

PLANNING CONDITION

EXTERNAL ARTIFICIAL LIGHTING ASSESSMENT REPORT

at

**NEW LANE
HAVANT**

for

**HAVANT PROPERTY
INVESTMENT LLP**

Issue Date: February 2021

Report Number: IDS/JG/10290/PL1/R1



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**New Lane
Havant**

External Artificial Lighting Assessment Report

R1	5.02.21	References updated	IDS	PH	JG
R0	29.01.21	Initial Issue	IDS	PH	JG
Issue Number	Issue Date	Comments	Prepared By (AU)	Checked By	Authorised By

Note:
Notify the Author (AU) on marked copy of this Specification of all errors, omissions, and suggested improvements.

**New Lane
Havant**

External Artificial Lighting Assessment Report

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1.0 **Introduction**

This External Artificial Lighting Assessment report has been prepared by Kelly Taylor & Associates (KTA) Consultant on behalf of 'Havant Property Investment LLP' to assist either a local planning authority in its consideration of a 'Site' application for approval or by any of the project stakeholders to evaluate the external artificial lighting proposed for the 'Development'.

1.1 **Application Terminology**

- The Site

Reference to the application site area for 'New Lane, Havant', as set out in the architects proposed site plan should be written as the 'Site', this is case sensitive.

Submissions should not include reference to the Site using any other variations such as the development area, application area, subject site etc.

- The Development

Reference to the planning application proposals for the complete 'Built Environment' within the Site should be made using the terminology the 'Development', this is case sensitive.

Submissions should not include reference to the scheme using other variations such as the development scheme, the application, the building(s), the warehouse(s) etc.

- The Developer

The applicant is 'Havant Property Investment LLP' but should be referred to simply as the 'Developer' in all applicable sections, this is case sensitive.

1.2 **Scope of Report**

The report will encompass the following aspects: -

- National & local planning policies.
- Relevant British Standards, guides and codes of practice for external artificial lighting.
- Baseline conditions within the Site and surrounding areas.
- Mitigation measures within a considered design and assessment of the need for lighting.
- Proposed external lighting design.
- New technologies incorporated within the design.
- Sustainability within material selection, design and use.

1.3 **Basis of Report**

The content of this Report has been prepared based on the following drawings: -

- SMR Architects Drawing No. 7379-SMR-00-ZZ-DR-A-2003-S4 (Rev. P6).
- Pfizer Biotech Incumbent Lighting Survey Report No. 10290-ELR-100 (Dated 08/12/2020).
- KTA Consultants Drawings No. 10290-PL-100 & 101.
- Thorlux Lighting DIALux Calculations Report No. JW/LW/540939/DLX

1.4 **Town and Country Planning (Use Classes) Order 1987 (as amended)**

The application will comprise of 1 (one) warehouse(s), van storage deck and ancillary works, falling within Commercial Use Class B8 (storage and distribution) with associated office(s), Commercial, Business and Service Use Class E(g), previously classed as B1 Use Class.

Use Class E introduced from 01st September 2020.

The Development is outlined with the following Gross Internal Area: -

Reference Name	B8 Warehouse Area	E(g) Office Area	Total GIA	Site Area	Site Access Points
4F	11,097 m ²	2,920 m ²	14,017 m ²	6.65 Hectares	3

The Development is provided with the following accommodations: -

Reference Name	Dock Level Doors	Level Access Doors	Site Van Parking Spaces	DA Van Parking Spaces	Car Parking Spaces
4F	10	14	197	720	208

1.5 **Legislative & Policy Context**

- National Planning Policy

The National Planning Policy Framework (NPPF February 2019) sets out the governments planning policies for England and how they are expected to be applied and provides a framework for local plans.

Under the broad heading of ‘Conserving and enhancing the natural environment’, Chapter 15 ‘Ground conditions and pollution’ deals with obtrusive light in clause 180 which states: -

‘limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.’

‘Pollution’ is defined as: -

‘anything that affects the quality of land, air water or soils which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions including light.’

