Cranborne Chase and West Wiltshire Downs Area of Outstanding Natural Beauty

Dark Skies and Light Pollution Study

Final Report

June 2007

Entec UK Limited

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Report for

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Purpose of this report

The purpose of this report is to provide a short statement for Cranborne Chase and West Wiltshire Downs AONB Partnership setting out their position on light pollution within the AONB. The report will also explain and identify: the scope of the issue; why light pollution is especially an issue for the AONB; identify principal lighting causes within the area; and provide guidance on the potential solutions to the problem.

Contents

1. Introduction

Cranborne Chase and West Wiltshire Area of Outstanding Natural Beauty (AONB) traverses parts of four counties, namely Dorset, Wiltshire, Hampshire and a little of Somerset. It stretches over 380 square miles from Frome and Warminster in the north to Wimborne Minster in the south; from Shaftesbury in the west to Salisbury in the east. A location map is given in Figure 1 (refer to Appendix A).

In 2004 the AONB Steering Group, in consultation with residents, produced a Management Plan for the AONB. One of the issues raised during consultation was the intrusive nature of lighting, which led to the AONB's Environment Action Plan 2004-2009 containing targets to identify and report on impacts of Lighting (and Noise) (action ref. AC37), with a view to producing Good Practice Guidance.

This report is intended to assist in the formulation of such Guidance and to consider any other steps relating to the adverse effects of lighting that need to be taken.

2. Scope and Methodology

The scope of this report is limited to the following:

- Reviewing existing relevant planning legislation and guidance;
- Exploring the planning control mechanisms in respect of lighting provision that exist within the County and District Councils concerned;
- Referring to studies undertaken and guidance papers prepared by other Authorities, Institutions and Pressure Groups;
- Outlining the particular nature of the AONB that makes the problems associated with light pollution more acute than elsewhere;
- Recording the principal situations where external artificial light is employed and the function it fulfils;
- Identifying the main problem areas within the AONB, both in respect of geographical location and form of light pollution generated;
- Research into Lighting Manufacturer's designs/types of pollution-reducing luminaries and related products;
- Preparing a set of recommendations for the AONB Management Unit to consider, and to assist them in their efforts to mitigate existing problems of light pollution and reduce the potential spread of it in the future; and
- Producing a draft Position Statement for the AONB to adopt.

The report would have undoubtedly been enriched by contributions from the following, but has needed to exclude them for the sake of expediency:

- Field study of existing conditions within the AONB;
- Detailed analysis of trends in the extent of light pollution; and
- Direct public consultation.

The study has been desk-based, gathering information from the following sources:

- Hampshire, Dorset and Wiltshire County Council Planning and Environment Officers and Technical Advisors;
- Salisbury, North and East Dorset, West Wiltshire and New Forest District Councils;
- South Northamptonshire Council (Supplementary Planning Guidance on Light Pollution);
- Ordnance Survey Data;

- Night-time satellite imagery - Campaign to Protect Rural England (CPRE) and Land Use Consultants;
- South Devon AONB;
- Department of Environment, Food and Rural Affairs (DEFRA);
- Department for Communities and Local Government;
- CPRE and British Astronomical Association (Night Blight Campaign and the Campaign for Dark Skies (CfDS)); and
- Institution of Lighting Engineers (ILE).
- Various lighting manufacturers and suppliers

3. Sensitivity of the AONB

The sensitivity of a landscape's character to damage is dependent upon the nature of the change and the robustness of the landscape's characteristics. For example, a modern town park would normally be able to absorb the building of a toilet block without adverse effect, whilst just a few cars parked next to a heritage site such as Stonehenge could greatly impact upon its cultural associations and thereby have a significant affect on its character.

In the case where the character of a landscape is built upon its ancient cultural associations, with tranquillity and remoteness as major factors, it will be particularly sensitive to changes resulting from the imposition or expansion of human activity within the area.

The Cranborne Chase AONB is described as a 'unique, tranquil and evolving landscape where remote downland contrasts with swathes of ancient woodland and beautiful vales'…'natural beauty within the AONB is seen as a blend of both the rich natural and cultural heritage': its special qualities include its diversity, distinctiveness, sense of remoteness and tranquillity (AONB Management Plan 2004).

In 2003 an 'Integrated Landscape Character Assessment' of the AONB was completed that confirms its diversity by identifying 8 separate character types, based on its range of characteristics. These characteristics include tranquillity, remoteness and ecological wealth, as well as an abundance of pre-historic sites and 18th and 19th century parklands and estates.

These qualities expose the special character of the AONB to a greater likelihood of damage by invasive light than other areas where tranquillity, remoteness and cultural heritage are less intrinsic character traits.

In many ways, the extent and intensity of light emanating from a place at night advertise its place in modern society and the density of its population; for example the high light levels within the conurbations and major cities of Europe (refer to page i). The absence of light suggests either the absence of people (remoteness) or the presence of poorer, or more ancient, communities. Hence the less artificial light there is within an area the more the qualities of wilderness/remoteness and/or long-established cultural heritage are reinforced.

The Governments own advisory paper *'Lighting in the Countryside - Towards Good Practice'* (DOE/CC 1997 - see Chapter 6) recognizes that 'artificial light may distort our impressions of the countryside, undermining some of the less tangible, perceptual dimensions of the landscape. For instance, glare may blot out the delicate tracery of the stars and the subtleties of moonlight and shadow in views across the moonlit countryside. The scattering of lights deep into the countryside may blur the distinction between urban and rural areas and decreases the sense of remoteness which is a much valued quality in our increasingly urban society.'

The AONB Management Plan 2004 includes the statement that 'Cumulatively, the impact of small scale development threatens the special perceptual sense of remoteness and tranquillity that pervades much of the AONB. The size of tranquil areas in Wiltshire reduced by 81% between 1960-1990 (CPRE)' and that 'Lighting associated with development already has an impact on the expanse of dark skies'.

4. The Sources and Forms of Light Pollution

Light pollution can be defined as 'the projection of light onto a surface or space to which it is not intended, causing an unwanted effect to persons and/or environments exposed'. (Temple: March 2006 - see Chapter 6) In practice, light pollution is obtrusive light that causes nuisance to others and may waste electricity. It manifests itself in the following ways:

- Glare — High intensity light directed to an unintentional receptor;
- Light Trespass — Spread of light into neighbouring property/windows;
- Skyglow — Brightening of the sky caused by the spread of light upwards beyond intended target; and
- Scenic Intrusion — Unwelcome visibility of light in scenic views.

Light trespass is normally the most immediate concern of neighbours of the light source, whilst *glare* affects travellers as well as neighbours. These types of light pollution are fairly readily controllable by the Local Authority (Environmental Health) - see Section 6 below.

Skyglow causes the stars at night to loose visual definition and is mainly the concern of star-gazers and astronomers; the move towards its reduction/eradication is championed by such organizations as the CfDS (Campaign for Dark Skies) and the CPRE (Campaign to Protect Rural England).

Scenic intrusion is perhaps the most significant for the AONB, affecting evening walkers, leisure travellers, tourists and certain outdoor leisure pursuits. It is not an effect that is considered separately from the other effects in most of the published papers/guidance notes on the subject - see Section 6 below. It is a form of pollution that can be caused by any light source or reflected glow that is not commensurate with the characteristics of an area of high landscape or townscape value. Thus the colour of a light can be as much a pollution factor as its location, orientation and intensity, as it can alter the character of a place after dark and adversely affect its scenic quality.

Problems with light glare can normally be dealt with fairly quickly by persuasion for the owner to alter the orientation of the light or shield it from the offended receptor. In cases of glare to road users it can clearly be dangerous and swift action is necessary. Glare can usually be controlled by ensuring that the main beam angle is no more than 70 degrees to the observer. Light trespass is generally more problematic to deal with, as it very often involves disputes between neighbours as to whether the light source is sufficiently obtrusive to warrant removal or alteration; however, it usually only involves a single installation such as light columns introduced on a highway or floodlights on a sports pitch . Skyglow is perhaps the most publicised and widely accepted form of light pollution, and yet it is the most difficult to deal with, often being caused by a number of installations spread over a wide area, and requiring pre-planned measures to be taken over a long period of time in order to reduce it. Scenic intrusion is probably the least recognised form of light pollution, although for areas of attractive

landscape, particularly ones characterised by wilderness and tranquillity, it is probably the most important to address.

In order to appreciate the difficulty of addressing the harmful effects of light within the AONB, it is useful to review the normal situations where lighting is considered to be a requirement. Below is an outline of the types of development or situations where lighting is involved, together with reference to its application:

Residential Property	**Normal times of use**
• Functional Interior lighting (external spread through windows);	*Every evening*
• Decorative Garden lighting; and	*Occasional*
• Security lighting.	*Intermittent*
Highways	
• Residential Street Lighting for visibility and safety;	*Every evening*
• Major highways for safety;	*All night*
• Precincts and public footpaths for visibility and safety;	*Every evening*
• Major road junctions for safety;	*All night*
• Traffic signage for safety and information;	*All night*
• Advertisements for promotion and information; and	*Evenings/nights*
• Vehicle lights for safety and visibility.	*Temporary*
Agricultural Operations	
• Tractor/machinery lights for harvesting after dark;	*Temporary*
• Farmyard lighting for operations after dark; and	*Varies*
• Security lighting.	*Intermittent*
Commerce and Industry	
• Functional Interior lighting (external spread through windows);	*Every evening*
• Lighting of car parks and service yards for safety/operations after dark;	*Evenings/nights*
• Associated vehicle lights, especially HGVs;	*Temporary*
• Petrol Filling Stations for safety/operations after dark;	*All night*
• Security lighting;	*Intermittent*
• Advertisement hoardings for promotion and information; and	*Evenings/nights*
• Illuminated fascias for promotion and information.	*Every evening*

Community Facilities

• Functional Interior lighting for educational establishments, leisure centres, religious buildings, community halls and cultural centres (external spread through windows);	*Every evening*
• Exterior safety lighting for vehicular and pedestrian circulation;	*Evenings/nights*
• Lighting of surface and multi-storey car parks for safety;	*Evenings/nights*
• External sports stadium and floodlit pitches for extended evening use (see Photograph 4.1) ; and	*Intermittent*
• Associated vehicle lights.	*Temporary*

Photograph 4.1 Floodlit Sports Area at Poole, Dorset

A light does not need to shine directly on to a recipient to be obtrusive and cause a nuisance. Light sources can be direct or indirect, focussed or diffused, and their colour can render them less or more noticeable, depending on their situation. Some different kinds of light fittings (luminaries) and their respective pollution tendencies are discussed in section 6.1 below.

