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Page 1 of 4

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27 February 2023

Dear Ms Parri,

### Environmental Light Pollution – Aberdaron Area

Further to our series of letters in December 2021 January, February and March 2022 culminating in the council refusing to act because I do not live close enough to be affected by the blinding phototoxic LED lights from the four properties cited :-

1. Bryn Farm Aberdaron LL53 5AP
2. Efail Rhos Garage Rhoshirwaun LL53 8HN
3. Wynnstay Farmers depot Penygroeslon LL53 8ER
4. Anelog Farm LL53 8BT

New expert evidence has become available indicating that the beam from an LED light has an intense central core that penetrates for miles, please see the diagrams in Appendix 1 with extracts from Dr. Nisa Khan's book "Understanding LED Illumination" I commend this book to the Council. Also please read the expert reports on LED light pollution referred to in appendix 2.

**The distance a LED beam penetrates is verified by the fact that that flashes from vehicles with LED lights 60 miles away across Cardigan Bay from Aberystwyth can be seen in Aberdaron.**

**These lights are also a road safety hazard.**

The Royal Society for the Prevention of Accidents (RoSPA) state: "Between the ages of 15 and 65, the time it takes to recover from glare increases from one to nine seconds – Becky Guy Road Safety Manager, England.

The Medical University of Vienna being one of the foremost institutions in the world in the understanding of eye, vision and cognition, undesired light effects including Distraction Blindness etc. - Prof emer. Peter Heilig MD agrees with the RoSPA's statement.

He quotes: "Every single supra-threshold, even weak light stimulus (including light stimulation of peripheral visual field areas) has to be processed by the brain. 'Overflow' (of visual short-term memory, working memories), i.e., too many, too bright, too distracting (blinking, moving, changing intensity or colour etc.) threatens to elicit Distraction Blindness including possible fatal sequelae and consequences.

Mark Baker BSc President of the [Softlights Foundation](#) states:

"As per the Cree Lighting white paper "Is Lighting Damaging Our Health" there are currently no valid formulas for glare from LED flat surface sources. Thus, the 9 second value cannot be confirmed.

However, the situation is likely worse than 9 seconds, because these LED lights will likely cause debilitating pain and total loss of vision. (Cree Lighting are the major manufacturer of LED chips, their white paper [Cree White Paper Is Lighting Damaging Our Health?](#) states that the present standards for measuring light from LED chips are inadequate.)

**At a speed of 30 mph, 1 second of disability glare = 13.4 metres travelled blind – enough to miss seeing a child. Nine seconds of disability glare = 120 metres travelled blinded.**

The Llŷn has an ageing population which means drivers could have impaired vision due to disability glare whilst driving from one end of Botwnnog village to the other. LED lights are already very disabling and an equalities issue for a growing number of people.

Having drawn the Council's attention to these reports from world renowned experts on the harm that LED lights can cause to humans the Council has statutory "Duty of Care" to protect citizens from harm,

In view of Gwynedd's past intransigence you are formally advised that should there be an accident as a phototoxic blinding LED lights anywhere in Gwynedd, you **Moira Duell Parri** as **Environmental Health Officer**, your line manager, your Director and the Council's Chief executive could be held legally liable.

Following International Dark Skies week, where Ynys Enlli were acclaimed for obtaining accreditation as the first dark sky sanctuary in Europe, a solution would be for Gwynedd Council to follow the good example set by all of France and many Alpine villages to limit the colour temperature of external lamps to less than 2,700k and that light should not exceed the property boundary.

Specifically in the interests of road safety, I request that Gwynedd Council serve a notice of statutory nuisance against the owners of those four cited properties (the Council have the occupiers names on their tax database).

I look forward to Gwynedd Council taking immediate action to make our environment safer and comply with Dark Skies standards by eliminating phototoxic external lights.