- Local Planning Policy

The planning officer will apply the relevant local planning policies.

- Statutory Guidance

The Clean Neighbourhoods and Environment Act 2005 (CNEA) amended the Environmental Protection Act 1990 to include within section 79 (statutory nuisance).

Therefore, since 6 April 2006, artificial light can be considered to be a statutory nuisance. If a light nuisance is considered by a local authority to exist, the local authority must serve a notice on the person responsible requiring the abatement of the nuisance, and/or restricting or prohibiting its recurrence.

- Non-Statutory Guidance

Health and Safety Executive published guidance notes for Lighting at Work (ISBN 978 0 7176 1232 1) explain how lighting contributes to the health and safety of people at work.

It deals with assessing and managing the health and safety risks attributable to lighting in the workplace, good practice and the minimum recommended illumination levels that meet health and safety requirements.

Assessment of the Problem of Light Pollution from Security and Decorative Light (Temple and NEP Lighting Consultancy on behalf of Defra, 2006) is a summary of legislation and guidance relating to external artificial lighting.

The document is aimed at providing advice to local authority officers on assessing whether lighting is causing a statutory nuisance and providing advice on how to mitigate such impacts.

Guidance Notes for the Reduction of Obtrusive Light, (ILP, GN01/2020) provides advice on lighting including the recommendation to local planning authorities to specify Environmental Zones for external lighting based on the existing external lighting levels in the area.

The document also provides design guidance including maximum lighting level limits for each environmental zone.

1.6 **Assessment of the Need for Lighting**

Notwithstanding the legislative requirements to provide adequate means of illumination to prevent the occurrence of dangerous incidents, external lighting is an industry standard requirement with focus on loss prevention as a policy, with additional requirements included to reduce the potential possibility of vehicular and pedestrian harmful incidents.

The safety and loss prevention benefits of providing external lighting outweigh any negatives for not providing external lighting.

Lighting in itself is not a problem; it only becomes a problem where it is excessive, poorly designed or badly installed. Additional mitigation measures for reducing the effects of providing artificial external lighting have been considered and will be incorporated into the external lighting design where required.

Whilst also considering the impact of lighting on any identified residential receptors and surrounding ecological sensitive areas, focus is maintained on the safe operation for a high traffic volume warehouse logistics & distribution building(s).

1.7 Site Classification

The current Site has been classified as Zone E3, Medium District Brightness area(s).

Limiting values are then placed onto the allowable levels of light trespass, sky glow etc. that should be present in these areas. Qualitative descriptions of the Environmental Zones from the ILP Guidance Notes for the Reduction of Obtrusive Light (GN01/2020) are listed below: -

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	UNESCO starlight reserves, IDA dark sky places.
E1	Natural	Dark (SQM 20 to 20.5)	Uninhabited rural areas, national parks, areas of outstanding natural beauty etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village, or relatively dark outer suburban locations.
E3	Suburban	Medium district brightness	Well inhabited rural & urban settlements, small town centres of suburban locations.
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity.

The limits applicable for each Environmental Zone are identified in the table below: -

Environment Zone Classification	Sky Glow Amenity [Max%] ≤		Light Intrusion into Windows Eavg (lux)		Luminaire Source Intensity I (candelas)		Building Luminance Pre-curfew
	ULR	UFR	Pre-Curfew ≤	Post-Curfew ≤	Pre-Curfew ≤	Post-Curfew ≤	Average L (cd/m ²) ≤
E0	0	n/a	n/a	n/a	0	0	<0.1
E1	0	n/a	2	<0.1	2,500	0	<0.1
E2	2.5	6	5	1	7,500	500	5
E3	5.0	12	10	2	10,000	1,000	10
E4	15.0	35	25	5	25,000	2,500	25

The theoretical lighting design demonstrates maximum values for each metric, the full calculations are appended within the DIALux report (Appendix D) and summarised in the table below: -

Environment Zone Classification	Sky Glow Amenity [Max%] ≤		Light Intrusion into Windows Eavg (lux)		Luminaire Source Intensity I (candelas)		Building Luminance Pre-curfew
	ULR	UFR	Pre-Curfew ≤	Post-Curfew ≤	Pre-Curfew ≤	Post-Curfew ≤	Average L (cd/m ²) ≤
E3	1.04	n/a	0.3	0.3	683	683	4.82
VERDICT	PASS		PASS	PASS	PASS	PASS	PASS

1.8 **Residential Receptors**

The current Site has neighbouring residential properties that would require design compliance against the ILP Guidance Notes for Obtrusive Light.