Table 1 tabulates the most common generic causes and effects of light pollution produced from the various types of development/situations scheduled above.

Within the Table 1 the adverse effects fall into the four specific categories of Glare, Light Trespass, Skyglow and Scenic Intrusion, as defined above

Also in Table 1 are given the places that are most likely to be affected by the different categories of pollution, as follows:

- Towns (as on the edge of the AONB);
- Villages and military camps; and
- Hamlets and open countryside.

Please see Chapter 5 for more detail.

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Table 1 Generic Cause and Effect of Light Pollution

ADVERSE EFFECTS can be glare, skyglow, light trespass or scenic intrusion - refer to text for definitions

APPLICABLE TO towns refers to those on the edge/beyond the boundary of the AONB

	Development/ Situation	Applicable To	Light Source	Function	Type of luminaire	Problem causes	Main Adverse Effects
1	**Residential Property**	Hamlets, villages, towns and countryside	Interior Lighting	Visibility	Various interior	Outspill through windows	Light trespass
						Outspill through skylights	Skyglow
2		Hamlets, villages, towns and countryside	Decorative garden lighting	Amenity	Traditional, mushroom	Outward spill beyond garden	Light trespass and scenic intrusion
					Globe (low power)	Upward spreads	Minor skyglow
3		Hamlets, villages, towns and countryside	Security lighting	Security	Halogen flood	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
4	**Highways**	Villages and towns	Residential street lamps	Visibility and safety	Modern or traditional post-top/wall-mounted	Open-sided, non-directional or poor shields	Glare and light trespass, scenic intrusion and skyglow
5		Towns and Countryside	Major highways	Safety	Modern post-top	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
6		Towns	Precincts and public footpaths	Visibility/amenity and safety	Modern or traditional post-top/wall-mounted	Open-sided, non-directional or poor shields	Glare, light trespass and skyglow
					Uplighters	Upward spreads	Skyglow

	Development/ Situation	Applicable To	Light Source	Function	Type of luminaire	Problem causes	Main Adverse Effects
					Globes	Up/sideward spreads	Glare light trespass and skyglow
7		Towns and Countryside	Major road junctions	Safety	Modern post-top	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
8		Villages, towns and countryside	Traffic signage and advertisements	Safety and/or information	Top-mounted spot or directional flood	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
					Bottom-mounted spot or directional flood	Overpowered, incorrect angle and upward spread	Skyglow and scenic intrusion
9		All accessible areas	Vehicle headlights	Visibility/safety	Directional flood	Incorrectly aligned	Glare
10	**Agricultural operations**	Hamlets and countryside	Farmyard lighting		Halogen or other directional flood	Overpowered, incorrect angle/inadequate shields	Scenic intrusion and skyglow
11		Countryside	Tractor/machinery	Visibility	Directional flood	Employment late at night	Scenic intrusion and glare
12		Hamlets and countryside	Security lighting	Security	Halogen flood	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
13	**Commerce and Industry**	Villages, towns and countryside	Interior Lighting	Visibility	Various interior	Outspill through windows	Light trespass
14		Villages, towns and countryside	Lighting car parks and service yards	Safety and night operations	Modern post-top and/or wall-mounted floods	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
15		All accessible areas	Vehicle headlights	Visibility/safety	Directional flood	Incorrectly aligned	Glare
16		Villages, towns and countryside	Petrol filling stations	Safety and night operations	Modern post-top and/or wall-mounted floods	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow

	Development/ Situation	Applicable To	Light Source	Function	Type of luminaire	Problem causes	Main Adverse Effects
					Under canopy-mounted fluorescent	Outward spill beyond forecourt	Light trespass and/or scenic intrusion
17		Villages and towns	Security lighting	Security	Halogen flood	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
18		Villages and towns	Advertisement hoardings	Safety and/or information	Top-mounted spot or directional flood	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
					Bottom-mounted spot or directional flood	Overpowered, incorrect angle and upward spread	Skyglow and scenic intrusion
19		Villages and towns	Illuminated fascias	Promotion and information	Wall-mounted spots or directional flood	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
					Backlighting	Overpowered	Light trespass
20	**Community facilities**	Villages and towns	Interior Lighting	Visibility	Various interior	Outspill through windows	Light trespass
21		Villages and towns	Exterior Lighting	Access Visibility/safety	Various external	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
22		Villages and towns	Surface and multi-storey car parks	Safety and eve activities	Modern or traditional post-top/wall-mounted	Open-sided, non-directional or poor shields	Glare, light trespass, scenic intrusion and skyglow
23		Towns	Sports stadium and floodlit pitches	Evening games	Floodlights	Overpowered, incorrect angle/inadequate shields	Glare, light trespass, scenic intrusion and skyglow
24		All accessible areas	Vehicle headlights	Visibility/safety	Directional flood	Incorrectly aligned	Glare

5. Existing Problem Areas

The extent and intensity of skyglow pollution within and around the AONB are evidenced by the satellite images in Figures 2 and 3 (Refer to Appendix A), one being recorded in the year 1993 and the other in 2000. By reference to these images, it can be seen that, as expected, the highest intensity of light emanates from the largest centres of population, all of which are just outside the boundaries of the AONB. These higher levels of light (i.e. of value 150-240 and more) emitted from settlements in 1993 expanded to cover slightly larger areas by the year 2000, and more settlements are found to be within the higher 150-240 value band, for example Verwood in East Dorset. However, one surprising factor is that the dark areas (i.e. of value <1.7), notably the one existing over the Great Ridge and around the nearby A303, appear to have enlarged during the period between the two dates of the imaging surveys, whilst light intensity has increased in the village communities centred upon Tisbury and Sixpenny Handley. Besides these observations and those recorded below, it may be noticed that other changes have occurred between the dates of the satellite surveys, but more on-site investigation would need to be made before any conclusions could be drawn from them.

5.1.1 Towns on the Edge of the AONB

The towns on the borders of the AONB, including Warminster, Salisbury, Wimborne Minster and Blandford Forum all lie just beyond the limits of the AONB designation; however, not only do each of these settlements light the night sky, thus causing a measure of skyglow, but they can also be viewed from vantage points and main routes within the AONB; Whilst it remains for on-site field study to confirm the fact, it is expected that the scenic intrusion of their lights at night is as much a pollution problem as their effect on dark skies (see Photographs 4.1 and 5.1).

Photograph 5.1 Skyglow from Wimborne Minster

As mentioned above, Verwood, which lies at the junction of the B3081 and B3072 north-west of Ringwood, stands out on the year 2000 satellite image along with the above towns as being within the bright light band of 150-240; whereas Fordingbridge and Shaftesbury remain within the 50-150 band, similar to the countryside that surrounds them.

Below listed are a few of the problem areas of light pollution within or at the edge of towns that have been identified by representatives of the Local Authorities as affecting the AONB:

- Queen Elizabeth School, Wimborne Minster (includes a floodlit all-weather pitch);
- Housing development within bypass on edge of Blandford Forum; and
- Sunrise Business Park, north of Blandford Forum.

(This list, and similar lists to follow, are by no means exhaustive, but are intended as examples only)

5.1.2 Villages and Military Camps

The only settlements within the bounds of the AONB are farmsteads, military camps, hamlets and villages. The largest of these settlements are the likes of Tisbury (north of the A30) and Sixpenny Handley. By reference to the satellite images (Figures 2 and 3), it can be seen that even these settlements radiate sufficient light to have the effect of raising the saturation levels detected by the satellite in those areas where the villages lie.

Other settlements within the AONB that have been noted by the Authority representatives as sources of light pollution are as follows:

- Knook army camp, on the A36 east of Warminster;
- Codford (also near the A36) new residential development; and
- Blandford Camp, north-east of Blandford Forum.

5.1.3 Hamlets and Open Countryside

Besides the visibility of the skyglow from neighbouring towns, the most common adverse impact of light in the AONB's countryside is scenic intrusion, as even the very presence of artificial light in a view can have the effect of undermining the AONB's inherent landscape character (see paras 3.3-3.4 above). To most people, however, pin-pricks of light from a farmhouse or small group of houses in a hamlet would not normally be considered an intrusion; it is only when poorly-shielded domestic security lights, farmyard floodlights or similar installations are switched on that lighting can become a pollutant in these areas. Highway junctions are a more obvious and sustained problem, because the columns are high and the lights are often on all night, and attract the eye in any view, appearing incongruous in an otherwise dark and tranquil landscape.

