

Wind Farm Low Flying Aviation Consultants Ltd

Kronospan CHP Stack Chirk: Lighting Report

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Introduction

1. Kronospan are proposing to install a new Low Carbon Heat and Power (CHP) facility at their existing site in Chirk, Wales. The development will include the addition of a **246ft (75m)** exhaust stack. This stack will be within the Kronospan Site's existing boundary which itself forms part of the Chirk/Waun congested (built-up) area.

Kronospan Low Carbon Heat and Power (CHP) Site Chirk: Chimney Stack Details		
Easting	Northing	Height
328521	338507	75m (246ft)

Civilian Aircraft Low Flying

2. CAA low flying rules require that all aircraft and helicopters must remain 500ft (153m) vertically or horizontally from any person, vessel, vehicle or structure. In addition, when flying over congested areas (Such as the Chirk/CHP facility) aircraft and helicopters must maintain 1000ft (305m) or more above the highest fixed obstacle within 600m of the congested area. Flying to these rules, the addition of the CHP exhaust stack will make no, or insignificant, difference to civilian aircraft and helicopters operating in the CHP area by day.

Military Aircraft Low Flying

3. Military aircraft operate to different rules that allow crews to train for wartime operations. Military aircraft and helicopters will operate at differing heights dependent upon type (e.g. fast Jet, tactical transport, helicopter) and the area being used: Low Flying Area (LFA), Tactical Training Area TTA, Dedicated Training Areas (DTA) and Areas of Intense Air Activity (AIAA). The Chirk CHP facility is in the RAF Shawbury DTA for helicopters. It is also known as LFA9 and promulgated on civilian charts as an AIAA. Military low flying charts show the town of Chirk and the CHP site as a single built-up congested area. Accordingly, military aircraft and helicopters are required to avoid direct low-level overflight of this location. In addition, the existing CHP site is currently marked on military charts with a 200ft (61m) unlit chimney stack.

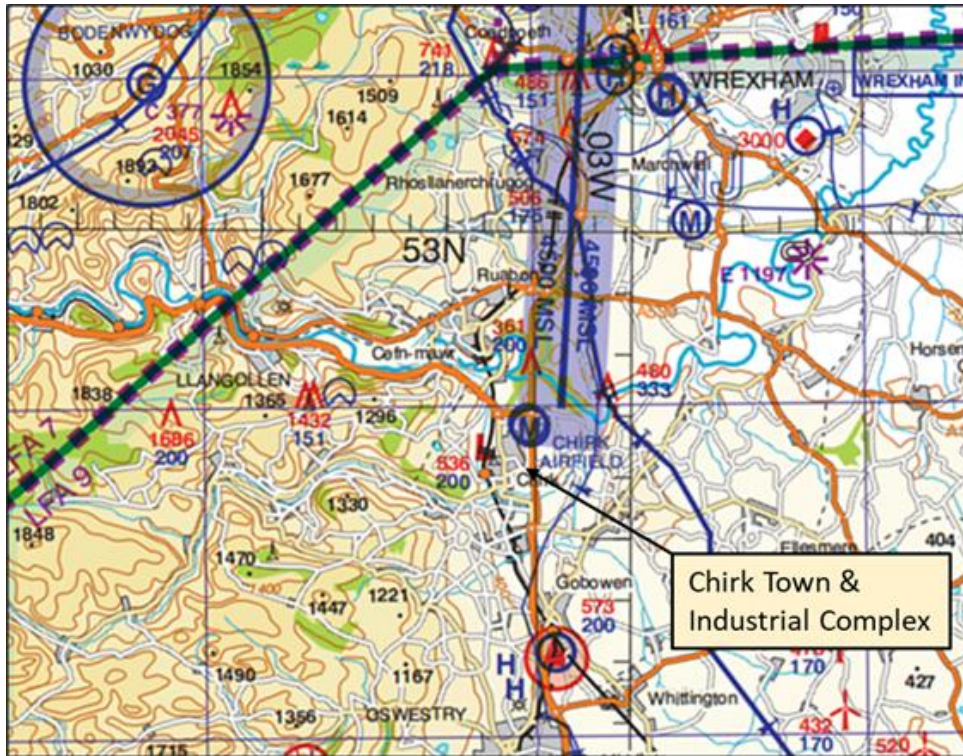


Figure 1. The proposed CHP Stack will be inside the built-up area of Chirk and in LFA9

Day Flying Summary

4. The two previous paragraphs (2 & 3) shown that the CHP stack's location will not impact aircraft and helicopters flying in the lower airspace.

The existence of the proposed CHP exhaust stack will not affect military and civilian aircraft and helicopters operating in the Chirk area by day.



