Proposed Strategic Housing Development, 'Kenelm', Deer Park, Howth, Co. Dublin

Site Lighting Report

Application Issue

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ethos ENGINEERING

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CURRENT ISSUE			
Issue No:	P4	Issue Date:	6th May 2021
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Print Name:	Raul Turcu	Peter Farrell	Application Stage

PREVIOUS ISSUES (Type Names)				
Issue No:	Date:	Originator:	Checker:	Reason For Issue:
P1	28th May 2020	Sean Brady	Peter Farrell	Issue for Pre-Planning
P2	20th October 2020	Sean Brady	Peter Farrell	Issue for Planning
P3	26th April 2021	Raul Turcu	Peter Farrell	Issue for Planning

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1. Introduction

The design rationale is to create and deliver a high quality, sustainable, strategic housing development which respects its setting and maximises the site's natural attributes while achieving maximum efficiency of existing infrastructure. The Proposed Site Layout is illustrated on **Drawing No. 1101** contained within the architectural suite of drawings.

The development will consist of;

i. 162 no. residential units distributed across 3 no. blocks (A, B & C) ranging in height from 5-6 storeys, with a cumulative gross floor area (GFA) of 13,337.10 sq.m comprising;
    a. 29 no. 1-bedroom units, - 17.9%
    b. 104 no. 2-bedroom units and – 64.2%
    c. 29 no. 3-bedroom units – 17.9%
ii. 3 no. resident services and amenity rooms (1 no. in each block A-C) to accommodate co-working space, a community room and a meeting room (combined GFA 108 sq.m)
iii. 132 no. car parking spaces at basement level (underlying Blocks A & B) including 6 no. accessible spaces, 13 no. electric vehicle spaces and 4 no. car sharing spaces;
iv. 325 no. residents bicycle parking spaces (long-stay) at basement level, and 30 no. visitor bicycle parking spaces (short-stay) at surface level;
v. communal amenity space in the form of courtyards and roof gardens (combined 2,192 sq.m)
vi. public open space of 1,161 sq.m including a botanic garden and pocket park;
vii. a single storey ESB sub-station and switch room (45.5 sq.m);
viii. demolition of 2 no. sections of the existing demesne northern boundary wall to provide, a primary access (vehicular/pedestrian/cyclist) to the northwest and a separate pedestrian/cyclist access to the northeast;
ix. restoration and refurbishment of the remaining extant northern and eastern demesne boundary wall;
x. change of use and regrading of part of the Deer Park Golf Course from active recreation use to passive amenity parkland and planting of a woodland belt on the southern boundary;
xi. undergrounding of existing ESB overhead lines, and, relocation of the existing gas main; and,
xii. all ancillary site development works including waste storage and plant rooms at basement level, drainage, landscaping/boundary treatment and lighting.

This external lighting report is based upon the following requirements and Fingal Development Plan;

- Provide adequate illumination to contribute towards the safe use of the site by both vehicles and pedestrians.
- Enhance site security.
- Provide a visually interesting environment.
- Contain the lighting within the site to lighting levels which will not impact on the neighbouring surroundings.
- Safe access to fire assembly points.
- Minimise light pollution, sky glow and visual glare for pedestrians and surrounding areas.
- Objective LP01 – Require that the design of the lighting schemes minimises the incidence of light spillage or pollution into the surrounding environment. New schemes shall ensure that there is no unacceptable adverse impact on neighbouring residential or nearby properties; visual amenity and biodiversity in the surrounding areas.

The external lighting is designed using the lighting simulation software DIALux and is in accordance with the following:

- CIBSE Lighting Guide LG – 6
- IS EN 12464-2
- CIE Guide regarding Illumination levels and "Obtrusive Light" to neighbouring properties
- HSA Regulations for Electricity
- ETCI National Rules for Electrical Installations ET 10101

2. Design Criteria

The design criteria is based upon the following:

Area	Lighting Levels (Lux)
Car Park	20
Public Walkways	10
Public Roadways	20
Stairs	100
Courtyard	20
Overspill Areas	5

3. Proposed Site Lighting Installation

The proposed site lighting installation comprises of 4-metre high post top column lighting to car park roads/ main access route with decorative 4m high columns at the main entrance and 1000mm bollard lighting to pedestrian walkways.