One such example of an illuminated junction within the AONB is the Sixpenny Handley roundabout. Here not only does the lit area adversely affect local views and landscape character, but the light spreads upwards causing skyglow. Such may well be the main cause of the higher light levels shown for this area that were recorded in the year 2000 satellite image but were not visible in 1993.

Other sources of light pollution identified locally within the AONB countryside are as follows:

- Grimsdyke Granaries, adjoining the A354 near Martin;
- Kings Farm, Sillen Lane, Martin;
- A303 junction with the A36 at Deptford; and
- Various small-scale developments in isolated locations.

Field study and public consultation would undoubtedly highlight other problem areas, and provide more information to allow assessment of where the main light pollution sources lie within the AONB, how to rank their nuisance value and how to mitigate their effects.

6. Existing Control Procedures

6.1 U.K. National Planning Legislation and Guidance

Until relatively recently, it had been the practice of Local Authorities to consider excessive, inappropriate or poorly-designed lighting as an issue that the developer/installer would address as a matter of course, on the basis that if problems were not rectified, lighting costs would be high or the lighting would be ineffective and need replacement. In the mid 90s Government-issued Planning Guidance called for Authorities to include lighting as one of the sources of possible pollution that needed to be safeguarded against when assessing any planning application; and by the end of the 20th Century several other guidance notes had been published that assisted Local Authorities in the task of controlling such pollution on new developments (see below). The difficulty remained with existing installations, against which there was little legislation; so the Local Authority (usually in the form of an Environmental Health Officer) could only assist those suffering from light glare or trespass by persuasion; failing such, offended parties were left on their own to take action against the perpetrator in the civil courts. It wasn't until the Clean Neighbourhoods and Environment Act 2005 came into force in April 2006 that Local Authorities were given legal backing to enforce offenders to remove or shield lights that were considered to be a nuisance (see below)

6.1.1 For Existing Installations

The Clean Neighbourhoods and Environment Act 2005 amended section 79(1) of the Environmental Protection Act 1990 to include under the statutory nuisance regime (in England and Wales) 'artificial light emitted from premises so as to be prejudicial to health or a nuisance'. Since April 2006 when the Act came into force, victims of glare or light trespass have been able to invoke this law to have the offending light source removed or shielded. District Councils must investigate any such case on behalf of the offended party and may serve an abatement notice where there is deemed to be a nuisance. Unfortunately, difficulties are likely to arise over the interpretation of what constitutes a nuisance. In theory, the Act could be applied to cases of skyglow and scenic intrusion also, but arguments in respect of the level of nuisance caused by any one lighting installation would probably prove unsustainable.

6.1.2 For Proposed Installations

The National Planning Policy Guidance on Planning and Pollution Control 1994 (**PPG23 -** now **Planning Policy Statement (PPS) 23**) recommends that Local Planning Authorities (LPAs) take account of 'the possible impact of potentially polluting development on land use, including the effects on health, the natural environment, or general amenity, resulting from releases from water, land or air, or noise, dust, vibration, light or heat'.

Appendix A of the above Statement, published in 2004, states that when considering development plans and planning applications, LPAs should take into account 'the need to limit and, where possible, reduce the adverse impact of light pollution, e.g. on local amenity, rural tranquillity and nature conservation'.

A third Annex to the Planning and Light Pollution **PPS23,** dealing specifically with obtrusive light**,** will be prepared for public consultation in due course. (Temple: March 2006)

PPG17 on Sport and Recreation (1991) gives guidance on the location of sport and recreation activities and advises that in the countryside great care should be taken to ensure that they are sensitive to their rural surroundings. Regarding floodlighting, it states that

> *'The LPA should seek adequate information as a basis for making decisions on applications involving the installation of floodlights...'*

PPG19 on Outdoor Advertisement Control advises that LPAs should have regard to the effect of an advertisement (including its illumination) on the appearance of the building or on visual amenity in the immediate neighbourhood.

The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 make it clear that light pollution must be considered when preparing environmental statements. Where such a statement is necessary in support of a planning application, the Regulations require that, in considering the effects on the environment, an estimate must be given of the expected residue from light and other emissions.

The Governments own advisory paper **'Lighting in the Countryside - Towards Good Practice'** (produced by the DOE/CC in 1997 but now administered by the Department for Communities and Local Government) is probably the most comprehensive study and guidance publication applicable to AONBs. It discusses the effects of lighting on people and the environment, reviews how to plan and assess a lighting scheme in the countryside, suggests how those involved with lighting provision should be made more aware of pollution issues and recommends that LPAs become more pro-active by including relevant policies in development plans and producing supplementary planning guidance.

The **Guidance Notes for the Reduction of Obtrusive Ligh**t by the Institution of Lighting Engineers (ILE) 2005 were initially produced in 1992 and have since been systematically updated. The latest version (2005) falls in line with the 2003 publication on the subject by the International Commission on Illumination (CIE), Publication No. 150 (see below). Within the UK the ILE Guidance Notes have been the first publication to specify different Environmental Zones ranging from National Parks and AONBs (E1) to Town/City centres (E4), with criteria for limiting the intensity of light and the amount of spillage upwards (skyglow) and outwards (light trespass) at both evening and night-times. This document has become widely used and is often referred to in planning applications (ref: Temple: March 2006).

Assessment of the Problem of Light Pollution from Security and Decorative Light is a report by Temple (assisted by NEP Lighting Consultancy) to the Department for Environment, Food and Rural Affairs (DEFRA) in March 2006. It surveyed Local Authorities on their knowledge of, and policies relating to, the control of obtrusive light and documented the known government planning legislation and guidance notes from interested organisations. Annexed to the report are a Model Lighting Policy Document for possible adoption by Local Planning Authorities, guidance for Environmental Health Officers and a suggested Public Information Leaflet.

Readers should refer to the above report for further references to UK guidance papers associated with light pollution. The principal ones are reproduced in Appendix G at the end of this report.

6.1.3 International Guidance

International Commission on Illumination (CIE) **Pub. No. 150:2003 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations** is currently the most comprehensive technical document on the effects of obtrusive light and how to control it, providing a methodology for calculating and measuring the effects and parameters to be employed. The latest version of the ILE's Guidance Notes (see above) is modelled on the CIE's Guide, which covers the following principal issues:

- Providing definitions for various forms of light pollution;
- Giving directions on the correct use of lighting fittings appropriate to the task;
- Setting categories for differing geographical situations ranging from city centres to remote landscape areas;
- Recommending acceptable limits to the various forms of light pollution dependent upon their geographical location and time of day (i.e. evening or later at night);
- Scheduling maximum values of glare that can be tolerated by drivers on differing classifications of road.

6.1.4 Examples of Local Authority good practice

An example of a Local Authority complying with good practice guidance is **Dacorum** Borough Council in Hertfordshire. **Policy 113** of its Plan, which was adopted in April 2004, is concerned solely with exterior lighting, with specific emphasis that there should be 'no significant (or material) adverse impact to either the amenity of residential areas, or the visual character and the natural and historic environment'. The Borough encompasses an AONB (Chiltern Hills) within its borders, and the Plan policy states that 'provision of new exterior lighting (within the AONB) will be minimised'. It goes on to give advice on the basis of the ILE's Guidance Notes (updated 2005), dividing the Borough into zones that correspond with the ILE's 4 Environmental Zones for different lighting categories. At the Local Plan Inquiry objections were raised to the application of the policy to sports floodlighting in the urban fringe, but the Inspector found in favour of the Council (except for minor re-phrasing) and the policy was retained in the Plan.

Doncaster Borough Council included the following policy in its Unitary Development Plan (adopted July 1998) **Policy ENV66** 'The Borough Council will seek to minimise light pollution. Details of any external lighting scheme required as part of any development should be submitted as part of the planning application. Applicants will be expected to demonstrate to the Local Planning Authority that the scheme proposed is the minimum needed for security and working purposes and that it minimises potential pollution from glare and spillage, particularly to residential and commercial areas, areas of nature conservation importance and areas whose open and remote landscape qualities would be affected.'

The Dacorum policy is more robust insofar as the use of the wording 'no significant (or material) adverse impact' suggests no pollution will be permitted, whilst Doncaster's requirement 'that (the proposed scheme) minimises potential pollution' accepts that a certain level is allowable. Further, by Dacorum providing a means of measurement through the use of the ILE guidelines, applicants can be clear as to what will be acceptable and can design their lighting scheme accordingly.

A similar policy and set of guidelines to that by Dacorum Borough Council has been produced by **South Northamptonshire** Council, in the form of Supplementary Planning Guidance (SPG). In layman terms it explains the potential for the various kinds of pollution from light fittings and, with the help of diagrams, sets out how to plan to avoid them. It gives the ILE and other organisations as useful contacts, but does not appear to advocate the application of ILE's methodology for measuring and controlling potential pollution levels.

6.1.5 Protocol of Neighbouring South Devon AONB

Part of the **South Devon AONB's** Protocol requires that the Local Planning Authorities will 'consider adopting relevant sections of the AONB Management Plan as Supplementary Guidance'. Whilst this is a laudable aim, in respect of controlling light pollution it is likely to have little effect, as the said Management Plan only contains passing reference to the reduction in light pollution in its Policy P/PD6, which is to do with securing improvements to the visual impact of past developments.

6.1.6 Existing Local Authority Policies & Guidance Covering the AONB

The greater part of the Cranborne Chase and West Wiltshire Downs AONB falls within **Wiltshire County** and the corresponding Districts of **Salisbury** and **West Wiltshire**. Wiltshire C.C. presently has no published policy or guidance specific to light pollution, but where issues arise officers may refer to the ILE's Guidance. Salisbury D.C. only mentions that 'light intrusion' is to be avoided along with other pollution under the general policy (G2) covering new developments, whereas West Wiltshire District Council has a fairly robust policy and refers potential developers to it. In particular it claims there must be no adverse impact on Areas of Outstanding Natural Beauty and then states that the Council will have regard to the governments publication 'Lighting in the countryside: towards good practice' (See Appendix F).

