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BUILDINGS AND BUILT ENVIRONMENT

Graven Hill Purchaser Ltd
Graven Hill D1 Site
Bicester
Lighting Impact Assessment

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Notice

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1. INTRODUCTION

Instruction

1.1 BWB Consulting Limited (BWB) was instructed by Graven Hill Purchaser Ltd (the Client) to undertake a lighting impact for the Proposed Development at the existing MOD Site in Bicester ('the Site').

Proposed Development

1.2 The redevelopment of MOD Bicester Site form part of the wider Bicester regeneration. The Proposed Development is for B8 'Storage and Distribution' use only and offices within these units would be 'ancillary' to the B8 use. The proposed development masterplan is detailed in **Appendix 1**.

Objectives

1.3 This report has been produced to identify the impact of the proposed external lighting installation on the existing site environment and the wider locality.

1.4 A lighting installation is required to enable users to operate safely and reduce the fear of crime. Lighting is needed for both pedestrians and vehicle drivers. For pedestrians, lighting for good viewing conditions and avoidance of dark areas is necessary. For vehicle drivers the emphasis is on good lighting for vehicle movement and use of the car parks and loading areas.

1.5 This report reviews the potential effects of new lighting and reviews methods of lighting the proposed external areas while limiting potentially obtrusive effects to receptors that may have a negative response to a change in their lighting condition. Nearby residential properties and wildlife / habitat which are found on, near or utilising the site are typical receptors considered for analysis.

Scope of Works

1.6 The Scope of work includes:

- Identification and assessment of receptors and their sensitivity;
- Identification of required / anticipated lighting provisions for the proposed development; and
- Assessment of the potential effects created by a new lighting strategy with respect to the baseline condition.

2. RELEVANT POLICY AND GUIDANCE

International guidance

Commission Internationale De L'Eclairage (CIE 150)

2.1 The purpose of this guide is to help formulate guidelines for assessing the environmental effects of outdoor lighting and to give recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels. As the obtrusive effects of outdoor lighting are best controlled initially by appropriate design, the guidance given is primarily applicable to new installations; however, some advice is also provided on remedial measures which may be taken for existing installations. This guide refers to the potentially adverse effects of outdoor lighting on both natural and man-made environments for people in most aspects of daily life, from residents, sightseers, transport users to environmentalists and astronomers.

Guidelines for Minimising Sky Glow (CIE 126)

2.2 These guidelines prepared by Commission Internationale De L'Eclairage provide general guidance for lighting designers and policy makers on the reduction of sky glow. The report gives recommendations about maximum permissible values for lighting installations. These values must be regarded as limiting values. Lighting designers should seek to meet the lowest specifications for the design. Other uses of the open air areas at night will usually result in less stringent sky-glow requirements. Practical implementation of the general guidance is left to National Regulations.

National guidance

National Planning Policy Framework (2021)

2.3 The Revised National Planning Policy Framework (NPPF) provides guidance relating to planning and pollution control for new development in England. The purpose of the planning system is to contribute to achievement of sustainable development. In relation to lighting, Paragraph 185 states: "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: c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation"

DEFRA's Lighting in the Countryside: Towards Good Practice (2001)

2.4 The Office of the Deputy Prime Minister (ODPM – now Department for Levelling Up, Housing and Communities') in conjunction with the Countryside Commission published 'Lighting in the Countryside: Towards Good Practice' in July 1997, and a revised issue in 2001. The guidance was developed to 'provide practical advice on the prevention and control of lighting effects through appropriate action by all those involved with lighting in the countryside'. Its objective is 'to identify good practice in the planning and design of lighting in rural areas; and advise on how it can be achieved, using case study examples'. The guide aims to provide an overview and common understanding of all aspects of good lighting practice stating that close co-operation and participation is

required for all those involved in planning, designing and installing lighting schemes. The guidance provides valuable information on lighting best practice and the standard methodology outlined in this guidance document has been followed as part of this assessment. Whilst the guidance relates to 'lighting in the countryside', it is considered best practice to adopt many of the principles contained within the guidance to sites of a more urban nature.

SLL Lighting Guide 1: The Industrial Environment (2018)

2.5 The scope of this guide is concerned with lighting for the industrial environment. In staff areas used for operational purposes, where specific tasks require a particular lighting treatment, the requirements which differ from the general recommendations of the SLL Code for Lighting are specified. The lighting guide includes reference to the exterior lighting requirements of BS 5489 and BS EN 12464.

Institute of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (2021)

2.6 The ILP has proposed lighting guidance and criteria for local authorities with a recommendation that they are incorporated at the local plan level. The guidance defines various forms of light pollution and describes a series of environmental zones (similar to the CIE 150 environmental zones). The ILP guidance provides suitable criteria against which the effects of artificial lighting can be assessed and is used in this assessment.

2.7 The ILP Guidance Notes recommends that the immediate environment is classified systematically as shown in **Table 1**. ILP Guidance Notes then make recommendations for limiting obtrusive light according to the environmental zone in which the lighting would be situated. The stringency depends on the capacity to absorb lighting effects, with Zone E0 requiring the strictest level of control and E4 the lowest.

Table 1. Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

2.8 For each Environmental Zone, recommended obtrusive light limits for exterior lighting installations have also been determined. These are summarised in **Table 2.**

Table 2. Obtrusive Light Limitations for Exterior Lighting Installations

Light Technical Parameter	Application Conditions	Environmental Zones				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx	1 lx	2 lx	5 lx
Upward light ratio (ULR) %		0	0	2.5	5	15

Institute of Lighting Professionals (ILP) Guidance Note 08 for Bats and artificial lighting in the UK (2018)

2.9 This document has been produced in partnership with The Bat Conservation Trust and is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios.

2.10 The Guidance Note provides recommendations for appropriate external lighting specification:

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700 Kelvin) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should always be mounted on the horizontal, ie no upward tilt.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

British Standards

BS EN 12464-2: Lighting of Workplaces, Outdoor Workplaces (2014)

2.11 This standard specifies requirements for lighting of tasks in most outdoor work places and their associated area in terms of quantity and quality of illumination. In addition, recommendations are given for good lighting practice. This standard includes important recommendations on how obtrusive light can be limited to keep night skies free of light pollution.

Local guidance

The Cherwell Local Plan 2011 - 2031

2.12 Cherwell Local Plan was adopted in July 2015 (incorporating Policy Bicester 13 readopted on 19 December 2016). The Plan sets out the vision and strategy for the development of Cherwell through to 2031.

2.13 **Policy ESD 15** (The Character of the Built and Historic Environment) states the following:

- *"Successful design is founded upon an understanding and respect for an area's unique built, natural and cultural context. New development will be expected to complement and enhance the character of its context through sensitive siting, layout and high quality design. All new development will be required to meet high design standards. Where development is in the vicinity of any of the District's distinctive natural or historic assets, delivering high quality design that complements the asset will be essential."*

- *"New development proposals should:*
  - *Be designed to deliver high quality safe, attractive, durable and healthy places to live and work in. Development of all scales should be designed to improve the quality and appearance of an area and the way it functions.*
  - *Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

- *"The design of all new development will need to be informed by an analysis of the context, together with an explanation and justification of the principles that have informed the design rationale."*

Ecologist Guidance

2.14 The appointed Ecologist has provided a sketch that identifies areas of ecological value that have potential to be negatively affected by the presence of external lighting. This sketch is included in **Appendix 2**.

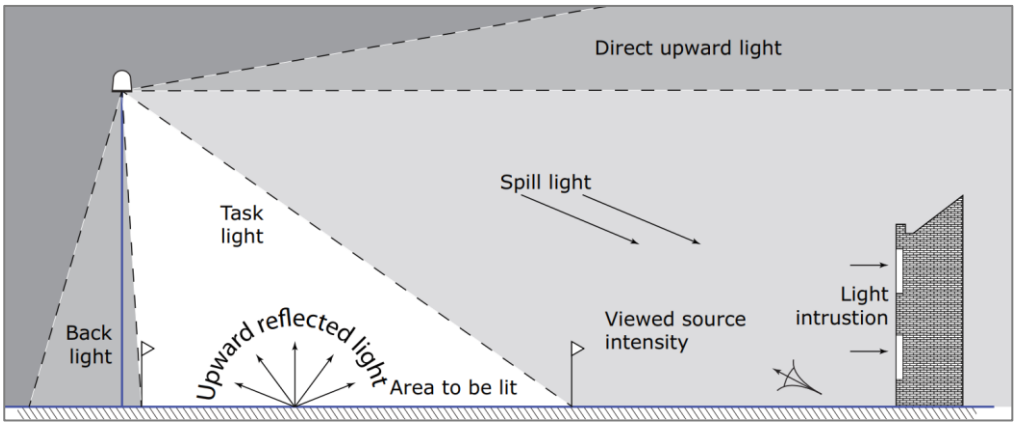
2.15 The sketch shows two proposed SuDS/basins (orange) and approximate location of a proposed bat house (green). The woodland and woodland edge (blue) are a valuable resource for foraging bats and should remain unlit as far as practical.

