

OUTDOOR LIGHTING

The right light after dark



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OUR APPROACH

Shared expertise, strong partnerships

At Whitecroft, we meet the demands of modern construction while exceeding standards and expectations along the way. For decades, we've been building and honing our solutions around the needs of our partners and the industry we serve.

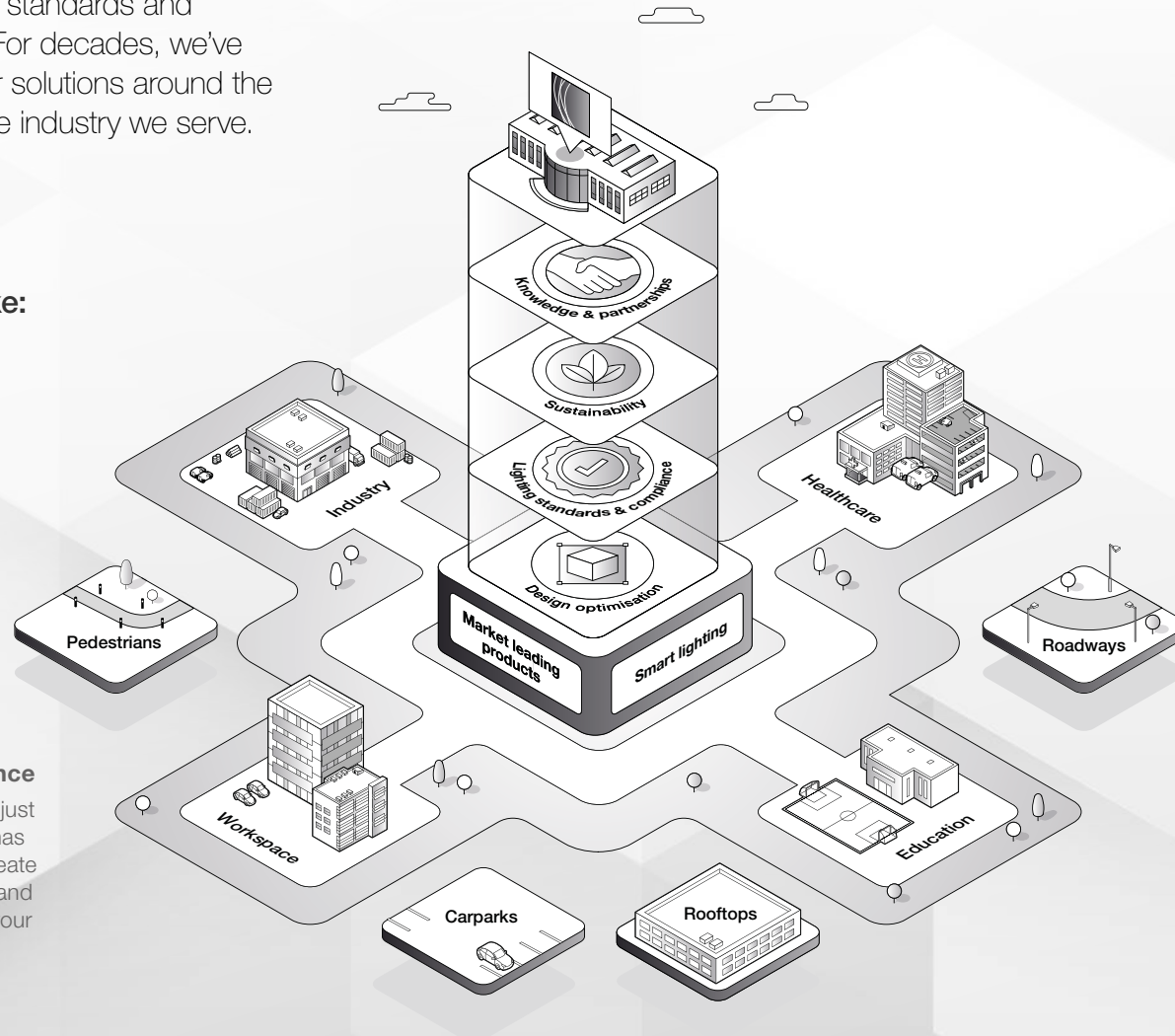
Four key pillars govern every project we undertake:

Knowledge and partnership

Our long-lasting partnerships are testament to our collaborative approach. We believe in sharing knowledge with our partners through CPDs, training sessions, and personalised consultations. With us by your side, you can make well-informed decisions at every stage of your project.

Lighting standards and compliance

Compliance is essential, but for us it's just the starting point. We know that light has an impact and our goal is always to create great spaces where people feel good and wildlife can thrive. Speak to us about your specific project requirements and we'll ensure we meet or exceed them.



Sustainability

We're at the forefront of environmentally conscious lighting design, adopting circular design principles that minimise waste and maximise lifespan. We offer complete transparency of product impacts through the independently verified Life Cycle Assessment (LCA) modelling and Environmental Product Declarations (EPDs).

Design optimisation

The best design integrates multiple needs into a single solution. Our design process considers the entire life cycle of our products to optimise the value and performance we deliver for our partners, our end users and our planet.

