Parcel R, Kingsmere, Bicester

Preferred Homes Bicester Ltd & Countryside (Bicester) Ltd

EXTERNAL IMPACT LIGHTING ASSESSMENT

Cudd Bentley Consulting Ltd.

Ascot Office:
Ashurst Manor, Church Lane,
Sunninghill,
Berkshire,
SL5 7DD
Tel: (01344) 628821

London Office;
12 Devonshire Street,
London,
W1G 7AB
Tel (0203) 393 6446

Solihull Office;
Regus, Central Boulevard,
Blythe Valley Business Park,
Solihull, West Midlands,
B90 8AG
Tel (0121) 711 4343

www.cuddbentley.co.uk

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Cudd Bentley Consulting

CONTENTS

RECORD OF REVISIONS.

Date.	Revision.	Description of change.
08/09/2023	P01	First Issue
11/09/2023	P02	Updated Following Planning Consultant Comments
18/09/2023	P03	Reference made to Parcel R
19/10/2023	P04	Entry Road Luminaires to be meet OOC requirements

1 INTRODUCTION

This report has been provided on behalf of Preferred Homes Bicester Ltd & Countryside (Bicester) Ltd, to review the proposed external lighting scheme at Parcel R, Kingsmere, Bicester.

In support of the development Planning Application, the intent of this report is to provide an External Lighting Assessment of the potential obtrusive light impact to surrounding buildings and the environment within the vicinity.

Where applicable, this document will outline the requirements of mitigation measures to be implemented at design and operational stages to reduce or remove any potential impact.

The potential impact of obtrusive lighting is categorised below:

- Light Spill: The spilling of light beyond the boundary of a property which may cause nuisance to others.
- Glare: The uncomfortable brightness of the light source against a dark background which results in dazzling the observer, which may cause residents and a hazard to road users.
- Sky Glow: The upwards spill of light into the sky which can cause a glowing effect and is often seen above cities when viewed from a dark area.

The site located within the Phase 2 Kingsmere Development is currently unlit with no luminaires installed. Phase 2 Kingsmere is under development to provide a large area of new residential properties. The site to be studied is located to the West of Bicester within the Phase 2 Kingsmere Development where roadways have already been constructed and LED street lighting installed. The surrounding plots of land are all to be developed as residential housing, a park and a primary school.

The luminaires selected will be a combination of column, bollard and wall mounted LED fittings, which are to comply with BREEAM requirements; Pol 04 (Reduction of night time light pollution), ENE 03 (External lighting) & Part L2A of the Building Regulations.

The lighting columns selected along the S38 adoptable access road have been selected to be in accordance with Oxfordshire County Council standard requirements.

The site has been classified as an E3 Environmental zone according to BS EN 12464-2:2014, Lighting of Work Places, Part 2. The table below is taken from BS 12464-2:2014, Table 2 and summarises the classifications of Environmental Zones.

Table 2 — Maximum obtrusive light permitted for exterior lighting installations

Environmental zone	Light on properties		Luminaire intensity		Upward light ratio	Luminance	
	E_v lx		I cd		R_{UL} %	L_b cd·m^{-2}	L_s cd·m^{-2}
	Pre-curfew[a]	Post-curfew	Pre-curfew	Post-curfew		Building facade	Signs
E1	2	0	2 500	0	0	0	50
E2	5	1	7 500	500	5	5	400
E3	10	2	10 000	1 000	15	10	800
E4	25	5	25 000	2 500	25	25	1 000

where

E1 represents intrinsically dark areas, such as national parks or protected sites;

E2 represents low district brightness areas, such as industrial or residential rural areas;

E3 represents medium district brightness areas, such as industrial or residential suburbs;

E4 represents high district brightness areas, such as town centres and commercial areas;

E_v is the maximum value of vertical illuminance on properties in lx;

I is the light intensity of each source in the potentially obtrusive direction in cd;

R_{UL} is the proportion of the flux of the luminaire(s) that is emitted above the horizontal, when the luminaire(s) is (are) mounted in its (their) installed position and attitude, and given in %;

L_b is the maximum average luminance of the facade of a building in cd·m^{-2};

L_s is the maximum average luminance of signs in cd·m^{-2}.

[a] In case no curfew regulations are available, the higher values shall not be exceeded and the lower values should be taken as preferable limits.

2 TERMINOLOGY

Luminaire

Electrical device used to create artificial light, also know as a light or light fitting.

Luminous intensity

Power emitted by a light source in a particular direction, measured in candelas [cd].

Luminous flux

Measure of the amount of visible light from a source, measured in lumens [lm].

Note: one lumen is defined as the luminous flux produced by a light source that emits one candela of luminous intensity over a solid angle of one steradian [lm=cd.sr]

Illuminance

The total luminous flux incident on a surface, per unit area, measured in lux [lx] or lumens per square metre [lm.m-2] or [cd.sr.m-2].

Luminance

The luminous flux emitted per unit area, also measured in lux [lx] or [lm.m-2] or [cd.sr.m-2].

Photometric diagrams

The diagrams below display luminous intensity of the luminaire as a function of direction. An example of a photometric diagram is given in the figure below. The distance from the centre of the diagram to the line corresponds to a luminous intensity value, in this case, measured in candelas per kilo-lumen [cd.klm-1]. The angles on the diagram are the elevation angle, usually denoted as gamma (γ). This angle is shown graphically in figure 2. The red and blue lines on the photometric diagram refers to the luminous intensity of the luminaire in the C= 0° & 180° planes and the C = 90° & 270° planes respectively. These C planes are also shown graphically in figure 2.

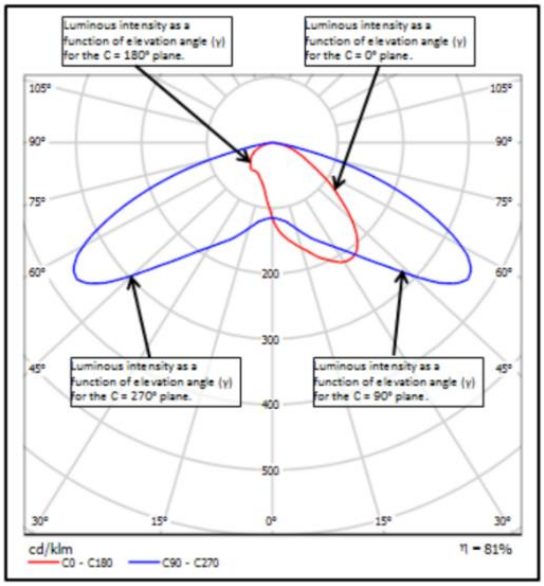


Figure 2

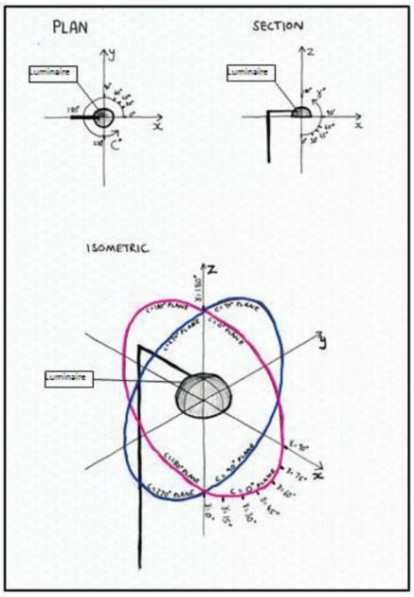


Figure 3

3 RELEVANT POLICY AND GUIDANCE

Legislations

Clean Neighbourhoods and Environment Act (CNEA) 2005

The Clean Neighbourhoods and Environment Act (CNEA) 2005 gives Local Authorities additional powers to deal with artificial lighting by classifying artificial light emitted from defined premises as a statutory nuisance (from April 2006). Guidance produced on Sections 101 to 103 of the CNEA extends the duty on local authorities to ensure their areas are checked periodically for existing and potential sources of statutory nuisances including nuisances arising from artificial lighting. Local authorities must take reasonable steps to investigate complaints of such nuisances from artificial light.

Empowerment to Light Roads - The Highways Act 1980

Section 97 empowers a Highway Authority to provide lighting for any highway or proposed highway for which they are or will be the Highway Authority. District Councils and many Parish or Town Councils also have the power to provide lighting as local lighting authorities.

National Planning Policy

The National Planning Policy Framework 2021

The National Planning Policy Framework (NPPF) encourages good design with planning policies and decisions limiting the effect of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Artificial lighting needs to be considered when a development may increase levels of lighting or would be sensitive to prevailing levels of artificial lighting. Artificial light provides a valuable benefits to society, including opportunities for sport and recreation grounds, and can be essential to a new development. However, for maximum benefit, it is important to get the right light, in the right place and for it to be used at the right time.

Artificial light is not always necessary. It has the potential to produce 'light pollution' or 'obtrusive light', and not all modern lighting is suitable in all locations. It can be a source of annoyance to people, harmful to wildlife and undermine enjoyment of the countryside or the night sky, especially in areas with intrinsically dark landscapes. Intrinsically dark landscapes are those entirely, or largely, uninterrupted by artificial light. National parks and nature reserves can serve as good examples, particularly where they support habitats for native nocturnal animals. The following National Planning Practice Guidance (NPPG) further details the factors relevant to the control of obtrusive light.

Light pollution – (https://www.gov.uk/guidance/light-pollution)

The National Planning Guidance (NPPG) advises how to consider light within the planning systems, focusing mainly on the following:

- When light pollution is relevant to planning
- What factors should be considered when assessing whether a development proposal might have implication for light pollution.
- What factor are relevant when considering where, when and how much light shines.
- What factors are relevant when considering possible ecological effects.

Obtrusive Light and Design Guidance

Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light GN01:2020

This guidance provides measurable design guidance limits and recommendations to ascertain acceptability of obtrusive light levels at nighttime.

