



NAVIGATOR QUARTER, LAND ADJACENT TO SOUTHAMPTON AIRPORT

ENVIRONMENTAL STATEMENT (VOLUME 3)

TECHNICAL ANNEX I. EXTERNAL LIGHTING STRATEGY

HYBRID PLANNING APPLICATION

MAY 2025

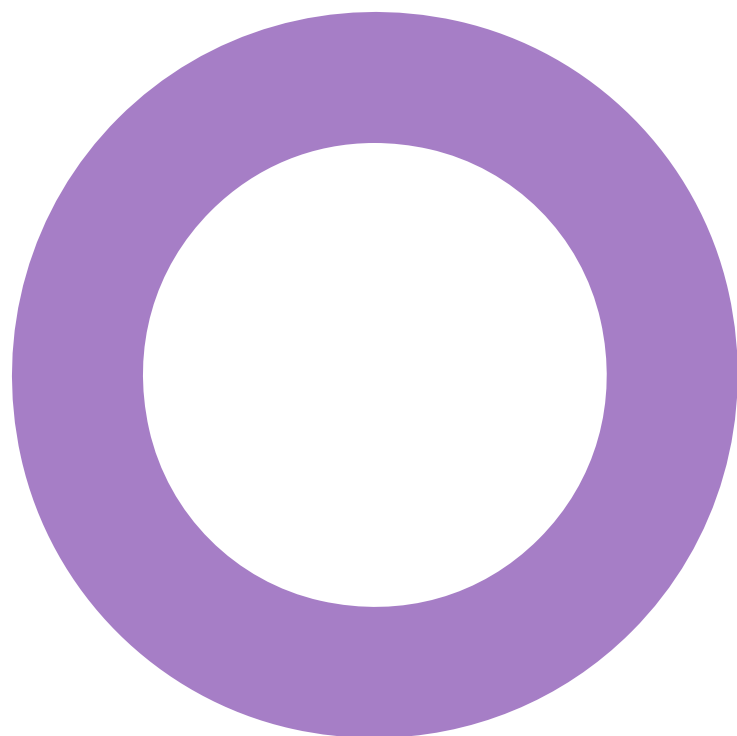
**blocwork (Eastleigh) LLP
&
Southampton International Airport Ltd**



Navigator Quarter, Land adjacent to Southampton Airport. Blocwork (Eastleigh) LLP & SIAL.

LIGHTING DESIGN
OBTRUSIVE LIGHTING STRATEGY.
MARCH 2025

1617877-HLE-XX-XX-RP-LD-708001-P01



Audit sheet.

Rev	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
P00	11-02-25	Initial Issue	KF	DLB	RM
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Glossary of terms.

- Adaptive lighting: Lighting systems that can adjust their intensity, timing, or colour temperature based on specific needs or conditions. Adaptive lighting can optimize energy efficiency, enhance safety, and minimize light pollution by tailoring the lighting to actual requirements.
- Adverse impact: The negative or detrimental effect that a particular action, development, or policy may have on the environment, community, or stakeholders.
- Ambient lighting: General, overall lighting that provides uniform illumination to a space.
- AONB: Areas of Outstanding Natural Beauty.
- Astronomical twilight: The period before sunrise and after sunset when the sky is dark enough for astronomical observations. Light pollution can significantly impact the visibility of celestial objects during this time.
- Baffle: A mechanical device for the control of luminance (brightness) and light spill. Sometimes referred to as a louvre.
- Beam angle: The angular spread of light emitted by a luminaire. It determines the width of the light beam and is typically measured in degrees.
- Beneficial impact: The positive or advantageous effect that a specific action, development, or policy can have on the environment, community, or stakeholders. (See also magnitude).
- Candela: (cd) is the base unit of luminous intensity in the International System of unit (SI); that is, luminous power per unit solid angle emitted by a point light source in a particular direction.
- CIE, Commission Internationale de l'Eclairage (International Commission on Illumination).
- Colour Rendering Index (CRI): A measure of how accurately a light source reveals the true colours of objects compared to a reference light source. CRI is typically rated on a scale from 0 to 100, with higher values indicating better colour rendering.
- Colour temperature: A measure of the colour appearance of light, expressed in Kelvin (K). Lower colour temperatures represent warmer or more yellowish light, while higher colour temperatures represent cooler or bluish light.
- Curfew times: often referred to as pre or post curfew, typically post curfew is regarded as 11pm, however different times may be applied by the LPA.
- Dark sky reserve: is a public or private land possessing an exceptional or distinguished quality of starry nights and nocturnal environment that is specifically protected for its scientific, natural, educational, cultural, heritage and/or public enjoyment- see IDA.
- Dimming: The process of reducing the light output of a luminaire. It is often used for adjusting illuminance (lux) levels and saving energy
- Direct sky glow: the direct upward spill of light into the sky, which can cause a 'glowing' effect and is often seen above cities when viewed from a dark area.
- Driver: is the name used to refer to the power supply component for LED lighting systems
- EIA, Environmental Impact Assessment.
- Energy waste: The unnecessary consumption of energy due to poorly designed or inefficient lighting systems.
- Environmental Zones: The characteristics of a locality are defined in ILP GN01. **“It is recommended that Local Planning Authorities specify the ...Environmental Zones for exterior lighting control within their Development Plans.”**
- ES, Environmental Statement.
- Fluorescent: A type of light source that emits light when an electrical current passes through a gas-filled tube, causing the phosphor coating inside the tube to fluoresce.
- Full cut-off luminaire: A type of luminaire that directs all of the light output downward, with no light emitted above the horizontal plane, (ideally below 85 degrees). It is designed to minimize light pollution by eliminating upward light and reducing glare.
- Glare: A visual discomfort caused by excessive brightness or uncontrolled light sources, which can impair visibility and cause discomfort to the eyes.
- Glare control: Measures and design techniques implemented to minimize excessive brightness and glare from lighting sources. These include shielding, diffusing or redirecting light, by selecting the appropriate luminaire.
- High-Intensity Discharge (HID): A type of light source that produces light by passing an electric current through a gas or vapour, such as metal halide or high-pressure sodium lamps. HID lamps are commonly used in streetlights and large commercial spaces.
- IDA, International Dark-Sky Association: is the recognized authority on light pollution and is the leading organization combating light pollution worldwide.
- Illuminance: is calculated as the density of lumen's per unit area and is expressed using lux (lumen's/square meter). Illuminance can be measured using a light meter.
- ILP, Institution of Lighting Professionals.
- Incandescent: A type of light source that produces light by heating a filament inside a bulb until it glows. Incandescent bulbs are less efficient compared to newer lighting technologies.
- Kelvin (K): A unit of measurement for the colour temperature of light. Lower Kelvin values represent warmer or more yellowish light, while higher Kelvin values represent cooler or bluish light.
- LED (Light-Emitting Diode): A semiconductor device that emits light when an electric current passes through it. LEDs are energy-efficient and have a longer lifespan compared to traditional light sources.
- LIA: Light Impact Assessment.
- Lighting master plan: A comprehensive plan that outlines the long-term vision and strategy for lighting within a city, town, or region. It includes guidelines for different types of lighting, such as street lighting, architectural lighting, and landscape lighting, to create a cohesive and sustainable lighting environment.
- Lighting plan: A document or design that outlines the placement, type, and characteristics of luminaires in a specific area of a project. It can include details on the intended lighting levels, distribution, and control strategies.

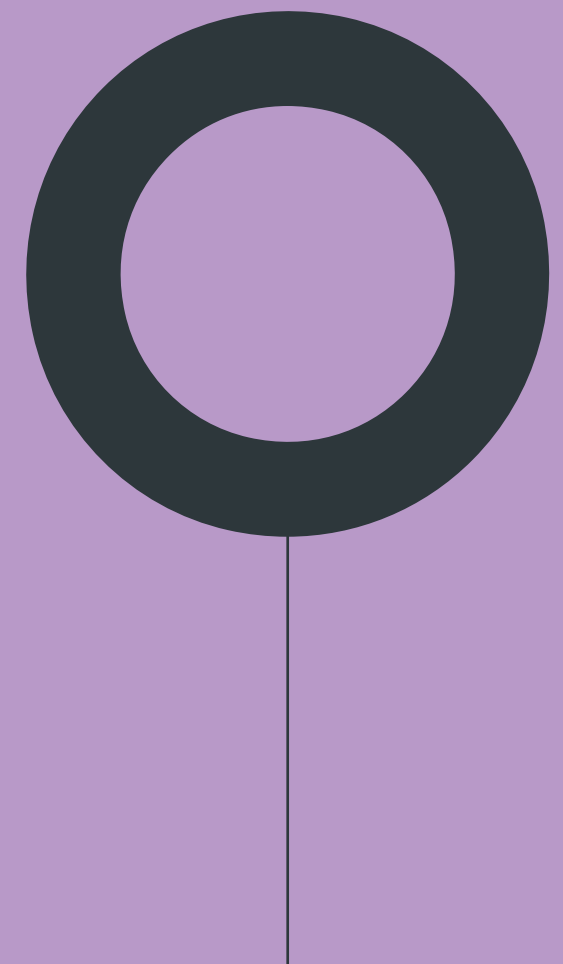
Glossary of terms.

- Lighting retrofit: The process of upgrading or replacing existing lighting systems with more energy-efficient and environmentally friendly alternatives.
- Louvre: A mechanical device for the control of luminance (brightness) and light spill. Sometimes referred to as a baffle.
- LPA: Local Planning Authority.
- Lighting simulation/modelling: The use of computer software or tools to create virtual models and simulations of lighting designs. It helps assess and visualize the expected lighting performance, distribution, and impact of a proposed lighting plan before implementation.
- Light pollution: The excessive or misdirected artificial light produced by human activities that adversely affects the natural darkness of the night sky and interferes with the environment, human health, and astronomical observations.
- Light Spill (vertical and horizontal): the spilling of light beyond the boundary of a property, which may cause nuisance to others.
- Lumen (lm): The unit of measurement for the total amount of visible light emitted by a light source. For example, a 60-watt incandescent bulb provides about 840 lumen's.
- Luminance (cd/m²) is a photometric measure of the luminous intensity per unit area of light travelling in a given direction. It describes the amount of light that passes through, is emitted or reflected from a particular area. This can be measured using a luminance meter but is more often calculated.
- Luminaire: A complete lighting unit that includes a light source, optical control, housing, and any necessary control components such as a driver.
- Lux: is the SI derived unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square metre.
- LVIA: Landscape Visual Impact Assessment.
- Magnitude: refers to the size, extent, or scale of something. It is a measure of the quantity, intensity, or importance of a particular attribute or phenomenon. Usually used in assessing the significance of effects.
- Maintenance factor: usually a percentage is allowed for in lighting calculations to allow for the effects of time on fittings and their surroundings. Light sources, drop in output, fittings and surroundings become dirtier, several factors combine to reduce the amount of light available. A typical maintenance factor would be 70% this would ensure an installation was still meeting required light levels in for example 3 years. For this report a factor of 100% (unity) has been used, that is a day one, worst case scenario.
- Motion sensor: A device that detects motion and triggers the lighting system to turn on or off automatically. It is commonly used for security and energy-saving purposes. (Sometimes referred to as a PIR).
- NTS: Non-Technical Summary (NTS).
- Photometry: is the light intensity and distribution of a luminaire. Luminaire manufacturers should provide electronic photometric data files, which are composed of light quantities and measurements, to illustrate

the performance of a specific luminaire product.

- PIR: Passive Infrared (detector). – See motion sensor.
- Planning condition: A condition imposed on a grant of planning permission (in accordance with the Town and Country Planning Act 1990) or a condition included in a Local Development Order or Neighbourhood Development Order.
- Ramsar sites: Wetlands of international importance, designated under the 1971 Ramsar Convention.
- Receptors: Light sensitive receptors are often sub categorized as - ecological, human, heritage and transport. Different receptors have various degrees of tolerance to increased light levels.
- Scattering: The process by which light is dispersed or deflected in different directions as it interacts with particles or molecules in the atmosphere. Scattering plays a significant role in the formation of sky-glow.
- Shielding: The use of fixtures and design techniques to control the direction of light and minimize its upward or sideways emission. Proper shielding helps reduce light pollution by directing light towards the intended area.
- Sky-glow: The brightening of the night sky caused by scattered and upward-directed artificial light. It reduces visibility of stars, constellations, and other celestial objects.
- SLL: Society of Light and Lighting.
- Site, Proposed Development area, usually denoted by a “red-line” boundary.
- A Site of Special Scientific Interest (SSSI): is a formal conservation designation. Usually, it describes an area that's of particular interest to science due to the rare species of fauna or flora it contains - or even important geological or physiological features that may lie in its boundaries.
- SQM: Sky quality meter, measures the darkness of the night sky in magnitudes per square arcsecond.
- Upward Light Flux (ULF): The total amount of light emitted upward from a luminaires or source. High ULF contributes significantly to light pollution.
- ULR, Upward Light Ratio. Expressed as a percentage of upward light compared to downward light.
- UNESCO, United Nations Educational, Scientific and Cultural Organization.
- Watt (W): A unit of electrical power that measures the rate at which energy is consumed by a light source.
- Wildlife corridor: Areas of habitat connecting wildlife populations.
- Zone of influence (ZOI) refers to the area or region that is affected or influenced by a particular factor, phenomenon, or entity.

1.0 Introduction.



1.0 Introduction.

This document covers the proposed lighting approach for the external areas of the Navigator Quarter development at Southampton Airport. It has been prepared to support reserved matters submissions for the buildings proposed at Southampton Airport. It sets out a strategy to demonstrate that a successful approach to lighting can be achieved through the reserved matters scheme, and which will provide a framework for subsequent detailed lighting design to be agreed via condition.

