

Lighting Impact Assessment Report for Lidl Newcastle

For LIDL Ireland GmbH

Lidl Newcastle

Main Street Upper

Newcastle,

Co. Dublin

Document Control:

Rev:	Date:	Prepared By/Project Engineer		Quality Check by:	
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Dated: 11th Nov 2022

1.0 Project Description

Permission for development at Main Street Upper, Newcastle, Co. Dublin, principally consisting of the construction of a Discount Foodstore Supermarket with ancillary off-licence sales. The proposed development comprises:

- 1) The construction of a single storey Discount Foodstore Supermarket with ancillary off-licence use (with mono-pitch roof and overall building height of c. 6.74 metres) measuring c. 2,207 sqm gross floor space with a net retail sales area of c. 1,410 sqm;
- 2) Construction of a vehicular access point to Main Street Upper and associated works to carriageway and including partial removal of boundary wall / façade, modification of existing footpaths / public realm and associated and ancillary works including proposed entrance plaza area;
- 3) Demolition of part of an existing rear / southern single storey residential extension (and related alterations to remaining structure) of 'Kelly Estates' building. The original 'Kelly Estates' building (a protected structure - Eircode: D22 Y9H7) will not be modified;
- 4) Demolition of detached single storey accommodation / residential structure and ancillary wall / fence demolitions to rear of existing 'Kelly Estates' building;
- 5) Demolition of existing single storey (stable) building along Main Street and construction of single storey retail / café unit on an extended footprint measuring c. 118 sqm and associated alterations to existing Main Street boundary façade;
- 6) Renovation and change of use of existing (vacant) two storey vernacular townhouse structure to Main Street, and single storey extension to rear, for retail / commercial use (single level throughout) totalling c. 62 sqm;
- 7) Repair and renewal of existing Western and Eastern 'burgage plot' tree and hedgerow site boundaries; and,
- 8) Provision of associated car parking, cycle parking (and staff cycle parking shelter), pedestrian access routes and (ramp and stair) structures (to / through the southern and western site boundaries to facilitate connections to potential future development), free standing and building mounted signage, free standing trolley bay cover / enclosure, refrigeration and air conditioning plant and equipment, roof mounted solar panels, public lighting, hard and soft landscaping, boundary treatments and divisions, retaining wall structures, drainage infrastructure and connections to services / utilities, electricity Substation and all other associated and ancillary development and works above and below ground level including within the curtilage of a protected structure.

3.0 Executive Summary

The assessment below provides design evidence that the designed lighting scheme shall be fit for purpose, achieve all applicable regulatory requirements and concludes that the light spill and glare from the car park, pathways and roadways within the development boundaries will have minimal impact on the surrounding area.

The recommendations made in this report for the area lighting are as follows;

- Zero Upwards Light Output Ratio (ULOR) lanterns and wall fittings are used.
- The height of all area lighting columns mounting points are restricted to 4 metre maximum.
- The lighting installation shall be controlled via a combination of timeclock and photocell and BMS operation which will restrict the lighting operation to only when essential. All external lighting will be programmed to switch off half an hour after store closes
- In addition lighting to the rear parking area of the store will be controlled by the Building Management System (BMS) and on presence detection (PIR) to only activate when required.

5.0 Methodology

5.1. General

This report assesses the impact of the external lighting for the proposed development of a Lidl store at Mainstreet Upper Newcastle Co. Dublin and associated grounds, on the surrounding residential properties, ecology, environment and public roadways and pathways. Colour temperature of the associated lighting will be 2700 Kelvin due to the sensitivity of bats in the area.

The original impact assessment report submitted was based on 8m high columns. Following SDCC FI request two alternative site lighting designs were carried out, Option 1 based on 4m high columns & Option 2 based on low level bollard type fittings.

Option 2 utilising low level bollards resulted in excessive glare, poor illumination efficiency, excessive upward light pollution. It also results in poor facial recognition, creating safety and security concerns. Based on these results option 2 was excluded.