Figure 2. The proposed CHP Stack will be inside the existing built-up area of Chirk

Civilian Aircraft Flying at Night

5. Although, in the past, some specialist civilian operators would fly at night at low level without night vision equipment (on carefully pre-planned exercises pre-flown by day) such events have been overtaken by the ever-widening use of night vision equipment. As a result, operators who now night fly without night vision equipment will continue to fly at or above 'safety altitude' when not under the guidance of Air Traffic Control. The safety-altitude used will be 1000ft (300m), 1500ft (450m) or 2000ft (600m) above the local terrain/highest obstacle, this will include both the CHP stack and the high ground that surrounds Chirk.

Civilian aircraft and helicopters flying at night without night vision equipment will not come into conflict with the proposed CHP stack.

6. Although the military have operated at low level at night for many decades using night vision equipment. In more recent times, the last decade or so, more civilian operators have moved to night low level (below safety altitudes) using suitable night vision equipment: e.g. night vision goggles/devices (NVG/NVDs) etc. Such civilian operators include Coast Guard (CSAR), Police, Helicopters, Emergency Medical Services (HEMS) and Air Ambulance. Such aircraft will benefit from suitable (MOD Spec) obstruction lighting.

Civilian aircraft and helicopters flying with night vision equipment will not come into conflict with the proposed CHP stack and benefit from MOD I-R obstruction lighting.

Military Aircraft Flying at Night

7. At night, the Shawbury DTA converts to Night Rotary Region (NRR) 9 and becomes a dedicated area for helicopter night training. This area already contains many masts, wind turbines, chimneys and all manner of vertical obstructions. These will either be unlit, or carry a variety of Visible Red (medium and low intensity) and/or Infra-Red lights. Some obstructions, higher than the proposed CHP stack, are unlit and, unlike the CHP stack, are not within the protection of congested areas. Crews at the RAF Shawbury Flying School (Helicopters) will be well versed, or in training, to operate in this environment.

Military and Civilian aircraft and helicopters, equipped with night vision equipment, operating in the Chirk area at night will not be affected by the CHP Stack and will benefit from Infra-Red lighting on the structure.

The MOD Response

The MOD response to the CHP Stack is as follows:

8. *In this case the development falls within Low Flying Area 7 (LFA 7), an area within which fixed wing aircraft may operate as low as 250 feet or 76.2 metres above ground level to conduct low level flight training. The addition of a stack at 95m AGL in this location has the potential to introduce a physical obstruction hazard to military aircraft engaged in low level training activities conducted in this locality.*

9. *To address this impact and given the location and scale of the development within LFA 7, the MOD would request that conditions are added to any consent issued requiring that the development is fitted with aviation safety lighting and that sufficient data is submitted to ensure that structures can be accurately charted to allow deconfliction. Suggested condition wordings are set out in Appendix A.*

Reply to the MOD Response

Unfortunately, there are several errors in the MOD response:

- The CHP Stack will not be in LFA 7 a primary fast jet training area.
- The CHP stack will be in LFA9 (NNR9 at night) a dedicated helicopter training area.

The response also omits important, significant and relevant facts:

- The CHP stack is within a mapped built-up area on military low flying charts. Such mapped areas are to be avoided laterally (0.5nm/1km) or vertically (2000ft) by military low flying aircraft.
- Likewise, helicopters are to avoid overflying built-up areas, day and night, but by lesser margins.
- In recent years the MOD has stopped openly publishing low flying statistics by area, or at least delayed such publication by many years. However, the most recent published statistics show a trend where the number of low flying hours, by fast jets in LFA 9, for a whole year, is reducing year-on-year and can be counted on the fingers of one hand. Conversely, the number of hours spent by helicopters in LFA9 was 4000+hours and rising.

10. The MOD response paints a picture of the CHP stack being a Physical Obstruction to military low flying aircraft in LFA 7. Clearly, located in LFA9, and within the bounds of a built-up-area, the stated confliction will not exist.

11. In addition, located in a dedicated helicopter training area, and again, within the bounds of a built-up area, the CHP stack will not conflict with military helicopters.

Civilian Night Operators.

12. Some civilian emergency services helicopters are occasionally required to operate at night over built-up areas. Normally they will be required to maintain CAA published minimum heights and horizontal separation criteria. On certain authorised occasions CSAR, Police and HEMS helicopters may operate below these separations and, indeed, land in built-up-areas.

13. The light, which this report will recommend for the CHP Stack, is the MOD IR light as detailed in MOD Guidance Specification AL4. The light is 'tuned' to night vision equipment detection frequencies and wavelengths and can be seen out to 7nm (14km); moreover, it flashes at a night vision equipment compatible rate and will stand-out against cultural background lighting (Chirk). Important when helicopters are manoeuvring in such spaces.

14. The CEL IR850 light was the light used in the MOD/CAA proving trials for IR lights and will meet the exact requirements for this location.