Dorset County covers almost a third of the land area of the AONB. The Authority publishes its Lighting Policy on its web-site (see Appendix C), and has a lighting team well-informed on the issues of Light Pollution. The Policy is based upon the ILE guidelines and is required to be applied to all the Council's own lighting installations and those by private developers with schemes that are to be put forward for adoption by (i.e. maintained as public highway by) the Council. In conjunction with this Policy, the Street Lighting Section 38 Specification as included in the County Council's own Highway Guidance For Estate Roads sets out the detailed requirements for developers to meet the standards of this Policy. Dorset C.C. has offered its expertise to all its District Councils, but only **North Dorset** has taken up this offer. North Dorset D.C. has included a policy on Lighting Standards within its local plan; on its own the Policy is a little less definitive for AONBs than that of West Wiltshire, but if the advice of Dorset County is taken-up by the District's officers and followed, the combined policies should be at least as effective when applied to proposed developments within the AONB (please refer to Appendix D for clarification). **East Dorset** District Council has not taken up Dorset C.C.'s offer of advice but has published its own basic policy on lighting, which advocates the minimising of both provision and of light spill. To its credit it does emphasise the need to safeguard the particular character of the AONB, and points developers to the ILE Guidance Notes.

Hampshire County, in the south-east sector of the AONB, publishes a Street Lighting Policy that is based on the ILE Guidance Notes but states that the Notes 'are not to be taken as absolute definitions due to differences in interpretation by different sections of society'. With such a

caveat included, difficulties are likely to arise for Council Officers in their attempts to enforce the policy. The Council also has a comprehensive set of sustainability policy fact sheets; the one prepared for street lighting is given in Appendix B.

6.1.7 Effectiveness of Legislation and Guidance

By reviewing the available guidance notes and advisory papers it would appear that there exists a framework of comprehensive advice and guidance to provide Development Control Officers and Forward Planners with the information necessary for them to ensure that developers keep light pollution to a minimum within their respective Authorities, and to give Environmental Health Officers (EHOs) powers to deal with existing lighting that is judged to be causing a nuisance.

However, in practice many LPAs are not familiar with the principal guidelines of the Government or the ILE, and have not produced specific policies or supplementary planning documents on lighting pollution to advise developers on what is, or is not, acceptable. Temple (March 06) sent a questionnaire to 360 Environmental Health Officers throughout England and Wales and found that, of 73 replies received, only half were aware of the ILE guidelines and only 15% had heard of the Government's *'Lighting in the Countryside'* document. Moreover, only 32% of the Councils had published any policies or guidance on the issue. A survey by CPRE produced similar results: the Campaign submitted a paper to the House of Commons Science and Technology Committee in April 2003, explaining that only 39% of District and Unitary Councils in England had specific light pollution policies in their plans.

Furthermore, even where Council's have adopted guidelines or installed policies within their Local Plans in respect of light pollution control, it falls to the Planning case officer to refer prospective developers to the guidelines and then to enforce the policies; as light pollution is not considered to be such an important issue as other development control matters, lack of time and resources can lead to it being forgotten or ignored by any number of professionals covering the various disciplines in the design and control process. For example, Planners and Landscape Architects can be accused of being so intent on ensuring that the daytime aesthetics of a light column are suitable for its setting, that light efficiency and pollution effects are not considered.

A problem also exists in the split of responsibilities and associated expertise between the counties and the districts. Generally, standards for highway lighting are the responsibility of the County Councils, whilst both the control of development and pollution, including light pollution, falls to the Districts. The County Councils hold the greatest expertise in highway lighting design, whilst the Districts rely upon their in-house Planners or Environmental Health Officers to give advice and guidance on external lighting, practitioners who are often not skilled or sufficiently informed on lighting design and technology or the best ways of achieving pollution reduction and prevention.

6.1.8 Response of Lighting Industry to the Pollution Issue

Whilst there remains the absence of direct legislation on the design and manufacture of lights in respect of energy efficiency and pollution control, many of the major players in the lighting industry have responded in some form to the recognition that light pollution is becoming more and more of a problem as population levels increase along with the volume of associated lighting needs. However, it would appear by discussion with company representatives that some firms are more reactionary than they are proactive in their pursuance of pollution-reducing designs and in the range of fittings and accessories that they offer to the specifier.

Historically, Lighting Engineers/Designers have sought to produce lighting schemes that meet the standards for safety and aesthetics, without necessarily being the most energy- or pollution-efficient. Independent consultants, particularly when designing decorative schemes for corporate clients, may even include more fittings than is necessary for safety & security in order to create a variety of visual effects, whilst issues of pollution are of low priority or ignored altogether. Because of this, most manufacturers have favoured aesthetics over energy and pollution efficiency in their design development process. However, now that these issues have become so high on political agendas, clients have become more aware of them, and specifiers are being trained to take account of them; so it is becoming expedient for manufacturers and suppliers to direct more resources towards the research and development of types of lamps (i.e. bulbs) and luminaries (light-fittings) that are energy-saving and pollution-efficient.

In choosing a particular type of lamp, one of the fundamental issues for specifiers has been the well-established tradition of referring to the power of a light source not by its output – as would seem logical – but by its electrical input. As lamp technology has developed this has resulted in lamps being sold with widely differing light output, for example 1,350 lumens and 9,000 lumens both rated at 100 watts. Whilst the lamp industry has now started to give output values against some of their lamps within their catalogues or on their packaging, this information is not always readily available and specifiers become confused.

One sure means of restricting the escalation of skyglow is for specifiers to choose luminaires that are Dark Sky compliant, i.e. throw little or no light upwards. To achieve this, the lamp must be recessed and the luminaire have a full horizontal cut-off, giving an Upward Light Ratio (ULR) of no more than 3%, measured above the horizontal. Again, however, specifiers are kept in the dark by some suppliers who do not clearly display the ULR value of their products in their promotional literature. Where ULR values are given, it is usually by Lighting Wholesalers who can offer a good range of Dark Sky compliant products.

To prevent glare, guidelines indicate that the light source should be directed at an angle of no more than 70 degrees to the potential recipient, but many luminaries, particularly older-style floodlights and spotlamps, are not sufficiently directional or are already fitted incorrectly; in which case practice has been to react to complaints about glare or light trespass from a fixed light source by appending shields to screen the offending light. Today there are many more purpose-made luminaries and accessories that are designed with integral means of attenuating glare or reducing light-spill. Below is a list of a few examples:

- Coated or frosted lamps to give a softer light;
- Flat-glass optics, rather than convex lenses or polycarbonate bowls that spill light sideways or upwards;
- Baffles internal to the luminaire, designed to reflect light back into the intended beam area;
- Cowls or hoods to surround the lamp and prevent the spread of light;
- Shields purpose-fitted to the frame to act as screens;
- Louvres to surround or cover the lens (e.g. on bollards).

One of the main arguments for not choosing to specify pollution-reducing luminaries is that they tend to be less efficient in lighting their intended target, the light from each luminaire covering a smaller area, leading to the need for more fittings to be employed, with consequential higher energy usage and cost. A balance, therefore, needs to be struck by the designer between energy efficiency and pollution control. In situations where pollution reduction is paramount, such as within an AONB, it may be desirable to use a larger number of lower-power or more directional light fittings that are well shielded, than a few wider-spreading high-power luminaries. Unfortunately, in many cases the cause of cost-effectiveness and energy-efficiency may over-ride that of pollution reduction.

In a brief survey of Lighting Manufacturers and Suppliers, one firm purported to be set on a mission of meeting new energy efficient targets that would give them tax breaks (Enhanced Capital Allowances - ECAs), if they could demonstrate that their products were significantly improved in saving electricity. ECAs are a straightforward way for a business to improve its cash flow through accelerated tax relief. The ECA scheme for energy-saving technologies encourages businesses to invest in energy-saving plant or machinery specified on the Energy Technology List (ETL) which is managed by the Carbon Trust on behalf of Government. Such tax advantages are clear incentives for lighting manufacturers to research into the production of energy-efficient equipment and for suppliers to promote and trade them. Unfortunately there appears to be no similar incentive for the industry to improve on pollution efficiency, although there is the argument that there will be less polluting greenhouse gases if there is reduced energy consumption.

In the above survey it was found that some external lighting suppliers provide a design service, and at least one of these firms offers a full Environmental Impact Assessment (EIA), guiding the client through the legislative planning process for new large-scale applications, with the claim that their company's products are more environmentally friendly and meet the best standards of pollution control. This same supplier also has a published policy statement on light pollution, something other manufacturers and suppliers claimed to have, but failed to produce.

In the absence of monetary advantages, it is hoped that as Lighting Engineers and Local Authority Planning Officers become more aware of the pollution issue and steer specifiers to choose the designs of manufacturers that are more pollution efficient, so more companies in the Lighting Industry will improve their range of pollution-efficient products.

7. Conclusions and Recommendations

The control of light pollution on any given development should in practice be straightforward, by first determining whether there is the need for the illumination, and then ensuring that the luminaries employed are fit for purpose, correctly angled and shielded against light overspill.

