

# GA Pet Food Partners

## Wind Turbine Risk Statement

### Document Control

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## Contents

Renewables First – Company .....	3
1 Introduction.....	4
2 Site details .....	4
3 Overall Risk.....	5
4 Operational Risks.....	5



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## Renewables First – Company

Renewables First is one of the UK's leading hydro, wind power and water source heat pump specialists and have been delivering these projects for nearly two decades, now also providing services in solar PV and energy storage. We provide all of the services from in-house resources to take a project from initial feasibility stage, through all of the consenting and engineering design stages and on to construction and commissioning. We use our experience of the installation and operational phases to provide feedback into the design stages of the next projects, ensuring that our customers benefit from our whole-project exposure.

We are independent of hardware suppliers, so we only recommend the most appropriate hardware to maximise energy production and return on investment, and to ensure a long and reliable operational life. We only recommend the best quality hardware from established manufacturers, and design good quality systems that will be reliable in the long-term. Our designs focus on maximising renewable energy production whilst applying best practice in regard to ecological protection or enhancement.

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## 1 Introduction

This report shall discuss the risks associated with an Enercon E138 4.26 MW wind turbine at the GA Pet Food Partners factory, near Leyland. The key risks associated with the operation of this turbine shall be discussed and mitigation will be outlined.

## 2 Site details

The property boundary can be seen in Figure 1.



*Figure 1 Overall site boundary.*

The Sollom site (Southern site) has been assessed as the most appropriate site for the location of the turbine. An Enercon E138 4.26 MW turbine, with a hub height of 111 m, is proposed at the easting/northing of 346225, 419368.

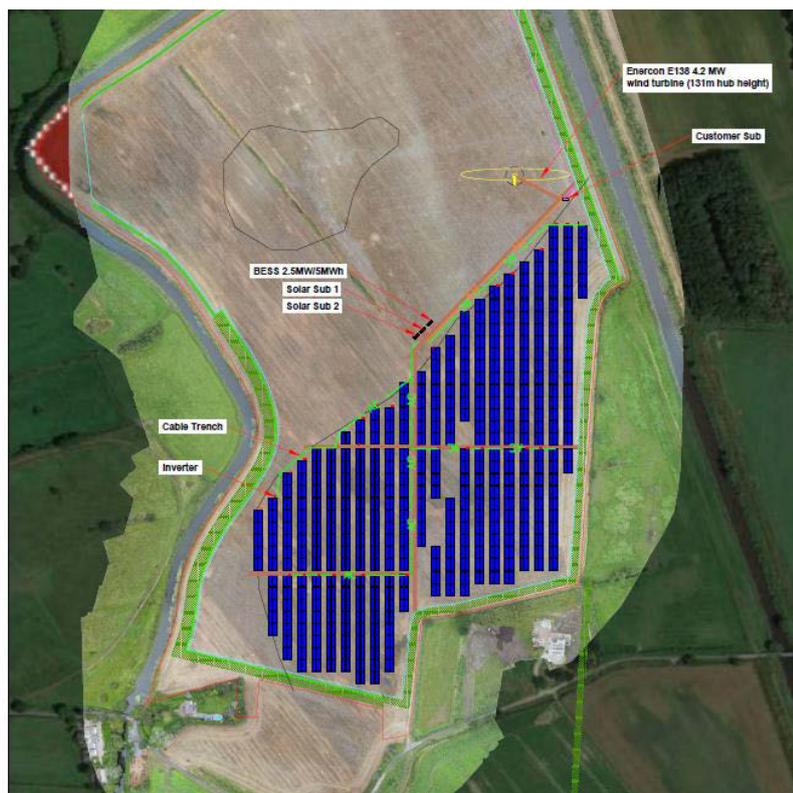


Figure 2 Asland Walks Energy Park Proposed Layout.

The above image shows the site layout of the Southern Site, termed as Asland Walks Energy Park. The Energy Park is proposed to install 12 MW of solar power and the 4.26 MW Enercon wind turbine.