The Draft Project Description is for a ;

Hybrid Planning Application - Outline application for development of the land adjacent to Southampton Airport to provide employment floorspace of up to 92,000 sqm (GIA) within Use Classes E(g) (ii & iii), B2 and B8 with ancillary offices and areas for service yards, car parking, landscaping, ancillary buildings and associated activities, and access from Wide Lane (all matters reserved except for access). Full planning application for initial infrastructure works and construction of new access road including site levelling and other engineering works.

We have undertaken specialist lighting design analysis and produced strategic scheme proposals taking the local context, client needs and ecology into consideration. While external lighting design can often be seen as purely functional for task based use, it should also enhance the perception of quality, safety and encourage use of night time environment for both transient use and dwell time in addition to allowing functional tasks to be carried out.

Lighting treatments to the site should provide for safe navigation, whether by car, bicycle, on foot or by vehicle and also promote safety and security of the site's physical assets and personnel.

Whilst providing lighting for these uses, it is critical to ensure minimal impact all ecological and human receptors that could potentially be affected. Through carefully selected product choices and lighting types combined with considerate and thoughtful design a balance can be struck between the requirements of the users and the impact on the surrounding area. Designing for people and the planet is of utmost importance.

The lighting will be positioned with care and designed to avoid over lighting to be efficient in energy use and be sympathetic to the ecology, neighbouring buildings and users of the site, whilst providing the lighting required to operate this type of development.

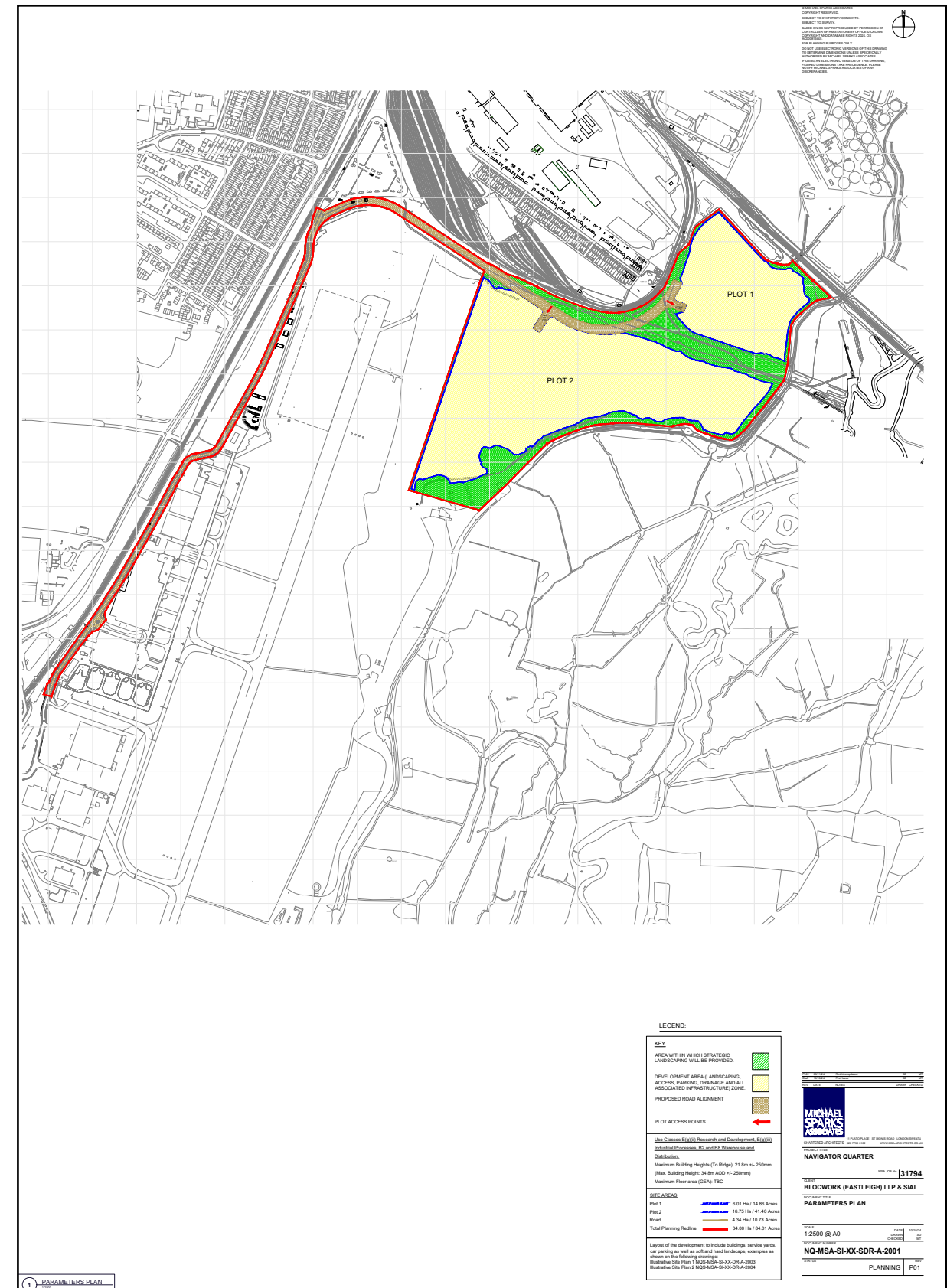
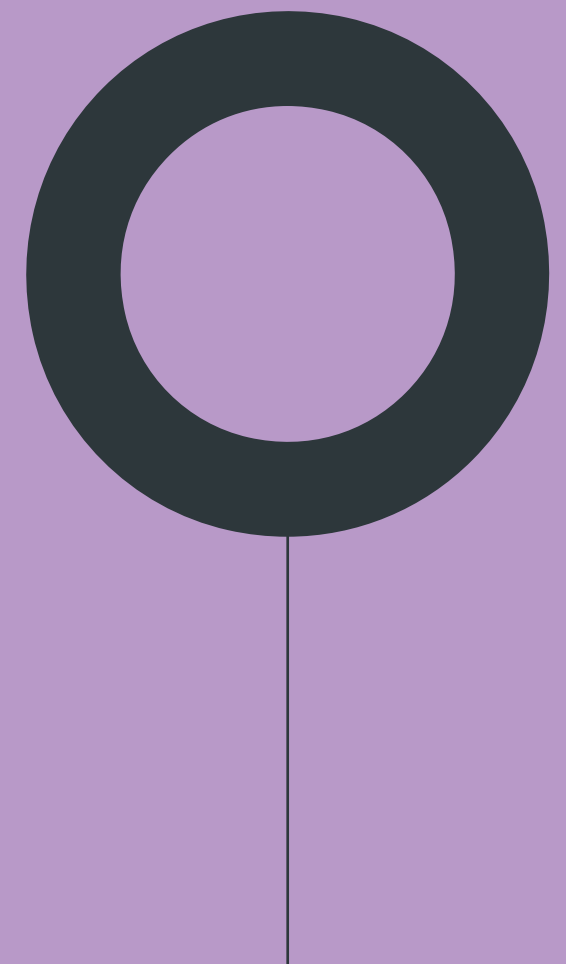


Figure 1.1 Michael Sparks Associates NQ-MSA-SI-XX-SDR-A-2001. Rev P01

Site Geography.



2.0 Legislation and planning policy.



Design Considerations - Guidelines and Criteria.

External Lighting.

There are several documents outlining the best practice and guidance on providing sufficient and appropriate lighting for vehicular thoroughfares, pedestrians passage and visual interest.

These are:

- BS EN 12464-2:2024: Lighting of Work places - Outdoor work places
- BS 5489-1:2020: Design of road lighting
- BS EN 13201-2:2015: Road lighting - Performance requirements
- CIE 136:2000: Guide to the lighting of urban areas

And, as appropriate:

- CIBSE Lighting Guide 6: The Exterior Environment 2016
- CIBSE Lighting the Environment: A guide to good urban design

Light Pollution.

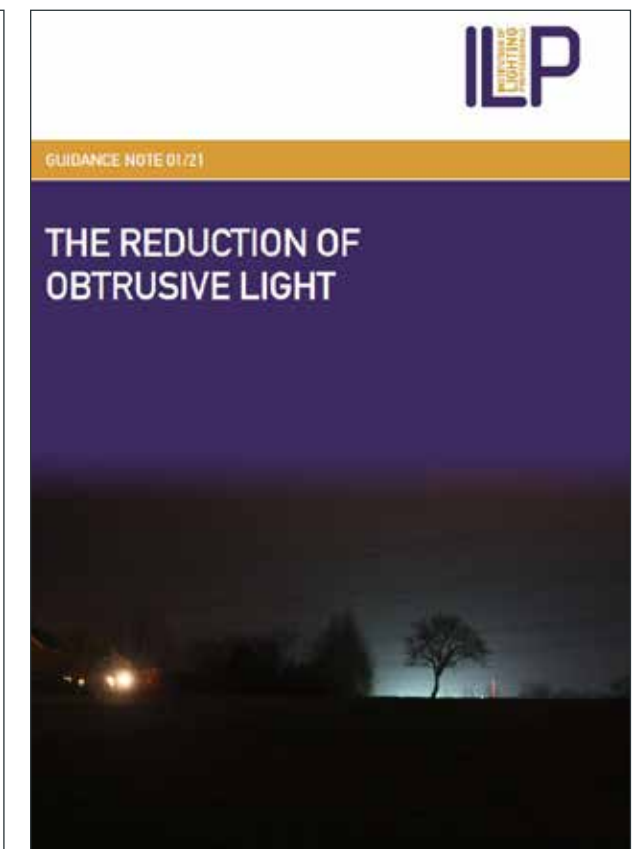
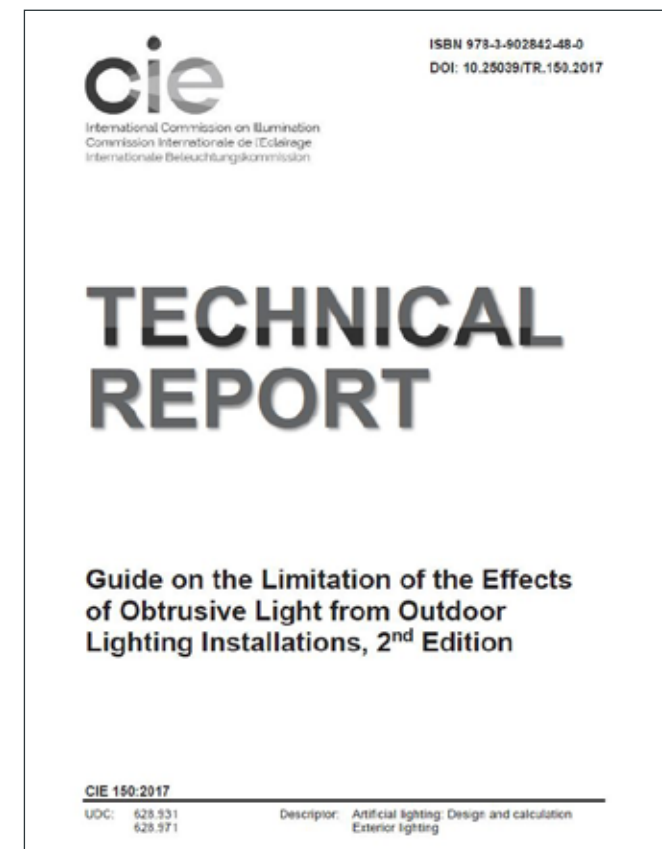
Similarly, there is an array of documents that outline best practice and guidance on reducing the visual and environmental impact of external lighting in relation to light pollution.

These are:

- Commission Internationale De L'Eclairage (CIE) 150: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (2017 2nd edition)
- IILP GN01/21: Guidance Notes for the Reduction of Obtrusive Light (2021)
- Bat Conservation Trust/IILP GN 08/23: Bats and Artificial Lighting at Night (2023)

The implementation of these standards is vital because of "The Clean Neighbourhoods and Environmental Act, 2005" which makes light a statutory nuisance.

It should be noted that, based on the current ecological conditions of the site and the proposed changes to the site, any lighting proposed to the site shall be considerate of any wildlife or potential new wildlife by ensuring that where possible light is directed into the site and any luminaires that are in close proximity to wildlife have good optical control and/or back spill shielding to minimize the impact on these areas.



Design Considerations - Guidelines and Criteria.

