Lighting Design & Impact Assessment

Great Houghton

Avant Homes

Investor House
Colima Avenue
Sunderland Enterprise Park
SR5 3XB

Prepared by:

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Revision Record

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Basis of Report

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Executive Summary

Avant Homes (the 'Client') has instructed SLR Consulting Ltd to provide a lighting design and assessment to support the discharge of Condition 22 in accordance with the terms of the application to the Barnsley Metropolitan Borough Council (the 'Council') for the development of 108 dwellings (the 'Proposed Development') on Land to the east of High Street, Great Houghton, Barnsley (the 'Site').

The lighting design will consider the requirements of all current industry regulations and recommendations alongside the requirement to protect light sensitive ecology including effects on biodiversity.

A best practice approach has been taken to ensure the scheme has minimal impact on the surrounding environment whilst providing safe and secure lighting where necessary.

The result of the detailed lighting design based on the advice contained within this document will provide a suitable and compliant scheme with minimal impact on ecology or other receptors.

To satisfy Condition 22, a suitable lighting design for the Site is required. This includes the identification of areas of high ecological sensitivity and the demonstration through a set of lighting calculations that illuminance limits to protect those areas are met, and can satisfy the objective of preventing lighting affecting ecological habitats or adjacent residential receptors within and around the Site.

The following items will be required to satisfy the planning process:

- Review of the proposed development plans and layouts;
- Identification of the Site location with respect to sensitive receptors;
- Identify appropriate design criteria for areas that require illumination including production of risk assessments for highway and pedestrian footpaths where necessary;
- Produce a suitable and compliant lighting design including equipment specifications, general best practice approach and reference to relevant standards and guidance; and
- Preparation of a mitigation strategy where necessary.

Every effort has been made to reduce, omit or minimise artificial lighting within the Proposed Development for the benefit of ecology, the character of the local area and the preservation of the quality of the landscape and night sky.

With minimal installed street lighting and sensitively designed domestic amenity lighting, the Proposed Development does not make any materially significant contribution to sky glow or pose a materially significant risk to the landscape through light pollution.

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Acronyms and Abbreviations

CIBSE	Chartered Institute of Building Services Engineers
ILP	Institute of Lighting Professionals
ALAN	Artificial Lighting at Night
PNL	Part Night Lighting

1.0 Introduction

1.1 Purpose of Report

1.1.1 The lighting design is provided to support a planning application for the development of 108 dwellings and new access from High Street ('Proposed Development') on land east of High Street, Great Houghton, Barnsley (the 'Site').

1.1.2 The report is intended to provide details of a carefully considered strategy for any lighting within the Site required for the safety, security and amenity of the residents whilst balancing the requirements to protect any identified receptors such as adjacent residential properties, light sensitive ecology, their linked natural habitats and the quality of the night sky.

1.1.3 At the reserved matters stage, the parameters and constraints considered by this report provide a framework for the development of a sensitive lighting design presented as part of the discharge of Condition 22 within the Decision Notice.

The scope is developed in response to Condition 22 provided by the Barnsley Metropolitan Borough Council (the 'Council').

Condition 22 of the Decision Notice states:

'22 - Notwithstanding the submitted details, prior to first occupation of the site, details of external/internal lighting shall be submitted to and approved in writing by the Local Planning Authority. The details shall be reviewed and produced by a suitably qualified ecologist and clearly demonstrate that lighting will not adversely impact wildlife using key corridors, foraging and commuting features and roosting sites. The details shall include, but are not limited to, the following:

• Identification of areas/features on site that are particularly sensitive e.g. breeding, resting, foraging and commuting sites;

• A drawing showing dark corridors and buffer areas;

• A report and drawings showing how and where external lighting will be installed so that it can be clearly demonstrated that areas to be lit will not disturb or prevent species using their territory or having access to breeding sites/resting places, this should include;

• Technical descriptions, design or specification of external lighting to be installed including shields, cowls or blinds where appropriate;

• A description of the luminosity of lights and their light colour;

• A drawing(s) showing the location and where appropriate the elevation and height of the light fixings;

• Methods to control lighting control (e.g. timer operation, Passive Infrared Sensors (PIR)); and

• Lighting contour plans, both horizontal and vertical where appropriate, taking into account hard and soft landscaping.'

To provide sufficient detail to satisfy **Condition 22**, a suitable and compliant lighting scheme design for the Site is required with the objective of preventing lighting affecting nearby residential receptors in terms of obtrusive light and, in co-ordination with the designated ecologist, to prove the scheme prevents harm to existing light sensitive habitats as a result of light pollution.

1.2 Site and Context

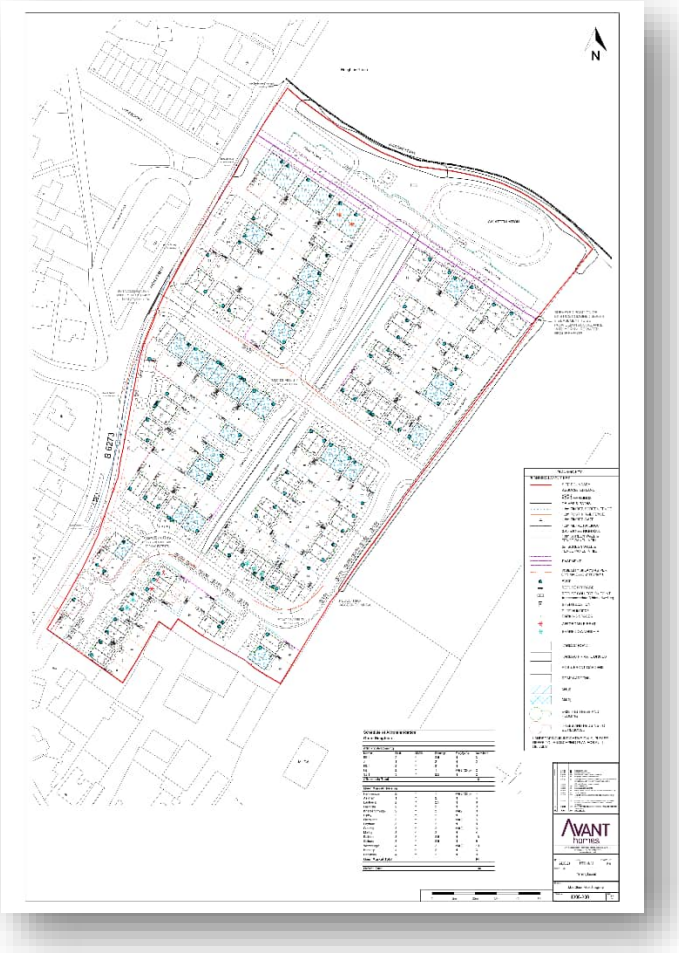
1.2.1 The Site occupies land to the northwest of the village of Great Houghton, Barnsley, bordered by agricultural fields to the north and east, and residential properties to the west and south.

1.2.2 The Site comprises two small agricultural fields with hedgerows lining the north, east and western peripheries; and is situated within a suburban area with the adjacent roads observed to be lit with typical street lighting, with the wider landscape comprised primarily of agricultural land with parcels of woodland and residential properties.

1.2.3 The development is to be accessed via a new connection to High Street at the western boundary and features internal vehicular and pedestrian circulation via adoptable roads to supply the development of 108 dwellings.

Figure A: Location and Boundary

'4206-200 Planning Layout Rev M' - Proposed Site Layout (by Avant Homes)



Site Location: 53.33291, 1.21117 / Google Plus Code: HJ5W+5MC Barnsley

1.3 Desk Based Survey

1.3.1 A desk-based survey of publicly available maps as satellite imagery was undertaken by SLR to assess the existing condition and potential risk to receptors around the Site. No fieldwork or baseline lighting survey was undertaken by SLR.

1.3.2 There is existing general street lighting installed on the adjacent access road to the west (High Street and Moor Lane), and throughout the residential parcels to the further west (Crabtree Drive) and to the east (School Street).

1.3.3 With the removal of the hedgerow at the western periphery, residential properties on High Street will have inward views towards the Site, however their primary facades are subject to existing typical street lighting, and the general context is a suburban area with medium district brightness. Subsequently, conclusions of the desk-based survey are that no residential receptors are identified with views towards the Site that are at materially significant risk of obtrusive light or visual impact from a sensitively designed lighting scheme within the Site.

1.3.4 The wider context comprises areas of biodiversity value, with West Haigh Wood, an area of ancient oak woodland designated as a Local Nature Reserve, approximately 1km to the north, and a woodland parcel 0.3km to the southwest on Park Lane which connects to Grimethorpe Nature Reserve and Dearne Valley Wetlands which is a Site of Special Scientific Interest (SSSI).

1.3.5 The northern hedgerow is identified to be of ecological value, particularly with the addition of the attenuation basin at the northeast corner as this provides foraging opportunities along the periphery of the Site, and the introduction of enhanced roosting and further commuting routes for bats. An appropriate lighting design should be employed to ensure minimal to no light spill at this boundary.

2.0 Methodology, Policy and Guidance

2.1.1 The lighting strategy uses the information provided in **Section 2.1.2** below along with policy and guidance as per **Section 2.1.3**, to determine the best practise for lighting impacts to human and ecological receptors.

2.1.2 The following information has been considered:

- Site Layout Plan (4206-200 Planning Layout Rev M - Proposed Site Layout) Prepared by Avant Homes;
- Proposed Lighting Layout (SL20-140-1300-01-REV A - High Street, Great Houghton - Section 38 Street Lighting Proposals)
- Ecological Impact Assessment (EcIA) Report (250729_410.066691.00002_Great Houghton EcIA_v4) Prepared by SLR; and
- Available maps and satellite imagery.

2.1.3 The following documents have been referred to in the preparation of this document. It is expected that, at the time of construction, the latest issue of the documents below will be referred to so as to ensure current regulations and best practice are met:

Government

- Clean Neighbourhoods and Environment Act 2005, (Section 102).
- DEFRA: Guidance on Sections 101 to 103 of the Clean Neighbourhoods and Environment Act 2005.
- Wildlife & Countryside Act 1981.
- Conservation (Natural Habitats etc.) Regulations 1994.

