Chilterns National Landscape

Chilterns Lighting Planning Guidance

Chilterns National Landscape

"Imagine a vista of outstanding natural beauty, to say nothing of historic and cultural significance, permanently obscured from public view by a cloud of non-toxic, but visually impenetrable, artificial vapour. Such a prospect seems unthinkable in Britain today. Yet, we seem to tolerate the daily destruction of arguably the most culturally universal and historically pristine of natural vistas – the night sky, filled with constellations of stars, and planets, and galaxies. The responsible pollutant, however, is not an impenetrable vapour, but the light that we so freely emit into our surroundings".

Extract produced under Crown copyright from The Royal Commission on Environmental Pollution (2009) Artificial Light in the Environment. London: The Stationery Office Limited.

The Chilterns National Landscape covers over 838 km² (324 square miles) across Buckinghamshire, Oxfordshire, Hertfordshire, and Bedfordshire. It was originally designated as an Area of Outstanding Natural Beauty (AONB) in 1965 and subsequently extended slightly in 1990. It is one of 34 National Landscapes in England, which are designated on the basis that their area is of such outstanding natural beauty that steps should be taken to conserve and enhance it. In relation to natural beauty, the criteria for designation are the same as for England's 10 National Parks (including the Broads). Importantly, the Chilterns is not just what lies on the ground – 50% of the National Landscape is the sky above it, contributing to its distinctive sense of space, tranquillity, and scenic value. This vast skyscape is an integral part of the area's natural beauty and visitor experience.

June 2025
Approved by the Planning Committee 25 July 2024, the Board 19 September 2024, and following Board recommendations with additional ecological content as agreed by the PC Lighting Working Group on 29 November 2024.

Cover image: Goring and Streatley from Lardon Chase (Dave Olinkski)

Introduction

This Model Lighting Model Policy and its accompanying appendices support the Chilterns National Landscape management plan policies on dark skies, which set out to "keep skies dark at night by only using light where and when needed. All new lighting should be the minimum required and demonstrate that it complies with published guidance for intrinsically dark zones. Avoid architectural designs that spill light out of large areas of glazing" (Management Plan DP8 Dark Skies) and "seek opportunities to remove or replace existing inappropriate external lighting to restore dark skies at night" (Management Plan DP15 Restore Dark Skies).

Such management plan policies carry planning weight as material planning considerations, and with this model lighting policy, they are intended to guide all planning decision-makers and property owners on the implications of lighting proposals within the Chilterns National Landscape and its setting. This document promotes best practice, and a Chilterns model lighting policy is set out below. A separate set of technical guidance notes deal with supporting materials, a glossary and other legislative and related policy areas.

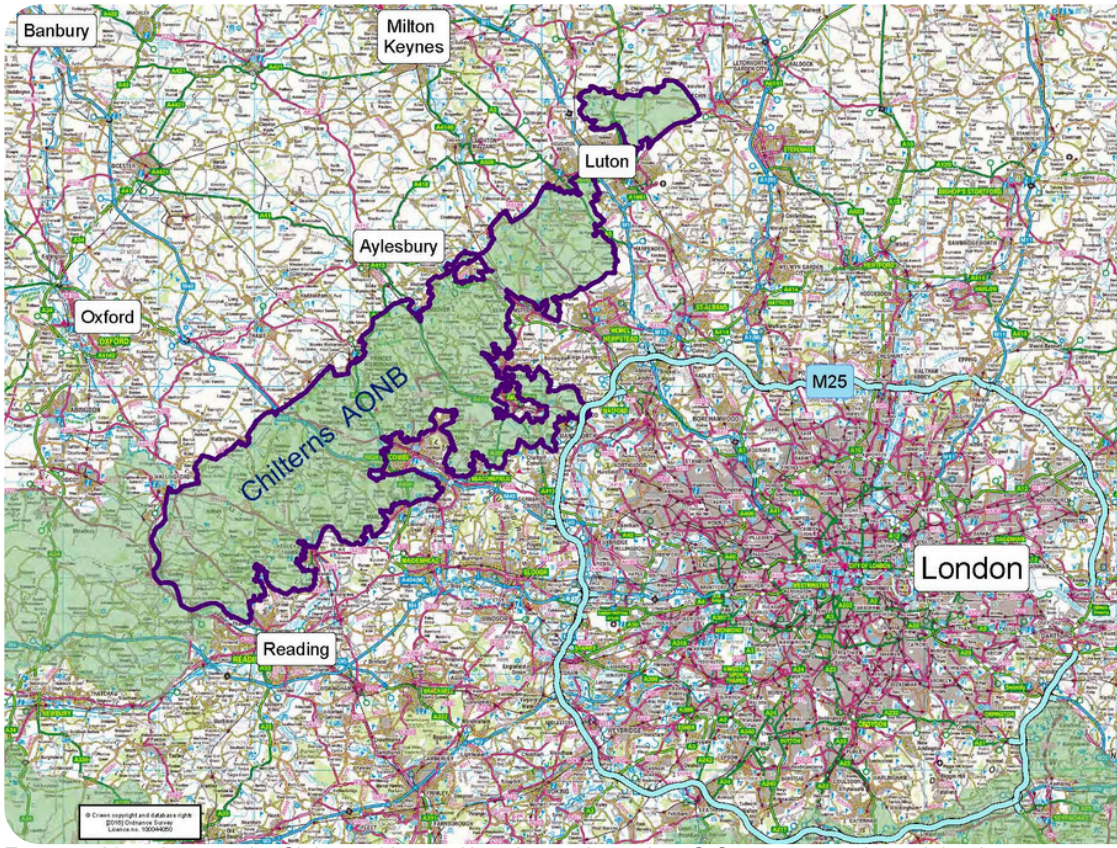

Figure 1: Map showing the Chilterns National Landscape boundary © Crown copyright and database rights (2016) Ordnance Survey Licence no. 100044050

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Published by the Chilterns Conservation Board, a Conservation Board established under the Countryside and Rights of Way Act 2000.

Disclaimer: While every effort is made to ensure all the legal and policy references are correct, the CCB always recommends that these are checked as revisions and updates will occur.

Explanatory language: The Chilterns National Landscape covers the area designated as the Chilterns Area of Outstanding Natural Beauty (AONB) and the Chilterns Conservation Board.

AONB is the legal designation used within this model lighting policy and technical guidance note. The Chilterns Conservation Board (CCB) was established in 2004 under powers given in the Countryside and Rights of Way Act 2000, to seek to further the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty, and the purpose of increasing the understanding and enjoyment by the public of the special qualities of the area of outstanding natural beauty.

Citation: This document should be cited as Chilterns Conservation Board (2024) The Chilterns National Landscape (AONB) Lighting Position Statement. Chinnor, Oxfordshire: The Chilterns Conservation Board.

Chilterns National Landscape Lighting Model Policy

1.0 Policy Introduction

1.1 This policy addresses lighting in the Chilterns landscape – either as a product of new development, or when new external lighting or the upgrading of existing installations is proposed. It will apply to lighting schemes requiring planning permission and listed building consent but also offers best practice suggestions where planning is not needed (schemes comprising "permitted development" or "not development", often including the upgrading of existing lighting [1]).

1.2. Substantial tracts of the Chilterns countryside enjoy dark skies and relatively dark skies, sometimes near urban settlements. Three principal sources of light pollution comprise:

- **Sky glow** – the horizontal transmission from light sources, often viewed as a brightening of the night sky.
- **Sky glare** – a light source set against a darker background, most acute in rural areas.
- **Light trespass or intrusion** – a general light spill flowing from a property, often due to windows or areas being lit.

1.3. All three cases may affect amenity, habitats and tranquillity. Traditional Chilterns vernacular buildings generally have small windows. Modern designs with large areas of glazing are inappropriate, as they often appear as boxes of light in the countryside at night and glinting glazed reflectors in the daytime. Internal light sources and their potential erosion of the night sky via domestic glazing can harm the relative tranquillity of the Chilterns as much as external lighting. Design details and technical specifications prevent excessive light from spilling from large openings and upper-storey windows. Roof lights should be avoided or kept to a minimum. Architectural illumination (bathing or otherwise highlighting the building in light) should be avoided.

1.4. The potential for light spill from large areas of fenestration (windows, roof lights and glazing) presents a considerable source of light pollution. The key is to design buildings that reduce the levels of light spill from internal glazing. Glare, glow, and light trespass are the product of a poor location for lighting, primarily rural, and a poor design, with poorly directed and sometimes excessive and unnecessary illumination levels.

1.5. Applications will need to be supported by a lighting assessment that addresses, among other things, the visibility of lighting within the landscape, the 'footprint' of the lighting, the nature of spill from windows, and the overall assessment of glow, glare, and light trespass.

[1] Where existing lighting is upgraded this may require planning permission because new structures are introduced. For example, introducing new lighting to a sports pitch. When upgrading existing installations, any previous planning consents must be consulted, because planning conditions may apply and require a formal application.

2.0 Chilterns National Landscape: Lighting Model Policy

New Development

Within the Chilterns National Landscape and its setting, the design of new development must avoid light trespass (or spill), glare, or glow and must conserve and enhance the intrinsic dark skies quality of the Chilterns National Landscape [2].

In determining planning applications:

2.1 The siting and orientation of new buildings, and the size and location of their windows must be given detailed consideration.

2.2 Consideration must be given to the appropriateness of mitigation. For example, this may be achieved by the fine grain of architectural detailing, such as recessed windows, generous eaves, or the use of brise-soleils[3], anti-reflective glazing (sometimes called reduced visible light reflectance glazing) may be appropriate.

2.3 Large glazing panels, such as picture windows, glazed gables, and floor-to-ceiling glazing, are unlikely to be considered appropriate in the Chilterns National Landscape unless a design is incorporated to mitigate artificial light spill.

