



Project Ref.	Document Title	Rev	Prepared by:	Issue Date	Checked by:
1831	Site Lighting Report	P1	MG	09-10-2019	SOB

1.0 INTRODUCTION

This report documents the approach taken by Homan O' Brien to develop an external lighting design for the proposed Connolly Quarter, lands adjacent to Connolly station and bounded by Sheriff St lower, commons St. Oriel St and Seville place. Homan O' Brien carried out Preliminary lighting calculations using the Dialux (4.13) lighting simulation software platform. The results of the calculations were compared to figures detailed in industry design standards. The design philosophy is detailed below. The proposed lighting layout complies with all of the required design criteria, specifically in relation to EN 1246-2 2014: Lighting of work places – outdoor work places.



Figure 1: The Connolly Quarter site map.

The development will consist of;

- i. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;
- ii. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;
 - a. Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
 - b. Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);
 - c. Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
 - d. Block C1 (maximum building height 79.450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
 - e. Block C2 (maximum building height 39.615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
 - f. Block C3 (maximum building height 39.650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
 - g. Block D1 (maximum building height 53.392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);
 - h. Block D2 (maximum building height 30.950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);
- iii. residential support amenities including 1 no. gyms, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;
- iv. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);
- v. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)
- vi. 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);
- vii. 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;
- viii. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;
- ix. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;

- x. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sherriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;
- xi. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and
- xii. Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

2.0 PROPOSED APPROACH

There were five key lighting design elements reviewed in advance of carrying out lighting calculations. The lighting design should conform to all standards listed below.

Design Criteria

1. Lighting Lux Levels.
2. Light pollution on surrounding properties
3. Luminaire intensity
4. Up Light Ratio (ULR)
5. Lighting Controls

Standards

- BS 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and Public amenity areas.
- EN 12464-2 2014 - Light and lighting. Lighting of work places. Outdoor work places
- SLL Code of Lighting 2012
- SLL Lighting Handbook 2018
- SLL Lighting Guide 6 – Exterior environment
- SLL Lighting Guide 9 – Lighting for communal residential buildings
- I.S 3217:2013
- Building Regulations Part M

2.1 DESIGN CRITERIA

The Connolly Quarter is a lighting class

City & town centres - Pedestrian thoroughfare Normal traffic flow E4a) S1 (average of 15 lux minimum) ~ BS 5489-1:2013

E4' environment in accordance with IS EN 12464-2:2014.

This represents high district brightness areas, such as town centers and commercial areas.

The following lighting criteria must be adhered to when designing a lighting installation for an E4 environment.

Seville Place access corridor will be classed as an enclosed arcade or canopy area.

(Average of 250 lux during day and 150 lux during night) ~ BS 5489-1:2013

Light Pollution on Surrounding Properties

- 25 lux pre-curfew (maximum value of vertical illuminance on properties)
- 5 lux post-curfew (maximum value of vertical illuminance on properties)

Luminaire Intensity (cd - candela)

- 25,000 pre-curfew
- 2,500 post-curfew

Upward Light (ULR %)

- 25%

General Task Lighting allows occupants navigate through the site and around building pedestrian pathways. General lighting is required during the normal operation of the building while emergency lighting is required in the case were the normal lighting operation fails due to power loss. The BS 5489-1:2013 guide for City & town centres - Pedestrian thoroughfare Normal traffic flow E4a) S1 (average of 15 lux minimum)

General Lighting Values

- Amenity exclusively for pedestrians – 15 lux (Illuminance)
- Regular Vehicle traffic – no vehicular traffic
- GRI – 50 (Glare Rating)
- Ra – 60 Ra (Colour Rendering)

