

APPENDIX 3

Obstacle Lighting Plan and Aviation Response

Lachlan Sweeney
Principal Environmental Scientist
Umwelt (Australia) Pty Ltd

February 2025

By email: lsweeney@umwelt.com.au

Our ref: 102211-02

Dear Lachlan

Re: Junction Rivers Wind Farm – Obstacle Lighting Plan and EIS responses

This correspondence responds to the issues raised in response to the exhibition of the Junction Rivers Wind Farm EIS submissions and a request for an Aviation Obstacle Lighting Plan in accordance with the relevant agency submissions and as per CASA's advice on the EIS.

1.1. References

- Advisory Circular (AC)139.E-05 *Obstacles (including wind farms) outside the vicinity of a CASA-certified aerodrome*
- Civil Aviation Safety Regulation (CASR) 1998 Part 139: *Aerodromes, Manual of Standards*
- Department of Planning, Housing and Infrastructure – *Wind Energy Guideline (November 2024)*
- National Airports Safeguarding Framework (NASF) Guideline D: *Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation*

1.2. Background

Aviation Projects prepared an Aviation Impact Assessment (AIA) for the Junction Rivers Wind Farm and concluded that obstacle lighting would not be required to maintain an acceptable level of safety for aircraft.

CASA, Airservices Australia and NSW Biodiversity, Conservation and Science Group raised issues during the EIS submissions.

1.3. Airservices Australia advice

Airservices Australia response to the EIS:

Airspace Procedures

With respect to procedures designed by Airservices in accordance with ICAO PANS-OPS and Doc 9905, at a maximum height of 369.7418m/1214ft AHD, 24 wind turbines will affect the 25nm MSA procedure at Swan Hill aerodrome.

The 25nm MSA is required to be raised by 200ft from 2000ft to 2200ft to accommodate the wind farm. The MSA will also need to be sectorised to accommodate the increased altitude without impacting the instrument approach procedures.

At a maximum height of 369.7418m/1214ft AHD, 46 wind turbines will affect the air route W762 lowest safe altitudes (LSALT) and 27 turbines will affect the H247 lowest safe altitudes (LSALT).

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The air route W762 is required to be raised by 200ft from 2100ft to 2300ft and the air route H247 is required to be raised by 300ft from 2000ft to 2300ft to accommodate the wind farm.

For the wind farm to not affect any procedures at Swan Hill aerodrome or any routes, wind turbines 50 to 56 and 58 to 96 must not exceed a maximum height of 304.8m (1000ft) AHD.

If this wind farm is approved the proponent will need to consult with stakeholders, CASA and Swan Hill aerodrome regarding the impacts detailed above.

Note: Procedures not designed by Airservices at Swan Hill aerodrome were not considered in this assessment.

Communications/Navigation/Surveillance (CNS) Facilities

We have assessed the proposed activity to the above specified height for any impacts to Airservices Precision/Non-Precision Navigation Aids, Anemometers, HF/VHF/UHF Communications, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links and have no objections to it proceeding.

Air Traffic Control (ATC) Operations

There are no additional instructions or concerns from our ATC.

Summary

It is our view is that the proposed Wind Farm impacts Airservices designed airspace procedures, CNS facilities or ATC operations at Swan Hill aerodrome.

Please consult with the aerodrome and aviation operators to ensure that they accept the proposed changes. We need confirmation from the aerodrome before we make any changes.

All amendments to airspace procedures are on a commercial basis. It is our view that the proposed Wind Farm impacts Airservices designed Grid LSALT as currently presented.

The Grid LSALT will need to increase from 1800 ft to 2300 ft.

Please advise the Vertical Obstacle Data (VOD) team at VOD@airservicesaustralia.com of any need to increase Grid LSALT heights at least two (2) weeks before construction commencing by supplying the below information:

- Approved wind turbine locations
- Elevations at the top of the highest point of the turbine in metres AHD
- A copy of this email

1.3.1. Aviation Projects' Response

The findings in the AIA are consistent with Airservices Australia's advice. No changes are required for the AIA report.