External Lighting

2.4 Where new external lighting is proposed or existing lighting is to be upgraded within the Chilterns National Landscape and its setting, its design must avoid light trespass (or spill), glare, or glow and must conserve and enhance the intrinsic dark skies quality of the Chilterns National Landscape.

In determining planning applications:

2.5 Design measures, as detailed in **Figure 2** (right), will be required and should be controlled by planning condition, where the proposal is appropriate.

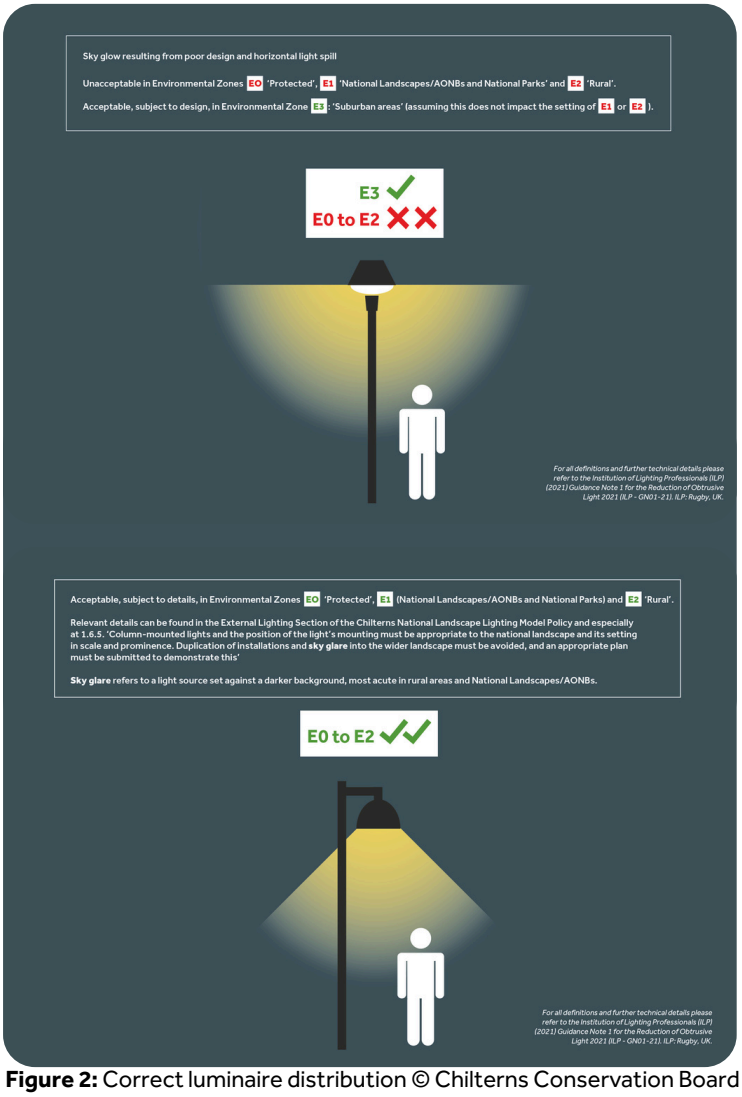


Figure 2: Correct luminaire distribution © Chilterns Conservation Board

[2] To assess these intrinsic dark skies category please refer to: Institution of Lighting Professionals (ILP) (2021) Guidance Note 1 for the Reduction of Obtrusive Light 2021 (ILP - GN01-21). ILP: Rugby, UK. Intrinsically dark landscapes are those entirely, or largely, uninterrupted by artificial light (see Gov.UK guidance on light pollution at https://www.gov.uk/guidance/light-pollution). An oft-cited rule of thumb to achieve a dark sky is the ability to see the milky way in the night sky by the unaided eye, see https://www.darkskydiscovery.org.uk.

[3] Brise soleils, sometimes brise-soleil is an architectural feature of a building that creates a sun break by, for example, using horizontal or vertical fins to shade the window openings. Associated with this is the reduction in heat gain by deflecting sunlight (Fleming J et al. (1991)). The Penguin Dictionary of Architecture London: Penguin Books.

2.6 Column-mounted lights and the position of the light's mounting must be appropriate to the National Landscape and its setting in scale and prominence. Duplication of installations and sky glare into the wider landscape must be avoided, and an appropriate plan must be submitted to demonstrate this.

2.7 Fixtures should make appropriate use of mounting arrangements, quality optics, cowls and screens [4], and control systems so the lighting is only operational when required [5].

2.8 A standard colour temperature of 3,000 kelvin, or 2,700 kelvin or lower, must be used [6]. If protected species or habitats in close proximity are likely to be affected, then all relevant guidance must be followed. If bats are likely to be affected, compliance with the ILP guidance GN08 Bats and Artificial Light is required.

2.9 The proposed lighting should not constitute or highlight a structure or feature that would have an adverse visual impact on the surrounding landscape.

2.10 The proposed lighting is designed to avoid disturbance to wildlife, biodiversity and their food source, by virtue of location (the principle of development in the correct location) or by the imposition of design details (in mitigation) and if necessary as controlled by planning condition.

2.11 Where domestic security lighting is required, it shall comply with ILP GN09 Domestic security lighting, getting it right [7].

Temporary Lighting

2.12 Where applications are made for temporary planning permission for lighting, they must demonstrate how they conserve and enhance the natural beauty of the National Landscape [8].

Mitigation / Moderation

2.13 The location, orientation, and architectural treatment of the lighting must conserve and mitigate the nocturnal effects on the natural beauty of the Chilterns landscape. It is recommended a lighting design consultant is sought to advise on means to achieve this aim.

[4] See examples certified by the International Dark Skies Association 'Fixture Seal of Approval' (https://darksky.org/what-we-do/darksky-approved/).
[5] Smart technology may be used to reduce the impact, where possible, new technologies such as solar ground-level way marker systems, for low-impact wayfinding.
[6] For further information on colour temperature, please see the "Design Details" section in Appendix One: Supporting Technical Documents, that accompanies this lighting policy.
[7] Where necessary, lamps of less than 500 lumens (~5W LED) are suitable for paths and 1,000 lumens (11W LED) for domestic extra light, such as finding the front door and opening it. Above 500 lumens, if justified, must be fully shielded, with downward-pointing LEDs. Please see https://theilp.org.uk/publication/guidance-note-9-domestic-exterior-lighting-getting-it-right/
[8] This may include demonstrating how it furthers the public understanding of the landscape's history, ecology, and cultural heritage associations. Examples include festivals and Son et lumière shows requiring temporary lighting for cultural purposes.

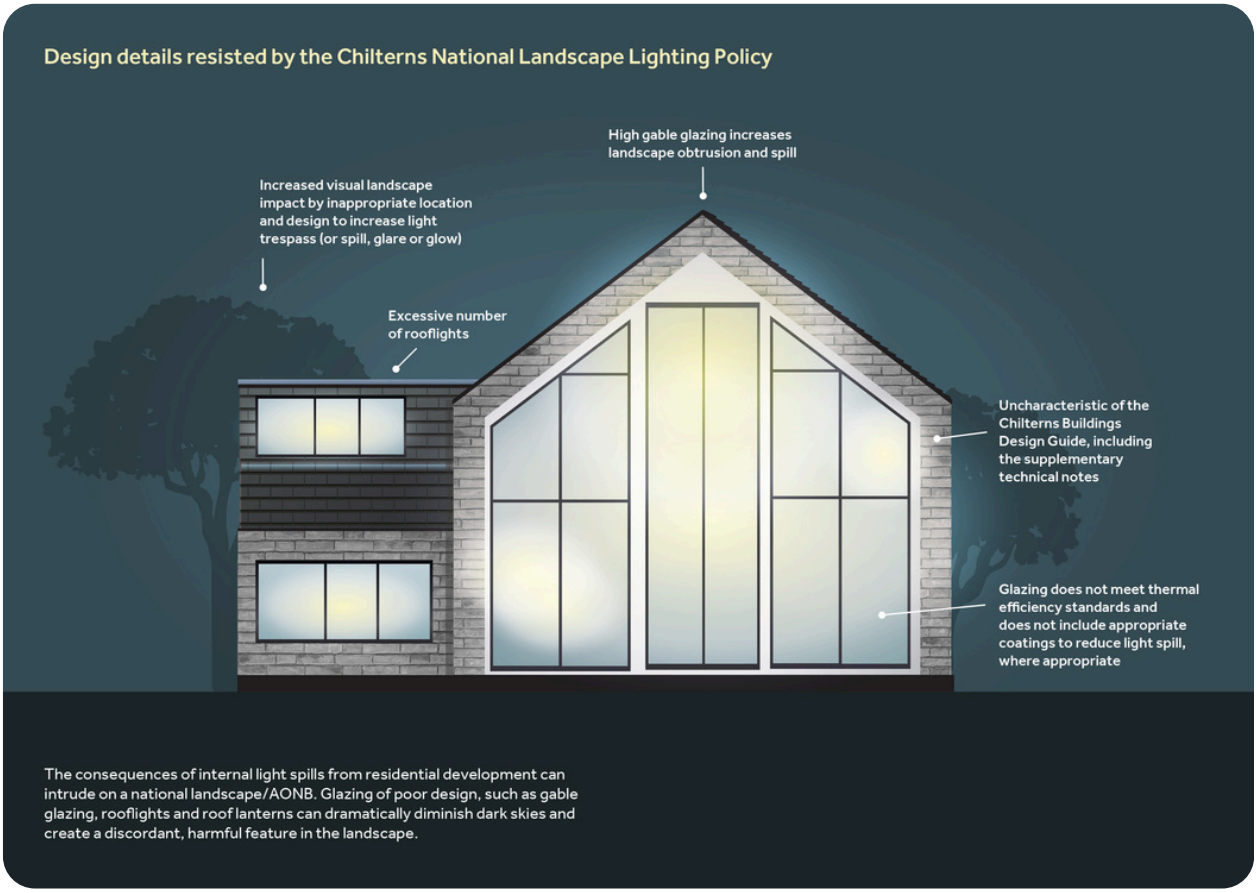


Figure 3: Design details resisted by the Chilterns National Landscape Lighting Policy © Chilterns Conservation Board