The proposed 4m column with post top luminaires will illuminate the areas described above to achieve an average illumination level of 20 lux. The photometric curve enclosed within Appendix 1 figure 5 for the proposed LED luminaire to the area, indicates how the light output is directed downwards with no risk of "sky glow".

It is proposed to provide 1000mm bollard type light fittings to pedestrian walkways to achieve an average illumination level of 20 lux at ground level.

It is proposed to provide 4-meter-high column LED luminaires for the entrance courtyard to achieve the 20 lux requirement at ground level.

It is proposed to provide recessed mounted floorwash LED luminaires to the bench areas to achieve the required 20 lux at ground level.

It is proposed to provide LED strip lighting mounted inside handrail for the stairs to achieve the 100 lux requirement to comply with Part M requirements.

4. Bat Considerations

4.1. Lighting Considerations

Major consideration was given to the design and development of lighting scheme to ensure there is no impacts on the local bat population which has been identified. There are certain key requirements that have to be addressed in the overall lighting design to ensure the scheme is sympathetic to its environment. It is accepted that bats will generally tend to keep away from illuminated areas so lighting can impede their flight to natural feeding areas and this is the main consideration.

There are two type of bat sensitive areas that need to be considered when evaluating a site and determining the most appropriate lighting scheme.

1. Bat Roosts
2. Bat Foraging and Commuting Routes

Bat Conservation Ireland (www.batconservationireland.org) has produced a set of guidance notes for consideration in the design of bat sensitive lighting schemes. The main items to consider for both types of bat habitat are listed below

Bat Roosts	**Foraging & Commuting**
No direct illumination at exist points	Avoid lighting along river, lakes and canals
Position lights to avoid sensitive areas	Avoid lighting along important commuting routes
Use low pressure or high-pressure sodium lights	Avoid the use of mercury or metal halide lamps
Avoid the use of mercury or metal halide lamps	Minimise light spills using shields masking and louvres
Restrict lights and the timing of such to avoid bat activity	Keep lighting columns as low as possible
Restrict lighting to ensure there are dark areas	Restrict lighting to ensure there are dark areas

Whilst the guidelines are particular to bats sensitive areas the principles are compatible with good lighting design which the overriding design principle should be to ensure adequate illumination is provided only where it is required with no overspill.

4.2. Design Principle

Bats are light-sensitive species and tend to avoid roosting or foraging in areas subject to artificial illumination.

Scott Cawley carried out comprehensive bat surveys as part of the preparation of this application and full details are contained in Chapter 11 of the EIAR (Volume II).

Key issues identified during the surveys and that informed the proposed lighting plan were;

1. Four species of bat: Common pipistrelle bat Pipistrellus pipistrellus, soprano pipistrelle bat Pipistrellus pygmaeus, Leisler's bat Nyctalus leisleri, and brown long-eared bat Plecotus auratus, were identified during surveys of the proposed development site and its vicinity, although only two of these species (Leisler's bat and common pipistrelle bat) were observed foraging within or passing over the proposed development site. The two species observed in the proposed development site are the most light-tolerant of the Irish bat species and tend to be associated with edge habitats.
2. Bat activity was more heavily concentrated in the area of mixed broadleaved woodland along the avenue in Deerpark, and in the vicinity of the old Abbey in Deerpark (both areas are outside of the proposed development site) on all survey dates.
3. Bats appear to avoid the northern boundary of the proposed development site, possibly due to the light spill from the adjacent public road, and from security lighting emitted from nearby residential dwellings.
4. The habitats in the adjacent Deerpark demesne, particularly woodland habitats, are of high suitability for foraging and commuting bats.

The proposed lighting design was developed in close consultation with the project ecologist, Scott Cawley Ltd. and is designed to be sensitive to the presence of commuting and foraging bats and adheres to the following guidance:

- Bats & Lighting: Guidance Notes for Planners, engineers, architects and developers (Bat Conservation Trust, 2010);
- Guidance Notes for the Reduction of Obtrusive Light GN01/20 (Institute of Lighting Professionals, 2020);
- Bats and Lighting in the UK – Bats and the Built Environment Series (Bat Conservation Trust UK, January 2008).

