

The Suffolk Coastal Local Plan

Supplementary Planning Guidance



11



Recreational Floodlighting

June 1995



EASTSUFFOLK
COUNCIL

On 1st April 2019, East Suffolk Council was created by parliamentary order, covering the former districts of Suffolk Coastal District Council and Waveney District Council. The Local Government (Boundary Changes) Regulations 2018 (part 7) state that any plans, schemes, statements or strategies prepared by the predecessor council should be treated as if it had been prepared and, if so required, published by the successor council. Therefore this document applies to the part of the East Suffolk Council area formerly covered by the Suffolk Coastal District until such time that it is replaced.

Following the reforms to the Planning system through the enactment of the Planning and Compulsory Purchase Act 2004 all Supplementary Planning Guidance's can only be kept for a maximum of three years. It is the District Council's intention to review each Supplementary Planning Guidance in this time and reproduce these publications as Supplementary Planning Documents which will support the policies to be found in the Local Development Framework which is to replace the existing Suffolk Coastal Local Plan First Alteration, February 2001.

Some Supplementary Planning Guidance dates back to the early 1990's and may no longer be appropriate as the site or issue may have been resolved so these documents will be phased out of the production and will not support the Local Development Framework. Those to be kept will be reviewed and republished in accordance with new guidelines for public consultation. A list of those to be kept can be found in the Suffolk Coastal Local Development Scheme December 2004.

Please be aware when reading this guidance that some of the Government organisations referred to no longer exist or do so under a different name. For example MAFF (Ministry for Agriculture, Fisheries and Food) is no longer in operation but all responsibilities and duties are now dealt with by DEFRA (Department for the Environment, Food and Rural Affairs). Another example may be the DETR (Department of Environment, Transport and Regions) whose responsibilities are now dealt with in part by the DCLG (Department of Communities & Local Government).

If you have any questions or concerns about the status of this Supplementary Planning Guidance please contact a member of the Local Plan team who will be able to assist you in the first instance.

We thank you for your patience and understanding as we feel it inappropriate to reproduce each document with the up to date Government organisations name as they change.

FOREWORD

Suffolk Coastal District Council has experienced an increasing number of proposals to floodlight recreational facilities, often in close proximity to residential properties, or in other sensitive locations.

While recognising the advantages that floodlighting can bring in making more effective use of recreational facilities the Council is also conscious that such proposals can have an adverse environmental impact.

The Supplementary Planning Guidance seeks to address the issue of floodlighting for recreational facilities and in due course it is hoped to produce similar guidance for other forms of floodlighting.

This guidance is based on the information currently available following consultation with a wide range of organisations and may be updated if new material becomes available which the District Council considers will be helpful.

It is intended to give those contemplating floodlighting schemes a clearer understanding of the planning issues involved and the factors which the District Council will take into account in determining planning proposals for such schemes.

The guidance also gives a brief background to the technical issues involved, but it cannot be stressed strongly enough that the design of floodlighting systems, particularly those intended for recreational facilities, requires considerable technical expertise. Reputable manufacturers and suppliers of such systems should be prepared to provide appropriate technical specifications to demonstrate that their product not only maintains the levels of illumination required for the intended use, but also does so with the minimum of visual intrusion or light pollution.

The document was originally published in June 1995 and has recently been updated in respect of policies and the names of organisations and departments.

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SUPPLEMENTARY PLANNING GUIDANCE RECREATIONAL FLOODLIGHTING

1.0 INTRODUCTION

- 1.1 This Supplementary Planning Guidance has been produced in order that those proposing to provide floodlighting for recreational sites may have a clearer understanding of the planning and technical issues involved.
- 1.2 It supplements planning policy relating to recreational use as set out in the Suffolk Coastal Local Plan (in particular Policy AP101) and sets out the criteria which will be taken into account when the District Council, as local planning authority, assesses and determines proposals for floodlit sports facilities. These criteria apply to both entirely new floodlit facilities and proposals to floodlight existing facilities which are often surrounded by other uses of land which could be adversely affected by inappropriately designed floodlighting installations.
- 1.3 The guidance also shows what an applicant will need to provide in terms of technical information in order that the District Council may have sufficient information to determine proposed floodlighting schemes. In order to provide this information, the applicant will almost certainly need to seek expert technical advice, but before doing so is advised to ascertain from the District Council whether his proposal can meet the basic planning criteria and is acceptable in principle.
- 1.4 Appendices to the guidance provide the Sports Council's recommendations on minimum maintained lighting requirements for outdoor sports facilities, potential contacts for further information and an explanation of some of the technical terms used in connection with floodlighting.

2.0 PLANNING POLICY

2.1 Neither National Planning Guidance, nor Structure and Local Plan policies properly address the issue of floodlighting recreational areas. Planning Policy Guidance Note No 17 on Sport and Recreation, produced by the Department of the Environment in September 1991 , simply states in paragraph 31 :

"The local planning authority should seek adequate information as a basis for making decisions on applications involving the installation of floodlights, It may be possible to grant permission subject to conditions, for example limiting the hours during which the lights may be switched on, or requiring the installation of some sort of shielding, In this way recreation can be encouraged wherever possible, and not stifled by lack of information about the effects of a particular development,"

2.2 The Planning Policy Guidance Note on Planning and Pollution Control (PPG23 of July 1994) simply points out in paragraph 2.18 that planning authorities should take account of, in preparing Local Plan policies:

"...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 on noise, dust vibration, light or heat..."

