to **Figure 6**). There are 3 certified aerodromes within 30 nautical miles (55.56 kilometres) of the project, as shown in **Figure 6**:

- Cessnock
- Maitland
- RAAF Williamtown / Newcastle Airport.

There are also 4 uncertified aerodromes including private airstrips, and aircraft landing areas (ALAs) and 10 HLS within 10 kilometres (5.4 nautical miles) of the HTP corridor (refer to **Figure 10**).

5. ASSESSMENT OF IMPACTS

5.1. Aviation Impact Statement

5.1.1. Certified aerodromes within 30 nautical miles of the HTP

Certified aerodromes are defined under the Civil Aviation Safety Regulations (CASR) Part 139.

> *An aerodrome that has an aerodrome certificate is a certified aerodrome. The operator of a certified aerodrome must meet certain requirements for operating and maintaining the aerodrome. (CASR 139.001)*

These aerodromes have protection surfaces that extend past the 30 kilometres radius required by the SEARS. Some protection surfaces, particularly the Minimum Sector Altitudes (MSA) extend to 30 nautical miles (55.56 kilometres). To comply with the more restrictive requirements of the AIS an area of 30 nautical miles was searched for certified aerodromes.

Three certified aerodromes are within 55.56 kilometres (30 nautical miles) of the HTP Corridor (see **Table 3**). PANS-OPS and OLS assessments are provided in *sections 5.1.1* and *5.1.2*, respectively.

Table 3 Certified aerodromes within 30 nautical miles of the HTP corridor

Certified Aerodrome Name	*Distance from the HTP Corridor*	*OLS overhead the HTP Corridor*	*Impact*
Cessnock	13 km (7 nm)	No	No impact
Maitland	29.6 km (16 nm)	No	No impact
RAAF Williamtown / Newcastle Airport	53.7km (29 nm)	No	No impact

Figure 6 shows the HTP corridor in relation to the identified certified aerodromes.

Figure 6 HTP corridor in relation to the certified aerodromes

5.1.2. PANS-OPS Assessments

Some certified aerodromes have been provided with instrument approach procedures (IAPs) that guide suitably equipped aircraft to the runway at the aerodrome in the event that weather conditions preclude the pilot from maintaining visual contact with ground or water until they are close to the runway. The IAPs provide a prescribed minimum obstacle clearance (MOC) above terrain and obstacles within a lateral tolerance on either side of the IAP's flight path.

The specifications for the IAPs are prescribed in International Civil Aviation Organisation (ICAO) Document 8168 – *Procedures for Navigation, Operations (PANS-OPS)* and within CASR Part 173 Manual of Standards (MOS) for Australian specific criteria.

PANS-OPS assessments were undertaken based on the proposed transmission line tower heights and locations within the lateral area of each IAP to determine whether the transmission line towers and construction cranes would infringe on any PANS-OPS surfaces.

Cessnock Aerodrome

Cessnock City Council operates the aerodrome, which is located approximately 13 kilometres (7 nautical miles) northeast of the HTP corridor.

Cessnock Aerodrome has 2 instrument approach procedures (Required navigation performance approach (RNP) 17 and RNP 35). The HTP corridor will be beneath the procedure protection surfaces.

The minimum sector altitude (MSA) applies to each instrument approach procedure at Cessnock Aerodrome. The CASR Part 173 MOS requires a minimum obstacle clearance (MOC) of 984 feet to be applied above the highest terrain or obstacle within the applicable segment.

Obstacles within the 10 nautical miles and 25 nautical miles MSA of Cessnock Aerodrome's aerodrome reference point (ARP) define the minimum height an instrument flying rules (IFR) aircraft can fly when within 10 nautical miles and 25 nautical miles of the aerodrome when not in visual flight conditions.

Both the 10 nautical miles MSA and 25 nautical miles MSA have a buffer of 5 nautical miles, which will extend it out to 15 nautical miles and 30 nautical miles.

The HTP corridor will be within the 10 nautical miles MSA and 25 nautical miles MSA western sector surfaces. The 10 nautical miles MSA's minimum altitude is 3200 feet AMSL, with a PANS-OPS surface of 2216 feet AMSL. The 25 nautical miles MSA western sector's minimum altitude is 3500 feet AMSL, with a PANS-OPS surface of 2516 feet AMSL Noting that the design is subject to further development, the highest part of the HTP corridor has a maximum elevation of 582 metres Australian Height Datum (AHD) (1910 feet AMSL), is below the PANS-OPS surface, and does not impact the MSA surfaces.

The HTP corridor does not infringe upon the PANS-OPS surfaces at Cessnock Aerodrome.

Maitland Aerodrome

Maitland Aerodrome is operated by the Royal Newcastle Aero Club and is located approximately 29.6 kilometres (15.6 nautical miles) northeast of the HTP corridor.

Maitland aerodrome has 1 instrument approach procedure (RNP W), but no segments of it are located above the HTP corridor.

The HTP corridor will be within the west sector of the 25 nautical miles MSA surfaces. The 25 nautical miles MSA's minimum altitude is 3400 feet AMSL to the west of Maitland, with a PANS-OPS surface of 2416 feet AMSL. The highest part of the HTP corridor has a maximum elevation of 582 metres AHD (1910 feet AMSL) which is below the PANS-OPS surface and therefore does not impact the 25 nautical miles MSA.

The HTP corridor does not infringe upon the PANS-OPS surfaces at Maitland Aerodrome.

RAAF Base Williamtown / Newcastle Airport

RAAF Base Williamtown is a military aerodrome operated by the Royal Australian Air Force (RAAF). Even though this is a military airfield, civilian operations are permitted. Parts of the airport are leased from the Federal Government to Newcastle Airport Ltd (NAPL) to manage civilian air travel. The airport is located approximately 53.7 kilometres (29 nautical miles) northeast of the HTP corridor. Civil aircraft are conducted under Civil Aviation Safety Regulations 1998 (CASRs), and the military aircraft operate to their specific authorisations.

ATC is provided by RAAF air traffic controllers to both military and civil aircraft in the military airspace surrounding the aerodrome.

Williamtown / Newcastle Airport has IAPs, but no segments of them are located above the HTP Corridor other than the 25 nautical miles Minimum Safe Altitude (MSA).

The HTP corridor will be within the west sector of the 25 nautical miles MSA surfaces. The 25 nautical miles MSA is 3100 feet AMSL to the west of RAAF Base Williamtown with a PANS-OPS surface of 2116 feet AMSL. The highest part of the HTP has a maximum elevation of 582 metres AHD (1910 feet AMSL) which is below the PANS-OPS surface and therefore does not impact the 25 nautical miles MSA.

The HTP corridor does not infringe upon the PANS-OPS surfaces at RAAF Base Williamtown/Newcastle Airport.

5.1.3. Obstacle Limitation Surfaces

The extent of OLS at certified aerodromes depends on the code number allocated to the relevant runway, which is determined by the type of operations (Visual Flight Rules (VFR) or Instrument Flight Rules (IFR)) using the runway and the length of the runway.

CASR Part 139 MOS details the specifications for the OLS. For the Code 2 non-precision runway at Cessnock Aerodrome and Maitland Aerodrome, the maximum lateral extent of the OLS is up to 4.7 kilometres (2.5 nautical miles) for the conical surface and 2.5 kilometres (1.35 nautical miles) for the take-off and approach surfaces.

The closest transmission line tower is approximately 13 kilometres (7 nautical miles) from Cessnock Aerodrome and 29 kilometres (15.6 nautical miles) from Maitland Aerodrome. The proposed HTP corridor is outside both Cessnock and Maitland Aerodrome's OLS.

RAAF Base Williamtown is a military aerodrome and is located 53.7 kilometres (29 nautical miles) from the closest transmission line tower. At this distance the HTP corridor will be located outside the OLS surfaces.

5.1.4. Air routes and LSALT

Air routes between aerodromes are provided with a Lowest Safe Altitude (LSALT), which is the lowest altitude that an aircraft can fly in Instrument Meteorological Conditions (IMC), i.e. where they can't necessarily maintain visual contact with the ground or water to avoid obstacles. These air routes are published in the ERC Charts. ERC-H designates routes for high altitude operations and ERC-L for those at a re lower altitude.

CASR Part 173 MOS prescribes a minimum obstacle clearance of 1000 feet above the highest terrain/obstacle within the lateral limits of the published air route to determine the LSALT for that route segment.

5.1.5. Grid LSALT

A Grid LSALT is provided for IFR aircraft that are not flying along a published air route. The grid is a 1 degree by 1 degree grid within the whole number latitude and longitude graticule.

The project is located within 3 x 1° x 1° grid areas with LSALTs of 6600 feet, 5600 feet and 3500 feet AMSL with protection surfaces of 5600 feet, 4600 feet and 2500 feet AMSL respectively.

The highest component of the project has a maximum elevation of 620 metres AHD (2034.1 feet AMSL) and would not infringe on the published Grid LSALTs, as shown in **Table 4**.

Table 4 Grid LSALT Analysis

Grid LSALT Route ft AMSL	*Protection Surface (ft AMSL)*	*Result*
6600	5600	No Impact
5600	4600	No Impact
3500	2500	No Impact

5.1.6. Air Route LSALTs

A protection area of 7 nautical miles laterally either side of an air route is used to assess the LSALT for the air route.

There are several air routes overhead and within 7 nautical miles of the HTP corridor (see Table 5).

Table 5 Air route analysis

Air Route	*Waypoint Pair*	*Route LSALT/Protection Surface (ft AMSL)*	*Result*
H91	UBLOM – IGDAM	6100/5100	No Impact
H652	IGDAM – SADLO	4200/3200	No Impact
J70	INOKE – IGDAM	6700/5700	No Impact
V402	LOWEP – UKIMO	3500/2500	No Impact
V543	OLTIN – DUUKE	3600/2600	No Impact
V668	OLTIN – MAKOR	3500/2500	No Impact
V791	MONDO - DUUKE	3600/2600	No Impact
W347	MATLA – MAKOR	3500/2500	No Impact
W786	OLTIN – MONDO	3600/2600	No Impact

The HTP corridor is below all nearby air routes LSALTs and would not create an impact on them.

5.2. Airspace protection

The project is located within Class G airspace and partly in Restricted Area R564A, an Australian Army training area south of Singleton, NSW (refer to **Figure 8**).

Class G is uncontrolled airspace up to 8,500 feet where both instrument flight rules and visual flight rules aircraft are permitted, and neither require air traffic control clearance (ASA).

As shown in **Figure 9** (Source: ASA, DAH dated 12 June 2025), the vertical limit of R564A is from the surface to 4000 feet AMSL. Within Restricted Area R564A transmission tower height may be up to 85m, subject to final design. The elevation of transmission towers within Restricted Area R564A range from 571ft to 919ft AMSL. As transmission infrastructure will be constructed and operated between the surface level and 4000 feet AMSL the HTP corridor will impact R564A. Therefore, consultation with the Department of Defence has been conducted.

