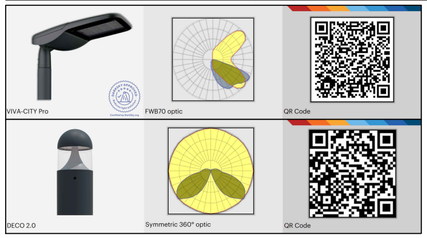
Dimensions are not to be scaled from this drawing

Luminaire Schedule

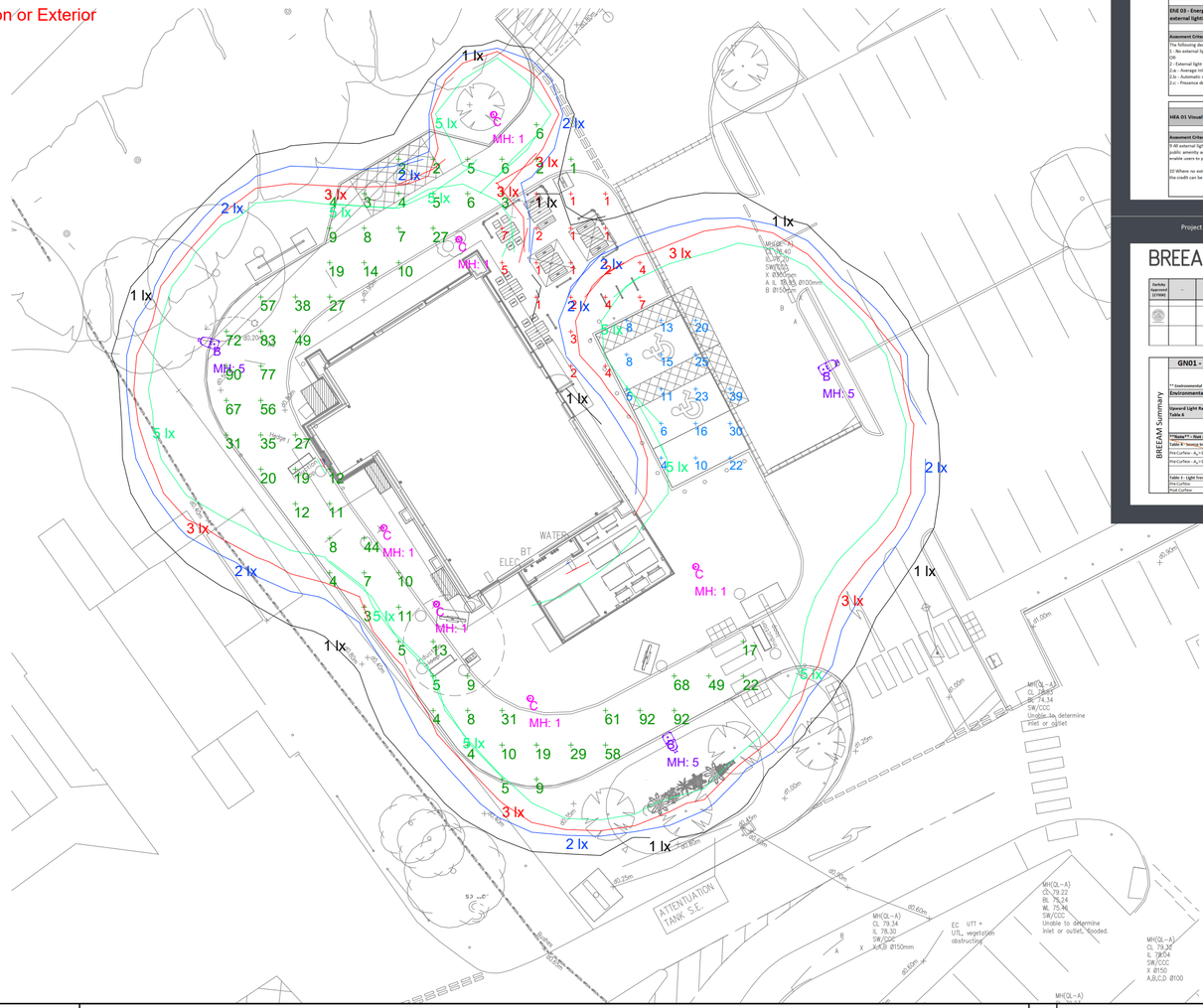
Symbol	Qty	Label	Arrangement	LLF	Description	Luminaire L/W	UWLR	Light Engine	Total Watts
	3	B	Single	0.900	60W VIVA-CITY Pro 4000K 6 16mA FWB70 spill control forward throw optic column mounted at 5m	113	0.00		180
	6	C	Single	0.900	7 SW DECO 2.0 bollard 4000K 1000mm 250mA radia l optic	124	0.13		45