2.3 The Suffolk Coastal Local Plan does not contain specific policy guidance relating to floodlighting (except for golf driving ranges - Policy AP114) but it does, in those policies relating to all forms of development, including recreational development, require that proper account is taken of the impact of that development on the environment. Proposals are therefore judged against a number of criteria which include the impact on landscape, wildlife, residential amenity and highway safety .

2.4 Whilst light levels can now be accurately measured, light pollution does not, under current legislation, constitute a statutory nuisance on which the District Council can take action (bodies such as the Institution of Environmental Health Officers are however lobbying for legal controls). It must therefore ensure that conditions imposed on any planning consent for floodlighting provide an adequate level of control.

3.0 THE ISSUE

- 3.1 In recent years there has been an overall increase in many forms of floodlighting, ranging from individual householders installing security lights through to highway and footway lighting, the floodlighting of recreational facilities, civic lighting and major operational lighting.
- 3.2 In parallel with, and partly because of this increasing use of light, there has been an increasing public awareness of issues such as light pollution and energy conservation. These issues are inextricably linked in that any light which illuminates areas beyond those intended is a form of pollution which may also waste energy and incur the user in extra expense. This point is made quite strongly by such bodies as the Council for the Protection of Rural England and the British Astronomical Association. Light pollution and, in particular, a phenomenon known as "sky glow" is reducing the ability of people to see the natural night sky. It also seriously detracts from the rural character of the countryside and from a practical point of view also means that an increasing number of astronomical observatories, such as the Orwell Observatory at Nacton, cannot be used to their full extent.
- 3.3 This Supplementary Planning Guidance (SPG) seeks to provide guidance on one of the most pressing planning issues - the floodlighting of recreational facilities. The improvement of existing sporting facilities, which could be by providing floodlighting, or the provision of new floodlit facilities will normally be supported by the District Council. (Local Plan Policy LP81). The provision of floodlighting can have a number of benefits for sports facilities and their users by extending periods of usage and therefore offering greater choice and flexibility. This enables in many cases, better use to be made of expensive and specialist facilities and for those facilities to better meet the demand which clearly exists. However, proposals for such floodlighting are often controversial not only because of the level of light required for some sporting activities, but also because the location of the facility is often within a residential area or close to a public highway where the effects of intensive illumination may be incompatible with residential amenity or highway safety.
- 3.4 Increasingly, it is also the case that where a sports club becomes successful and is promoted to a higher league, it is a requirement that the Club's home ground must be equipped with floodlighting which would provide a specified level of illumination over the whole playing area. This also raises a separate, but related planning issue. The provision of floodlighting almost inevitably involves an intensification of use. There may, however, be a considerable difference in the environmental impact of the use which involves only those participating in or practising a particular sport and one which attracts a large number of spectators. It is, therefore, essential that the local planning authority is made aware of how a facility is to be used before they determine proposals.
- 3.5 The installation of floodlighting systems in a manner which provides an appropriate level of illumination over the playing area, with a sharp cut-off to avoid light spillage, requires a high level of technical expertise. Poorly designed systems may cause considerable inconvenience to neighbours and add to the overall level of light pollution. It may also be extremely expensive to modify a poorly designed and installed floodlighting system to achieve an acceptable performance.
- 3.6 This SPG clarifies what the District Council, as local planning authority, will take into account when considering proposals to floodlight recreational areas. It also sets out what information the applicant will need to provide in support of such a proposal.

4.0 FACTORS WHICH WILL BE TAKEN INTO ACCOUNT

i) The Location of the Sports Facility to be Floodlit

4.1 The environmental impact of floodlights may be considerably less in an already well-lit urban environment than, for example, in a village setting where there is much less background light. Intense floodlighting can, even in urban well lit situations "spill" to create a substantial sky glow. The following principles will therefore normally apply:

- (a)** Proposals which introduce a major new light source into an area with no background lighting will normally be resisted (see amplification of this below).
- (b)** Proposals for floodlighting in urban areas and in larger villages will normally be acceptable, but will be judged on the degree to which they affect residential amenity, particularly where they enable a significant intensification of use or introduce spectators to the area. The visual impact of the lighting columns as well as the impact of the illumination provided will be material considerations as will the location within a Conservation Area or an Area to be Protected from Development and identified as such in the Suffolk Coastal Local Plan.
- (c)** In small villages, floodlighting proposals for sports facilities will not normally be permitted, unless they are of a small scale such as a Bowling Green or a single Tennis or Netball court. These are much more domestic in scale and normally require lower levels of lighting but in appropriate locations could include multi games areas as advocated by the Sports Council.
- (d)** Floodlighting for sports facilities in the countryside will normally only be permitted on the fringes of urban areas or larger villages and where it can be demonstrated that there is a need to floodlight an existing facility, or in the case of new facilities, that no viable alternative site exists.
- (e)** The provision of floodlit sports facilities will not be permitted in sensitive open landscapes within the Suffolk Heritage Coast and the Suffolk Coast and Heaths Area of Outstanding Natural Beauty, or Historic Parklands, and will not normally be permitted in Special Landscape Areas.
- (f)** Floodlighting proposals associated with recreational farm diversification in the countryside will only be permitted where it can be demonstrated that the scale of the proposal and the level of lighting will not have a significant adverse environmental impact. Criteria (d) and (e) above will apply to proposals.