Modern society requires outdoor lighting for a variety of needs, including safety and commerce, the International Dark Sky Association (IDA) recognizes this but advocates that any required lighting be used wisely and to minimize the harmful effects of light pollution, lighting should: -

- Only be on when needed.
- Only light the area that needs it.
- Be no brighter than necessary.
- Minimize blue light emissions.
- Be fully shielded (pointing downward).

An incumbent lighting survey was conducted by KTA on Tuesday the 8th of December under moonlight conditions (Appendix C), the lighting survey highlighted several areas of concern in terms of poor lighting practices and obtrusive light: -

- Luminaires mounted vertically resulting in unnecessary sky-glow and a visible light source.
- Luminaires utilised with light emitted above the horizontal in all configurations.
- Luminaires of differing colour temperatures and source intensity mounted at varying heights.
- High levels of light trespass and building luminance to neighbouring residential properties.
- Perimeter fencing and hedgerows do not provide a full barrier against light trespass.
- Perimeter luminaires are installed without back-light shielding.

To this end, the proposed lighting design will mitigate against all the above obtrusive light conditions currently installed within the Site and demonstrate compliance against all relevant industry standards and guides including the ILP Guidance Notes for Obtrusive Light.

1.9 **References**

The following standards, policies, guidance notes and framework documents will form the basis within this report for assessment with consultation prior to, during and post completion of the Development solution: -

- National Planning Policy Framework (Revision February 2019)
- Clean Neighbourhoods and Environment Act 2005 (CNEA)
- Environmental Protection Act (1990)
- Countryside Commission, Lighting in the Countryside – Towards Good Practice (1997)
- HSE Executive Lighting at Work (ISBN 978 0 7176 1232 1) 1997
- British Standards, Lighting of Outdoor Work Places (BS EN 12464, 2:2014)
- British Standards, Lighting of Indoor Work Places (BS EN 12464-1:2011)
- British Standards, Accessible & Inclusive Built Environment (BS 8300-1:2018)
- British Standards, Photobiological Safety of Lamp Systems (BS EN 62471:2008)
- CIBSE Lighting Guide LG1, The Industrial Environment (2018)
- CIBSE Lighting Guide LG6, The Outdoor Environment (2016)
- ILP Technical Report TR12 Lighting of Pedestrian Crossings (2007)
- ILP Guidance Notes for the Reduction of Obtrusive Light (GN01/2020)
- ILP Guidance PLG23 Lighting For Cycling Infrastructure (2020)
- IWBI The Well Building Standard™ v2 (2020)
- UK Green Building Council, Net Zero Carbon Buildings (2019)
- DEFRA, Clean Air Strategy (PB14554:2019)
- IEC, LED Modules for General Lighting – Performance Requirements (IEC 62717:2019)
- IEC, Luminaire Performance – Particular Requirements for LED Luminaires (IEC 62722:2014)

2.0 **Best Practice Lighting Design Principles**

In order to prevent any mitigation against the statutory requirements in terms of light nuisance, further stipulations were imposed upon the lighting design for the proposed Development: -