Figure 7 Airspace and HLS near the HTP corridor (1)

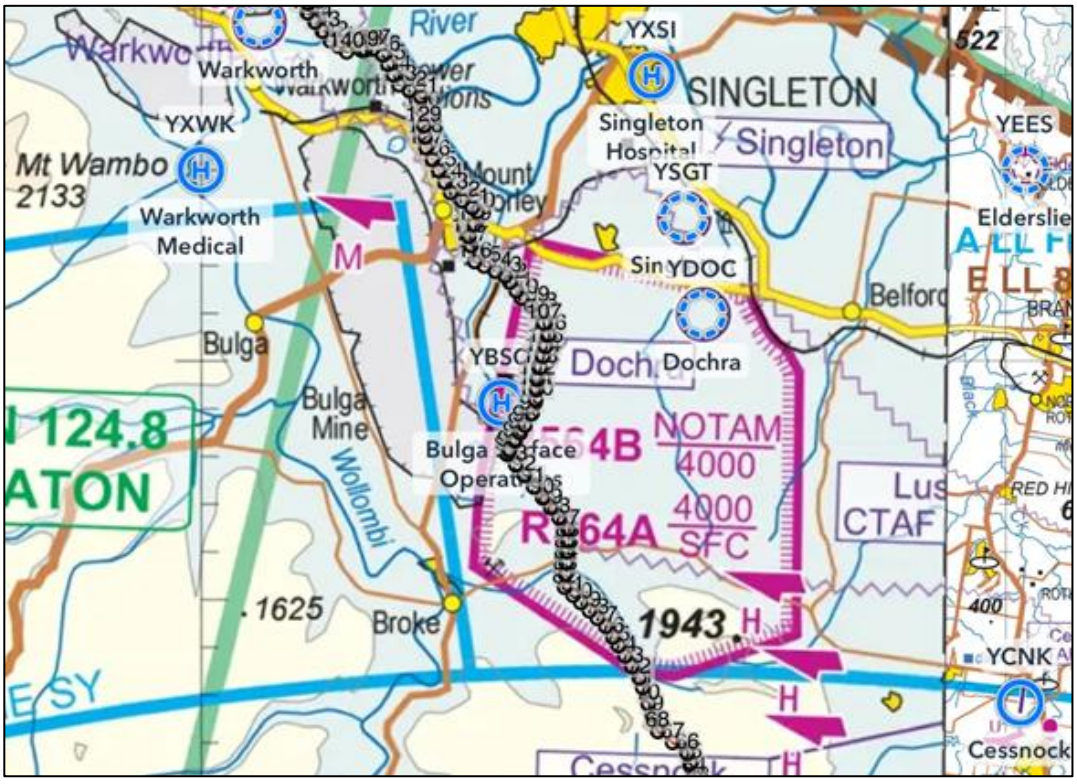

Figure 8 Airspace and HLS near the HTP corridor including R564A (2)

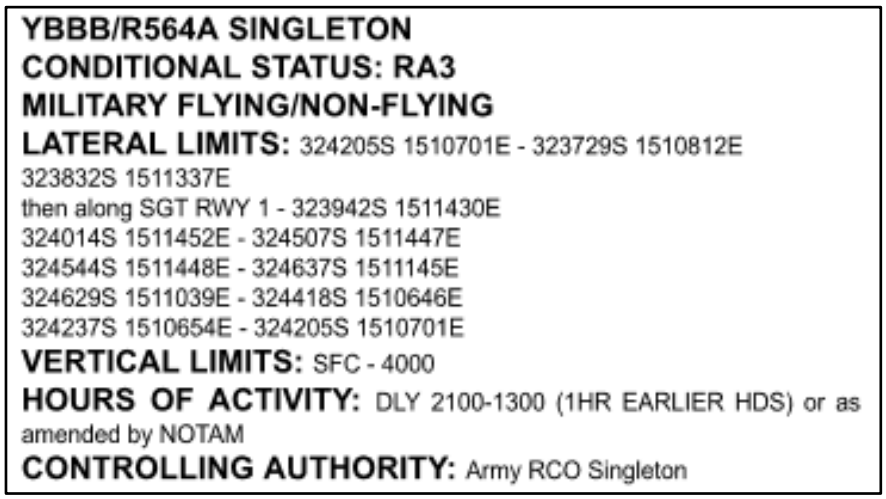

Figure 9 Details of R564A

5.3. Aviation navigation and communication facilities

NASF Guideline G, *Protection of Aviation Facilities - Communication, Navigation and Surveillance (CNS)* (15 kilometres (8 nautical miles)) and CASR Part 139 MOS specify the area where the development of buildings and structures has the potential to cause unacceptable interference to CNS facilities.

The nearest aviation navigation facilities are located at Maitland Aerodrome, approximately 42 kilometres (22.7 nautical miles) north of the HTP corridor. The project is located at a sufficient distance away from nearby aviation navigation and communication facilities to not have an impact upon them.

Airservices Australia's communication facilities are not publicly available. It is assumed that the nearest ATC communication system is located at Mt Heaton, approximately 15 kilometres (8 nautical miles) northeast of the HTP corridor however consultation with Airservices Australia will determine this.

5.4. ATC surveillance radar facilities

Airservices Australia requires an assessment of the potential for the HTP corridor to affect the radar line of sight.

EUROCONTROL guidelines for assessing the potential impact by high-tension electricity transmission lines on radar surveillance sensors stipulate the following assessment requirements.

Primary Surveillance Radar (PSR)

- Zone 1 0-500 m: Not permitted
- Zone 2 500 m – 15 kilometres: Detailed assessment
- Zone 3: Further than 15 kilometres but within maximum instrumented range and in radar line of sight: Simple assessment
- Zone 4: Anywhere within maximum instrumented range but not in radar line of sight or outside the maximum instrumented range: No assessment.

Secondary Surveillance Radar (SSR)

- Zone 1: 0 - 500 metres: Not permitted
- Zone 2: 500 metres - 16 kilometres but within maximum instrumented range and in radar line of sight: Detailed assessment
- Zone 4: Further than 16 kilometres or not in radar line of sight: No assessment.

(Zone 3 is not established for secondary surveillance radar)

A PSR/SSR may be located at RAAF Williamtown. Defence has been consulted.

The nearest radar facility to HTP Corridor is the Mt Sandon Route Surveillance Radar (RSR) located approximately 138.9 kilometres (75 nautical miles) north of the HTP corridor. The HTP corridor is outside the line-of-sight range of the Mt Sandon RSR radar and would not impact this facility.

5.5. RAAF Williamtown Radar Terrain Clearance Chart (RTCC)

An RTCC is provided for RAAF Williamtown ATC and published for Defence use in Australian Defence Force – Flight Information Publication, Terminal Australia (ADF-FLIP-TERMA). It is used by ATC to assign aircraft being controlled under radar vectors, minimum altitudes in accordance with the chart segments to ensure terrain and obstacle clearance for the aircraft.

Within the project impact area, the lowest assigned altitude on the RTCC is 3600 feet with a protection surface of 2600 feet AMSL. The highest transmission line tower of the HTP has a maximum elevation of 582 metres AHD (1910 feet AMSL) and, as such, would not infringe the published RTCC protection surfaces.

5.6. Uncertified Aerodromes

Uncertified aerodromes are defined in the CASR as those aerodromes that are not certified under CASR Part 139. These include private airstrips, uncertified aerodromes and helicopter landing sites (HLS). CASA does not regulate the operation of uncertified aerodromes.

There are 4 uncertified aerodromes (including private airstrips, and ALA) within 10 kilometres (5.4 nautical miles) of the HTP corridor (see **Table 6**), and 10 HLS are located within 10 kilometres (5.4 nautical miles) of the HTP corridor. Assessments of HLS are provided in *section 5*, respectively.

Table 6 Uncertified Aerodromes within 10 kilometres of the HTP corridor

Uncertified Aerodrome Name	*Bearing and Distance from the HTP Corridor*	*Impact*
Warkworth	2 km (1.1 nm) west	No adverse impact if mitigation is in place
Coolmore Stud	5.35 km (2.9 nm) west	No impact
Singleton	5.7 (3 nm) km east	No impact
Dochra Military Aerodrome	9.5 km (5.1 nm) east	No impact

Figure 10 shows the HTP in relation to the identified uncertified aerodromes.

Figure 10 HTP in relation to the identified uncertified aerodromes

5.6.1. Warkworth Aerodrome

Warkworth Aerodrome is operated by the Hunter Valley Gliding Club (HVGC). The club operates gliding activities that occur mainly on weekends, Fridays and public holidays.

HVGC also makes the aerodrome available for student pilots from flying schools in the Sydney area to practice circuits and take-off/landings. This would generally occur any day of the week.

Warkworth Aerodrome's published aerodrome elevation is 76.2 metres AHD (250 feet AMSL) (source: AIP, effective 12 June 2025). Warkworth Aerodrome's ARP coordinates published in Airservices Australia's DAH are Latitude 32°32'54" S and Longitude 151°01'27" E (Source: AIP, effective 12 June 2025).

Based on aerodrome details provided in the OzRunways electronic flight bag program, the glider runway 10/28 has a length of 1000 metres, as shown in Figure 11 (Source, Google Earth). The operation huts are located beside the runway at both ends and provided a sound indication of the take-off points used in both directions.

Consultation with HVGC held on the 5 June 2025 indicated that the runway length for powered aircraft other than tow planes should be considered as 1550 metres with the eastern end of the runway 30 metres from the boundary.

Figure 11 Warkworth aerodrome and distance to HTP corridor

Tow planes and gliders generally land beside the indicated runway when other aircraft are not ahead of them.

The eastern end of the glider runway is located at least 2.5 kilometres (1.5 nautical miles) from the nearest point of the HTP corridor along the runway centreline, as shown in **Figure 11**.

A powered aircraft runway 10/28, although unpublished, is located to the north of the glider runway. The eastern end of this runway is located 30 metres from the eastern fence (as advised by HVGC) and is approximately 2.7 kilometres (1.4 nautical miles) from the HTP corridor along the runway centreline.

The closest part of the HTP corridor is 1.87 kilometres (1 nautical mile) from the closest point of the Warkworth Aerodrome boundary, measured with what would be described as a take-off or approach splay approximately 15 degrees either side of the runway centreline.

The normal circuit direction is left-hand, in accordance with CASR Part 91, but gliders may conduct a right-hand circuit to land if operationally required. The glider and tow plane combination, which are used at Warkworth Aerodrome, are usually airborne within 600 metres from the start of take-off point and, in a worse case, take off with a fully ballasted glider on a hot day within 1000 metres from the start of take-off point. This indicates that a tow plane/glider combination taking off towards the east and climbing at an a rate of approximately 500 feet per minute and an indicated airspeed of 60 nautical miles per hour (knots) would take approximately 1 minute to reach the HTP Corridor and would be at a height of 500 feet or more above the runway, and therefore more than 220 feet above the HTP by the time they reach the transmission line.

The HTP transmission line towers would have a maximum height of 85 metres/278.9 feet AGL and be located on terrain approximately the same height as the runway. There is no minimum clearance distance that must be achieved between an aircraft and infrastructure such as a powerline within the CASRs during take-off and landing. The CASRs mandate that pilots must operate aircraft safely and maintain obstacle awareness.

Therefore, the tow plane/glider combination would obtain an acceptable height above the HTP corridor before reaching it.

Aircraft, including tow plane/glider combination, turn left upon reaching 500 feet above the runway to continue climbing to where the glider would like to release from the tow plane and fly away. CASR Part 91 prescribes that the pilot in command must ensure that the aircraft has the performance to clear all obstacles by a safe margin.

