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EXTERNAL LIGHTING DESIGN REPORT

For

DOGS TRUST REDEVOLPMENT – MERSEYSIDE



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Project Ref: C1568

Document Information

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External Lighting Design Report
C1568 - Dogs Trust Merseyside

Revision	Author	Purpose	Date
A	S.Koutsoudi	Planning Submission	April 2023

Approved By	Signed	Title	Date
A	S.Koutsoudi	Director	April 2023

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PART 1 – GENERAL

1.1 INTRODUCTION

This report has been prepared to support the planning application for the redevelopment of an existing Dogs Trust Rehoming site – Located at Whiston Lane, Huyton, Whiston, Liverpool. L36 6HP.

1.2 DESIGN STANDARDS

The proposed External Lighting scheme is based on best practice and National & International Industry Standards, incorporating the following;

- BS EN 12464-2 (2014) 'Lighting for Workplaces. Outdoor Workplaces'
- BS EN 13201-2 (2015) 'Road Lighting. Performance Requirements'
- BS 7671 (2018) +A1 (2020) 'Requirements for Electrical Installations. The IET Wiring Regulations.
- BS 5489-1 (2013) 'Code of Practice for the Design of Road Lighting – Part 1: Lighting Roads and Public Amenity Areas.
- GN 01/20 (2020) 'Guidance Notes for the Reduction of Obtrusive Light' Institution of Lighting Professionals.
- CIE 150 (2017) 'Guide on the limitation of the effects of obtrusive light from outdoor lighting installations'
- GN 08/18 (2018) 'Bats and Artificial Lighting in the UK'. Institution of Lighting Professionals.
- LG06/16 (2016) CIBSE Lighting Guide 06. 'The Exterior Environment'. CIBSE
- Building Regulations

All external lighting equipment shall be specified in accordance with the latest edition and amendments of all applicable standards, codes, laws and regulations listed below.

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- CE Marking Directive 93/68/EEC
- RoHS Directive: 2011/65/EC

Note: All electrical equipment and systems supplied shall conform to the appropriate EU Directive and shall carry the appropriate CE Marking.

1.3 KEY ELEMENTS OF PROPOSED LIGHTING SCHEME

To ensure the safe movement around the proposed development for both Staff and Public and to aid site surveillance systems, lighting is proposed to the following areas:

- Lighting to Carparking areas & entrance driveway
- Lighting to driveways/roadways within site boundary
- Lighting to Pathways & pedestrian routes surrounding to buildings & runs.

External Lighting Drawing No: D48950/LKM/B enclosed in Appendix A provides positions and further design related information in relation to the proposed external lighting scheme.

The key elements of the external perimeter lighting are set out below with excerpts of key performance specifications at Appendix A:

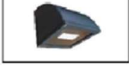
	Colour Temperature (K)	Qty	Range	Light Source	Luminaire Lumens (lm)
	4000	4	Viva City PRO	40w LED FW70	5880
	4000	2	Viva City PRO	40w LED AY70	5927
	4000	22	Viva City PRO	15w LED AY70	2260
	4000	47	Quarto 2.0	7.5w LED OC	780

Figure 1: Lighting Specification Luminaires

Full Data sheets of the proposed luminaires can be found in Appendix B of this document.

Lighting to Carparking areas, entrance driveway, roadways within the site boundary is achieved using Column mounted luminaires. The Columns are 5 Metre high and the luminaires mounted to the columns are of varying outputs as noted on Figure 1 above and as shown on Drawing No: D48950/LKM/B

Lighting to Pathways & pedestrian routes surrounding to buildings & runs is achieved using the building mounted Quarto 2.0 Luminaire, which is optically directed down and towards the pathways and pedestrian routes around the buildings.

Lighting Control Specifications

The external perimeter lighting is required during hours of darkness only (dusk till dawn) and will be controlled via timeclock and photocell arrangement to reduce energy usage & to meet the Operational needs of the Dogs Trust.

The lighting design is optimised for the site to ensure no obtrusive glare, light spillage or other light nuisance on neighbouring uses. Further technical details of the proposed lighting can be found in Section 2.

PART 2 - SITE LIGHTING BASIS OF DESIGN

2.1 LIGHT POLLUTION – OVERVIEW

Obtrusive light from floodlighting within the site boundary onto adjacent roads / landscaped areas shall be minimized taking into consideration the following;

- (a) sky glow (direct upward waste light),
- (b) intrusive light and light into windows/windcreens), over illumination, and glare (viewed source intensity) – refer to Figure 2 below.

