Appendix B

Aviation Impact Assessment

Bodangora Wind Farm Pty Ltd

Bodangora Wind Farm

Aviation Impact Statement

October 2012

Executive summary

The proposed wind farm at Bodangora is in close proximity to the airfield at Wellington. Presently there is no conflict in operations. The only potential impact to operations would be a likely limitation on circling to the north-eastern side of Runway 13/31. The proposed wind farm does not impact of the approach and departure airspace for any of the runways. See Figure 3.

Runway 05/23. There are currently no departures from runway 05 due to the rising terrain.

Night operations on Runway 13/31 facilitated by the recent installation of runway lights are also not affected by the proposed wind farm.

Table of contents

Table index

Figure index

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1. Introduction

1.1 Background

Infigen Energy proposes to build a wind farm near Bodangora, NSW. It is a requirement that in order to manage the risk to aviation safety from wind farms that an aviation assessment must be undertaken. This assessment must include an Aviation Impact Statement.

1.2 Purpose of this report

To inform Infigen energy of the potential impacts on operation of the proposed wind farm by its proximity to Wellington Airport and to comply with the Airservices Australia requirement to undertake an Aviation Impact Study for all wind farm proposals.

2. References

Airservices Aviation Assessments for Wind Farm Developments.

Airservices Australia Aeronautical Information Package (AIP) 23 August 2012, including;

- En Route Supplement Australia (ERSA) – Facilities (FAC);

Civil Aviation Safety Authority (CASA) publication;

Manual of Standards Part 139 – Aerodromes (MOS Part 139);

- Chapter 7: Obstacle Restriction and Limitation.
- Chapter 13 Standards for small aerodromes intended for small aeroplanes conducting air transport operations under CASR 121B

3. Wellington / Bodangora Airport

The airport is un-certified by the Civil Aviation Safety Authority (CASA). It is owned and operated by Wellington Shire Council. Location; 32 28'S 148 59'E.

Figure 1 shows the airport layout and the location of the closest wind turbine 5.05km north-east of the airport.

The main runway is designated Runway 13/31 The runway is sealed, 15 metres (m) wide with a 60 metre runway strip and is 1500 m long. It is classified as a Code 1a runway. The airport elevation is 1398 feet (426 m) above mean sea level (AMSL).

Runway lighting installed.

The second runway is 05/23. The runway is un-sealed; 10 metres wide with a 45 metre runway strip and is 900 metres long.

There are no precision or non-precision approach procedures published for the airport:

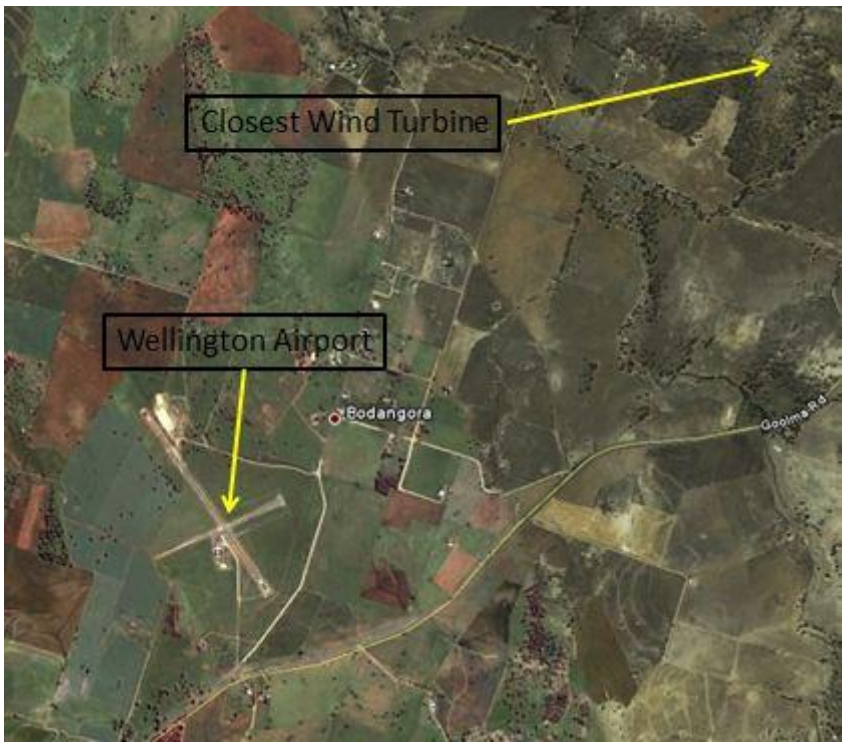

Figure 1 Wellington Airport

3.1 Current operations

- Corrective services use the airfield to transfer personnel and prisoners including night transfers.
- Pilot training including night training
- Crop spraying and dusting operations
- Fire fighting operations
- RAAF remote field night and day landing exercises
- Patient transfer for medical reasons and RFDS flights
- Mining exploration and personnel transfer for the mines that are being developed in the district
- Recreational flying
- Flying for business purposes
- Home base for Recreational and General Aviation Private aircraft owners
- Temporary Base for Air Charter and Aerial Work operations (including aerial bushfire control, crop spraying, etc.)