CIE – 150:2017 – Guidance on the Limitation of the effects of Obtrusive Light from Outdoor Lighting Installations

The purpose of this guide is to help formulate guidelines for assessing the environmental effects of outdoor lighting. This guide will also recommend limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels. 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 potential adverse effects of outdoor lighting on both natural and man-made environments for people in most aspects of daily life, from residence, sightseers, transport users to environmentalists and astronomers.

BS5489-1: 2020 – Code of practice for the design of road lighting – Part 1: Lighting of roads and public amenity area

This part of BS 5489 gives recommendations on the general principles of road lighting, and its aesthetic and technical aspects, and advises on operation and maintenance.

BS EN 13201-2: 2015 – Road lighting – Part 2: Performance requirements

This part of this European Standard defines, according to photometric requirements, lighting classes for road lighting aiming at the visual needs of road users, and it considers environmental aspects of road lighting.

BS EN 12464-2: 2014 – Lighting of Workplaces – Part 2: Outdoor Work Places

This European standard specifies lighting requirements for outdoor work places, which meet the needs for visual comfort and performance. All usual visual tasks are considered.

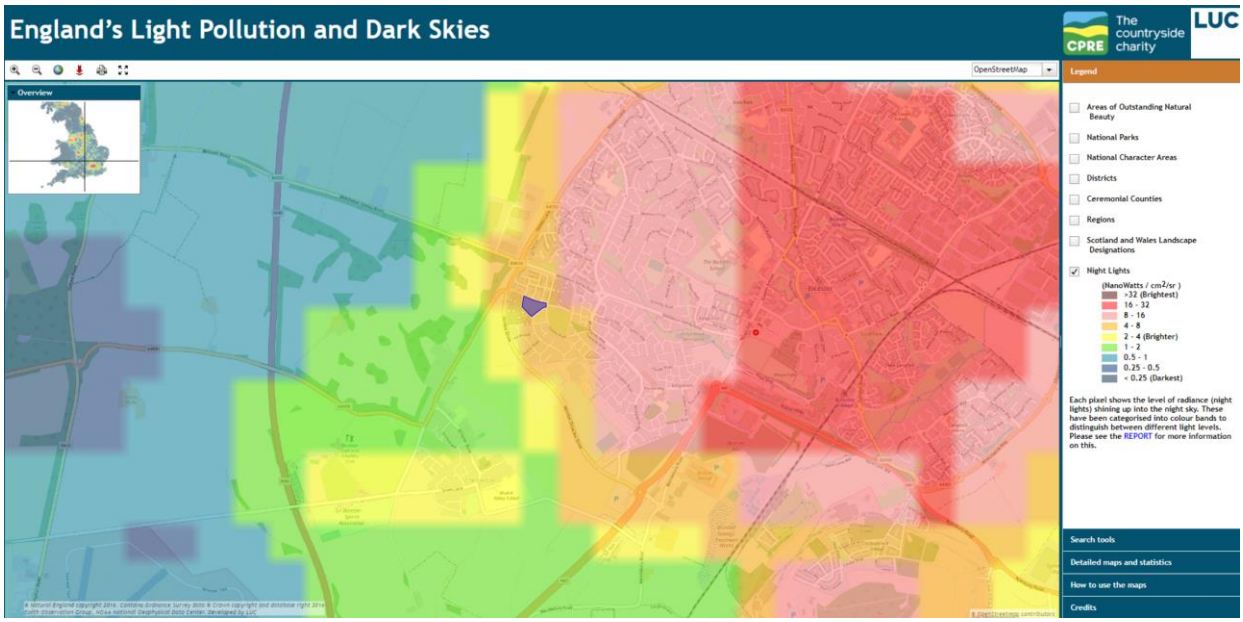
Campaign to Protect Rural England (CPRE) – Night Blight 2017

CPRE – Night Blight data (2017) gives a broad-brush indication of upwards light (sky glow) experienced within the UK. The interactive mapping tool allows specific areas and locations to be assessed with regards to a baseline condition.

4 DARK SKY

The image below shows the satellite Sky Glow overview of Bicester (http://www.nightblight.cpre.org.uk/maps/). The area indicated in blue on the image below is the approximate location of the site. As shown below, the orange shading around the blue site outline identifies the current level of Sky Glow within the development areas.

It can be seen that current levels are at the upper mid-point of the indicated Night Light levels. The external lighting strategy to be employed will ensure recommended Sky Glow limits are not exceeded, or where existing local area Sky Glow levels already exceed recommended limits, then the proposed lighting solution will not produce an exacerbation or worsening of these levels.



5 LUMINAIRE SELECTION AND TYPE

The following luminaires have been selected:

Qty	Range	Mounting Height (m)	Mounting Type	Lamp	Lm/W	LOR %	RA	L2A Compliant	BREEAM Compliant
6	Q-Drome	5m	Column	28w	124.68	100%	70	Yes	Yes
23	Semita Arc	1.8m	Wall	8w	95.73	100%	70	Yes	Yes
3	Kirium Pro 1	5m	Column	23W	173.6	100%	70	Yes	Yes
27	PIXOL150 Oneway	0.7m	Bollard	10w	58.00	100%	70	Yes	Yes

6 LUMINAIRE CONTROL PHILOSOPHY

A combination of photocells & timeclocks shall be installed to control all external lighting. The time clocks will act as a master control and be set to switch off at times when the development is not in operation. Outside of these hours photocells will control the site external lighting according to day light levels. This will prevent night time lighting pollution and to comply with POL 04/L2A.

7 ECOLOGICAL MITIGATION MEASURES

The Preliminary Ecological Assessment accompanying the application indicates a low presence of a Bat activity on the plot. As precautionary mitigating measures, the minimisation of illumination to vegetated boundaries, together with the utilisation of a warmer colour temperature of 3000 degrees kelvin shall be implemented where feasible. This is thought to be less impactful to the bats and is the preferred correlated colour temperature in accordance with the 'ILP Bat Conservation Trust Guidance note 08/18'.

8 ASSESSMENT SUMMARY MATRIX

Effect/Description	Mitigation	Calculation Results
Light Intrusion: Light intrusion from the site to surrounding residential areas.	All luminaires will be fitted with suitable optics to limit excessive emissions on the horizontal plane.	The Light Trespass at the site has been calculated. This is below the maximum permitted level of Light Intrusion for an Environmental Zone deemed to be E3.
Sky Glow: Brightening of the night sky	All Luminaires will be fitted with horizontal cut off optics to minimise upward light spill.	The sky glow achieved at the site is 0%. This is below the maximum permitted level of sky glow for an Environmental Zone deemed to be E3.
Luminaire Intensity: Glare, the uncomfortable brightness of light against a dark back ground	Lighting design will comply with the relevant limits on lighting intensity.	Luminaire Intensity (Pre and Post curfew) at the site has been calculated as 37. This is below the maximum permitted levels of luminaire intensity for an Environmental Zone deemed to be E3.

9 CONCLUSION

Relevant polices have highlighted that it is necessary to both ensure sufficient lighting is provided for security and working purposes, and also to ensure that light spillage from the site is minimised.

Guidance from relevant institutions has been used to set design lux levels at the levels for the scheme. As the site is classified as an E3 environmental zone, external lighting calculations have been carried out to achieve the correct lux levels for this site, taking into consideration, light pollution, surrounding the premises and other aspects.

The proposed lighting will be switched via a combinations of photocells & timeclocks. The time clocks will act as a master control and be set to set off at times when the development is not in operation. In addition, for security purposes, some lighting may be required to stay on throughout the night although this would be kept to a minimum.

The proposed luminaires used to carry out external lighting calculations are LED. Utilising LED luminaires helps reduce light pollution and can reduce the overall power consumption by 40-60%.

Criteria set by the Institute of Lighting Professionals regarding limiting obtrusive light will be met, these criteria are:

	ILP Guideline	Calculated Achieved
Sky Glow	< 5%	0%
Light Intrusion	Pre-Curfew < 10 Lux Post-Curfew < 2 Lux	0 Lux 0 Lux
Luminaire Intensity	Pre-Curfew < 10,000 candelas. Post-Curfew <10,000 candelas.	37 candelas 37 candelas

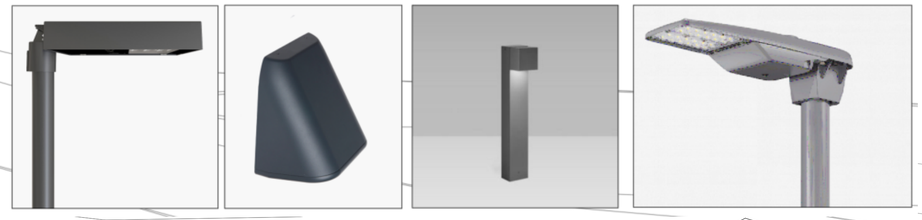
In summary, it has been ensured that the entire proposed lighting scheme meets the minimum levels for security and working purposes while also meeting the post curfew requirements for a relatively dark urban area.