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max	Meter Type	Description
Costa Parking	Illuminance	Lux	15.94	39	4	0.25	0.10	Horizontal	
Drive Thru	Illuminance	Lux	24.59	92	1	0.04	0.01	Horizontal	
ObtrusiveLight_1_Cd_Seg1	Obtrusive - Cd	N.A.	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_1_Cd_Seg2	Obtrusive - Cd	N.A.	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_1_Cd_Seg3	Obtrusive - Cd	N.A.	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_1_R_Seg1	Obtrusive - lll	Lux	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_1_R_Seg2	Obtrusive - lll	Lux	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_1_R_Seg3	Obtrusive - lll	Lux	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_2_Cd_Seg1	Obtrusive - Cd	N.A.	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_2_Cd_Seg2	Obtrusive - Cd	N.A.	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_2_Cd_Seg3	Obtrusive - Cd	N.A.	17.00	41	0	0.00	0.00	Vert-PerpCW	
ObtrusiveLight_2_R_Seg1	Obtrusive - lll	Lux	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_2_R_Seg2	Obtrusive - lll	Lux	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
ObtrusiveLight_2_R_Seg3	Obtrusive - lll	Lux	0.00	0	0	N.A.	N.A.	Vert-PerpCW	
Patio Areas	Illuminance	Lux	2.63	7	1	0.38	0.14	Horizontal	



Design does not meet Costa Coffee Exterior lighting specification or Exterior Lighting Standards.



Project Number D89818 Project Title - COSTA - WREXHAM Date 06/10/2025 Kingfisher Lighting

BREEAM®

BREEAM New Construction 2018 (UK)

POL 04 - External Lighting

Aim: To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimized, thereby reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties

Number Of Credits Available: 1
Minimum Standards: No

DMU Fitments before: TM5 For full documents visit: https://theilp.org.uk/

Table 1 - The effect on the ability to view the night sky

Angle Of Light Emitted (Degrees)	Sky Glow Effect	Glare Effect
100-180	Limit	Little
90-100	Significant	Some
80-90	High	High
0-80	Significant	High
0-90	Minimum	Some

Table 2 - Environmental zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO Dark Sky reserves, IDA dark sky places
E1	Natural	Dark (SQM 20.5 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Assement Criteria

1 - External lighting portion has been eliminated through effective design that minimizes the need for external lighting. This does not adversely affect the safety and security of the site and its users.

OR alternatively, where the building does have external lighting, one credit can be awarded as follows:

2 - The external lighting strategy has been designed in compliance with Table 2 and the requirements of the Institution of Lighting Professionals (ILP) Guidance Notes for the reduction of obtrusive light, 2012.*

3 - All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.

4 - If safety or security lighting is provided and will be used between 23:00 and 07:00, 50 percent of the lighting system complies with the lower levels of lighting recommended during these hours in Table 3 of the ILP guidance notes.

5 - Illuminated advertisements are designed in compliance with ILP PLA05 The Brightness of Illuminated Advertisements.2

** NOTE - ILP Guidance Note 1 updated - 4/04/2021 ***

The Institution of Lighting Professionals has published Institution of Lilumnat light 2011. This has now been updated to the ILP Guidance note 1 for the reduction of obtrusive light 2021. This is available for free from the ILP website Requirements Table 2 of the guidance note 1 for the reduction of obtrusive light 2021 (see Table 2.4 on page 16) sets out tasks to define which sets of requirements apply to the assessment. Tables 2.4–2.9 the guidance note define the requirements for criterion 2. For cut-off type luminaires which (to design) block out light in obstructive directions, calculations are not required for meeting requirements relating to:

Upward light ratio (ULR) Max

Ruminous intensity (Table 4).

This update will be reflected in the future revisions of the relevant manuals.

Table 3 - Maximum values of upward light ratio (ULR) of luminaires

Light technical parameter	Environmental zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) / %	0	0	2.5	5	15

Note 1 This is the primary approach to limit skyglow and is suitable to compare different single luminaires and mitigate the contribution of each luminaire within an installation.

Note 2 This does not take into account the effect of light reflected upwards from ground that also contributes to skyglow.

Note 3 Some lighting schemes will require the deliberate and careful use of upward light, e.g. ground recessed luminaires, ground mounted floodlights and festoon lighting to which these limits cannot apply. However, care should always be taken to minimize any upward waste light by the proper application of suitably directioned luminaires and light controlling attachments.

Table 4 - Maximum values of upward flux ratio of installation (of four or more luminaires)

Light technical parameter	Type of installation	Environmental zones				
		E0	E1	E2	E3	E4
Upward flux ratio (UFR) / %	Road	n/a	2	5	8	12
	Amenity	n/a	n/a	8	12	30
	Sports	n/a	n/a	2	6	15

Table 5 shows the effect of both direct and reflected upward components of a whole installation to be considered. The factor being the upward flux ratio (UFR).