CASR Part 91, Chapter 24 of the MOS prescribes the requirements relating to take-off performance for the flight of an aircraft:

> 24.02 Take-off performance for aeroplanes
>
> (1) The pilot in command of an aeroplane during and after take-off must ensure that, until the aeroplane reaches the minimum height for the flight in accordance with regulation 91.265, 91.267, 91.277 or 91.305 (as applicable), the aeroplane has the performance to clear all obstacles by a safe margin.
>
> (2) For subsection (1), the pilot in command must determine the performance of the aeroplane from any 1 of the following:
>
> (a) the AFM;
>
> (b) the manufacturer's data manual (if any);
>
> (c) other data approved under Part 21 of CASR for the purpose.
>
> (3) For subsection (2), the pilot in command must take the following into account:
>
> (a) the take-off distance available;
>
> (ab) the type of runway surface, and the runway surface condition, if available;
>
> (b) the pressure altitude and temperature;
>
> (c) the gradient of the runway in the direction of the take-off;
>
> (d) the wind direction, speed and characteristics;
>
> (e) the take-off and en route weather forecast;
>
> (f) the obstacles in the vicinity of the take-off flight path.

Tow pane pilots should, wherever possible, avoid climbing the combination in the downwind leg of the circuit and plan their departure so as to keep the glider within gliding distance of the airfield. "While it is usual for an aircraft to maintain runway heading until it reaches 500 feet AGL, the pilot in command of a tow plane/glider combination (on tow) is permitted to make deviations to maximise safety for the combination during the take-off, so as to remain over land able terrain". [1]

Gliding Australia is the organisation, authorised by CASA to oversee safety compliance for all gliding and glider launching activities in Australia. Aerotowing is one such launch method.

Warkworth aerodrome does not have any OLS established that would be compatible with CASR Part 139. HVGC have established an unofficial OLS with the nearby coal mines to help to protect the airfield airspace from intrusions by the mining operation. This OLS is detailed in Figure 11.

[1] Gliding Australia Aerotowing Manual Rev 5, June 2023.

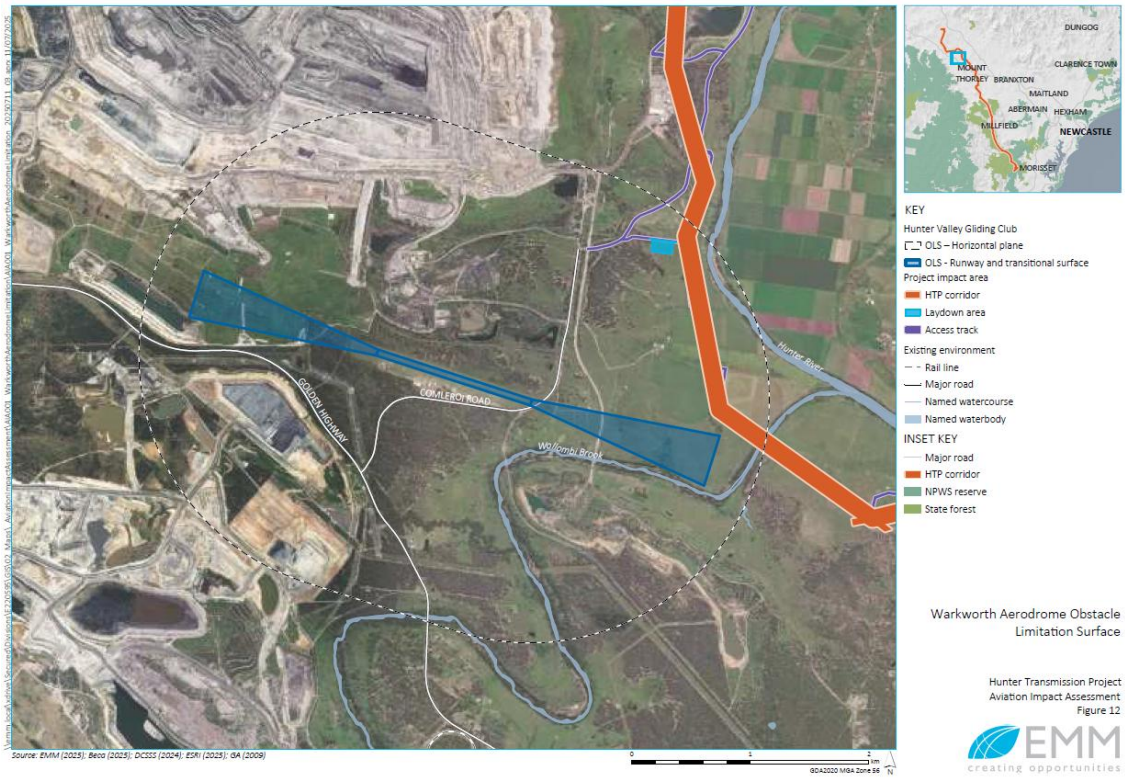

Figure 12 Warkworth aerodrome unofficial OLS

It can be seen from Figure 11 that the approach surface and the take-off surface to the east of the aerodrome are not infringed by the project. Infringements are not normally approved.

The horizontal surface, which would normally be at an elevation of 45 metres above the aerodrome, is infringed by the project.

An OLS consistent with CASR Part 139 MOS, for a Code 1 non-instrument runway was constructed for the powered aircraft runway to determine whether the HTP would create adverse impacts to an OLS associated with certified aerodromes throughout Australia. Warkworth is not certified and therefore has no CASR Part 139 OLS. The OLS is shown in Figure 13. If the OLS was transposed onto the glider runway the approach surface and the take -off climb surface would also be clear of the HTP corridor.

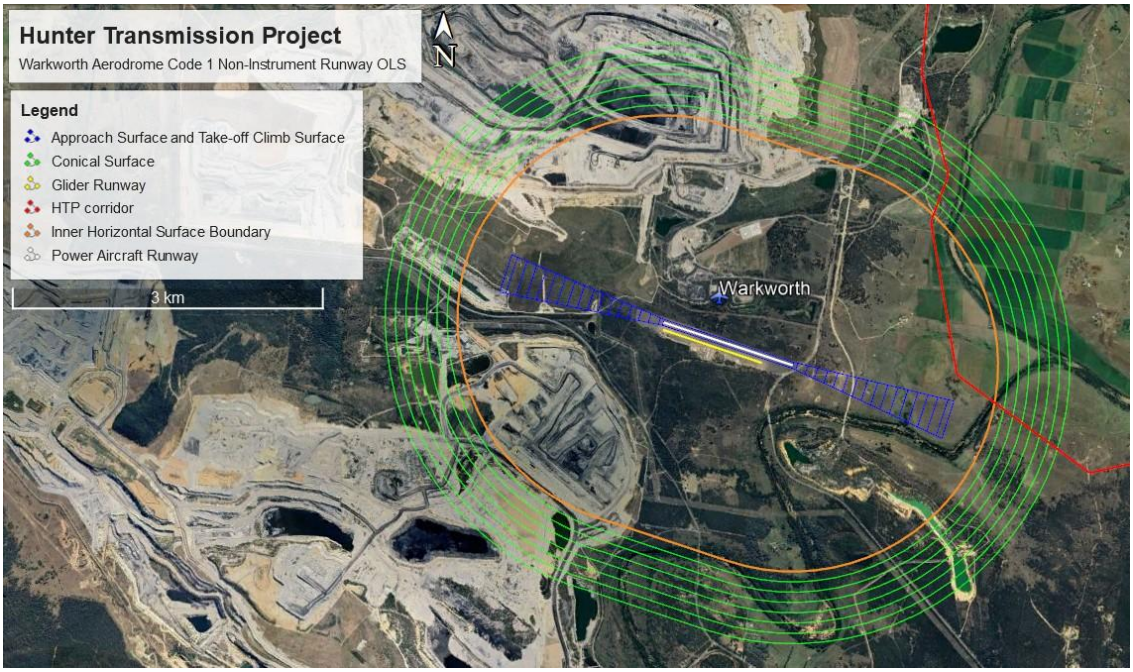

Figure 13 Warkworth Code 1 non-instrument runway OLS

It can be seen from Figure 13 that the approach surface and the take-off surface to the east of the aerodrome are not infringed by the Project corridor. Infringements are not normally approved.

The inner horizontal surface, which has an elevation of 45 metres above the aerodrome, is infringed by the Project corridor.

The inner horizontal surface normally allows infringements to it because it is only related to visual aircraft movements where pilots can see and avoid obstacles and terrain infringing it. Infringements into official horizontal surfaces, outside the approach surfaces and take-off surfaces occur regularly and are generally approved by aerodrome operators. There is precedent for infringements of the inner horizontal surface throughout Australia that have been approved at certified airports, noting that each individual aerodrome, including Warkworth Aerodrome, should be considered on its own operational requirements.

Infringements of the inner horizontal surface are permitted subject to an aeronautical study determining that such infringements do not create an adverse impact on flight safety and efficiency at the aerodrome.

Normal and low-level circuit operations at Warkworth aerodrome operate well above the HTP and would not be impacted by it.

The HTP transmission towers would have a maximum height of 85 metres/278.9 feet AGL and are located on terrain approximately the same height as the runway. Therefore, the tow plane/glider combination would obtain an acceptable height above the HTP corridor before reaching it.

Aircraft, including tow plane/glider combination, turn left upon reaching 500 feet above the runway and continue climbing to where the glider would like to release from the tow plane and fly away.

Competition-type glider flights may descend to an altitude of not below 500 feet AGL at high speed at a designated finish line, generally located approximately 3 kilometres (1.6 nautical miles) from the aerodrome in the direction of the task set for the competition. These gliders would then climb to a circuit altitude of approximately 800 feet above the aerodrome in preparation for landing in a safe and orderly manner to land at

Warkworth Aerodrome. They may also conduct a straight-in approach along the runway centreline if safe to do so.

The competition director would need to consider the HTP corridor in their task planning and finish line determination to ensure a safe finish is available and may consider a higher finish altitude to ensure clearance of the HTP corridor, but it is not expected to create an adverse hazard to these types of flights when appropriately considered in any competition planning. Gliders that cannot reach the aerodrome and cannot climb above the HTP corridor can safely outland (land away from an airfield) in a suitable paddock prior to reaching the HTP corridor.

Emergency procedures and outlanding training by the HVGC can be conducted in the area between the aerodrome and the HTP corridor, or beyond it.

In response to a request from HVGC during the meeting on 5 June 2025, an indicative emergency response action review has been developed. In nil wind conditions, Table 7 Indicative emergency response action reviewTable 7 provides an indication of approximate heights and distances from the point where the combination gets airborne along the runway on days with temperatures below 30 degrees Celsius. The distance may be longer by approximately 10 to 15 per cent on hot days.