ii) The Size of the Area to be Lit

4.2 The implications for neighbouring properties of light pollution, or the degree to which the "sky glow" affect occurs will often depend on the scale of the proposed floodlighting and the nature of the surface to be illuminated. The environmental impact of, for example, a small area such as a netball court illuminated at a low intensity, will clearly be far less than that of floodlighting a multi-use sports facility with several pitches, or a golf driving range covering perhaps 5 hectares. The District Council will take the sky glow effect into account when assessing recreational floodlighting proposals.

iii) The Nature of the Illumination Required

4.3 Most sporting facilities require lighting of a uniform level over the whole playing area. This is normally best provided by downward facing lights mounted on columns. The Institution of Lighting Engineers recommends that the most effective way of achieving this and preventing light spillage into surrounding areas is to use floodlights with an asymmetric beam that, while producing the main beam at around 60° - 70°, permits the front glass to be kept horizontal. (The upper limits to the beam will also need to be specified depending on circumstances but should normally not exceed 70° from the downward vertical - see Appendix IV for a definition of the upper limits.)

4.4 Different sporting activities require different light levels on the playing surface. Sports such as hockey, with a fast moving small ball, require a much higher level of illumination than, for example, netball. It is usually the case that the higher level at which a sport is played, for example, County or National standard, the higher the level of illumination required. Training or more informal use may be undertaken with a lower level of illumination. (See Appendix 1).

4.5 Some sports facilities such as golf driving ranges present particular difficulties for floodlighting. Most sites tend to be in open countryside and have floodlights aimed either horizontally, or slightly above the horizontal plane to enable players to follow the flight of the ball. These lights, which are often of considerable intensity and with a wide beam, can cause inconvenience to neighbours and can be a safety hazard, particularly where dazzle affects highway users. Golf driving range lights are probably one of the most polluting forms of floodlighting in that they invariably illuminate a much larger area than is required. The only circumstances where a horizontal beam of this nature may be permitted are where the natural landform (such as in a valley), or a permanent natural or manmade landscape feature, can effectively contain the light.

* See Appendix III for Sports Council/CIBSE suggested standards.

4.6 Some recreational uses, such as artificial ski slopes, because of their nature can introduce floodlighting into elevated and exposed positions. Lamps normally have to be column mounted to elevate them sufficiently over the slope to reveal depressions and irregularities in the surface. Applicants will need to demonstrate how use of the existing landform, or landscaping proposals will mitigate the impact of the proposal. With any floodlit recreational facility the use of natural features on the periphery of the site to minimise the impact of the proposal may be appropriate.

4.7 It might also be necessary to assess the level of benefit to the wider community, although it is recognised that in some cases this may be provided by private clubs. The floodlighting of a facility might also be in the interests of an educational user (ie a school, possibly with community use) in terms of developing its sporting curriculum.

iv) The Relationship of the Site to Other Uses

4.8 Many recreational sites within existing developed areas are surrounded by other land uses. Where these are commercial uses which are already well lit, appropriate floodlighting of a recreational area may not present a problem. Where the floodlighting of a recreational site abutting private gardens and dwellings or a public highway is proposed, the following criteria will normally be applied.

4.9 Light levels at the boundary of a floodlit site where it abuts a residential curtilage should meet the following criteria. (See diagram in Appendix IV - letters in brackets refer.)

- (a) Light levels, when measured in a vertical plane, at the closest window of a habitable room of any dwellinghouse adjacent to the floodlit site shall not exceed 10 lux at ground floor level (ab) or 5 lux at first floor level (bc). Where the background levels of lighting already exceed these levels the proposal must not add to the level of the existing background lighting by more than the levels expressed above.
- (b) Where the distance between the boundary of the residential curtilage and the closest wall of the dwellinghouse is less than 20 metres the light level within the curtilage shall not be greater than 5 lux when measured in the horizontal plane.
- (c) Where the distance between the boundary of the residential curtilage and the closest wall of the dwellinghouse is greater than 20 metres the light level shall not exceed 5 lux within 20 metres of the dwelling and 10 lux elsewhere when measured in the horizontal plane.

Note 1 these figures are based on the assumption that the ground is level and that the same height as the floodlit facility. Changes in level, or the presence of natural features may have to be taken into account.

Note 2 lux levels when measured in the vertical plane will generally be higher than those measured in a horizontal plane.

Note 3 see diagrams in Appendix Iv.

- (d) Light levels at the boundary of a floodlight site where it abuts an unlit public highway shall not exceed 1 lux when measured in a horizontal plane.

Note 4 this very low level is suggested by the County Surveyor because light spillage onto an unlit highway can create a rapid transition between light and darkness which can cause problems for road users. A greater problem is created where the light source is visible to road users and dazzles them. Systems which cause such dazzle will not be permitted. The County Surveyor has suggested that this can be expressed in the following way and can be measured by his street lighting engineers.

The luminance from any source of light when measured at a height of 1.6 metres above ground level on the site boundary with a highway, or when viewed by any user on the highway should not normally exceed 5000 candelas per square metre.

v) The Type of use Proposed

4.10 The use to which a floodlit area is put can have a considerable impact on the amenity of the surrounding area. There will be a considerable difference between a facility used for training purposes, or just by the participants in a sport, and a use which attracts large numbers of spectators.

4.11 Where floodlighting will enable uses to take place which may affect residential amenity the frequency of the use may be controlled by conditions to any planning consent.

