A610
White Pines East
RESIDENTIAL LIGHTING ANALYSIS

Planning Stage

29th March 2021

A610-OCSC-XX-XX-RP-E-0001

NOTICE

DOCUMENT CONTROL & HISTORY

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P05	For Planning	MC	MD	EP	29.03.2021
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P02	For Planning	MC	MD	EP	22.05.2020
P01	For Planning	MC	MD	EP	18.05.2020

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1.0 INTRODUCTION

Ardstone Homes Ltd. intend to apply to for permission for a Strategic Housing Development at a site of 2.98 ha, at Stocking Avenue, Woodstown, Dublin 16, which is contained within the Ballycullen-Oldcourt Local Area Plan lands.

The development will consist of:

- The construction of 241 no. residential units, in 5 no. apartment blocks, ranging in height from 4-6 storeys, and 3 no. three storey duplex block. The development will provide 93 no. 1 Bed and 148 no. 2 bed units, as follows;
  - Block A is a 5 storey block comprising 40 units (20 no. 1 bed units; and 20 no. 2 bed units). Block A includes balconies on southern, northern and western elevations. A dedicated community building space comprising 552sq.m will also be provided on the ground floor of Block A.
  - Block B is a 4 storey block comprising 34 units (18 no. 1 bed units; and 16 no. 2 bed units). Block B includes balconies on southern, southern, western and eastern elevations;
  - Block C is a Part 4 Part 5 storey block comprising 43 units (21 no. 1 bed units; 22 no. 2 bed units) Block C includes balconies on southern, eastern and western elevations. Residential Tenant Amenities comprising c.171sq.m is provided at ground floor level of Block C to serve all residential units, comprising; a reception area, games space, residents lounge and gym space.
  - Block D is a 5 storey block comprising 49 no units (21 no. 1 bed units and 28 no. 2 bed units). Block D includes balconies on southern, western and eastern elevations;
  - Block E is a 6 storey block comprising 47 no units (13 no. 1 bed units and 34 no. 2 bed units). Block E includes balconies on southern, western, eastern and northern elevations;
  - 3 no. 3 storey duplex blocks are provided to the western boundary of the site, comprising 28 no. 2 bed units. Balconies and terrace space is provided to the eastern elevation.
- Provision of 204 no. on street car parking spaces
- Omission of crèche as approved under SDCC Ref. SD14A/0222;
- The main vehicular access to the scheme will be from Stocking Avenue. A second new vehicular access is proposed from White Pines North to the east.
- Provision of 401 no. bicycle parking spaces;
- All other ancillary site development works to facilitate construction, site services, piped infrastructure, ESB sub-stations, plant, public lighting, bin stores, bike stores, boundary treatments and provision of public and private open space including hard and soft landscaping, plant, provision of public and private open space areas comprising hard and soft landscaping, site services all other associated site excavation, infrastructural and site development works above and below ground.

This report outlines the design intent and considerations to be taken into account with regard to residential lighting for the development roadways on the proposed residential development at White Pines East as developed by O'Connor Sutton Cronin M&E Ltd.

The key objectives for the lighting design are as follows:

- Provide adequate illumination to contribute towards the safe use of all public roads, footpaths and cycle paths by vehicles and bicycles;
- Provide adequate illumination to contribute towards the safe use of all walkways and footpaths by pedestrians;
- Contain the lighting within the site boundary;
- Minimise light pollution and visual glare to residents and neighbouring areas;
- Take account of ecological factors such as local bat populations;
- Provide a visually stimulating environment;
- Enhance security.

The predicted performance of the external lighting installation has been assessed in detail using lighting simulation software. The software used for this study is Lighting Reality: Roadway Lighting.

2.0 DESIGN CRITERIA

The design criteria applied to the proposed external lighting installations is in accordance with I.S. EN 13201-2 Road Lighting Performance Requirements, BS 5489-1:2003 Code of practice for the design of road lighting, CIE Guide to the Lighting of Urban Areas, South Dublin County Council Public Lighting Specification. The guidelines in "Bats & Lighting, Guidance Notes for Planners, engineers, architects and developers", issued by Bat Conservation Ireland were also taken into account in the design of lighting.

Additional guidance on light trespass onto residential buildings has been obtained from CIBSE Lighting Guide 4.