GETTING STARTED

The big questions to ask








Our approach is to share our expertise to ensure you're fully informed and make the best decisions for your project. Here are some of the big questions you should be asking before getting started.

How do I get to the right lighting solution?

Before lighting design can begin, you need to consider several factors. This includes: density and speed of traffic, conflict zones, and ecological reports. You also need to know which of the five environmental zones you are in as target light levels and other standards you'll need to meet will vary.

Environmental zones

E0	E1	E2	E3	E4
				
Protected	Natural	Rural	Suburban	Urban

How do I get light distribution right?

Light distribution measures should be part of your design. Adjustments to fitting angle and the addition of shields and attachments deliver the correct lighting solution for those using the space while keeping pollution in check.

A note on standards:

Designs should be to current BS/EN standards with CIBSE/SLL and ILP guidance also taken into consideration as 'best practice'. Enhanced criteria such as 'Secure by Design' may also be required. However, we believe such standards should always be seen as a foundation on which to build performance excellence.

GETTING STARTED

The big questions to ask

How high should luminaires be mounted?

It can be easy to fixate on surface lux level when selecting the appropriate mounting height for outdoor lighting. But it's a balance. Mounting height may intensify the light, but it can also increase glare. Lower mounting height can diminish good facial recognition and create a space that doesn't feel safe after dark.

Why is eye adaptation important?

Rapid changes in lighting can cause discomfort and can also be dangerous, for example when entering multi-storey car parks. Pay special attention to light levels at these indoor/outdoor transition points. While you shouldn't over-light these areas, lighting that facilitates easy eye adaptation ensures everyone stays safe and comfortable.

What are my emergency lighting needs?

External emergency lighting is crucial for ensuring the safety and orderly evacuation of occupants during emergencies, such as power outages or fires.

The best approach to designing emergency lighting outdoors involves adherence to British Standards, such as BS 5266-1 and BS EN 1838, which provide comprehensive guidance on the provision, placement, and maintenance of luminaires to guide people to a place of safety.

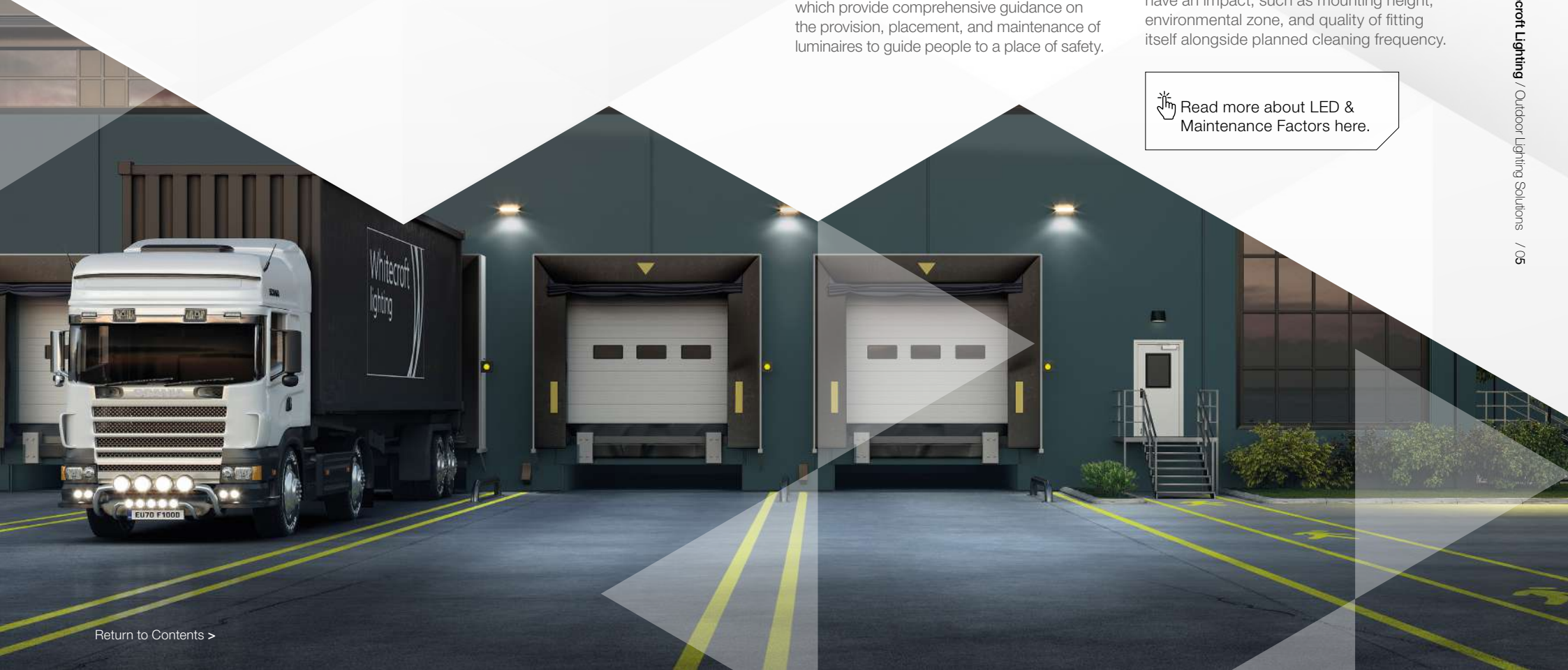
Designing for whole life

While conducting lighting calculations, designers should always consider appropriate maintenance factors.