4.12 The planning authority will, in making a decision on a proposal for a floodlit recreation facility, take into account, in addition to the criteria set out in this Supplementary Planning Guidance, the normal development control criteria by which any planning proposal is judged.

vi) The Location and Height of Columns

4.13 Careful consideration needs to be given to the positioning and height of lighting columns if an even light distribution over the playing surface is to be achieved whilst maintaining light spillage into adjacent property to a level below that indicated in iv) above. Floodlighting columns may vary in height from around 5 m to 25 m depending upon the type of illumination required and the area to be lit.

4.14 The higher the lighting columns, the easier it is to ensure that the beam is directed downwards as indicated in iii) above, and to minimise light spillage to surrounding areas. A judgement in all cases will need to be made on the visual impact of the lighting columns during daylight hours as well as the impact of the floodlighting system when in use.

4.15 It may be possible to locate columns in positions so that they are screened from neighbouring property by trees or other landscape features. Unfortunately, reducing the number or height of columns is likely to increase the potential for light spillage to surrounding areas.

4.16 Retractable or folding columns are available, but are normally more expensive, involve higher levels of maintenance, can be difficult to raise and lower and are more susceptible to the carefully aimed lamps being knocked out of adjustment and causing problems of light spillage. In some locations where tall columns would cause a major visual intrusion it may, however, be necessary to impose conditions requiring the use of such columns.

vii) Time of Use and Frequency of Use

4.17 However carefully a floodlighting system is designed, those living in surrounding areas will be aware that it is in use. Any inconvenience to neighbours can be mitigated by controlling the hours and frequency of illumination.

4.18 It will not normally be appropriate for floodlighting to remain in use beyond 10 pm although in some circumstances, and particularly in sensitive areas, an earlier time limit may be imposed. More restrictive conditions will be appropriate on Sundays.

4.19 Where a recreational facility is used for spectator sports as well as for practice, conditions may be imposed specifying how many evenings per week the facility may be used for practice and how many times in the year the lights may be used for matches at which spectators are present.

viii) Types of Light Source

4.20 Floodlighting systems can utilise a number of different light sources each with its own particular characteristics in terms of colour rendering, operating costs, and the amount of glare produced. The type of light source will need to be carefully matched with the level of illumination required and the height and positioning of columns, the visual impact of which will be a material planning consideration.

4.21 It is also essential that the fittings are sufficiently robust to ensure that the carefully aimed lamps necessary to minimise light spillage outside the floodlit site are not knocked out of alignment by high winds or the weight of snow.

ix) Participation in Sport

4.22 In coming to a decision on the merits of a particular proposal, the District Council will take into account the use of the facility, for example the need of an educational establishment to develop its sporting curriculum or the wider public benefits which might accrue by the potential increased participation in sporting activities. Consideration will be given in particular areas to the relationship between the use of the facility and the interests of conservation, amenity and safety. However, where the impact of a proposal is considered to be unacceptable or cannot be mitigated through ameliorative measures, the protection of those recognised interests will prevail.

5.0 THE IMPOSITION OF PLANNING CONDITIONS

5.1 Where the District Council grants planning consent for recreational floodlights it may impose conditions governing the times and frequency of use. In particularly sensitive locations where the positioning, alignment and types of light source are critical to minimising adverse environmental impact, the District Council may impose conditions requiring that the floodlighting system is not altered from the agreed specification. In certain circumstances it may be necessary to reach an agreement that the floodlighting system is regularly checked and maintained with evidence to that effect in the form of a report from the independent suitably qualified engineer. (This could be undertaken as part of the maintenance to ensure that the system continues to provide the correct level of illumination - see footnote below and Maintained Illuminance Appendix IV.)

5.2 In some locations the District Council may be prepared to grant consent for recreational facilities where floodlighting to permit use during the hours of darkness would not be acceptable. In these circumstances conditions may be imposed to ensure that the facility is not 'upgraded' for such use at a later date.

NOTE: The CIBSE (see Appendix II item 4) guidance since 1990 has included a requirement for "maintained illuminance". This means that floodlighting systems for particular applications have to be subject to a maintenance plan in order to ensure that the average illuminance over the relevant lit area does not fall, throughout the life of the installation, below a predetermined level. (See also Appendix I for Sports Council "minimum maintained" lighting requirements for various sports.)

INFORMATION REQUIRED

·Much of the following information is of a technical nature and before seeking the relevant professional advice, potential applicants are advised to discuss their proposal with the District Council to ascertain whether it is able to meet the basic planning criteria. Any proposal for a floodlit recreational facility will, in addition to the information set out below, need to be accompanied by that normally required for any other planning proposal.