ILP - Institution of Lighting Professionals

- GN01:2021. Guidance Notes for the Reduction of Obtrusive Light.
- PLG02:2013. The Application of Conflict Areas on the Highway.
- PLG03:2012. Lighting for Subsidiary Roads.
- PLG04:2013. Guidance on Undertaking Environmental Lighting Impact Assessments.
- Bat Conservation Trust ILP Guidance Note GN08:2023 - Bats and Artificial Lighting at Night
- TR12-1:1997. Lighting of Pedestrian Crossings.
- TR25:2002. Lighting for Traffic Calming Features.

SLL - The Society of Light and Lighting (CIBSE)

- Fact File 8: Lighting for People who are Visually Impaired 2012.
- The SLL Lighting Handbook 2018.
- The SLL Code for Lighting 2022.

CIE - International Commission on Illumination

- CIE Publication 150-2017. Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition.
- CIE Publication 115-2010. Lighting of Roads for Motor & Pedestrian Traffic.
- CIE Publication 126-1997. Guidelines for minimising sky glow.

British Standards

- BS 5489-1:2020 - Design of road lighting - Lighting of roads and public amenity areas. Code of Practice.
- BS EN 12464-2:2024 - Light and lighting - Lighting of work places - Part 2: Outdoor work places.

Other

- DarkSky (previously known as The International Dark-Sky Association).
- All-party Parliamentary Group (APPG) for Dark Skies.
- Bat Conservation Trust.
- Eurobats Publication Series No.8 - Guidelines for Consideration of bats in lighting projects.
- Secured by Design Residential (Homes) Guide 2025

2.1.4 Potential receptors are identified as:

- **Bats**, as stated within Ecological impact Assessment (EcIA) Report (Prepared by SLR) the Site appears to be an important commuting route for bats, with the hedgerow along the northern perimeter identified as having foraging and roosting opportunities.
- **Residential properties** to the west on High Street and Crabtree Drive, and properties to the east on School Street and Garraby Close with partial inward views across the Site.
- **The quality of the night sky** as the existing condition can be considered as Class 5 on the Bortle Scale, based on information gathered from www.lightpollutionmap.info consistent with a ‘Suburban’ sky although this should be protected from any contribution to localised sky-glow.

2.1.5 To determine the environmental zone for the site, information provided in the Institute of Lighting Professionals (ILP) Guidance Note 1 ***'ILPGN01:2021 - The Reduction of Obtrusive Light'*** Table 2 is replicated below in Table A. Environmental Zone **E2** is the appropriate zone for the site.

Table A: ILP Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones 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 and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

2.1.6 **Table B** below shows illuminance limitations (lux levels) and maximum luminous intensity (cd, candelas) for each Environmental Zone. These are the maximum levels of light that would be permitted at the receptor and the emission of the light source within the luminaire when viewed from the receptor position.

2.1.7 For Environmental Zone E2 this would be maximum of 5 lux pre-curfew and 1 lux post-curfew. As a simple comparison, a standard candle at 1 metre would give 1 lux and twilight is judged to be approximately 1 lux. The maximum luminous intensity allowed would be 7,500 cd pre-curfew and 500 cd post-curfew.

2.1.8 Post-curfew hours would be considered from 23:00 hours (a reasonable expected time) until 05:00.

Table B: Illuminance Limitations & Maximum Luminous Intensity (Ap)

Zone	Pre-Curfew (lx)	Post-Curfew (lx)	Pre-Curfew (cd)	Post-Curfew (cd)
E0	N/A	N/A	0	0
E1	2	<0.1*	2,500	0
E2	5	1	7,500	500
E3	10	2	10,000	1,000
E4	25	5	25,000	2,500
* If the installation is for public (road) lighting then this can increase to 1 lx				

2.1.9 The Institute of Lighting Professionals (ILP) Guidance Note 8 ***'ILPGN08:2023 - Bats and Artificial Lighting'*** provides further detail with particular attention to sections *'Appropriate Luminaire Specifications 4.29'* and '*Lighting Contour Plans 4.51-4.54'.*

2.2 Bats and Lighting

2.2.1 Relevant extracts from the ***'National Planning Policy Framework (NPPF) December 2024'***:

2.2.2 Para 187: *"Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value. d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures and incorporating features which support priority or threatened species such as swifts, bats and hedgehogs."*

2.2.3 Para 192: *"To protect and enhance biodiversity and geodiversity, plans should: a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity68; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity."*

2.2.4 Para 193: *"When determining planning applications, local planning authorities should apply the following principles: a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and. d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate."*

2.2.5 Para 195: *"The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site."*

2.2.6 Para 198: *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

2.2.7 Relevant extracts from the ***'Bat Conservations Trust ILP Guidance Note 08/2023 - Bats and Artificial Lighting at Night'*** include:

2.2.8 (1.12) - *'In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats. Many night-flying species of insect that bats hunt are attracted to light, especially those light sources that emit an ultraviolet component (Light Emitting Diodes (LEDs) have removed this) or have a high blue spectral content.'*

2.2.9 **Applied Strategy:** No lighting equipment to be specified that includes any UV emission and the colour temperature must be 2700k or lower.

2.2.10 (1.21) - *'Continuous lighting in the landscape, such as along roads or waterways, creates barriers which many bat species cannot cross, especially slower-flying species, even at very low light levels. Lesser Horseshoe bats have been shown to move their flight paths which link their roosts and foraging grounds to avoid artificial light installed on their usual commuting routes. Significant effects have been recorded from as low as 3.6 lux.'*

2.2.11 **Applied Strategy:** Careful consideration must be made for linear features such as the internal roadways requiring lighting at night, to prevent the bisection of parcels of habitat through continuous lighting. Mitigations such as part night lighting and part night dimming to be included in the control strategy as well as breaks in the lighting installed to create a network linked dark habitats via the hedgerows and tree lines around the Site.

2.2.12 (4.15) - *'An adverse impact from illumination onto a Key Habitat feature is likely to have a significant effect on the bats using it. Therefore, an absence of artificial illumination and glare acting upon both the feature and an appropriately sized buffer zone is most often the only acceptable solution. An ecologist will be best placed to set the size of such a buffer zone according to the species present and the level of usage, and these can be tens of metres if unattenuated light spill or glare from local sources is predicted. The input of a lighting professional should be sought when determining the distances of light spill from new sources and likelihood of glare.'*

2.2.13 **Applied Strategy:** In coordination with the project ecologist as part of the lighting scheme design, buffers protecting areas of existing bat activity are to be defined with the intention of preserving relative darkness throughout those habitats, foraging and commuting routes. In addition, where the ecologist identifies suitable links to form 'dark corridors' enabling light sensitive ecology to access a wider network of linked habitats around the Site, these must also be protected from light pollution.

2.2.14 (4.16) - *'...There is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety... Nevertheless, these are not exempt from the statutory protection afforded to bats, their roosts and commuting routes directly associated with roosts, and good design principles such as the Institution of Lighting Professionals' GN01: The Reduction of Obtrusive Light remain best practice. However, in the public realm, while lighting can increase the perception of safety and security, measurable, objective benefits on safety and security are less well established. Consequently, lighting design should be holistic, taking into consideration the relevant British Standards or local policies concerning lighting but, through a risk assessment-style process, be able to fully take into*

account the presence of protected species and the likely adoption of mitigation approaches through proper engagement with local communities.'

2.2.15 **Applied Strategy:** Subject to risk assessments, consideration should be made to areas of conflict between maintaining dark corridors and lighting for safety, security and amenity to potentially abstaining from lighting those areas and maintaining unlit areas to preserve dark 'hop-over' links to habitats beyond.

2.2.16 (4.31) - *'Light spill can be successfully screened through landscaping and the installation of walls and fences, or even banks and bunds. In order to ensure that fencing makes a long-term contribution, it is recommended that it is supported on concrete or metal posts. Fencing can also be over planted with hedgerow species or climbing plants to soften its appearance and provide a vegetated feature which bats can use for navigation or foraging.'*

2.2.17 **Applied Strategy:** Where appropriate, opaque fences should be included within the landscaping design to help with the limitation of light spill to any identified areas of sensitivity or to preserve the quality of lighting buffers.

2.2.18 (4.35) - *'Depending on the pattern of bat activity across the Supporting Habitat identified by the ecologist, it may be appropriate for an element of on-site lighting to be controlled by dimming or switching either diurnally, seasonally, or according to human activity (light on demand). This is known as Part-Night Lighting (PNL). It is important to state that PNL is not likely to be appropriate where Key Habitats are at risk, especially as PNL often results in lighting when bats are most active.'*

2.2.19 **Applied Strategy:** The inclusion of Part Night Lighting can be effective in managing areas such as roadways and associated active travel links that benefit from lighting in terms of road safety and a reduction in the fear of crime but would ideally not be continuously lit. Conflict areas and crossings may be continuously lit during the hours of darkness for safety whilst the typical roadway may be subject to 'switch off' during late night hours. This ensures the lighting is not continuous and therefore does not present a barrier to light sensitive species in the landscape.

3.0 Lighting Strategy

3.1 Proposed Lighting Scheme

3.1.1 There is no legal duty requiring any place to be lit or requiring that new developments should necessarily require street lighting. It is determined to be beneficial to minimise the extent of lighting and leave some areas unlit such as footpaths through sensitive areas such as woodland or ecological habitat which will not be lit by general street lighting.

3.1.2 Subject to risk assessments and lighting class, primary roadways, such as the estate roadway within the Site require suitable lighting and should meet all criteria for adopted highways in terms of illumination and uniformity. Lighting proposals must comply with appropriate standards and guidance as appropriate for the road class and risk assessment. LED luminaires should match local highways agency controls specification or equivalent, to allow for easier adoption.

3.1.3 Following receipt of a proposed lighting layout from Barnsley Metropolitan Borough Council, a photometric model has been produced to assess the amount of illumination received across the road surface and subsequently determine the equivalent Lighting Class that the scheme has been designed to adhere to.

3.1.4 The determination of which class and illumination level a street is to be designed to is typically based upon a risk assessment for the street, which considers the following:

- amount and speed of vehicle traffic;
- segregation / interaction with pedestrians;
- complexity of visual field and navigation;
- hazards, such as parked cars or traffic calming;
- relationship with surrounding illuminated areas; and
- crime risk and perception of safety.

