

AGHA GROUP  
MAULDETH ROAD YARD  
MANCHESTER  
LIGHTING IMPACT ASSESSMENT



## DOCUMENT ISSUE RECORD

|                    |                            |
|--------------------|----------------------------|
| Document reference | 250216-LTBL-REP-001_P1     |
| Issue Date         | 18.03.2025                 |
| Author             | Dan Alasfar MEng IEng MILP |

## CONTENTS

|     |                             |
|-----|-----------------------------|
|     | EXECUTIVE SUMMARY           |
| 1.0 | POLICY AND GUIDANCE         |
| 2.0 | LIGHT POLLUTION             |
| 3.0 | BASELINE                    |
| 4.0 | DESIGN PARAMETERS           |
| 5.0 | MITIGATION                  |
| 6.0 | CALCULATION SUMMARY         |
| 7.0 | PROPOSED LUMINAIRES         |
| 8.0 | CONSTRUCTION PHASE LIGHTING |

## APPENDICES

APPENDIX 1: EXTERNAL LIGHTING LAYOUT

APPENDIX 2: MANUFACTURERS DATA SHEETS

## EXECUTIVE SUMMARY

This Lighting Impact Assessment has been prepared by Dan Alasfar, an Incorporated Engineer and Registered Member of the Institute of Lighting Professionals (“ILP”) with 10+ years’ experience of technical input for environmental lighting.

An external lighting design has been produced using high quality directional LED luminaires to ensure safety and security after dark. The design has been produced in accordance with Manchester City Council Policy, National Policy, and guidance from British Standards and the ILP.

The lighting design layout is included in **Appendix 1** which indicates proposed luminaire heights, directions and levels of illuminance. Data sheets for the proposed luminaires are included in **Appendix 2**.

### Obtrusive Light Summary

Obtrusive light calculations have been undertaken and summarised within this report. Through careful design and appropriate product selection the results demonstrate that the proposed installation **complies** with light pollution guidance as set out in the *ILP Guidance notes for the reduction of obtrusive light* (GN01/21). If external lighting is installed in accordance with the proposed design the overall impact on the sensitive receptors identified is anticipated to be **negligible**.

### Design Model

Detailed lighting modelling has been undertaken using industry standard software ReluxDesktop. **Figure 1** and **2** include false colour and luminance extracts taken from the lighting design model. The figures illustrate how light will fall on and surrounding the Site. All reasonable steps have been taken to contain light within the Site as far as reasonably practicable, whilst achieving the performance criteria as set out in this report. The false colours are a measurement of lux, graduated on the scale shown.

Figure 1. Extract from the lighting design model (False colour view)