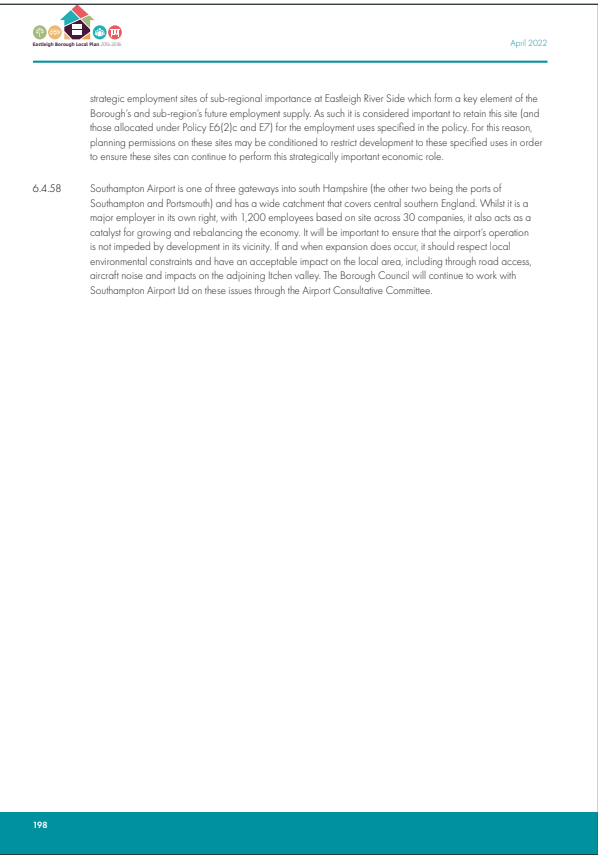
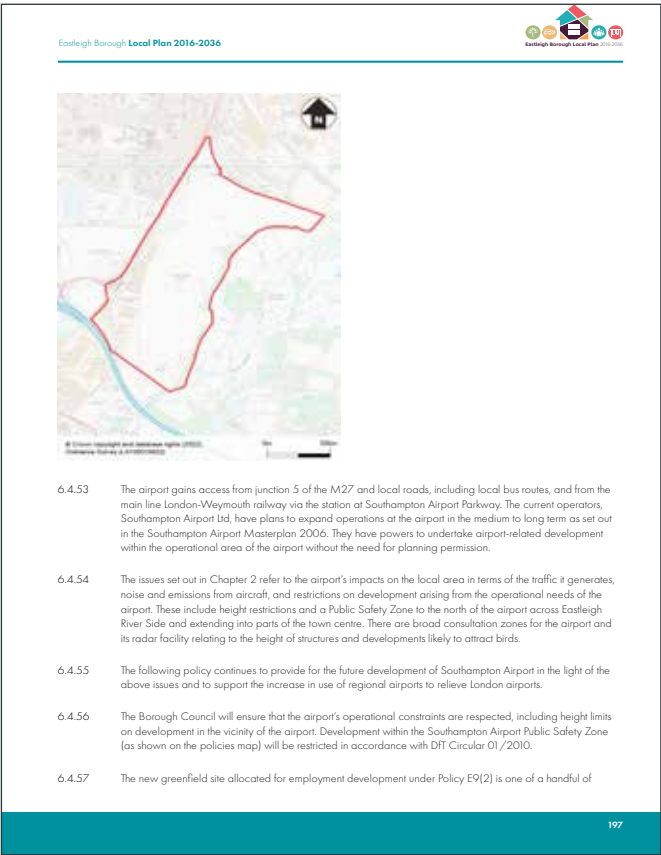
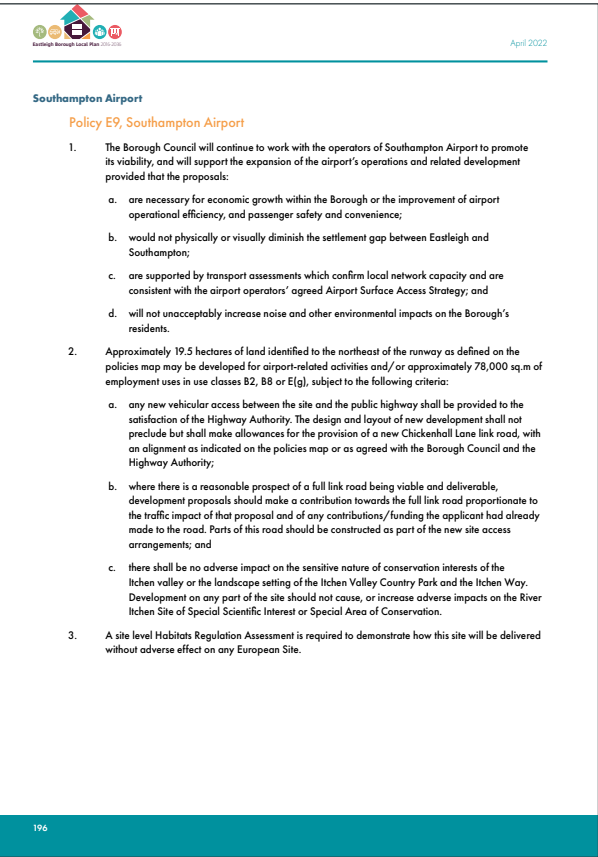
Planning Policy Documentation.

Eastleigh Borough Council have produced documentation to define their planning policy which need to be adhered to in respect of artificial lighting.

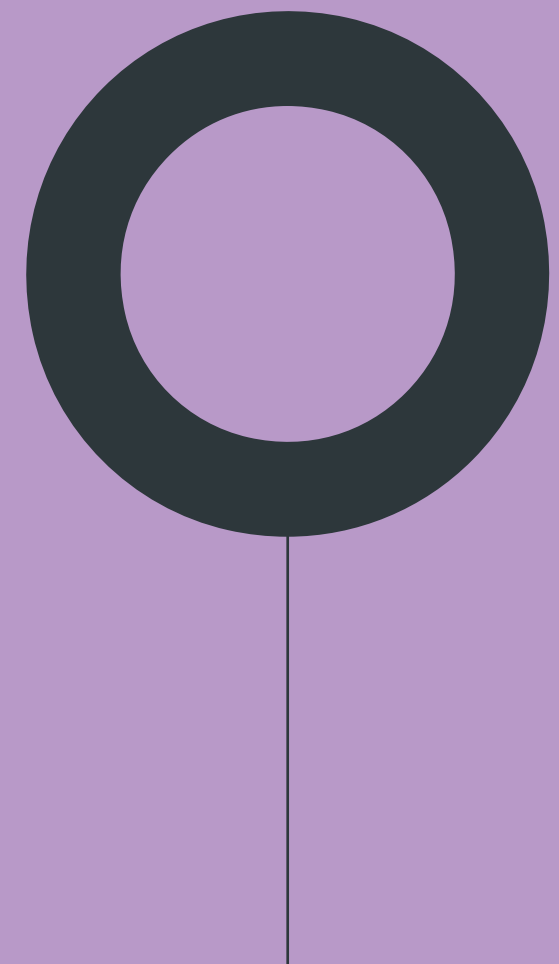
The main document is the Eastleigh Borough Local Plan (2016-2036) Adopted April 2022.

High quality and fully considered design will provide a lighting solution that meets the targets of the Local Plan.

Policy E9 does not specifically reference lighting, but it will need to be considered as part of the development to ensure a sustainable development.



3.0 Obtrusive light standards and guidance.



3.0 Obtrusive light standards and guidance.

3.1 Guidance.

International guidance

Commission Internationale De L'Eclairage (CIE) 150: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (2017 2nd edition)

The purpose of CIE 150 is to aid in formulating guidelines for assessing the environmental effects of exterior lighting and to provide limits for relevant lighting parameters to contain the obtrusive effects obtrusive effects of exterior lighting to tolerable levels. CIE 150 refers to the potentially adverse effects of exterior lighting on both natural and man-made environments.

CIE 126: Guidelines for Minimising Sky Glow (1997)

This gives general guidance for lighting designers and policy makers on the reduction of sky glow. The report gives recommendations about maximum permissible values for exterior lighting installations. These values are regarded as limiting values. Lighting designers should strive to meet the lowest criteria for the design. Practical implementation of the general guidance is left to national regulations.

National guidance

ILP's PLG04: Guidance on Undertaking Environmental Lighting Impact Assessments (2013)

The aim of this guidance is to outline good practice in lighting design and provide practical guidance on the production and assessment of potential lighting impacts from new developments. A key guidance in this document states:

'In cases where the Planning Authority has not set Environmental Zones for its area, the lighting professional may have to make decisions on the nature of the area and explain the reasoning in the LIA. Ensuring that the objective assessment is based on the nature of the area in general and not on the presence of various types and levels of lighting within it, is a crucial step' (highlight by HL).

ILP's GN01/21: Guidance Notes for the Reduction of Obtrusive Light (2021)

This document gives the core, quantitative, guidance for assessing light pollution and offers extra, UK appropriate, information on the topic. In its' introduction it states:

'This Guidance Note supersedes GN01/20 to reflect the changes in international guidance regarding obtrusive light as detailed in CIE 150: 2017 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations. It also considers industry comment regarding the assessment and definition of obtrusive lighting.'

The ILP has proposed lighting guidance and criteria for local authorities with a recommendation that these are incorporated at the local plan level.

Bat Conservation Trust/ILP GN 08/23: Bats and Artificial Lighting at Night (2023)

This is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and professionals specifying lighting. 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.



Figure 3.1 Cover pages of various guidances on minimising light pollution.

3.0 Obtrusive light standards and guidance.

3.2 Light pollution.

What is light pollution

Light pollution (sometime referred to as obtrusive light) is the excessive or misdirected use of artificial light produced by human activities that can disrupt the natural darkness of the night sky and can interfere with the environment, ecological and human receptors as well as interfering with astronomical observations by creating sky glow.

As stated in ILP's GN01/21: "Obtrusive light, whether it keeps you awake through a bedroom window, impedes your view of the night sky or adversely affects the performance of an adjacent lighting installation, is a form of pollution. It may also be a nuisance in law and can be substantially mitigated without detriment to the requirements of the task."

GN01/21 sets out acceptable, quantifiable limitations for light pollution based on the Environmental Zone in which a Proposed Development is to be located. These lighting limitations are set out for the following:

- **Light spill** is the spilling of light beyond the boundary of the area being lit and **Light intrusion ('Nuisance')** are all forms of obtrusive light which may cause nuisance to others, or adversely affect fauna and flora as well as waste money and energy. This is measured in illuminance, unit lumens/m² or lux (lighting levels)
- **Glare** is the uncomfortable brightness of a light source, also known as source intensity which is measured in luminance, unit cd/m², when viewed against a darker background
- **Sky glow** is a brightening of the night sky, caused by artificial light directed upwards into the sky from poorly aimed, or installed, luminaires which is measured as a percentage

What is not light pollution

It is not the observation of an artificially lit site from a distance if it complies with current guidance. It is important to understand that the subjective impression of an artificially lit site at night, when there was no prior artificial lighting, does not itself constitute light pollution.

Figure 3.2 illustrates the types of light pollution. Note that the 'Task light' area is **not** regarded as light pollution if it's function is to create a safe and secure environment at night.

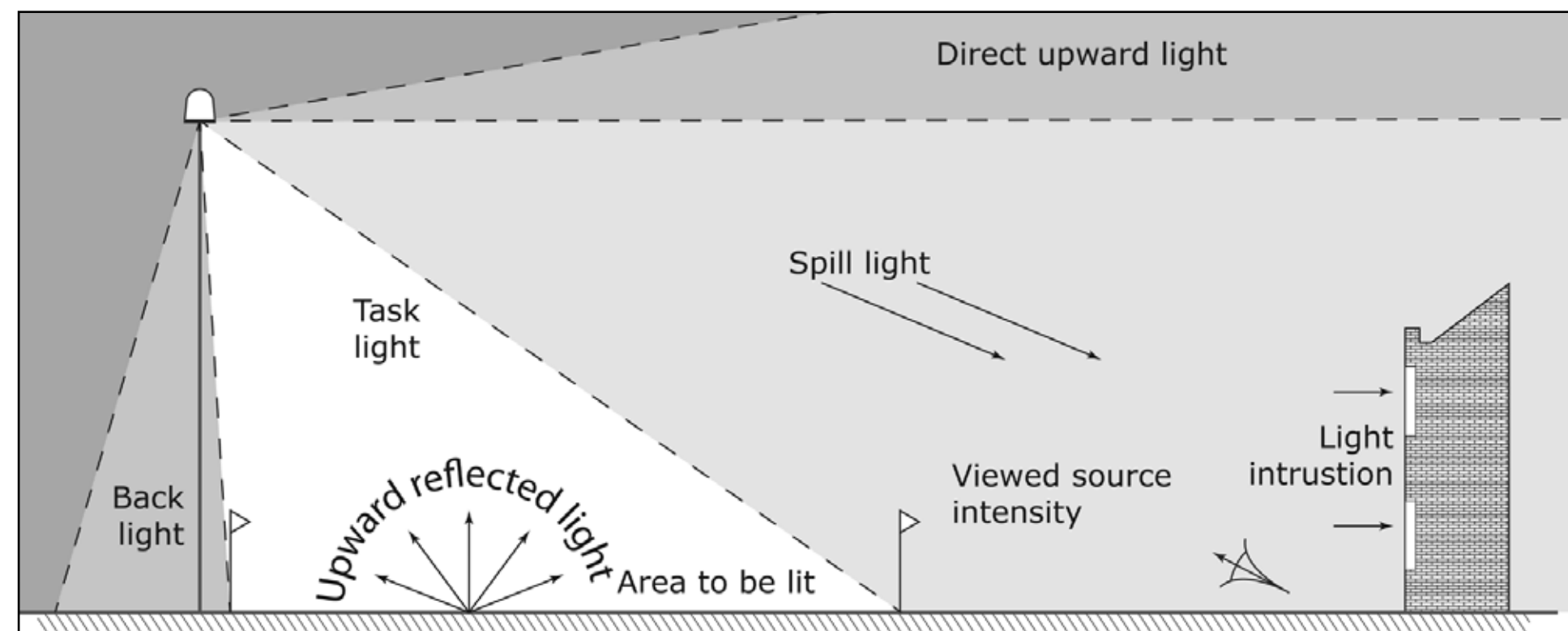


Figure 3.2 Types of light pollution - image from ILP GN01/21.

