Unity Primary School

Playzone Floodlighting

Lighting Impact Assessment

In Accordance with ILP

GN01/26 'The Avoidance of Obtrusive Light'

Project Ref : HLS9177
Report By – Harry Johnson
Revision 2 – 20/10/2026

1.0 Introduction

This report has been commissioned by Unity Primary School to examine the effects on the environment of the floodlighting associated with the proposed playzone development at Unity Primary School. The proposal includes the building of one new playzone suitable for multi-use games purposes. The facility will include an all-weather surface, catch fencing and the installation of floodlights suitable for general play.

The aim of the report is to ensure that the proposed floodlight system will comply with current standards for large ball sports such as football. The lighting must also comply with nationally recognised obtrusive light limitations to maintain the amenity of nearby residents.

This revision (Rev 2) responds to Environmental Health comments on the discharge of planning condition 11b (External Lighting). It refers to the current ILP Guidance Note GN01/26, and sets out the calculated vertical illuminance and luminous intensity at the windows of nearby residential properties in text and table form, with a plain-English explanation of what the results mean.

2.0 Site Location

The playzone will be located to the south of Allesley Drive. The site is bounded by residential properties to the north, east and south, and by the school to the west. The nearest residential properties are approximately 18m from the proposed playzone.



Aerial View

3.0 Design Standards

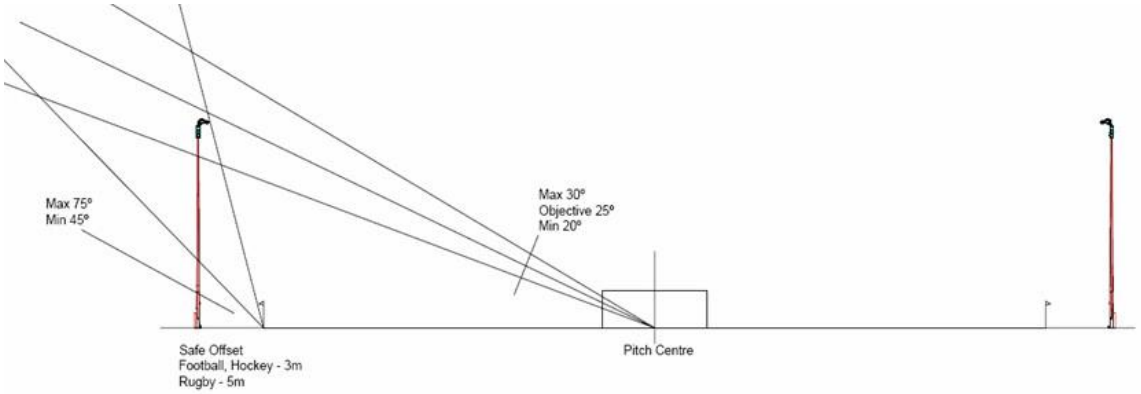
The floodlighting proposals have been assessed using the guidance outlined by the following publications:

BS EN 12193:2018 Light and Lighting – Sports Lighting
BS EN 12193 sets the minimum lighting levels for sports within Europe. It classifies sports lighting into three classes:
Class III – Training and recreational use
Class II – High quality coaching and low level competition
Class I – National standard coaching and high level competition

ILP Guidance Note GN01/26 The Avoidance of Obtrusive Light (2026)
The current national guidance on obtrusive light, superseding GN01/21. It sets maximum values for light falling on neighbouring windows, the brightness of floodlights seen from those windows, and upward light, according to the environmental zone of the site. It is based on CIE 150:2017.

SLL Lighting Guide LG4 – Sports Lighting

Many of the lighting guides available offer little design guidance. However, LG4 provides the designer with a wealth of information, including how to use floodlight beams, the control of glare and spill light containment. It also gives a method of calculating the optimum mounting height for floodlights using maximum and minimum angles projected from the centre of the pitch or court. This method limits the aiming angle of the floodlight to produce the most efficient lighting design with limited overspill or waste light.