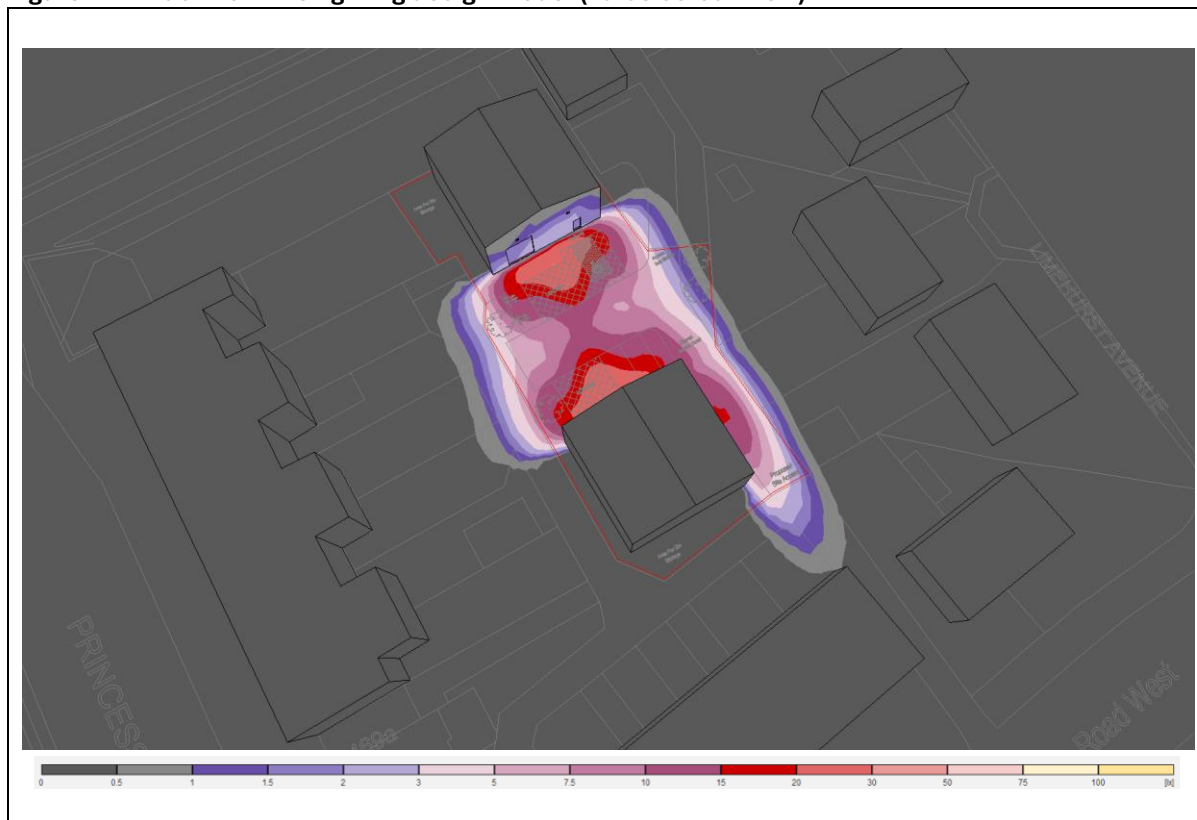
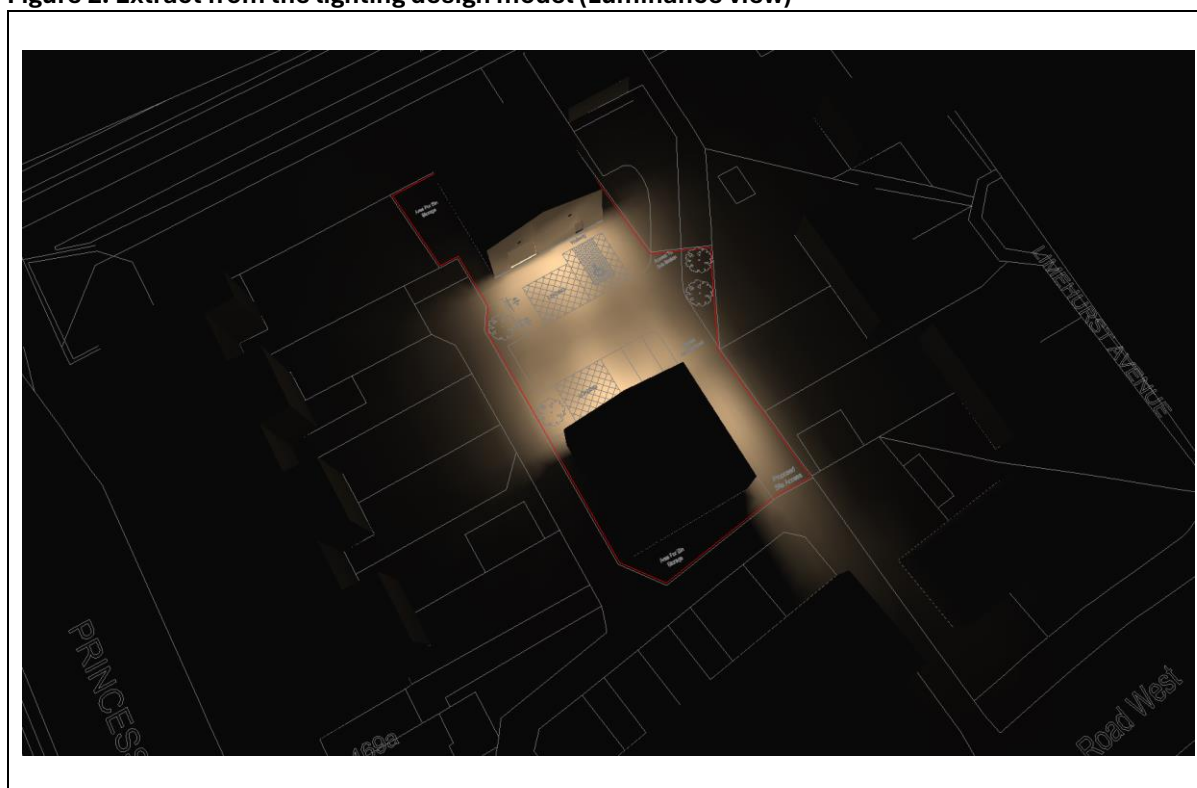


Figure 2. Extract from the lighting design model (Luminance view)



## 1.0 POLICY AND GUIDANCE

### **Manchester Core Strategy (2012-2027)**

The Core Strategy was adopted by Manchester City Council on 11th July 2012. It is the key document in Manchester's Local Development Framework and covers a period of 15 years from 2012 to 2027.

#### Policy DM 1 Development Management

*“All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-*

- *Appropriate siting, layout, scale, form, massing, materials and detail.*
- *Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.*
- *Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.*
- *Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes.*
- *Community safety and crime prevention.*
- *Design for health.*
- *Adequacy of internal accommodation and external amenity space.*
- *Refuse storage and collection.”*

### **MCC Guide to Development in Manchester Supplementary Planning Document and Planning Guidance (2007)**

The Guide to Development in Manchester is effectively a hybrid document acting as both a Supplementary Planning Document and planning guidance.

#### Community Safety and Crime Prevention

*“Crime prevention measures should be included in designs:*

*Building owners, users and visitors have quite different needs in terms of security and safety, but these specific needs should find expression in shared, high quality design principles. Entry and exit from all buildings should be clearly monitored either by person or by the use of CCTV. Approved window and door locks should be provided and the design of balconies, porches and outbuildings should not facilitate unauthorised access. Good practice relating to the protection of persons visiting the building should be*

*promoted by the use of good lighting, appropriate landscaping and clearly identified routes.”*

## **MCC Places for Everyone Joint Development Plan (2024)**

The Places for Everyone spatial strategy seeks to deliver sustainable, inclusive growth by focusing significant growth in jobs and housing at the core; boosting northern competitiveness through provision of significant new employment and housing opportunities and infrastructure and supporting key economic drivers in the south.

