



TECHNICAL REPORT

J Aviation Impact Assessment



WESTERN RENEWABLES LINK AVIATION IMPACT ASSESSMENT

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AusNet Transmission Group Pty Ltd

Report to:



26 May 2025 V1.0



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ABBREVIATIONS AND GLOSSARY

Abbreviations

AC	Advisory Circular (document supporting CASR 1998)
ACFT	Aircraft
AHD	Australian Height Datum
AGL	Above ground level
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
ALA	Aeroplane Landing Area
ARP	Aerodrome Reference Point
BRA	Building Restricted Areas
CAAP	Civil Aviation Advisory Publication
CAR	Civil Aviation Regulation 1988
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation 1998
CNS	Communications, Navigation and Surveillance
СТА	Controlled Airspace
EES	Environment Effects Statement
ERSA	EnRoute Supplement Australia
Ft	feet
GNSS	Global Navigation Satellite System
HEMS	Helicopter Emergency Medical Service
IAP	Instrument Approach Procedure
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
km	kilometres
kV	Kilovolt
LSALT	Lowest Safe Altitude
m	metres
MSA	Minimum Safe Altitude
Nm	Nautical mile
NOTAM	Notice To Airmen
OFA	Obstacle Free Area (defined in CAAP 92-1(1))



OLS	Obstacle Limitation Surface
PANS-OPS	Procedures for Air Navigation Services – Aircraft Operations
RNAV	Area Navigation
RWY	Runway
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VNC	Visual Navigation Chart
VPP	Victoria Planning Provisions
VTC	Visual Terminal Chart
YARA	Ararat aerodrome
YBFT	Beaufort aerodrome
YBLT	Ballarat aerodrome
YBSL	Rowsley/Brooks Landing aerodrome
YBSS	Bacchus Marsh aerodrome
YMEL	Melton aerodrome
YMML	Melbourne Airport
YRWS	Rowsley helipad
YSWL	Stawell aerodrome

Glossary

500kV	500kV transmission line
AC	Advisory Circular - Issued by the Civil Aviation Safety Authority (CASA) and are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means, of complying with the Civil Aviation Safety Regulations.
Accident (aviation)	An occurrence involving an aircraft where: -
	 A person dies or suffers serious injury The aircraft is destroyed or is seriously damaged Any property is destroyed or seriously damaged.
ARP	Aerodrome Reference Point is the point established as the geographic centre of the aerodrome landing area.
AHD	Australian Height Datum - The datum to which all vertical control for mapping is to be referred. The datum surface is that which passes through mean sea level at the 30 tide gauges and through points at zero AHD height vertically below the other basic junction points
AIP	Aeronautical Information Publication - a publication promulgated to provide operators with aeronautical information of a lasting character essential to air navigation. It contains details of regulations, procedures, and other information pertinent to flying and operation of aircraft. In Australia, the AIP is issued by Airservices Australia on behalf of CASA.



AIC	Aeronautical Information Circular – a publication used to promulgate explanatory or planned long term information advisory information concerning technical, legislative or administrative matters, as well as information on the long-term forecast of major changes in legislation, regulations, procedures or facilities liable to affect flight safety.
Airservices Australia	Australian government-owned corporation providing safe and environmentally sound air traffic management and related airside services to the aviation industry
Airspace Classes	Australian airspace is divided broadly into Controlled Airspace and Uncontrolled Airspace. Controlled Airspace is controlled by Air Traffic Control and aircraft require an airways clearance to operate.
	There are five Classes of Australian airspace:
	 Class A – Controlled Airspace for high level enroute transit Class C – Controlled Airspace for terminal areas and low level enroute transit Class D – Controlled Airspace surrounding General Aviation and some regional airports with a Control Tower Class E – Mid level enroute transit Class G – Uncontrolled Airspace where no air traffic control is provided. Pilots arrange their own aircraft separation and collision avoidance.
	Class A 18,000–60,000 ft
	12,500 ft Class E B,500 ft Class C
	1,500 ft Class G Class G
	General aviation and regional airport Major airport
Air traffic control	Air traffic control manages the safe and orderly flow of aircraft into, out of, and across Australian airspace.
Airways clearance	An airways clearance is an authorization from air traffic control to fly an aircraft under specific conditions. It's required to enter controlled airspace.
ALA	'Manual of Standards Part 139—Aerodromes' defines an ALA as an "aircraft landing area, being an area for the landing, movement and take-off of aircraft that is not a certified or registered aerodrome". In this definition, the term 'aircraft' is taken to include rotary wing aircraft (i.e., helicopters).
Altitude	Vertical distance of a level, a point, or an object, considered as a point, measured above mean sea level.
AusNet	AusNet Transmission Group Pty Ltd
СААР	<i>Civil Aviation Advisory Publication</i> — is a publication that provides explanatory information and guidance for compliance with the Civil Aviation Regulations



CASA	<i>Civil Aviation Safety Authority,</i> Australian government authority responsible under the <i>Civil Aviation Act 1988</i> for developing and promulgating appropriate, clear and concise aviation safety standards. As Australia is a signatory to the ICAO <i>Chicago</i> <i>Convention,</i> CASA adopts the standards and recommended practices established by ICAO, except where a difference has been notified.
CAR	<i>Civil Aviation Regulations</i> - are promulgated by CASA and establish the regulatory framework (<i>Regulations</i>) within which all service providers must operate.
CASR	<i>Civil Aviation Safety Regulations</i> - are promulgated by CASA and establish the regulatory framework (<i>Regulations</i>) within which all service providers must operate
Certified aerodrome	An Aerodrome is "a defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft". 'Civil Aviation Safety Regulations 1998, Part 139—Aerodromes (CASR 139), reg 139.040' requires that an aerodrome must be certified if it:
	(a) has a runway that is suitable for use by aircraft having:
	(i) a maximum passenger seating capacity of more than 30 seats; or
	(ii) a maximum carrying capacity of more than 3,400 kilograms; and
	 (b) is available for use in regular public transport operations or charter operations by such aircraft.
Civil Aviation Act 1988	The Act establishes the CASA with functions relating to civil aviation, in particular the safety of civil aviation and for related purposes
Controlled Airport	A Controlled Airport has an operating control tower and is within Controlled Airspace. Aircraft movements must comply with the terms of an Airways Clearance and Air Traffic Control instructions.
Controlled Airspace	A Controlled Airspace is controlled by Air Traffic Control and aircraft require an airways clearance to operate. See also Airspace Classes.
Control Zone	Controlled airspace of given dimensions around an aerodrome where aircraft movements must be in accordance with Air Traffic Control Instructions. See also Airspace Classes.
Environment Effects Act	Environment Effects Act 1978
Forced Landing	An immediate landing, on or off the airport, necessitated by the inability to continue further flight
ICAO	International Civil Aviation Organisation - an agency of the United Nations which codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth. The ICAO Council adopts standards and recommended practices concerning air navigation, its infrastructure, flight inspection, prevention of unlawful interference, and facilitation of border-crossing procedures for international civil aviation. In addition, the ICAO defines the protocols for air accident investigation followed by transport safety authorities in countries signatory to the Convention on International Civil Aviation, commonly known as the <i>Chicago Convention</i> . Australia is a signatory to the <i>Chicago Convention</i>
IFR	Instrument Flight Rules - are rules applicable to the conduct of flight under IMC. IFR is established to govern flight under conditions in which flight by outside visual



	reference is not safe. IFR flight depends upon flying by reference to instruments in the flight deck, and navigation is accomplished by reference to electronic signals. It is also referred to as, "a term used by pilots and controllers to indicate the type of flight plan an aircraft is flying," such as an IFR or VFR flight plan
IMC	Instrument Meteorological Conditions - meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, less than the minimum specified for visual meteorological conditions
Incident (aviation)	An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation (ICAO Annex 13), and meet the definition of a "Transport Safety Matter" as prescribed in Section 23 of the <i>Transport Safety Investigation Act 2003 (TSI Act)</i> .
	Serious Incident is an incident involving circumstances indicating that an accident nearly occurred (ICAO Annex 13)
Instrument Approach Procedure (IAP) or (DAP)	An instrument approach procedure describes the operation of an aircraft with reference to navigation guidance information. The operation must be in accordance with an authorised instrument approach procedure (IAP).
(,,,,,),,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	An IAP is based on criteria that enables a descent below the minimum safe altitude (MSA) which positions the aircraft to safely approach and land.
	The IAP relies on ground or satellite navigation infrastructure. Aircraft navigation systems use these to generate navigation guidance information. Some systems give lateral (directional) guidance while others can provide both lateral and vertical navigation guidance information.
Joint User aerodrome	A Military aerodrome designated for use by civil aircraft, <i>Darwin and Townsville</i> are designated Joint User and civil aircraft do not require prior permission from the relevant Military Authority.
LSALT	<i>Lowest Safe Altitude</i> - published for each low-level air route segment. Their purpose is to allow pilots of aircraft that suffer a system failure to descend to the LSALT to ensure terrain or obstacle clearance in IMC where the pilot cannot see the terrain or obstacles due to cloud or poor visibility conditions. It is an altitude that is at least 1,000 feet above any obstacle or terrain within a defined safety buffer region around a particular route that a pilot might fly
Military aerodrome	Aerodrome controlled and operated by the Department of Defence for the use of military aircraft.
MOS	<i>Manual of Standards</i> – Legislative Instrument publishing explanatory material and methods of compliance for the particular suite of Civil Aviation Safety Regulations
MSA	<i>Minimum Safe Altitude -</i> the minimum altitude within that sector of an instrument approach procedure below which it is UNSAFE to fly
Minimum Sector Altitude	<i>Minimum Sector Altitude</i> – the lowest altitude that provides at least 1,000 feet (approximately 300 metres) of vertical clearance above all objects within a sector of a circle with a radius of 25 nautical miles from a navigation aid or fix. This altitude is important for ensuring safety during Instrument Flight Rules (IFR) operations, particularly in areas with significant terrain or obstacles.
NASF	National Airports Safequarding Framework - is the set of quidelines, adopted in July



NASAG	<i>National Airports Safeguarding Advisory Group</i> – is the group that creates, reviews and monitors implementation of the NASF Guidelines.
ΝΟΤΑΜ	Notices issued by the NOTAM office containing information or instruction concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to persons concerned with flight operations
Obstacles	All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight
OLS	Obstacle Limitation Surface - a series of planes associated with each runway at a certified aerodrome that defines the desirable limits to which objects may project into the airspace around the aerodrome so that aircraft operations may be conducted safely
PANS-OPS	<i>Procedures for Air Navigation Services – Aircraft Operations</i> - Air Traffic Control term denominating rules for designing instrument approach and departure procedures. Such procedures are used to allow aircraft to land and take off under Instrument Meteorological Conditions (IMC) or Instrument Flight Rules (IFR). ICAO document 8168-OPS/611 (volumes 1 and 2) outlines the principles for airspace protection and procedure design which all ICAO signatory states must adhere to. The regulatory material surrounding PANS-OPS may vary from country to country.
PANS-OPS Surface	Like an Obstacle Limitation Surface, the PANS-OPS protection surfaces are imaginary surfaces in space which guarantee the aircraft a certain minimum obstacle clearance. These surfaces may be used as a tool for local governments in assessing building development. Where buildings may (under certain circumstances) be permitted to penetrate the OLS, they cannot be permitted to penetrate any PANS-OPS surface, because the purpose of these surfaces is to guarantee pilots operating under IMC an obstacle free descent path for a given approach
Planning and Environment Act	Planning and Environment Act 1987
Precautionary Landing	A situation where further flight is possible but inadvisable and the aircraft is landed because in the judgement of flight crew, a hazard exists with continued flight
Prescribed Airspace	An airspace specified in, or ascertained in accordance with, the Airports Act 1996 Regulations, where it is in the interests of the safety, efficiency, or regularity of existing or future air transport operations into or out of an airport for the airspace to be protected. The prescribed airspace for an airport is the airspace above any part of either an OLS or a PANS OPS surface for the airport and airspace declared in a declaration relating to the airport.
	Applicable to Melbourne, Essendon, Moorabbin and Avalon airports in Victoria. See also Protected Airspace.
Principal Contractor	During the construction stage, there will be multiple principal contractors and sub- contractors involved in the delivery of the different project components. This EES refers to Principal Contractor as a catch all term for the contractor responsible for the works.
Project Area	The Project Area encompasses all areas that would be used to support the construction and operational components of the Project considered in the EES.



	The Project Area is contained within the Project Land and encompasses the following:	
	Permanent infrastructure:	
	- Transmission tower structures	
	- Upgrade and connection to the Bulgana Terminal Station	
	- Connection to the Sydenham Terminal Station	
	- An upgrade of Elaine Terminal Station	
	- The new 500kV terminal station near Bulgana	
	 Access tracks required for operation 	
	- The Proposed Route.	
	Temporary construction areas and infrastructure:	
	- Distribution line crossovers	
	- Hurdles	
	- Laydown areas	
	- Stringing pads	
	- Access tracks	
	- Tower assembly areas	
	- Workforce accommodation facilities.	
Project Land	 The Project Land encompasses all land parcels that could be used for the purpose of temporary Project construction and permanent operational components. The Project Land corresponds with the extent of the Specific Controls Overlay proposed in the draft Planning Scheme Amendment for the Project. This generally includes the entire land parcel intersected by a Project component. 	
Proposed Route	The Proposed Route is approximately 100 to 170m wide and encompasses the nominal future easement for the proposed new transmission line (including a buffer either side), and the terminal station areas. The Proposed Route is located within the Project Area.	
Protected Airspace	As for Prescribed Airspace and used for certified aerodromes other than Commonwealth Leased Airports of Melbourne, Essendon, Moorabbin and Avalon within Victoria. Airspace is protected by Civil Aviation Regulations 1988 (CAR) and Civil Aviation Safety Regulations 1998 (CASR).	
Runway centreline	The runway centreline marks the centre of a runway.	
Shielded obstacle	A new obstacle located in the vicinity of an existing obstacle and assessed as not being a hazard to aircraft is considered to be shielded. The parameters for defining a shielded obstacle are defined in the Figure below	



	Clearing the "critical (in this case existing) obstacle" ensures clearance of the shielded (i.e. new) obstacle defined as the "permanent obstacle" in the Figure above.
Uncertified aerodrome	Aerodromes not regulated in accordance with CASR Part 139. Often referred to as Aircraft Landing Areas (ALA) or airstrips
VFR	<i>Visual Flight Rules</i> - rules applicable to the conduct of flight under Visual Meteorological Conditions (VMC). VFR allow a pilot to operate an aircraft in weather conditions generally clear enough to allow the pilot to maintain visual contact with the terrain and to see where the aircraft is going. Specifically, the weather must be better than basic VFR weather minima. If the weather is worse than VFR minima, pilots are required to use Instrument Flight Rules
VMC	Visual Meteorological Conditions - are meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, equal or better than specified minima.



EXECUTIVE SUMMARY

The Western Renewables Link (the Project) proposes a new transmission line starting at Bulgana, near Stawell in Victoria's west, and extending approximately 190km to Sydenham in Melbourne's north-west. The Project will enable the connection of new renewable energy generated in western Victoria into the National Electricity Market and increase the Victorian transmission capacity. The Project is being delivered by AusNet Transmission Group Pty Ltd (AusNet).

This Aviation Impact Assessment forms part of the Environment Effects Statement (EES) for the Project in accordance with the *Environment Effects Act 1978*. This report and the methodology applied in preparing this report, responds to the requirements set out in the EES scoping requirements, with a view to identifying the existing aviation values of the 'study area'; assessing the potential impacts on these aviation values resulting from the Project; and describing proposed mitigation or management measures to reduce potential effects.

Overview

The assessment has been based on a review of applicable legislation, policy and guidelines, characterisation of the existing conditions, identification of construction, operation and decommissioning impacts, evaluation of the significance of impacts, and recommendation of Environmental Performance Requirements (EPRs).

Consistent with the scoping requirements, controls have been developed that are proportionate to the risk. If eliminating the risk of harm is not reasonably practicable, then the risk of harm is to be reduced so far as reasonably practicable. The EPRs presented in this impact assessment have been developed using reasonably practicable avoidance or mitigation measures as relevant to aviation.

The key Project activities with the potential to impact on existing aviation activities were identified as:

- 1) Pre-construction aerial survey of the transmission line route
- 2) Use of cranes and/or helicopters for any associated activities required to facilitate tower build during the construction stage
- 3) Use of helicopters for conductor and earth wire stringing during construction
- 4) Presence of transmission towers and the overhead transmission line during operations
- 5) Use of aircraft for transmission line inspection and maintenance during operations.
- 6) Use of cranes and/or helicopters to facilitate tower deconstruction during decommissioning.

The key aviation-related values that may be affected were identified as including operations at Certified Aerodromes and Uncertified Aerodromes, air navigation and air traffic management services, transiting air routes and authorised low flying activities (including aerial agricultural applications, firefighting, medical and emergency flights, flight training, sports aviation, private flights and tourism, military activities and other approved flights).

Approaches were developed to assess the potential for impacts to these aviation values from each of the six key Project activities identified above.



Existing conditions

The study area for the assessment varies based on the different aviation values being assessed. Full details of this, including the basis is provided in **Section 5.2**.

A review of existing conditions identified the following existing facilities and aviation-related activities occurring within the spatial extents of the relevant study areas:

- Certified Aerodromes: Stawell (YSWL), Ararat (YARA), Ballarat (YBLT) and Melbourne Airport (YMML).
- Uncertified Aerodromes: Glenlofty, Beaufort (YBFT), Ballarat Hospital Helipad (YXBT), Myrniong ALA, Rowsley/Brooks Landing (YBSL), Rowsley Helipad (YRWS), Greystones ALA, Bacchus Marsh (YBSS), Bacchus Marsh Health Helipad and Melton (YMEL).
- Air navigation and air traffic management services: Communications: Mount William, Mount Macedon and Melbourne Airport; Navigation: Aviation ground-based navigation equipment (navaids) is located at Melbourne Airport; and Surveillance: Mount Macedon, Gellibrand Hill, Melbourne Airport and Mount William.
- Transiting air routes: V223, H345 and W657.
- Authorised low flying: Aerial agricultural applications, aerial firefighting, medical and emergency flights, flight training, sports aviation, private flights and tourism, military activities and other authorised activities

Impact assessment key findings

Using the evaluation approaches as relevant to each aviation value detailed in Section 5.5, the following impacts were determined (further details are provided in Section 7 to Section 10):

- Certified Aerodrome:
 - No impacts to OLS or PANS-OPS protected airspace at Stawell or Ararat during construction, operations or decommissioning.
 - No impacts at Ballarat during construction, operations or decommissioning, provided that Project activities remain below the published protected airspace of the RWY 18 instrument approach path. No operational impacts associated with the presence of new transmission towers, terminal stations and the overhead transmission line were determined.
 - 'Minor' unmitigated impacts during construction and decommissioning were determined at Melbourne Airport, noting that construction activities associated with the towers from Sydenham Terminal Station west to Tower F3002DL are within YMML Controlled Airspace. With the application of the recommended mitigation and management measures and EPRs, no residual impacts were determined during construction or decommissioning activities. Regarding operations, as part of the design, the height of key towers was reduced to fit the protected airspace so that impacts are avoided.

• Uncertified Aerodrome:

 No impacts to safe operations from Project activities during construction, operations or decommissioning were determined at Beaufort (YBFT), Ballarat Hospital Helipad (YXBT), Myrniong ALA, Rowsley/Brooks Landing (YBSL), Rowsley Helipad (YRWS), Greystones ALA, Bacchus Marsh (YBSS) or Bacchus Health Helipad.



- At Melton (YMEL), 'moderate' to 'major' unmitigated impacts from Project activities were determined during construction and decommissioning. Early consultation and coordination through construction (particularly during construction and stringing of adjacent towers) were recommended to address this, in addition to notifications to CASA and the wider aviation industry. Consistent with the established impact ratings, moderate residual impacts may still be expected during construction and decommissioning that will need to be carefully managed.
- During operations, the presence of new transmission towers and the overhead transmission line was determined to present 'moderate' unmitigated impacts to activities at the Melton Uncertified Aerodrome. In addition to consultation with the operator, CASA and wider industry, the marking of key transmission line towers and catenary so that they are more visible to pilots flying at YMEL was recommended (detail provided below in EPR AV2). With the application of the recommended measures, residual impacts at YMEL would be reduced from moderate to minor.
- Air navigation and air traffic management services: No impacts to any of the identified communications, navigation or surveillance services within the study area was determined.
- **Transiting air routes:** The minimum LSALT for all of the transiting air routes that cross the spatial extents of the study area is 4,000ft (1,200m) AHD. This is safely above the highest level that could be expected from Project activities; therefore, the Project will not impact the published air routes transiting the study area.
- Authorised low flying:
 - 'Minor' unmitigated impacts were determined for all authorised low flying activities within the study area during construction, understanding that the use of tall construction equipment and helicopters would introduce additional obstacles that pilots would need to be aware of and safety avoid. The same outcome was determined during decommissioning. Notifications of Project activities via the Aeronautical Information Publication (AIP) was recommended to make pilots aware so that they can plan accordingly to avoid any temporary obstacles introduced during construction. However, minor residual impacts were still determined, noting that there are no reasonable and feasible alternative methods available to those planned that would not require the use of cranes and helicopters for construction.
 - During operations, 'Minor' unmitigated impacts to aerial agricultural applications, firefighting and medical and emergency flights were determined, understanding that there may be circumstances that necessitate the need for these activities to occur near the new transmission towers, terminal stations and the overhead transmission line introduced by the Project. Notification of the Project infrastructure in the AIP, combined with notifications to surrounding Aerodrome Operators will limit the potential for impacts to authorised low flying in the study area, however the residual impact is likely to remain as minor. No impacts were determined for other authorised low flying activities.