- a) a statement setting out why a floodlighting system is required, the proposed frequency of use and hours of illumination (any consent issued may be subject to conditions limiting the periods of use);**
- b) a site survey showing existing landscape features, together with proposed landscaping to mitigate the impact of the proposed floodlighting system (where the proposal is for a new floodlit sports facility the site survey should show the whole area within the applicants control - there may be opportunities to adjust the position of the floodlit areas to minimise its environmental impact);**
- c) a technical report prepared by a qualified Lighting Engineer or the lighting company setting out the type of lights, their performance, height and spacing of lighting columns (taking into account factor (b) above). The light levels to be achieved over the playing area and at the site boundaries should be superimposed on a map of the site and its surroundings - an Isolux diagram see Appendix IV (where a site abuts residential properties or a public highway, the light levels immediately adjacent to the properties themselves, all the points on the highway to be agreed with the Highway Authority shall also be shown on the plan. In these areas light levels should be expressed in both the horizontal and vertical planes to get a more realistic indication of the proposals on those living in or moving through the area);**
- d) details of parking and access arrangements (this will be particularly important where the floodlit facility will enable spectators to use the site. A site which may be acceptable for training or use by participants in the sport only may not be acceptable for spectator sports, particularly if it is situated in a residential area and cannot provide sufficient off-street parking);**
- e) details of any measures to mitigate noise (this will be particularly relevant where a site is within a residential area and where spectator sports are involved);**
- f) any other information relevant to the proposals (all normal planning considerations will apply to proposals for recreational floodlighting);**
- g) when considering planning applications which are likely to give rise to significant environmental effects, the District Council will have regard to the need for Environmental Assessment as set out in the regulations [The Town & Country Planning (Assessment of Environmental Effects) Regulations 1988 and Circular 15/88]. In general, the District Council will expect Environmental assessments to accompany all significant planning applications which could result in the loss of, or damage to important landscape or wildlife features or increase public pressure on sensitive wildlife sites. The District Council will also welcome Environmental Assessments for less significant development proposals.**

APPENDIX I

TABLE SHOWING MINIMUM MAINTAINED LIGHTING REQUIREMENTS FOR OUTDOOR SPORTS FACILITIES (REPRODUCED FROM SPORTS COUNCIL FACTFILE 2, FLOODLIGHTING FOR SPORT)

FACILITY	RECREATIONAL/ TRAINING USE		CLUB/COUNTY USE		NATIONAL/ INTERNATIONAL USE	
	Lux	Uniformity	Lux	Uniformity	Lux	Uniformity
Archery (target) (shooting zone)	750 200	0.8 0.5	750 200	0.8 0.5	750 200	0.8 0.5
Athletics	100	0.5	200	0.5	500	0.7
Basketball	75	0.5	200	0.6	500	0.7
Bowls: lawn	100	0.5	200	0.7	300	0.7
Crown green bowls	100	0.5	200	0.7	300	0.7
Cycle Racing	100	0.5	300	0.7	500	0.7
Cycle Speedway	100	0.3	200	0.5	500	0.7
American Football	75	0.5	200	0.6	500	0.7
Association Football	75	0.5	200	0.6	500	0.7
Rugby League Football	75	0.5	200	0.6	500	0.7
Rugby Union Football	75	0.5	200	0.6	500	0.7
Hockey	300	0.7	300	0.7	500	0.7
Mini Hockey	200	0.5	300	0.6	-	-
Lawn Tennis Over Court Over Playing Area	300 250	0.7 0.6	300 250	0.7 0.6	500 400	0.7 0.6
Netball	75	0.5	200	0.6	500	0.7
Roller Hockey	200	0.7	300	0.7	500	0.7
Golf Driving Range	50	0.25	-	-	-	-
Artificial Ski Slope	100	0.3	-	-	-	-

Note: These levels do not include lighting for television broadcasts and may not meet the requirements for all international events as set out by various sports governing bodies.

APPENDIX II

USEFUL PUBLICATIONS AND CONTACTS

- (1) Planning Guidance Note 17 SPORT AND RECREATION published September 1991 by The Department of the Environment available from HMSO Publications Centre (mail and telephone orders only), PO Box 276, LONDON, SW8 5DT - Tel: 071 873 9090.
- (2) Sports Council Factfile 2 Floodlighting for Sport 1993 available from the publications unit at the Sports Council, 16 Upper Woburn Place, LONDON, WC1H QQP - Tel: 071 388 1277 please quote reference No. PLAN 19.
- (3) The Institution of Lighting Engineers (ILE) Lennux House, 9 Lawford Road, Rugby, Warwickshire, CV21 2DZ. Tel: 01788 576492 has produced guidance notes for reduction of light pollution.
- (4) Chartered Institution of Building Services Engineers (CIBSE) Lighting Division, Delta House, 222 Balham High Road, LONDON, SW12 9BS. Tel: 081 675 5211 has produced lighting guide for sports, reference LG4 Sports.
- (5) International Commission on Illumination (CIE) Central Bureau, Kegelgasse 27, A-1030 Wien, Austria. Tel: 010 431 753 187. Publications can be obtained from CIBSE (4 above) has produced lighting guide for sports reference LG4.
- (6) British Standards Institution (BSI) Linford Wood, Milton Keynes, MK14 6LE. Tel: 01908 221166.
- (7) Lighting Industry Federation (LIF) Swan House, 207 Balham High Road, LONDON, SW1 7BQ. Tel: 071 675 5432.
- (8) Council for the Protection of Rural England (CPRE) Warwick House, 25 Buckingham Palace Road, LONDON, SW1W 0PP. Tel: 071 976 6433.
- (9) British Astronomical Association (BAA) Burlington House, Piccadilly, LONDON, W1V 9AG. Tel: 071 734 4145.