### Policy JP-P1 Sustainable Places

*“We aim to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having the following key attributes that all development, wherever appropriate, should be consistent with:*

- *[...] Safe, including by designing out crime and terrorism, reducing opportunities for anti-social behaviour and by ensuring that developments make appropriate provision for response and evacuation in the case of an emergency or disaster.*

## **National Planning Policy Framework (2024)**

The Revised National Planning Policy Framework (NPPF) provides guidance relating to planning and pollution control for new development in England. The purpose of the planning system is to contribute to achievement of sustainable development. In relation to lighting, Paragraph 198 states: *“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation”*

## **Institute of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (GN01/21)**

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

---

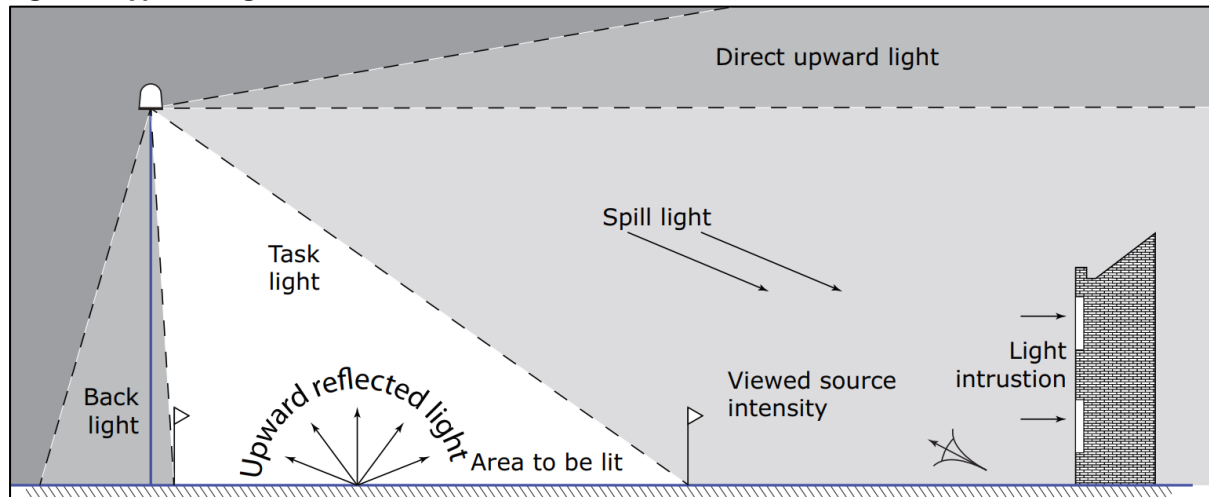
## **BS EN 12464-2: Lighting of Workplaces, Outdoor Workplaces (2024)**

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

## 2.0 LIGHT POLLUTION

Light pollution is a generic term for all adverse impacts that artificial lighting can have after dark. The main types of light pollution are shown diagrammatically in **Figure 3**.

**Figure 3. Types of Light Pollution**



**Light Spill** – Unwanted or misdirected artificial light that extends beyond its intended area, causing inefficiency and disturbance. It can affect wildlife, disrupt sleep, and create visual distractions.

**Sky Glow** – The brightening of the night sky due to excessive artificial light scattering in the atmosphere. It reduces visibility of stars and disrupts ecosystems, particularly affecting nocturnal species.

**Glare** – Intense, excessive brightness that causes visual discomfort or impairs vision. It can be blinding, hazardous, and is often caused by unshielded lights or overly bright signage.

### Example Lux Levels

To give context to the lux levels mentioned to within this report, **Table 1** provides examples of typical lux levels in various scenarios and applications.

**Table 1. Example lux levels (Source: IPCCTV specialists use-IP Ltd)**

| Lighting Condition                | Lux level  |
|-----------------------------------|------------|
| British summer sunshine           | 50,000     |
| Overcast sky                      | 5,000      |
| Well-lit office                   | 500        |
| Minimum for easy reading          | 300        |
| Passageway / outside working area | 25         |
| Main road lighting                | 5-20       |
| Sunset                            | 10         |
| Typical side road lighting        | 5          |
| Minimum security lighting         | 2          |
| Twilight                          | 1          |
| Clear full moon                   | 0.25 to <1 |
| Typical moonlight / cloudy sky    | 0.1        |
| Typical starlight                 | 0.001      |
| Poor starlight                    | 0.0001     |
| British summer sunshine           | 50,000     |
| Overcast sky                      | 5,000      |
| Well-lit office                   | 500        |