Table 7 Indicative emergency response action review

Elevation (ft) of Glider or Tow Plane	Approximate distance from start of take-off roll at Warkworth Aerodrome (km)	Proposed action under emergency aircraft failure of tow plane or rope break	Emergency Response Impact of Proposed HTP
100	0.37	Outland in a suitable paddock within 30 degrees off runway heading, immediately to the east of Warkworth Aerodrome	The tow plane and glider will not reach the transmission line. No change in action or outcome between the existing scenario and post HTP construction scenario.
200	0.75	Similar to above option but slightly more ability for glider to turn a little more, maybe be 45 degrees off runway heading	The tow plane and glider will not reach the transmission line. No change in action or outcome between the existing scenario and post HTP construction scenario.
300	1.12	Similar to above option for the tow plane. Glider may be able to turn back and land at the airfield depending on wind direction and strength.	Tow plane and glider cannot reach to transmission line. No change in action or outcome between the existing scenario and post HTP construction scenario. Some landing space near the HTP corridor would not be suitable for outlanding training but anything goes in a real emergency.
400	1.5	Very similar to above option for the tow plane but can turn slightly to land in a nicer area. Glider	Tow plane and glider will have some options due to height to avoid the transmission line. No change in action

		should be able to turn back and land at the airfield.	or outcome between the existing scenario and post HTP construction scenario. Glider should be at sufficient height to turn back and land at the airfield depending on wind strength and direction. Glider and tug at 400 ft are above the transmission line and towers.
500	1.87	Sufficient height for the glider to complete a modified circuit and land at Warkworth Aerodrome. The tow plane has more options to chose suitable landing area.	No change in action

Aircraft, including gliders are not permitted to fly less than 500 feet above terrain or obstacles within 300 metres of it, except during take-off and landing, unless authorised to do so by specially qualified pilots. Glider pilots are not considered specially qualified to operate below 500 feet except for take-off and landing, either at an aerodrome or in paddock. The HTP transmission towers will provide a clear indication of the presence of the transmission line to enable pilots to see it in sufficient time to avoid it. HTP will also be marked on aeronautical charts to enable pilots to be aware of its presence and assist them to look for it in the appropriate place.

Aircraft, including gliders are not permitted to fly less than 500 feet above terrain or obstacles within 300 metres of it, except during take-off and landing, unless authorised to do so by specially qualified pilots. Glider pilots are not considered specially qualified to operate below 500 feet except for take-off and landing, either at an aerodrome or in paddock. The HTP transmission towers will provide a clear indication of the presence of the transmission line to enable pilots to see it in sufficient time to avoid it. It will also be marked on aeronautical charts to enable pilots to be aware of its presence and assist them to look for it in the appropriate place.

Flying schools based in the Sydney area regularly use Warkworth aerodrome for navigation and circuit and landing training. These aircraft typically reach an adequate height above the HTP corridor on a take-off to the east. When joining the circuit from the east, prior to landing they would be at a minimum height of 1000 feet above the runway, when over the HTP corridor.

For a landing to the west, there is sufficient distance from the HTP corridor for the pilot to turn onto a base leg to join a final approach path to land.

There are other transmission lines in the vicinity of Warkworth Aerodrome that require similar considerations by pilots. It is noted that the existing transmission lines are around 45 metres high where as HTP transmission towers will stand at a maximum of 85 metres high. The existing transmission lines are shown in Figure 14.

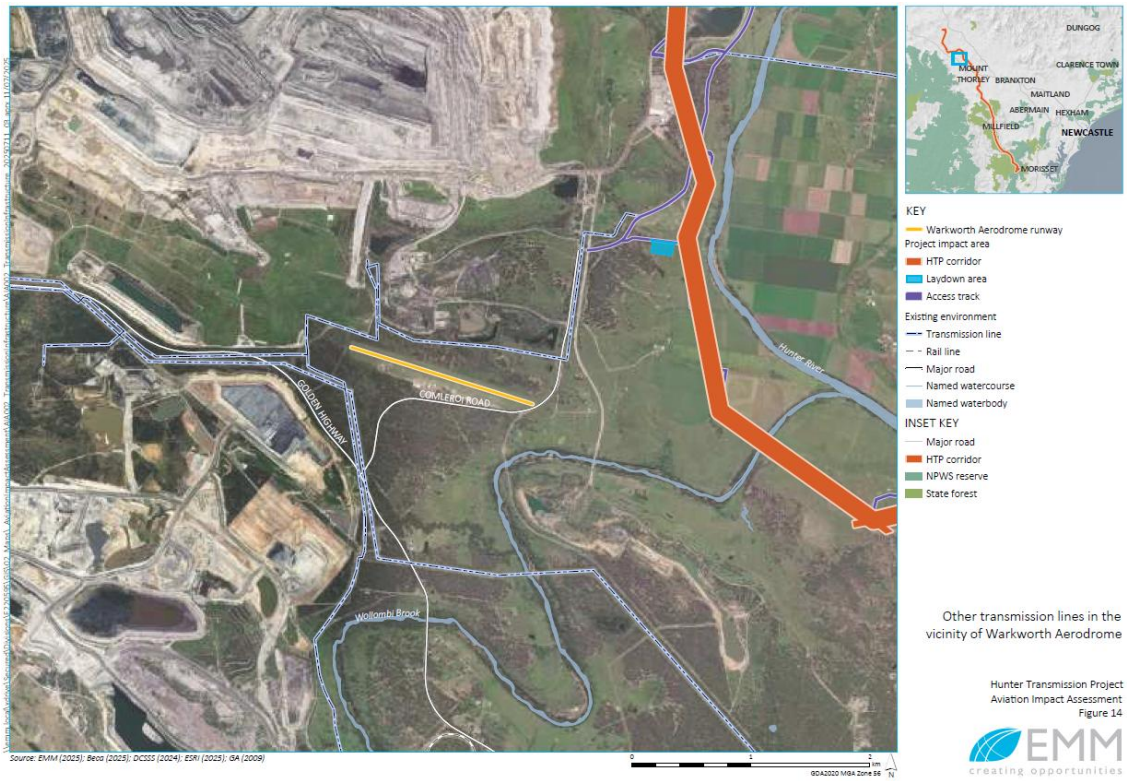

Figure 14 Other transmission lines in the vicinity of Warkworth Aerodrome

Prior to commencing construction of the HTP corridor, the following activities will be discussed with HVGC:

- activities involving cranes that are taller than the transmission line towers
- use of helicopters or drones for stringing operations.

Cranes are unlikely to present a hazard provided they are a clearly visible colour against the background terrain and/or have an obstacle light fitted near the top of the crane.

Helicopters and/or drones used during construction or maintenance for stringing or transmission tower assembly would be operated in accordance with the applicable CASRs for such operations, including in the vicinity of the Warkworth Aerodrome. The Hunter Valley Gliding Club would be provided with notice prior to these operations commencing. Refer to *section 5.7* for further information on helicopter and drone use.

Given the above and when normal aviation procedures are conducted, the HTP is not anticipated to adversely impact the Warkworth Aerodrome, where the mitigation measures listed in *section 7* are implemented.

5.6.2. Singleton Aerodrome

Singleton Aerodrome is operated by Singleton Air Services Pty Ltd for their flying operations. Permission is required to fly to/from there.

Singleton Aerodrome's published aerodrome elevation is 45.7 metres AHD (150 feet AMSL) (source: AIP, effective 28 November 2024). Singleton Aerodrome's ARP coordinates published in Airservices Australia's DAH are Latitude 32°37'00" S and Longitude 151°12'00" E (Source: AIP, effective 12 June 2025).

The nearest part of the runway is located approximately 5.7 kilometres (3 nautical miles) from the HTP Corridor. It is located outside the 1 nautical mile standard circuit described in Annexure 3. Therefore, the HTP corridor will not impact aircraft operations at Singleton Aerodrome.

5.6.3. Dochra Military Aerodrome

The Dochra Military Aerodrome is used by military aircraft to support Australian Army operations in restricted area R564A/B, a military training area which does not allow civilian aircraft operations within it.

Dochra Military Aerodrome's published aerodrome elevation is 69.5 metres AHD (228 feet AMSL) (source: AIP, effective 28 November 2024). Dochra military aerodrome's ARP coordinates published in Airservices Australia's DAH are Latitude 32°39'02" S and Longitude 151°12'29" E (Source: AIP, effective 12 June 2025).

The Dochra Military Aerodrome is located approximately 9.5 kilometres (5 nautical miles) east of the HTP corridor, and the aircraft will likely be at least 500 feet AGL when near it. If lower flight operations are required, pilots will need to consider the HTP Corridor in the same manner that they consider existing transmission lines in the surrounding area.

Consultation with the Department of Defence has occurred and would be ongoing through-out the HTP construction activities would need to be coordinated with appropriate military authorities for the part of HTP within Singleton Military Area. Refer to section 6 for further details on consultation.

The HTP corridor would not impact military flight operations at Dochra Military Aerodrome.

5.6.4. Coolmore Stud Aerodrome

Coolmore Stud Aerodrome is located adjacent to the Golden Highway and 5.35 kilometres (2.9 nautical miles) west of the HTP corridor.

Aircraft larger than single-engine light aircraft regularly operate at Coolmore Stud Aerodrome for private and commercial air transport operations other than regular air transport. However, they would be at a height well above the HTP corridor.

The HTP corridor is not anticipated to impact aircraft operations at Coolmore Stud Aerodrome.

5.7. Helicopter Landing Sites

Ten HLS are located within 10 kilometres (5.4 nautical miles) of the HTP corridor (see in **Table 8**, **Figure 7** and **Figure 8**).

Table 8 HLS within 10 kilometres (5.4 nautical miles) of the HTP corridor

HLS Name	*Bearing and Distance from the HTP Corridor*	*Impact*
Bulga Surface Operations	1.27 km (0.7 nm) west	No adverse impact
Camberwell Medical	532 m (0.3 nm) north	No adverse impact
Glendall Mine	8.83 km (4.8 nm) east	No adverse impact
Integral Coal	9.6 km (5.2 nm) east	No adverse impact
Unnamed HLS (north of Warkworth aerodrome)	551 m (0.3 nm) west	No adverse impact
Lemington Hunter Valley Operations	4.1 km (2.2 nm) east	No adverse impact
Liddell Coal	5.9 km (3.2 nm) northeast	No adverse impact
Liddell Open Cut	8 km (4.3 nm) east	No adverse impact
Ravensworth Coal CHPP	6.5 km (3.5 nm) east	No adverse impact
Ravensworth Open Cut	6.4 km (3.4 nm) north	No adverse impact

Unlike fixed-wing aircraft, helicopters are able to operate in close proximity to trees, buildings and other structures, allowing HLS to be located nearer to structures than airstrips used for fixed wing aircraft operations. Two locations of HLS within 1 kilometre of the HTP corridor were identified. It is unlikely that the transmission line would have an adverse impact on these HLS, or to any others. All of the known HLS are on open land without HTP infrastructure within the immediate vicinity.

Helicopter flight operations are also likely to occur throughout the area, especially for bush fire suppression (refer to *section 5.12*) and medical emergency evacuations in areas that are hazardous to fixed wing operations. The flexibility of the helicopter would allow them to land and take-off from locations that would not be impacted by the proposed transmission line.

Pilots intending to use these HLS are responsible for ensuring that HLS is suitable for the safe operation of their aircraft. They must obtain details of any proposed landing area from the landowner for that purpose, prior to operating there. All pilots operating in the area near the proposed transmission line would need to consider its location in relation to their planned flight to ensure they can remain clear of it by the prescribed margins set out in the aviation regulations

There are no designated flight paths indicated in publicly available aeronautical information publications, therefore allowing pilots to select the most suitable (safe) flight path to/from the HLS to avoid local obstacles of any kind.

