CANNOCK CHASE
A NATIONAL LANDSCAPE

Light Pollution and Dark Skies in the Cannock Chase Area of Outstanding Natural Beauty:

A Good Lighting Guide

Image ©Robert Taylor

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THE NATIONAL ASSOCIATION Areas of Outstanding Natural Beauty

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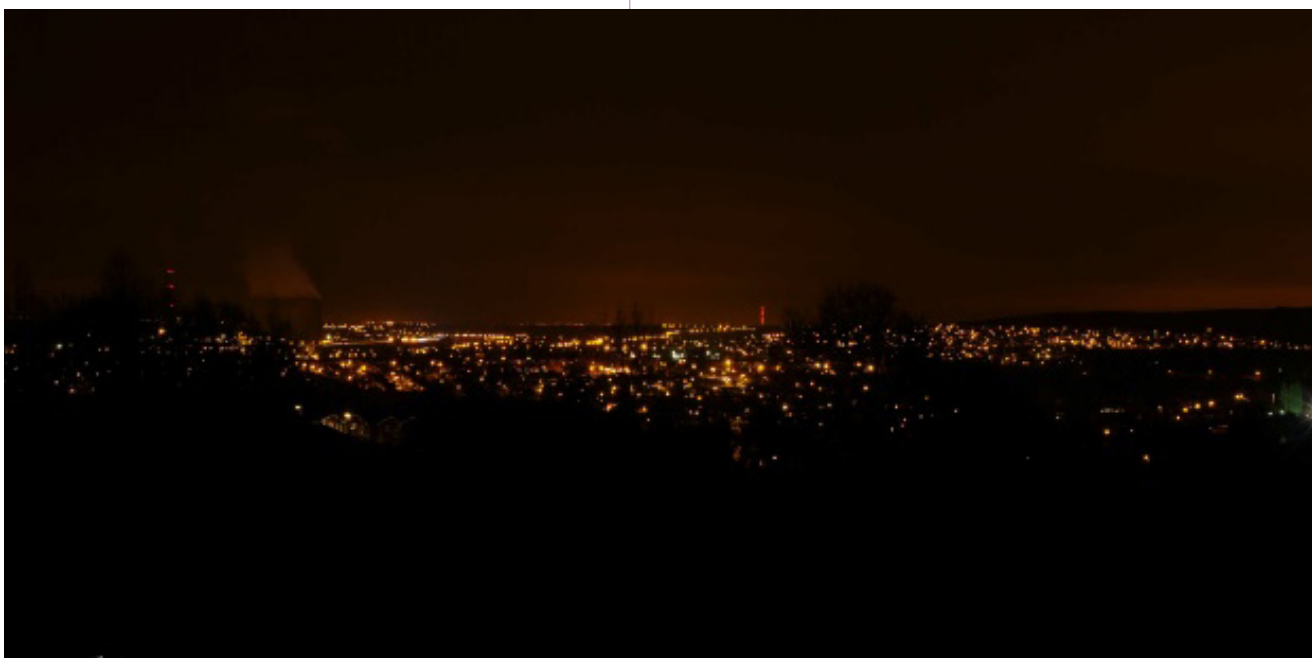


Sky glow viewed from Etching Hill

1. Introduction

1.1 Cannock Chase AONB

The Cannock Chase Area of Outstanding Natural Beauty (AONB) is one of a family of AONBs established in England and Wales under the National Parks and Access to the Countryside Act 1949. Along with National Parks, AONBs are 'protected landscapes' formally recognised as representing the finest countryside in England and Wales, where special policies should apply to safeguard and manage the countryside for the benefit of this and future generations.

Cannock Chase was designated an AONB in 1958. The primary purpose of the designation, as set out in the Countryside and Rights of Way Act, 2000, is the conservation and enhancement of natural beauty. 'Natural beauty' is not just the look of the landscape, but includes landform and geology, plants and animals, landscape features, the rich history of human settlement over the centuries, scenic quality and relative wildness and tranquillity. Natural starry skies are one of the sights which make Cannock Chase special. Night-time darkness is a key characteristic of the area's sense of tranquillity and relative remoteness.

However, light pollution has the potential to erode and destroy that tranquillity and sense of remoteness. It diminishes the ability to see and understand the dark night skies and beauty of our galaxy. It also has adverse impacts on our health and wellbeing, wildlife behaviour, and wastes resources. Artificial lighting also introduces a suburban feel and can detract from the landscape beauty of the AONB.

1.2 What is light pollution?

Light pollution is artificial light which shines where it is neither wanted, nor needed. It is the result of lighting which is poorly designed, badly directed or unnecessarily bright. Fortunately, light pollution is reversible. In relation to restoring dark night skies this involves simple actions to control, limit, and reduce light emissions.

1.3 The purpose of the guide

The purpose of this guide is to raise awareness of dark skies, their social, environmental, and economic benefits, and to demonstrate how simple changes to the way we light our homes, businesses and neighbourhoods can have big impacts. It provides information and advice to individuals, businesses and decision makers interested in reducing and avoiding light pollution so that we keep Cannock Chase special.

2. Background

2.1 Evidence of light pollution affecting the AONB

Cannock Chase is the smallest inland AONB in England, sitting between Stafford 4 km to the northwest, Rugeley to the east and Cannock and Burntwood directly to the south. The surrounding conurbations have a significant effect upon night skies, spilling light into the relatively darker skies of the AONB.

In 1993 and again in 2000 the CPRE The Countryside Charity published maps of light pollution for the whole of the country. More recently their study, Night Blight: Mapping England's light pollution and dark skies[1], gathered satellite data recording light emitted into the skies at 1:30am during September nights in 2015. This showed starkly that the larger urban areas had the most light pollution. The effect of that is few, if any, of the stars can be seen from those areas with the naked eye.