### 3 Overall Risk

The Enercon E138 EP3 wind turbine, developed by one of the most reputable and established manufacturers in the wind energy industry, is certified with a design life of 25 years. Enercon's longstanding track record of engineering excellence, rigorous testing procedures, and high manufacturing standards directly contribute to the turbine's reliability. Their proven design and quality assurance processes significantly reduce the likelihood of structural or mechanical failure. Provided routine maintenance and standard operational practices are followed, the risk of failure over the turbine's design life is considered extremely low. Therefore, no specific risks related to turbine failure are anticipated during this period.

### 4 Operational Risks

Despite comprehensive design measures to ensure safety, the operation and maintenance of wind turbines inherently involve a number of risks. These hazards are present across multiple areas of the system and require strict adherence to safety procedures and protocols.



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## 1. Falls from Height

There is a significant risk of falls both within and from the wind turbine structure. This can lead to severe injury or fatality. Use of personal fall protection equipment is mandatory in areas where falling hazards exist, especially when ascending ladders or using the service hoist.

## 2. Confined Spaces

Confined areas within the wind turbine can lead to physical strain, increased risk of collisions, and higher electrical hazards. These spaces should be entered only when necessary, with proper supervision, communication, and rescue procedures in place.

## 3. Falling Objects

Unsecured tools, materials, or components can fall and cause serious injuries. Personnel must wear head protection and secure all loose items. Larger tools should be transported using approved lifting equipment like the nacelle crane.

## 4. Slips, Trips, and Housekeeping Hazards

Items left lying around, oil spills, or accumulated dirt on surfaces can lead to slips and falls. Work areas must be kept clean, and escape routes must remain unobstructed at all times.

## 5. Sharp Edges and Structural Hazards

Many components have sharp corners or edges that can cause injury. Personnel should wear gloves and exercise caution, particularly when climbing or working in tight spaces.

## 6. Electrical Hazards

Accidental contact with live components can result in electrocution. Live working is not permitted, and electrical systems should be isolated before work commences. Only trained personnel should access electrical cabinets, and all safety guards must remain in place.

## 7. Damaged or Non-functional Safety Equipment

Compromised safety systems such as emergency stops or protective guards present severe risks. All safety equipment must be routinely inspected and maintained in accordance with guidelines.

## 8. Environmental Conditions

**Noise:** High noise levels can lead to hearing damage. Hearing protection is required to be worn when operating inside a running wind turbine.

**Hot Surfaces:** Components like generators, inverters etc., may become dangerously hot. Protective equipment such as gloves should be worn as needed.

**Exceptional Weather:** High wind speeds, lightning, extreme temperatures, and flooding pose significant risks. Entry into the wind turbine during storms or adverse weather conditions should be avoided, and emergency protocols followed.

An alarm would be triggered if the wind speed exceeded 23 m/s over a 10-minute mean. People should leave the nacelle and descend the tower. The service hoist must not be used, and the turbine should be switched to automatic. The cut-out wind speed for the turbine is 28 m/s, and the turbine



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can withstand extreme 3-second-long gusts of 52.5 m/s. Wind speed data from the two closest MET Office MIDAS weather stations — Winter Hill and Aughton — were reviewed. These locations have elevation differences of 436 m (Winter Hill) and 52 m (Aughton) above the Sollom site, which accounts for the observed differences in wind speeds.

- Winter Hill recorded a maximum mean wind speed of 23.7 m/s and a maximum gust of 37.6 m/s over a year long period.
- Aughton showed 11.8 m/s mean and a 22 m/s maximum gust over a year long period.

Given the relatively low elevation of Sollom, wind events exceeding operational thresholds are possible but rare, mostly occurring during major weather systems.

Since 2023, there has been an onsite LIDAR system measuring the wind speed. This supports the MET office data, displaying a maximum recorded wind speed at the site, over a 27-month period, of 23.063 m/s at the turbine's proposed hub height.