## 3.0 BASELINE

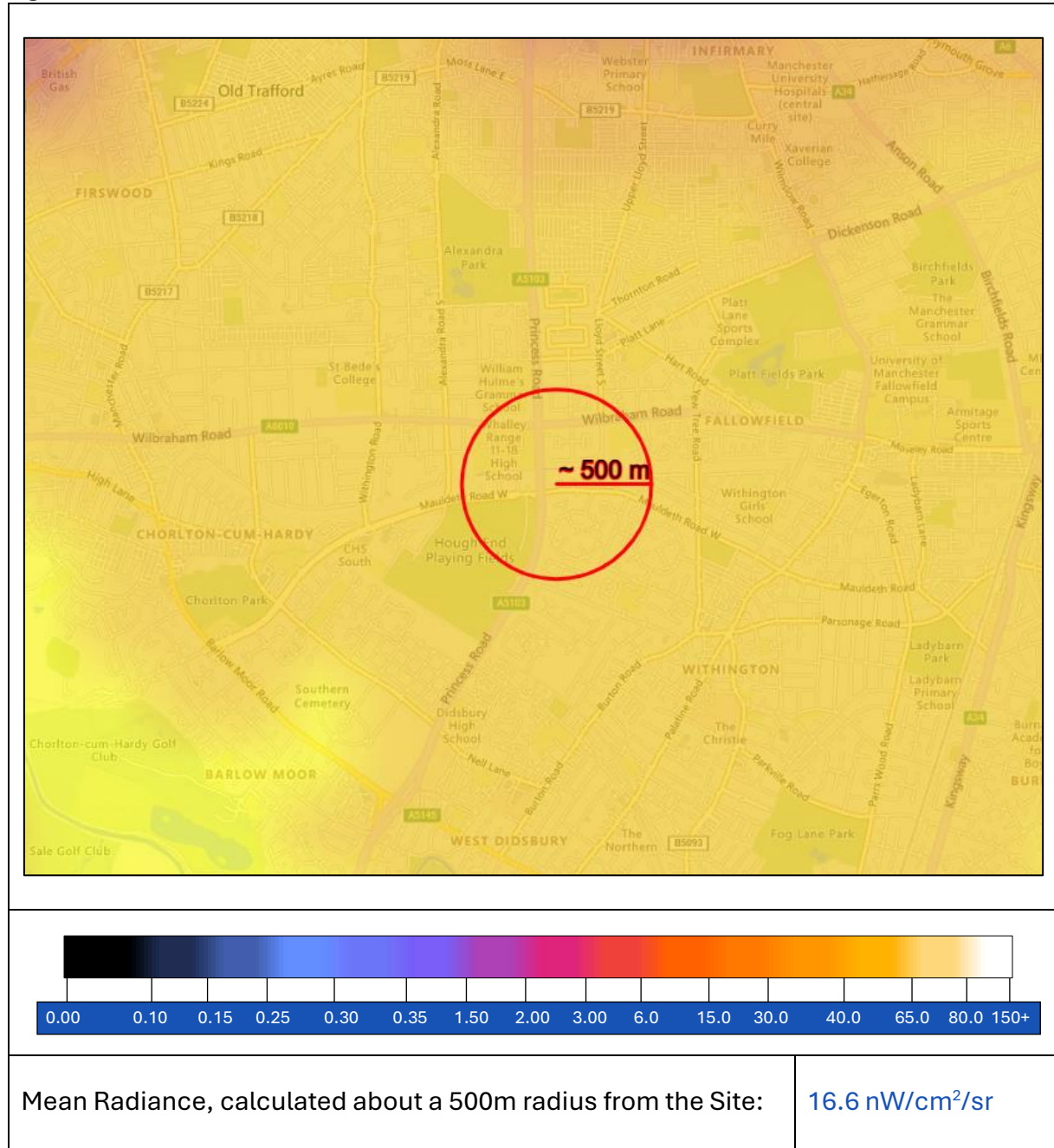
The study area includes the Site, the surrounding areas and any sensitive receptors which may have a direct view towards external lighting proposals and/or which may be affected during the construction and operation of the Proposed Development. Assessment of designation, use, habitat and external lighting condition dictates the classification of Environmental Zone across the proposed site location and surrounding areas.

### Local Radiance

The Visible Infrared Imaging Radiometer Suite (VIIRS) is a satellite instrument which orbits earth to collect and record radiance data (light emissions). The latest data was recorded in 2023 and is available in visual format. An extract at the Site location is included in **Figure 4**.

It is important to state that recognised organisations, such as the ILP or CIE, have not calibrated VIIRS radiance data with the Environmental Zones established in Table 1. It is also important to note the data should not accurately be relied upon and should be viewed conservatively. The data should be used as one tool to help understand the context of existing light emissions local to the Site.

Figure 4. Local radiance



## Sensitive Receptors

The sensitive receptors surrounding the Site have been identified based on a desktop study using mapping data in conjunction with Google Earth satellite and street view imagery.

Residential properties with a direct view of the Site are considered potentially sensitive.

Potentially sensitive residential receptors surrounding the Site are illustrated in **Figure 5**. Mitigation measures and obtrusive light calculations are discussed later in this report.

**Figure 5. Sensitive receptors**



- R1: 457-469 Princess Road
- R2: 240-248 Mauldeth Road West
- R3: 236-238 Mauldeth Road West
- R4: 1-3 Limehurst Avenue
- R5: 5-7 Limehurst Avenue
- R6: 9 Limehurst Avenue

## Environmental Zone

ILP GN01/21 recommends that the immediate environment is classified into an environmental zone based on ambient lighting levels in the surrounding area. The environmental zones are detailed in **Table 2**. Zone E0 requires the strictest level of control and E4 the lowest.

The Site has been classified as Environmental Zone E3.

