
K416
Lands Adjacent to “The Grange”
Brewery Road/Stillorgan Road
Blackrock, Co. Dublin

LIGHTING ANALYSIS



Planning Stage
Rev03

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NOTICE

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DOCUMENT CONTROL & HISTORY

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1.0 EXECUTIVE SUMMARY

The report considers the lighting design as developed by O'Connor Sutton Cronin (OCSC) and outlines the design intent and considerations with regards to transport, cyclists, pedestrians whilst considering access for deliveries and collections at the Grange residential development. The lighting design complies with the regulations services such as ETCI National Rules for Electrical Installations ET101:2008, Dun Laoghaire - Rathdown County Council Public Lighting Installations and British Standards Institution 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas lighting regarding Illumination levels.

The report has been developed with the following principal considerations:

- Provide adequate illumination to contribute towards the safe use of the roadways, footpaths and pedestrian walkways.
- Contain the lighting within the site.
- Minimise light pollution and visual glare for pedestrians and neighbouring areas.
- Enhance security.

The complete external lighting installation was designed to align with the regulations services such as ETCI National Rules for Electrical Installations ET101:2008, Dun Laoghaire - Rathdown County Council (DLRCC) Public Lighting Installations and British Standards Institution 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas lighting regarding Illumination levels. The design criteria is outlined in Section 3.0.

The predicted performance of the external lighting installations has been assessed in detail using Lighting Simulation software. The Lighting Simulation software used was Lighting Reality; which includes isoline contour capabilities.

Our design intent comprising of column lighting for the roadways and footpaths are described in Section 4.0. An indicative example of the type of proposed luminaire (light fitting) and associated lamp specification have been included, with accompanying images, photometric and dimensional data.

Section 5.0 provides analysis of the predicted illumination results for the roadways, footpaths and pedestrian walkways.

2.0 INTRODUCTION

The newly proposed residential development at Lands Adjacent to “The Grange”, Brewery Road/Stillorgan Road, Blackrock, Co. Dublin is within an urban area with low level traffic and public use is likely to be moderate with usage of amenities primarily by local residents. A lighting class of P3 is required within the development with results outlined in section 5 of this report.

The report will deal with compliance with the regulations services such as ETCI National Rules for Electrical Installations ET101:2008, Dun Laoghaire - Rathdown County Council Public Lighting Installations and British Standards Institution 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas lighting regarding Illumination levels.

3.0 DESIGN CRITERIA

The design criteria applied to the proposed roadways, footpaths and pedestrian walkways lighting installation shall be in accordance with ETCI National Rules for Electrical Installations ET101:2008 as well as Dun Laoghaire - Rathdown County Council Public Lighting Installations.

The key items in focusing the design are as described below:

1. Compliance with lighting regulations for the roadways, footpaths and pedestrian walkways functionality
2. Mitigate light spill onto adjoining trees

To address these points the following measures were put in place:

1. Consciously positioned, so as to limit negative spill and light pollution whilst also maintaining the required lux levels uniformly across the roadways, footpaths and pedestrian walkways.
2. Narrow beam optics are employed to physically contain unnecessary light spillage and light pollution.
3. Light levels at the Grange were kept to a minimum to meet the conditions of classification P3 (7.5 Lux) at ground level as per Dun Laoghaire - Rathdown County Council (DLRCC) requirements.

3.1 GUIDELINES TO ROADWAYS AND FOOTPATHS LIGHTING DESIGN

The points below were used as guidelines where practical in the design of the external lighting.

1. Cool white light (4000K) LED luminaire.
2. Minimum lux levels shall be used as required by DLRCC Public Lighting (Classification P3)
3. Dun Laoghaire - Rathdown County Council public lighting guidance document for roadways and to be designed to conform with required lux levels with an average of 7.5 lux

- Roadways and footpaths at the Grange Apartments will be designed to classification P3.
- To comply with P3 lighting classification the following parameters must be adhered to;
 - a. Average Horizontal Illuminance (\bar{E}) must be an average of 7.5 lux.
 - b. Minimum Horizontal Illuminance (E_{min}) must be a minimum of 1.5 lux.
 - c. It is recommended that the actual overall uniformity of illuminance (U_o) be as high as reasonably practicable.

