**In the matter of the Stockyard Hill Wind Farm**

**Planning Panels Victoria**

**Proponent: Stockyard Hill Wind Farm Pty Ltd**

# Expert Witness Statement of Ian Jennings

**Expert of Stockyard Hill Wind Farm Pty Ltd**

# 1 Name and address

Ian Jennings

27 Hilda Street,

Essendon Vic 3040

# 2 Qualifications and experience

Annexure A contains a statement detailing my qualifications and expertise and addressing the matters set out within Planning Panels Victoria's Guide to Expert Evidence.

# 3 Scope

## 3.1 Role in Preparation of the Amendment Application

My firm Ambidji was responsible for the preparation of the technical report titled *"Final Report, Stockyard Hill Wind Farm Aeronautical Impact Assessment, Aviation Impact Statement, Qualitative Risk Assessment and Obstacle Lighting Review 180m Turbines, J0462 dated 28 April 2016"* [Ambidji Report] which was submitted by Stockyard Hill Wind Farm Pty Ltd as part of its Amendment Application.

My role in the preparation of the report was to conduct the Qualitative Risk Assessment and Obstacle Lighting Review and then to finalise the overall report to include the Aviation Impact Statement. Further involvement included the consultation process with Airservices Australia, Department of Defence and the Civil Aviation Safety Authority.

## 3.2 Instructions

My instructions to prepare this witness statement are set out in Annexure C, with particular reference to the Amendment Application including a number of changes to the existing Stockyard Hill Wind Farm Wind Energy Facility (SHWF WEF) planning permit PL-SP/05/0548-1, including:

- A rotor diameter of up to 142 metres (an increase from the permitted blade length of 52 metres / rotor diameter of up to 104 metres);
- A hub-height of up to 120 metres (an increase from the permitted hub-height of up to 80 metres);
- A ground clearance from the bottom of the blades to the ground level of no less than 32 metres (not previously specified); and
- A total blade tip height up to 180 metres (an increase from the permitted height of up to 132 metres).

## 3.3 Process and Methodology

I have reviewed the Ambidji Report and compared the aeronautical data contained in the current Australian Aeronautical Information Publication (AIP) dated 10 November 2016 with that used in the report.

The methodology used was the same as that used in the Ambidji Report. In particular for the Aviation Impact Statement to review:

- Obstacle Limitation Surfaces for nearby certified and registered aerodromes;
- Published instrument approach procedures and associated PANS-OPS prescribed airspace for nearby certified and registered aerodromes;

- Published flight paths for infringement of Lowest Safe Altitudes;
- Published flying training areas; and
- Communications, Navigation and Surveillance Systems.

The review of the Qualitative Risk Assessment, looked, in particular for any changes to the AIP and CASA documents as well as the National Airports Safeguarding Framework (NASF) Guideline D *Managing the Risk to Aviation Safety of Wind Turbine Installations (Wind Farms)/Wind Monitoring Towers*[1].

On 26 May 2016, Airservices Australia as part of the *Navigation Rationalisation Project 2016* changed the primary means of navigation for aircraft flying to the Instrument Flight Rules (IFR) from ground based radio navigation aids to Global Navigation Satellite System (GNSS). A significant number of ground based radio navigation aids across Australia were turned off. Two of these navaids were the Non Directional Beacons (NDB) at Ballarat aerodrome (YBLT) and a primary entry point to Melbourne Airport Controlled Airspace (CTA) at Yarrowee (YWE). This way point has been renamed ESDIG. The criteria used for calculating Lowest Safe Altitudes (LSALT) was also changed.

The removal of these NDB's changes some detail of the Ambidji Report but not its findings.

# 4 Findings

## 4.1 Summary of Opinions

I have reviewed the details provided regarding the Amendment Application including changes to the turbine tip height from 132m to 180m above ground level (AGL) in preparing this expert witness statement.

Save where otherwise indicated I adopt the *Final Report, Stockyard Hill Wind Farm Aeronautical Impact Assessment, Aviation Impact Statement, Qualitative Risk Assessment and Obstacle Lighting Review, 180m Turbines. J0462 V1.1 dated 28 April 2016.*as the basis of my evidence before Planning Panels Victoria.

### Abbreviations

Abbreviations used in this report, and the meanings assigned to them for the purposes of this report are detailed in the following table:

| Abbreviation | Meaning |
|---|---|
| AC | Advisory Circular (document supporting CASR 1998) |
| AHD | Australian Height Datum |
| AIA | Aeronautical Impact Assessment |
| AIP | Aeronautical Information Publication |
| AIS | Aviation Impact Statement |
| ALA | Aeroplane Landing Area |
| ARP | Aerodrome Reference Point |
| AsA | Airservices Australia |
| ATC | Air Traffic Control(ler) |
| CAO | Civil Aviation Order |
| CAR | Civil Aviation Regulation 1988 |
| CASA | Civil Aviation Safety Authority |

[1] NASF Guideline D – last accessed 23 January 2017
https://infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/files/4.1.3_Guideline_D_Wind_Turbines.pdf

| Abbreviation | Meaning |
|---|---|
| CASR | Civil Aviation Safety Regulation 1998 |
| Cat | Category |
| DAP | Departure and Approach Procedures (charts published by AsA) |
| DME | Distance Measuring Equipment |
| ERSA | Enroute Supplement Australia |
| ft | feet |
| GA | General Aviation |
| GNSS | Global Navigation Satellite System |
| ICAO | International Civil Aviation Organisation |
| IFR | Instrument Flight Rules |
| km | kilometres |
| LAT | Latitude |
| LONG | Longitude |
| LSALT | Lowest Safe Altitude |
| m | metres |
| MOC | Minimum Obstacle Clearance |
| MOS | Manual of Standards, published by CASA |
| MSA | Minimum Sector Altitude |
| SSR | Monopulse Secondary Surveillance Radar |
| NASAG | National Airports Safeguarding Advisory Group |
| NASF | National Airports Safeguarding Framework |
| NDB | Non Directional Beacon |
| nm | Nautical Mile (= 1.852 km) |
| NOTAM | NOtice To AirMen |
| OLR | Obstacle Lighting Review |
| OLS | Obstacle Limitation Surface |
| PANS-OPS | Procedures for Air Navigation Services – Aircraft Operations |
| PSR | Primary Surveillance Radar |
| QRA | Qualitative Risk Assessment |
| RPT | Regular Public Transport |
| RWY | Runway |
| SFC | Surface |
| SHWFPL | Stockyard Hill Wind Farm Pty. Ltd. |
| SHWF WEF | Stockyard Hill Wind Farm Wind Energy Facility |
| SSR | Secondary Surveillance Radar |
| VFR | Visual Flight Rules |
| VOR | Very high frequency Omni directional Range |
| YARA | Ararat Registered Aerodrome |
| YBLT | Ballarat Registered Aerodrome |
| YWE | Yarrowee Navigation Aid |