Maintenance factors as metrics help to predict system light output depreciation over time and help to balance effective task performance, safety, and energy consumption strategy during the design stage. Various factors can have an impact, such as mounting height, environmental zone, and quality of fitting itself alongside planned cleaning frequency.



Read more about LED & Maintenance Factors here.



DESIGNING FOR OUTDOORS

Avoiding light pollution

Ensuring light levels meet the needs of people using the space is paramount. However, when designing for outdoor environments, there's a balance between compliant task lighting and unwelcome over-lighting. Light that falls outside of the task plane to a significant degree is light pollution. Standards and guidance for light pollution vary depending on environmental zone and application.

Getting design right

Light pollution can easily be avoided with the correct lighting design:

Know your environmental zone

Select the correct output for the application

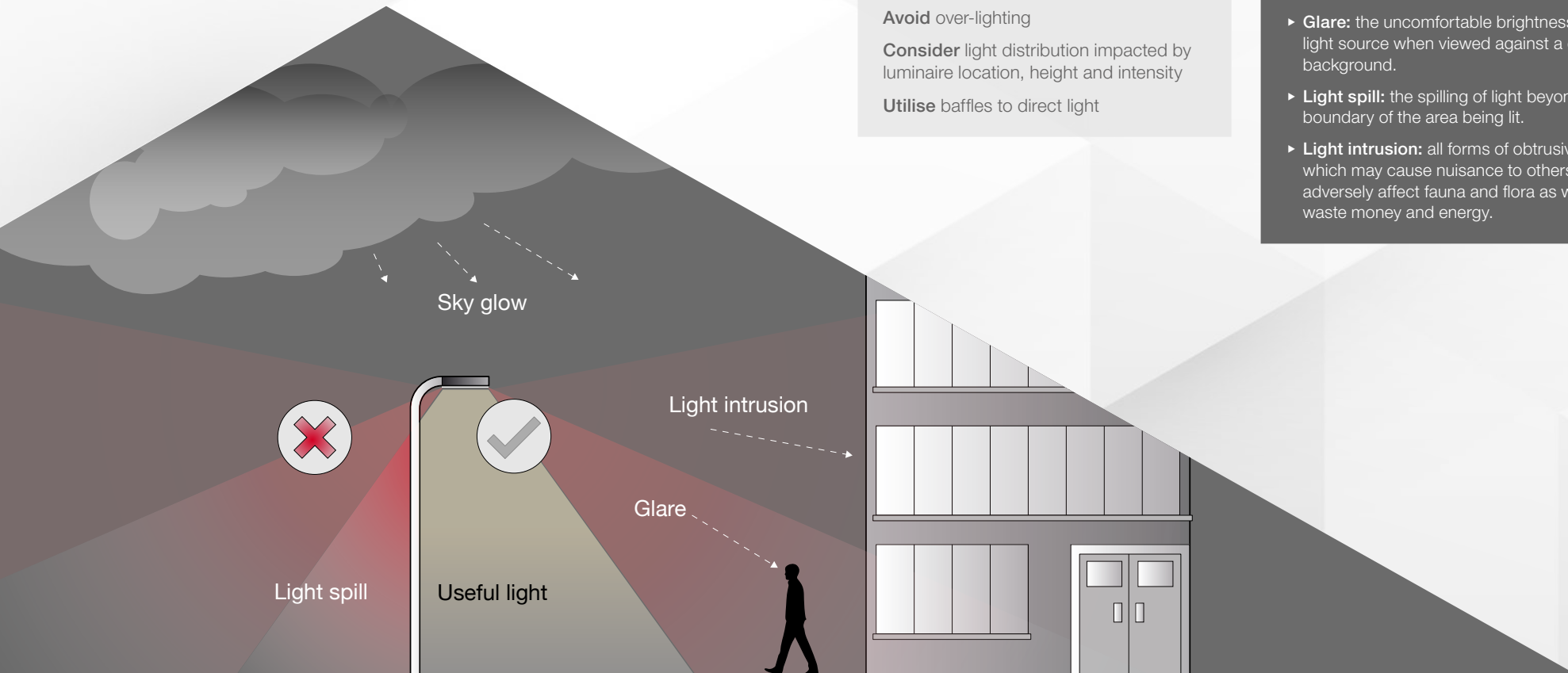
Avoid over-lighting

Consider light distribution impacted by luminaire location, height and intensity

Utilise baffles to direct light

Types of light

- ▶ **Useful light:** providing focussed illumination for specific tasks or general illumination to create a uniform level to enhance general visibility and comfort.
- ▶ **Sky glow:** reflected light that impedes the view of the night sky.
- ▶ **Glare:** the uncomfortable brightness of a light source when viewed against a darker background.
- ▶ **Light spill:** the spilling of light beyond the boundary of the area being lit.
- ▶ **Light intrusion:** all forms of obtrusive light which may cause nuisance to others, or adversely affect fauna and flora as well as waste money and energy.