Helicopters and/or drones used during the construction and maintenance of HTP for stringing or transmission tower assembly would be operated in accordance with the applicable CASRs for such operations. Their operation would be conducted with prior notification being provided to all airspace users in the area, in VFR conditions likely to involve light winds. Pre-flight planning would ensure that operators are aware of existing infrastructure and other potential hazards, and operations would be planned to avoid such obstacles.

The drone/helicopter operators would also be aware of their obligations in relation to other airspace, aerodrome users and communication requirements in Class G airspace, to reduce their risk from other aviation activity in the area, and the risk they pose to others. A number of helicopter pads will be established during the construction phase to support the works. These will be located indicatively at the Hebden Road, Pikes Gully Road, Gouldsville Road and Freemans Drive construction support sites.

5.8. Marking and lighting of the HTP

Marking and lighting of high-tension power lines beyond the vicinity of aerodrome OLS is not required under CASR. Warkworth does not have an OLS that is compliant with CASR Part 139 as it is an uncertified aerodrome.

Australian Standard AS 3891.1:2021, Air Navigation – Cables and their supporting structures – Marking and Safety requirements, Part 1, specifies requirements for aircraft warning markers on overhead cables and supporting structures designed to provide a visual warning to pilots of aircraft. It does not prevent the marking of cables and supporting structures in other locations, as long as they are consistent with the Standard.

For cables located in proximity to a non-certified aerodrome, a rising plane with a 3.3 per cent slope is used to define an area at the ends of runways, above which cables and supporting structures should be marked.

Warkworth Aerodrome is located approximately 2500 metres from the nearest transmission tower along the runway centreline (Tower 142 – subject to finalised design). A 3.3 per cent slope originating at the end of the runway provides a slope height of 82.5 metres above the runway. As Tower 142 is located on terrain that is 5 metres lower than the nearest runway end, an 85-metre AGL transmission tower (80 metres above the runway) will not infringe this slope, and markers would not be required.

However, it is recommended that marker balls be installed on transmission line conductors between transmission line towers 139 and 149 of the HTP corridor nearest Warkworth Aerodrome. While not required under the Standard, this would make the conductors and transmission line towers more conspicuous for pilots operating in the vicinity of Warkworth Aerodrome. No other transmission lines in the area around the aerodrome have marker balls.

Consideration should also be given to marking transmission line conductors in close proximity to the HLS identified in **Table 8** where requested by the HLS operator, however it is noted that no other transmission lines in close proximity to an HLS in the area is equipped with marker balls.

Consultation with the Department of Defence is ongoing. Marker ball installation may be required within Singleton Military Area and will be determined during detailed design.

The transmission towers within the HTP corridor with heights below 152.4 metres AGL would not require obstacle lighting. No towers are expected to exceed this height.

Temporary construction cranes greater than 60 metres in height will have obstacle lighting fitted near the top of the crane.

5.9. Aerial Application Operations

Aerial application operations including such activities as fertiliser, pest and crop spraying are generally conducted under day VFR below 500 feet AGL, usually between 6.5 feet (2 metres) and 100 feet (30.5 metres) AGL and are conducted from any suitable paddock located on farmlands throughout the area.

Due to the nature of the operations conducted, aerial application pilots are subject to rigorous training and assessment requirements to obtain and maintain their licence to operate under these conditions.

The Aerial Application Association of Australia (AAAA) has a formal risk management program (which is recommended for use by its members) to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained. AC 91-10 v1.4- *Operations in the vicinity of non-controlled aerodromes* provides guidance on standard aerodrome traffic. Except, according to paragraph 3.6.2, aerial application operators may not conform to the standard aerodrome circuit.

> *3.6.2 Aerial application operations frequently involve low-level manoeuvring after take-off and prior to landing. These low-level manoeuvres are not required to conform to the standard traffic circuit.*

The transmission lines would likely reduce the area available for the aerial application of agricultural products as the use of aircraft would not be able to normally occur under transmission lines but could occur in close proximity to the project.

Following the finalised design of the project, EnergyCo would provide relevant details of the proposed transmission line to the aerodrome owners, to enable them to consider the potential impact of the transmission line towers and transmission lines on their operations.

To facilitate the flight planning of aerial application operators conducting flight operations on any property near the proposed transmission line, details of the project, including location and height information of the finalised design of the transmission line and towers would be provided to landowners. This is so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.

Each aerial application flight is usually preceded by a thorough pre-flight briefing from the property owner, a risk assessment of all threats and weaknesses such as power lines, trees, defences such as operator culture and attitudes, operational awareness and planning and risk controls that minimise the risk of a collision with terrain or obstacle in and surrounding the area over which the aerial application will take place.

The inclusion of the transmission line on aeronautical charts will enable the pilots conducting an aerial application flight operation to be aware of the presence of the transmission line and consider its impact during the planning on their low-level flights. When combined with the briefing carried out with the landowner prior to any such flights, and the AAAA formal risk management program, the pilot will have the best knowledge about obstacle environment around the intended flight(s). These briefings are similar to current practices associated with low-level flights near large transmission lines.

The transmission line towers associated with the project would be large and highly visible structures that should be readily identified by aerial application pilots at a sufficient distance for them to be able to avoid them by the safety margins applicable to the type of operation and aerial application operators approved by CASA.

The transmission lines are less visible but obviously apparent between tower structures It is anticipated that ongoing consultation with landowners would identify areas where regular aerial application operations occur.

5.10. Aerial baiting in National Parks

Aerial baiting to control pest species in NSW National Parks is conducted by the NSW Parks and Wildlife Service (NPWS) using helicopters. The HTP corridor traverses Corrabare North Flora Reserve. A small portion of

the HTP corridor traverses the Jilliby State Conservation Area to the south of Olney switching station where a tie in occurs within the existing 500 kV transmission line easement. Both the Corrabare North Flora Reserve and the Jilliby State Conservation Area are managed by NPWS.

There are several existing transmission lines of a similar nature to the project. Aerial baiting in the vicinity of the proposed transmission line is likely to be conducted to the same standard as occurs today for existing transmission lines.

Previous consultation with NPWS, related to other transmission lines, determined that transmission lines and towers are unlikely to have an adverse impact upon aerial baiting flight operations in National Parks and outside the operation area.

Further consultation with NPWS will be occur during detailed design. The final design of HTP would be provided to NPWS to ensure they are aware of its location relative to land managed by the NPWS and for them to consider the HTP during flight planning for aerial baiting operations.

5.11. Aeromedical services

The Royal Flying Doctor Service (RFDS) and other emergency services operations are generally conducted under the IFR, except when arriving/departing a destination that is not serviced by instrument approach aids or procedures, in which case they would be operating day or night VFR.

Most emergency aviation services organisations have formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained.

For example, pilots and crew require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed.

The HTP, with transmission structures up to a maximum height of 85 metres AGL would not impact flight operations operating in accordance with the requirements of the IFR.

The HTP would not adversely impact upon HLS uses (refer to *section 5.7*). This includes use during medical emergencies. Helicopters are highly manoeuvrable and can operate in the vicinity of structures such as transmission lines. Any flight planning would take into account the HTP, as included on aeronautical charts. Correspondence from the WestPAC Rescue Helicopter Service received on 15 May 2025 stated that there were no issues with the HTP, recommending that “temporary structures that exceed 60 metres (cranes etc) be lit at night and marked to be readily identified by day”.

5.12. Aerial firefighting

Aerial firefighting operations (firebombing in particular) are conducted under day VFR, sometimes below 500 feet AGL. Under certain conditions visibility may be reduced/limited by smoke/haze.

Aerial firefighting organisations have formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained. For example, pilots require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed.

The NSW Rural Fire Service assesses each fire operation on a complete set of conditions for each individual occasion. NSW Rural Fire Service will consider objects within the vicinity of planned operations as shown in aeronautical charts, such as HTP.

The HTP, with transmission structures up to a maximum height of 85 metres AGL would not create an adverse impact upon aerial firefighting.

6. CONSULTATION

Consultation has been undertaken by Aviation Projects with the following stakeholders following client acceptance of the final draft report (EnergyCo Draft 2) and authorisation to distribute:

- Airservices Australia – consultation included the AIS for confirmation of the PANS-OPS assessment, to commence the process that will include details in the aeronautical obstacle database and publish the final transmission line on aeronautical charts
- Department of Defence – consultation has been undertaken to confirm the extent of Defence aviation activities in the area and activities within R564A and Dochra aerodrome
- Hunter Valley Gliding Club – operator of Warkworth aerodrome.
- NSW Ambulance Service – operator of emergency helicopters in NSW
- NSW Parks and Wildlife Service
- Forestry Corporation of NSW.
- NSW Rural Fire Service.

Details of the consultation undertaken, feedback received and actions arising from consultation are provided in Table 9.

Table 9 Stakeholder consultation

Stakeholder	*Feedback provided*	*Action Required*
Airservices Australia	Received 19 May 2025 Good afternoon, I refer to your request for an Airservices assessment of the proposed activity at Hunter Transmission Line Project, NSW. **Airspace Procedures** With respect to procedures designed by Airservices in accordance with ICAO PANS-OPS and Document 9905, at a height of 582.1m (1910ft) AHD the transmission line will not affect any sector or circling altitude, nor any instrument approach or departure procedure at Williamtown aerodrome or Newcastle Westpac Base aerodrome or any air routes. Note: procedures not designed by Airservices were not considered in this assessment. **Communications/Navigation/Surveillance (CNS) Facilities** We have assessed the proposed activity to the above specified height for any impacts to Airservices Precision/Non-Precision Navigation Aids, Anemometers, HF/VHF/UHF Communications, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links and have no objections to it proceeding. Note: Meteorological instruments not owned by Airservices were not considered in this assessment. In accordance with Part 139 (Aerodromes) Manual of Standards, Chapter 19, we recommend consulting with the Bureau of Meteorology (the Bureau) to ensure that the proposed activity does not adversely affect their equipment. The Bureau can be contacted at airport.developments@bom.gov.au	Vertical Obstacle notification will occur upon finalised design and prior to construction.