3.2 Future Use

- A new mine has been approved to the north-east, near Dunedoo. The planning for the mine included the use of fly in fly out operations.
- All current uses with increased traffic
- Development of an air park. This is in the Wellington Council's current LEP.
- As Dubbo airport becomes busier, more training will occur at Wellington including night training

- As more airports close on the coast, Wellington will be used more for training and as a base for aircraft owners, especially when the airpark is developed
- There will be increased use for fire fighting aircraft
- There will be increased use for night flying now the new runway lights are in operation all night
- There is potential for non-precision GPS landing system on the 13/31 runway

4. Airservices guidelines

4.1 Airservices Aviation Assessments for Wind Farm Developments

Guidelines to manage the risk to aviation safety from wind turbine installations (Wind Farms/Wind Monitoring Towers) are under development by the National Airports Safeguarding Advisory Group (NASAG). NASAG is comprised of high-level Commonwealth, State and Territory transport and planning officials and has been formed to develop a national land use planning regime to apply near airports and under flight paths.

The wind farm guidelines will provide information to proponents and planning authorities to help identify any potential safety risks posed by wind turbine and wind monitoring installations from an aviation perspective.

Potential safety risks include (but are not limited to) impacts on flight procedures and aviation communications, navigation and surveillance (CNS) facilities which require assessment by Airservices.

To facilitate these assessments all wind farm proposals, as stated in their submission to the BWF, submitted to Airservices must include an Aviation Impact Statement (AIS) prepared by an aeronautical consultant in accordance with the AIS criteria set out below.

4.2 Aviation Impact Statement Criteria

The AIS must provide a detailed analysis covering, as a minimum:

4.2.1 Airspace Procedures:

1. Obstacles
   - Co-ordinates in WGS 84 (to 0.1 second of arc or better)
   - Elevations AMSL (to 0.3 metres)
2. Drawings
   - Overlayed on topographical base not less that 1:250,000. Details of datum and level of charting accuracy to be noted.
   - Electronic format compatible with Microstation version 8i.
3. Aerodromes
   - Specify all registered/certified aerodromes that are located within 30nm (55.56km) from any obstacle referred to in (1) above.
   - Nominate all instrument approach and landing procedures at these aerodromes.

- Confirmation that the obstacles do not penetrate Annex 14 or OLS for any aerodrome. If an obstacle does penetrate, specify the extent.

4. Air Routes

- Nominate air routes published in ERC-L & ERC-H which are located near/over any obstacle referred to in (1) above.
- Specify two waypoint names located on the routes which are located before and after the obstacles.

5. Airspace

Airspace classification – A, B, C, D, E, G etc where the obstacles are located.

4.2.2 Navigation/Radar:

1. Detect the presence of dead zones
2. False target analysis
3. Target positional accuracy
4. Probability of detection
5. Radar coverage implications
6. We would expect the analysis to follow the guidelines outlined in the EUROCONTROL Guidelines on How to Assess the Potential Impact of Wind Turbines on Surveillance Sensors.

http://www.eurocontrol.int/surveillance/public/standard_page/sur_WTTF.html

4.3 Certified Airports within 30 nautical miles of Wellington Airport

There are numerous small airstrips within the local area but only one certified airport within 30 NM of Wellington.

- Dubbo; 26 NM bearing 304 degrees - certified
- Instrument approaches - VOR, DME and NDB
- Largest aircraft SAAB 34 and Dash 8-2/3/4/00 series.
- The PansOps surfaces for Dubbo would not be penetrated and flying operations not affected by turbines at the proposed wind farm.

4.4 Air Routes

There is only one air route crossing the area of the wind farm. W785 between Mudgee (MDG) and Dubbo (DU). The lowest safe altitude on this route is 4300ft AMSL.

4.5 Airspace

The airspace in the area encompassing the airport and the proposed wind farm is Class G.

4.6 Radar

There is no radar at Wellington.

4.7 Night Operations

Runway, taxiway and windsock lighting has been installed sufficient to allow for non-precision approaches.

5. Critical Surfaces

5.1 Obstacle Limitation Surface (OLS)

An OLS for a non-precision instrument runway comprises of a:

(a) approach surface;

(b) take-off climb surface;

(c) transitional surface;

(d) inner horizontal surface (45 m above the runway); and

(d) conical surface.

The final OLS sources comprises of a surface for take-off and for approach. Where two OLS surfaces overlap, the lower surface is used as the controlling OLS.

MOS 139 defines an obstacle as: “any object that penetrates the OLS, a series of surfaces that set the height limits of objects, around an aerodrome.”

It also states that an obstacle must not be located within the obstacle restriction area of the aerodrome without the specific approval of CASA.

Temporary obstacles and transient (mobile) obstacles, such as road vehicles, cranes, rail carriages or ships, in close proximity to the aerodrome and which penetrate the OLS for a short duration must also be referred to CASA to determine whether they will be a hazard to aircraft operations.