To address the concerns the following are the main elements of the proposed lighting scheme.

- Lighting will be restricted to the building perimeter, basement plant areas, roadways and basement car parking.
- Lighting controls will be provided to ensure loading
- All lighting columns will be a maximum of 5m high with sharp cut off luminaires. These will be positioned 1m from kerb edges to protect the lower column height from high vehicles.
- All pathways etc will be illuminated using bollards etc.
- LED technology will be utilised to ensure no UV component as recommended by Bat Conservation Ireland.

The design as proposed and shown on drawing HDR-ETH-XX-XX-DR-E-SS100 has been modelled to ensure the solution.

4.3. Construction Phase

Similar principles as outlined in the site scheme above will apply during the construction phase of the project.

The following is a summary of the key considerations to be taken into account during the construction phase.

- Lighting shall be controlled, and external lighting will be switched outside or working hours apart from necessary security lighting which will be sensor controlled
- No metal halide sources will be used
- All luminaires used will have shielded sources to ensure light is directed only where it is required.

All fittings installed adjacent to bat commuting routes will have baffle plates / shielding fitted to ensure that no light spill occurs.

Construction phase lighting is designed to be sensitive to the presence of commuting and foraging bats and adheres to the following guidance:

- Bats & Lighting: Guidance Notes for Planners, engineers, architects and developers (Bat Conservation Trust, 2010);
- Guidance Notes for the Reduction of Obtrusive Light GN01/20 (Institute of Lighting Professionals, 2020);
- Bats and Lighting in the UK – Bats and the Built Environment Series (Bat Conservation Trust UK, January 2008).

5. Simulation Results

Figure 1 below indicates the illumination lighting levels at road area and walkways. Illumination is indicated using a colour scale.

The illumination achieves over 20 Lux average in accordance with CIBSE requirements.

The zone A, B and C indicate the areas with the highest light spill from the adjacent light fittings. Each zone is further described in chapter 6.