2.16 The southern and eastern boundaries of the site (i.e. along the disused rail track and adjacent to the farmland) are valuable retained habitats on site for commuting (red). These routes will form key corridors within the wider area and any increases in lighting could negatively impact upon connectivity and the success of the proposed bat mitigation.

3. LIGHT POLLUTION

3.1 Light pollution is a generic term for all the adverse impacts that artificial lighting can have after dark. This section describes the three main types of direct effects that can be created by a new lighting installation. The main types of light pollution are shown diagrammatically in **Figure 2**.

Figure 1. Types of Light Pollution



3.2 Contributing to these direct effects are three design aspects that should be considered alongside the purpose for a new lighting installation and the type of sensitive receptors found in the local area. These are described later in this report.

Types of Light Pollution

Light Spill

3.3 Light spill is the 'the spilling of light beyond the boundary of the site on which a light source is located', such that it causes a noticeably adverse effect. More simply, light spill is often termed as the intrusion of light into homes. It can also have a negative effect on wildlife and ecological systems local to an installation.

3.4 The limits vary according to the environmental zone of the existing location and have been set to encourage appropriate lighting design. Through careful design, it can readily be ensured that this impact is prevented and that the illumination falling within any residential property can be reduced to zero. This is incorporated into the Lighting Strategy.

Sky Glow

3.5 Sky glow is the 'the brightening of the night sky' above illuminated areas. The brightness created is constantly varying as a function of many parameters such as direct upward-lighting, ground surface reflectance, overhead cloud cover, and the degree of water droplets in the atmosphere - rain, fog/mist, and snow, for example, exacerbate the effect.

3.6 Mitigation is achieved by complying with the recommended limits in the ILP Guidance Notes for upward light emission. The limits vary according to the environmental zone of

the existing location and have been set to encourage appropriate lighting design. The Lighting Strategy will ensure that these limits can be met for the Proposed Development.

3.7 To mitigate it as much as possible, lighting must be accurately targeted and kept to a minimum, and this design principle is incorporated into the Lighting Strategy.

3.8 The magnitude of the impact is a matter of judgement, taking into account the existing nighttime view. The magnitude is lessened for those views where an observer is subject to direct illumination from, say, a nearby streetlight, or where light spill from a nearby light source illuminates the foreground, because the observer's vision is not fully dark adapted.

Glare

3.9 Glare, which addresses the potential for experiencing visual discomfort or disability stemming from direct views of lamp sources or high contrast of an installation against a dark background. The placement of luminaires, their photometric characteristics, and the viewing context contribute to glare, which has been noted to result from uncontrolled private lighting installations, security lighting, street lighting mounted at high level near residences or habitat.

3.10 Glare is easily avoidable by designing in compliance with the ILP Guidance Notes and, where necessary, complying with additional requirements stipulated by highway, rail authorities, as described in the Lighting Strategy.

Design Aspects

Building Luminance

3.11 This considers the appropriateness and scale of brightness for the lighting / highlighting of built structures. Design criteria is included within ILP guidance notes as more of a main effect. While this is addressed independently, building luminance can also be considered as an indirect contributor to light spill, sky glow and glare.

Light Levels

3.12 Light levels, both as designed and installed, which have the potential to create areas which have a noticeable difference in brightness. A new lighting installation in an area that has not been lit or is significantly brighter than the surrounding area may affect both adjacent receptors in the form of light spill or glare and those over a larger area by contributing to sky glow through over lighting.

Light Colour

3.13 Light colour, which has the potential to alter an individual's perception of their environment with respect to colour and clarity, as the human eye responds best to whiter light with higher quantities of ultraviolet wavelengths. Various wildlife species may respond differently to spectral composition depending on how reliant they are on darkness; many nocturnal animals continue their social habits and feeding behaviours with increased activity in the area while others may decrease their activity and possibly desert their habitat. This type of effect could affect pedestrians, vehicle operators and wildlife and are likely to occur where new lighting is placed.

4. EXISTING DEVELOPMENT

4.1 This section provides a review of the existing conditions at the site.

4.2 The existing site is a former MOD development containing five warehouse buildings, associated access roads and disused railway infrastructure.

4.3 The north is bound by Pioneer Road with MOD development beyond.

4.4 The east is bound by agricultural land with woodland beyond, and the village of Ambrosden further beyond.

4.5 The south and west are bound by agricultural land and a solar farm.

Existing Light Sources

On-site lighting

4.6 Artificial light sources are very limited. The access roads and disused railway infrastructure are unlit. The warehouse buildings are provided with sporadic floodlighting, likely providing limited local illumination.

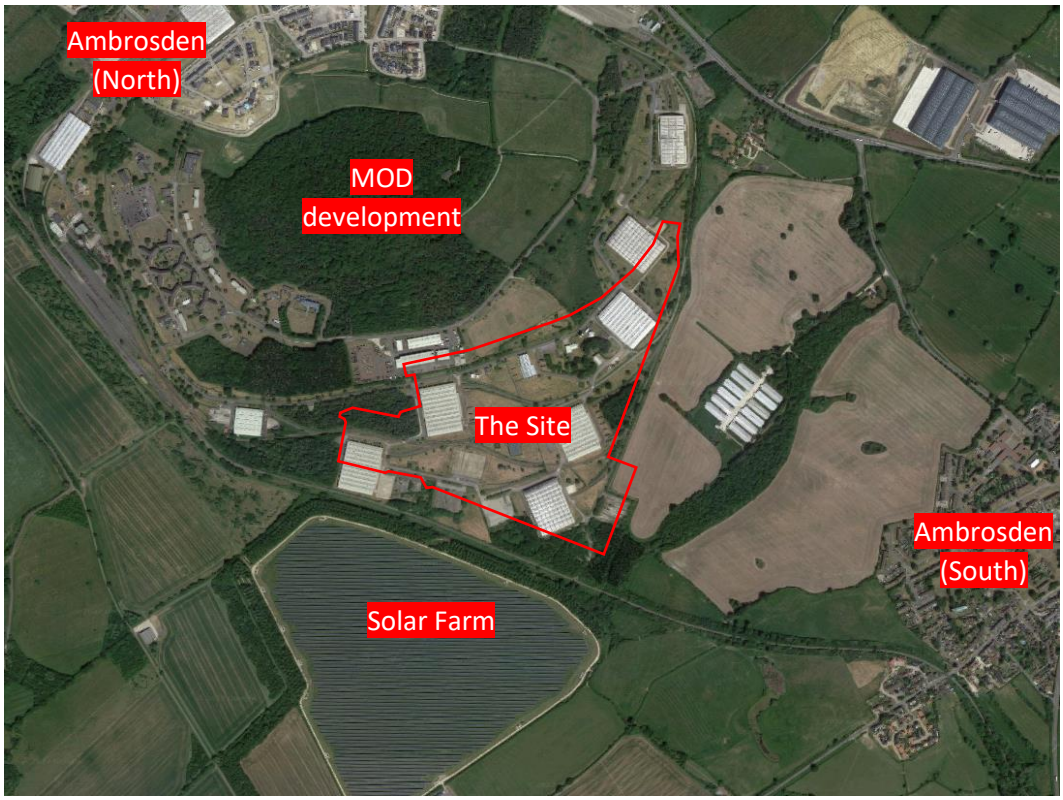
Off-site lighting

4.7 Pioneer Road is provided with sporadic lighting columns, likely providing limited illumination. Pioneer Road is currently being upgraded to an adopted 'Employment Access Road' which is due to be completed later in 2022.

4.8 Ambrosden is provided with sporadic street lighting, likely providing limited illumination.

4.9 **Figure 2** shows an aerial view of the proposed site.

Figure 2. Aerial view of the Proposed Site



Environmental Zone

4.10 Following the desktop assessment it was concluded that the development is in a suburban location and the proposed development site is currently considered as 'Environmental Zone E2 – Rural (low district brightness area), in accordance with the ILP guidance limits outlined within **Table 1**. Therefore, with reference to **Table 2**, the worst case permitted light trespass limit at an offsite receptor in the pre-curfew period (typically considered to be 07:00-23:00) is 5 lux and in the post curfew period (typically considered to be 23:00-07:00) is 1 lux. The maximum upward light ratio (ULR) is 2.5%.

5. PROPOSED DEVELOPMENT

Introduction

5.1 This section sets out the proposed external lighting strategy and the anticipated lighting impact caused by the Proposed Development.

5.2 A modern external lighting installation is vitally important to the Proposed Development for many reasons including, but not limited to, the following:

- To provide safety for pedestrians from moving vehicles, railway and cranage;
- To provide ease of wayfinding and navigation for staff and visitors;
- To provide security and deter antisocial behaviour;
- To set the architectural scene and urban landscape;
- To control direction signage and their relationship with other illuminated material;
- To protect installations from accidental or deliberate damage; and
- To allow safe access and maintenance.