**Aerodromes and Airstrips**

As described in section 1.3 of the Ambidji Report, aerodromes fall into four categories:

- Military or Joint User (combined military and civilian);

- Certified;
- Registered; and
- Uncertified or Aeroplane Landing Areas

A Military aerodrome is operated by the Department of Defence and is suitable for the operation of military aircraft. A Joint User aerodrome is a Military aerodrome used by both military and civilian aircraft, for example Darwin International and Townsville International Airports.

A Certified Aerodrome, certified under Civil Aviation Safety Regulation (CASR) 139.040, is available for Regular Public Transport and Charter operations and has a runway suitable for use by an aircraft having a maximum carrying capacity of more than 3,400kg or a passenger seating capacity of more than 30 seats, for example Melbourne International Airport, Mildura Airport and Portland Airport.

A Registered Aerodrome, registered under CASR 139.260, is one to which CASR 139.040 does not apply and the operator has applied to CASA to have it registered, for example Horsham, Warracknabeal, Stawell and Ararat Airports.

An Uncertified Aerodrome is any other aerodrome or airstrip and is referred to as an Aeroplane Landing Area (ALA). These range in capability and size from having a sealed runway with lighting capable of accommodating corporate jet aircraft to a grass paddock that is smooth enough to land a single engine light aircraft or a purpose built aerial agricultural aircraft.

Military, Certified and Registered aerodromes are listed in the Aeronautical Information Publication[2] (AIP) and are subject to a NOTAM[3] service that provides the aviation industry with current information on the status of the aerodrome facilities. This information is held in the public domain, is available through aeronautical publications and charts and is kept current by mandatory reporting requirements.

ALA are not required to be listed in the AIP so information about them is not held in the public domain, is not available through aeronautical publications and charts and is not required to be reported. Where ALA information is published in the AIP it is clearly annotated that it is not kept current. Consequently ALA can come into use and fall out of use without any formal notification to CASA, AsA or any other authority. Airstrips that appear on survey maps often no longer exist; others exist but do not feature on maps. Similarly a grass paddock used as an ALA is not usually discernable on satellite mapping services such as Google Earth.

Military, Joint, Certified and Registered aerodromes usually have OLS and PANS-OPS surfaces prescribed to protect the airspace associated with published instrument approach and landing procedures. An ALA cannot have a published instrument approach and landing procedure so cannot have associated prescribed airspace protected by OLS or PANS-OPS. All operations into ALA therefore, must be conducted in accordance with the Visual Flight Rules (VFR) and in Visual Meteorological Conditions (VMC).

**Aviation Obstacle Lighting**

With respect to aviation obstruction lighting section 7.2 of the Ambidji report finds that: -

> "In line with the NASF Guideline D and the findings of the QRA (see 6.13.2 and 6.14), obstacle lighting is not considered necessary because the assessed risk to aviation safety is LOW and therefore no additional mitigation is required."
>
> "It is noted that the Instrument Approach Plates (part of the AIP) for the Ballarat RNAV-Z RWY 18 and NDB RWY 36, dated 26 MAR 2014, have an editorial note that the nearby wind farm obstacle lighting has been decommissioned. This decommissioning occurred in 2010." [The wind farm referred to is Waubra}

[2] AIP; a mandatory worldwide distribution system for the promulgation of aviation rules, procedures and information

[3] NOTAM (Notice to Airmen); a mandatory reporting service to keep aerodrome and airways information current and available to the aviation industry world wide

"It is also noted that there is an existing unlit wind farm between the SHWF WEF and YARA (Ararat aerodrome) which is marked on the appropriate aeronautical charts."

The issue of aviation obstruction lighting is covered in the National Airport Safeguarding Framework (NASF) Guideline D

The Civil Aviation Safety Authority (CASA) cannot mandate aviation obstacle lighting where the obstacle is beyond the aerodrome Obstacle Limitation Surface (OLS) and does not penetrate the Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) surfaces, Lowest Safe Altitudes (LSALT) or any other prescribed airspace. The SHWF WEF does not penetrate any OLS, PANS-OPS, LSALT or any other prescribed airspace. To my knowledge CASA has not undertaken any risk analysis as required in NASF Guideline D paragraphs 33 and 34. The Ambidji Report contains the results of the Qualitative Risk Assessment carried out in accordance with NASF Guideline D paragraph 34 (above) that concludes the Stockyard Hill Wind Farm, with 180m tip height turbines is not a hazard to aircraft safety.

Wind turbines, by their size and colour are considered, by day, to be conspicuous objects that do not need additional risk mitigation. For VFR aircraft flying at night a height of 1000 feet above the highest obstacle within 10nm of the aircraft must be maintained. Given the regulated clearance requirements for aircraft flying VFR at night or IFR, aviation obstacle lighting at night is not mitigating a risk and is therefore not required.

Aviation Obstacle Lighting is not required.

**Low Flying**

With respect to low flying, as carried out by aerial agricultural application aircraft, aerial firefighting, emergency services and other authorised low level flying the increase in turbine tip height has minimal impact. Aircraft are required to be at least 500ft above the highest object on the terrain below.

The statement, "500ft AGL minima that VFR pilots are permitted to operate to," as referred to in submission SHWF_7 and by CASA is incorrect.