Calculation method for floodlight mounting height for SLL LG4

FA – Guide to Floodlighting

The FA Floodlighting Guidance sets the minimum illuminance levels recommended by the Football Association for match play and training.

Using the guidance available, the following illuminance levels were chosen to comply with the minimum requirements.

Playzone

Minimum Average Maintained Illuminance required (FA) = 120 Lux
Design Average Maintained Illuminance (Eave) = 210 Lux (233 Lux initial), dimmable
Uniformity Ratio (Emin/Eave) = 0.62
Floodlight Mounting Height = 6m

4.0 Obtrusive Light Limitations

The Institution of Lighting Professionals has produced a guidance document to be used by lighting professionals, planning authorities and people with an interest in reducing the environmental impact of lighting installations. The ILP GN01/26 *'The Avoidance of Obtrusive Light'* categorises the environment into five zones. The categorisation is according to the amount of urbanisation, the existing background illumination and the degree of protection required to maintain the current environmental zone.

The environmental zone categories are shown in Table 2 and the obtrusive light limitations that apply to this site in Tables 3, 4 and 6.

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Intrinsically dark	Astronomical observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones
E2	Rural	Low district brightness	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres or suburban locations
E4	Urban	High district brightness	Town / city centres with high levels of night-time activity

Table 2: Lighting environmental zones (ILP GN01/26)

Light technical parameter	Application conditions	E3 limit
Illuminance in the vertical plane (Ev)	Pre-curfew	10 lux
	Post-curfew	2 lux

Table 3 (CIE 150 Table 2): Maximum values of vertical illuminance on premises, Zone E3

Luminaire group (A_p, m²)	0 to 0.002	0.002 to 0.01	0.01 to 0.03	0.03 to 0.13	0.13 to 0.50	over 0.5
E3 pre-curfew	0.86 *d*	1.9 *d*	3.8 *d*	7.5 *d*	15 *d*	10,000
E3 post-curfew	0.29 *d*	0.63 *d*	1.3 *d*	2.5 *d*	5.1 *d*	1,000

Table 4 (CIE 150 Table 3, amended): Limits for the luminous intensity of bright luminaires (cd), Zone E3. d = distance between the observer and the floodlight in metres.

Light technical parameter	E3 limit
Upward light ratio (ULR) / %	5

Table 6 (CIE 150 Table 5): Maximum values of upward light ratio (ULR) of luminaires, Zone E3

The guidance notes also recommend the maximum beam elevations for floodlights and the most effective reflector design required to minimise spill light and glare. By following this advice, effective light control can be assured.

In plain terms, the guidance checks three things: how much light from the floodlights lands on the windows of nearby homes (measured in lux); how bright the floodlights themselves look from those windows (measured in candelas); and how much light is sent up into the night sky. Each has a maximum value, and the maximums are stricter in darker areas and later at night, after the curfew time.

5.0 Environmental Zone and Curfew

The site at Unity Primary School is located within an established residential area of Cheetwood. The surrounding area is well inhabited, with street lighting along Allesley Drive, Barrow Hill Road and the surrounding roads, together with domestic and school lighting. This matches the description of Environmental Zone E3 (suburban, medium district brightness), and the floodlighting has therefore been assessed against the E3 limits. GN01/26 notes that the zone designation is ultimately a matter for the local planning authority; as shown in Section 7, the light reaching neighbouring windows is also within the stricter E2 limit.

The floodlights will be controlled by an automatic timer and will be switched off by 22:00 each evening, so the pre-curfew limits apply throughout the hours of operation. The football floodlighting will be used for

match play, small area games and training purposes.

6.0 Proposed Lighting System

The proposed floodlighting system has been designed by Halliday Lighting using the Siteco FL21 LED floodlight system. The floodlights will be mounted on 6m columns (M1–M4).