Mitigation includes:

- Check wind speed in advanced of planned maintenance
- Strict evacuation and equipment shutdown protocols during high wind event
- Turbine designed for gust resistance and automatic shutoff

Internally, turbine temperatures can reach up to 50 °C, particularly in enclosed areas like the nacelle during peak generation or in sunny weather. Externally, the turbine is designed to withstand temperatures as low as -20 °C.

MET Office records for the nearest relevant station (Blackpool, Squire Gate) indicate over the past 34 years:

- 20<sup>th</sup> percentile minimum temperature over the coldest month: approximately 0.41 °C
- 80<sup>th</sup> percentile maximum temperature over the hottest month: approximately 21.25 °C

These values suggest that ambient temperatures are not extreme, it is unlikely that internal temperatures would exceed standard working conditions. However, in the event of that happening, the following mitigation is outlined.

Mitigation includes:

- Limiting time spent in hot confined areas
- Wearing breathable PPE and carrying water
- Avoiding work during peak daytime hours when internal temps are highest

The turbine site is located in Flood Risk Zone 3, meaning a greater than 1% annual chance of flooding from nearby rivers. The River Douglas, which borders the site, is the primary concern. Flood defences exist along its banks, reducing the immediate threat. The following map shows the flood extent with the flood defences that are in place.



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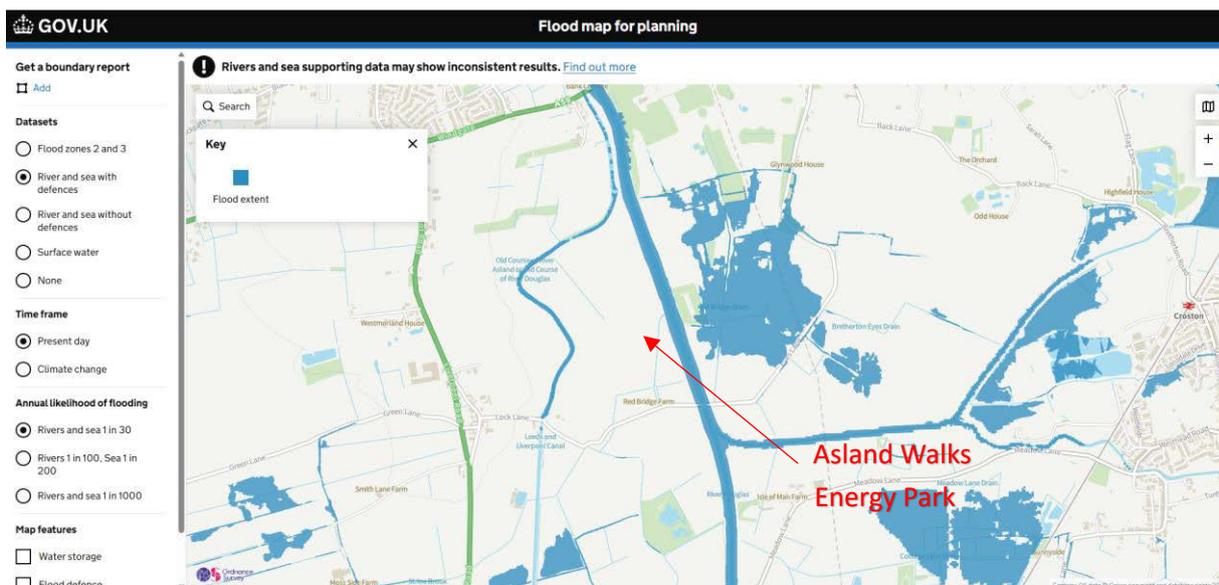


Figure 3 Flood Map showing floods from Rivers with defences in place.

Mitigation and protocols include:

- Immediate shutdown of the turbine in any flood condition
- Inspection and testing of all electrical and structural systems before restarting
- Avoiding access to flooded areas, especially electrical cabinets
- Annual review of local flood maps and emergency drainage systems
- Storing emergency equipment above known flood levels
- Ensure internal electrical equipment is placed above the worst-case flood levels, including a margin for safety.

