

Guidance

Light pollution

Advises on how to consider light within the planning system.

From: **Ministry of Housing, Communities and Local Government**
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What light pollution considerations does planning need to address?

Artificial lighting needs to be considered when a development may increase levels of lighting, or would be sensitive to prevailing levels of artificial lighting. Artificial light provides valuable benefits to society, including through extending opportunities for sport and recreation, and can be essential to a new development. However, for maximum benefit, it is important to get the right light, in the right place and for it to be used at the right time.

Artificial light is not always necessary. It has the potential to become what is termed 'light pollution' or 'obtrusive light', and not all modern lighting is suitable in all locations. It can be a source of annoyance to people, harmful to wildlife and undermine enjoyment of the countryside or the night sky, especially in areas with intrinsically dark landscapes. Intrinsically dark landscapes are those entirely, or largely, uninterrupted by artificial light. National parks and nature reserves can serve as good examples, particularly where they support habitats for native nocturnal animals.

Lighting schemes can also be costly and difficult to change, so getting the design right and [setting appropriate conditions at the planning stage](https://www.gov.uk/guidance/use-of-planning-conditions) (<https://www.gov.uk/guidance/use-of-planning-conditions>) is important. In particular, some types of premises (including prisons, harbour premises, airports and transport depots where high levels of light may be required for safety and security reasons) are exempt from the statutory nuisance regime for artificial light, so it is even more important to get the lighting design for these premises right at the outset.

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What factors can be considered when assessing whether a development proposal might have implications for light pollution?

The following questions indicate matters that may need to be considered in relation to managing the effects of light pollution:

- Does an existing lighting installation make the proposed location for a development unsuitable, or suitable only with appropriate mitigation? For

example, this might be because:

- the artificial light has a significant effect on the locality; and/or
- users of the proposed development (e.g. a hospital) may be particularly sensitive to light intrusion from the existing light source.

Where necessary, development proposed in the vicinity of existing activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme, reflecting the agent of change principle (<https://www.gov.uk/guidance/national-planning-policy-framework/15-conserving-and-enhancing-the-natural-environment#para182>). Additional guidance on applying this principle is set out in the planning practice guidance on noise (<https://www.gov.uk/guidance/noise--2>).

- Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?
- Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration, but will need to be considered in terms of both their severity and alongside the wider benefits of the development.
- Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?
- Would new lighting have any safety impacts, for example in creating a hazard for road users?
- Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.
- Does the proposed development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour.)

If the answer to any of the above questions is 'yes', local planning authorities and applicants should think about:

- where the light shines;
- when the light shines;
- how much light shines; and
- possible ecological impacts.

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What factors are relevant when considering where light shines?

Light intrusion occurs when the light ‘spills’ beyond the boundary of the area being lit. For example, light spill can result in safety impacts related to the impairment or distraction of people (e.g. when driving vehicles), health impacts arising from impaired sleep, cause annoyance to people, compromise an existing dark landscape and/or adversely affect natural systems (e.g. plants, animals, insects, aquatic life). These adverse effects can usually be avoided with careful lamp and luminaire selection and positioning:

- Lighting near or above the horizontal is usually to be avoided to reduce glare and sky glow (the brightening of the night sky).
- Good design, correct installation and ongoing maintenance are essential to the optical effectiveness of lighting schemes such as fixed and/or regularly operated functional and decorative lighting elements.
- In combination with optical good practice aimed at limiting light pollution, efficient lamp and luminaire selection are important considerations to minimise energy use and associated carbon emissions.

Common causes of complaints to local authorities include domestic, shop or office exterior security lights, illuminated advertising and flood lighting, so these installations may require particular attention. Similarly, insensitively positioned decorative lighting, particularly in rural areas, can be a cause for concern.

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What factors are relevant when considering when light shines?

The use of lighting only when the light is required can have a number of benefits, including minimising light pollution, reducing energy consumption, reducing harm to wildlife and improving people's ability to enjoy the night sky:

- Lighting schemes could be turned off when not needed ('part-night lighting') to reduce any potential adverse effects - e.g. when a business is closed or between midnight and 5am or 6am. Planning conditions could potentially require this where necessary.
- Lighting could also be dimmed to minimise its visual impact at times of reduced need or increased sensitivity.
- Impacts on sensitive ecological receptors throughout the year, or at particular times (eg during bird migrations) may be mitigated by the design of the lighting or by turning it off or down at sensitive times.