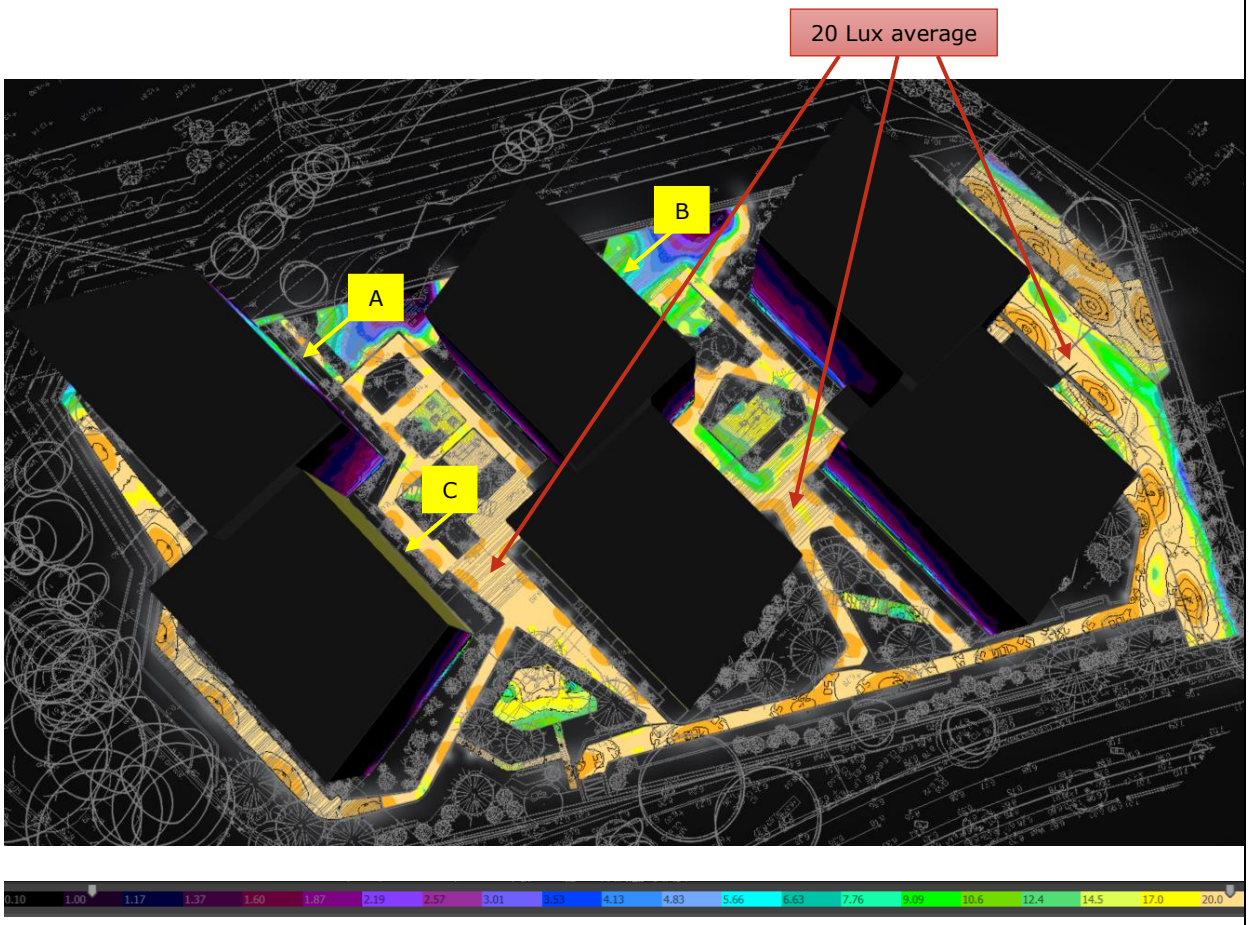