The floodlights proposed are FL21 Midi sports floodlights, which feature flat style optics designed to reduce upward waste light and overspill. See photograph below:



Siteco FL21

The floodlight uses the latest LED technology and features an internal optical system to shield the LED optics. The internal optical system maintains a flat floodlight profile, producing uniform illuminance over the playzone whilst cutting off obtrusive light towards properties and upwards into the sky. The optics also feature Back Light Control, which cuts off stray light at extremely acute angles to stop stray light when located in close proximity to residential properties.

The floodlight also features a variable dimming facility to allow the end user to tailor the illuminance levels to suit the standard of play. The system can therefore be used at a lower illuminance level for training when the visual task is less taxing, resulting in lower energy costs and reduced visual impact.

The playzone lighting has been designed to comply with the requirements of the FA Guidance for Floodlighting, which requires an average illuminance level of 120 Lux. The system has been designed to provide lighting conditions suitable for grassroots football, with the facility to be dimmed for training and coaching.

The proposed mounting height of 6m has been calculated in line with the LG4 design method to ensure that the floodlights are mounted at the optimum height. By using this mounting height, the floodlight aperture will remain close to horizontal (10° tilt).

7.0 Light Spill Calculations

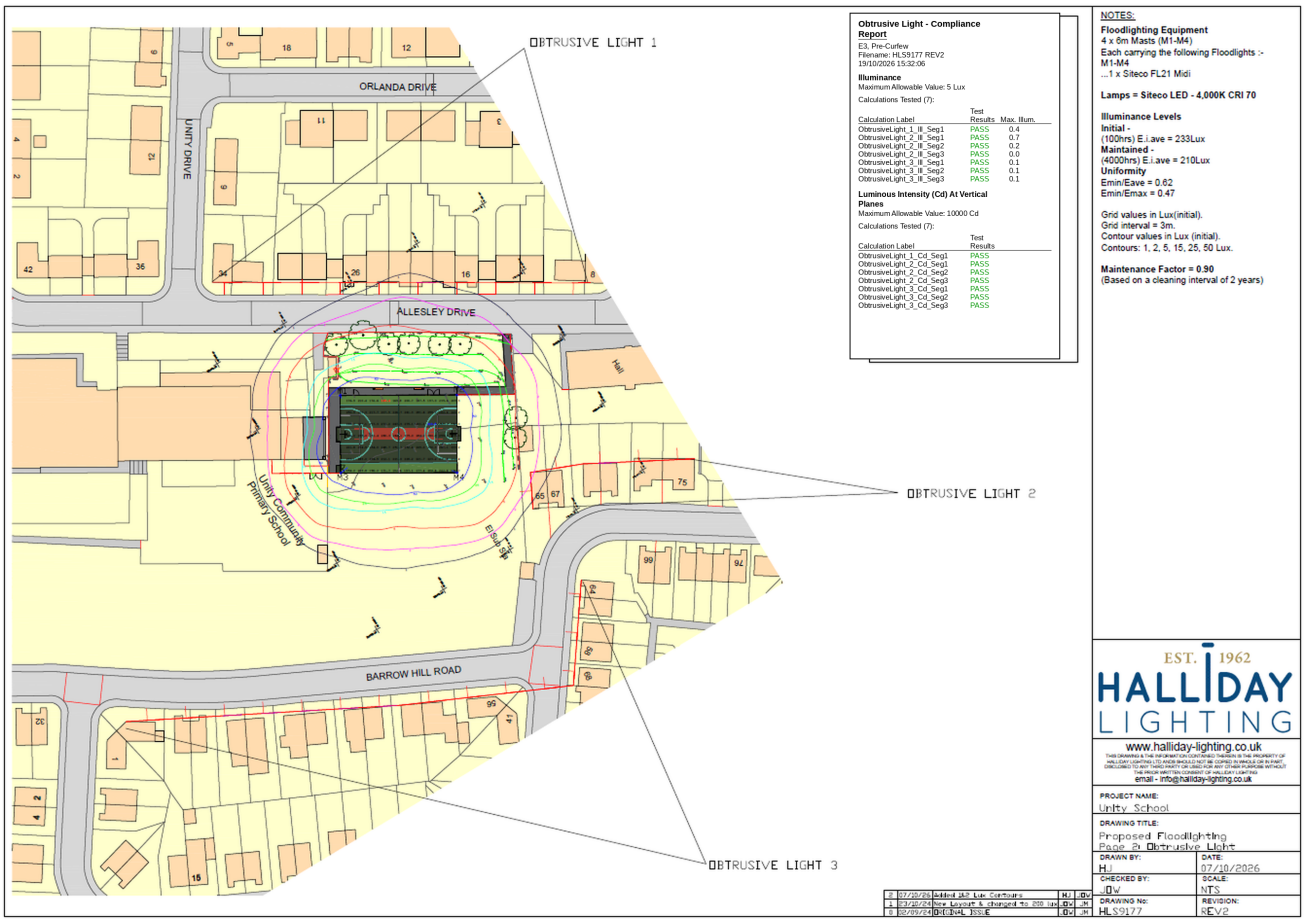
The lighting design details are shown on Halliday Lighting drawing HLS9177 REV2. The drawing shows the proposed column locations, playzone lighting levels and overspill predictions. All calculations have been carried out using Calculux lighting design software, and include spill light and vertical illuminance at residential windows, luminous intensity towards residential properties, and upward light.