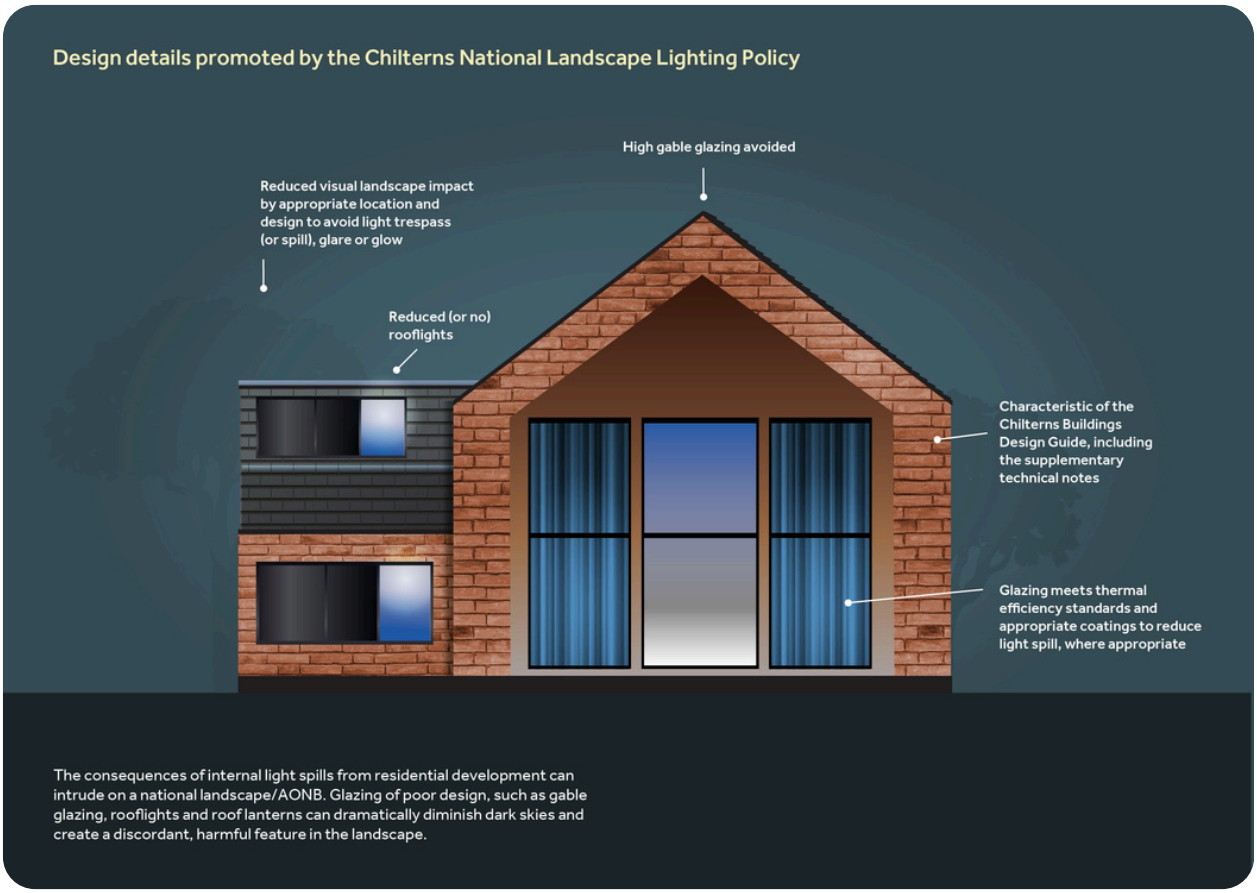


Figure 4: Design details promoted by the Chilterns National Landscape Lighting Policy © Chilterns Conservation Board

3.0 The Chilterns National Landscape Approach

3.1 The Chilterns landscape and its constituent tranquillity is the consequence of many influencing factors and, significantly, includes "relatively dark skies of great value to human and wildlife health, unspoilt countryside, secret corners, and a surprising sense of remoteness" (see management plan, Chapter 2 [9]). These special qualities are, therefore, protected attributes within the legislation and policy protections that specifically focus on the "duty to further" the conservation and enhancement of the National Landscape's special qualities and scenic beauty. Tranquillity is defined by the Landscape Institute (LI) as "a state of calm and quietude associated with peace, considered to be a significant asset of landscape" [10].

3.2 The Chilterns Conservation Board endorses the oft-quoted five principles of responsible lighting, as promoted by professional advisers. The right light is the aim; it should be:

- Useful – all artificial lighting should have a clear purpose.
- Targeted – light should only be directed where needed. All light above the horizontal should be avoided.
- Designed (Low lighting levels) – light should be no brighter than necessary and the result of professional guidance.
- Controlled – light should be the subject of planning conditions and when not needed they should be turned off with manual switches, timers or proximity (PIR) sensors.
- Colour – use the right light source for the task. Lamps above 3,000 or 2,700 kelvin should be avoided.

3.3 In other words:

- Right light – or the correct selection of light source, with due consideration of the most energy-efficient modern sources. Sensitive areas, such as National Landscapes, and places of ecological sensitivity, will warrant special consideration.
- Right time – for example, lowering levels to the minimum required for safety and security, or even full switch-off regimes, may be considered at certain times.
- Right place – with a reduction in obtrusive light to comply with the constraints imposed by the applicable Environmental Zone
- Right system – with a suitable control system.

3.4 The benefits of dark skies are obvious: savings on carbon emissions and money, as well as being better for nocturnal wildlife (bats, moths, plant germination). Astro-tourism is growing in popularity, with local communities and visitors coming to dark sky areas for stargazing events, allowing us to re-discover the beauty of the night sky. Being able to see the stars and imagine ancient peoples looking at the same view is a cherished childhood memory and must be preserved for generations to come.

[9] Caring for the Chilterns forever & for everyone: The area of outstanding natural beauty management plan for the Chilterns National Landscape, 2025-2030, approved by the Board on 19 June 2025, https://www.chilterns.org.uk/what-we-do/future-proofing-the-chilterns/management-plan/

[10] Landscape Institute 2013, Guidance for Landscape and Visual Impact Assessment, 3rd edition.

4.0 National Policy and Planning Guidance

4.1 The National Planning Policy Framework (NPPF), as periodically updated states:

"Planning policies and decisions should also ensure that new development is appropriate for its location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: …c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

4.2 The government's online Defra guidance on light pollution "advises on how to consider light within the planning system" [11] and section 3.0 details the following: what factors can be considered when assessing whether a development proposal might have implications for light pollution? This guidance is useful in considering whether an existing lighting installation makes the proposed location for a development unsuitable or suitable only with appropriate mitigation.

Of note, in a National Landscape, this guidance then asks:

"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?" and continues at the end of the section: "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".

4.3 The Chilterns National Landscape is considered an E1 Natural Zone within the Institution of Lighting Professionals (ILP) defined environmental zones.

4.4 The guidance recommends that where an area to be lit lies close to the boundary of two zones, the obtrusive light limitation values used should be those applicable to the darkest, most rigorous zone. The setting of the National Landscape is – where not already defined as Zone E1 – close to the boundary of Zone E1, and therefore the values applicable to Zone E1 shall apply throughout **(Table 1)**.

Following an approach advocated by the Northumberland National Park Authority [12], we have annotated the ILP guidance from the perspective of the Chilterns National Landscape.

[11] www.gov.uk/guidance/light-pollution
[12] Good Practice Guide for Outside Lighting in Northumberland International Dark Sky Park (Informed by the Northumberland International Dark Sky Park Lighting Management Plan November 2015)

Zone	Surrounding	Examples
E0	Protected (SQM 20.5+)	Astronomical observable dark skies, UNESCO starlight reserves, IDA dark sky places.
E1	Natural (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc. Chilterns National Landscape includes countryside, rural to urban edges (sometimes peri-urban), and some larger settlements "washed over", such as Goring-on-Thames and Woodcote.
E2	Rural (SQM 15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations.
E3	Suburban	Well inhabited rural and urban settlements, small town centres of suburban locations.
E4	Urban	Town and city centres with high levels of night-time activity.

Table 1: UK lighting environmental zones. **Source:** Institution of Lighting Professionals (ILP) (2021) Guidance Note 1 for the Reduction of Obtrusive Light 2021 (ILP - GN01-21). ILP: Rugby, UK.

4.5 Some lighting is necessary and appropriate but should be the minimum required. Design, detailing and location must deliver minimum impact and maximum mitigation. Planning decisions can result in harmful lighting impacts on landscape, tranquillity, dark skies protection and ecology. Our model lighting policy and supporting technical appendix are based on guidance issued by the Dark Skies Society, the International Dark Skies Association (IDA) and the Institution of Lighting Professionals (ILP) and our experience of the Chilterns landscapes over many years.

4.6 Key elements of this guidance inform our proposed model policies for (a) lighting installations and (b) lighting impacts of built development. This summary of existing guidance is submitted as background information and reasoned justification for the Model Lighting Policy (as above).