Option 2 also results in a significant reduction in lighting levels across the site when compared to the original lighting design (Average lux level of 6.32 v's original of 16)

This revised report is based on Option 1

Briefly, these light sources consist of;

- 4-meter columns with area lighting, Veelite Durostar series lanterns illuminating the LIDL Car park.
- 4-meter columns with area lighting, Veelite CHI series lanterns illuminating the Plaza Area.
- Recessed wall lights will be used on the access ramp at the rear entrance to the store and car park.

Selection of the environmental category sets out specific guidelines for the allowable light spillage to both nearby properties and 'skyglow' or upwards light output ratio. These values are shown with the table below.

Table: Obtrusive Light Limitations

Source: ILP GN01:2021

Table 3 (CIE 150 table 2): Maximum values of vertical illuminance on premises

Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

Table 4 (CIE 150 table 3): Limits for the luminous intensity of bright luminaires⁴

Light technical parameter	Application conditions	Luminaire group (projected area A_p in m^2)					
		$0 < A_p \leq 0.002$	$0.002 < A_p \leq 0.01$	$0.01 < A_p \leq 0.03$	$0.03 < A_p \leq 0.13$	$0.13 < A_p \leq 0.50$	$A_p > 0.5$
Maximum luminous intensity emitted by luminaire (I in cd) ⁵	E0						
	Pre-curfew	0	0	0	0	0	0
	Post-curfew	0	0	0	0	0	0
	E1						
	Pre-curfew	0.29 <i>d</i>	0.63 <i>d</i>	1.3 <i>d</i>	2.5 <i>d</i>	5.1 <i>d</i>	2,500
	Post-curfew	0	0	0	0	0	0
	E2						
	Pre-curfew	0.57 <i>d</i>	1.3 <i>d</i>	2.5 <i>d</i>	5.0 <i>d</i>	10 <i>d</i>	7,500
	Post-curfew	0.29 <i>d</i>	0.63 <i>d</i>	1.3 <i>d</i>	2.5 <i>d</i>	5.1 <i>d</i>	500
	E3						
Pre-curfew	0.86 <i>d</i>	1.9 <i>d</i>	3.8 <i>d</i>	7.5 <i>d</i>	15 <i>d</i>	10,000	
Post-curfew	0.29 <i>d</i>	0.63 <i>d</i>	1.3 <i>d</i>	2.5 <i>d</i>	5.1 <i>d</i>	1,000	
E4							
Pre-curfew	1.4 <i>d</i>	3.1 <i>d</i>	6.3 <i>d</i>	13 <i>d</i>	26 <i>d</i>	25,000	
Post-curfew	0.29 <i>d</i>	0.63 <i>d</i>	1.3 <i>d</i>	2.5 <i>d</i>	5.1 <i>d</i>	2,500	

5.3. Car Park Lighting

The car park areas within the boundaries of the site have been designed to the illuminance levels set out within British Standards BS12464-2 and BS5489.

Table 2-3 Car Park Lighting Requirements

Source: BSEN 12464-2 (2014)

Table 5.9 — Parking areas

Ref. no.	Type of area, task or activity	\bar{E}_m lx	U_o -	R_{GL} -	R_a -	Specific requirements
5.9.1	Light traffic, e.g. parking areas of shops, terraced and apartment houses; cycle parks	5	0,25	55	20	
5.9.2	Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0,25	50	20	
5.9.3	Heavy traffic, e.g. parking areas of major shopping centres, major sports and multipurpose building complexes	20	0,25	50	20	

5.4. Calculation Procedure

The proposed lighting scheme has been designed using the lighting design software Dialux to ensure all regulations are achieved and to review its effects on the local residents, ecology and environment.