Low Flying is governed by Civil Aviation Regulation (CAR) CAR 157 – Low Flying[4] that states at sub regulation:

- (1) The pilot in command of an aircraft must not fly the aircraft over: (a) any city or populous area at a height lower than 1000 feet; or (b) any other area at a height lower than 500 feet;
- (2) An offence against sub regulation (1) is an offence of strict liability;
- (3) A height specified in sub regulation (1) is the height above the highest point of the terrain, **and any object on it**, within a radius of (a) in the case of an aircraft other than a helicopter – 600 metres; or (b) in the case of a helicopter – 300 metres; from a point on the terrain vertically below the aircraft.

Sub regulation (4) provides a number of exceptions to sub regulation (1). Sub regulation (4) states: Sub regulation (1) does not apply if: (a) through stress of weather or any other unavoidable cause it is essential that a lower height be maintained. The subsequent parts (b) through (h) refer to specific CASA authorised activities such as aerial agricultural applications or search and rescue operations.

The operative word in (4) (a) is **unavoidable**. Flying into an area of low cloud and reduced visibility is avoidable. At all times a VFR pilot must have a forward visibility of 5000 metres and remain clear of cloud.

Section 6.12 of the Ambidji Report finds that the flying training schools at Ballarat conduct training in the general area to the east of the SHWF WEF. Consequently such training flights would normally be outside the SHWF WEF boundaries. It is also noted that the Western Highway and the Ballarat/Ararat railway line to the north and the Ballarat to Skipton Road to the south, are sufficiently clear of the SHWF WEF to enable a VFR pilot caught by low cloud to navigate safely by using them as a visual guide.

The Qualitative Risk Assessment, at section 6.14 summarises the risk to aviation from the SHWF WEF as LOW. The QRA shows that the increased tip height and the reduced

[4] CAR 157 – Low Flying is provided over the page.

number of the turbines proposed for the already approved SHWF WEF will not be of operational significance or be a hazard to aircraft safety.

**CAR 157**

To assist the Panel CAR 157 is shown below.

### 157 Low flying[5]

*(1) The pilot in command of an aircraft must not fly the aircraft over:*

*(a) any city, town or populous area at a height lower than 1,000 feet; or*

*(b) any other area at a height lower than 500 feet.*

*Penalty: 50 penalty units.*

*(2) An offence against subregulation (1) is an offence of strict liability.*

*Note: For **strict liability**, see section 6.1 of the Criminal Code.*

*(3) A height specified in subregulation (1) is the height above the highest point of the terrain, and any object on it, within a radius of:*

*(a) in the case of an aircraft other than a helicopter—600 metres; or*

*(b) in the case of a helicopter—300 metres;*

*from a point on the terrain vertically below the aircraft.*

*(3A) Paragraph (1)(a) does not apply in respect of a helicopter flying at a designated altitude within an access lane details of which have been published in the AIP or NOTAMS for use by helicopters arriving at or departing from a specified place.*

*(4) Subregulation (1) does not apply if:*

*(a) through stress of weather or any other unavoidable cause it is essential that a lower height be maintained; or*

*(b) the aircraft is engaged in private operations or aerial work operations, being operations that require low flying, and the owner or operator of the aircraft has received from CASA either a general permit for all flights or a specific permit for the particular flight to be made at a lower height while engaged in such operations; or*

*(c) the pilot of the aircraft is receiving flight training in low-level operations or aerial application operations, within the meaning of Part 61 of CASR; or*

*(d) the pilot of the aircraft is engaged in a baulked approach procedure, or the practice of such procedure under the supervision of a flight instructor or a check pilot; or*

*(e) the aircraft is flying in the course of actually taking-off or landing at an aerodrome; or*

*(f) the pilot of the aircraft is engaged in:*

*(i) a search; or*

*(ii) a rescue; or*

*(iii) dropping supplies;*

*in a search and rescue operation; or*

*(g) the aircraft is a helicopter:*

*(i) operated by, or for the purposes of, the Australian Federal Police or the police force of a State or Territory; and*

*(ii) engaged in law enforcement operations; or*

*(h) the pilot of the aircraft is engaged in an operation which requires the dropping of packages or other articles or substances in accordance with directions issued by CASA.*

[5] CAR 175 - https://www.legislation.gov.au/Details/F2016C00872/Html/Volume_3#_Toc462908884 last accessed 18/01/2017

**Aerial Agricultural Applications**

With respect to aerial agricultural applications the increased height of the turbines is not relevant to these operations. Section 6.10 of the Ambidji Report refers.

Previous work undertaken by Ambidji, including myself, shows that, for example an AirTractor 802 (AT802A) aircraft [the largest purpose built aerial agricultural aircraft] fully loaded travelling at normal operational airspeed is able to safely end an application run at 450m from a turbine and execute a 180 degree turn to commence the next application run. The turn radius of an aircraft is a function of aircraft weight and speed, therefore a smaller and lighter aircraft is able to commence the turn at the end of an application run closer to the obstacle. For example a Piper Pawnee (PA25-235) fully loaded travelling at normal operational airspeed is able to safely end an application run at 249m from a turbine and execute a 180 degree turn to commence the next application run. If the application run is parallel to a line of turbines then the offset from the obstacle is the same as for any other obstacle, for example a line of trees, and is approximately 2 wing spans or for an AT802A 37m and a PA25-235 23m.

A number of factors are involved in the selection of run orientation over a given ground area being:

- The longest run length available;
- The operation type, i.e. spraying or spreading;
- The wind direction (for spraying operations, runs are normally carried out crosswind; this is not necessarily the case for spreading operations); and
- Obstructions and their orientation relative to the area to be treated.

Aerial agricultural operations are only carried out in light to moderate winds, i.e. up to 15kts. To this end, the turbulence downwind of wind towers will not be significant, indeed no more than that from lines of tall trees.