- All lighting should have a clear purpose and avoid the use of unnecessary lighting simply to create a 'presence' at night.
- Concentrate lights where they are needed and establish a clear hierarchy, with minimum lighting around the outer perimeter of the proposed Development (isoLUX boundary contour lines are shown at 2.0 lux and 1.0 lux).
- Reduce the scale of street/road lighting and consider height and spacing of lights in relation to buildings.
- Direct all floodlights carefully and away from any residential receptors to where they are most needed and design equipment to minimise light pollution including the use of dedicated task optics.
- Ensure that the design of the lighting is in harmony with the building envelope.
- Propose a unified lighting scheme, ensuring that different types of light sources or colour temperatures are not specified.
- Alternative value-engineered luminaires are not to be proposed as a point-for-point replacement post tender as the total solution is unique to the manufacturer verified within this process, after careful pre-analysis of all performance criteria has been undertaken in terms of the following: -
 - Sky Glow (Obtrusive Light)
 - Obtrusive Glare (Obtrusive Light)
 - Disability Glare (Obtrusive Light)
 - Light Trespass (Obtrusive Light)
 - Source Intensity
 - Building Luminance
 - Luminaire Efficacy
 - Design Efficiency
 - Solution Capital Cost
 - BWIC Cost
 - Operating Cost
 - Energy Reporting & Reduction in Operation
 - Sustainability

2.1 **Obtrusive Light**

Obtrusive light is generally a consequence of poorly designed, poorly installed or insensitive lighting schemes, the three main problems associated with obtrusive light are: -

- Sky-glow, the orange or blue glow/haze we see around urban areas caused by a scattering of artificial light by dust particles and water droplets in the sky.
- Glare, the uncomfortable brightness of a light source when viewed against a darker background.
- Light Trespass, light spilling beyond the boundary of the property on which a light is located.

Each of the three types presents very different problems for the general public and the environment, during the design process the necessary mitigation measures were taken against: -

- Sky-glow, the result of wasteful and ill-directed lighting that reduces the ability of people to see the natural night sky.
This is a problem found not only in urban areas but also in rural areas where dark skies at night are one of the special and intrinsic qualities of the rural landscape.
Artificial lighting can also destroy local character by introducing a suburban feel into rural areas.
- Disability glare and insensitive lighting can have serious implications for motorists who may become distracted or blinded by glaring lights spilling out on to the highway.
Excessively bright artificial lighting at night can create glare to a dark-adapted observer and, by comparison, create adjacent deep shadow which the eye cannot adjust well to.
Bright or inappropriate lighting in the countryside can also have severe ecological implications.
Obtrusive light in rural locations can affect the natural diurnal rhythms amongst a wide range of animals and plants.
- Light trespass is a common problem and can intrude on the residential amenity in both urban and rural settings causing stress and anxiety for people affected.
In addition to these specific problems, obtrusive light increases the carbon footprint and represents a waste of energy, resources and money.

2.2 **Performance Criterion**

Additional stipulations are imposed upon the lighting design and luminaire selection to ensure that the total solution provides a harmonised and 'best in class' solution: -

- ILP Guidance Notes and best practice limitations stipulate that in order to reduce levels of Obtrusive Glare and provide a safe working environment that the peak intensity of all the luminaires should be below 70° in the horizontal position.
- BREEAM Ene03 External Lighting (one credit) dictates that all external light fittings within the construction zone, have an average luminaire efficacy not less than 70 luminaire lumens per circuit watt (>70 llm/cW).
- Luminaires will be protection rated to a minimum of IP65/IK08.
- The lighting design will be simulated using luminaires with a Colour Temperatures of 4,000°K and a Colour Rendering > 60 (CRI).
- Each luminaire will comply fully with BS EN 62471:2008 and protect from physiological, photochemical and biological reactions including infrared radiation, ultraviolet radiation and retinal thermal injuries.
- In the horizontal position, each luminaire will emit no upward light (0% ULOR).
- The complete light engine will have a rated life time >100,000 hrs at L80/B10, other life time metrics will not be stipulated (i.e. L70/B50).
- The use of back-light shields is to be specified where either perimeter lighting is to be restricted or receptor views of the light source are to be inhibited, including the use of positive and negative bracket tilt.
- All column mounted luminaires are to be installed at no more than 6m AGFL to reduce both the Development building illumination and impact upon unnecessary sky-glow by interreflected light.
- Column mounted luminaires will not be configured in multiple arrangements (greater than 2 luminaires) on a single lighting column unnecessarily creating 'hot-spots' of light (interreflection into the night-sky) and potentially causing a serious risk upon failure (large areas with no functional artificial lighting).