However, whilst glare, light trespass and a high proportion of skyglow can be overcome by correct alignment and shielding of the light source, scenic intrusion is not so easily dealt with, as the very presence of strong light within a dark landscape can be intrusive; and the highlighting of a scene such as a road junction or a modern structure can be distracting to the viewer and damaging to the character of a sensitive area such as the AONB's. It is for this reason that endeavours should be made to keep the remote areas of the Cranborne Chase and West Wiltshire AONB free from light as far as possible, and to restrict the extent and intensity of light throughout the region's small towns and villages to a level proportionate to their size and population whilst respecting their heritage and cultural associations.

In order to address the immediate problems from light pollution sources identified locally within the AONB, some of which are recorded in Chapter 5 above, it would be advisable that the AONB Management make representation to the respective District Authorities and request that their Environmental Health Officers investigate the problems and determine the appropriate action to be taken, applying the Clean Neighbourhoods and Environment Act 2005 where appropriate. In the case of offensive highway lighting, the Highway Authority should be approached and asked to consider installing shields or replacing fittings.

In dealing with other possible sources of light pollution, the Local Authorities might be asked to survey the AONB for other lighting installations that could be considered to be inefficient and a pollution source. Alternatively, those living and working within the AONB might be best placed to find and report on these sources, conveying their findings to the AONB Management in response to information leaflets, questionnaires or articles on the AONB web-site.

In many situations it may be advantageous in pursuit of pollution reduction to guide lighting engineers/specifiers to design for a greater number of lower-power, more directional light fittings that are well shielded, than a few wider-spreading high-power luminaires; and in some situations an alternative to normal lighting may be more appropriate. For example, The Highways Agency is carrying out a trial on the A303 east of Mere employing 'intelligent light studs' in lieu of conventional roadside lighting columns. These emit sufficient artificial light when natural light is unavailable, and yet are of very low power consumption. They may prove to be an effective alternative to standard highway lighting in situations where high light levels are not required.

In respect of skyglow, if the ILE's guidance notes are being applied correctly within the bounds of the AONB, so that full horizontal cut-off luminaries are employed, there should be virtually no skyglow pollution resulting from any new developments inside the AONB borders. However, as has been demonstrated above, skyglow from towns covers wide expanses of sky, and that radiating from the larger towns on the AONB borders can be seen from within the AONB with consequential adverse impact.

Similarly, the lit-up towns themselves can be viewed from some higher vantage points in the AONB, affecting the AONB's qualities of tranquillity, remoteness and historical associations.

The Cranborne Chase and West Wiltshire Downs AONB Management Plan states that 'Where visible from the AONB, the surrounding landscape, which is often of significant landscape value, is an important element of the AONB's natural beauty. Relevant local planning authorities must have regard to the landscape and visual impact of major development adjacent to or within close proximity of the AONB's boundary.'

It is therefore important that there is dialogue between AONB's management unit and the Local Authorities in which these towns are located, for the purpose of keeping any urban-based light pollution that might affect the AONB, down to a minimum. (The Partnership Panel may be a suitable Forum in which to discuss such issues.)

Whilst skyglow, glare and light trespass from the offending towns can be mitigated by the application of more stringent controls within the settlements, such controls will not greatly reduce the effects of scenic intrusion, because light from homes and offices and that reflecting from buildings and roads will still be visible, continuing to adversely effect the wilderness quality of the AONB. To help overcome this, consideration may be given to introducing tree-planting belts along the borders of the AONB at the extremity of affected views, to help screen-out the artificial light of nearby towns. Such planting belts, however, would need to contain an understorey and be deep enough to be effective in filtering-out the light, particularly in winter, as light can easily pass through stands of trees that are only a few rows deep. Similar woodland screen planting may also be helpful in the visual containment of light emanating from military camps and highway junctions. However, a careful balance would have to be taken to ensure that removal of the light intrusion was not achieved at the expense of daytime scenic beauty or with adverse impact on the landscape character as a whole.

Some of the District Authorities covering the AONB do not have robust policies or clear guidance on light pollution. It may be appropriate for the AONB unit to impress upon these Authorities the need to incorporate policies such as West Wiltshire's District Plan Policy C35 (see Appendix F) in their Local Development Frameworks, and to provide technical guidance in the form of Supplementary Planning Documents to assist developers in lighting design. Such guidance would do well to follow that prepared by Dorset County Council entitled 'Street Lighting and Illuminated Sign Maintenance' (see Appendix C)

The AONB management group may also wish to encourage local District Councils' Planning and Environmental Health Departments to use Dorset's Street Lighting Team (or other lighting specialist) to check-over any planning applications in the AONB involving lighting, to give advice on lamp and luminaire type and to calculate that the emissions will fall within the guideline parameters.

Training could be offered to all planning officers, designers, Environmental Health Officers and highway engineers of the relevant Local Authorities to ensure that they are not ignorant of the facts in respect of light pollution cause and effects in the AONB.

In respect of existing light fixtures that are within the bounds of the AONB and are causing skyglow or scenic intrusion, there appears to be little that can be done in the way of legal enforcement to screen, shield or remove them. Unless or until more specific and robust extensions are made to the Clean Neighbourhoods and Environment Act 2005 to cover such eventualities, Environmental Health Officers, together with the backing of environmental bodies and local interest/pressure groups, will have to continue their crusade of gentle persuasion.

To assist in such persuasion it would be useful to provide Local Authority officers with informative literature and leaflets that can be handed-out by them to the general public,

explaining the issues of light pollution and remedies to alleviate the problems, with particular reference to the AONB. These explanations and suggestions would be most effective if placed within the same publicity material alongside arguments for energy sustainability and cost efficiency.

7.1 Summary

In summary, in pursuance of light pollution reduction/mitigation in, and within the vicinity of, the AONB, it is recommended that:

- The design for any proposed lighting installation be checked at the planning stage by experts at the relevant Local Authority for optimum design to ensure pollution reduction efficiency. Designs found to fail the check should not be permitted, or be altered to comply. Such design checks should be applied to Highway Authority and Council's own schemes, as well as to those of any independent developer or private landowner;
- Where a particular Authority is considering installing new or replacement lighting on a highway, the employment of alternative high-tech low-energy fittings should be investigated in the first instance;
- During the planning application process, only lighting essential to security or safety be granted permission, unless such lighting can be shown to cause no pollution in the form of skyglow, glare, light trespass or scenic intrusion as defined above;
- The AONB Management Unit produce information leaflets and web-site articles to make local businesses and home-owners aware of light pollution issues and to direct them towards good practice;
- The AONB Management Unit produce leaflets and/or questionnaires and web-site articles for tourists and those living or working in the AONB to register their concerns on light pollution and to report particular problem areas and offending installations;
- The AONB Management Unit lobby the District Authorities local to the AONB, particularly those Authorities dilatory in dealing with incidences of light pollution, to investigate existent installations that cause pollution and to take appropriate action in exercise of their powers under the Clean Neighbourhoods and Environment Act 2005;
- Dialogue be initiated by the AONB Management Unit with the District Authorities local to the AONB for the purpose of keeping any urban-based pollution affecting the AONB, such as that of skyglow from the larger towns, down to a minimum;
- Consideration be given to the planting of deep woodland belts to screen any lighting that is deemed to cause unacceptable levels of scenic intrusion and yet cannot be dealt with at source, as long as such woodland can be accommodated without adverse effect on the landscape;
- The AONB Management Unit press the District Authorities local to the AONB to send their officers, responsible for the provision of lighting, the control of development and the safeguarding of the environment, on training courses relevant to the reduction of light pollution within their districts.

7.2 The Future

Whilst it is clear that there is still much ignorance amongst some local authorities and lighting practitioners regarding light pollution issues, it is encouraging to note that a few of the Local Plans do contain specific control policies that will have the affect of keeping pollution levels down within the AONB in the future. Furthermore, with the application of the Clean Neighbourhoods and Environment Act 2005, District Environmental Health Officers will now be in a better position to deal with existing private lighting installations that cause a nuisance to others. The test as to the range of effectiveness of this Act will come when a case of scenic intrusion is argued against the owner of an over-powerful or poorly-screened light in one of the more remote areas of the AONB. It is probable that the Act will require amendment to cope with such a case – the AONB Management may need to lobby parliament accordingly.

The satellite images suggest that between 1993 and 2000 the extent of truly dark skies within the AONB had actually increased over the more remote areas, whilst in 2000 there were more areas showing increased light-emission levels in the vicinity of centres of population or development. To verify this observation, more detailed on-site data collection and analysis is necessary; but it will indeed be interesting to see if these trends are continuing should a similar satellite image become available in 2007.

Nevertheless, with more of the AONB District and County Councils achieving greater awareness of light pollution issues through education and training and by following the lead of the more-informed authorities, each formulating their own framework of design guidelines and controls, it is hoped that the coming decade will see the extent of light pollution effecting the AONB being reduced.