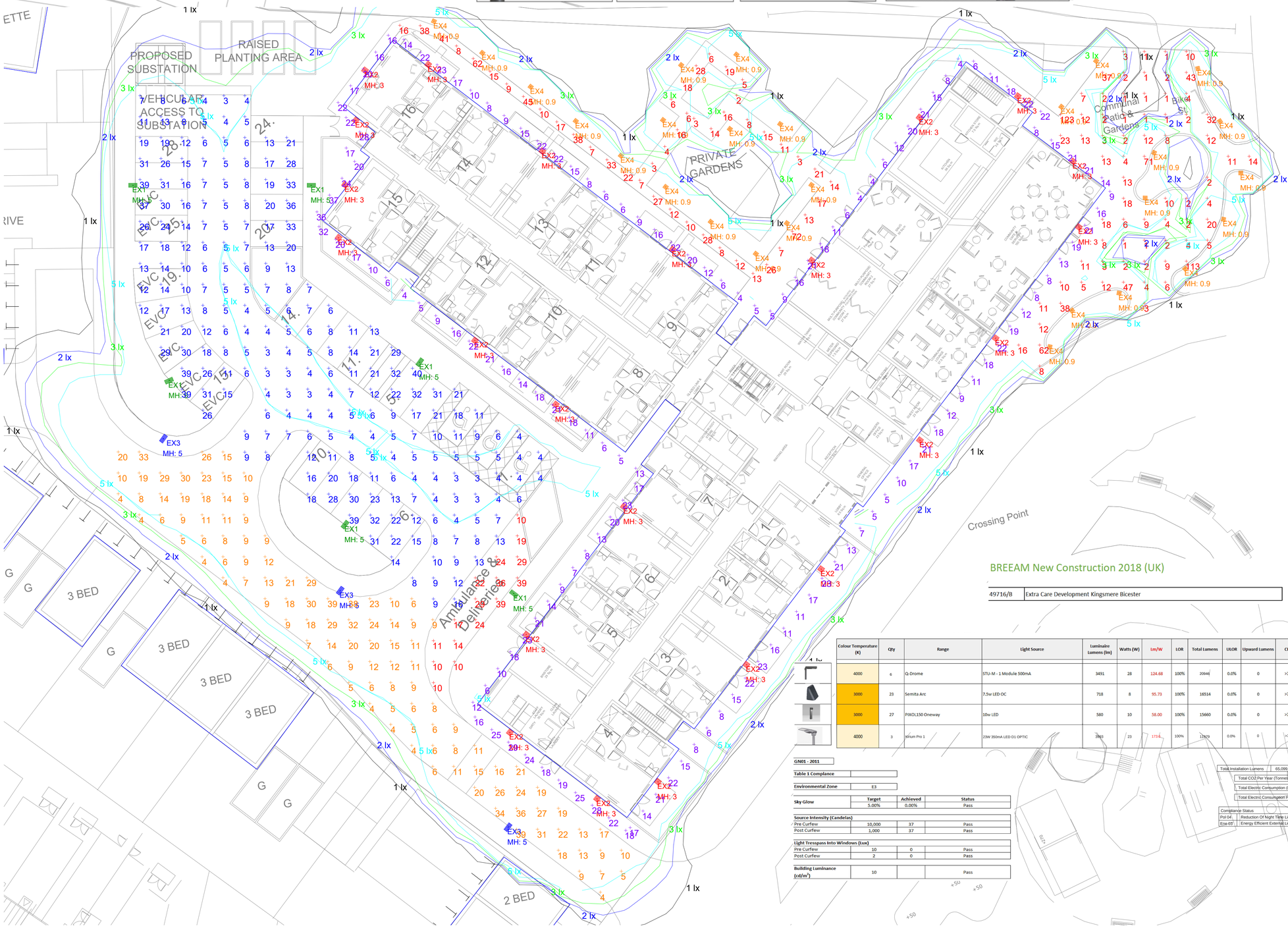
10 APPENDICES

10.1 LIGHTING DESIGN

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Description	Lum. Lumens	LLF
	6	EX1	SINGLE	28w (1 module) 500mA Q-Drome with STU-M Optic column mounted at 5m.	3491	0.900
	27	EX4	SINGLE	PIXOL150 10w 3000K 580lm one way	580	0.900
	23	EX2	SINGLE	7w LED 3000k Semita Arc bulkhead with cycle optic wall mounted at 3m	781	0.900
	3	EX3	SINGLE	23w LED 350mA 4000k Kirium Pro 1 D1 Optic	3993	0.900

Calculation Summary								
Label	CalcType	Units	Avg	Max	Min	Uniformity	Diversity
Ambulance & Deliveries	Illuminance	Lux	21.44	39	10	0.47	0.26
Building Perimeter	Illuminance	Lux	15.22	37	4	0.26	0.11
Car Park	Illuminance	Lux	12.12	40	3	0.25	0.08
Communal Patio & Gardens	Illuminance	Lux	13.60	123	1	0.07	0.01
Entrance Road	Illuminance	Lux	14.36	39	4	0.28	0.10
Nearby Residential Houses 1_Cd_S	Obtrusive - Cd	N.A.	5.57	16	0	0.00	0.00
Nearby Residential Houses 1_III_	Obtrusive - III	Lux	0.00	0	0	N.A.	N.A.
Nearby Residential Houses 2_Cd_S	Obtrusive - Cd	N.A.	6.64	28	2	0.30	0.07
Nearby Residential Houses 2_III_	Obtrusive - III	Lux	0.00	0	0	N.A.	N.A.
Nearby Residential Houses 3_Cd_S	Obtrusive - Cd	N.A.	8.80	37	2	0.23	0.05
Nearby Residential Houses 3_III_	Obtrusive - III	Lux	0.00	0	0	N.A.	N.A.
Private Garden Footpath	Illuminance	Lux	17.68	72	2	0.11	0.03





NOTES

BREEAM New Construction 2018 (UK)

49716/B	Extra Care Development Kingsmere Bicester

Colour Temperature (K)	Qty	Range	Light Source	Luminaire Lumens (lm)	Watts (W)	Lm/W	LOR	Total Lumens	ULOR	Upward Lumens	CRI	** ART Hour Per Day	CO^2 (Tonnes)	Kw/Hour
4000	6	Q-Drome	STU-M - 1 Module 500mA	3491	28	124.68	100%	20946	0.0%	0	>70	12	0.22	735.84
3000	23	Semita Arc	7.5w LED OC	718	8	95.73	100%	16514	0.0%	0	>70	12	0.16	755.55
3000	27	PIXOL150 Oneway	10w LED	580	10	58.00	100%	15660	0.0%	0	>70	12	0.25	1182.60
4000	3	Kirium Pro 1	23W 350mA LED D1 OPTIC	3993	23	173.6	100%	11979	0.0%	0	>70	12	0.06	302.22

CO^2 Calculation For A Year

Total Installation Lumens	65,099
Total Upward Light	0.00%
Total CO2 Per Year (Tonnes)	0.69
Total Electric Consumption (Kw)	0.69
Total Electric Consumption Per Year (Kwh)	2976.21

Compliance Status		
Pol 04	Reduction Of Night Time Light Pollution	Pass
Ene 07	Energy Efficient External Lighting	Pass

GN01 - 2011			
Table 1 Compliance			
Environmental Zone	E3		
Sky Glow	Target	Achieved	Status
	5.00%	0.00%	Pass
Source Intensity (Candelas)			
Pre Curfew	10,000	37	Pass
Post Curfew	1,000	37	Pass
Light Trespass Into Windows (Lux)			
Pre Curfew	10	0	Pass
Post Curfew	2	0	Pass
Building Luminance (cd/m^2)	10		Pass

Revision	Description	Drawn By	Engineer	Approved	Date
P01	EXTERNAL LUX LEVELS	OS	GA	GA	19-10-23

Cudd Bentley Consulting

www.cuddbentley.co.uk

Cudd Bentley Consulting Ltd, Ashurst Manor Church Lane Ascot Berkshire SL5 7DD
(t) 01344 62 8821 (e) info@cuddbentley.co.uk

Cudd Bentley Consulting Ltd, Suite 1 Shelly Crescent Centre 20 Farmhouse Way Solihull B90 4EH
(t) 0121 711 4343 (e) info@cuddbentley.co.uk

Cudd Bentley Consulting Ltd, 12 Devonshire Street London W1G 7AB
(t) 0203 393 6446 (e) info@cuddbentley.co.uk

PRELIMINARY

Client

PREFERRED HOMES LIMITED

Project/Site Location

BICESTER CARE HOME
KINGSMERE, BICESTER

Drawing Title

EXTERNAL LUX LEVELS

Scale	Size	Drawn By	Engineer	Approved	Date
NTS	A1	OS	GA	GA	19-10-23

Drawing Reference

6609-CBC-00-00-DR-E-63007

Revision

P01

File Location: C:\Users\charlie.stokes\Documents\Drawing3.dwg

10.2 LUMINAIRE TYPE EX1 – Q-DROME WITH STU-M OPTIC

Efficienza.
Efficiency.

Affidabilità.
Reliability.

Q-DROME è un apparecchio progettato da AEC con le **più recenti tecnologie** per ottenere performance illuminotecniche di alto livello.

La serie è disponibile con numerose ottiche di tipo **asimmetrico** per ogni tipo di applicazione urbana e stradale.

Il corpo compatto, realizzato interamente in **alluminio pressofuso** a basso contenuto di rame, garantisce un'elevata resistenza meccanica, buone prestazioni termiche e massima affidabilità dei componenti elettronici.

Q-DROME *is a luminaire designed by AEC with the best technologies in order to obtain the best performance.*

The series is available with asymmetrical optics for each type of urban and street applications.

The body is made by die-cast aluminium with low copper content which assure high mechanical resistance, good thermal performance and maximum reliability of electronic components.

Q-DROME

Ready for Smart Cities.

Q-DROME

Q-DROME rappresenta la soluzione vantaggiosa per qualsiasi progetto di illuminazione urbana e stradale garantendo qualità e prestazioni, con ridotta manutenzione.

Inoltre, grazie alla predisposizione per **AEC Smart Node**, l'apparecchio può essere integrato in **AEC Smart System** per una città che guarda al futuro e al risparmio energetico.

Q-DROME *is the advantageous solution for any urban and street lighting project, that guarantees high quality and performance, with reduced maintenance.*

Thanks to the predisposition for AEC Smart Node, it is possible to integrate Q-DROME in AEC Smart System for a city that looks to the future and to energy saving.

Smart System

VERSIONE TESTA PALO
POST-TOP VERSION

Q-DROME è predisposto di **attacco universale per installazioni a braccio o testa palo.** L'attacco è disponibile per pali da ø33-60mm o in opzione ø76mm, con possibilità di regolazione dell'inclinazione ogni 5°.
L'apparecchio è ispezionabile tramite l'apertura del vetro. Quattro molle in acciaio, di semplice apertura, consentono l'accessibilità alle parti elettriche e al sistema ottico.

Q-DROME *has a universal fixing for bracket and post top installations.*
The universal fixing is suitable for poles of ø33-60 or optional ø76mm, with inclination every 5°. The luminaire can be inspected by opening the glass. Four steel springs, of simple opening, allow the opening/closing of the glass reaching the electrical parts and the optical group.