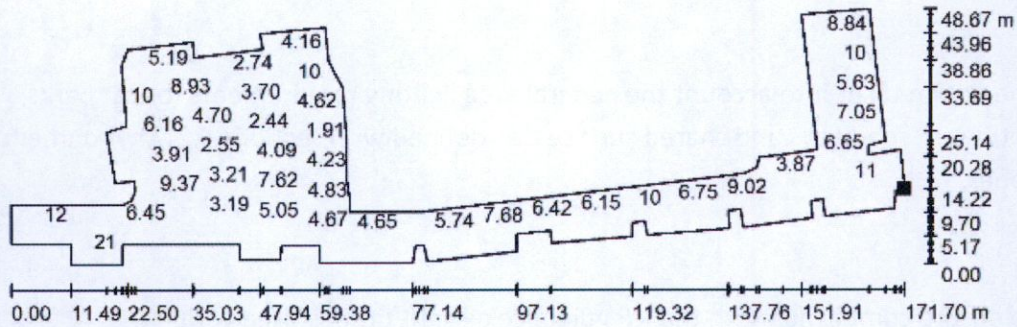
The lighting design within the site boundary shall generally be carried out utilising 4metre high lighting poles, flat glass lanterns with LED light sources with supplementary wall mounted and ceiling mounted bulkheads to illuminate perimeter. The lighting shall be automatically controlled via photocell and timeclock combination.

All light fittings used shall comply with the requirements set out within table 2.2 of section 4.2 Environmental Zones of this report and comply with the 'Dark Skies' Initiative, as detailed within the ILP Guidance notes for the reduction of obtrusive light (2021).

6.2. Luminaire Parts List: Lidl Newcastle Carpark

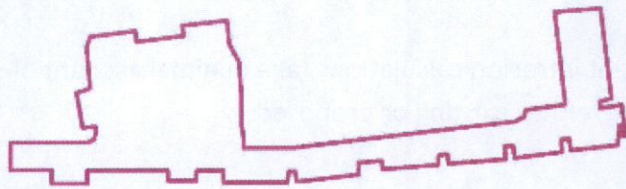
<p>11 Pieces</p>	<p>Veelite 5DRS08LGA-FT2 Durostar 30w LED 2700K Forward Throw 2 Optic (Type 1) Article No.: 5DRS08LGA-FT2 Luminous flux (Luminaire): 2000 lm Luminous flux (Lamps): 2000 lm Luminaire Wattage: 30.0 W Luminaire classification according to CIE: 100 CIE flux code: 31 71 98 100 100 Fitting: 1 x User defined (Correction Factor 1.000).</p>	
<p>5 Pieces</p>	<p>VEELITE 5CHI13LGA CHI 36W 16LED, Symmetric CIR04, 2700K, 700mA Article No.: 5CHI13LGA Luminous flux (Luminaire): 3127 lm Luminous flux (Lamps): 3127 lm Luminaire Wattage: 36.0 W Luminaire classification according to CIE: 97 CIE flux code: 18 48 87 97 100 Fitting: 1 x 16L(2x8)2700K700mA - 36.00 W (Correction Factor 1.000).</p>	
<p>31 Pieces</p>	<p>Veelite G5629.BRXA400EN Margen Wall Size 3, 13W 2700 K Symmetric 38° X 86° Article No.: G5629.BRXA400EN Luminous flux (Luminaire): 578 lm Luminous flux (Lamps): 2140 lm Luminaire Wattage: 13.0 W Luminaire classification according to CIE: 100 CIE flux code: 77 94 99 100 27 Fitting: 1 x LEDX0158-2700KC00-0250-XG (Correction Factor 1.000).</p>	

Exterior Scene 1 / Ground Element 1 / Surface 1 / Value Chart (E)



Not all calculated values could be displayed.

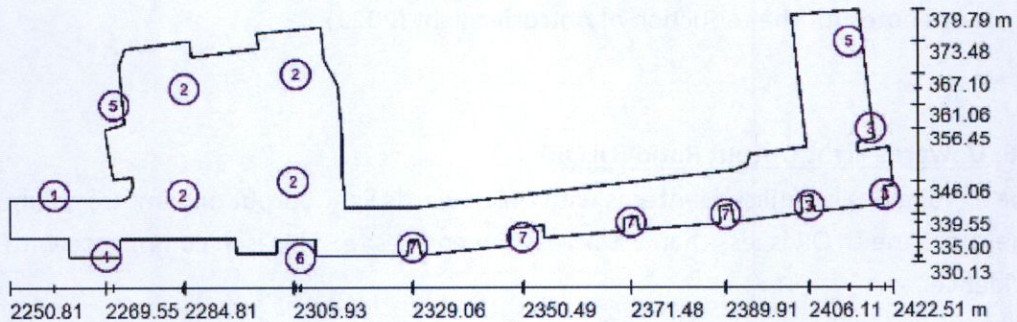
Position of surface in external scene:
Marked point: (2422.512 m, 345.343 m, 0.000 m)