1.4. NSW Biodiversity, Conservation and Science Group

1.4.1. NSW Biodiversity, Conservation and Science Group advice on EIS

NSW Biodiversity, Conservation and Science Group responded on 03 September 2024 and advised:

On review of the EIS and the Aviation Impact Assessment, Junction Rivers Wind Farm prepared by Aviation Projects Pty Ltd, dated 13 May 2024 (AIA) as Appendix 15.

The AIA recognises NPWS as a land manager, which undertakes aerial operations. However, the AIA lacks detail around the use of both rotary and fixed-wing aircraft for the purpose of park management (covering aerial pest management, wildlife monitoring, pest animal control) or emergency operations (aerial firefighting and medical evacuation). The AIA only states that low level flight operations within 2000 metres of a WTG may experience downwind turbulence, but the assessment but does not consider implications in the management of land adjoining, and the impact of no fly zones in the vicinity of WTGs. The SEARs also directs the applicant to identify aerodromes which includes aircraft landing areas within 30 kilometres of the nearest WTG, the AIA considers only these within three nautical miles (or about 5.5km).

Recommendations:

Revising the EIS, and AIA to ensure:

2.1. un-certified aerodromes on NPWS estate or those used by the agency including a Helipad at Yanga Homestead 34° 42.91' S and 143° 36.576' E which is within 30 kilometres of the nearest WTG. NPWS also advises that temporary aircraft landing facilities for emergency purposes can occur anywhere on NPWS estate during a state of emergency, or during elevated risk land management operations. What restrictions on aircraft use will need to apply based on the operation of JRWFP, and how will this directly affect NPWS.

2.2. safety risk assessments consider NPWS emergency and firefighting aerial operations (as both low flight and low visibility operations) specific to the shared interface with Yanga SCA. Ensuring the maintenance of acceptable levels of safety are delivered in this locality, clear mitigation is articulated and will translate into a relevant JRWFP operational plan.

1.4.2. Aviation Projects' Response

2.1 Un-certified aerodromes on NPWS estate or those used by the agency including a Helipad at Yanga Homestead 34° 42.91' S and 143° 36.576' E which is within 30 kilometres of the nearest WTG. NPWS also advises that temporary aircraft landing facilities for emergency purposes can occur anywhere on NPWS estate during a state of emergency, or during elevated risk land management operations. What restrictions on aircraft use will need to apply based on the operation of JRWFP, and how will this directly affect NPWS.

The Yanga Homestead landing site (HLS) is located near the Sturt Highway, but cannot be identified using aeronautical data that is publicly available or on Google Earth. Based on the location NPWS provided, the Yanga Homestead HLS is approximately 10km north of the WTG. At this distance, the wind farm would not affect the HLS and helicopter operations to and from it.

Uncertified aerodromes that are further than 3 nm (5.56 km) (Based on AC-91-10 operations in the vicinity of non-controlled aerodromes) from the wind farm are not affected by the wind farm. NPWS helicopter operations in the area are required to be operated in accordance with Civil Aviation Safety Authority Regulations relevant to their operations, in particular the Visual Flight Rules, minimum altitudes and distances from obstacles, and houses.

They need not be considered in the AIA.

The wind turbines are highly visible from a significant distance in visual meteorological conditions and can be identified and avoided by both fixed wing and helicopter pilots.

Low level flying operations by authorised organisations using authorised aircraft flown by authorised pilots require extensive pre-flight study of intended flight paths and areas of operation. The study of topographical and aeronautical charts form a basis for determining the location of potential hazards and therefore safe operating areas and detailed information from local landholders and NPWS would provide further information

of the location of wind turbines near to the national park. This will enable NPWS and other pilots to plan their flights to avoid any likely impacts from the wind turbines.