In line with GN01/26 Appendix 3, the obtrusive light calculations use initial (100 hour) light output, equivalent to a maintenance factor of 1.0, which represents the brightest the installation will be. The calculations do not include the shading effect of existing mature trees, so they represent a worst case.

5



Halliday Lighting Drawing HLS9177 Rev 2 – Proposed Floodlighting, Pitch Levels



Halliday Lighting Drawing HLS9177 Rev 2 – Obtrusive Light Calculation Positions

Light containment is excellent, with spill light being cut off sharply as it reaches the site boundary. Calculations have been undertaken on the facades of the nearest properties at window height (5m) in three areas:

Obtrusive Light 1 – properties on the north side of Allesley Drive, facing the playzone.
Obtrusive Light 2 – properties to the east of the playzone (nos. 65, 67 and 75), assessed in three segments.
Obtrusive Light 3 – properties on Barrow Hill Road to the south, assessed in three segments.

7.1 Vertical Illuminance at Residential Windows

The calculated maximum vertical illuminance at the windows of each property is set out below, taken from the Obtrusive Light Compliance Report (HLS9177 REV2, 19/10/2026).

Calculation position	Location	Calculated max. Ev (lux)	E3 limit pre-curfew (lux)	Result
Obtrusive Light 1, Seg 1	Allesley Drive (north)	0.4	10	Pass
Obtrusive Light 2, Seg 1	Nos. 65, 67 and 75 (east)	0.7	10	Pass
Obtrusive Light 2, Seg 2	Nos. 65, 67 and 75 (east)	0.2	10	Pass
Obtrusive Light 2, Seg 3	Nos. 65, 67 and 75 (east)	0.0	10	Pass
Obtrusive Light 3, Seg 1	Barrow Hill Road (south)	0.1	10	Pass
Obtrusive Light 3, Seg 2	Barrow Hill Road (south)	0.1	10	Pass
Obtrusive Light 3, Seg 3	Barrow Hill Road (south)	0.1	10	Pass

The highest vertical illuminance at any residential window is 0.7 lux, at the properties to the east of the playzone. This is 7% of the E3 pre-curfew limit of 10 lux, and is also within the E3 post-curfew limit of 2 lux and the stricter E2 limit of 5 lux. The software compliance check tested all seven positions against 5 lux, and all passed.

