



NORTH FALLS

Offshore Wind Farm

Electro-Magnetic Fields Non-technical Statement

Document Reference: 9.40
Volume: 9
Date: April 2025
Revision: 0

Project Reference: EN010119



Project	North Falls Offshore Wind Farm
Document Title	Electro-Magnetic Fields Non-technical Statement
Document Reference	9.40
Supplier	Ben Cave Associates
Supplier Document ID	33313180800.51.1024 PB9244-RHD-ZZ-ON-RP-ON-0373

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Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
0	April 2025	Deadline 4	BCA	NFOW	NFOW

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Glossary of Acronyms

EMF	Electro-Magnetic Fields
ICNIRP	International Commission on Non-Ionising Radiation Protection
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
μT	Microteslas
WTGs	Wind turbine generators

Glossary of Terminology

The Project Or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.
wind turbine generator (WTG)	Power generating device that is driven by the kinetic energy of the wind

1. What are Electro-Magnetic Fields?

1. Whenever electricity is generated or used, it creates invisible areas of energy which are known as Electro-Magnetic Fields (EMF).
2. EMF is a collective term used to describe both electric and magnetic fields. EMF stands for *electro-magnetic fields* or *electric and magnetic fields*.
 - An **electric field** is the invisible force around electric charges, like the static you feel when touching a balloon after rubbing it on your hair.
 - A **magnetic field** is the invisible force created when electricity flows through a wire, like the force that can make a compass needle move near a power line.
3. EMF can create a small electrical current in things that are nearby and that can conduct electricity. Metal conducts electricity and so does the human body.

2. Electro-Magnetic Fields and North Falls

4. North Falls Offshore Wind Farm (North Falls) will transport electricity from its offshore wind turbine generators (WTGs) to the proposed onshore substation using a High Voltage Alternating Current (HVAC) transmission system, via cables buried under the seabed and under the ground. This reduces interference on magnetic receptors compared to alternative technologies such as High Voltage Direct Current (HVDC).
5. HVAC transmits electricity by making the flow of electricity switch directions back and forth. To minimise losses caused by the 'alternating' nature of HVAC electricity, a high voltage is needed. This generates EMF within the cables.

3. How will North Falls Eliminate Risk to the Public from Electro-Magnetic Fields?

6. North Falls will adhere to strict UK guidelines by ensuring that electric fields and magnetic fields stay within safe exposure limits for the public. North Falls will use two different approaches to eliminate risk to the public from EMF. It uses a barrier approach for the *electric fields* and it uses distance for the *magnetic fields*.
 - **Electric fields:** North Falls' electricity cables will be surrounded by a metal sheath/screen. This will provide mechanical protection and it will prevent the electric field from extending outside the cable.
 - **Magnetic fields:** The magnetic field gets weaker the farther you are from the source. North Falls' electricity cables will be buried to a depth of 0.9 to 2.0 metres below ground, with a typical burial depth of 1.2 metres. This will

provide protection through distance, and it will reduce the magnetic field at ground level to a level that poses no risk to the general public.

4. Electro-Magnetic Fields and UK and International Guidance

7. For areas where members of the public may spend significant time (e.g., homes, schools), the following limits apply:
 - Electric Field Strength: 9 kV/m
 - Magnetic Field Strength: 360 microteslas (μT) (National Grid, [EMFs.info](https://www.emfs.info/), 2020).
8. These guidelines set exposure limits that are safe for the public and they include a large safety margin.
9. As described above, the *electric fields* will be prevented from extending outside of the cable by the metal sheath/screen.
10. The highest level of the *magnetic fields* at ground level for the North Falls underground cable system has been calculated as 106.2 μT . This is within the compliance level of 360 μT .
11. Table 4.1 shows the levels of typical *magnetic fields* from common household appliances which run off mains electricity, for comparison.

Table 4.1 Typical magnetic field levels from common household mains appliances (National Grid, EMFs.info, Energy Networks Association (2017))

Factor	Magnetic field (μT)	
	Close to appliance	1 m distance
Vacuum cleaner	800	2
TV, washing machine, microwave	50	0.2
Electric oven	10	0.02
Fridge	2	0.01

12. Figure 1 illustrates the electro-magnetic spectrum, organised by wavelength. For reference the earth has a natural static *magnetic field*, which is around 50 μT in the UK.

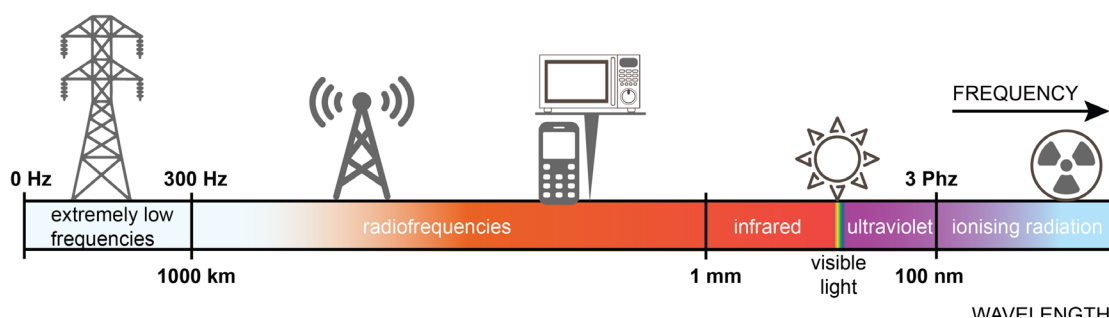


Figure 1 The electro-magnetic spectrum

5. Electro-Magnetic Fields and Health

13. According to National Grid's website (National Grid, [EMFs.info](#), 2020), there are some known, direct and indirect, effects from EMF to the human body, including:
- **Direct:** Interference with nerves from very high levels of EMF. However, the first effects do not happen until levels of EMF reach approximately 10,000 μT , where flickering sensations in the peripheral vision have been reported in laboratory experiments. This means that effects are only seen at extreme levels, far above what North Falls' underground cables will produce.
 - **Indirect:** Microshocks from material objects, which have been charged with electricity and later touched by a person. There are no health effects associated with microshocks, which are similar to a static shock from a balloon or trampoline.
14. In summary, buried North Falls HVAC cables will emit very low levels of EMF, well within the safe limits set by both national and international guidelines. Adherence to established safety standards will ensure EMF emitted by North Falls' cables, under the seabed and under the ground, will pose no risk to human health.

6. References

National Grid, EMFs.info, Energy Networks Association (2017)
National Grid, EMFs.info (2020) Available from: Electric and magnetic fields EMFs [accessed: November 2024]



NORTH FALLS

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HARNESSING THE POWER OF NORTH SEA WIND

North Falls Offshore Wind Farm Limited

A joint venture company owned equally by SSE Renewables and RWE.

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