5.3 A lighting design has been prepared that reflects:

- Environmental requirements and the applicable guidance / standards.
- Technical requirements and the applicable guidance / standards; and
- Appropriate selection of lighting typologies to suite the above.

5.4 The lighting design layout is included in **Appendix 3**. The lighting lux plot layout is included in **Appendix 4.**

Design Parameters

5.5 The proposed luminaires are LED light source to provide optimum energy efficiency and accurate targeting of light output to keep light pollution effects to the absolute minimum.

5.6 External lighting has been proposed as necessary to provide a safe and secure environment for staff and other users after dark. 'Secured by Design' principles will be adopted and emphasis will be placed on achieving good uniformity of light distribution. All illumination levels have been set as low as practicable while complying with safety and security recommendations. Spill of light onto building facades and outside of the target area for illumination have been minimised through careful design, specification and positioning of lighting equipment.

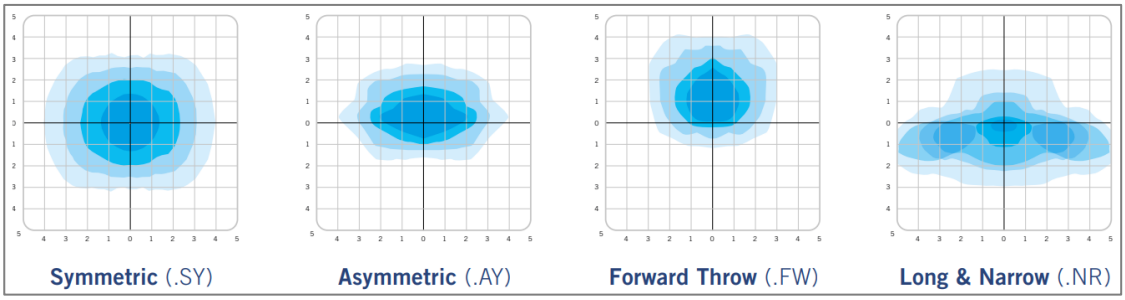
5.7 The proposed luminaires shall be mounted on buildings and on standard lighting columns and shall be arranged to maximise the amount of light reaching trafficked hard surfacing while minimising spill light onto adjacent areas.

5.8 Lighting levels will be suitable for pedestrian, vehicular use and the operation of a CCTV system. Lighting will be installed to provide sufficient illumination for safe circulation and to promote a feeling of safety and security.

5.9 The proposed luminaires have been designed to achieve the target lighting illuminance and uniformity at full cut-off, at 0° tilt, designed to ensure 0% upward light.

5.10 The proposed luminaires utilise optimum optical distribution to direct exactly where needed while allowing maximum spacing between luminaries and minimise the required number of columns. Examples are illustrated in **Figure 3**.

Figure 3. Light Distributions



Performance Requirements

5.11 All illumination levels have been as low as practicable while complying with safety and security recommendations and the design levels set out in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places'. A summary of the applicable target design levels is detailed in **Table 3**. Actual design levels for each particular area across the site are detailed in **Appendix 3**.

Table 3. Proposed External Lighting Minimum Design Levels

TYPE OF AREA, TASK OR ACTIVITY	MAINTAINED ILLUMINANCE, E_m (Lux)	ILLUMINANCE UNIFORMITY, u0
Access Roads	20	0.40
Service Areas / Yards	30	0.40
Loading bays	50	0.40
Car Parks	20	0.25
Walkways	5	0.25
Gatehouses	50	0.40

Access Roads

5.12 Lighting shall be provided from standalone lighting columns with a limited mounting height not exceeding eight metres.

5.13 Luminaires shall be complete with purposely designed road optics to distribute the light as efficiently as possibly whilst controlling and minimising any light spill and to assist in reducing the number of columns required.

5.14 Lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 20 lux.

Service Areas / Yards

5.15 Lighting for service areas / yards will be provided from a combination of column and building mounted floodlights around the perimeter of the yard. Maximum column height will be 10 metres.

5.16 Lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 30 lux.

Loading bays

5.17 Lighting for service areas / yards will be provided from building mounted floodlights installed above the loading areas, mounted at a height of 10 metres.

5.18 Lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places' and the target average illuminance will be 50 lux.

Car Parks

5.19 Car parks will be lit by luminaires mounted on standalone 6m high lighting columns.

5.20 The lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places'. The target average illuminance will be 20 lux.

Walkways

5.21 Lighting for walkways will be provided from building mounted luminaires a height of 3.5 metres or form part of the road lighting.

5.22 Luminaires shall be complete with purposely designed pathway optics to distribute the light as efficiently as possibly whilst controlling and minimising any light spill, this also assists in reducing the number of columns / bollards required to achieve the lighting levels and uniformity.

5.23 The lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places'. The target average illuminance will be 5 lux.

Gatehouses

5.24 Gatehouses shall be lit to provide ease of wayfinding for staff and visitors and shall generally be lit by building mounted luminaires and luminaires mounted on standalone lighting columns.

5.25 The lighting will comply with the recommendations given in BS EN 12464 'Light and lighting – Lighting of work places – Part 2: Outdoor work places'. The target average illuminance will be 100 lux for entrance areas.

Special Measures close to Biodiversity-sensitive areas

5.26 Light spill has the potential to affect both flora (plants etc) and fauna (insects, reptiles, wild animals etc). Light spill can disrupt feeding patterns and force ecological receptors to leave their habitat.

5.27 All luminaires are proposed at 2700K colour temperature in accordance with the ILP Guidance Note 08 for Bats and artificial lighting in the UK. LED typically features no UV component and research indicates that while lower UV components attract fewer invertebrates, warmer colour temperatures (2700K) cause less impacts on bats. This is in line with the recommendations of the appointed Ecologist and the ILP Guidance Note 08 for Bats and artificial lighting in the UK (2018).

5.28 There are a number of ecological areas that will be sensitive to lighting effects. Where lighting is to be sited close to such areas there is the potential for such effects to be significant unless special measures are employed. This is particularly true for the SuDS/basins, proposed bat house, woodland, and southern and eastern boundaries of the site (i.e. along the disused rail track and adjacent to the farmland)

5.29 All lighting sited close to ecologically sensitive areas has been designed to minimise light spill. In liaison with the appointed Ecologist, the lighting strategy seeks to mitigate light spill where there are potential biodiversity receptors that could be adversely affected.

5.30 In order to minimise disturbance to potential bat habitat the following measures have been incorporated:

- Use of warm white, narrow spectrum lights with little or no UV.
- Lowest practical luminaire Wattage.
- Directional lighting with near full horizontal cut off.
- Minimum height columns at maximum spacing.
- Introduction of shielding via cowls where deemed necessary. and;
- Use of luminaires with sharp cut-off.

Upward light ratio (ULR)

5.31 The proposed building and column mounted floodlights have been designed to achieve the target lighting illuminance and uniformity at full cut-off, at 0° tilt, designed to ensure 0% upward light.

5.32 The proposed building mounted LED amenity lights are fully hooded, at 0° tilt, designed to ensure 0% upward light.

5.33 The design has been used to calculate the predicted ULR of the proposed external lighting scheme. Model outputs predict ULR of 0.0%. As illustrated in **Table 2**, the ILP sky glow limitation for an area classified as Environmental Zone E2 is 2.5% ULR. As such the proposed lighting scheme meets the ILP sky glow limitations and is therefore not considered to result in unacceptable impacts on the dark sky landscape.

Light spill

5.34 The mounting height for all luminaires has been limited to a maximum of 10m, at 0° tilt, to reduce the quantity of light spill. Limiting column heights also helps to reduce the impact on the daytime setting.

Ecology

5.35 Illumination of the sensitive areas as identified by the appointed Ecologist has been minimised as far as practicable by limiting mounting heights, careful selection of lighting optics, and strategic positioning of luminaires. Where this has not been adequate, shielding has been introduced to the columns located on the Site perimeter to keep spill to an absolute minimum.

Residential

5.36 The closest residential properties are in the village of Ambrosden. Properties lie approximately 400m south-east from the eastern edge of the Site, and approximately 600m from the north-west from the western edge of the Site. Due to these distances, there is no possibility of light intrusion into these residential properties, meaning the installation fully complies with limits illustrated in **Table 2** for Environmental Zone E2.

5.37 Views of lit development from Ambrosden will generally be screened via existing woodland. The majority of the lit development will generally be screened via the proposed buildings. It is possible that some lighting units will be partially visible from certain properties, but it is concluded that the impact of light presence will be negligible.

Luminaire Selection

5.38 **Table 6** includes the luminaires that have been used in the lighting design presented.