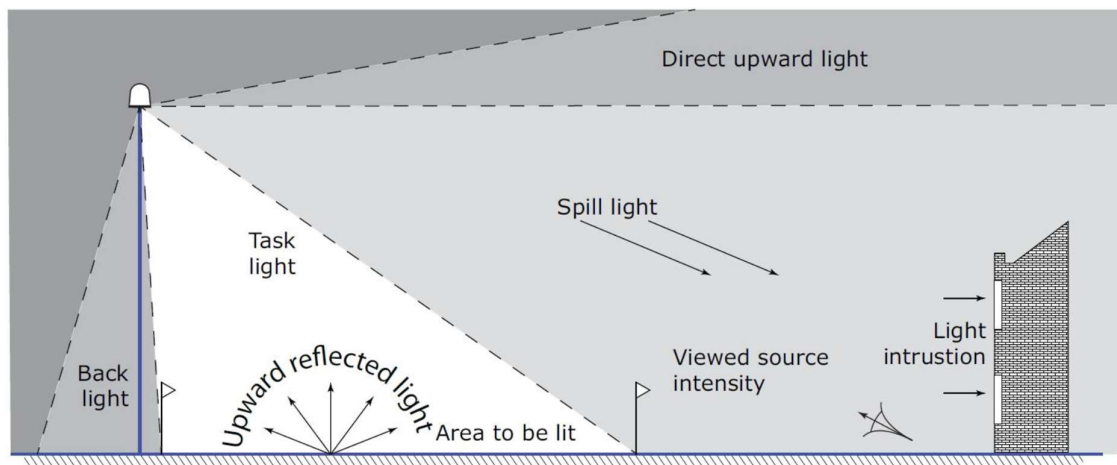


Figure 2: Light Pollution

2.2 ENVIRONMENTAL CLASSIFICATION

Predictive modelling has been undertaken to study, identify and reduce potential light pollution from the proposed site to achieve compliance with ILP GN 01/20 *Guidance Notes for the Reduction of Obtrusive Light* with reference to CIE 150 and BS EN 12464-2 Table 2, for Environmental Zone E3 – refer to Figure 3 below for excerpt. from BS EN 12464-2.

Environmental Zone E3 is defined in BS EN 12464-2 Clause 4.5 as “medium district brightness areas, such as industrial or residential suburbs”.

2.3 OBTRUSIVE LIGHT LEVELS

In accordance with Environmental classification above, the Environmental Zone will be designed to Classification E3, i.e. medium district brightness, with a maximum sky glow

(Upward Light Ratio) of 5%, maximum intrusive light (onto windows of adjoining properties) of between 2 to 10 lux (pre and post curfew). There is no lighting curfew policy that identifies a need for the exterior lighting of this site to meet the stricter post-curfew obtrusive lighting requirements as outlined in the table above. However, as the proposed building shall require staff to occupy the site 24/7 and therefore operational, it is limited to the areas of lighting that can be completely turned off during darkness hours. (subject to detailed values noted in BS EN 12464-2)

The illumination spill calculations shall not take into consideration landscaping proposals which are intended to provide visual screening between adjacent properties and areas of illumination. Landscaping screening (trees) will further reduce light trespass below the required levels in some areas. There is very minimal lighting spill outside of the site boundary as detailed on External lighting drawing D48950/LKM/B enclosed in Appendix A

2.4 DESIGN LIGHTING LEVELS

The site lighting design is based on “P1” requirements, as stipulated in BS EN 13201-2:2015, Clause 6 which is intended for “for pedestrians and pedal cyclists on footways, cycleways, emergency lanes and other road areas lying separately or along the carriageway of a traffic route, and for residential roads, pedestrian streets, parking places, schoolyards etc”. Minimum maintained illuminance levels shall be designed to achieve between 5 and 15 lux, measured at road level.

PART 3 - DETAILED DESIGN

3.1 DESIGN CALCULATIONS

The external lighting design and has been calculated in accordance with BS EN 12464-2 Environmental zone E3 requirements using Dialux lighting design software. The calculation results are included at Appendix A of this report on Drawing Number D48950/LKM/B.

