Homes England

The Housing and Regeneration Agency

West of Ifield, Crawley
Lighting Impact Assessment

WOI-HPA-DOC-LIA-01
Version 1 - Planning submission

July 2025

DFL

· LIGHTING DESIGN · ELECTRICAL · SMART CITIES ·
ENERGY REDUCTION · LIGHTING IMPACT

WEST OF IFIELD

LIGHTING IMPACT ASSESSMENT

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Suitability	**Revision**	**Purpose Description**	**Originated**	**Checked**	**Approved**	**Date**
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S3	P03	For Planning	FE	DS	DS	24/05/2023
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S3	P07	For Planning	AS	DS	AS	26/03/2025
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S3	P09	For Planning	AS	DS	AS	08/04/2025
S3	P10	For Planning	SP	AS	AS	16/06/2025

Designs for Lighting (DFL) is a business built on successfully collaborating with our clients. We have over 20 years proven experience in our industry, listening to the challenges our clients face, developing the best solutions and being innovators in our specialism. Our role is to find the most effective and sustainable outcome to enhance and support your projects. We proudly work with recognised industry bodies to promote and shape the future of the industry and ensure our staff are trained to exceed the required competency levels of our industries. Above all, we ensure each project delivers against our values.

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1. INTRODUCTION

1.1. General

1.1.1. Designs for Lighting Ltd have been commissioned to undertake a Lighting Impact Assessment incorporating a sensitive external Lighting Strategy for a residential-led mixed use development (the "Proposed Development") of an approximately 171 hectare site at West of Ifield near Crawley in West Sussex (referred to as the 'Site').

1.1.2. Designs for Lighting Ltd is a specialist lighting design consultancy with experience in lighting impact assessments, mitigation, and lighting design for the protection of residential amenity and ecology.

1.1.3. This report has been compiled by Alistair Scott on behalf of Designs for Lighting Ltd.

1.1.4. Alistair is a Chartered Engineer and a Consultant Lighting Professional. Alistair is a Fellow of the Institution of Lighting Professionals (ILP) with 38 years post qualification experience in lighting design and lighting impact assessment work.

1.1.5. Homes England intends to submit a hybrid planning application (part outline and part full planning application) for a phased, mixed-use development which is described as follows (the 'Proposed Development'):

"*Hybrid planning application (part outline and part full planning application) for a phased, mixed use development comprising:*

A full element covering enabling infrastructure including the Crawley Western Multi-Modal Corridor (Phase 1, including access from Charlwood Road and crossing points) and access infrastructure to enable servicing and delivery of secondary school site and future development, including access to Rusper Road, supported by associated infrastructure, utilities and works, alongside

An outline element (with all matters reserved) including up to 3,000 residential homes (Class C2 and C3), commercial, business and service (Class E), general industrial (Class B2), storage or distribution (Class B8), hotel (Class C1), community and education facilities (Use Classes F1 and F2), gypsy and traveller pitches (sui generis), public open space with sports pitches, recreation, play and ancillary facilities, landscaping, water abstraction boreholes and associated infrastructure, utilities and works, including pedestrian and cycle routes and enabling demolition.

This hybrid planning application is accompanied by an Environmental Statement.

This hybrid planning application is for a phased development intended to be capable of coming forward in distinct and separable phases and/or plots in a severable way."

1.1.6. Further details on the Proposed Development, the Description of Development and the proposed land uses are set out within the Development Specification and Parameter Plan Framework (WOI-HPA-DOC-DSPPF-01) and the Design and Access Statement (WOI-HPA-DOC-DAS-01).

1.1.7. This hybrid planning application is for a phased development intended to be capable of coming forward in distinct and separable phases and/or plots in a severable way.

1.1.8. The indicative boundary of the Site is shown in **Figure 1**. The Land Use Parameter Plan of the Proposed Development is shown in **Figure 2** below.

1.1.9. Full details regarding the Site and Proposed Development description can be found in the Environmental Statement (ES) Volume 1 Chapter 1: Introduction, and Chapter 4: Proposed Development Description.

1.1.10. The objective of the Lighting Impact Assessment is to provide an independent report on the potential lighting effects on sensitive receptors as a result of the proposed lighting of the Proposed Development. The assessment is in accordance with guidance outlined in the ILP Professional Lighting Guidance 04 (PLG04:2013)[1] "*Guidance on undertaking Environmental Lighting Impact Assessments*".

1.1.11. The Proposed Development would require lighting for the purposes of safety, security, and amenity during the hours of darkness. It is considered that lighting associated with the Proposed Development can be applied sensitively to ensure that the potential for obtrusive light is suitably minimised in compliance with the predetermined obtrusive light limits for the relevant Environmental Zone (assessed to be E2 for the Site as detailed in **Section 8.6).** This can be achieved through the implementation of the carefully planned Lighting Strategy (**Appendix 1**) which is informed by relevant standards and guidance.

1.1.12. The proposed external Lighting Strategy (**Appendix 1**) proposes good practice and outlines a suitable approach to apply to the lighting design of the Proposed Development. It has been utilised for the detailed design for Phase 1 and is also to be used for the outline element. The aim of the strategy is to outline a minimally obtrusive approach to lighting, which is functional, compliant with minimum standards and to ensure sensitivity to both the potentially sensitive local environment and potentially sensitive human receptors.

1 Institution of Lighting Professionals. (2013) – PLG04:2013 - Guidance on Undertaking Environmental Lighting Impact Assessments.ILP

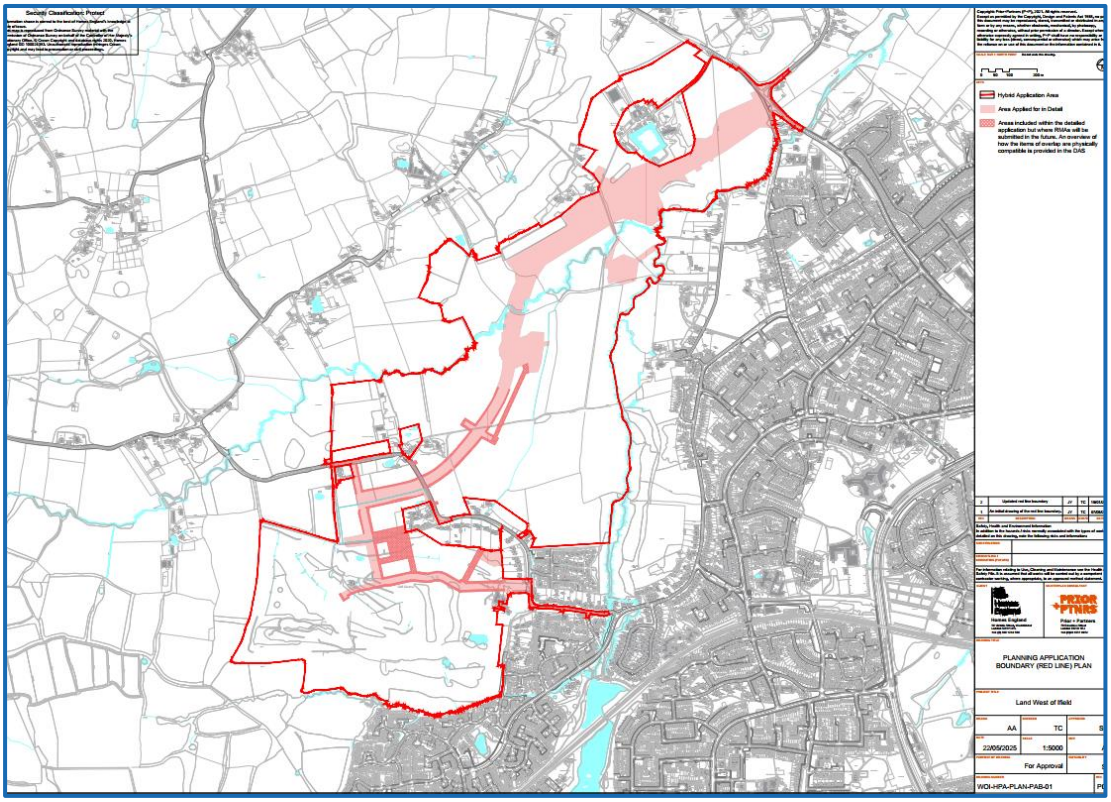


Figure 1–Site Boundary (Red Line) with area applied for in detail (Phase 1) shown in red shading (WOI-HPA-PLAN-PAB-01).

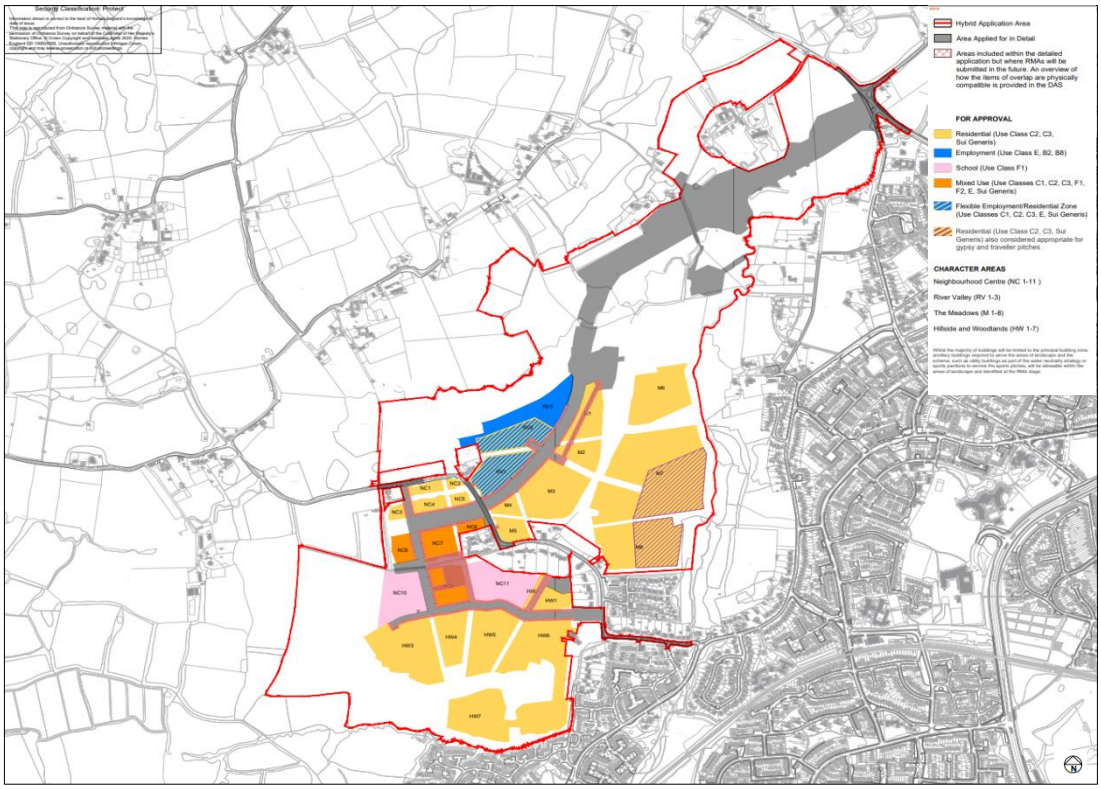


Figure 2 – Land Use Parameter Plan (WOI-HPA-PLAN-PP03-02)

2. METHOD OF ASSESSMENT AND SIGNIFICANCE CRITERIA

2.1. Methodology

2.1.1. The assessment has been carried out in accordance with the published guidance documents from the ILP including document PLG04:2013[1] above "*Guidance on Undertaking Environmental Lighting Impact Assessments*"1 above, and Highways standard DMRB[2] V11(LA104) model of assessing effects.

2.1.2. The assessment references ILP guidance GN01[3] which quantifies the levels of direct upward light, light intrusion, viewed source intensity and glare which are regarded as being acceptable for varying Environmental Zones. In addition, GN08[4] quantifies acceptable levels of vertical and horizontal illuminance where bats are present. This guidance is relevant to the Site due to the presence of bats on the Site and in surrounding woodland parcels.

2.1.3. The Lighting Impact Assessment was based on a desktop study and baseline survey. The methodology employed for this assessment is appropriate to the location of the Site. It comprises a desk-top study of the legislative policy and guidance context; consultation with the design team; a desktop study and Site surveys (carried out on 16th April and 7th May 2024) in which the baseline conditions were established based on industry guidance; confirmation of the general expected light levels for the relevant Environmental Zone in which the Site is located; evaluation of the likely effects of the approved lighting using appropriate assessment criteria; parameter plans; and associated light spill modelling.

2.1.4. The desktop study has involved liaison with other disciplines including Landscape and Visual Impact Assessment (LVIA) and Ecology to identify areas of overlap. It also involves the study of maps, plans and aerial photography views to identify likely receptor locations.

2.2. Technical Scope

2.2.1. The technical scope for this assessment includes the external lighting proposed within the Proposed Development for both the Demolition and Construction Stage and Completed Development Stage. This includes:

- Demolition and Construction Task Lighting
- Demolition and Construction Security Lighting
- Operational Street Lighting
- Operational Amenity, Schools and Sports Lighting

2.2.2. The effects of the following parameters of light will be assessed:

- Illuminance (Lux): Light Intrusion and Light Spill

2 Highways England. LA 104, 'Environmental assessment and monitoring' (Design Manual for Roads and Bridges (DMRB))

3 Institution of Lighting Professionals. (2021) ILP GN01/21 Guidance Note 1 for the reduction of obtrusive light.

4 Institution of Lighting Professionals. (2023) ILP GN08/23 Guidance Note 8 Bats and Artificial Lighting at Night ILP/BCT

- Upward Light (Sky Glow)

2.3. Study Area

2.3.1. The desktop study area was determined by assessing the Site boundaries and the potential receptors that could be affected by a change in the base line lighting levels. The effects of proposed artificial lighting installed within the Site were then evaluated in line with the criteria shown in **Tables 1 - 5**.

2.3.2. The desktop study involved research into relevant legislation, policy and guidance relating to obtrusive light. It also involved the study of ordnance survey maps, plans and aerial photography views to identify likely receptor locations.

2.3.3. The study area is detailed in **Section 8**.

2.4. Classification of Environmental Zone

2.4.1. To understand the restrictions needed to keep the implementation of lighting to a minimum we use what is classified as an Environmental Zone, this is rated from E0 to E4. An Environmental Zone is given its designation based on the context of the surrounding environment as defined by the ILP in GN01/21[3] (see **Section 6**).

2.5. Potential Effects from Artificial Light

2.5.1. In the absence of suitable statutory guidance for undertaking light impact assessments, the ILP "*Guidance Notes for the Reduction of Obtrusive Light*" GN01/21[3] is typically used, to provide suitable assessment criteria against which to assess the likely effects of artificial lighting.

2.5.2. The potential effects on human receptors and the surrounding environment are evaluated based on their adherence to the limitations outlined in the relevant ILP guidance. This guidance, GN01/21[3], outlines restrictions on such things as light intrusion, luminous source intensity, upward light spill (or sky glow). The tables outlining the relevant criteria are in **Table 6 & 7**

2.5.3. The following potential effects can arise from inappropriately designed artificial lighting of a development:

Effects from light intrusion from exterior lighting on residents (through windows)

2.5.4. Wherever residential properties are in proximity to sources of artificial light, there is the potential for light to intrude into the property. A new development has the potential to increase light intrusion on nearby existing properties. Light intrusion (or light spill) is the term for the spilling of light beyond the boundary of the area being lit. The ILP Guidance Notes places a limit on the amount of vertical Illuminance which falls upon the centre of a dwelling window. The suggested maxima values quoted are relative to the amount of light measured as a baseline without the presence of the obtrusive light source.

Effects from viewed source intensity on residents.

2.5.5. ILP guidance GN01/21[3] advises limits on luminaire intensity or viewed source intensity from luminaires to an observer. The greatest effects are usually encountered from poorly aimed floodlights or security lighting, or from lighting which is located too close to properties.

Effects from upward light (or sky glow)

2.5.6. Light emitted above the horizontal either directly from luminaires or indirectly as reflected light from surfaces such as the landscape or buildings, has the potential to cause sky glow. The ILP GN01/21[3] "*Guidance Notes for the Reduction of Obtrusive Light*" places limits on the percentage of direct upward light emitted from the luminaires in their installed attitude, which is dependent upon the Environmental Zone in which the Site lies.

2.5.7. Indirect upward light is subject to surface reflectance properties. It is not easily quantifiable but is unlikely to be as significant as direct upward light from luminaires.

Effects from disability glare on transport users

2.5.8. Glare from light sources can have an intensity towards road users which becomes disabling if the intensity is too high when viewed against a darker background. This disabling glare represents a potential safety hazard as drivers become less able to detect hazards.

Effects from light on bats roosts and insects

2.5.9. As the needs of ecology differ from those of human amenity or human safety as a receptor, a separate set of guidance, GN08/2023[4], is used to evaluate the effects of lighting on light sensitive ecological receptors. An explanation of the implementation and restrictions to protect light sensitive ecology such as bats is outlined in **Section 6**.

2.5.10. Light falling on a roost access point would (at the least) delay some species of bats from emerging and this shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed.

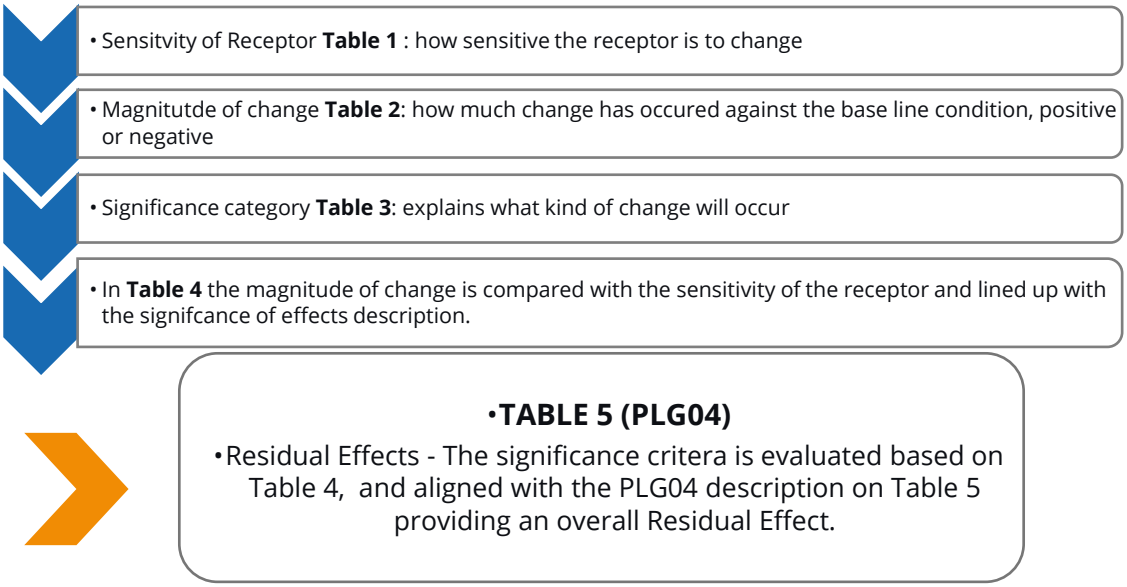
2.5.11. In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats. There are two aspects to this - one is the attraction that certain types of lamps has to a range of insects; the other is the presence of lit conditions.

2.6. Significance Criteria

2.6.1. The significance of an effect from artificial lighting has been based upon the sensitivity of the receptor and the magnitude of impact at that receptor due to the revised conditions.

- The sensitivity of the receptor has been classified as High, Medium, or Low according to the descriptions provided in **Table 1**.
- The magnitude of change is determined as being High, Medium, Low, Negligible, Adverse or Beneficial, descriptions for each are provided in **Table 2.**
- The scale of impact is derived through a matrix (**Table 4**), matching the sensitivity of the receptor, with the magnitude of the impact to calculate the significant criteria and residual effects value.
- The residual effects values are then matched to the significance of effects or residual effects (**Table 5**).

Figure 3 Effects Outcome Explanation



Sensitivity	Description of Criteria	
High	The environment is fragile, and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.	
	Human Amenity (HR)	receptors which are sensitive to a change in lighting such that their quality of life would be affected (i.e. lighting is designated a statutory nuisance).
	Human Safety (HS)	receptors where a change in the lighting has the potential to either dramatically improve or reduce safety (for pedestrians, drivers or workers).
	Ecological (ER)	where a change in the lighting affects the habitats, breeding or feeding of fauna (e.g. protected habitats or other special areas) or growth patterns of fauna / crops.
Medium	The environment has a degree of adaptability and resilience and is likely to accommodate the changes caused by an impact, although there may still be some residual modification as a result.	
	Human Amenity (HR)	receptors which are sensitive to a change in lighting, however not such that their quality of life would be affected.
	Human Safety (HS)	receptors where a change in the lighting has the potential to either improve or reduce safety (for pedestrians, drivers or workers).
	Ecological (ER)	where a change in the lighting affects the movement or feeding patterns of fauna but the receptor can adapt.
Low	The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions.	

Sensitivity	Description of Criteria	
	Human Amenity (HR)	receptors which would not noticeably be aware of a change in lighting.
	Human Safety (HS)	receptors where a change in the lighting has limited potential to affect safety (for pedestrians, drivers or workers).
	Ecological (ER)	The environment is adaptable and is resilient to change. Nearly all impacts can be absorbed within it without modifying the baseline conditions.

Table 1: Criteria for Receptor Sensitivity

Magnitude of Change		Description of Criteria
High	Adverse	A large change compared to the natural variations in background levels. A clear breach of limits and standards. For example, levels of obtrusive light in the form of sky glow, light trespass or glare towards a receptor which exceeds the limits set within the ILP guidance for a higher Environmental Zone would classify as a high magnitude of change.
	Beneficial	A large change compared to the natural variations in background levels. A clear and obvious decrease in light as a result of the Proposed Development when compared to the existing baseline. For example, the removal of a large obtrusive light source that results in a surrounding baseline being compliant with the relevant standards and guidance.
Medium	Adverse	Change which is noticeable and may be a breach of limits and standards. In terms of the limits set in the ILP guidance this might equate to exceeding the limit but within the limits set for the next Environmental Zone.
	Beneficial	Change that results in a slight improvement on the existing baseline. This may bring a site that is in minor breach of guidance to being compliant or closer to compliant.
Low	Adverse	Change which, when compared to background levels, is only just noticeable but does increase the surrounding light levels
	Beneficial	Change which, when compared to background levels, is only just noticeable but does decrease the light impacting the surrounding environment.
Negligible		Localised change which, when compared to background levels, is either not noticeable or only just noticeable but does not increase the surrounding light levels.