2.3 Design Illuminance

The lighting design appended to this report stipulates and demonstrates the achieved horizontal design illuminances by 'Task Zone' contained within the Site and applicable to the Development; all derived from the above standards or guides and increased where necessary to the Applicants own lighting design standard for safe external Site operations.

The 'Task Zone' is the area where specifically designated functions are performed, it is important and stipulated by the HSE to consider the ratios of illuminance for adjacent areas or Task Zones.

Maximum ratios of illuminance for exterior applications are stipulated as 10:1. This ratio is between the minimum lux level achieved within a Task Zone to the Maximum lux level achieved within the adjacent Task Zone. This also applies where interior applications transition into exterior applications, i.e. Dock-Level Doors or Building Entrances.

A transition zone may be required between adjacent high and low district brightness areas.

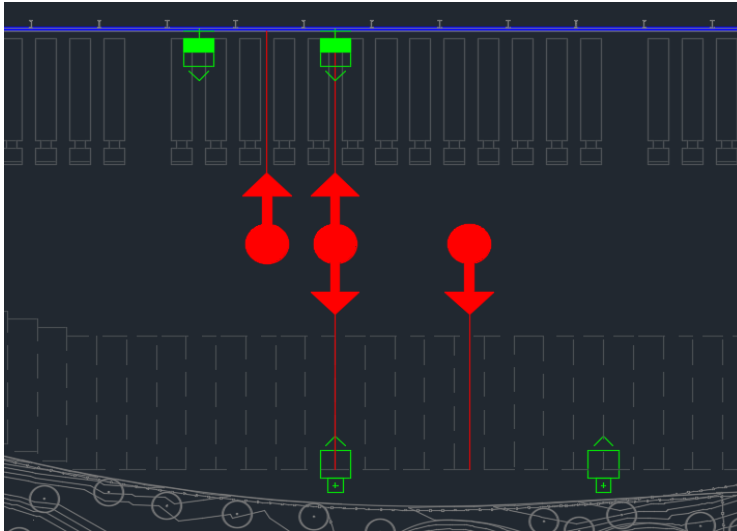
2.4 Maintenance Factor

The design illuminance will be achieved using the following maintenance factor parameters in accordance with BS 5489-1:2020: -

Maintained Illuminance				
<u>percentage of initial light output (x)</u>		<u>$\frac{100-y}{100}$</u>		LMF
100	x		x	
	x	percentage of initial luminous flux of an LED		
	LSF	percentage of LEDs that will be operational at F ₁₀		
	y	100-LSF (Lamp Survival Factor)		
	LMF	Annex C pTable C.1 in BS 5489-1:2020		
Environmental Zone Classification	E2			
Column Mounting Height	>6m			
Cleaning Frequency	72 Months			
L ₇₀ F ₁₀	100,000 Hours			
Power Factor	>0.95			

2.5 **Glare Calculations**

Design verification Glare calculations are to be performed as requested in the Design Illuminance tables (Section 2.3), for clarification an indicative 'Service Yard' scenario is exemplified in the thumbnail below: -