Lighting Controls

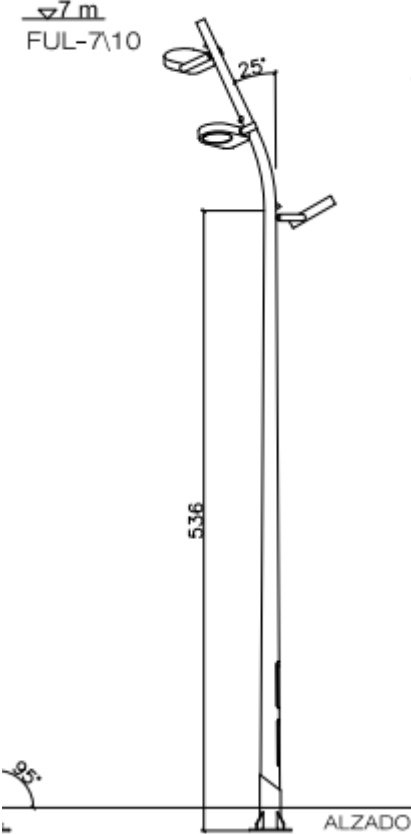
Lighting controls are essential for all exterior lights. A full dimming control system is recommended to allow the light levels to be reduced during the hours of 2am to 6am.

A photo-electric cell (PEC) is proposed for automatic switch-on at dusk and off with time control. Presence detection in areas may be incorporated for safety purposes, e.g. when nobody is outside, after a set interval time lighting reduces to a pre-determined level, e.g. 50%, but as soon as human movement is detected, full illumination is restored.

3.0 PROPOSED LIGHTING

Pole top lighting is proposed for the Pedestrian amenity thoroughfare, with local bollards & Ground lights for the suggested landscaping lighting. The proposed luminaires are utilized to meet all the aforementioned design criteria (minimum lux levels, glare, colour rendering etc.). Lighting specification sheet can be seen in Appendix 1.

Figure 2: Pole Top Luminaire Example



**PROYECTORES
FLOODLIGHTS**

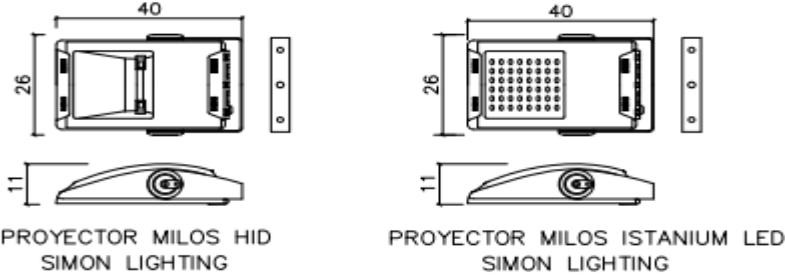
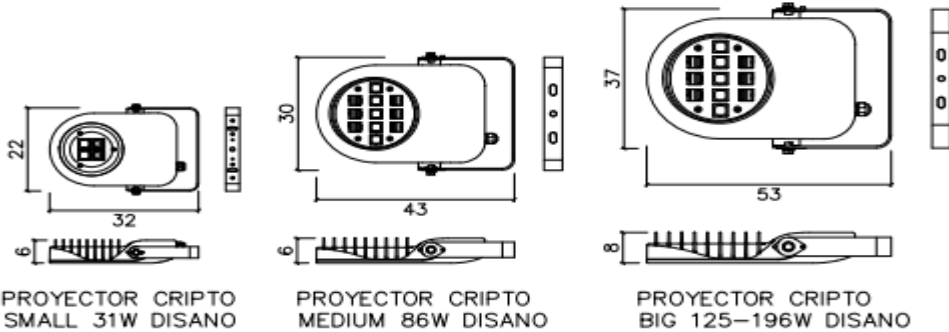


Figure 3: Bollard Luminaire Example



3.1 PROPOSED LIGHTING CALCULATIONS

Figure 4 below details the light calculation result's generated by Dialux for the amenity area. City & town centres - Pedestrian thoroughfare Normal traffic flow E4a) S1 (average of 15 lux minimum) ~ BS 5489-1:2013 as per design criteria.

Our lighting positions are based on the Bernard Seymour Landscape Architects and have positioned the lighting to get the best uniformity and reduce glare.