VERSIONE A MURO
WALL VERSION

Q-DROME può essere installato con attacco a muro ad inclinazione variabile (versione AM).

Q-DROME *can be installed on the wall with adjustable inclination* (*AM version*).

Unconventional luminaires.

Q-DROME

CARATTERISTICHE
CHARACTERISTICS

Sistema ottico modulare.
Modular optical system.

Temperatura di colore sorgente LED:
4000K (3000K in opzione).
LED light source colour temperature 4000K (3000K for option).

Sistema ottico PIXLED con riflettore in alluminio.
PIXLED optical module with aluminium reflector.

Schermo di protezione in vetro piano temperato.
Protection screen in flat tempered glass.

CRI ≥70

Grado di protezione IP66.
Protection degree IP66.

Resistenza meccanica IK08.
Mechanical resistance IK08.

Classe di isolamento: I - II.
Insulation class: I - II.

Alimentazione: 220÷240V - 50/60Hz.
Power supply: 220÷240V - 50/60Hz.

Corrente LED: 400/500mA.
LED current: 400/500mA.

Fattore di potenza: > 0.95 (a pieno carico F, DA, DAC).
Power factor: > 0.95 (at full load, F, DA, DAC).

Protezione sovratensioni fino a 10kV.
Overvoltage protection up to 10kV.

Consultare la scheda tecnica nel sito web per i dati aggiornati.
Please check the last updated product sheet in our website.

OPZIONI DI DIMMERAZIONE
DIMMING OPTIONS

F: Fisso non dimmerabile.
Fixed power not dimmable.

DA: Dimmerazione automatica (mezzanotte virtuale) con profilo di default.
Automatic dimming (virtual midnight) with default profile.

DAC: Profilo DA custom.
DA custom profile.

FLC: Flusso luminoso costante.
Constant light flux.

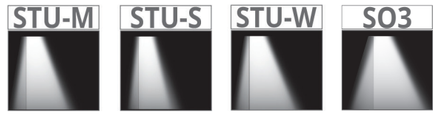
WL: Sistema di comunicazione punto/punto ad onde radio.
Wireless single point communication system.

DALI: Interfaccia di dimmerazione digitale DALI.
Digital dimming interface DALI.

NEMA: Presa 7 pin (ANSI C136.41).
Socket 7 pin (ANSI C136.41).

ZHAGA: Presa 4 pin (Book 18).
Socket 4 pin (Book 18).

OTTICHE
OPTICS



COLORE
COLOUR

GRAFITE 01
Graphite 01

MATERIALI
MATERIALS

Corpo in alluminio pressofuso a basso contenuto di rame per una maggiore protezione alla corrosione in ambienti marini. Verniciato a polveri poliestere.
Vetro piano temperato spessore 5mm. Ganci di chiusura in acciaio INOX.

Die casting aluminium body with low copper content for high protection against aggressive marine environment. Highly transparent tempered glass thickness 5mm. Powder coated. Stainless steel closure springs.

INSTALLAZIONE
INSTALLATIONS

TP/BR Attacco universale testa palo o braccio ø33-ø60mm in opzione attacco ø76mm.
AM Attacco a muro

TP/BR *Post-top fixing or bracket ø33-ø60mm in option fixing ø76mm.*
AM *Wall mounting*

MANUTENZIONE
MAINTENANCE

Gruppo ottico e cablaggio rimovibile. Apertura vano cablaggio e vano ottico con attrezzi di uso comune.

Removable optical and gear tray compartment. Opening wiring harness and optical compartment with commonly used tools without sealed parts with adhesives.

PESO E DIMENSIONE
WEIGHT AND DIMENSIONS

365x305X75mm - 5.2kg
Superficie esposta laterale max 0.03m² - pianta 0.11 m²

365x305X75mm - 5.2kg
Lateral surface exposed max 0.03m² - plant max 0.11m²

COLORE
COLOUR

Verniciatura corpo con polveri poliestere **grafite cod. 01**.
Protezione alla corrosione: 1500hr nebbia salina ISO 9227.

Powder coating graphite cod. 01.
Corrosion protection: 1500hr saline fog ISO 9227.

TEMPERATURA OPERATIVA
OPERATING TEMPERATURE

- 40°C + 50°C

ALIMENTATORE
POWER SUPPLY

Alimentatore in doppio isolamento. Protezione al corto circuito, circuito aperto, sovratemperatura, sovraccarico. Interfaccia 1-10V (in opzione DALI). FLC flusso luminoso costante (opzionale).

Double insulation power supply. Protection against short circuit, open circuit, overtemperature, overload. 1-10V interface (optional DALI). FLC constant luminous flux (optional).

INGRESSO RETE
CABLE ENTRY

Per cavi sez. max 4mm² (versioni con sezionatore opzionale).

For cables sec. max 4mm² (versions with on-load switch optional).

NORME
STANDARDS

EN 60598-1, EN 60598-2-3, EN 62471, EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3.

PROTEZIONE SOVRATENSIONI
OVERVOLTAGE PROTECTION

Protezione fino a 10kV a modo comune e differenziale. SPD (Opzionale) 10kV-10kA, type II, completo di LED di segnalazione e termofusibile per disconnessione del carico a fine vita.

Overvoltage protection up to 10kV in common and differential mode. SPD (Optional) 10kV-10kA, type II, provided with LED signalling and thermal fuse for end-of-life load disconnection.

VITA GRUPPO OTTICO
OPTICAL UNIT LIFETIME

≥100.000hr L90B10 **Tq=25°C, 500mA**
≥100.000hr L90, TM-21 **Tq=25°C, 500mA**

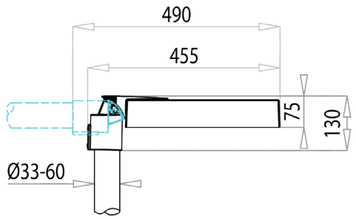
TP BR

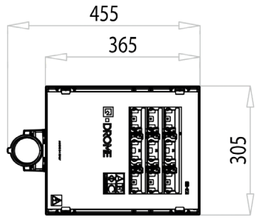
TESTA PALO E BRACCIO

Installazione di Q-DROME con **attacco universale** per testa palo e braccio, su pali da ø33-60mm. Regolazione dell'inclinazione ogni 5°.

POST-TOP AND BRACKET

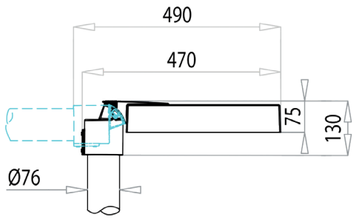
Installation of Q-DROME with universal fixing for post top and bracket, on poles of ø33-60mm. Regulation of inclination every 5°.





In opzione attacco universale per testa palo e braccio ø76mm. Regolazione dell'inclinazione ogni 5°.

Optional *universal fixing for post top and bracket ø76mm. Regulation of inclination every 5°.*



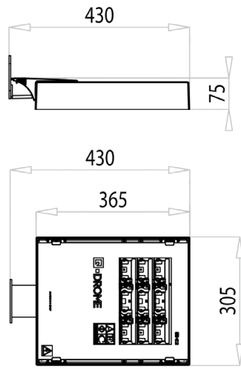
AM

ATTACCO A MURO

Installazione di Q-DROME con attacco a muro ad angolazione regolabile.

WALL MOUNTING

Installation of Q-DROME with wall fixing of adjustable inclination.



Q-DROME

L'apparecchio si integra perfettamente in ogni contesto architettonico.

The luminaire perfectly integrates with every architectural contexts.

10.3 LUMINAIRE TYPE EX2 – SEMITA ARC BULKHEAD

Kingfisher Lighting

Part of the Luceco plc group of companies

Datasheet

SEMITA Arc

Product Description

Bring style and functionality to your schemes with SEMITA Arc.

Specification Text

The SEMITA Arc shall be manufactured from high-pressure die-cast aluminium and powder coated with a RAL 7016 Anthracite Grey marine grade finish. It shall have a power output ranging between 7.5 - 13.2W, with an efficacy from 101 - 116lm/W. It shall deliver 755 - 1,615 luminaire lumens. The SEMITA Arc has a range of different optics to suit narrow, medium and wide paths with a fully programmable DALI driver. Available in 2700K and 4000K, the luminaire shall be IK10 and IP66 rated with 3 hour integral emergency back-up and self-test options available.

Specification

Weight: 3.4kg

Material: Die-cast Aluminium

Paint finish: RAL7016 Anthracite Grey Finish

Embodied Carbon: 58 kg CO^2e

Key Features

- 7.5 - 13.2W
- 755 - 1,615 Luminaire Lumens
- Efficacy up to 116.0 lm/W
- 4000K, CRI >70
- Lifetime >100,000hr >80

Kingfisher Lighting

Part of the Luceco plc group of companies

LED | IP66 | IK09 | DIM | Control Compatible

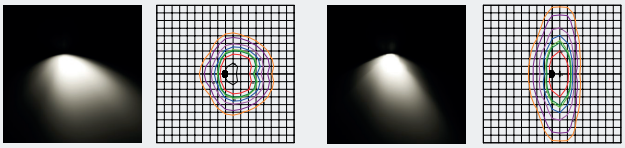
Mounting Options

- Wall Mount

Other Options

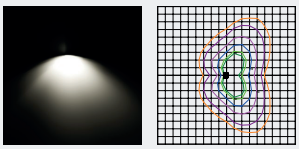
- Part Night Dimming
- Colour Temperature Option
- Emergency Option
  Contact for details