Table 2: Criteria for Magnitude of Change (+/- = Baseline – Proposed Development)

Significance category	Typical description
Major	Effects at this level are material and significant in the decision-making process.
Moderate	Effects at this level can be significant decision-making factors.
Minor	Effects at this level are not significant in the decision-making process.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 3: Definitions of significance categories (Magnitude of change x receptor sensitivity)

Significance of Effect Matrix		Magnitude of Change			
		Negligible	**Low**	**Medium**	**High**
Sensitivity of Receptor	**Low**	Negligible	Negligible	Negligible -Minor	Minor
	Medium	Negligible	Negligible -Minor	Minor	Moderate
	High	Negligible	Minor	Moderate	Major

Table 4 Significance of Effect Matrix (Score +/- based on Magnitude of Impact)

PLG04 Description	Description
Major (beneficial) (Significant)	Substantial reduction in obtrusive light at sensitive receptors and/or users of the site such that large scale improvements to visual amenity, human safety or health is delivered. Significantly improves ecological habitats and conditions for species
Moderate (beneficial) (Significant)	Moderate reduction in obtrusive light at sensitive receptors and/or users of the site such that noticeable improvements to visual amenity, human safety or health are delivered. Improves ecological habitats and conditions for species
Minor (beneficial) (Not significant)	Minor reduction in obtrusive light at sensitive receptors and/or users of the site such that perceptible improvements to visual amenity, human safety or health is delivered; perceptible improvement to ecological habitats and conditions for species.
Negligible (Not significant)	No appreciable effect on sensitive receptors. Effects are reversible.
Major (adverse) (Significant)	Major increase in obtrusive light at sensitive receptors and / or users of the site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires extensive remedial works. For example, a floodlighting installation which directs light into the eyes of oncoming motorists causing disability glare and potential reduction in visual performance leading to an increased risk of collision.
Moderate (adverse) (Significant)	Moderate increase in obtrusive light at sensitive receptors and / or users of the site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires monitoring and local remedial work. For example, lighting which is visible and causes nuisance to a sensitive receptor outside the site.

PLG04 Description	Description
Minor (adverse) (Not significant)	Minor increase in obtrusive light at sensitive receptors and / or users of the site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Effects are reversible or temporary.

Table 5 Residual Effect Description

2.7. Assumptions and Limitations

2.7.1. The assessment assumes that Demolition and Construction Stage lighting for the Phase 1 detailed component will be implemented in line with the Phase 1 Outline Construction Environmental Management Plan[5] (OCEMP) dated March 2024 and the mitigation detailed in **Section 12** of this report.

2.7.2. For the Phase 1 detailed component, this assessment assumes that lighting would be installed in line with the Phase 1 OCEMP and the external Lighting Strategy presented in **Appendix 1**.

2.7.3. For the outline component, this assessment assumes that the Proposed Development's lighting design would be undertaken by suitably qualified and experienced designers and contractors; who are capable of carrying out such works.

2.7.4. For the outline component, this assessment assumes that lighting would be installed in line with the external Lighting Strategy presented in **Appendix 1**.

2.7.5. It is assumed that detailed lighting calculations for the outline component of the planning application will be undertaken at the Reserved Matters stage to ensure that the design conforms to the obtrusive light requirements of each sensitive receptor detailed within this report.

2.7.6. The installation for all stages is to be overseen and undertaken by a competent person or people in accordance with any requirements that have been imposed on the Site.

2.7.7. Any mitigation required is implemented.

5 West of Ifield Phase 1 Infrastructure Outline Construction Environmental Management Plan, Arcadis, dated March 2024 Document Ref: 10051123-ARC-XXX-ZZ-TR-CM-00001

3. LEGISLATIVE FRAMEWORKS AND NATIONAL POLICIES

3.1. Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005[6]

3.1.1. Since 2005, artificial light has been incorporated as a potential statutory nuisance. An amendment to section 79 of the Environmental Protection Act 1990, contained within the Clean Neighbourhoods and Environment Act 2005 states:

"The following matters constitute "statutory nuisances" for the purposes of this Part, that is to say— [....]

[....] artificial light emitted from premises so as to be prejudicial to health or a nuisance;

[....]and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint".

3.2. National Planning Policy Framework 2024 (Revised 2025)

3.2.1. The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how they are expected to be applied and provides a framework for local plans. With regard to light pollution, the NPPF was updated in December 2024 with a minor revision in February 2025, and states in paragraph 198, that the following elements are to be considered:

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

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

3.3. Planning Practice Guidance

3.3.1. Guidance for assessing the effects of proposed artificial lighting is outlined in the planning practice guidance (PPG) under the category of "Light Pollution". The guidance states in paragraph 001 that

"Artificial lighting needs to be considered when a development may increase levels of lighting, or would be sensitive to prevailing levels of artificial lighting."

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

3.3.2. Paragraph 002 states:

"What factors can be considered when assessing whether a development proposal might have implications for light pollution?

The following questions indicate matters that may need to be considered in relation to managing the effects of light pollution:

"Does an existing lighting installation make the proposed location for a development unsuitable, or suitable only with appropriate mitigation? For example, this might be because:

- *the artificial light has a significant effect on the locality; and/or*
- *users of the Proposed Development (e.g., a hospital) may be particularly sensitive to light intrusion from the existing light source.*

Where necessary, development proposed in the vicinity of existing activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme, reflecting the agent of change principle. Additional guidance on applying this principle is set out in the planning practice guidance on noise.

Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?

Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration but will need to be considered in terms of both their severity and alongside the wider benefits of the development.

Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?

Would new lighting have any safety impacts, for example in creating a hazard for road users?

Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.

Does the Proposed Development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour.)"

4. LOCAL POLICIES

4.1. West Sussex County Council

4.1.1. The Site sits within the county of West Sussex. There are no relevant policies from West Sussex County Council (WSCC) which directly relate to the effects of lighting. The street lighting specification for WSCC is detailed below at **4.3**

4.2. Horsham District Council, Horsham District Planning Framework 2015[7]

4.2.1. The relevant Local Planning Authority (LPA) for the Proposed Development is Horsham District Council. The Site lies primarily within the boundary of Horsham District Council which sets out the vision for the area to 2031 in the '**Horsham District Planning Framework 2015**' and have also published a document "**Facilitating Appropriate Development[8]**" in October 2022, however there is no specific content relating to this assessment.

4.2.2. The most relevant policies to lighting outlined within the "**Horsham District Planning Framework 2015"** are:

Policy 24 Strategic Policy: Environmental Protection

"The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents.

Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to, and the emission of pollutants including noise, odour, air and light pollution and ensure that they…

7. Ensure that the cumulative impact of all relevant committed developments is appropriately assessed."

4.2.3. In the preamble to Policy 24 it states that "the appropriate types and locations of lighting should be used, so as not to give rise to unnecessary light pollution, particularly in rural areas."

Policy 27 Strategic Policy: Settlement Coalescence

"Landscapes will be protected from development which would result in the coalescence of settlements.

Development between settlements will be resisted unless it can be demonstrated that:…

2. It does not generate urbanising effects within the settlement gap, including artificial lighting, development along key road corridors, and traffic movements."

4.3. Rusper Parish Council

Rusper Neighbourhood Plan 2018-2031[9]

4.3.1. The relevant policy to artificial lighting outlined within the **Rusper Neighbourhood Plan 2018-2031** is:

7 Horsham District Council, (2015) Horsham District Planning Framework 2015

8 Horsham District Council, (2022) Facilitating Appropriate Development

9 Rusper Neighbourhood Plan 2018-2031

Policy RUS10: Dark Skies

"All development proposals should be designed to minimise the occurrence of light pollution. The Parish Council will expect such schemes to employ energy-efficient forms of lighting that also reduce light scatter and comply with current guidelines established for rural areas by the Institute of Lighting Professionals (ILP).

The requirement for any external lighting should be restricted to areas of specific concern and may include:

i. Road safety in areas where there is a very specific risk to pedestrians and cyclists.

ii. Deterring criminal activity

iii. Lighting entrances to buildings used after dark.

iv. Lighting for evening sporting or recreational activities.

v. Supporting the night-time economy, including lighting for farmers needing to work at night.

Proposals for all development will be expected to demonstrate how it is intended to prevent light pollution. Information on these measures must be submitted with applications, and where a development would potentially impact on light levels in the area, an appropriate lighting scheme will be secured by planning condition."

4.3.2. In the commentary related to the above policy it states…

" 6.54. Artificial lighting schemes that are likely to be approved will include good designs that:

- *Seek innovative green solutions for low-level lighting*
- *Reflect the type of area where they will be in operation*
- *Minimise brightness and do not over illuminate an area*
- *Minimise hours of operation and have automatic PIR sensors and timed cut-off*
- *Use light fittings that control the direction of the beam, which should not emit light at angles greater than 70 degrees and avoid any upward light emission."*

4.4. West Sussex County Council Highways and Transport, Street Lighting Specification, Version 7 March 2023 (Agreed WSCC Tony McCarthy)[10]

4.4.1. Adoptable Lighting associated with the Proposed Development would be designed and installed in accordance with the West Sussex County Councils' adoptable specification for Street Lighting, as per this policy document. The external Lighting Strategy (Appendix 1) has been based on this guidance as have the detailed designs for Phase 1 (detailed) component.

Street Lighting Specification, Version 7 March 2023

4.4.2. This policy document states the following luminaire can be used as standard:

"Standard road lighting luminaire is:

• Urbis Axia 3, Neutral White LED – NW 740 (4000K),"

10 West Sussex County Council. 2023 Highways and Transport, Street Lighting Specification, Version 7 March 2023

4.4.3. Additional non-standard luminaires may also be used:

"In circumstances that require exceptional optical performance other options may be considered:

- *Signify Luma Gen 2 - 5.2S Neutral White LED – NW 740 (4000K CCT),*
- *For TR12 calculations at Zebra and "parallel" crossings to enhance use the following: -*
- *Signify Luma Gen 2 – 5.2S Cool White LED – CW 757 (5700K CCT), CLO*

Road lighting luminaires should be configured as follows:

- *Switch control: Individual Telensa telecell fitted into the patented 7-pin Nema socket built into each lantern"*

4.4.4. The following clarifications within the WSCC street lighting specification are made regarding obtrusive light and ecology:

"Obtrusive light – further to BS 5489 (4.23) and ILP GN01

See also ILP's GN01/20 Guidance notes for the reduction of obtrusive light.

The majority of lighting in West Sussex is within the E3 "suburban" zone (Table 2, ILP GN01/20); therefore, values of vertical illuminance onto properties should not exceed post curfew value 2 lux Ev (Table 3, ILP GN01/20).

South Downs National Park has been designated a Dark Sky Zone (E1 zone). Within the designated area Zones have been specified to buffer sensitive areas from light intrusion. Consideration to controlling light in and around the area must be made and all lights must be set at zero tilt. Louvres should be considered to limit light spill beyond the target highway area. See Appendix I.

Light intrusion problems should be dealt with using the lantern manufacturer's bespoke louvres and shields. Extraneous third-party manufactured shields fitted to column or lantern are not acceptable.

If louvres/shields are used, then the photometric data file used in lighting calculations must correspond.

Ecology – further to BS 5489 (4.2.4) and ILP GN08/18

The designer's commentary should discuss any relevant Environmental Impact Assessments or development-specific design codes and describe any mitigations applied. See Appendix A.

Light sources of 4000K CCT (correlated colour temperature) are specified throughout West Sussex; ILP GN08/18 advises that in special circumstances 'warmer' light sources may be advisable (e.g. 3000K CCT); designer commentary to discuss any departure from standard 4000K."

5. BRITISH STANDARDS

5.1. BS 5489-1:2020 - Lighting of Roads and Public Amenity Areas - Code of practice[11].

5.1.1. This standard gives recommendations on the general principles of road lighting, its aesthetics and technical aspects and provides guidance on operational maintenance. It also provides guidance on means of minimizing energy consumption and limiting the impacts on the environment and adjacent properties.

5.2. BS EN 13201-2:2015 - Road lighting. Performance requirements[12].

5.2.1. This British and European standard defines the performance requirements specified as lighting classes for road lighting aiming at the visual needs of the road users, as well as the consideration of the environmental aspects of the road lighting to be applied.

5.3. BS EN 12464-2:2024 - Light and Lighting – Lighting of workplaces[13]

5.3.1. This British and European standard specifies lighting requirements for outdoor workplaces which meet the needs for visual and performance. All visual tasks are considered with the exclusion of lighting specified for the use of lighting required in an emergency.

5.4. BS EN 12193:2018 – Light and Lighting – Sports Lighting[14].

5.4.1. This British and European standard specifies lighting for indoor and outdoor sports events, the document covers most sports events practised within Europe. The document considers the application of artificial lighting, control methodology, uniformity, glare restrictions, illuminance and colour properties for optimal performance.

11 British Standards Institution. (2020) BS 5489-1:2020 - Lighting of Roads and Public Amenity Areas - Code of practice. London: BSI.

12 British Standards Institution. (2015) BS EN 13201-2:2015 - Road lighting. Performance requirements. London: BSI.

13 British Standards Institution. (2024) BS EN 12464-2:2024 - Light and Lighting – Lighting of workplaces. London: BSI.

14 British Standards Institution. (2018) BS EN 12193:2018 – Light and Lighting – Sports Lighting. London: BSI.

6. GUIDANCE

6.1. Guidance Notes for the Reduction of Obtrusive Light (Institution of Lighting Professionals GN01/2021)[3]

6.1.1. This Lighting Assessment is informed by industry guidance notes which aim to reduce the potential for obtrusive light to occur, which is typically caused by poorly designed and installed exterior artificial lighting. The Lighting Strategy is informed by the most relevant sections of GN01/2021 that aims to reduce the potential for obtrusive light from a wide range of exterior lighting applications.

6.1.2. Consideration has been given to light intrusion, direct upward light (sky glow) and glare within the context of varying Environmental Zones.

6.1.3. Light intrusion refers to the spilling of light beyond the boundary of the area to be lit. This includes the intrusion of light into bedroom windows.

6.1.4. Sky glow refers to the brightening of the sky above towns cause by direct or reflected upward light.

6.1.5. Glare refers to the uncomfortable brightness of a light source when viewed against a dark background.

6.1.6. **Figure 4** illustrates the different types of obtrusive light.

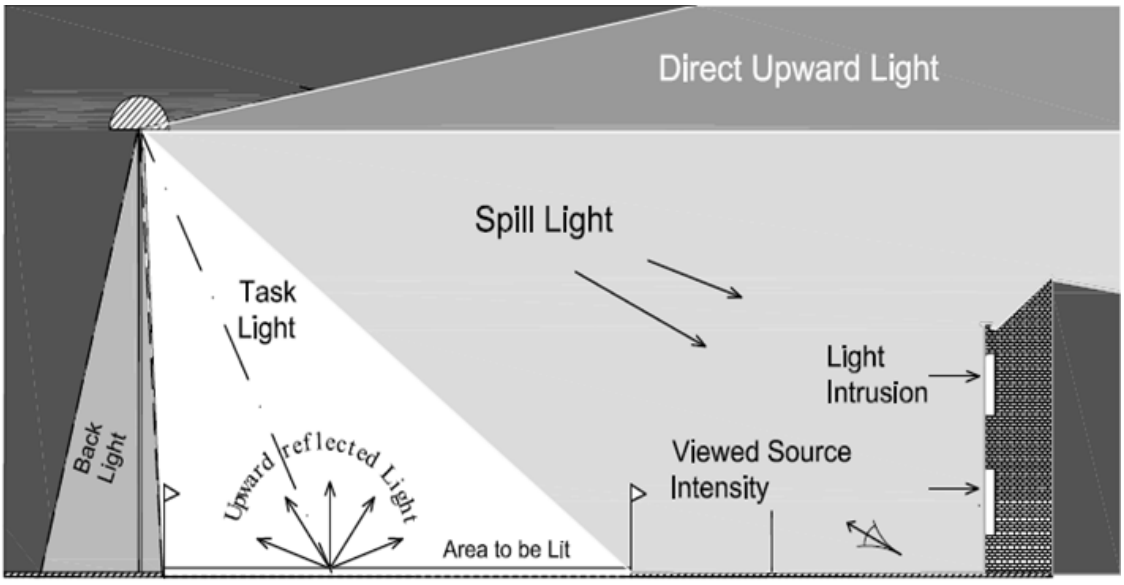


Figure 4 Types of Obtrusive light diagram from ILP GN01/21[3],

6.1.7. The ILP Guidance Notes Guide includes quantifiable levels of obtrusive light regarded as acceptable for varying Environmental Zones E0 to E4. These are shown in **Table 6**.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	Astronomical Observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks.
E1	Natural	Intrinsically dark	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, etc.
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 6: Environmental Zone Descriptions from ILP GN01/21[3]

Environmental Zones	Sky Glow ULR[a] (Max %)	Light Trespass (Into Windows) Ev (lux)		Building Luminance Average, Pre-curfew
		Pre- Curfew	Post-Curfew[b]	Average L (cd/m^2)
E0	0	0	0	0
E1	0	2	0.1 (1[c])	0
E2	2.5	5	1	5
E3	5	10	2	10
E4	15	25	5	25

Table 7: Obtrusive Light Criteria from ILP GN01/21[3]

Notes to Table 7

a. ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky

b. Curfew refers to a time when the local planning authority has agreed that the lighting installation should be switched off; this typically refers to 23h00 – 07h00

c. If the installation is for public (road) lighting then this may be up to 1 lx

6.1.8. The relevant criteria of upward light, light intrusion and direct source intensity are shown in **Table 7** which sets limits for each criterion.

6.1.9. In the application of task lighting requiring high levels of illuminance, such as (but not limited to) sports lighting, the potential for glare can occur due to high levels of luminous intensity. The limits for the luminous intensity of bright luminaires are dependent on the viewing distance d, (between the observer and the bright luminaire(s)) and the projected area A_p, of the bright part of the luminaire in the direction of the observer **Table 8** shows the maximum values for the luminous intensity of luminaires in designated directions.

	Environmental zone	30 to 40 cm	40 to 80 cm	>80 cm
Maximum luminous intensity emitted by luminaire. (*I* in cd)5	E0 Pre curfew Post Curfew	0	0	0
	E1 Pre curfew	2.5 *d*	5.1 *d*	2,500
	Post Curfew	0	0	0
	E2 Pre curfew	5.0 *d*	10 *d*	7,500
	Post Curfew	2.5 *d*	5.1 *d*	500
	E3 Pre curfew	7.5 *d*	15 *d*	10,000
	Post Curfew	2.5 *d*	5.1 *d*	1,000
	E4 Pre curfew	13 *d*	26 *d*	25,000
	Post Curfew	2.5 *d*	5.1 *d*	2,500

Table 8: Limitation of bright luminaires in the field of view from ILP GN01/21[3]

- d is the distance between the observer and the glare source in metres
- A luminous intensity of 0 cd can only be realised by a luminaire with a complete cut-off in the designated directions.
- Ap is the apparent surface of the light source seen from the observer position.
- For further information refer to Annex C of CIE 150.
- Upper limits for each zone shall be taken as those with column Ap>0.5.

6.2. GN08/2023 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals[4].

6.2.1. This document is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting near or within sensitive ecological receptor locations. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios. However, it is not meant to replace site-specific ecological and lighting assessments, which states the following:

"It is acknowledged that, especially for vertical calculation planes, very low levels of light (<0.5 lux) may occur even at considerable distances from the source if there is little intervening attenuation. It is therefore very difficult to demonstrate 'complete darkness' or a 'complete absence of illumination' on vertical planes where some form of lighting is proposed on site despite efforts to reduce them as far as possible and where horizontal plane illuminance levels are zero. Consequently, where 'complete darkness' on a feature or buffer is required, it may be appropriate to consider this to be where illuminance is below 0.2 lux on the horizontal plane and below 0.4 lux on the vertical plane. These figures are still lower than what may be expected on a moonlit night and are in line with research findings for the illuminance found at hedgerows used by lesser horseshoe bats, a species well known for its light adverse behaviour (Stone, 2012)."

"A warm white light source (2700Kelvin or lower) should be adopted to reduce blue light component."

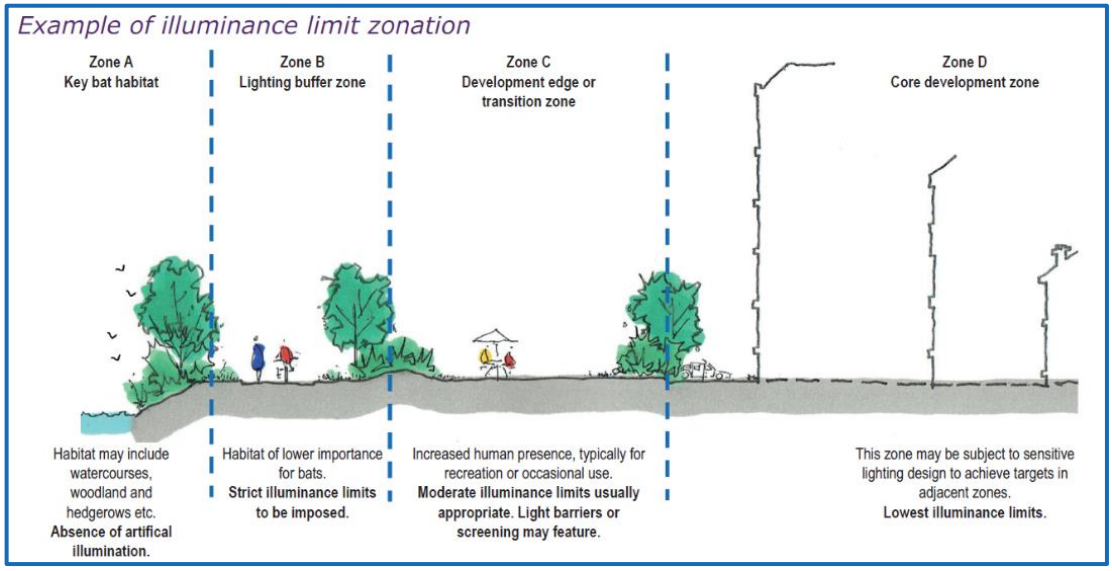


Figure 5 Example of lighting zonation near sensitive boundaries from ILP GN08/23

*"A buffer zone subdivided to into smaller zones of increasing illuminance limit further away from the Supporting Habitat would ensure light levels (illuminance - measured in lux) do not exceed certain defined limits. This has the effect of a gradual decrease in lighting from the developed zone, rather than a distinct cut-off, which may provide useable area for the project which also limits lighting impacts on less sensitive species, or less well-used habitat." (*see **Figure 5**).*"

6.2.2. The target horizontal and vertical illuminance limits from GN08/23 are levels where 'complete darkness' on a feature or buffer is required and can be summarised in the **Table 9**. These levels are important in relation to this Proposed Development as there are areas of the Site where there are light-sensitive species.

	Illuminance (lux)
Target horizontal illuminance	<0.2 lux
Target vertical illuminance	<0.4 lux

Table 9 GN08 guidance illuminance levels for achieving "complete darkness"

6.3. Institution of Lighting Professionals (ILP) PLG 04 "Guidance on Undertaking Environmental Lighting Impact Assessments", 2013[1]

6.3.1. PLG 04 is used to ensure that the Lighting Impact Assessment is correctly carried out:

"…this document is designed to provide an explanation of, and guidance on, the process for producing a Lighting Assessment…to remove or minimise environmental problems".