These studies showed that Cannock Chase is the least dark of all 34 AONBs in England. Although none of Cannock Chase falls within the two darkest categories, 47% falls in the third darkest category where there is no severe light pollution (Figure 1). The map clearly demonstrates light spilling out from the towns of Cannock, Rugeley and Stafford into the AONB, but this is not the sole reason for light pollution in the AONB. Brighter areas inside the AONB to some extent correlate with street lighting, villages such as Upper Longdon and Brocton and the local scattered settlement pattern such as around Cannock Wood and Gentleshaw. Relatively large parts of the AONB still remain an oasis of darkness for people to enjoy compared to the surrounding towns, although the core of the Chase has become popular for night-time activities such as mountain biking which brings impacts on appreciation of the night sky and general disturbance.

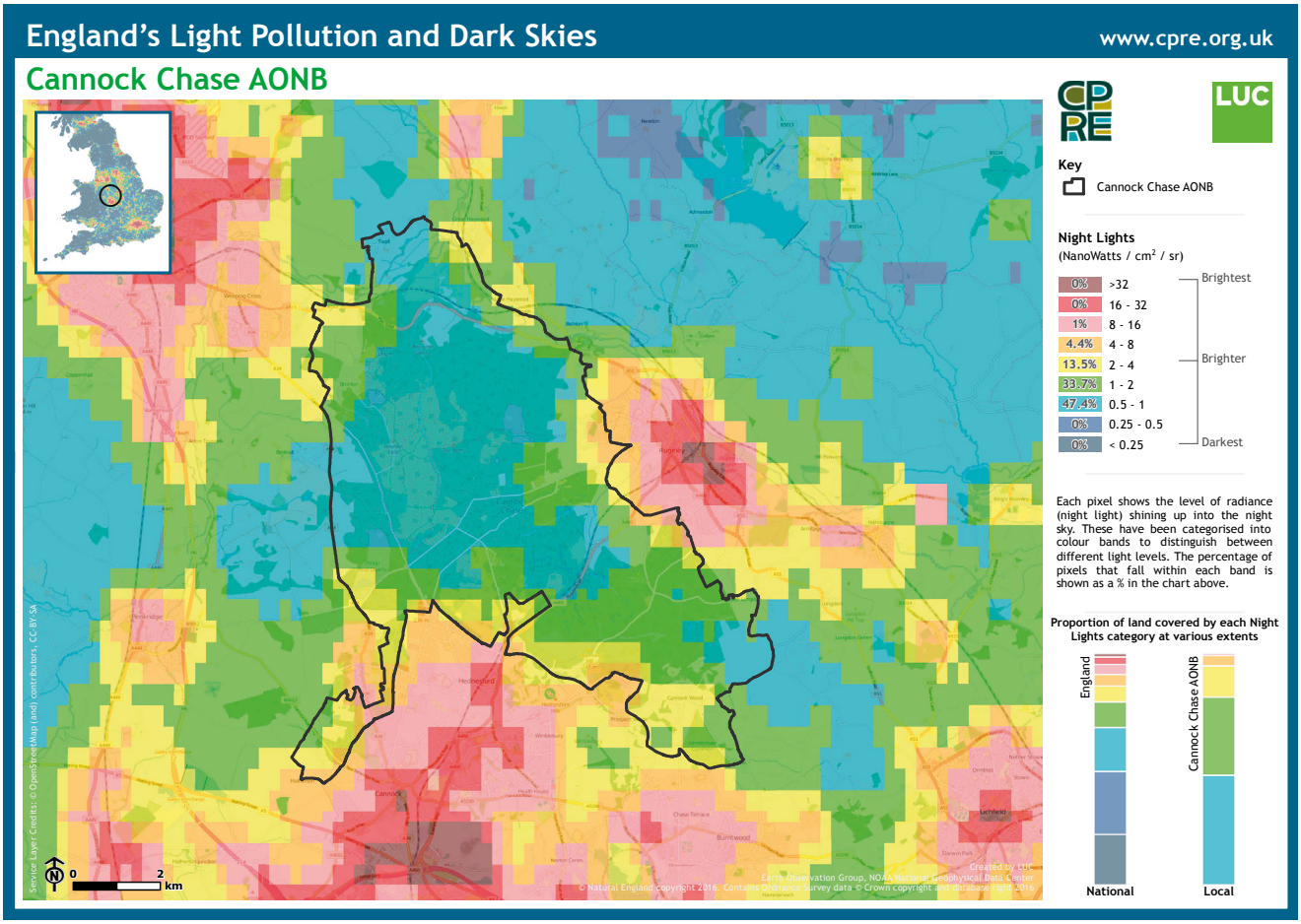


Figure 1. CPRE Map Night Blight for Cannock Chase AONB (2015)

[1] Night Blight: Mapping England's dark skies and light pollution – CPRE 2016

As part of its strategic objectives to connect people and the countryside, CPRE runs an annual citizen science project called the Star Count. Counting the number of stars that can be seen with the naked eye in the Orion constellation gives an indication of the amount of light pollution in an area. The results of the 2021 Star Count, which took place from 6-14 February, showed that 51% of people in England who took part were not able to see more than 10 stars in the Orion constellation. This indicates severe light pollution. Only 5% of those who took part were lucky enough to see more than 30 stars, which is a sign of truly dark skies. A more detailed breakdown of the results shows that for those who took part in Star Count from within five miles of the AONB boundary, the corresponding figures were 66% and 1.5% respectively (or figures for Staffordshire – 60% and 3.6% respectively). This reinforces the evidence in Figure 1 that darker skies are experienced in parts of rural Staffordshire.

In order to better understand the levels of light pollution in the AONB, in March 2021 the AONB carried out its own Sky Quality Survey, with the help of volunteers. Measurements need to be taken in open areas, so the survey was limited by woodland and tree cover, but the results confirmed that the darkest parts of the AONB are at Shugborough in the north, and in the central core of the Chase around the Sherbrook Valley (Figure 2). Lighting associated with scattered habitation effects light levels locally, such as around Cannock Wood and Gentleshaw, and on the A34 running along the AONB's western boundary. The survey methodology is in Appendix A.