On review of the lighting results, it's clear that the recommended light levels are being achieved and no light pollution on adjacent properties exists, as the proposed design avoids lighting / illuminating in the direction of the partially surrounding properties.

The ULR has been estimated at 20% which is less than the design criteria maximum of 25% for an E4 environment.

Figure 4 Dialux Calculation

Ground floor Plaza

Location of luminaires

Terreno 1



Disano Illuminazione SpA 1711 LED 24w CLD CELL 1711 Cripto small - asimmetrico 3K

Terreno 1



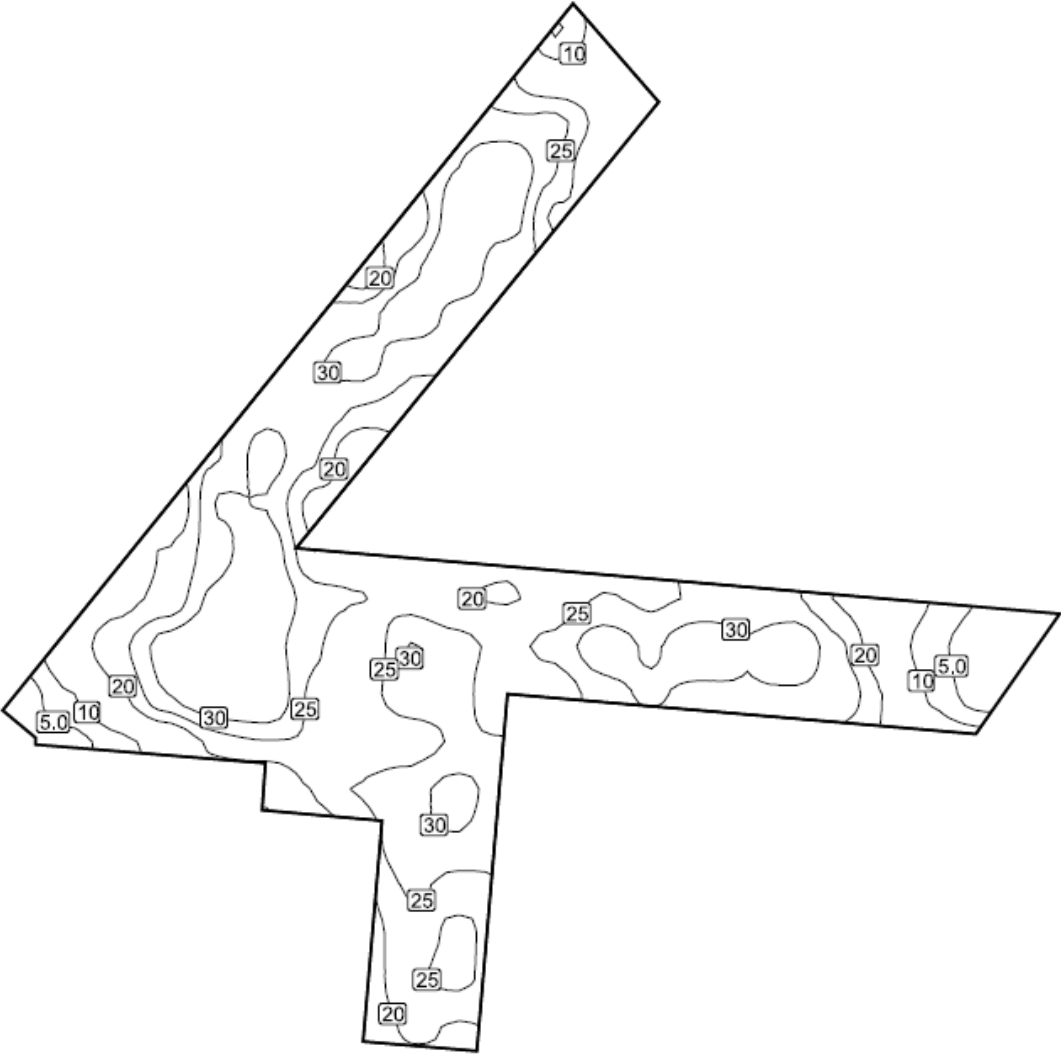
Maintenance factor: 0.80

General

Surface	Result	Average (Target)	Min	Max	Min/average	Min/max
1 Superficie de cálculo 1	Perpendicular illuminance [lx] Height: 0.000 m	23.8	0.29	37.6	0.012	0.008