LIGHT POLLUTION

BIODIVERSITY

SOCIOLOGICAL IMPACT

SMART LIGHTING

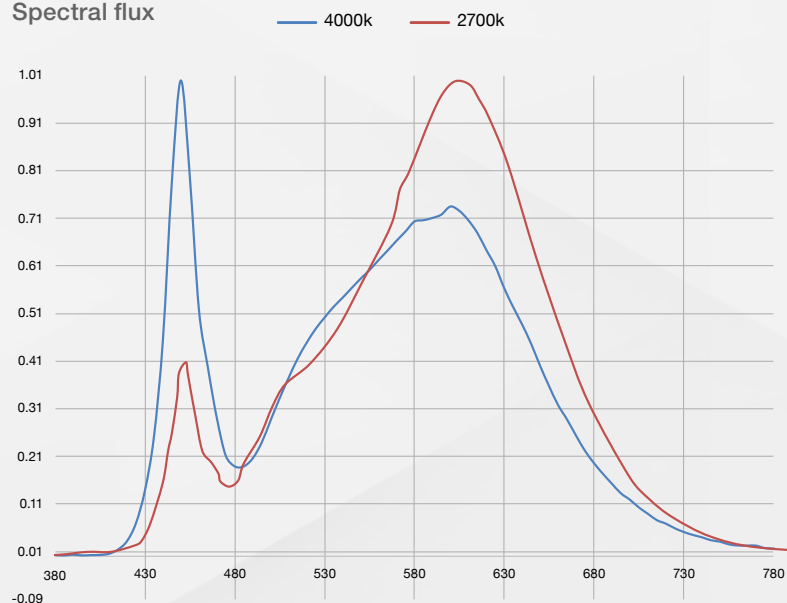
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DESIGNING FOR OUTDOORS

Protecting wildlife and biodiversity

Adding unnatural light to a dark environment may be essential for human needs, but it can affect the nighttime activity of wildlife. Such disruption can decrease species numbers and leads to a drop in biodiversity. However, with good design there are ways to mitigate the ecological impact of light. One way is through consideration of colour temperature.

Spectral flux



Colour temperature

The Institute of Lighting Professionals (ILP) recommends using light sources with a colour temperature no greater than 2700K and a peak intensity >550nm to minimise disruption to bat habitats and other wildlife.¹

Getting design right

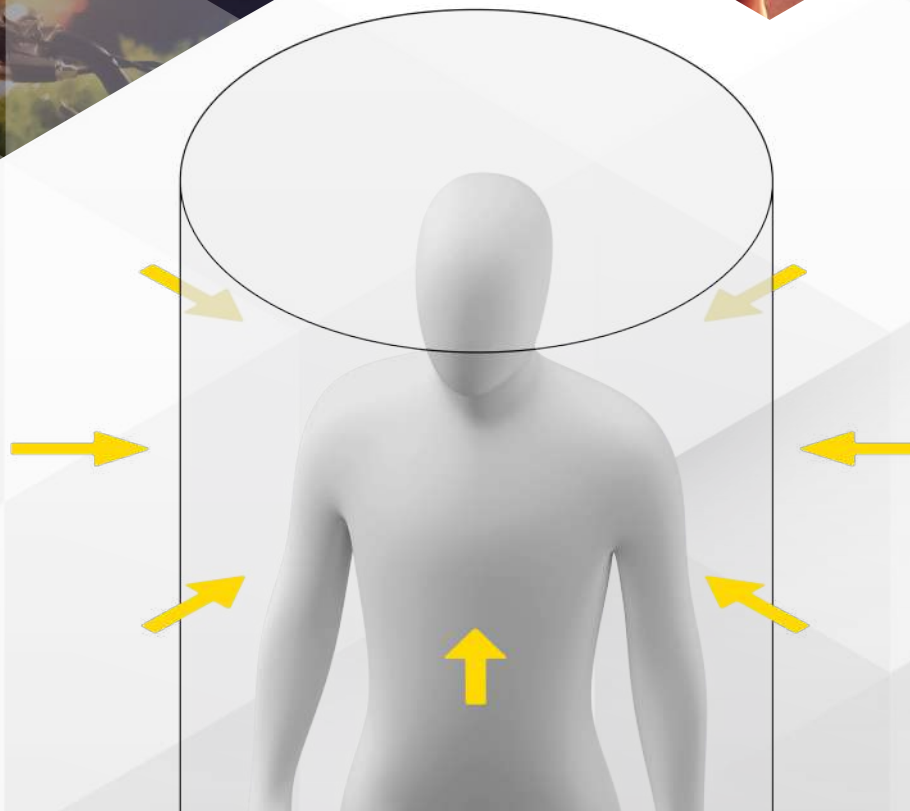
We implement responsible lighting design and technologies that minimise our impact on local wildlife and biodiversity:

- ▶ **Direct** lighting fixtures to minimise light spill and glare
- ▶ **Reduce** unnecessary illumination
- ▶ **Implement** lighting curfews or dimming strategies
- ▶ **Choose** warm-coloured LED lights to minimise disruption to wildlife

1. ILP, Guidance Note 1 for the reduction of obtrusive light.



Sociological impact of light



Lighting can influence human perceptions, emotions, and biological responses. Design can change how people experience and interact with public spaces, shape perceptions of safety, and contribute to the overall quality of urban life.