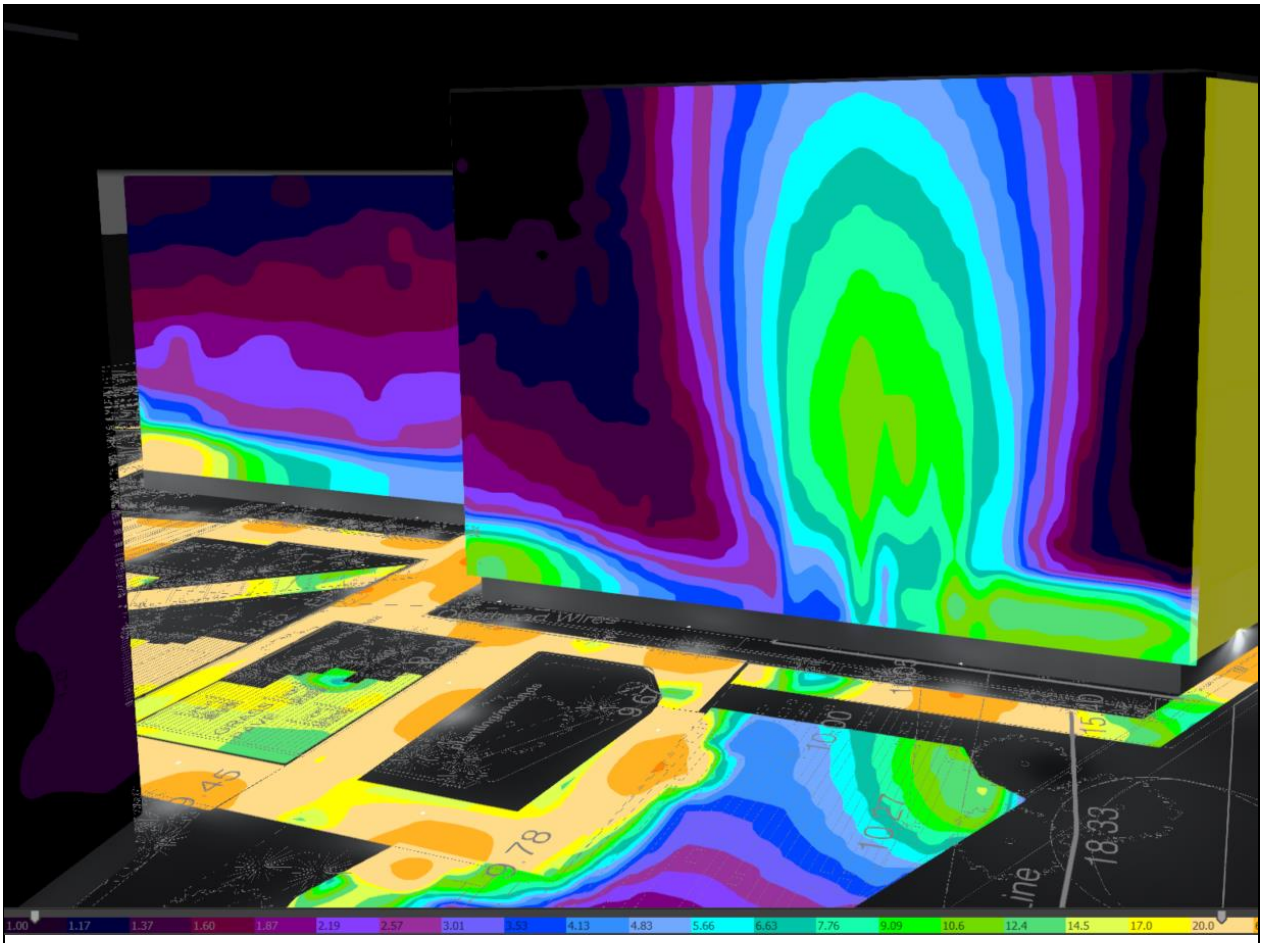