CPRE and BAA jointly produced a leaflet entitled *Starry Starry Night - how to keep sight of the stars.*

- (10) English Nature East Region, Bury St Edmunds Office, Norman Tower House, 1-2 Crown Street, Bury St Edmunds, Suffolk, IP33 1QX. "Species Conservation Handbook - impact of outdoor lighting on insect populations."
- (11) 'CEN' Comité Européen De Normalisation (European Committee for Standardisation)

Rue de Stassart
B-1050 Brussels
(Tel 3225196811)

Working Group 4 of CEN/TC169
"Lighting Applications"
Convenor of Working Group
Mr J Lecocq of "Société Thorn Europhane"
Route de la Paix
France
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(Tel 333221 4817)

APPENDIX III

SUGGESTED STANDARDS FOR FLOODLIGHTING GOLF RANGES

**(TAKEN FROM THE FUTURE FOR GOLF - REVIEW
EASTERN COUNCIL FOR SPORT AND RECREATION 1993/94)**

- 6.7** In order to permit year round use, especially during the evenings, and therefore ensure viability, floodlighting is commonly associated with golf driving ranges. When lighting a range, it is important to ensure that the player can follow the full flight of the ball through the air and to the landing area. Traditionally lights have been mounted on the roof of range bays, but there is increasing concern that this produces unacceptable light pollution both in terms of glare and the characteristic aura produced overhead, and often seen for miles around.
- 6.8** It is becoming increasingly common to use a combination of two sorts of lighting - roof mounted, but directed downwards so that the flight of the ball can still be observed, and mast mounted or ground lighting to illuminate the landing area. The Chartered Institute of Building Services (CIBSE) recommends that an illuminance level of 50 lux is achieved throughout the range, this uniformity being required to avoid distraction. A minimum of one 400w lamp per driving bay would achieve the required lux levels on an average sized range. Traditionally, high pressure sodium bulbs have been used, but metal halide bulbs, with their white light, render colour better. In cases of particular sensitivity, the use of hoods or louvres may be considered, though these will require upgraded lamps owing to light loss through screening.
- 6.9** In order to overcome the obvious problems associated with floodlighting golf driving ranges, the brilliance of the lighting should be limited to the minimum functional level and adequate screening provided. Golfers have a high expectation of illumination and experiments in reducing lighting levels should be undertaken.

APPENDIX IV

GLOSSARY OF TECHNICAL TERMS AND DEFINITIONS WHICH MAY BE USED IN RELATION TO FLOODLIGHTING

Asymmetrical Beam

Floodlights giving a fan shaped lighting pattern - available in wide, medium and narrow beams.

Beam Angle (see also upper limit of beam)

The angle formed by the centre of the beam of light from a lamp relative to the vertical.

When light is emitted from a lamp it forms a cone from the light source. The shape of this cone will depend on the reflector design in the lamp.

Generally the intensity of the beam diminishes away from the centre and in order to control the potential glare from lights it is often necessary to relate beam angle, not to the main beam, but to a point where the light output has diminished sufficiently that it will not create a glare nuisance. This is normally accepted as the point where the light output has reduced to 1/10th of the intensity of the main beam.

Candela (cd)

The unit of luminous intensity. It is the power of a light source (lamp) or illuminated surface to emit light in a given direction.

Colour Rendering

Different light sources can change the colour appearance of objects. A good colour rendering gives a colour appearance similar to that experienced in daylight. (See under lamp types for further details.)

Double Asymmetric Beam

Floodlight combining a narrow and wide asymmetric beam in a single unit. Often used to light sports areas from the side as the whole width can be covered by a single lamp unit. In practice, in order to achieve uniform lighting most areas a light from both sides. (See also uniformity ratio.)

Glare

The discomfort or impairment of vision which is experienced when part of the visual field is excessively bright in relation to the general surroundings.

Direct glare normally occurs when the viewer can see the light source. Glare can cause either discomfort, or impair the ability to see detail.

Illuminance

The amount of light falling on a surface. It is usually measured in terms of "lux". The higher the "lux" value the more light there is falling on the illuminated surface.

Isolux Contour/Isolux diagram

An Isolux Contour is a line joining points of equal illuminance on a surface.

Manufacturers will normally provide diagrams showing the distribution of the Isolux Contours for a single lamp or a complete lighting system. The distribution of light depends not only on the type of lamps used, but also on their mounting height and the beam angle in relation to the area to be illuminated. It is important that these calculations are made by a competent lighting engineer or the supplier of the lighting system.

Lamp Types

Three main lamp types are used for recreational floodlighting. The table below briefly describes their characteristics.

CHARACTERISTIC		TUNGSTEN HALOGEN	HIGH PRESSURE SODIUM	HIGH PRESSURE METAL HALIDE
Lamp Output		Low/Moderate	High	Very High
Lamp Life		Short (2000 hours)	Long (9000 + hours)	Moderate (4/6000 hours)
Colour	Rendering	Excellent	Moderate	Good/Excellent
	Appearance	Warm White	Golden White	Cool White
Costs	Initial	Low	High	High
	Running	High	Low	Low
Ease of Use		Instant switch on/restart, no control gear required	Control gear required. Needs to cool before restart unless very high voltage can be applied	Control gear required needs to cool before restart unless very high voltage can be applied
Problems			Light from some discharge lamps can give stroboscopic effects. Can be eliminated by connecting adjacent lamps to different phase of 3 phase supply.	
Typical applications		Small sports areas with infrequent or short term use	Larger sports areas and areas with long periods of use	Sports stadia and large areas. May be suitable for televised sports

Light Pollution (See also skyglow)

Any light which illuminates areas beyond that which needs to be lit can be considered to be a form of light pollution. The extent to which it is perceived as being a nuisance will often depend on the background light from other sources and the intensity of the light.

All forms of light pollution or spillage are in fact a waste of energy and are costing the user money.