In plain terms, lux is a measure of how much light lands on a surface. The most light reaching any neighbouring window from the new floodlights is 0.7 lux, which is comparable to bright moonlight (see the table of typical light levels at the end of this report). Most of the surrounding homes receive 0.1 lux or less, which is below the level of a full moon.

7.2 Existing Lighting

No site survey of existing light levels has been undertaken; the figures above are calculated, and represent the contribution of the new floodlights alone. However, the site lies within an established, street-lit residential area. Typical light levels from residential street lighting are in the order of 5 to 15 lux, compared with 0.3 to 0.5 lux from a full moon. Given the location, it is highly likely that the existing street and domestic lighting at the nearest properties already exceeds the maximum 0.7 lux contribution from the floodlights, so the floodlighting will not cause a noticeable increase in the light already falling on neighbouring windows.

7.3 Luminous Intensity Towards Residential Properties

Luminous intensity describes how bright the floodlight appears to someone looking towards it, rather than how much light lands on their window. Under GN01/26 Table 4, the limit is not a single fixed figure: it depends on the distance between the observer and the floodlight (*d*) and the size of the floodlight as seen by the observer (projected area, A_p).

Following the method in GN01/26 Appendix 4:

• **Luminaire group:** the FL21 Midi falls within the 40 to 80 cm size band of the GN01/26 Appendix 4 aid, giving a representative projected area of 0.251 m². This places it in the $0.13 < A_p \leq 0.50$ m² group, for which the E3 pre-curfew limit is $15 \times d$.

• **Observer distance:** GN01/26 states that the closest realistic observer position is the most onerous. The nearest residential properties are approximately 18m from the playzone, so 18m has been used for every receptor as a worst case. Most windows are further away than this, which would allow a higher limit.

• **Limit:** 15 × 18m = **270 cd** at every receptor.

Calculux calculated the luminous intensity from each floodlight at 29 observer points on the facades of the nearest properties (window height 5m). The results are summarised below.

Calculation position	Observer points	Calculated intensity range (cd)	Max. (cd)	E3 limit at 18m (cd)	Max. as % of limit	Result
Obtrusive Light 1 – Allesley Drive	10	117 – 170	170	270	63%	Pass
Obtrusive Light 2 – Nos. 65, 67, 75	9	109 – 151	151	270	56%	Pass
Obtrusive Light 3 – Barrow Hill Road	10	101 – 117	117	270	43%	Pass