Isolines [lx]



Scale: 1 : 1000

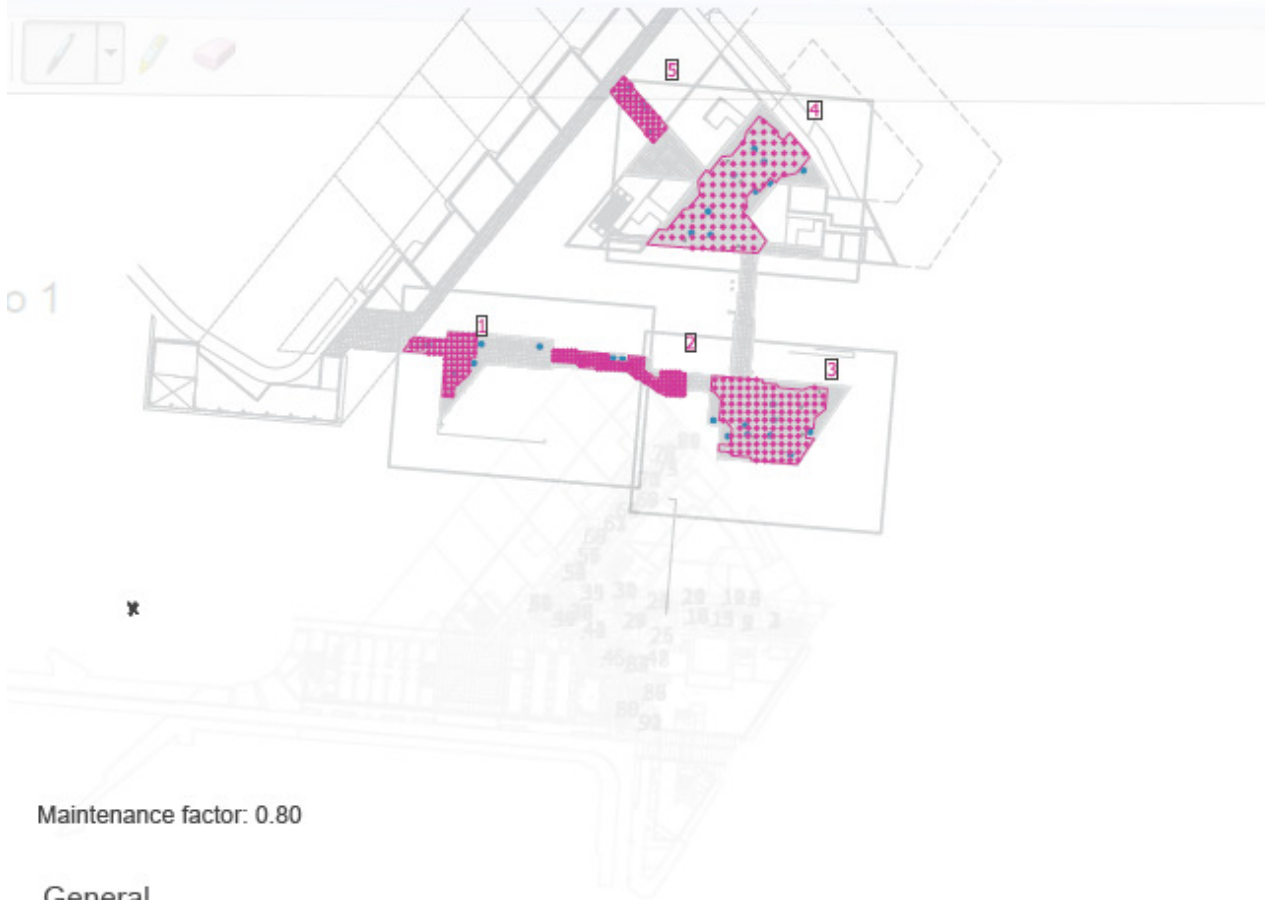
Figure 5 Dialux Calculation Output Walkways