Louvre

An open grid construction impervious to light. Normally positioned in front of a light source to physically restrict the beam of light. It is normally better, if possible, to restrict the beam optically by means of the lamp reflector design as louvres can reduce the efficiency of lamps by up to 25% and add weight to the light fitting. Louvres can also increase the surface area of the lamp fitting and can make it more susceptible to movement in high winds.

Lumen (lm)

The amount of luminous flux (light) emitted by a light source or falling on a surface.

Luminance

This is a term which expresses the intensity of light emitted in a given direction (by a unit area of luminous surface). It is the physical equivalent of what is subjectively called brightness. It is also a useful measure of potential glare and is measured in candelas per square metre.

Lux

A measurement of illumination. One lux equals one lumen per square metre.

Maintained Illuminance

Lamps deteriorate with use and this combined with dirt on the fittings reduces the amount of light they produce over a period of time. Maintained illuminance means that the lamps must be maintained by cleaning and bulb replacement to ensure that the amount of light falling on the relevant area (normally the playing surface) does not fall below a predetermined level throughout the life of the installation. (See also Appendix II for maintained lighting requirements for various sports.)

Skyglow

A phenomenon where light - usually from a major light source such as a urban area or industrial/recreational floodlight installation is seen, often from many miles distance, as a glow in the sky. Some of the light is reflected from the illuminated surfaces and some is emitted directly skyward from poorly designed lighting systems.

Skyglow resulting from poorly designed systems is particularly noticeable in dark landscapes where there are few other light sources. Most rural areas and in particular The Area of Outstanding Natural Beauty would fall into this category.

Symmetrical Beam

A circular fronted floodlight normally with a parabolic reflector, available with different beam powers dependent on wattage, lamp type and reflector concentration.

The beam can be highly focused.

Uniformity Ratio

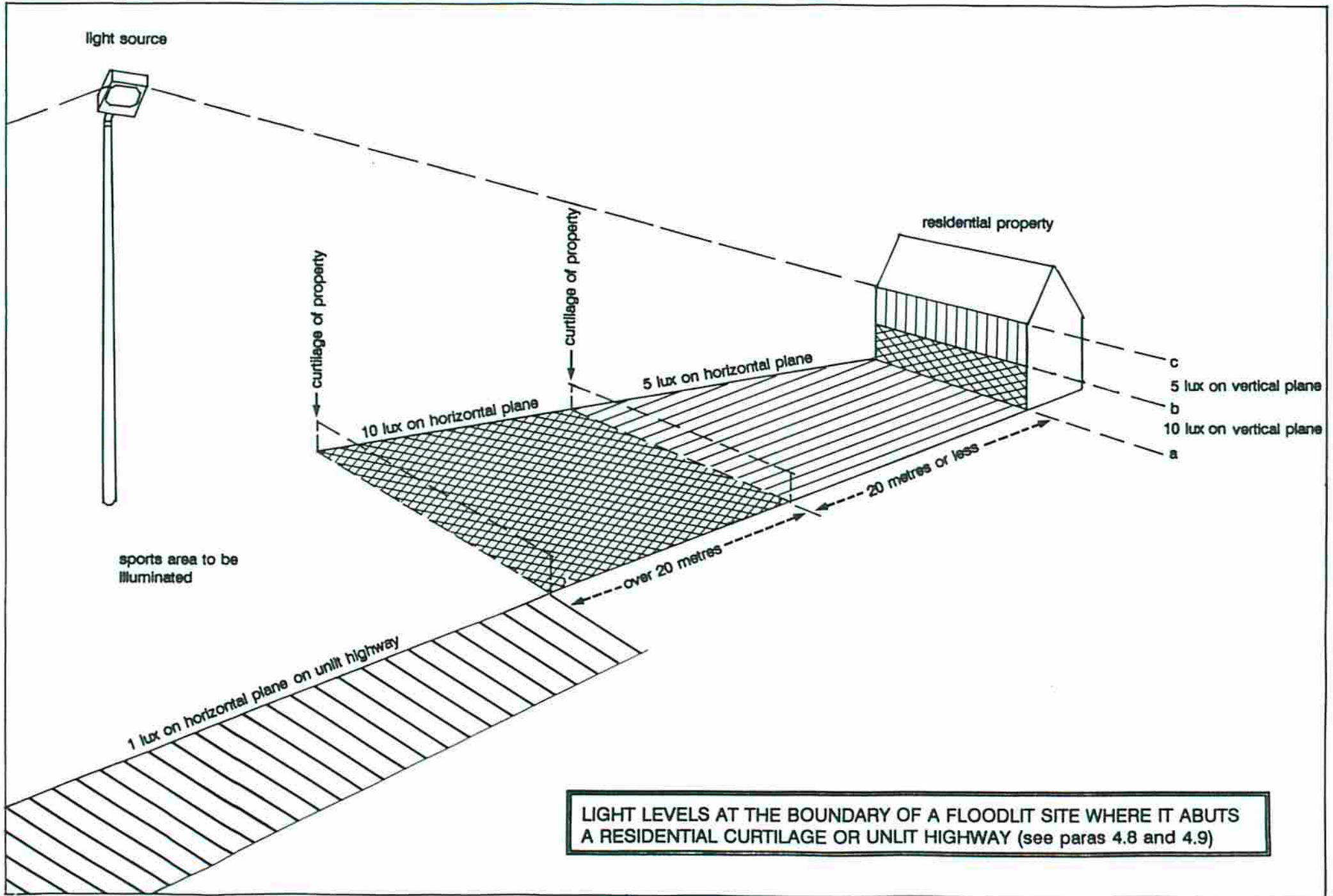
Ratio of the minimum illuminance over an area to the average illuminance for the same area. It is calculated by dividing the minimum illumination by the average. (E_{\min}/E_{ave}) The higher the uniformity ratio the more uniform the light levels are over the whole surface. Such uniformity, together with high lux levels, is essential for games such as hockey involving a small fast moving ball.