3.1.5 The estate roadway is anticipated to have sufficiently low traffic volume with no through route, meaning the risk to pedestrians and cyclists during late hours is minimal and therefore a lower lighting output can be employed. Additionally, adequate spacing for off street parking for residents and visitors is observed, and as such parked cars are assumed to not be present within the development.

3.1.6 ***'BS EN 13201-2, Road Lighting – Performance Requirements'*** gives details of the necessary minimum and average levels of lighting to be achieved at each of the lighting classes. The lighting classifications have been identified in accordance with ***'BS13201-3:2015'*** and ***'BS5489-1:2020'***.

3.1.7 Modelling the proposed lighting layout provided by Barnsley Metropolitan Borough Council presented results across the road surface that adhere to the illuminance requirements for Lighting Class **P5** (lux ave 3 – 4.5, minimum 0.6) as shown in **Table C: Lighting Class Parameters.**

Table C: Lighting Class Parameters Parameters for P Lighting Class Ref: CIE 115:2010 Table 7		
Lighting Class: Selected Parameter	**Average Horizontal Illuminance (Lux Ave)**	**Minimum Horizontal Illuminance (Lux Min)**
Lighting Class P5	3 – 4.5	0.6

3.1.8 Lighting Class P5 is an appropriate design parameter for this scheme as justified by the following risk assessment.

3.1.9 The risk assessment for roadways follows guidance contained in ***'BS 5489-1:2020 Annex A'*** This advice provides a systematic approach to the choice of lighting class based on:

- type of road or area;
- pedestrian and cycle flow;
- presence of conflict areas;
- presence of traffic-calming features;
- crime risk; and
- ambient luminance levels.

3.1.10 Methodology for selecting appropriate Lighting Classes are set out in ***'CIE115:2010'***, an internationally used standard. These concepts have been adapted for UK conditions and the particular applications described in ***'BS 5489-1:2020'***.

3.1.11 The Risk Assessment provided in **Table D: Primary Estate Roadway Risk Assessment** suggests that aligning with ***'BS 5489-1:2020 - Lighting classes for Subsidiary Roads'***, the appropriate P Class for the Primary Estate Roadway is designated as P5, considering both the proposed roadway design and prevailing conditions.

Table D: Primary Estate Roadway Risk Assessment Parameters for P Lighting Class Ref: CIE 115:2010 Table 6		
Parameter	**Option**	**Weighting**
Speed	Low	1
Traffic Volume	Very Low	-1
Traffic Composition	Pedestrian / Cycle / Motorised	2
Parked Vehicles	Not Present	0
Ambient Illuminance	Low	-1
*(*Round up if not a whole number)* **Total:**		**1***
[6 - Total = Lighting Class]		**P5**

3.2 Design Specification

3.2.1 Following the risk assessment, all areas identified as 'Estate Roadway' within the scheme should be calculated to Lighting Class **P5** with columns at a maximum of 6 metres in height and conform to local highways agency specifications.

3.2.2 All lighting within the Proposed Development Site will have a maximum colour temperature of 2700 kelvin to meet requirements of reducing impact on light sensitive ecology.

3.2.3 LED luminaires should meet local highways agency standard specification or equivalent and must be designed to 'dark skies' standards with zero direct upward light emission, full shielding, warm colour temperature, appropriate lumen output (minimum required) and good optical design to constrain the light to the area intended for illumination only.

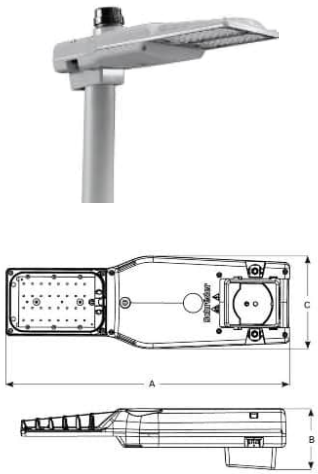
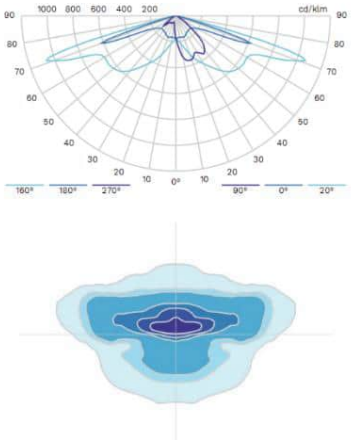
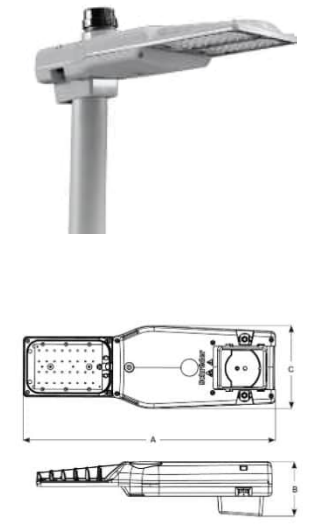
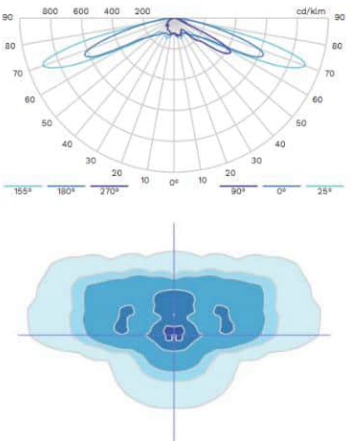
3.2.4 Lighting equipment should be offset a minimum of 0.8m from the roadside to avoid obstruction (***'BS5489-1:2020 Section 6.13'***) and should be placed so that they do not impinge on available widths of footways in the interests of wheelchair users and people pushing prams, or pose a hazard for blind or partially-sighted people.

3.2.5 As the Distribution Network Operator (DNO), The Northern Power Grid (Yorkshire) should be contacted to provide low voltage un-metered electricity supplies to the proposed columns in adopted areas.

3.2.6 Mitigation such as back-light shields and good optical control can minimise impact where roadway lighting must be installed adjacent to light sensitive habitats such as tree lines, and should be used where necessary to further reduce impacts on ecology.

3.2.7 An alternative equipment specification (shown in **Table E: Equipment Specification**) has been used for this assessment instead of the specification provided by Barnsley Metropolitan Borough Council, as the type of optic specified by the Council is no longer available for the desired model and output. The output and positioning have however remained the same as specified within the proposed layout provided by Barnsley Metropolitan Borough Council.

Table E: Equipment Specification

Product Specification	Reference Image	Photometric Distribution
Barnsley Metropolitan Borough Council Lighting Layout		
Schreder Axia 3.1 16 OSLON SQUARE GIANT@500mA Optic: 5270 25.7 W Mounting Height: 6m (Above FFL) ULR: 0%		
Schreder Axia 3.1 Optic: 5270 8.3 W Mounting Height: 6m (Above FFL) ULR: 0%		
SLR Lighting Design Assessment		
Schreder Axia 3.1 16 OSLON SQUARE GIANT@500mA Optic: 5384 25.8 W – 3135 lm Mounting Height: 6m (Above FFL) ULR: 0% Back Light Shield		
Schreder Axia 3.1 8 OSLON SQUARE GIANT @300mA Optic: 5384 8.1 W – 687 lm Mounting Height: 6m (Above FFL) ULR: 0% Back Light Shield		

3.3 Ecological Assessment

3.3.1 Following review of the EcIA Report (Prepared by SLR)

(4.3.1.1) "The hedgerows along the boundaries of the Site, as well as the trees, scrub and ephemeral vegetation around the yard likely provide foraging and commuting resources for the surrounding bat population"

"the Site is assessed as being of local ecological importance for commuting bats, allowing bats to commute around the Site and into the wider landscape."

(4.4)"The Site appears to be an important commuting corridor for bats (due to the hedgerows); however, it appears to offer only minimal/ low quality foraging habitat."

3.3.2 Bat Activity Survey Report – Brooks Ecological Ltd

(57)"Sensitive design of the masterplan includes a minimum 20m buffer from the northern hedgerow, meaning potential impacts on this commuting route will be negligible. To further minimise any potential impact lighting design should ensure that this corridor buffer is not subject to excessive light spill, and that the existing hedge remains unlit.

This buffer area will include surface water attenuation basins, designed to be dry and planted with a species rich seed mix, areas of wildflower grassland and new native trees and shrubs and will offer enhancement to both the identified commuting route and the baseline foraging value of this area of the Site."

3.3.3 Applied Strategy: A 20m buffer offset from the northern hedgerow encroaches into the developed area, however no street lighting has been installed within this zone. A 10m lighting buffer/ transition zone offset from the 'Dark Habitat Zone' that meets the edge of the edge of the developed area has been implemented and results generated from the 3D photometric model present that illuminance levels at the face of hedgerow are not in exceedance of 0.4 lux, which can be defined as 'contextual darkness'.

3.4 Residential Amenity Lighting

3.4.1 Developer installed exterior lighting equipment should be provided for all primary entrances, garages and rear gardens to dissuade the installation of ad-hoc lighting post habitation. No light from exterior amenity lighting should project beyond the property boundary.

3.4.2 Exterior lighting specified must have no directly visible light source or a diffused surface but should have downward only optics and very low output. Units should have inbuilt presence detection (with no manual override) and this should be set to minimum practical duration 'on' and minimum sensitivity to reduce false triggering from a distance.

3.4.3 Luminaires to the front of properties, rear gardens and garages should be of suitable domestic amenity use with a maximum of 2700 kelvin colour temperature, contain no upward light distribution, and the downward distribution should not leave the immediate area intended for illumination (i.e. the immediate area at the front door, the immediate area at the garage door or rear garden access door).

3.4.4 Due to the requirement to preserve darkness where possible around the periphery of the Site, minimal lighting is required to meet Secured by Design principles and allow for visibility or facial recognition at the primary entrance of residential properties. Porch or entrance lighting is ideally provided by a recessed baffled, low output, warm white (maximum 2700k) down light in an oversailing porch canopy. This helps to provide good vertical illuminance at the entrance portal as well as constrain the light to the immediate area with no direct contribution to lateral light spill or upward light emission.