8. Draft Position Statement

For inclusion within the Cranborne Chase and West Wiltshire Downs AONB Management Plan, a Position Statement on acceptable sustainable external lighting could read as follows:

'**Because the Cranborne Chase and West Wiltshire Downs Area of Outstanding Natural Beauty derives much of its beauty from its qualities of tranquillity, remoteness and cultural heritage, it is not considered appropriate that there should be any artificial external lighting within its borders that is not muted and screened and the minimum required. To accord with this aim, no external lights should be erected or installed in, or within the setting of, the AONB unless:**

(a) They can be proven 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 and outward spillage;

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

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

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

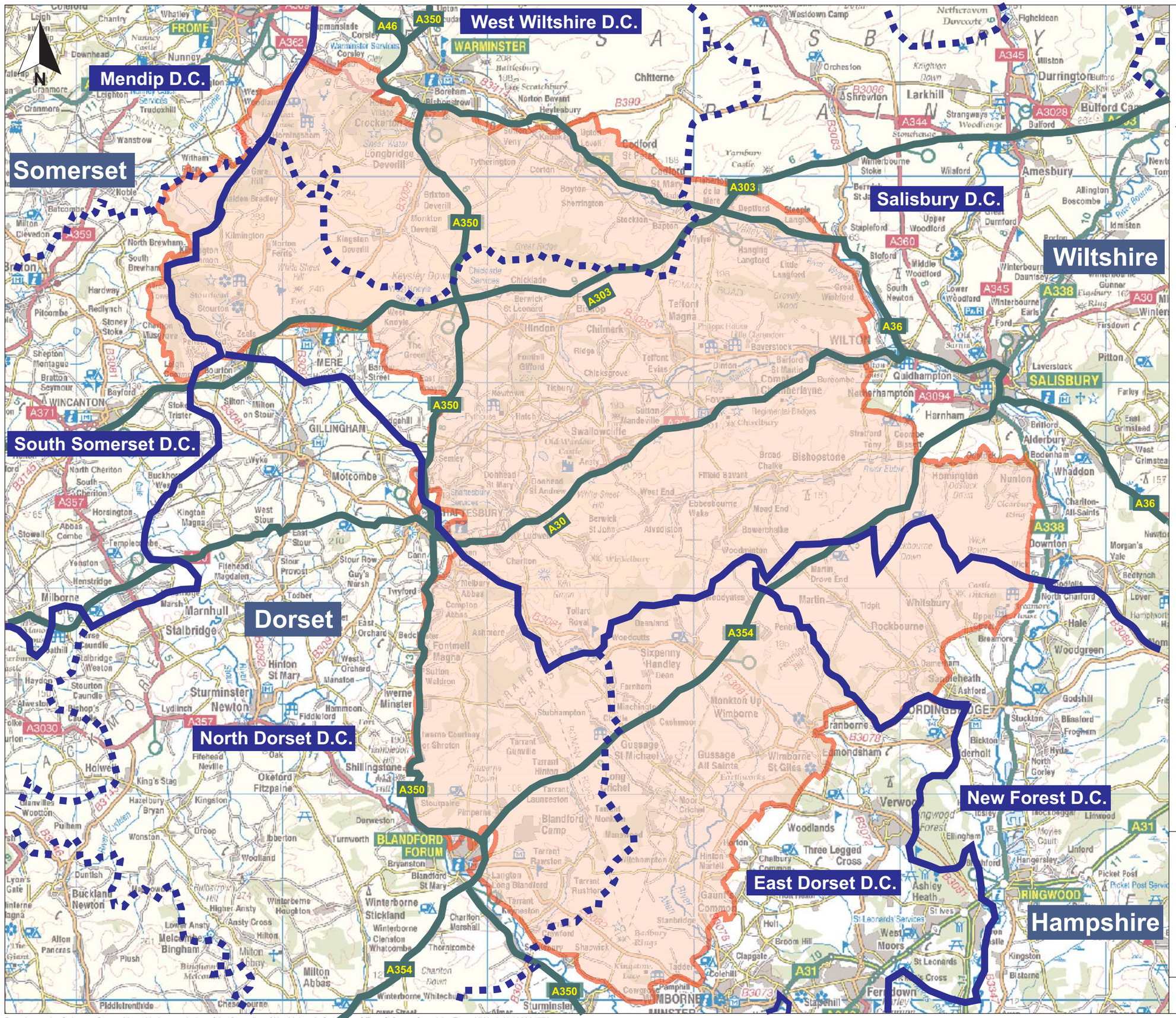
Where existing lights are considered by the AONB Management Board to be having an adverse effect on the character of the AONB, such lights should be removed unless they are modified to meet the above requirements.

By keeping external lighting within the above parameters, it will ensure that the AONB's environment will not be spoilt by intrusive light but will remain an attractive area during both daylight hours and after dark.'

Such a statement would be equally applicable to Local Authorities proposing installations such as highway junction lighting, to private developers, and to individuals wishing to add security lights to their properties in, and within the setting of, the AONB.

Appendix A
Figures

3 Pages



Key

- Area of Outstanding Natural Beauty
- Strategic highway
- District boundaries
- County boundaries

0 km — 1 km

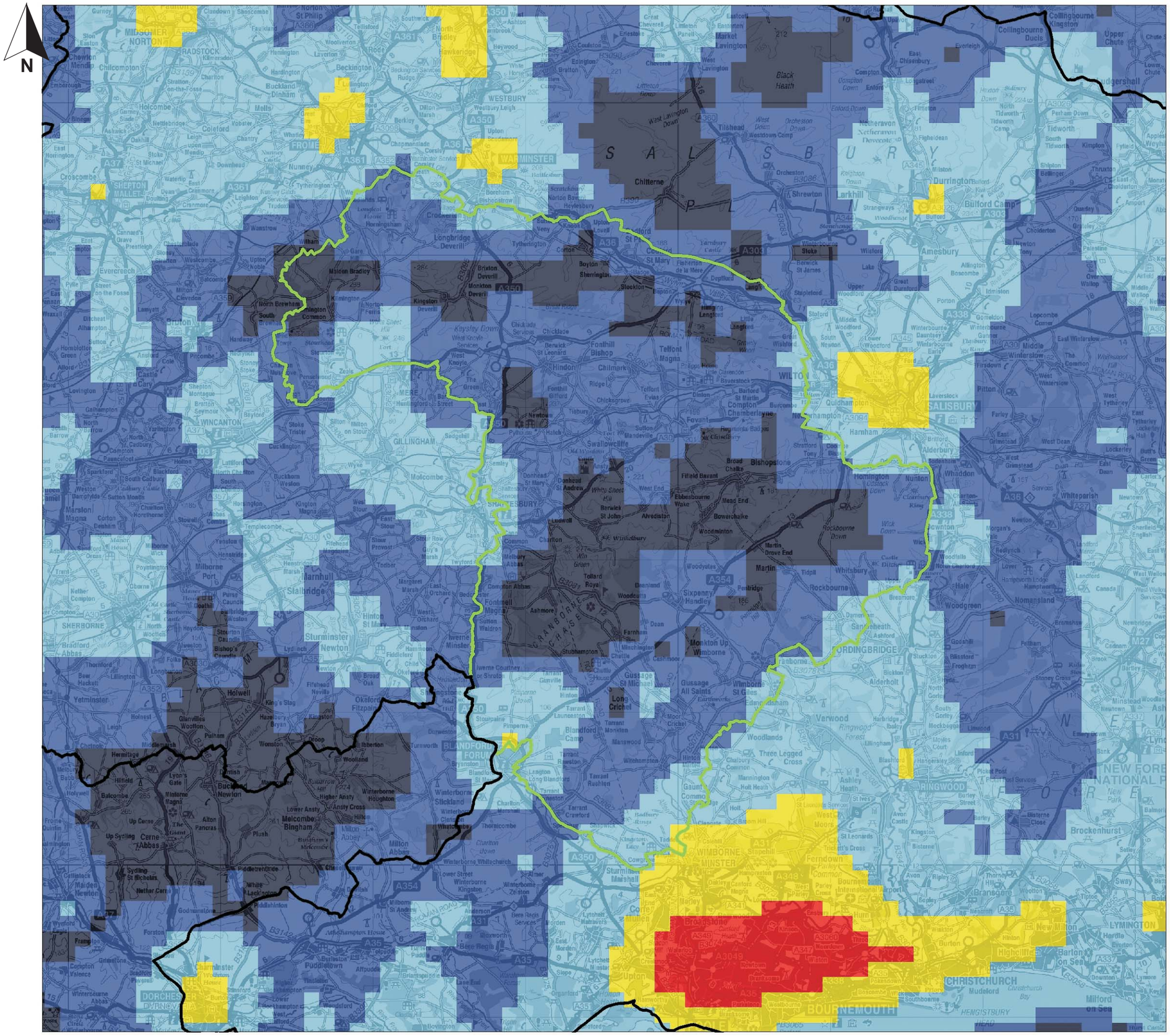
Not to scale

Cranborne Chase and West Wiltshire Downs AONB
Follow up Planning Issues 2005/2006

Figure 1
Site Location and Strategic Highway Network

February 2006
17566-L01.cdr bernb

Entec



Light Pollution 1993 Cranbourne Chase & West Wiltshire Downs

Key

Value

- 0 - 1.7
- 1.7 - 50
- 50 - 150
- 150 - 240
- 240 - 255
- Cranbourne Chase and West Willtshire Downs AONB
- Other AONB boundary

CPRE/LUC nighttime satellite imagery. Data obtained and manipulated/analysed by and on behalf of CPRE by Land Use Consultants and Nigel Press Associates.

Satellite images from:
NOAA-NESDIS National Geophysical Data Center

This map is a colour representation of satellite measurements of artificial light and was created from pixels representing a square kilometre. Light has been measured against a range of 0 to 255 where 0 means the satellite detected no light and 255 means the satellites detector was saturated with light.