	\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

footpaths are

Table 3.1 - P Classification BS 5489-1:2013

4.0 PROPOSED INSTALLATIONS

The proposed residential development roadways, footpaths and pedestrian walkways will require illumination and shall for the purposes of this report comprise of the lighting installation of the Grange Apartments, Stillorgan.

It is proposed that the development roadways will accommodate 6 metre high columns with a zero outreach. To ensure compliance with guidelines and standards Dun Laoghaire - Rathdown County Council (DLRCC) do not permit the use of bollard lighting. Two of the main reasons for this are:

- Inefficiency - using bollards is an inefficient way of lighting an area.
- Safety

4.1 Column Lighting for Development Roadways

It is proposed to provide 6m high column type light fittings with a zero outreach required for the roadways. The light fittings will have a zero outreach required in order to achieve average illumination levels.

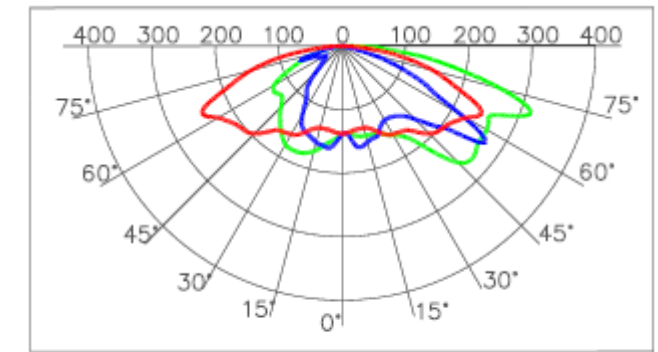
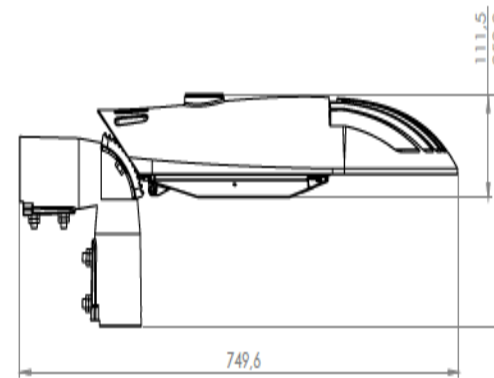
The proposed column light fittings are indicatively displayed in the accompanying images.

Proposed Light Fitting A as per Lighting Reality Report

The indicative luminaires selected would be provided with 1 x 26 Watt LED lamp module, with a lamp output of 6676 lumens and colour temperature 4000K.

The photometric curve displayed indicates how all light output is directed downwards (0-90° angle); i.e. no risk of sky glow.

Fig 4.2.1 Dimensions - Light Fitting no1	Figure 4.2.2 - Luminaire Mounted on Column- Image	Figure 4.2.3 - Floodlight Luminaire - Photometric Curve
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Column Lighting along Pedestrian Walkways

It is proposed to provide 6m high column-type light fittings to the pedestrian walkways with a zero outreach required in order to achieve average illumination levels.

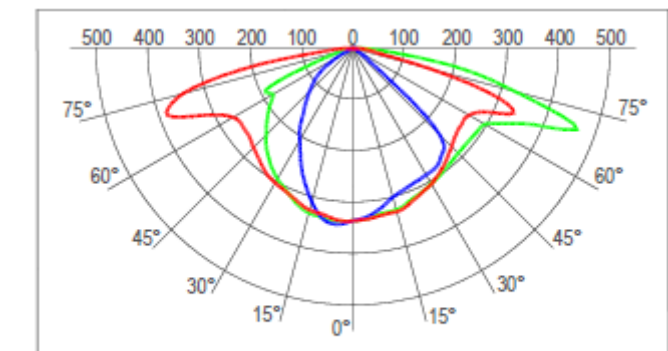
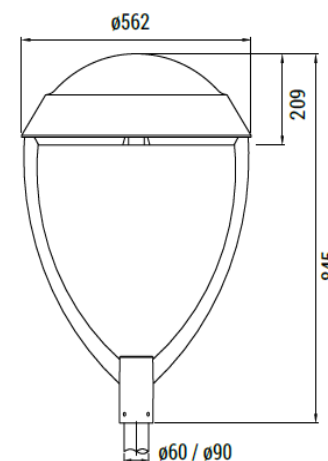
The proposed column light fittings are indicatively displayed in the accompanying image.