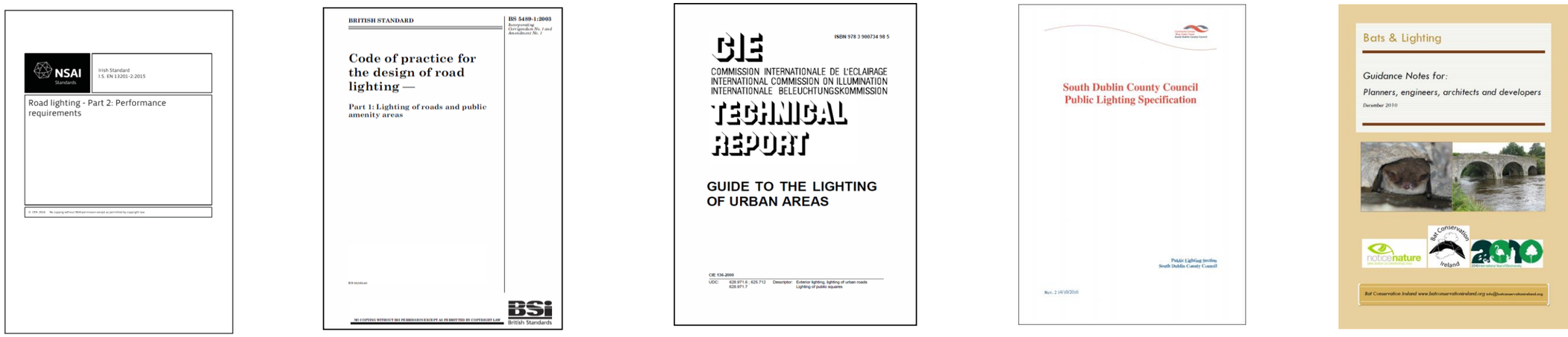

Figure 2.1 - Lighting Design Guides

Listed below are a number of key criteria which have been incorporated into the external lighting design for the scheme:

1. No white light or other lighting with a UV component permitted due to bat habitats.
2. Lighting with a narrow spectrum not permitted to reduce impact on insects.
3. Minimise lux levels around site boundary in keeping with bat protection guidelines.
4. Luminaires are chosen with zero upward light ratio, to minimise light pollution, energy waste and impact on wildlife.
5. An Amber LED (3000K) has been shown to have a reduced impact on Bats due to its narrow spectrum properties.
6. South Dublin County Council public lighting guidance document states all roadways are to be designed to conform to required lux levels of P4 lighting classes (5 lux):
    - Lighting Classification P4 is intended for users of motorised vehicles on traffic routes where traffic speeds are from low to medium, pedestrian footpath / cycle ways
    - To comply with P4 lighting classification the following parameters must be adhered to:
        a) Average Horizontal Illuminance (Ẽ) must be an average of 5 lux

b) Minimum Horizontal Illuminance (Emin) must be a minimum of 1 lux

c) It is recommended that the actual overall uniformity of illuminance (Uo) be as high as reasonably practicable

7. Lighting to be directional on to the roadways and footways only with minimal spillage of light to adjoining habitats. To reduce light spillage from luminaries, lights should not to emit at angles greater than 70° from the vertical plane.

8. Maintain dark zones for foraging bats in areas where lighting is not necessary. However, where lighting is required, this lighting will be placed at a minimum height using the lowest lux value permitted for public health and safety.

	$\bar{E}$	E_{min}
P1 or S1	15.0	3.0
P2 or S2	10.0	2.0
P3 or S3	7.5	1.5
P4 or S4	5.0	1.0
P5 or S5	3.0	0.6
P6 or S6	2.0	0.4

Figure 2.2 - P4 - S4 Lighting Class per EN13201:2015

9. The following table from CIBSE Lighting Guide 4 (2006) has been used in assessing the light trespass onto the vertical faces of the residential buildings in the development.

Environmental zone	Sky glow ULR inst. (max %)	Light trespass (into windows) E_v (lux) max	Source intensity I (kcd) max
E1 Dark landscapes	0	2	2.5
E2 Rural, village, dark urban locations	2.5	5	7.5
E3 Urban locations and small town centres	5	10	10
E4 Town and city centres	15	25	25

Figure 2.3 - CIBSE Lighting Guide Part 4

3.0 PROPOSED DESIGN

3.1 Introduction

The main road through the development and pedestrian access routes will require illumination.