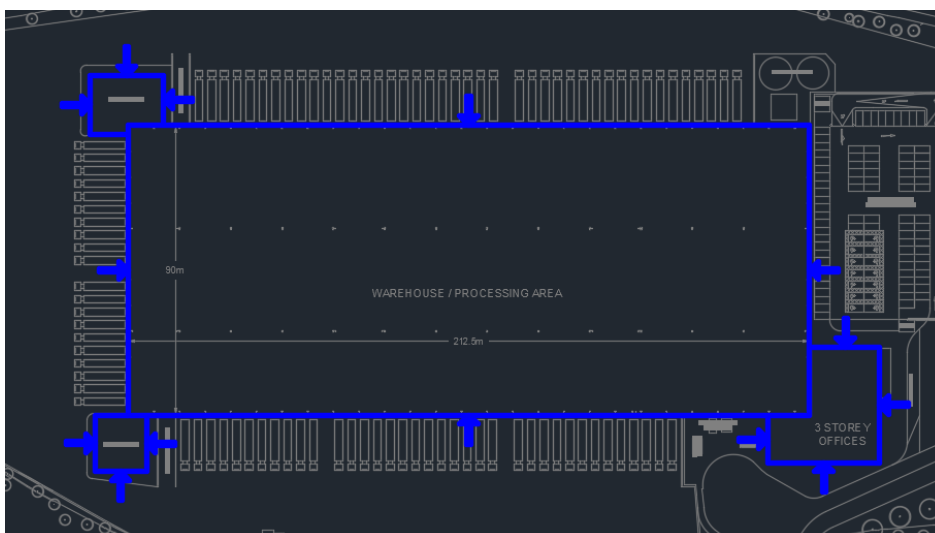


Glare calculations are performed at two locations in the centre of the yard in two directions with receptors at 2.25m AGFL:

- 1) Directly below a luminaire.
- 2) Equal distance between two wall-mounted and column mounted luminaires.

2.6 **Building Luminance**

Design verification Building Luminance calculations are to be performed as requested in the Site Classification, ILP Guidance Notes table with the maximum average recorded. For clarification each elevation of the building perimeter is to be calculated independently as exemplified in the thumbnail below: -



- 1) Building luminance (cd/m^2) is calculated from the building mounted luminaire height (hm) and across the total area beneath on each elevation of the building (above example = 14 calculations).

2.7 **Artificial External Lighting Design Summary**

The artificial exterior lighting design for the completed and operational Development at the Site considers each task and any potential hazards associated with: -

- Site-wide roaming pedestrians, cyclists and assisted accessibility.
- HGV & LGV vehicles queuing, idling, parking, loading and unloading and reversing.
- Gatehouse procedures, biometric identification, vehicle checks, administration etc.
- Regular vehicle traffic & movement including parking, electric vehicle charging and pedestrian accessibility.
- Site security, CCTV and facial recognition.
- Muster-points and methods of escape, emergency lighting levels.
- Transition zones from building interior to exterior, i.e. level access doors & reception.
- Plant maintenance, operation and meter checking.
- Light nuisance to neighbouring residents and any receptor locations, including light trespass, sky-glow, obtrusive glare and building luminance.
- Adjoining highways traffic in terms of acceptable design illuminance(s) and disability glare to non-Site traffic.

The lighting design demonstrates full compliance with all standards and guides whilst not including any natural obstructions (acoustic barriers are included), landscaping and changes in topology.

It is therefore considered worst-case and in practice the levels of horizontal light-spill, obtrusive glare, visible source intensity and building luminance are permissible within the Environmental Zone classification of 'E3'.

The lighting design also considers the perceived potential obtrusive glare to either dwellings or adjacent road receptors by ensuring that where possible luminaires and optical arrays are positioned, orientated and tilted to prevent any direct views of the light source and reduce subsequent intensity levels (candelas) to an acceptable level.

There will be a residual impact of interreflected sky-glow on the night-time scene as a result of the proposed Development, but with appropriate considerations taken within the lighting design process these impacts can be considered negligible, with the direct element of upward light of 1.04%.