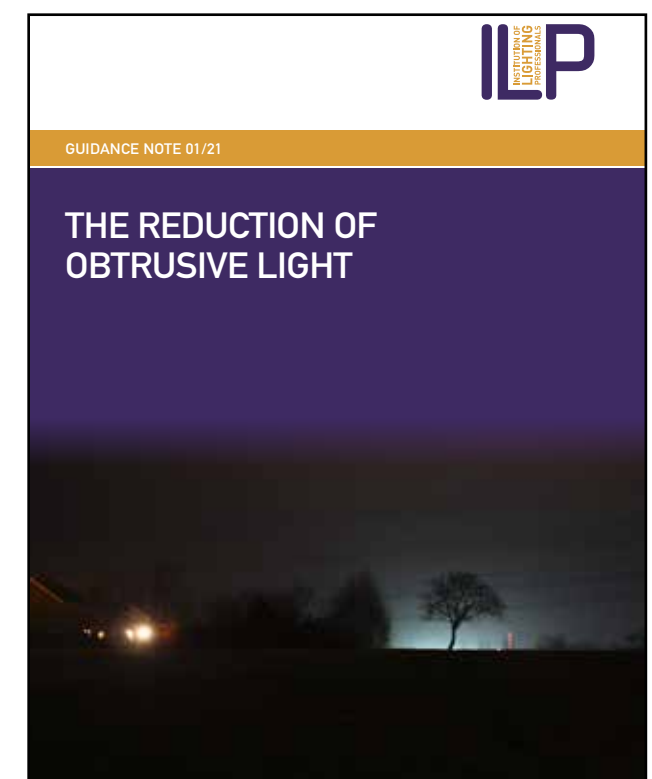


Figure 3.3 Cover page of ILP guidance note GN01/21.

3.0 Obtrusive light standards and guidance.

3.3 Environmental Zones.

Overview

Whilst current legislation (CNEA) covers light pollution issues, it doesn't define the criteria or methodology for classifying the sensitivity of an area in relation to acceptable artificial light at night. This classification is known as an Environmental (E#) Zone. To classify an area and set limits on acceptable light at night, several nationally recognised documents, by the CIE & ILP, can be referenced. Both apply a common environmental zoning system, summarised in **Table 3.1 Environmental Zones** from the ILP's GN01/21 guidance.

The amount of current human activity in an area is the key indicator in classifying an existing zone, as per the definitions in the 'Examples' column below, rather than the amount of artificial light already present in an area to be assessed, as previously highlighted in the PLG04 guidance.

Table 3.1 Environmental Zones (taken from ILP GN/01, 2021 (Table 2))			
Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places.
E1	Natural	Dark (SQM 20 to 20.5+)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~ 15 to 20)	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 of suburban locations.
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity.

Table 3.1 Environmental Zones notes

1. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.
2. Rural zones under protected designations should use a higher standard of policy.
3. Zone E0 must always be surrounded by an E1 Zone.
4. Zoning should be agreed with the local planning authority and due to local requirements a more stringent zone classification may be applied to protect special/specific areas.
5. SQM (Sky Quality Measurements) referenced by the International Dark-Sky Association (IDA), the criteria for E0 being revised in mid 2019 but not retrospective.
6. Astronomical observable dark skies will offer clearer views of the Milky Way and of other objects such as the Andromeda galaxy and the Orion Nebula.
7. Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way, these skies will have their own relative intrinsic value in the UK.

3.0 Obtrusive light standards and guidance.

3.3 Environmental Zones.

Environmental Zones - adjacent zone consideration

GN01/21 provides guidance on zones that are adjacent to each other. As stated in the introduction to this report, some Survey Locations were visited which do not relate to specific sensitive receptors. The reason for this is so that an exterior lighting design required for the safe and secure use of the Proposed Development, can be assessed to ensure it is not causing light pollution into the wider environment. The guidance stresses that although the Proposed Development site may change the pre development zone categorisation (based on the development type), it should **not** change the existing categorisation of any adjacent zones in its vicinity.

GN 01/21 states: 'Where an area to be lit lies within visual distance of the boundary between two zones then the obtrusive light values applicable to the most rigorous zone shall apply. Figure 5 (shown in **Figure 3.4** below) demonstrates this. For an observer located within or at the boundary of a more rigorous zone (E(X-1)) compared to the adjacent less rigorous zone (E(X)) then when the observer faces the less rigorous zone they will only be exposed to obtrusive lighting level pertinent to the zone within which they are located'.

Figure 3.5 provides a graphical representation of the statement above, in three scenarios, A, B and C.

Scenario A shows two neighbouring baseline condition E1 zones, with the one on the left proposing the development of a distribution centre. A survey location (SL) is shown in the adjacent zone, on the right. This SL records the existing lighting levels (lux) in that zone. Scenario B shows that if the proposal is approved, then it is likely that the E1 on the left (where the proposed distribution centre will be developed), will change to an E3 zone. However, in order to follow the guidance, the lighting design must be assessed and ideally show that any adjacent zone to the Proposed Development will not experience quantitative values above those acceptable to its existing categorisation. Scenario C shows however, should light pollution from the Proposed Development impact the adjacent zone, then measures must be set out to mitigate the aspects of light pollution impacting the zone. In order to clarify the GN01/21 requirements, lighting levels (lux) may be collected at a range of Survey Locations, other than those identified as sensitive receptors, and included in this BLS for quantitative assessment later.

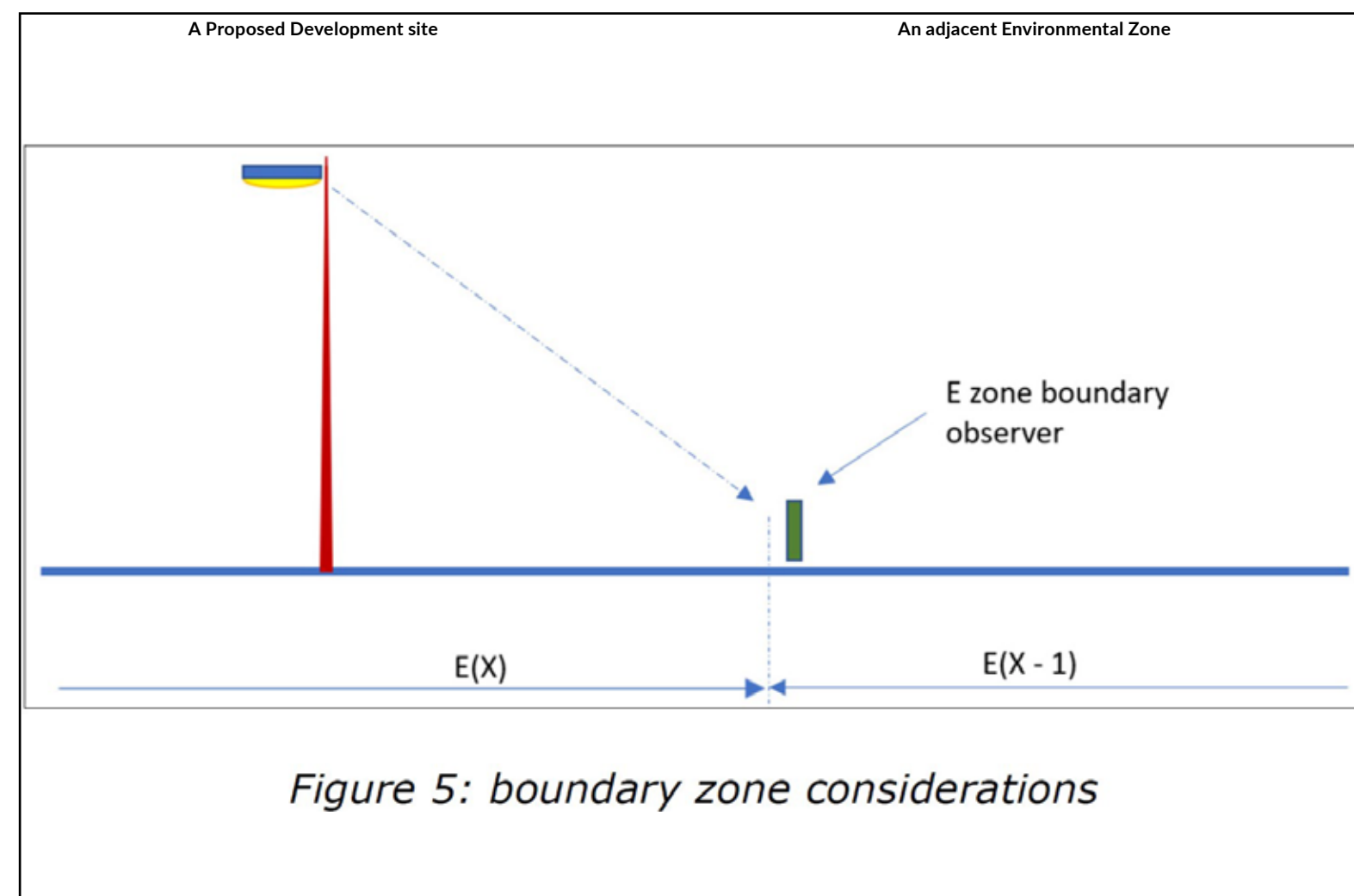


Figure 3.4 Extract from ILP guidance note GN01/21 - Figure 5

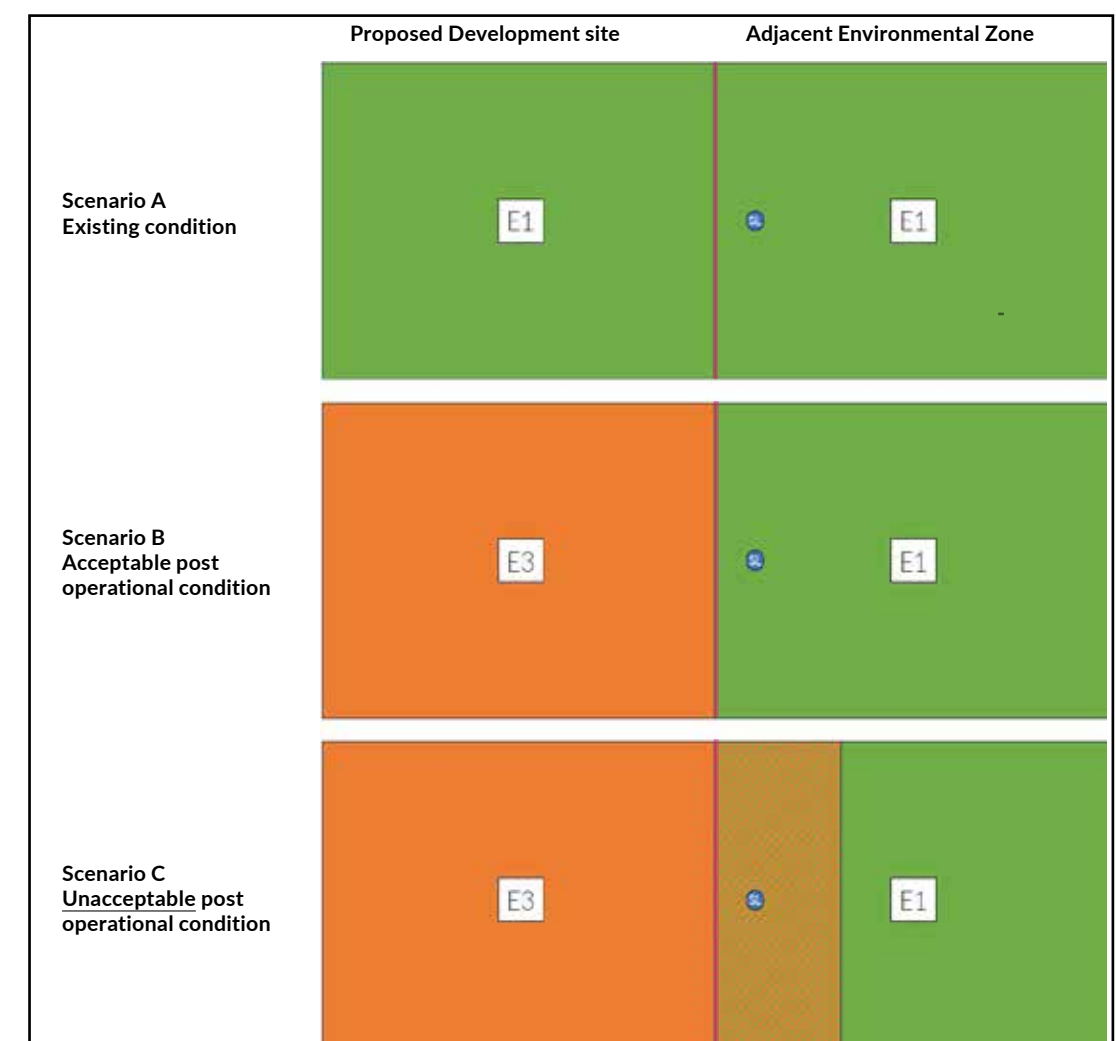


Figure 3.5 Diagram showing adjacent Environmental Zones, with survey location on boundary (SL) pre and post planning permission and site operational

3.0 Baseline condition.

3.4 Council for the Preservation of Rural England (CPRE) sky glow

The Figures below are extracts from CPRE – Great Britain's light pollution and dark skies. **Figure 3.6** shows the approximate location of the Proposed Development and wider area. **Figure 3.7** gives a broad brush indication of the upwards light (sky glow) experienced in the year 2015 for the Site and further surrounding locations. Satellite measurements range from <0.25 (NanoWatts/cm²/sr) (being a dark sky) to <32 (NanoWatts/cm²/sr) (being a saturated bright sky at night – city centre). Full details on this mapping are available at https://nightblight.cpre.org.uk/images/resources/Night_Blight_cpre.pdf.

- Shades of blue are indicative of the lowest levels of sky glow
- Shades of red are indicative of the highest levels of sky glow

The **Figure 3.7** indicates the approximate area of the Site to be relatively well lit, with a darker unlit corridor to the east.