**Aerial Firefighting**

With respect to aerial firefighting the increase in turbine tip height has no impact. Section 6.9.4 of the Ambidji Report deals with aerial firefighting and notes that *"It is important to remember that aircraft alone do not extinguish fires."* The report also notes that the rural firefighting agencies in Victoria, New South Wales, South Australia and Western Australia all view wind turbines and wind farms to be 'just another hazard' that is considered in the risk management process associated with aerial firefighting. The South Australian Country Fire Service fact sheet titled *Understanding Aerial Firefighting* explains the use and limitations of aircraft in firefighting. The major point made is that:

> "*The popular perception amongst much of the population is that aircraft alone can put out bushfires. This is not true. CFS firefighters and fire appliances for the vast majority of instances are the primary and only method of controlling bushfires."*

It is also noted, at section 6.9.5 of the Ambidji Report that these same rural firefighting agencies make the point that access for fire trucks and personnel, and consequently their ability to fight a fire within a wind farm is greatly enhanced by the access roads built for construction and maintenance of the turbines.

## 4.2 Any Additional Work Undertaken Since Submission of Amendment Application

On 26 May 2016, Airservices Australia as part of the Navigation Rationalisation Project 2016 changed the primary means of navigation for aircraft flying to the Instrument Flight Rules (IFR) from ground based radio navigation aids to Global Navigation Satellite System (GNSS). A significant number of ground based radio navigation aids across Australia were turned off. Two of these navaids were the Non Directional Beacons (NDB) at Ballarat aerodrome (YBLT) and a primary entry point to Melbourne Airport Controlled Airspace (CTA) at Yarrowee (YWE). This way point has been renamed ESDIG. The criteria used for calculating Lowest Safe Altitudes (LSALT) was also changed.

Due to the decommissioning of the ground based radio navigation aids at YBLT and YWE the following changes have occurred: -

- The BLT NDB Approach referred to on page 21 of the Ambidji Report no longer exists. The remaining GNSS procedures for runways 18 and 36 remain. The MSA for these approaches remains at 3100ft over the Stockyard Hill Wind Energy Facility.
- The RNAV-Z RWY 36 approach shown on page 24 and the RNAV-Z RWY 18 approach shown on page 26 have been updated, however the MSA in the sector over the Stockyard Hill Wind Energy Facility remains unchanged at 3100ft which is safely above the maximum tip height of the highest turbine. The approaches remain clear of the wind energy facility.
- The YWE NDB Approach referred to on page 28 of the Ambidji report no longer exists and has not been replaced with a GNSS procedure, therefore the statement in the report remains that there is no impact on the Stockyard Hill Wind Energy Facility.
- The LSALT shown in Table 5.1 on page 30 remain unchanged. The route segment names have changed as shown in the table below.

| Route | Section | LSALT |
|---|---|---|
| GRID | | 4800ft |
| W306 | ESDIG-BURRA | 4800ft |
| W291 | ESDIG-HSM | 4800ft |
| W245 | ESDIG-HML | 4100ft |
| W191 | ESDIG-MTG | 4100ft |
| W657 | ESDIG-BLT | 3500ft |
| W418 | HML-AV VOR | 4100ft |

The highest turbine tip is 2019ft AHD, and when the MOC of 1000ft is applied the result is 3019ft AHD.

As the lowest LSALT is 3500ft on W657, none of the LSALTs are impacted by the SHWF WEF.

## 4.3 Response to Submissions

I have reviewed the following submissions that raise issues concerning aviation:

- Submission 40
- Submission 7
- Submission 23
- Submission 25
- Submission 26
- Submission 27

My detailed response to the matters raised in these submissions is set out in Annexure D.

### 4.4 Amended Planning Permit Conditions

I have reviewed the draft amended planning permit conditions, including those provided by the Department of Environment, Land, Water and Planning relevant to aviation.

- None applicable to aviation.

## 5 Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Signed …

Dated: - 24th January 2017

# Annexure A – Response to PPV Guide to Expert Evidence

**Expert's Qualifications**

My qualifications and experience are set out in Annexure B.

**Expertise to Make Report**

My area of expertise is airspace and air traffic management. I also have expertise in the area of aircraft maintenance planning and aircraft performance. Through these activities I have an extensive knowledge of aviation regulations.

I have undertaken Aeronautical Impact and Qualitative Risk Assessments for Wind Farm projects in Victoria, New South Wales, South Australia and Western Australia. These have included investigations into the impact of wind farms on the operation of Aeroplane Landing Areas and the use of aerial agricultural applications activity. Additionally, I have undertaken Aviation Impact Assessments for organisations wishing to develop land within and adjacent to the Melbourne Airport Environs Overlay.

A common requirement of all these positions is a thorough knowledge of aviation legislation and regulations and the ability to apply them to the task at hand. I have also taught "air legislation" (rules and regulations) and "basic aero knowledge" (how aeroplanes fly) as part of my time as an Air Traffic Services Senior Instructor.

I am a Certified Air Ground Radio Operator with CASA Aviation Reference Number (ARN) 435274.

**Reports Relied Upon to Prepare Expert Witness Statement**

*Final Report, Stockyard Hill Wind Farm Aeronautical Impact Assessment, Aviation Impact Statement, Qualitative Risk Assessment and Obstacle Lighting Review, 180m Turbines. J0462 V1.1 dated 28 April 2016.*

# Annexure B – Curriculum Vitae

| | |
|---|---|
| Name | **Ian Jennings** |
| Date of Birth | 15 June, 1949 |
| Nationality | Australian |
| Education | ▪ Bachelor of Education – LaTrobe University<br>*Majors in Adult Education and Curriculum Studies*<br>▪ Diploma or Air Traffic Control – Airservices Australia<br>▪ Further Certificate of Business Studies (Management) – Kangan Batman TAFE<br>*Majors in Personnel and Industrial Relations*<br>▪ Certificate IV Workplace Training and Assessment – Airservices Australia<br>▪ Diploma of Electronic Engineering *(partially complete)* – RMIT |
| Certifications | ▪ Aviation Safety and Lead Auditor – Aviation Compliance Solutions<br>▪ Incident Investigators Course *(Air Traffic Services)* – Airservices Australia<br>▪ Understanding Risk Management – Emergency Management Australia<br>▪ DAMP (Drug & Alcohol) Supervisor – Civil Aviation Safety Authority<br>▪ Understanding Environmental Management – SIA Global<br>▪ Certified Air – Ground Radio Operator - CASA |
| Professional Associations | ▪ Member Risk Management Institution of Australasia |
| Key Skills and Attributes | ▪ Leadership and People Management<br>▪ Project Management<br>▪ Training Design, Development and Delivery<br>▪ Extensive knowledge and understanding of aviation regulatory requirements<br>▪ High level technical literacy with the ability to understand and explain complex technical literature<br>▪ Risk Management<br>▪ Safety Management<br>▪ Aviation safety auditing and incident investigation |
| Career Overview | Ian has an extensive background in Air Traffic Services having spent 25 years with Airservices Australia in a variety of operational and management positions. He has a detailed understanding of Air Traffic Control/Management, airspace and aerodrome issues, particularly in his previous role as an ATS Centre Group Leader. He has held positions as a Manager responsible for ATS training, personnel standards and licensing. He was part of a management team tasked with major airspace |