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What factors are relevant when considering how much the light shines?

Consideration of how much light shines may include an assessment of the quantitative and spectral attributes of the lighting scheme (eg light source and performance levels) and whether it exceeds the levels required to fulfil its intended purpose. Consideration can also be given to whether the proposed lighting is purely for decorative purposes as opposed to being needed for functional reasons such as security. The character of the area and the surrounding environment may affect what will be considered an appropriate level of lighting for a development. In particular, lighting schemes for developments in protected areas of dark sky or intrinsically dark landscapes need to be carefully assessed as to their necessity and degree.

Glare needs to be avoided, particularly for safety reasons. Glare is the uncomfortable brightness of a light source due to the excessive contrast between bright and dark areas in the field of view. Consequently, the perceived glare depends on the brightness of the background against which it is viewed. It is affected by the quantity and directional attributes of the source. Where appropriate, lighting schemes could include 'dimming' to lower the level of lighting (e.g. during periods of reduced use of an area, when higher lighting levels are not needed).

More lighting does not necessarily mean better lighting. For example, large differences in adjacent lit areas can mask activity in shadow and cause areas of high contrast or glare.

White light, with more blue content or with ultraviolet content, is generally more disruptive to wildlife than, say, yellow/orange light. Similarly, for humans, light intrusion by white/blue light is more disruptive to sleep. Use of modern white light sources that filter out blue or ultraviolet light may mitigate these effects, as well as offering superior directional control. However, whiter light aids people's vision and ability to perceive colour; it also facilitates CCTV use.

The needs of particular individuals or groups will need to be considered where appropriate. These include the safety of pedestrians and cyclists, and the needs of those whose activities rely on low levels of artificial light such as astronomers. Schemes designed for those more likely to be older or visually impaired may require higher levels of light and enhanced contrast, together with more control, as the negative effects of glare also increase with age.

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What factors are relevant when considering possible ecological impacts of lighting?

Wildlife species differ from humans in their sensitivity to light (e.g. they can be affected by very low levels of light) and may be adversely affected in a number of ways by it (see the Royal Commission on Environmental Pollution's 2009 report, Artificial light in the environment (<https://www.gov.uk/government/publications/artificial-light-in-the-environment>)). The positioning, duration, type of light source and level of lighting are all factors that can affect the impact of light on wildlife.

The ability of some building materials to polarise light may cause insects, birds and other wildlife to mistake the material for water. This is a daytime and night-time effect and is different to artificial light reflected off surfaces. The effect is particularly strong with smooth (shiny) dark surfaces and may be important to consider when assessing schemes near water bodies. The use of rough, matt, light-coloured materials may reduce the effect.

Further advice is available from the Defra (<https://www.gov.uk/environment/biodiversity-and-ecosystems>) and Natural England (<https://www.gov.uk/government/organisations/natural-england>) websites on handling the impact on wildlife – including from artificial light – where Protected Sites or protected species could be affected. The specific nature of any consideration will depend on the features of any protected site or presence of any protected species.

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What other information is available that could inform approaches to lighting and help reduce light pollution?

- Information from the Bat Conservation Trust on Bats and artificial lighting in the UK (<https://www.bats.org.uk/our-work/buildings-planning-and-development/lighting>), and Eurobats Guidelines for consideration of bats in lighting projects (<https://www.eurobats.org/node/1563>)
- The Chartered Institution of Building Services Engineers (CIBSE) – Society of Light and Lighting (SLL) Code for Lighting (<https://www.cibse.org/knowledge-research/knowledge-portal/sll-code-for-lighting>)
- The Chartered Institution of Building Services Engineers (CIBSE) – Society of Light and Lighting (SLL) Lighting Guide 6: The Exterior Environment (<https://www.cibse.org/knowledge-research/knowledge-portal/lighting-guide-06-the-exterior-environment-2016>)
- The Chartered Institution of Building Services Engineers (CIBSE) – Society of Light and Lighting (SLL) Lighting Guide 15: Transport Buildings (<https://www.cibse.org/knowledge-research/knowledge-portal/lighting-guide-15-transport-buildings-2017>)

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