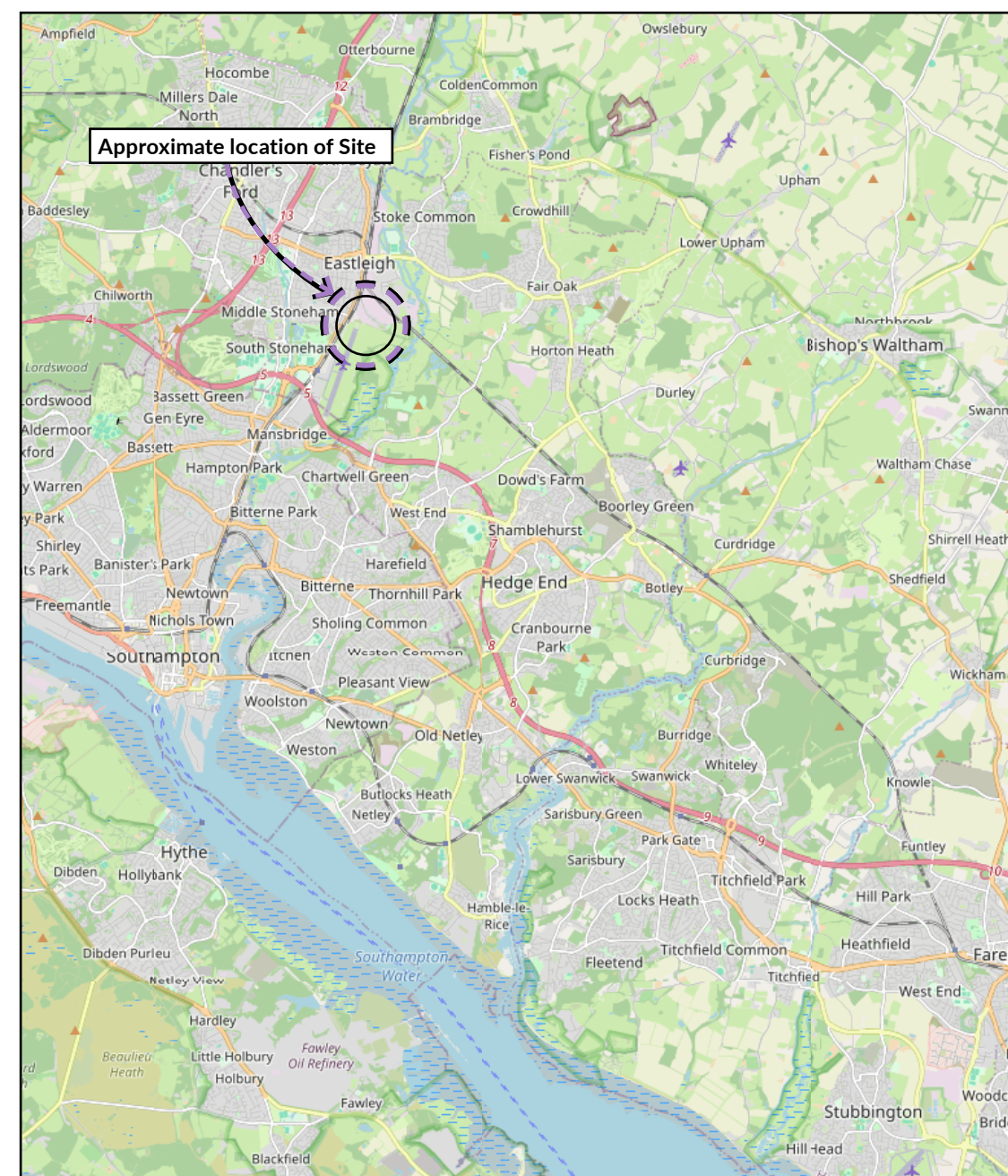


Figure 3.6 Extract from CPRE website, road map image.

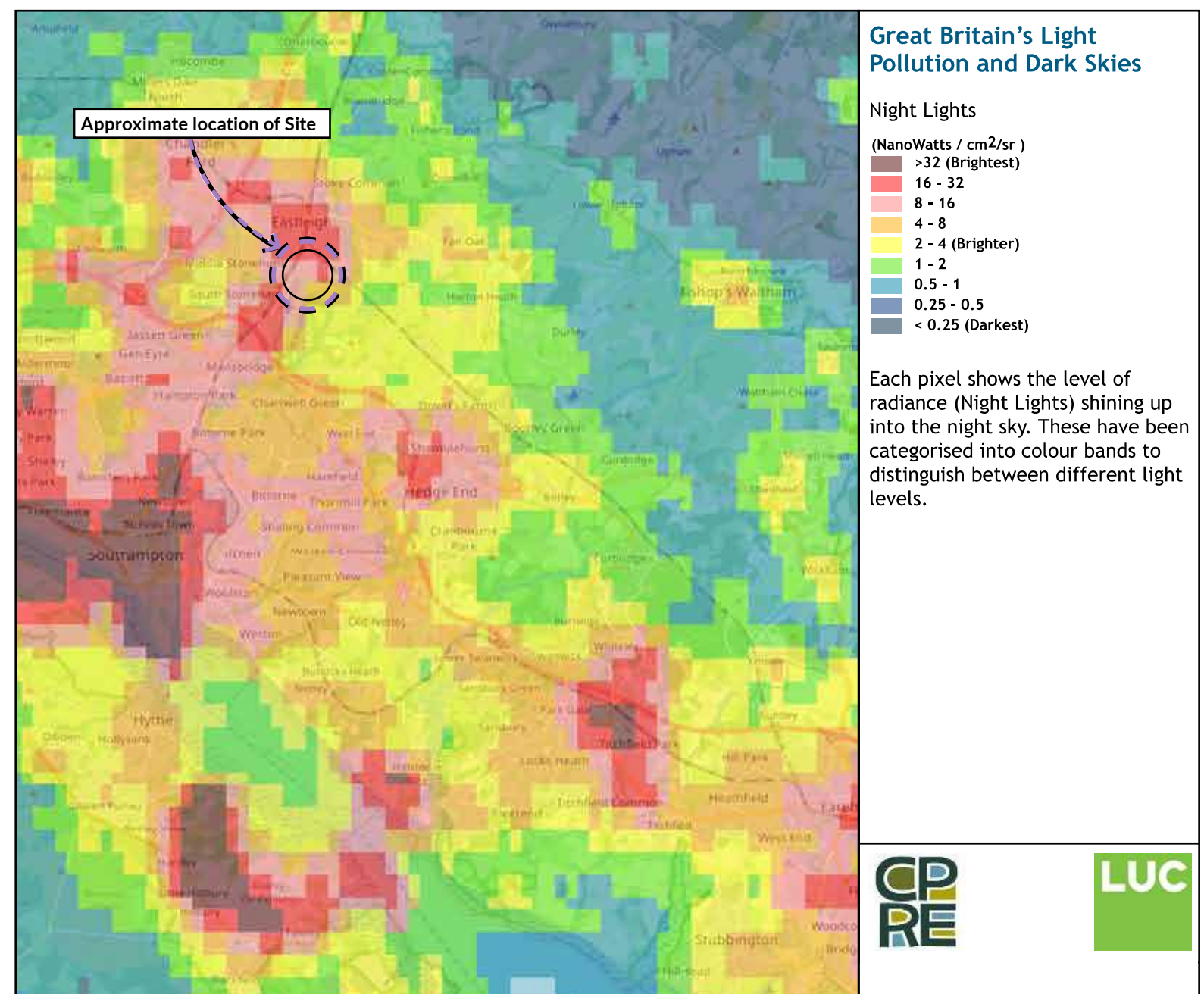


Figure 3.7 Extract from CPRE website, light level image.

3.0 Baseline condition.

3.5 Baseline environmental zones

To assess the current site and surrounding condition we refer to the ILP's guidance notes PLG04 and GN01/21. As stated previously PLG04 states that: *'In cases where the Planning Authority has not set Environmental Zones for its area, the lighting professional may have to make decisions on the nature of the area and explain the reasoning in the LIA'.*

Based upon satellite information and professional judgement, a composite image (**Figure 3.8**) has been produced to assist in representing the current Environmental Zones of the locality. It must be noted that this graphic is an average representation of the area, based on a limited study.

In **Figure 3.8** areas would be classified as:



- **E1 Natural, dark (SQM ~ 20 to 20.5). Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.**

These areas are predominately wooded and green open spaces.



- **E2 Rural, Low district brightness. Sparsely inhabited rural areas, village or relatively dark outer suburban locations.**

These areas are predominately low density domestic dwellings.



- **E3 Suburban, Medium district brightness. Well inhabited rural and urban settlements, small town centres of suburban locations.**

These areas are commercial, industrial or high traffic in nature.

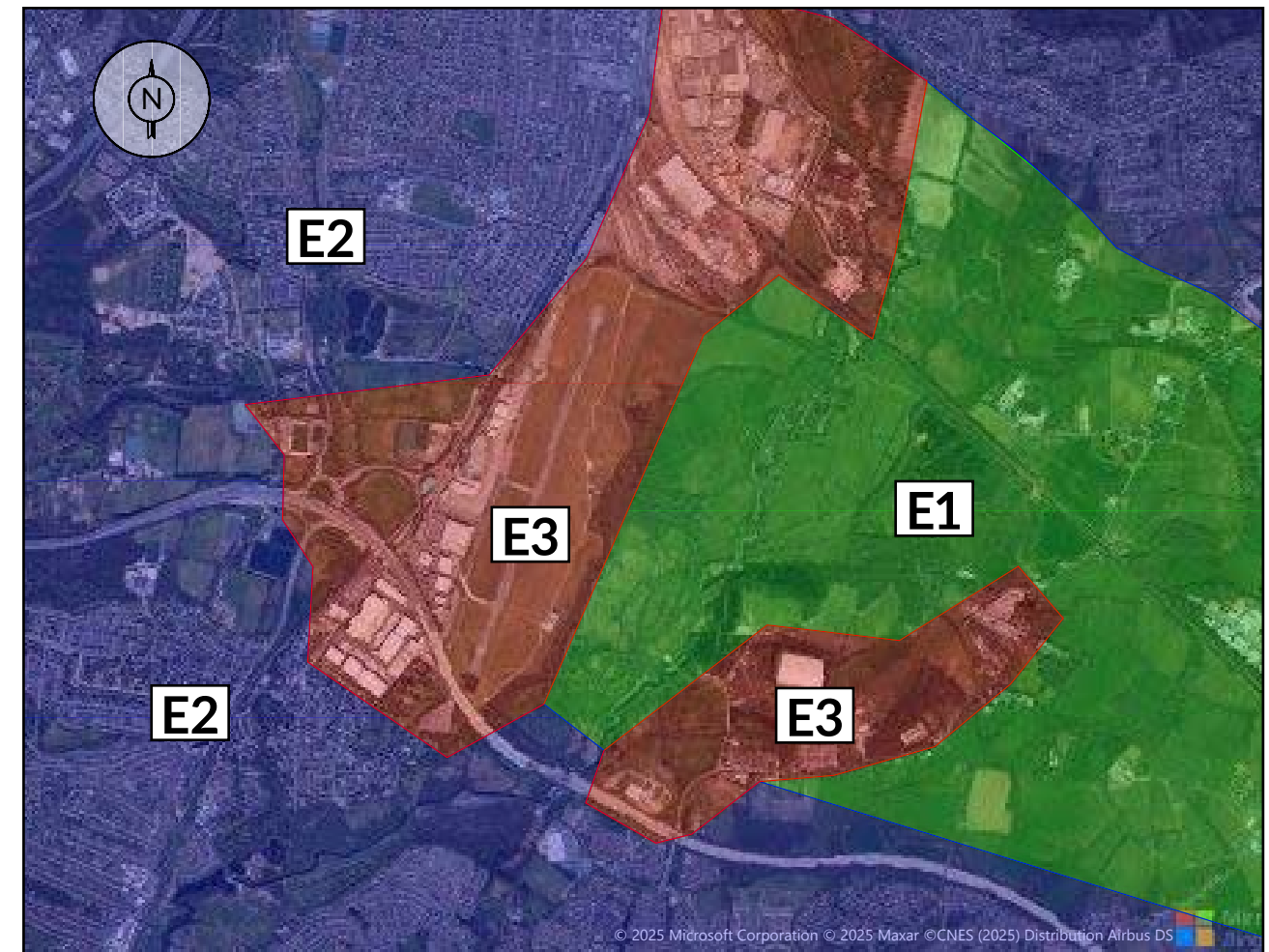
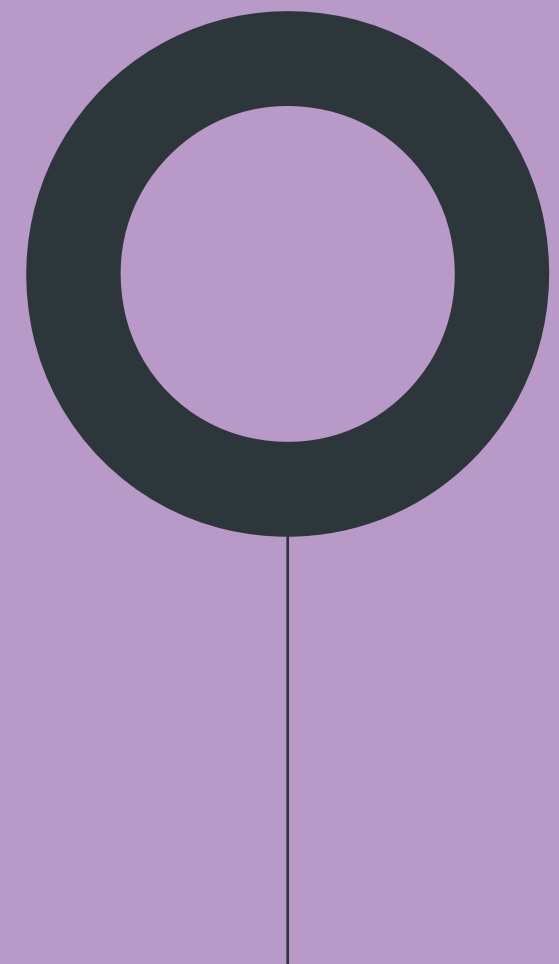


Figure 3.8 Map showing current average environmental lighting zones.