## 9. Ice Shedding and Ice Throw

During cold weather, ice may accumulate on blades and other components. Ice can fall (ice shedding) or be flung at high speed (ice throw), both of which can cause serious or fatal injuries. Warning systems and restricted access zones must be observed during these conditions. However, this is not a standard concern in the Sollom, Lancashire, United Kingdom due to the mild weather conditions, elevation and altitude.

The temperatures found at the closest MET Office station display that the minimum temperature over a 34-year period is approximately 0.41 °C. This is still above freezing point. However, in the uncommon event of ice formation, the E138 turbine comes with a PI-CS control system, and this allows us to monitor ice build up on the blades. An ice detection system is provided standardly, which shuts down the wind turbine when there is a build up of ice on the rotor blades.

### Risk Zones

The following image, taken from the manufacturer's guidance, illustrates the best-case scenarios for potentially hazardous zones around the wind turbine, primarily associated with falling objects such as ice.

Ice throw from wind turbines is not a significant concern in the UK due to the country's relatively mild winters and low frequency of the specific cold, wet conditions required for ice formation on turbine blades.

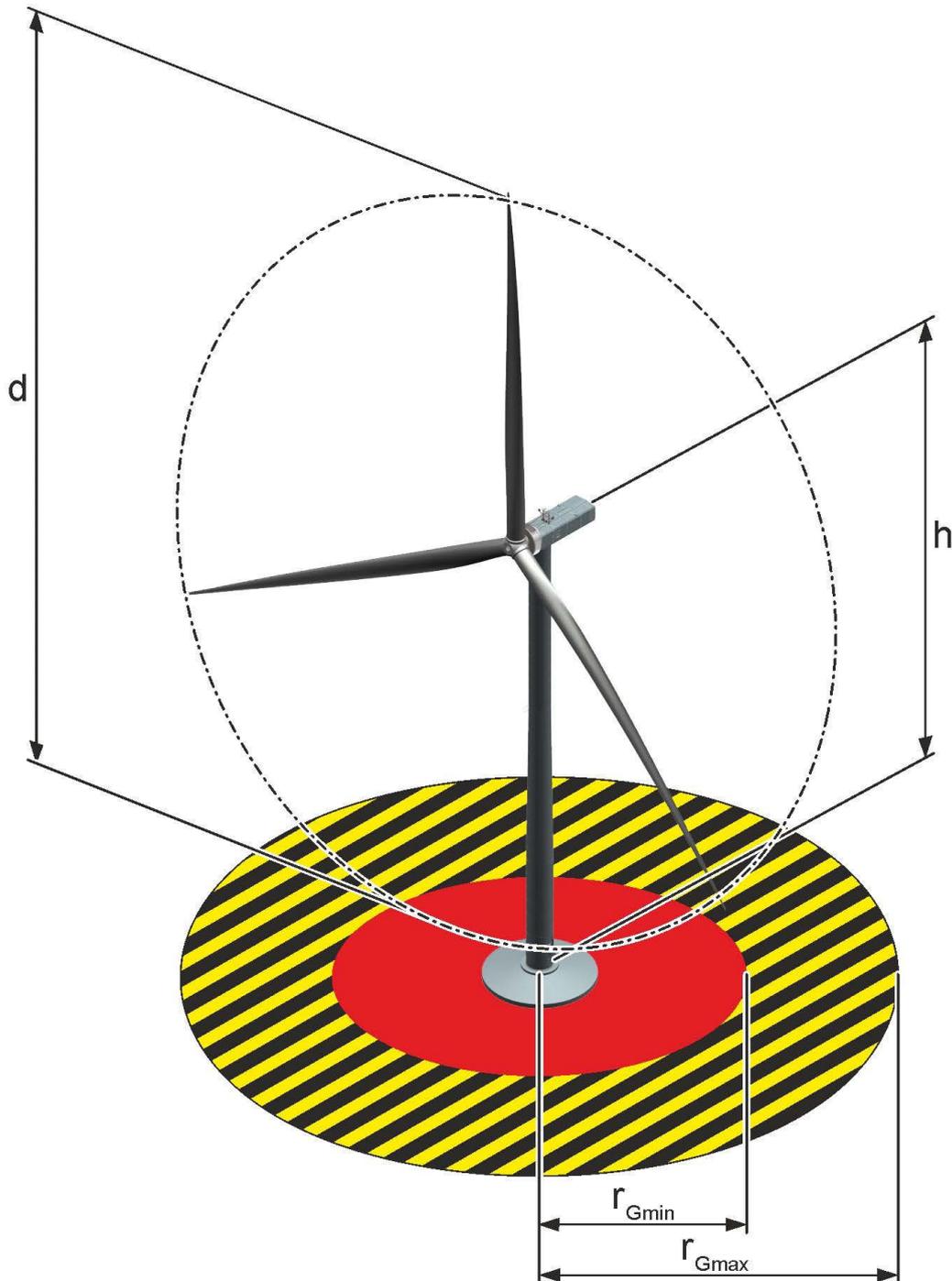


Figure 4 Enercon Risk Zones for falling object

**h** - Hub height

**d** - Rotor diameter

$r_{Gmin}$  - Minimum risk zone radius =  $0.5 \times d$

$r_{Gmax}$  - Maximum risk zone radius =  $1.5 \times (h + d)$

The minimum risk zone  $G_{min}$  of the wind turbine lies within a horizontal circle with the tower at its centre. The radius of this circle is calculated from the rotor diameter using the following formula:  $r_{Gmin} = 0.5 \times d$ .

The maximum risk zone  $G_{max}$  of the wind turbine lies within a horizontal circle with the tower at its centre. The radius of this circle is calculated from the rotor diameter and hub height using the formula given below. This formula is derived from empirical values for how far objects (e.g. chunks of ice) can possibly be thrown:  $r_{Gmax} = 1.5 \times (h + d)$ .

The internal risk zone of the wind turbine includes all enclosed areas—foundation, tower, nacelle, and rotor blades. Access is controlled via a lockable door that can always be opened from the inside using a panic lock. The turbine constitutes an enclosed electrical operating area.