Environmental Performance Requirements

To meet the EES evaluation objectives, mitigation and management measures, including the following Environmental Performance Requirements (EPRs) were developed:



• AV1: Provide notification to Airservices Australia

- 1. The Project must provide relevant Project details to Airservices Australia so that pilots, including operators of any fire response aircraft, are aware of its existence, location and features of the Project that may pose a hazard to aircraft operations.
- 2. The information must include relevant details of the Project plant, equipment and infrastructure, and meet the requirements (detail and frequency) of Airservices Australia for the promulgation of an Aeronautical Information Circular (AIC) and where required a Notice to Airmen (NOTAM) or an Aeronautical Information Publication Supplement (AIP SUP) to keep the aviation industry informed of progress throughout construction.
- This information is to be reported in accordance with CASA Advisory Circular AC139.E-05 Obstacles (including wind farms) outside the vicinity of a CASA certified aerodrome and AC139.E-01 Reporting of tall structures.

• AV2: Mark transmission line towers and associated catenary around Melton Uncertified Aerodrome (YMEL)

Towers and associated catenary are to be marked with standard obstacle markings as per Australian Standard AS 3891.1:2021 and AS 3891.2 to make them more visible to pilots flying. Towers near the Melton Uncertified Aerodrome (YMEL) are to be marked, including:

- a) F4458DL
- b) F4459SL-A
- c) F4460SL-A
- d) F4461SL-A
- e) F4462SL-A
- f) F4463SL-A
- g) F4464SL-A
- h) F4459SL-B
- i) F4460SL-B
- j) F4461SL-B
- k) F4462SL-B

Conclusion

With the implementation of measures to comply with EPRs, it is considered that the Project meets the evaluation objective 'to avoid, or minimise where avoidance is not possible, adverse effects on land use, social fabric of the community, businesses including farming and tourism, local and state infrastructure, aviation safety and to affected and neighbouring landholders during construction and operation of the Project'.

- I) F4463SL-B
- m) F4464SL-B
- n) F4587DL
- o) F4588DL
- p) F4589DL
- q) F4590DL
- r) F4592DL
- s) F4593DL
- t) F4594DL
- u) F4595DL



1. INTRODUCTION

1.1 Background

The Western Renewables Link Project (the Project) proposes a new transmission line starting at Bulgana, near Stawell in Victoria's west, and extending approximately 190km to Sydenham in Melbourne's north-west (refer to Figure 3.2 for the Project Area). The Project will enable the connection of new renewable energy generated in western Victoria into the National Electricity Market and increase the Victorian transmission capacity. The Project is being delivered by AusNet Transmission Group Pty Ltd (AusNet).

The Project was originally referred to the former Minister for Planning under the *Environment Effects Act 1978* (Environment Effects Act) on 9 June 2020 by AusNet and it was determined that an Environment Effects Statement (EES) was required. On 22 August 2023, the Minister for Planning determined that the Project has the potential to cause significant environmental effects and that an EES was required to inform decision-makers in the granting of key approvals for the Project. In summary the key changes in the new proposed Project scope are:

- The urgent Sydenham Terminal Station Rebuild will be assessed and approved separately. A connection into the Sydenham Terminal Station forms part of Western Renewables Link scope
- The 220kV portion of the transmission line is proposed to be uprated to 500kV
- The new terminal station north of Ballarat will no longer be required
- A new 500kV terminal station near Bulgana will be required, including a new 220kV connection to the existing Bulgana Terminal Station.

The Commonwealth Government's Department of Agriculture, Water and the Environment (DAWE) — now Department of Climate Change, Energy, the Environment and Water (DCCEEW) — has also confirmed that the Project is a 'controlled action' and will require assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Commonwealth has determined that it will use the bilateral assessment agreement and rely on the Victorian Government's assessment process (EES) to inform an approval decision under the EPBC Act.

1.2 Purpose of this report

The purpose of this report is to assess the potential aviation impacts associated with the Project and to define any Environmental Performance Requirements (EPRs) necessary to determine the environmental outcomes that the Project must meet, to be achieved through the implementation of mitigation measures during construction, operation and decommissioning, and address the EES evaluation objectives.

The specific objectives of the impact assessment, as defined by the scoping requirements, are to:

- Identify key aviation-related operations requiring assessment.
- Identify local existing and proposed aviation land uses around the Project.



- Provide an assessment of the likely impact of the Project on aviation safety around these
 existing and proposed aviation land uses to inform approvals under relevant policy and
 legislation.
- Provide recommendations to further avoid or minimise impacts on identified aviation safety values where appropriate, as well as EPRs.

1.3 Structure of the report

The report is structured in the following way:

- Introduction (Section 1) which provides background details for the Project and outlines the purpose and structure of the Aviation Impact Assessment.
- **EES scoping requirements** (Section 2) where the EES scoping requirements relevant to aviation are set out, and an indication of where each component of the EES scoping requirements has been considered and addressed in this study.
- **Project description** (Section 3), where Project components and activities relevant to the assessment are explained including the locations with the highest related impacts.
- Legislation, policy and guidelines (Section 4) which lists the Commonwealth, state and other documents relevant to the assessment.
- **Method** (Section 5) where the approaches applied to assess potential impacts associated with the Project is explained.
- **Existing conditions** (Section 6) which identifies existing conditions as relevant to aviation activities.
- **Impact assessment**, including mitigation of impacts (Section 7 to Section 10) where impacts are assessed during construction, operation and decommissioning of the Project, including potential impacts cumulative impacts from other relevant projects are evaluated. Measures to mitigate or effectively manage impacts determined are presented here.
- Environmental Performance Requirements (Section 11) which set out the environmental outcomes to be achieved through the implementation of mitigation measures during construction, operation and decommissioning. While some EPRs are performance based to allow flexibility in how they will be achieved, others include more prescriptive measures that must be implemented. Compliance with the EPRs will be required as a condition of the Project's approval.
- **Conclusion** (Section 12) where the objectives, methods, outcomes and recommendations of the assessment are presented.

1.4 Related studies

This report should be read in conjunction with the following related technical reports, from which this report draws specific information:

 Technical Report E: Land Use and Planning Impact Assessment – for information on planning provisions relevant to the Project and provides an assessment of land use and planning impacts of the Project



- Technical Report H: Agriculture and Forestry Impact Assessment for information on the presence of types of agricultural activities that can be supported by the use of aerial agricultural applications within the Project Area
- Technical Report K: Bushfire Impact Assessment for information on the use of aerial firefighting within the Project Area.



2. **EES** SCOPING REQUIREMENTS

The Scoping Requirements – Western Renewables Link Environment Effects Statement (DTP, 2023) set out in detail the matters to be investigated, assessed and documented in the EES for the Project and are referred to in this report as the EES scoping requirements.

2.1 EES evaluation objectives

The EES scoping requirements specify evaluation objectives which provide a framework to guide an integrated assessment of environmental effects of the Project, in accordance with the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978, Eighth edition, 2023.* The evaluation objectives identify desired outcomes in the context of key legislative and statutory policies, as well as the principles and objectives of ecologically sustainable development and environmental protection, including net community benefit.

The evaluation objective relevant to this Aviation Impact Assessment is set out in Section 4.4 (land use and socio-economic) of the EES scoping requirements:

Avoid, or minimise where avoidance is not possible, adverse effects on land use, social fabric of the community, businesses including farming and tourism, local and state infrastructure, aviation safety and to affected and neighbouring landowners during construction and operation of the project.

In order to meet the evaluation objective, it is necessary to understand the potential impact of the Project on existing aviation activities, so that impacts can be appropriately avoided or mitigated. Understanding potential impacts requires an impact assessment, for which the starting point is a clear understanding of the existing conditions. This report details the characterisation of the existing aviation activities, and the subsequent impact assessment needed to assess the Project against the evaluation objective.

2.2 Assessment of specific environmental effects

The EES scoping requirements set out the key issues that the Project poses to the achievement of the evaluation objective, together with the features and values of the existing environment that are to be characterised – these are referred to as the 'existing conditions'. The scoping requirements also list potential effects of the Project and identify where mitigation measures may be required.

The scoping requirements pertaining to aviation are reproduced in *Table 2-1* below together with directions to the reader as to where these items have been addressed in this report (and other reports as applicable).



Aspect	Scoping requirement	Relevant sections
Key issues	Potential significant disruption to existing and/or proposed land uses, with associated economic and social effects.	Key issues identified in Section 3.3.4 with potential impacts assessed in Section 7 to Section 10
	Potential adverse effects of overhead transmission infrastructure on aviation, especially with respect to use of aircraft for farming work and firefighting.	Key issues identified in Section 3.3.4 with potential impacts assessed in Section 7 to Section 10
	Potential for impacts on reasonably foreseeable upgrades to public infrastructure.	Covered in Section 7 to Section 10, noting the key public infrastructure requiring assessment was identified as future upgrades at Melbourne Airport
	Potential adverse impacts on agriculture or other forms of farming, including constraints on cropping or grazing, spread of weeds or pathogens and restrictions on farming practices.	Assessed in Section 7 to Section 10
Existing environment	Describe the project area of interest and its environs in terms of land use (existing and proposed), land classification and suitability for specific purposes, development, urban areas, townships, residences, farming and other economic activities, forestry, tourism and conservation areas.	Aspects relevant to aviation described in Section 6
	Describe zoning and overlays and public infrastructure within the project area of interest that support current and strategic patterns of economic and social activity.	Described in Section 4 (zoning and overlays) and Section 6 (public infrastructure as relevant to aviation)
	Identify relevant local, regional and state policies.	Identified in Section 4
	Identify and describe aerodromes, air navigation and air traffic management services, transiting air routes, and designated airspaces in or adjacent to the project area of interest.	Identified and described in Section 6
	Characterise current use of aerial spraying and aerial firefighting that could be affected by the project (including any significant water resource that may be used for aerial firefighting in the vicinity of the area of interest).	Identified and described in Section 6
Mitigation measures	Demonstrate whether the project is consistent with relevant planning scheme provisions and other relevant policies (including approved management plans for adjacent public land).	Provided in Section 7 to Section 10

Table 2-1: EES scoping requirements



Aspect	Scoping requirement	Relevant sections
	Describe proposed mitigation or management measures to reduce potential effects on aviation operations and safety with regard to advice from Civil Aviation Safety Authority and emergency services.	Provided as relevant in Section 7 to Section 10
Likely effects	Identify potential long and short-term effects of the project on existing and foreseeable land uses, public infrastructure and fire and emergency management.	Unmitigated and residual impacts during construction, operations and decommissioning, as well as potential cumulative impacts determined in Section 7 to Section 10
	Identify the potential effects and risks to aviation operations and safety from the project.	Determined in Section 7 to Section 10
Performance criteria	Outline measures to monitor the success of commitments to mitigate or manage effects on land use and socioeconomic values during all phases of the project.	Measures as relevant to aviation are provided in Section 7 to Section 10, with EPRs detailed in Section 11
	Describe and evaluate proposed measures to monitor potential residual social, land use and economic impacts and describe contingency measures for responding to unexpected impacts.	Measures as relevant to aviation are provided in Section 7 to Section 10, with EPRs detailed in Section 11



3. **PROJECT DESCRIPTION**

3.1 **Project overview**

The Project aims to address the current constraints of the western Victorian transmission network by providing the additional capacity, reliability and security needed to drive the development of further renewable electricity generation in western Victoria. By doing so, the Project supports the transition from coal-generated electricity to renewables and the efficient connection of renewable electricity into the National Electricity Market.

The Project comprises the construction and operation of a new approximately 190km overhead double circuit 500kV transmission line between Bulgana in Victoria's west and Sydenham in Melbourne's north-west. To support the connection of the new transmission line, the following works are proposed:

- The construction and operation of a new 500kV terminal station near Bulgana and new 220kV transmission line connection to the existing Bulgana Terminal Station
- Expansion of the existing Bulgana Terminal Station
- Connection works at the Sydenham Terminal Station including the modification of a bay and a bay extension with associated infrastructure
- Upgrade of the existing Elaine Terminal Station, through the diversion of an existing line
- Protection system upgrades at connected terminal stations.

The Project's main features are summarised in Figure 3-1 and the location is shown in Figure 3-2.



Figure 3-1: Western Renewables Link (Source: AusNet, 2024)



The Project can be described by the following key terms:

- **Project Land:** The Project Land encompasses all land parcels that could be used for the purpose of temporary Project construction and permanent operational components. The Project Land is shown in *Figure 3-2*.
- **Project Area:** The Project Area is contained within the Project Land and encompasses all areas that would be used to support the construction and operation of the Project. The Project Area is shown in *Figure 3-2*.
- **Proposed Route:** The Proposed Route is approximately 100 to 170m wide and encompasses the nominal future easement for the proposed new transmission line (including a buffer either side), and the terminal station areas. The Proposed Route is located within the Project Area.

The Proposed Route commences at the existing Bulgana Terminal Station with a 220kV transmission line connection to the new 500kV terminal station approximately 2.3km to the north-east. The Proposed Route then runs from the new 500kV terminal station to the north of the existing Ballarat to Horsham transmission line, where it runs parallel to the existing transmission line for approximately 60km. East of Lexton, the Proposed Route deviates from the Ballarat to Horsham transmission line, passing through the northern section of the Waubra Wind Farm between Mount Bolton and Mount Beckworth. Continuing east, the Proposed Route passes south of the Berry Deep Lead gold mining precinct and north of Allendale and Kingston. North of Kingston the Proposed Route turns south-east to Mount Prospect. From Mount Prospect to near Dean, the Proposed Route deviates from the existing transmission line to run south, then east through Bolwarrah, Bunding and Myrniong to Darley. The Proposed Route then continues eastward crossing Merrimu Reservoir north of Long Forest and along the northern boundary of MacPherson Park at Melton, connecting to the existing electricity network at the Sydenham Terminal Station.

The Project crosses six local government areas (LGAs), namely:

- Shire of Northern Grampians
- Shire of Pyrenees
- City of Ballarat
- Shire of Hepburn
- Shire of Moorabool
- City of Melton.

For the purposes of this Aviation Impact Assessment, the 'study area' adopted is further discussed in Section 5.2.





Figure 3-2: Project location (Source: Jacobs 2025)

3.2 Project infrastructure

The Project includes both permanent and temporary infrastructure, as described in Sections 3.2.1 and 3.2.2. The Project has been progressively refined from an initial broad area of interest as described in EES Chapter 5: Project development.

3.2.1 Permanent infrastructure

The proposed Project includes the construction of the infrastructure listed in *Table 3-1*. Further detail is provided in EES Chapter 6: Project description.



Double circuit lattice towers	418 double circuit towers.
Single circuit lattice towers	36 single circuit towers (18 sets of two side-by-side).
Approximate length of 500kV transmission line route	Approximately 190km, between Bulgana in Victoria's west to Sydenham in Melbourne's north-west.
Approximate length of 220kV transmission line route	Approximately 2.5km, between the existing Bulgana Terminal Station to the new terminal station.
Terminal Stations	A new 500kV terminal station and associated infrastructure near Bulgana to be connected of the existing Bulgana Terminal Station via a 220kV connection.
	Expansion of the existing Bulgana Terminal Station with a 220kV transmission line constructed to support the connection to the new 500kV terminal station near Bulgana.
	A connection to the Sydenham Terminal Station, including the modification of a 500kV bay and a new 500kV bay extension with associated infrastructure
	Relocation and diversion of existing 220kV transmission line at Elaine Terminal Station.

Table 3-1: Project infrastructure - key components*

* Note: These figures are approximate and subject to final detailed design, which will consider further landowner consultation and geotechnical, site and other investigations.

For the safe and reliable operation of the transmission line, an easement is needed for the operation of the transmission line, and other related infrastructure to protect public safety and to provide access for maintenance and repair purposes. The transmission line easements will be typically between 70 and 100m wide for the Project.

The transmission line design requirements are specified by the Australian standard AS/NZS 7000:2016 Overhead Line Design and AusNet's Electricity Safety Management Scheme. Key assumptions and considerations of the transmission towers that will form part of the Project and have been used as the basis of this report are described below.

- Transmission towers (towers) support the overhead conductors (wires or lines) at the required height above the ground to meet regulations and safety requirements. The preferred tower configuration will be a galvanised steel lattice structure similar to those found elsewhere across Victoria and within the national network. The typical tower height for the Project is between 60 to 80m.
- Each tower has four footings which will typically be 1.8m in diameter and 9m deep. The four footings base width will be between 10 to 17m wide. During construction, ground disturbance around each tower will typically be no greater than 50 by 70m.
- The spacing or span length between each tower is determined by the height from the ground that the conductors need to be to achieve the required ground clearance in the middle of the span. Typical span length is between 450 to 550m for the transmission line. Longer span lengths are possible over sensitive areas or to avoid impacts, however, longer spans require taller towers to provide safe ground clearances and wider easements to allow for greater sway of the conductors. Similarly, where it is difficult to achieve the required ground clearance in the middle of the span, due to topography or obstacles, the tower span may be reduced.



• Each span comprises 26 conductors, made up of 12 conductors on each side of the tower cross arms and two ground wires across the top of the tower. Each conductor is approximately 32mm thick and made of aluminium wire strands with a steel core.

As part of the Project, the existing Bulgana Terminal Station will be expanded to support the connection of the new 500kV terminal station into the existing 220kV switchyard. The new 500kV terminal station will support the connection of the Project transmission line and future connections. The new terminal station will require additional land to the north-east of the existing Bulgana Terminal Station.

Upgrades required at Elaine Terminal Station will involve the relocation of existing 220kV transmission line and diversion of an existing 220kV line into the terminal station. The footprint of the terminal station will not change, and all new equipment will be approximately the same height and scale as existing structures and equipment at the Elaine Terminal Station.

Connection works are proposed at Sydenham Terminal Station. The existing Sydenham Terminal Station will be re-built through the Sydenham Terminal Station Rebuild Project, prior to the Project works. The Project will connect into Sydenham through the modification of a 500kV bay and new 500kV bay extension.

3.2.2 Temporary infrastructure

During construction there will be additional work areas, including vehicle access tracks, temporary tower stringing pads, distribution line crossover points, potential hurdle locations, temporary laydown areas and workforce accommodation facilities.

Temporary laydown areas associated with the terminal stations and the transmission line will be used to sort materials, pre-assemble Project components and store equipment, vehicles and other supplies that support construction activities. Temporary fencing, gates, security systems and lighting will also be installed at the laydown areas. The Project will establish five laydown areas; two of which will be located at existing terminal station sites (Bulgana and Sydenham), one at the new 500kV terminal station near Bulgana, and an additional two sites at intermediate locations between the stations south-east of Lexton and south-east of Ballan. The two intermediate laydown areas are required for the construction of the transmission line. The size of each site (including workforce accommodation facilities) will vary depending on storage requirements. The site south-east of Lexton will be up to approximately 12ha and the site south-east of Ballan will be up to approximately 24ha.

AusNet proposes to utilise temporary construction workforce accommodation facilities to accommodate construction workforce personnel. Two facilities are proposed; one in each of the western and eastern portions of the Project, co-located with each of the intermediate laydown areas near Lexton and Ballan. Each facility will have capacity for up to 350 personnel and will provide individual accommodation units, a communal kitchen and meals area, laundry, gym facilities, mobile and Wi-Fi boosters and serviced cleaning. The layouts of the proposed workforce accommodation facilities will be determined by the Principal Contractor.



3.3 Summary of key Project activities

3.3.1 Construction

Construction of the Project will include preparatory activities (e.g., site investigations, establishment of laydown areas etc.), establishment of temporary infrastructure (such as water and wastewater infrastructure and power supplies), construction of towers and transmission line stringing works; construction works at terminal stations; site rehabilitation works; and pre-commissioning activities.

The overall construction duration of the Project is approximately two years. This schedule is dependent on adjustments required to deliver the Project and the granting of approvals within certain timeframes. For tower assembly and transmission line stringing, work will not be constant, with specialist crews following each other along the route doing specific jobs (clearing, site preparation, tower construction, conductor stringing, site rehabilitation, etc). As each work crew leaves a site (or property) there may be days, weeks, or possibly months of inactivity until the next crew arrives. The cumulative duration of construction work at each tower (i.e., time on each property) will be approximately 9 to 22 weeks (over a two-year period). Once construction is complete, site rehabilitation will occur and commissioning activities will include final inspections and other safety and pre-operational checks. Construction of the Project is anticipated to commence in late 2026 and be completed by late 2028.

Key activities associated with the construction of towers include:

- Site preparations, including necessary vegetation clearance
- Construction of vehicle access tracks and minor upgrades to existing roads and tracks
- Tower foundation construction
- Tower structure assembly and erection
- Transmission line stringing works
- Commissioning
- Site rehabilitation.

The works proposed at the new 500kV terminal station near Bulgana, the existing Bulgana Terminal Station and Sydenham Terminal Station will be constructed over a period of approximately 20 months, with key activities including:

- Site preparations, access and necessary vegetation clearance
- Earthworks
- Construction of footings, foundations and drainage systems
- Installation of structures and equipment
- Commissioning
- Landscaping and rehabilitation.



3.3.2 Operations

The operation and maintenance of transmission lines are subject to stringent regulatory controls to ensure public safety and the uninterrupted supply of electricity. All transmission line operators are required to comply with these controls and provide regular reports to the relevant authorities, including Energy Safe Victoria.

The key operation stage activities for the transmission line include:

- Scheduled inspections of the transmission line and easement (either by vehicle patrols or LiDAR/aerial surveys)
- Ongoing vegetation management to maintain safety clearances under the transmission line
- Tower maintenance inspections
- Repairs and maintenance to address issues found in above inspections.

While the terminal stations are operated remotely, staff are only present at stations for inspections or maintenance. Routine inspections will occur bi-monthly, with personnel checking the overall condition of the terminal station's assets.