2.8 **Artificial External Lighting Design Decree**

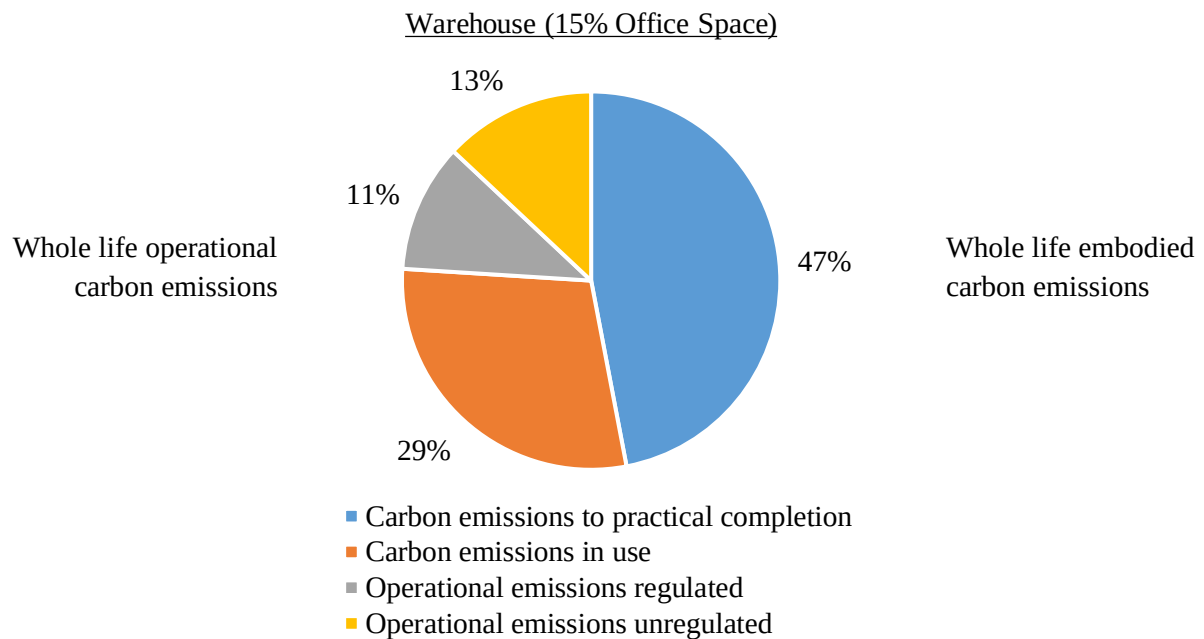
It is considered that the submitted External Artificial Lighting Design (Appendix B) complete with luminaire selection achieves the industry recognised and desired task illuminance lighting level(s); are wholly appropriate, acceptable and conditionally demonstrate compliance within this report against all relevant standards, guides and planning policies.

2.9 **Sustainability**

The UK Green Building Council has produced a Net Zero Carbon Building framework document (April 2019) that outlines plans to tackle the greatest challenge of our times, climate change.

The document identifies 5 steps to establishing a Net Zero Carbon Scope through the construction and operation process.

Exemplified within the report is the total whole life carbon emissions breakdown for new buildings and a typical warehouse shed with associated office space within the London perimeter: -



The greatest potential for the reduction of embodied carbon within the construction process is found within the planning application stage, with further reductions highlighted in the demand of energy in the operation and use of the Development through Prioritising the increased use of on-site sources of renewable energy supply and any remaining carbon offset using a recognised offsetting framework.

To this end, the complete exterior services solution including artificial lighting proposed for the Site will demonstrate obedience and acknowledgment of all the environmental consequences that arise from new buildings in their construction and operation within the planning application.

3.0 **Net Zero Development Initiatives**

The external artificial lighting design for the Development forms an integral part of all the external services enabling a wireless network & on-line portal that can be utilised for all consumption and generation metrics with compliance against energy reporting in kWh (Section 3, Reduce Operational Energy Use).

The manufacturing process for all specified lighting luminaires will be supplied carbon neutral with all total embodied carbon being offset by the luminaire manufacture in an accredited tree-planting programme.

APPENDIX A

SMR Architects Drawings

7379-SMR-00-ZZ-DR-A-2003-S4-P6

New Lane, Havant PROPOSED SITE PLAN

APPENDIX B

KTA Consultant Drawings

10290-PL-100	External Artificial Lighting Design
10290-PL-101	External Lighting Intrusive Lighting Renders & Calculation Points

APPENDIX C

KTA Supporting Documents

10290-ELR-100

Pfizer Biotech Incumbent Lighting Survey Report

APPENDIX D

Thorlux Lighting

JW/LW/540939/DLX

DIALux Calculations, Report & Luminaires Datasheets