3.2 SUMMARY OF CALCULATIONS

The calculations show that the maximum permissible Upward Light Ratio (ULR) of 5% has not been exceeded. The lighting design calculations demonstrate that the proposed lighting installation achieves an upward light ration of 0%, thus the design is compliant with BS EN 12464-2 Environmental zone E3 requirements. The maximum intrusive light (lux) of 2 lux on the vertical plan has not been exceeded. The lighting calculations demonstrate that the proposed lighting installation achieves a value of less than 0.1 lux, thus the design is compliant with BS EN 12464-2 Environmental zone E3 requirements. In addition, the Class of Road Lighting design is based on P1 requirements, as per BS EN 13201-2:2015. The proposed lighting scheme is specifically designed as the worst case scenario, and where possible all recommended limitations on obtrusive light stipulated in the above mentioned standards are adhered to. It is also important to note that the minimal illumination spill onto adjacent roads does not take into consideration proposed landscaping (screening), this screening will further reduce light trespass onto these roads.

External lighting circuits shall be controlled by, photocells and time switch to achieve practical use of the site for both Public areas and staff.

3.3 DESIGN CONCLUSIONS

This analysis demonstrates that the external lighting design is in compliance with the standards noted within this report.

**APPENDIX A –
EXTERNAL LIGHTING DESIGN LAYOUT PLAN WITH CALCULATION RESULTS**

BREEAM New Construction 2018 (UK)

48950 Dogs Trust, Merseyside Rehoming Centre

Colour Temperature (K)	Qty	Range	Light Source	Luminaire Lumens (lm)	Watts (W)	lm/W	LOE	Total Lumens	U.L.O.R.	Upward Lumens	CRI	** ART Hour Per Day	CO ₂ (tonnes)	Kwh/Year
4000	4	Viva City PRO	40w LED FW70	5880	40	147.00	100%	23520	0.0%	0	>70	12	0.15	760.80
4000	2	Viva City PRO	40w LED AY70	5527	40	138.18	100%	11184	0.0%	0	>70	12	0.07	350.40
4000	22	Viva City PRO	15w LED AY70	2260	15	150.67	100%	49720	0.0%	0	>70	12	0.30	1445.40
4000	47	Quattro 2.0	7.5w LED OC	780	8	104.00	100%	36660	0.0%	0	>70	12	0.82	1243.95

G1013 - 2013

Table 1 Compliance

Environmental Zone E3

Sky Glow	Target	Achieved	Status
	2.00%	0.00%	Pass

Source Intensity (Candelas)	Pre-Curfew	Post-Curfew	Pass
	10,000	1,000	Pass

Light Transgress into Windows (Lux)	Pre-Curfew	Post-Curfew	Pass
	10	2	Pass

Building Luminance (cd/m ²)	Pre-Curfew	Post-Curfew	Pass
	10		Pass

Total Installation Lumens 125754.00 Total Upward Light 0.00%

Total CO₂ Per Year (Tonnes) 0.85

Total Electric Consumption (kwh) 0.82

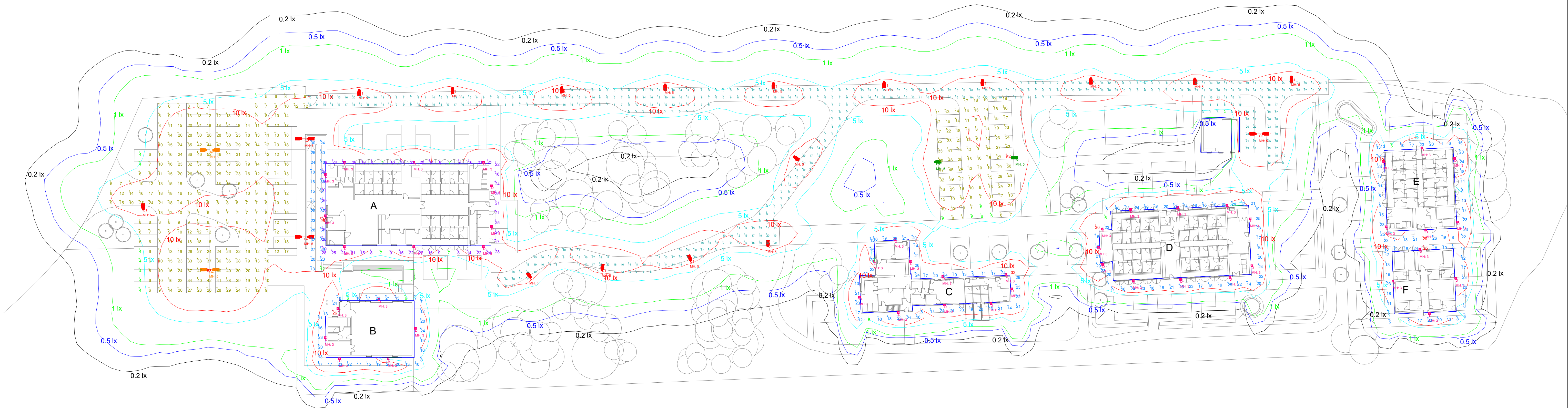
Total Electric Consumption Per Year (kwh) 660.55