consolidation and transition of air traffic services on the east coast of Australia to the TAAATS/Eurocat system. In this role he gained experience in developing courses and simulator exercises for training and rating air traffic services staff.

Ian has 10 years' experience in the corporate charter airline industry providing aircraft facility management, maintenance control and planning, aircraft modification project management and technical services management.

Ian has several years' experience as an aviation consultant across diverse fields from training Air Traffic Services personnel in Fiji, determining design aircraft performance requirements for airport upgrades to conducting aeronautical impact and qualitative risk assessments for tall structures including wind farms.

A common requirement of all these positions is a thorough knowledge of aviation legislation and regulations and the ability to apply them to the task at hand. Ian has also taught "air legislation" (rules and regulations) and "basic aero knowledge" (how aeroplanes fly) as part of his time as an Air Traffic Services Senior Instructor.

In addition Ian holds tertiary qualifications in education, training and management

Ian's consulting activities with Ambidji have ranged from aeronautical assessments, Qualitative Risk Assessments, to aircraft maintenance system audits, training development and organisational reviews.

## Employment History

*From :* **Present**

*Position/Company:* ***Principal Consultant - Ambidji (A division of Landrum & Brown)***

*Relevant Work Experience :* Provision of management and aviation consultancy services in support of Ambidji's airspace, airports and airworthiness projects.

Ian's recent consulting activities have included the following:

- Aeronautical Impact, Qualitative Risk and Obstacle Lighting Assessments for wind farm projects in WA, SA, NSW and Vic;
- Establish design aircraft performance requirements for proposed airport upgrade at Dili Airport, Timor Leste;
- Airspace review and Air Traffic Control training associated with the introduction of ADS-B surveillance equipment in Fiji;
- Aeronautical Impact Assessments of proposed land developments in the vicinity of Melbourne Airport;
- Maintenance System audit and organisational review for West Wing Aviation;

*From :* **2009 - 2011**

*Position/Company:* ***Base Manager and Maintenance Controller – LUFT Aviation Charter Pty Ltd***

*Relevant Work Experience :*

Established the position and consolidated the maintenance control of four large corporate jet aircraft. Undertook a complete audit of all maintenance records that identified significant anomalies. These were rectified in order to establish, and demonstrate to the Regulators, the airworthiness of the aircraft. Managed the daily operations of the aircraft, hangar and airside facilities. Established close working relationships with the airport authorities, local and overseas maintenance organisations, manufacturers' Technical Representatives and spare parts suppliers to facilitate the safe and expeditious use of the aircraft.

*From :* **2001 - 2009**

*Position/Company :* ***Technical Services Manager – Executive Airlines Pty Ltd***

*Relevant Work Experience :*

Established the Technical Services Section to manage the acquisition, distribution, control and storage of technical and regulatory data required for the maintenance of jet and turboprop aircraft. Provided technical, regulatory, risk management and safety input into the management of the maintenance and airside operations facilities. Provided project management for the modification and maintenance of a specialised aircraft used for hydrographical survey by the Royal Australian Navy. Provided ad-hoc in-house training on a variety of technical and operational topics. Conducted regular audits of Operational and Maintenance System manuals to ensure continued compliance with regulatory and manufacturers' requirements and specification.

*From :* **1994 - 2001**

*Position/Company :* ***Air Traffic Services – Melbourne - Airservices Australia***

*Relevant Work Experience :*

As a key member of the management team tasked with major airspace consolidation and transition of air traffic services on the east coast of Australia to the TAAATS/Eurocat system. This project required;

- Airspace design;
- Risk assessment and management;
- Training design and delivery (simulator and classroom);
- Staff training and assessment;
- Internal and external liaison regarding service delivery;
- Management of staff during the change process.

As Manager Melbourne Flight Service managed 180 Air Traffic Services staff during a period of major organisational change and uncertainty. This involved;

- Budget control and forecasting – approx. $8 million annually;
- All aspects of staff management including rosters, overtime and leave;
- Successfully implementing major new work practices resulting from a national Enterprise Bargain industrial agreement;
- Industrial relations issues – including instructing an Industrial Officer in the Industrial Relations Commission for a satisfactory outcome;

- Successfully resolving a specific workplace harassment case;
- Management of work related injury cases;
- Successfully implementing remedial action associated with OH&S (workplace safety) issues;
- Staff suspension and counselling action related to air safety incidents;
- Air safety incident investigation;
- Liaising effectively with all levels of management within the organisation, with external organisations including clients, regulators and government.

As Group Leader Melbourne Flight Service managed 60 Air Traffic Services staff during a period of major airspace and procedural change. This involved;

- All aspects of staff management;
- Development of airspace specific operating procedures;
- Training and rating endorsement;
- Staff proficiency assessment including remedial training;
- Air Safety Incident investigation including staff suspension and training.

*From :* **Pre 1994**

*Position/Company :* ***Air Traffic Services - Airservices Australia***

*Relevant Work Experience :*

As Manager Flight Service Training College managed the closure of the facility. This involved;

- Staff redeployment;
- Disposal of assets;
- Transfer of intellectual property.

As Senior Instructor Flight Service Training College managed;

- The day to day requirements of the Instructors and students;
- Content and delivery of the course;
- Performance assessment including counselling and termination.