5.39 Included within **Appendix 5** is literature from the manufacturer.

Table 4. Proposed luminaires

LUMINAIRE TYPE	MANUFACTURER INFORMATION	IMAGE
Building mounted, Column mounted	Kingfisher Lighting Zactis LED luminaire 120W – 360W output 8m – 10m mounting height 2700K CRI>80 Various optic types 0° tilt and 0% upward light	
Column mounted	Kingfisher Lighting Viva-City Pro LED luminaire 60W – 80W output 6m-8m mounting height 2700K, CRI>70 Various optic types 0° tilt and 0% upward light	
Building mounted	Kingfisher Lighting Viva-City Flood LED luminaire 60W output 8m mounting height 2700K, CRI>70 Various optic types 0° tilt and 0% upward light	
Building mounted	Kingfisher Lighting Quarto 2.0 LED luminaire 7.5W output 2700K CRI>70 3.5m mounting height Various optic types 0° tilt and 0% upward light	

6. CONCLUSION

6.1 A review has been made of the potential impact created by new lighting in relation to the proposed development.

6.2 Legislation, British standards and good practice guidance indicate the development requires new exterior lighting for purposes of vehicular and pedestrian safety.

6.3 This assessment has been produced to minimise light through a number of measures, such as addressing colour temperature, minimising mounting heights, providing downward light only, and the introduction of shield where appropriate.

6.4 The lighting design presented indicates the potential significant effects from new lighting for the proposed development can be adequately managed and all tested parameters are expected to meet recommended guidance benchmarks.

6.5 The lighting design presented indicates the proposed lighting installation can achieve the required minimum lighting levels and distribution to meet the applicable standards while causing negligible effects to nearby residential properties and areas containing sensitive ecology.

6.6 The lighting design presented has been reviewed and subsequently approved by the appointed Ecologist.

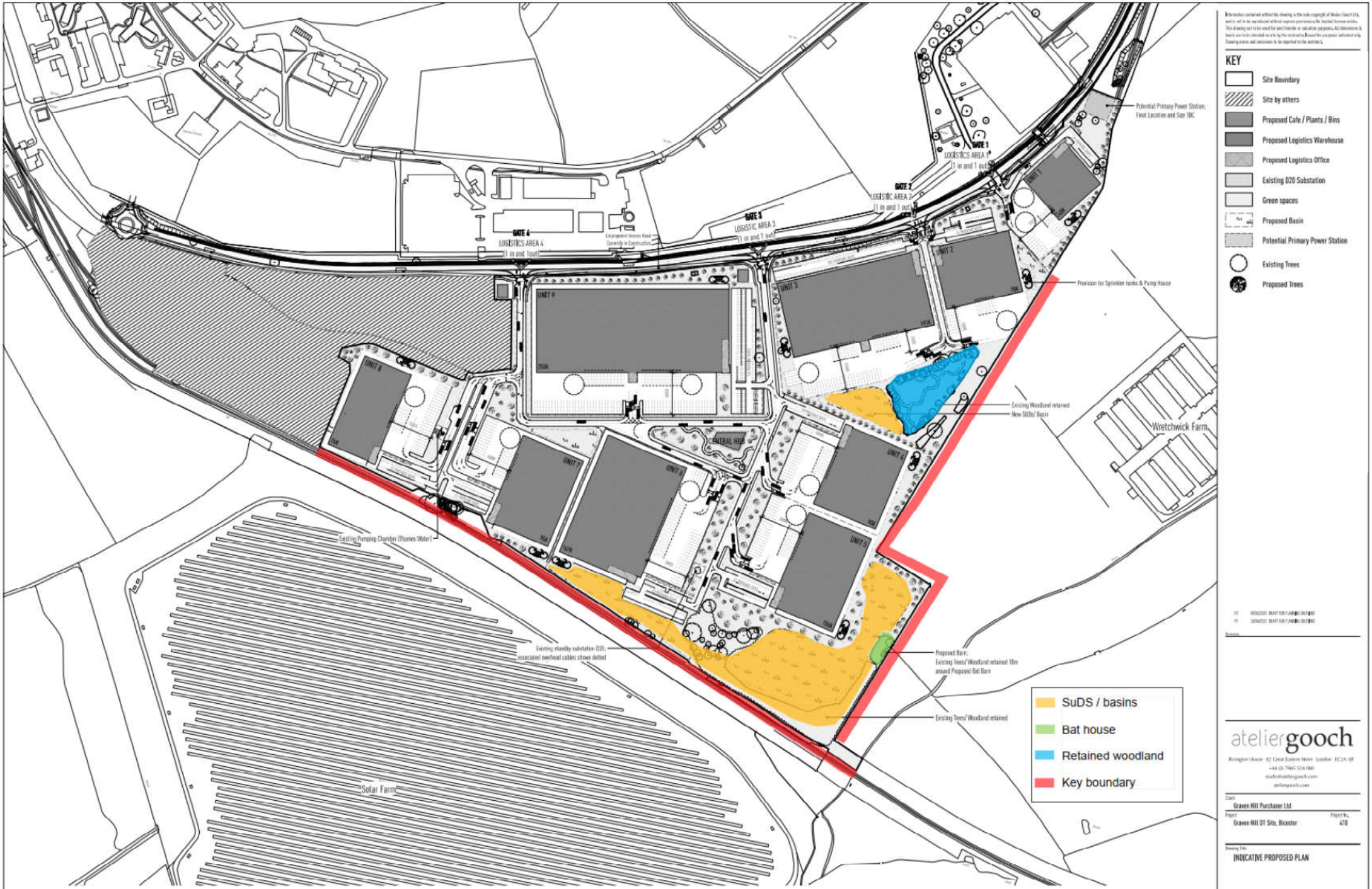
6.7 The impact of the proposed development lighting is considered to be negligible with respect to sensitive receptors. The most noticeable effect due to the proposed lighting installation expected to remain is a slight increase in sky glow.

6.8 The final detailed site layout may be amended but the lighting strategy and parameters must be maintained and the subsequent lighting levels, light spill and impact and ecology shall be consistent with the results achieved within this assessment.

APPENDICES

Appendix 1: Proposed Development Masterplan

Appendix 2: Ecology Layout



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Client: Graven Hill Purchaser Ltd

Project: Graven Hill D1 Site, Bicester — Project No.: 410

Drawing Title: INDICATIVE PROPOSED PLAN

Status	Drawn	Checked
PLANNING	JH	GO
Scale		Date
1:2000 @A1		APR 2022
Drawing Number		Revision
410_S-50		P2

Appendix 3: Proposed External Lighting Layout

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Legend

78.1m
76.3m
76.2m
Tank
WB
Pipeline
Pipe Line
Water
Wretchwick Farm
Depot
CF
ESS
Drain