3.4.5 Under no circumstances should any developer installed lighting fixture emit any direct light above horizontal. This means the proposed lighting scheme must not include any use of typical wall mounted flood lights, up/down wall lights, exposed bulbs, lanterns, bulkhead lights and any exterior up-lighting.

3.4.6 It should be noted when selecting suitable residential amenity lighting that artificial light emitted from premises which affects someone's enjoyment of their own premises can be considered as a legal nuisance.

3.4.7 Examples of good and poor domestic amenity lighting are shown in **Table F: Examples of Good & Bad Domestic Amenity Lighting on Page 16**.

Table F: Examples of Good & Bad Domestic Amenity Lighting		
Exterior Entrance Lighting	**Exterior Garage Lighting**	**Exterior Garden Lighting**
		
Do Not Specify: Directly visible light source / lit surface Excessively bright Source of glare Projects light laterally No optical control Upward light emission No presence detection		
		
Do specify: No visible light source Minimal light output No glare Light constrained to area Good optical control No upward light emission Presence detection		

3.5 Application of Lighting Parameters

3.5.1 The design of the lighting scheme is based on the Developments layout and therefore an application of the lighting parameters is shown in **Appendix A**.

3.5.2 It is required that the principles of the application of these lighting parameters be applied to the detailed design layout.

3.5.3 The ‘Core Development’ comprises residential properties and their private gardens, outbuildings (such as garages) and access paths. Domestic amenity lighting should be included in accordance with advice contained in this Lighting Strategy in **Section 3.4**.

3.5.4 The ‘Estate Roadways’ comprises the primary route through the Site from the access junction at High Street and should be lit to Lighting Class P5 according to the risk assessment in **3.1.11**.

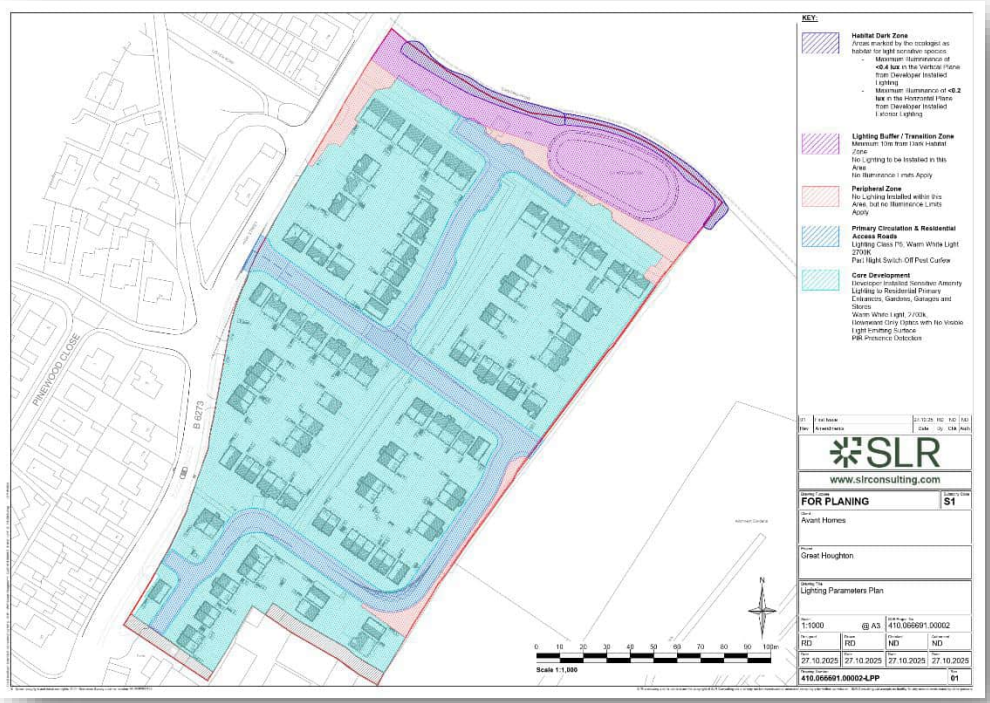
3.5.5 The ‘Lighting Transition Zones’ shall be considered any area of public landscaping or amenity space that does not require lighting and may form a dark buffer between the Core Development and the areas identified as potential light sensitive bat habitat such as tree lines or hedgerows within or beyond the Site boundary. No lighting shall be installed in these areas but no specific illuminance limits apply. Effort should be made to reduce light spill or glare conditions within these areas to maximise the total area remaining in contextual darkness for the benefit of ecology.

3.5.6 Areas surrounding the Site that are identified as part of linked habitats for foraging and commuting bats shall be considered ‘Dark Zones’ and shall be kept dark with reference to limits from ***‘Institute of Lighting Professionals (ILP) Guidance Note 8 Bats and Artificial Lighting 2023’*** Section 4.54 where ‘complete darkness’ is defined as 0.2 lux or below on the horizontal plane (ground level) and 0.4 lux on the vertical plane.

3.5.7 See **Appendix A** for an application of the lighting parameters to the Masterplan Layout and the Detailed Lighting Design must adhere to these principles:

3.6 Lighting Parameters Plan

See **Appendix A** for drawing reference ***'Appendix A-LPP 20.10.2025 -'*** (SLR)



Key:

- Area shaded in **Turquoise** represents the 'Core Development' residential parcels, as per the Masterplan:
  - Domestic amenity lighting provided (Porch, Garage & Rear Garden - See **Section 3.4**) with presence detection.
- Area shaded in **Blue** represents the 'Estate Roadways', as per the Masterplan:
  - Primary Estate Roadways Street Lighting (Lighting Class P5).
- Area shaded in **Peach** represents a peripheral 'No / Low Lighting Zone':
  - Peripheral Areas where no lighting is to be installed
- 'Area shaded in **Pink** represents 'Lighting Transition Zone':
  - Minimum 10m from Dark Habitat Zone
  - No lighting to be installed in this area, however, no illuminance limits apply
- 'Area shaded in **Purple** represents 'Dark Habitat Zone':
  - Areas marked by the ecologist as habitat for light sensitive species.
  - Maximum Illuminance of <0.4 lux in the Vertical Plane from Developer Installed Lighting
  - Maximum Illuminance of <0.2 lux in the Horizontal Plane from Developer Installed Exterior Lighting

4.0 Summary & Conclusion

4.1 The application of lighting parameters, best practice lighting design techniques and specifications result in a development that has a minimal, sensitively designed general street lighting scheme and carefully considered domestic amenity lighting.

4.2 The result of the efforts to avoid excessively lighting the Proposed Development, in line with local and national policy, minimises any potential impact on the identified receptors.

4.3 The Site has been observed to be ecologically sensitive along the northern periphery with foraging and commuting opportunities for bats, and therefore an appropriate scheme has been employed to mitigate adverse effects at this boundary.

4.4 Adjacent residential receptors, including those to the east and west (School Street and High Street, respectively) are unlikely to experience any adverse effects or obtrusive light as a result of lighting within the Site. The development would be similar in character to the surrounding existing streets with some street lighting at night.

4.4.1 With minimal installed street lighting and sensitively designed domestic amenity lighting, the Proposed Development would not make any materially significant contribution to sky glow or pose a materially significant risk to ecology, adjacent residential receptors, the landscape or the quality of the night sky through light pollution.

Appendix A Lighting Parameters Plan

Lighting Design & Impact Assessment

Great Houghton

Avant Homes

SLR Project No.: 410.066691.00002

27 October 2025

KEY:

Habitat Dark Zone
Areas marked by the ecologist as habitat for light sensitive species.
- Maximum Illumninance of **<0.4 lux** in the Vertical Plane from Developer Installed Lighting
- Maximum Illuminance of **<0.2 lux** in the Horizontal Plane from Developer Installed Exterior Lighting

Lighting Buffer / Transition Zone
Minimum 10m from Dark Habitat Zone
No Lighting to be Installed in this Area
No Illuminance Limits Apply

Peripheral Zone
No Lighting Installed within this Area, but no Illuminance Limits Apply

Primary Circulation & Residential Access Roads
Lighting Class P5, Warm White Light 2700K
Part Night Switch-Off Post Curfew

Core Development
Developer Installed Sensitive Amenity Lighting to Residential Primary Entrances, Gardens, Garages and Stores
Warm White Light, 2700k,
Downward Only Optics with No Visible Light Emitting Surface
PIR Presence Detection

Rev	Amendments	Date	By	Chk	Auth
01	First Issue	27.10.25	RD	ND	ND

SLR

www.slrconsulting.com

Drawing Purpose: **FOR PLANING**	Suitability Code: **S1**
Client: Avant Homes	
Project: Great Houghton	
Drawing Title: Lighting Parameters Plan	
Scale: 1:1000 @ A3	SLR Project No.: 410.066691.00002

Designed	Drawn	Checked	Authorised
RD	RD	ND	ND
Date: 27.10.2025	Date: 27.10.2025	Date: 27.10.2025	Date: 27.10.2025

Drawing Number: **410.066691.00002-LPP** Rev.: **01**

C:\Users\Ryan.Dale\SLR Consulting\Lighting - WIP - WIP\Great Houghton\5. CAD\410.066691.00002 - LPP 20.10.2025.dwg 27/10/2025