2.2 Cannock Chase AONB Management Plan

The current AONB Management Plan (2019 -2024) sets out the AONB's special qualities and policies that seek to conserve and enhance them. In relation to Relative Wildness and Tranquillity it describes the AONB as:

"A haven of tranquillity and wildness, compared to the busy towns and roads that surround it…."

Although no Management Plan policies specifically refer to dark skies, the following policies seek to avoid impact on the environment and reduce disturbance:

- **Policy LCP1: Development proposals within the AONB should be of high quality design and environmental standards, respecting local distinctiveness, be complementary in form and scale with their surroundings, should take opportunities to enhance their setting and minimise their carbon footprint and negative impacts on the local environment.**

- **Policy LCP8: Development and land management proposals in the area, which by virtue of their nature, size, scale, siting, materials or design can be considered to have a negative impact on the natural beauty and special qualities of Cannock Chase AONB, should be resisted.**

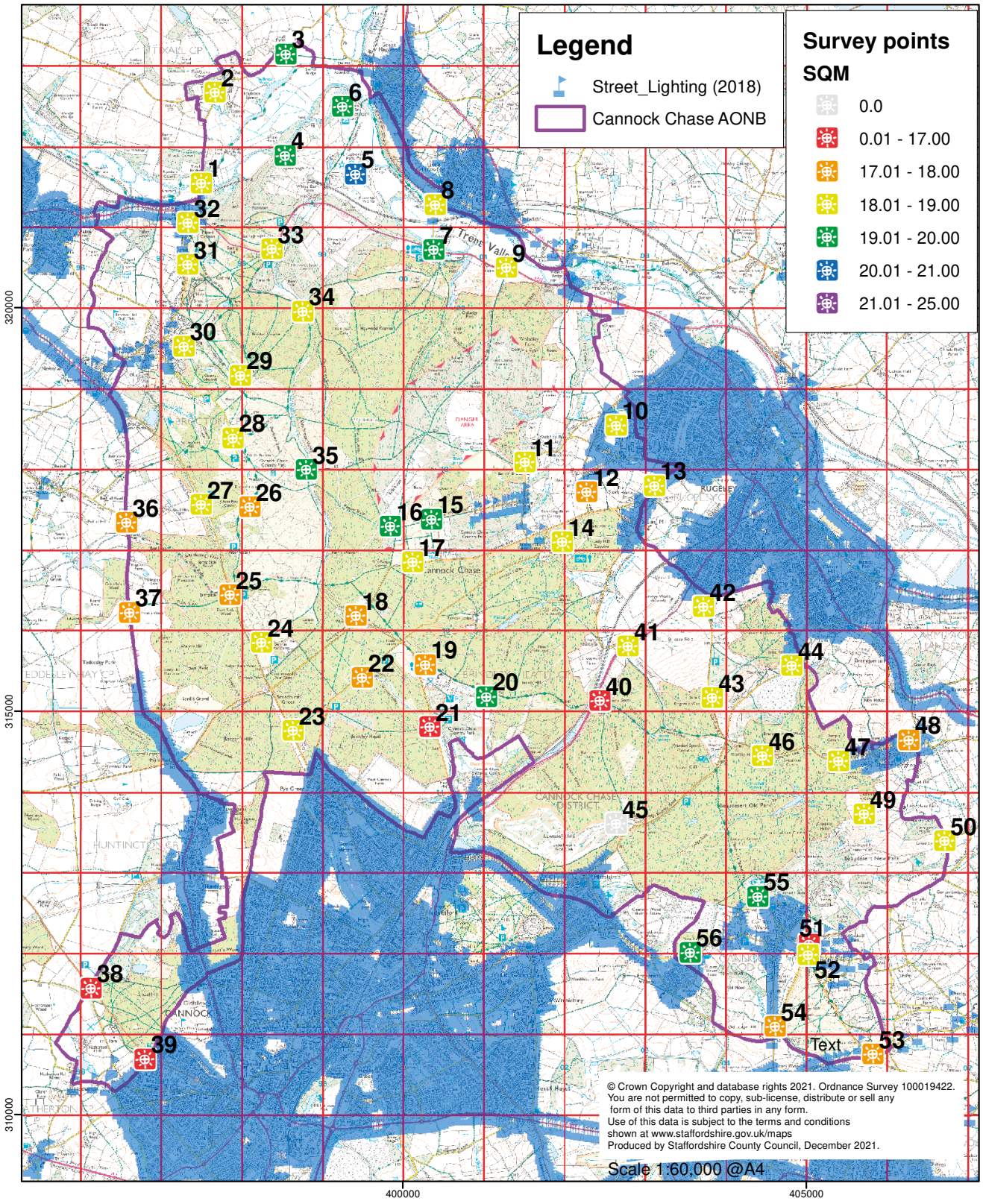
- **Policy LCP9: In the immediate vicinity of the AONB, the character of the public realm (e.g. landscaping around roads and buildings, public lighting and signage) should be designed and maintained so that it reinforces and complements the landscape character and quality of the Chase and provides a welcoming experience for those entering the AONB.**

- **Policy WN2: A coordinated approach across landholdings will be taken to monitor and undertake actions to enhance the conservation status of populations of key species and their habitats, taking particular account of threats such as disturbance and pollution.**

2.3 Cannock Chase AONB Design Guide (2020)

The AONB Design Guide was prepared in response to policies and actions in the Management Plan. It promotes good practice and provides advice so that future building development does not detract from the natural beauty of the AONB and enhances the local character. The Design Guide sets out general principles of good design that should be considered in the design process for all development and provides more specific advice to ensure design proposals are informed by the AONB's local character. The detailed guidance mainly focusses on matters such as building scale, style, materials and colour; and it also includes some advice on lighting.