Grid: 128 x 128 Points

E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	u_0	E_{min} / E_{max}
6.32	1.59	30	0.252	0.053

Exterior Scene 1 / Luminaires (layout plan)



Scale 1 : 1228

7.0. Impact on surrounding area due to proposed lighting scheme

7.1. Light pollution reduction

Careful consideration was taken when preparing our lighting schemes to ensure there is no risk of light pollution. Lighting systems frequently emit light that, in addition to performing their primary function of illumination of exterior functions, illuminate beyond what is necessary. Light Pollution is often considered a nuisance, a safety hazard when it causes 'blind' spots to pedestrians and drivers and also poses environmental concerns as it disrupts human health, affects bird migration patterns and other natural cycles. Another negative condition that arises from light pollution is the inability to view the night sky by the general public.

The requirements which we shall be following in our design of the relevant lighting schemes shall be as follows:

- BSEN 12464-2:2014 'Lighting of Work Places – Part 2 – Outdoor Workplaces'
- BS5489-1 (2020) – Code of practice for the Design of Road Lighting – Lighting of roads and public amenity areas
- Guidance note for the Reduction of Obtrusive Light – GN01:2020, produced by the Institute of Lighting Professionals (ILP)
- ILP Guidance Note 08/18 Bats and artificial lighting in the UK Bats and the Built Environment series
- We shall specify light fittings which have lighting shields to prevent the risk of light pollution to adjacent properties.
- We shall specify Light Emitting Diode (LED) lamps and fixtures for all exterior lighting including parking lots and streets.

7.4 Impact upon Bats

Introduction:

Many Species of Bat, insects and other wildlife are in danger from increasing urbanisation in general and lighting is part of the problem. Legislation protects the Roost (Resting places for Bats) from being intentionally or recklessly disturbed. If a lighting scheme is being developed in an area with Bats, a survey is carried out to plan and minimise the disruption to Bats.

For safety reasons lighting will be required to illuminate the car park on the site. However, several factors have been included in the lighting design to mitigate the disruption to Bats at the boundary areas.

The requirements which we shall be following in our design of the relevant lighting schemes are as follows:

ILP – Guidance Note 08/18 : Bats and artificial lighting in the UK/Bats and the Built Environment series and recommendations of the Environmental Consultants Report.

The Proposed Lighting Design Factors which will minimise the effect on Bats at the boundary areas:

1. The lighting installation has been designed to only illuminate the new car parking. The proposed luminaires minimise light spill to any other area forming part of the Bats commute. The luminaires provide no uplight, and have narrow downward beams of light, and optics that prevent back spill.
2. Lighting Cowls/Shields shall be installed on luminaires where there may be the potential for any light spill on the perimeter to further minimise the effects on bats as indication on the site lighting plan
3. Lighting Controls - The peak time for feeding for Bats is dusk. This is when they exit the Roost to go foraging. The light output from the luminaires is restricted, based on mounting height, pole location, PIR control and cowls/shields to avoid light spill into the vegetation along the boundaries.
4. Artificial Lighting – LED. This is the light source of choice for most local authorities. The light emitted is more directional and normally controlled by lenses or sometimes reflectors. The light is produced in a narrow beam. It is an instant light source. LED is available in several colour temperatures. 'Warm white' (more yellow/orange colour) at 2700°K can now be used with little reduction in lumen output. LED typically features no UV component and research indicates that while lower UV components attract fewer invertebrates, warmer colour temperatures with peak wavelengths greater than 550nm (~2700°K) cause less impacts on bats (Stone, 2012, 2015a, 2015b).