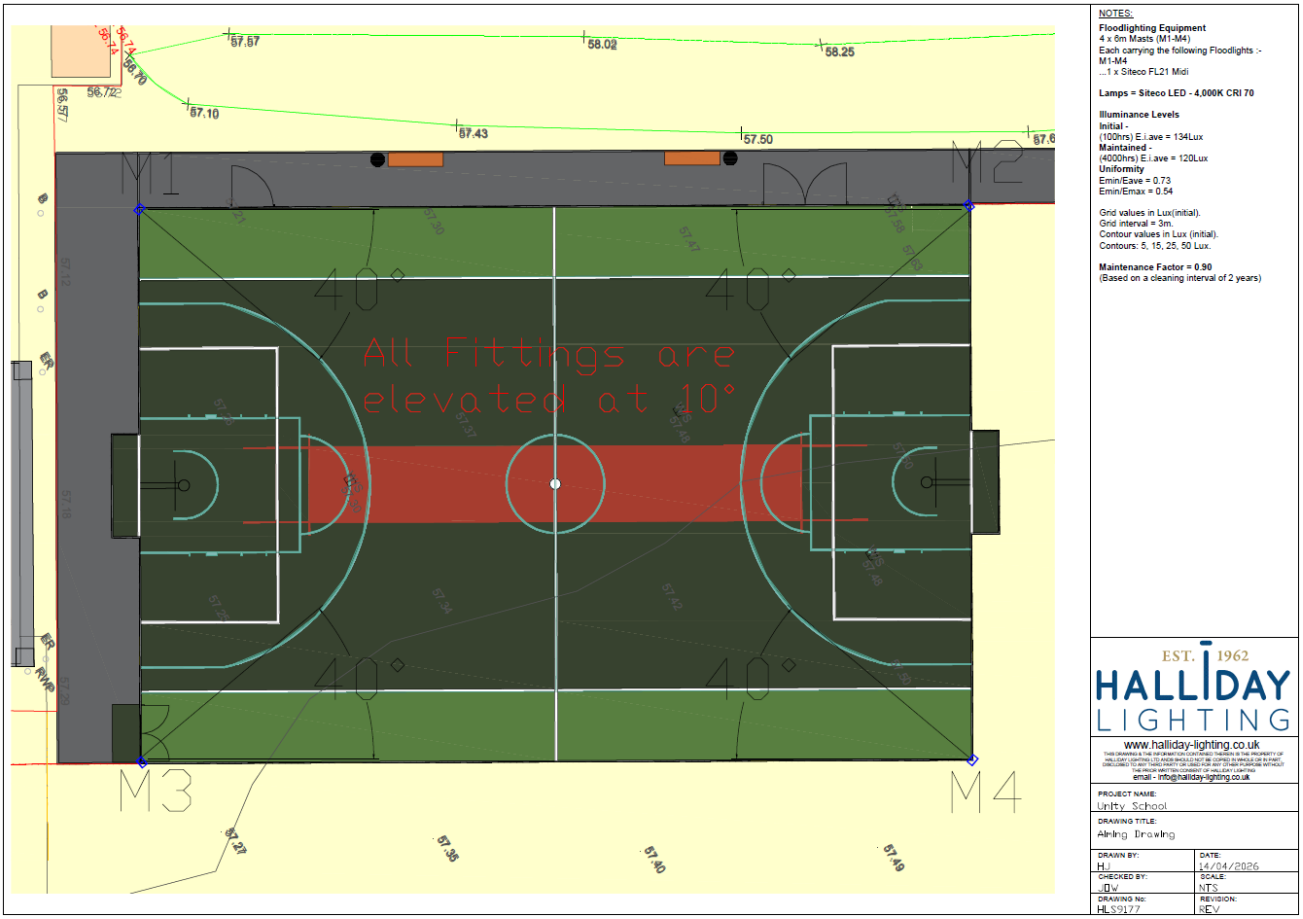
The highest luminous intensity towards any property is 170 cd, at the properties on Allesley Drive, which is 63% of the 270 cd limit even with the worst-case distance applied. All 29 observer points also passed the software's check against the E3 upper limit of 10,000 cd. As the floodlights will be switched off by 22:00, the post-curfew limits do not apply.

In plain terms, this checks how bright the floodlights look from inside a neighbour's home. The further away a home is, the more brightness the guidance allows, because a light looks dimmer the further you are from it. The floodlights are aimed down onto the playzone, so very little of their light is directed towards neighbouring homes. Even assuming every home is as close as the nearest one, the brightest view of any floodlight is well under two-thirds of what the guidance allows.

7.4 Upward Light

The direct upward light ratio for the lighting system has been calculated as 0%, against an E3 limit of 5%. This confirms that the proposed lighting installation will not have a negative effect on the existing night sky. In plain terms, none of the light from the floodlights goes up into the sky.

8.0 Site Aiming Angles



9.0 Conclusion

The proposed lighting system for the playzone has been designed to meet the specific lighting requirements for large ball sports such as football. The proposed system is suitable for grassroots standards of play as well as coaching and training, whilst ensuring that nationally recognised environmental standards are adhered to.

The design takes account of the site location and the close proximity of existing residential properties. The designer has chosen a luminaire with excellent spill control, oriented to avoid disturbance to observers within nearby properties. Assessed against ILP GN01/26 for Environmental Zone E3:

- The maximum vertical illuminance at any residential window is 0.7 lux, against a limit of 10 lux.
- The maximum luminous intensity towards any residential property is 170 cd, against a worst-case limit of 270 cd.