Appendix B Operational Requirements

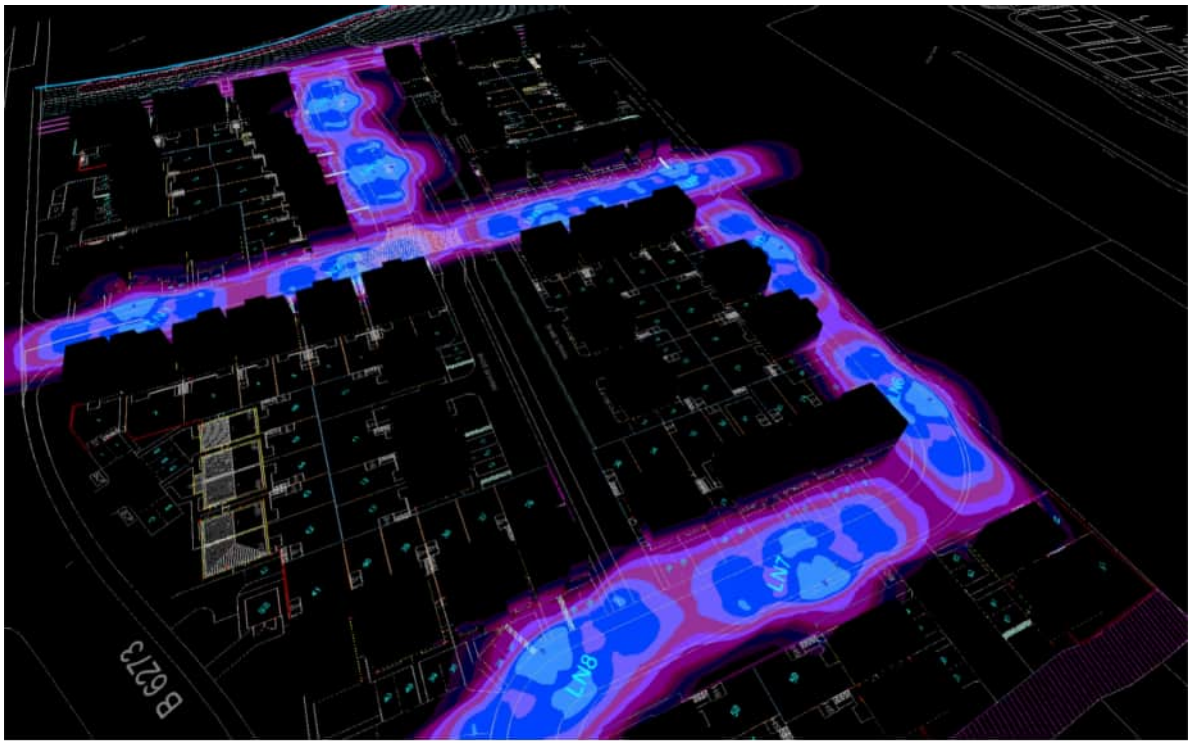
Lighting Design & Impact Assessment

Great Houghton

Avant Homes

SLR Project No.: 410.066691.00002

27 October 2025



Great Houghton

Appendix B: Operational Requirements

Description

Project Number: 410.066691.00002
Based on:
"4206-200 Planning Layout Rev M" (Avant Homes) and,
"SL20-140-1300-01-REV A - High Street, Great Houghton - Section 38 Street Lighting Proposals" (Barnsley Metropolitan Borough Council)
Environmental Zone E2 (Suburban) - 'Sparsely inhabited rural areas, village or relatively dark outer suburban locations'
ILP GN01
Maintenance Factor: 0.93 (Mounting height <6m / cleaning frequency 60 months)
BS5489-1:2020

Images

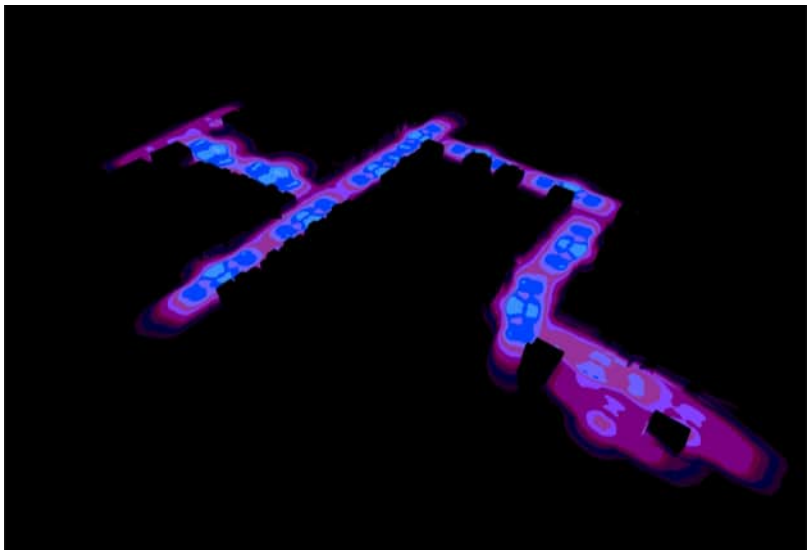
Overview Lighting

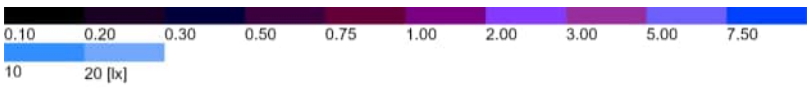
Visual representation of the 3D photometric model rendered with all parts of the lighting scene active.

Overview False Colour

Visual representation of the 3D photometric model rendered with all parts of the lighting scene active.

The colours represent lux levels according to the key below.



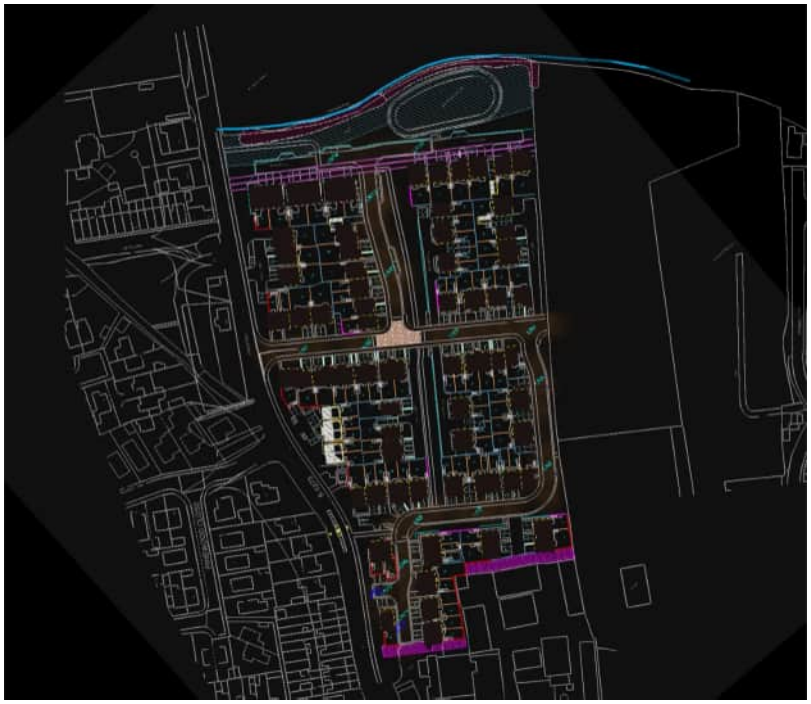


Images

Light Rendering Glow Plan

Glow Plan visual representation of the 3D photometric model rendered with all parts of the lighting scene active.

The CAD layout is visible for reference.

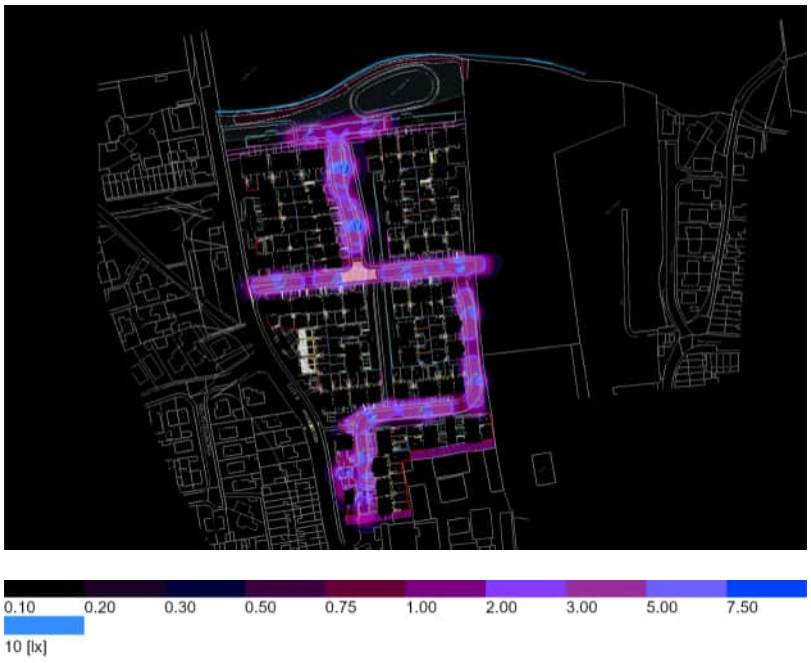


False Colour Glow Plan

Glow Plan representation of the 3D photometric model rendered with all parts of the lighting scene active.

The colours represent lux levels according to the key below.

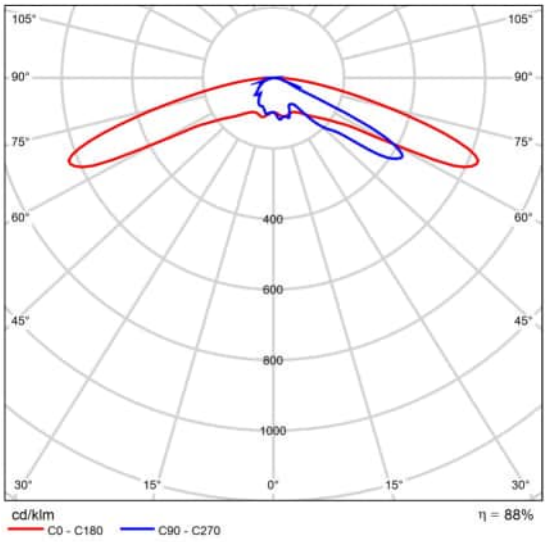
The CAD layout is visible for reference.



