

## Ralph B Holland

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**Subject:** RE: Gullen Range Wind Farm [SEC=UNCLASSIFIED]  
**Attachments:** Response to Mr R Holland-Crookwell- Gullen Range Wind Farm.pdf.pdf; Crookwell  
Aerodrome: Windfarm Obstructions and Wake Plumes

Dear Mr Mathew,

When referring to UK CAA CAAP 764 <http://www.caa.co.uk/docs/33/cap764.pdf> care should be taken to read section 8.3; and to not quote the CAAP out of context. Wind farm Aviation Hazards need a case by case study, and the hazard just does not stop at 16 blade diameters downstream from the turbines.

I am not just concerned with turbulence, I am very concerned with the velocity deficit within the wake plume, a point that alludes the department. This velocity deficit is a wind-shear, which I assume you have heard of, and in the near field it is coupled with the wake-turbulence of the blades, not too unlike wing tip vortices, which I also believe you have heard of. These plumes do not just last for 2 minutes duration, they last for a long time and are blown down-stream in the wind. The wake plumes from wind-farms have been measured to extend 10s of kilometers downstream, a point your department has also ignored from my other correspondence.

In the case of Crookwell Aerodrome more than a few of the approved turbines are aligned along the ridge where their wake plumes can affect the aerodrome's let-down, departure and circling areas. The landing phase being the worst effected due to the fact that aircraft are at minimum power, and under certain prevailing wind conditions these wake plumes will accumulate (or be reinforced), and in other conditions they will cross the runway.

Providing me with quotations from the references I used in my research, and quoting the CAA CAAP 764, does not mean you have given justice to the wake plume matter, for all you have considered is the extent of the turbulence, not the extent of the velocity deficit that constitutes the wake plume. Since you expect that 1.7 kilometres is a safe distance would you like a trip across the Cullerin Ridge wind farm at blade-tip height in a light aircraft just to see - it can be organised?

Referring to my notes and recent releases at [www.arising.com.au/aviation/windturbines](http://www.arising.com.au/aviation/windturbines), and taking a very big note of the featured photograph, which incidentally was published by the Horns Rev Windfarm owner complaining about the Wake field causing substantial losses to their wind-farm - there is great support for the danger of the wake plume. This very farm is

subject to NOAA research that clearly shows they gave up their measurements at 15 kilometres down-stream. This wake plume contains a velocity deficit as well as turbulence, emphasis on containing, for the plumes do not diverge to any great extent.

A wake plume should be given respect, it represents a velocity deficit that is coupled with turbulence in the near field and one like a vortex that does not diverge. One may ask - just how far do wake plumes extend and what effect will they have on aircraft, bearing in mind that the aircraft at Crookwell Aerodrome must climb or descend through all this with the blade tips being close to circuit height?

The point of registration is that I am concerned that the 11 deleted turbines will be reinstated once the Aviation Consultant has determined the operating procedures at the Crookwell Aerodrome. On the evidence available and tabled before your organization and others, the approved turbines represent a hazard to aviation, and the 11 deleted turbines would be an extreme hazard if they were re-instated, approval may be able to stop the reversal of the decision.

These turbine blades are on towers running along a ridge which means the blade tips are over 660 feet above the aerodrome elevation, and aircraft must pass through the wake plume levels to: land at, or takeoff from, the Crookwell Aerodrome.

In my opinion it is an absurd concept that planners stand by and watch while a proponent can inform us how to fly. So nothing has changed, DOIT have undone it; the CASA project to study and rule on these effects is cancelled. What I believe should be done is to commission a proper study where real measurements may be made of existing and typical wind farm in the same region, noting that CASA places no confidence in an Aviation Hazard assessment of wind farm turbines.

I re-iterate, there is no legislation protecting aerodromes from wind farm wake plumes, your guidelines are guidelines that apply to registered and certified aerodromes, and these are only guidelines, and your guidelines are flawed, for they do not take into account the extent of the wake. Your only discussion was to cover turbulence and obstructions.

So we lobbied in 2008 and 2009 our concerns and asked for legislation that can be applied to the proponents, and in 2012 I find that DOIT have cancelled the resulting CASA project studying wind turbines and their wakes, broken their promise to me to develop legislation that can be enforced on the proponent, and instead developed their own Guidelines D without a proper study, under the guise to protect all National Aerodromes. When you full well know it only protects Registered and Certified Aerodromes.

Unless you can legislate or strengthen these guidelines they will not protect any of our un-registered regional aerodromes, and once lost an aerodrome will be a resource never to be recovered.

The point of registration of the Crookwell Aerodrome was to protect the Aerodrome from the re-instatement of the 11 deleted turbines. For I cannot see how registration can retrospectively protect the aerodrome against the approved turbines, I feel it is too late for that.

The safety of Crookwell Aerodrome can't help to be compromised when the development goes ahead, and I have tabled before and say to your department again that it is turning a blind eye to the velocity deficit behind a wind turbine.

Under the consideration of: Common Law and Duty of Care, Torte Law liability, and on the grounds of Safety, I ask your department to answer:

1. Has the department called upon Air Services to raise the lower safe altitude for flight within wind farm regions, and if so by how much?
2. Does the department support that structures above 360' do not require lighting, i.e.do you support the retraction of CASA AC-139-18(0) Obstacle Marking and Lighting of Wind Farms?
3. Does the department support that further study and measurement is unwarranted through the cancellation of CASA project AS 06/07 Assessment of obstacles including wind turbines and exhaust plumes?
4. Does the department know that the effect of wind turbines stops at 16 blade diameters?
5. Does the department know how far a wind turbine wake plume extends?
6. Does the department know what constitutes a safe distance between a wind turbine and an aircraft in its phases of operation?
7. Does the department know and support that an un-registered aerodrome has a different hazard assessment and outcome to a registered aerodrome? Or will the department modify, strike or strengthen sentence 20, and other sentences in Guidelines D so all aerodromes are protected?
8. Will legislation be drafted as was stated in the CASA response  
<http://www.arising.com.au/aviation/windturbines/20091207CASAdrafting.pdf>
9. Is your department taking over the advisory role for Aviation Safety from CASA?
10. Are you a light aircraft pilot and of what type? I am also interested in what qualifications you hold that have enabled you to write the department's determination you provided in your response to me (attachment A)?

I took the courtesy to forward your response to the addressees of my original email. This and related material can be found on my website [www.arising.com.au/aviation/windturbines](http://www.arising.com.au/aviation/windturbines).

Yours sincerely,

Ralph Holland  
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