[11] www.gov.uk/guidance/light-pollution
[12] Good Practice Guide for Outside Lighting in Northumberland International Dark Sky Park (Informed by the Northumberland International Dark Sky Park Lighting Management Plan November 2015)
[13] See https://darksky.org/

4.7 Where lighting is deemed acceptable in principle, the Chilterns National Landscape (CCB) will promote the Model Lighting Policy. International Dark Skies Association (IDA) certification is desirable [13], and close and careful regard should be paid to the International Dark Skies Association LED Practical Guide (available at https://www.darksky.org/our-work/lighting/lighting-for-citizens/led-guide) and to the Institution of Lighting Professionals (ILP) guidance on reducing obtrusive light and other related documentation (see supporting technical appendix).

4.8 Designing out (and only then minimising) the need for lighting is always the best method of reducing light pollution. However, where this is not possible, the careful choice of an appropriate light source, luminaire, mounting height and focus, coupled with illuminance and luminance criteria, are key to successfully limiting the impact that light may have on its surrounding environment.

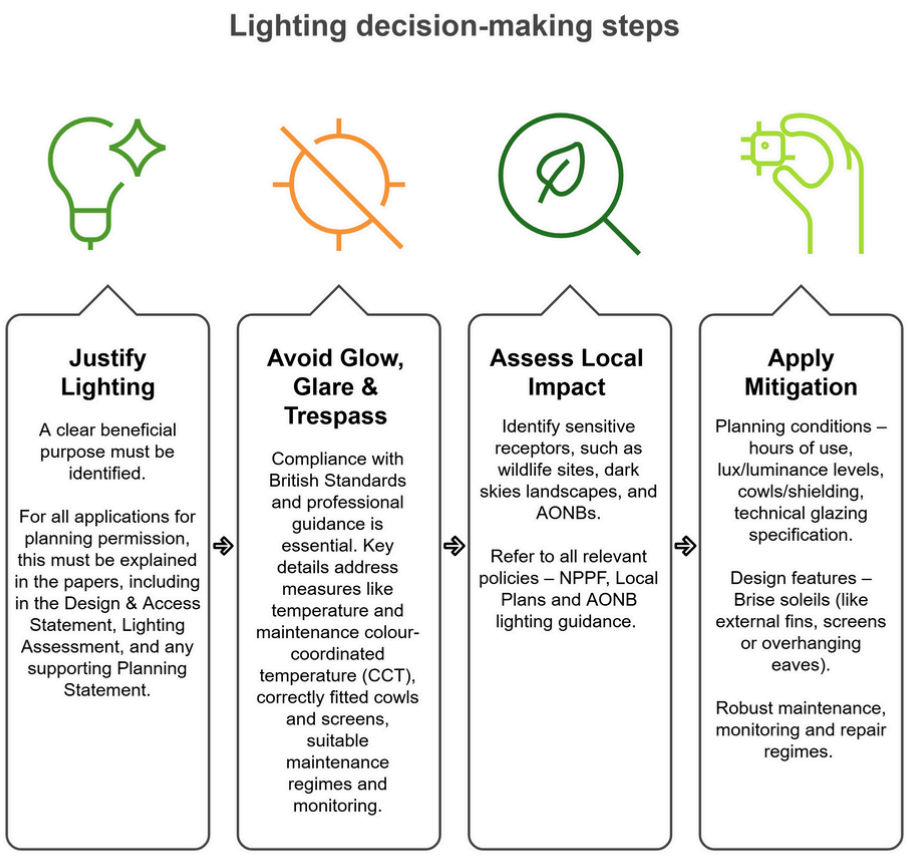


Figure 5: Lighting decision-making steps

Technical Appendices

June 2025.
Approved by the Planning Committee 25 July 2024, the Board 19 September 2024, and following Board recommends with additional ecological content as agreed by the PC Lighting Working Group on 29 November 2024.

Appendix One: Supporting Technical Documents

1.0 The Chilterns National Landscape and its context

1.1 This supporting appendix to the position statement deals with dark skies and light pollution. Both are relevant to tranquillity, with dark skies and tranquillity for people and nature being objectives to be conserved and enhanced and light pollution a matter to be carefully controlled to help achieve this objective.

1.2 The relative tranquillity of the Chilterns National Landscape is one of its acknowledged special qualities (see management plan). The National Landscape is, by definition, a dark skies environment [1]. When considering the impact of lighting on the National Landscape's setting [2], The Institution of Lighting Professionals (ILP) advises that any lighting on the boundary should apply the lighting limitation values applicable to the most rigorous zone, e.g. anything within or affecting the setting of a National Landscape will fall within the ILP's defined natural zone and, by definition, an intrinsically dark sky will be promoted.

1.3 Concern for the erosion of the night sky environment is not new. In 1989, the Campaign (now Commission) for Dark Skies (CfDS) was established to raise awareness of dark skies, oppose light glare, and promote best practice. Research sponsored by CPRE, the Countryside Charity (formerly the Campaign to Protect Rural England) and published as their "night blight initiative" [3], tracked data back to 1993, reporting that:

"The problem is getting worse. Between 1993 and 2000 light pollution increased 24%, nationally the amount of truly dark sky in this country fell from 15% to 11%, the amount of light saturated night sky rose to 7%."

1.4 In 2003, the House of Commons Select Committee on Science and Technology drew attention to the increasing problem of light pollution, concluding "we recommend the government update 'Lighting in the Countryside' to take into account its relevance to urban authorities and, bearing in mind the imminent investment by local authorities into street light replacement, republish and circulate the document accordingly" [4]. In 2009, the Royal Commission on Environmental Pollution studied artificial lighting and the environment when considering the provision of lighting, its intensity and design.

[1] see Institution of Lighting Professionals, Guidance Note 1, The Reduction of Obtrusive Light, Table 2 (Environmental Zones)
[2] also see the Chiltern Conservation Board's Position Statement (2011) Development affecting the setting of the Chilterns AONB – Adopted June 2011 (Rev 1)
[3] See CPRE online resource, with mapping, policy and best practice at www.nightblight.cpre.org.uk/cpre-s-view.
[4] See paragraph 108 of the House of Commons, Session 2002-03, Science and Technology Committee Publications - Seventh Report, Section 4 'can and should light pollution be subject to legislative control'. The published report was ordered by the House of Commons to be printed 15 September 2003.

1.5 The Commission concluded that "government needs to accept the fact that light, like noise and chemicals, in the wrong quantity, in the wrong place, and at the wrong time can cause problems and must be addressed explicitly in policy development" (Royal Commission on Environmental Pollution 2009 [5]). The report focused on the fact that light pollution (i.e. unwanted light in the wrong place) has become one of the major unaddressed pollution problems in the UK, and that "as a nation we do not have a good understanding of the extent of such dark-sky areas" (2.12).

1.6 The considered government approach was primarily wrapped up in Defra's policy update of 2013 [6], in which they reported as next steps, they would "continue to promote the protection and restoration of dark skies and the reduction of unnecessary artificial light within our National Parks, Areas of Outstanding Natural Beauty and other areas, where possible, working with National Park Authorities and others that plan to apply for Dark Sky status".

1.7 The All-Party Parliamentary Group (APPG) for Dark Skies produced a recommended "Ten Dark Sky policies for the government" in 2021, which included a recommendation that the government "sets standards for the brightness and colour temperature of lighting: establish legal limits to the amount of blue light that luminaires can have in their spectrum ….." [7]. Two years later, a wide-ranging study into noise and lighting impacts by the House of Lords Science and Technology Committee [8] heard expert evidence that "a significant proportion of light pollution is unnecessary and caused by bad design or poor use of LEDs" – several key recommendations called for explicit planning guidance. For National Parks and National Landscapes, the recommendation was unequivocal that "those responsible for the management of existing National Parks and Areas of Outstanding Natural Beauty, and the equivalent National Scenic Areas in Scotland, seek to eliminate unnecessary outdoor light, and to better design and manage that which cannot be eliminated…." (recommendation 6.4).

1.8 Lighting impacts are material to planning decisions and the subject of occasional reference in planning policy. For example, when considering ground conditions and pollution, the National Planning Policy Framework refers to the explanatory note to the Noise Policy Statement for England (Defra 2010). Nonetheless, such lighting blight still occurs due to wrong location, weak design, and poor maintenance or management.

1.9 The broad impacts of light pollution are described in various ways, including CPRE's colloquial "night blight", or waste light, which can create an urbanising effect across a wider countryside area close to urban locations. Unnatural skyglow is defined as "a combination of reflected and refracted light from the atmosphere. A major effect of skyglow at night is to reduce contrast in the sky. This is the most pervasive form of light pollution and can affect areas many miles from the original light source" [9].

[5] The Royal Commission (2009) Artificial Light in the Environment. London: The Stationery Office.
[6] Department for Environment, Food and Rural Affairs Artificial Light in the Environment Policy Update December 2013
[7] All-Party Parliamentary Group for Dark Skies 2021 "Ten Dark Sky Policies for the Government" London APPG, printed by the South Downs National Park Authority and CPRE.Available at https://appgdarkskies.co.uk/policy-plan
[8] See paragraph 82 of the House of Lords Science and Technology Committee 2nd Report of Session 2022–23 The neglected pollutants: the effects of artificial light and noise on human health Ordered to be printed 11 July 2023 and published 19 July 2023.
[9] Extract from The Royal Commission on Environmental Pollution (2009) Artificial Light in the Environment. London: The Stationery Office Limited

1.10 These impacts are almost always caused by light projecting above the horizontal, either directly or scattered, refracted, or reflected by water, particles, and aerosols in the atmosphere. Therefore, they diminish the night sky and reduce the visibility of astronomical objects.