This Good Lighting Guide builds on the principles and advice in the AONB Design Guide, with information about the issues and impacts of light pollution and further detail on how to reduce light spillage.



Cannock Chase
Area of Outstanding Natural Beauty

Cannock Chase Area of Outstanding Natural Beauty Dark Skies Project Sky Quality Survey

Figure 2. Cannock Chase AONB Sky Quality survey 2021. Readings of 16 or 17 indicate a dark sky that is impacted by either artificial light or bright moonlight; 19 indicates dark skies; 20 or 21 indicates a dark sky where the stars of the Milky Way are clearly visible.

3. Aims and Benefits of Dark Skies

The need to protect and restore the rhythm of night and day has never been more urgent and the AONB is keen to work with decision makers and property owners inside and surrounding the AONB to address artificial lighting and light pollution in their policies and everyday practices. There are sound social, environmental, and economic reasons for doing so.

3.1 Human health

Research has continued to show that artificial light can increase risks for obesity, depression, sleep disorders and diabetes amongst others. Exposure to blue light at night is especially harmful, suppressing the secretion of the hormone melatonin which influences circadian rhythms or our daily body clocks. This includes light emitted from most outdoor lighting LEDs.

3.2 Impacts on wildlife

Plants and animals depend on the circadian rhythm of light and dark to govern life-sustaining behaviours such as reproduction, food, sleep, and protection from predators. Artificial light has negative effects on many creatures, including amphibians, birds, mammals, invertebrates, and plants, which impacts on the sensitive habitats on the Chase.

3.3 Impacts on landscape quality

Darkness at night should be an integral part of its landscape, adding to its tranquillity and sense of remoteness. We want to ensure that our skies don't get any lighter, and that looking up at a starry sky is something we can continue to experience and enjoy. Artificial lighting introduces a suburban feel and can detract from the landscape and natural beauty of the AONB.

3.4 Climate change and energy costs

Poorly designed or misdirected light is wasteful energy-wise, raising costs unnecessarily and contributes to carbon emissions and global warming.

4.Lighting Considerations

The rest of this guide considers the changes we can all make to reducing light pollution to improve the night skies over Cannock Chase AONB. This does not necessarily mean less lighting but good lighting. Good lighting does not create light pollution and often provides better illumination than poorly designed schemes.

4.1 Light intrusion

Every form of artificial light which shines outside the areas intended to be illuminated is light pollution. There are several forms:

- **Light 'trespass' - when light enters a neighbouring property**
- **Over illumination - where there is excessive light**
- **Glare – often resulting from an unshielded light source resulting in contrasting dark shadows and excessively bright areas**
- **Clutter - excessive groupings of lights which can cause confusion and distraction from obstacles intended to be illuminated**
- **Sky glow - where light is escaping upwards.**

Light units which point upwards, and those which direct light across a site, contribute to light pollution. Lights pointing out from a site not only spread light into neighbouring properties but can also be dangerous to drivers through dazzle and glare. Even downward-directed and/or low-colour temperature LEDs are still often too bright for the lighting task.

So called 'security lighting' often creates strong shadows for intruders to hide in, as well as glare and dazzle which limits the ability of witnesses to identify key features of the perpetrators.

Light can also reflect from surfaces and create light pollution and problems for householders and wildlife, so attention to the type of light source is important in good lighting. Correct installation is also important to ensure the performance offered by the manufacturer is achieved.

Reducing the power of lights, dimming, and limiting the time lights are on, not only reduces the potential for light pollution but also saves money.

Retrofit shields and baffles can reduce significantly light pollution from existing light fittings. Fittings with exposed glass covers and upward globes are particularly problematic. Horizontally mounted flat glass light units are the least polluting and can be designed to spread light down onto a wide area. The Institution of Lighting Professionals provides a range of advice notes that explains this in more detail. Further information can be found in the 'Where to find out more' section, where you can also find a link to a useful glossary of lighting terms.

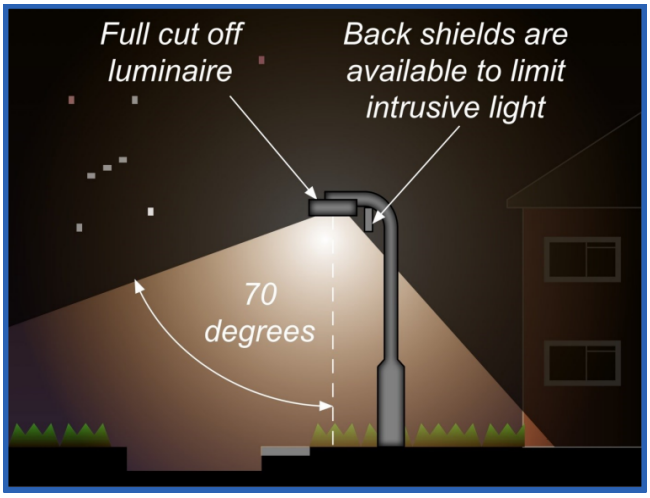
4.2 Street lighting

Lighting that is in the public domain has been receiving close attention in recent years.

Staffordshire County Council operates a system of renewal for street lighting when lights become age expired or structurally unsafe. Over the past 5-8 years the advancement in LED technology means that LED lanterns are now the standard form of lantern renewal. They focus light on the ground, and the current choice of lantern is described as 'Full Cut-off' so the Upward Lighting Ratio (ULR) should be 0%. Since 2013 streetlights in Staffordshire subject to asset renewal incorporate the use of dimming. For traffic routes the power output of a lantern is dimmed by 50% from midnight until 06:00 hrs. In residential streets a 2-stage dimming process has been introduced with the first stage dimming the lantern by 25% from 20:00 hrs to midnight after which time the lantern output is further reduced to 50% until 06:00 hrs. Some areas cannot be dimmed for reasons of public and highway safety.