It is proposed that 6m high tubular roadway light fittings with overhang reach are installed to illuminate the road surface. 6m high lamp posts have been selected due to their characteristics which enable a lower quantity of luminaires to be used and provide an even spread of luminance along the road.

A combination of 4m high lamp posts and 1m high bollards are to provide directional light to the pedestrian walkways and amenity areas.

Finally, wall mounted fittings are to be installed to provide lighting to steps, ramps and stairs throughout the development.

A proposed site lighting layout drawing is enclosed with this report detailing the location and type of fitting to be used.

The desired lighting design may also be achieved by other luminaires and the final lighting installation may use other luminaires, with modified positioning and aiming to achieve the same result. Manufacturers' stated performance characteristics are subject to change. Any changes to be agreed with South Dublin County Council Road Lighting Department.

3.2 Public Road Luminaire

It is proposed to provide 6m high column-type light fittings to the road area. The proposed fitting is a modern decorative LED luminaire 28W LED lamp module with direct light spread. The luminaire is constructed out of die cast aluminium. The luminaire will be installed with a DALI ballast for future use. Fully compliant with EN 60598: CE.

Figure 3.2.1
Luminaire Fitting

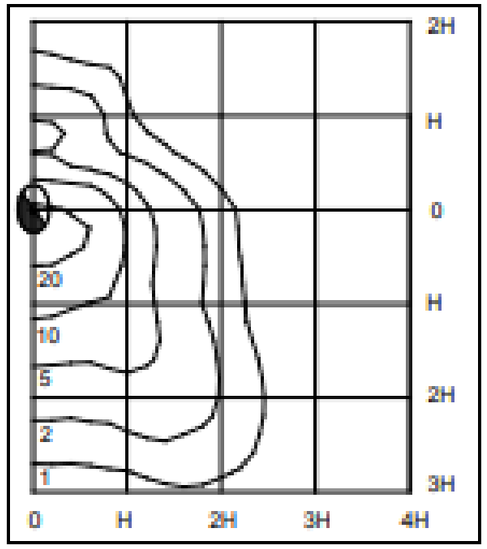

Figure 3.2.2
Luminaire - Photometric Space Height Curve

3.3 Amenity / Pedestrian Area Luminaire

It is proposed to provide 4m high column-type light fittings and bollards to the pedestrian walkways / cycle routes and amenity area in order to achieve required Illumination levels including 20 lux on level and gently sloped access routes. The proposed column light fitting is a modern decorative LED luminaire 28W LED lamp module with direct light spread. The proposed bollard light fitting is a modern decorative LED luminaire 12W bollard. The luminaire will be installed with a DALI ballast for future use. Fully compliant with EN 60598: CE.

Figure 3.3.1
Luminaire Fitting

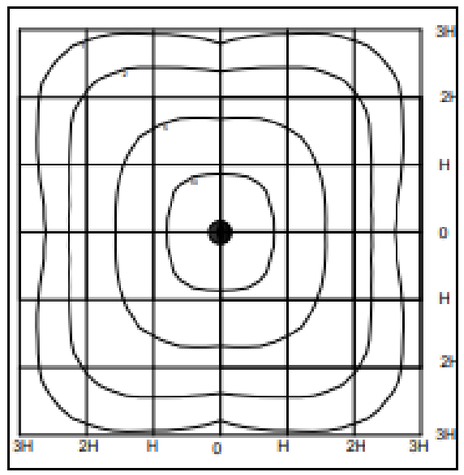

Figure 3.3.2
Luminaire - Photometric Curve

Figure 3.3.3
Luminaire Fitting

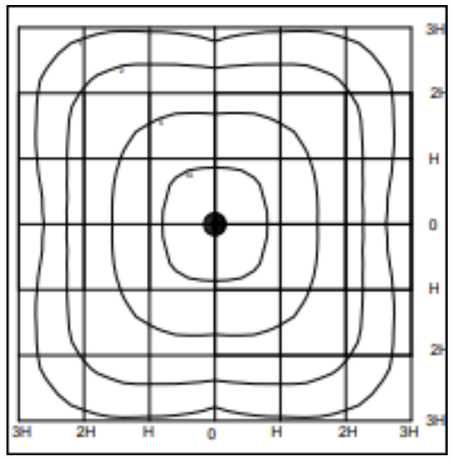

Figure 3.3.4
Luminaire Fitting

3.4 Wall Mounted Luminaire

It is proposed to provide wall mounted luminaires to provide 100 lux Illumination on ramps and steps within the walkways. The proposed light fitting is a Thorn EyeKon LED round, impact resistant luminaire rated at IP65 for ingress protection and IK10 for vandal resistance. The body is a die-cast aluminium powder coated anthracite colour. The diffuser is polycarbonate with a die-cast aluminium bezel. Complete with 3000K LED.