6.4. CAST Aerodrome Safeguarding Advice Note 2 – Lighting Near Aerodromes[15].

6.4.1. This advice note published by the Civil Aviation Authority (CAA) "considers the location, height, brightness, type, and pattern of lights around the aerodrome, with an overall caveat that no light should be directed or pointed towards any aircraft."

15 CAST Aerodrome Safeguarding Advice Note 2 – Lighting Near Aerodromes

6.4.2. It further states that "Various types of lighting have the potential to cause issues for example:

- Temporary lighting, e.g. construction lighting, light shows, temporary installations • Advertisements
- Lighting of buildings and other structures
- Street and car park lighting
- Flood lighting at sporting venues or similar including special events in temporary locations.

6.4.3. No lighting should be displayed which could distract pilots or confuse them by being mistaken for aeronautical ground lights."

6.4.4. The advice then references use of Road Lighting Standards BS 5489-1:2020[11] and BS EN 13201-2:2015[12] which are referenced in **Section 5**.

7. CONSULTATION

Scoping Opinion (Outline) 2020

7.1. Place Services (on behalf of Horsham District Council)

7.1.1. Place Services provided ecological advice on behalf of HDC and submitted a scoping opinion on 19th October 2020. In it there is reference to lighting as follows:

"It should be noted that hedges that meet the definition for Priority habitat may also be of importance to bats. These flight and foraging lines are important to enable bats to feed and also to enable them to reach open countryside; they could also be vulnerable to lighting."

7.1.2. In relation to "Any trees with medium or high potential to support roosting bats" the opinion states that:

"If through the master planning stage, none of these trees will be lost and a bat friendly lighting scheme can be provided, the Local Planning Authority can have certainty of impacts for these European Protected Species and will secure the necessary mitigation as a condition of any consent."

Scoping Opinion 2023

7.2. London Gatwick Airport

7.2.1. London Gatwick provided a scoping opinion in a letter ref LGW5339 dated 19th October 2023. This opinion is repeated and superseded by their scoping opinion dated 12th June 2024 discussed below.

Scoping Opinion 2024

7.3. Horsham District Council

7.3.1. Horsham District Council provided a scoping opinion Ref EIA/24/003 dated 15th July 2024. The scoping opinion can be found in ES Volume 2 Technical Appendix 2.2. There was no specific reference to lighting included in this opinion.

7.4. London Gatwick Airport

7.4.1. London Gatwick provided a scoping opinion in a letter ref LGW5536 dated 12th June 2024. The letter states that "*it is important that aerodrome safeguarding considerations are covered in full in the EIA as follows:*

Lighting

Any lighting will need to be carefully designed and laid out to ensure that there will be no issues for pilots, aircrew and ATC. At night and in periods of poor visibility during the day pilots rely on a particular pattern of the aeronautical ground lights, principally the approach and runway lights to assist in aligning themselves with the runway to touch down at the correct point. Therefore, other lights must not be displayed which would distract pilots or confuse them by being mistaken for aeronautical ground lights.

There must not be a high level of background lighting which could diminish the effectiveness of runway lighting, no light spill above the horizontal and no lighting that could cause dazzle or distract pilots or Air Traffic Control such as laser lights or flashing lighting.

Please see CAST Advice Note 2 "Lighting near Aerodromes" available at for further general information. CAST Advice Notes | Civil Aviation Authority (caa.co.uk)"

7.5. Response to Scoping Opinions

7.5.1. The opinions which relate to lighting are all valid and are all addressed within this lighting assessment and the external Lighting Strategy.

8. DESKTOP STUDY

8.1. Desk Top Assessment

8.1.1. During the desktop assessment, publicly available information was used to assess the Site and the surrounding area to inform the baseline survey; to identify potentially sensitive receptors; and to identify the Environmental Zone applicable to the Site and the surrounding area.

8.1.2. Information used during the desktop assessment includes:

- The Countryside Charity (CPRE) Skyward Radiance Mapping[16],
- Google imaging data for roadways (dated 2021).

8.2. Site Description and Context

8.2.1. The Site is approximately 171 hectares (ha) and is located west of Ifield which is itself situated to the north-west of Crawley in West Sussex. The application boundary of the Site and Parameter Plan 3: land Use (WOI-HPA-PLAN-PP03-01) can be seen in **Figure 1 & 2**.

8.2.2. The Site is predominantly occupied by a mixture of arable and pastoral fields and includes the Ifield Golf Course and Country Club in its far southern portion. The River Mole is present across the northern part of the Site and flows from south-west to north-east.

8.2.3. The surrounding area is occupied by agricultural land uses, light industrial, commercial and residential land-uses. Much of the eastern Site boundary is bordered immediately by Ifield Brook Wood and Meadows, beyond which is the residential development associated with the suburb village of Ifield, which forms a wider built context within Crawley. The M23 motorway, which connects London with the south of England, is located approximately 3.7 km to the south-east.

8.2.4. Land to the west and south-west is predominantly in agricultural use with small holdings and villages present further west, for example, the villages of Lambs Green and Rusper.

8.2.5. Land uses to the north are also predominantly agricultural, with the key exception being Gatwick airport, which is located approximately 1km to the north-east, beyond which lies the town of Horley. Land adjacent to the north-west of the Site is occupied by ancient woodland and few farmlands beyond. An extensive network of public footpaths provides for pedestrian access and recreation across the rural area, both within and the outside the Site, and this includes good connections with the urban area. The surrounding land supports a variety of individual residential houses and farmhouses

8.2.6. The Site's western boundary is characterised by woodland, understorey vegetation, and agricultural land. Beyond the boundary is farmland, associated farm buildings, and isolated residential properties. Beyond this, the surrounding land includes scattered farmhouses and individual houses, including an intermittent array of houses along Ifield Wood approximately 200m to the north-west at the nearest point.

16 The Countryside Charity (CPRE). (2016). Night Blight: Mapping England's light pollution and dark skies. (https://nightblight.cpre.org.uk/maps/) CPRE

8.2.7. The Site's southern boundary is met by Hyde Hill Brook and woodland. Beyond is Ifield West with residential land-use. The south-western edge of the boundary is predominantly occupied by ancient and semi-natural woodland of Hyde Hill Wood.

8.2.8. Rusper Road bisects the Site for a short section near the golf course, where the Site is bounded by Peverel Road and Hyde Hill Brook along the south-eastern boundary,

8.2.9. The Site's eastern boundary abuts Ifield Brook Wood and Meadows. The eastern boundary runs along the Ifield Brook until it feeds into the River Mole in the north and reaches 'The Maples' residential estate in the south. Beyond the Ifield Brook is the Ifield Conservation Area and Rusper Road Playing Fields. The area adjacent to the eastern boundary and beyond is mostly residential in land-use, with the closest buildings located along Rusper Road. The Parish Church of St. Margaret, a Grade 1 listed building, is located approximately 180m to the east of the Site.

8.2.10. Further to the east lies the residential Ifield Village, which includes the Church of St. Margaret, Ifield Theatre and a public house.

8.2.11. The northern boundary of the Site abuts Charlwood Road, Ifield Avenue, Bonnets Lane, and Ifield Green. Ifield Wood and Cophall Wood are directly adjacent to the Site's north-western boundary.

8.2.12. There is a discrete off-Site parcel of land that is situated within the northern portion of the Site. This northern 'island' comprises the Ifield Court Hotel (covering an area of approximately 1ha), a medieval moat at Ifield Court, a scheduled monument and some agricultural buildings.

8.3. Designations

8.3.1. There are no Natura 2000 (Special Areas of Conservation (SACs and Special Protection Areas SPAs)) nor Ramsar sites within 10km. Furthermore, there are no statutory sites notified for bat species that have been recorded associated with the Site. Whilst not nationally designated sites, there is one notable bat population centred on Hyde Hill Woods which is immediately south of the Site, and another associated with the Ifield Wood area to the north-west of the Site.

8.3.2. There are four statutory designated sites within 2 km of the Site, as summarised in **Table 10**.

8.3.3. While there are no statutory ecological or landscape designations on the Site, it has biodiversity value due to the presence of notable habitats, including trees, tree groups, semi-natural grassland areas and hedgerow, as well as the potential to support protected and notable species. The Phase 1 habitat survey identified on-Site habitats and informed a series of surveys which are submitted as part of the planning application.

Site Name	Designation	Reasons for Designation	Distance from Site (Approx.)
House Copse	SSSI	A small, isolated woodland, 665m south of the Site The woodland is too distant for there to be any effects due to lighting	0.665 km

Site Name	Designation	Reasons for Designation	Distance from Site (Approx.)
Buchan Hill Ponds	SSSI	These ponds are 1.6km south of the Site and separated from the Site by Ifield West and Bewbush. They are too distant for there to be any effects due to lighting	1.6km
Willoughby Fields	LNR (also, an LWS)	Large site containing several unimproved grassland fields with a network of hedgerows, areas of scrub and small copses that lies between the River Mole and an unnamed stream on the outskirts of Langley Green in Crawley. The site is well used by the public for informal recreation, and it adjoins a rugby club. A considerable amount of tree and hedge planting has been carried out on the site. This site is assessed to be too distant from the Site for any lighting effects.	0.6km
Target Hill Park	LNR	This comprises a mosaic of grassland, scrub and woodland habitats and is located 1.9km south-east of the Site. This site is assessed to be too distant from the Site for any lighting effects.	1.9km
Hyde Hill Woods	LWS	This woodland area to the south of the golf course is a known habitat of Bechstein's Bats	0km
Ifield Brook Wood and Meadows	LWS & SNCI	This area lies to the east of the Site and consists of several herb-rich meadows enclosed by thick hedges, Ifield Brook and an area of woodland.	0km

Table 10 Designated sites within 2km of the Site

8.4. Existing Lighting in the Study Area

8.4.1. Urban areas including the village of Ifield are found to the east of the Site, whilst the area to the west of the Site is predominantly rural.

8.4.2. The roads to the west and north-west of the Site (Ifield Wood, Rusper Road, Hillybarn Road) were surveyed and are unlit and the ambient luminance to the west of the Site is low. There are isolated properties which have land abutting the Site. These properties may have sources of luminance from the interior room and garden security / amenity lighting, however there were no major sources of luminance evident onto the Site.

8.4.3. Rusper Road where it dissects the Site was surveyed and is unlit apart from 3 lighting columns at the junction of the Maples development (Drughorn Way) until where it reaches the mini roundabout to the east of the Site. There are residential and commercial

properties on Rusper which abut the Site. These properties may have sources of luminance from the interior room and garden security / amenity lighting, however there were no major sources of luminance evident onto the Site. The Maples estate to the north-east of the golf course is a residential development leading from Rusper Road. It has lit streets and lighting normally associated with residential properties.

8.4.4. The hotel and residential properties found within the off-Site "island" at the north of the Site is a source of luminance, however the light level emitted from this area is not significant. The access road to the "island" is unlit.

8.4.5. From the site survey it was noted that the main luminance sources close to the Site are from the residential development of Ifield West located 25-50m to the south of the golf course. The roads are all lit in this area and additional sources of luminance are from house lighting and security lighting in some rear gardens abutting the woodland.

8.4.6. To the east of the Site, Rusper Road, Ifield Avenue and Charlwood Road and subsidiary roads leading off, are all lit with street lighting and associated residential properties are also potential sources of luminance from interiors and security lighting. The other roads (with the exception of Rectory Lane and parts of Ifield Lane) are lit, however, not to a high level of illuminance. The residential properties on these roads are also potential sources of luminance , but not to a high level as would be consistent with light emitted from the interiors and from garden security / amenity lighting.

8.4.7. From the site survey, it was noted that lighting associated with the urban area of Crawley is evident in the form of sky glow as a result of lighting associated with Gatwick Airport (approximately 1km north-east of the Site).

8.5. Assessment of baseline sky radiance - CPRE Night Blight Mapping[16]

8.5.1. CPRE Night Blight Mapping is a visual representation of light pollution as a view from above the earth's atmosphere and indicates upward light spill based on sky glow.

8.5.2. CPRE Night Blight Mapping has informed the baseline light level assessment. Night Blight mapping of the area is shown in Figure 6 and indicates low levels of skyward radiance in the vicinity of the Site. The skyward radiance levels range from 1-2 NanoWatts / cm2 / sr in the west of the Site increasing to 2-4 NanoWatts / cm2 / sr in the east of the Site which is adjacent to other residential development. The scale of values in Figure 5 puts some context into the results for the Site, in that a value of 1-2 or 2-4 NanoWatts / cm2 / sr would typically be found in rural areas.

8.5.3. There is also increased sky radiance moving east from the Site as shown in **Figure 6**. These levels of >4NW/cm^2/sr are typical for residential areas.

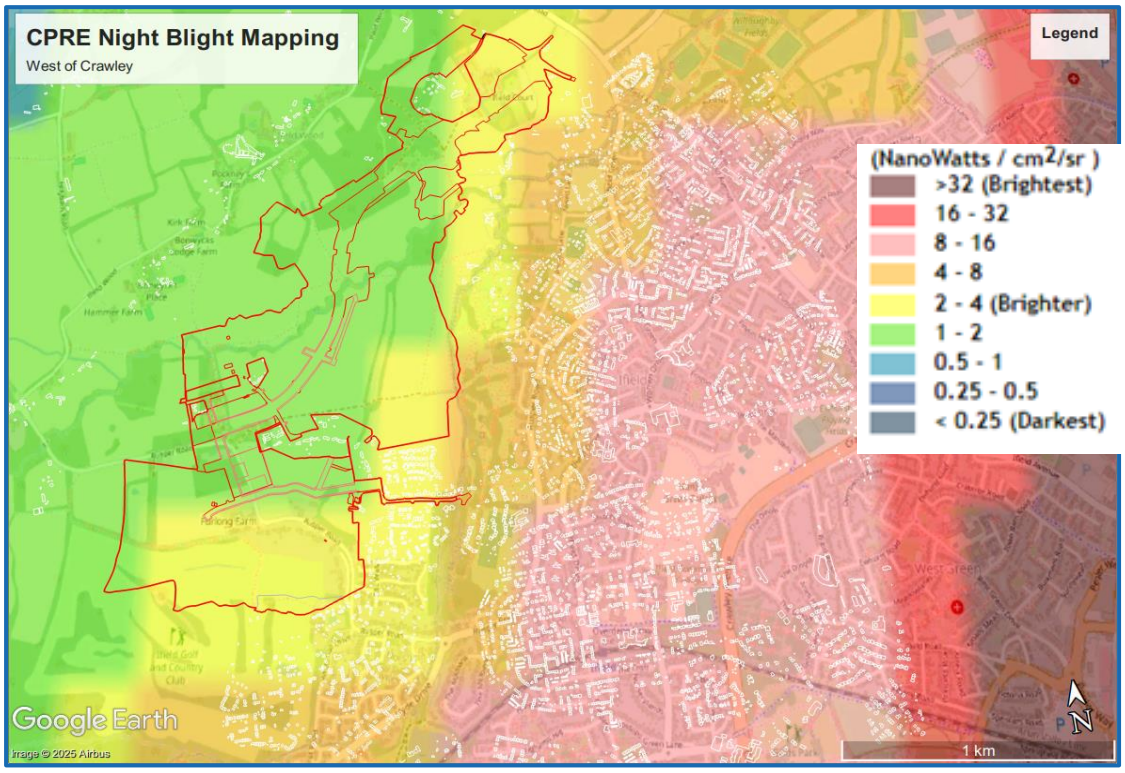


Figure 6 CPRE Sky Radiance Map

8.6. Assessment and Classification of Environmental Zone

8.6.1. The Environmental Zone criteria detailed within **Table 6** and **Table 7** informs the basis of the external Lighting Strategy. The ILP guidance notes GN01[3] define Environmental Zones E0 to E4 and quantify the maximum levels of obtrusive light regarded as acceptable for each of the Environmental Zones E0 to E4.

8.6.2. The assessment of the Environmental Zone involves obtaining evidence from the desk-top study, the Site survey and light measurements taken, looking at the wider study area and the context of the Site within that wider area and reviewing the CPRE ambient sky radiance mapping data.

8.6.3. From visiting the Site and the study area during daytime and nighttime and from studying local mapping including google maps, there is no lighting on the existing Site and there is little exterior lighting, emanating outside the Site in the locality. The lighting that is existing in the immediate study area is from street lighting and residential properties and it is generally of low brightness, however the ambient luminance increases further east from the Site towards Ifield and Crawley.

8.6.4. The light measurements taken during the Site survey are recorded in **Appendix 3 Table 3.1** and they indicate low levels of illuminance found on Site and at the Site boundaries. The measurements were typically significantly less than 0.1 lux which is a very low lighting level and confirms the lack of artificial lighting and the low ambient luminance within the Site boundary,

8.6.5. The assessment of Environmental Zone is made by reviewing the above evidence and comparing it with the descriptors of each Environmental Zone from **Table 6.**

8.6.6. The Site is in a "rural" location and the lighting environment can be described as "low district brightness". The Site is therefore categorised as an **E2** Environmental Zone in accordance with **Table 6**. The examples provided in Table 6 are also consistent with the Site and its surrounds i.e. " "*Sparsely inhabited rural areas, Village or relatively dark outer suburban locations*,"

8.6.7. The wider study area is also assessed to ensure that the assessment for the Site fits within the context of its surrounds. The **E2** descriptors of "*rural*" and "*low district brightness*" are also applicable for the study area to the north, west and south-west of the Site. However, to the east of the Site there are areas of residential development that might be described as "*Suburban*" surrounds having a "*Medium district brightness*" with examples including "*Well inhabited rural and urban settlements, small town centres or suburban locations*". These areas would be assessed as an E3 Environmental Zone.

8.6.8. Thus, the wider study area includes both **E2** and E3 Environmental Zone. As stated in ILP GN01/21[3] the most onerous option ie **E2** will be used for the Assessment to ensure that a sensitive approach is taken. This is consistent with the above assessment.

8.6.9. The assessment of Environmental Zone is also reviewed against the CPRE sky radiance mapping. In **section 8.5**, the CPRE map shows that the skyward radiance above the Site is low (1-2NW/cm2/sr increasing to 2-4NW/cm2/sr to the east of the Site). Whilst the sky radiance levels are not specifically linked to a particular Environmental Zone, there is a correlation such that the levels of skyward radiance above the Site are not inconsistent with those found in an **E2** Environmental Zone moving to an E3 Environmental Zone in the more populated areas.

8.6.10. An **E2** Environmental Zone will be applied to the Lighting Impact Assessment and will inform the external Lighting Strategy.

8.6.11. By ensuring that the lighting associated with the Proposed Development is compliant with **E2** Environmental Zone Criteria, this will help to ensure that any potential effects from the Proposed Development on the surrounding area is minimised and acceptable in the context of the Site and its location. This will be achieved by restricting the levels of Upward Light Ratio (ULR), Pre-curfew and Post-Curfew light trespass to the levels outlined in **Table 11**.

Zone	Surrounding	Examples	Limitations		Sky Glow ULR (Max)
			Pre-curfew	Post-curfew	
E2	Rural	Sparsely inhabited rural areas, Village or relatively dark outer suburban locations	5 lux	1 lux	2.5%

Table 11 Environmental Zone Light Limitations from ILP GN01[3]

8.7. Baseline Survey

8.7.1. A baseline survey of the Site was undertaken during the day and evening of the 16th of April 2024 and 7th May 2024 by two suitably competent DFL lighting professionals.

Date	16th April 2024	7th May 2024
Time of Astronomical Dusk	21.18pm	22.04pm
Cloud Cover	Full Cloud	Full Cloud
Moon Phase	1st Quarter (57%)	New Moon (1%)
Weather	Cloudy and Dry	Cloudy and Dry

Table 12 Site survey conditions

8.7.2. The conditions on the Site during the baseline survey have been detailed in **Table 12**.

8.7.3. The first survey on 16th April 2024 was undertaken during the daylight and following the onset of astronomical dusk. Weather conditions were partly cloudy, and the moon was partially visible. Moonlight penetration through the clouds was not significant. This survey covered all parts of, but predominantly the south and west of the Site and also included the survey area (off-Site).

8.7.4. The second survey on 7th May 2024 was undertaken during the daylight and following the onset of astronomical dusk. Weather conditions were cloudy, and the moon was not visible. This survey covered predominantly the north and east parts of the Site and survey area (off-Site).

8.7.5. Photographs of the study area taken during the surveys, by day and night, are shown in **Appendix 4.** The locations from which the photos were taken are shown in **Figure 4.1,** and the photos are presented in **Figures 4.2** to **4.23** within **Appendix 4**.

8.7.6. Illuminance measurements were taken in the horizontal plane and in vertical planes facing north, east, south, and west at a height of 1.5m above ground level, providing 5 illuminance readings per measurement location.

8.7.7. Measurements were taken using a Hagner T-10 illuminance meter which had a valid calibration certificate and is widely regarded as the standard instrument for providing a consistent level of accuracy at the low illuminance levels associated with site measurements in locations with typically low ambient luminance.

8.7.8. The results of the baseline survey show the Site can be generally described as being intrinsically dark with readings taken not exceeding 0.2 Lux, which is consistent with a lighting environment of "*Low district brightness*" of an **E2** Environmental Zone as described in **Table 6**. There are views from the Site onto areas of higher luminance in the north (from lighting at Gatwick Airport) and in the east (Crawley) and views of high levels of sky glow from these distant built-up areas.

8.7.9. In the areas surrounding the Site, there are some roads to the east of the Site which have street lighting. The residential areas to the south and south-east of the golf course have street lighting as shown in **Appendix 4** (**Figures 4.5-4.8)**. To the east on Rusper Road and surrounding residential roads, there is street lighting as shown in **Appendix 4** (**Figures 4.21 & 4.23)**.

8.7.10. The locations where illuminance readings were recorded, and the results of the baseline survey are presented in **Appendix 3**.

8.7.11. The Site survey and light levels taken confirmed that the lighting within the study area is of low luminance level with street lighting and some amenity or security lighting associated with residential gardens.

8.7.12. It was noted during the site survey that due to the topography of the Site and the extensive existing trees and foliage surrounding the Site, many of the views of areas beyond the Site were obscured and there is very little penetration of light into the Site from sources of luminance outside the Site.

9. IDENTIFIED SENSITIVE RECEPTORS

9.1.1. This assessment considers the potential effects of lighting associated with the Proposed Development on sensitive receptors such as; adjacent residents (human amenity receptors), public highways and Gatwick airport (human safety receptors), ecology receptors, and Night Sky.

9.1.2. Where multiple receptors are sited in the same direction relative to sources of lighting, the closest of the two receptors will be considered as the magnitude of change at receptor positions will diminish as the distance from the Site increases.

9.1.3. **Tables 13-16** list the identified receptors, and maps of the potentially sensitive Human Amenity and Ecology receptors is presented in **Appendix 2.** Note that the Human Safety and Dark Skies receptors have not been mapped as they cover multiple directions.

9.2. Ecological

9.2.1. The potentially sensitive ecological receptors to the Proposed Development are predominantly bats and other light sensitive species, who use existing hedgerows adjacent to the Site as commuting and foraging routes, as well as some areas of the surrounding areas of woodland. Therefore, these wooded/planted areas have been identified as sensitive receptors for this assessment and are considered to have **High** sensitivity to changes in lighting as shown in **Table 13**.