Luminaire Schedule

Symbol	Qty	Label	Arrangement	LLF	Description
	28	A	SINGLE	0.900	80w LED 2700k Viva City Pro 805mA with FW70 Optic column mounted at 6m
	3	A (Back Spill Shield)	SINGLE	0.900	80w LED 2700k Viva City Pro 805mA with Internal Spill Shield FWB70 Optic column mounted at 6m
	11	A2	BACK-BACK	0.900	2 x 80w LED 2700k Viva City Pro 805mA with FW70 Optic column mounted at 6m
	3	AW	SINGLE	0.900	80w LED 2700k Viva City Pro 805mA with FW70 Optic wall mounted at 6m
	8	B	SINGLE	0.900	320w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	41	BW	SINGLE	0.900	320w LED 2700k Zactis 808mA Floodlight with FW70 Optic wall mounted at 10m
	26	C	SINGLE	0.900	160w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	7	C (Back Spill Shield)	SINGLE	0.900	160w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	5	C2	BACK-BACK	0.900	2 x 160w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	57	DW	SINGLE	0.900	60w LED 2700k Viva City Flood 805mA with AY70 Optic wall mounted at 6m
	6	EW	SINGLE	0.900	7.5w LED 2700k Quarlo 2.0 250mA bulkhead with street optic wall mounted at 2.5m
	41	F	SINGLE	0.900	60w LED 2700k Viva City Pro 610mA with AY70 Optic column mounted at 8m
	7	G	SINGLE	0.900	60w LED 2700k Viva City Pro 610mA with FW70 Optic column mounted at 8m
	49	HW	SINGLE	0.900	7.5w LED 2700k Quarlo 2.0 250mA bulkhead with cycle optic wall mounted at 3.5m
	1	B (Back Spill Shield)	SINGLE	0.900	320w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	1	B2	BACK-BACK	0.900	2 x 320w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
Access Road	Illuminance	Lux	19.47	82	5	0.26	0.06
Unit 1 Car Park	Illuminance	Lux	24.34	71	7	0.29	0.10
Unit 1 Gatehouse	Illuminance	Lux	59.91	84	43	0.72	0.51
Unit 1 Loading Bays	Illuminance	Lux	60.50	78	42	0.69	0.54
Unit 1 Pavilion	Illuminance	Lux	24.45	42	8	0.33	0.19
Unit 1 Perimeter	Illuminance	Lux	15.50	52	4	0.26	0.08
Unit 1 Roadway	Illuminance	Lux	19.19	43	5	0.26	0.12
Unit 1 Truck Circulation Areas	Illuminance	Lux	39.81	77	16	0.40	0.21
Unit 1 Truck Parking	Illuminance	Lux	27.61	47	11	0.40	0.23
Unit 1 Truck Turning Circle	Illuminance	Lux	49.57	79	24	0.48	0.30
Unit 2 & 3 Roadway	Illuminance	Lux	18.45	46	4	0.22	0.09
Unit 2 Car Park	Illuminance	Lux	20.27	66	8	0.39	0.12
Unit 2 Gatehouse	Illuminance	Lux	44.94	61	27	0.60	0.44
Unit 2 Loading Bays	Illuminance	Lux	44.93	67	29	0.65	0.43
Unit 2 Pavillion	Illuminance	Lux	23.33	62	6	0.26	0.10
Unit 2 Perimeter	Illuminance	Lux	14.43	42	6	0.42	0.14
Unit 2 Truck Circulation Areas	Illuminance	Lux	30.47	70	13	0.43	0.19
Unit 2 Truck Parking	Illuminance	Lux	38.40	65	22	0.57	0.34
Unit 2 Truck Turning Circle	Illuminance	Lux	44.59	69	26	0.58	0.38
Unit 3 Car Park	Illuminance	Lux	17.08	43	6	0.35	0.14
Unit 3 Gatehouse	Illuminance	Lux	46.38	81	24	0.52	0.30
Unit 3 Loading Bays	Illuminance	Lux	50.13	69	24	0.48	0.35
Unit 3 Pavillion	Illuminance	Lux	24.02	42	9	0.37	0.21
Unit 3 Perimeter	Illuminance	Lux	11.54	22	3	0.26	0.14
Unit 3 Truck Circulation Areas	Illuminance	Lux	28.65	72	12	0.42	0.17
Unit 3 Truck Parking	Illuminance	Lux	21.53	35	13	0.60	0.37
Unit 3 Truck Turning Circle	Illuminance	Lux	53.97	71	29	0.54	0.41
Unit 4 Car Park	Illuminance	Lux	21.01	47	7	0.33	0.15
Unit 4 Emergency Route	Illuminance	Lux	19.14	39	6	0.31	0.15
Unit 4 Gatehouse	Illuminance	Lux	49.91	73	29	0.58	0.40
Unit 4 Loading Bays	Illuminance	Lux	50.17	69	30	0.60	0.43
Unit 4 Pavillion	Illuminance	Lux	20.99	42	13	0.62	0.31
Unit 4 Truck Circulation Areas	Illuminance	Lux	25.81	66	12	0.46	0.18
Unit 4 Truck Parking	Illuminance	Lux	26.72	46	16	0.60	0.35
Unit 4 Truck Turning Circle	Illuminance	Lux	37.56	68	20	0.53	0.29
Unit 5 Car Park	Illuminance	Lux	28.01	70	9	0.32	0.13
Unit 5 Emergency Route	Illuminance	Lux	20.27	36	8	0.39	0.22
Unit 5 Gatehouse	Illuminance	Lux	51.48	72	32	0.62	0.44
Unit 5 Loading Bays	Illuminance	Lux	67.37	84	48	0.71	0.57
Unit 5 Pavillion	Illuminance	Lux	26.50	59	13	0.49	0.22
Unit 5 Truck Circulation Area	Illuminance	Lux	30.54	75	15	0.49	0.20
Unit 5 Truck Parking	Illuminance	Lux	25.86	49	15	0.58	0.31
Unit 5 Truck Turning Circle	Illuminance	Lux	56.11	84	27	0.48	0.32
Unit 6 Car Park	Illuminance	Lux	18.72	46	5	0.27	0.11
Unit 6 Emergency Route	Illuminance	Lux	16.92	32	5	0.30	0.16
Unit 6 Gatehouse	Illuminance	Lux	57.35	86	27	0.47	0.31
Unit 6 Loading Bays	Illuminance	Lux	50.85	71	34	0.67	0.48
Unit 6 Pavillion	Illuminance	Lux	20.68	40	9	0.44	0.23
Unit 6 Truck Circulation Areas	Illuminance	Lux	25.70	73	11	0.43	0.15
Unit 6 Truck Parking	Illuminance	Lux	19.10	31	11	0.58	0.35
Unit 6 Truck Turning Circle	Illuminance	Lux	51.84	72	25	0.48	0.35
Unit 7 Car Park	Illuminance	Lux	20.72	63	6	0.29	0.10
Unit 7 Emergency Route	Illuminance	Lux	14.66	30	5	0.34	0.17
Unit 7 Gatehouse	Illuminance	Lux	64.85	86	39	0.60	0.45
Unit 7 Loading Bays	Illuminance	Lux	56.62	80	26	0.46	0.33
Unit 7 Pavillion	Illuminance	Lux	14.70	39	8	0.54	0.21
Unit 7 Service Road	Illuminance	Lux	38.16	56	12	0.31	0.21
Unit 7 Truck Circulation	Illuminance	Lux	24.42	71	11	0.45	0.15
Unit 7 Truck Parking	Illuminance	Lux	38.83	70	21	0.54	0.30
Unit 7 Truck Turning Circle	Illuminance	Lux	60.15	82	27	0.45	0.33
Unit 8 Car Park	Illuminance	Lux	19.75	50	6	0.30	0.12
Unit 8 Emergency Route	Illuminance	Lux	16.41	29	7	0.43	0.24
Unit 8 Gatehouse	Illuminance	Lux	85.73	108	54	0.63	0.50
Unit 8 Loading Bays	Illuminance	Lux	51.03	71	36	0.71	0.51
Unit 8 Pavillion	Illuminance	Lux	22.81	45	12	0.53	0.27
Unit 8 Service Road	Illuminance	Lux	30.79	62	15	0.49	0.24
Unit 8 Truck Circulation Area	Illuminance	Lux	26.93	70	10	0.37	0.14
Unit 8 Truck Parking	Illuminance	Lux	23.64	44	11	0.47	0.25
Unit 8 Truck Turning Circle	Illuminance	Lux	50.82	76	22	0.43	0.29
Unit 9 Car Park	Illuminance	Lux	22.95	65	6	0.26	0.09
Unit 9 Emergency Route	Illuminance	Lux	15.36	30	7	0.46	0.23
Unit 9 Gatehouse	Illuminance	Lux	77.75	119	45	0.58	0.38
Unit 9 Loading Bays	Illuminance	Lux	53.87	75	32	0.59	0.43
Unit 9 Pavillion Area	Illuminance	Lux	21.76	45	11	0.51	0.24
Unit 9 Truck Circulation Area	Illuminance	Lux	30.78	78	11	0.36	0.14
Unit 9 Truck Parking	Illuminance	Lux	23.21	51	11	0.47	0.22
Unit 9 Truck Turning Circles	Illuminance	Lux	51.73	91	20	0.39	0.22

P3	01.06.22	Issued for Information Latest Architect layout incorporated.	GEM	DA
P2	27.04.22	Issued for Information Revised in line with Ecology feedback. Latest Architect layout incorporated.	GEM	DA
P1	06.04.22	Issued for Information	GEM	DA
Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

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Client

GRAVEN HILL PURCHASERS LLP

Project Title

BLACKHALL STUDIOS BICESTER

Drawing Title

ELECTRICAL SERVICES PROPOSED EXTERNAL LIGHTING LAYOUT PROPOSED SITE PLAN

Drawn:	G. E. Maher	Reviewed:	D. Alasfar		
BWB Ref:	LDA2850	Date:	06.04.22	Scale@A0:	1:1000

Drawing Status

INFORMATION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
BSB-BWB-XX-XX-DR-E-2300	**S2**	**P3**

Appendix 4: Proposed External Lux Plot Layout

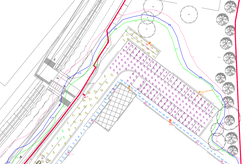
Notes

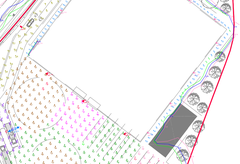
1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

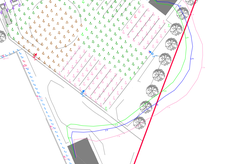
Legend

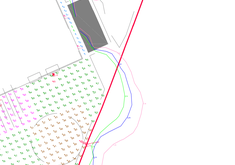
1 Lux
2 Lux
3 Lux

78.1m
76.3m
76.2m
Tank
WB
Water
Pipe Line
Pipeline
Pipeline
Pipeline
Depot
Wretchwick Farm
CF
CF
ESS
Drain