4.0 Design Considerations.



4.0 Lighting Design Considerations.

Task area lighting

Lighting levels shall be appropriate for the task being undertaken in each area. This varies from the passage of people and transport throughout the site, specific activities related to the activity of each unit and any supporting operational requirements.

All lighting proposals will take the sensitive ecological context of the site's surround into consideration and will meet or improve on the requirements set out in documents such as those produced by the Institute of Lighting Professionals.

Roads and pavements shall be illuminated to levels deemed suitable for the travel speed and users. Loading bays, car parking and supporting areas will also be illuminated to the appropriate light levels when in use. It is recommended these dim down to a lower level when not in use. All lighting is to have a minimum level of lighting control consisting of daylight sensors (photocells) to ensure activation only occurs during hours of darkness.

Uniform lighting is key for surveillance, both by security staff and for CCTV cameras. Security relies on both active and passive surveillance, both of which can be supported by good lighting practice. A well-illuminated site providing good facial recognition characteristics with clear way-finding and routes of passage work to alleviate the "fear of crime".

Safety and Orientation.

The amount of lighting required for obstacle avoidance and visual orientation is minimal. For example, emergency lighting standards suggest a value of between 0.5 and 1 lux for a person, in a high stress situation, to safely negotiate a safe passage. Often these low levels of illumination are provided by existing light spill and moonlight alone.

In reality, the purpose of urban realm pedestrian lighting is not one of obstacle avoidance, but of human subjectivity. Research has shown that the ability to read a person's facial features in external realm environments is a key function in reducing fear of crime.

Appropriately illuminated pedestrian areas can reduce feelings of discomfort or alienation, which is known to encourage footfall – this in turn can increase natural and community surveillance and further deter criminal acts.

A pleasing and visually interesting exterior environment can be further enhanced by creating spaces and zones of interaction which encourage utilisation of spaces in the evening.



4.0 Lighting Design Considerations.

Ecology & Light Pollution

Further to the guidelines and good practice, the site has its own specific ecology concerns. Key items of note are as follows:

- A balance must be struck between the operational and security needs of the site and the ecology and biodiversity that must be maintained.
- Light spill onto tree lines is to be kept to an absolute minimum to not disturb wildlife.
- High quality lighting design should mitigate any negative impact and glare shield accessories should be specified to minimise any light spill in areas that require additional attenuation.

Humans & Light Pollution

This overarching topic can be broken down into three key parts:

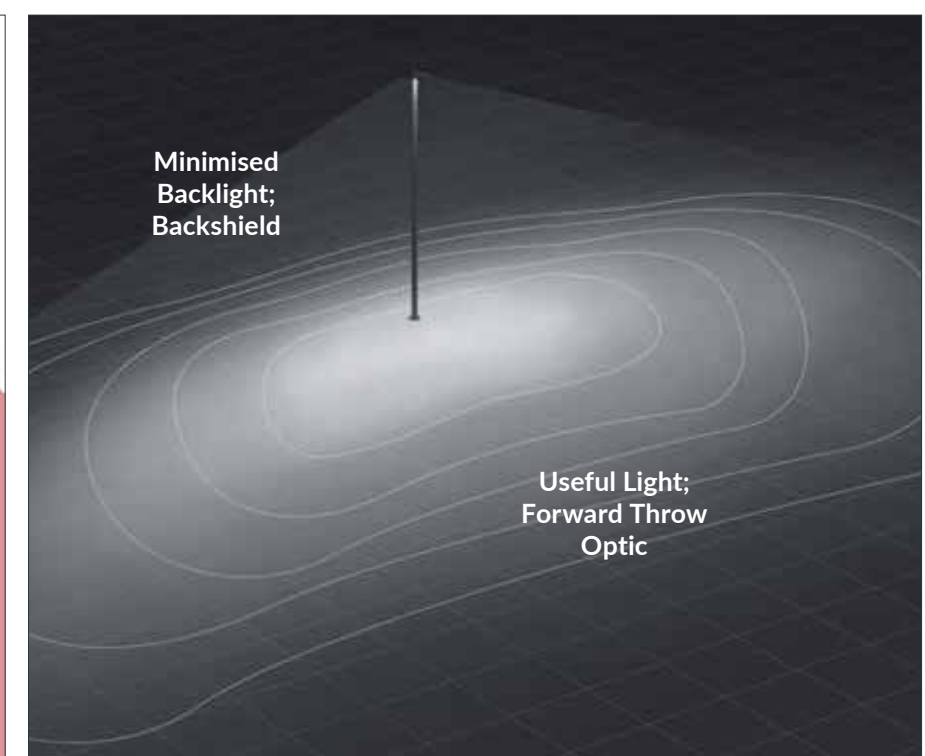
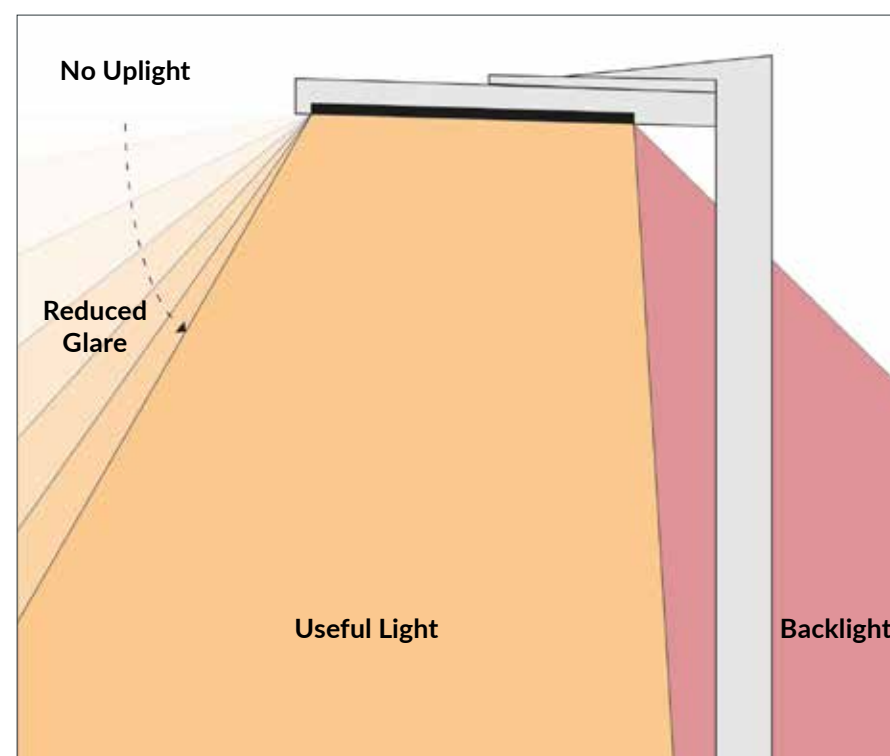
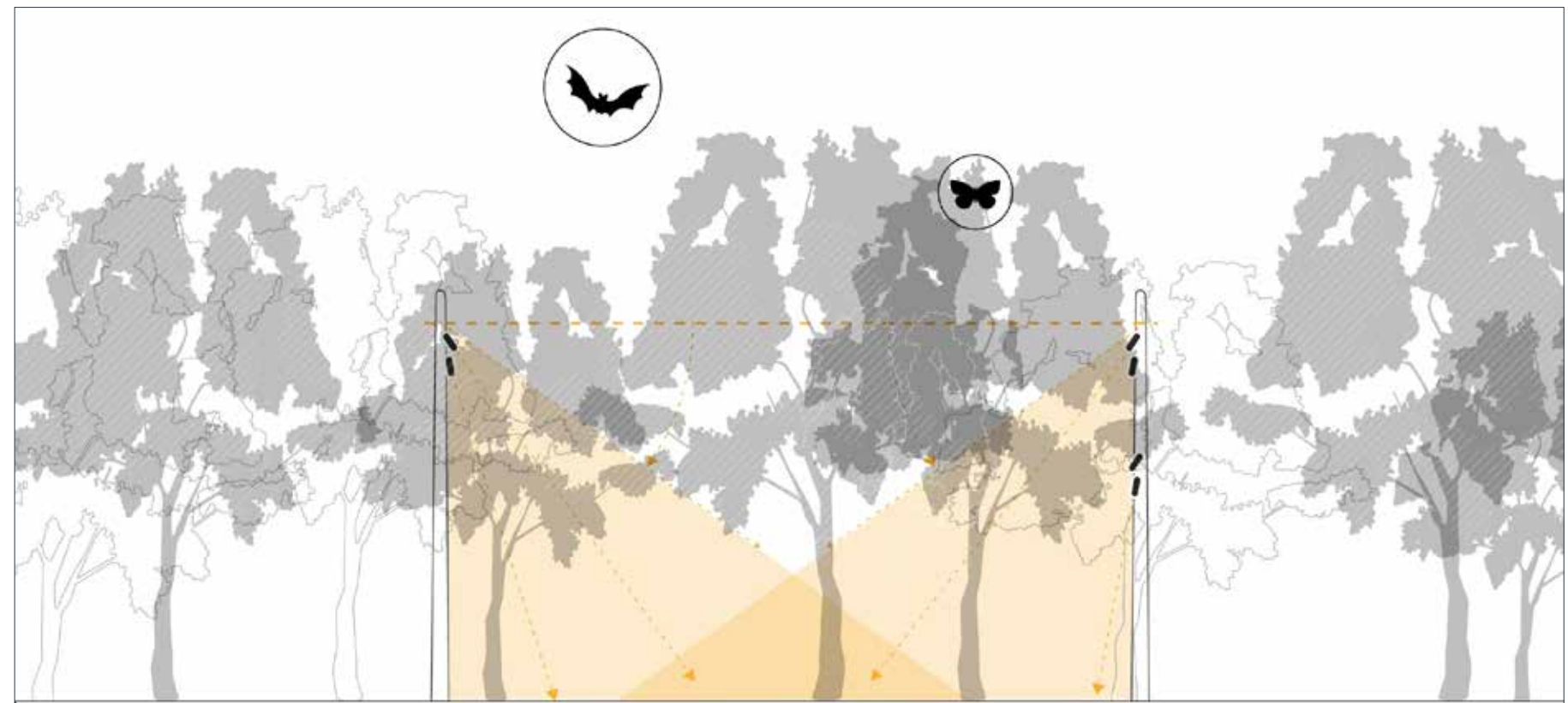
Light intrusion (or nuisance): Lighting emitted into the boundary of residential properties typically assessed at bedroom or habitable windows.

Sky Glow: Where lighting shines directly upwards or is reflected upwards it can create "sky glow" which is typically seen above towns and cities. It washes out views of the dark night sky, taking away an important natural resource.

Glare (luminous source intensity): this can occur when a person sees light directly from the fixture (or light source) and contrast ratios are high. There is legislation as part of the 'Clean Neighbourhoods and Environment Act 2005' which covers lighting as a nuisance, although there are exclusions, it does start to highlight the importance of well-designed external lighting as an integral part of the modern urban landscape. The Institution of Lighting Professionals (ILP) Guidance note GN01/21 "The reduction of obtrusive light" assists with quantifiable metrics for the above topics.

Project Limitations

This development abuts existing transport zones, namely Southampton Airport to the South and West, a the train depot to the North and railway lines running North/South to the West of the site and East/West to the North of the site. In additional, there is a residential area to the West. The lighting strategy and design must take into account all of these different areas and each will have their own limitations on the impact of any lighting. Any lighting must be in accordance with set limitations (eg: colour, height, glare, levels, appearance etc) in order to satisfy these varied neighbours requirements.