9.2.2. Potentially sensitive ecological receptors are present within the Site and at it's boundaries. These take the form of commuting corridors for various species of bats through the Site, as well as Hyde Hill Wood (south), Ifield Brook to the east and Ifield Wood (north-west) which are located adjacent to the Site.

9.2.3. The report created by Davidson-Watts Ecology[17] on the 26th of September 2022 provides a baseline of bat activity. The results of the 2022 surveys captured Bechstein's Bats occurring on Site in the southern parts, such as in and around the golf course and Hyde Hill Wood area, and in the north-western part of the Site adjacent to and within Ifield Wood. The other bat species captured included common and soprano pipistrelle (*Pipistrellus pipistrellus* and *P. pygmaeus*), brown long-eared (*Plecotus auritus*), Natterer's (*Myotis nattereri*), whiskered (*M. mystacinus*), Brandt's (*M. brandtii*) and noctule (*Nyctalus noctula*) bats.

9.2.4. A further report was created by Davidson-Watts Ecology[18] in December 2024 to update the baseline of bat activity. The results of the 2024 surveys reiterated the results of the 2022 surveys, reconfirming the importance of the south-western and north-western areas for Bechstein's bats. The other bat species captured were similar with the addition of one species, the Daubenton's (*Myotis daubentonii).*

9.2.5. A description of the Potentially Sensitive Ecological Receptors (ER), as well as their likely sensitivity to light based on the desktop assessment of the surrounding environment, can

17 Bat Trapping and Radio-tracking Baseline Report and Evaluation For Land West of Ifield, Crawley For Ramboll dated 26 September 2022 – Davidson-Watts Ecology Ltd

18 Bat Trapping and Radio-tracking 2024. Further Baseline Report and Evaluation For Land West of Ifield, Crawley For Ramboll December 2024 – Davidson-Watts Ecology Ltd

be seen in **Table 13,** and their location is provided in **Appendix 2**. Therefore, this external Lighting Strategy has been written in accordance with GN08/23[4] (Lighting for Bats).

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Ecology	ER 001	Woodland on the eastern boundary of the golf course (Landscape ecological buffer)	High
Ecology	ER 002	Hyde Hill LWS - Woodland on southern boundary of the golf course (Landscape ecological buffer)	High
Ecology	ER 003	Woodland on the western boundary of the golf course (Landscape ecological buffer)	High
Ecology	ER 004	Landscape Ecological Buffer on western boundary north of Rusper Road	High
Ecology	ER 005	Ifield Wood	High
Ecology	ER 006	Ifield Brook Wood & Meadows Landscape Ecological Buffer on eastern boundary	High
Ecology	ER 007	Ifield Brook Wood & Meadows Landscape Ecological Buffer on eastern boundary	High
Ecology	ER 008	Willoughby Fields Local Nature Reserve	High
Ecology	ER 009	Ifield Mill Pond LWS	High
Ecology	ER 010	Hyde Hill Wood LWS	High

Table 13: Potentially Sensitive Ecological Receptors (ER)

9.3. Human Amenity Receptors

9.3.1. Existing potentially sensitive human amenity receptors to the Proposed Development consists of residential properties. This assessment considers 1st floor bedroom windows facing in the direction of the Site as the primary source of sensitivity. These windows typically start at heights of approximately 3.5 metres above ground level and the receptors will be considered to have a **Medium** sensitivity to changes in lighting according to **Table 14**.

9.3.2. A description of the Potential Human Amenity Receptors (PHAR) and their likely sensitivity to light can be seen in **Table 14**.

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Human Amenity	HR 001	Residential Properties and Trivelle's Hotel, Gatwick	Medium
Human Amenity	HR 002	Residents of Bonnet Lane / Charlwood Road	Medium
Human Amenity	HR 003	Residents of Tweed Lane	Medium
Human Amenity	HR 004	Residents within Ifield Village Conservation Area, off Ifield Green to the east of the Site	Medium
Human Amenity	HR 005	Residents of Rectory Lane and Ifield Street and associated roads	Medium

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Human Amenity	HR 006	Residents of Rusper Rd and associated roads within the built-up area of Ifield to the east of Ifield Brook Wood and Meadows	Medium
Human Amenity	HR 007	Residents on Rusper Road within West Ifield close to the eastern boundary of the golf course	Medium
Human Amenity	HR 008	Residents of The Maples Development to the north-east of the golf course	Medium
Human Amenity	HR 009	Residents of Rusper Road and at Lower Barn terraced cottages to the north of the golf course.	Medium
Human Amenity	HR 010	Residents of Birkdale Drive and associated roads to the south of the golf course.	Medium
Human Amenity	HR 011	Residents of dispersed properties within the rising land to the west and south-west of the Site	Medium
Human Amenity	HR 012	Residents along Ifield Wood to the north-west of the Site	Medium
Human Amenity	HR 013	Residents of Properties off Ifield Wood inc. Wild Acres, Glenbervie and The Druids.	Medium
Human Amenity	HR014	Little Foxes Hotel, off Charlwood Road	Medium

Table 14: Potential Human Amenity Receptors (PHAR)

9.4. Human Safety

To the north of the Site, potentially negative effects arising from glare to aviation pilots may occur. This external Lighting Strategy has been written in accordance with GN01/21[3], *Table 4 - Limitation of bright luminaires in the field of view*.

A description of the Human Safety Receptors (HS) and their likely sensitivity to light can be seen in **Table 15**.

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Human Safety	HS 001	Gatwick Airport Approaches	High

Table 15: Human Safety Receptors (HR)

9.5. Night Skies

9.5.1. The Rusper Neighbourhood Plan makes specific reference to “Dark Skies” in policy RUS 10 Dark Skies. A description of the Night Skies receptor (NS) and their likely sensitivity to light can be seen in **Table 16**.

Receptor Type	Receptor No. (Appendix 3)	Description	Sensitivity
Night Sky	NS 001	Observers of the Night Skies	Medium

Table 16: Night Skies Receptors (NS)

10. EXTERNAL LIGHTING STRATEGY

10.1. Demolition and Construction Stage Lighting

10.1.1. Full details of the external Lighting Strategy for the Demolition and Construction Stage of the Proposed Development are located in the Phase 1 OCEMP[5] for Phase 1 and the Outline CEMP for the Outline component and supplemented by the external Lighting Strategy at **Appendix 1**.

10.1.2. Lighting would be required during the Demolition and Construction Stage of the Proposed Development to facilitate the safe transit and use of the Site for limited periods during the hours of darkness and for site security.

10.1.3. Outline demolition and construction lighting requirements would be provided in the Phase 1 OCEMP[5] accompanying the application. Through the implementation of the Phase 1 OCEMP potential effects associated with demolition and construction lighting would be minimised.

10.1.4. The Phase 1 OCEMP[5] requires "Temporary lighting at site perimeters (security standards and illumination)".

10.1.5. Demolition and Construction Stage lighting would be temporary in nature, as it would be installed and removed in phases and fully removed once the Proposed Development is completed. Construction is expected to be approximately 16 years, with a phased approach.

10.1.6. Lighting levels for demolition and construction lighting would be defined on a phase by phase basis and a task-by-task basis, in accordance with the relevant guidance and lighting levels set out in BS EN 12464-2:2014 which defines appropriate lighting levels for outdoor work tasks.

10.2. Completed Development Stage Lighting

10.2.1. The Proposed Development would require lighting for safety security and wayfinding at limited times during the hours of darkness. Lighting would be fit for purpose and sensitive to nearby human and ecological receptors.

10.2.2. For the Phase 1 Detailed component, Street Lighting compliant with British Standard BS5489-1:2020 is to be provided to the Crawley Western Multi-Modal Corridor (CWMMC) and subsidiary roads for Phase 1 and Outline Components, throughout the Site, to provide safety for motorists, pedestrians, and cyclists and to improve the amenity of the area. Importantly the lighting for the CWMMC does not include any lighting from the bridge to the access point on Charlwood Road, given the potential presence of foraging bats in this area.

10.2.3. Lighting would be of an appropriate specification and designed in accordance with British Standards.

10.2.4. The following criteria seeks to ensure that the lighting is not outside of the obtrusive light limits for the Environmental Zone in which the Site is located, is sensitive to the area, and provides a recognised standard level of lighting for all adoptable areas requiring illumination. Luminaires would distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the buildings and upwards towards the sky.

10.2.5. Lighting for adoptable areas would be provided in accordance with the West Sussex County Council (WSCC) Adoptable Specification[10]. The specification sets out parameters for the implementation of lighting, such as luminaire manufacturer, models & correlated colour temperature (CCT).

10.2.6. Lighting in adopted areas would be required in the following application areas:

- Crawley Western Multi-Modal Corridor – Detailed Component
- Subsidiary Roads (Detailed and Outline Component)

10.2.7. Lighting in unadopted areas would be required in the following task areas:

- Industrial Areas
- Commercial, Hotel, Schools, Business & Community Areas
- Sports Pitch
- Amenity Lighting including footpaths
- Property Fronts and Rears

10.2.8. The industrial areas may require lighting for activities such as loading / unloading of lorries, car parking and general amenity lighting. Lighting for these areas would be designed in accordance with BS EN 12464-2:2024

10.2.9. Commercial, business and community areas may require lighting for which roads and footpaths would be designed in accordance with BS 5489-1:2020 and car parks, service yards and loading bays designed in accordance with BS EN 12464-2:2024

10.2.10. Hotel (C1) community and school education facilities would require lighting in accordance with BS EN 12464-2:2024.

10.2.11. One of the Sport pitches may require floodlighting if used after dark, in accordance with the relevant sport guidance. In accordance with the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01) pitches closest to the Ancient Woodland buffer would be unlit, with any artificial and lit pitches located to the east in this area (i.e. furthest away from the Ancient Woodland). A standalone Lighting Impact Assessment and supporting Lighting Design details would be required to support these facilities at reserved matters stage.

10.2.12. As included in the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01)), no lighting or light spill is to be allowed within Hyde Hill LWS. Lighting close to the edge of the buffer zone should also face away from the zone.

10.2.13. Amenity lighting would be provided to property frontages and rears for the purposes of safety and amenity; enabling wayfinding during the hours of darkness. Amenity lighting for the Proposed Development would be applied sensitively to account for the receptors identified bounding the Site and within the Proposed Development.

11. POTENTIAL EFFECTS (WITHOUT MITIGATION)

11.1. Potential Effects from Demolition and Construction Stage Lighting (without mitigation)

11.1.1. Glare from inappropriately oriented floodlighting associated with the Demolition and Construction Stage has the potential to adversely affect nearby potentially sensitive human safety receptors during winter months, when flood lighting of demolition or construction tasks has the potential to be required for short durations in the early morning and after sunset.

11.1.2. Lighting associated with the Demolition and Construction Stage of the Proposed Development has the potential to cause effects on residential and ecological receptors through obtrusive light, where site demolition, preparation and construction tasks are taking place during the hours of darkness.

11.1.3. Obtrusive light can arise from poorly designed lighting, that generally consists of the installation of a limited number of luminaires that are being used to light a wide area. Due to this, the lighting is normally installed with tilt angles that are too great, or that provide an inappropriate lighting distribution, because there is a need to spread the light as far as possible, lighting the intended area, as well as surfaces where the lighting was not intended. This also has the effect of producing high levels of vertical illuminance.

11.1.4. Poorly oriented floodlighting has the potential to increase sky glow over the construction site due to light being directed at close to or above the horizontal direction. This would mainly occur between sunset and the end of the working day.

11.1.5. Poorly designed lighting can contribute the following obtrusive light components:

- Light spill onto windows of existing residential properties: this is typical of wall mounted or pole mounted luminaires with high tilt angles;
- Upward light causing sky glow: this is typical of up-lighting or poorly aimed floodlights;
- Glare: due to high light source intensity from floodlights, or luminaires used for highway lighting; and
- Intrusive light affecting surrounding sensitive ecology: caused by excessive height and tilt.

11.1.6. The potential effects from the Demolition and Construction Stage lighting, without mitigation, would likely be temporary in nature and of **Moderate Adverse (Table 4)** significance, based on the above components of obtrusive light, all of which could occur unless mitigation measures outlined in **Section 12** are implemented.

11.2. Potential Effects from Completed Development Stage Artificial Lighting (without mitigation)

11.2.1. As a result of the exterior lighting as detailed in Section 6.2, and without mitigation, there is a potential for obtrusive light to occur if it is not installed in accordance with the external Lighting Strategy and detailed lighting design.

11.2.2. Obtrusive light can arise from poorly designed lighting. Poor design can include issues such as:

- installation of too few luminaires for an area of a large size;
- lighting installed with tilt angles that are too great; and
- lighting with an inappropriate lighting distribution, lighting surfaces where the lighting was not intended.

11.2.3. These issues tend to all have the effect of producing high levels of vertical illuminance and obtrusive light.

11.2.4. Poorly designed lighting can contribute the following obtrusive light components:

- Light spill onto windows of surrounding residential houses: this is typical of wall mounted luminaires with high tilt angles;
- Upward light causing sky glow: this is typical of up-lighting;
- Glare: due to high light source intensity from floodlights, or luminaires used for highway lighting; and
- Intrusive light affecting ecology: caused by excessive height and tilt.

11.2.5. The potential effects without mitigation are likely to be permanent in nature and of **Moderate Adverse** significance (**Table 4**) based on the above components of obtrusive light, all of which could occur unless mitigation measures outlined in **Section 12** are implemented. However, as noted in the following sections, the proposed external Lighting Strategy incorporates recommended mitigation measures, hence ensuring that the majority of impacts are negligible.

12. SCOPE OF MITIGATION (BY DESIGN)

12.1. Mitigation Demolition and Construction Stage

12.1.1. For all phases, Demolition and Construction Stage lighting would be provided in accordance with the guidance within BS EN 12464-2:2024 "Lighting of outdoor workplaces"[13]; which defines appropriate lighting levels for outdoor work tasks. The levels required would vary depending upon the task being undertaken and would be assessed on a task-by-task and phase by phase basis. Demolition and Construction Stage lighting would not significantly exceed the relevant lighting standard for the task being undertaken to limit the visibility of lighting within the landscape. The lighting levels can be measured to ensure that limits are not exceeded.

12.1.2. Demolition and construction tasks would predominantly be undertaken during the hours of daylight and as such, there is a limited requirement for lighting throughout the Demolition and Construction Stage of the Proposed Development. Demolition and construction tasks are not anticipated to be undertaken for significant periods during the hours of darkness except for limited periods in the early morning and late afternoon during winter months.

Phase 1 Demolition and Construction Stage

12.1.3. Lighting requirements for the Demolition and Construction Stage of Phase 1 are provided in the Phase 1 OCEMP[5] which will accompany the planning application.

12.1.4. The Phase 1 OCEMP[5] states that for the site layout, "Site lighting will be located and directed so as not to intrude into occupied residential properties, sensitive areas or constitute a road hazard".

12.1.5. The Phase 1 OCEMP[5] further states that "To reduce the likelihood of either an environmental incident or nuisance occurring the following measures will be used, where relevant.

- controls on temporary [solar tower] lighting/illumination to reduce visual intrusion or any adverse effect on sensitive ecology such as bat roosts and badger setts."

12.1.6. The Phase 1OCEMP[5] further states that to protect ecology, "Any new or temporary lighting design will follow guidance and principles provided in the Bat Conservation Trust and Institution of Lighting Professionals (ILP) Guidance Note 08/18 'Bats and artificial lighting in the UK'.

12.1.7. The Phase 1 OCEMP[5] also provides landscape and visual amenity mitigation measures and states "To ensure that adverse impacts of lighting associated with the construction of the project are minimised, the following mitigation may be included in the final LEMP:

- *Use of only appropriately designed luminaires for the task at hand.*
- *Minimisation light break-out above the horizontal (using 'low cut-off' and 'full cut-off' lighting systems).*
- *Use of louvres and shields to prevent undesirable light break-out.*
- *Use of visual screening, such as on-site spoil, hoardings, between more sensitive visual receptors and construction light sources;*

- *Reducing lighting levels outside working hours to suitable levels for safety and security. Lighting will be reduced when not required for safety purposes. Security lighting will be kept at the minimum level needed for visual and security protection.*
- *Use of automated devices to switch lights on and off according to activity / ambient light levels. If appropriate, to reduce the need for fixed visible lighting outside working hours, the use of infrared floodlighting and CCTV systems will be considered for security.*
- *Construction lighting will be directed so it does not intrude outside of the immediate working area. All lighting related to the works will be designed and fitted to minimise light intrusion onto any sensitive habitat such as hedgerows, mature trees, and woodland.*
- *Sufficient lighting units used to avoid the need for tall, wide beam lighting units to illuminate large areas."*

12.1.8. The working hours for the Phase 1 OCEMP are as follows:

- 08.00hrs – 18.00hrs Monday – Friday
- 09.00hrs- 13.00hrs Saturday
- No works are permitted on Sundays or Bank Holidays unless agreed in writing with Horsham District Council and no continuous 24 hour working envisaged.

12.1.9. These mitigation measures are as outlined in the Phase 1 OCEMP[5], and will help minimise any potential effects associated with the demolition or construction lighting.

Demolition and Construction Stage for later phases (Outline Component)

12.1.10. An OCEMP has been prepared for the outline component of the scheme (ES Volume 2 Technical Appendix 5.1). Mitigation that is detailed for the Phase 1 demolition and construction has been incorporated into this OCEMP.

12.2. Mitigation by Design Completed Development Stage

Detailed Component (Phase 1A & 1B)

12.2.1. Detailed designs have been completed for Phase 1. The designs are in line with the external Lighting Strategy (**Appendix 1**) and the West Sussex County Council Street Lighting Specification. If the lighting is implemented in line with the detailed designs, this would provide suitable mitigation to minimise obtrusive light for both human amenity receptors, and for ecology receptors including bats.

12.2.2. The potential effects of artificial lighting have been effectively mitigated through the lighting proposals, that have been prepared by a suitably competent lighting professional. The design executes good lighting design and choice of suitable lighting equipment to ensure the area is illuminated appropriately, without giving rise to obtrusive light that would breach the recommended limits for the Environmental Zone.

12.2.3. Importantly the detailed designs show that no lighting is proposed for the section from the bridge northwards to the junction with Charlwood Road given the potential presence of foraging bats in this area

12.2.4. Good lighting practices have been incorporated into the lighting design such that the proposed lighting includes:

- High quality luminaires throughout the design to ensure that light is focussed downwards onto the ground or other surfaces in the horizontal plane, minimising the potential for direct upward light, glare, light spill and light trespass. Luminaires of this type would be optically efficient, thus reducing the amount of light spilled onto the vertical plane, thereby reducing the potential for obtrusive light.
- Luminaires with good optical control and the ability to install shields, reduce the potential for adverse levels of both horizontal and vertical spill light.
- Luminaires within the detailed design that would ensure the peak beam angle of all lights directed towards any potential observer is not more than 70 degrees when the luminaire is installed with a tilt angle of 0 degrees. This applies mainly to column mounted roadway and footpath luminaires.

12.2.5. Additional mitigation, if required, can be provided in the form of luminaire shields for specific luminaires which have the potential to light areas close to the sensitive receptors.

Outline component.

12.2.6. In accordance with the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01) pitches closest to the Ancient Woodland buffer would be unlit, with any artificial and lit pitches located to the east in this area (i.e. furter away from the Ancient Woodland). A standalone Lighting Impact Assessment and supporting Lighting Design details would be required to support these facilities at reserved matters stage.

12.2.7. As included in the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01)), no lighting or light spill is to be allowed within Hyde Hill LWS. Lighting close to the edge of the buffer zone should also face away from the zone.

12.2.8. Potentially negative effects of artificial lighting associated with the Proposed Development would be effectively mitigated through the implementation of the external Lighting Strategy (**Appendix 1**).

12.2.9. The external Lighting Strategy (**Appendix 1**) sets out the types, positions, heights, outputs, and specification of luminaires to be used throughout the Proposed Development.

12.2.10. Measures as outlined in ILP GN01/21[3] would be implemented to ensure the Proposed Development does not cause adverse effects to nearby potentially sensitive receptors. Where allowable within the West Sussex Council Adoptable Specification, lighting would be implemented in accordance with ILP GN08/23[4] for the protection of nearby ecological receptors.

12.2.11. Lighting would be designed and implemented such that it does not significantly exceed the requirements for the lighting standards proposed throughout the Site.

12.2.12. Mounting heights would be minimised to the lowest practical level, to reduce the potential spread of lighting beyond the areas where it is needed.

12.2.13. All luminaires would emit light downwards only, with an Upward Light Output Ratio (ULOR) of 0%. This minimises the level of skyglow created by the Proposed Development and reduces the potential for the Proposed Development to cause an adverse effect on potentially sensitive receptors.

12.2.14. Luminaires would have good optical control, and light spill would be limited by directing light only where it is needed.

12.2.15. Luminaires in proximity to potentially sensitive receptors would have shields installed by default, specifically on columns adjacent to ecological sensitivity throughout the Site.

12.2.16. West Sussex County Council Highway Street Lighting Specification specifies use of a standard dimming regime for all roads in Crawley lit dusk to dawn, dimmed by 40% light output from 24:00 (GMT) / 01:00 (BST). This will ensure that for most of the hours of operation, lighting levels are significantly lower than those modelled.

12.2.17. Street lighting luminaires used throughout the Proposed Development are to have good optical control and the option for the installation of luminaire shields. This is an effective method of shielding the source intensity and reducing both horizontal and vertical light spill.

12.2.18. The external Lighting Strategy is presented in **Appendix 1**.

13. MAGNITUDE OF CHANGE ASSESSMENT

13.1. Demolition and Construction Stage (with Mitigation)

13.1.1. It is noted that construction lighting will be used minimally throughout the summer and would be limited in its use during spring and autumn due to the limited working hours. This would reduce the time in which the illuminance levels on these hedge rows are above 0.4 Lux and keeps this primarily to time out of peak bat activity.

13.1.2. Mitigation is described in Section **12** and is also embedded into the external Lighting Strategy (**Appendix 1**) to reduce the effects of lighting on areas deemed as ecologically sensitive.