2.2. safety risk assessments consider NPWS emergency and firefighting aerial operations (as both low flight and low visibility operations) specific to the shared interface with Yanga SCA. Ensuring the maintenance of acceptable levels of safety are delivered in this locality, clear mitigation is articulated and will translate into a relevant JRWFP operational plan.

Aviation Projects has included an aviation risk assessment that considers the need for the lighting of the wind turbines and wind monitoring towers in the AIA for the planning authority to consider.

CASA has been provided with the details of the wind farm infrastructure and has provided their response which is referred to below.

Flight operations can occur throughout the national park and surrounding areas. Pilots must be aware of local obstacles and terrain to ensure the safe operation of the aircraft.

Under CASR Part 91 the pilot is responsible for ensuring that a place intended for landing or take-off is suitable for safe flight operations.

1.5. CASA advice

1.5.1. CASA advice on the EIS

CASA responded on 11 July 2024, and required obstacle lighting for the Junction Rivers Wind Farm:

Contrary to Recommendation 9, CASA considers the proposed wind farm will be a hazard to aviation safety and recommends that the wind farm is obstacle lit with steady medium-low intensity red obstacle lighting in accordance with the National Airports Safeguarding Framework Guideline D 'Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation' National Airports Safeguarding Framework Principles and Guidelines (infrastructure.gov.au) and section 9.31 of Part 139

Aerodromes Manual of Standards Part 139 (Aerodromes) Manual of Standards 2019 (legislation.gov.au) (lower level lights on the turbine support columns are not essential).

International standards require 2,000 candela lighting intensity on the nacelle (also recommended in the NASF guideline) and 200 candelas at the mid-point of the turbine mast. CASA recommends that 200 candela as a minimum intensity lighting on the nacelle would suffice (due mainly to the lack of background lighting in the vicinity of the turbines). The obstacle lighting should be monitored to alert the wind farm operator of any outage and at least some of the obstacle lights remain on during an outage. CASA is prepared to review a lighting plan that indicates which turbines are proposed to be lit.

As the Aviation Safety regulator, CASA does not consider the visual impact of obstacle lighting on neighbours / homesteads. However, there are mitigations for visual impact such as baffling and intensity control (as described in the Aviation Impact Assessment Table 12 / Page 68 'Effect of obstacle lighting on neighbours').

Further to Recommendation 13, and as recommended by the Aerial Application Association of Australia, CASA recommends that the following Australian Standard be considered regarding overhead transmission lines:

- AS 3891.2, Air navigation – Cables and their supporting structures – Marking and safety requirements, Part 2: Low-level aviation operations.

The impacts on:

- the 25nm MSA procedure at Swan Hill aerodrome
- air route W762 lowest safe altitudes (LSALT)
- the H247 lowest safe altitudes

are covered in Aviation Impact Assessment Section 6 Consultation and Section 11 Conclusions but not specifically included in Section 12 Recommendations. The proponent (or the proponent's Aviation Consultant) should engage with Airservices Australia and the Swan Hill Aerodrome operator regarding the changes to the MSA and LSALTs, before the offending WTGs have been erected. (Airservices may need some lead time).

1.5.2. Aviation Projects' Response

CASA's response is appropriate in consideration of its responsibility for aviation safety. It does not consider the practical use of the obstacle lights which the Aviation Projects' risk assessment shows as unnecessary to maintain the current level of aviation safety:

- By day the turbines are highly visible at a suitable distance to allow pilots to identify them and avoid them
- If low cloud exists below the hub, aircraft flying beneath the cloud due to stress of weather, cannot see the lights but the pilots can still see the turbine tower at a suitable distance to identify and avoid them
- By night and during IFR flight, aircraft are at least 1000 ft above all obstacles and terrain during cruising flight. During an instrument approach to an aerodrome, or during an IFR departure, they are protected by PANS-OPS surface minimum altitudes which keeps them clear of the obstacles and terrain by prescribed margins.