First floor walkways

Terreno 1



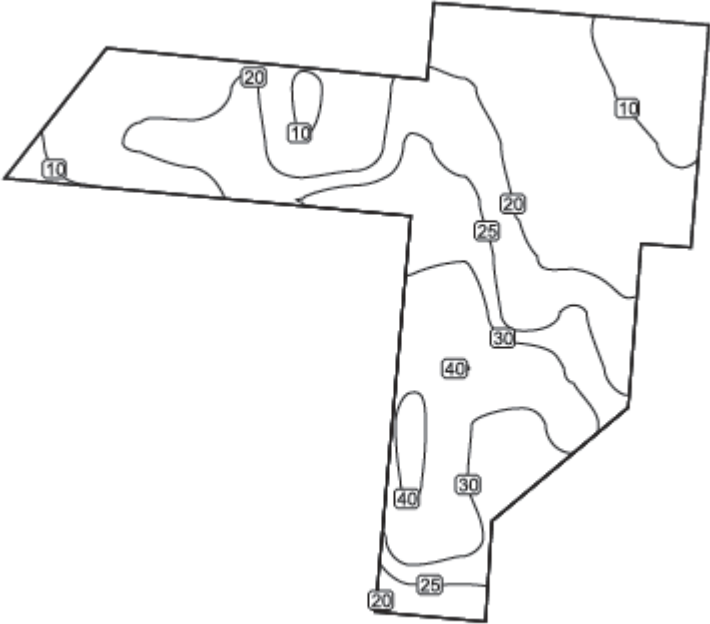
Terreno 1



General

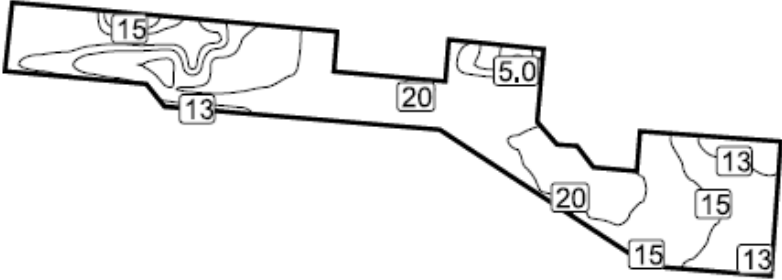
Surface	Result	Average (Target)	Min	Max	Min/average	Min/max
1 Superficie de cálculo 1	Perpendicular illuminance [lx] Height: 0.000 m	22.1	6.16	42.1	0.28	0.15
2 Superficie de cálculo 2	Perpendicular illuminance [lx] Height: 0.000 m	16.7	2.63	22.1	0.16	0.12
3 Superficie de cálculo 3	Perpendicular illuminance [lx] Height: 0.000 m	27.5	0.00	51.1	0.00	0.00
4 Superficie de cálculo 4	Perpendicular illuminance [lx] Height: 0.000 m	25.7	11.9	35.6	0.46	0.33
5 Superficie de cálculo 5	Perpendicular illuminance [lx] Height: 0.000 m	14.3	0.21	21.8	0.015	0.010

Isolines [lx]