**Table 2. Environmental Zones**

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

## 4.0 DESIGN PARAMETERS

This Section sets out the parameters for Site lighting, both lighting performance requirements and obtrusive light limits which must be complied with in order to reduce adverse impacts to negligible levels. A modern external lighting installation is vitally important to the Site for many reasons including, but not limited to, the following:

- To provide ease of wayfinding and navigation after dark;
- To provide security and deter antisocial behaviour;
- To set the architectural scene and urban landscape; and,
- To protect installations from accidental or deliberate damage.

The proposed external lighting layout is included in **Appendix 1**.

### Lighting Performance

The design has been produced in accordance the requirements set out in **Table 3** to meet performance requirements set out in BS EN 12464-2 *Lighting of outdoor workplaces*.

Maintained average is the average amount of light received by surface. Uniformity ratio is a measure of how evenly distributed the light falls across a surface.

**Table 3. Lighting Performance criteria**

| Site Area           | Description                                                                                     | Maintained average (lux) | Uniformity ratio |
|---------------------|-------------------------------------------------------------------------------------------------|--------------------------|------------------|
| Car park and access | Traffic areas for slowly moving vehicles (max. 10 km/h)                                         | 10                       | 0.25             |
| Loading areas       | Short-term handling of large units and raw materials, loading and unloading of solid bulk goods | 20                       | 0.40             |

### Obtrusive Light

According to ILP GN01/21 the obtrusive light limits for exterior lighting in Environmental Zone E3 are as set out in **Table 4**.

**Table 4. Obtrusive light limits**

| Parameter                                                                              | Conditions  | Environmental Zone E3 Limits |
|----------------------------------------------------------------------------------------|-------------|------------------------------|
| Illuminance in the vertical plane (light intrusion into neighbouring property windows) | Pre curfew  | 10 lux                       |
|                                                                                        | Post curfew | 2 lux                        |
| Upward light ratio                                                                     |             | 5%                           |

## 5.0 MITIGATION

Poorly thought-out external lighting has the potential to cause unacceptable impacts on neighbouring properties. The following mitigation steps have been applied to reduce adverse impacts to negligible levels.

**Optimising mounting heights:** Mounting heights have been restricted to 4.5m, limiting the overall size and scale of lighting.

**Directional light:** All proposed luminaires are directional, full cut-off type, emitting all their light below the horizontal plane. Direct upward light has been removed by ensuring all luminaires are installed at zero tilt. Directional light also helps limit glare as can be seen in **Figure 6**.

Figure 6. Directional light

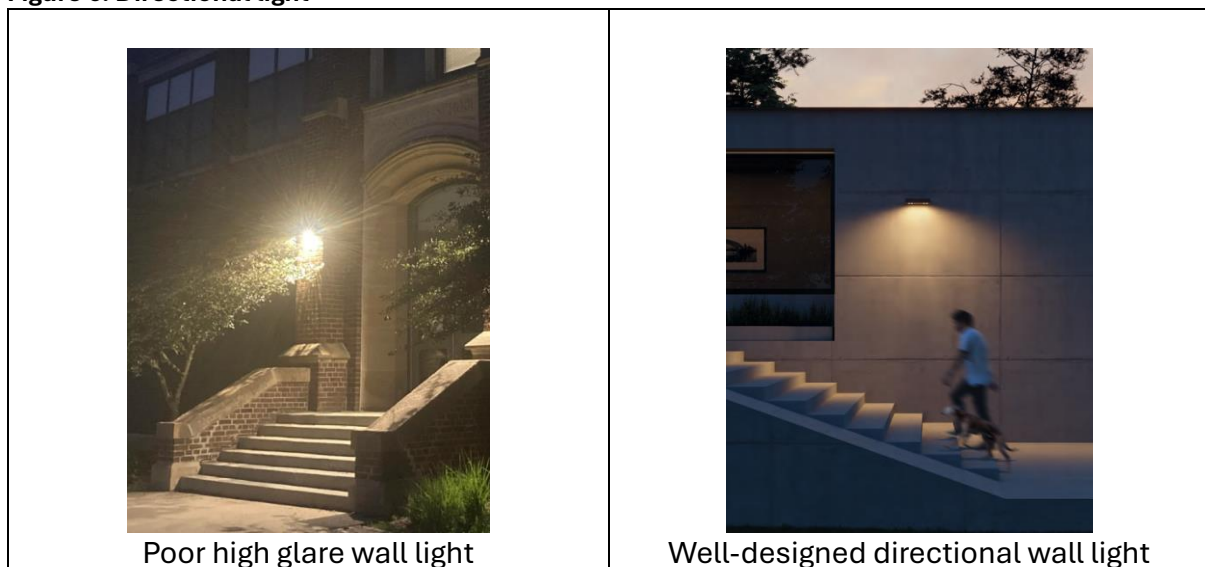
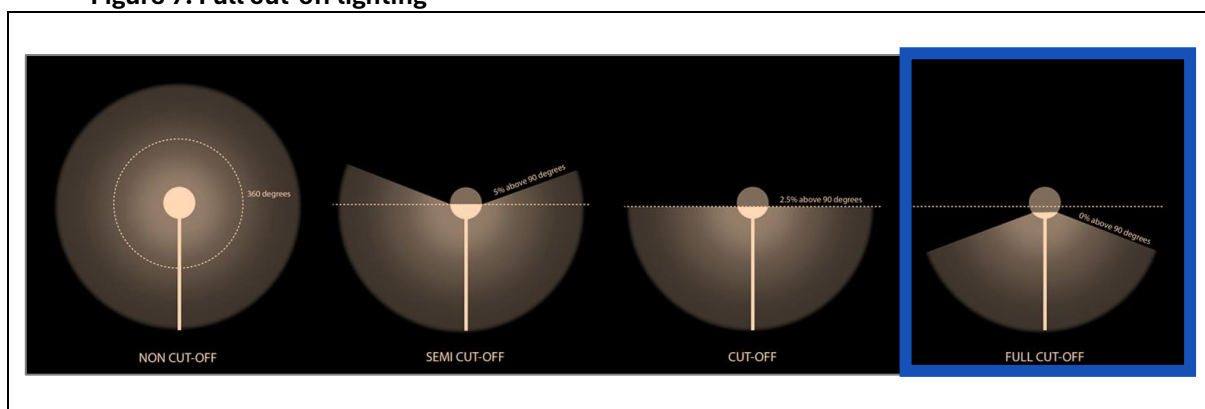