The consultation started with Swan Hill Council on 2 October 2023 and 22 April 2024, but we have not yet received a response regarding approval to amend the procedure. Aviation Project will follow up and their response will be provided to Airservices Australia.

For the obstacle lighting situation CASA's recommendation will be considered by the planning authority along with the recommendation provided in the AIA by Aviation Projects, when they consider the amenity of the local community in relation to lighting nuisance.

Overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial application operations should be identified in consultation with local aerial application operators and marked in accordance with Part 139 MOS 2019 Chapter 8 Division 10 section 8.110 (7) and section 8.110 (8).

1.6. Obstacle lighting arrangements

In applying the requirements of CASR Part 139 MOS or NASF Guideline D in relation to obstacle lighting on wind turbines, and in particular the 900 m interval, it is suggested that the following wind turbines (red dots and orange dots illustrated in Figure 1 and Table 1) are lit. The Junction Rivers Wind Farm should have 200 candela (cd) low intensity steady red obstacle lighting that is fitted and operational.

Light and Shielding Specification:

- Lights:
 - 2 low intensity steady red lights (per lit wind turbine):

- Fixed lights showing red
 - A horizontal beam spread that results in 360° coverage around the obstacle
 - A minimum intensity of 200 candela (cd)
 - A vertical beam spread (to 50% of peak intensity) of 10°
 - A vertical distribution with 50 cd minimum at +6° and +10° above the horizontal
 - Not less than 10 cd at all elevation angles between -3° and +90° above the horizontal.
 - Obstacle lights should operate at night, and at times of reduced visibility.
- *Shielding:*
 - Shielding of the downward component of obstacle lighting is permitted, and if used, must be such that:
 - No more than 5% of the nominal light intensity is emitted at or below 5° below the horizontal
 - No light is emitted at or below 10° below horizontal
 - Two lights must be provided on top of the generator housing in a way that allows at least one of the lights to be seen from every angle in azimuth.
 - *Department of Defence obstacle lighting requirement:*
 - The frequency range of the LED light emitted must fall within the range of wavelengths 655 to 930 nanometres.