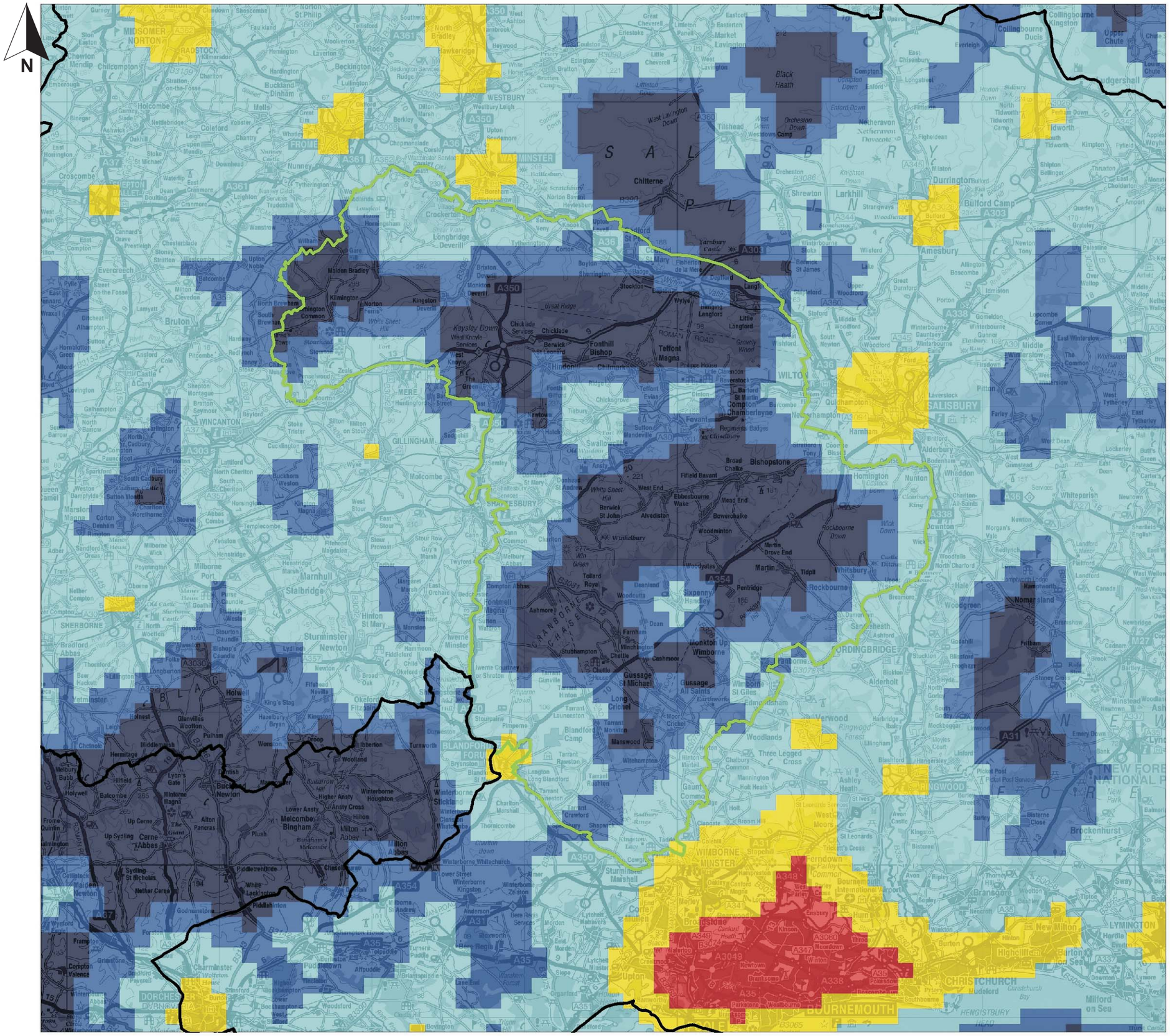
0 km — 10 km

Cranbourne Chase and West Wiltshire Downs AONB

Figure 2
Night-time Satellite Images (1993)

November 2006
17566-L06.cdr bernb

Entec



Light Pollution 2000 Cranbourne Chase & West Wiltshire Downs

Key

Value

■ 0 - 1.7

🟦 1.7 - 50

▨ 50 - 150

🟨 150 - 240

🟥 240 - 255

🟩 Cranbourne Chase and West Wiltshire Downs AONB

□ Other AONB boundary

CPRE/LUC nighttime satellite imagery. Data obtained and manipulated/analysed by and on behalf of CPRE by Land Use Consultants and Nigel Press Associates.

Satellite images from:
NOAA-NESDIS National Geophysical Data Center

This map is a colour representation of satellite measurements of artificial light and was created from pixels representing a square kilometre. Light has been measured against a range of 0 to 255 where 0 means the satellite detected no light and 255 means the satellites detector was saturated with light.

0 km 10 km

Cranbourne Chase and West Wiltshire Downs AONB

Figure 3
Night-time Satellite Images (2000)

November 2006
17566-L07.cdr bernb

Entec

Appendix B
Hampshire CC's Lighting Policy - Environmental Statement

1 Page

Environment and Agenda 21

The County Council is committed to providing a sustainable environment for the residents of Hampshire. From a street lighting point of view this means:

i) Reducing to a minimum the need for illumination wherever possible to minimise energy generation and the production of greenhouse gases by direct and indirect action.

ii) Ensuring that all new and replacement lighting is sustainable development.

iii) Specifying materials which are designed and manufactured to high quality standards.

iv) Utilising the most energy efficient equipment by taking advantage of all technological advances in the fields of electronics and communications.

v) Ensuring that all contractors involved in street lighting shall send all waste for recycling through established or experimental means to ensure the reuse of all materials in any format possible.

vi) Using recycled materials wherever possible, e.g. traffic sign faces, as well as ensuring that all materials purchased are recyclable.

vii) Taking care to provide unobtrusive lights wherever possible. However, residential properties in an urban area may experience some light trespass. The general principle would be to minimise the intrusion where possible but at the same time to recognise the technical limitations that may make such shielding impracticable.

viii) Progressing energy purchase from renewable sources wherever possible accepting that in doing so the premium payment will support this fledgling industry.

Appendix C
Dorset CC's Street Lighting Policy

4 Pages

Following are the clauses relevant to light pollution copied from the above document:

Street Lighting and Illuminated Sign Maintenance

7.1. Definitions
This Policy sets out the requirements and standards for all external public lighting as adopted by the County Council. It is written in order to assist the County Council meet its Corporate Aims.

7.2. Street Lighting Policy Summary
Within the County Council there are 39,460 streetlights, illuminated signs, bollards and beacons (at April 2003). With a minimum average replacement cost of £656 for a single unit, the asset value of the lighting stock is in excess of £25.9 million. Due to this high value and the need to keep units safe it is important that the lighting stock is well maintained. The total number of lighting columns by type is shown in Figure 7.2 of the Appendix Document.

The aim of this Policy is to assist in ensuring that the following Street Lighting Objectives are met:

1. To Minimise the adverse effect on the environment whilst still enhancing the night-time ambience.
2. To improve the night-time safety of road users and members of the community.
3. To reduce crime and the fear of crime during the hours of darkness.
4. To provide public lighting that is cost effective, taking into account energy conservation and sustainability.
5. To maintain the lighting asset so as to prevent premature structural failures

In conjunction with this Policy, the Street Lighting Section 38 Specification as included in the County Council's own Highway Guidance for Estate Roads sets out the detailed requirements for developers to meet the standards of this Policy. In addition a model contract document also exists for highway improvement schemes promoted by the County Council.

This Document is also in accord with the following general legislation and more specific street lighting industry standards:

- Highways Act 1980;
- Goods and Services Act;
- The Local Government Contract Act;
- The Management of Health and Safety at Work Regulations 1982;

- Electricity at Work Regulations 1989;
- Traffic Signs Regulations and General Directions 1991;
- Disabled Persons Act 1981;
- Road Hump Regulations 1990;
- New Roads and Street Works Act 1991;
- BS 7671: Regulations for Electrical Installations 1992;
- BS 5489: Parts 1 - 10,'Code of Practice for Road Lighting';
- BS EN 60529: Specification for Clarification of Degrees of Protection provided by Enclosures;
- BS EN 605589-2-3: 1994 Luminaires for Road and Street Lighting;
- BS 5649: Lighting Columns;
- •BS EN 40:Lighting columns1992;
- •Department of Environment Transport and Regions Departmental;
- Standard BD26/94 - Design of Lighting Columns.

7.3. Environmental Factors

There are a number of environmental factors that need to be considered when contemplating installing exterior lighting schemes. Firstly, is there a real need to install lighting at all? If so, then the energy usage, visual impact of the equipment and light pollution have to be taken into consideration. An environmental zoning system is used across Dorset to define standard and type of light to be used.

Zone 1 World Heritage site, Areas of Outstanding Natural Beauty, Sites of Special Scientific Importance and other Dark Areas e.g.: areas that currently have very low population densities and with none or intermittent lighting. Villages and settlements within this zone will generally only be provided with lighting when it is requested and funded by the Town or Parish Council with support from the residents and interest groups. Such lighting will be limited to strategic locations such as telephone boxes, bus stops etc. Lighting will generally only be installed outside of villages and settlements where there is a night-time safety issue that cannot be solved by other means. Careful design will ensure that rural locations are not urbanised by the provision of an unsuitable lighting scheme. Luminaires should be well controlled and restrict the upward light ratio to 0%. Consideration may also be given to part night operation in appropriate cases.

Zone 2 Areas of Low District Brightness (Rural locations outside Zone 1) E.g.: areas that have low/medium population densities and some roads already lit. Villages and settlements within this zone will generally be provided with lighting in accordance with the relevant minimum standard applicable to the type and use of the highway. Roads between villages and settlements in this zone will generally only be provided with lighting where there is a known safety issue during the hours of darkness that cannot be solved by other means. Luminaires should be well controlled and restrict the upward light ratio to 0%.

Zone 3 Areas of Medium District Brightness (Urban Location) e.g.: areas that have medium/high population densities and most roads should already be lit to an acceptable standard. Generally within an urban location all highways will be lit in accordance with the relevant standard applicable to the type and category of the highway. In special environmental interest, dark landscape and ecologically sensitive areas such as parks and woodlands, individual assessments will be carried out. Luminaires should normally be well controlled and restrict the upward light ratio to a maximum of 2.5%.