Optics



Asymmetric Flood Optic

Asymmetric Path Optic



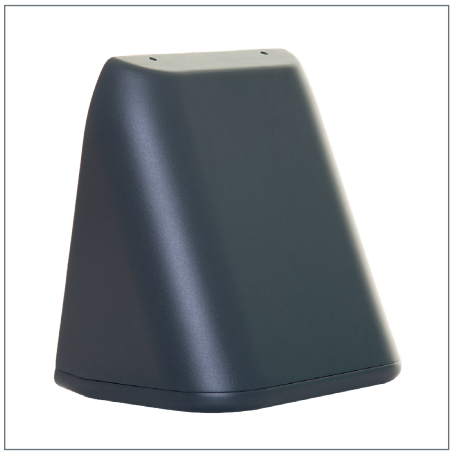
Asymmetric Street Optic

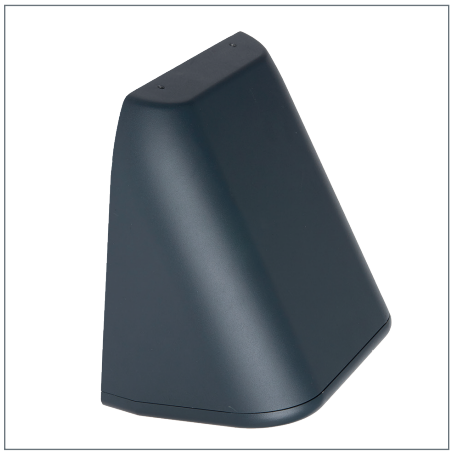
ida DARK SKY APPROVED by the International Dark-Sky Association darksky.org

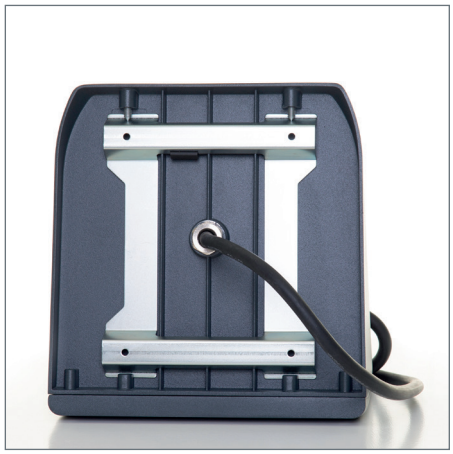
DESIGNED & ENGINEERED IN THE UK

Circular Economy Score	
0 to 0.5	Very poor circular economy performance
0.5 to 1.5	Some circular economy functionality
1.5 to 2.5	Definite/ substantial progress to circularity
2.5 to 4.0	Excellent circularity

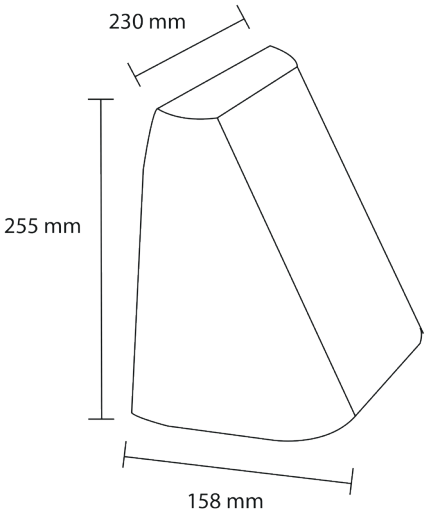
Code	Power	Luminaire Lumens	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included
SEMAFL08D	7.5	836	250	Asymmetrical Flood Optic (FL)	4000	IP66	IK09	3.4	RAL7016 Anthracite Grey	Driver Inc
SEMAFL13D	13.2	1,615	500		4000	IP66	IK09	3.4	RAL7016 Anthracite Grey	Driver Inc
SEMAOC08D	7.5	780	250	Asymmetrical Path Optic (OC)	4000	IP66	IK09	3.4	RAL7016 Anthracite Grey	Driver Inc
SEMAOC13D	13.2	1,515	500		4000	IP66	IK09	3.4	RAL7016 Anthracite Grey	Driver Inc
SEMAST08D	7.5	755	250	Asymmetrical Street Optic (ST)	4000	IP66	IK09	3.4	RAL7016 Anthracite Grey	Driver Inc
SEMAST13D	13.2	1,475	500		4000	IP66	IK09	3.4	RAL7016 Anthracite Grey	Driver Inc







Dimensions



Kingfisher Lighting
Part of the Luceco group of companies

10.4 LUMINAIRE TYPE EX3 – DW WINDSOR – KIRIUM PRO 1

DW Windsor

Kirium Pro

Design Guide

Comprehensive LED lighting,
from 320 – 46100lm

AUGUST 2019

How to specify | Luminaire specification | Optical control | Photometry | Installation & maintenance | UMS | Product codes

Contents

Welcome

An introduction to this guide

Thank you for considering Kirium Pro. In this guide you will find in-depth technical information and guidelines, intended to help during the design phase of your project.

Further information and support

Please visit **dwwindsor/kirium-pro**
call **01992 474600** or email
light@dwwindsor.com

How to specify Kirium Pro

To specify state:

Comprehensive range of LED road and street lighting luminaires comprising four sizes with extensive optical and lumen packages from 320 - 46100lm.

23 lighting distributions for precise lighting control. Lift-off head with automatic power disconnection for safe, simple installation and maintenance. Fit for the future; compatible with all leading CMS products and able to accommodate SmartCity equipment and new Zhaga compliant sensor receptacle sockets.

Luminaire manufactured from a high pressure die-cast aluminium, finished in a high quality polyester powder-coated paint.

Range of mounting options to allow for Ø34-60mm side entry and Ø60-76mm direct post with the ability to adjust the inclination between -15° to +15° in 5° increments clearly marked on the exterior of the product.

Available with anti-glare shields (front, rear and side) which can be fitted post-installation without opening the luminaire.

ENEC certified.

Comparable products for HID replacements

The table below gives guideline options for narrowing down potential one-for-one replacement options for standard lamp type solutions using the Kirium Pro range.

Lamp type	Connected load	Lamp lumens	Approx. comparable LED lumens*	Kirium Pro alternative	Energy saving
35W SOX	65W	4450	2447	16LED @ 300mA - 14W	**78%**
55W SOX	74W	7800	4290	16LED @ 550mA - 26W	**65%**
90W SOX	130W	14000	7700	24LED @ 750mA - 49W	**62%**
135W SOX	190W	22600	11798	48LED @ 550mA - 70W	**60%**
180W SOX	246W	32000	17600	64LED @ 650mA - 108W	**56%**
50W SON-T+	69W	4400	2860	16LED @ 350mA - 17W	**75%**
70W SON-T+/CDO-TT	78W	6600	4290	16LED @ 550mA - 26W	**69%**
100W SON-T+/CDO-TT	112W	10700	6955	24LED @ 750mA - 49W	**60%**
150W SON-T+/CDO-TT	165W	17500	12689	48LED @ 600mA - 76W	**61%**
250W SONT+/CDO-TT	285W	33200	21580	64LED @ 800mA - 134W	**55%**
45W CPO-TW	52W	4950	3217	16LED @ 450mA - 21W	**60%**
60W CPO-TW	66W	7200	4680	16LED @ 650mA - 30W	**55%**
90W CPO-TW	96W	10450	6792	24LED @ 650mA - 42W	**58%**
140W CPO-TW	164W	16500	10725	32LED @ 800mA - 70W	**55%**

* based on assumed luminaire LOR of 75% and improved maintenance factor of LED over traditional lamps

Lumen packages and wattages matrix

The same lumen packages can be achieved in a number of ways, dependant on your driving factors. For the lowest capital cost choose the fewest LEDs, run at a higher output. For the most efficient option, with reduced lifetime costs, choose more LEDs and run at a lower drive current.

Product	Number of LEDs	Lumens	Power	Energy saving
Kirium Pro 1 or 2	32 @ 900mA	11535	79W	
Kirium Pro 2	48 @ 550mA	11447	70W	11%
Kirium Pro 2 or 3	64 @ 400mA	11343	66W	16%

Please see table below highlighting the most efficient options from the table above.

The table below provides base lumen packages for the new Kirium Pro range. Calculations based on 4000K with no LOR applied. Due to continuous development of LEDs the figures within this table are subject to change at any time. See page 6 for details on how to generate further data.

	Number of LEDs		Drive current (mA)																
			200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Kirium Pro Mini	4	lm	385	484	578	669	759	844	930	1012	1095	1172	1249	1323	1399	1470	1540	1606	1674
		W	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	14	15
Kirium Pro 1*	8	lm	770	967	1156	1337	1517	1687	1858	2024	2189	2343	2497	2648	2798	2939	3080	3214	3348
		W	6	7	8	9	10	11	12	14	15	16	18	19	20	22	23	25	26
	16	lm	1516	1890	2263	2616	2969	3303	3637	3961	4285	4586	4887	5128	5477	5753	6028*	6291*	6554*
		W	10	12	14	17	19	21	23	26	28	30	33	35	37	40	42*	45*	47*
	24	lm	2314	2885	3455	3993	4531	5024	5217	5985	6475	6896	7338	7750	8160	8757	8944	9294	9642
		W	14	17	20	23	27	30	33	36	39	42	46	49	53	56	60	63	67
Kirium Pro 2	32	lm	2901	3615	4330	5005	5680	6320	6958	7578	8198	8775	9351	9915	10480	11008	11535	12037	12540
		W	19	23	27	31	35	39	43	48	52	56	61	65	70	75	79	84	89
	48	lm	4382	5462	6541	7561	8581	9546	10511	11447	12383	13254	14125	14978	15830	16628	17424	18183	18942
		W	27	33	39	45	51	57	64	70	76	82	89	95	102	109	116	123	131
	64	lm	5793	7218	8645	9995	11343	12618	13893	15125	16369	17521	18671	19798	20925	21978	23031	24035	25038
		W	35	42	50	58	66	74	82	91	99	108	116	125	134	142	151	160	168
Kirium Pro 3	80	lm	6977	8696	10414	12040	13664	15200	16735	18227	19719	21106	22493	23850	25208	26476	27744	28953	30162
		W	45	55	65	75	86	96	106	117	127	138	149	160	171	182	193	205	216
	96	lm	8173	10186	12199	14102	16006	17806	19604	21351	23098	24724	26348	27938	29528	31015	32500	33916	35332
		W	53	65	77	89	101	113	126	139	151	164	177	190	203	216	229	242	255
	128	lm	17841	22235	26629	27766	28903	30138	31372	32712	34052	35506	36960	38539	40117	41181	42911	44554	46109
		W	70	85	101	116	132	148	164	181	197	214	231	248	265	282	300	317	335

*only applies to Kirium Pro 1 16LED

Lumen packages - guide

We provide a wide range of LED quantities and drive currents to give designers choice. As a result, there are a number of options which provide similar lumen packages across the range; the table below shows which Kirium Pro options deliver the most cost effective solution versus the most energy efficient.