**Yours sincerely,**



**Roy Milnes**

**cc**

Prof emer. Peter Heilig MD  
Professor Mark Baker BSc  
Peter Veto University of Ulm  
BBC Panorama  
The Cambrian News  
Caernarfon and Denbigh News  
Wales On line

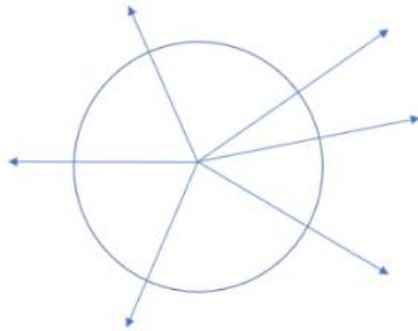
LED lights which are a flat source do not comply with Building Lighting or Road Vehicles Lighting Regulations 1989 which are based upon incandescent point source which emit spherically uniform light.

**Dr Nisa Khan, one of the foremost experts in the world on LED lights writes: -**

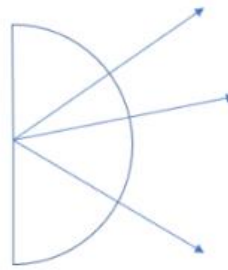
*“Flat light sources produce Lambertian light distributions and only LED flat light sources do this. This means that luminous intensity and luminance are both non uniform in space for the source and what the viewer sees. ALL of illumination scientific theories are based on point light sources, which means there is spherical uniformity for luminance and luminous intensity regarding the light source and what the viewer sees.”*

Dr M. Nisa Khan, President IEM Lighting Technologies and Author, *Understanding LED Illumination*.

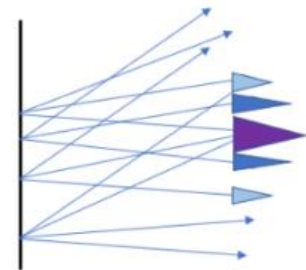
The art and science of illumination for the past 150 years have been predicated on the foundational premise that the light source can be reduced to a single infinitely small mathematical point. From a point source, the light emanates in all spherical directions uniformly, such that taking measurements at any point in space would result in the same readings. This is shown on the left side of the diagrams.



Spherical Emitter



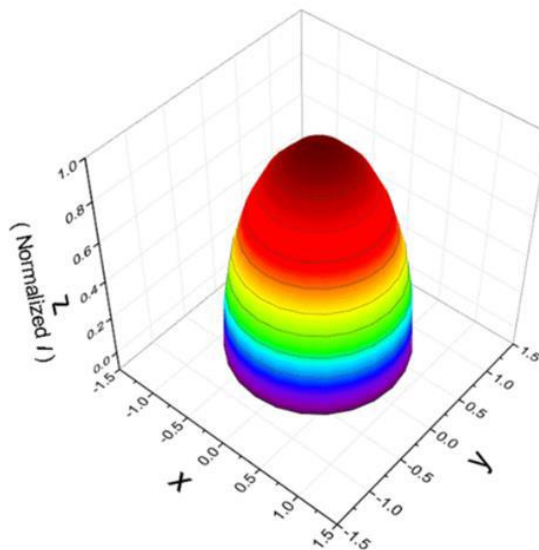
Theoretical Hemispherical Emitter



Flat Surface Emitter



**Spherical Emitter**



**Flat Surface Emitter**

Light Emitting Diodes, however, emit light from a flat surface, meaning that there is no curvature. The light leaves the chip surface within a given escape angle and because of the flat surface, the light rays intersect. The largest amount of intersection occurs in the middle of the chip and the least amount occurs on the chip edges. The resulting shape of the light from an LED is a spatial energy profile resembling a bullet, as shown on the right side of the diagrams.

While human comfort level for the density of visible light is approximately 300 nits, LED chip makers have already exceeded 100,000,000 nits of peak luminance, resulting in high risk of short-term and long-term eye damage, with babies and children being particularly at risk. In addition, due to the small 1mm x 1mm size of an LED chip, and due to the extreme density of the light, the entire energy emitted by the chip lands on the eye nearly invariant of distance.

The bullet-shaped non-uniform energy profile interferes with normal human nerve functioning, causing seizures, migraines, panic attacks, anxiety, and agitation.