• The upward light ratio is 0%, against a limit of 5%.
• The floodlights will be switched off by 22:00.

Light calculations have been produced taking account of the local terrain but have not included the shading effect of existing mature trees. As a result, the calculations represent the worst-case scenario and spill values will be further reduced in reality.

In summary, the floodlights have been designed so that the light stays on the playzone. Very little light will reach neighbouring homes, the floodlights will not appear excessively bright from their windows, no light will go up into the night sky, and the lights will switch off each evening. The proposals fully comply with ILP GN01/26 'The Avoidance of Obtrusive Light'.

For and on behalf of

Halliday Lighting

For reference, please see below a description of typical lighting levels.

Light Source	**Horizontal Lux**
Full Moon	0.3 to 0.5
Street Lights – Footpath	3 to 10
Street Lights – Residential Area	5 to 15
Typical City Centre Car Park (non retail)	20 to 30
Office / Classroom	250 to 750
Professional Stadium	800 to 2,500
Sunny Day	80,000 to 120,000

Standards and Guidance

The following lighting guides and documents have been used for reference.

ILP Guidance Note GN01/26 'The Avoidance of Obtrusive Light' (2026)

CIE 150:2017 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations

ILP Guidance Note GN08/23 – Bats and Artificial Lighting at Night

The Society of Light and Lighting (CIBSE), Lighting Guide 4 'Sports Lighting'

FA Guide to Floodlighting

BS EN 12193:2018 Light and Lighting – Sports Lighting

Clean Neighbourhoods and Environment Act 2005

Glossary

Lumen
The standard unit of light (luminous flux) used in describing light emitted by a source or received by a surface.

Illuminance and Maintained Illuminance (lumens/m² or lux)
Illuminance is the term used to describe the level of light on a surface in lumens per square metre, or lux. Maintained illuminance is the average illuminance on a reference surface at the time maintenance has to be carried out.

Horizontal Illuminance
The level of light falling on to a horizontal plane, i.e. the ground.

Vertical Illuminance
The level of light falling on to a vertical plane, i.e. the walls or windows of a house.

Luminous Intensity (cd)
The brightness of a light source in a given direction, measured in candelas. It describes how bright a floodlight appears to someone looking towards it.

Projected Area (Ap)
The apparent area of the bright part of a luminaire as seen from the observer's position.

Light Output Ratio (LOR)
The ratio of the total light output of a luminaire relative to the total light output of the lamp(s) under reference conditions. Total LOR can be divided into downward (DLOR) and upward (ULOR) light output ratios.

Light Intrusion / Spill Light
The flow of light spilling outside the location boundary. With inadequate control, intrusive light may be sufficient to cause nuisance and disturbance to adjacent areas.

Glare
Glare may be divided into two types, known as disability and discomfort glare. In a sports lighting context it relates primarily to direct viewing of the floodlights. Only in severe situations would disability glare be experienced; in most instances it is discomfort glare that may result, causing annoyance to the viewer if adequate screening of floodlights is not provided.

Sky Glow
The general term for the halo effect caused by upwardly directed light, forming a glow in the night sky. It reduces the contrast of stars against their dark background, making astronomical observation difficult. It can be caused by direct waste light from floodlights or light reflected from the sports surface.

Curfew
The time after which stricter obtrusive light limits apply, typically set by the local planning authority.

ILP

The Institution of Lighting Professionals.

ILP GN01/26 'The Avoidance of Obtrusive Light'

Guidance produced by the ILP on reducing the impact of exterior lighting on the environment. The permissible light spill, luminous intensity and upward light vary according to the environmental zone. Due to the higher ambient lighting levels in built-up areas, the restrictions are less stringent in towns and cities, whereas dark landscapes and rural areas require tighter control.