As Simulator Manager, Flight Service Training College managed the;

- Utilisation of the simulator by multiple courses;
- Design of simulator programs to meet specific training needs;
- Updated simulator programs to reflect current procedures;
- Upgrade Simulator fidelity;
- Performance assessment including counselling and termination.

# Annexure C – Instructions

Mr Ian Jennings
Principal Consultant
The Ambidji Group Pty Ltd
Suite 11
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WHEELERS HILL VIC 3150
ijennings@ambidji.aero

31 August 2016
Matter 82489236
By Email

Dear Mr Jennings

Confidential and Privileged

## Stockyard Hill Wind Farm
## Engagement of Expert Witness – Aviation Safety

We are acting as legal advisors to Stockyard Hill Wind Farm Pty Ltd (**Stockyard Hill**) in connection with the Stockyard Hill Wind Farm (**Project**), and specifically the following applications:

- application to amend the existing planning permit PL-SP/05/0548-1 for the Project (**Amendment Application**),
- together with three associated planning permit applications:
    - two applications for the removal of native vegetation and to create an alter access to a Road Zone, Category 1 (External Overhead Powerlines) (Permit Application No. PA1600101 under the Pyrenees Planning Scheme and Permit Application No. PA 1600126 under the Corangamite Planning Scheme) (**Overhead Powerlines Applications**); and
    - application for an Extractive Industry (On-site Quarry) (Planning Permit Application No. PA2499/16 under the Pyrenees Planning Scheme) (**Quarry Application**).

### 1 Background

The Amendment Application includes a number of changes to the existing planning permit PL-SP/05/0548-1, including:

- A rotor diameter of up to 142 metres (an increase from the permitted blade length of 52 metres / rotor diameter of up to 104 metres);
- A hub-height of up to 120 metres (an increase from the permitted hub-height of up to 80 metres);
- A ground clearance from the bottom of the blades to the ground level of no less than 32 metres (not previously specified); and
- A total blade tip height up to 180 metres (an increase from the permitted height of up to 132 metres).

On 8 August 2016, the Minister for Planning determined to call-in the Overhead Powerlines Applications and the Quarry Application under section 97B of the *Planning and Environment Act 1987* (Vic) (**PE Act**). The Minister indicated he will consider these applications concurrently with the Amendment Application, and, following completion of the public notification period, appoint a panel of inquiry (**Panel**) under the PE Act if submissions are received as a result of the public notice. The Minister confirmed this would be a combined panel hearing considering all of the applications referred to above which have been made by Stockyard Hill.

### 2 Scope

#### 2.1 Expert witness statement

We would like you to prepare a witness statement in accordance with Planning Panel Victoria's *Guide to Expert Evidence* (**Guide**) which prescribes the content and form of

expert witness statements. We enclose a copy of the Guide for your reference. You are required to review and understand the Guide and to ensure your witness statement addresses all matters set out in the Guide, in particular those matters listed under the heading 'Content and Form of Experts Report'. Please contact us if there is anything in this Guide which you do not understand, or if you have questions in relation to it. Your witness statement should include matters required as set out in the Guide such as:

(a) A reference to any technical report or reports that you rely upon;

(b) A statement to the effect that you adopt the findings in reports you helped to prepare and were submitted as part of the amendment application and identifying any departure from the findings and opinions you express in those reports;

(c) Any key assumptions made in preparing your witness statement.

Once submissions have been received that are relevant to your area of expertise we will also request you consider those submissions and respond to any relevant matters in your witness statement.

We have prepared a template to assist you to prepare and order your expert witness statement. You should treat the template as an aid and should not consider yourself constrained by it if you would prefer to structure your statement differently.

## 3 Timing

As the dates for a potential Panel hearing have not been confirmed, the timing of your expert witness statement is to be advised. We will let you know as soon as we can.

Any documents you prepare under this engagement should be marked 'Confidential and subject to legal professional privilege.'

## 4 Fee estimate and invoicing

It is important to note that you will continue to be contractually engaged on behalf of/by Stockyard Hill. Stockyard Hill will continue to be responsible for the payment of your fees and your accounts should be sent directly to the appropriate person nominated by Stockyard Hill.

## 5 Confidentiality

Your expert report prepared in accordance with this retainer is confidential and is not to be copied or used for any purpose unrelated to the Panel hearing without our permission.

Material supplied by Herbert Smith Freehills is, unless it is already in the public domain, confidential and is not to be copied or used for any purpose unrelated to your retainer without our permission.

## 6 Conflict of interest

It is important that you are free from any possible conflict of interest in providing your advice. You should again ensure that you have no connection with any potential party to the panel hearing which could preclude you from providing your opinion in an objective and independent manner.

## 7 Your duties and responsibilities as an expert witness

As set out in the Guide, an expert witness has a duty to the Panel and not to the person engaging the expert. You are not an advocate for any party. Consequently, though you are retained by Stockyard Hill, you are retained as an expert to assist the Panel, and have an overriding duty to it. The Panel will expect you to be objective, professional and form an independent view as to the matters in respect to which your opinion is sought.

Until your expert witness statement is in final form it should not be signed. You should, however, be aware that unsigned documents may need to be disclosed to other parties.

## 8 Communications

Unless advised otherwise, all communications, whether verbal or written, should be directed to our office so that we can coordinate, manage and integrate work activities with legal requirements and ensure legal professional privilege is maintained as appropriate. It is however quite appropriate for your communication to be copied into Stockyard Hill.

If you have any questions about this letter, your role in the hearing, or the approval process, and would like to discuss your availability or the content of your report, please contact us.

Yours sincerely

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13 December 2016

Mr Ian Jennings
Principal Consultant
The Ambidji Group Pty Ltd
622 Ferntree Gully Road
WHEELERS HILL VIC 3150
ijennings@ambidji.aero

Dear Ian

We refer to your engagement dated 11 August 2016 by Herbert Smith Freehills on behalf of Stockyard Hill Wind Farm Pty Ltd (Stockyard Hill) to act as an expert witness with respect to the Stockyard Hill Wind Farm project (Project).