Product data sheet

Schréder - AXIA 3.1 5384 Integrated lenses 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487502

Article No.	487502
P	8.1 W
Φ_{Lamp}	1132 lm
$\Phi_{Luminaire}$	992 lm
η	87.67 %
Luminous efficacy	122.5 lm/W
CCT	2700 K
CRI	70
Index	L3

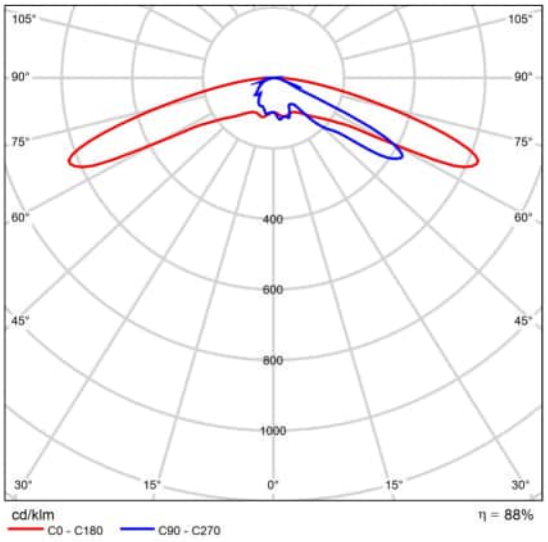


Polar LDC

Product data sheet

Schréder - AXIA 3.1 5384 Integrated lenses 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487502

Article No.	487502
P	25.7 W
Φ_{Lamp}	3576 lm
$\Phi_{Luminaire}$	3135 lm
η	87.67 %
Luminous efficacy	122.0 lm/W
CCT	2700 K
CRI	70
Index	L2

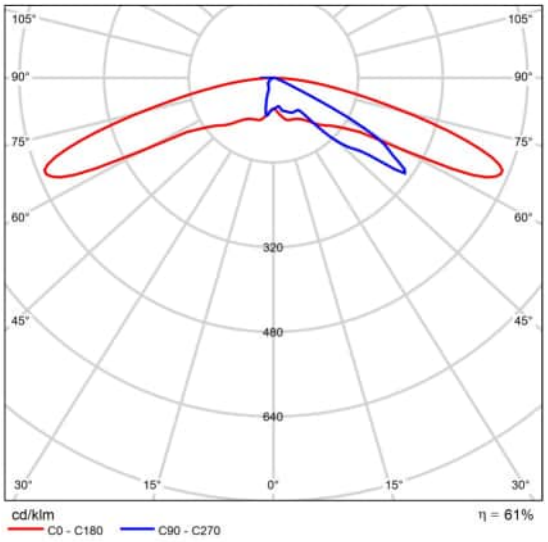


Polar LDC

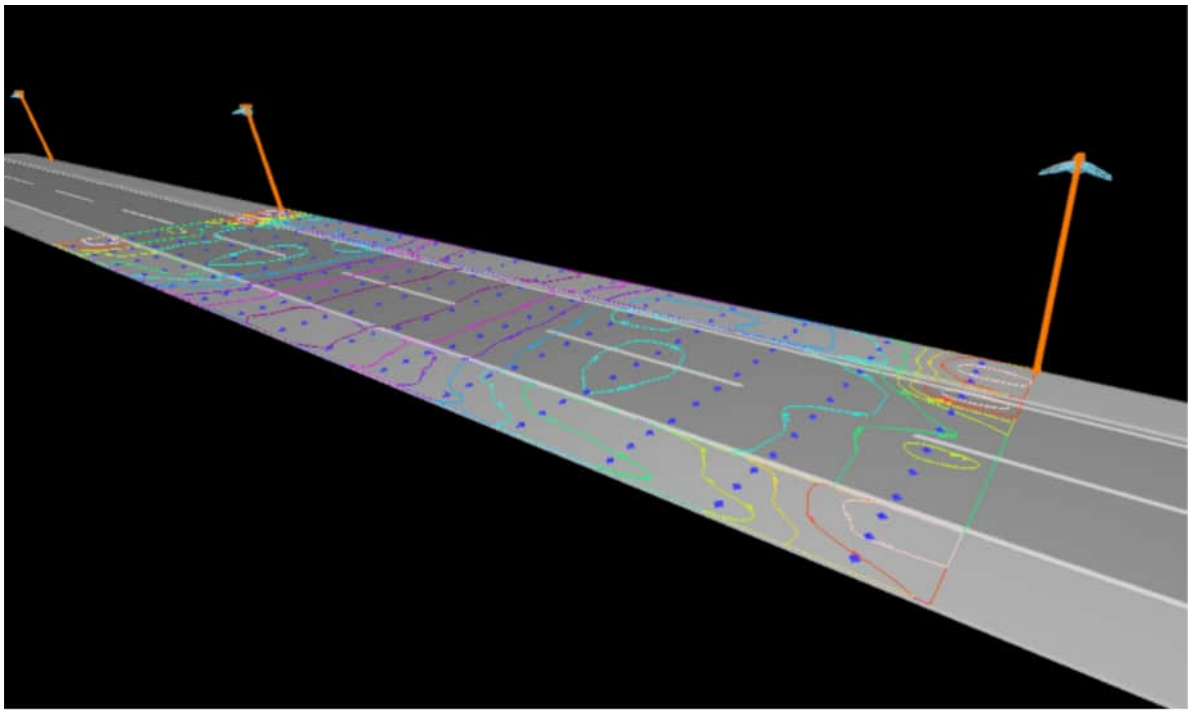
Product data sheet

Schréder - AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Article No.	487532
P	25.7 W
Φ_{Lamp}	3576 lm
$\Phi_{Luminaire}$	2170 lm
η	60.69 %
Luminous efficacy	84.5 lm/W
CCT	2700 K
CRI	70
Index	L1



Polar LDC



Estate Roadway (P5)

Description

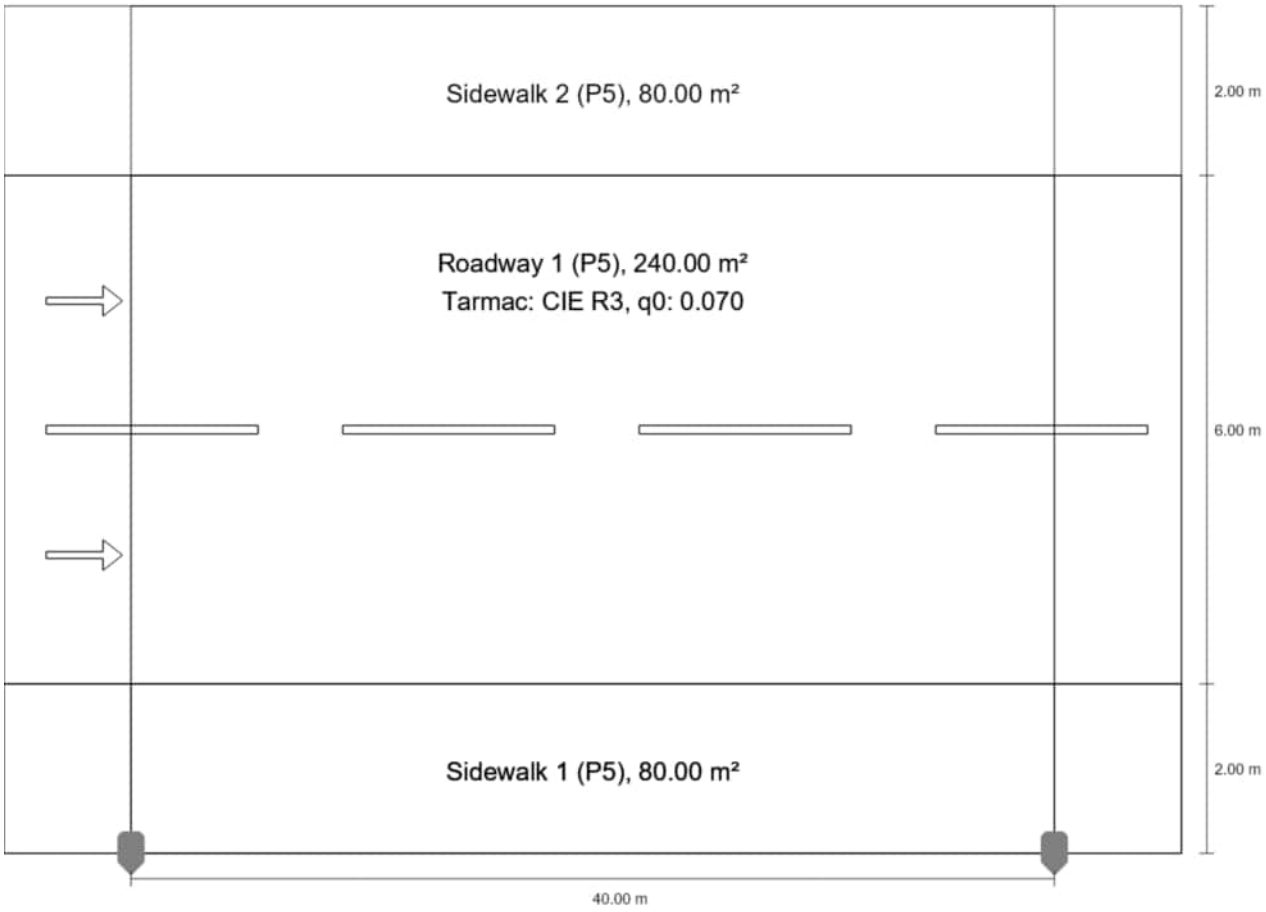
Lighting Class Risk Assessment:

CIE 115:2010 - Table 6 - P Lighting Class

Speed | Low | 1
Traffic Volume | Very Low | -1
Traffic Composition | Pedestrians, Cyclists & Motorised traffic | 2
Parked Vehicles | Not Present | 0
Ambient Luminance | Low | -1
Sum of Weighted Values = 1
Lighting Class = 6 - Sum of Weighted Values ∴ = P5

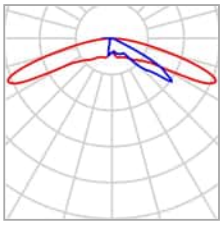
Estate Roadway (P5)

Summary (according to EN 13201:2015)



Estate Roadway (P5)

Summary (according to EN 13201:2015)

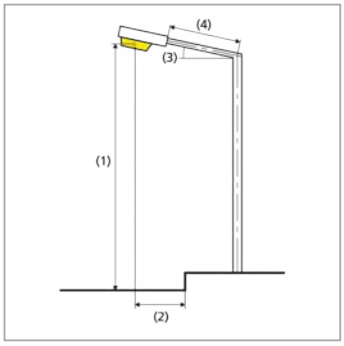


Manufacturer	Schréder	P	25.7 W
Article No.	487532	Φ_{Lamp}	3576 lm
Article name	AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532	$\Phi_{Luminaire}$	2170 lm
		η	60.69 %
Fitting	1x 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814		
Index	L1		

Estate Roadway (P5)

Summary (according to EN 13201:2015)

AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532 (single side bottom)



Pole distance	40.000 m
(1) Light spot height	6.000 m
(2) Light point overhang	-2.000 m
(3) Boom inclination	0.0°
(4) Boom length	0.000 m
Annual operating hours	4000 h: 100.0 %, 25.7 W
Wattage / route	642.5 W/km
ULR / ULOR	0.00 / 0.00
Max. luminous intensities Any direction forming the specified angle from the downward vertical, with the luminaire installed for use.	≥ 70°: 1400 cd/klm ≥ 80°: 304 cd/klm ≥ 90°: 0.00 cd/klm
Luminous intensity class The luminous intensity values in [cd/klm] for calculation of the luminous intensity class refer to the luminaire luminous flux according to EN 13201:2015.	–
Glare index class	D.3
MF	0.93

Estate Roadway (P5)

Summary (according to EN 13201:2015)

Results for valuation fields

A maintenance factor of 0.93 was used for calculating for the installation.