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
ER 001	**Phase 1 and Outline Components** This woodland on the south-eastern boundary of the golf course separates existing residential properties and new residential properties within the Proposed Development. Where demolition or construction activities are taking place adjacent to this boundary, it is possible that there would be illuminance levels on these hedge rows above the 0.4 Lux recommendation from GN08/23, for the duration of that Demolition and Construction Stage. This would not be the case for the complete length of the boundary, meaning that there would be maintained dark areas for the nocturnal species (bats) to use. As such, the magnitude of change is assessed as Low.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	Temporary
ER 002	Hyde Hill LWS is a known habitat of Bechstein's bats. **Phase 1 Detailed Component** The Phase 1 boundary is over 350m from this receptor. As such the	No Only in isolated locations, with the majority of the area being	Negligible	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	magnitude of change is assessed to be Negligible. **Outline Component** The Proposed Development has created a landscape buffer zone in order to keep demolition or construction away from this receptor. As such it is unlikely that the lighting guidance criteria would be breached. As such, the magnitude of change is assessed as Low.	maintained in darkness	Low (adverse)	
ER 003	**Phase 1 Detailed component** The Phase 1 boundary is over 300m from this receptor. As such the magnitude of change is assessed to be Negligible. **Outline Component** There is an ecological buffer zone as well as an 'Area Managed for Nature Conservation Purposes' on the south - western corner of the golf course where Bechstein's Bats may be encountered. The buffer zone would ensure that the boundary is maintained as a dark environment. Along this boundary, there is also a large area to be used for 'Parks and Gardens provided in Secondary School', with the 'Principal Building Zone located further east into the Site'. It is assessed that the light levels would not exceed the requirements of GN08/23[4]. As such it is assessed to have a Negligible magnitude of change.	No	Negligible Negligible	Temporary
ER 004	This landscape ecological buffer is on the west boundary of the Site **Phase 1 Detailed component**	No	Negligible	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	It is assessed that the buffer between this receptor and any lit elements of the demolition and construction stage is approximately 50m. There is significant woodland and foliage within the gap, that there would be minimal penetration of light. It is assessed that there would be Negligible magnitude of change. **Outline Component** The receptor is bounded by an area of "Park & Gardens" which are not intended to be lit during demolition or construction.		Negligible	
ER 005	Ifield Wood is an extensive area to the north-west of the Proposed Development. **Phase 1 Detailed component** The Phase 1 construction boundary is immediately adjacent to this receptor. Where demolition or construction activities are taking place adjacent to this boundary, it is possible that there would be illuminance levels on these hedge rows above the 0.4 Lux recommendation from GN08/23[4], for the duration of that Demolition and Construction Stage. This would not be the case for the complete length of the boundary, meaning that there would be maintained dark areas for the nocturnal species (bats) to use. As such, the magnitude of change is assessed as Low. **Outline Component** The Parameter Plans show a buffer of "Natural and semi-natural green	Only in isolated locations, with the majority of the area being maintained in darkness No	Low (Adverse) Negligible	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	space". This area will not require demolition or construction lighting. It is assessed that the buffer between this receptor and any lit elements of the Proposed Development is sufficiently wide for there to be Negligible magnitude of change.			
ER 006	This is an ecological buffer zone on the eastern boundary adjacent to Ifield Brook Wood and Meadows. The buffer zone should help maintain the boundary as a dark environment. **Phase 1 Detailed Component** The receptor is over 200m from the Phase 1 boundary. It is assessed that the light levels would not exceed the requirements of GN08/23[4], As such it is assessed to have a Negligible magnitude of change. **Outline Component** The receptor is close to the construction works for a residential zone. There may be isolated areas where the light level exceeds 0.4 lux. As such it is assessed to have a Low magnitude of change.	No Only in isolated locations, with the majority of the area being maintained in darkness	Negligible Low (Adverse)	Temporary
ER 007	This is an ecological buffer zone on the east boundary adjacent to Ifield Brook Wood and Meadows. The buffer zone should help maintain the boundary as a dark environment. **Phase 1 Detailed component** The receptor is over 300m from this Phase 1 boundary. It is assessed that the light levels will not exceed the requirements of GN08/23[4] and the magnitude of change is assessed as Negligible	No	Negligible Low	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	Outline Component The receptor is close to the construction works for a residential zone. There may be isolated areas where the light level exceeds 0.4 lux. As such it is assessed to have a Low magnitude of change.	Only in isolated locations, with the majority of the area being maintained in darkness	(Adverse)	
ER 008	**Phase 1 and Outline Components** Willoughby Fields Local Nature reserve is approximately 300m north-east of the Site. At this distance it is assessed that there will be Negligible magnitude of change due to demolition or construction lighting.	No	Negligible	Temporary
ER 009	**Phase 1 and Outline Components** Ifield Mill Pond is located approximately 300m to the south-east of the Site. At this distance it is assessed that there will be Negligible magnitude of change due to demolition or construction lighting.	No	Negligible	Temporary
ER 010	This wood is located immediately to the south of the Site. **Phase 1 Detailed component** The receptor is greater than 250m from the phase 1 construction boundary. At this distance there will be Negligible magnitude of change **Outline Component** The receptor is protected by a landscape buffer of 35m. This distance is too far for there to be any effects from demolition or construction lighting. There will be Negligible magnitude of change	No	Negligible Negligible	Temporary
HR 001	**Phase 1 detailed component**	Only in isolated	Low (Adverse)	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	Residents and users of Trivelles Hotel may experience an increase in visible light and light levels from demolition or construction lighting for the Phase 1 demolition and construction. There is likely to be an increase in light visible to these properties and the magnitude of change is assessed to be Low. **Outline Component** This area should remain dark during the Outline Component as there is no construction work on the part of the Site near to this receptor.	locations, with the majority of the area being maintained in darkness	Negligible	
HR 002	**Phase 1 detailed component** Residents of Bonnet Lane and Charlwood Road that have existing views of the Site may experience an increase in visible light and light levels from demolition or construction lighting for Phase 1. There may be an increase in light visible to these properties and the magnitude of change is assessed to be Low. **Outline Component** This area should remain dark during the Outline Component as there is no construction work on the part of the Site near to this receptor.	Only in isolated locations, with the majority of the area being maintained in darkness No	Low (Adverse) Negligible	Temporary
HR 003	**Phase 1 detailed** Residents of Tweed Lane would likely be protected by long rear gardens, as well as the hedge lined boundary of the Site. There are also tree-lined fields also providing a barrier. It is assessed that while there may be occasional glimpses of demolition or construction lighting during Phase 1, there is unlikely to be a breach of the GN01/21[3]	No	Negligible	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	guidance light levels. The magnitude of change would be Low. **Outline Component** This area should remain dark during the Outline Component as there is no construction work on the part of the Site near to this receptor. For later phases, the magnitude of change would be Negligible	No	Negligible	
HR 004	**Phase 1 Detailed component** Residents on Ifield Green are some distance from the construction site, ranging from 30m at the northern part of Ifield Green to in excess of 300m further south. The receptors are protected by mature trees and foliage. They may experience some visibility of demolition or construction lighting for the phase 1 work and this may lead to a Low magnitude of change. **Outline Component** As there is minimal construction planned for the north of the Site. The receptor is too far from the Site to experience obtrusive light for Outline Component. The assessed magnitude of change is Negligible	Only in isolated locations, with the majority of the area being maintained in darkness No	Low (Adverse) Negligible	Temporary
HR 005	**Phase 1 Detailed component** Residents of Ifield Street and Rectory Lane may experience some visibility of demolition or construction lighting for the phase 1 work, however they are situated typically over 300m from the Phase 1 Site boundary and are protected by existing trees and foliage. The assessed magnitude of change at this distance is negligible **Outline Component**	No	Negligible	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	The distance from this receptor to the construction site in excess of 150m. The receptor is protected by mature trees and foliage between the receptor and the Site. The assessed magnitude of change is Negligible.		Negligible	
HR 006	Residents of Ifield are to the east of Ifield Brook Wood and Meadows which provides a natural barrier between the receptor and the Site. There is also a good landscape buffer of mature trees and foliage which obscure most views of the Site. **Phase 1 Detailed component** The distance from this receptor to the Phase 1 construction is in excess of 500m. At this distance the assessed magnitude of change is assessed to be Negligible. **Outline Component** The receptor is typically >190m from the Site boundary. At this distance, the assessed magnitude of change will be Negligible	No	Negligible Negligible	Temporary
HR 007	**Phase 1 and Outline Components** Residents of Rusper Road within West Ifield which are adjacent to the section of road which is within the Site boundary forming the site access would have views of construction lighting which would be a temporary street lighting installation. The magnitude of change is assessed as Low.	No	Low (Adverse)	Temporary
HR 008	**Phase 1 Detailed component** Residents at the south-west side of the Maples development off Rusper Road would have views of the demolition and construction directly to the west.	Only in isolated locations, with the majority of the area	Low (Adverse)	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	There are mature trees and hedges providing a buffer between the receptor and the Site, but there will be partial views, and due to the proximity of the Site, it is assessed that for the houses closest to the Site there will be a Low magnitude of change. **Outline Component** Residents at the north side of the Maples development off Rusper Road to the north-east of the golf course would have views of the demolition and construction directly to the north. There is a hedge providing a buffer between the receptor and the Site, but there will be partial views, and due to the proximity of the Site, it is assessed that for the houses closest to the Site there will be a Low magnitude of change.	being maintained in darkness Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	
HR 009	**Phase 1 and Outline Components** Rusper Road bisects the Site and there will be partial views of the demolition and construction, much of which will be obscured by the mature trees and foliage and the long gardens for many of the houses. There will be a Low magnitude of change.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	Temporary
HR 010	**Phase 1 and Outline Components** Residents of Birkdale Drive and other roads immediately to the south and east of the golf course boundary are protected by mature boundary trees and foliage, of Hyde Hill Brook although there are partial views into the Site. The magnitude of change is assessed to be Low.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
HR 011	**Phase 1 and Outline Components** Residents of properties to the west and south-west of the Site are some distance from the Site and are therefore unlikely to encounter significant increases in light levels, although the construction activities may likely entail an increase in visibility of light. The assessed magnitude of change is Negligible.	No	Negligible	Temporary
HR 012	**Phase 1 Detailed component** The residents of Ifield Wood are in houses with mature foliage and trees providing a natural screen to the Site. In addition, much of the Site is obscured by Ifield Wood. The distance of this receptor to demolition and construction works on the Site (>350m) mean that it is unlikely that there will be lighting effects. The magnitude of change is assessed to be Negligible **Outline Component** The distance to the construction areas for the Outline Component is > 500m, so it is unlikely that there will be any lighting effects. The magnitude of change is assessed to be Negligible	No	Negligible Negligible	Temporary
HR 013	These residences off Ifield Wood, directly adjoin the Site and will have direct views of the Site. **Phase 1 Detailed component** There would be demolition and construction lighting associated with the Phase 1 works for the CWMMC which have the potential to give a Low magnitude of change.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	Temporary

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	Outline Component There are no lit elements of construction at this north part of the Site. The distance to lit elements is in excess of 500m. At this distance the magnitude of change would be negligible	No	Negligible	
HR 014	**Phase 1 and Outline Components** Little Foxes Hotel is situated to the north of the Site and is protected from lighting effects from the Site by a wide buffer of trees and foliage (Ifield Wood). It is therefore assessed that the magnitude of change would be Negligible.	No	Negligible	Temporary
HS 001	**Phase 1 and Outline Components** Following mitigation, construction lighting would be focussed downward and onto the Site. As such, there would be no potential for glare or distraction to pilots as a result of the demolition and construction stage of the Proposed Development. The magnitude of change is assessed as Negligible.	No	Negligible	Temporary
Night Sky	**Phase 1 and Outline Components** For the Night Sky receptor, the magnitude of change is considered Negligible following mitigation as all the luminaires used have 0 % ULR or upward light.	No	Negligible	Temporary

Table 17 Magnitude of Change Assessment – Demolition and Construction Stage

13.2. Completed Development Stage (with Mitigation)

13.2.1. For Human Amenity receptors being considered against the criteria for an **E2** Environmental Zone, light spill onto windows may be up to 5 lux Pre-Curfew and 2 Lux Post-Curfew, in accordance with GN01/21[3]. When implemented, the external Lighting Strategy would help to ensure that levels of Light Spill reaching the receptors would be below the criteria for an **E2** Environmental Zone.

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
ER 001	**Phase 1 and Outline Components** This woodland on the eastern boundary of the golf course separates existing residential properties and new residential properties within the Proposed Development. The mitigation and adherence to the external Lighting Strategy would ensure that for the complete length of the boundary there will be maintained dark areas for the nocturnal species (bats) to use. The lighting levels are unlikely to exceed the guidance levels from GN08/23[4]. As such, the magnitude of change is assessed as Low.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	Permanent
ER 002	Hyde Hill LWS is a known habitat of Bechstein's bats. **Phase 1 Detailed component** The receptor is in excess of 350m from the Phase 1 lit elements. At this distance, the street lighting is assessed to have negligible magnitude of change. **Outline Component** The Proposed Development has created a landscape buffer zone in order to protect this receptor. The buffer zone should help maintain the boundary as a dark environment. It is assessed that the light levels would not exceed the requirements of GN08/23[4], however there may be isolated areas where the light level exceeds 0.4 lux. As such it is assessed to have a Low magnitude of change. As such, the magnitude of change is assessed as Low.	No Only in isolated locations, with the majority of the area being maintained in darkness	Negligible Low	Permanent
ER 003	There is an ecological buffer zone on	No	Negligible	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	the south-western boundary of the golf course where Bechstein's Bats have been noted to be present. **Phase 1 Detailed component** The receptor is in excess of 300m from the Phase 1 lit elements. At this distance, the street lighting is assessed to have negligible magnitude of change. **Outline Component** The receptor is in excess of 250m from the nearest elements. At this distance, the street lighting is assessed to have negligible magnitude of change.		Negligible	
ER 004	This landscape ecological buffer is on the western boundary of the Site and is bound by an area of "Park & Gardens" which is an areas that it not intended to be lit. **Phase 1 Detailed component** It is assessed that the buffer (approx.100m) between this receptor and any lit elements is sufficiently wide for there to be Negligible magnitude of change. **Outline Component** It is assessed that the buffer between this receptor and any lit elements of the Proposed Development is sufficiently wide >75m and there is sufficient existing trees and foliage for there to be a Negligible magnitude of change.	No	Negligible Negligible	Permanent
ER 005	Ifield Wood is an extensive area to the north-west of the Proposed Development. The Parameter Plan shows a buffer of "Natural and semi-natural green space". **Phase 1 Detailed component**			Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	The Phase 1 element is unlit at this end of the Site. There would be a negligible magnitude of change. **Outline Component** This area of the Proposed Development would not require lighting. It is assessed that the buffer between this receptor and any lit elements of the Proposed Development is sufficiently wide for there to be Negligible magnitude of change.	No No	Negligible Negligible	
ER 006	There is an ecological buffer zone on the eastern boundary adjacent to Ifield Brook Wood and Meadows. **Phase 1 Detailed component** The Phase lit elements are greater than 200m from this receptor. At this distance it is assessed that the magnitude of change would be Negligible. **Outline Component** The buffer zone should help maintain the boundary as a dark environment. It is assessed that the light levels would not exceed the requirements of GN08/23[4], however there may be isolated areas where the light level exceeds 0.4 lux. As such it is assessed to have a Low magnitude of change.	No Only in isolated locations, with the majority of the area being maintained in darkness	Negligible Low (Adverse)	Permanent
ER 007	There is an ecological buffer zone on the eastern boundary adjacent to Ifield Brook Wood and Meadows. **Phase 1 Detailed component** The Phase lit elements are greater than 200m from this receptor. At this distance it is assessed that the magnitude of change would be Negligible.	No	Negligible	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	Outline Component The buffer zone should help maintain the boundary as a dark environment. It is assessed that the light levels would not exceed the requirements of GN08/23[4], however there may be isolated areas where the light level exceeds 0.4 lux. As such it is assessed to have a Low magnitude of change.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	
ER 008	**Phase 1 and Outline Components** Willoughby Fields Local Nature reserve is approximately 300m east of the Site. At this distance it is assessed that there would be Negligible magnitude of change due to operational lighting.	No	Negligible	Permanent
ER 009	**Phase 1 and Outline Components** Ifield Mill Pond is located approximately 300m to the south-east of the Site. At this distance it is assessed that there would be Negligible magnitude of change due to operational lighting.	No	Negligible	Permanent
ER 010	There is an ecological buffer zone on the south-western boundary of the golf course where Bechstein's Bats have been noted to be present. **Phase 1 Detailed component** The receptor is in excess of 250m from the Phase 1 lit elements. At this distance, the street lighting is assessed to have negligible magnitude of change. **Outline Component** The Proposed Development has created a landscape buffer zone in order to protect this receptor. The buffer zone should help maintain the boundary as a dark environment. It is assessed that the light levels would not exceed the requirements of GN08/23[4],	No Only in isolated locations, with the majority of the area being maintained in darkness	Negligible Low (Adverse)	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	however there may be isolated areas where the light level exceeds 0.4 lux. As such it is assessed to have a Low magnitude of change. As such, the magnitude of change is assessed as Negligible.			
HR 001	**Phase 1 and Outline Components** Residents and users of Trivelle's Hotel are some distance from any lit elements of the operational development. They may experience an increase in visible light; however, the magnitude of change is assessed to be Negligible.	No	Negligible	Permanent
HR 002	**Phase 1 Detailed component** The roads are unlit at the north of the Site. Residents of Bonnet Lane and Charlwood Road that have existing views of the Site may experience an increase in visible light from the Proposed Development. However, the lit elements are some distance (>1km) from these properties. The magnitude of change is assessed to be Negligible. **Outline Component** There are no lit elements at the north of the Proposed Development. Residents of Bonnet Lane and Charlwood Road that have existing views of the Site may experience an increase in visible light from the Proposed Development. However, the lit elements are some distance (>1km) from these properties. The magnitude of change is assessed to be Negligible.	No No	Negligible Negligible	Permanent
HR 003	Residents of Tweed Lane are typically protected by long rear gardens and tree or hedge lined boundary with the Site and in some instances, there are tree-lined fields also providing a barrier.			Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	Phase 1 Detailed component The road remains unlit at the north of the Site. The magnitude of change would be negligible. **Outline Component** there is some distance (>500m) from the nearest lit elements. It is assessed that there is unlikely to be a breach of the GN01/21[3] guidance light levels. The magnitude of change will be Negligible.	No No	Negligible Negligible	
HR 004	**Phase 1 Detailed component** Residents on Ifield Green are in excess of 700m from the nearest Phase 1 street lighting. The receptors are protected by mature trees and foliage. The assessed magnitude of change is Negligible. **Outline Component** As there is minimal construction planned for the north of the Site. The receptor is too far from the Site to experience obtrusive light for Outline Component. The assessed magnitude of change is Negligible	No	Negligible	Permanent
HR 005	**Phase 1 Detailed component** Residents of Ifield Street and Rectory Lane will may experience some visibility of street lighting for Phase 1, however they are situated typically over 300m from the Phase 1 Site boundary and are protected by existing trees and foliage. The assessed magnitude of change at this distance is negligible **Outline Component** The distance from this receptor to the lit elements within the completed development is in excess of 500m. The receptor is protected by mature trees	No No	Negligible Negligible	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	and foliage between the receptor and the Site. The assessed magnitude of change is Negligible.			
HR 006	Residents of Ifield are to the east of Ifield Brook Wood and Meadows which provides a natural barrier between the receptor and the Site. There is also a good landscape buffer of mature trees and foliage which obscure most views of the Site. **Phase 1 Detailed component** The distance from this receptor to the Phase 1 lighting is in excess of 500m. At this distance the assessed magnitude of change is assessed to be Negligible. **Outline Component** The receptor is typically >190m from the Site boundary and any lit elements. At this distance, the assessed magnitude of change will be Negligible.	No No	Negligible Negligible	Permanent
HR 007	**Phase 1 Detailed component** Residents of Rusper Road within West Ifield which are adjacent to the section of road which is within the Site boundary forming the site access would have views of construction lighting which would be a temporary street lighting installation. The magnitude of change is assessed as Low. **Outline Component** Residents of Rusper Road within West Ifield are in excess of 150m from the lit elements of the nearest residential development Site. There is also an existing landscape buffer of mature trees and foliage which obscure most views of the Site. The assessed magnitude of change is	Only in isolated locations, with the majority of the area being maintained in darkness No	Low (Adverse) Negligible	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	assessed to be Negligible.			
HR 008	**Phase 1 Detailed component** Residents at the south-west side of the Maples development off Rusper Road would have views of the Phase 1 street lighting. There are mature trees and hedges providing a buffer between the receptor and the Site, but there will be partial views, however it is assessed that there will be a Negligible magnitude of change. **Outline Component** Residents at the north side of the Maples development off Rusper Road to the north east of the golf course would have views of the residential development directly to the north. There is a hedge providing a buffer between the receptor and the Site, but there will be partial views, and due to the proximity of the Site, it is assessed that for the houses closest to the Site there will be a Low magnitude of change.	No Only in isolated locations, with the majority of the area being maintained in darkness	Negligible Low (Adverse)	Permanent
HR 009	**Phase 1 and Outline Components** Rusper Road bisects the Site and as such there would be partial views of the Proposed Development, much of which would be obscured by the mature trees and foliage and the long gardens for many of the houses. There are residential building zones on either side of the road which means that there will be an increase in light in the area and residents may get views of new lighting from the street lighting or garden amenity lighting. There would be a Low magnitude of change.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	Permanent
HR 010	**Phase 1 Detailed component** This receptor is at least 125m from the lit elements of Phase 1. At this distance	No	Negligible	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	the magnitude of change would be negligible **Outline Component** Residents of Birkdale Drive and other roads immediately to the south and south-east are protected by existing mature boundary trees and foliage, although there are partial views into the Site. There would be built elements close to these receptors. The Site survey measurements demonstrated that the penetration of light onto the Site was minimal. The same order of magnitude would be expected from the new development penetrating towards this receptor. The magnitude of change is assessed to be Low.	Only in isolated locations, with the majority of the area being maintained in darkness	Low (Adverse)	
HR 011	**Phase 1 and Outline Components** Residents of properties to the west and southwest of the Site are some distance from the Site and are therefore unlikely to encounter significant increases in light levels, although the sports pitch lighting may entail an increase in visibility of the lighting installation, however this would not breach any of the lighting guidelines. The assessed magnitude of change is Negligible.	No	Negligible	Permanent
HR 012	The residents of Ifield Wood are in houses with mature foliage and trees providing a natural screen to the Site. In addition, much of the Site is obscured by Ifield Wood. The distance of this receptor to lit elements of the Proposed Development (>200m) mean that it is unlikely that there would be lighting effects. The magnitude of	No	Negligible	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	change is assessed to be Negligible. **Phase 1 Detailed component** The residents of Ifield Wood are in houses with mature foliage and trees providing a natural screen to the Site. In addition, much of the Site is obscured by Ifield Wood. The distance of this receptor to Phase 1 street lighting (>350m) means that there would not be lighting effects. The magnitude of change is assessed to be Negligible **Outline Component** The distance to the construction areas for the Outline Component is > 450m, so it is unlikely that there will be any lighting effects. The magnitude of change is assessed to be Negligible			
HR 013	**Phase 1 and Outline Components** These residences off Ifield Wood, directly adjoin the Site and would have direct views of the Site. There are no lit elements in the vicinity of these receptors as the CWMMC is unlit at this end of the Site. The assessed magnitude of change is Negligible.	No	Negligible	Permanent
HR 014	**Phase 1 and Outline Components** Little Foxes Hotel is situated to the north of the Site and is protected from lighting effects from the Site by a wide buffer of trees and foliage (Ifield Wood). There is no lighting intended for the north of the Proposed Development. It is therefore assessed that the magnitude of change will be Negligible.	No	Negligible	Permanent
HS 001	**Phase 1 and Outline Components** Lighting would be implemented in accordance with the external Lighting	No	Negligible	Permanent

Receptor	Description of Effect	Breach in lighting Guidance Criteria	Magnitude of Change	Duration
	Strategy and guidance (i.e. no upward light cut-off luminaires directed downwards.) so as not to cause distraction to pilots. It would also not be characteristically like the runway and approach lighting at Gatwick Airport, thus would be unlikely to cause confusion. The magnitude of change to Human Safety receptors is considered Negligible			
Night Sky	**Phase 1 and Outline Components** For the Night Sky receptor, the magnitude of change is considered Negligible following mitigation as all the luminaires used have 0 % ULR or upward light.	No	Negligible	Permanent

Table 18 Magnitude of Change Assessment – Completed Development Stage

13.3. Significance of Effect

13.3.1. Using the matrix in **Table 4** the sensitivity of the receptor (**Table 13 – Table 16**) and the magnitude of change (**Table 17** and **Table 18**) the significance of the effect of lighting is assessed.