Stakeholder	*Feedback provided*	*Action Required*
	Air Traffic Control (ATC) Operations There are no additional instructions or concerns from ATC. **Summary** The proposed activity does not impact Airservices operations or facilities at Williamtown aerodrome or Newcastle Westpac Base aerodrome or any air routes. **Vertical Obstacle Notification** As this proposed activity is more than 30m (99ft) AGL, please follow the below notification process: Complete the Vertical Obstacle Notification Form: ATS-FORM-0085_Vertical_Obstruction_Data_Form.pdf (airservicesaustralia.com) Submit completed form to: VOD@airservicesaustralia.com as soon as the development reaches the maximum height. For further information regarding the reporting of tall structures, please contact the VOD team: Phone - (02) 6268 5622 Email - VOD@airservicesaustralia.com Or refer to: Civil Aviation Safety Regulation Part 175 — Airservices and You - Airservices (airservicesaustralia.com) If you have any queries, please let our team know. Thanks and Regards,	

Stakeholder	*Feedback provided*	*Action Required*
	Airport Development & Protection	
Department of Defence	Dochra Airfield: Dochra Airfield is located approximately 59.3km east northeast of RAAF Williamtown, New South Wales. The airfield is within the Singleton Military Training Area (STA). Dochra Airfield (YDOC) is a Defence unregistered aerodrome within the Singleton Training Area (STA) and is activated as required for exercises/operations under an individual agreement. Civilian aircraft are restricted from using Dochra Airfield as the airspace is restricted. YDOC has one runway: Runway 18/36 Bearing 180 / 360 (approx.) Length: 1000m / 3281ft Width: 30m / 98ft RWS width: 73m ELEV: 228ft Advance Landing Ground The airfield is located approximately 62.7km east northeast of RAAF Williamtown, New South Wales within Singleton Army Barracks, Singleton. It is bounded to the south and east by Whittingham Road, and to the north by Matilda Road. The airfield is accessed via Matilda Road and Airfield Road. The Advance Landing Ground is an unsealed grass strip, which has not been in use or maintained. Blackhawk and other military helicopters infrequently used the airfield before its closure.	Continued consultation through detailed design and provision of the final design. Coordinate construction works with the Department of Defence.

Stakeholder	*Feedback provided*	*Action Required*
	Please seek comments from the RAAF, Navy and Army Aviation addressing any concerns about the proposed HTP Transmission Towers with regard to the safety of possible flying operations conducted at Singleton Military Area (SMA). Air Services Australia (ASA) is responsible for recording the location and height of tall structures. The information is held in a central database managed by ASA and relates to the erection, extension or dismantling of tall structures, RAAF requirements are: a. 30 metres AGL, that are within 30 kilometres of an aerodrome, and b. 45 metres AGL elsewhere. As the proposed HTP Transmission Towers meet the requirement for reporting tall structures, Defence requests that the applicant is to provide Air Services Australia (ASA) "as constructed" details. Request for further feedback was sent on 18 March 2025. The preliminary findings of the AIA were presented to the Department of Defence on 18 June 2025. No concerns or issues were raised.	
Hunter Valley Gliding Club (Warkworth Aerodrome)	Email received 4 December 2023: The Hunter Valley Gliding Club (HVGC) wishes to make the following comments regarding this proposal which has the potential to have an adverse safety impact on our airfield and our gliding operations. The Project Overview document contains discussion regarding the selection of the preliminary corridor that does not give any indication as to whether the planners of this project are aware of the location of Warkworth Airfield and the potential for the 500 kV transmission line to negatively impact the safe operation of the airfield. <u>Warkworth Airfield</u> Warkworth Airfield was built by the RAAF as a dispersal airstrip in 1942 as a component of the Commonwealth Government's 73 Squadron Plan and constructed to	Assessment of impacts on Warkworth Aerodrome and HVGC are included in *section 5.6.1* Continued consultation with HVGC will occur through detailed design HVGC will be provided a copy of the final design Coordinate construction works with the HVGC.

Stakeholder	*Feedback provided*	*Action Required*
	a standard suitable for the operation of medium bombers. The Hunter Valley Gliding Club has operated from this airstrip since 1965 and has owned the airstrip since 1974. As well as supporting the local gliding operations the airfield is an important asset for aviation activities external to the club's operation. This includes use by visiting sports aircraft, pilot training operations from training schools based in the Hunter Valley and the Sydney region as well as use by emergency services. It has served as a valuable resource for Rural Fire Service during bushfire events in Wollemi National Park, and as a backup for Cessnock Aerodrome when it was closed for runway repairs. It is one of very few all-weather airstrips located within the Singleton Council LGA and a valuable asset for the region. Warkworth Airfield is defined by Lot 10 of Deposited Plan 247239 and Lot 92 of Deposited Plan 733895, both owned by Hunter Valley Gliding Club, and part of Lots 5 and 6 of Deposited Plan 247239 that are utilised under an agreement with United Wambo Joint Venture (UWJV). The airfield location is at 115 Comleroi Road, Warkworth. The preliminary corridor mapping included in the Project Overview document shows that Warkworth Airfield is wholly located within the preliminary corridor. <u>Risks posed by a 500 kV transmission line</u> The presence of a 500 kV transmission line in the vicinity of Warkworth Airfield would create a risk of collision between a glider or powered aircraft with either a transmission line tower or the powerlines themselves. Given the height of the proposed structure above ground level, there is a high likelihood that such a collision would have fatal consequences for the occupants of an aircraft. The risk of collision would be present during the normal take-off or approach for landing phases of flight, or during training exercises for emergency flight procedures that are conducted at low level adjacent to the airfield. In the event of an engine fault in the early phases of a flight requiring an immediate forced landing, transmission lines in the close vicinity of the airfield would present a serious hazard. The transmission line would also present a risk to a glider pilot returning at a flat glide angle to the airfield and finding their flight path blocked by	

Stakeholder	*Feedback provided*	*Action Required*
	the transmission line, leading to an off-field landing in potentially unsuitable terrain. The risks presented by a 500 kV transmission line are greater for glider operations than powered aircraft due to a glider having less options for obstacle avoidance. <u>Obstacle Limitation Surface</u> The risk of aircraft collisions with terrain or fixed obstacles in the vicinity of an airfield is mitigated through the definition of an Obstacle Limitation Surface (OLS). This defines a surface above which terrain and obstacles must not intrude. To maximise the safety of our existing operations the Hunter Valley Gliding Club has established an agreed OLS with the adjacent Hunter Valley Operations and United Wambo Joint Venture mining operations. This OLS was developed with the intention of limiting the height of terrain adjustment though mining operations adjacent to the airfield, rather than defining an OLS for infrastructure such as transmission lines. The existing OLS extends for 1.6 km (1 in 20 to an 80 m height) beyond the boundary of the airfield in a direction parallel to the runway alignment. In the direction perpendicular to the alignment of the airfield the OLS extends for 225 m (1 in 5 to a 45 m height). There is a 330 kV transmission line, approximately 50 m high, located 275 m from the edge of the airfield's south-western boundary. Our experience with this 330 kV transmission line is that while this is outside our mining surface OLS, it is n a position that during emergency exercise training is uncomfortably close. It also places a limitation on our future operations by constraining them to the current orientation of the landing strip. Looking forward to HTP2 Appendix 2 of the Project Overview document discusses a future proposal to duplicate the 500 kV transmission line as HPT2, including the possibility that this would replace one of the existing 330 kV transmission lines. We have concerns that this may occur in the easement for the 330 kV lines that are located just to the south-west of the airfield. These lines were moved from their original alignment closer to the airfield as part of United Wambo Joint Venture mining plans. The club is of the opinion that these	

Stakeholder	*Feedback provided*	*Action Required*
	transmission lines should be returned to their original alignment if they are to be upgraded to 500 kV. Their relocation closer to the airstrip was considered as part of an Agreement for Mitigation Measures negotiated between HVGC and UWJV. Our opinion is that this should not be seen as an acceptance by HVGC for these transmission lines to be subject to future upgrades by a third party. The map on page 20 of the Project Overview document shows the original location of the 330 kV transmission line and not their existing location since their adjustment by UWJV. Hunter Valley Gliding Club response to the preliminary corridor 1. Warkworth Airfield is an important resource for the Singleton LGA community that the Hunter Valley Gliding Club has protected as an operational airfield despite being surrounded by intensive open-cut mining activity. It is important to ensure the development of the 500 kV transmission line as the Hunter Transmission Project does not negatively impact the safe operation of the airfield, nor limit its future use and development to support local aviation. 2. If a new transmission line is located in the vicinity of Warkworth Airfield, then a suitable OLS needs to be agreed upon for application to both HTP and HTP2 projects. This OLS must consider the use of Warkworth Airfield for gliding operations and not constrain the potential future aviation activities nor the ongoing development of the airfield. Considering the issues highlighted above, the Hunter Valley Gliding Club is of the opinion that additional information and discussion is required to allow us to properly understand the impact of this proposal on our operations. Until such actions have taken place the Hunter Valley Gliding Club is opposed to the proposed HTP preliminary corridor. Meeting with HVGC 5 June 2025 A meeting with HVGC occurred on 5 June 2025. The meeting was attended by representatives of HVGC, Gliding Australia, EnergyCo and Aviation Projects. EnergyCo	

<table>
<tr><th>Stakeholder</th><th>Feedback provided</th><th>Action Required</th></tr>
<tr><td></td><td>provided a presentation that outlined the project and potential impacts to operations at Warkworth Aerodrome. HVGC were able to provide clarification on their operations, runway length and raised a number of questions in relation to the project. An action list was developed from the meeting. The action list was as follows;
<table>
<tr><th>Item</th><th>Action</th><th>Responsibility</th></tr>
<tr><td>5.1</td><td>HVGC to provide the bounds of the runway</td><td>HVGC</td></tr>
<tr><td>5.2</td><td>AIA to be updated to assess runway length consistent with what HVGC provides and calculate/define OLS</td><td>Aviation Projects</td></tr>
<tr><td>5.3</td><td>Provide data to assist the 3D Modelling including tower locations and heights (e.g. in shapefiles)</td><td>EnergyCo</td></tr>
<tr><td>5.4</td><td>Provide flood mapping in the area around the airstrip.</td><td>EnergyCo</td></tr>
<tr><td>5.5</td><td>Update comparison of proposed 85m towers with existing 45m infrastructure in AIA</td><td>Aviation Projects</td></tr>
<tr><td>5.6</td><td>Update comparison to other airfields and recognise HVGC has own safety standards in AIA</td><td>Aviation Projects</td></tr>
<tr><td>5.7</td><td>Include assessment of emergency scenarios in AIA and provide proof of supporting safety claims to HVGC</td><td>Aviation Projects</td></tr>
</table>
These actions have been addressed and this AIA updated as necessary.</td><td></td></tr>
</table>

Stakeholder	*Feedback provided*	*Action Required*
NSW Ambulance Service	Request for feedback was sent on 18 March 2025. A response was received on 15 May 2025 from the Westpac Rescue Helicopter. Generally no issues. The only request is for any temporary structures that exceed 60m (cranes etc) be lit at night and marked to be readily identified by day. Due to our random nature of landing locations, this would provide a safety buffer when responding to an incident in close proximity to construction sites.	Lighting of cranes is to occur and is addressed within *section 5.6.1*
NSW Parks and Wildlife Service	Request for feedback was sent on 18 March 2025 but no response was received.	Continued consultation through detailed design and provision of the final design.
Forestry Corporation of NSW	Request for feedback was sent on 18 March 2025 but no response was received. The results of the AIA were presented to FCNSW on 5 May 2025 in an EIS briefing. FCNSW confirmed they use helicopters or drones for spraying within the hardwood plantation, mostly younger areas. No concerns were raised.	Continued consultation through detailed design and provision of the final design.
NSW Rural Fire Service	Request for feedback was sent on 23 June 2025 but no response was received.	Continued consultation through detailed design and provision of the final design.

7. MANAGEMENT

Management measures proposed to avoid or minimise impacts to aviation during construction and operation of the project are listed in **Table 10**.