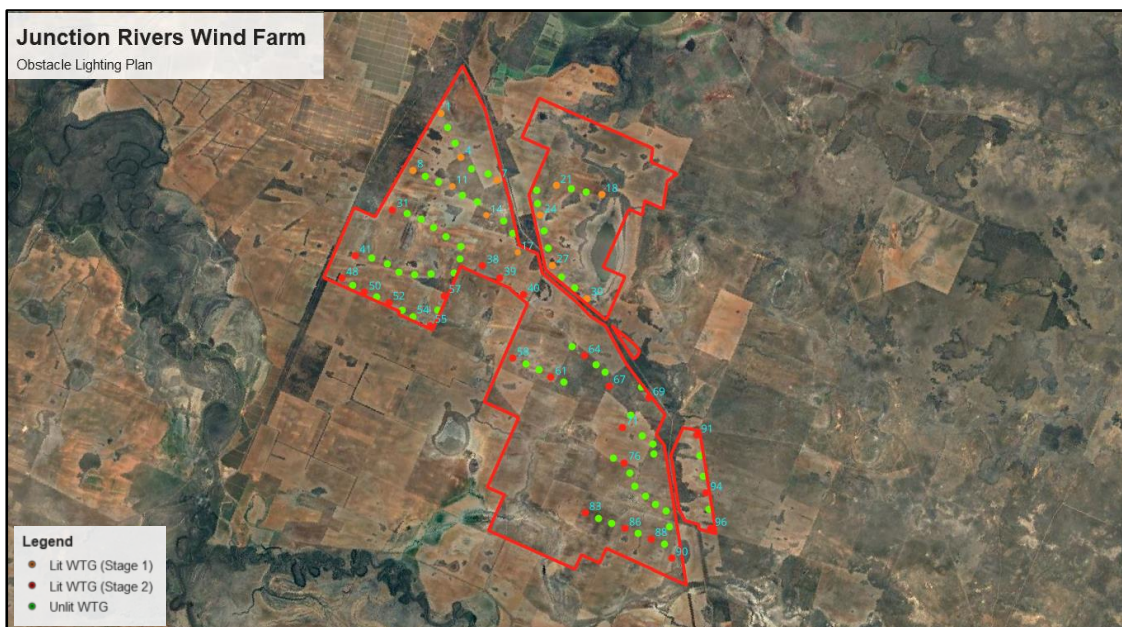


Figure 1 Proposed obstacle lighting layout

Table 1 Wind turbine ID for Proposed obstacle lighting

<i>WTG ID</i>	<i>Longitude</i>	<i>Latitude</i>
Stage 1		
WTG 01	-34.791	143.535
WTG 04	-34.805	143.549
WTG 07	-34.810	143.568
WTG 08	-34.815	143.529
WTG 11	-34.817	143.549
WTG 14	-34.824	143.568
WTG 17	-34.834	143.587
WTG 18	-34.804	143.617
WTG 21	-34.806	143.596
WTG 24	-34.818	143.592
WTG 27	-34.835	143.604
WTG 30	-34.844	143.624
Stage 2		
WTG 31	-34.832	143.525
WTG 38	-34.843	143.573
WTG 39	-34.846	143.582
WTG 40	-34.849	143.595
WTG 41	-34.853	143.514

<i>WTG ID</i>	<i>Longitude</i>	<i>Latitude</i>
WTG 48	-34.862	143.511
WTG 50	-34.865	143.523
WTG 52	-34.866	143.536
WTG 55	-34.870	143.557
WTG 57	-34.858	143.560
WTG 58	-34.874	143.598
WTG 61	-34.877	143.618
WTG 64	-34.865	143.630
WTG 67	-34.874	143.645
WTG 69	-34.874	143.664
WTG 71	-34.888	143.656
WTG 76	-34.901	143.662
WTG 83	-34.923	143.651
WTG 86	-34.925	143.671
WTG 88	-34.926	143.684
WTG 90	-34.931	143.695
WTG 91	-34.883	143.691
WTG 94	-34.903	143.702
WTG 96	-34.916	143.709

If you wish to clarify or discuss the contents of this correspondence, please get in touch with me on 0433 747 835.