Luminaire Schedule					
Symbol	Qty	Label	Arrangement	LLF	Description
	28	A	SINGLE	0.900	80w LED 2700k Viva City Pro 805mA with FW70 Optic column mounted at 6m
	3	A (Back Spill Shield)	SINGLE	0.900	80w LED 2700k Viva City Pro 805mA with Internal Spill Shield FW870 Optic column mounted at 6m
	11	A2	BACK-BACK	0.900	2 x 80w LED 2700k Viva City Pro 805mA with FW70 Optic column mounted at 6m
	3	AW	SINGLE	0.900	80w LED 2700k Viva City Pro 805mA with FW70 Optic wall mounted at 6m
	8	B	SINGLE	0.900	320w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	41	BW	SINGLE	0.900	320w LED 2700k Zactis 808mA Floodlight with FW70 Optic wall mounted at 10m
	26	C	SINGLE	0.900	160w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	7	C (Back Spill Shield)	SINGLE	0.900	160w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	5	C2	BACK-BACK	0.900	2 x 160w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	57	DW	SINGLE	0.900	60w LED 2700k Viva City Flood 805mA with AY70 Optic wall mounted at 6m
	6	EW	SINGLE	0.900	7.5w LED 2700k Quarlo 2.0 250mA bulkhead with street optic wall mounted at 2.5m
	41	F	SINGLE	0.900	60w LED 2700k Viva City Pro 610mA with AY70 Optic column mounted at 8m
	7	G	SINGLE	0.900	60w LED 2700k Viva City Pro 610mA with FW70 Optic column mounted at 8m
	49	HW	SINGLE	0.900	7.5w LED 2700k Quarlo 2.0 250mA bulkhead with cycle optic wall mounted at 3.5m
	1	B (Back Spill Shield)	SINGLE	0.900	320w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m
	1	B2	BACK-BACK	0.900	2 x 320w LED 2700k Zactis 808mA Floodlight with FW70 Optic column mounted at 10m

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
Access Road	Illuminance	Lux	19.47	82	5	0.26	0.06
Unit 1 Car Park	Illuminance	Lux	24.34	71	7	0.29	0.10
Unit 1 Gatehouse	Illuminance	Lux	59.91	84	43	0.72	0.51
Unit 1 Loading Bays	Illuminance	Lux	60.50	78	42	0.69	0.54
Unit 1 Pavilion	Illuminance	Lux	24.45	42	8	0.33	0.19
Unit 1 Perimeter	Illuminance	Lux	15.50	52	4	0.26	0.08
Unit 1 Roadway	Illuminance	Lux	19.19	43	5	0.26	0.12
Unit 1 Truck Circulation Areas	Illuminance	Lux	30.81	77	16	0.40	0.21
Unit 1 Truck Parking	Illuminance	Lux	27.61	47	11	0.40	0.23
Unit 1 Truck Turning Circle	Illuminance	Lux	49.57	79	24	0.48	0.30
Unit 2 & 3 Roadway	Illuminance	Lux	18.45	46	4	0.22	0.09
Unit 2 Car Park	Illuminance	Lux	20.27	66	8	0.39	0.12
Unit 2 Gatehouse	Illuminance	Lux	44.94	61	27	0.60	0.44
Unit 2 Loading Bays	Illuminance	Lux	44.93	67	29	0.65	0.43
Unit 2 Pavillion	Illuminance	Lux	23.33	62	6	0.26	0.10
Unit 2 Perimeter	Illuminance	Lux	14.43	42	6	0.42	0.14
Unit 2 Truck Circulation Areas	Illuminance	Lux	30.47	70	13	0.43	0.19
Unit 2 Truck Parking	Illuminance	Lux	38.40	65	22	0.57	0.34
Unit 2 Truck Turning Circle	Illuminance	Lux	44.59	69	26	0.58	0.38
Unit 3 Car Park	Illuminance	Lux	17.08	43	6	0.35	0.14
Unit 3 Gatehouse	Illuminance	Lux	46.38	81	24	0.52	0.30
Unit 3 Loading Bays	Illuminance	Lux	50.13	69	24	0.48	0.35
Unit 3 Pavillion	Illuminance	Lux	24.02	42	9	0.37	0.21
Unit 3 Perimeter	Illuminance	Lux	11.54	22	3	0.26	0.14
Unit 3 Truck Circulation Areas	Illuminance	Lux	28.65	72	12	0.42	0.17
Unit 3 Truck Parking	Illuminance	Lux	21.53	35	13	0.60	0.37
Unit 3 Truck Turning Circle	Illuminance	Lux	53.97	71	29	0.54	0.41
Unit 4 Car Park	Illuminance	Lux	21.01	47	7	0.33	0.15
Unit 4 Emergency Route	Illuminance	Lux	19.14	39	6	0.31	0.15
Unit 4 Gatehouse	Illuminance	Lux	49.91	73	29	0.58	0.40
Unit 4 Loading Bays	Illuminance	Lux	50.17	69	30	0.60	0.43
Unit 4 Pavillion	Illuminance	Lux	20.99	42	13	0.62	0.31
Unit 4 Truck Circulation Areas	Illuminance	Lux	25.81	66	12	0.46	0.18
Unit 4 Truck Parking	Illuminance	Lux	26.72	46	16	0.60	0.35
Unit 4 Truck Turning Circle	Illuminance	Lux	37.56	68	20	0.53	0.29
Unit 5 Car Park	Illuminance	Lux	28.01	70	9	0.32	0.13
Unit 5 Emergency Route	Illuminance	Lux	20.27	36	8	0.39	0.22
Unit 5 Gatehouse	Illuminance	Lux	51.48	72	32	0.62	0.44
Unit 5 Loading Bays	Illuminance	Lux	67.37	84	48	0.71	0.57
Unit 5 Pavillion	Illuminance	Lux	26.50	59	13	0.49	0.22
Unit 5 Truck Circulation Area	Illuminance	Lux	30.54	75	15	0.49	0.20
Unit 5 Truck Parking	Illuminance	Lux	25.86	49	15	0.58	0.31
Unit 5 Truck Turning Circle	Illuminance	Lux	56.11	84	27	0.48	0.32
Unit 6 Car Park	Illuminance	Lux	18.72	46	5	0.27	0.11
Unit 6 Emergency Route	Illuminance	Lux	16.92	32	5	0.30	0.16
Unit 6 Gatehouse	Illuminance	Lux	57.35	86	27	0.47	0.31
Unit 6 Loading Bays	Illuminance	Lux	50.85	71	34	0.67	0.48
Unit 6 Pavillion	Illuminance	Lux	20.68	40	9	0.44	0.23
Unit 6 Truck Circulation Areas	Illuminance	Lux	25.70	73	11	0.43	0.15
Unit 6 Truck Parking	Illuminance	Lux	19.10	31	11	0.58	0.35
Unit 6 Truck Turning Circle	Illuminance	Lux	51.84	72	25	0.48	0.35
Unit 7 Car Park	Illuminance	Lux	20.72	63	6	0.29	0.10
Unit 7 Emergency Route	Illuminance	Lux	14.66	30	5	0.34	0.17
Unit 7 Gatehouse	Illuminance	Lux	64.85	86	39	0.60	0.45
Unit 7 Loading Bays	Illuminance	Lux	56.62	80	26	0.46	0.33
Unit 7 Pavillion	Illuminance	Lux	14.70	39	8	0.54	0.21
Unit 7 Service Road	Illuminance	Lux	38.16	56	12	0.31	0.21
Unit 7 Truck Circulation	Illuminance	Lux	24.42	71	11	0.45	0.15
Unit 7 Truck Parking	Illuminance	Lux	38.83	70	21	0.54	0.30
Unit 7 Truck Turning Circle	Illuminance	Lux	60.15	82	27	0.45	0.33
Unit 8 Car Park	Illuminance	Lux	19.75	50	6	0.30	0.12
Unit 8 Emergency Route	Illuminance	Lux	16.41	29	7	0.43	0.24
Unit 8 Gatehouse	Illuminance	Lux	85.73	108	54	0.63	0.50
Unit 8 Loading Bays	Illuminance	Lux	51.03	71	36	0.71	0.51
Unit 8 Pavillion	Illuminance	Lux	22.81	45	12	0.53	0.27
Unit 8 Service Road	Illuminance	Lux	30.79	62	15	0.49	0.24
Unit 8 Truck Circulation Area	Illuminance	Lux	26.93	70	10	0.37	0.14
Unit 8 Truck Parking	Illuminance	Lux	23.64	44	11	0.47	0.25
Unit 8 Truck Turning Circle	Illuminance	Lux	50.82	76	22	0.43	0.29
Unit 9 Car Park	Illuminance	Lux	22.95	65	6	0.26	0.09
Unit 9 Emergency Route	Illuminance	Lux	15.36	30	7	0.46	0.23
Unit 9 Gatehouse	Illuminance	Lux	77.75	119	45	0.58	0.38
Unit 9 Loading Bays	Illuminance	Lux	53.87	75	32	0.59	0.43
Unit 9 Pavillion Area	Illuminance	Lux	21.76	45	11	0.51	0.24
Unit 9 Truck Circulation Area	Illuminance	Lux	30.78	78	11	0.36	0.14
Unit 9 Truck Parking	Illuminance	Lux	23.21	51	11	0.47	0.22
Unit 9 Truck Turning Circles	Illuminance	Lux	51.73	91	20	0.39	0.22