Receptor	Sensitivity	Magnitude of Change	Significance of Effect
Phase 1 Detailed Component - Demolition and Construction Stage			
ER 001	High	Low	Minor
ER 002	High	Negligible	Negligible
ER 003	High	Negligible	Negligible
ER 004	High	Negligible	Negligible
ER 005	High	Low	Minor
ER 006	High	Negligible	Negligible
ER 007	High	Negligible	Negligible
ER 008	High	Negligible	Negligible
ER 009	High	Negligible	Negligible
ER 010	High	Negligible	Negligible
HR 001	Medium	Low	Negligible - Minor
HR 002	Medium	Low	Negligible - Minor
HR 003	Medium	Negligible	Negligible
HR 004	Medium	Low	Negligible - Minor
HR 005	Medium	Negligible	Negligible
HR 006	Medium	Negligible	Negligible
HR 007	Medium	Low	Negligible - Minor

Receptor	Sensitivity	Magnitude of Change	Significance of Effect
HR 008	Medium	Low	Negligible - Minor
HR 009	Medium	Low	Negligible - Minor
HR 010	Medium	Low	Negligible - Minor
HR 011	Medium	Negligible	Negligible
HR 012	Medium	Negligible	Negligible
HR 013	Medium	Low	Negligible - Minor
HR 014	Medium	Negligible	Negligible
HS 001	High	Negligible	Negligible
Night skies	Medium	Negligible	Negligible
Phase 1 Detailed Component - Completed Development Stage			
ER 001	High	Low	Minor
ER 002	High	Negligible	Negligible
ER 003	High	Negligible	Negligible
ER 004	High	Negligible	Negligible
ER 005	High	Negligible	Negligible
ER 006	High	Negligible	Negligible
ER 007	High	Negligible	Negligible
ER 008	High	Negligible	Negligible
ER 009	High	Negligible	Negligible
ER 010	High	Negligible	Negligible
HR 001	Medium	Negligible	Negligible
HR 002	Medium	Negligible	Negligible
HR 003	Medium	Negligible	Negligible
HR 004	Medium	Negligible	Negligible
HR 005	Medium	Negligible	Negligible
HR 006	Medium	Negligible	Negligible
HR 007	Medium	Low	Negligible - Minor
HR 008	Medium	Negligible	Negligible
HR 009	Medium	Low	Negligible - Minor
HR 010	Medium	Negligible	Negligible
HR 011	Medium	Negligible	Negligible
HR 012	Medium	Negligible	Negligible
HR 013	Medium	Negligible	Negligible
HR 014	Medium	Negligible	Negligible
HS 001	High	Negligible	Negligible
Night skies	Medium	Negligible	Negligible

Table 19: Significance of Effect – Phase 1 Detailed Component

Receptor	Sensitivity	Magnitude of Change	Significance of Effect
Outline Component - Demolition and Construction Stage			
ER 001	High	Low	Minor
ER 002	High	Low	Minor
ER 003	High	Negligible	Negligible
ER 004	High	Negligible	Negligible
ER 005	High	Negligible	Negligible
ER 006	High	Low	Minor
ER 007	High	Low	Minor
ER 008	High	Negligible	Negligible
ER 009	High	Negligible	Negligible
ER 010	High	Negligible	Negligible
HR 001	Medium	Negligible	Negligible
HR 002	Medium	Negligible	Negligible
HR 003	Medium	Negligible	Negligible
HR 004	Medium	Negligible	Negligible
HR 005	Medium	Negligible	Negligible
HR 006	Medium	Negligible	Negligible
HR 007	Medium	Low	Negligible - Minor
HR 008	Medium	Low	Negligible - Minor
HR 009	Medium	Low	Negligible - Minor
HR 010	Medium	Low	Negligible - Minor
HR 011	Medium	Negligible	Negligible
HR 012	Medium	Negligible	Negligible
HR 013	Medium	Negligible	Negligible
HR 014	Medium	Negligible	Negligible
HS 001	High	Negligible	Negligible
Night skies	Medium	Negligible	Negligible
Outline Component - Completed Development Stage			
ER 001	High	Low	Minor
ER 002	High	Low	Minor
ER 003	High	Negligible	Negligible
ER 004	High	Negligible	Negligible
ER 005	High	Negligible	Negligible
ER 006	High	Low	Minor
ER 007	High	Low	Minor
ER 008	High	Negligible	Negligible
ER 009	High	Negligible	Negligible
ER 010	High	Low	Minor
HR 001	Medium	Negligible	Negligible
HR 002	Medium	Negligible	Negligible
HR 003	Medium	Negligible	Negligible
HR 004	Medium	Negligible	Negligible
HR 005	Medium	Negligible	Negligible
HR 006	Medium	Negligible	Negligible
HR 007	Medium	Negligible	Negligible

Receptor	Sensitivity	Magnitude of Change	Significance of Effect
HR 008	Medium	Low	Negligible - Minor
HR 009	Medium	Low	Negligible - Minor
HR 010	Medium	Low	Negligible - Minor
HR 011	Medium	Negligible	Negligible
HR 012	Medium	Negligible	Negligible
HR 013	Medium	Negligible	Negligible
HR 014	Medium	Negligible	Negligible
HS 001	High	Negligible	Negligible
Night skies	Medium	Negligible	Negligible

Table 20: Significance of Effect – Outline Component

14. RESIDUAL EFFECTS ASSESSMENT

14.1. Phase 1 Detailed Component

14.1.1. The residual effects of the lighting proposed for the Phase 1 Proposed Development can be seen in **Table 21**.

Receptor Number	Residual Effect - Phase 1 Detailed Component		Description of effect
	Demolition and Construction	Completed Development	
ER 001	Minor	Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.
ER 002	Negligible	Negligible	No noticeable change.
ER 003	Negligible	Negligible	No noticeable change.
ER 004	Negligible	Negligible	No noticeable change.
ER 005	Minor	Negligible	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
ER 006	Negligible	Negligible	No noticeable change.
ER 007	Negligible	Negligible	No noticeable change.
ER 008	Negligible	Negligible	No noticeable change.
ER 009	Negligible	Negligible	No noticeable change.
ER 010	Negligible	Negligible	No noticeable change.
HR 001	Negligible - Minor	Negligible	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 002	Negligible - Minor	Negligible	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 003	Negligible	Negligible	No noticeable change.
HR 004	Negligible - Minor	Negligible	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 005	Negligible	Negligible	No noticeable change.
HR 006	Negligible	Negligible	No noticeable change.
HR 007	Negligible - Minor	Negligible - Minor	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.

Receptor Number	Residual Effect - Phase 1 Detailed Component		Description of effect
	Demolition and Construction	Completed Development	
HR 008	Negligible - Minor	Negligible	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 009	Negligible - Minor	Negligible - Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 010	Negligible - Minor	Negligible	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 011	Negligible	Negligible	No noticeable change.
HR 012	Negligible	Negligible	No noticeable change.
HR 013	Negligible - Minor	Negligible	Slight increase in the visibility of lighting for construction stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 014	Negligible	Negligible	No noticeable change.
HS 001	Negligible	Negligible	No noticeable change.
Night skies	Negligible	Negligible	No noticeable change.

Table 21: Residual Effects Assessment – Phase 1 Completed Development Stage

14.2. Outline Component Residual Assessment

14.2.1. The residual effects of the lighting proposed for the Outline Component of the Proposed Development can be seen in **Table 22**.

Receptor Number	Residual Effect – Outline Component		Description of effect
	Demolition and Construction	Completed Development	
ER 001	Minor	Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.
ER 002	Minor	Minor	Slight increase in the visibility of lighting for Completed Development. Very low likelihood of breaches in the Environmental Zone limits lighting.
ER 003	Negligible	Negligible	No noticeable change.
ER 004	Negligible	Negligible	No noticeable change.

Receptor Number	Residual Effect – Outline Component		Description of effect
	Demolition and Construction	Completed Development	
ER 005	Negligible	Negligible	No noticeable change.
ER 006	Minor	Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.
ER 007	Minor	Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.
ER 008	Negligible	Negligible	No noticeable change.
ER 009	Negligible	Negligible	No noticeable change.
ER 010	Negligible	Minor	Slight increase in the visibility of lighting for Completed Development. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 001	Negligible	Negligible	Slight increase in the visibility of lighting. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 002	Negligible	Negligible	Slight increase in the visibility of lighting. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 003	Negligible	Negligible	No noticeable change.
HR 004	Negligible	Negligible	No noticeable change.
HR 005	Negligible	Negligible	No noticeable change.
HR 006	Negligible	Negligible	No noticeable change.
HR 007	Negligible - Minor	Negligible	Slight increase in the visibility of lighting for Construction Stage. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 008	Negligible - Minor	Negligible - Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 009	Negligible - Minor	Negligible - Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.
HR 010	Negligible - Minor	Negligible - Minor	Slight increase in the visibility of lighting for all stages. Very low likelihood of breaches in the Environmental Zone limits lighting.

Receptor Number	Residual Effect – Outline Component		Description of effect
	Demolition and Construction	Completed Development	
HR 011	Negligible	Negligible	No noticeable change.
HR 012	Negligible	Negligible	No noticeable change.
HR 013	Negligible	Negligible	No noticeable change.
HR 014	Negligible	Negligible	No noticeable change.
HS 001	Negligible	Negligible	No noticeable change.
Night skies	Negligible	Negligible	No noticeable change.

Table 22: Residual Effects Assessment – Outline Component Completed Development Stage

14.3. Residual Assessment Summary

14.3.1. In summary, it has been assessed that the Proposed Development would have **non-significant** effects on all identified receptors in terms of external lighting.

Ecology Receptors

14.3.2. In Phase 1 detailed component, receptors ER001 and ER005 would experience Minor Adverse effects during the Demolition and Construction Stage. These would be Temporary in nature.

14.3.3. At the Completed Development Stage of Phase 1, receptor ER001 would experience Minor Adverse effects which would be Permanent.

14.3.4. For the Outline component, receptors ER001, ER002, ER006 and ER007 would experience Minor Adverse effects during the Demolition and Construction Phases which would be Temporary in nature.

14.3.5. For the Outline component, during the completed Development stage receptors ER001, ER002, ER006, ER007, ER010 would experience Minor Adverse effects which would be Permanent.

14.3.6. Minor effects are experienced because isolated locations along the retained hedgerows and boundaries may experience illuminance levels marginally above 0.4 Lux, but the majority of these hedgerows and boundaries would be maintained at light levels below 0.4 Lux.

14.3.7. All other ecology receptors would experience Negligible effects.

Human Amenity Receptors

14.3.8. In Phase 1 (detailed component) receptors HR001, HR002, HR004, HR007, HR008, HR009, HR010, HR013 would experience Negligible - Minor Adverse effects during the Demolition and Construction Stage. These would be Temporary in nature.

14.3.9. At the Completed Development Stage of Phase 1, receptor HR007 and HR009 would experience Negligible - Minor Adverse effects which would be Permanent.

14.3.10. For the Outline component, receptors HR007, HR008, HR009 and HR010 would experience Negligible - Minor Adverse effects during the Demolition and Construction Stage which would be Temporary in nature.

14.3.11. For the Outline Component, at the Completed Development Stage, receptors HR008, HR009 and HR010 would experience Negligible - Minor Adverse effects which would be Permanent.

14.3.12. All other receptors would experience Negligible effects,

Human Safety Receptor

14.3.13. The Human Safety receptor (aircrew using Gatwick Airport) would only experience Negligible Effects for all stages, and for both the Phase 1 (detailed) and outline component.

Dark Skies Receptor

14.3.14. The Dark skies receptor would only experience Negligible effects for all stage, and for both the Phase 1 (detailed) and outline component.

Summary

14.3.15. In totality, the Proposed Development would not result in significant effects of lighting on the identified receptor locations.

15. CUMULATIVE AND IN-COMBINATION EFFECTS

15.1.1. **Table 21** lists the cumulative sites that have been identified for the Proposed Development that are within 5km of the Site. These sites have been assessed for the likelihood of having cumulative effects alongside the Proposed Development, and these effects have been categorized into direct effects (light spill and light intrusion) and indirect effects (upward light and sky glow) on the identified sensitive receptors. This initial assessment is based on the distance of the cumulative sites from the Site.

Scheme and Planning Reference	Approx. Distance from the Site	Potential for Effects of Lighting	
		Direct	Indirect
Land North of Steers Lane - Crawley BC CR/2018/0894/OUT	4.4km	No	No
Overline House, Station Way CR/2016/0294/OUT	2.5km	No	No
Land North of Horsham DC/16/1677	4.1km	No	No
Former Pay and Display Car Park, Telford Place CR/2023/0357/OUT	3.0km	No	No
Kilnwood Vale DC/10/1612	0.5km	Yes	Yes
Reserved Land – Kilnwood Vale, Horsham DC DC/17/2481	1.4km	No	No
New Garden Village - Brookvale Horsham DC EIA/24/0006	4.5km	No	No
Crawley Civic Office Crawley BC CR/2017/0997/OUT	2.6km	No	No
LAND ADJ TO HYDEHURST LANE, NORTHGATE, CRAWLEY Crawley BC CR/2023/0197/FUL	2.2km	No	No
Former GSK Site (north and west land parcels) Crawley BC CR/2014/0415/ARM	3.0km	No	No
Land at Faraday Road and Manor Royal Crawley BC CR/2021/0174/FUL	3.2km	No	No
Land to the North of Fleming Way (Eastman House and Former Flight Training Centre) CR/2022/0187/FUL	2.0km	No	No
44 Goffs Park Road, Southgate Crawley Crawley BC CR/2023/0223/FUL	2.2km	No	No
STATION WAY, FRIARY WAY, HASLETT AVENUE WEST AND THE MARTLETS, NORTHGATE, CRAWLEY Crawley BC CR/2024/0554/FUL	2.0km	No	No

Scheme and Planning Reference	Approx. Distance from the Site	Potential for Effects of Lighting	
		Direct	Indirect
Staff Car Park, Tunnel Road, Gatwick Airport Crawley BC CR/2022/0707/CON	4.6km	No	No
MOKA, STATION WAY, NORTHGATE, CRAWLEY Crawley BC CR/2019/0542/FUL	2.4km	No	No
Tushmore Lane Crawley BC CR/2022/0407/OUT	2.1km	No	No
Steers Lane, Phase 2 Crawley BC CR/2022/0055/FUL	4.4km	No	No
Tinsley Lane Crawley BC CR/2021/0355/OUT	3.3km	No	No
Former TSB Site, Russell Way Crawley BC CR/2020/0037/FUL	3.8km	No	No
Longley House, East Park Crawley BC CR/2020/0024/FUL	2.5km	No	No
TEN SIXTYSIX, BALCOMBE ROAD, POUND HILL, CRAWLEY Crawley BC CR/2021/0685/OUT	4.7km	No	No
Breezehurst Drive, Crawley BC CR/2020/0192/RG3	1.6km	No	No
Gatwick Airport, The Planning Inspectorate TR020005	1.0km	No	No

Table 23: Potential for Cumulative Effects

15.1.2. Those sites in **Table 21** that have been identified as being capable of having either direct or indirect effects alongside the Proposed Development have been assessed in more detail (**Table 22**).

15.1.3. This is due to the distance of the sites to the Site as any site greater than 1km from the Site would only have Negligible cumulative effects.

Relevant Receptors	Effects Assessment
HR 010 **ER 002** **ER 003** **ER 010**	**Kilnwood Vale – DC/10/1612** Outline approval for the development of approximately 2500 dwellings. This cumulative development is located approximately 500m to the south of the Proposed Development. **Phase 1 and Outline Components** Due to the distance from the Site and the nearest relevant receptors the cumulative magnitude of change is assessed as **Negligible**, and

Relevant Receptors	Effects Assessment
	non-significant. In particular for ER010, the effects from the cumulative site would be only affecting the south of this receptor where there would be Negligible effects from lighting emanating from the Site.

Table 24: Cumulative Effects Assessment

16. SUMMARY OF ASSESSMENT

16.1. General

16.1.1. Following the implementation of mitigation measures as outlined in **Section 12**, the residual effects are assessed to be **Minor adverse, Negligible – Minor adverse** or **Negligible;** the level of light as a result of the Proposed Development would increase from the baseline, however it is not likely to be obtrusive in nature. Furthermore, the proposed lighting would be implemented in line with relevant British Standards and guidance through the implementation of an appropriate lighting design.

16.1.2. Ecology Receptors ER001, ER002, ER005, ER006 ER007 and ER010 may experience effects that could be considered Minor. This is because isolated locations along the retained hedgerows and boundaries may experience illuminance levels marginally above 0.4 Lux, but the majority of these hedge rows and boundaries will be maintained at light levels below 0.4 Lux.

16.1.3. Human Amenity receptors HR001, HR002, HR004, HR007, HR008, HR009, HR010, HR013 may experience effects that could be considered Negligible - Minor due to the potential for an increase in light intrusion, though not high enough to breach the GN01/21[3] limits.

16.1.4. The Human Safety receptor (Aircrew using Gatwick Airport) would only experience Negligible Effects for all stages, and for both the Phase 1 (detailed) and outline component.

16.1.5. The overall impact of the proposed lighting on the Site and surrounding receptors, as a result of the Proposed Development, has been judged based on the proposed external Lighting Strategy's compliance to the relevant standard or guidance.

17. SCOPE OF MITIGATION (FURTHER REQUIREMENTS)

17.1. Post Results Mitigation and Enhancements

17.1.1. Due the careful implementation of lighting as outlined within the external Lighting Strategy, no further mitigation than that implemented during the design process is required for the majority of receptors, however there are additional mitigation measures which would assist in the mitigation for those receptors which may experience Minor effects as per **Table 23**.

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured	
		By S.106	By Condition
1	The use of solid hoarding during the Demolition and Construction Stage.		X
2	Detailed obtrusive light calculations will be completed for the identified receptors along with an Isolux Contour plan. This will be required as part of planning conditions.		X

Table 25: Further Mitigation

18. CONCLUSION

18.1. General

18.1.1. The proposed lighting associated with the Proposed Development shall be designed in accordance with the external Lighting Strategy for the Site outlined in **Appendix 1.**

18.1.2. The external Lighting Strategy has been written in accordance with the relevant British Standards, industry guidance GN01/21[3] & GN08/23[4] and local policies to ensure it is unlikely to give rise to obtrusive light with the potential to affect human, environmental and ecological receptors.

18.1.3. The Human Safety receptor (Aircrew using Gatwick Airport) would only experience Negligible Effects for all stages, and for both the Phase 1 (detailed) and outline component.

18.1.4. Detailed Lighting is to be designed by competent lighting professionals in accordance with the external Lighting Strategy in **Appendix 1** and within ILP Guidance GN01/ 21[3] and GN08/23[4].

18.1.5. During the design and assessment process, the potential for cumulative impacts was accounted for; the baseline survey undertaken by DFL (see **Appendix 3**) informs the baseline light level and assisted this process.

18.1.6. Through the application of this external Lighting Strategy, sensitive receptors would not be adversely affected by obtrusive light.

18.1.7. Lighting for the detailed component, which includes the CWMMC road and subsidiary roads, has had a detailed design completed. The detailed design meets the requirements of the external Lighting Strategy and the West Sussex County Council Adoptable Specification.

18.1.8. Lighting for the outline component would be implemented in accordance with the external Lighting Strategy for the Proposed Development. The strategy outlines the types, outputs, positions, mounting heights, tilts, and colour temperatures of luminaires to be used throughout the Proposed Development.

18.1.9. Through careful design and mitigation, the external Lighting Strategy ensures the lighting installation at the Proposed Development will be in accordance with British Standards, Guidance and Local Policy.

18.1.10. Proposed lighting applied to the Site, as a result of the Proposed Development, would result in at worst a likely residual effect of **Minor Adverse.** No further actions are required as the sensitive application of lighting for the Proposed Development results in a non-significant effect.

18.1.11. In areas where the limits of GN01/21[3] or GN08/23[4] have the potential to be breached, further mitigation at the detailed design stage in the form of luminaire back shields are advised.

18.1.12. The hybrid planning application is for a phased development intended to be capable of coming forward in distinct and separable phases and/or plots in a severable way. In

terms of severability, the overall identified lighting effects would increase incrementally as different phases are built out, although would not be greater than those identified in this assessment. Providing mitigation proposed in this report was implemented (to be secured by appropriate planning condition or detailed within future reserved matters applications) then development of a given phase would not alter identified residual lighting effects, as mitigation for a given phase is not contingent on implementation or mitigation of other phases of the Proposed Development.

18.1.13. The lighting proposed meets the requirements of the national and local policies as well as British Standards and industry guidance.

18.1.14. In conclusion, the lighting effects associated with both the detailed and outline components of the Proposed Development are assessed to be **Minor, Negligible-Minor,** or **Negligible** and **non-significant**.

APPENDIX 1

19. DETAILED EXTERNAL LIGHTING STRATEGY

19.1. Demolition and Construction Stage Lighting – Phase 1 and Outline Components

19.1.1. Lighting will be required during the Demolition and Construction Stage of the Proposed Development to facilitate the safe transit and use of the Site for limited periods during the hours of darkness and for site security.

19.1.2. The Phase 1 OCEMP[5] requires "Temporary lighting at site perimeters (security standards and illumination)"

19.1.3. Demolition and construction lighting would be temporary in nature, as it would be installed and removed in phases and fully removed once the Proposed Development is completed. Construction is expected to be approximately 16 years, with a phased approach.

19.1.4. Lighting levels for demolition and construction lighting will be defined on a phase-by-phase basis and a task-by-task basis, in accordance with the relevant guidance and lighting levels set out in BS EN 12464-2:2014.

19.1.5. Artificial Lighting will be required during the demolition and construction stage to facilitate the safe operation of the Site after dark and the security of the Site and operatives.

19.1.6. Demolition and construction lighting would be provided in compliance with the guidance within BS EN 12464-2:2014, which defines appropriate lighting levels for outdoor work tasks. The levels required would vary depending upon the task being undertaken and would be assessed on a task-by-task basis. Demolition and Construction Stage lighting would not significantly exceed the relevant lighting standard for the task being undertaken in order to limit the visibility of construction lighting within the landscape.