Table 10 Proposed management measures – aviation

Reference	Impact	Mitigation Measure	Timing	Applicable location(s)
AS1	Safety of Aircraft Movements	The final location of the transmission line and towers, with coordinates and elevations will be provided to the following stakeholders prior to construction: • Airservices Australia • Commonwealth Department of Defence • Hunter Valley Gliding Club • NSW Ambulance Service • NSW Parks and Wildlife Service • Forestry Corporation of NSW • NSW Rural Fire Service • mine complexes traversed by HTP • certified aerodromes within 30km of the HTP • uncertified aerodromes and HLS within 10km of the HTP Further notification will occur if the finalised design, upon completion of construction, alters the details supplied to the above listed stakeholders. Complete the Vertical Obstacle Notification Form in accordance with the requirements of Airservices Australia.	Detailed design	Operation area
AS2	Safety of Aircraft Movements	To facilitate the flight planning of aerial application operators conducting flight operations on any property near the proposed transmission line, final design details of the project, including location and height information of the	Detailed design	Operation area

		transmission line will be provided to landowners. This is so that, when asked for hazard information on their property, the landowner may provide the aerial application pilots and/or emergency services helicopter pilots with all relevant information.		
AS3	Safety of Aircraft Movements	The following stakeholders will be notified of the scheduling of the use of cranes, drones and helicopters for the construction of the project, prior to the commencement of relevant works: • Airservices Australia • Commonwealth Department of Defence • Hunter Valley Gliding Club • NSW Ambulance Service • NSW Parks and Wildlife Service • Forestry Corporation of NSW • NSW Rural Fire Service • mine complexes traversed by HTP	Pre-construction	Construction area
AS4	Safety of Aircraft Movements	Helicopters and/or drones used for stringing will be operated in accordance with the applicable CASRs for their operations.	Construction	Construction area
AS5	Obstacle lighting	Obstacle lighting and marking of the transmission lines is not considered to be required outside of the lateral limits of certified airports' OLS. Whilst not currently a requirement, this would need to be confirmed by CASA. The provision of markers on transmission lines and towers within 3 nautical miles of an uncertified aerodrome and the Singleton Military Area should be discussed with the appropriate stakeholders during detailed design. Obstacle lighting and marking of the transmission lines in the vicinity of HLS is to be considered where requested by nearby landowners.	Detailed design Construction	Operation area

AS6	Obstacle Lighting	Temporary construction cranes greater than 60m in height will have obstacle lighting fitted near the top of the crane	Construction	All locations

8. CONCLUSION

The aviation impact assessment for the Hunter Transmission Project (HTP, the Project) concluded the following:

- 3 certified aerodromes, including RAAF Base Williamtown, exist within 30 nautical miles (55.56 kilometres of the HTP corridor however none would be impacted by the project
- air route Lowest Safe Altitudes (LSALTs) in the vicinity of the HTP corridor, and the overhead Grid LSALT would not be infringed by the project
- the HTP corridor would be located within Class G airspace and is partly located within military training area R564A, an Australian Army training area south of Singleton New South Wales (NSW). The HTP corridor would impact the restricted area therefore, further consultation with Department of Defence will be required.
- the HTP corridor is outside the clearance zones associated aviation navigation aids, communication systems and air traffic control (ATC) surveillance radars
- the following 4 uncertified aerodromes would be located within 10 kilometres (5.4 nautical miles) of the HTP corridor and would not be adversely impacted by it:
    - Warkworth aerodrome
    - Singelton aerodrome
    - Coolmore Stud aerodrome
    - Dochra military aerodrome
- 10 helicopter landing sites (HLS) were identified within 10 kilometres (5.4 nautical miles) of the HTP Corridor and would not be impacted by it
- the proposed transmission lines and tower structures are unlikely to create an adverse impact to firefighting and emergency evacuation flight operations when the recommended risk management process is carried out by the pilot and landowner whose property has the transmission line or is immediately adjacent to the proposed transmission line
- temporary construction cranes are unlikely to present a hazard provided they are of a clearly visible colour against the background terrain and/or have an obstacle light fitted near the top of the crane
- Aviation marker balls are not required but may be applied on a precautionary basis in the vicinity of uncertified aerodromes within 3 km of HTP such as Warkworth Aerodrome. Marker balls may also be installed within Singleton Military Area in consultation with the Department of Defence during detailed design. Obstacle lighting and marking of the transmission lines in the vicinity of HLS would be considered where requested by HLS landowners.

9. REFERENCES

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

Airservices Australia (2025) *Aeronautical Information Publication.*

Australian Defence Force (2024), *Flight Information Publication, Terminal Australia.*

Civil Aviation Safety Authority (1988) *Civil Aviation Regulations (CAR).*

Civil Aviation Safety Authority (1998) *Civil Aviation Safety Regulations (CASR).*

Civil Aviation Safety Authority (2025) Advisory Circular (AC) 91-10 v1.4: *Operations in the vicinity of non-controlled aerodromes.*

Civil Aviation Safety Authority (2020) CASR Part 139 *(Aerodromes) Manual of Standards.*

Civil Aviation Safety Authority (2020) CASR Part 173 Manual of Standards – *Standards Applicable to Instrument Flight Procedure Design*, version 1.7.

Department of Infrastructure and Regional Development (2013) National Airport Safeguarding Framework, NASF Guideline F: *Managing the Risk of Intrusions into the Protected Operational Airspace of Airports*.

International Civil Aviation Organization (ICAO) Doc 8168 *Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS).*

OzRunways (2024) aeronautical navigation charts extracts.

ANNEXURE 1 – ASSESSMENT CONTEXT

All civil aviation safety requirements/standards are listed here.

National Airports Safeguarding Framework

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

- The implementation of best practices 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 landowners
- Improvements to regulatory certainty and efficiency
- 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 F: *Managing the Risk of Intrusions into the Protected Operational Airspace of Airports*, provides guidance to State/Territory and local government decision makers as well as airport operators to jointly address the issue of intrusions into the operational airspace of airports by tall structures, such as buildings, cranes and transmission lines, as well as trees in the vicinity of airports.

Key considerations for the management of airport airspace are extracted from NASF Guideline F:

Protection of visual operations - Obstacle limitation surfaces

CASA publishes these criteria in the Manual of Standards for Part 139 of the Civil Aviation Safety Regulations (CASR).

> *Structures, trees or other activities that intrude into the OLS could constitute obstacles to aircraft taking off or approaching to land. The OLS for an airport charts the volume and dimensions of operational airspace that should be kept free of obstacles to aircraft operations being conducted under VFR or during the visual stages of IFR operations.*
>
> *It is important to note that the OLS does not prohibit all intrusions. The aim is to ensure that all objects that intrude into the OLS can be identified and assessed for their potential impact on aircraft operations. The assessment will enable a determination on whether the intrusion is permissible, and if so, a determination on whether any risk mitigation requirements should be imposed.*
>
> *The requirements to protect operational airspace will be enforced most rigorously along the extended centrelines of runways in the approach and take-off areas. This could extend up to 15 kilometres from the ends of runways at major airports. Other OLS surfaces that protect aircraft circling to land may also extend up to 15 kilometres from major airports.*
>
> *The effects of individual obstacles may be relatively minor, but together a number of obstacles may seriously limit runway utilisation, cause airspace congestion and reduce the effective handling capacity of the airport. It is therefore important to understand that the pre-existence of a structure or*

other intrusion into operational airspace does not necessarily mean that a new proposal to penetrate operational airspace will be approved under Commonwealth legislation.

Protection of flight operations conducted under the instrument flight rules (IFR) and Procedures for Air Navigation Services – Operations (PANS-OPS) surfaces

Under IFR operations, pilots fly aircraft relying on instruments for navigation. Airspace protection for IFR operations cannot allow for any long-term penetrations.

ICAO established these criteria which are published in a document titled 'Procedures for Air Navigation Services – Operations (PANS-OPS)'. The surfaces determined by using the criteria in the PANS-OPS publication are called PANS-OPS surfaces.

The PANS-OPS surfaces are used in the construction of take-off, landing and approach procedures based entirely on navigation with sole reference to aircraft instruments. They are designed to protect aircraft from colliding with obstacles when flying on instruments. Minimum safe altitudes are established for each segment of an instrument procedure.

If it is agreed by all stakeholders that a long-term penetration of the PANS-OPS surfaces is essential, the PANS-OPS surfaces must be raised so they are clear of the development causing the penetration. However, this may also have operational penalties for airport operations and could have community impacts, such as re-design of flight paths that increase the population exposed to high levels of aircraft noise.

Aircraft operations at non-controlled aerodromes

Advisory Circular (AC) 91-10 v1.4 *Operations in the vicinity of non-controlled aerodromes* provides guidance for pilots flying at or in the vicinity of non-controlled aerodromes, with respect to CASR 91.

A conventional circuit pattern and heights are provided in AC 91-10 v1.4. The standard circuit consists of a series of flight paths known as *legs* when departing, arrival or when conducting circuit practice. Illustrations of the standard aerodrome traffic circuit procedures provided in AC 91-10 v1.1 are shown in **Figure 15** and **Figure 16**.

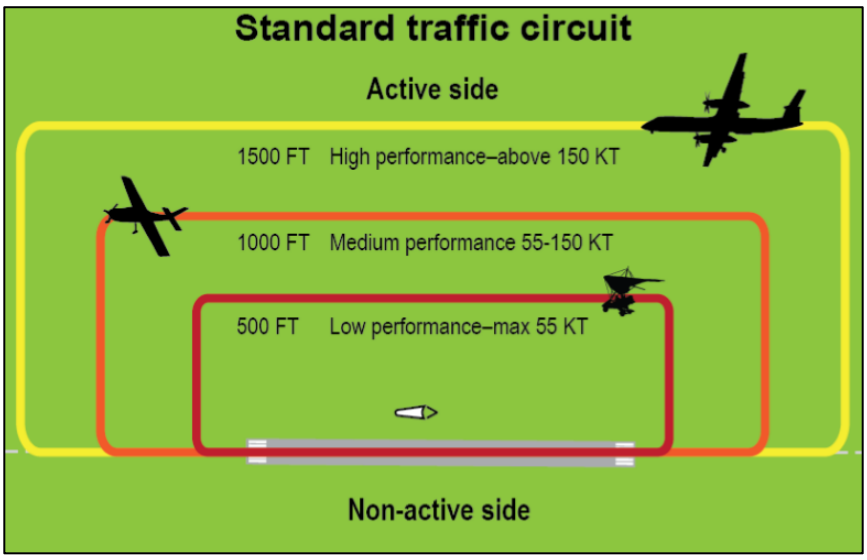

Figure 15 Lateral and vertical separation in the standard aerodrome traffic circuit