P3	01.06.22	Issued for Information Latest Architect layout incorporated.	GEM | DA
P2	27.04.22	Issued for Information Revised in line with Ecology feedback. Latest Architect layout incorporated.	GEM | DA
P1	06.04.22	Issued for Information	GEM | DA
Rev	Date	Details of issue / revision	Drw | Rev

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London | 020 7407 3879
Manchester | 0161 233 4260
Nottingham | 0115 924 1100
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Client

GRAVEN HILL PURCHASERS LLP

Project Title

BLACKHALL STUDIOS BICESTER

Drawing Title

ELECTRICAL SERVICES PROPOSED EXTERNAL LUX PLOT LAYOUT PROPOSED SITE PLAN

Drawn:	G. E. Maher		Reviewed:	D. Alasfar	
BWB Ref:	LDA2850	Date:	06.04.22	Scale@A0:	1:1000

Drawing Status

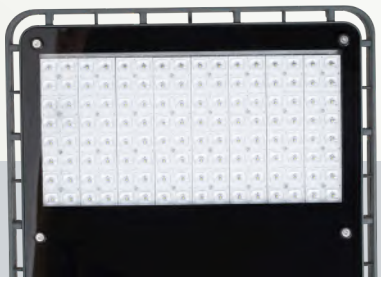
INFORMATION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
BSB-BWB-XX-XX-DR-E-2301	**S2**	**P3**

Appendix 5: Proposed Luminaire Type

Kingfisher Lighting

Datasheet



Zactis

Product Description

Zactis is a high-performance flat-to-ground LED flood light perfect for sports, high mast and area applications. As well as facilitating easy installation and maintenance, the sleek, low-profile design, reduces the load together with decreasing windage.

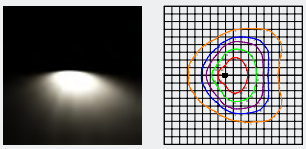
Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 138.0 lm/W and will be capable of producing up to 44,156 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP65 and IK08.

Specification

Weight:	15.0 - 16.5kg
Windage:	0.1m²
Material:	Die-cast Aluminium
Paint finish:	RAL7016 Anthracite Grey Marine Grade Finish

Optics



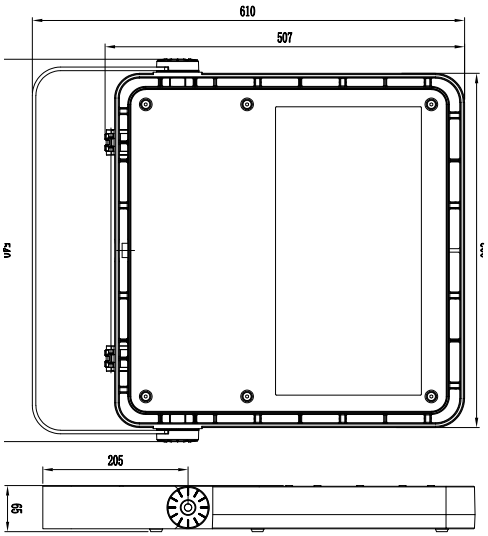
Asymmetrical Forward Throw Optic

Key Features

- 125.0 - 320.0W
- 17,125 - 44,156 Luminaire Lumens
- Efficacy up to 138.0 lm/W
- 4000K, CRI >70
- Lifetime >100,000hr, L70

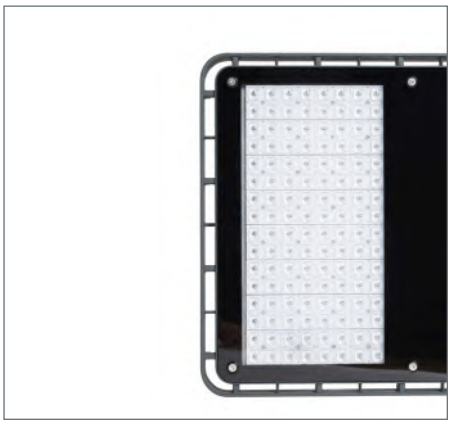
LED | IP65 | IK08 | DIM | Control Compatible

Dimensions



DESIGNED & ENGINEERED IN THE UK

Code	Power	Luminaire Lumens	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included
ZAC-FW70-4.5-125D	125.0	17,686	645	Asymmetrical Forward Throw Optic - 70°	4000	IP65	IK08	15.0	RAL7016 Anthracite Grey Marine Grade Finish	Driver inc
ZAC-FW70-4.7-160D	160.0	22,800	808		4000	IP66	IK08	15.0	RAL7016 Anthracite Grey Marine Grade Finish	Driver inc
ZAC-FW70-4.5-250D	250.0	35,836	645		4000	IP66	IK08	16.5	RAL7016 Anthracite Grey Marine Grade Finish	Driver inc
ZAC-FW70-4.7-320D	320.0	46,768	808		4000	IP66	IK08	16.5	RAL7016 Anthracite Grey Marine Grade Finish	Driver inc



Accessories & Options

Mounting Options

- Stirrup Mount
  Contact for details

Other Options

- Part Night Dimming
- Colour Temperature Options
- Photocell Option
  Contact for details

Kingfisher Lighting

Kingfisher Lighting

Datasheet

Viva-City Flood

Product Description

The Viva-City Flood is a sleek, powerful luminaire with asymmetrical distribution. It is part of the Viva-City family.

Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 128.0 lm/W and will be capable of producing up to 15,320 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP66 and IK08.

Specify 2700K for IDA compliance.

Specification

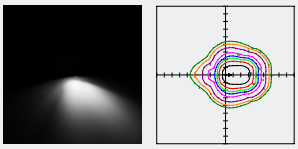
Weight: 7.5 - 8.1kg

Windage: 0.5m²

Material: Die-cast Aluminium

Paint finish: RAL7016 Anthracite Grey Finish

Optics



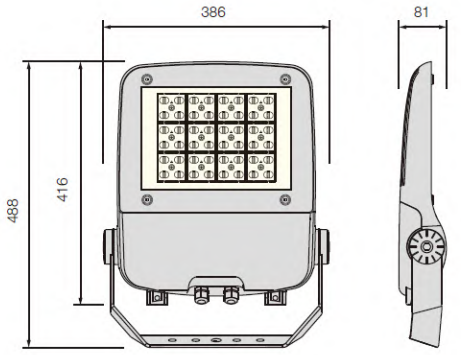
Flood Optic - 50°

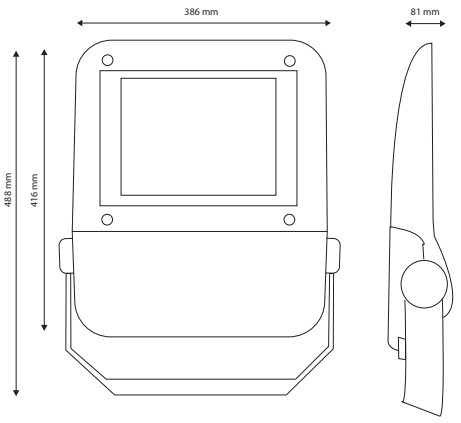
Key Features

- 6.0 - 120.0W
- 7,320 - 15,320 Luminaire Lumens
- Efficacy up to 128.0 lm/W
- 4000K, CRI >70
- Lifetime > 100,000hr, L80

LED | IP66 | IK08 | DIM | Control Compatible

Dimensions





ida DARK SKY APPROVED

Code	Power	Luminaire Lumens	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included	Driver Type
VCYF-FL50-4.6-60D	60.0	7,320	805	Asymmetrical Flood Optic - 50°	4000	IP66	IK08	7.5	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYF-FL50-4.6-60DPEC	60.0	7,320	805		4000	IP66	IK08	7.6	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYF-FL50-4.8-120D	120.0	15,320	808		4000	IP66	IK08	8.0	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYF-FL50-4.8-120DPEC	120.0	15,320	808		4000	IP66	IK08	8.1	RAL7016 Anthracite Grey Finish	Driver inc	Dali

Accessories & Options

Mounting Options

- Surface Mount Bracket
  Contact for details

Other Options

- Part Night Dimming
- Colour Temperature Option
- Photocell Option
- Emergency Option
  Contact for details

Kingfisher Lighting

Datasheet

Viva-City Pro

Product Description

A modular, slimline, performance street lantern with improved efficacy and output. Viva-City Pro offers a choice of optics with asymmetrical distribution including an area optic.

Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 150.0 lm/W and will be capable of producing up to 24,660 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP66 and IK08.