3.3.3 Decommissioning

The Project's transmission line is designed for a service life of 80 years, while the terminal station works have been designed for a minimum life of 45 years. The terminal station works will be maintained and upgraded to enable the terminal stations to remain operational for the service life of the transmission line. At the end of the service life of the transmission line, the infrastructure will either be decommissioned or upgraded to extend its service life to maintain the security and reliability of the transmission network as determined by the network planner at that time. In the event of decommissioning, key activities may involve:

- Lowering the overhead transmission line and ground wires to the ground and cutting them into manageable lengths to roll onto drums or reels for disposal as scrap metal
- Removing insulators and line hardware from structures at the site and disposal at an approved waste facility
- Dismantling towers in manageable sections, removing from the site and selling steel as scrap
- Excavation of footings below finish surface level
- Decommissioning and removal of terminal stations
- Easement restoration and rehabilitation, where required.

3.3.4 Activities relevant to the Aviation Impact Assessment

The following Project activities have the potential to impact on existing aviation activities:

- Pre-construction aerial survey of the transmission line route
- Use of cranes and/or helicopters for any associated activities required to facilitate tower build during the construction stage



- Use of helicopters for conductor and earth wire stringing during construction
- · Presence of transmission towers and the overhead transmission line during operations
- Use of aircraft for transmission line inspection and maintenance during operations.
- Use of cranes and/or helicopters to facilitate tower deconstruction during decommissioning.

The key aviation-related values that may be affected include:

- Operations at nearby Certified Aerodromes: An aerodrome is a place for the landing and taking off of an aeroplane. A helicopter is an aeroplane, therefore there is no specific differentiation between helipads and aerodromes. A Certified Aerodrome is a facility that meets the standards and requirements of 'Civil Aviation Safety Regulations 1998, Part 139—Aerodromes (CASR 139), reg 139.040', including terminal instrument flight procedures (i.e., a series of predetermined manoeuvres that pilots use to land an aircraft while referring to flight instruments), and is certified by CASA. Military or Joint User Aerodrome are also used by Military aircraft. Military Aerodrome are controlled and operated by the Department of Defence for the use of military aircraft. Joint User Aerodrome are Military Aerodrome also designated for use by civil aircraft. There are only two Joint User Aerodrome (Darwin and Townsville), and none within the vicinity of the Project.
- Operations at nearby Uncertified Aerodromes, including helicopter landing facilities and aircraft landing areas (ALAs): Uncertified Aerodromes are not certified by CASA. They include any other aerodrome, other than those that are Certified. These include helicopter landing facilities and ALAs. ALAs can be 'verified' or 'unverified'. 'Verified' ALAs are recorded in Airservices Australia's Aeronautical Database and are published on associated charts. For 'unverified' ALAs, the status and serviceability have not yet been provided to or confirmed by Airservices Australia.
- Air navigation and air traffic management services: This includes to Communications, Navigation and Surveillance (CNS) facilities used by Civil Air Traffic Control.
- **Transiting air routes:** These are commonly used flight paths documented in the Aeronautical Information Publication (AIP). In Controlled Airspace, this will be at the approval of air traffic control (ATC).
- Authorised low flying including:
 - Aerial agricultural applications: Aerial agricultural operations include the application of fertiliser, pesticide and herbicide to farming land (crops, pasture), as well as aerial survey and mustering.
 - Aerial firefighting: Aerial firefighting includes the application of water or fire-retardant chemical to the fire on the ground by fixed wing or rotary wing aircraft with water/chemical storage capacity. Aerial firefighting is used when these aircraft are available and likely to be useful in containing the fire.
 - Medical and emergency flights: Including Helicopter Emergency Medical Service (HEMS), Police Airwing and Search and Rescue.
 - Flight training: This includes training conducted in in single engine light aircraft flown in accordance with visual flight rules, advanced training in light twin engine aircraft and training in more advanced larger twin turboprop aircraft.
 - Sports aviation: This includes, gliding, parachuting, and aerobatics flying activities.



- Private flights and tourism: This includes private flights by authorised pilots, including those for tourism purposes.
- Military activities: This includes all low level fixed and rotary wing flying operations undertaken by Australian and authorised foreign Defence authorities.
- Other approved activities: This includes the use of model aircraft and unmanned aerial vehicles (drones).



4. LEGISLATION, POLICY AND GUIDELINES

This section summarises the relevant legislation, policy and guidelines applicable to the Aviation Impact Assessment as well as implications for the Project.

4.1 Commonwealth legislation

Table 4-1: Key Commonwealth legislation relevant to aviation

Legislation	Relevance to this report	
Civil Aviation Act 1988	The Act provides a regulatory framework for maintaining, enhancing and promoting the safety of civil aviation, with particular emphasis on preventing aviation accidents and incidents.	
	The undertaking of aerial firefighting operations and aerial agricultural applications within the study area and in the surrounding landscape is regulated under this Act.	
Airspace Act 2007	The Act relates to airspace administration and regulation in Australia, with the object of providing for an airspace which is administered and used safely, taking into account protection of the environment, efficient use of the airspace; equitable access to the airspace for all users; and national security.	
<i>Civil Aviation Safety Regulations</i> 1998 (CASR)	CASR are promulgated by CASA and provide the regulatory framework (i.e., regulatory controls) for the safety of air navigation and to which all service providers must operate. The regulation of CASA Certified Aerodromes is set out in Part 139 of CASR.	
<i>Civil Aviation Regulations 1988</i> (CAR)	CAR are promulgated by CASA and establish the regulatory framework within which all aviation service providers must operate.	
Airspace Regulations 2007	Regulates airspace administration, with the purpose of enabling CASA to perform the functions and exercise the powers in connection with the administration and regulation of Australian-administered airspace.	
Airports Act 1996	This Act provides a system for the lease of Commonwealth owned airports to lessee companies.	
Airports (Protection of Airspace) Regulations 1996	The object of these Regulations is to establish a system for the protection of airspace at, and around, airports in the interests of the safety, efficiency or regularity of existing or future air transport operations into or out of federally leased airports. In the context of the aerodromes around the Project, these regulations only apply to Melbourne and Essendon Airports.	


4.2 State legislation

Table 4-2: Key state legislation relevant to aviation

Legislation	Relevance to this report
The Environment Effects Act 1978 (Environment Effects Act) provides for the assessment of projects that are capable of having a significant effect on the environment by enabling the Minister administering the Act	On 22 August 2023, the Minister for Planning determined that the Project requires assessment through an EES under the Environment Effects Act, due to matters as set out in the Statement of Decision on Referral No. 2023R-04, and summarised below:
 to decide that an EES should be prepared. An EES may be required where: There is a likelihood of regionally or State significant adverse apvironmental offecto. 	 The area of interest for the project supports significant environmental values and other social values, potential aggregate impacts on which are of at least regional significance
 There is a need for an integrated assessment of social and economic effects of a project or relevant alternatives 	 Multiple alignment and design alternatives for the project within the area of interest require rigorous and transparent assessment and refinement
 Normal statutory processes would not provide a sufficiently comprehensive, integrated and transparent assessment. 	 An EES responds to community interest in project siting, alignment and design alternatives by providing appropriate opportunities for public input.
The process under the Environment Effects Act is not an approval process in itself; rather it is an assessment process that enables statutory decision-makers to make decisions about whether a project with potentially significant environmental effects should proceed.	The Minister for Planning issued the EES scoping requirements in November 2023 (Section 2), which have informed this assessment.
The <i>Planning and Environment Act</i> 1987 (Planning and Environment Act) provides a framework for planning the use, development and protection of land in Victoria in the	The construction and operation of the Project would occur in the LGAs of Northern Grampians, Pyrenees, Ballarat, Hepburn, Moorabool and Melton and is subject to a range of planning controls.
present and long-term interests of all Victorians.	Section 4 of the Planning and Environment Act states that the objectives of planning in Victoria are –
	 a) to provide for the fair, orderly, economic and sustainable use, and development of land;
	 b) to provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity;
	 c) to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria;
	 d) to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value;
	 e) to protect public utilities and other assets and enable the orderly provision and coordination of public utilities and other facilities for the benefit of the community;



Legislation	Relevance to this report	
	f) to facilitate development in accordance with the objectives set out in paragraphs (a), (b), (c), (d) and (e);	
	g) to facilitate the provision of affordable housing in Victoria;	
	h) to balance the present and future interests of all Victorians.	

4.3 Policy, guidelines, and standards

Policy, guidelines and standards	Relevance to this report	
Aeronautical Information Publication	Contains a compendium of aeronautical rules, data, and requirements including charts that apply to aviation activities that take place around the Project.	
Advisory Circular AC139.E-01 v1.0	Provides recommendations and guidance for the reporting of tall structures, such as the transmission towers that would be constructed as part of the Project	
Advisory Circular AC 139.E-05 (May 2021)	Provides advice regarding tall structures outside the vicinity of a Certified Aerodrome. Again, this guidance applies as relevant to the transmission towers that would be constructed within the vicinity of surrounding Certified Aerodrome around the Project.	
International Civil Aviation Organisation (ICAO) Document 8168 Procedures for Air Navigation Systems – Aircraft Operations (ICAO Document 8168)	Outlines the principles for airspace protection and procedure design which all ICAO signatory states, including Australia should adhere to.	
Manual of Standards Part 139 – Aerodromes	Provides the standards applicable to Certified Aerodromes. These apply at all Certified Aerodrome surrounding the Project.	
CASR Part 173 Manual of Standards – Standards applicable to Instrument Flight Procedure Design	Establishes the standards pertaining to the design of Instrument Flight Procedures. It also establishes the link to ICAO Document 8168. These apply at all Certified Aerodrome surrounding the Project.	
National Airports Safeguarding Framework Guideline F and Guideline D.	A set of guidelines, adopted in July 2012, developed by the National Airports Safeguarding Advisory Group (NASAG) to safeguard airports and surrounding communities.	
Victoria Planning Provisions	State-wide reference document containing a set of planning provisions for Victoria used to construct a planning scheme for each municipality. Clause 18.02-7S and 18.02-7R are particularly relevant for this report. Clause 18.02-7S seeks to strengthen the role of Victoria's airports and airfields within the state's economic and transport infrastructure, guide their siting and expansion, and safeguard their ongoing, safe and efficient operation with strategies to protect airports and airfields from incompatible land use and development to prevent land use and development that poses risks to the safety or efficiency of an airport or airfield. Clause 18.02-7R intends to ensure that the curfew-free status of Melbourne Airport is protected, and	

Table 4-3: Policy, guidelines and standards relevant to aviation



Policy, guidelines and standards	Relevance to this report	
	that any new development doesn't prejudice its operation or optimum usage.	
	Applicability of Clause 52.15 (helicopter landing sites and heliports) would also need to be reviewed once the relevant details of helicopter landing sites (for construction and decommissioning) are developed. The need for related permits should be reviewed and attained as required.	
Melbourne Airport Environs Overlay and Airport Environs Overlay (Victoria Planning Provisions Clause 45.02)	Part of the Victoria Planning Provisions to ensure land use and development are compatible with the operation of airports in accordance with appropriate airport strategy or master plan. This applies at Melbourne Airport, as well as all other Certified aerodromes with a Master Plan. Only Commonwealth Leased Aerodromes are required to produce a Master Plan every 5 years.	



5. METHOD

5.1 Overview

This section describes the method that was used to assess the potential impacts of the Project. Risk screening was applied to prioritise the key issues for impact assessment. Measures to avoid, minimise and manage potential effects have then been developed to address these impacts. The key steps undertaken in completing this assessment included:

- Identifying all Project activities that could impact aviation values (identified above in Section 3.3.4)
- 2) Reviewing the EES scoping requirements and relevant legislation and policy to determine the relevant requirements for the assessment (see Section 2 and Section 4 above)
- 3) Establishing the study area for the assessment
- 4) Characterising key features of the environment as relevant to aviation
- 5) Undertaking an initial risk screening review to identify the key aviation-related issues
- 6) Consulting with government and community stakeholders to understand key aviation-related considerations for the Project
- 7) Completing a more detailed evaluation of potential impacts associated with these key issues, initially determining unmitigated risks and then residual impact values following the application of mitigation and management measures and EPRs
- 8) Reviewing the potential for cumulative aviation impacts from other nearby projects
- 9) Developing EPRs to meet the EES objectives.

The following sections outline the method adopted for the Aviation impact assessment.

5.2 Study area

Recognising that aviation operates in three dimensions, the overall study area applied to the assessment considered the spatial extents (i.e., length, width and height) of airspace potentially impacted by the Project. The sensitivity of the different aviation values identified in Section 3.3.4 to activities from the Project varies. Noting this, the following spatial extents were applied to the study area for different activities:

Aviation aspect	Study area	Basis
Operations at surrounding Certified Aerodromes	Any Certified Aerodrome within 30nm (56km) of the Proposed Route must be assessed.	Encompass the protected airspace surrounding each identified Certified Aerodrome. The protected airspace surrounding Certified Aerodromes extends to 25nm (46.3km) with an associated safety buffer of 5nm (9.26km) taking the area to be assessed to 30nm (55.6km) radius of the Certified Aerodrome's

Table 5-1. Spatial extents of study area for different aviation activities



Aviation aspect	Study area	Basis
		Aerodrome Reference Point (ARP). This area encompasses the Obstacle Limitation Surfaces (OLS) that can extend to 15km from the runway end and the Procedures for Aircraft Navigation Services – Aircraft Operations surfaces protecting published Instrument Approach Procedures (PANS-OPS).
Operations at nearby Uncertified Aerodromes, including helicopter landing areas and ALAs	Within 16.2nm (30km) of the Proposed Route	The 16.2nm (30km) distance adopted for Uncertified Aerodromes and helipads is in line with the Victoria Planning Provisions for aerodromes which uses the 'National Airports Safeguarding Framework Guideline D Managing the risk to aviation safety of wind turbine installations (wind farms)/wind monitoring towers' of 30km.
Air navigation and air traffic management services	 Communications: Within 30nm (56.6km) of Proposed Route 	• Communications: Study area developed with reference to guidance from 'Manual of Standards Part 139: Chapter 19', (CASA)
	 Navigation: Within 30nm (56.6km) of Proposed Route 	 Navigation: Study area developed with reference to guidance from Have 'Manual of Standards Part 139: Chapter 19', (CASA)
	 Surveillance: 250nm (463km) from the Radar Site at Mount Macedon 	• Surveillance: In accordance with 'EUROCONTROL Guidelines on assessing the potential impact of wind turbines on surveillance sensors Edition 1.2', (EUROCONTROL, 2014)
Transiting air routes	Within 16.2nm (30km) of the Proposed Route	Transiting air routes are published in the AIP. Noting the granularity of information presented in the AIP, a conservative approach was taken to consider all routes within 30km of the Proposed Route.
Authorised low flying including:Aerial agricultural spraying	Below 50ft and within 500m of the Proposed Route	Authorised low flying occurs at or below 500ft and is only permitted for suitably trained and endorsed pilots. Impacts are only possible if these activities interact with the Project.
Aerial firefighting		
Flight training		
 Sports aviation 		
 Private flights and tourism 		
 Military activities 		

With reference to Certified Aerodromes, Uncertified Aerodromes (including helicopter landing sites and ALAs) and air navigation and air traffic management services facilities referred to in *Table 5-1*, the following were considered:

• **Certified Aerodromes:** Stawell, Ararat, Ballarat, and Melbourne (Tullamarine) Airport. It is noted that Essendon Fields Certified Aerodrome is also approximately southeast 15km of the Proposed Route. The Essendon Airport Control Zone (i.e., airspace under the control of an air traffic controller) is contiguous with the Melbourne Airport Control Zone and is therefore not considered in this report because the protected airspace for Melbourne Airport also protects Essendon Airport in the sector of airspace being considered for the Proposed Route.



- Uncertified Aerodromes: Beaufort, Rowsley/Brooks Landing, Bacchus Marsh, Melton, Glenlofty, Fiskville, Myrniong and Greystones. The Uncertified Aerodrome at Fiskville was closed on 26 March 2015 and is no longer a consideration for the Project.
- Helicopter landing sites: Ballarat Hospital, Rowsley, and Bacchus Health. it is noted that all three of these locations are Uncertified Aerodromes.
- Air navigation and air traffic management services facilities: Civil aviation communications facilities at Mount William, Mount Macedon and Melbourne Airport; civil aviation surveillance facilities (primary and secondary radar) at Melbourne Airport and Mount Macedon; and ground-based navigation facilities at Melbourne Airport.

The key spatial extents of the study area as described in Table 5-1 are displayed below in Figure 5-1.





Figure 5-1: Aviation key features of study area (Source: Jacobs, 2024) (Note: Radar Sites are not displayed)



5.3 Existing conditions

The study of the existing aviation conditions comprised a desktop review of the known aeronautical facilities and aviation activity within the defined study areas. The information used to characterise these existing conditions are provided in *Table 5-2*.

Table 5-2: Information used to identify existing conditions

Aviation aspect	Source
Certified Aerodromes	Information presented in the AIP, CASR and relevant Victoria Planning Policy and Guidelines were reviewed to identify Certified Aerodromes within 30 nautical miles (nm) (56.6km) of the Proposed Route.
Uncertified Aerodromes, including helicopter landing areas and ALAs	Verified Uncertified Aerodromes within the study area were identified using information presented in the AIP EnRoute Supplement Australia (ERSA), AIP Charts, and the AIP Designated Airspace Handbook (DAH), as well as the World Aeronautical Charts and online mapping database.
	Regarding 'Unverified' ALAs, these were identified from aerial imagery, as well as from stakeholder discussions and industry experience.
Air navigation and air traffic management services	The location and details of these facilities are published in the AIP. This information was reviewed to identify air navigation and air traffic management facilities within the identified study area.
Transiting air routes	Transiting air routes are published in the AIP. This was reviewed to identify any routes crossing above the Project study area.
 Authorised low flying including: Aerial agricultural applications Aerial firefighting Medical and emergency flights Flight training Sports aviation Private flights and tourism Military activities Other aviation activity 	 Within Class G airspace an aircraft may operate anywhere at any time as permitted by the CASR; therefore, the occurrence of such flying is neither monitored nor recorded. Noting this, the following information sources were used to inform the occurrence of the various authorised low flying activities across the study area: Aerial agricultural applications: Identified from discussions with key regional aerial agricultural contractors (as detailed below in Section 5.6) Aerial firefighting: Identified from discussions with key regional aerial firefighting contractors (as detailed below in Section 5.6) Medical and emergency flights: Determined through consultation with Senior Base Pilots at Babcock (HEMS) and Pelair (fixed wing Air Ambulance), with consideration of known locations of use Flight training: Identified from an understanding of activities at surrounding aerodromes
	 Sports aviation: Determined via discussions with Recreational Aviation Australia, as well as from AIP charts which display locations of key hang gliding, parachuting and other sports aviation activities. Private flights and tourism: Identified from an understanding of activities at surrounding aerodromes Military activities – Expected from the presence of surrounding military operations (e.g., RAAF Base Point Cook and RAAF Base East Sale) Other aviation activity: Identified using guidance from AIP Charts and local



5.4 Risk screening

A risk screening process was undertaken to identify the aviation risks associated with the design, construction, operation, and decommissioning of the Project and to provide for the appropriate level of investigation. The outcomes of the risk assessment identified the key issues that were taken forward into the impact assessment phase (see **Section 7.2**, **Section 8.2** and **Section 9**).

5.5 Impact assessment method

Impacts to the various aviation values identified within the spatial extents of the study area were assessed as detailed in *Table 5-3* with initial unmitigated and residual mitigated impacts evaluated as per the definitions established in *Table 5-4*.