Required lumen package	Lowest capital cost option	Lowest energy consumption option
1,000	Kirium Pro Mini / 4 LEDs / 550mA	Kirium Pro Mini / 4 LEDs / 550mA
2,500	Kirium Pro Mini / 8 LEDs / 700mA	Kirium Pro 1 / 24 LEDs / 250mA
3,000	Kirium Pro Mini / 16 LEDs / 400mA	Kirium Pro 1 / 24 LEDs / 300mA
4,500	Kirium Pro Mini / 16 LEDs / 650mA	Kirium Pro 1 / 32 LEDs / 350mA
5,000	Kirium Pro 1 / 24 LEDs / 550mA	Kirium Pro 2 / 48 LEDs / 250mA
7,000	Kirium Pro 1 / 24 LEDs / 700mA	Kirium Pro 2 / 64 LEDs / 300mA
10,000	Kirium Pro 1 / 32 LEDs / 800mA	Kirium Pro 3 / 96 LEDs / 300mA
12,000	Kirium Pro 2 / 48 LEDs / 600mA	Kirium Pro 3 / 96 LEDs / 350mA
15,000	Kirium Pro 2 / 48 LEDs / 750mA	Kirium Pro 3 / 128 LEDs / 200mA
20,000	Kirium Pro 2 / 64 LEDs / 800mA	Kirium Pro 3 / 128 LEDs / 300mA
25,000	Kirium Pro 3 / 80 LEDs / 800mA	Kirium Pro 3 / 128 LEDs / 400mA
30,000	Kirium Pro 3 / 96 LEDs / 700mA	Kirium Pro 3 / 128 LEDs / 650mA
35,000	Kirium Pro 3 / 128 LEDs / 700mA	Kirium Pro 3 / 128 LEDs / 800mA

Note: The examples shown above are based on using a D1 optic and 4000K colour temperature product

Colour temperature

In order to account for the reduction in lumen packages caused by warmer colour temperatures, the following reduction factors can be applied to the base lumen packages;

Colour temperature	Light output reduction factor
2700K	0.76
3000K	0.84
3500K	0.9
4000K	1.0

Glare ratings

For the Kirium Pro range, each Diamond+ Optic has a different glare rating. See the table below for each optic setting and applicable G rating;

A Optic	G Rating
A1	None
A2	G3
A3	G3
A4	G3
A5	None

B Optic	G Rating
B1	G3
B2	G3
B3	G3
B4	G3
B5	G4

C Optic	G Rating
C1	G6
C2	G3
C3	G6
C4	G6
C5	G4

D Optic	G Rating
D1	None
D2	G3
D3	G3
D4	G2
D5	None

Z Optic	G Rating
ZR	G6
ZL	G6
ZF	None

Note: All versions of Kirium Pro have a zero LOR above the horiztonal plane

Optical control

Introducing Diamond+

The new Kirium Pro range comes with a wide range of optical solutions for ultimate flexibility in scheme design and precise control of light distribution.

Diamond+ A optic

Applications
Wide road

What does this cover?
- >14m overall road widths
- M class lighting solutions
- Higher P class solutions
- Dual carriageways

Options

A1 A2 A3 A4 A5

Diamond+ B optic

Applications
Footpath

What does this cover?
- <4m overall road widths
- Footpath
- Cycle path
- Platform lighting

Options

B1 B2 B3 B4 B5

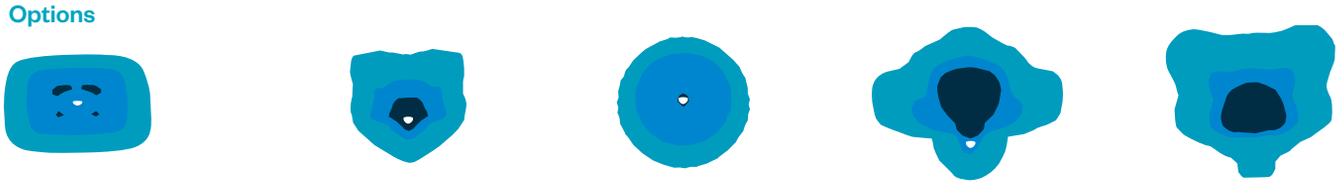
Optical control

Diamond+ C optic

Applications
Area

What does this cover?
- Car parks
- Open areas
- Perimeter lighting
- Public realm spaces

Options



C1 C2 C3 C4 C5

Diamond+ D optic

Applications
Standard road

What does this cover?
- <14m overall road widths
- Road and residential applications
- Single carriageways
- P class solutions

Options

D1 D2 D3 D4 D5

Diamond+ Z optic

Applications
Pedestrian crossing

What does this cover?
- Pedestrian crossings
- Zebra crossings

Options

ZR ZL ZF

Photometry

Understanding photometric data

DW Windsor has recently simplified our photometric data codes. All photometry now features a consistent naming format: to give designers detailed product information within the code itself.

Example naming format:	Product variant	LED quantity	Drive current	Colour temperature	Total luminaire circuit watts	Diamond+ optic setting
Example data code:	Kirium Pro 1	16 LED	1000mA	3K	50W	A1

Optical centres

In order to be able to use the Kirium Pro range within lighting design software, it can be useful to understand the distance from the back of the product to the optical centre of the luminaire. This distance can be applied to the outreach information so the lighting design software is adjusted to suit the actual site application of the product.

For instance, a luminaire being installed on a 1m bracket arm which has a distance of 550mm to the optical centre would have an overall over reach of 1.55m for use in design software.

The table below shows the additional distances to be applied;

Product	Dimension (mm)
Kirium Pro Mini	310
Kirium Pro 1	490
Kirium Pro 2	550
Kirium Pro 3	740

S/P ratios

What is an S/P ratio?

Our eyes respond differently at daytime and night-time lighting levels. These are commonly referred to as Photopic (day) and Scotopic (night) responses. For any artificial light source, the ratio between these outputs is fixed and independent of the intensity of that source.

When utilising LED light sources for street lighting applications, new lighting standards allow for a reduction in the illumination levels required to meet the same perceived light level. The level of illumination required on subsidiary roads and paths may be reduced if the light source has a colour rendering index of 60Ra or higher.

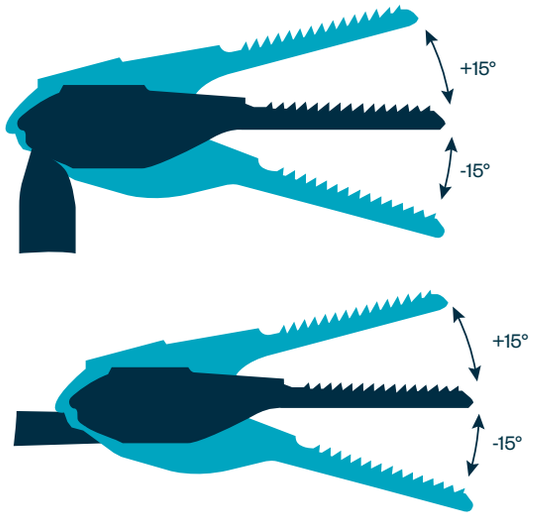
For the Kirium Pro range, the following SP ratios apply;

Colour temperature	SP ratio
2700K	1.2
3000K	1.3
3500K	1.4
4000K	1.5

For further information on understanding S/P ratios visit our blog

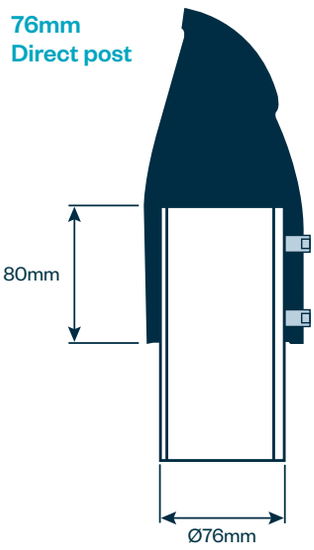
Inclination options

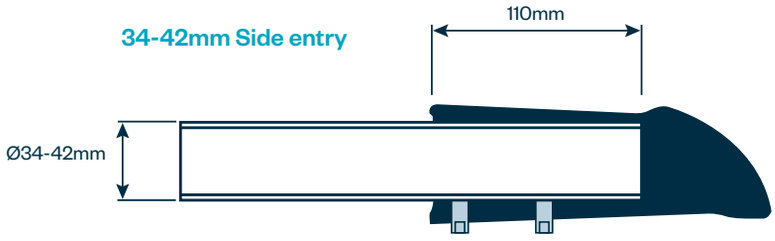
The Kirium Pro range is suitable for inclinations anywhere between -15° and +15° in easily identifiable 5° steps, clearly marked on the exterior of the luminaire. This can be achieved without opening the product with no compromise to the products IP rating.

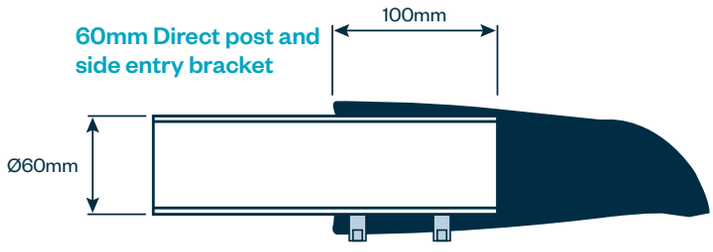


Entry spigot details

The details shown below confirm the amount of bracket entering each spigot entry type. Also detailed is the length of entry into each spigot option.