1.11 The most recently published data presents a stark picture. Following their 1993- and 2000-night sky mapping exercise, the CPRE survey of 2015 updated the data set with the use of more sophisticated technology. This study concluded that only 22% of England had pristine dark skies and that National Landscape- and National Park-protected landscapes constitute the darkest sky environments at around 53% of all such dark sky environments. 40% of all National Landscapes have the darkest skies possible. The report concluded that "designated landscapes cover much of England's darkest skies and suggests that the designation is helping to protect these dark skies". However, the results demonstrate that some 60% of all National Landscape areas are not in the darkest category.

1.12 Inappropriate development in or around the National Landscape boundary will erode the night sky and diminish the darkest sky status. Development within the setting of the Chilterns displays considerable potential to erode its special qualities. The CPRE maps do illustrate a marked contrast between the Chilterns designated area and its urban neighbours, with a stark division, at times, between the brightest and darkest colour band ranges. These national maps (available at www.nightblight.cpre.org.uk) divide into categories (known as the Bortle Scale) [10], ranging from 1 (darkest) to 9 (brightest), which are mapped using satellite data and then graded using 400m x 400m grids. The impact of development adjacent to the boundaries of the National Landscape is magnified by various factors, the combination of which is unique to the Chilterns. These factors include the relatively long and convoluted boundaries of the National Landscape, the fragmented nature of the designated areas, and the proximity of existing high-density urban development and transport infrastructure.

1.13 In 2020, Dr Chris Kyba led research to understand the contribution of well-designed and operated street lighting on the night sky – and especially skyglow. Dr Kyba used satellites to measure what fraction of the total light emissions were due to streetlights across the city of Tucson, Arizona. At 01.30 every morning for 10 days, the city dimmed its streetlights, increasing the percentage of dimming each night. His light-from-space experiment, published in the journal Lighting Research and Technology [11], showed that most of the artificial light wasted – by being sent upwards into space, rather than illuminating a sign, street or building on Earth – does not actually come from streetlights, but from other sources. Illuminated advertisements, floodlighting installations, lit buildings, facade lighting, parking lots, and sports lighting are the types of installations responsible for most of these light emissions. Dr Kyba advised that "this is really important information for policymakers and light pollution activists...this does make it more difficult to solve, because there are so many contributors. It means everyone has to get together to decide what lights need to be lit at night, and how brightly."

1.14 This research demonstrated that key contributors to the problem are other lighting systems, sports lighting, security (commercial and domestic), illuminated advertisements, light emitted from commercial and grand projects with large glass facades and windows.

[10] John E. Bortle created the scale and published it in the February 2001 edition of Sky & Telescope magazine to help amateur astronomers compare the darkness of observation sites.
[11] Direct measurement of the contribution of street lighting to satellite observations of nighttime light emissions from urban areas published in Lighting Research and Technology Vol 53 (3) and available at https://doi.org/10.1177/1477153520958463

1.15 The advent of ever more sophisticated and energy-efficient technologies, coupled with the removal from the market of inefficient lamp-based sources, has resulted in lighting getting brighter and whiter. Astronomers and coordinators of the British Astronomical Association's Campaign for Dark Skies stated that, "sadly, far too many LEDs are very bright – too bright for the lighting task, and their excess light reflects from the ground into the sky. Also, many LED lights have a blue-rich spectrum mimicking daylight, which is bad news for nocturnal wildlife and for humans trying to sleep. The least damaging types of LED would be amber or some other less white colour if white or warm white (colour temperature about 2700-3000 kelvin) is preferable to blue-rich (4000 kelvin)" [12].

1.16 All light sources can contribute to skyglow effects, especially if housed in a luminaire with poor optical control or mounted inappropriately. This has perhaps become more evident with LEDs, as the overall light source consists of several point light sources within a luminaire, and white light tends to reflect a greater extent from particulates within the air than other types of light – such as orange, low-pressure sodium lights.

2.0 Lighting Assessments to support planning applications

2.1 A lighting assessment that supports a planning application must include an appraisal, including necessary details on ecological issues, design details, and lighting levels, as applicable. Any such assessment must also consider operational and mitigation requirements (such as curfews and smart, also called switch, technology). We deal with these below, including lighting areas used for recreational activities, such as sports pitches and multi-use games areas (MUGAs).

2.2 Various areas of content may include:

(a) Impacts on ecology

2.2.1 National Landscapes sit squarely within the government's aspirations for delivering a "nature recovery network" (NRN), itself a significant commitment in the Environment Act 2021 and the 25-year Environment Plan. Julian Glover's Landscape Review (2019) and the government's Consultation Response (2022) respectively promoted National Landscapes as leaders in the creation of NRNs and very much at the heart of their delivery [13].

2.2.2 Lighting impacts a vast range of species and their habitats – bats, amphibians, reptiles, invertebrates, birds (including migratory birds), and mammals [14] (see appendices for a detailed list of resources). Lighting will impact ecology, especially in relation to habitats – such as roof voids and niche roosts for bats in buildings, woodlands, ponds, trees, and hedgerows – that provide habitat for nocturnal and crepuscular wildlife and opportunities for roosting bats. A detailed assessment will be required of the ecological sensitivity of the location and the specification of the proposed technology. Light spill and glow have the potential to, for example, interrupt feeding patterns and force the fledging of birds.

[12] Lecture by the late Bob Mizon (March 2016) Lighting, types, qualities, and impacts, (Commission for Dark Skies).
[13] See The Environment Act 2021 Part 6 deals with nature and biodiversity. In the government's response to the Glover Landscapes Review the ambition was set that, "we want our National Landscapes to work together with big ambitions, so they are happier, healthier, greener, more beautiful and open to everyone'" Landscaped Review (Glover Report) Final Report 2019 and Defra policy paper – Landscapes Review (National Parks and AONBs): government response (chapter 2), Published 15 January 2022
[14] For general effect on wildlife: https://www.nature.com/articles/d41586-018-00665-7, https://www.darksky.org/light-pollution/wildlife/

2.2.3 In 2020, Touzot studied the impact of artificial light on common toads [15]. The common toad is not as common as its name suggests and is protected in the Wildlife and Countryside Act 1981. This study found that "the fertilisation rate of five lux-exposed males was reduced by 25% in males exposed to light during breeding".

2.2.4 Research undertaken by the Bat Conservation Trust (BCT) and the Institution of Lighting Professionals (ILP) concluded that lighting in the vicinity of a bat roost, causing the disturbance and abandonment of the roost, could constitute an offence (see ILP/Bat Conservation Trust 2023 [16]). Any lighting strategy and its design must demonstrate how it avoids, reduces, and mitigates light spills where bats are present. A detailed assessment must follow BCT and ILP guidance. While great care is required when scrutinising technology, design detail and other forms of mitigation must not be used to permit what is otherwise harmful to the National Landscape's inherent ecology and ecological connectivity by virtue of glint, glare, or glow.

(b) design details

2.2.5 Any design proposals should, at concept stage and throughout the design process, aim to remove, reduce, and mitigate unnecessary light pollution, unnecessary energy consumption, nuisance light spill, glow, or glare onto neighbouring land, including the National Landscape and within its setting. White light consists of a spectrum of colours that range from violet blue (380-495 nm) to red (620-750 nm). The colour correction temperature (CCT, most often expressed as Ra) index is a measure of how much blue is contained in the white light mix. Many new white light sources are above 4000 kelvin and even as high as 5500 kelvin. The resulting light is a harsh blue-white light which reflects from the grass, trees and foliage and scatters high into the atmosphere. This causes a greater sky glow impact than predecessor sodium-based lights.

2.2.6 LED lighting may be proposed. LED lighting with a correlated colour temperature of 2700 kelvin or less may be recommended. It should be noted that LED light sources contain no UV wavelengths and the warmer colour temperatures reduce the light emitted beyond the 550 nm wavelengths. In other words, the section of the electromagnetic radiation spectrum that is visible to the human eye. This is often referred to as the spectrum of white light.

[15] Touzot M, Lengagne T, Secondi J, Desouhant E, Théry M, Dumet A, Duchamp C, Mondy N. Artificial light at night alters the sexual behaviour and fertilisation success of the common toad. Environmental Pollution, Vol 259, April, 113883.
[16] See Bat Conservation Trust (BCT) and Institution of Lighting Professionals (ILP) (2023) Guidance Note 08/18, Bats and Artificial Lighting in the UK – Bats and the Built Environment Series. BCT: London. Also see BCT website for lighting updates at www.bats.org.uk.

2.2.7 All light sources have an associated colour temperature, which is a measure of how cool or warm the colour appears (denoted in kelvin). Therefore, lighting which appears warm with a red, amber or orange hue, exhibits a lower colour temperature, usually from around 2,000 kelvin. With an increase in the colour temperature, so does the appearance. At around 3000- to 4000 kelvin, the lighting appears neutral. When it reaches 5000 kelvin it takes on a blue tinge and appears cooler. Above that threshold it appears brighter and whiter.

2.2.8 As a rule of thumb, the higher the colour temperature, the increased levels of blue light (itself shorter wavelength) are present in the distribution. This is shown in the chart dealing with visible light spectrum **(Table 1).**

2.2.9 Within a National Landscape, best practice requires using warmer light sources when trying to limit short wavelength (blue or violet) output to create a more comfortable environment for humans and an acceptable installation ecologically. This is shown in the kelvin temperature chart in **Figure 1** below.