Runway and obstacle surfaces	Aeroplanes not exceeding 5,700kg by night	Aeroplanes not exceeding 5,700kg by day	Aeroplanes not exceeding 2,000kg by day
Runway and strip			
Runway width	18 m	15 m	10 m
Runway strip width: - preferred graded - minimum acceptable graded - graded plus ungraded	 80 m 45m 80m	 60 m 45m 60m	 30 m 60m
Runway longitudinal slope	2%	2%	2%
Runway transverse slope	2.5%	2.5%	2.5%
Runway strip transverse slope	3.0%	3.0%	3.0%
Approach and take-off surfaces			
Length of inner edge	80 m	60 m	30 m
Distance of inner edge before threshold	60 m	30 m	30 m
Divergence, each side	10%	10%	10%
Length of surface	2500 m	1600 m	900 m
Slope	4%	5%	5%
Transitional surface			
Slope (to 45 m in height)	20%	20%	20%
Inner horizontal surface			
Height	45 m	45 m	45 m
Radius from runway strip	2,500 m	2,000 m	2,000 m

Table 1 Standards for Physical and Obstacle Limitation Surfaces

Figure 2 Obstacle Limitation Surfaces

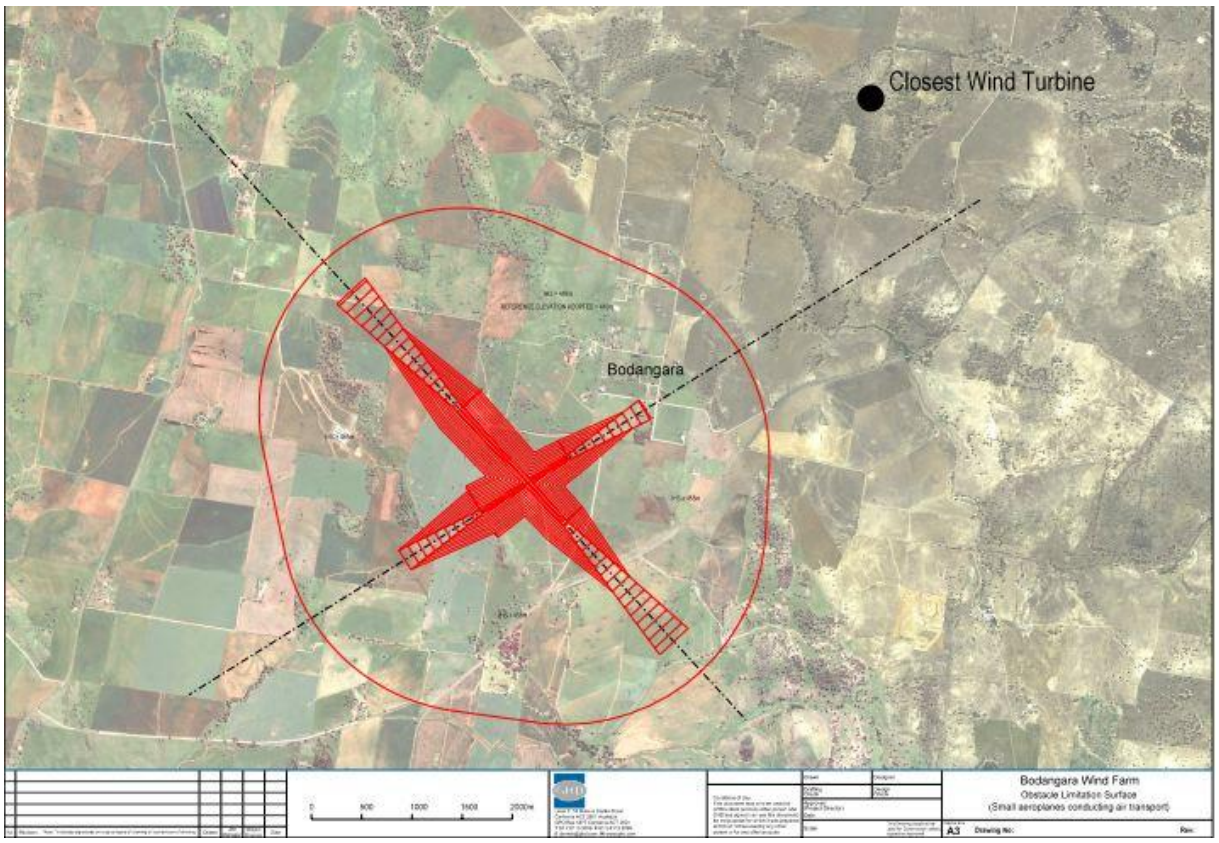

Figure 3 Current Obstacle Limitation Surfaces for Wellington based on Column 3, Table 1

5.2 PANS-OPS Surfaces

As Wellington does not have any published procedures these surfaces do not apply.

6. Discussion

At present the location and height of the proposed wind farm would not affect flying operations at Wellington / Bodangora Airport.

The only potential impact on operations would be a likely limitation on circling to the north-eastern side of Runway 13/31. The proposed wind farm does not impact of the approach and departure airspace for any of the runways. See Figure 3.

Runway 05/23. There are currently no departures from runway 05 due to the rising terrain.

Night operations on Runway 13/31 facilitated by the recent installation of runway lights are also not affected by the proposed wind farm.

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