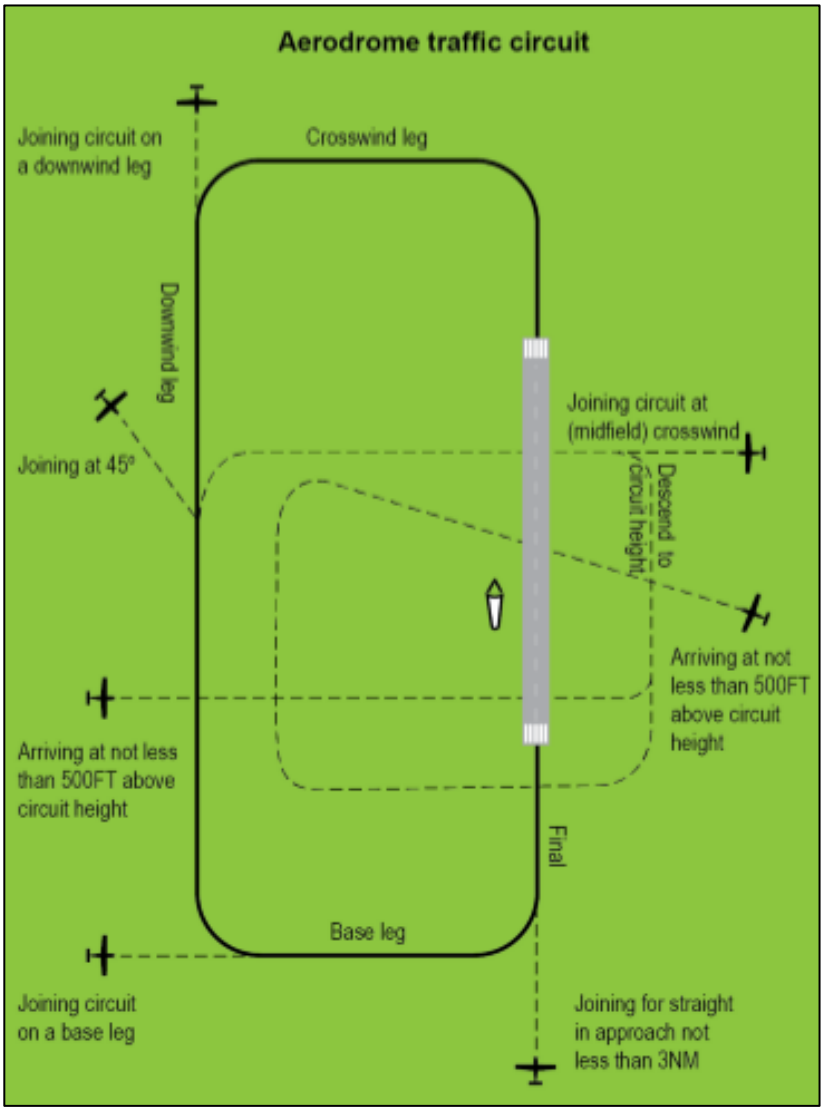

Figure 16 Aerodrome standard traffic circuit, showing arrival and joining procedures

AC 91-10 v1.4. paragraph 7.11 makes reference to a distance that is 'normally' well outside the circuit area and where no traffic conflict exists, which is at least 3 nautical miles (5556 m). The paragraph is copied below:

> *7.11 Departing the circuit area*
>
> *7.11.1 Aircraft should depart the aerodrome circuit area by extending one of the standard circuit legs or climbing to depart overhead. However, the aircraft should not execute a turn to fly against the circuit direction unless the aircraft is well outside the circuit area and no traffic conflict exists. This will normally be at least 3 nautical miles from the departure end of the runway, but may be less for aircraft with high climb performance. In all cases, the distance should be based on the pilot's awareness of traffic and the ability of the aircraft to climb above and clear of the circuit area.*

Rules of flight

Flight under Day Visual Flight Rules (VFR)

According to Aeronautical Information Publication (AIP) the meteorological conditions required for visual flight in the applicable (Class G) airspace at or below 3000 feet AMSL or 1000 feet AGL whichever is the higher are: 5000 metres visibility, clear of clouds and in sight of ground or water.

For helicopters operating below 700 feet over land, the flight visibility must be at least 800 m, clear of clouds, by day, at a speed that allows the pilot to see obstructions or other traffic in sufficient time to avoid a collision and if not more than 10 nautical miles from an aerodrome with an IAP – in a way that ensures the flight maintains a separation of at least 500 feet vertically from any aircraft that is less than 10 nautical miles from the aerodrome that is conducting an IFR operation.

CASR 91.267 (Minimum height rules—other areas) prescribes the minimum height for flight. Generally speaking, and unless otherwise approved, aircraft are restricted to a minimum height of 500 feet AGL above the highest point of the terrain and any object on it within a radius of 300 metres in visual flight during the day when not in the vicinity of built-up areas, and 1000 feet AGL over built up areas (within a horizontal radius of 600 metres of the point on the ground or water immediately below the aeroplane).

These height restrictions do not apply if through stress of weather or any other unavoidable cause it is essential that a lower height be maintained.

Flight below these height restrictions is also permitted in certain other circumstances such as take-off and landing and authorised low level flight operations.

Night VFR

With respect to flight under the VFR at night, Civil Aviation Safety Regulations (1998) 91.277 requires that the pilot in command of an aircraft flying VFR at night must not fly below the following heights (unless during take-off and landing operations within 3 nautical miles of an aerodrome, or with an air traffic control clearance):

- *the published lowest safe altitude for the route or route segment (if any);*
- *the minimum sector altitude published in the authorised aeronautical information for the flight (if any);*
- *the lowest safe altitude for the route or route segment;*
- *1,000 feet above the highest obstacle on the ground or water within 10 nautical miles ahead of, and to either side of, the aircraft at that point on the route or route segment;*
- *the lowest altitude for the route or route segment calculated in accordance with a method prescribed by the Part 91 Manual of Standards for the purposes of this paragraph.*

Instrument Flight Rules (Day or night)

According to CASR 91, flight under the instrument flight rules (IFR) requires an aircraft to be operated at a height clear of obstacles that is calculated according to an approved method.

Obstacle lights on structures not within the vicinity of an aerodrome are effectively redundant to an aircraft being operated under the IFR.

Aircraft operator characteristics

Flying training may be conducted under either the instrument flying rules (IFR) or visual flying rules (VFR). Other general aviation operations under either IFR or VFR are also likely to be conducted at various aerodromes in the area.

Operations conducted under VFR are required to remain in visual meteorological conditions (VMC) ((at least 5,000 metres horizontal visibility) and clear of the highest point of the terrain by 500 feet vertical distance and 300 metres horizontal distance.

The transmission line towers will be shown on appropriate aeronautical charts to allow pilots to consider the impact upon their flight operations in the area around the transmission line. It is also expected that the transmission line towers would be sufficiently visually conspicuous to pilots conducting VFR operations within the vicinity of the Project to enable pilots to take appropriate action in sufficient time to avoid the transmission line.. The distance between towers allows pilots to determine the direction that the lines run between them.

Private operations

Private operations are generally conducted under day or night VFR, with some IFR. Flight under day VFR is conducted above 500 feet AGL.

Military operations

Military operations are conducted under separate but compatible regulations and standards, including obstacle separation requirements. There may be some high-speed low-level military jet aircraft, transport aircraft, tactical operations and helicopter operations conducted in the area.

Military flight operations occur at Dochra aerodrome, located approximately 3.3 nautical miles from the nearest segment of the HTP Corridor and within the Singleton training area - R564A, administered by the Army.

The provision of the data to Department of Defence will ensure that their low-level charts include them and that the military pilots are aware of them when planning and conducting low level flight operations

Aerial application operations

Aerial application operations including such activities as fertiliser, pest and crop spraying are generally conducted under day VFR below 500 feet AGL, usually between 6.5 feet (2 metres) and 100 feet (30.5 metres) AGL.

Aerial application operations may be conducted in the area.

Due to the nature of the operations conducted, aerial application pilots are subject to rigorous training and assessment requirements to obtain and maintain their licence to operate under these conditions.

The Aerial Application Association of Australia (AAAA) has a formal risk management program (which is recommended for use by its members) to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained.

The inclusion of the transmission line on aeronautical charts will enable the pilots conducting an aerial application flight operation to be aware of the presence of the transmission line so that they consider its impact during the planning of their low-level flights. When combined with the briefing carried out with the land holder prior to any such flights, and the AAAA formal risk management program, the pilot will have the best possible knowledge about the obstacle environment around the intended flight(s). These briefings will be no different to those conducted today in areas where there are large transmission lines above or near to areas where these low-level flight operations are conducted.

Aerial Application Association of Australia

The AAAA has initiated a Powerline Safety Program and identified that 'powerlines have been a significant safety issue since the electrification of rural areas and wirestrikes have been a major threat to aerial application since the late 1940s when the industry began in Australia.

While training and ongoing professional development play a significant role in preparing pilots to manage the risks associated with low level operations around powerlines, there are 2 key initiatives that can support and improve safety for the sector:

- The provision of mapping information on powerline networks
- The marking of powerlines

Over recent years, AAAA has worked to reshape the Australian Standard on the marking of powerlines (AS 3891 Parts 1 & 2), has developed and delivered world-leading human factor training courses, and has worked with powerline companies to develop mapping and marking systems and make them available to pilots and business owners.

AAAA has now launched its Powerline Safety Program that aims to encourage and facilitate power companies improving aviation safety and provide a way of both aviation businesses and rural landowners engaging in meaningful safety actions to improve safety.

Wirestrikes account for approximately 57% of all aerial application accidents/incidents. While this is only a fraction of the total safety problem surrounding contact between all vehicles and farm implements with power infrastructure, it is a significant cost to the industry and a personal impact on pilots involved in wirestrikes.

AAAA acknowledges that not all aerial application companies will be able to participate in the program due to the following practical restrictions that are not under the control of the company or AAAA:

- *Availability of energy network mapping that is region specific, clean data that is easily uploadable, useable and updateable. Availability is entirely dependent on energy companies providing the mapping in the same or similar way as Essential Energy already does*
- *Availability of an energy company marking request and action system similar to Essential Energy's system. There are a range of contributing elements including the Australian Standard rewrite, availability of good markers, and a reasonable price for fitting and installation.*

Those States/Territories and energy companies that are unable to deliver the 2 requirements above will not be able to participate in the program, but AAAA will seek to work with them to achieve these relatively straight forward requirements.

Currently, Essential Energy in NSW is fully compliant, Ergon Energy in Queensland is working on achieving these systems and has advised it already has a marking system in place, but further work is required on simplifying access and the provision of mapping.'[2]

The provision of the transmission line tower locations to Airservices Australia will ensure that they are marked on aeronautical charts, enabling pilots to be aware of them and to be compliant with a key AAAA initiative.

[2] AAA Powerline Safety Program: www.aaaa.org/aaaa-powerliine-safety-program/

Aeromedical services

Emergency services operations are generally conducted under the IFR, except when arriving/departing a destination that is not serviced by instrument approach aids or procedures, in which case they would be operating day or night VFR.

The mine sites in the Hunter Valley are provided with HLS for emergency medical evacuation purposes.

Emergency aviation services organisations have formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained.

For example, pilots and crew require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed to ensure that prerequisite safety standards are maintained in accordance with CASR and contract obligations.

If a helicopter emergency medical service is required at a location other than an aerodrome, ALA or helicopter landing site, the pilot will engage with local emergency services personnel and/or landowners to discover what local hazards are in the vicinity of the proposed landing site and take appropriate mitigation action.

Aerial firefighting

Aerial firefighting operations (firebombing in particular) are conducted under Day VFR, sometimes below 500 feet AGL. Under certain conditions visibility may be reduced/limited by smoke/haze.

Aerial firefighting organisations have formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained. For example, pilots require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed.

AVIATION PROJECTS

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