Colour	Wavelength (nm)
Red	625-740
Orange	590-625
Yellow	565-590
Green	520-565
Cyan	500-520
Blue	435-500
Violet	380-435

Table 1: The visible light spectrum

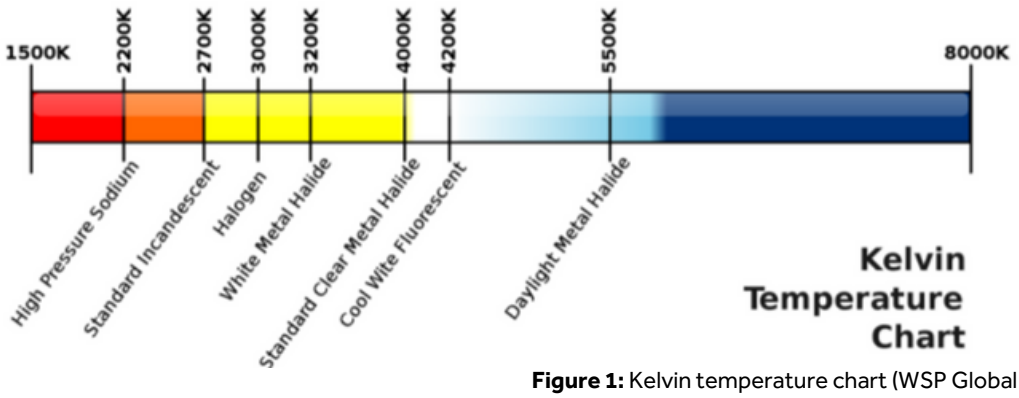


Figure 1: Kelvin temperature chart (WSP Global Inc 2023)

(c) Lighting levels and mitigation measures

2.2.10 Artificial lighting may be required for specific reasons which may or may not coincide with the best interests of the National Landscape. Such reasons may include amenity, safe passage, security, and health and safety requirements during periods of darkness. The potentially obtrusive light effects towards surrounding light-sensitive receptors can be controlled by design, location, technology, and operational duration. Where such lighting serves such a public benefit, an appropriate commentary is required, including discussing necessary mitigation.

(d) Assessments of impact, including operational requirements

2.2.11 These must be judged against the environmental zone classification in the ILP guidance. Detailed assessments must evaluate the following:

- The resulting change in sky glow.
- Any resulting increase in the light glare which may influence the visual comfort of residents. In residential schemes, this may predominantly be highway lighting.
- The consideration of mitigation (screens and cowls) and alternatives such as solar way markers and low-impact technologies, e.g. the Solar Eye system for way marker lighting, including footways and cycle routes.
- It is common practice to expect manufacturers and lighting designers to provide contour diagrams of light intensity, which demonstrate the lighting intensity and the spatial cover of the light fitting. Technical documents and a detailed lighting assessment should cover these matters.

We recommend the use of a non-technical summary, to assist all parties to a planning application. Without this assistance such information can be difficult to decipher.

Terms used in describing good lighting, and waste light not directed to the area to be lit

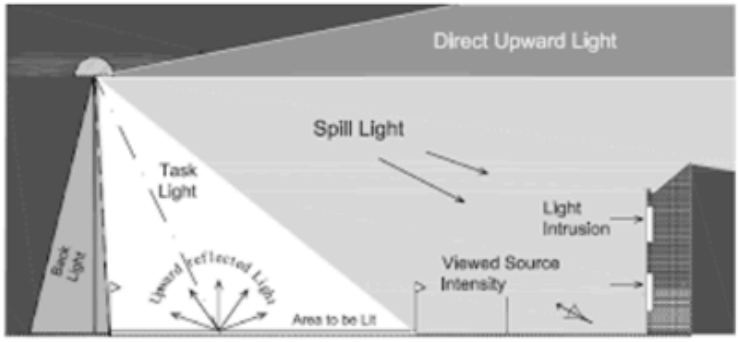


Diagram courtesy of the Institution of Lighting Professionals

(ILP Guidance Notes for the Reduction of Obtrusive Light)

Figure 2: Terms used to describe good lighting from ILP Guidance Notes for the Reduction of Obtrusive Light.

(e) Areas used for Recreational Activities

2.2.12 Various recreational uses, such as golf driving ranges, artificial ski slopes, tennis courts (including padel tennis), shooting ranges, multi-use games areas (MUGAs) and 3G sports pitches, are often designed for evening use and include illumination. A 5m high mast lighting with a 4000 kelvin correlated colour temperature (CCT) is not uncommon. Any impact assessment for a 3G sports pitch will require a categorisation from the relevant British Standards.

2.2.13 The top-lit illumination of multi-use games areas or sports pitches within, or near, a National Landscape exhibits the potential to create glare and glow. Great care and attention are required, but it may simply be the case that a MUGA near, or within, the National Landscape is resisted and avoided altogether. In all such applications, reference should be made to the ILP guidance notes on light pollution.

3.0 Best Practices Case Study – Missenden School Car Park Lighting Project

3.1 The Missenden School car park project is located within the Chilterns National Landscape. Buckinghamshire Council, working through their planning officers and project managers, was alert to the sensitivity of this location when designing new car parking and a bus turning area. The proposal comprised the resurfacing of an existing semi-formal car park, including the creation of 37 formalised car parking spaces and a two-way carriageway, a new pedestrian footpath, and new pedestrian accesses. New low-level lighting would be installed and formed a part of the project.

3.2 The project team engaged the Chilterns Conservation Board at the earliest opportunity and before any planning submission was made. The design thinking started from the baseline of a relatively dark skies site on the edge of the existing settlement, adjoining a large greenspace that separates the school from Great Missenden. The need for student safety, when alighting from a school bus, or making their way to the stop, was of paramount importance.

3.3 The design team identified a safe route, kerbed in and with low-impact, low-level bollard lighting, towards the safe refuge where students would join or disembark from their school buses. The accompanying design and access statement was clear. "The lighting design has considered the use of 4m high lamp columns as opposed to low-level lighting. However, a low-level design is proposed as this has been deemed more in keeping with the conservation area and nature of the site. The lighting will be motion activated to minimise the need to light the car park when it is not in use."

3.4 Twenty-three, one-metre-high lighting columns were proposed to light safe paths around the parking in order not to floodlight the whole parking area. A concise and straightforward lighting appendix illustrated this technology and denoted the radii of lighting around the columns, reinforcing that they lit the pathways and refuges. The wider parking area for parents would remain unlit.

3.5 Planning permission was granted for this project in June 2021, with completion ahead of the new academic year the following September. A planning condition (number 3) stated that, "the development hereby approved shall be implemented in accordance with the lighting scheme as set out in the approved drawings and in the Planning Statement (Appendix A). No high-level lighting columns above 1m in height shall be inserted without prior written approval of the Local Planning Authority. Reason: To ensure that any lighting columns above 4m in height are properly controlled, in the interests of the visual amenity of the area, highway safety and ecology".

4.0 The use of planning conditions

We consider these conditions as best practice, emanating from a scheme in the Chilterns National Landscape at Kidmore End Memorial Hall, Reade's Lane, Sonning Common, South Oxfordshire District (approved August 2021 under reference P20/S4912/FUL).

4.1 Location

"The location of the lighting columns hereby approved shall be as that shown on drawing Horizontal Illuminance (lux) [lists the approved plans].

Reason: To secure the proper planning of the area in accordance with development plan policies."

4.2 CCT details

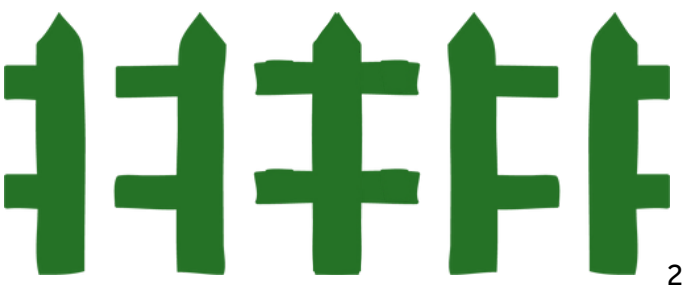
"The Correlated Colour Temperature for the MUGA lighting shall not exceed 3000 kelvin (warm white) and the Correlated Colour Temperature for the wayfaring lighting shall not exceed 2700 kelvin (very warm white) as set out in the Lighting Assessment [refers to such details]. The luminaires for the MUGA and the wayfaring lighting and the columns upon which that are mounted shall accord with specification for the luminaires and columns as set out in the Lighting Impact Assessment [refers to such details].

Reason: To protect the appearance of the area and wider National Landscape, the environment and wildlife, and local residents from light pollution in accordance with Policies ENV1 and ENV12 of the South Oxfordshire Local Plan 2035."

4.3 Lighting controls and timing

"The lighting controls for the MUGA lighting (on-demand button) and the wayfaring lighting (motion sensor controls) shall be implemented to accord with the lighting control details set out in the Lighting Assessment [refers to such details] and thereafter maintained in accordance with these details unless otherwise agreed in writing. The motion sensors shall be designed and calibrated to ensure they shall only be activated by a person or vehicle entering the floodlit area. The use of the external lighting shall be restricted to between 16:00 and 21:30 daily.

Reason: To protect the appearance of the area and wider National Landscape, the environment and wildlife, and local residents from light pollution in accordance with Policies ENV1 and ENV12 of the South Oxfordshire Local Plan 2035."



4.4 Mitigation Controls Design Details (Shields)

“The MUGA lighting lanterns hereby approved shall be fitted with lighting shields as set out in the Lighting Assessment Addendum [refers to such details]. Rear lighting shields shall be fitted to the MUGA lighting columns as set out in the Lighting Assessment Addendum [refers to such details]. The rear lighting shields shall be the Cranked Tespa Banded Light Shields or equivalent approved to the following specification (as examples):

- Designed for column mounting or bespoke mounting to Philips CLEARFLOOD LED Luminaire.
- Manufactured from S235JR grade mild steel or equivalent.
- Galvanised in accordance with BS EN ISO 1461:2009 or equivalent.

The lantern shields and rear lighting shields shall be implemented and maintained in accordance with these details.