This internal zone information is specific to technical equipment provided by Enercon. Any modifications or additions to the equipment require a revised risk assessment to re-establish the risk zones.

As noted, ice throw is not typically a concern in the UK. Nevertheless, in the unlikely event of ice formation, the turbine has been sited such that no sensitive receptors are located within the maximum risk zone for this selected wind turbine.

## 10. System Failures and Missing Documentation

Failure of warning signals or missing operational documentation can increase the likelihood of accidents. All personnel must ensure proper documentation is accessible and all safety systems are tested before use, with appropriate and comprehensive training of all required personnel

## 11. Oil and Grease

Oil and grease leaks from wind turbine components can increase fire risk, harm the environment, and cause slips. Avoid contact, clean spills immediately using absorbent materials, and dispose of waste properly. Notification should then be made to Enercon to prevent any system function being affected.

## 12. Fire Extinguishers

CO<sub>2</sub> extinguishers can cause cold burns, or suffocation. Avoid contact with the gas, warn nearby personnel, and stay clear of electrical components in the event of fire extinguisher use. Personnel working within the wind turbine should all be trained in the correct use of the CO<sub>2</sub> fire extinguishers and in working in an oxygen reduced environment.

## 13. Automatic Extinguishing System

This system may release conductive, hazardous chemicals when cabinets are opened. Only authorized, trained personnel may open electrical cabinets after system deactivation.



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#### 14. Flammable Materials

Storing combustible items in the turbine increases fire risk. No flammable materials should be stored in the wind turbine or within a 10m radius of the wind turbine.

#### 15. Cooling Liquid

Cooling liquid leaks can affect turbine function, pollute the environment, and cause slipping or poisoning. In the event of a cooling liquid spill, spills should be cleaned immediately with appropriate cleaning materials and notification made to Enercon if functionality is at risk.



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