We are writing to advise that White & Case now represent Stockyard Hill with respect to the upcoming Planning Panel for the Project. All of the instructions to you in your engagement letter from Herbert Smith Freehills with respect to preparation of your witness statement and evidence at the Planning Panel still apply. Your invoices should be sent direct to Stockyard Hill, as White & Case is not responsible for payment of your invoices.

All correspondence to this office should be marked to the attention of Michelle Keen and Zach Tyler.

We look forward to working with you on the Project.

Yours sincerely

**Michelle Keen**
Partner
**E** michelle.keen@whitecase.com

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **The loss of amenity created by Aviation Obstruction Lighting.**<br>This respondent is concerned about the visual impact created by aviation obstruction lighting at night. | **40** | The Ambidji Report, at section 7.2, concludes that aviation obstacle lighting is not required for the Stockyard Hill Wind Energy Facility.<br>The issue of aviation obstruction lighting is covered in the National Airport Safeguarding Framework (NASF) Guideline D.<br>The Civil Aviation Safety Authority (CASA) **cannot mandate** aviation obstacle lighting where the obstacle is beyond the aerodrome Obstacle Limitation Surface (OLS) and does not penetrate the Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) surfaces, Lowest Safe Altitudes (LSALT) or any other prescribed airspace. The SHWF WEF does not penetrate any OLS, PANS-OPS, LSALT or any other prescribed airspace.<br>Section 6, Qualitative Risk Assessment of the Ambidji Report concludes that the SHWF WEF is not a hazard to aircraft safety.<br>Section 7, Obstacle Lighting Review of the Ambidji Report concludes that aviation obstacle lighting is not required as the SHWF WEF is not a hazard to aircraft safety, therefore no further mitigation is required.<br>As noted in this Objection, the lights at the Waubra Wind Farm were turned off in 2010. I undertook a Qualitative Risk Assessment of the Waubra Wind Farm in 2015 which concluded that the lights at Waubra could safely remain turned off. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aviation Safety**<br>**Unacceptable Aviation Hazard –**<br>**Low Flying**<br>*"It is also important to note that the new proposed height of 590 feet is above the lowest height of 500ft that aircraft can operate over non built up areas."* | **7** | The basic premise of this argument is incorrect.<br>Pilots are required to remain at least 500ft above the **highest obstacle** on the terrain.<br>CAR 157 – LOW FLYING, sub regulation (1) is where this 500ft figure comes from, but sub regulation (1) is qualified by sub regulation (3) which states: *A height specified in sub regulation (1) is the height above the highest point of the terrain, and any object on it, within a radius of (a) in the case of an aircraft other than a helicopter – 600 metres; or (b) in the case of a helicopter – 300 metres; from a point on the terrain vertically below the aircraft.*<br>Consequently, aircraft are required to either fly around the wind energy facility or fly over it at least 500ft above the turbine tip height. The location and heights of wind farms are marked on the appropriate aeronautical charts.<br>Refer to Ambidji Report section 6, particularly sections 6.2 through 6.7 and 6.9. Section 6.10 concludes that there are sufficient visual guides for a pilot caught by low cloud to navigate and remain clear of the SHWEF. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aviation Safety**<br><br>**Unacceptable Aviation Hazard –**<br><br>**Use of Aerodromes**<br><br>*The airstrip on our property is in continuous use by ourselves and is a valuable resource for aerial agriculture, emergency aircraft and flying training.*<br><br>This aeroplane landing area (ALA) is referred to as the Beaufort Aerodrome. | **7** | Refer to page 3 *Aerodromes and Airstrips* of this document for an explanation of aerodrome classifications.<br><br>The Ambidji report at section 6.2 refers to the Beaufort (YBFT) ALA which is listed in the AIP ERSA (10 NOV 2016) as uncertified. There are several notes in the ERSA entry under Additional Information providing a caution for power lines and trees as well as wind monitoring masts.<br><br>In my opinion, the SHWF WEF will not preclude the safe use of the Beaufort ALA and that it will remain a viable airstrip.<br><br>CAR 92 – Use of Aerodromes, requires that a person must not land an aircraft on, or engage in conduct that causes an aircraft to take off from a place unless, having regard to all the circumstances of the proposed landing or take-off (including prevailing weather conditions) the aircraft can do so in safety.<br><br>Many factors influence the creation of turbulence that effects aircraft. Prevailing wind over terrain and obstacles such as trees and buildings influences turbulence.<br><br>In relation to turbulence from wind turbines, the Australian Transport Safety Bureau have advised me that, over the last decade, there have been two reports of turbulence associated with a wind farm and that they were not investigated because they were in an area known for mountain wave turbulence associated with the terrain. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aviation Safety**<br>**Unacceptable Aviation Hazard –**<br>**Circling Area**<br>*Turbines J1 through J6 fall into the performance Category B circling area* | **7** | A Circling Area is used with a published Instrument Approach Procedure associated with a certified, registered or military aerodrome.<br>An aeroplane landing area (ALA), such as the Beaufort aerodrome, is none of these and therefore cannot have a published instrument approach procedure. Consequently, an ALA can only be used in accordance with the Visual Flight Rules (VFR) which requires that the aircraft be navigated by visual reference to the ground.<br>Thus the pilot in command must visually navigate clear of obstacles such as tree covered terrain, power lines and other tall structures within the circling area. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aviation Safety**<br>**Unacceptable Aviation Hazard –**<br>**Aerial Firefighting**<br>*Unacceptable increase in fire risk.*<br>*"There has also been a greater reliance on aerial firefighting."* | **7** | Aerial Firefighting is only one, limited, resource used for fighting fires in open grassland and forests.<br>The Ambidji Report at 6.9.4 notes *"it is important to remember that aircraft alone do not extinguish fires."*<br>The Ambidji report also makes it clear that aircraft engaged in aerial firefighting operate in accordance with the VFR and in daylight hours only. They must remain clear of smoke to ensure they have requisite visibility to avoid obstacles – including ground based firefighting resources and to accurately drop retardant where it is needed. The pilot in command of the aircraft has the ultimate responsibility for the safety of the aircraft.<br>It is also noted at 6.9.5 of the Ambidji Report that due to the access and protection infrastructure associated with wind energy facilities there is greater access for ground based firefighting and that the spread of a fire is slowed. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aviation Safety**<br><br>**Unacceptable Aviation Hazard –**<br><br>**Aerial Agricultural Applications**<br><br>*The position of turbines J5 and J6 and under certain circumstances J1, J2, J3, and J4 will prevent us from using aircraft to treat our crops.* | **7** | Previous work undertaken by Ambidji, including myself, shows that, for example an AirTractor 802 (AT802A) aircraft [the largest purpose built aerial agricultural aircraft] fully loaded travelling at normal operational airspeed is able to safely end an application run at 450m from a turbine and execute a 180 degree turn to commence the next application run. The turn radius of an aircraft is a function of aircraft weight and speed, therefore a smaller and lighter aircraft is able to commence the turn at the end of an application run closer to the obstacle. For example a Piper Pawnee (PA25-235) fully loaded travelling at normal operational airspeed is able to safely end an application run at 249m from a turbine and execute a 180 degree turn to commence the next application run. If the application run is parallel to a line of turbines then the offset from the obstacle is the same as for any other obstacle, for example a line of trees, and is approximately 2 wing spans or for an AT802A 37m and a PA25-235 23m.<br><br>A number of factors are involved in the selection of run orientation over a given ground area being:<br><br>▪ The longest run length available;<br>▪ The operation type, i.e. spraying or spreading;<br>▪ The wind direction (for spraying operations, runs are normally carried out crosswind; this is not necessarily the case for spreading operations); and<br>▪ Obstructions and their orientation relative to the area to be treated.<br><br>Aerial agricultural operations are only carried out in light to moderate winds, i.e. up to 15kts. To this end, the turbulence downwind of wind towers will not be significant, indeed no more than that from lines of tall trees. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aircraft Safety**<br><br>**Aerial Firefighting**<br><br>*"… the restrictions and effect of the Stockyard Hill Wind Farm proposal will have on firefighting operations, access for CFA on the ground and airspace and aerial water fighting abilities."* | **23**<br>**26**<br>**25**<br>**27** | These four objections are identical for aviation and relate to aerial firefighting and aerial agricultural applications.<br><br>With respect to aerial firefighting<br><br>Aerial Firefighting is only one, limited, resource used for fighting fires in open grassland and forests.<br><br>The Ambidji Report at 6.9.4 notes *"it is important to remember that aircraft alone do not extinguish fires."*<br><br>The Ambidji report also makes it clear that aircraft engaged in aerial firefighting operate in accordance with the VFR and in daylight hours only. They must remain clear of smoke to ensure they have requisite visibility to avoid obstacles – including ground based firefighting resources and to accurately drop retardant where it is needed. The pilot in command of the aircraft has the ultimate responsibility for the safety of the aircraft.<br><br>It is also noted at 6.9.5 of the Ambidji Report that due to the access and protection infrastructure associated with wind energy facilities there is greater access for ground based firefighting and that the spread of a fire is slowed. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aviation Safety**<br><br>**Aerial Agricultural Applications**<br>*We have major concern for our right and need to aerial spray over our properties, located within 2km of the wind farm boundary.* | **23**<br>**26**<br>**25**<br>**27** | These four objections are identical for aviation and relate to aerial firefighting and aerial agricultural applications.<br><br>Previous work undertaken by Ambidji, including myself, shows that, for example an AirTractor 802 (AT802A) aircraft [the largest purpose built aerial agricultural aircraft] fully loaded travelling at normal operational airspeed is able to safely end an application run at 450m from a turbine and execute a 180 degree turn to commence the next application run. The turn radius of an aircraft is a function of aircraft weight and speed, therefore a smaller and lighter aircraft is able to commence the turn at the end of an application run closer to the obstacle. For example a Piper Pawnee (PA25-235) fully loaded travelling at normal operational airspeed is able to safely end an application run at 249m from a turbine and execute a 180 degree turn to commence the next application run. If the application run is parallel to a line of turbines then the offset from the obstacle is the same as for any other obstacle, for example a line of trees, and is approximately 2 wing spans or for an AT802A 37m and a PA25-235 23m.<br><br>A number of factors are involved in the selection of run orientation over a given ground area being:<br>▪ The longest run length available;<br>▪ The operation type, i.e. spraying or spreading;<br>▪ The wind direction (for spraying operations, runs are normally carried out crosswind; this is not necessarily the case for spreading operations); and<br>▪ Obstructions and their orientation relative to the area to be treated.<br>Aerial agricultural operations are only carried out in light to moderate winds, i.e. up to 15kts. To this end, the turbulence downwind of wind towers will not be significant, indeed no more than that from lines of tall trees. | **None** |