Average Luminance Lumens Per Circuit Watt 131.58

Compliance Status	Pass
Pol 04 Reduction Of Night Time Light Pollution	Pass
Env 03 Energy Efficient External Lighting	Pass
Env 03 Internal And External Lighting Levels	Pass

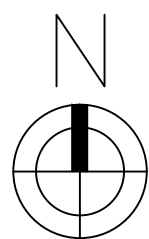
Note - HEAD1 in this report only applies to exterior lighting
* ART = (Average Run Time)

Date 24/04/2023



Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description
1	42	A2	BACK-TO-BACK	5880	0.900	2 x 40w LED 4000K Viva City Pro 805mA with FW70 Optic column mounted at 5m
2	81	B1	SINGLE	5527	0.900	40w LED 4000K Viva City Pro 805mA with AY70 Optic column mounted at 5m
16	C1		SINGLE	2260	0.900	15w LED 4000K Viva City Pro 640mA with AY70 Optic column mounted at 5m
3	C2		BACK-TO-BACK	2260	0.900	2 x 15w LED 4000K Viva City Pro 640mA with AY70 Optic column mounted at 5m
47	D		SINGLE	620	0.900	7.5w LED 4000K Quattro 2.0 250mA bulkhead with cyclic optic wall mounted at 3m

Label	CalcType	Units	Avg	Max	Min	Uniformity	Diversity
Car Park on the left	Illuminance	Lux	16.15	53	4	0.25	0.08
Car Park on the right	Illuminance	Lux	18.59	52	6	0.32	0.12
Perimeter A	Illuminance	Lux	20.25	40	7	0.35	0.18
Perimeter B	Illuminance	Lux	18.09	28	6	0.37	0.23
Perimeter C	Illuminance	Lux	18.46	32	5	0.27	0.16
Perimeter D	Illuminance	Lux	18.66	30	6	0.31	0.20
Perimeter E	Illuminance	Lux	16.30	29	5	0.31	0.17
Perimeter F	Illuminance	Lux	14.00	25	4	0.39	0.16
Ramp A	Illuminance	Lux	26.64	43	12	0.45	0.28
Roads	Illuminance	Lux	12.78	27	4	0.31	0.15



Dogs Trust, Merseyside Rehoming Centre

Scale 1: 400 at A1

Project Number D48950B

Date 24 April 2023

Drawing No. D48950/LKM/B

Lighting Designer : Laura Karaleviciute

A lighting applications design service is provided by us in good faith and without charge, relating to Kingfisher products only. As such, whilst every endeavor is made for accuracy from information provided by yourselves, the final responsibility for the suitability of the design lies with the client. The company cannot, therefore, accept any liability or consequential loss incurred.

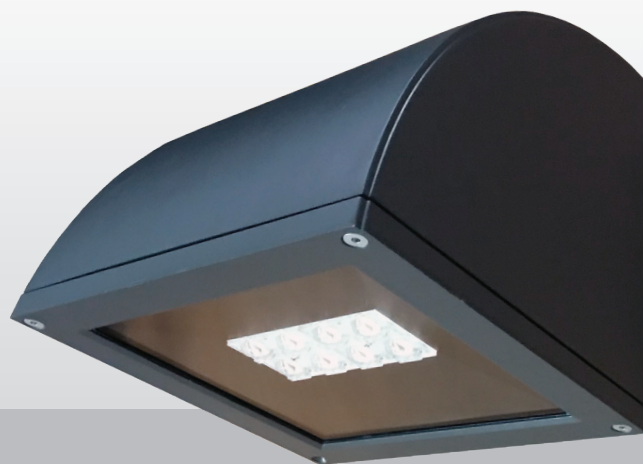
APPENDIX B – LUMINAIRE DATA SHEETS



Kingfisher Lighting

Datasheet

Quarto



Specification Text

The luminaire shall be manufactured from high pressure die-cast aluminium. It shall have an LED efficacy of up to 114.2 luminaire lm/W and will be capable of producing up to 1,542 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP65 and IK10.