19.1.7. Demolition and Construction Stage lighting would be maintained at a low level and focussed into the Site, onto the task being undertaken. Where possible, demolition and construction lighting is to be provided by handheld sources or headtorches, ensuring the lowest possible amount of light is used for the task at hand.

19.1.8. Demolition and construction tasks will predominantly be undertaken during the hours of daylight and as such, the requirement for construction lighting throughout the demolition and construction stage of the Proposed Development is limited. Demolition and construction tasks are not anticipated to be undertaken for significant periods during the hours of darkness, except that some activities may take place after dark during the winter months.

19.1.9. Glare from inappropriately oriented flood lighting associated with the Demolition and Construction Stage has the limited potential to affect nearby potentially sensitive human safety receptors during winter months, when flood lighting of demolition or construction tasks has the potential to be required for short durations after sunset.

19.1.10. Luminaires used for demolition and construction lighting will be fitted with baffles or shields where necessary to ensure that lighting is not directed towards potentially sensitive receptors.

19.1.11. To limit the visibility of demolition and construction lighting within the landscape, it will be switched off when not in use. Task lighting for demolition and construction tasks is to be controlled by timed switches, ensuring that task lighting is only provided when needed and does not operate outside the hours of use.

19.1.12. Security lighting to the construction compound will be provided by luminaires fixed to site infrastructure, such as cabins or scaffolding pole and will be oriented downwards only. To reduce the levels of light spill leaving the Site, security lighting will be focussed into the Site only.

19.1.13. Security lighting will be controlled via photosensor, ensuring that lighting is only operational during the hours of darkness.

19.1.14. Demolition and Construction Stage lighting requirements for Phase 1 Detailed component will be provided in the Phase 1 OCEMP[5] accompanying the application. Through the implementation of the Phase 1 OCEMP[5], potential effects associated with demolition or construction lighting will be minimised.

19.1.15. For the Outline Component an Outline CEMP (ES Volume 2 Technical Appendix 5.1) would provide the strategy for Demolition and Construction Stage lighting requirements.

19.2. Completed Development Stage Lighting – Phase 1 and Outline Components

19.2.1. The Proposed Development will require lighting for safety, security and wayfinding at limited times during the hours of darkness. Lighting will be fit for purpose and sensitive to nearby human and ecological receptors.

19.2.2. Detailed lighting proposals will come forward in due course under reserved matters or in the discharging of any planning conditions, and these will follow the Lighting Strategy (Appendix 1). This can be secured by a reasonably worded planning condition.

19.2.3. Phase 1 road lighting compliant with British Standard BS5489-1:2020 is to be provided to the CWMMC and Subsidiary Roads throughout the Site, to provide safety for motorists, pedestrians, and cyclists and to improve the amenity of the area. It should be noted that the CWMMC will not be lit from the bridge north to the junction with Charlwood Road.

19.2.4. Lighting will be of an appropriate specification and designed in accordance with British Standards.

19.2.5. Luminaires will be used with integral LEDs and only where the luminaire photometry is available from the manufacturer. This is to ensure the photometric footprint of the luminaires can be modelled to ensure the potential effects of light spill are minimised or mitigated.

19.2.6. The following criteria seeks to ensure that the lighting is not outside of the obtrusive light limits for the Environmental Zone in which the Site is located, is sensitive to the area, and provides a recognised standard level of lighting for all adoptable areas requiring

illumination. Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the buildings and upwards towards the sky.

19.2.7. All lighting unless otherwise stated is to emit a warm white colour temperature light (2700 Kelvin or less) to reduce the potential for adverse effects onto potentially sensitive receptors.

19.2.8. Lighting for adoptable areas will be provided in accordance with the West Sussex County Council (WSC) Adoptable Specification. The specification sets out parameters for the implementation of lighting, such as luminaire manufacturer, models & correlated colour temperature (CCT).

19.2.9. Lighting in adopted areas will be required in the following application areas:

- Crawley Western Multi-Modal Corridor – Detailed Component-
- Subsidiary Roads (Detailed and Outline Component)

19.2.10. Lighting in unadopted areas will be required in the following task areas:

- Industrial Areas
- Commercial, Hotel, Schools, Business & Community Areas
- Sports Pitch
- Amenity Lighting including footpaths
- Property Fronts and Rears

19.2.11. The industrial areas may require lighting for activities such as loading / unloading of lorries, car parking and general amenity lighting. Lighting for these areas will be designed in accordance with BS EN 12464-2:2024

19.2.12. Commercial, business and community areas may require lighting for which roads and footpaths will be designed in accordance with BS 5489-1:2020 and car parks, service yards and loading bays designed in accordance with BS EN 12464-2:2024

19.2.13. Hotel (C1) community and education facilities will require lighting in accordance with BS EN 12464-2:2024.

19.2.14. One of the Sport pitches may require floodlighting if used after dark, in accordance with the relevant sport guidance. In accordance with the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01) pitches closest to the Ancient Woodland buffer would be unlit, with any artificial and lit pitches located to the east in this area (i.e. furthest from the Ancient Woodland). A standalone Lighting Impact Assessment and supporting Lighting Design details would be required to support these facilities at reserved matters stage.

19.2.15. As included in the Site-Wide Design Code (WOI-HPA-DOC-SWDC-01), no lighting or light spill is to be allowed within Hyde Hill LWS. Lighting close to the edge of the buffer zone should also face away from the zone.

19.2.16. Amenity lighting is to be provided to property frontages and rears for the purposes of safety and amenity; enabling wayfinding during the hours of darkness. Amenity lighting

for the Proposed Development will be applied sensitively to account for the receptors identified bounding the Site and within the Proposed Development.

19.3. Crawley Western Multi-Modal Corridor (CWMMC) (Phase 1 Detailed Component) Completed Development Stage.

19.3.1. The CWMMC running through the Proposed Development is to be adopted and would be required to be lit in accordance with BS 5489-1:2020 and the West Sussex Council (WSC) Adoptable Specification. The adoptable specification sets out parameters for the implementation of lighting, such as luminaire manufacturer, models, & correlated colour temperature.

19.3.2. Luminaires are to be mounted at a tilt angle of 0 degrees and are to emit light downwards only in accordance with guidance set out in GN01/21[3] & GN08/18[4].

19.3.3. Luminaires used are to have good optical control,, effectively shielding the source intensity and reducing both horizontal and vertical light spill. Light spill onto boundary features from street lighting will be restricted by focusing light into the Site.

19.3.4. Luminaire performance parameters for the Spine Road running through the Proposed Development are outlined in **Table 1.1**.

19.3.5. A detailed design has been completed for the CWMMC and subsidiary roads forming Phase 1A and 1B and these are compliant with the external Lighting Strategy.

Equipment Specification	Description
Location	Spine Roads
Correlated Colour Temperature (Kelvin)	As per WSCC adoptable specification
Luminaire Manufacturer	Urbis Schreder (As per WSCC adoptable specification)
Luminaire Model	Axia 3 (As per WSCC adoptable specification)
Light Source	LED
Height	8m
Mounting Arrangement	Post-Top
Luminaire Tilt	0° (Maximum)
Upward Light Output Ratio (ULOR)	0% (Maximum)
Example Luminaire Image	
Lighting Class P4	
Lighting Design Criteria	5.00 lux maintained average horizontal illuminance, 1.00 lux minimum horizontal illuminance.
Controls	Mayflower CMS nodes to fit 7-pin NEMA socket. Photocell switch on at 35 lux and off at 18 lux. Part night lit dusk to 24:00/ 5.30 to dawn (GMT)

Table 1.1 Performance and Installation Requirements – CWMMC

19.4. Subsidiary Roads (Detailed and Outline Component) Completed Development Stage

19.4.1. Lighting of the subsidiary roads throughout the Proposed Development will require lighting in accordance with BS 5489-1:2021. Light spill onto boundary features from street lighting will be restricted by focusing light into the Site.

19.4.2. At least some of the Subsidiary roads throughout the Proposed Development are to be adopted and are therefore required to be lit in accordance with the West Sussex County Council (WSCC) Adoptable Specification. The adoptable specification sets out parameters for the implementation of lighting, such as luminaire manufacturer, models, & correlated colour temperature.

19.4.3. Luminaires are to be mounted at a tilt angle of 0 degrees and are to emit light downwards only in accordance with guidance set out in GN01/21[3] & GN08/23[4].

19.4.4. Luminaires used are to have good optical control and the option for the installation of luminaire shields. This is an effective method of shielding the source intensity and reducing both horizontal and vertical light spill. Luminaires in proximity to potentially sensitive receptors will be considered for shields at the design stage, with shields installed where needed prior to the occupation of the Proposed Development.

Luminaire performance parameters for the subsidiary roads running through the Proposed Development are outlined in **Table 1.2**.

Equipment Specification	Description
Location	Subsidiary Roads
Correlated Colour Temperature (Kelvin)	As per WSCC Adoptable Specification or 2700K in non-adoptable roads
Luminaire Manufacturer	Urbis Schreder (As per WSCC Adoptable Specification)
Luminaire Model	Axia 3 (As per WSCC Adoptable Specification)
Light Source	LED
Height	6m
Mounting Arrangement	Post-Top
Luminaire Tilt	0° (Maximum)
Upward Light Output Ratio (ULOR)	0% (Maximum)
Example Luminaire Image	
Lighting Class P5	
Lighting Design Criteria	3.00 Lux Maintained Average Horizontal Illuminance, 0.60 Lux Minimum Horizontal Illuminance.
Controls	Mayflower CMS nodes to fit 7-pin NEMA socket. Photocell switch on at 35 lux and off at 18 lux. Part night lit dusk to 24:00/ 5.30 to dawn (GMT)

Table 1.2 Performance and Installation Requirements – Car parking, Footpath and Amenity Lighting

19.5. Outline Component - Car Parking, Footpaths and Amenity Areas – Completed Development Stage.

19.5.1. Lighting will be provided to the car parking, footpaths, and amenity areas throughout the development, including the schools, business and commercial areas, for the safety and amenity of residents and to enable wayfinding during the hours of darkness.

19.5.2. Detailed lighting proposals will come forward in due course under reserved matters or in the discharging of any planning conditions, and these will follow the Lighting Strategy (Appendix 1). This can be secured by a reasonably worded planning condition.

19.5.3. Lighting will be provided by column mounted luminaires, mounted at a height not exceeding 6.00 metres from ground level.

19.5.4. Luminaires will direct light downwards only and light spill will be limited by directing light where it is needed.

19.5.5. Luminaires will emit warm white light, with a Correlated Colour Temperature (CCT) of 2700 Kelvin or less; in accordance with recommendations set out in ILP GN08/23[4].

19.5.6. Luminaire performance parameters for the car parks, footpaths and amenity areas are outlined in **Table 1.3**.

Equipment Specification	Description
Location	Car parking, footpaths, and amenity areas
Correlated Colour Temperature (Kelvin)	2700 Kelvin (Maximum)
Luminaire Manufacturer	Urbis Schreder
Luminaire Model	Axia 3
Light Source	LED
Height	6m
Mounting Arrangement	Post-Top
Luminaire Tilt	0° (Maximum)
Upward Light Output Ratio (ULOR)	0% (Maximum)
Example Luminaire Image	
Lighting Class – TBC at detailed design, but maximum P4	
Lighting Design Criteria	Roadway and Pathway – 5 lux / 0.20 U_o Car Parks – 5 lux 0.40 U_o
Controls	Mayflower CMS nodes to fit 7-pin NEMA socket. Photocell switch on at 35 lux and off at 18 lux. Part night lit dusk to 24:00/ 5.30 to dawn (GMT)

Table 1.3 Performance and Installation Requirements – Car parking, Footpath and Amenity Lighting

19.6. Outline Component - Sports Facilities – Completed Development Stage

19.6.1. Lighting will be provided to one of the Sport Pitches within the development for the safe functioning of the relevant sport.

19.6.2. Lighting will be provided by column mounted sports lighting luminaires, with luminaires mounted at a height not exceeding 16.00 metres from ground level.

19.6.3. Luminaires will direct light downwards only and light spill will be limited by directing light where it is needed onto the playing surface.

19.6.4. Luminaires will emit white light, with a Correlated Colour Temperature (CCT) of 4000 Kelvin or less; in accordance with recommendations set out in relevant sport lighting guidance.

19.6.5. Rear Shields will be fitted to the floodlights or columns to further restrict obtrusive light.

19.6.6. A detailed design by competent lighting professionals, complete with obtrusive light calculations will be provided to confirm that the obtrusive light guidance levels are not exceeded. The lighting levels will be confirmed by site measurement by competent lighting professionals during final commissioning.

19.6.7. Detailed lighting proposals will come forward in due course under reserved matters or in the discharging of any planning conditions, and these will follow the Lighting Strategy (Appendix 1). This can be secured by a reasonably worded planning condition.

19.6.8. Luminaire performance parameters for the Sport Facilities are outlined in **Table 1.4**.

Equipment Specification	Description
Location	Sport Facilities
Correlated Colour Temperature (Kelvin)	Sport task specific lighting – 4000 Kelvin (Maximum)
Luminaire Manufacturer	DW Windsor (Or equivalent approved)
Luminaire Model	Sabre (Or equivalent approved)
Light Source	LED
Height	<= 16m
Mounting Arrangement	Post-Top
Luminaire Tilt	0° (Maximum)
Upward Light Output Ratio (ULOR)	0% (Maximum)
Example Luminaire Image	
Lighting Class	
Lighting Design Criteria	Task specific lighting – TBA at detailed design stage based on specific sports to be played and relevant guidance.
Controls	To be controlled via manual switch / time clock.

Table 1.4 Performance and Installation Requirements – Sports Facilities

19.7. Outline Component - Property Frontages and Rears – Completed Development Stage

19.7.1. Lighting will be provided to the frontages and rears of residential properties within the Proposed Development for the safety and amenity of residents and to enable wayfinding to front and rear doors during the hours of darkness.

19.7.2. Detailed lighting proposals will come forward in due course under reserved matters or in the discharging of any planning conditions, and these will follow the Lighting Strategy (Appendix 1). This can be secured by a reasonably worded planning condition.

19.7.3. Lighting will be provided by wall mounted amenity lighting luminaires and maintained at a low level, with luminaires mounted at a height not exceeding 2.00 metres from ground level.

19.7.4. Luminaires will direct light downwards only and light spill will be limited by directing light where it is needed.

19.7.5. Wall mounted luminaires will emit warm white light, with a Correlated Colour Temperature (CCT) of 2700 Kelvin or less; in accordance with recommendations set out in ILP GN08/23[4].

19.7.6. Luminaire performance parameters for the property frontages and rears are outlined in **Table 1.5.**

Equipment Specification	Description
Location	Property Frontages and Rears
Correlated Colour Temperature (Kelvin)	2700 Kelvin (Maximum)
Luminaire Manufacturer	UNILAMP (Or equivalent approved)
Luminaire Model	BRONCO Wall Downlight Narrow Beam (Or equivalent approved)
Light Source	LED
Height	2m
Mounting Arrangement	Wall Mounted
Luminaire Tilt	0° (Maximum)
Upward Light Output Ratio (ULOR)	0% (Maximum)
Example Luminaire Image	
Lighting Class N/A	
Lighting Design Criteria	Lighting to be provided for wayfinding purposes to aid entrance and egress from properties during the hours of darkness.
Controls	To be controlled via photocell and PIR Sensor to the following regime: Daylight: OFF Dusk – Dawn: PIR activated. (Switch ON @ 100% for 2 minutes upon PIR activation)

Table 1.5 Performance and Installation Requirements – Property Frontages and Rears

19.8. Off-Site Ifield Brook Wood and Meadows Pedestrian / Cycleway link

19.8.1. The proposed pedestrian / cycle link through Ifield Brook Wood and Meadows forms part of the off-Site mitigation package for the Proposed Development. As a key element of the proposed transport strategy and for achieving target modal shares, it has been considered as far as possible within the supporting assessment work as embedded mitigation.

19.8.2. Lighting may be provided to the pedestrian / cycleway to the Site through Ifield Brook Wood and Meadows for the safety and amenity of pedestrians and cyclists. As described in the Site-Wide Design Code, the lighting across the Ifield Brook and Wood Meadows towards the station should be lit with wildlife friendly directional lighting, with further details reserved for detailed design stage.

19.8.3. Detailed lighting proposals will come forward in due course under reserved matters or in the discharging of any planning conditions, and these will follow the Lighting Strategy (Appendix 1). This can be secured by a reasonably worded planning condition.

19.8.4. Lighting will be designed at the detailed stage to ensure that there is minimal light at the boundaries of the pedestrian / cycleway link to maintain compliance with GN08/23

19.8.5. Lighting will be provided by bollard lighting luminaires and maintained at a low level, with luminaires mounted at a height not exceeding 1.00 metre from ground level.

19.8.6. Luminaires will direct light downwards only using an asymmetric optic which reduces obtrusive light and glare. Light spill will be limited by directing light where it is needed.

19.8.7. The luminaires will emit warm white light, with a Correlated Colour Temperature (CCT) of 2700 Kelvin or less; in accordance with recommendations set out in ILP GN08/23[4].

19.8.8. Luminaire performance parameters for the footpath / cycleway are outlined in Table 1.6.

Equipment Specification	Description
Location	Pedestrian / Cycleway Link through Ifield Brook Wood & Meadows
Correlated Colour Temperature (Kelvin)	2700 Kelvin (Maximum)
Luminaire Manufacturer	Thorn (Or equivalent approved)
Luminaire Model	Urba Bollard (Or equivalent approved)
Light Source	LED
Height	1m
Mounting Arrangement	Bollard root mounted
Luminaire Tilt	0° (Maximum)
Upward Light Output Ratio (ULOR)	0% (Maximum)
Example Luminaire Image	
Lighting Class N/A	
Lighting Design Criteria	Lighting to be provided for wayfinding purposes to aid movement of pedestrians and cyclists across Ifield Brook Wood and Meadows
Controls	To be controlled via photocell and PIR Sensor to the following regime: Daylight: OFF; Dusk – Dawn: PIR activated.

Table 1.6 Performance and Installation Requirements -Pedestrian / Cycle Link

APPENDIX 2 – SENSITIVE RECEPTORS

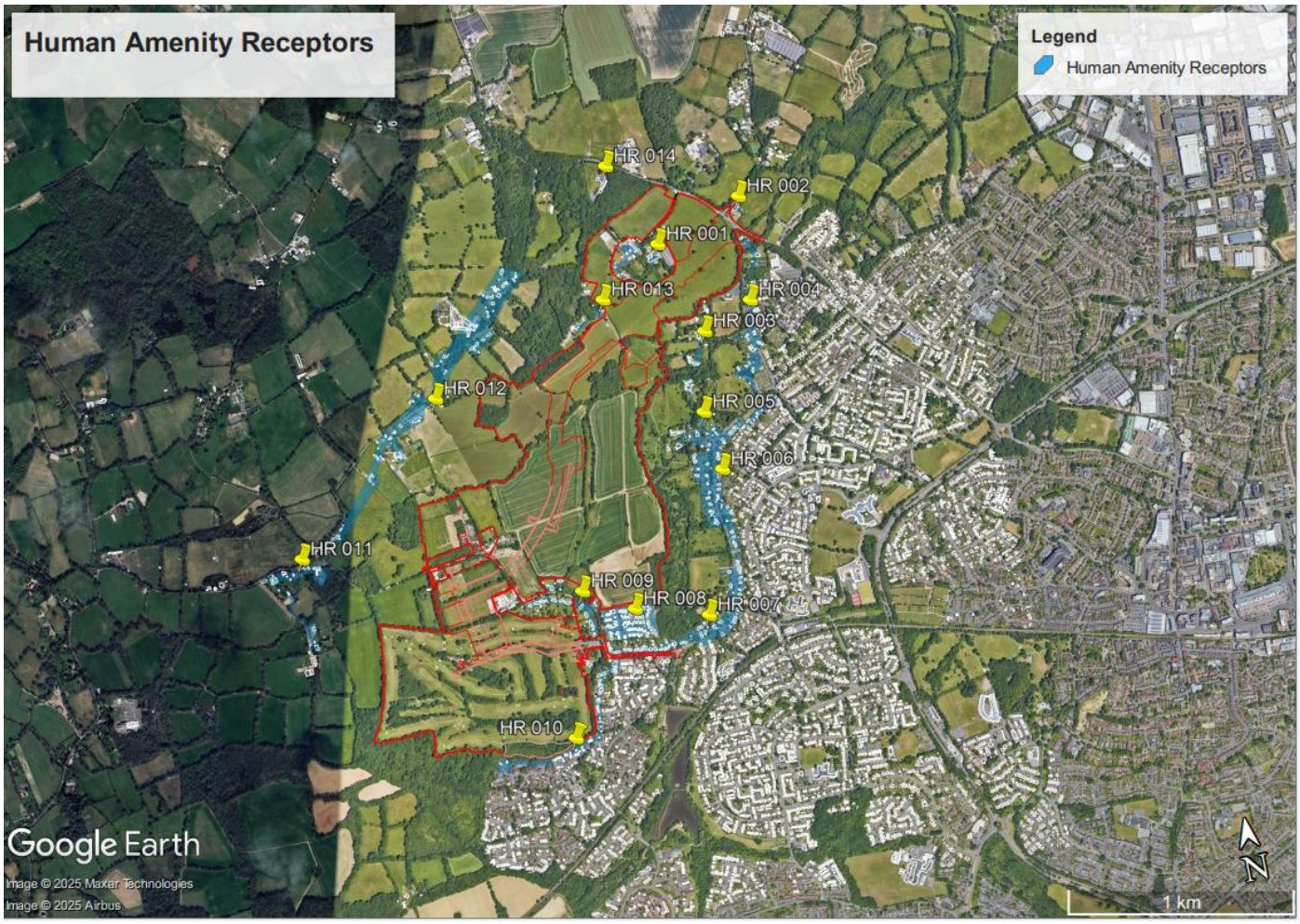


Figure 2.1: Sensitive Human Amenity Receptors

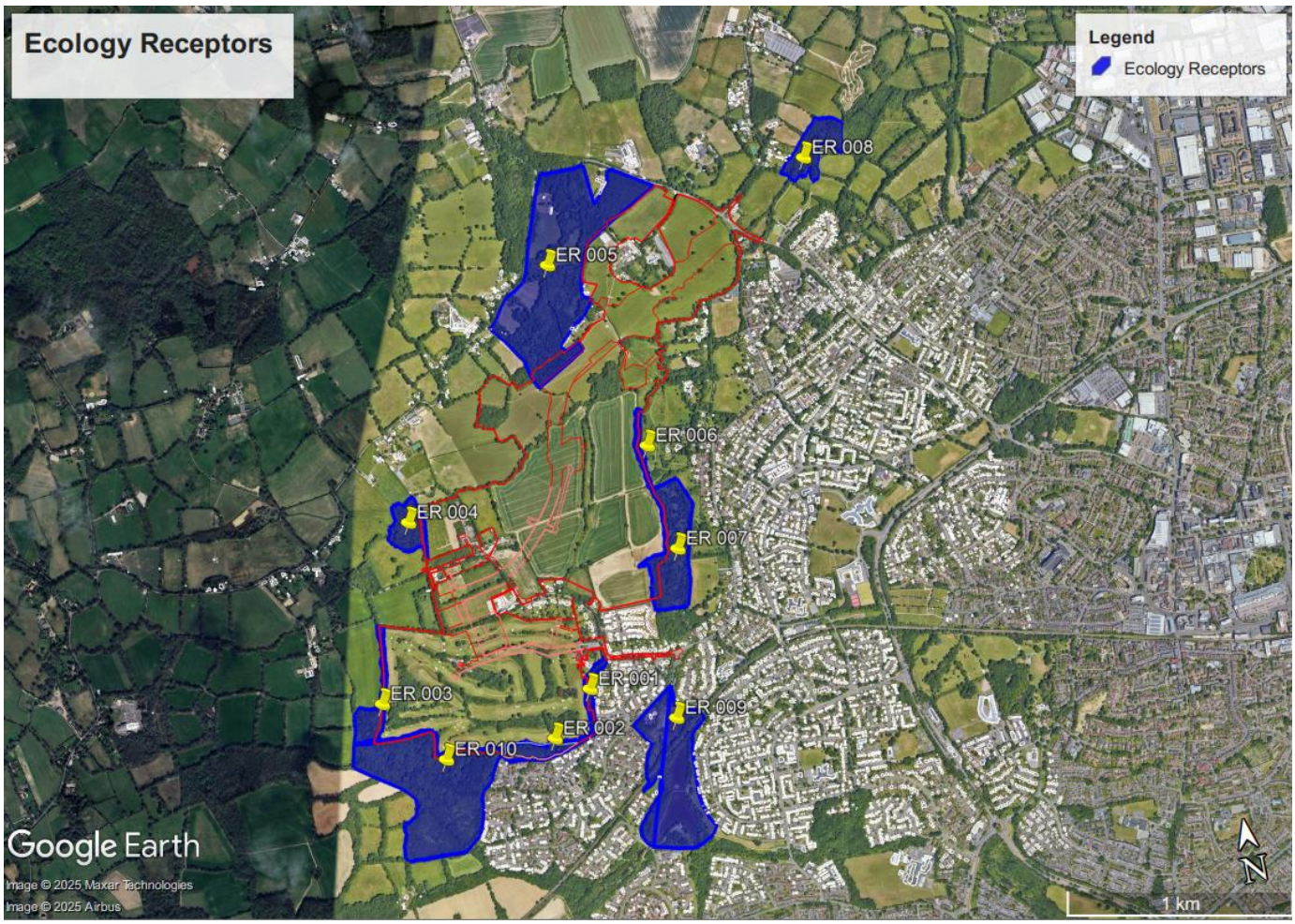


Figure 2.2: Sensitive Ecology Receptors

APPENDIX 3 – SURVEY LIGHT MEASUREMENTS

Illuminance measurements were taken at the locations shown on **Figure 3.1**.