Aviation value(s)	Impact assessment steps		
All	Project hazard identification: Tall structures (i.e. 30m above ground level) must be reported to the Airservices Australia Vertical Obstacle Database in accordance with Advisory Circular AC 139.E-01 v1.0. Construction, operational and decommissioning details of the Project were reviewed to identify tall structures that could present a hazard to the identified aviation values within the study area. For construction and decommissioning activities this included tall plant such as cranes, and for operations, given that the transmission line towers will be up to 85m above ground level (279ft) they are, in aviation terms also potential hazards.		
	Additionally, another activity that could present a hazard to aviation values during construction is the use of helicopters for transmission tower construction and line stringing. Project details were reviewed to identify where this could present an issue.		
Operations at Certified Aerodromes	Impacts at Certified Aerodromes: Impacts to operations at Certified Aerodromes were assessed as follows:		
	 Determining the protected airspace restrictions around each Certified Aerodrome. Information presented in the AIP EnRoute Supplement Australia (ERSA), AIP Charts, AIP Designated Airspace Handbook (DAH) and AIP Departure and Approach Procedures (DAP) were used to identify OLS and PANS-OPS around each Certified Aerodrome within the study area. 		
	2) Identifying Project hazards for each stage of the Project (construction, operation and decommissioning) within the OLS and PANS-OPS around each Certified Aerodrome.		
	3) Confirming the presence of any existing 'shielding'. A new obstacle located in the vicinity of an existing obstacle and assessed as not being a hazard to aircraft is considered to be 'shielded'. The parameters for defining a shielded obstacle is defined in the figure below. Clearing the critical obstacle provides clearance of the shielded obstacle defined as a "permanent obstacle" in the figure below:		



Aviation value(s)	Impact assessment steps
	Perimanent obstacle horizontal Vole angle Subtended angle
	4) For the remaining unshielded Project hazards, comparing heights of project activities and infrastructure against those for protecting safe aviation operations established in the OLS and PANS-OPS (as relevant). Initial unmitigated impacts were determined with reference to the impact classifications listed below in <i>Table 5-4</i> .
Operations at Uncertified Aerodromes	Impacts at Uncertified Aerodromes: Uncertified Aerodromes are not regulated by 'CASR Part 139 – Aerodromes' and are therefore not protected by an OLS and cannot have a published instrument approach procedure with its associated PANS-OPS. The Pilot in Command is responsible for ensuring the landing and take-off area is suitable for the intended aircraft operation, having regard to runway conditions, weather conditions, aircraft take-off weight, aircraft performance and obstacles. Potential impacts at Uncertified Aerodromes were determined by reviewing whether the hazards associated with the Project could affect how operations at these locations currently take place. Initial unmitigated impacts were determined with reference to the impact classifications listed below in <i>Table 5-4</i> .
	Impacts at Melton Uncertified Aerodrome: As raised in Section 6.3.10, additional stakeholder and community feedback has been received in relation to the potential for the Project to affect aviation values at Melton Uncertified Aerodrome. Noting this and the relative proximity of the Project to this location compared to other Aerodromes, a more detailed assessment was undertaken for this location. That said, the same approaches were applied as for other Uncertified Aerodrome; namely reviewing whether the Project would affect existing operations by way of imposing additional restrictions for the Pilot in Command.
Air navigation and air traffic management services	Impacts to air navigation and air traffic management services: These facilities were identified within the study area (as detailed above in Section 5.3), with impacts reviewed based on the effects of existing high voltage transmission lines and terminal stations in the region.
Transiting air routes	Impacts to transiting air routes: Impacts from the identified Project hazards (determined above in Step 1) were assessed by comparing these levels with the Lowest Safe Altitude (LSALT) for the published air routes.
Authorised low flying activities	Impacts to authorised low flying activities: Noting that authorised low flying is flight permitted to operate below 500ft above the tallest obstacle on the terrain that is within 300m radius of a point directly below the aircraft, potential impacts were assessed by reviewing whether the identified Project hazards would impact on low flying within the study area determined above in Section 5.2.
Cumulative impacts	Cumulative impacts: Cumulative impacts occur when a project together with the impacts of other relevant projects that may interact spatially and temporally, result in cumulative impacts beyond the contributions from any individual project. Potential cumulative impacts were determined for projects identified as being proportionate to the



Aviation value(s)	Impact assessment steps
	scale and potential significance of the impacts of Western Renewables Link (i.e., that also have the potential to result in hazards to aviation activities); that have sufficient information publicly available in an EES or an environmental approvals application; and that have a spatial and temporal relationship to the Project.
	EES Chapter 4: EES assessment framework and approach identifies relevant future projects that have these relationships. These projects were reviewed to identify ones that present potential aviation hazards that could result in potential cumulative impacts to aviation values. Potential cumulative impacts were assessed qualitatively to identify any measures required to limit cumulative effects to aviation values.
All	Mitigation and management, EPRs and residual impacts: Based on the outcomes of the assessment, any standard or specific practice control measures were developed.
	EPRs were subsequently recommended to define the environmental outcomes to be achieved through the implementation of mitigation measures during construction, operation and decommissioning. While some EPRs are performance based to allow flexibility in how they will be achieved, others include more prescriptive measures that must be implemented. Compliance with the EPRs will be required as a condition of the Project's approval. These are presented in Section 11.
	Residual impacts were subsequently determined with the application of these measures and EPRs, in-line with the impact definitions established in <i>Table 5-4</i> .

Table 5-4:	Impact	definitions
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Impact	Descriptor
No impact	No change to current baseline operations. Operations continue as normal.
Minor	Minor change to current baseline operations. Operations continue as normal, with the mitigator that pilots are aware of the Project activity/infrastructure and the need to fly accordingly (i.e., the Pilot in Command has to make minor (i.e. immaterial) adjustments e.g., to the descent and departure angles/profiles, to ensure clearance is maintained over the Project activity/infrastructure). Minor (i.e., immaterial) impacts to air navigation and air traffic management services.
Moderate	Moderate change to current baseline operations. Operations continue as normal, with the mitigator that pilots are aware of the Project activity/infrastructure and the need to make moderate (i.e., material but not unachievable) adjustments (e.g., to the descent and departure angles/profiles, to ensure clearance is maintained over the Project activity/infrastructure) to maintain safe flying. Moderate (i.e., material but not unmanageable) impacts to air navigation and air traffic management services.
Major	Major change to current baseline operations. i.e. The Pilot in Command has to make significant (i.e., material and challenging) adjustments (e.g., to descent and departure angles/profiles) to ensure clearance is maintained over the Project activity/infrastructure. e.g., for aerodromes, operations are required to be curtailed or severely limited on particular runways and/or for specific aircraft types. Major (i.e., material and disruptive) impacts to air navigation and air traffic management services.
Unacceptable impact	Operations are unable to continue owing to conditions that preclude the ability of an aircraft to safely operate at a location, as well as land or take off from an aerodrome. Air navigation and air traffic management services become ineffective.



5.6 Stakeholder engagement

Stakeholders and the community were consulted to support the preparation of this report and to inform the development of the Project and understanding of its potential impacts.

Table 5-5 lists specific engagement activities that have occurred in relation to aviation, with more general engagement activities occurring at all stages during the preparation of the EES for the Project. Feedback received during community consultation sessions is summarised in Section 5.7 relevant to the Aviation Impact Assessment.

Activity	Date	Matters discussed
Telephone interview AG Air Services, Stawell	4 June 2021	Effect of Project on aerial applications and aerial firefighting.
Telephone interview with Field Air, Ballarat	4 June 2021	Effect of Project on aerial applications and aerial firefighting.
Telephone interview with County Helicopters, Ballarat	7 June 2021	Effect of Project on aerial applications and aerial firefighting.
Virtual meeting with Bacchus Marsh Aerodrome Management	29 March 2021	Effect of Project on operations at Bacchus Marsh Uncertified aerodrome. Future expansion plans, including likelihood of seeking CASA certification of the aerodrome.
Virtual meeting with Melton Aerodrome operator and Melton Aerodrome's appointed legal team.	4 June 2021	Effect of Project on operations at Melton Uncertified aerodrome. Future expansion plans, including a new runway and extension of an existing runway. Operator produced an aerodrome survey including a possible Obstacle Limitation Chart.
Face to face meetings with Melton Aerodrome operator and Melton Aerodrome's appointed legal team	6 May 2022 and 28 June 2022	Discussion regarding operations at Melton Uncertified Aerodrome. Melton Aerodrome operator is opposed to the proposed locations of the transmission towers adjacent to the site.
CASA consultation	23/09/2021 Response: 13/10/2021	CASA have no jurisdiction " <i>outside the vicinity of a Regulated aerodrome</i> " as stated in AC139.E-05, May 2021. CASA will provide advice to the Planning Authority; however, they do not wish to engage with Project proponents.
Australia Pacific Airports (Melbourne)	23/09/2021 2022 – 2023	Consultation commenced with Australia Pacific Airports (Melbourne Airport) in 2021, regarding the proposed location and height of towers for Western Renewables Link. Limited information was disclosed regarding the proposed north/south runway.
		Further consultation with Australia Pacific Airports continued in 2023 regarding the obstacle limitation surfaces for the proposed parallel east/west runway and Sydenham Terminal Station. Melbourne Airport is pursuing the parallel north/south runway which is compatible with

Table 5-5: Stakeholder engagement undertaken for Aviation Impact Assessment



Activity	Date	Matters discussed
		the Sydenham Terminal Station and the Project connection to Sydenham Terminal Station.
Emergency Services 2021 -	2021 – 2023	Consultation with Senior Base Pilots at Babcock (HEMS) and Pelair (fixed wing Air Ambulance), as well as Senior Base Pilot Police Airwing.
		Consultation with Fire Management (Regional and Head Office) at Country Fire Authority (CFA) and Forest Fire Management (FFM).
		These discussions confirmed that all emergency services operations are undertaken using dynamic risk assessment, which accounts for known obstacles.

Additionally, various communications were undertaken with Recreational Aviation Australia, Parachute Federation and Hand Gliding Federation Victoria as relevant to related sporting aviation activities around the Project.

5.7 Community feedback

In addition to consultation undertaken with specific stakeholders, consultation has been ongoing with the community throughout the design development and the EES process. Contributions from the community have been received via a range of engagement events, the Project website, email, and telephone hotline. Feedback relevant to aviation was received through community consultation sessions and the gathering of social Pinpoint data provided by the community. AusNet and Jacobs collated and provided this data. Social Pinpoint data was provided via an interactive online mapping tool, which asked stakeholders to provide feedback on what is important to individuals and communities in their local area. The online mapping tool was available between July and October 2020 and again from March to May 2021. Social Pinpoint data showed 11 pins related to aviation. Several of these related to regular use of operational aerodromes, such as Melton Uncertified Aerodrome; three pins identified agricultural air strips in an area to the north of Myrniong; and one pin related to a known helipad at Rowsley. Information received from this community consultation helped to characterise relevant features of the existing environment, so that potential impacts were assessed and suitably managed.

Table 5-6 lists the feedback received relevant to aviation and where these matters have been addressed in this report.

Matter raised	Where matter has been addressed
Several comments about regularly using Melton Uncertified Aerodrome.	Section 7.4, Section 8.4 and Section 9
Agricultural air strips (i.e., ALA) in an area to the north of Myrniong.	Section 7.4, Section 8.4 and Section 9
Private helipad (i.e., ALA) at Rowsley.	Section 7.4, Section 8.4 and Section 9
Agricultural air strip (i.e. ALA) at Glenlofty	Section 7.4, Section 8.4 and Section 9

 Table 5-6: Community feedback for Aviation Impact Assessment



5.8 Assumptions, limitations and uncertainties

The following assumptions, limitations and uncertainties apply to this impact assessment:

- Consideration of planning schemes, planning scheme amendments and development applications has been undertaken using publicly accessible sources of information and information provided by Councils and the Department of Transport and Planning.
- Consideration of current aviation legislation, regulation and publicly available documentation and information through the AIP, Advisory Circulars and information provided by aerodrome operators has been undertaken at the time of preparing this report. The AIP is amended regularly on an AIRAC cycle of three months or six months for charts and Designated Airspace Handbook.
- The report has been written at a point in time and is based on information provided by AusNet on the Project (Project components and location of components) and information on current and future land use and planning matters available through public sources and in consultation with key stakeholders of the EES process. Much of the information and data used within this report is dynamic and is constantly evolving, including planning schemes. The information is presumed as accurate at the time of writing.
- For the assessment, the towers were considered at a height of 85m, except for locations where single circuit towers are proposed. This is a conservative assumption, as proposed tower designs do not exceed a height of 80m.



5.9 Independent review

An independent review of this assessment has been completed by Peter White of Aviation Projects. The independent reviewer's scope included an assessment of this report's methodology and assumptions, the impact assessment's findings, the suitability of any EPRs, and if the report adequately addresses if the Project can meet the relevant evaluation objective in the EES scoping requirements. Any matters in this assessment which they disagreed with are also considered for inclusion in this report.

6. EXISTING CONDITIONS

6.1 Overview

Aspects of the receiving environment as relevant to aviation values are described in this Section. Details are provided regarding Certified Aerodromes, Uncertified Aerodromes, air navigation and air traffic management services, transiting air routes and authorised low flying activities (including aerial agricultural applications, aerial firefighting, medical and emergency flights, flight training, sports aviation, private flights and tourism, military activities, and other aviation activities) within the spatial extents of the study area (determined in Section 5.2).

6.2 Certified Aerodromes

Using the information sources outlined in *Table 5-2* the following Certified Aerodromes were identified within the Project study area:

- Stawell (YSWL) Certified Aerodrome
- Ararat (YARA) Certified Aerodrome
- Ballarat (YBLT) Certified Aerodrome
- Melbourne Airport (YMML).

The following sub-sections 6.2.1 to 6.2.4 describe the existing conditions as relevant to the impact assessment for these four sites.

6.2.1 Stawell (YSWL) – Certified Aerodrome

Key details for the Stawell (YSWL) Certified Aerodrome are provided below in *Table 6-1*. The location of the site is displayed below in *Figure 6-1*.

Aspect	Details
Operator	Northern Grampians Shire Council
ARP	370418.00S 1424425.00E
Aerodrome elevation (m AHD)	807ft (246m) AHD

Table 6-1: Existing conditions - Stawell (YSWL) Certified Aerodrome



Aspect	Details
Features	Pilot Activated Lighting on Runway 11/29 (NW/SE) and published Instrument Approach Procedures for both these runways. It has a second, short, unlit runway 18/36 (N/S).
Key operations	Home to AGA Services who provide aerial agricultural, aerial firefighting, charter and aircraft maintenance services. Department of Energy, Environment and Climate Action (DEECA) has an Airbase on the aerodrome for co-ordination of aerial firefighting in the Grampians and surrounding area. The aerodrome is capable of handling SAAB SF340 36 seat Regional Airliners.
OLS	The OLS extends to 15,000m from the ends of Runway RWY 11/29 and 2500m from the ends of Runway RWY 18/36
Instrument Approach Procedures	Two published Instrument Approach Procedures (IAPs) – RNP RWY29 and RNP RWY11 enable aircraft operating to the Instrument Flight Rules to land during periods of inclement weather and at night. The RNP RWY29 approach path passes over the Bulgana Wind Farm.
Current restrictions	Aircraft operations into Stawell from the northeast to the east southeast, must avoid the Bulgana Wind Farm (maximum tip height 2134ft AHD) and the existing 220kV transmission line. The existing 220kV transmission line is shown on current aeronautical charts.
Location in relation to the Project	The existing Bulgana Terminal Station component of the Project is located approximately 22km (11.88nm) east northeast of the Stawell ARP.

Key aviation features at and around YSWL are displayed in Figure 6-1.



Figure 6-1: Stawell Certified Aerodrome (YSWL) (Source: Chiron, 2024)



6.2.2 Ararat (YARA) – Certified Aerodrome

Key details for the Ararat (YARA) Certified Aerodrome are provided below in *Table 6-2*. The location of the site is displayed below in *Figure 6-2*, and includes the key aviation features at and around YARA.

Table 6-2: Existing cond	itions - Ararat (YAR	A) Certified Aerodrome

Aspect	Details
Operator	Ararat Rural City Council
ARP	371834.00S 1425919.00E
Aerodrome elevation (m AHD)	1008ft (307.2m) AHD
Features	One lit runway RWY 12/30 equipped for night operation, with a shorter unlit runway RWY 04/22 $% \left(\frac{1}{2}\right) =0.00000000000000000000000000000000000$
Key operations	Often used for recreational glider operations and privately owned light aircraft. It can also be used by Air Ambulance aircraft.
OLS	The OLS extends to 5,000m from the ends of Runway RWY 12/30 and 5000m from the ends of Runway RWY 04/22
Instrument Approach Procedures	None
Current restrictions	ERSA contains the following additional information "gliding, daylight hours, winch and wire launch" and that "RWY 04/22 closed during winch launching".
Location in relation to the Project	Proposed Route is approximately 25.8km from the Ararat ARP





Figure 6-2: Ararat Certified Aerodrome (YSLW) (Chiron, 2024)

6.2.3 Ballarat (YBLT) – Certified Aerodrome

Key details for the Ballarat (YBLT) Certified Aerodrome are provided below in *Table 6-3*. The location of the site is displayed below in *Figure 6-3*, and includes the OLS and PANS-OPS 10nm Minimum Safe Altitude.

Aspect	Details
Operator	City of Ballarat
ARP	373042S 1434728E
Aerodrome elevation (m AHD)	1433ft (437m) AHD
Features	Three runways. Runways RWY 18/36 and RWY 05/23 are sealed and runway RWY 13/31 is unrated grass. Runway RWY 18/36 is equipped for night operations and has published Instrument Approach Procedures.
Key operations	Home for Field Air and County Helicopters (Major aerial agricultural and firefighting contractors); flight training and advanced instrument flight training; aircraft maintenance facilities; and charter flights.
OLS and other requirements	OLS in-place for all three runways. At its furthest point it extends to 15,000m (8.1nm) from the end of RWY 36 toward the Project. Ballarat also has two published Departure and Approach Procedures, RNP RWY18 and RNP RWY36

Table 6-3: Existing conditions - Ballarat (YBLT) Certified Aerodrome



Aspect	Details
	with associated Procedures for Air Navigation Services-Aircraft Operations protected airspace which extends over the Project.
Instrument Approach Procedures	The associated Procedures for Air Navigation Services – Aircraft Operations 10nm Minimum Safe Altitude is 3700ft (1127m) and the 25nm Minimum Safe Altitude is 4000ft (1219m) over the Project Area. The RNP RWY18 Segment Minimum Safe Altitude over the Project is 2800ft (854m).
Current restrictions	No aircraft above 5,700kg maximum take-off weight (MTOW) require prior permission.
Location in relation to the Project	Proposed Route is approximately 18km north of the Ballarat ARP.



Figure 6-3: Ballarat Certified Aerodrome (YBLT) (Source: Chiron, 2024)

Figure 6-4 below shows that the Project passes under the runway 18 instrument approach path between 9.8 and 10.4nm from the threshold. The grey shaded areas show the segment minimum safe altitude in that part of the approach path. The red line shows the width and location of the Proposed Route in relation to the instrument approach path.





Figure 6-4: Segment of the Ballarat RWY 18 Instrument Approach Plate (Source: AIP, 2022)

This PANS-OPS airspace limits the height and location of transmission towers or other infrastructure in the vicinity of the aerodrome.

6.2.4 Melbourne Airport (YMML) – Certified Aerodrome

Key details for the Melbourne Airport (YMML) are provided below in *Table 6-4*. The location of the Project including the connection into the existing Sydenham Terminal Station relative to the Melbourne Airport Obstacle Limitation Surface is displayed in *Figure 6-5*.

Aspect	Details
Operator	Australian Pacific Airports (Melbourne) Pty Ltd
ARP	374024S, 1445036E
Aerodrome elevation (m AHD)	132.3m AHD
Features	Major International Airport with no curfew.
Key operations	Major International Airport with 24-hour operations.
OLS and other requirements	OLS in-place for the two existing runways. OLS is defined for the planned parallel north/south and parallel east/west runways.
	The Melbourne Airport Environs Overlay (MAEO) in the Melton Planning Scheme applies to part of the Project Area. This planning overlay is primarily concerned with aircraft noise and the control of building uses. Maps of the Melton Planning Scheme MAEO are available at the Victorian Planning Schemes website.
	Melbourne is a Controlled Airport with associated Controlled Airspace, whereby aircraft movements must comply with the terms of an Airways Clearance and Air Traffic Control instructions.
Instrument Approach Procedures	Multiple instrument approach procedures as defined in AIP.
Current restrictions	None

Table 6-4: Existing conditions – Melbourne Airport (YMML)



Aspect	Details
Location in relation to the Project	The Project connection to the existing Sydenham Terminal Station is approximately 8.4km (4.5nm) from the Melbourne Airport ARP and is within the protected airspace for the four runways gazetted at Melbourne Airport.



Figure 6-5: YMML OLS future four runways airspace and Sydenham Terminal Station (Source: Chiron, 2025)

6.3 Uncertified Aerodrome

Using the approaches outlined in *Table 5-2* the following verified and unverified Uncertified Aerodrome (including helicopter landing areas and ALAs) were identified within the Project study area:

- Glenlofty ALA (unverified)
- Beaufort (YBFT) Uncertified Aerodrome
- Ballarat Hospital Helipad
- Myrniong ALA (unverified)
- Rowsley/Brooks Landing (YBSL) Uncertified Aerodrome
- Greystones ALA (unverified)
- Bacchus Marsh (YBSS) Uncertified Aerodrome

- Bacchus Health Helipad
- Melton (YMEL) Uncertified Aerodrome.

Key details for each of these locations are provided in sub-sections 6.3.1 to 6.3.10.

6.3.1 Glenlofty ALA – Uncertified Aerodrome

AusNet was informed by the landowner of an existing airstrip in the Glenlofty area, south of the Proposed Route. Key details for the Glenlofty ALA are provided below in *Table 6-5*. The location of the site is displayed below in *Figure 6-6*.

Tahle	6-5	Existina	conditions -	Glenloft	ΙΔ
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Aspect	Details
Operator / landowner	Private
Approximate location	370844.87S 1431209.69E
Aerodrome elevation (m AHD)	Not known
Features	700m long unrated runway. From aerial imagery it appears, at present, to be cultivated land and unsuitable for aircraft operations.
Status	Unverified. The airstrip is not identified on the World Aeronautical Chart or the Melbourne Visual Navigation Chart. There is no indication on the aerial imagery of an area suitable for aircraft use or recently used by aircraft. Such airstrips are not permanent and are only mowed and cleared when required.
Key operations	Owner advised that it is occasionally used for aerial agricultural applications
Current restrictions	The existing 220kV transmission line is located between the ALA and the Proposed Route.
Location in relation to the Project	Approximately 350m south of the Proposed Route.





Figure 6-6: Glenlofty ALA (Source: Chiron, 2024)

6.3.2 Beaufort (YBFT) – Uncertified Aerodrome

Key details for the Beaufort (YBFT) Uncertified Aerodrome are provided below in *Table 6-6*. The location of the site is displayed below in *Figure 6-7*.

Aspect	Details
Operator / landowner	Private
Approximate location	372940S 1434728E
Aerodrome elevation (m AHD)	396m AHD
Features	Single northwest/southeast runway RWY11/29
Status	Verified. Listed in the AIP.
Key operations	Private use
Current restrictions	Operations at Beaufort are shielded from the Project by the Stockyard Hills and Waubra wind farms located 2,500m and approximately 20km north of the aerodrome respectively. An existing 220kV transmission line also provides constraints.
Location in relation to the Project	Approximately 22km to the southwest of the Proposed Route.

Table 6-6: Existing conditions - Beaufort (YBFT) Uncertified Aerodrome





Figure 6-7: Beaufort ALA (Source: Chiron, 2024)

6.3.3 Ballarat Hospital Helipad (YXBT)

Key details for the Ballarat Hospital Helipad are provided below in Table 6-7.

Aspect	Details
Operator / landowner	Ballarat Health Services (operator)
Approximate location	373332.86S 1435044.42E on the roof of the carpark behind Ballarat Hospital
Aerodrome elevation (m AHD)	Approximately 500m AHD
Features	Single helipad
Status	Helicopter landing surface (HLS)
Key operations	Used by Helicopter Emergency Medical Service (HEMS)
Current restrictions	Available to HEMS only
Location in relation to the Project	17.4km southwest of the Proposed Route

6.3.4 Myrniong ALA – Uncertified Aerodrome

-From consultation undertaken as part of the Project (see Section 5.7), an ALA was identified at



Myrniong. Key details for the Myrniong ALA are provided below in *Table 6-8*. The approximate location of Myrniong ALA is displayed below in *Figure 6-8*.