Late in 2019, the County Council agreed that a colour rating of 3000K (warm white) would be adopted for all replacement street lights.

The International Dark-Sky Association advocates the use of shielded 3000K or less LED lighting as better for human health, and to help to reduce skyglow, improve nightscapes and reduce disturbance to nocturnal wildlife.



Typical well directed full cut-off street lighting, with shields. Courtesy Commission for Dark Skies

4.3 Planning consent

Some lighting can be installed without permission or consent. The forms that do require permission include:

- **Lighting installations which materially alter the external appearance of a building**
- **Lighting installations on Listed Buildings which affect their character**
- **Illumination of outdoor advertisements**
- **Most forms of lighting on columns [eg sports, street, security lighting].**

Local authorities have their own Policy and Supplementary Planning Documents (SPD) which set out policy on acceptable installations and design, and include requirements for external lighting. Special considerations may apply within the AONB. If in doubt, contact your local council's planning department for advice.

4.4 Lights and the law

Light pollution is categorised as a statutory nuisance under the Environmental Protection Act 1990[2]. This means that if artificial light from your property encroaches onto a neighbour's property that is 'prejudicial to health or a nuisance', you could be served with an abatement notice by the local council. Using the information in this guide should help you to identify and rectify a problem before it comes to this.

[2] Environmental Protection Act 1990

5. Cannock Chase AONB's position

5.1 The AONB's position

Building on the adopted AONB Management Plan and mindful of the simple improvements that can be made to provide good and adequate lighting without prejudicing dark skies, Cannock Chase AONB Partnership takes the position that all artificial external lighting within its borders, or within the setting of the AONB, should be muted, screened, and the minimum required. Any temporary lighting that may be required for safety at permitted events should be similarly limited to the minimum necessary. The appropriateness of proposals for temporary decorative installations, such as on historic assets, should be carefully considered to avoid impact on dark skies and wildlife.

5.2 General principles for good lighting

To accord with this aim, the AONB Partnership advocates that no external lights should be erected or installed in, or within the setting of, the AONB unless:

(a) They can be shown to be essential for security or safety, and the minimum necessary to achieve it.

(b) They are directed downwards and designed or shielded to prevent upward, sideways, and outward spillage.

(c) They give a light whose colour and intensity are appropriate for the wider setting and for wildlife.

(d) They do not highlight a structure or feature that would have an adverse visual impact on the surrounding landscape; and

(e) They utilise the most energy- and pollution-efficient equipment that is reasonably available.

Additionally, where existing lighting is identified as having an adverse effect on the character of the AONB, is particularly obtrusive, or damaging to wildlife, the AONB Partnership will encourage its removal or modification of the lighting units.

Where applications for new lighting schemes are submitted to local planning authorities that effect the AONB, the AONB will seek planning conditions requiring lighting to be approved in accordance with the AONB Design Guide and AONB Good Lighting Guide. The AONB will support modifying and installing external lighting that meets the above criteria to help to ensure that the AONB's special character and attractive environment will not be spoilt by sky glow or intrusive light.

6. Good Lighting Guidance for Owners and Developers

6.1 Lighting essentials

Good lighting delivers the right amount of light, where it is needed, and when it is needed. In many cases lighting does not need to be on constantly. Significant economies can be made by fitting motion sensors so that lights only come on when activity likely to need light is sensed. Simple 'curfew' periods when lights are switched off, such as late evening and early morning, can also reduce amounts of wasted light. In areas where some lighting is appropriate, a programme of dimming lights can operate at periods where there is minimal use of the location. All these arrangements help reduce the potential for light pollution, lessening the harmful effects of extended periods of 'daylight' on wildlife and humans, cutting costs and saving energy.

The position of the property and, where appropriate, the settlement type within which it falls should influence decisions about potential lighting. For development within the AONB reference to the AONB Design Guide is recommended as this includes checklists and design advice for ensuring a sensitive solution. The Guide highlights, for example, to maintain tranquillity, sense of wildness and avoid light pollution, the use of lighting should be minimised on the edge of settements where they are adjacent to semi-natural landscapes.

6.2 Common issues

6.2.1 Domestic lighting

External domestic lighting tends to be chosen for security purposes. However, it is often unnecessarily bright for the lighting task, left on constantly and directed so that it can dazzle potential witnesses to any misdemeanour while providing useful shadows to hide in. This also can cause light nuisance into neighbouring properties, glare into the eyes of walkers and car drivers and adds to pollution of the night sky. Simple, cheap floodlights are readily available but may not provide the best solution in terms of ease of adjustment and limiting light spillage.

The current trend to have large glass walls and gable ends to new dwellings and conversions means there is considerable potential for internal domestic lighting to spill out. Where this occurs blinds or curtains would help reduce light spillage.

External lighting on terraces and patios and ornamental lighting in gardens has also become popular. Limiting the hours of operation will reduce disturbance to wildlife and light spillage.

6.2.2 Lighting associated with farms, businesses and community buildings

Farmyard and commercial premises lighting is often a larger-scale version of domestic 'security' lighting. However, the light output of the light fittings should be proportionate to the task. It is better to install multiple, flat glass asymmetric lower lumen light fittings around the yard than try to blast the area with a single, high power light fitting from one end. Skylights in barns and other agricultural buildings can also send light upwards, polluting the night sky, especially in those that are lit throughout the night. Ideally louvres or blinds should be fitted but if the internal lights have integral shades above them then only reflected rather than direct light will be emitted.

Similar situations occur with other businesses that operate during hours of darkness. Motion sensors and timers can be helpful and illuminated signage minimised – consider whether buildings, signs and parking areas need to be lit outside business hours. In some cases, where there is essential night-time use, then lighting needs to be carefully designed to eliminate light pollution and to keep costs to a minimum.