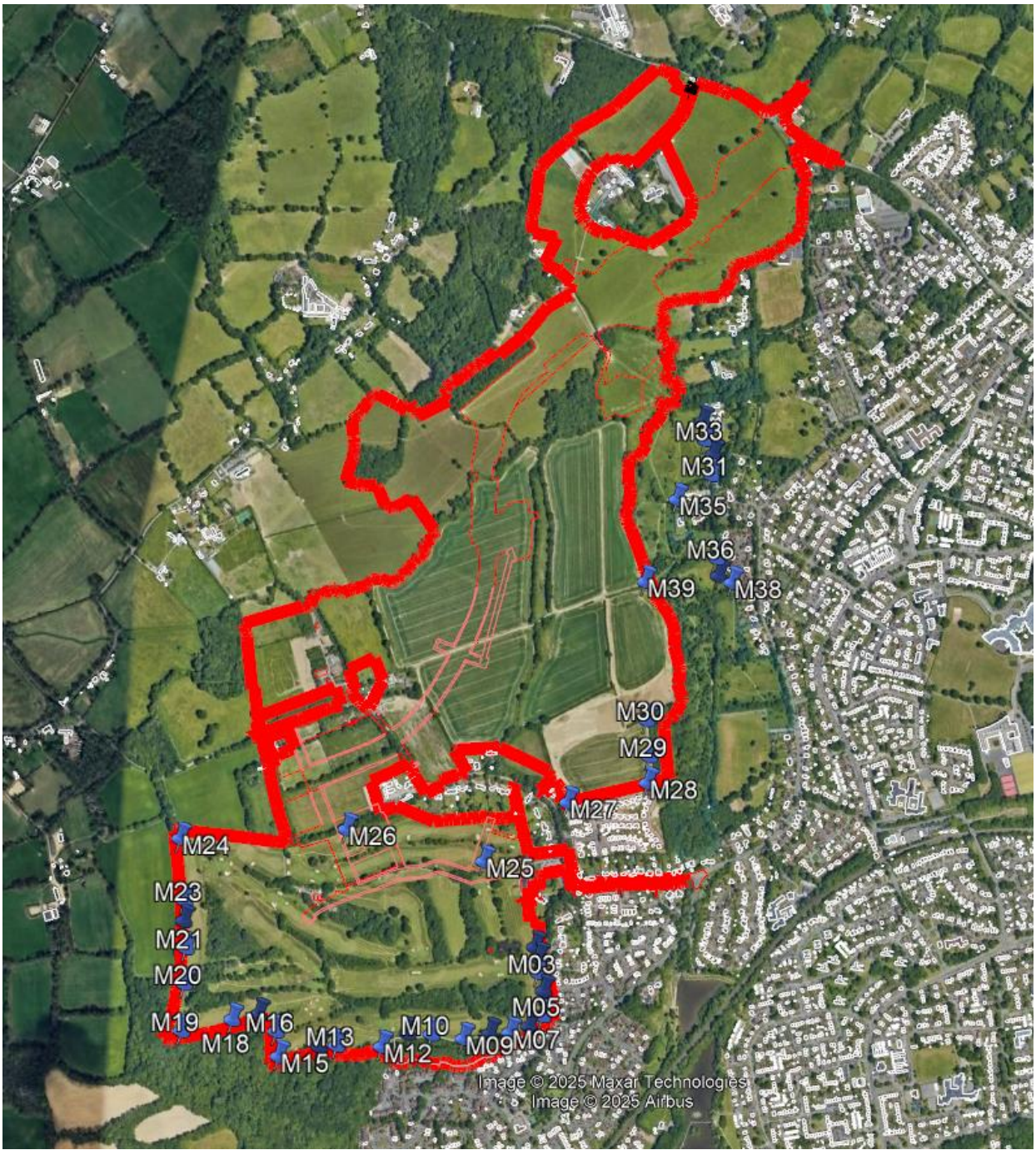


Figure 3.1 – Locations of illuminance measurements.

Location	Horizontal	Vertical (lux)			
	(lux)	North	East	South	West
M01	0.03	0.02	0.00	0.02	0.03
M02	0.03	0.02	0.01	0.02	0.03
M03	0.05	0.02	0.01	0.02	0.03
M04	0.05	0.03	0.02	0.03	0.03
M05	0.06	0.04	0.03	0.02	0.03
M06	0.07	0.05	0.04	0.01	0.02
M07	0.07	0.05	0.04	0.00	0.02
M08	0.08	0.05	0.06	0.02	0.02
M09	0.09	0.05	0.06	0.03	0.02
M10	0.06	0.04	0.04	0.01	0.01
M11	0.09	0.05	0.07	0.03	0.02
M12	0.07	0.05	0.05	0.01	0.02
M13	0.07	0.05	0.05	0.02	0.02
M14	0.06	0.05	0.04	0.02	0.02
M15	0.05	0.03	0.05	0.01	0.01
M16	0.06	0.02	0.04	0.04	0.02
M17	0.04	0.03	0.02	0.00	0.00
M18	0.03	0.03	0.02	0.00	0.00
M19	0.04	0.03	0.03	0.00	0.00
M20	0.04	0.02	0.02	0.00	0.00
M21	0.04	0.01	0.03	0.01	0.00
M22	0.04	0.02	0.03	0.02	0.00
M23	0.04	0.02	0.04	0.02	0.00
M24	0.03	0.01	0.03	0.03	0.00
M25	-	-	0.20	-	-
M26	0.02	0.03	0.03	0.02	0.01
M27	0.04	0.03	0.04	0.02	0.02
M28	0.04	0.02	0.01	0.00	0.02
M29	0.04	0.01	0.00	0.02	0.02
M30	0.03	0.02	0.01	0.02	0.02
M31	0.02	0.02	0.01	0.01	0.02
M32	0.02	0.01	0.00	0.01	0.01
M33	0.01	0.02	0.00	0.02	0.01
M34	0.02	0.01	0.00	0.00	0.00
M35	0.01	0.00	0.00	0.01	0.01
M36	0.01	0.02	0.01	0.00	0.00
M37	0.02	0.02	0.01	0.00	0.01
M38	0.03	0.03	0.03	0.01	0.01

Table 3.1 Site survey illuminance measurements

APPENDIX 4 – SURVEY PHOTOGRAPHS

Photographs were taken at the locations indicated in **Figure 4.1**

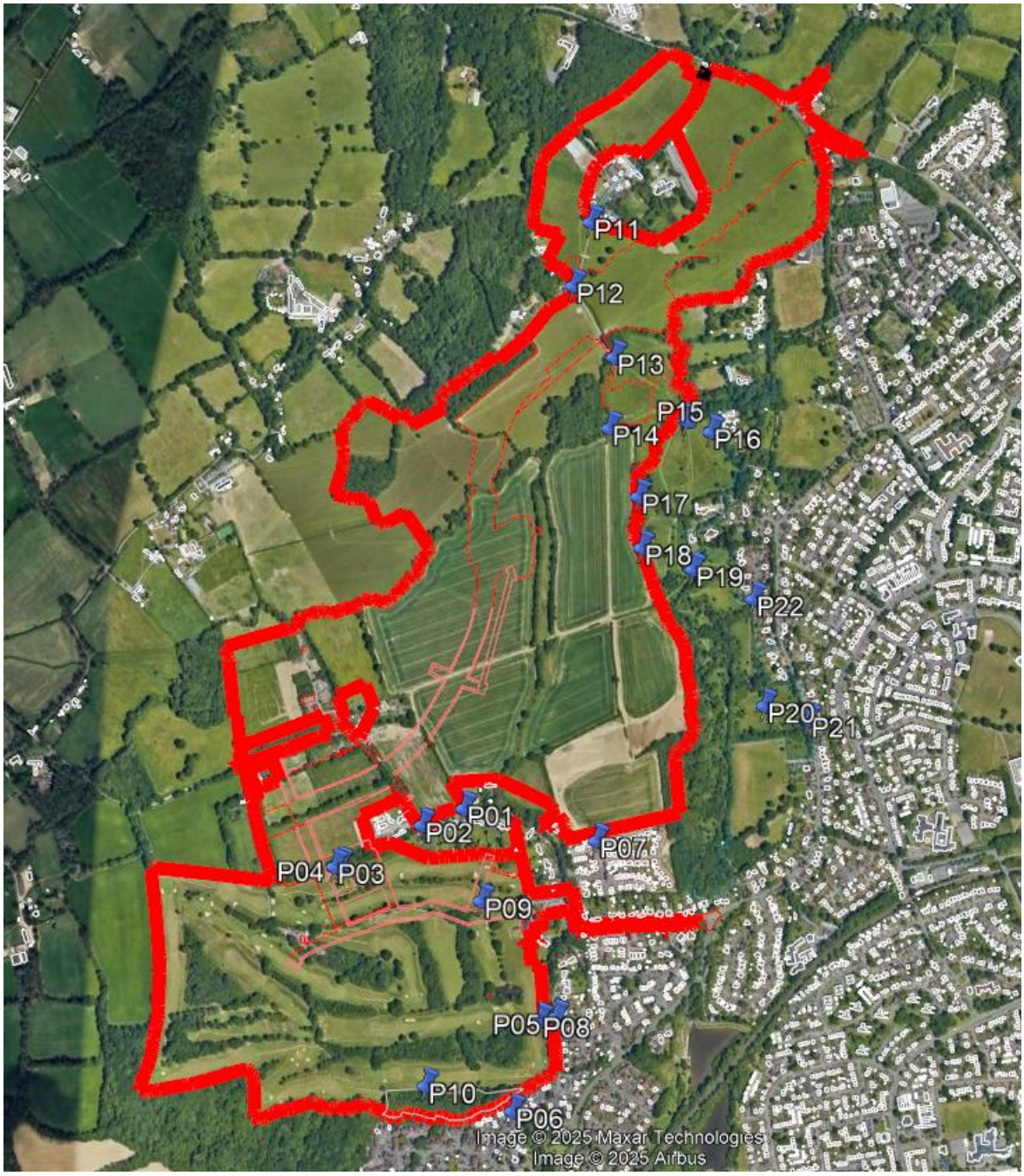


Figure 4.1 – Locations of photographs

Figure 4.2 – Location P01 on Rusper Road

Figure 4.3 – Location P02 on Rusper Road

Figure 4.4 – Location P03 looking south into Site from north of golf course.

Figure 4.5 – Location P04 within the Site at northern edge of golf course looking south.

Figure 4.6 – Location P05 –Peverel Rd at Site boundary with golf course to right.

Figure 4.7 - Location P06 Poynings Road cul-de-sac looking towards golf course.

Figure 4.8 - Location P07 Rhodes Drive adjacent to the Site

Figure 4.9 - Location P08 on golf course looking south to Poynings Road.

Figure 4.10 - Location P09 on golf course looking east to clubhouse.

Figure 4.11 - Location P09 on golf course looking east to clubhouse.

Figure 4.12 - Location P09 on golf course looking north.

Figure 4.13 - Location P09 on golf course looking north towards Gatwick Airport

Figure 4.14 - Location P11 View from Site boundary looking south into Site.

Figure 4.15 - Location P12 at West boundary, looking east into the Site.

Figure 4.16 - Location P13 Centre of the Site looking east.

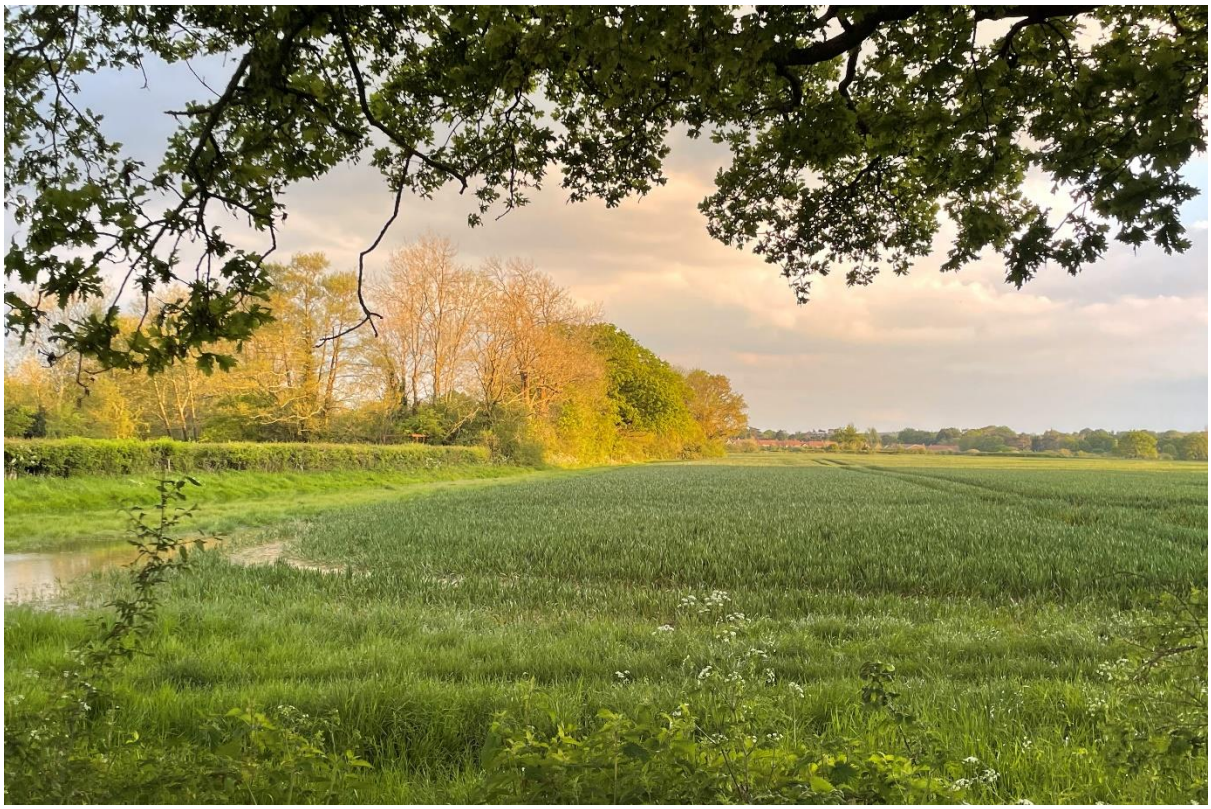


Figure 4.17 - Location P14 Centre of the Site looking east.

Figure 4.18 - Location P15 at Site boundary across Ifield Meadow to Rectory Lane

Figure 4.19 – Location P16 View from Site east boundary.

Figure 4.20 - Location P18 View of Ifield Church from Site boundary.

Figure 4.21 - Location P19 view from Ifield Meadow towards Aldingbourne Close

Figure 4.22 - Location P20 View from Ifield Meadow towards Rusper Road

Figure 4.23 - Location P21 Street lighting on Rusper Road to the east of the Site

TECHNICAL DESCRIPTIONS, DEFINITIONS AND ABBREVIATIONS

HR: is an abbreviation for a potential human amenity receptor, a location where an observer could have the potential to be affected by the proposed lighting to be installed *Abbreviation used by DFL LIandP.*

ER: is an abbreviation for an area identified as or treated as a location that may host a potentially sensitive ecological receptor. This is generally used where light sensitive bats have the potential to live, forage or use as a flight path, other ecologically sensitive receptors such as (but not limited to) the Great Crested Newt may also be identified by this term. *Abbreviation used by DFL LIandP.*

HS: is an abbreviation for an area where an individual maybe susceptible to light brightness (Light intensity) which may have the potential to cause a hazardous situation. *Abbreviation used by DFL LIandP.*

Obtrusive Light: refers to excessive or bothersome artificial light that goes where it should not l, causing discomfort and disruption. *Spill light which because of quantitative, directional or spectral attributes in a given context gives rise to annoyance, discomfort, distraction or reduction in the ability to see essential information.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Sky glow: When lights are directed upwards or light is scattered by particles in the air, like dust or water droplets, it creates a glow that makes it hard to see stars. *The increase in diffuse illuminance of the night sky above that produced by natural sources such as the moon and visible star.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Vertical Illuminance: is how much light lands on upright surfaces like walls. It's measured in lux or footcandles and matters for places where the view from a vertical angle is important. *Lighting of vertical surfaces such as walls, windows, statues, sculptures and people's faces*. CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Correlated colour temperature (CCT): the appearance of light emitted by a light source measured in Kelvin (K), Lower CCT values such as 2700K represent warmer, more yellowish light, *similar to the light from older incandescent lamps. (Tcp)The temperature of the Planckian radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions, measured in absolute temperature on the kelvin (K) scale.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lux: measures the brightness of light as perceived by the human eye at a specific point on a surface. *The SI derived unit of illuminance, measuring luminous flux per unit area (1 lux =1 lumen/m2).* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Lumens: measure how bright a light appears to our eyes. *The SI derived unit of luminous flux; a measure of the total quantity of visible light emitted by a source or received by a surface (unit: lumen).* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Glare: refers to an excess of bright light that makes you uncomfortable or hinders your vision. It happens when there's a big difference between a bright light and the rest of the surroundings. *Glare: condition of vision in which there is discomfort or a reduction in the ability to see details or objects, caused by an unsuitable distribution or range of luminance, or by extreme contrasts.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.1.8

Luminous intensity: is light brightness or how intense the light source is. light intensity is how intense a light source is emitted or received in a particular direction, this is measured candelas and is termed as luminous intensity *Iv <of a source, in a given direction> quotient of the luminous flux, dΦv, leaving the source and propagated in the element of solid angle dΩ containing the given direction, by the element of solid angle (unit: cd =lm · sr -1.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.2.

Candela: is a measurement for the brightness of a light source, taking into account the direction in which the light is emitted. *Base unit of luminous intensity in the International System of Units (SI); the luminous power per unit solid angle emitted by a point light source in a particular direction.* CIBSE LG21 Lighting Guide 21: Protecting the night-time environment.

Uniformity (Uo): is an explanation for the even distribution of light across an area or surface. *The overall uniformity shall be calculated as the ratio of the lowest luminance, occurring at any grid point in the field of calculation, to the average luminance.* BS EN 13201-3-2015, Calculation of Performance Section 8.3.

Luminance: is how bright a surface appears to our eyes. It considers the light coming from or reflected by an object. *Lv <in a given direction, at a given point of a real or imaginary surface> quantity defined by the formula (unit: cd · m-2 = lm · m-2 · sr-1)* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.3.

Illuminance is how much light lands on a surface per square meter. It's measured in lux. More lux means a brighter area. *Ev (unit: lx = lm · m-2) 1. <at a point of a surface> quotient of the luminous flux dΦv incident on an element of the surface containing the point, by the area dA of that element 2. <at a point of a surface> equivalent definition: integral, taken over the hemisphere visible from the given point, of the expression.* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.2.10.

Luminaire: a light fixture, this is also sometimes referred to as a lantern or a light fitting, is a product that produces artificial light. *apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.3

ULOR: upward light output ratio or ULOR refers to the amount of light the light fixture will produce upwards as a percentage of its total light output. *RULO <of a luminaire> ratio of the upward luminous flux of the luminaire, measured under specified practical conditions with its own lamp(s) and equipment, to the sum of the individual luminous fluxes of the same lamp(s) when operated outside the luminaire with the same equipment, under specified conditions* BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.3.12.

Maintenance factor (MF): is an allowance for how well the lights keep working overtime. It considers things like dirt on the light fittings and "wear and tear". *DEPRECATED: light loss factor ratio of illuminance produced by the lighting installation after a certain period to the illuminance produced by the installation when new Note 1 to entry: The term depreciation factor has been formerly used to designate the reciprocal of the above ratio. Note 2 to entry: The maintenance factor takes into account light losses caused by dirt accumulation on luminaires and room surfaces (in interiors) or other relevant surfaces (in exteriors, where appropriate), and the decrease of the luminous flux of lamps*. BS EN 12665-2018, Light and lighting - Basic terms and criteria for specifying lighting requirements, Section 3.5.18.

***Tilt**: is how much the luminaire is lifted based on the fitting facing flat to the ground.*

Outreach: how far away the fitting is from the column/wall its mounted on to the light source.

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