| Issue | Submission No. | Response | Any Recommended New or Modified Conditions |
|---|---|---|---|
| **Aircraft Safety**<br><br>**Possible Construction of a Runway**<br>*"… we plan to build a runway on our property in the near future."* | **25**<br>**27** | These two objections are identical and relate to the possibility of constructing a runway.<br><br>In relation to constructing a runway there are numerous determining factors such as; intended uses, the aircraft types, runway length and width, prevailing winds, the orientation of the runway and whether or not it is intended to have the facility certified or registered in accordance with CASR Part 139 – Aerodromes.<br><br>When selecting a runway location and direction, it is necessary to take into account the prevailing wind directions, terrain and obstacles, both existing and planned.<br><br>Many factors influence the creation of turbulence that effects aircraft. Prevailing wind over terrain and obstacles such as trees and buildings influence possible turbulence. In relation to turbulence from wind turbines, the Australian Transport Safety Bureau have advised me that, over the last decade, there have been only two reports of turbulence associated with a wind farm and that they were not investigated because they were in an area known for mountain wave turbulence associated with the terrain.<br><br>The requirements for constructing a runway to certification or registration standard are set out in the Manual of Standards, Part 139. The construction of an ALA is guided by CAAP 92-1(1) Guidelines for aeroplane landing areas. | **None** |