Fig 1 - False Colour Image

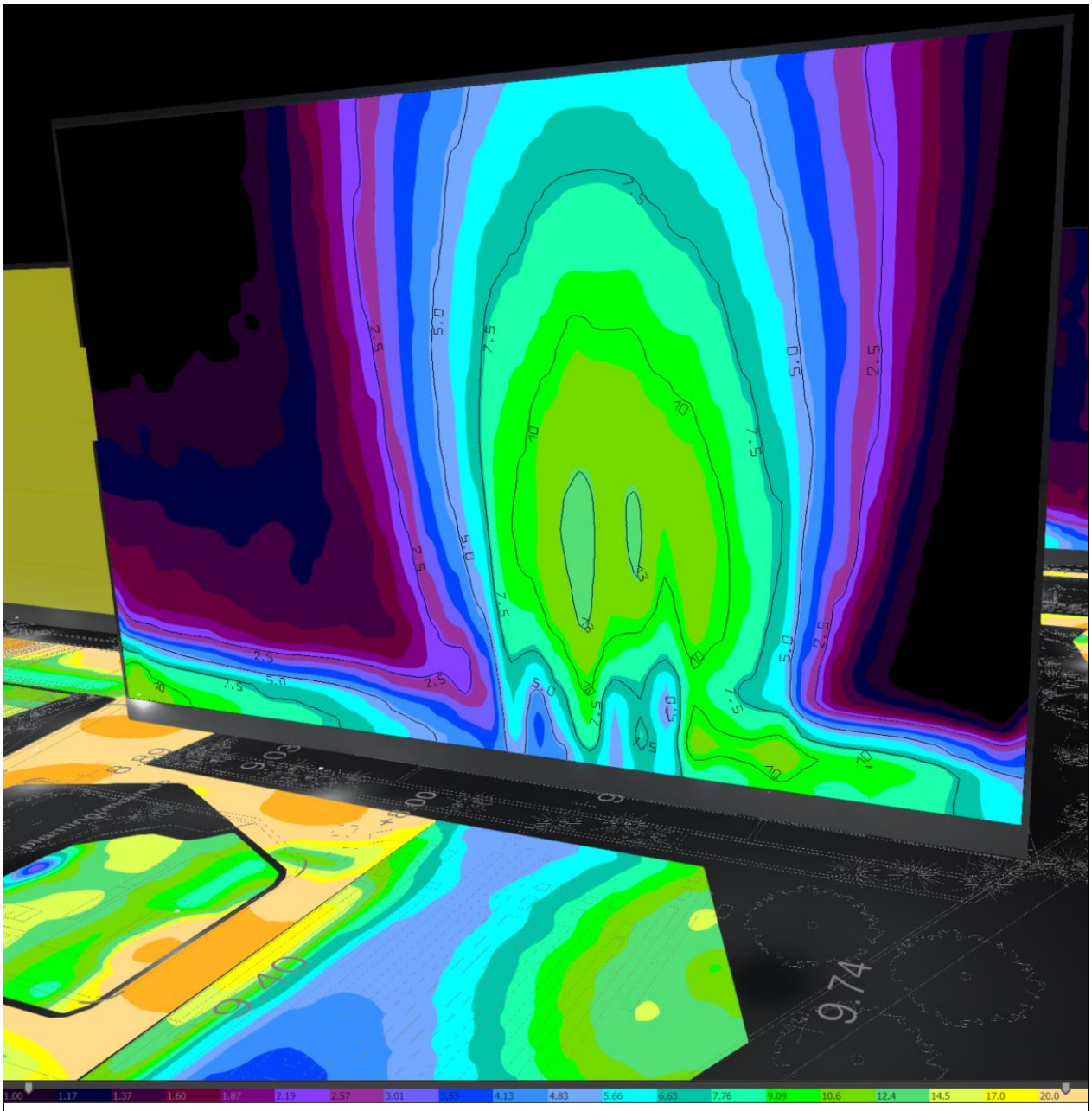
6. External Site Light Overspill

Figure 2 indicates the illumination levels on the neighbouring properties from the proposed luminaires. From the analysis the illumination achieved is 5 lux which is within the design guidelines, CIE Guide regarding Illumination levels and "Obtrusive Light" to neighbouring properties. The light spill is caused by the requirements of lighting along the pathways.