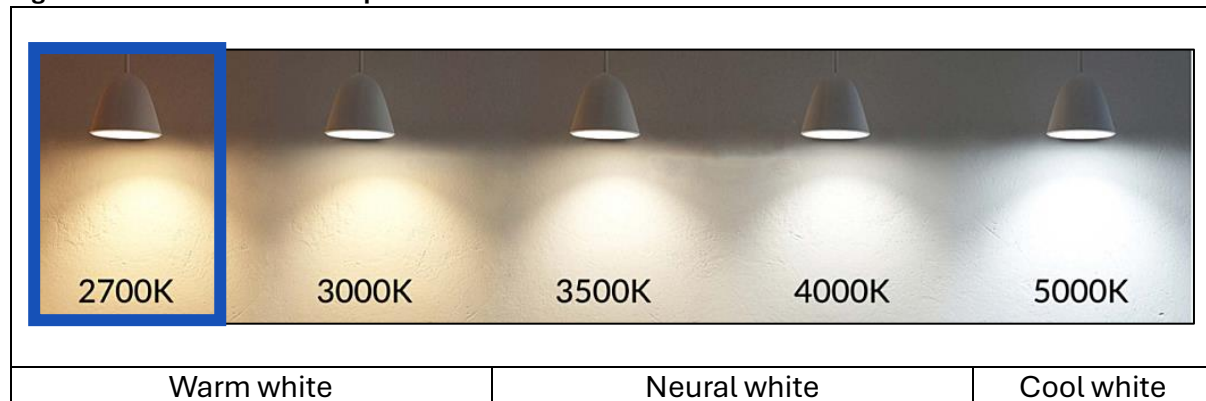
Figure 7. Full cut-off lighting



**Avoiding over lighting:** All illumination levels have been set as low as practicable while complying with safety and security recommendations and performance values as set out in this report.

**Colour temperature:** Luminaires are proposed at 2700K warm white colour temperature with reduced blue light component. Warm white is less prone to disrupt natural sleep-wake cycle and melatonin production and causes less light “scatter” which contributes to sky glow.

Figure 8. Selected colour temperature



**Spill control:** Luminaires have been proposed with specific optics, design to contain light within the site as far as reasonably practicable.

**Only switched on when required:** Lighting is anticipated to be controlled by an astronomical time switch which automatically controls lighting based on the time of day and astronomical events such as sunset and sunrise, accounting for geographic location and calendar date. Time programmes shall be set to ensure that lights are only switched on when required.

Figure 9. Astronomical time switch – Sangamo Suntracker



## 6.0 CALCULATION SUMMARY

### Lighting Performance

**Table 5** summarises the lighting design calculation results with a **PASS** / **FAIL** assigned against each test.

**Table 5. Lighting design summary**

| Site Area           | Performance requirements |            | Calculated results       |            | PASS / FAIL |
|---------------------|--------------------------|------------|--------------------------|------------|-------------|
|                     | Maintained average (lux) | Uniformity | Maintained average (lux) | Uniformity |             |
| Car park and access | 10                       | 0.25       | 10.7                     | 0.29       | <b>PASS</b> |
| Unit 01 Loading     | 20                       | 0.40       | 22.2                     | 0.53       | <b>PASS</b> |
| Unit 02 Loading     | 20                       | 0.40       | 22.8                     | 0.54       | <b>PASS</b> |

### Obtrusive Light

**Table 6** and **7** summarise the obtrusive light calculation results with a **PASS** / **FAIL** assigned against each test. As can be seen the proposed installation **complies** with light pollution guidance as set out in ILP GN01/21. If external lighting is installed in accordance with the proposed design the overall impact is anticipated to be **negligible**.