Kind regards

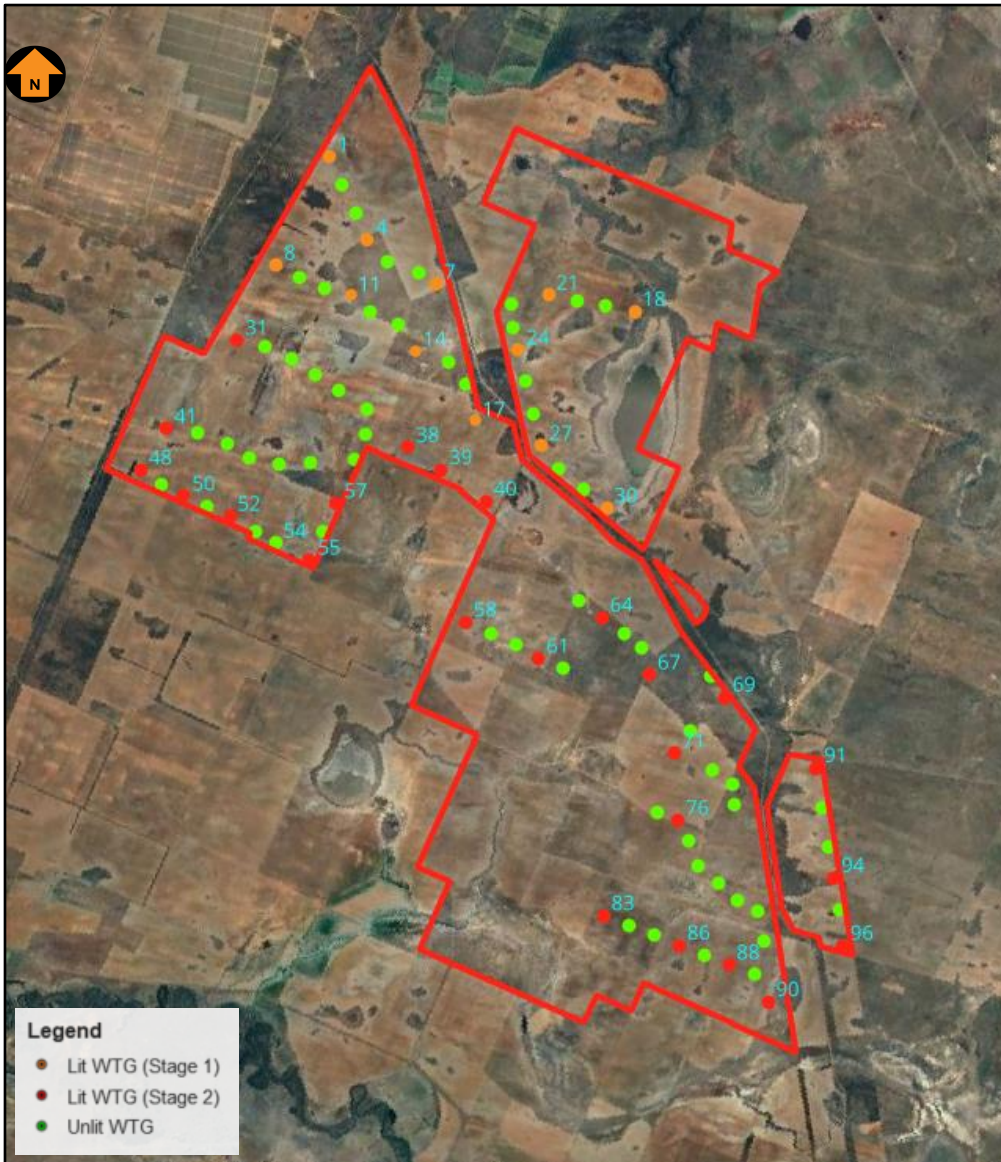


Lyn Wang

Aviation Specialist Consultant

13 February 2025

Enclosure: Obstacle Lighting Plan



1. Light and Shielding Specification:

Lights:

- **2 low intensity** steady red lights:
 - fixed lights showing red
 - a horizontal beam spread that results in 360° coverage around the obstacle
 - a minimum intensity of 200 candela (cd)
 - a vertical beam spread (to 50% of peak intensity) of 10°
 - a vertical distribution with 50 cd minimum at +6° and +10° above the horizontal
 - not less than 10 cd at all elevation angles between -3° and +90° above the horizontal.

Shielding:

- shielding of the downward component of obstacle lighting is permitted, and if used must be such that:
 - no more than 5% of the nominal light intensity is emitted at or below 5° below horizontal
 - no light is emitted at or below 10° below horizontal
- two lights must be provided on top of the generator housing in a way that allows at least one of the lights to be seen from every angle in azimuth.

Department of Defence obstacle lighting requirement:

- the frequency range of the LED light emitted must fall within the range of wavelengths 655 to 930 nanometers.

2. References

- Civil Aviation Safety Authority, *Part 139 (Aerodromes) Manual of Standards 2019*, dated 14 December 2024; Chapter 9 Division 4 Obstacle lighting (Sections 9.31, 9.32 and 9.33)
- Department of Infrastructure, Transport, Regional Development, Communications and the Arts, Australian Government, National Airport Safeguarding Framework, *Guideline D Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation*, v4.1.3, 15 July 2012, paragraphs 35, 36 and 37