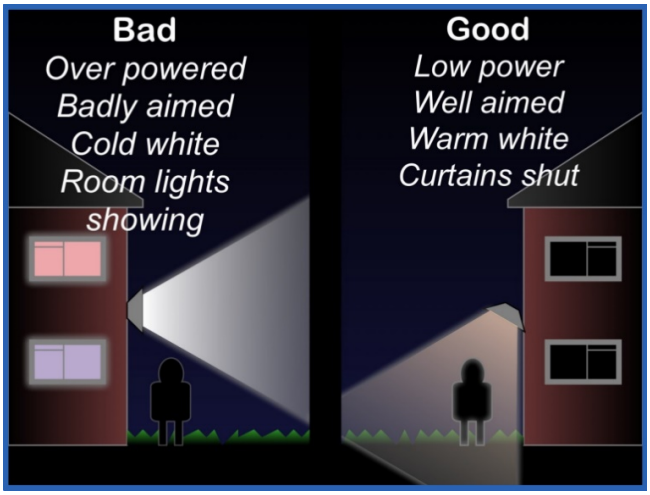


Diagram showing the impact of shielded light fittings on commercial premises. Courtesy Commission for Dark Skies

Various uses such as service stations, pubs and village halls also have a requirement for external lighting. Up-lighters on buildings spill light into the night sky whereas down-lighters could achieve a similar illumination effect with minimal light spillage. Ornamental / up lighting on public buildings such as churches should be carefully considered to minimise light spillage and duration of use.

The lighting of parking areas should avoid using one or two large lights directed across the area, which would spill light sideways and upwards and risks dazzling traffic on the site and on the approach road. Proposals should therefore use lighting fittings that do not allow upwards or sideways dispersion of light. Lighting from the edges of the site inwards is generally more effective and less problematic than lighting from a central position outward. Dimming regimes can reduce light pollution and costs, and benefit wildlife.

6.2.3 Recreation and sports lighting (including equestrian lighting)

Sports lighting is a significant source of light waste and skyglow in the United Kingdom. Like other kinds of lighting it can cause skyglow, light intrusion, glare, and unnecessary sideways light dispersion. It is comparatively easy to direct sports lighting onto the area to be lit using the technical capabilities of lighting units. Correct angling and shielding are vital if pollution, light nuisance and waste are to be avoided, and for small areas such as tennis courts a single football pitch, flat glass units are necessary.

Good design and effective implementation are both important. That includes not just night-time lighting but the urbanising appearance of lighting poles, columns, and towers in the daytime. There may be the temptation to install a couple of tall towers, each with a bank of lights. However, several shorter poles with pairs of lights are likely to be much less visually intrusive, equally effective, and less likely to contribute to light pollution. In all cases it is important that lights are correctly installed and not 'tipped up' to attempt to spread light further. Sports lighting should be appropriate to the level of play and use, and the lights should only be on at full power for the duration of the match or event and switched off as soon as safety allows.

Manèges are popular all-weather exercise areas for horses. Lighting of manèges in the AONB should be controlled to limit visual intrusion and light spillage. To encourage correct design and implementation of lighting it is recommended that where there are planning applications for new manèges the local planning authorities exercise appropriate controls over lighting as part of the planning permission process.

There may be locations within the AONB where such lighting would be inappropriate.

6.3 Lighting solutions

6.3.1 Key considerations

There are numerous resources which illustrate 'good lighting' at all scales, some of which are referenced in the 'Where to find out more' section in this guide. These emphasise the importance of:

- **Using directional lighting fittings that are correctly aimed to light only the areas intended to be illuminated.**
- **Manufacturers can provide contour diagrams of light intensity which demonstrate the capabilities of a particular light fitting. Using these can help to make the best choices to minimise light spillage.**
- **Taking advice from manufacturers, suppliers and designers, who should be able to advise on solutions that meet requirements for safety or decorative effect while avoiding light pollution.**
- **Flat glass, sometimes asymmetric fittings are the most appropriate for lighting entrances, driveways, and routes. They are also likely to be effective as smaller scale units, for 'security' lighting.**

Units that are particularly liable to cause pollution are simple and traditional bulkhead and lantern style lights that emit light in all directions. Wall lighters can be both useful and attractive when they direct light downwards and illuminate a surface, such as a path to a door. However, when they direct light sideways and upwards, they can create significant light pollution, and glare. Illuminated bollards need to be designed to direct light downwards otherwise they dazzle pedestrians and drivers and contribute to light pollution.

CHECKLIST: Installing exterior lighting

- Follow the manufacturer's installation instructions.
- Ensure that you only light the target area.
- Be careful not to allow light to fall outside the boundary of your property, including into a neighbours' windows, onto the pavement, or out into the countryside.
- Check that motion detectors can only be activated from inside your property – you may need your neighbours' help with this exercise. Lights should not be triggered by movement outside your property boundary.
- Lights should be angled correctly and not too bright. This will improve your security and reduce light pollution. The Commission for Dark Skies advice on security floodlighting illustrates how the correct angle of installation enhances security and minimises light pollution.
- Take care to ensure lights are not set off by the movement of vegetation in the wind.
- Operate lights for the minimum required time and have a curfew period when they are turned off.

6.3.2.Effectiveness

Whilst the pressures to reduce light pollution and energy use are leading to a greater number of effective and energy efficient lighting units becoming available, lighting needs to be angled correctly to be effective. Some existing lights can be made less problematic by adjusting them to point downwards and incorporating effective motion sensors and timers to reduce the time they are on, and the energy used. Planning consultation responses by the AONB Partnership will seek lighting schemes that demonstrate their effectiveness at the application stage and may also request approved schemes are checked after installation to ensure that the correct units have been installed correctly. Properly installed good lighting simply means that the light is directed where it is needed rather than being dissipated and wasted.