Specification

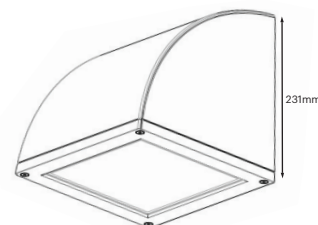
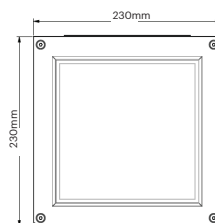
Weight: 4.26kg Max.
Windage: 0.05m² Max.
Material: Die-cast Aluminium
Paint Finish: Anthracite Grey

Key Features

- 7.5W & 14.2W
- 857 - 1542 Luminaire Lumens
- Efficacy up to 114.2 lm/W
- 2700K, 3000K & 4000K
- Lifetime >100,000hr L80
- Asymmetrical
- Dali Dimmable options

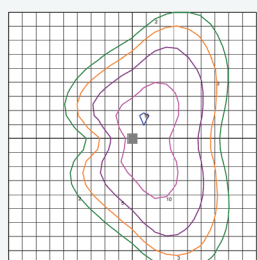
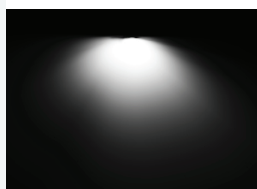


Dimensions

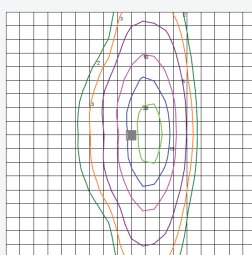
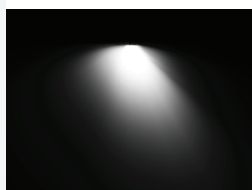


Optics

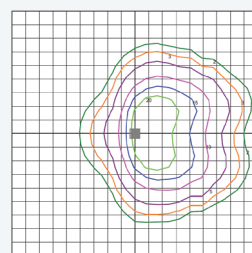
STREET



CYCLE



FLOOD



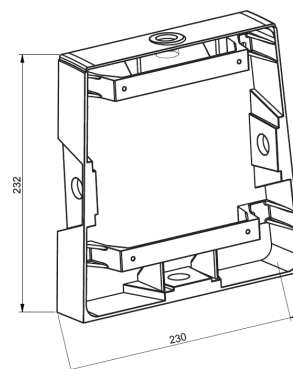
Code	Power	Light Source	Luminaire Lumens	Optic	CCT(K)	IP	IK	Weight (kg)	Paint Finish
QUAFL08D	7.5W	LED	857	Asymmetrical Flood Light Optic (FL)	4000	IP65	IK10	3.95	Anthracite Grey
QUAFL08DEM	7.5W	LED	857		4000	IP65	IK10	4.21	Anthracite Grey
QUAFL08DEMPEC	7.5W	LED	857		4000	IP65	IK10	4.26	Anthracite Grey
QUAF08DPEC	7.5W	LED	857		4000	IP65	IK10	4.00	Anthracite Grey
QUAFL15D	13.5W	LED	1542		4000	IP65	IK10	3.95	Anthracite Grey
QUAFL15DEM	13.5W	LED	1542		4000	IP65	IK10	4.21	Anthracite Grey
QUAFL15DEMPEC	13.5W	LED	1542		4000	IP65	IK10	4.26	Anthracite Grey
QUAF15DPEC	13.5W	LED	1542		4000	IP65	IK10	4.00	Anthracite Grey
QUAOC08D	7.5W	LED	825	Asymmetrical Street Optic (ST)	4000	IP65	IK10	3.95	Anthracite Grey
QUAOC08DEM	7.5W	LED	825		4000	IP65	IK10	4.21	Anthracite Grey
QUAOC08DEMPEC	7.5W	LED	825		4000	IP65	IK10	4.26	Anthracite Grey
QUAOC08DPEC	7.5W	LED	825		4000	IP65	IK10	4.00	Anthracite Grey
QUAOC15D	13.5W	LED	1485		4000	IP65	IK10	3.95	Anthracite Grey
QUAOC15DEM	13.5W	LED	1485		4000	IP65	IK10	4.21	Anthracite Grey
QUAOC15DEMPEC	13.5W	LED	1485		4000	IP65	IK10	4.26	Anthracite Grey
QUAOC15DPEC	13.5W	LED	1485		4000	IP65	IK10	4.00	Anthracite Grey
QUAST08D	7.5W	LED	806	Asymmetrical Cycle optic (OC)	4000	IP65	IK10	3.95	Anthracite Grey
QUAST08DEM	7.5W	LED	806		4000	IP65	IK10	4.21	Anthracite Grey
QUAST08DEMPEC	7.5W	LED	806		4000	IP65	IK10	4.26	Anthracite Grey
QUAST08DPEC	7.5W	LED	806		4000	IP65	IK10	4.00	Anthracite Grey
QUAST15D	13.5W	LED	1453		4000	IP65	IK10	3.95	Anthracite Grey
QUAST15DEM	13.5W	LED	1453		4000	IP65	IK10	4.21	Anthracite Grey
QUAST15DEMPEC	13.5W	LED	1453		4000	IP65	IK10	4.26	Anthracite Grey
QUAST15DPEC	13.5W	LED	1453		4000	IP65	IK10	4.00	Anthracite Grey