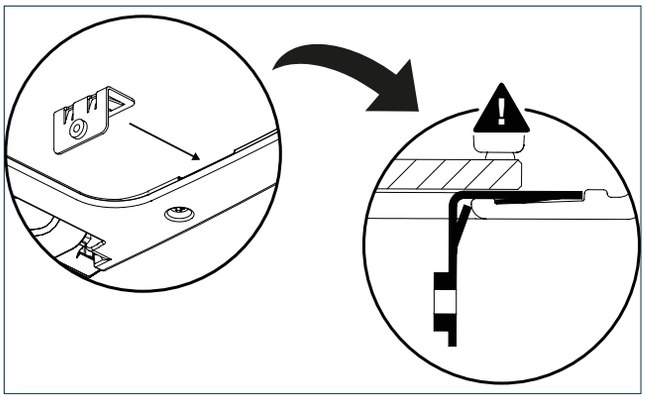


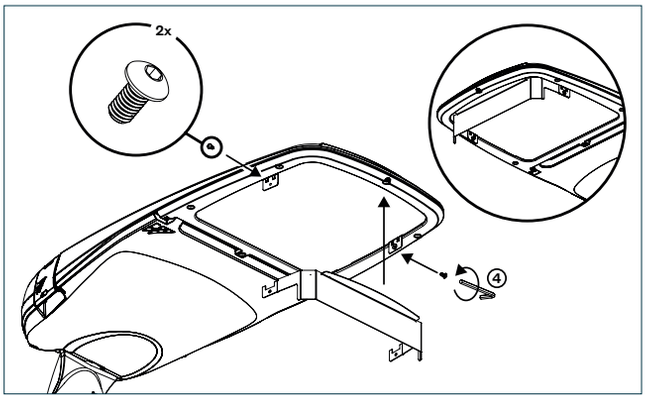


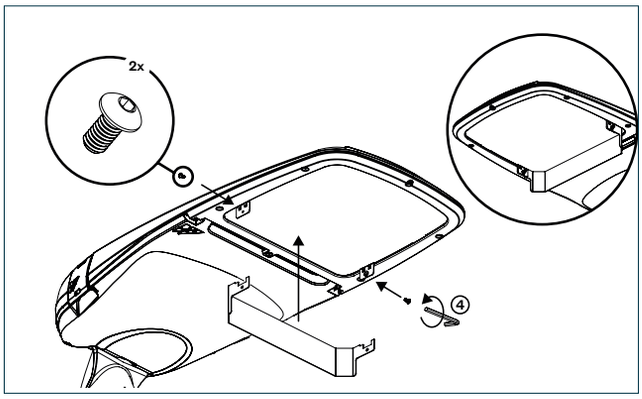


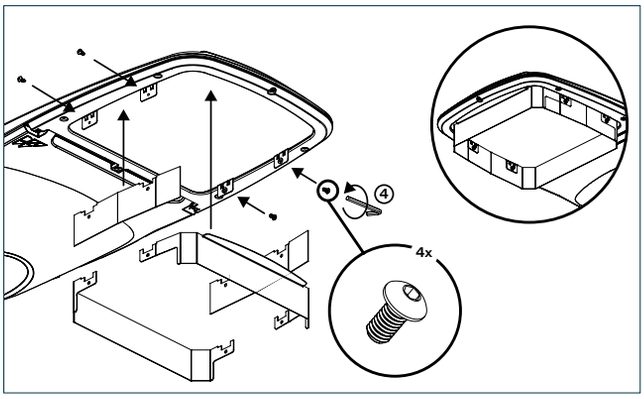
Anti-glare shields

Should unwanted spill light become an issue, we have a full range of anti-glare (back, front and side) shields available. **These can be fitted to the luminaire post-installation** without opening the product, by attaching push-fit spring clips (shown in the diagrams below).



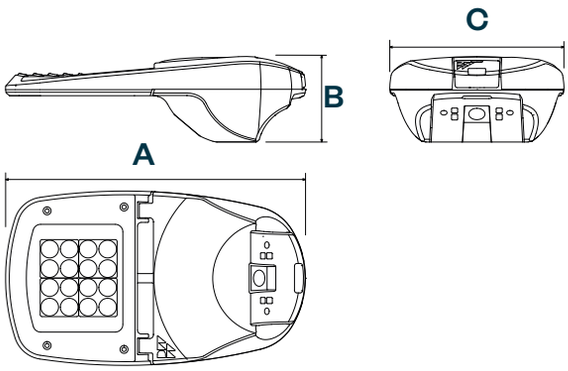






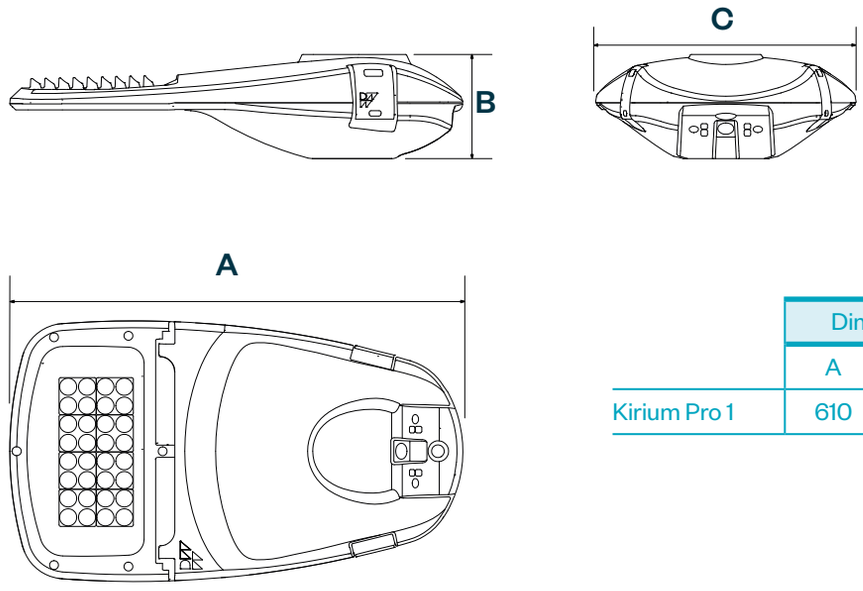
Size, weight and windage

Kirium Pro Mini



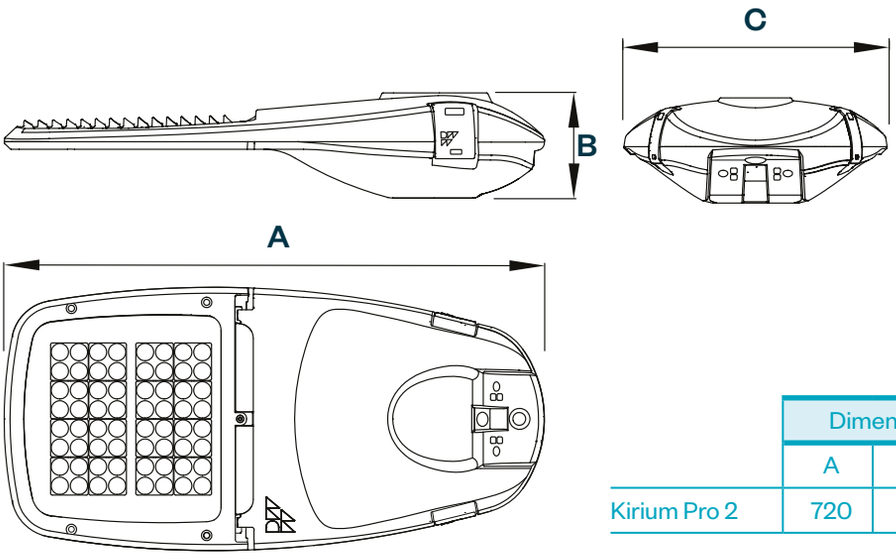
	Dimensions (mm)			Weight (kg)	CxS (m^2)
	A	B	C		
Kirium Pro Mini	390	110	227	3.6	0.021

Kirium Pro 1



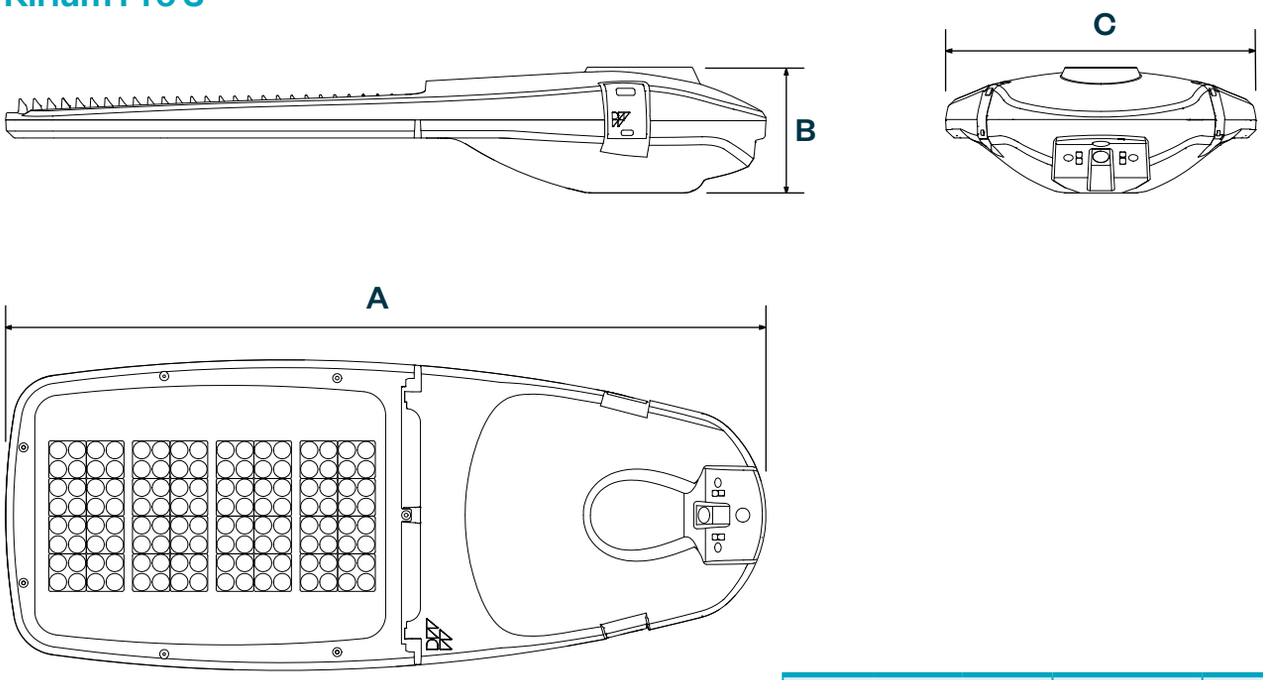
	Dimensions (mm)			Weight (kg)	CxS (m^2)
	A	B	C		
Kirium Pro 1	610	140	350	7.1	0.029