	Symbol	Calculated	Target	Check
Sidewalk 2 (P5)	E_{av}	3.11 lx	[3.00 - 4.50] lx	✓
	E_{min}	1.63 lx	≥ 0.60 lx	✓
Roadway 1 (P5)	E_{av}	3.87 lx	[3.00 - 4.50] lx	✓
	E_{min}	2.09 lx	≥ 0.60 lx	✓
Sidewalk 1 (P5)	E_{av}	3.94 lx	[3.00 - 4.50] lx	✓
	E_{min}	1.61 lx	≥ 0.60 lx	✓

Results for energy efficiency indicators

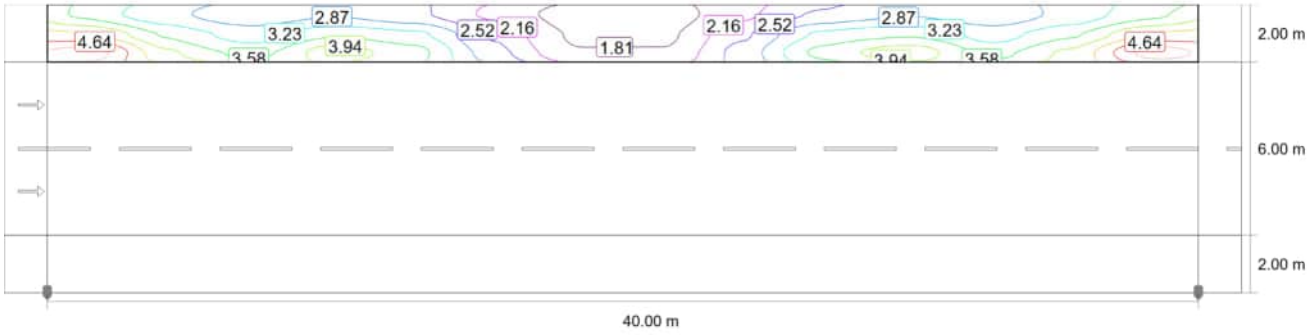
	Symbol	Calculated	Energy Consumption
Estate Roadway (P5)	D_p	0.017 W/lx*m^2	–
AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532 (single side bottom)	D_e	0.3 kWh/m^2 yr	102.8 kWh/yr

Estate Roadway (P5)

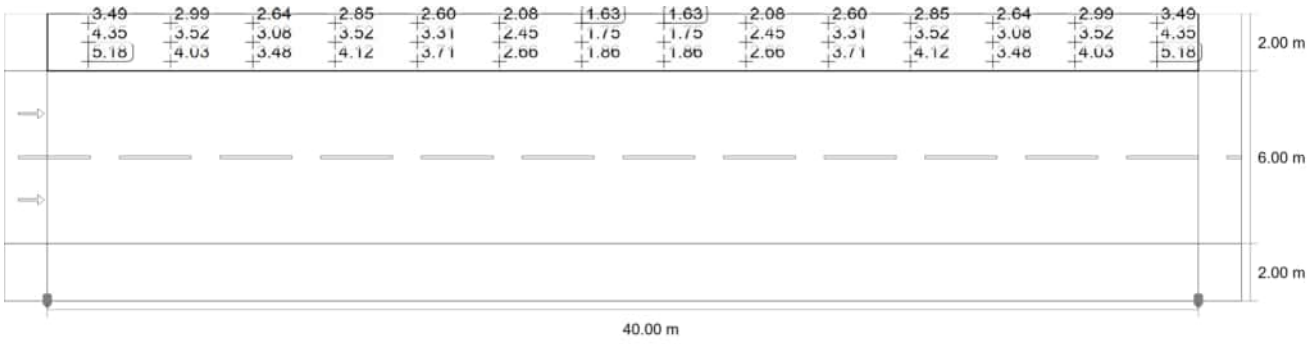
Sidewalk 2 (P5)

Results for valuation field

	Symbol	Calculated	Target	Check
Sidewalk 2 (P5)	E_{av}	3.11 lx	[3.00 - 4.50] lx	✓
	E_{min}	1.63 lx	≥ 0.60 lx	✓



Maintenance value, horizontal illuminance [lx] (Iso-illuminance curves)



Maintenance value, horizontal illuminance [lx] (Value grid)

m	1.429	4.286	7.143	10.000	12.857	15.714	18.571	21.429	24.286	27.143	30.000	32.857	35.714	38.571
9.667	3.49	2.99	2.64	2.85	2.60	2.08	1.63	1.63	2.08	2.60	2.85	2.64	2.99	3.49
9.000	4.35	3.52	3.08	3.52	3.31	2.45	1.75	1.75	2.45	3.31	3.52	3.08	3.52	4.35
8.333	5.18	4.03	3.48	4.12	3.71	2.66	1.86	1.86	2.66	3.71	4.12	3.48	4.03	5.18

Maintenance value, horizontal illuminance [lx] (Value chart)

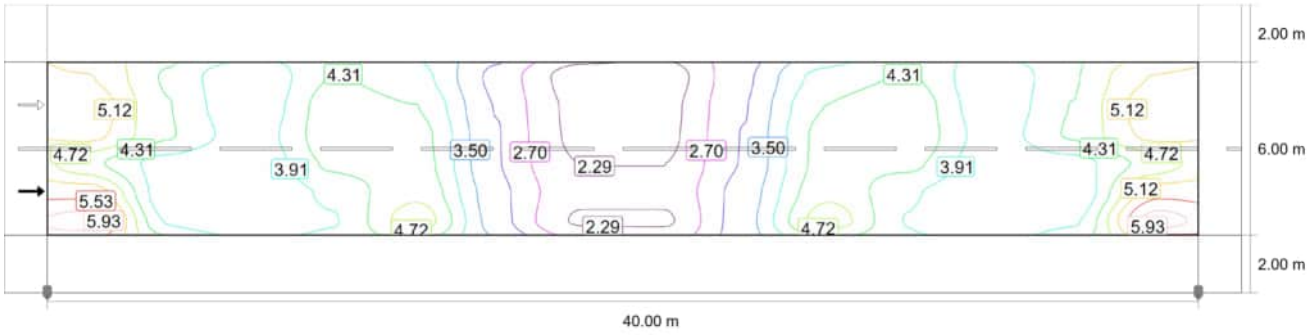
	E_{av}	E_{min}	E_{max}	U_o (g_1)	g_2
Maintenance value, horizontal illuminance	3.11 lx	1.63 lx	5.18 lx	0.53	0.32

Estate Roadway (P5)

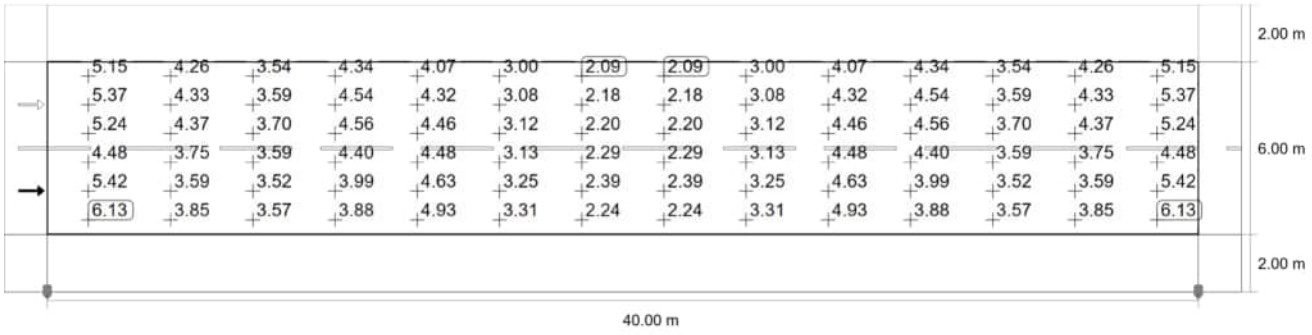
Roadway 1 (P5)

Results for valuation field

	Symbol	Calculated	Target	Check
Roadway 1 (P5)	E_{av}	3.87 lx	[3.00 - 4.50] lx	✓
	E_{min}	2.09 lx	≥ 0.60 lx	✓



Maintenance value, horizontal illuminance [lx] (Iso-illuminance curves)



Maintenance value, horizontal illuminance [lx] (Value grid)

Estate Roadway (P5)

Roadway 1 (P5)

m	1.429	4.286	7.143	10.000	12.857	15.714	18.571	21.429	24.286	27.143	30.000	32.857	35.714	38.571
7.500	5.15	4.26	3.54	4.34	4.07	3.00	2.09	2.09	3.00	4.07	4.34	3.54	4.26	5.15
6.500	5.37	4.33	3.59	4.54	4.32	3.08	2.18	2.18	3.08	4.32	4.54	3.59	4.33	5.37
5.500	5.24	4.37	3.70	4.56	4.46	3.12	2.20	2.20	3.12	4.46	4.56	3.70	4.37	5.24
4.500	4.48	3.75	3.59	4.40	4.48	3.13	2.29	2.29	3.13	4.48	4.40	3.59	3.75	4.48
3.500	5.42	3.59	3.52	3.99	4.63	3.25	2.39	2.39	3.25	4.63	3.99	3.52	3.59	5.42
2.500	6.13	3.85	3.57	3.88	4.93	3.31	2.24	2.24	3.31	4.93	3.88	3.57	3.85	6.13