Note n/a within table 7 denotes that lighting of this type is not usually expected within these zones

This should only be considered where an installation consists of four or more luminaires that form an installation with a defined performance requirement or specialised flume growth lighting systems (such as those use to promote grow growth in sports stadia) and is in proximity to:

* Astronomical Observatories
* Cites within dark SQ1 areas which attain a protected SQ1 dark sky zone ** Further information on ILP website**

ENE 03 - Energy efficient external lighting

Aim: To reduce energy consumption through the specification of energy efficient light fittings for external areas of the development.

Number Of Credits Available: 1
Minimum Standards: No

Assement Criteria

The following demonstrates compliance:

1 - No external lighting (which includes lighting on the building, at entrances and signs).

OR

2 - External light fittings within the construction zone with:

2.a - Average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt

2.b - Automatic control to prevent operation during daylight hours

2.c - Presence detection in areas of intermittent pedestrian traffic

HEA 01 Visual Comfort

Aim: To encourage best practice in visual performance and comfort by ensuring daylighting, artificial lighting and occupant controls are considered.

Number Of Credits Available: 1
Minimum Standards: No

Assement Criteria

3) All external lighting located within the construction zone is specified in accordance with BS 5489-1:2013 Code for the practice for the design of road lighting. Lighting of roads and public amenity areas1 and BS EN 12464-2:20144 Light and lighting – Lighting of work places – Part 2: Outdoor work places. External lighting should provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night.

10 Where no external light fittings are specified (either separate from or mounted on the external building façade or roof), the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with criteria 7-8.c above. If no internal lighting is specified, the credit cannot be awarded.

Project Number D89818 Project Title - COSTA - WREXHAM Date 22/10/2025 Kingfisher Lighting

BREEAM®

Factory Approved (FCMM)	–	Qty	Luminaire	Light Source	Watts (W)	Luminaire Lumens (lm)	CLG/W	LOR	Total Lumens	ULOR	Upward Lumens	Light Engine: Colour Temperature (K)	Light Engine: L Value	Light Engine: B Value	Light Engine: Rated Life (hrs)	Light Engine: CRI	GP GN05 - Table 9 & Table 7: Beam Angle	GP GN05 - Table 9 & Table 7: Sky Glow Effect	Reduce GN01 Table 6: Glare Effect	Reduce GN01 Table 6: % of luminaires beyond 90° (GRP GRP)	CO² Calculation For A Year: ** ANT Hour Per Day	CO² (Tonnes)	Kw/Hour
		3	VIVA-CITY Pro	vcp - 60W LED FWB70	60.0	6798	113.30	100%	20394	0.0%	0	4000	L80	B20	100,000	170	62.5°	Minimum	Some	123	n/a	12	0.16	788.40
		6	DECO 2.0	dec - 3.5w LED	7.5	930	124.00	100%	5580	13.3%	742	4000	L70	B–	50,000	≥80	90°	Minimum	Some	92	6.8%	12	0.04	197.10

GN01 - 2021

** Environmental Zone to be confirmed by assessor **

Environmental Zone: E3

Upward Light Ratio (ULR) - Table 6	Target	Achieved	Status
	5.0%	2.0%	Pass

Total Installation Lumens	23974	**Total Upward Light**	2.9%
Total CO2 Per Year (Tonnes)			0.20
Total Electric Consumption (Kw)			0.23
Total Electric Consumption Per Year (Kwh)			985.5
Average Luminaire Lumens Per Circuit Watt			115.4

Compliance Status Summary

Pol 04	Reduction Of Night Time Light Pollution	Pass
Ene 03	Energy Efficient External Lighting	Pass
Hea 01	Internal And External Lighting Levels	Fail

Note - HEA01 is this report only applies to exterior lighting
AST = (Average Run Time)
Date: 22/10/2025

BREEAM Summary

Table 7 - Light Trespass Into Windows (Lux)

Pre-Curfew	10		Pass
Post-Curfew	2		Pass

Table 8 - Luminous Intensity (Candelas)

Pre-Curfew - A_1 >0.5	30,000		Pass
Pre-Curfew - A_1 >0.5	1,000		Pass

****Note** - Not a BREEAM requirement for Cut-Off Lanterns (See POL4 Assessment Criteria above)**

Scale	Project Number
1: 250 at A2	D89818E
Date	Drawing No.
22 October 2025	D89818/RD/E

COSTA - WREXHAM

A2

For this lighting design a 0.9mf has been used. If it differs from the maintenance plan for this project then you must advise us accordingly

Kingfisher Lighting
A division of the LUCECO group

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Rev.	Description	Initials



For more information on EV charging for your installation please visit www.sync.energy or click the image