CHECKLIST: Maximising the effectiveness of lighting

- Fit the right light for the right task.
- Use the minimum level of brightness.
- Install and adjust all lights correctly.

6.3.3 Types of light

Technology has moved from tungsten lighting to halogen lighting and onwards to LED lighting. LED lighting is particularly attractive because of its low energy use, low cost, longevity and other positive factors. However, there are some complications relating to the type of light that is emitted.

Often the light is described by its light temperature, which is measured in degrees Kelvin. Lights which are described as 'daylight' are often in the 5000 - 6000 degrees Kelvin range which is blue-rich, and often too bright for the task. Blue-rich daylight bulbs appear to be rather easier to manufacture so there is often a preference to use them because of their lower cost. However, blue-rich light has been shown to have negative effects on wildlife and tends to bounce from the ground and from vegetation, and therefore dissipates upwards causing light pollution.

CHECKLIST: Type of light

- New lighting installations should use a 'warm white' light in the region of 2700 - 3000 degrees Kelvin, which is currently regarded as the most user-friendly light.
- Avoid using white/blue light bulbs over 4000 Kelvin (so-called 'daylight' bulbs), which are less good for health and the environment.

7. Advice For Local Authority Decision Makers

7.1 Policy and decisions

Local authority policy and planning decisions will be pivotal in helping to reduce light pollution to improve the night skies over Cannock Chase AONB and thereby benefit human health and wildlife and conserve the character and tranquillity of the AONB. Including specific policy on reducing light pollution and lighting in the AONB would be warmly welcomed. Policy regarding lighting in the immediate setting of the AONB may be more complex. However, reference in local plan policy to the Cannock Chase AONB Design Guide, Cannock Chase AONB Views and Setting Guide and Good Lighting Guide would help direct applicants to these advisory documents which set out the aspirations and expectations of the AONB.

The AONB Design Guide includes checklists and design advice for ensuring sensitive design solutions in the AONB. The Guide highlights, for example, where on the edge of settlements that are adjacent to semi natural landscapes the use of lighting should be minimised to maintain tranquillity, sense of wildness and avoid light pollution. Some more specific lighting advice is provided in relation to development types. This Good Lighting Guide builds on the principles and advice in the AONB Design Guide, with information about the issues and impacts of light pollution and further detail on how to reduce light spillage.

The AONB Views and Setting Guide identifies representative viewpoints and provides guidance for minimising the impact of development on the AONB. Development in the setting of the AONB that includes significant or uncharacteristic lighting may have detrimental impact on wildlife, tranquillity and the sense of wildness and should be carefully considered and controlled to minimise effects.

7.2 Planning conditions

In considering individual planning applications in the AONB and in the setting of the AONB, where considered appropriate, a requirement for submission of detailed proposals for lighting associated with a development should be secured either in support of the full application or as a pre-commencement condition. Lighting in areas adjacent to semi natural landscapes and in farmland is particularly intrusive and should be particularly carefully controlled. Manèges are often located in open countryside where lighting is more uncharacteristic and potentially intrusive.

CHECKLIST: Maximising the effectiveness of lighting

- Contour diagrams of light intensity distribution (Lux levels) which demonstrate the capabilities of a particular light fitting or lighting make the best choices to minimise light spillage.
- Use of shielded light fittings that minimise upward or sideways light spillage.
- Directional lighting fittings that are correctly aimed to only light only the areas intended to be illuminated.
- Plans indicating the proposal to the surrounding landscape. Sites in an elevated exposed location will be more visible and prominent in views.
- Hours of operation, height of columns.
- Visual mitigation if applicable.

CHECKLIST: Lighting proposals in the AONB

- Is the proposed lighting necessary?
- Contour plans for Lux levels indicate lighting would not be too bright, below 3000 degrees Kelvin, is targeted at the required area and there is no light spillage.
- Shielded light fittings would be used to minimise upward and sideways light spillage.
- The proposed lighting would not detrimentally affect protected species, or the effects can be adequately mitigated.
- Proposed hours of operation would minimise wildlife disturbance and conserve overnight dark skies.
- The proposal would not introduce urbanising features (lighting columns and associated infrastructure) that would be visually unacceptable in the AONB.
- Lighting would be operated for the minimum required time.

In some cases where the location is particularly sensitive, the AONB may request that following a planning approval and development case officers check that the installation has been carried out in accordance with the approved plans.

8. Summary

This Good Lighting Guide provides information and advice on how to achieve good lighting, good security, and minimise light pollution whether or not consent is required.

Cannock Chase AONB encourages those in and near the AONB to review their existing lighting using this guide, to support a reduction in light pollution, a better night-time environment for wildlife and humans, to reduce energy consumption and to be able to better enjoy our star lit night skies. New lighting proposals in the AONB should be informed by the AONB Design Guide and this Guide to avoid unnecessary lighting, minimise light pollution and conserve the natural beauty of the AONB's dark skies.

The AONB encourages local planning authorities to use this guide in their planning decision making processes.

CHECKLIST: Good lighting principles

- Phase out and renew all old-fashioned 'security' lights. New ones should be of the horizontally mounted flat glass asymmetric type.
- Illuminate only the area or premises to be lit, and nowhere else.
- Use motion sensors and timers to limit lighting to situations when it is needed and save energy and money.
- Ensure bulkhead and lantern style lights, and illuminated bollards have internal baffles and/or external shields fitted to avoid upwards and sideways displacement of light. Or, fit alternative, well-directed types of units.
- Avoid top of pole globe lighting.
- Light car parks, service stations, village halls, farmyards and other businesses from the outside inwards, using horizontally mounted flat glass lighting units.
- Fit glazed gable ends and skylights with blinds or louvres.
- Fit glazed gable ends and skylights with blinds or louvres.
- Use LED 'warm white' lights in the region of 2700 - 3000 degrees Kelvin, avoiding blue rich, 'daylight' units.