Table 6-8: Existing conditions – Myrniong ALA

Aspect	Details
Operator / landowner	Private
Approximate location	373730.4S 1442030.01E
Aerodrome elevation (m AHD)	Approximately 400m AHD
Features	500m long runway with an unrated surface orientated 15/33 (i.e., southeast/northwest). There is a taxiway leading to a hangar.
Status	Unverified. There are no details of the runway shown in the AIP.
Key operations	Expected to be used for sport aviation
Current restrictions	Unknown
Location in relation to the Project	Approximately 3.4km southwest of the Proposed Route



Figure 6-8: Myrniong ALA (Source: Chiron, 2024)

6.3.5 Rowsley/Brooks Landing (YBSL) – Uncertified Aerodrome

Key details of the Rowsley/Brooks Landing (YBSL) Uncertified Aerodrome are provided below in



Table 6-9. The location of the site is displayed below in Figure 6-9.

Table 6-9: Existing conditions – Rowsley/Brooks Landing (YBSL) Uncertified Aerodrome

Aspect	Details
Operator / landowner	Brooks Landing, 1096 Glenmore Road, Rowsley Valley, Vic 3340
Approximate location	374229S 1442034E
Aerodrome elevation (m AHD)	600m AHD
Features	Single runway 08/26
Status	Verified, Uncertified Aerodrome.
Key operations	Private airstrip
Current restrictions	Unknown
Location in relation to the Project	Approximately 10.3km south southwest of the Proposed Route



Figure 6-9: Rowsley/Brooks Landing (YBSL) ALA (Source: Chiron, 2024)

6.3.6 Rowsley Helipad (YRWS)

Key details for the Rowsley Helipad (YRWS) are listed below in *Table 6-10*. The location of the site is displayed above in *Figure 6-9*.



Aspect	Details
Operator / landowner	Private
Approximate location	374240S 1442239E
Aerodrome elevation (m AHD)	225m AHD
Features	Single helipad
Status	Verified. YRWS is listed in the Designated Airspace Handbook section of the AIP, but not in EnRoute Supplement Australia.
Key operations	Private
Current restrictions	Unknown
Location in relation to the Project	Approximately 9.5km south of the Proposed Route

Table 6-10: Existing conditions – Rowsley Helipad

6.3.7 Greystones ALA – Uncertified Aerodrome

Key details for the Greystones ALA are provided in *Table 6-11*. The location of the site is displayed below in *Figure 6-10*.

Aspect	Details
Operator / landowner	Private
Approximate location	374448.43S 1442141.52E
Aerodrome elevation (m AHD)	Approximately 200m AHD
Features	800m unrated natural surface runway oriented 08/26
Status	Unverified farm airstrip
Key operations	Aerial agricultural applications
Current restrictions	Unknown
Location in relation to the Project	Approximately 13.2km south of the Proposed Route





Figure 6-10: Greystones ALA (Source: Chiron, 2024)

6.3.8 Bacchus Marsh (YBSS) – Uncertified Aerodrome

Key details for Bacchus Marsh (YBSS) Uncertified Aerodrome are provided in *Table 6-12*. The location of the site is displayed below in *Figure 6-11*.

Aspect	Details
Operator / landowner	Operated by Bacchus Marsh Aerodrome Management Incorporated under a long- term lease from Moorabool Shire Council.
Approximate location	374400S 1442520E
Aerodrome elevation (m AHD)	159m AHD
Features	Two runways, Runway 01/19 at 950m and Runway 09/27 at 900m, both with unrated sealed surfaces.
Status	Verified; listed in EnRoute Supplement Australia and is depicted on the Visual Terminal Chart Melbourne (although beyond Melbourne Airport OLS).
Key operations	General aviation facility hosting commercial flying training, aircraft maintenance operations, private flying and hangarage of light aircraft. YBSS is home to an active Flying Training School and three active Gliding Clubs (Melbourne Gliding Club, Geelong Gliding Club and Beaufort Gliding Club).

Table 6-12: Existing conditions – Bacchus Marsh (YBSS) Uncertified Aerodrome



Aspect	Details
Current restrictions	ERSA lists several required flight procedures including the use of Runways 19 or 27 whenever practical. This is a noise abatement measure to keep aircraft away from populated areas to the north and east.
	There are displaced thresholds and additional flight procedures in place when gliding is active. As noted in the ERSA entry, gliders and tow aircraft normally operate inside and below the standard 1000ft circuit.
Location in relation to the Project	Approximately 10.8km south of the Proposed Route.



Figure 6-11. Bacchus Marsh ALA (YBSS) (Source: Chiron, 2024)

6.3.9 Bacchus Health Helipad

Key details for the Bacchus Health Helipad are listed below in *Table 6-13*. The location of the site is displayed above in *Figure 6-11*.

Aspect	Details
Operator / landowner	Western Health
Approximate location	374042S 1442604E at Bacchus Marsh and Melton Regional Hospital
Aerodrome elevation (m AHD)	108m AHD
Features	Single helipad
Status	Unverified. Is not listed in the AIP.

Table 6-13: Existing conditions – Bacchus Health Helipad



Aspect	Details	
Key operations	Used by Helicopter Emergency Medical Service (HEMS)	
Current restrictions	Available to HEMS only	
Location in relation to the Project	Approximately 5.3km south of the Proposed Route	

6.3.10 Melton (YMEL) – Uncertified Aerodrome

Key details for the Melton (YMEL) Uncertified Aerodrome are provided below in *Table 6-14*. The location of the site, including its runways are displayed below in *Figure 6-12*.

Table 6-14: Existing conditions – Melton (YMEL) Uncertified Aerodrome

Aspect	Details	
Operator / landowner	The operator is listed as E Reeve, 995 Coburn Road, Melton	
Approximate location	373718S 1443356E	
Aerodrome elevation (m AHD)	D4m AHD	
Features	Melton has four unrated grass runways: RWY16/34, RWY10/28, RWY04/22 and RWY14/32. Each runway at Melton Uncertified aerodrome is displayed below in <i>Figure 6-12</i> with further relevant details listed in the following bullet points. Additional detail is noted for RWY14/32, noting its proximity and orientation in relation to the Project, as well as not having specific restrictions enforced by the ERSA to protect specific aircraft operations.	
	• RWY16/34: Approximately 650m long, orientated approximately north northwest / south southeast. The RWY 34 threshold is approximately 1000m north of the Proposed Route As listed in the ERSA 'restrictions' (explained further below), landings are only permitted on RWY34 (i.e., to the north northwest) with no take-off's in this direction permitted. Further, the ERSA restricts both take-off/landing on RWY16. Given these conditions, aircraft are only permitted to land from the south on this runway.	
	These restrictions limit the aircraft type, size and weight that can use RWY34. The use of RWY34 is also restricted by the wind conditions, in that aircraft need to land into the wind (that is with a headwind).	
	 RWY10/28: Approximately 1000m long, orientated northwest / southeast. As per the ERSA 'restrictions' only right-hand circuits are permitted when using RWY10. 	
	• RWY04/22: Approximately 1300m long, orientated northeast / southwest. RWY 04 threshold is approximately 900m north of the Proposed Route. The ERSA restricts to right hand circuits for RWY04. ERSA shows that RWY 04/22 has Low Intensity Runway Lighting (LIRL), available by prior arrangement.	
	• RWY14/32: Approximately 1200m long, orientated north northwest / south southeast, having a slope of 1% up to the north. RWY14/32 is the newest runway at YMEL, having been added to the ERSA on 7 September 2023. The runway is 30m wide, with a runway strip of approximately 60m.	



Aspect	Details	
	The YMEL RWY32 threshold is approximately 700m from the two-storey pavilion at MacPherson Park and the floodlight towers (approximately 30m tall) for the sports grounds. An aircraft taking off to the southeast will have to climb over the two-storey building and lighting towers at MacPherson Park.	
	As such, existing obstacles that constraint operations at RWY14/32 include this infrastructure at MacPherson Park, as well as high terrain beyond the northwestern end of the runway:	
	 A take-off on RWY32 (i.e., to the northwest) or landing on RW14 is towards rising terrain approximately 100m high. And within 1200m of the northern end of the runway (i.e., RWY14 threshold). 	
	 A landing on RWY32 or a take-off on RWY14 (i.e., to the southeast) is toward the infrastructure of MacPherson Park approximately 700m from the end of the runway (RWY32 threshold). Elevation of the MacPherson Park Infrastructure is approximately 188m and can therefore be considered an existing obstacle of 208m AHD up to 700m from the RWY32 threshold. 	
Status	Verified Uncertified Aerodrome. Being Uncertified, YMEL does not have an OLS or PANS-OPS.	
Key operations	Melton is home to Melton Airservices, a flying training school, charter, and aircraft maintenance organisation.	
Current restrictions	As noted above, the ERSA lists several restrictions on the use of the four runways. These include:	
	 All departing aircraft to commence take-off roll from runway end to maximise height over residential areas after take-off. 	
	 Arrivals - at least 3 legs of the circuit to be flown (downwind, base and final for arrival and upwind, crosswind and downwind for departure). 	
	Straight in approaches not permitted.	
	Right hand circuits on RWY04 and RWY10.	
	 Landings only RWY34 – i.e., to the northwest, (no take-off permitted). 	
	 Take-off/landing RWY16 not permitted – i.e., it cannot be used. 	
	All aircraft to avoid overflying Toolern Vale township.	
	The restrictions detailed above are listed in the Local Traffic Regulations and Flight Procedures sections of the ERSA for YMEL Uncertified aerodrome also require aircraft to maximise height over residential areas after take-off.	
Location in relation to the Project	As described above in the 'features' Section. At its closest point it is approximately 520m from the Proposed Route.	





Figure 6-12: YMEL Uncertified Aerodrome and surrounding tall structures (lighting towers in red and pavilions in yellow at MacPherson Park) (Source: Chiron, 2024)

6.4 Air navigation and air traffic management services

Using the methods and data sources described in *Table 5-2* the following Air Navigation and Air Traffic Management Communications, Navigation and Surveillance services facilities were identified across the study area:

Service type	Facilities	
Communications	Air Traffic Control communications facilities are located at:	
	 Mount William, 44km southwest of the Proposed Route with an elevation of 1141m AHD 	
	 Mount Macedon, 28.5km north of the Proposed Route with an elevation of 883m AHD 	
	 Melbourne Airport, 7.6km east of the Proposed Route with an elevation of 130m AHD 	
Navigation	Aviation ground-based navigation equipment (navaids) is located at Melbourne Airport. These include Instrument Landing Systems (ILS), VHF Omni Range (VOR), Distance Measuring Equipment (DME) and Ground Based Augmentation Systems (GBAS). There are no other navaids in the study area.	

Table 6-15: Existing conditions - Air navigation and air traffic management services



Service type	Facilities	
Surveillance	This commonly refers to both primary and secondary radar systems and also includes ground based Automatic Dependent Surveillance – Broadcast (ADS-B) receivers. Radar is located at Mount Macedon and Gellibrand Hill with ADS-B at Melbourne Airport and Mount William.	

6.5 Transiting air routes

From a review of the AIP the following transiting air routes were identified as crossing the spatial extents of the study area:

Table 6-16: Existing conditions – transiting air routes

Air Route	Lowest safe altitude (LSALT) ft (m) AHD
V223	4,800ft (1,500m) AHD
H345	4,800ft (1,500m) AHD
W657	4,000ft (1,200m) AHD

6.6 Authorised low flying activity

6.6.1 Overview

Authorised low flying is conducted by suitably trained and endorsed pilots who are aware of the hazards of such activity and plan their flights accordingly. In general, authorised low flying occurs below 500ft (152m) above ground level, often down to 10 ft (3m) or less for aerial application (e.g. agricultural spraying) operations.

Authorised low flying activity is permitted in the study area. The study area is in 'Class G uncontrolled' airspace except for the section within 8nm (14km) of Melbourne Airport ARP which is in 'Class C controlled' airspace. Within Class G airspace an aircraft may operate anywhere at any time as permitted by the CASR, therefore the occurrence of such flying is neither monitored nor recorded. The Pilot in Command is responsible for ensuring the safety of the flight. This includes avoiding obstacles.

Given the ad-hoc nature of authorised low flying in Class G Uncontrolled Airspace, it is not possible to provide precise details concerning this activity within the study area. Noting this, an account of existing authorised low flying activities across the study area is provided by activity type in the following sub-sections below.

6.6.2 Aerial agricultural applications

Aerial agricultural applications flying is authorised low flying activity.

Within the study area, potato growing and other high intensity crops in the potato growing areas are the only agricultural enterprises known to use aircraft as part of their farming systems. Further detail on these agricultural enterprises is provided in the Agriculture and Forestry Impact Assessment.



Aerial applications are undertaken using both fixed and rotary wind aircraft. Discussion with the major fixed and rotary wing aerial agricultural applications organisations in Ballarat and Stawell, as part of this assessment, confirmed that the use of fixed wing aircraft is limited by the size of the areas being treated and the need to avoid overspray onto neighbouring areas. Whilst rotary wing aircraft have a manoeuvrability advantage, their load carrying capacity, flight speed and operating costs temper this advantage.

Aerial agricultural applications are known to occur from Stawell (YSWL) and Ballarat (YBLT). Otherwise, they can take place from any suitable aerodrome.

6.6.3 Aerial firefighting

Aerial firefighting is authorised low flying activity.

Aerial firefighting is used when it is available and considered to be effective. As detailed in the Bushfire Impact Assessment, aircraft can assist in reducing the intensity and slowing the spread of a fire, allowing ground crews to properly extinguish the flames or create an earthen fuel break. Aerial firefighting flying is conducted at low level using specialist aircraft flown by appropriately rated pilots in accordance with the visual flight rules. The pilot is required to maintain visibility with the ground and remain clear of smoke so that they can accurately and safely drop the fire retardant.

Discussions with the CFA, FFM and Aerial Agricultural operators at Stawell and Ballarat confirmed that the various aerial firefighting assets used within the study area are normally fixed wing Single Engine Air Tankers and medium to large helicopter tankers. Occasionally, dependant on availability and fire size a Large Air Tanker, such as the C130 Hercules, Dash 8 Q400AT or RJ80 is used. Aerial firefighting assets are contracted by the Victorian and Commonwealth Governments. The number and type available for each fire season is dependent on projected fire severity and the availability of suitable aircraft. These specialist assets, including locally owned, operate worldwide which may impact on availability, particularly for the large air tankers and heavy helicopters.

Fixed wing aircraft typically do not attack fires at night. Some helicopters, fitted with night vision imaging systems and flown by suitably endorsed pilots, are authorised to do so in some instances.

Fixed and rotary wing fire response aircraft are based at several aerodromes in proximity to the Project Area, including Stawell (YSWL), Ballarat (YBLT), and Avalon Airport. Fixed-wing aircraft utilise any suitable aerodrome, such as Ararat (YARA), Ballarat (YBLT) and Bacchus Marsh (YBSS) to refill with retardant, while rotary wing aircraft can refill from field sources, including farm dams, domestic swimming pools, and water supply reservoirs, provided they can be accessed safely. In accessing water sources, the Pilot in Command will have ensured that the water source is suitable and the area around it is suitable for the aircraft operation.

The Air Tractor AT-802F Fire Boss is an amphibious version of the AT-802F (Single Engine Air Tanker) that is fitted with floats and is capable of scooping water whilst moving on the surface of a suitable water reservoir. There are two of these aircraft known to be operated by an organisation based at Ballarat aerodrome. To do this the aircraft requires a stretch of water approximately 1500m in length and 200m wide, with a safe access and egress path. Around the study area, Pyke's Creek Reservoir and Merrimu Reservoir are the only such water bodies that may be suitable.

Large Aerial Tankers such as the BAe146/RJ80 aircraft with a MTOW of 44,225kg can use Stawell and Ballarat aerodromes for a limited time before causing runway damage. The NSW Rural Fire



Service B737 (MTOW 70,000kg) is limited to operating from Avalon, Melbourne (Tullamarine), Mildura and East Sale RAAF Base Aerodromes.

In addition to the "firebombing" aircraft other aircraft are used for fire scanning, aerial spotting and guiding the attack aircraft to the required drop locations. These additional aircraft range in size from single and twin-engine light aircraft (Cessna 182, Cessna 337 Partenavia PN68) to larger turboprop aircraft (Aero Commander 690 and Super Kingair B200) fitted with infrared fire scanning equipment. The Large Air Tankers use twin turboprop (AC690, B200) or small jet aircraft (Cessna Citation C525 or C550) as birddog lead in aircraft. These larger aircraft will, where possible, use sealed runways available at the suitable Certified Aerodromes.

6.6.4 Flying training

As noted in Section 3.3.4, flight training includes:

- Single engine light aircraft flown in accordance with visual flight rules
- Light twin engine aircraft flown as per instrument flight rules
- Larger twin turboprop aircraft as per instrument flight rules.

Flying training schools within the study area were identified at Ballarat (YBLT), Bacchus Marsh (YBSS) and Melton (YMEL).

6.6.5 Medical and emergency flights

HEMS flights will originate from Essendon, Warrnambool or Bendigo. Fixed wing air ambulance flights will originate from Essendon. Police Airwing are also based at Essendon. Any other emergency flights (e.g., search and rescue) will originate wherever suitable aircraft are available. These flights will land or operate wherever required within safe proximity to the Project, as determined by the Pilot in Command.

6.6.6 Sport aviation

Sport aviation usually occurs within Class G Uncontrolled Airspace.

Sport aviation includes, gliding, parachuting, and aerobatics flying, all of which occurs in visual meteorological conditions where the activity is clear of cloud and the pilot has at least 5000m forward visibility. Regarding gliding, there are clubs at Ararat (YARA) Certified Aerodrome and Bacchus Marsh (YBSS) Uncertified Aerodrome. The gliders are usually towed into the sky by a single engine light aircraft (usually a small aerial applications aircraft) at both aerodromes. From a review of aeronautical charts, a hang-gliding area at on the hills east of Ararat was also identified. With respect to parachuting and other sporting aviation, no specific locations are shown in AIP, although they could take place at suitable locations.

6.6.7 Private flights and tourism

As described in Section 3.3.4 these types of flights encompass light aircraft flying for private, aerial work and charter operations. Tourism flying is in this category as a charter operation. Aircraft in this



category are mostly single engine aircraft being flown in accordance with the Visual Flight Rules. Some charter operations may by flown in accordance with the Instrument Flight Rules.

Tourism flying is not usually endorsed for low flying. This activity is considered to be Charter Flying, to which additional requirements apply.

Given that the Project is predominantly within Class G airspace where aircraft may operate wherever and whenever they like, relevant data on the exact locations and numbers of such activity across the study area is not known and is unpredictable.

6.6.8 Military aircraft

The RAAF Base Point Cook is located approximately 27km south of the eastern end of the Proposed Route. RAAF Base East Sale is approximately 190km east of Melbourne. Noting these two bases, as well as other military airfields throughout Australia, there is a possibility of military aircraft, both fixed and rotary wing, operating at low level in the study area.

6.6.9 Other aviation activity

Other aviation activity includes such things as model aircraft and unmanned aerial vehicles (drones). CASRs govern these activities, and they generally occur within Class G airspace by day. Again, relevant data on the exact locations and numbers of such activity across the study area is not known and is unpredictable. A model aircraft site is located approximately 3.5km east of Sydenham Terminal Station.

6.7 Existing Sydenham Terminal Station

The existing Sydenham Terminal Station will be upgraded prior to the construction of the Project. Construction of associated tower infrastructure and ancillary works required to connect into the terminal station forms part of the Project.

Figure 6-5 shows the existing Sydenham Terminal Station is overlayed by the Melbourne Airport OLS, and the PANS-OPS protected airspace associated with the Instrument Arrival and Departure Procedures for RWY 09 (landing to the east) and RWY 27 (departures to the west). As displayed, the existing Sydenham Terminal Station is within Protected Airspace for the four runways gazetted at Melbourne Airport.

Noting this, the construction of towers to connect into the upgraded Terminal Station (and existing Sydenham Terminal Station infrastructure features, is considered below in **Section 10**) presents limitations to any proposed tall structures at this location associated with the Project which are the subject of this assessment.


7. CONSTRUCTION IMPACT ASSESSMENT

7.1 Overview

This section assesses the potential impacts of the Project to identified aviation values within the study area (as determined in Section 6) during construction using the methods detailed in Section 5. Initial unmitigated potential impacts were determined in-line with the definitions established in *Table 5-4*. Based on these initial risks, mitigation and management measures were developed, with residual impacts subsequently determined based on the application of the recommended measures.

7.2 Identified Project hazards during construction

The key aviation hazards from the Project during construction include:

- **Pre-construction aerial survey of the transmission line route:** Prior to construction, helicopter and other aircraft may be used to survey the Proposed Route.
- Use of cranes and/or helicopters for any associated activities required to facilitate tower building during the construction stage: Tall cranes and helicopters will be required for the erection of the towers. Each tower will take approximately 4 to 7 weeks to construct.
- Use of helicopters and other equipment for conductor and earth wire stringing during construction: The stringing of the transmission conductors between the towers will be completed using helicopters and/or other ground-based equipment.

Potential impacts to aviation values across the study area for each of these hazards is assessed below.

7.3 Construction impact assessment, Certified Aerodromes

7.3.1 Initial unmitigated impacts

Initial unmitigated impacts from aviation hazards associated with the Project during construction determined at surrounding Certified Aerodromes are detailed below in *Table 7-1*.