Accessories / Options

- Control options available
- Colour temperature options
- Remote driver options

Mounting Options

- Optional pattress



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.

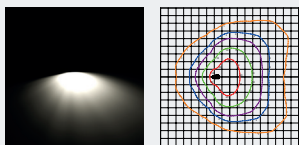
Specification Text

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.

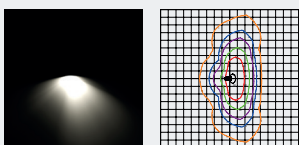
Specification

Weight: 4.5 - 9.0kg
Windage: 0.09m²
Material: Die-cast Aluminium
Paint finish: RAL7016 Anthracite Grey Finish

Optics



Asymmetric Forward Throw Optic 70°



Street Optic - Wide 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



Mounting Options

- Post Top 60mm

Other Options

- Part Night Dimming
 - Colour Temperature Option
 - Photocell Option
 - Emergency Option
- [Contact for details](#)



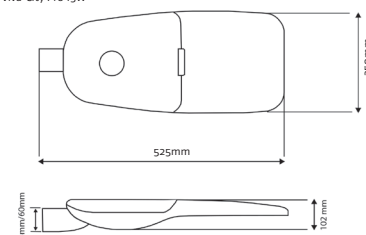
Code	Power	Luminaire Lumens	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included	Driver Type
VCYP-AY70 -4.3-15D	15.0	2,260	640	Street Optic - Wide 70°	4000	IP66	IK08	4.5	RAL7016 Anthracite Grey Finish	Driver Inc	DALI
VCYP-AY70 -4.8-40D	40.0	5,927	805		4000	IP66	IK08	6.0	RAL7016 Anthracite Grey Finish	Driver Inc	DALI
VCYP-AY70 -4.6-60D	60.0	8,844	610		4000	IP66	IK08	6.0	RAL7016 Anthracite Grey Finish	Driver Inc	DALI
VCYP-AY70 -4.8-80D	80.0	11,120	805		4000	IP66	IK08	6.0	RAL7016 Anthracite Grey Finish	Driver Inc	DALI
VCYP-AY70 -4.6-120D	120.0	17,828	610		4000	IP66	IK08	9.0	RAL7016 Anthracite Grey Finish	Driver Inc	DALI
VCYP-AY70 -4.8-180D	180.0	24,840	880		4000	IP66	IK08	9.0	RAL7016 Anthracite Grey Finish	Driver Inc	DALI

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 -4.8-40D	40.0	5,880	805		4000	IP66	IK08	6.0	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 -4.8-80D	80.0	11,040	805		4000	IP66	IK08	6.0	RAL7016 Anthracite Grey Finish	Driver Inc	DALI
VCYP- FW70 -4.6-120D	120.0	17,760	610		4000	IP66	IK08	9.0	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

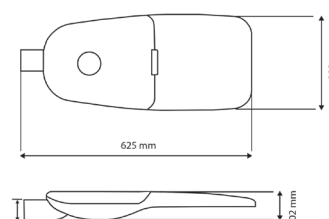


Dimensions

Viva-City Pro 15W



Viva-City Pro 40W, 60W and 80W



Viva-City Pro 120W, 180W