**There are no current government regulations to protect people from dangerous LED light.**

[The Law - Road Vehicle Lighting Regulation RVLr reg 27](#)

[Highway Code Lighting requirements 114](#)

Professor Peter Veto University of Ulm videos:

[Why are LED headlights so glaring? | Part 1: Luminance - YouTube](#)

[Why are LED headlights so glaring? | Part 2: Color \(spectral power distribution\) - YouTube](#)

[Demo: LED vs. halogen apparent luminance distribution - YouTube](#)

[Understanding LED Illumination Dr. M. Nisa Khan](#), President IEM Lighting Technologies and Author

[Generalised letter for LED light sensitive individuals](#) Dr. Nisa M. Khan Ph D President IEM LED Lighting Technologies

[Light-emitting-diode induced retinal damage and its wavelength dependency](#)

[Light Induced Retinal Ganglion Cell Damage](#)

[Human and Environmental Effects of Light Emitting Diode \(LED\) Community Lighting](#)

American Medical Association - Louis J Kraus MD June 2016

[Human Responses to Lighting based on LED](#) Public Health England, Chartered Institute of Building Services and Society of Light and Lighting May 2016 5.2 Blue Light hazards and hotspots, page 18

[Blinding Headlights and LED Lights: Dangerous on Roadways and Off](#) by Suzanne Coleman MD

[Eyecare research LED cause 5x more phototoxicity](#) Dr. Celia Sanchez-Ramos RCC Harvard

[Inattentional Blindness and Conspicuity](#) Professor Marc Green Phd Yale University updated 2011

[Tailored to the Eye P. Heilig March 2015](#) Professor Peter Heilig University of Vienna explains how bright light affect the eye down to photon and molecular level

[Daytime Running Lights - What good? P. Heilig Jan 2014](#) "Traffic Safety: No Benefit, Contravention of Human Rights, Children at risk particularly on pedestrian crossings

[Bright white headlights: are they safe? Flyingshingle.com Jan 2012](#)

Michael D. Mehta, Ph.D. Dean and Professor, Faculty of Arts Thompson Rivers University BC

[Why HID Xenon headlights bother older drivers](#) [British Journal of Ophthalmology 2003](#)

M A Mainster, G T Timberlake, Department of Ophthalmology, University of Kansas Medical Center, "Governmental regulations determine which headlights we encounter. Acceptance or rejection of the current generation of HID xenon headlights ultimately depends on their record in traffic and litigation.

[Retinal Light Damage 2009 Dr. P. Heilig, Dr. Elena Rozanova, Dr. Jasminka Godnic-Cvar](#)

[Disability and Discomfort Glare of Headlamps - english](#) Locher, J.& Kley, F. (2009). ISAL 8th International Symposium on Automotive Lighting (38 - 42) This paper seeks to justify Xenon headlights - it concludes in static laboratory conditions that there is minimal difference between Xenon-HID, LED and normal Tungsten-Halogen headlights if correctly aligned. However if mis-aligned discomfort glare is present. A major failing of this static laboratory experiment is not carrying out real-world tests on moving vehicles with Xenon-HID headlamps - when they traverse legal speed humps or potholes they temporarily blind drivers. This is a real concern as the laboratory was Hella's who make headlights for many vehicles.

<https://medicalxpress.com/news/2019-05-eyes-health-authority.html> states:

The "blue light" in LED lighting can damage the eye's retina and disturb natural sleep rhythms.

"Exposure to an intense and powerful [LED] light is 'photo-toxic' and can lead to irreversible loss of retinal cells and diminished sharpness of vision" Chronic exposure can "accelerate the ageing of retinal tissue, contributing to a decline in [visual acuity](#) and certain [degenerative diseases](#) such as [age-related macular degeneration](#),"

[Mind How You Go by Adrian Shurmer and Stephen John O'Donnell](#) The Thinkers guide to a safer drive (Amazon).

[The problem of 'blinding' car headlights – and how to stay safe on the road](#) The Telegraph James Foxall 13 April 2022

[Cree White Paper Is Lighting Damaging Our Health?](#)

[The Highways \(Road Humps\) Regulations 1999 \(legislation.gov.uk\)](#)

[Lightmare.org](#)

[Soft Lights Foundation](#)