

## CWL01 - Design

# External Lighting Strategy Report

**Client** Microsoft


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# Revision

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# 1.0 Introduction

The purpose of this report is to provide an overview of the external lighting strategy for the proposed scheme of 2no. new Hyperscale Data Centres in Newport, South Wales.

The proposed scheme will cover an approximate area of 37,000m<sup>2</sup>, which includes the Data Centres and support structures for daily operations. A reduction in impermeable paved areas, uplift in landscape provision and enhancement to the local biodiversity has also been included in the scheme.

Exterior lighting during the hours of darkness will be a minimum of 10 lux in usable areas and exterior walkways must be illuminated to 30 Lux with roadways / parking between 20-30 Lux. Due to the proposed site being a rural area, calculations will be required to ensure excessive light spill from CWL01 & CWL02 does not give out more than 0.5 to 1 lux in commuting and foraging areas to minimize local disturbance to wildlife and protected species i.e., Bats. This will specifically be to the areas immediately adjacent to the Southern and Western boundaries of the site.

To minimise light spill into commuting and foraging areas, items on exterior luminaries such as back spill cowls can be provided along with low level bollard lighting to reduce glare and overall impact to the rural environment. During the detailed design some key areas may need to be positioned to minimize impact on commuting and foraging areas.

The exterior lighting levels were selected in accordance with British Standards (BS 12464-2) and Microsoft Security Requirements.

## 2.0 Luminaire Selection

### 2.1 Roadways and Walkways

This luminaire is a 30W LED streetlight suitable for minor-major roads, car parking and logistics areas and shall be mounted to a height of 8m.

To comply with local biodiversity and light pollution requirements, the particular streetlight selected produces no uplighting and distributes most of the light output onto the road or walkway. Therefore, this also provides minimal backlighting, which helps achieve an illuminance of below 1.0 lux on the site boundary. Please refer to Figure 1 below for the chart which shows the distribution of light from this luminaire.

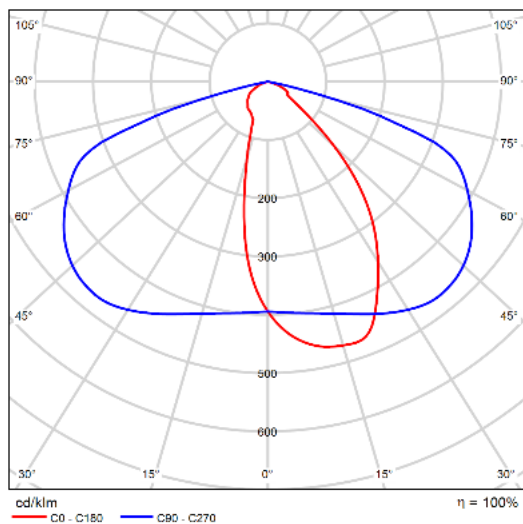


Figure 1 – Light Distribution Chart (LDC) of the streetlight. The blue line indicates light distribution when you are viewing the luminaire from the front. The red line indicates the light distribution when you are viewing the luminaire from the side. Note that both lines do not cross the 90° line, indicating that the luminaire provides no uplighting.

### 2.2 Bicycle Sheds

This luminaire is a 26W LED linear luminaire suitable for internal and external industrial applications. These luminaires shall be surface mounted and will be used to provide lighting for the bicycle sheds, therefore these luminaires will be mounted much lower than the streetlights (approximately 2m).

Due to the application for these luminaires, they pose little risk to the site boundary having an illuminance greater than 1.0 lux.

# 3.0 Typical Vertical Illuminance Calculation Result

## 3.1 Overview

To ensure that the site boundary does not exceed 1.0 lux, the external lighting scheme has been modelled and calculated within DIALux Evo (computer software used to model and calculate lighting levels). In the next sections, we provide typical vertical illuminance results.

## 3.2 Typical Calculation Result 1 – South Boundary

This calculation result has been taken along the South Boundary, close to the pond near CWL02, as shown in Figure 2. In Figure 3, the illuminance at the boundary, in this location, is below 1.0 lux.