Kirium Pro 2



	Dimensions (mm)			Weight (kg)	CxS (m^2)
	A	B	C		
Kirium Pro 2	720	140	350	9.5	0.034

Kirium Pro 3



	Dimensions (mm)			Weight (kg)	CxS (m^2)
	A	B	C		
Kirium Pro 3	1010	167	415	17.5	0.056

UMS codes

UMS codes are available for the full Kirium Pro range, see below or download online here

	Number of LEDs	Elexon designation	Generic LED codes – Lower limit	Generic LED codes – Upper limit
Kirium Pro Range	8	LX3-116-08 LED CLO	42 0006 0000 100	42 0026 0000 100
	16	LX3-116-16 LED CLO	42 0010 0000 100	42 0047 0000 100
	24	LX3-116-24 LED CLO	42 0014 0000 100	42 0067 0000 100
	32	LX3-116-32 LED CLO	42 0019 0000 100	42 0089 0000 100
	48	LX4-116-48 LED CLO	42 0027 0000 100	42 0131 0000 100
	64	LX4-116-64 LED CLO	42 0035 0000 100	42 0168 0000 100
	80	LX5-116-80 LED CLO	42 0045 0000 100	42 0216 0000 100
	96	LX5-116-96 LED CLO	42 0053 0000 100	42 0255 0000 100
	128	LX5-116-128 LED CLO	42 0070 0000 100	42 0335 0000 100
Kirium Pro Mini Range	4	LX6-116-04 LED CLO	42 0003 0000 100	42 0015 0000 100
	8	LX3-116-08 LED CLO	42 0006 0000 100	42 0026 0000 100
	16	LX3-116-16 LED CLO	42 0010 0000 100	42 0040 0000 100

Elexon have recently introduced a new system of generic codes, specifically for LED products. Learn more about the new 42 charge codes here

Product codes

You may find the following product codes helpful for ease of specification and ordering:

				Code	Example
Model					
Kirium Pro Mini				KPM	**KP2**
	Kirium Pro 1			KP1	
		Kirium Pro 2		KP2	
			Kirium Pro 3	KP3	
LED quantity					
4 LED				004	**048**
8 LED	8 LED			008	
16 LED	16 LED			016	
	24 LED			024	
	32 LED	32 LED		032	
		48 LED		048	
		64 LED	64 LED	064	
			80 LED	080	
			96 LED	096	
			128 LED	128	
Mounting					
Ø34-42mm Side entry				S	**D**
Ø76mm Direct post				D	
Ø60mm Side entry / Direct post adapter				I	
Colour temperature					
2700K				27	**30**
3000K				30	
3500K				35	
4000K				40	
Distribution					
Diamond+ A Optic - Wide road (A1 / A2 / A3 / A4 / A5)				A1 / A2 / A3 / A4 / A5	**D1**
Diamond+ B Optic - Footpath (B1 / B2 / B3 / B4 / B5)				B1 / B2 / B3 / B4 / B5	
Diamond+ C Optic - Area (C1 / C2 / C3 / C4 / C5)				C1 / C2 / C3 / C4 / C5	
Diamond+ D Optic - Standard road (D1 / D2 / D3 / D4 / D5)				D1 / D2 / D3 / D4 / D5	
Diamond+ Z Optic - Pedestrian crossing (ZL / ZR / ZF)				ZL / ZR / ZF	
Drive current					
Drive currents from 200mA to 1000mA are available in 50mA increments. Insert drive current value in 4-digit format (eg 250mA = 0250).				0200 / 0250 / 0300 / 0350 / 0400 / 0450 / 0500 / 0550 / 0600 / 0650 / 0700 / 0750 / 0800 / 0850 / 0900 / 0950 / 1000	**0550**
Product colours					
RAL 7046 Mid grey				CF	**29**
RAL 7035 Light grey				29	
RAL 9005 Black				10	
Control					
No photocell				N	**U**
Photocell 35 lux (1:0.5)				U	
Part night switching Photocell 35 lux (1:0.5) (switch off midnight - 05:30) (Elexon regime 762)				A4	
Photocell 35 lux (1:0.5) + pre-programmed dimming (dimmed to 50% midnight - 05:30) (Elexon regime 531)				D8	
3 pin NEMA				E	
5 pin NEMA				C3	
7 pin NEMA				D2	
*Pre-programmed dimming**					
*CMS compatible**					
*SR ready**					

Example code = KP2 048 D 30 D1 0550 29 U

**Available as standard subject to further information being provided at time of order.*

DW Windsor

MADE IN BRITAIN

Kirium® Pro is a registered design

Due to continuous product development the details within this brochure are subject to change at any time, please contact us for the most up-to-date information or visit: www.dwwindsor.com

DW Windsor
Pindar Road, Hoddesdon, Hertfordshire, EN11 ODX
T: +44 (0) 1992 474600 | E: info@dwwindsor.com
dwwindsor.com

How to specify | Luminaire specification | Optical control | Photometry | Installation & maintenance | UMS | Product codes

10.5 LUMINAIRE TYPE EX4 – PIXOL 150

Kingfisher Lighting

Part of the Luceco plc group of companies

Datasheet

Pixol Bollard

Product Description

Available in both wooden and aluminum finishes, the Pixol bollard has many variations from top ilumination to side as well a range of optics to choose from. This versatile range sits perfectly with the Pixol range.

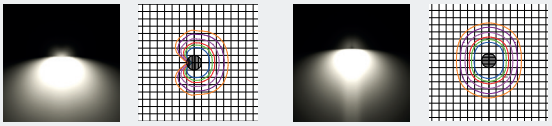
Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 62 lm/W and will be capable of producing up to 680 luminaire lumens at 4000K with a CRI >80. It shall have an asymmetric forward throw optic and is rated at IP66 and IK08.

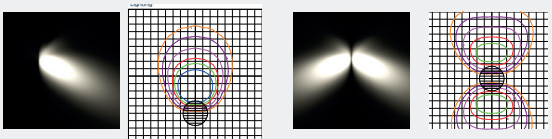
Specification

Weight: 4.8 - 15.3kg
Material: Die-cast Aluminium, Treated Lamellar Wood
Paint finish: Graphite Grey

Optics



One Way | Two Way



One Way | Two Way

Key Features

- 10.0W-20.0W
- 280 - 680 Luminaire Lumens
- Efficacy up to 62 lm/W
- 4000K, CRI >80
- Lifetime >60,000hr, L80

Arcluce

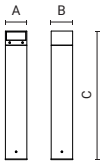
LED | IP66 | IK08 | DIM | Control Compatible

Mounting Options

- Flange plate
- Root mounting

Code	Power	Luminaire Lumens	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish
PIX7-BSA110-1W-840-10-16	10.0	590	one way	4,000	IP66	IK08	4.8	Graphite Grey
PIX7-BSA110-2W-840-20-16	20.0	590 x 590	two way	4,000	IP66	IK08	6.3	Graphite Grey
PIX7-BSW110-1W-840-10-16	10.0	590	one way	4,000	IP66	IK08	6.5	Graphite Grey
PIX7-BSW110-2W-840-20-16	20.0	590 x 590	two way	4,000	IP66	IK08	8	Graphite Grey
PIX7-BTA110-1W-840-10-16	10.0	310	one way	4,000	IP66	IK08	4.8	Graphite Grey
PIX7-BTA110-2W-840-10-16	10.0	280	two way	4,000	IP66	IK08	4.8	Graphite Grey
PIX7-BTW110-1W-840-10-16	10.0	310	one way	4,000	IP66	IK08	6.5	Graphite Grey
PIX7-BTW110-2W-840-10-16	10.0	280	two way	4,000	IP66	IK08	6.5	Graphite Grey
PIX9-BSA150-1W-840-10-16	10.0	620	one way	4,000	IP66	IK08	8	Graphite Grey
PIX9-BSA150-2W-840-20-16	20.0	620 x 620	two way	4,000	IP66	IK08	9.1	Graphite Grey
PIX9-BSW150-1W-840-10-16	10.0	620	one way	4,000	IP66	IK08	10.8	Graphite Grey
PIX9-BSW150-2W-840-20-16	20.0	620 x 620	two way	4,000	IP66	IK08	12	Graphite Grey
PIX9-BTA150-1W-840-10-16	10.0	340	one way	4,000	IP66	IK08	8.2	Graphite Grey
PIX9-BTA150-2W-840-20-16	20.0	680	two way	4,000	IP66	IK08	8.4	Graphite Grey
PIX9-BTW150-1W-840-10-16	10.0	340	one way	4,000	IP66	IK08	15.1	Graphite Grey
PIX9-BTW150-2W-840-20-16	20.0	680	two way	4,000	IP66	IK08	15.3	Graphite Grey

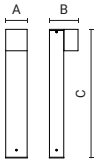
Dimensions



A-150mm

B- 110/150mm

C-730/900mm



A-150mm

B- 200/210mm

C- 900mm

Arcluce