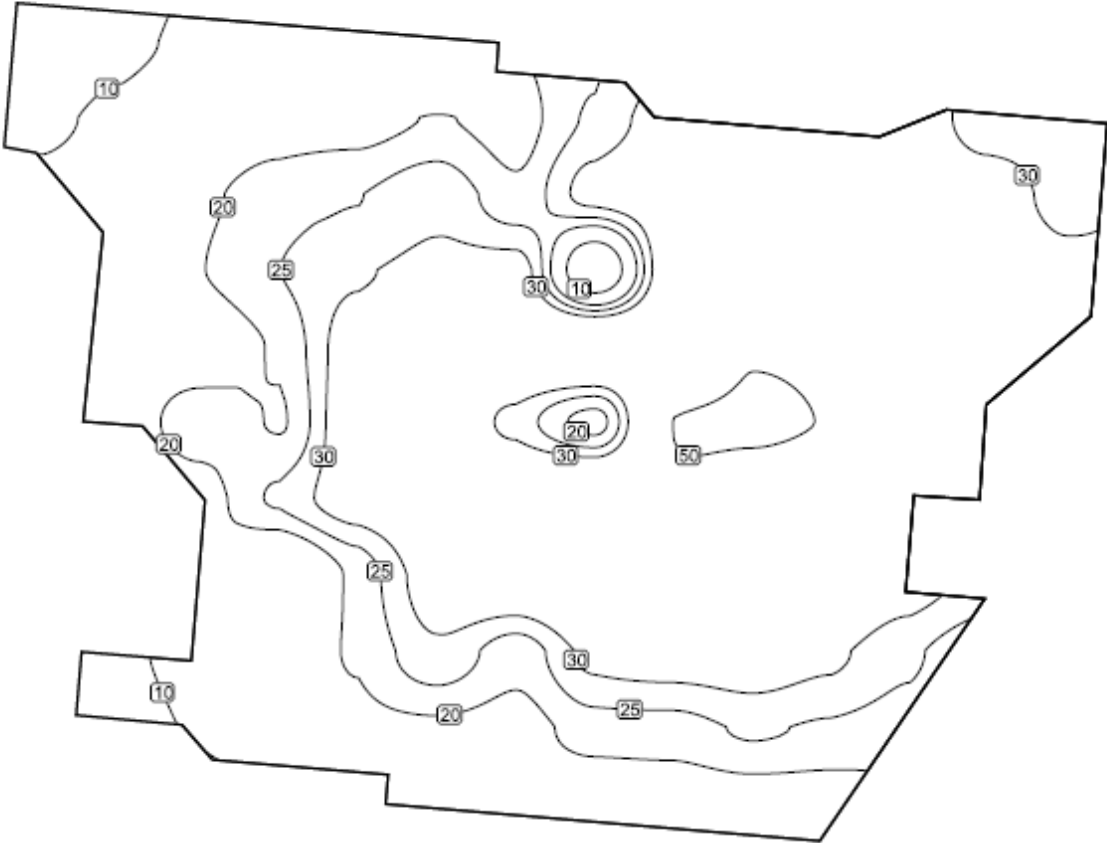
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Isolines [lx]



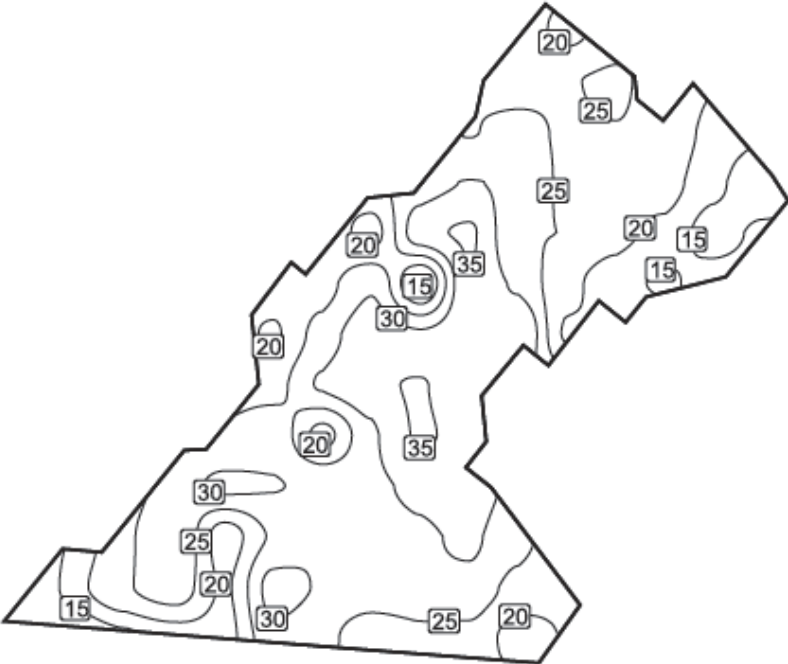
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Isolines [lx]