Pi co ha	roject onstruction azards	Certified Aerodrome	Review of whether activities would impact on associated protected airspace	Unmitigated impact rating
•	Pre- construction aerial survey	Stawell (YSWL)	No . The Project is approximately 8km beyond the OLS and below the PANS-OPS protected airspace.	No impact
•	Use of cranes and/or helicopters for	Ararat (YARA)	No. The Project is approximately 15km beyond the OLS protected airspace.	No impact
		Ballarat (YBLT)	No . Project is around 2km beyond the OLS protected airspace.	No impact provided activities

Table 7-1: Unmitigated impacts during construction at surrounding Certified Aerodromes



tower construction • Use of helicopters and other equipment for conductor and earth wire stringing		It is within the spatial extents of the published instrument approach path for RWY18, and steps will need to be taken to ensure that all construction activities remain below the documented level or are otherwise appropriately managed through liaison with the aerodrome operator.	remain below the published appropriate Segment Minimum Safe Altitude of the RWY 18 instrument approach path (refer to <i>Figure</i> <i>6-4</i>) as is expected.
	Melbourne Airport (YMML)	Yes . Construction activities associated with the towers from Sydenham Terminal Station west to Tower F3002DL are within YMML Controlled Airspace. Though Project infrastructure is below the OLS, plant and equipment, including helicopters used during construction may be required at levels above the OLS. Co-ordination is required with air traffic within the YMML Controlled Airspace to avoid potential impacts during these activities. Liaison with the Melbourne Air Traffic Control Tower is required to ensure these activities can be conducted safely.	Minor impact

7.3.2 Mitigation and management measures

As *Table 7-1* shows, no impacts to operations as a result of construction activities associated with the Project are expected at Stawell (YSWL), Ararat (YARA) or Ballarat (YBLT) Certified Aerodrome. Minor potential impacts, if left unmitigated were determined for operations at Melbourne Airport (YMML). To address these risks, the following mitigation and management measures are required:

General requirements:

- Project must notify the aviation industry via the AIP. This is achieved through notification of the Project details to Airservices Australia, in accordance with Advisory Circular AC139.E-01 v1.0 Reporting of Tall Structures.
- o Notification to Airservices Australia Vertical Obstacles Database.
- Additional notification to the aviation industry via a NOTAM (Notice to Airmen) or AIP Supplement to advise planned activities and potential hazards.
- These notifications are included as an EPR (AV1) below in Section 11.

• Ballarat (YBLT) construction requirements:

 Prior to commencement, advise Aerodrome Operator of all planned activities within the instrument approach path for RWY 18 including timings, nature of activities, times of day, maximum expected heights and locations. This should be completed in addition to the general notification via the AIP. Authorisation from the Aerodrome Operator is required if works are required within the protected airspace before they can proceed.



 Notifications to the Aerodrome Operator of construction activities will be achieved through the Community and Stakeholder Engagement Plan proposed for the construction stage (EPR EM4). The plan will specify direct consultation with key stakeholders, including aviation stakeholders. In-line with this requirement, AusNet will engage with aerodrome operators, regarding the timing and duration of construction works to minimise the extent and duration of impacts to aircraft operations.

• Melbourne Airport (YMML) construction requirements:

- Prior to commencement of activities that could present a hazard within protected airspace around YMML, including the Control Zone, consult and liaise with Melbourne Airport Tower Air Traffic Control and the Aerodrome Operator, so that arrangements to avoid potential impacts can be determined and implemented.
- Notifications and consultations to Melbourne Airport Air Traffic Control Tower and the Aerodrome Operator of construction activities will be achieved through the Communications and Stakeholder Engagement Management Plan proposed for the construction stage (EPR EM5). The plan will specify direct consultation with key stakeholders, including aviation stakeholders. In-line with this requirement, AusNet will engage with aerodrome operators, regarding the timing and duration of construction works to minimise the extent and duration of impacts to aircraft operations.

7.3.3 Residual impacts

With the implementation of the mitigation and management measures above, no residual impacts to aviation values around Stawell (YSWL), Ararat (YARA), Ballarat (YBLT) and Melbourne Airport (YMML) Certified Aerodrome during construction are expected.

7.4 Construction impact assessment, Uncertified Aerodromes

7.4.1 Initial unmitigated impacts

Initial unmitigated impacts from Project construction activities determined at surrounding Uncertified Aerodrome are detailed below in *Table 7-2*.

Pi co ha	roject onstruction azards	Uncertified Aerodrome	Review of whether activities could result in impacts	Unmitigated impact rating
•	Pre- construction aerial survey Use of cranes and/or belicopters for	Glenlofty ALA	No . Glenlofty ALA is already restricted by the existing adjacent 220kV transmission line around 150m to the northeast. Noting this, it is not anticipated that the Project would introduce additional operational restrictions during construction.	No impact
	tower Beaufort (YBFT) construction	No. Noting the distance of Project construction activities from Beaufort (YBFT) (approximately 22km), it is not anticipated that	No impact	

Table 7-2: Unmitigated impacts during construction at surrounding Uncertified Aerodrome



Project construction hazards	Uncertified Aerodrome	Review of whether activities could result in impacts	Unmitigated impact rating
Use of helicopters and		the Project would introduce additional operational restrictions.	
other equipment for conductor and earth wire stringing	Ballarat Hospital Helipad (YXBT)	No. Noting the distance of Project construction activities from Ballarat Hospital Helipad (approximately 17km) and its use, it is not anticipated that the Project would introduce additional operational restrictions.	No impact
	Myrniong ALA	No. Noting the distance of Project construction activities from Myrniong ALA (around 3km) and runway direction (i.e., being approximately parallel), it is not anticipated that the Project would introduce additional operational restrictions.	No impact
	Rowsley/Brooks Landing (YBSL)	No. Noting the distance of Project construction activities from Rowsley/Brooks Landing (YBSL) (approximately 10km) and runway direction (i.e., being approximately parallel), it is not anticipated that the Project would introduce additional operational restrictions.	No impact
	Rowsley Helipad (YRWS)	No . Noting the distance of Project construction activities from Rowsley Helipad (YRWS) (around 10km) and its use, it is not anticipated that the Project would introduce additional operational restrictions.	No impact
	Greystones ALA	No. Noting the distance of Project construction activities from Greystones ALA (approximately 13km) and its uses, it is not anticipated that the Project would introduce additional operational restrictions.	No impact
	Bacchus Marsh (YBSS)	No . Noting the distance of Project construction activities from Bacchus Marsh (YBSS) (around 11km), it is not anticipated that the Project would introduce additional operational restrictions.	No impact
	Bacchus Health Helipad	No . Noting the distance of Project construction activities from Bacchus Health Helipad (around 5km) and its use, it is not anticipated that the Project would introduce additional operational restrictions.	No impact
	Melton (YMEL)	Yes. Although it is the responsibility of the Pilot in Command (as per CASR 91.430) for ensuring that the place intended to be used for a take-off or landing is suitable for the particular aircraft in the particular situation of that operation, activities during construction (such as the use of cranes and helicopters)	Moderate to Major depending on whether operations are only restricted (i.e., use of particular runway)



Project construction hazards	Uncertified Aerodrome	Review of whether activities could result in impacts	Unmitigated impact rating
		will add obstacles which become additional considerations for pilots using YMEL. The responsibility for avoiding obstacles rests with the Pilot in Command.	or stopped during construction.

7.4.2 Mitigation and management measures

As *Table 7-2* shows, no impacts to operations as a result of construction activities associated with the Project are expected at any Uncertified Aerodrome identified across the study area with the exception of Melton (YMEL). The following 'general requirements' are recommended for all Uncertified Aerodromes within the study area:

• General requirements:

- Completion of the AIP, Vertical Obstacles Database and NOTAM notification steps as outlined above in Section 7.3.2. (AV1)
- Additional prior notification regarding details of construction to all known Uncertified Aerodrome owners and operators within the study area. This will be achieved through the Community and Stakeholder Engagement Plan proposed for the construction stage (EPR EM4) which will specify direct consultation with key stakeholders, including aviation stakeholders. In-line with this requirement, AusNet will engage with aerodrome operators, regarding the timing and duration of construction works to minimise the extent and duration of impacts to aircraft operations.
- For YMEL, additional early consultation and co-ordination through construction (particularly during construction and stringing of adjacent towers) so that interruptions to operations can be minimised as far as practicable (also via EPR EM4).

7.4.3 Residual impacts

With the application of the mitigation and management measures above, no residual impacts during construction are expected at the following Uncertified Aerodrome:

- Glenlofty ALA (unverified)
- Beaufort (YBFT)
- Ballarat Hospital Helipad (YXBT)
- Myrniong ALA (unverified)
- Rowsley/Brooks Landing (YBSL)
- Rowsley Helipad (YRWS)
- Greystones ALA (unverified)
- Bacchus Marsh (YBSS)
- Bacchus Health Helipad.



At Melton (YMEL), even with the application of the recommended measures, residual impacts are still expected to be moderate. These moderate residual impacts would be temporary and are only expected during construction activities associated with the tower build within 4km of YMEL ARP. However, they would remain present over this period owing to the need for the pilot in command to make moderate (i.e., material but not unachievable) adjustments to flight plans when operating at and around YMEL. Otherwise, no residual impacts would be expected during the remaining construction activities.

7.5 Construction impact assessment, Air navigation and air traffic management services

During construction, no impacts to air navigation and air traffic management services identified in *Table 6-15* are expected.

National Airports Safeguarding Framework (NASF) Guideline G describes how CNS facilities have Building Restricted Areas (BRAs), which can extend up to 15km, to prevent development or other activities interfering with these facilities' operations. BRAs are designed to prevent obstructions that can interfere with line-of-sight, reflections, or electromagnetic interference, which could impact the operability of the CNS facility. Project construction activities (including use of tall equipment and helicopters) will occur outside the BRAs of all of the identified CNS facilities, except the ATC at Melbourne Airport. As such, no impacts are expected at these facilities during construction.

Regarding ATC at Melbourne Airport, no impact during construction is also expected, with the operator being made aware of the nearby construction activities (including helicopter use) through the notification made to the AIP via EPR AV1, and co-ordination with YMEL during the construction stage, as detailed in Section 7.3.2 and to be implemented through EPR EM5 (Communications and Stakeholder Engagement Management Plan).

7.6 Construction impact assessment, transiting air routes

7.6.1 Initial unmitigated impacts

As determined in *Table 6-16* the minimum LSALT for all of the transiting air routes that cross the spatial extents of the study area is 4,000ft (1,200m) AHD. This is safely above the highest level that could be expected from Project activities during construction (noting towers would be constructed to a nominal maximum height of 85m above ground level). Considering this, no impacts to transiting air routes are expected during construction.

7.6.2 Mitigation and management measures

Noting the outcome above, completion of the 'general construction requirements' above in Section 7.3.2 will be completed so that the industry, including operators, are aware of Project activities below transiting air routes across the study area.

7.6.3 Residual impacts

No residual impacts to transiting air routes from Project activities during construction are anticipated.



7.7 Construction impact assessment, authorised low flying activity

7.7.1 Initial unmitigated impacts

Initial unmitigated potential impacts to authorised low flying activities within the study area are detailed below:

Project construction hazards		Authorised low flying activity	Review of whether activities would impact authorised low flying activities	Unmitigated impact rating
 Pre- construction aerial survey Use of cranes and/or helicopters for tower construction Use of helicopters and other equipment for conductor and earth wire stringing 	Pre- construction aerial survey Use of cranes and/or helicopters	Aerial agricultural applications	Yes . The use of tall equipment and helicopters during construction could impact aerial agricultural applications along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact
	for tower construction Use of helicopters and other equipment for conductor and earth wire stringing	Aerial firefighting	Yes. The use of tall equipment and helicopters during construction could impact aerial firefighting along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact
		Medical and emergency flights	Yes . The use of tall equipment and helicopters during construction could impact Medical and emergency flights along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact
		Flight training	Yes . The use of tall equipment and helicopters during construction could impact Flight training along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact
		Sports aviation	Yes . The use of tall equipment and helicopters during construction could impact sports aviation along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact

Table 7-3: Unmitigated impacts during construction to nearby authorised low flying activities



Project construction hazards	Authorised low flying activity	Review of whether activities would impact authorised low flying activities	Unmitigated impact rating
	Private flights and tourism	Yes . The use of tall equipment and helicopters during construction could impact Private flights and tourism along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact
	Military activities Yes. The use of tall equipment and helicop during construction could impact Military activities along the Proposed Route throug introduction of additional obstacles, noting airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensurin separation from other aircraft and obstacles	Yes . The use of tall equipment and helicopters during construction could impact Military activities along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact
	Other aviation activity	Yes . The use of tall equipment and helicopters during construction could impact other aviation activity along the Proposed Route through the introduction of additional obstacles, noting most airspace is unrestricted 'Class G' where the Pilot in Command is responsible for ensuring separation from other aircraft and obstacles.	Minor impact

7.7.2 Mitigation and management measures

There are no reasonable and feasible alternative methods of construction and decommissioning available to those planned that would not require the use of cranes and helicopters for construction. The most effective measure to limit the potential for impacts to approved low flying in the study area during construction is notification to the AIP, as detailed above in Section 7.3.2. This is a standard requirement for any project involving the use of tall plant and equipment or that would establish tall structures (i.e., 30m or higher). Airservices Australia will issue an AIP Supplementary notice (AIP SUP) to notify the aviation community of the Project construction locations, heights and durations. This notification, combined with notification to the relevant Aerodrome Operators as above, is expected to enable the aviation industry to be aware of any hazards posed by the Project during construction, such that pilots will plan their flights to avoid these potential hazards accordingly.

7.7.3 Residual impacts

A minor residual impact is still expected along the Proposed Route, with effects consistent with the definition for 'minor' provided above in *Table 5-4*. Impacts may require minor, temporary changes to authorised low flying activities around the Proposed Route whereby the Pilot in Command may need to make minor adjustments to planned routes so that clearance from Project construction obstacles is maintained.



8. OPERATIONAL IMPACT ASSESSMENT

8.1 Overview

This section assesses the potential impacts of the Project during operations using the methods detailed in Section 5. Initial unmitigated potential impacts were determined in-line with the definitions established in *Table 5-4*. Based on these initial impacts, mitigation and management measures were developed, with residual impact ratings determined with on the application of the recommended measures.

8.2 Identified Project hazards during operations

The key aviation hazards from the Project during operations include:

- Presence of new transmission towers and overhead lines and terminal stations: The Project infrastructure includes various tall tower structures that can present an obstacle to aviation. For the assessment, the towers were considered at a height of 85m, except for the single circuit towers that pass by the Melton (YMEL) Uncertified Aerodrome (where towers are no more than 44.5m tall); and height limited towers from 44m to 74m under the Melbourne Airport (YMML) Protected Airspace west from Sydenham Terminal Station. It is noted that there are other locations where shorter towers would be used, however, the conservative 85m was applied (excepting the two instances above)
- Use of aircraft for transmission line inspection and maintenance: Helicopters and tall equipment may occasionally be used to inspect and maintain the Project infrastructure, including towers and the transmission line during operations.

Potential impacts to aviation values across the study area for these hazards is assessed below.

8.3 Operational impact assessment, Certified Aerodromes

8.3.1 Initial unmitigated impacts

Potential unmitigated impacts associated with the presence of new transmission towers and overhead lines and terminal stations are listed below in *Table 8-1*.

Certified Aerodrome	Considerations	Assessment	Unmitigated impact rating
Stawell (YSWL)	The Project infrastructure is clear of the Stawell OLSs, which extend to 15,000m along the extended runway centrelines of Runways 11 and 29 and 2,500m along the extended runway centrelines for Runways 18 and 36. At these dimensions	Aircraft operating in the vicinity of the Project are already altitude limited by the requirement to avoid the Bulgana wind farm and the existing 220kV transmission line (i.e., the need to fly above to avoid existing tall structures). Due	No impact

Table 8-1: Unmitigated impacts from operation of Project at surrounding Certified Aerodromes



Certified Aerodrome	Considerations	Assessment	Unmitigated impact rating
	the OLSs are 11km clear and nearly parallel to the Project at the closest point. Using a tower height of 85m (279ft) above ground level and a ground height of 300m (985ft) AHD, the tower tops are 385m (1264ft) AHD. This equates to the tower tops being at an altitude of 1264ft. Adding the required Minimum Obstacle Clearance of 1000ft gives a LSALT of 2300ft (2264 rounded up to next 100) over the Project. This is below the published instrument approach procedure 25nm Minimum Sector Altitude protected airspace plane of 3700ft in the sector over the Project. There is an existing 220kV transmission line parallel, south, and adjacent to the Proposed Route. This existing 220Kv transmission line is shown on current aeronautical charts. Aircraft operations into Stawell from the northeast to the east southeast, must avoid the Bulgana Wind Farm (maximum tip height 2134ft AHD) and the existing 220kV transmission line. Aircraft approaching or departing YSWL in the northeast sector must be above the Bulgana Wind Farm turbines which are 180m above ground level (AGL). The tops of the Bulgana Wind Farm turbines are 848ft above the top of the Project towers. The Bulgana Wind Farm turbines are 848ft above the top of the Project towers. The Bulgana Wind Farm turbines. <i>Figure 6-1</i> depicts the relationship between the Project is effectively shielded by the Bulgana Wind Farm turbines. <i>Figure 6-1</i> depicts the relationship between the Project, the Bulgana Wind Farm and the Instrument Approach Procedure to Runway 29 at Stawell aerodrome. Similarly, aircraft operating on a Visual Flight Rules (VFR) flight plan are required to remain at least 500ft above the Bulgana Wind Farm or laterally clear of it by 300m	to these restrictions aircraft will already be above the height of the Project infrastructure. These existing hazards provide shielding for the Project as aircraft have to avoid the existing obstacles. The wind farm turbines are 180m AGL, that is 95m taller than the Project. An aircraft flying over the wind farm will therefore be well above the Project. The Proposed Route on 85m tall towers does not penetrate the OLS or PANS-OPS at Stawell (YSWL).	
Ararat (YARA)	Ararat has OLSs but does not have published instrument approach procedures and associated protected airspace.	Aircraft operating in the vicinity of the Project infrastructure are already altitude limited by the requirement to avoid wind farms and the existing 220kV	No impact



Certified Aerodrome	Considerations	Assessment	Unmitigated impact rating
	Operations to the northeast of Ararat must avoid the existing Ararat and Challicum Hills wind farms and the existing 220kV transmission line adjacent to the Project. The existing 220kV transmission line is depicted on the appropriate aeronautical charts.	transmission line. Due to these constraints aircraft will be above the height of the Project infrastructure. These existing hazards provide shielding for the Project. The Proposed Route on 85m tall towers does not penetrate (i.e., is beyond the outside edge) the OLS.	
Ballarat (YBLT)	The Ballarat aerodrome has OLS for each runway and protected airspace associated with the published instrument approach procedures. As described in Section 6.2.3 (reproduced below in <i>Figure 8-1</i>), the Runway RWY 36 OLS extends to 15,000m (8.1nm) from the RWY18 threshold (northern end of the runway). At 18km from the aerodrome the Project infrastructure is 3km beyond the Runway 36 Obstacle Limitation Surface. At 21km northeast of the Runway 23 threshold and the Proposed Route is 8km beyond the associated Obstacle Limitation Surface. The associated 10nm Minimum Sector Altitude, protected airspace for the published instrument approach procedure is 3700ft over the Project infrastructure.	Using a ground height of 495m (1625ft) AHD, where the Project passes under the instrument approach path and adding the tower height of 85m (279ft) equates to a maximum tower height of 580m (1903ft) AHD. The Minimum Obstacle Clearance required in this segment of the approach is 500ft. Therefore, the safe altitude for the Project infrastructure at this point is 2500ft. The Project infrastructure safe altitude is below the Segment Minimum Sector Altitude of 2800ft. As such, the Proposed Route with 85m tall towers would not adversely impact operations at YBLT.	No impact
Melbourne Airport (YMML)	Aircraft operating at Melbourne Airport in the vicinity of the Proposed Route are operating in accordance with an ATC Clearance. Aircraft utilising the published instrument approaches are required to remain above the PANS-OPS protected surfaces. Aircraft approaching Melbourne Airport over the Project and Sydenham Terminal Station are required to fly above the PANS-OPS lowest safe altitudes and in accordance with an ATC Clearance. Consultation with the Melbourne Airport operator confirms that the existing Sydenham Terminal Station impacts on the OLS and PANS-OPS airspace for the gazetted four runway configuration at YMML (OLS and PANS-OPS reproduced below in <i>Figure 8-2</i>). The gazetting of the	The Project infrastructure does not impact on the proposed third runway [parallel north/south], Runway 16R/34L, OLS or PANS- OPS. However, the protected airspace for the parallel east/west runway (RWY 09R/27L) limits the height of towers required to connect the Project into the terminal station at towers F4614SL-A and F4614SL- B west to tower F22DL. The design considered the Melbourne Airport OLS and PANS-OPS data and Project tower locations, base elevation and tower height data so that Project infrastructure is below the OLS.	No impact



Certified Aerodrome	Considerations	Assessment	Unmitigated impact rating
	OLS and PANS-OPS protected airspace for the four runways provides for future building development within the protected area (i.e. Project connections into the new Sydenham Terminal Station) must remain clear of the airspace, thus ensuring safe aircraft operations.	For towers F4614SL-A, F4614SL-B, F4615SL-A and F4615SL-B, located immediately west of the Sydenham Terminal Station, tower heights are 39.62m for F4614SL-A, F4614SL-B, and 41.15m for F4615SL-A and F4615SL-B. Likewise towers F3003DL, F3004DL and F3005DL located in the far west of the protected airspace also have shorter heights of 66.90m, 65.55 m and 66.90m AGL respectively to ensure that they remain below the RWY 09R/27L OLS.	



Figure 8-1: Ballarat Airport OLS and PANS-OPS





Figure 8-2: YMML OLS future four runways airspace

Regarding operational maintenance activities (identified in **Section 8.2**), potential unmitigated impacts are expected to be comparable or less than those determined during construction. Although the hazards (e.g., use of tall plant and equipment) during operational maintenance activities would be used much less frequently than during construction, the equipment are comparable and so present similar risks insofar as presentation of a potential hazard to operations from Certified Aerodrome.