**Table 6. Obtrusive light - Illuminance in the vertical plane**

| Receptor                       | Illuminance in the vertical plane |                  | PASS / FAIL |
|--------------------------------|-----------------------------------|------------------|-------------|
|                                | Threshold (lux)                   | Calculated (lux) |             |
| R1: 457-469 Princess Road      | 2                                 | 0.10             | <b>PASS</b> |
| R2: 240-248 Mauldeth Road West | 2                                 | 0.10             | <b>PASS</b> |
| R3: 236-238 Mauldeth Road West | 2                                 | 0.40             | <b>PASS</b> |
| R4: 1-3 Limehurst Avenue       | 2                                 | 0.07             | <b>PASS</b> |
| R5: 5-7 Limehurst Avenue       | 2                                 | 0.20             | <b>PASS</b> |
| R6: 9 Limehurst Avenue         | 2                                 | 0.05             | <b>PASS</b> |

**Table 7. Obtrusive light – Upward light ratio**

| Receptor | Upward light ratio |            | PASS / FAIL |
|----------|--------------------|------------|-------------|
|          | Threshold          | Calculated |             |
| Site     | 5%                 | 0.00%      | <b>PASS</b> |

## 7.0 PROPOSED LUMINAIRES

| Type A   Building mounted luminaire |                                                                                                            |
|-------------------------------------|------------------------------------------------------------------------------------------------------------|
| Specification                       | Description                                                                                                |
| Correlated Colour Temperature (CCT) | 2700K (warm white)                                                                                         |
| Mounting                            | Building mounted at 4.5 meters                                                                             |
| Location                            | Unit frontage                                                                                              |
| Manufacturer                        | Kingfisher Lighting                                                                                        |
| Product                             | Semita Urban c/w <a href="#">FL Optic</a>                                                                  |
| Output                              | 11.0W                                                                                                      |
| Upward light                        | 0.0%                                                                                                       |
| Emergency lighting                  | Complete with 3-hour emergency battery backup for safe building egress in the event of mains power failure |
| Luminaire image                     |                         |

| Type B   Building mounted luminaire |                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------|
| Specification                       | Description                                                                          |
| Correlated Colour Temperature (CCT) | 2700K (warm white)                                                                   |
| Mounting                            | Building mounted at 4.5 meters                                                       |
| Location                            | Access road                                                                          |
| Manufacturer                        | Kingfisher Lighting                                                                  |
| Product                             | Semita Urban c/w <a href="#">OC Optic</a>                                            |
| Output                              | 11.0W                                                                                |
| Upward light                        | 0.0%                                                                                 |
| Emergency lighting                  | n/a                                                                                  |
| Luminaire image                     |  |

## 8.0 CONSTRUCTION PHASE LIGHTING

While construction phase lighting is expected to be short term and reversible it is important to minimise disruption as far as practicable. To reduce the effects of lighting during the construction phase the following measures should be put in place:

- Lighting will operate in all external areas used by construction workers after dark in order to provide a safe and secure working environment without over lighting. High quality LED light sources with high colour rendering index (CRI) shall be utilised to maximise visibility with efficient light output;
- Lighting shall be provided to meet the target lux level as set out in BS 12464-2 *Lighting of outdoor workplaces* without over lighting. Luminaires shall be mounted at the lowest practical mounting height, providing lighting only where lighting is required;
- The Contractor shall specify working hours, uses of lighting, location of temporary floodlights and construction compound and agreeing these with the local council to reduce duration of impact;
- Lighting controls should be employed to dim or switch off any lighting that is not needed;
- Lighting that needs to be sited close to the permitter or ecologically sensitive areas should be fitted with shielding or be switched off or dimmed when not in use;
- Lighting should be controlled in such a way to illuminate high activity, hazardous or high security areas while reducing lighting levels at less pertinent areas; and
- The Contractor should act responsibly to adjust any temporary lighting reported as causing nuisance.

## ***APPENDIX 1 – EXTERNAL LIGHTING LAYOUT***



- NOTES
- THIS IS NOT A CONSTRUCTION DRAWING.
  - DO NOT SCALE FROM THIS DRAWING.
  - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER PROJECT DOCUMENTS.

KEY

| LUMINAIRE SCHEDULE |                                                                                                     |       |
|--------------------|-----------------------------------------------------------------------------------------------------|-------|
| SYMBOL             | DESCRIPTION                                                                                         | IMAGE |
| A                  | KINGFISHER LIGHTING SEMITA URBAN<br>FL OPTIC<br>11.0W 2700K<br>C/W 3HR EMERGENCY<br>WALL MOUNT 4.5M |       |
| B                  | KINGFISHER LIGHTING SEMITA URBAN<br>OC OPTIC<br>11.0W 2700K<br>WALL MOUNT 4.5M                      |       |

| CALCULATION SUMMARY  |          |          |            |
|----------------------|----------|----------|------------|
| AREA                 | AVG. lux | MIN. lux | UNIFORMITY |
| CAR PARK AND ACCESS  | 10.7     | 2.8      | 0.29       |
| LOADING AREA UNIT 01 | 22.2     | 11.8     | 0.53       |
| LOADING AREA UNIT 02 | 22.8     | 12.4     | 0.54       |

|     |          |             |
|-----|----------|-------------|
| P1  | 17.03.25 | FIRST ISSUE |
| REV | DATE     | DESCRIPTION |

PROJECT  
MAULDETH ROAD YARD  
MANCHESTER

DRAWING TITLE  
EXTERNAL LIGHTING  
LAYOUT

DRAWING NO.  
250216-LTBL-DWG-001

|                                                                   |                |                    |           |
|-------------------------------------------------------------------|----------------|--------------------|-----------|
| DAN ALASFAR MEng IEng MILP<br>dan@lightable.co.uk<br>07877 912379 | SCALE<br>1:200 | DATE<br>17.03.2025 | REV<br>P1 |
|-------------------------------------------------------------------|----------------|--------------------|-----------|

## ***APPENDIX 1 – MANUFACTURERS DATA SHEETS***



# Kingfisher Lighting

Part of the LUCECO group of companies

## Datasheet

### SEMITA Urban



#### Specification Text

The SEMITA Urban 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 6 - 11W, with an efficacy of 127 - 146 lm/W. The luminaire shall deliver 744 - 1,611 luminaire lumens. The SEMITA Urban 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.