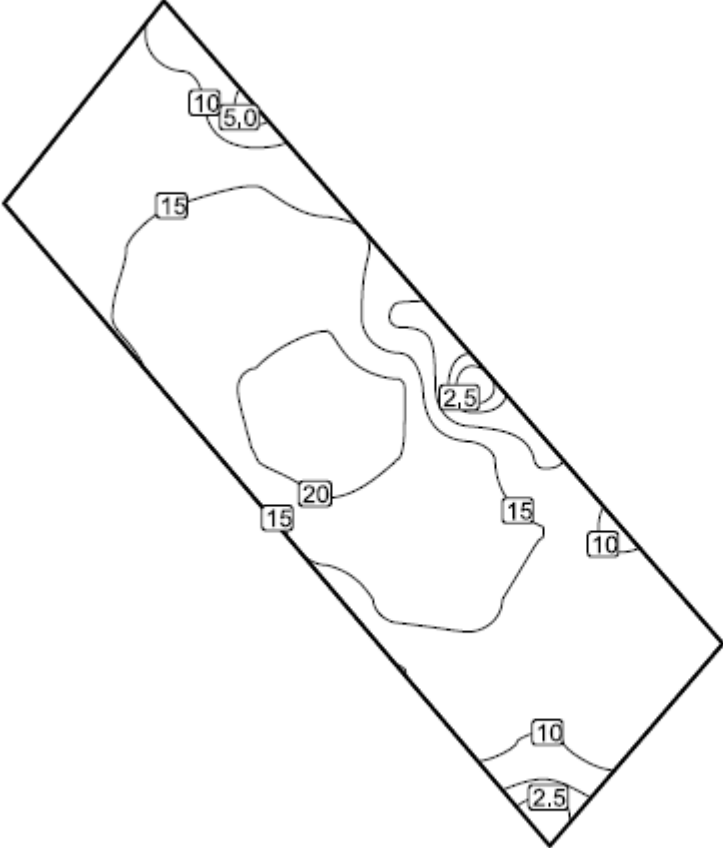
Scale: 1 : 200

Isolines [lx]



Scale: 1 : 500

Isolines [lx]



Scale: 1 : 200

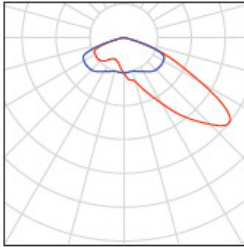
4.0 CONCLUSION

The proposed lighting layout complies with all of the required design criteria. Dialux calculations indicate that there will be no light pollution on surrounding properties. The upward light is estimated at 20% which is below the 25% maximum for an E4 environment. The proposed layout offers lighting resulting in an aesthetically pleasing environment for occupants. Homan O' Brien believe the proposed layout will blend seamlessly into the surrounding environment.

APPENDIX 1

LIGHTING SPECIFICATION SHEET

19035 - Connolly 1F_v1

Quantity	Luminaire (Luminous emittance)		
59	Disano Illuminazione SpA - 1711 LED 24w CLD CELL 1711 Cripto small - asimmetrico 3K Luminous emittance 1 Fitting: 1xLux_mu1711 Light output ratio: 100% Lamp luminous flux: 2293 lm Luminaire luminous flux: 2293 lm Power: 26.0 W Luminous efficacy: 88.2 lm/W Colourimetric data 1x: CCT 3000 K, CRI 70	See our luminaire catalog for an image of the luminaire.	

Total lamp luminous flux: 135287 lm, Total luminaire luminous flux: 135287 lm, Total Load: 1534.0 W, Luminous efficacy: 88.2 lm/W