Zone 4 Areas of High Brightness (Urban centres with high usage during the hours of darkness) e.g.: areas that have high population densities and all roads should be lit to a current lighting standard. In urban centres with high vehicle or pedestrian use during hours of darkness, carefully designed lighting will not only provide adequate illumination for the motorist but also provide an interesting and attractive ambience for people to enjoy themselves. Luminaires should normally be well controlled and restrict the upward light ratio to a maximum of 15%, whilst also allowing illumination of building facades. The Term Maintenance Contractor's environmental management system ensures that sufficiently sustainable methods are used in the supply, storage, distribution and disposal of equipment and resources. County Council progression towards ISO 14001 accreditation will also help to reinforce sustainable street lighting related activity into the long-term.

7.4 Light Sources

The type of light source has a significant effect on the night-time scene due to the different colour appearances produced. The following types are used in Dorset dependant upon the environment to be lit.

a) SOX - low-pressure sodium Low running cost. Monochromatic yellow orange colour providing poorcolour rendering. Installation of new SOX lighting will be restricted to areas of ecological importance. English Nature recommends using full cut off SOX luminaires to reduce the effect on plant, insects and animals.

b) SON - high-pressure sodium Low running cost. Golden yellow colour providing average colour rendering. The most commonly used light source in Dorset. SON luminaires have better optics than SOX luminaires, allowing greater control of the light and reducing light pollution.

c) White SON - high-pressure sodium Medium running cost. Warm white colour providing excellent colour rendering. An ideal light source for areas where good colour rendering adds to the night-time ambience - town centres, especially those fitted with CCTV.

d) CDM-T - ceramic discharge metal halideMedium running cost. White light providing excellent colour rendering. An ideal light where colour rendering is the main priority, which can also provide a means of highlighting objects and areas such as pedestrian crossings.

e) PL - compact fluorescent lamp Low running cost. White light providing good colour rendering. Only available in low wattages and, therefore, ideal for use where low levels of illumination are required, e.g. housing estates. New luminaires are now being manufactured to meet the proposed CEN codes. Obtrusive light is light which falls outside of the area to be illuminated and causes annoyance,

discomfort and distraction to the public and, in extreme cases, reduces the ability to see. Obtrusive light can be divided into three categories:

a) Skyglow - caused by poorly designed luminaires emitting light upwards or at high angles of elevation. This light is then scattered by dust particles and water droplets resulting in the familiar orange glow above urban areas. Solution - Use of full cut-off luminaires with an upward light ratio of 0%.

b) Glare - An intense blinding light, usually seen against a dark background, which reduces a person's visual performance. Poorly designed, installed and maintained lighting can cause glare that affects the vision of pedestrians, cyclists and drivers, creating a hazard rather than increasing safety. Solution - properly designed and maintained lighting schemes.

c) Light Trespass - light that falls where it is not needed or wanted. Light shining into bedrooms hinders sleep and reduces privacy. Solution - good scheme design and the use of correct luminaires.

Appendix D
North Dorset District Council's Local Plan Policy: Lighting Standards

1 Page

Lighting Standards

1.80 The external lighting of new development areas has been the subject of increasing concern for the following reasons;

- The detrimental affect on previously unlit rural areas (i.e. 'light pollution');
- The visual effect of tall lighting columns;
- Possible glare for highway users;
- The effect on wildlife habitats;
- High energy use.

There is a clear case for introducing the following policy to effectively control lighting schemes proposed as part of new development applications.

Policy 1.19

Lighting Standards

The external lighting of new development will only be approved in the following circumstances where:

(i) There is no detrimental effect on existing unlit rural areas;

(ii) The scale of lighting columns is in keeping with the character of an area;

(iii) Highway safety would not be adversely affected;

(iv) There would be no adverse effect on wildlife habitats;

(v) The lighting scheme proposed is the minimum required for security or working purposes;

(vi) Light spillage and glare is minimised;

(vii) Any necessary landscaping is included as screening.

Appendix E
East Dorset District Council's Local Plan Lighting Policy

2 Pages

Lighting

6.201. Outdoor lighting is beneficial for a number of purposes including:

- Safety of movement;
- Security of movement;
- Extension of working practices;
- Extension of sporting and leisure activities;
- Advertising of commercial enterprises;
- 'Bringing on' horticultural and farming produce; and
- Enhancing the amenity value of important buildings and settlements.

6.202. However, lighting can have significant environmental and amenity disbenefits. Lighting columns and associated generators and junction boxes can be visually intrusive. Poorly designed lighting can result in light spill leading to a loss of residential amenity. Light spill is also a sign of wasted energy. Light pollution of night skies can extend over wide areas. There is a concern that increased levels of outdoor lighting are also having detrimental effects on flora and fauna. Lighting also enables activities to take place through the evenings, which could result in problems of noise for nearby residents through, say, noisy sports and vehicle movements.

6.203. There is concern that additional lighting could have an adverse impact on the character of the countryside. In particular, the Cranborne Chase AONB is characterised by very low density scattered development, with little external lighting. It is important that this character is maintained. Detailed advice on the provision of external lighting is provided within the DETR publication 'Lighting in the Countryside'.

6.204. When considering external lighting, the Council will need to be satisfied that the scheme is the minimum required for security and working purposes and that light spill is minimised. Use of external lighting for sports facilities may be restricted in the hours of use by way of condition. Detailed advice on the provision of suitable lighting schemes can be gained from the Institute of Lighting Engineers 'Guidance Notes for the Reduction of Light Pollution'.

6.205. Policy LTDEV1 Proposals for development that require external lighting will need to demonstrate that;

a) The lighting is the minimum required for the specified use;

b) Light spill is minimised;

c) Lighting fixtures, including generators, columns and junction boxes are located to prevent visual intrusion. It is expected that applicants should submit lighting plots, and column and luminaire details to demonstrate that the scheme does not cause significant light spill. Conditions may be used to limit the hours of operation.

Appendix F
West Wiltshire Policy Against Light Pollution

1 Page

Light Pollution

C35 Proposals for development which include a lighting scheme will be permitted only where:

A The minimum amount of lighting necessary to achieve its purpose is proposed;

B Glare and light spillage from the site is minimised;

C There is no adverse impact on the amenity and safety of neighbouring uses and on transport users, including pedestrians;

D There is no adverse impact on the wider environment, in particular on conservation areas, Areas of Outstanding Natural Beauty and other rural landscapes.

2.4.25 Lighting provides positive benefits during darkness hours. In particular, it permits use of scarce sports and recreation resources for longer hours during the winter period and helps to achieve additional security and safety at night, particularly in the context of road users and pedestrians. It can also be used for aesthetic reasons, for example floodlighting at Longleat House.

2.4.26 However, the spillage of light into the environment from poorly designed lights can have a number of adverse effects. Floodlighting can harm the privacy of and be a nuisance to neighbouring residential areas. Dazzle and glare can also be a potential road hazard and can cause deep shadows, actually compromising safety and security around warehouses, car parks and other areas. Outside and adjacent to urban areas, lighting can cause 'skyglow', reducing the visibility of the stars in the night sky and reducing the feeling of remoteness in rural areas, which is an essential part of the character of many rural landscapes. Badly designed lighting is also inefficient in terms of energy consumption.

2.4.27 To ensure that future proposals which include lighting schemes do not have an adverse effect upon local amenity, highway safety and the surrounding environment, particularly within conservation areas and Areas of Outstanding Natural Beauty where the visual quality of the environment is of especial importance, proposals will be considered against the criteria in Policy C35. The Countryside Commission has produced a document entitled 'Lighting in the countryside : Towards good practice' and the District Council will have regard to this advice when considering future lighting schemes.

Appendix G
References (extracted from 'Assessment of the Problem of Light Pollution from Security and Decorative Light' by Temple)

2 Pages

Title	Author	Date
Guidance Notes for the Reduction of Obtrusive Light	Institution of Lighting Engineers (ILE).	1992; Latest Rev 2005
Road Lighting and the Environment	Department of Transport	1993
Lighten our Darkness	Royal Fine Arts Commission	1994
Lighting the Environment – A Guide to Good Urban Lighting.	Ch. Inst. Building Services Engineers (CIBSE) & Institution of Lighting Engineers (ILE).	1995
Lighting in the Countryside – *Towards Good Practice*	Department of Environment / Countryside Commission	1997
Light Pollution – SPG	South Northamptonshire Council	1998
Starry, Starry Night .	British Astronomical Association (BAA) & CPRE	2000
Domestic Security Lighting, Friend or Foe	Institution of Lighting Engineers	2001
Light Pollution – Responses and Remedies	Bob Mizon, Springer	2002
Low Energy Domestic Lighting	Energy Savings Trust	2002
Environmental Considerations for Exterior Lighting (Factfile no.7)	Ch. Inst. Building Services Engineers (CIBSE) Rev. 1	Oct 2003
Night Blight!	Campaign for the Protection of Rural England (CPRE)	2003
Light Pollution & Astronomy	H of C Science and Tech. Committee	2003
BS 5489-1:2003 Part 1; BS/EN 13201-2 Part 2; Pren 12464-2 Part 2	British Standards Institute	
Guidelines for Minimizing Urban Sky Glow nr. Astronomical Observatories	International Astronomical Union (IAU) Pub. No 1	1980
Guidelines for Minimising SkyGlow	Pub. No 126	1997
Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations	Pub. No 150	2003