9. Where to find out more

Commission for Dark Skies: The Commission for Dark Skies - Home (britastro.org) The site includes Home and Commercial Security Lighting :This includes 'how to' advice on security lighting and an interactive demonstration of floodlighting.

Commission for Dark Skies Good Lighting Guide

CPRE: Night Blight Report

Interactive map revealing the UK's darkest and light polluted skies

International Dark-Sky Association: Light Pollution

A glossary of lighting terms

Institution of Lighting Professionals:

A wide range of free downloads on lighting are available including:

Guidance note for the reduction of obtrusive light

Simple tips to get your floodlight working best for you and the environment (produced working with DEFRA, CPRE and the Campaign for Dark Skies)

Bats and Artificial Lighting in the UK (written with the Bat Conservation Trust)

Domestic exterior lighting: getting it right

Cranborne Chase AONB : Lighting types, qualities and impacts paper

UK Government guidance on light pollution

Local Authority SPDs:

Cannock Chase District Council Design SPD Design Principles

Lichfield District Council Rural Development SPD

South Staffordshire District Council Design Guide SPD

Cannock Chase AONB publications:

Cannock Chase Management Plan 2019-2024

Cannock Chase AONB Design Guide (2020)

Cannock Chase AONB Views and Setting Guide (2020)

Cannock Chase AONB

c/o Staffordshire County Council **cannockchase@staffordshire.gov.uk** February 2023

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Appendix A Sky Quality Survey Methodology

The International Dark-Sky Association (IDA) provides advice on the structure of a sky quality survey. Taking additional advice from Bob Mizon, Coordinator, British Astronomical Association's Commission for Dark Skies, who has extensive experience of sky quality survey, the following approach was taken:

Survey Locations

Theoretically, to achieve an even spread of reading across the AONB a 1km grid is recommended, allowing one survey location per km2. The grid established 75 potential survey squares. However, survey points had to be easily accessible to volunteer surveyors and require an open location more than 10m from trees, for readings to be meaningful and avoid inaccuracy due to the shadow effect from tree canopies. Areas of woodland were therefore unsuitable, and locations were selected to be on or close to roads where a car could pull off in a safe location, away from mature trees.

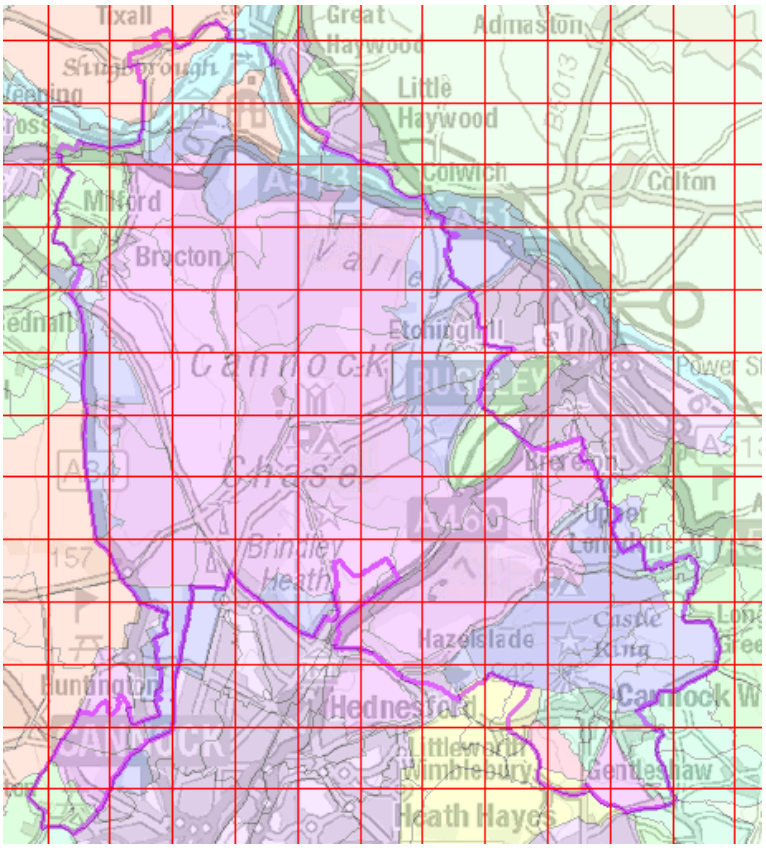

Figure 1 km grid superimposed on AONB

Survey

The Survey was carried out between 9th and 15th March, either side of the New Moon on the 13th March to limit the effect of moonlight. The AONB is grateful for the support of volunteers from partner organisations including National Trust, Forestry England and Staffordshire County Council. Due to Covid 19 restrictions in place it was not possible to engage members of the public in the survey, however this may be possible in future.

Quantitative measurements were taken using a Unihedron Sky Quality Metre with Lens (SQM-L), as recommended by the IDA. The Sky Quality Meter is sensitive to visual light and measures the brightness of the night sky in magnitudes per square arcsecond. Magnitudes per square arcsecond is a logarithmic measurement which means that a large change in sky brightness are equal to a relatively small numerical change. Three /four readings were taken, rotating 90 degrees between each reading, and the average calculated for each location.

Department for Environment Food & Rural Affairs

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Cannock Chase Area of Outstanding Natural Beauty is supported by:

Defra, Cannock Chase Council, Lichfield District Council, South Staffordshire Council, Stafford Borough Council, Staffordshire County Council, Forestry England, Natural England, Historic England, National Trust, RSPB, Staffordshire Wildlife Trust, British Horse Society, Cannock Chase Cycle Centre, Cemex UK Operations Ltd, Country Land and Business Association, CPRE, Friends of Cannock Chase, Hanson Aggregates, National Farmers Union, Ramblers, Staffordshire Parish Councils' Association, Walton Chasers, West Midland Bird Club.

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