Feeling safe: three-dimensional light

When too much emphasis is put on task lighting (often lighting horizontal surfaces), shadows can be cast on vertical planes—including faces—which can diminish facial recognition. This can have a detrimental effect on perception of safety. It also reduces the likelihood of a police identification from CCTV.

By thinking in the round with cylindrical illuminance we create outdoor spaces that put users at ease.

Getting design right

- ▶ **Position** light source above head height and don't over-space fixtures
- ▶ **Consider** vertical illumination
- ▶ **Avoid** high brightness contrasts
- ▶ **Choose** correct colour rendering index
- ▶ **Minimise** glare

DESIGNING FOR OUTDOORS

Smart lighting

Lighting design is about getting the right light, in the right place, at the right time. And with smart lighting, your timing is always perfect, balancing the needs of users and other factors such as building and site security, while reducing energy usage and minimising impact on neighbours and wildlife.

At a minimum, we recommend astronomical time clocks are included with all external lighting projects. However, with the addition of movement sensors and set-back lighting (dimming when unoccupied), further energy savings can be made. These smart features ensure the safe use of the space while minimising light pollution and impact on biodiversity.

In addition, photocell technology can also be utilised for automatic dimming of luminaires when maximum output is not required. With the option of a ZHAGA socket on our Mistral family, it is possible to integrate timeclocks and photocells to optimise energy efficiency and ensure the lights are only on when they need to be.

Getting design right

- ▶ **Implement** curfews and dimming strategies
- ▶ **Utilise** movement sensing
- ▶ **Consider** how the space is used

LIGHT POLLUTION

BIODIVERSITY

SOCIOLOGICAL IMPACT

SMART LIGHTING

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WORKING WITH US

Planning and compliance

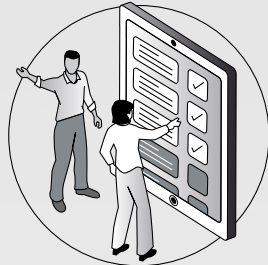
We know that for any project, achieving planning permission, demonstrating compliance and meeting project schemes such as BREEAM is fundamental. For outdoor applications, these requirements can include energy targets, light pollution and ecological impact.

Through our experienced lighting design team and leading product portfolio, we can support the delivery of the appropriate documentation, plans and 3D renders to support these requirements and achieve project sign-off.