Proposed Light Fitting B as per Lighting Reality Report

The indicative luminaires selected would be provided with 1 x 21 Watt LED lamp module, with a lamp output of 5692 lumens and colour temperature 4000K.

The photometric curve displayed indicates how all light output is directed downwards (0-90° angle); i.e. no risk of sky glow

Fig 4.2.4 Dimensions - Light Fitting no2	Figure 4.2.5 - Luminaire Mounted on Column- Image	Figure 4.2.6 - Floodlight Luminaire - Photometric Curve
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4.2 Column Lighting Functionality

4.2.1 Pre-programming Ability / Dimmable Functionality & Telemetry

All lanterns shall be fitted with smart electronic ballasts suitable for use with the Dun Laoghaire - Rathdown County Council proposed method of lighting control with programmable DALI drivers. The drivers shall have dimming capability of 75% full light output between mid-night and 6am, have a 90% CLO (Constant Light Output) type, have a segment controller at street level for the onward forwarding of data and control signalling to / from a server.

The Public Lighting system of Dun Laoghaire - Rathdown County Council shall also incorporate a facility for remote monitoring and diagnostics.

The installation will be directly compatible with lighting control management software in use by Dun Laoghaire - Rathdown County Council.

4.3.2 Photocells

Switching control of the lighting columns will be achieved by means of miniature photocell control. Each individual lantern shall be capable of being switched "ON" from dusk to dawn, unless otherwise requested by Dun Laoghaire - Rathdown County Council.

An individual solid-state one-part Photo-Electric Control Unit (PECU) which will include a "fail safe" circuit that switches the lantern on in the event of photocell failure will control each lantern.

The PECU will incorporate a phototransistor complying with I.S.428: 1991 as the light sensor; e.g. SELC 84 by Solar Enterprises Ltd., or equivalent approved by the Council.

The PECU will be designed to fit the 7 pin NEMA socket provided on each lantern.

Each lantern will be fitted with a miniature photocell unless otherwise directed by the Engineer. The miniature photocell shall have a minimum IP65 rating.

The lanterns will have an integrated miniature photocell, switching at 35/18 lux levels. A control cable shall be installed from the miniature photocell to the column door to allow for future programming.



5.0 RESULTS

5.1 Ground Illumination for Development

Figure 5.1.1 indicates results of the predicted illumination levels on Ground for the proposed installation.

The results indicate:

- These levels are based upon a 6 metre high pole with pole top lanterns (i.e.) zero outreach.
- The Average Horizontal Illuminance is 8.08 Lux **P3 compliant**.
- The Minimum Horizontal Illuminance is 1.75 Lux **P3 compliant**.
- The Overall Uniformity U_o of 0.22 is achieved.

The results from the lighting simulation software, Lighting Reality produced a layout displaying the horizontal illuminance (lux).