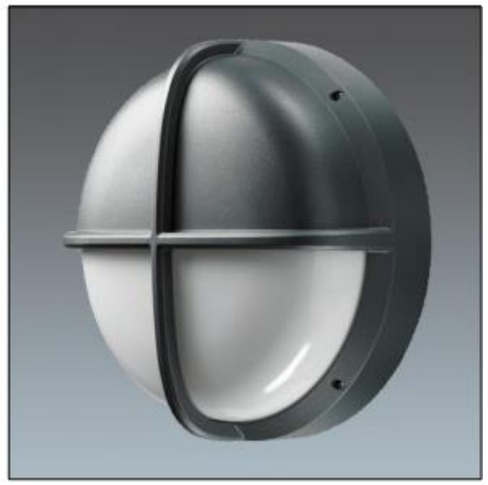

Figure 3.4.1
Luminaire Fitting

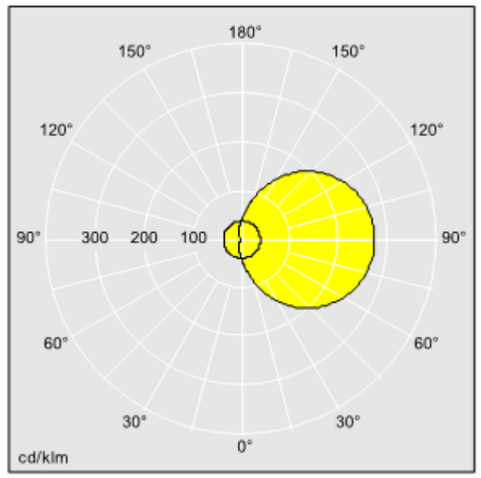

Figure 3.4.2
Luminaire - Photometric Curve

4.0 RESULTS

4.1 Main Road Lighting

Figure 4.1.1 indicates the predicted illumination levels on the main roadway through the development. Details of the proposed lighting layout are shown on the drawing appended to this report.

Results for the main road indicate the following:

- Compliance with P4 S4 class as per I.S. EN 13201:2015

Eav	10.02
Emin	1.72
Emax	26.65
Emin/Emax	0.06
Emin/Eav	0.17

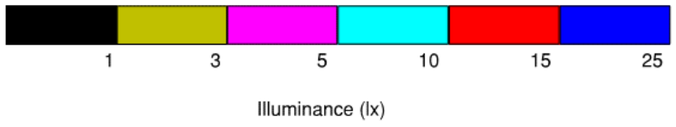

Figure 4.1.1 - Ground Illumination Levels (Lux) for Main Road

4.2 Amenity Areas and Light Spill on Residential Units

Figure 4.2.1 illustrates the calculated illumination levels for the proposed installations around the residential areas and demonstrates the following:

- The light spill on the apartments and duplexes reach a level of up to 5 Lux.
- The light on the front façade of the apartment & duplexes does not exceed the guidelines set forth in table 2.2 CIBSE Lighting Guide 4, which is 10 lux.

Eav	12.13
Emin	1.03
Emax	123.86
Emin/Emax	0.01
Emin/Eav	0.09

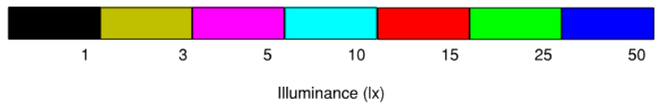

Figure 4.2.1 Ground Illumination Levels (lux) for Development

4.3 Bat Conservation and Lighting Levels

In compliance with Bat Conservation Ireland guidelines the following results were achieved:

- Light spill in areas not requiring illumination, and which are noted as bat migration routes and habitats achieve average levels of approximately 1 lux.
- There are minimal lights in close proximity to wooded areas known to contain bats, to the South-East of the development.

5.0 CONCLUSIONS

The main road through the site achieves and average of 10 lux, which is within the range of P4 lighting class.

The other amenity walkways throughout the development meet the lighting design requirements, with an average of 12 lux.

The proposed lighting scheme complies with the recommendations of BCI in relation to protection of bat habitats.