1

Discuss your project vision



2

Understand any project specific considerations



3

Prepare design scheme and calculations



4

Produce drawings and compliance reports

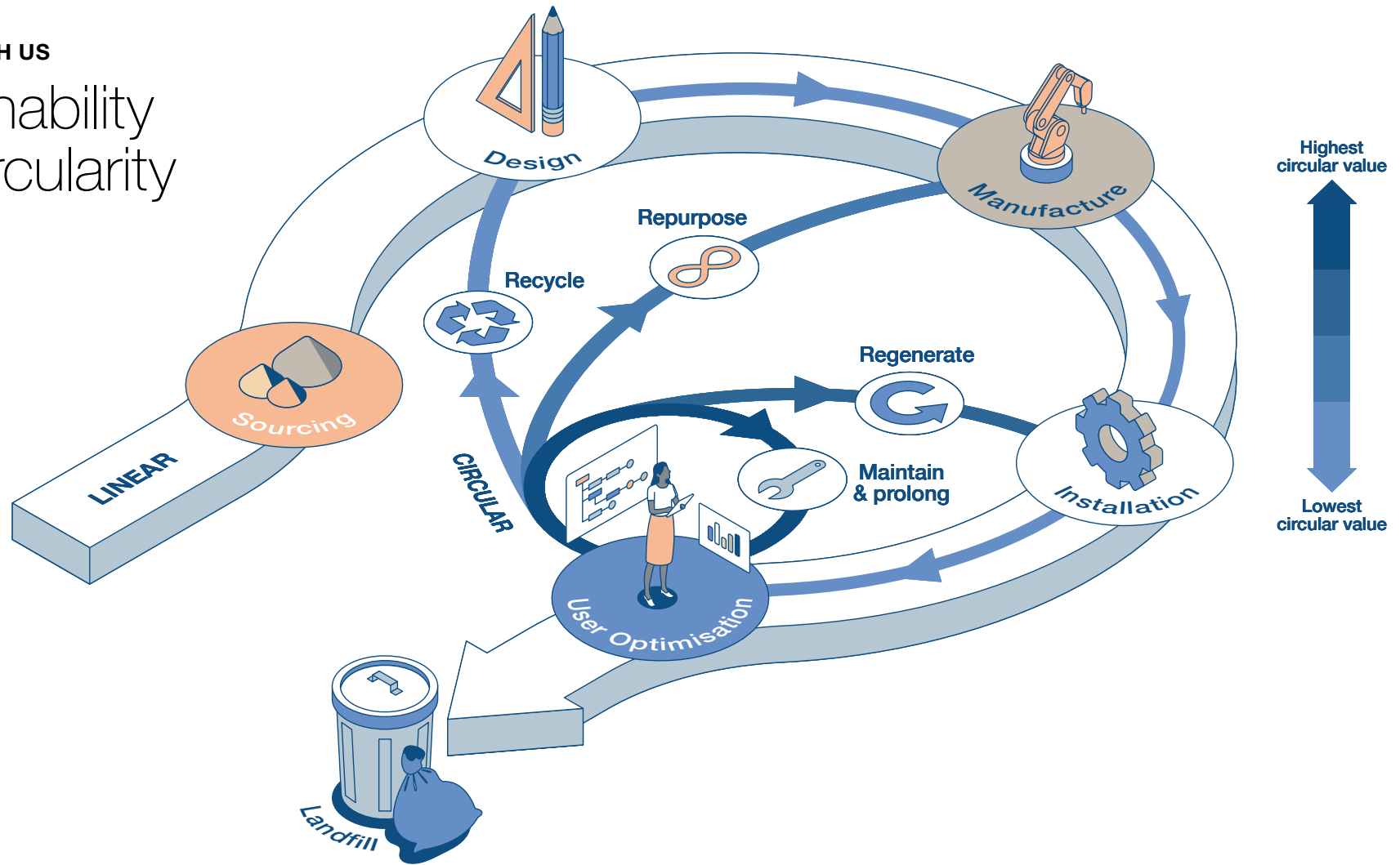


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Continuous support

WORKING WITH US

Sustainability and circularity



We are at the forefront of delivering circular, environmentally conscious product and lighting design. Our approach is led by transparency around our impacts through Life Cycle Assessment (LCA) modelling and Environmental Product Declarations (EPDs).

A shared environment

We support the ambitions and values of initiatives such as 'Dark Skies' and will continue to adopt and implement best practice product and design principles within our industry.

Outdoor environments are shared with a wider ecosystem that we must always consider and protect. It's why our thoughtful design respects the needs of humans and wildlife alike.

 SCIENCE BASED TARGETS <small>DRIVING AMBITIOUS CORPORATE CLIMATE ACTION</small>	 THE NET ZERO STANDARD <small>APPROVED NET-ZERO TARGETS</small>
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In October 2023, as part of the Fagerhult Group, we had our Net Zero Targets approved by the SBTi.

CHECKLIST

Are you ticking all the right boxes for great outdoor design?

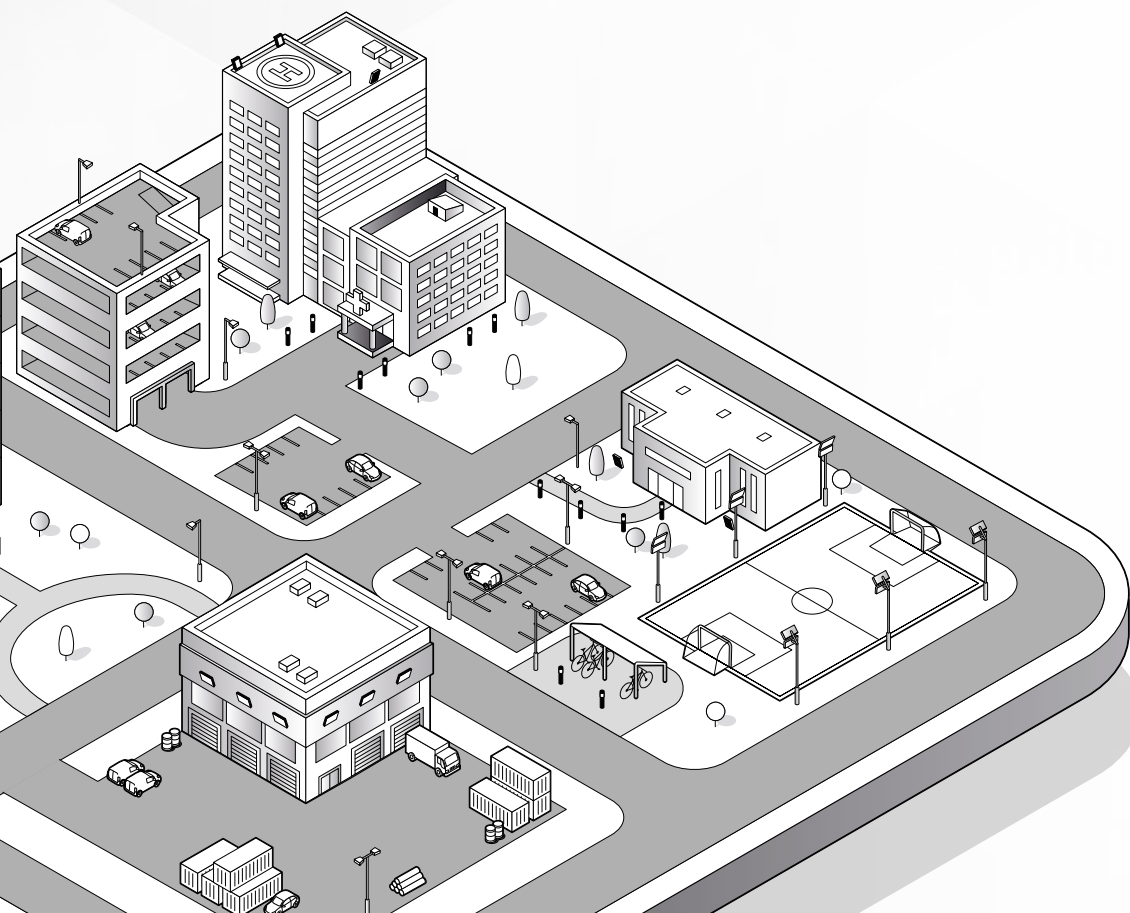
No.	Checklist item title	Explanation	<input checked="" type="checkbox"/> Are you ticking all the boxes for great outdoor design?
1	Plans and Project Scope Determination	▶ Ensures documentation availability and defines the project scope, minimising additional work and project non-compliance.	<input type="checkbox"/>
2	Planning Permissions and Environmental Assessment	▶ Ensures compliance with regulations and protects sensitive areas.	<input type="checkbox"/>
3	Environmental Zone Classification and Light Levels Agreement	▶ Determines environmental classification. Aligns design with client expectations for lighting levels and best practice requirements.	<input type="checkbox"/>
4	Mounting and Installation Consideration	▶ Considers physical constraints and identifies potential clashes, streamlining installation.	<input type="checkbox"/>
5	Neighbour and Environmental Impact Assessment	▶ Helps to assess potential environmental disturbance risks, ensuring project sustainability.	<input type="checkbox"/>
6	Light Distribution and Spacing Optimisation	▶ Ensures even light distribution and efficient fixture placement, maximising lighting effectiveness.	<input type="checkbox"/>
7	Emergency and Control Requirements	▶ Specifies automation needs and ensures safety during emergencies, enhancing functionality.	<input type="checkbox"/>
8	Public Safety	▶ Enhanced visibility in high-traffic areas. Ensures safe environment and increases crime prevention.	<input type="checkbox"/>
9	Visual Perception and Performance	▶ Considers user comfort and safety by addressing glare, recognition needs, and light adjustment.	<input type="checkbox"/>
10	Maintenance Factor Consideration	▶ Addresses long-term maintenance needs and allows for more accurate calculations.	<input type="checkbox"/>