For DarkSky Specifications, the luminaire shall produce a CCT of 2700K.



#### Specification

Weight: 2.4 kg  
Material: Die-cast Aluminium  
Paint Finish: RAL7016 Anthracite Grey  
Embodied Carbon: 44 kg CO<sub>2</sub>e

#### Product Description

Designed and engineered in the UK, SEMITA Urban is a slimline wallpack, available with street, path or flood optics in addition to comfort options.



Kingfisher  
Lighting

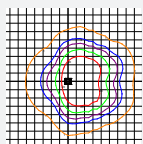
Part of the LUCECO group of companies

#### Key Features

- 6.0W - 11.0W
- 744 - 1,611 Luminaire Lumens
- Efficacy up to 146.0 lm/W
- 2700K, 4000K, CRI>70
- IP66, IK10
- Lifetime > 100,000hr, L80
- 3 Hour Integral Emergency
- DarkSky Approved

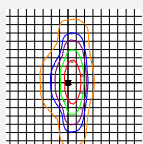
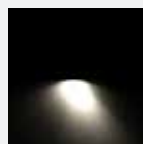
Available with integral 3 hour emergency using a 3.0W pack. Output range from 372 - 438 lm dependant on optic, CCT & accessories.

#### Optics



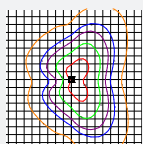
##### Flood Optic FL

Designed with excellent wide distribution for areas needing greater illumination such as car parks, children's areas and many more areas



##### Path Optic OC

Perfect for a variety of pedestrian areas in close proximity to buildings. E.g retail parks, façade lighting and offices



##### Street Optic ST

Ideal for illuminating areas such as building perimeters and access areas. It would be best placed in areas such with high security needs.



#### Circular Economy Score

|            |                                              |
|------------|----------------------------------------------|
| 0 to 0.05  | 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                        |

## Other Options Available

Contact for further details

- 3 Hour Integral Emergency
- Colour Temperature Opportunities

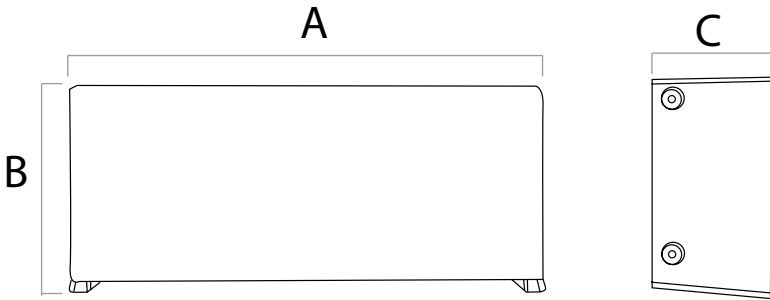
## Mounting Options

- Wall Mount

## Dimensions

| Body Type | A   | B   | C  |
|-----------|-----|-----|----|
| Standard  | 337 | 148 | 82 |

All measurements in mm



| Code         | Power (W) | Luminaire Lumens (lm) | Drive Current (mA) | Inrush Current (A pk) | Optic                        | CCT (K) | IP   | IK   | Weight (kg) | Driver Included | Driver Type |
|--------------|-----------|-----------------------|--------------------|-----------------------|------------------------------|---------|------|------|-------------|-----------------|-------------|
| SEMUFL08D    | 6.0       | 812                   | 205                | 5.0                   | Asymmetrical Flood Optic FL  | 4000    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUFL08D27K | 6.0       | 771                   | 205                | 5.0                   |                              | 2700    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUFL15D    | 11.0      | 1,611                 | 410                | 5.0                   |                              | 4000    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUFL15D27K | 11.0      | 1,530                 | 410                | 5.0                   |                              | 2700    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUOC15D    | 11.0      | 1,570                 | 410                | 5.0                   | Asymmetrical Path Optic OC   | 4000    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUOC15D27K | 11.0      | 1,505                 | 410                | 5.0                   |                              | 2700    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUOC08D    | 6.0       | 802                   | 205                | 5.0                   |                              | 4000    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUOC08D27K | 6.0       | 762                   | 205                | 5.0                   |                              | 2700    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUST08D    | 6.0       | 783                   | 205                | 5.0                   | Asymmetrical Street Optic ST | 4000    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUST08D27K | 6.0       | 744                   | 205                | 5.0                   |                              | 2700    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUST15D    | 11.0      | 1,496                 | 410                | 5.0                   |                              | 4000    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |
| SEMUST15D27K | 11.0      | 1,425                 | 410                | 5.0                   |                              | 2700    | IP66 | IK10 | 2.4         | Yes             | Basic DALI  |