Specify 2700K for IDA compliance.

Specification

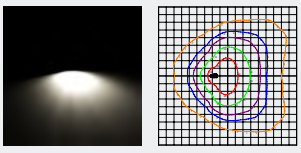
Weight: 4.5 - 9.1kg

Windage: 0.04m²

Material: Die-cast Aluminium

Paint finish: RAL7016 Anthracite Grey Finish

Optics



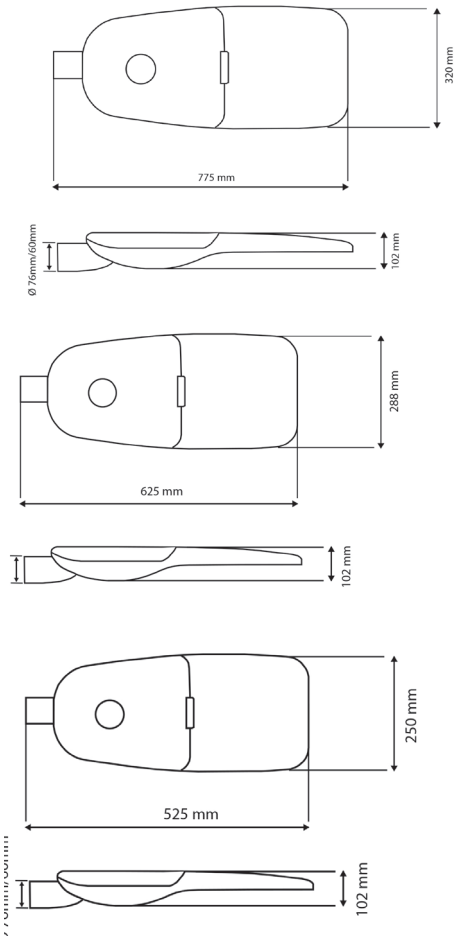
Asymmetric Forward Throw Optic 70°

Key Features

- 15.0 - 180.0W
- 2,250 - 24,660 Luminaire Lumens
- Efficacy up to 150.0 lm/W
- 4000K, CRI >70
- Lifetime >100,000hr, L80

LED | IP66 | IK08 | DIM | Control Compatible

Dimensions



ida DARK SKY APPROVED

Code	Power	Luminaire Lumens	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included	Driver Type
VCYP-FW70-4.3-15D	15.0	2,250	640	Asymmetrical Forward Throw Optic - 70°	4000	IP66	IK08	4.5	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.3-15DPEC	15.0	2,250	640		4000	IP66	IK08	4.6	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.8-40D	40.0	5,880	805		4000	IP66	IK08	6.0	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.8-40DPEC	40.0	5,880	805		4000	IP66	IK08	6.1	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.6-60D	60.0	8,760	610		4000	IP66	IK08	6.0	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.6-60DPEC	60.0	8,760	610		4000	IP66	IK08	6.1	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.8-80D	80.0	11,040	805		4000	IP66	IK08	6.0	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.8-80DPEC	80.0	11,040	805		4000	IP66	IK08	6.1	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.6-120D	120.0	17,760	620		4000	IP66	IK08	9.0	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.6-120DPEC	120.0	17,760	620		4000	IP66	IK08	9.1	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.8-180D	180.0	24,660	880		4000	IP66	IK08	9.0	RAL7016 Anthracite Grey Finish	Driver inc	Dali
VCYP-FW70-4.8-180DPEC	180.0	24,660	880		4000	IP66	IK08	9.1	RAL7016 Anthracite Grey Finish	Driver inc	Dali

Accessories & Options

Mounting Options

- Post top 60mm
  Contact for details

Other Options

- Part Night Dimming
- Colour Temperature Option
- Photocell Option
- Emergency Option
  Contact for details

Kingfisher Lighting

Kingfisher Lighting

Part of the Luceco group of companies

Datasheet

Quarto 2.0

Product Description

A stylish, modern bulkhead available with LED emergency and photocell. Quarto 2.0 is suited to building and perimeter lighting.

Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 114.0 lm/W and will be capable of producing up to 1,453 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP65 and IK10.

Specification

Weight: 4.0kg

Material: Die-cast Aluminium

Paint finish: RAL7016 Anthracite
Grey Marine Grade Finish

Key Features

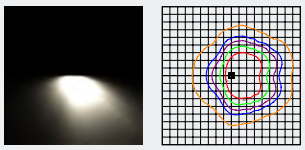
- 7.5 - 14.2W
- 806 - 1,453 Luminaire Lumens
- Efficacy up to 114.0 lm/W
- 4000K, CRI >70
- Lifetime >100,000hr, L80

LED | IP65 | IK10 | DIM | Control Compatible

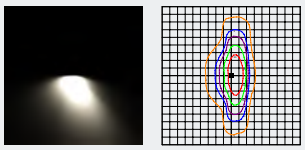
Other Options

- Colour Temperature Options
- Photocell Option
- Emergency Option
  Contact for details

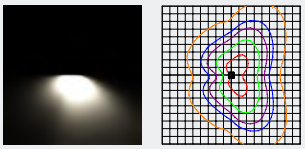
Optics



Flood Optic



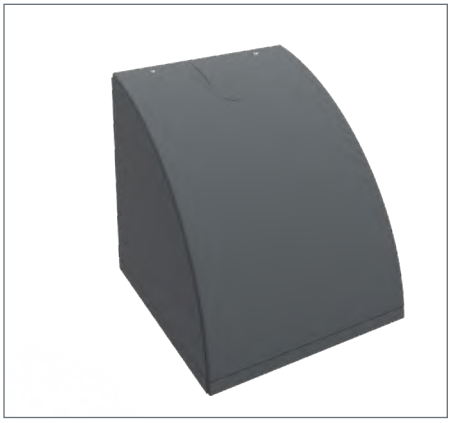
Path Optic

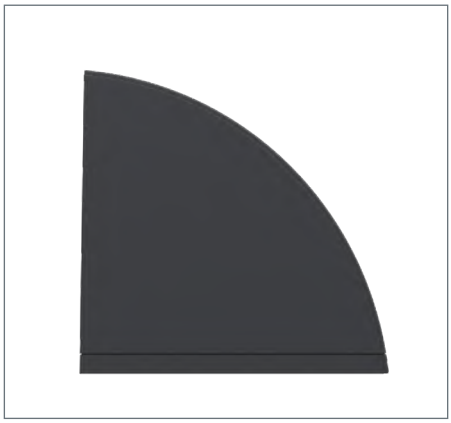


Street Optic

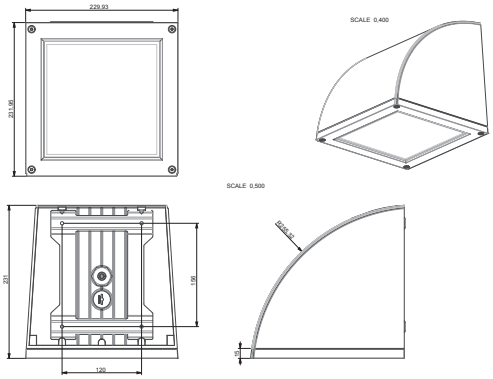
DESIGNED & ENGINEERED IN THE UK

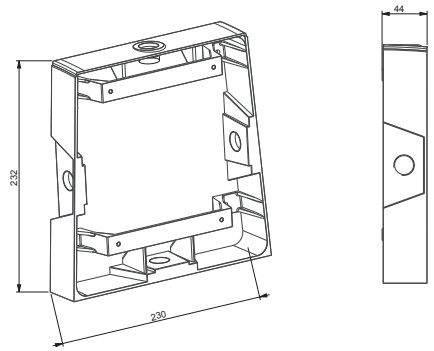
Code	Power	Luminaire Lumens	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included
QUAFL08D	7.5	857	250	Asymmetrical Flood Optic FL	4000	IP65	IK10	4.0	RAL7016 Anthracite Grey Marine Grade	Driver Inc
QUAFL15D	14.2	1,542	500		4000	IP65	IK10	4.0	RAL7016 Anthracite Grey Marine Grade	Driver Inc
QUAOC08D	7.5	825	250	Asymmetrical Path Optic OC	4000	IP65	IK10	4.0	RAL7016 Anthracite Grey Marine Grade	Driver Inc
QUAOC15D	14.2	1,485	500		4000	IP65	IK10	4.0	RAL7016 Anthracite Grey Marine Grade	Driver Inc
QUAST08D	7.5	806	250	Asymmetrical Street Optic ST	4000	IP65	IK10	4.0	RAL7016 Anthracite Grey Marine Grade	Driver Inc
QUAST15D	14.2	1,453	500		4000	IP65	IK10	4.0	RAL7016 Anthracite Grey Marine Grade	Driver Inc





Dimensions





Kingfisher Lighting
Part of the Luceco group of companies


BWB
A CAF GROUP COMPANY