THINGS TO CONSIDER

Application guidance

The following tables offer guidance on the standards and lighting requirements commonly used for near-building applications. Project specific standards may also apply.



Roads

Consider:

Conflict zones ▶ Nearby task lighting may spill into driver view causing glare. This should be taken into consideration during design stage.

Luminaire positioning ▶ Should be positioned facing into the project site and on the outside of bends.

Most commonly used standards and light levels:

▶ BS 13201-2, Table 3

Road class*	Em (lx)	E(min)
P2	▶ 10	▶ 2
P3†	▶ 7.5	▶ 1.5
P4	▶ 5	▶ 1

*See glossary P-class. †Most common for Whitecroft application.

External car parks

Consider:

Light spill ▶ Wasted light that can cause nuisance, environmental impact and wasted energy. Can be reduced by choosing correct optics and right fittings placement.

Fittings spacing ▶ To create a safe environment, vertical illuminance needs to be taken into consideration. This can be achieved by appropriate spacing of the columns. While newer optics sometimes allow for increased spacings, a rule of thumb of 3:1 spacing:column height ratio is advised to deliver good facial recognition.

Most commonly used standards and light levels:

▶ BS EN 12464-2, Table 5.9

Area	Em (lx)	Uo
Light traffic	▶ 5	▶ 0.25
Medium traffic	▶ 10	▶ 0.25
Heavy traffic	▶ 20	▶ 0.25

THINGS TO CONSIDER

Application guidance

Perimeter lighting

Consider:		
Safety	▶ Perimeter lighting plays a crucial role in ensuring building safety and security. Emergency provisions near final exit doors need to be made.	
Product optics selection	▶ Consideration should be given to choosing the correct optics that provide light only on the task plane, minimising light spill and energy consumption, while also minimising upward light.	
Most commonly used standards and light levels:		
▶ BSEN 12464-2, Table 5.1		
Area	Em (lx)	Uo
Walkways exclusively for pedestrians	▶ 5	▶ 0.25

Multi-storey carpark

Consider:		
Driver eye adaptation	▶ Drivers entering internal lit space from daytime. Higher illumination levels at gates is recommended to alleviate this.	
Light uniformity	▶ To maximise safety, uniform lighting levels needs to be provided. It can be achieved by carefully orienting and positioning light fittings.	
Most commonly used standards and light levels:		
▶ BS EN 12464-1, Table 5.34		
Area	Em (lx)	Uo
In/out ramps – day	▶ 300	▶ 0.4
In/out ramps – night	▶ 75	▶ 0.4
Traffic lanes	▶ 75	▶ 0.4
Parking areas	▶ 150	▶ 0.4

Roofs

Consider:	
Risk factors	▶ What level of plant machinery etc is located on the roof and will need to be accessed/maintained at night? Are walkways clearly defined?
Maintenance	▶ What height and fixing locations are available for lighting? How will it affect access for maintenance purposes?
Most commonly used standards and light levels:	
▶ Whilst there is no clear guidance for lighting roofs, we can look to EN12464-2 for some direction. To balance energy consumption, safe egress and light pollution, we would recommend an average of 5 lux to roof walkways and 50 lux to plant spaces. Emergency provision may also be needed if roof plant has to be accessed at night, in the event of power failure or emergency situation.	