Upper limits of beam (see also beam angle)

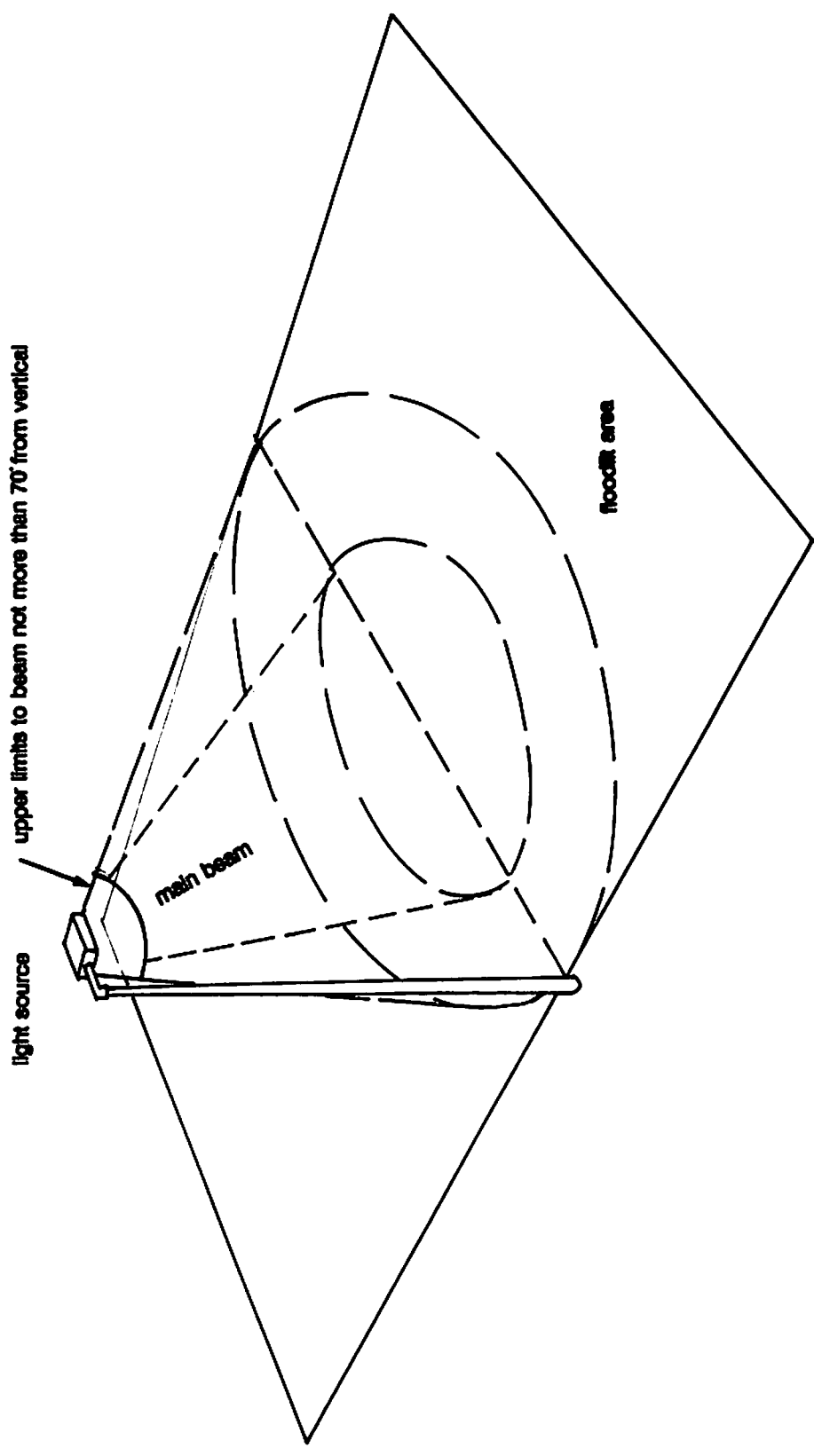
Where light is emitted from a lamp it forms a cone from the light source. The shape of this cone will depend on the reflector design in the lamp.

Light output diminishes towards the edge of this cone of light sufficiently that it will not create a glare nuisance. This is normally accepted as the point where the light output has reduced to 1/10th of the intensity of the main beam. When a lamp is angled downwards to floodlight a playing surface the upper limits of the beam (where intensity is 1/10th of the main beam) shall not exceed 70° from the vertical. See diagram.

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LIGHT LEVELS AT THE BOUNDARY OF A FLOODLIT SITE WHERE IT ABUTS A RESIDENTIAL CURTILAGE OR UNLIT HIGHWAY (see paras 4.8 and 4.9)



Note : This is diagrammatic only. Different types of lamp produce different beam patterns. Only one light source is shown.

DIAGRAM TO SHOW UPPER LIMITS OF BEAM