4.0 Lighting Design Considerations.

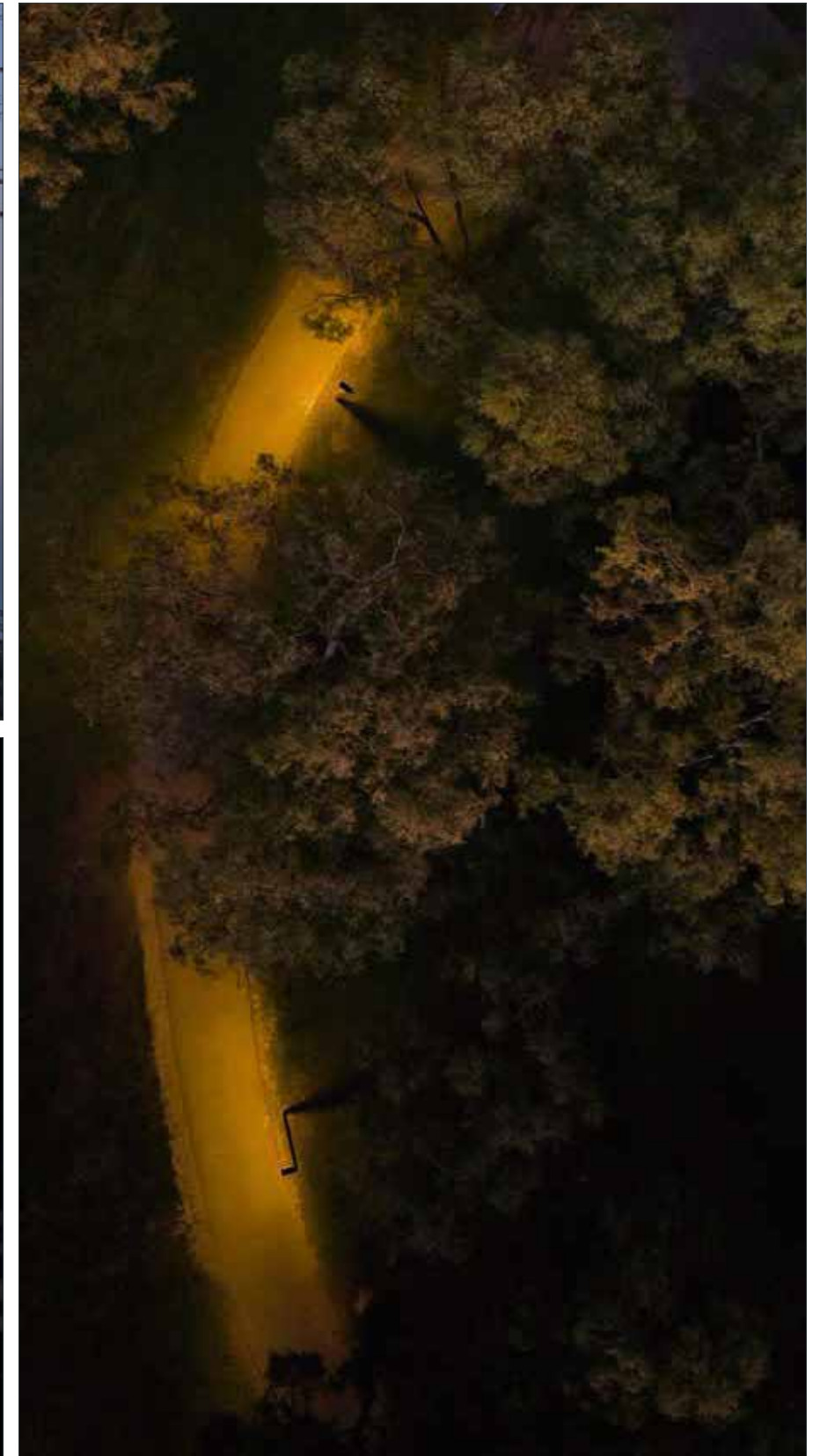
Control and White Light Colour Temperature.

The use of controls and colour is important in creating an external environment that is sympathetic both to the occupants of the site and also the surrounding neighbours.

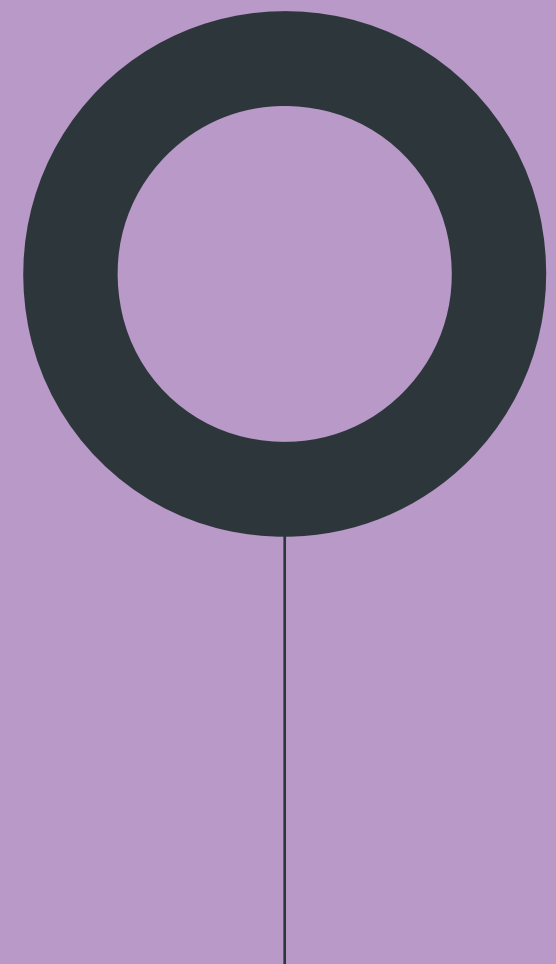
Leaving the luminaires on at full output, without any control or dimming, throughout the duration of the evening is not only a waste of energy but also insensitive to the inhabitants. Ideally all suitable luminaires will be dimmable to allow the light output to be correctly tuned to the needs of the development, and adjusted to create a balanced lighting scheme.

Safety and orientation lighting should remain on through the course of the evening to enable good active and passive surveillance of the site. Task-specific lighting, such as to the loading bay and refuelling station, should ideally be dimmed down when not in use. The exterior bike storage area should be equipped with motion controlled lighting, ensuring that the lights automatically activate when required but remain off at all other times. All light is to be controlled by daylight sensors to not only enhances energy efficiency by reducing unnecessary lighting during daylight hours but also improves security and convenience for users by providing adequate illumination when needed.

As this site will be accessed 24/7, luminaires should be chosen with a warmer, more 'amber' white colour of light to be the least disruptive to human circadian rhythm. However, different species of plants and animals are variably responsive to different spectral bands of light, and an in-depth conversation with the ecologist should be undertaken to choose a colour range that is the least impact on the resident species.



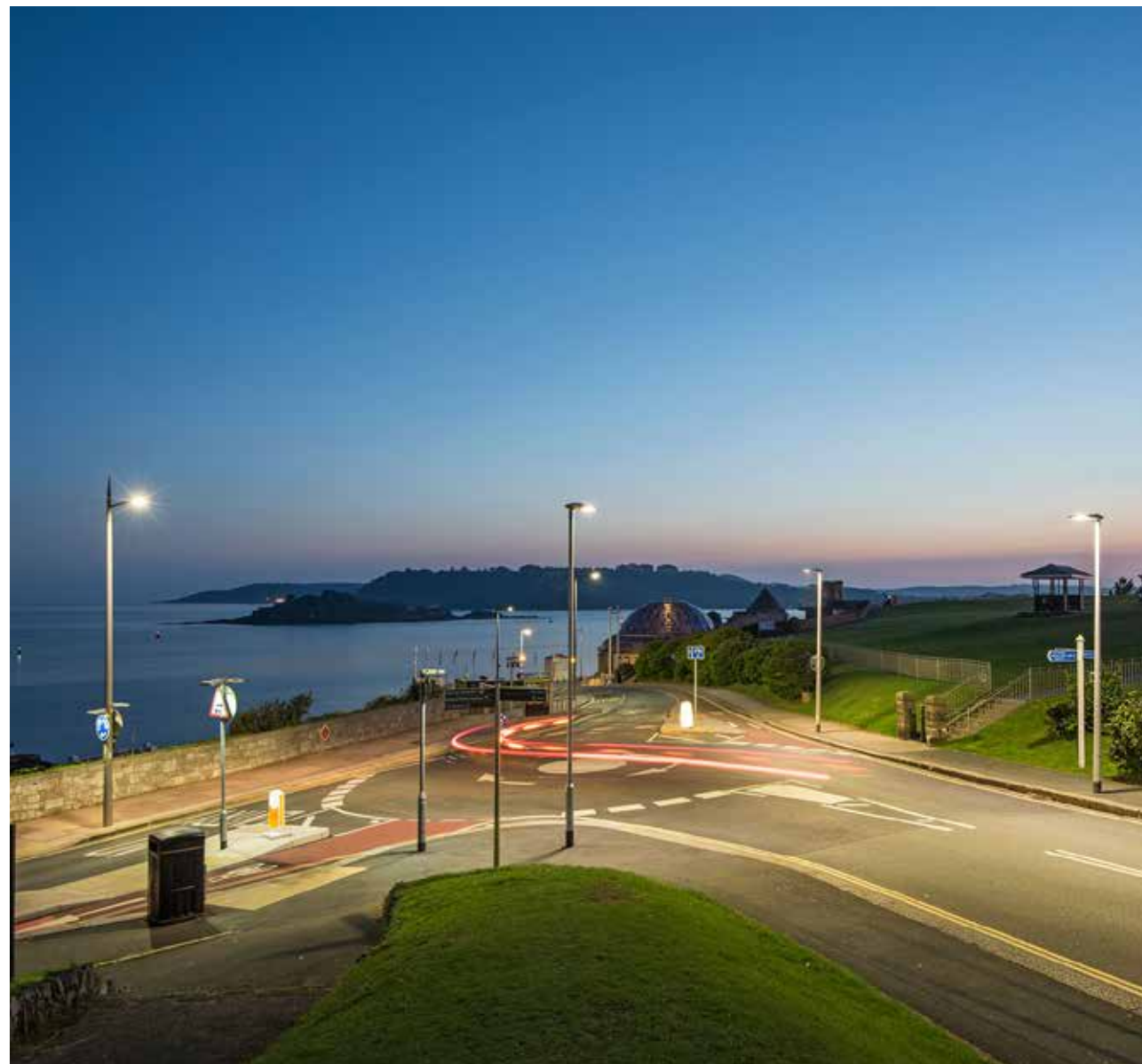
5.0 Typical exterior lighting typologies.



5.0 Typical exterior lighting typologies.

Interfaces with local authority adopted road network

- Routes that provide the interface between the development and the adopted road network.
- To be coordinated with the local authority to ensure continuity between adopted and private areas.
- Column mounted luminaires coordinated with local authority requirements and preferred suppliers/ products, requirements and specifications.
- Lighting control to meet local authority operational requirements.
- Lighting to be directed inwards towards site and downward onto task surfaces to avoid unnecessary light spill.



Typical lighting image - to illustrate lighting intent only, architecture and landscape shown is generic

Typical products

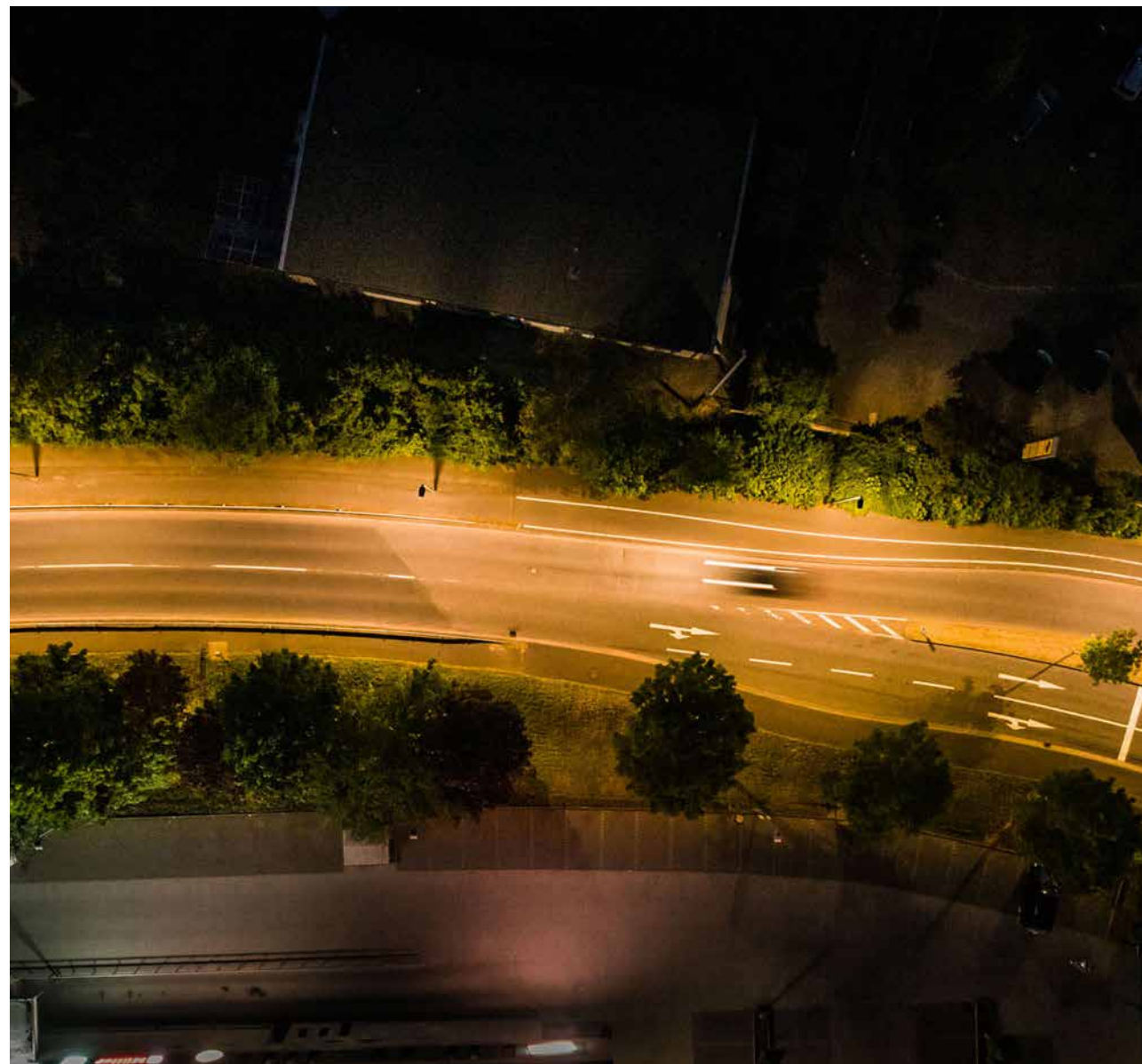


Typical luminaire products

5.0 Typical exterior lighting typologies.

Primary roads

- Routes that connect all of the main accesses, interaction points and buildings.
- Some pedestrian paths share the same route, the distribution of light will be considered to ensure these paths are covered from the same light source to reduce product and energy use.
- Lighting to be directed inwards towards site and downward onto task surfaces to avoid unnecessary light spill.
- Warmer colour temperature to be considered to further reduce impact on natural surroundings.