Other Local Aviation Organisations

15. There are no significant local aviation interests, licenced airfields etc, that will be affected by the proposed CHP Stack. However, there is the Chirk Microlight site to the immediate north of Chirk. Microlights do not fly at night; in addition, by day they will be required to avoid the built-up area of Chirk by the published CAA minima as outlined in paras 2 & 3.

Proposed Obstruction Light for the CHP Stack

16. The specifications for the I-R Light proposed for the CHP Stack is set-out in **Figure 3** below:

<u>MOD Specification IR.</u>
<u>IR wavelength</u> – 750 to 900nm. But ideally concentrated within 800 to 850nm for optimum detection by all military NVG types.
<u>IR intensity</u> – 600mW/sr minimum at peak flash but not above 1200mW/sr. (Note: Typically a 300mW/sr steady burn LED IR light will generate 600mW/sr at peak flash) This will generate a 7-8 nm NVG pick-up range - remaining above 5nm as the light ages.
<u>Horizontal Pattern</u> – unrestricted 360 deg.
<u>Vertical Pattern</u> – Minimum flash intensity of 600 mW/sr between +30 deg and -15 deg elevation. – up to 50% reduction between +25 to +30 deg and -10 to -15 deg is acceptable. – Maximum intensity of 1200 mW/sr for all angles of elevation. – Vertical overspill is acceptable.
<u>Flash Pattern</u> – 60 flashes per min at 100-500 ms duration (ideally 250ms)
<u>Synchronisation</u> – all lights to be visually synchronised across a wind farm site

Figure 3. MOD Specification for IR Obstruction Lights

17. Although many MOD compatible lights are now available, the light used in the MOD/CAA trials, upon which the above specification was written, is the CEL IR850. This light has a proven 15-year track record of reliability and is now available in a MKII version. The MKII is a more robust light for fitting where there are demanding environments (hot stack etc). However, mounting above the stack will not be recommended so, two lights mounted just below the top and slightly proud of the stack, will provide a full 360 deg coverage. See **Figure 4** below.

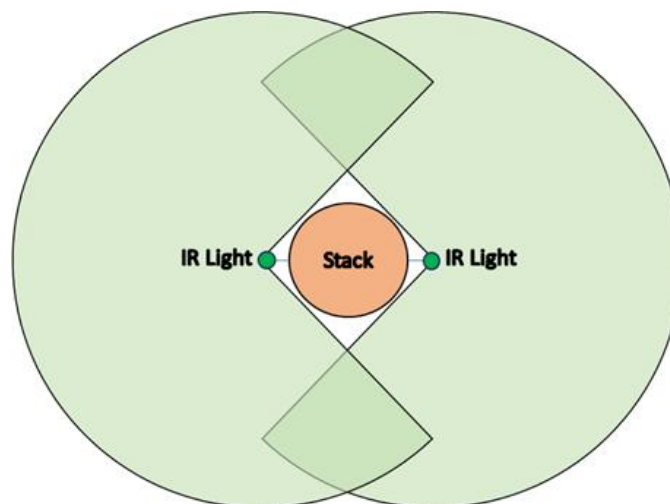


Figure 4: Vertical View (Looking Down) on the CHP Stack and Proposed Twin IR Lights.

Conclusion & Recommendation.

It is unfortunate that the MOD DIO Response to the CHP Stack proposal identifies the site as in LFA 7 and potentially in conflict with military fast jet training exercises.

The actual site of the proposed CHP Stack is within LFA 9 a dedicated helicopter area. Moreover, the stack is in a built-up area (Congested Area) formed by the town of Chirk; military aircraft and helicopters are instructed to avoid such built-up areas.

The vast majority of military and civilian aircraft operating in the area of Chirk will not be affected by the CHP Stack. For those very few occasions when CSAR, Police & HEMS helicopters may be required to operate over Chirk at low level at night. The addition of two synchronised MOD Spec IR lights on the Stack will ensure that Flight Safety will not be compromised during such flights.



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The Author

Mike Hale has spent over 45 years flying both civilian and military aircraft around the world. During 40 years as a military pilot, he filled the posts of operational low level fast jet pilot, fighter pilot, flight commander, air combat leader, instructor pilot (fast jet and basic training), senior instructor, principal examiner, test pilot and squadron commander. For his last 8 years in the military, and in concert with his continued flying duties, Mike held the position of OC the MOD Low Flying Operations Squadron. In this post, as well as overseeing the management and safe operation of the UK Low Flying System and Weapons Ranges, he wrote, and had approved, the MOD guidance to wind energy developers for the integration of wind turbines, masts and vertical infrastructure into low flying systems. Moreover, between 2008 and 2012, Mike proposed, set-up and ran a series of MOD, CAA, Trinity House, vertical obstacle lighting flight trials to clear the use of infra-red and low intensity red lights for use in low flying areas. This was followed by compiling the detailed specifications for such lights, relaying the results to other military authorities and assisting aviation lighting companies, in several countries, to start production of these lights.