Reason: To protect the appearance of the area and wider National Landscape, the environment and wildlife, and residents from light pollution in accordance with [refer to policy details, as may apply].”

Appendix Two: Technical Glossary

Term	Definition
Absence of darkness	Artificial light makes experiencing natural night-time lighting conditions impossible in many parts of the country. Source: The Royal Commission on Environmental Pollution (2009) The Royal Commission on Artificial Light in the Environment. The Stationery Office: London.
Light clutter	Excessive grouping of lights. The combined or cumulative impact of which becomes a dangerous distraction to motorists. Source: The Royal Commission on Environmental Pollution (2009) The Royal Commission on Artificial Light in the Environment. The Stationery Office: London.
Light pollution	The brightening of the night sky above our towns, cities and countryside. Glare – the uncomfortable brightness of a light source when viewed against a dark background. Light trespass – the spilling of light beyond the boundary of the property or area being lit, are all forms of obtrusive light which may cause nuisance to others, waste money and electricity and result in the unnecessary emissions of greenhouse gases. Source: The Institution of Lighting Engineers (2021 and as updated) Guidance Note 1 for the reduction of obtrusive light.
Light profligacy	Over-illumination with unnecessary use of energy and money. Source: The Royal Commission on Environmental Pollution (2009) The Royal Commission on Artificial Light in the Environment. The Stationery Office: London.
Light nuisance	Unwanted light emanating, for example, from adjacent properties and activities. Source: The Royal Commission on Environmental Pollution (2009) The Royal Commission on Artificial Light in the Environment. The Stationery Office: London.
Lighting – colour (CCT) expressed in kelvin and illuminance or LUX.	Kelvin is a metric that measures colour (sometimes CCT, Colour Coordinated Temperature). The best practice strives for a warmer white light at around 2,700K LUX measures illuminance or the amount of light falling on a surface.

Term	Definition
Lighting – watt and lumens.	Watts are a unit of power and measure the rate of power consumption. The lumen (expressed as lm) is the power output of a bulb. Present-day light-emitting diode (LED) bulbs emit far more lumens, using far less power, than old filament or sodium bulbs.
Sky glare	The excessive contrast between bright and dark areas in the field of view. Source: The Royal Commission on Environmental Pollution (2009) The Royal Commission on Artificial Light in the Environment. The Stationery Office: London.
Sky glow	A combination of reflected and refracted light from the atmosphere. A major effect of sky glow at night is to reduce contrast in the sky. This is the most pervasive form of light pollution and can affect areas many miles from the original light source. Source: The Institution of Lighting Engineers (2021 and as updated) Guidance Note 1 for the reduction of obtrusive light.
Sky trespass	The trespass of light spilling beyond the property or area being lit. Although this pollution generally relates to windows and intrusion into private property, light intrusion also applies to habitats and areas of high species interest. Source: South Downs National Park (2021) Dark Skies Technical Advice Note version 2.
Visible Light Transmission (VLT)	VLT expresses the amount of light transmitted through glazing, often expressed as a percentage.

Appendix Three: Legislation and Policy (other than town and country planning legislation or policy)

3.1 Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

In 2005, the Clean Neighbourhoods and Environment Act (CNEA 2005) made light pollution a form of statutory nuisance within the scope of the Environmental Protection Act 1990 (often referred to as the EPA). The CNEA 2005 legislation was amended in 2006 to include the following in the definition of nuisance: "artificial light emitted from premises so as to be prejudicial to health or nuisance…" Guidance produced on sections 101 to 103 of the CNEA by the Department of Environment, Food and Rural Affairs (Defra) in April 2006 extends the duty on local authorities to ensure their areas are checked periodically for existing and potential sources of statutory nuisance including nuisance arising from artificial lighting.

The CNEA 2006 sections 101, 102 and 103 amend sections 79, 80 and 82 of the Environmental Protection Act 1990 to extend the statutory nuisance regime to include two new statutory nuisances (statutory nuisance from insects and statutory nuisance from artificial light). Should a statutory nuisance from artificial light be claimed, the local authority must take reasonable steps to investigate complaints of such nuisance. If satisfied that a statutory nuisance has occurred, may occur, or even recur, the local authority must issue an abatement notice. These powers are set out in section 80(2) of the Environmental Protection Act (1990). Such abatement notices will require the nuisance to cease and provide a timescale for its enforcement.

3.2 Department for Environment, Food and Rural Affairs (Defra) Guidance

The Defra guidance (2006) deals with the overlap with planning and states:

Statutory Nuisance and Planning :

- Paragraph 21: "Prevention is better than cure, and it is preferable to address potential statutory nuisances at the planning stage".
- Paragraph 22: "The courts have ruled that lighting itself is not development. However, planning permission is required for lighting if it materially alters the appearance of a building. It has been possible since 1997 for local authorities to consider lighting as part of the planning process for new buildings, both residential and commercial. Local authorities can decide to regulate lighting under planning permission and set planning conditions for lighting to prevent light pollution.…However, the existence of planning permission does not mean that a statutory nuisance cannot then exist. Circumstances and local environments change. Statutory nuisance can occur whether or not planning permission is in place either expressly or implicitly permitting lighting". (Our emphasis) [17].

This Defra guidance is useful on some background definitions (see also our Glossary at the end).

[17] Defra 2006 Statutory Nuisance from Insects and Artificial Light.

- Paragraph 84: "In order to understand what may be termed a statutory nuisance in lighting, an understanding of some lighting terminology is required: Light (or luminous flux) is a type of radiation and forms part of the electromagnetic spectrum visible to the eye. It is measured in lumens (lm) (not watts, which is only a measure of electrical consumption). The amount of light falling on a surface is known as illuminance and is measured in lumens per square metre or lux. While illuminance is easy to calculate and measure and is therefore widely used, the eye does not see illuminance, but rather the light radiated or reflected off a surface which is known as luminance, or brightness. It is measured in candelas per square metre (cd/m2) and if the surface is glossy, can differ with the angle of view. The term candela (cd) or (Kcd = 1000 cd) is by itself a measure of light intensity. Whether this light intensity is seen as glare or not depends on the surrounding luminance, as can be noted when comparing a road lighting luminaire or floodlight lit during the day and again at night".
- Paragraph 85: "Local authorities have a duty to take reasonable steps, where practicable, to investigate any complaints of artificial light nuisance; it is expected that the following sources will generate most complaints: domestic security lights, commercial security lights, healthy living and sports facilities, domestic decorative lighting, exterior lighting of buildings and decorative lighting of landscapes, laser shows/sky beams/light art".

Road Humps:

- The provision of any new road humps might require lighting arrangements. In England and Wales, the Highways (Road Hump) Regulations 1999 are relevant. The Highways Act 1980, section 97, empowers a highway authority to provide lighting for any highway or proposed highway for which they are or will be the highway authority. District councils and many parishes or town councils also have the power to provide lighting as local lighting authorities. This power is given by the Public Health Act 1985, or the Parish Councils Act 1957. Where such councils wish to provide lighting on a highway, the consent of the highway authority is required, under the Local Government Act 1996, section 29.

Traffic Signs:

- When lighting is provided on a previously unlit road or access entrance, it is likely that certain traffic signs will have to be illuminated. In England, Wales and Scotland, the Traffic Signs Regulations and General Directions 2002 are relevant.

3.3 Relevant British Standards

The following British Standards (BS) for lighting that relates to the proposed development are:

- BS 5489-1 Code of Practice for the Design of Road Lighting, Part 1: Lighting of roads and public amenity areas.
- BS 12464-2 Light and Lighting - Lighting of Workplaces: Outdoor lighting. Recommendations for the design of lighting for all types of highway and public thoroughfares, including those specifically for pedestrians and cyclists, and for pedestrian subways and bridges.

3.4 Biodiversity considerations

A body of evidence now affirms the relationship between sky brightening resulting from sources of artificial night-time light and harm to ecology, covering habitats and the foraging of food supplies. "Artificial light at night", cited in several scientific studies under the acronym ALAN, is considered a potential contributing factor to disrupting a range of insect behaviour, with calls for more studies (see work by Boyes et al 2022).

Reported declines in insect populations have sparked global concern, with artificial light at night (ALAN) identified as a potential contributing factor. Strong empirical evidence concludes that lighting disrupts various insect behaviours, negatively affecting species abundance in hedgerows and grass margins. Such negative impacts were more pronounced under white light-emitting diodes (LEDs) streetlights than conventional yellow sodium lamps. This indicates that ALAN and the ongoing shift toward white LEDs (i.e., narrow—to broad-spectrum lighting) will substantially affect insect populations and ecosystems.

The University of Exeter Centre for Ecology and Conservation published a ground-breaking meta-analysis in 2021 examining research data from 126 published studies to determine overall trends. The creation and interrogation of this new database shows that exposure to artificial light at night induces strong responses for physiological measures, daily activity patterns and life history traits... "So far, few studies have focused on the impact of artificial light at night on ecosystem functions. The breadth and often strength of biological impacts we reveal highlight the need for outdoor artificial night-time lighting to be limited to the places and forms – such as timing, intensity and spectrum – where it is genuinely required by the people using it to minimise ecological impacts. (see Sanders, D., Frago, E., Kehoe, R. et al, 2021).

In our CCB model policy, we include the need for robust consideration and protection of ecological impacts through their avoidance and mitigation, where appropriate. The closely allied policy objective of protecting and enhancing dark skies reinforces the need for artificial night-time light to be carefully controlled by the planning system when granting or refusing planning applications within the Chilterns National Landscape.