8.3.2 Mitigation and management measures

The 'general requirements' to mitigate and manage impacts during construction (detailed in Section 7.3.2) would also apply generally during operations. These requirements, as well as additional items as relevant to operations include:

• General requirements:

- Notification to the aviation industry of the permanent change along the Proposed Route via the AIP in accordance with Advisory Circular AC139.E-01 v1.0 Reporting of Tall Structures.
- Notification of the permanent change to Airservices Australia Vertical Obstacles Database.
- Again, these notifications are included as an EPR (AV1) below in Section 11.

If Project operational maintenance activities within Ballarat (YBLT) Certified Aerodrome protected airspace are required, the following requirement must also be implemented:



• Ballarat (YBLT) operational requirements:

 Authorisation from the aerodrome operator is required before any works affecting the Protected Airspace can proceed. This will be achieved through the Community and Stakeholder Engagement Plan proposed for the construction stage (EPR EM4) which will specify direct consultation with key stakeholders, including aviation stakeholders.

8.3.3 Residual impacts

With the implementation of the mitigation and management measures above, the presence of the new transmission towers and overhead lines and terminal stations would present no residual impacts to aviation values around Stawell (YSWL), Ararat (YARA), Ballarat (YBLT) and Melbourne Airport (YMML) Certified Aerodrome are expected during Project operations.

Regarding operational maintenance activities, no residual impacts are expected, as determined above for construction.

8.4 Operational impact assessment, Uncertified Aerodromes

8.4.1 Initial unmitigated impacts

Initial unmitigated impacts determined for operations at surrounding Uncertified Aerodrome from the presence of new transmission towers and overhead lines and terminal stations are listed in *Table 8-2*. As noted in Section 5.5, Uncertified Aerodromes are not regulated by 'CASR Part 139 – Aerodromes' and are not protected by an OLS and cannot have a published instrument approach procedure with its associated PANS-OPS. The Pilot in Command is responsible for ensuring the landing and take-off area is suitable for the intended aircraft operation, having regard to runway conditions, weather conditions, aircraft take-off weight, aircraft performance and obstacles. These limitations were considered in the outcomes determined below.

Uncertified Aerodrome	Considerations	Assessment	Unmitigated impact rating
Glenlofty ALA	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. Aircraft approaching Glenlofty ALA over the Project are required to fly above it.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
	If aircraft can currently operate safely from this ALA, then the Project will not pose any significant reduction in safety, as the Project is shielded by the existing transmission line (around 150m away). That is, the existing transmission line is closer to the runway than the Project, which runs parallel, and is an impediment to safe operation by the restrictions it imposes.		

Table 8-2: Unmitigated impacts from operation of Project at surrounding Uncertified Aerodrome



Uncertified Aerodrome	Considerations	Assessment	Unmitigated impact rating
Beaufort (YBFT)	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. Aircraft approaching Beaufort (YBFT) over the Project are required to fly above it. Aircraft operating in the vicinity of the Project are already altitude limited by the requirement to avoid Stockyard Hill and Waubra wind farms and the existing 220kV transmission line. Due to these constraints' aircraft will be above the height of the Project infrastructure, therefore tracking for landing and after take-off at YBFT will not be impacted. The Project infrastructure does not interfere with normal functioning of the aerodrome or airspace.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
Ballarat Hospital Helipad (YXBT)	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. Aircraft approaching Ballarat Hospital Helipad over the Project are required to fly above it. Given the nature of the helicopter operations (i.e. their highly manoeuvrable operations and ability to hover), the location within the township, and the distance from the Project of this helipad (around 18km away), it is considered that the Project infrastructure will not impact on the normal functioning of the helipad.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
Myrniong ALA	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. Aircraft approaching Myrniong ALA over the Proposed Route are required to fly above it. The runways are almost parallel to the Proposed Route and its infrastructure, therefore aircraft departing and landing at the ALA will be flying parallel to the Project infrastructure at a distance sufficient to safely avoid it (over 3km from the Project).	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
Rowsley/Brooks Landing (YBSL)	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact



Uncertified Aerodrome	Considerations	Assessment	Unmitigated impact rating
	Aircraft approaching Rowsley/Brooks Landing over the Project are required to fly above it. The Project is considered sufficiently distant from YBSL (around 10km away) for it to have no impact on safe operations at the aerodrome.		
Rowsley Helipad (YRWS)	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. Aircraft approaching Rowsley Helipad (YRWS) over the Project are required to fly above it.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
	Given the nature of the helicopter operations (i.e. their highly manoeuvrable operations and ability to hover) and the distance from the Project, it is considered that the Project infrastructure will not impact on the normal functioning of the helipad.		
	The Project is considered sufficiently distant from YRWS (approximately 10km away) for it to have no impact on safe operations at the aerodrome.		
Greystones ALA	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. Aircraft approaching Greystones ALA over the Project are required remain clear of it.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
	The Project is considered sufficiently distant from Greystones ALA (around 13km away) for it to have no impact on safe operations at the aerodrome.		
Bacchus Marsh (YBSS)	Aircraft operating in the vicinity of the Proposed Route are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. The Project is considered sufficiently distant from YBSS (approximately 11km away) for it to have no impact on safe operations at the aerodrome.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
Bacchus Health Helipad	Aircraft operating in the vicinity of the Project are required to remain at regulated heights above and distances from obstacles, terrain and populous areas. Aircraft approaching Bacchus Health Helipad over the Project are required to fly above it.	The Project infrastructure does not impose additional restrictions on operations at the site.	No impact
	Given the nature of the helicopter operations (i.e. their highly manoeuvrable operations and ability to hover), the location within the township, and the distance from the Project of this helipad		



Uncertified Aerodrome	Considerations	Assessment	Unmitigated impact rating
	(approximately 5km away), it is considered that the Project infrastructure will not impact on the normal functioning of the helipad.		
Melton (YMEL)	See below Section 8.4.1.1	See below Section 8.4.1.1	Moderate impacts as determined below

Regarding the potential for impacts during operational maintenance activities, these are expected to be comparable or less than those determined for construction. These activities are expected to be much less frequent, but present similar risks insofar as presentation of a potential hazard.

8.4.1.1 Melton (YMEL) – Uncertified Aerodrome

Regarding Melton (YMEL) Uncertified Aerodrome, additional information is provided below with regards to the design of the Project and assessment of impacts, noting the sites proximity to the Project.

Mitigation-in-design for operation

If the nominal design 85m tall double circuit towers were applied along the Proposed Route along MacPherson Park, adjacent to Melton Uncertified Aerodrome, there would be significant impacts to aircraft operations, particularly for RWY14/32. To address this, Project infrastructure at this location was designed and located such that it is supported by lower single circuit towers ranging from 33.76m to 39.62m in height (between towers F4459SL-A and F4464SL-B). This is listed below in *Table 8-3* and displayed in *Figure 8-3*. The height of the connecting double circuit towers either side (F4458DL to the east and F4588DL to F4595DL to the west) were also reduced from the standard tower heights, ranging from 60.9m tall to 69.9m tall.

Pilots are required to make themselves familiar with the aerodrome limitations prior to deciding that the aerodrome is suitable for the aircraft operation intended. The proximity of the Project infrastructure to Melton Uncertified Aerodrome is such that aircraft arriving and departing on runways RWY04/22, RWY14/32 and RWY34 will need to be briefed by the aerodrome operator on the location and height of the Project infrastructure to so their flight is appropriately planned. The Pilot in Command is required to seek prior permission to use Melton Uncertified Aerodrome and obtain information regarding the status of the aerodrome, including local hazards such as powerlines, prior to landing or taking off from the aerodrome.

Structure Number	Centreline Elevation m AHD	Latitude WGS84	Longitude WGS84	Designed Structure Height m AGL	Tower Structure
F4458DL	184.728	37 38 06.13937884S	144 34 38.26858511E	68.70	Double Circuit
F4459SL-A	185.649	37 38 04.43674631S	144 34 25.03674170E	36.57	Single Circuit
F4460SL-A	187.288	37 38 02.05909895S	144 34 12.37978313E	36.57	-

Table 8-3: Project tower numbers and heights passing Melton Uncertified Aerodrome



Structure Number	Centreline Elevation m AHD	Latitude WGS84	Longitude WGS84	Designed Structure Height m AGL	Tower Structure
F4461SL-A	186.763	37 38 03.70593738S	144 34 01.44906191E	35.26	
F4462SL-A	187.433	37 38 05.24107220S	144 33 51.25796182E	33.76	
F4463SL-A	187.481	37 38 06.63896765S	144 33 41.97642417E	33.76	
F4464SL-A	186.6	37 38 08.15736625S	144 33 31.89317144E	36.57	-
F4459SL-B	186.035	37 38 03.17086685S	144 34 25.39490523E	36.57	
F4460SL-B	187.638	37 38 00.76191034S	144 34 12.41737353E	36.57	-
F4461SL-B	187.391	37 38 02.44616099S	144 34 01.14842811E	35.26	-
F4462SL-B	187.898	37 38 03.96943875S	144 33 50.95462717E	33.76	-
F4463SL-B	187.381	37 38 05.35654885S	144 33 41.67058314E	33.76	-
F4464SL-B	186.93	37 38 06.89671326S	144 33 31.36029325E	36.57	-
F4587DL	190.986	37 38 12.03187959S	144 33 20.27090037E	62.70	Double Circuit
F4588DL	192.557	37 38 16.09971718S	144 33 09.97087800E	60.90	
F4589DL	184.194	37 38 20.72400536S	144 32 58.26076522E	62.85	
F4590DL	180.099	37 38 18.93186860S	144 32 42.87893068E	63.90	
F4592DL	176.68	37 38 17.03402743S	144 32 26.59529878E	63.90	
F4593DL	177.18	37 38 15.37906307S	144 32 12.39981880E	63.90	
F4594DL	179.848	37 38 13.39642973S	144 31 55.39953111E	66.90	
F4595DL	181.547	37 38 11.35423368S	144 31 37.89454190E	69.90	





Figure 8-3: Tower locations around Melton (YMEL) Uncertified Aerodrome

Impact assessment

The assessment reviews the potential for impacts to operations associated with each of the four runways (RWY16/34, RWY10/28, RWY04/22 and RWY14/32) as a result of the proposed Project. Further detail is provided in relation to RWY14/32, given its proximity and orientation in relation to the Project. The YMEL ERSA provides specific operational restrictions and instructions for the use of the aerodrome.

<u>RWY16/34</u>

As noted in Section 6.3.10, ERSA 'restrictions' limit landings to RWY34 (i.e., to the north northwest) with no take-offs in this direction permitted. Further, the ERSA prohibits both take-off/landing on RWY16. Given these conditions, aircraft are only permitted to land from the south on this runway. The RWY 34 threshold is approximately 1,100m north of the Project at tower F4460SL-B. As such, it was concluded that the Project would not result in any changes to existing ERSA-restricted operations on RWY16/34, noting that pilots will need to be aware of the tall obstruction crossing the extended runway centreline.

<u>RWY10/28</u>

RWY10/28 is orientated away from the nearest Project Infrastructure. The YMEL ERSA imposes a right-hand circuit requirement for the use of RWY10. This ensures aircraft are turning away from the Project infrastructure. Likewise, a left-hand circuit on RWY 28 ensures aircraft are turning away from the Project infrastructure. Owing to its orientation and distance from the Proposed Route, no change to this operation of RWY10/28 are expected as a result



of the Project.

<u>RWY04/22</u>

RWY04/22 is also orientated away from the nearest Project towers passing MacPherson Park. The ERSA restricts operations to right hand circuits for RWY04. This ensures the aircraft turn away from the Project infrastructure. The RWY04 threshold is approximately 2,000m from the Project at tower F4592DL. Noting the distance from the runway and orientation in relation to the Proposed Route, it was concluded that the Project would not result in any changes to existing, operations at RWY04/22, understanding that the Pilot in Command should be aware and plan for the tall obstruction crossing the extended runway centreline 2,000m from the end of the runway RWY22.

<u>RWY14/32</u>

The closest Project transmission tower to the threshold of RWY32 is F4462SL-B. This is the middle tower set of the reduced height (F4464SL to F4460SL, see heights above in Table 8-3) single circuit line adjacent to MacPherson Park that was lowered through design to reduce the impacts to operations at Melton Uncertified Aerodrome. Tower F4462SL-B is almost directly in line with the extended RWY14 centreline and is 519.82m from the RWY32 threshold (i.e., the southern end of RWY14). It is the nearest tower to YMEL associated with the Project, and as such represents the worst case, insofar as the potential for impacts to operations. Key details considered in this assessment were as follows.

• YMEL RWY32 threshold elevation is 192m.

This was determined from web mapping and information presented in the document titled *Melton Aerodrome Obstacle Limitation Chart, Airport Surveys, dated 20 April 2021.*

Melton as an Uncertified Aerodrome does not have an OLS. The Obstacle Limitation Chart was produced for and supplied by the aerodrome operator.

- Tower F4462SL-B base elevation is 187.898m and its height is 33.76m (AusNet, 2023).
- Tower F4462SL-B is 519.82m from the RWY32 threshold (i.e., reference point).





Figure 8-4: Climb gradient

Table 8-4: RWY14/32 impacts review

Runway 14/32 movement	Details
RWY32 take-off and RWY14 landing	A take-off on RWY32 (i.e., to the northwest) or a landing on RWY14 would be unaffected by the Project. The constraints for these operations are the existing high terrain within 1200m of the northern end of the runway (i.e., RWY14 threshold), and the need to avoid flying over Toolern Vale and other residential areas as per the ERSA.
RWY14 take-off	A typical light aircraft taking off on RWY14 would be airborne approximately 1220m from tower F4462SL-B and 1400m from the MacPherson Park infrastructure. At a 5% gradient the aircraft would be 61m above the runway elevation of approximately 200m AHD (at the point of lift off), that is 261m AHD at tower F4462SL-B. Tower F4462SL-B has a top height of 222m AHD. This provides a clearance of 39m (128ft) above the tower top for this aircraft take-off.
	Even if a shallower, 3% take-off climb gradient was considered, the aircraft would be 36.3m above the runway elevation of approximately 200m AHD (at the point of lift off), that is 236.6m AHD at tower F4462SL-B which is 222m AHD. This would still provide a clearance of 14.6m (48ft) above the tower top. The Pilot in Command must make themselves aware and plan accordingly to ensure climb after take-off is sufficient to avoid the tall structures crossing the extended centreline 520m from the end of the runway.
RWY32 landing	A typical light aircraft landing on RWY32 approaches the runway over the MacPherson Park infrastructure and the Project. Clearing the Project and the MacPherson Park infrastructure will require a steeper approach path and/or a touchdown point further along the runway in order to achieve an appropriate decent slope and Landing Distance Required on a runway that is 1200m in length, whilst landing over an obstacle that is 520m from the end of the runway. The Landing Distance Required in this instance is less than the full length of the runway, typically 600 to 700m on a 1200m long runway. That is, there is sufficient runway length available from the point of touchdown for the aircraft to safely stop. The Pilot in Command must make themselves aware and plan accordingly to ensure that there is sufficient available runway for the particular landing.



Summary of impacts

While constrained, operations at YMEL do not become unsafe as a result of the Project. The Project transmission towers along the northern boundary of MacPherson Park were designed to reduce impacts to operations at Melton Uncertified Aerodrome (YMEL).

- Landings on RWY04 and RWY34 can continue, however pilots will need to be aware of the tall
 obstruction crossing the extended runway centrelines. Landings on RWY32 will require a
 steeper approach and touch down point north of the runway threshold.
- Departures on RWY22 will need to be planned to ensure the climb after take-off is sufficient to avoid the tall obstruction crossing the extended runway centreline 2,000m from the end of the runway. Departures are not permitted on RWY16/34. Departures on RWY14 will need to be planned to ensure climb after take-off is sufficient to avoid the tall structures crossing the extended centreline 520m from the end of the runway. Operations on runway 14/32 will require the Pilot in Command to decide if there is sufficient runway available, in the prevailing conditions, to facilitate the take-off or landing and be able to avoid the known obstacles (CASR 91.410) at each end of the runway.

In summary, given that the Project infrastructure adds additional obstacles to aerodrome operation, that would still allow it to operate as normal, but with moderate pilot adjustments for use of some runways, moderate unmitigated impacts were determined in-line with Section 5.5.

8.4.2 Mitigation and management measures

No additional mitigation or management measures for hazards presented by the Project during operation are required at any of the identified Uncertified Aerodromes except Melton (YMEL), noting that operators of these facilities would also be made aware of the Project through the notification to the AIP as discussed in Section 7.3.2.

The following additional measures will support to manage impacts to the safe operation of the Melton Uncertified Aerodrome:

 Transmission line towers and catenary as identified in Table 8-3 should be marked with standard obstacle markings in-line with 'Manual of Standards Part 139, Chapter 8, Division 10' that make them more visible to pilots flying at the YMEL. This measure has been recommended as an EPR (AV2).

8.4.3 Residual impacts

With the application of the mitigation and management measures above, the presence of the new transmission towers and overhead lines and terminal stations were determined to present no residual impacts during operations at:

- Glenlofty ALA (unverified)
- Beaufort (YBFT) Uncertified Aerodrome
- Ballarat Hospital Helipad (YXBT)
- Myrniong ALA (unverified)
- Rowsley/Brooks Landing (YBSL) Uncertified Aerodrome
- Rowsley Helipad (YRWS)



- Greystones ALA (unverified)
- Bacchus Marsh (YBSS) Uncertified Aerodrome
- Bacchus Health Helipad.

At Melton (YMEL), with the application of the recommended measures, residual impacts would be reduced from moderate to minor. As discussed in Section 8.4.2, these impacts are manageable but will require updates to procedures so that the Pilot in Command understands all requirements before landing or taking off from the aerodrome.

Regarding operational maintenance activities, residual impacts were determined as above for construction.

8.5 Operational impact assessment, air navigation and air traffic management services

NASF Guideline G describes how CNS facilities have BRA, which can extend up to 15km. BRAs are designed to prevent obstructions that can interfere with line-of-sight, reflections, or electromagnetic interference, which could impact the operability of the CNS facility. The Project infrastructure is located outside the BRAs of all of the identified CNS facilities in *Table 6-15*, except the ATC at Melbourne Airport. As such, no impacts are expected at these facilities.

Regarding the ATC at Melbourne airport, there are no known impacts from existing high voltage transmission lines and terminal stations (e.g., 500kV transmission line in Bulla and the existing Sydenham Terminal Station). Considering this, impacts at Melbourne Airport ATC as a result of the Project during operations are also not expected. Again, operators of these facilities will be made aware of the presence of the Project infrastructure through the notification made to the AIP.

8.6 Operational impact assessment, transiting air routes

8.6.1 Initial unmitigated impacts

As determined in *Table 6-16* the minimum LSALT for all of the transiting air routes that cross the spatial extents of the study area is 4,000ft (1,200m) AHD. This is safely above the highest level that could be expected from Project activities during operations. Considering this, no impacts to transiting air routes are expected during operations (including the presence of the new transmission towers and overhead lines and terminal stations, and operational maintenance activities)

8.6.2 Mitigation and management measures

Noting the outcome above, completion of the 'general operational requirements' above in Section 8.3.2 so that the industry, including operators, are aware of the operational Project infrastructure below transiting air routes across the study area.

8.6.3 Residual impacts

No residual impacts to transiting air routes from the Project during operations are expected.