Typical lighting image - to illustrate lighting intent only, architecture and landscape shown is generic

Typical products

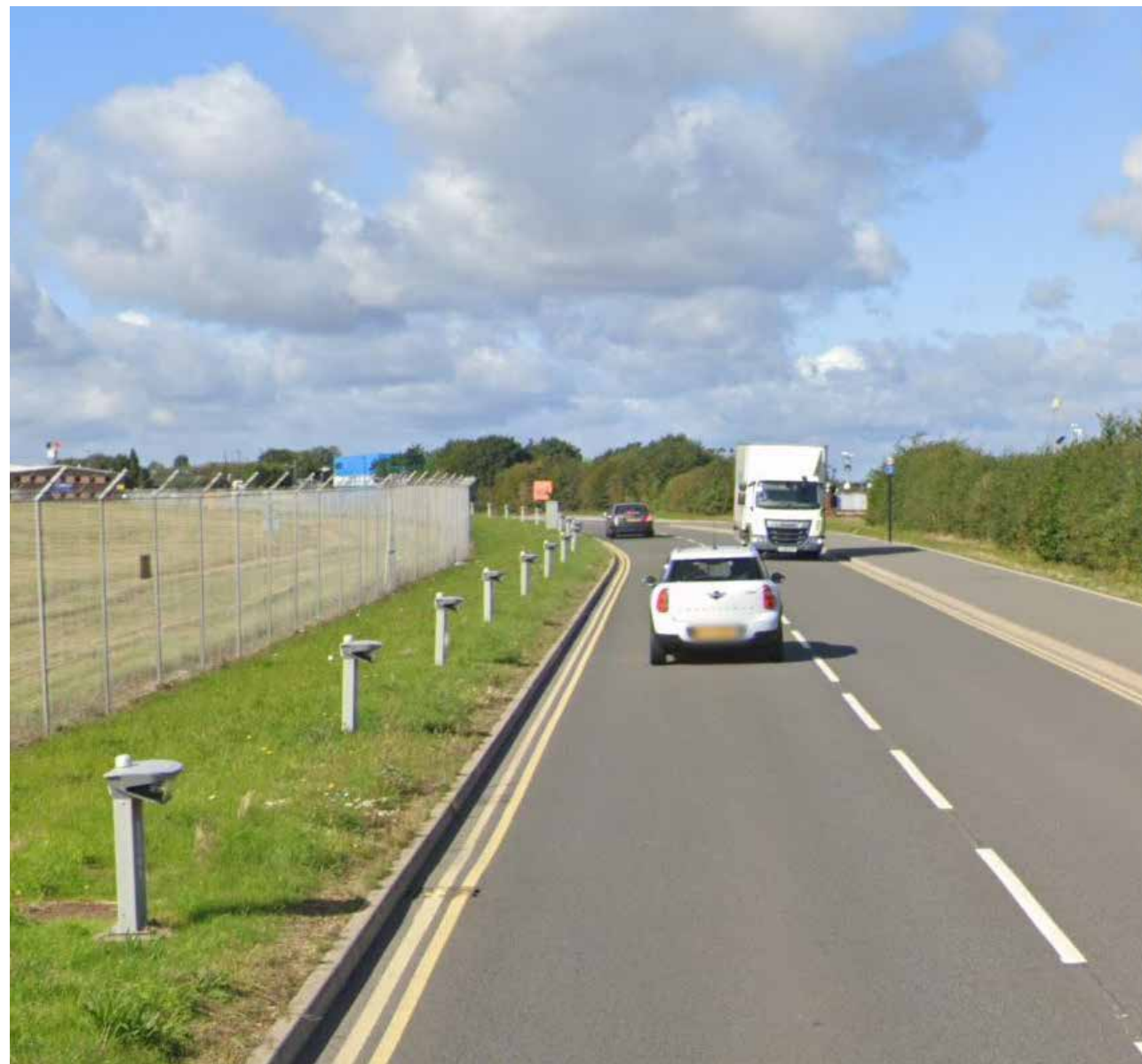


Typical luminaire products

5.0 Typical exterior lighting typologies.

Road adjacent to airport runway

- Routes that abut the airfield.
- Requires input from Southampton Airport to define acceptable lighting strategy.
- Luminaires should potentially be mounted at a low height to prevent interference with aircraft or confusion within the RVR.
- Lighting to be directed inwards towards site and downward onto task surfaces to avoid unnecessary light spill.
- Warmer colour temperature to be considered to further reduce impact on natural surroundings.



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Typical products



Typical luminaire products

5.0 Typical exterior lighting typologies.

Pedestrian/cycle paths

- Routes that provide on-site circulation and link the off-site travel network to the on-site circulation
- Aim is to illuminate routes with minimum amount of luminaires possible.
- Where adjacent to roadways, some pedestrian paths share the same route and the distribution of lighting will be considered to ensure these paths are covered from the same light source to reduce product and energy use.
- Lighting to be directed inwards towards site and downward onto task surfaces to avoid unnecessary light spill.
- Warmer colour temperature to be considered to further reduce impact on natural surroundings.



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Typical luminaire products

5.0 Typical exterior lighting typologies.

Road and paths adjacent to buildings

- Routes that run in between buildings and connect inner spaces
- Aim is to illuminate routes with minimum amount of luminaires possible, whilst keeping luminance (surface brightness) of building as low as possible.
- Mounting height to be as low as possible whilst achieving an efficient lighting solution.
- Lighting to be fixed to buildings where practical.
- Warmer colour temperature to be considered to further reduce impact on natural surroundings.



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Typical products

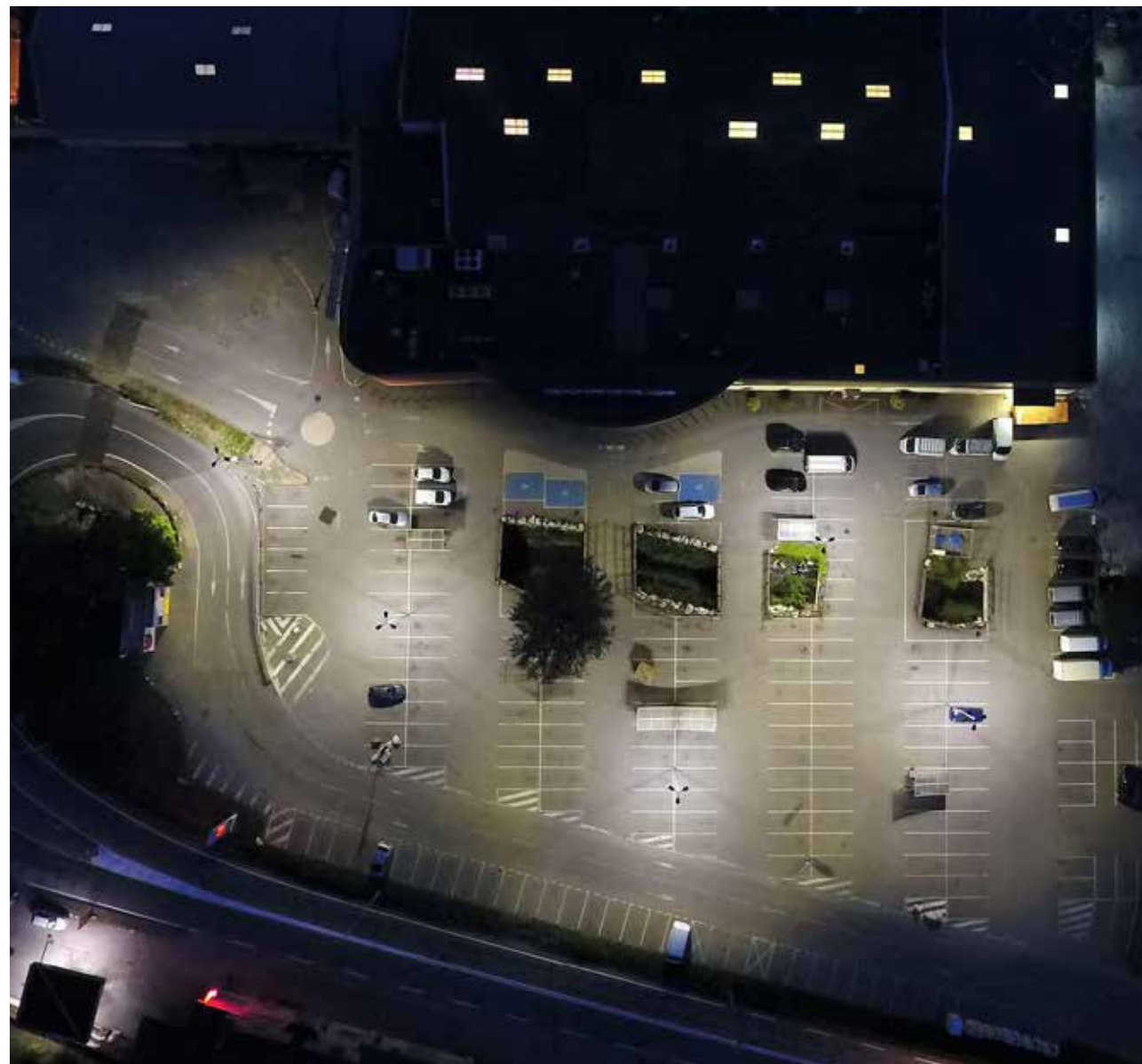


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5.0 Typical exterior lighting typologies.

Car parks

- Uniform horizontal distribution of light is important.
- Needs to deliver lighting in an efficient way, using carefully selected optics and suitable column placement coordinated with the car park layout.
- Opportunity to mount multiple fittings per column.
- Car sharing stations to be included in lighting design strategy.
- Warmer colour temperature to be considered to further reduce impact on natural surroundings.



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Typical products



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5.0 Typical exterior lighting typologies.

Loading bays

- Lighting to be activated only when required.
- Building or column mounted luminaires as required by site layout.
- Needs to deliver lighting in an efficient way, using carefully selected optics and good luminaire placement.
- Where columns are utilised, there is an opportunity to mount multiple fittings per column.
- Warmer colour temperature being considered to further reduce impact on natural surroundings.



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5.0 Typical exterior lighting typologies.

Zebra crossings (not signal controlled) and/or Pelican/Puffin/Toucan crossing (signal controlled)

- Specific crossing points for pedestrians (and cyclists) to traverse roadways.
- Lighting to highlight and identify the crossing point for safety of all road users.
- Vertical illuminance to be considered (positive or negative contrast).
- Lighting to be directed onto task surfaces.
- Where specific crossing lighting is used, contrasting colour temperature to be incorporated.
- Warmer colour temperature being considered to further reduce impact on natural surroundings.



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Typical products



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5.0 Typical exterior lighting typologies.

HGV vehicle parking/manoeuvring

- Task areas directly associated with the unit operation, generally involving goods vehicles.
- Specific requirements dependant on the use of the area to be designed in accordance with guidance and recommendations.
- A combination of wall and column mounted lighting positioned locally with a mounting height to suit vehicle types and provide the required lighting to efficiently cover the area. Excessive mounting heights are to be avoided.
- Lighting to be directed inwards towards site and downward onto task surfaces to avoid unnecessary light
- Warmer colour temperature being considered to further reduce impact on natural surroundings.



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Typical luminaire products

5.0 Typical exterior lighting typologies.

Security gates/access points

- Access points to units with increased perimeter security.
- Lighting to provide increased local illumination for security identification/authorisation including reading of documentation, ANPR, CCTV and other security measures.
- Column mounted luminaires for vehicular areas with wall or building mounted luminaires for pedestrian areas.
- Lighting to be directed inwards towards site and downward onto task surfaces to avoid unnecessary light spill.



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Typical products



Typical luminaire products

5.0 Typical exterior lighting typologies.

Infrastructure support areas (substations, water treatment, MEP infrastructure etc)

- Areas providing the infrastructure support for the operation of the units.
- Lighting to be manually or sensor operated to ensure activation only when required. Lighting to be off at all other times.
- Column, equipment, structure or building mounted luminaires as required for each specific set of circumstances. When higher levels of lighting required for visual acuity (maintenance etc), this is to be provided by portable/temporary lighting.
- Lighting to be directed inwards towards site and downward onto task surfaces to avoid unnecessary light spill.
- Warmer colour temperature being considered to further reduce impact on natural surroundings.



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Typical luminaire products

5.0 Typical exterior lighting typologies.

Bus stop waiting canopies

- Designated places for users to wait for public transport.
- Lighting to be coordinated and integrated into structure as required by bus operators, local authority or architectural design.
- Lighting to be directed directly into structure.
- Warmer colour temperature being considered to further reduce impact on natural surroundings.



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5.0 Typical exterior lighting typologies.

Bicycle parking shelters

- Structures for the safe and secure storage to bicycles and other sustainable transport methods.
- Lighting to be coordinated and integrated into structure to provide adequate lighting for cycle parking and operation of security equipment.
- Sensor controlled lighting preferable to ensure activation only when required.
- Lighting to be directed directly into structure.
- Warmer colour temperature being considered to further reduce impact on natural surroundings.



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HOARELEA.COM

Royal Exchange
Manchester
M2 7FL