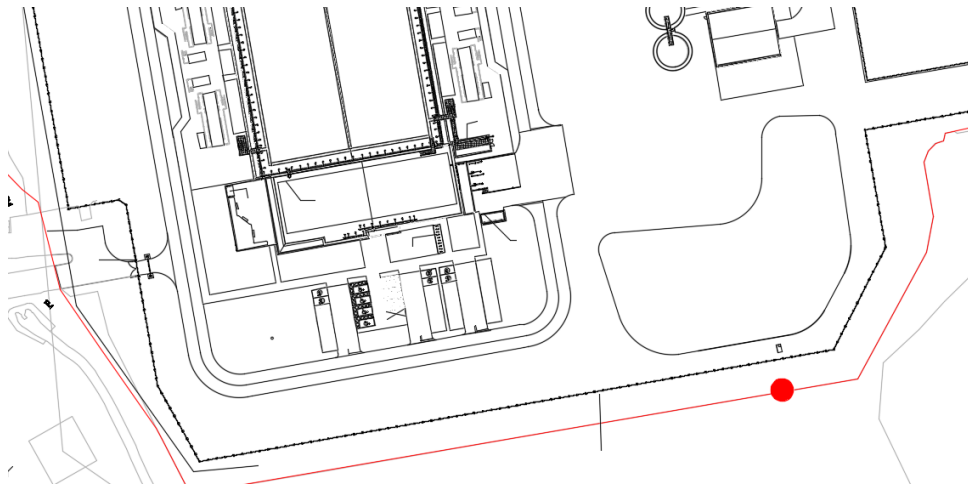


Figure 2 – the position of the calculation surface, as shown by the red dot.



| Properties  | $\bar{E}$ | $E_{min}$ | $E_{max}$ | $g_1$ | $g_2$ |
|---|-----------|-----------|-----------|-------|-------|
| Calculation surface (Site Boundary)<br>Perpendicular illuminance<br>Height: 8.998 m | 0.13 lx   | 0.017 lx  | 0.27 lx   | 0.13  | 0.063 |

Figure 3 – DIALux Evo vertical illuminance calculation result.

### 3.3 Typical Calculation Result – North Boundary

This calculation result has been taken along the North Boundary, along CWL01, as shown in Figure 4. In Figure 5, the illuminance at the boundary, in this location, is below 1.0 lux.

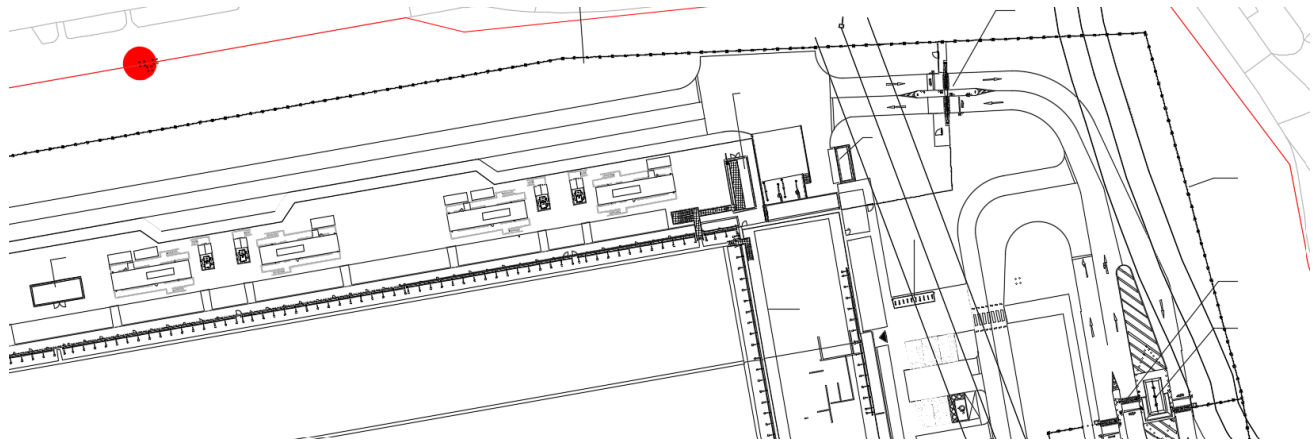


Figure 3 – the position of the calculation surface, as shown by the red dot.



| Properties  | $\bar{E}$ | $E_{min}$ | $E_{max}$ | $g_1$ | $g_2$ |
|---|-----------|-----------|-----------|-------|-------|
| Calculation surface (Site Boundary)<br>Perpendicular illuminance<br>Height: 9.502 m | 0.29 lx   | 0.052 lx  | 0.46 lx   | 0.18  | 0.11  |

Figure 5 – DIALux Evo vertical illuminance calculation result.