8.7 Operational impact assessment, authorised low flying activity

8.7.1 Initial unmitigated impacts

Initial unmitigated potential impacts to authorised low flying activities within the study area from Project infrastructure and operational activities are detailed below:

Table 8-5: Unmitigated impacts from Project infrastructure to nearby authorised low flying activities

Authorised low flying activity	Considerations	Review of whether Project operations would impact authorised low flying activities	Unmitigated impact rating
Aerial agricultural applications	The Project will affect the ability of both fixed and rotary wing aircraft to conduct aerial agricultural applications (e.g. crop dusting) due to the need to fly around the towers. Rotary wing aircraft will be able to manoeuvre closer to the towers than fixed wing aircraft, however, fixed wing aircraft utilise different flight paths to achieve maximum coverage of an area whilst avoiding obstacles. The aerial application organisations contacted confirmed that the Project could create limitations but would not preclude aerial applications.	The presence of the Project infrastructure will limit, but not preclude the ability of aircraft to apply chemicals to the entire crop area. The study area contains many existing tall structures that present as obstacles for aerial agricultural pilots, such as high voltage transmission lines, wind farm turbines, mobile phone towers, even tall trees. The Project will introduce tall towers and catenary that of a similar size and scale to some existing infrastructure. It is assessed that given the range of tall obstacles in the existing environment; the addition of the Project infrastructure would not create a significant additional constraint. The Pilot in Command of aerial agricultural operations will need to plan their flight with new information obtained from Airservices Australia.	Minor impact
Aerial firefighting	Aerial firefighting is conducted at low level using specialist aircraft flown by appropriately rated pilots in accordance with the visual flight rules. The pilot is required to maintain visibility with the ground and remain clear of smoke so that they can accurately and safely drop the fire retardant. Fixed wing aircraft typically do not attack fires at night. Some helicopters, fitted with night vision imaging systems and flown by suitably endorsed pilots, are authorised to do so in some instances. Aircraft used for infrared scanning (Fire Scan) of fire hot spots are typically larger twin engine light aircraft (Cessna 421, Aero commander 690 and Beech 200) that	The presence of the Project infrastructure will limit, but not preclude the ability of aircraft to be used for aerial firefighting. The study area contains many existing tall structures that present as obstacles for aerial agricultural pilots, such as high voltage transmission lines, wind farm turbines, mobile phone towers, even tall trees. The Project will introduce tall towers and catenary that of a similar size and scale to some existing infrastructure. It is assessed that given the range of tall obstacles in the existing environment; the addition of the Project infrastructure would not be significant. The Pilot in Command of aerial firefighting operations will need to plan their flight with new	Minor impact



Authorised low flying activity	Considerations	Review of whether Project operations would impact authorised low flying activities	Unmitigated impact rating
	operate at high level over the fireground and prefer larger aerodromes with sealed runways and published instrument approach procedures facilitating night operations. Aircraft used for local observing and guiding the tankers (Bird Dog) are typically smaller light aircraft, either single or twin engine (Cessna 206, Cessna 337 or Partenavia P68), or may be small corporate jet (e.g., Cessna Citation) that will use any suitable aerodrome.	information obtained from Airservices Australia.	
Medical and emergency flights	This type of activity can be conducted a low level using specialised aircraft operated by appropriately rated pilots. Helicopter operations are highly manoeuvrable and can safely operate in proximity to known obstacles.	The presence of the Project infrastructure will limit, but not preclude the operation of medical and emergency service aircraft. The Pilot in Command of these operations will need to plan their flight with new information obtained from Airservices Australia.	Minor impact
Flight training	Flying training is conducted in single engine light aircraft flown in accordance with visual flight rules. Advanced flying training to achieve twin engine and Instrument Flight Rules endorsement is conducted in light twin engine aircraft. More advanced training will be conducted in larger twin turboprop aircraft. The Instrument Flight Rules training occurs above the published lowest safe altitude for the route being flown. The lowest safe altitude is above the Project infrastructure.	Given that flying training is required to maintain the regulated minimum safe altitudes for the type of flight and that there are known obstacles (wind farms, transmission lines) proximate to the Project combined with mandated flight planning requirements it is considered that the Project will have no impact on flying training. Any practice forced landing (engine failure) procedures conducted during flying training are carried out in suitable areas. Part of the training is to have the student analyse the area and select a suitable place to land.	No impact
Sports aviation	This includes, gliding, parachuting, and aerobatics flying, all of which occurs in visual meteorological conditions where the activity is clear of cloud and the pilot has at least 5000m forward visibility. The other category of aircraft using the airspace are Recreational Aviation Australia (RA-Aus) registered ultra- light aircraft that are limited to a MTOW of 600kg and daytime Visual Flight Rules flight only.	Given that sport aviation is required to operate in accordance with the visual flight rules the Project infrastructure will be a known entity and visible, such that it can be avoided, it is considered that the Project will have no impact on sport aviation.	No impact



Authorised low flying activity	Considerations	Review of whether Project operations would impact authorised low flying activities	Unmitigated impact rating
Private flights and tourism	These are normally conducted in light aircraft flown in accordance with regulations.	Given that the majority of activity in this category is required to fly at or above published or calculated lowest safe altitudes (including VFR altitude requirements) and not undertaking authorised low flying, it is considered that the Project will have no impact.	No impact
Military activities	These flights are conducted in accordance with military requirements. The Pilot in Command remains responsible for the safety of the aircraft.	These flights are carefully planned and utilise dynamic risk assessment. Noting this, it is considered that the Project will have no impact	No impact
Other aviation activity	Other aviation activities such as UAV (drones) and model aircraft generally operate at lower levels of up to 1000ft AGL in areas of no more than 1000m radius of the operator. AIP Charts depicts some known areas for such activity, for example the Keilor Model Aircraft flying area approximately 3.3km east of the Sydenham Terminal Station. There are also areas depicted west of Ballarat and near Ararat across the hills.	The known areas are between and near existing 220kV transmission lines. Noting this existing hazard, and the distance from these activities, it was determined that the Project will have no impact.	No impact

8.7.2 Mitigation and management measures

As for construction, notification of the Project infrastructure to the AIP during operations will limit the potential for impacts to authorised low flying in the study area. This notification, combined with notification to the relevant Aerodrome Operators as above is expected so that the aviation industry will be aware of any hazards posed by the Project during operations, such that pilots will plan their flights to avoid these potential hazards accordingly.

8.7.3 Residual impacts

Minor residual impacts within the study area are still expected for aerial agricultural, aerial firefighting and medical and emergency flights due to the need for the Pilot in Command to make minor adjustments to the descent and departure angles/profiles to maintain clearance over the transmission line. Otherwise, operations at aerodromes from which they depart/return and flight paths would continue as normal. No residual impacts are expected for the other low flying activities considered.



9. DECOMMISSIONING IMPACT ASSESSMENT

Similar plant and equipment are expected to be used during decommissioning as for construction. As such, Project impacts to aviation activities during decommissioning and required mitigation and management are expected to be similar to those determined above for construction in Section 7.



10. CUMULATIVE IMPACTS

A cumulative impact assessment considers the impacts of a project together with the impacts of other relevant projects that may interact spatially and temporally to change the level of impact on environmental, social or cultural values. EES Chapter 4: EES assessment framework and approach identifies relevant future projects that are proportionate to the scale and potential significance of the impacts of Western Renewables Link Project (WRL); that have sufficient information publicly available in an EES or an environmental approvals application; and that have a spatial and temporal relationship to the Western Renewables Link. A cumulative impact is only possible when all three aspects exist. Cumulative impacts may occur when incremental, successive and combined effects of actions or projects are added to other proposed actions or projects.

Of the 23 shortlisted projects identified in EES Chapter 4: EES assessment framework and approach, six projects have been considered with regard to cumulative impacts related to aviation aspects. No other projects with tall structures that could impact on aviation activities are known at the time of writing.

10.1 Melbourne Renewable Energy Hub

The Melbourne Renewable Energy Hub (MREH) (formerly Melton Renewable Energy Hub) is a battery and solar farm project proposed adjacent to the Sydenham Terminal Station. This project involves the development of a solar farm consisting of multiple photovoltaic cell arrays and battery units (comparable to shipping container units). With regard to aviation aspects, the MREH could result in glint and glare impacts from the photovoltaic cell arrays. The MREH infrastructure is much lower in height compared to Project infrastructure.

The Project would not result in glint and glare impacts, such that associated cumulative effects of both Projects are not expected. Regarding the potential for cumulative impacts from the tall structures introduced by both projects, again cumulative impacts are not expected, noting that the Project is not expected to result in any residual impacts (during construction, operations or decommissioning), and with structures being lower for MREH, its impacts are expected to be negligible.

10.2 Victoria to New South Wales Interconnector – West project

The Victoria to New South Wales Interconnector - West (VNI - West) project is a 500kV high voltage transmission line commencing at the Bulgana Terminal Station and heading north to the Murray River. Assuming the VNI West uses the same type of infrastructure, its impacts to aviation would be comparable to the Project, i.e. tall structures that could impact on existing aviation flight operations. The only location where obstacles from both Projects would be proximal is around the connection at Bulgana Terminal Station. As discussed, this location is outside the OLS and PANS-OPS of the nearest Certified Aerodrome at Stawell. Cumulative impacts to authorised low flying could occur around Bulgana due to the additional infrastructure associated with both transmission line projects, however design information from VNI - West is not presently available to understand the extent of impact.



10.3 Watta Wella Renewable Energy Project

The Watta Wella Renewable Energy project comprises 47 wind turbines, a solar farm and battery. The Project is located approximately 16km north-east of Stawell, straddling the existing 220kV transmission line immediately to the northwest of the Bulgana Terminal Station. The location of the project is displayed below in *Figure 10-1*.

It is estimated that the turbines will have a 250m AGL tip height. Based on this, the wind farm would have a minimal impact on the operations at Stawell Certified Aerodrome (YSWL) as it will have to be below the 25nm Minimum Safe Altitude, and it is beyond the published PANS-OPS. The same outcomes were determined for the Project. As such, no cumulative impacts to operations at Stawell Certified Aerodrome (YSWL) are expected.

Regarding impacts to other aviation values, through construction, operation and decommissioning both Projects will introduce new tall structures around Bulgana. The operational structures associated with Watta Wella Renewable Energy project will be considerably higher than the Project, such that the potential for cumulative impacts would be limited.





Figure 10-1: Watta Wella Renewable Energy Project Location (Source: Umwelt, 2022)



10.4 Brewster Wind Farm

This is a small wind farm comprising seven turbines with a tip height not above 250m AGL, located approximately 16km south of the Project. It is north of and close to the existing Stockyard Hill wind farm. It is sufficiently distant from the Project to have no cumulative aviation impacts.

10.5 Nyaninyuk Wind Farm

Nyaninyuk Wind Farm is a proposed renewable energy project in Western Victoria. The project is currently in the planning and approvals stage. It consists of up to 58 turbines with a tip height of up to 280m AGL, located between Evansford, Clunes and Waubra. Once constructed, the new wind farm would straddle the Project from approximately Coghill's Creek Road (i.e., tower F6279DL) to the Waubra Talbot Road (i.e., tower F6262DL). Given that the turbines are on the north and south side of the Project are around 195m taller, they would become the key aviation obstacle, shielding any effects associated with the Project. As such, the potential for cumulative impacts would be limited.

10.6 Sydenham Terminal Station Rebuild

Upgrade of the existing Sydenham Terminal Station will be completed prior to the construction of the Project at that location. Construction of associated tower infrastructure and ancillary works required to connect into the terminal station forms part of the Project.

As noted in Section 6.7, the existing Sydenham Terminal Station is (and the upgraded terminal station will remain) within the Protected Airspace around Melbourne Airport. The Project towers connecting into the Upgraded Sydenham Terminal Station and associated infrastructure have been designed so that they remain below the minimum vertical extents (i.e., the OLS) of the Protected Airspace (as is the case for the infrastructure associated with the Sydenham Terminal Station Rebuild Project). As such, the potential for cumulative impacts would be limited.

10.7 Summary of potential cumulative impacts

Aviation impacts associated with MREH and Brewster Wind Farm are such that no cumulative impacts with the Project are expected. Regarding VNI – West there is the potential for localised cumulative impacts to authorised low flying around Bulgana. However, these effects would be effectively shielded by the taller obstacles introduced by Watta Wella Renewable Energy Project which would be the primary aviation obstacle around this location. For Nyaninyuk Wind Farm, it would be the key aviation obstacle around the shared spatial extents with the Project, being considerably higher such that cumulative impacts would be negligible. Finally, for the Sydenham Terminal Station Rebuild, connecting Project infrastructure and infrastructure associated with the upgrade have been designed so that they remain below the minimum vertical extents of Melbourne Airport's Protected Airspace.

As recommended earlier, the location of the Project will be promulgated to the aviation industry via the AIP and relevant aeronautical charts. This will be the same for the other projects, should they be developed, so that pilots are aware of the various aviation hazards present along their planned flight routes.



11. ENVIRONMENTAL PERFORMANCE REQUIREMENTS

EPRs set out the environmental outcomes to be achieved through the implementation of mitigation measures during construction, operation and decommissioning. While some EPRs are performance based to allow flexibility in how they will be achieved, others include more prescriptive measures that must be implemented. Compliance with the EPRs will be required as a condition of the Project's approval.

To meet the EES evaluation objective: Avoid, or minimise where avoidance is not possible, adverse effects on land use, social fabric of the community, businesses including farming and tourism, local and state infrastructure, aviation safety and to affected and neighbouring landowners during construction and operation of the project, the following EPRs are recommended.

Table 11-1: Aviation EPRs

EPR code	Environmental Performance Requirements	Project component	Stage
AV1	 Provide notification to Airservices Australia The Project must provide relevant Project details to Airservices Australia so that pilots, including operators of one fire response aircreft on autors of ite 	Transmission towers, tall plant and equipment	Construction and operation
	existence, location and features of the Project that may pose a hazard to aircraft operations.		
	2. The information must include relevant details of the Project plant, equipment and infrastructure, and meet the requirements (detail and frequency) of Airservices Australia for the promulgation of an Aeronautical Information Circular (AIC) and where required a Notice to Airmen (NOTAM) or an Aeronautical Information Publication Supplement (AIP SUP) to keep the aviation industry informed of progress throughout construction.		
	3. This information is to be reported in accordance with CASA Advisory Circular AC139.E-05 Obstacles (including wind farms) outside the vicinity of a CASA certified aerodrome and AC139.E-01 Reporting of tall structures.		



EPR code	Enviro	nmental Performance Requirements	Project component	Stage
AV2	Mark t catena (YMEL	ransmission line towers and associated ary around Melton Uncertified Aerodrome)	Transmission towers	Design, construction and operation
	1. To wit Sta the Me ma	wers and associated catenary are to be marked h standard obstacle markings as per Australian andard AS 3891.1:2021 and AS 3891.2 to make em more visible to pilots flying. Towers near the elton Uncertified Aerodrome (YMEL) are to be arked, including:		
	a)	F4458DL		
	b)	F4459SL-A		
	c)	F4460SL-A		
	d)	F4461SL-A		
	e)	F4462SL-A		
	f)	F4463SL-A		
	g)	F4464SL-A		
	h)	F4459SL-B		
	i)	F4460SL-B		
	j)	F4461SL-B		
	k)	F4462SL-B		
	I)	F4463SL-B		
	m)	F4464SL-B		
	n)	F4587DL		
	o)	F4588DL		
	p)	F4589DL		
	(p	F4590DL		
	r)	F4592DL		
	s)	F4593DL		
	t)	F4594DL		
	u)	F4595DL.		

Additionally, EPR EM5 (Develop and Implement a Communications and Stakeholder Engagement Management Plan) will include direct consultation with key aviation stakeholders, including aerodrome operators. In-line with this requirement, AusNet will engage with aerodrome operators regarding the timing and duration of construction works to minimise the extent and duration of impacts to aircraft operations.

Further, impacts during decommissioning would be managed according to the Decommissioning Management Plan to be developed and implemented as part of EPR EM11.

No specific ongoing environmental management and monitoring requirements are required for aviation.



12. CONCLUSIONS

This report provides an assessment of the potential aviation-related impacts of the Project. The purpose of the assessment was to determine aviation values that are likely to be impacted by the proposed works, and how these would be mitigated or otherwise effectively managed.

The assessment has been based on a review of applicable legislation, policy and guidelines, characterisation of the existing conditions, identification of construction, operation and decommissioning impacts, evaluation of the significance of impacts, and recommendation of Environmental Performance Requirements. The key outcomes for each of these aspects and the overall assessment are outlined below.

12.1 Existing conditions

A review of existing conditions as relevant to aviation identified the following existing activities occurring within the spatial extents of the relevant study areas established:

- Certified Aerodrome: Stawell (YSWL), Ararat (YARA), Ballarat (YBLT) and Melbourne Airport (YMML).
- Uncertified Aerodrome: Beaufort (YBFT), Ballarat Hospital Helipad (YXBT), Myrniong ALA, Rowsley/Brooks Landing (YBSL), Rowsley Helipad (YRWS), Greystones ALA, Bacchus Marsh (YBSS), Bacchus Health Helipad and Melton (YMEL).
- Air navigation and air traffic management services: Communications: Mount William, Mount Macedon and Melbourne Airport; Navigation: Aviation ground-based navigation equipment (navaids) is located at Melbourne Airport; and Surveillance: Mount Macedon, Gellibrand Hill, Melbourne Airport and Mount William.
- Transiting air routes: V223, H345 and W657.
- Authorised low flying: Aerial agricultural applications, aerial firefighting, medical and emergency flights, flight training, sports aviation, private flights and tourism, military activities and other authorised activities.

12.2 Impact assessment

Using the evaluation approaches as relevant to each aviation value detailed in Section 5.5, the following unmitigated impacts were initially determined (further details are provided in Section 7 to Section 10):

- Certified Aerodromes:
 - No impacts to OLS or PANS-OPS protected airspace at Stawell or Ararat during construction, operation or decommissioning.
 - No impacts were predicted at Ballarat provided that Project activities remain below the published instrument approach path for RWY 18. No operational impacts associated with the presence of new transmission towers, terminal stations and the overhead transmission line were determined.



 'Minor' unmitigated impacts were determined at Melbourne Airport during construction noting that construction activities associated with the towers from Sydenham Terminal Station west to Tower F3002DL are within YMML Controlled Airspace.

• Uncertified Aerodromes:

- No impacts to safe operations from Project activities during construction, operations or decommissioning were determined at Beaufort (YBFT), Ballarat Hospital Helipad (YXBT), Myrniong ALA, Rowsley/Brooks Landing (YBSL), Rowsley Helipad (YRWS), Greystones ALA, Bacchus Marsh (YBSS) or Bacchus Health Helipad.
- At Melton (YMEL), 'moderate' to 'major' unmitigated impacts from Project activities were determined during construction and decommissioning. During operations, the presence of new Project infrastructure including transmission towers, terminal stations and the overhead transmission line was determined to present 'moderate' unmitigated impacts to activities at the Uncertified Aerodrome.
- Air navigation and air traffic management services: No impacts to any of the identified communications, navigation or surveillance services within the assessment study area were determined.
- **Transiting air routes:** The minimum LSALT for all of the transiting air routes that cross the spatial extents of the study area is 4,000ft (1,200m) AHD. This is safely above the highest level that could be expected from Project activities
- Authorised low flying:
 - 'Minor' unmitigated impacts were determined for all authorised low flying activities within the study area during construction, understanding that the use of tall construction equipment and helicopters would introduce additional obstacles that the pilot in command would need to be aware of and safety avoid. The same outcome was determined during decommissioning.
 - During operations, 'Minor' unmitigated impacts to aerial agricultural applications, firefighting and medical and emergency flights were determined, understanding that there may be circumstances that necessitate the need for these activities to occur near the new transmission towers, terminal stations and the overhead transmission line introduced by the Project. No impacts were determined for the other authorised low flying activities.

To address the unmitigated risks described above, mitigation and management measures were developed which are described in Section 7 to Section 9.

12.3 Environmental Performance Requirements

The following EPRs were recommended in order to meet the EES evaluation objectives:

- AV1: Provide notification to Airservices Australia
 - 1. The Project must provide relevant Project details to Airservices Australia so that pilots, including operators of any fire response aircraft, are aware of its existence, location and features of the Project that may pose a hazard to aircraft operations.
 - 2. The information must include relevant details of the Project plant, equipment and infrastructure, and meet the requirements (detail and frequency) of Airservices Australia



for the promulgation of an Aeronautical Information Circular (AIC) and where required a Notice to Airmen (NOTAM) or an Aeronautical Information Publication Supplement (AIP SUP) to keep the aviation industry informed of progress throughout construction.

- This information is to be reported in accordance with CASA Advisory Circular AC139.E-05 Obstacles (including wind farms) outside the vicinity of a CASA certified aerodrome and AC139.E-01 Reporting of tall structures.
- AV2: Mark transmission line towers and associated catenary around Melton Uncertified Aerodrome (YMEL)
 - 1. Towers and associated catenary are to be marked with standard obstacle markings as per Australian Standard AS 3891.1:2021 and AS 3891.2 to make them more visible to pilots flying. Towers near the Melton Uncertified Aerodrome (YMEL) are to be marked, including:
 - a) F4458DL

b) F4459SL-A

c) F4460SL-A

d) F4461SL-A

e) F4462SL-A

f) F4463SL-A

g) F4464SL-A

h) F4459SL-B

i) F4460SL-B

- I) F4463SL-B
- m) F4464SL-B
- n) F4587DL
- o) F4588DL
- p) F4589DL
- q) F4590DL
- r) F4592DL
- s) F4593DL
- t) F4594DL
- u) F4595DL.

j) F4461SL-Bk) F4462SL-B

EPR AV1 was developed so that the relevant notifications to Airservices Australia identified as being required during construction, operation and decommissioning are implemented as recommended in Section 7 to Section 9.

As detailed in Section 8.4.2, EPR AV2 was developed to address specific impacts during operation at Melton (YMEL) Uncertified Aerodrome.

12.4 Residual impacts

Residual impacts were then evaluated, with the application of recommended mitigation and management controls, including the EPRs. The ratings determined are summarised below in Table 12-1.


Location / aviation value	Construction and decommissioning		Operations				
	Unmitigated impact rating	Residual impact rating	Unmitigated impact rating	Residual impact rating			
Certified Aerodrome							
Stawell (YSWL)	No impact	No impact	No impact	No impact			
Ararat (YARA)	No impact	No impact	No impact	No impact			
Ballarat (YBLT)	No impact	No impact	No impact	No impact			
Melbourne Airport (YMML)	Minor impact	No impact	No impact	No impact			
Uncertified Aerodrome							
Glenlofty ALA	No impact	No impact	No impact	No impact			
Beaufort (YBFT)	No impact	No impact	No impact	No impact			
Ballarat Hospital Helipad (YXBT)	No impact	No impact	No impact	No impact			
Myrniong ALA	No impact	No impact	No impact	No impact			
Rowsley/Brooks Landing (YBSL)	No impact	No impact	No impact	No impact			
Rowsley Helipad (YRWS)	No impact	No impact	No impact	No impact			
Greystones ALA	No impact	No impact	No impact	No impact			
Bacchus Marsh (YBSS)	No impact	No impact	No impact	No impact			
Bacchus Health Helipad	No impact	No impact	No impact	No impact			
Melton (YMEL)	Moderate to major impact	Moderate impact	Moderate impact	Minor impact			
Air navigation and air traffic management services	No impact	No impact	No impact	No impact			
Transiting air routes	No impact	No impact	No impact	No impact			
Authorised low flying activities							
Aerial agricultural applications	Minor impact	Minor impact	Minor impact	Minor impact			
Aerial firefighting	Minor impact	Minor impact	Minor impact	Minor impact			
Medical and emergency flights	Minor impact	Minor impact	Minor impact	Minor impact			
Flight training	Minor impact	Minor impact	No impact	No impact			

Table 12-1: Summary of unmitigated and residual impacts



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Location / aviation value	Construction and decommissioning		Operations	
	Unmitigated impact rating	Residual impact rating	Unmitigated impact rating	Residual impact rating
Sports aviation	Minor impact	Minor impact	No impact	No impact
Private flights and tourism	Minor impact	Minor impact	No impact	No impact
Military activities	Minor impact	Minor impact	No impact	No impact
Other aviation activity	Minor impact	Minor impact	No impact	No impact



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