Results

Eav	8.08
Emin	1.75
E _{max}	22.50
E _{min} /E _{max}	0.08
E _{min} /E _{av}	0.22

Fig 5.1.1
Illuminance Levels

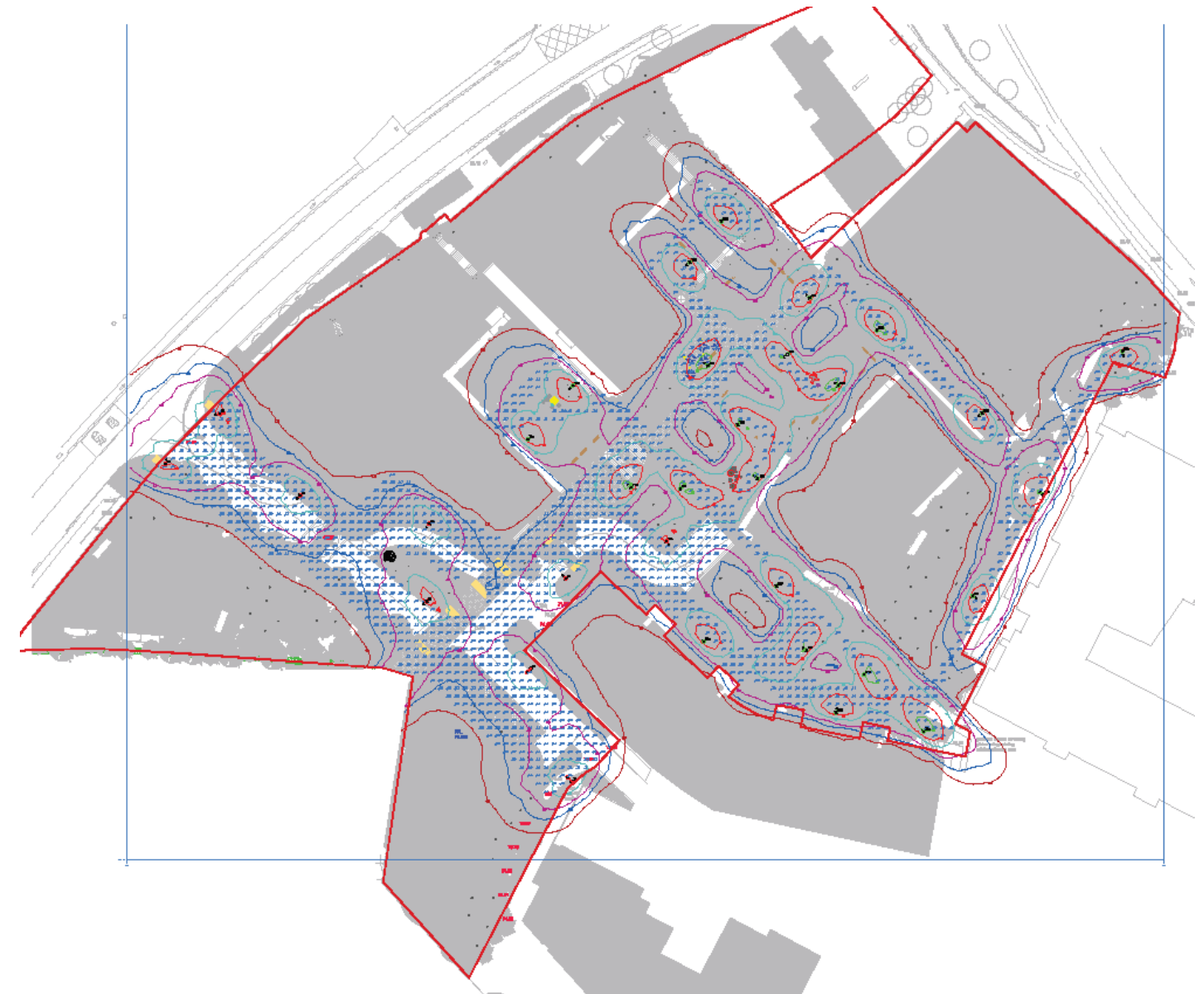


Fig 5.1.2
Ground Illumination Levels

6.0 CONCLUSION

As shown in Figure 5.1.1 the illumination throughout the Grange development meets the lighting design requirements.

It should be noted that the results in Figure 5.1.1, show the design intent only. Additional lamp standards may be required during the course of detailed design to ensure P3 Classification is adhered to ensuring lux level requirements are maintained throughout.