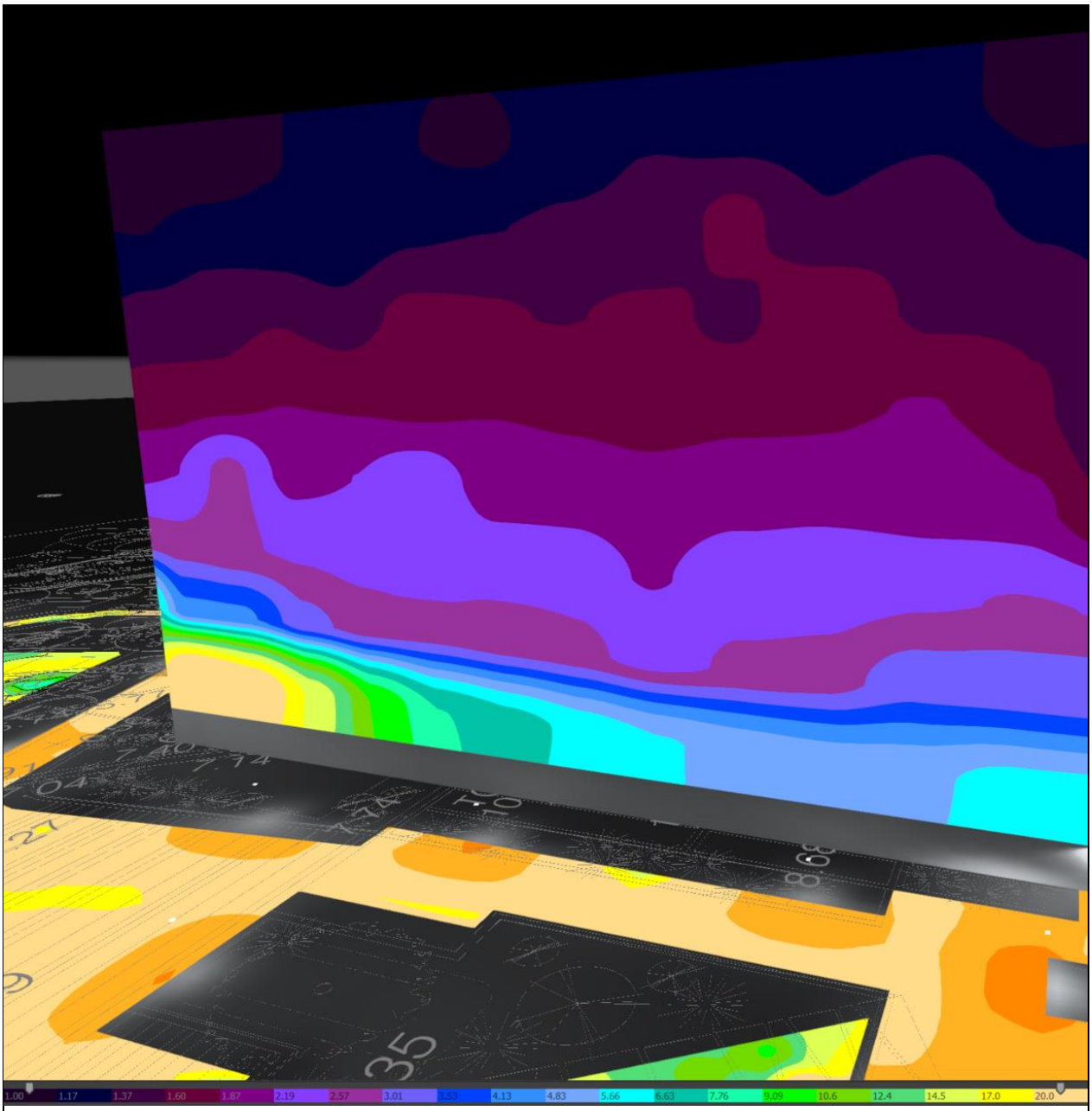
Light Overspill of 4.13 Lux

The above view highlights the area with the second highest light spill onto the wall from the adjacent light fittings. The direction of view is indicated by the zone A and the yellow arrow in Figure 1.



Light Overspill of 4.38 Lux

The above view highlights the area with the highest light spill onto the wall from the adjacent light fittings. The direction of view is indicated by the zone B and the yellow arrow in Figure 1.

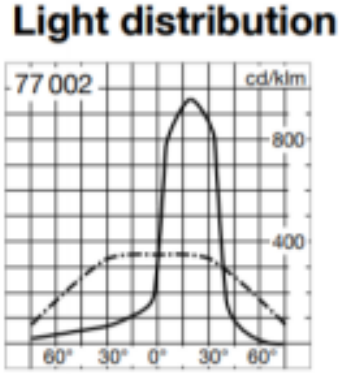


Light Overspill of 2.97 Lux

The above view highlights the area with the third highest light spill onto the wall from the adjacent light fittings. The direction of view is indicated by the zone C and the yellow arrow in Figure 1.

Fig 2 – Areas with the highest light overspill

APPENDIX 1: External Luminaire Schedule

<table>
<tr><th></th><th>Image</th><th>Photometric Curve</th><th>Description</th></tr>
<tr><td rowspan="3">Type A</td><td>  </td><td> 
</td><td rowspan="3">In-ground recessed light fitting to be used along the public landscape areas.

The indicative luminaire selected would be provided with 7.9 Watt LED lamp module, with a lamp output of 500 lumens.

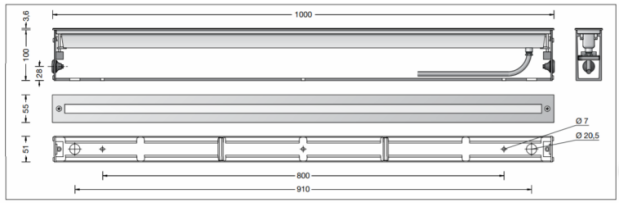
The photometric curve displayed indicates how all light output is directed upwards but with minimal output there will be no risk of sky glow.</td></tr>
<tr><td>Dimensions of Luminaire</td><td></td></tr>
<tr><td> 
</td><td></td></tr>
<tr><td colspan="4">Fig 2 – Proposed In-ground Luminaire</td></tr>
</table>

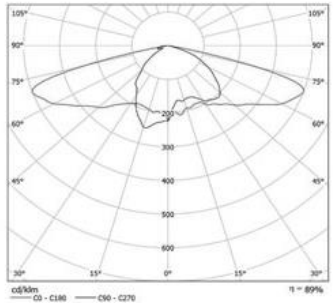
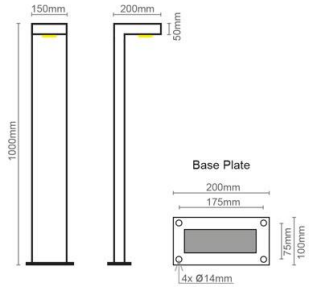
	Image	Photometric Curve	Description
Type B			Bollard light fittings to be used in the access walkways. The indicative luminaire selected would be provided with 9.5 Watt LED lamp module, with a lamp output of 1,285 lumens. 1000mm high bollard light fittings installed in the amenity areas of the site to light up the walkways.
	Dimensions of Luminaire		
			