Under-canopy

Consider:		
Intended use	▶ How often and how will space be used?	
Mounting restrictions and fixture placement	▶ What are possible mounting points? Is there any machinery/equipment that could potentially block the light?	
Most commonly used standards and light levels:		
▶ LG2, 8.5.4 Entrances		
Area	Em (lx)	Uo
Entrance	▶ 75-100	▶ 0.4

Small sports pitches

Consider:

- Light levels** ▶ Different sports require different light levels. This should be addressed without over-lighting the area.
- Light pollution** ▶ Special attention should be given to the possibility of light spill into neighbouring properties. Lighting shields can be used if needed.

Most commonly used standards and light levels:

▶ BS EN12193, Annex A[†]

Sport	Em (lx)	Uo
Tennis	▶ 200	▶ 0.6
Five-a-side football	▶ 200	▶ 0.5
Basketball	▶ 200	▶ 0.5
Hockey	▶ 300	▶ 0.7

[†]Values shown for Class III application — defined in BS EN12193 as 'Low level competition such as local or small club competition which generally do not involve spectators. General training, physical education (school sports) and recreational activities'.

Service yards

Consider:

- Luminaire placement** ▶ Careful luminaire placement and attention to end-user needs is necessary to ensure that useful light is not being obstructed while work is being conducted.
- Standby lighting** ▶ As advised in LG1 (Lighting Guide 1: Industrial environment) document, for areas where continuous operation is needed, standby lighting could be installed. Illuminance of standby light may vary from 5% up to 100% depending on project specification.

Most commonly used standards and light levels:

▶ BSEN 12464-2, Table 5.7

Area	Em (lx)	Uo
Short-term handling of large units and raw materials, loading and unloading of solid bulk goods.	▶ 20	▶ 0.25
Continuous handling of large units and raw materials, loading and unloading of freight, lifting and descending location for cranes, open loading platforms.	▶ 50	▶ 0.4
Reading of addresses, covered loading platforms, use of tools, ordinary reinforcement and casting tasks in concrete plants.	▶ 100	▶ 0.5
Demanding electrical, machine and piping installations, inspection.	▶ 200	▶ 0.5

Glossary

Biodiversity: The variety of life in a particular habitat. It can be affected by artificial lighting that disrupts natural patterns and behaviours.

Cylindrical illuminance: Measures total luminous flux falling on a curved surface, aiding facial recognition.

EPD: Environmental Product Declaration. Standardised document providing third party verified environmental impact data for the product.

LCA: Life Cycle Assessment is a method used to evaluate the impact a product has on the environment over its whole life cycle.

Light pollution: Artificial light that disrupts ecosystems, obscures the night sky, and negatively impacts human health and wellbeing.

Peak intensity: The wavelength at which the light source emits the highest amount of energy.

Road lighting class: Classification system for roadway and street lighting, designed to ensure safety for various types of roads based on factors such as traffic volume and speed.

Road lighting class P: Defined in BS EN13201-2, this is the road class used for subsidiary roads, pedestrian walkways and other areas with low traffic speed.

BS 5489-1 Table A5

Traffic flow	Lighting class		
	▶ Environmental zone E1-E4	▶ Environmental zone E1-E2	▶ Environmental zone E3-E4
	▶ Pedestrians and cyclists only	▶ Speed limit v<30mph	▶ Speed limit v<30mph
Busy	▶ P5	▶ P4	▶ P3
Normal	▶ P5	▶ P5	▶ P4
Quiet	▶ P6	▶ P5	▶ P4

Smart lighting: Advanced lighting systems that optimise lighting efficiency, comfort, and functionality, often integrated with smart city infrastructure.

Sociological impact: The effect on social behaviour, community well-being, and quality of life, including aspects such as safety, social interaction, and mental health.

Spectral flux: Distribution of luminous flux across different wavelengths in the visible spectrum.

Wavelength: Typically measured in nanometres (nm) determines light colour within the visible spectrum.

Zhaga-book-18 socket: Standardised interface for connecting sensors and communication modules.

Whitecroft Lighting

A leading light in circularity and sustainability.

The outdoor lighting sector is just one of the areas in which we have been at the forefront of sustainability and circularity in UK commercial lighting. We are a leader in the development of products, lighting solutions and controls that minimise the use of materials and promote reusability through replaceable modular hardware.



Whitecroft Lighting Ltd
Burlington Street
Ashton-Under-Lyne
Lancashire OL7 0AX

T +44 (0)161 330 6811
F +44 (0)161 331 5855
whitecroftlighting.com
email@whitecroftlight.com