3.5 Institution of Lighting Professionals (ILP), Bat Conservation Trust Lighting Guidance (updated 2023)

The Bat Conservation Trust and the ILP produced a paper in 2018, "Bats and Lighting in the UK", discussing the appropriate lighting levels, types of lamps and the most appropriate colour temperatures which are suitable for lighting areas where there are bats. The guidance states, "this latest guidance recommends a working partnership between the Lighting Profession and the Ecologists who specialise in bats where lighting is required, and bats may be impacted. The guidance considers bats roosting, foraging, and commuting needs in greater details than ever before. Some bat species have been shown to be impacted by significantly lower lighting levels than others, certain colour temperature environments also play a factor in the level of impact. However, all bats require dark roosting areas, corridors through the landscape and habitats to feed". A new edition of the guidance was published in 2023.

3.6 Institute of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (2021 and as updated)

The ILP sets guidance, commonly recognised as the industry standard. This states that, obtrusive light (more commonly, light pollution) refers to any light emitted in any direction in which it is not required nor wanted. This light is, therefore, considered to be detrimental to other users.

This guidance sets out a series of six environmental zones of protected, natural, rural, suburban, and urban. Many local planning authorities cross-refer to these zones in local plan policies and in development management decisions. Within this guidance, National Landscapes fall within relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones, etc. The latter refers to an international dark sky, as designated by the International Dark Skies Association.

3.7 Lighting Designers – When implementing projects and addressing obtrusive

CIE 150:2017 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (International Commission on Illumination, 2017).
CIE 126:1997 Guidelines for Minimizing Sky Glow (International Commission on Illumination, 1997).

3.8 Institution of Lighting Professionals

Professional Lighting Guide 04, Guidance on Undertaking Environmental Lighting Impact Assessments (PLG04) (ILP, 2013) Guidance Note 01/21, Guidance Notes for the Reduction of Obtrusive Light (GN01) (ILP, 2021) (this document supersedes and improves on the guidance provided in the 2020 version), and Bat Guidance Note Bats and artificial lighting in the UK (ILP, 2023).

3.9 The Society for Light & Lighting (SLL)

Lighting Handbook (2018), Lighting Guide 1: The Industrial Environment (2018), Lighting Guide 6: The Exterior Environment (2016), SLL Lighting Guide 18: Lighting for Licensed Premises (2018)

Appendix Four: Source Material and Bibliography

4.1 General Sources

- Institution of Lighting Professionals: www.theilp.org.uk
- Dark Skies International: www.darksky.org

4.2 Specific Resources

- CPRE (2013 onwards) Night Blight – Reclaiming our Dark Skies, campaign resources and literature. See https://www.cpre.org.uk/what-we-care-about/nature-and-landscapes/dark-skies/
- The Royal Commission on Environmental Pollution (2009) The Royal Commission on Artificial Light in the Environment. The Stationery Office: London.

4.3 National Landscape Lighting Design Guides / Supplementary Design Guides

4.3.1 Dedham Vale National Landscape (2023) Lighting Design Guide

A helpful 'Planners Checklist' (see page 51), which we acknowledge and have utilised for the Chilterns in this publication.

- https://dedhamvale-nl.org.uk/2023/08/07/new-landscape-lighting-design-guide-published/

4.3.2 North Pennines Blog

Describes the 'green lungs' of National Landscape designations and how, taken together, 53% of England's pristine dark skies are found within such National Landscapes. A helpful narrative as to why this topic is so important.

- www.northpennines.org.uk/keeping-dark-places-dark

4.3.3 Cotswolds Conservation Board Position Statement Dark Skies and Artificial Light

A helpful position statement containing a vision (outcome) linked to a policy itself supported by a set of background principles covering landscape character, enjoyment and understanding, wildlife, heritage, human health and well-being, and economic benefits.

- Outcome 7 (Dark Skies) states "the dark skies of the Cotswolds National Landscape will have been conserved and enhanced, with fewer areas being affected by light pollution".
- Policy CE5: Dark Skies:
  - Proposals that are likely to impact on the dark skies of the Cotswolds National Landscape should have regard to these dark skies, by seeking to (i) avoid and (ii) minimise light pollution.
  - Measures should be taken to increase the area of dark skies in the Cotswolds National Landscape by (i) removing and (ii) reducing existing sources of light pollution.
  - Consideration will be given to seeking a formal dark sky designation for those parts of the Cotswolds National Landscape that are least affected by light pollution.
- https://www.cotswolds-nl.org.uk/wp-content/uploads/2019/03/Cotswolds-Dark-Skies-Artificial-Light-Position-Statement.pdf

4.3.4 North York Moors National Park. Dark Skies – A Careful Approach to Lighting Local Plan Supplementary Planning Document (SPD) – December 2023

This SPD links to the North York Moors Local Plan Policy ENV4 Dark Night Skies. The darkness of the night skies above the National Park will be maintained and where possible enhanced. All development will be expected to minimise light spillage through good design and lighting management and the following lighting principles will be applied:

- No external lighting will be permitted in remote areas.
- In open countryside, proposals that involve external lighting will only be permitted where it can be demonstrated that the lighting is essential for safety or security reasons and the lighting details meet or exceed those set out in any lighting guidelines adopted by the Authority.
- Within settlements listed in the Authority's settlement hierarchy, proposals that involve external lighting will be permitted where it can be demonstrated that the lighting is essential for safety, security or community reasons and the lighting details meet or exceed those set out in any lighting guidelines adopted by the Authority.
- https://www.northyorkmoors.org.uk/

A useful checklist is presented as the Careful Lighting Checklist:

1. Is the application for development within a remote area?
2. Is the lighting needed?
3. Does the lighting have a colour temperature of 2700K or less or, where this is not practicable, does not exceed 3000K?
4. Is the lighting effectively shielded regardless of light output?
5. Is the lighting fitted with a sensor or timer appropriate to the intended function of the lighting?
6. Does the development include large areas of new glazing?

4.3.5 North Wessex Downs "Guide to Good External Lighting"

Paragraph 3.2 sets out the principles of good lighting to minimise light pollution; first, ask yourself, "Is lighting really needed at all?" If it is, then follow these four main principles:

1. How much light is needed?
2. When is light needed?
3. How warm is the light?
4. Is the light where it is needed?

https://www.northwessexdowns.org.uk/wp-content/uploads/2021/11/Lighting_Guide_07-05_MEDRES.pdf

4.3.6 Malvern Hills AONB "Guidance on Lighting" May 2024

A series of case studies (pages 60 onwards) illustrate best practice principles.

- https://www.malvernhills-nl.org.uk/our-work/planning/guidance-documents/

4.3.7 Blackdown Hills Light Pollution and Dark Skies in the Blackdown Hills Area of Outstanding Natural Beauty: A Good Lighting Guide 2017

A useful statement of purpose, set out as "the Blackdown Hills National Landscape's position building on the adopted National Landscape management plan and mindful of the simple improvements that can be made to provide good and adequate lighting without prejudicing dark skies. The Blackdown Hills National Landscape Partnership takes the position that all artificial external lighting within its borders, or within the setting of the National Landscape, should be muted, screened, and the minimum required. It acknowledges that there are occasions when special features, such as the Wellington Monument, are lit for celebrations and particular effects for limited periods of time".

- https://blackdownhillsaonb.org.uk/our-work/document-library/

4.3.8 Cranborne Chase

Cranborne Chase became the first National Landscape in the country to be designated in its entirety as an International Dark Sky Reserve in 2019. A series of ground-breaking principles and guidance, useful flowcharts including a home lighting assessment flow chart.

- https://cranbornechase.org.uk/our-work/dark-night-skies/

4.3.9 South Downs National Park Dark Skies Technical Advice Note 2021 and UK Dark Skies Partnership; Local Authorities, Communities and Dark Skies Toolkit 2022

A comprehensive technical advice note, starting with general lighting principles and including guidance on temporary planning permissions. New lighting should not adversely degrade the sky quality beyond the immediate area to be lit:

- Angle Lights Downward – no unnecessary light above or near the horizontal.
- Lamps of 500 lumens and less are appropriate for most domestic purposes.
- Lamps above 500 lumens should be installed in dark sky friendly fixtures that prevent unnecessary upward light.

- Point where the light is needed not in a direction that causes a nuisance to neighbours or wildlife.
- Switch off when not needed. Use proximity sensors. Avoid dusk-till-dawn sensors.
- Light to the appropriate illuminance – do not over light needlessly.
- Avoid bright white and cooler temperature LED's.
- Install at the lowest possible height to achieve lighting levels.
- Use and shut the curtains at night.
- https://www.southdowns.gov.uk/planning-policy/supplementary-planning-documents/technical-advice-notes-tans/dark-skies-technical-advice-note-tan/

4.4 Ecological Resources

- For Bats see: https://www.bats.org.uk/
- For amphibians and reptiles: Perry, G Buchanan, B Fisher, R Salmon, M and Wise, S (2008) -Effects-of-night-lighting-on-urban-reptiles-and-amphibians. Journal of Herpetological Conservation 3: 239-256.
- For moths: https://www.science.org/doi/10.1126/sciadv.abi8322 and https://resjournals.onlinelibrary.wiley.com/doi/10.1111/icad.12447.

4.5 Additional references

- Sanders, D., Frago, E., Kehoe, R. et al. A meta-analysis of biological impacts of artificial light at night. Nat Ecol Evol 5, 74–81 (2021). https://doi.org/10.1038/s41559-020-01322-x.
- Boyes, D., Evans, D., Fox, R et al. Is light pollution driving moth population declines? A review of causal mechanisms across the life cycle. Insect Conservation and Diversity (2021). https:// doi: 10.1111/icad.12447.
- Boyes, D., Evans, D., Fox, R et al. Lighting has detrimental impacts on local insect populations. Published in Science Advances.
- Sci. Adv., 7 (35), eabi8322.