Fig 3 – Proposed Bollard Luminaire

	Image	**Photometric Curve**	**Description**
Type C			Semi Recessed light fittings to be used in the amenities area. The indicative luminaire selected would be provided with 3.2 Watt LED lamp module, with a lamp output of 311 lumens.
	Dimensions of Luminaire		
			

Fig 4 – Proposed Ground Luminaire

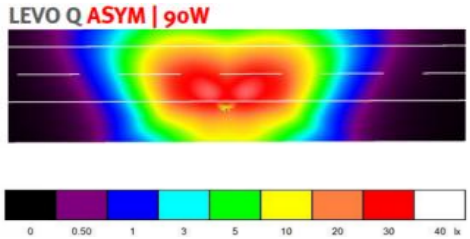
	Image		**Description**
Type D			4m column luminaire installed in the courtyards. The indicative luminaire selected would be provided with 30-Watt LED lamp module. The photometric curve displayed indicates how all light output is directed downwards; i.e. no risk of sky glow.
	Dimensions of Luminaire		

Fig 5 – Proposed Column Entrance Luminaire

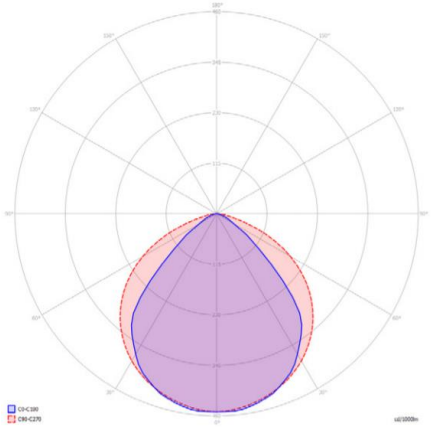
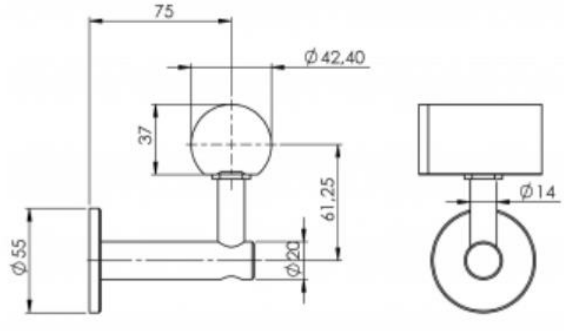
	Image		**Description**
Type F			Recessed handrail fittings installed in the handrails. The indicative luminaire selected would be provided with 2 Watt LED lamp module, with output of 113 lumens/m.
	Dimensions of Luminaire		
			

Fig 6 – Proposed Handrail Luminaire

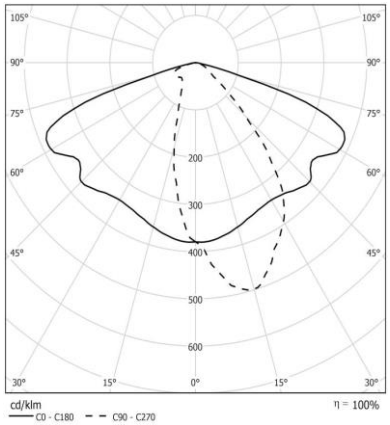
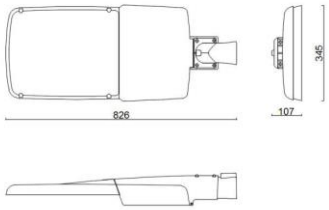
	Image		**Description**
Type G			4m Pole mounted column fittings installed in the roadway and main access route The indicative luminaire selected would be provided with 42 Watt LED lamp module, with a lamp output of 5300 lumens. The photometric curve displayed indicates how all light output is directed downwards; i.e. no risk of sky glow
	Dimensions of Luminaire		
			

Fig 7 – Proposed Column Luminaire

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