Maintenance value, horizontal illuminance [lx] (Value chart)

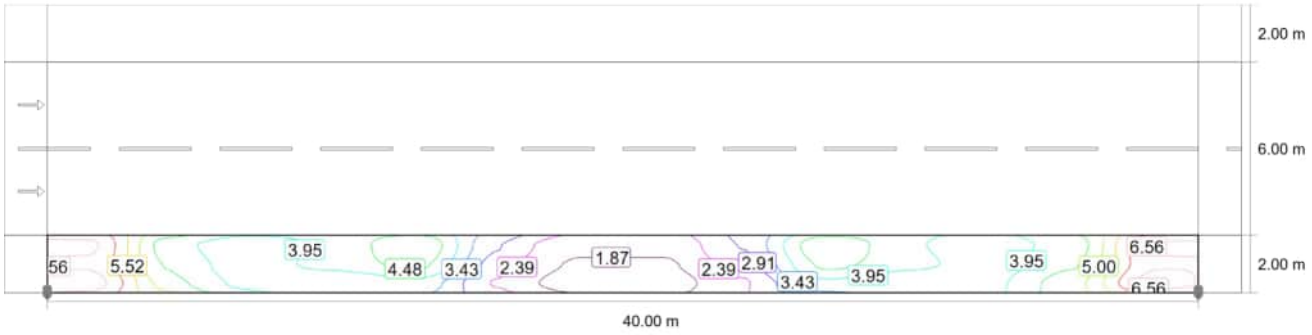
	E_{av}	E_{min}	E_{max}	U_o (g_1)	g_2
Maintenance value, horizontal illuminance	3.87 lx	2.09 lx	6.13 lx	0.54	0.34

Estate Roadway (P5)

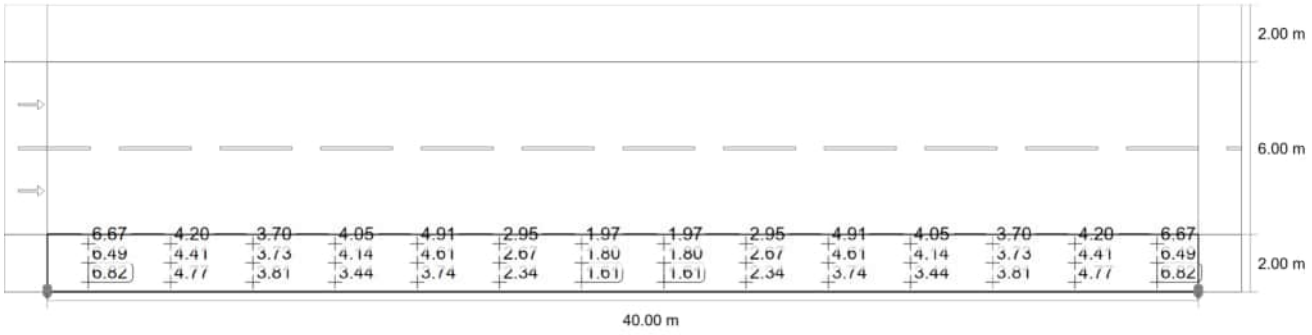
Sidewalk 1 (P5)

Results for valuation field

	Symbol	Calculated	Target	Check
Sidewalk 1 (P5)	E_{av}	3.94 lx	[3.00 - 4.50] lx	✓
	E_{min}	1.61 lx	≥ 0.60 lx	✓



Maintenance value, horizontal illuminance [lx] (Iso-illuminance curves)



Maintenance value, horizontal illuminance [lx] (Value grid)

m	1.429	4.286	7.143	10.000	12.857	15.714	18.571	21.429	24.286	27.143	30.000	32.857	35.714	38.571
1.667	6.67	4.20	3.70	4.05	4.91	2.95	1.97	1.97	2.95	4.91	4.05	3.70	4.20	6.67
1.000	6.49	4.41	3.73	4.14	4.61	2.67	1.80	1.80	2.67	4.61	4.14	3.73	4.41	6.49
0.333	6.82	4.77	3.81	3.44	3.74	2.34	1.61	1.61	2.34	3.74	3.44	3.81	4.77	6.82

Maintenance value, horizontal illuminance [lx] (Value chart)

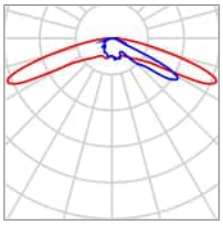
	E_{av}	E_{min}	E_{max}	U_o (g_1)	g_2
Maintenance value, horizontal illuminance	3.94 lx	1.61 lx	6.82 lx	0.41	0.24

Great Houghton

Luminaire layout plan

Great Houghton

Luminaire layout plan



Manufacturer	Schréder	P	25.7 W
Article No.	487502	$\Phi_{Luminaire}$	3135 lm
Article name	AXIA 3.1 5384 Integrated lenses 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487502		
Fitting	1x 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814		
Index	L2		

1 x Schréder AXIA 3.1 5384 Integrated lenses 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487502

Type	Line arrangement
1st luminaire (X/Y/Z)	245.408 m / 327.791 m / 6.000 m
X-direction	1 pcs., Centre - centre, 0.322 m
Arrangement	A12

X	Y	Mounting height	Luminaire
245.408 m	327.791 m	6.000 m	3

1 x Schréder AXIA 3.1 5384 Integrated lenses 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487502

Type	Line arrangement
1st luminaire (X/Y/Z)	227.515 m / 294.346 m / 6.000 m
X-direction	1 pcs., Centre - centre, 0.321 m

X	Y	Mounting height	Luminaire
227.515 m	294.346 m	6.000 m	5

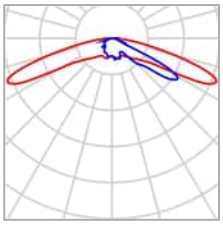
Great Houghton

Luminaire layout plan

Arrangement	A13

Great Houghton

Luminaire layout plan



Manufacturer	Schréder	P	8.1 W
Article No.	487502	$\Phi_{Luminaire}$	992 lm
Article name	AXIA 3.1 5384 Integrated lenses 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487502		
Fitting	1x 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802		
Index	L3		

1 x Schréder AXIA 3.1 5384 Integrated lenses 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487502

Type	Line arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	110.987 m / 180.207 m / 6.000 m	110.987 m	180.207 m	6.000 m	11
X-direction	1 pcs., Centre - centre, 0.308 m				
Arrangement	A1				

1 x Schréder AXIA 3.1 5384 Integrated lenses 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487502

Type	Line arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	109.008 m / 158.721 m / 6.000 m	109.008 m	158.721 m	6.000 m	15
X-direction	1 pcs., Centre - centre, 0.308 m				

Great Houghton

Luminaire layout plan

Arrangement	A2

1 x Schréder AXIA 3.1 5384 Integrated lenses 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487502

Type	Line arrangement
1st luminaire (X/Y/Z)	270.367 m / 336.298 m / 6.000 m
X-direction	1 pcs., Centre - centre, 1.268 m
Arrangement	A10

X	Y	Mounting height	Luminaire
270.367 m	336.298 m	6.000 m	2

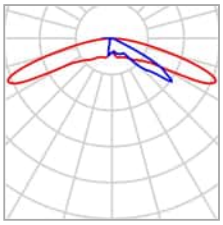
1 x Schréder AXIA 3.1 5384 Integrated lenses 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487502

Type	Line arrangement
1st luminaire (X/Y/Z)	240.116 m / 354.971 m / 6.000 m
X-direction	1 pcs., Centre - centre, 0.325 m
Arrangement	A11

X	Y	Mounting height	Luminaire
240.116 m	354.971 m	6.000 m	1

Great Houghton

Luminaire layout plan



Manufacturer	Schréder	P	25.7 W
Article No.	487532	$\Phi_{Luminaire}$	2170 lm
Article name	AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532		
Fitting	1x 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814		
Index	L1		

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	127.144 m / 178.961 m / 6.000 m	127.144 m	178.961 m	6.000 m	12
X-direction	1 pcs., Centre - centre, 0.321 m				
Arrangement	A3				

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	152.510 m / 199.299 m / 6.000 m	152.510 m	199.299 m	6.000 m	10

Great Houghton

Luminaire layout plan

X-direction	1 pcs., Centre - centre, 0.326 m
Arrangement	A4

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	180.356 m / 170.548 m / 6.000 m	180.356 m	170.548 m	6.000 m	13
X-direction	1 pcs., Centre - centre, 0.321 m				
Arrangement	A5				

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	221.333 m / 165.381 m / 6.000 m	221.333 m	165.381 m	6.000 m	14
X-direction	1 pcs., Centre - centre, 0.321 m				
Arrangement	A6				

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement	X	Y	Mounting height	Luminaire
1st luminaire (X/Y/Z)	247.176 m / 201.832 m / 6.000 m	247.176 m	201.832 m	6.000 m	9
X-direction	1 pcs., Centre - centre, 0.321 m				
Arrangement	A7				

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Great Houghton

Luminaire layout plan

Type	Line arrangement
1st luminaire (X/Y/Z)	262.582 m / 235.049 m / 6.000 m
X-direction	1 pcs., Centre - centre, 0.321 m
Arrangement	A8

X	Y	Mounting height	Luminaire
262.582 m	235.049 m	6.000 m	8

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement
1st luminaire (X/Y/Z)	229.258 m / 247.577 m / 6.000 m
X-direction	1 pcs., Centre - centre, 0.321 m
Arrangement	A9

X	Y	Mounting height	Luminaire
229.258 m	247.577 m	6.000 m	7

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement
1st luminaire (X/Y/Z)	193.317 m / 272.885 m / 6.000 m
X-direction	1 pcs., Centre - centre, 0.321 m
Arrangement	A14

X	Y	Mounting height	Luminaire
193.317 m	272.885 m	6.000 m	6

1 x Schréder AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532

Type	Line arrangement
1st luminaire (X/Y/Z)	165.152 m / 304.108 m / 6.000 m
X-direction	1 pcs., Centre - centre, 0.321 m
Arrangement	A15

X	Y	Mounting height	Luminaire
165.152 m	304.108 m	6.000 m	4

Great Houghton

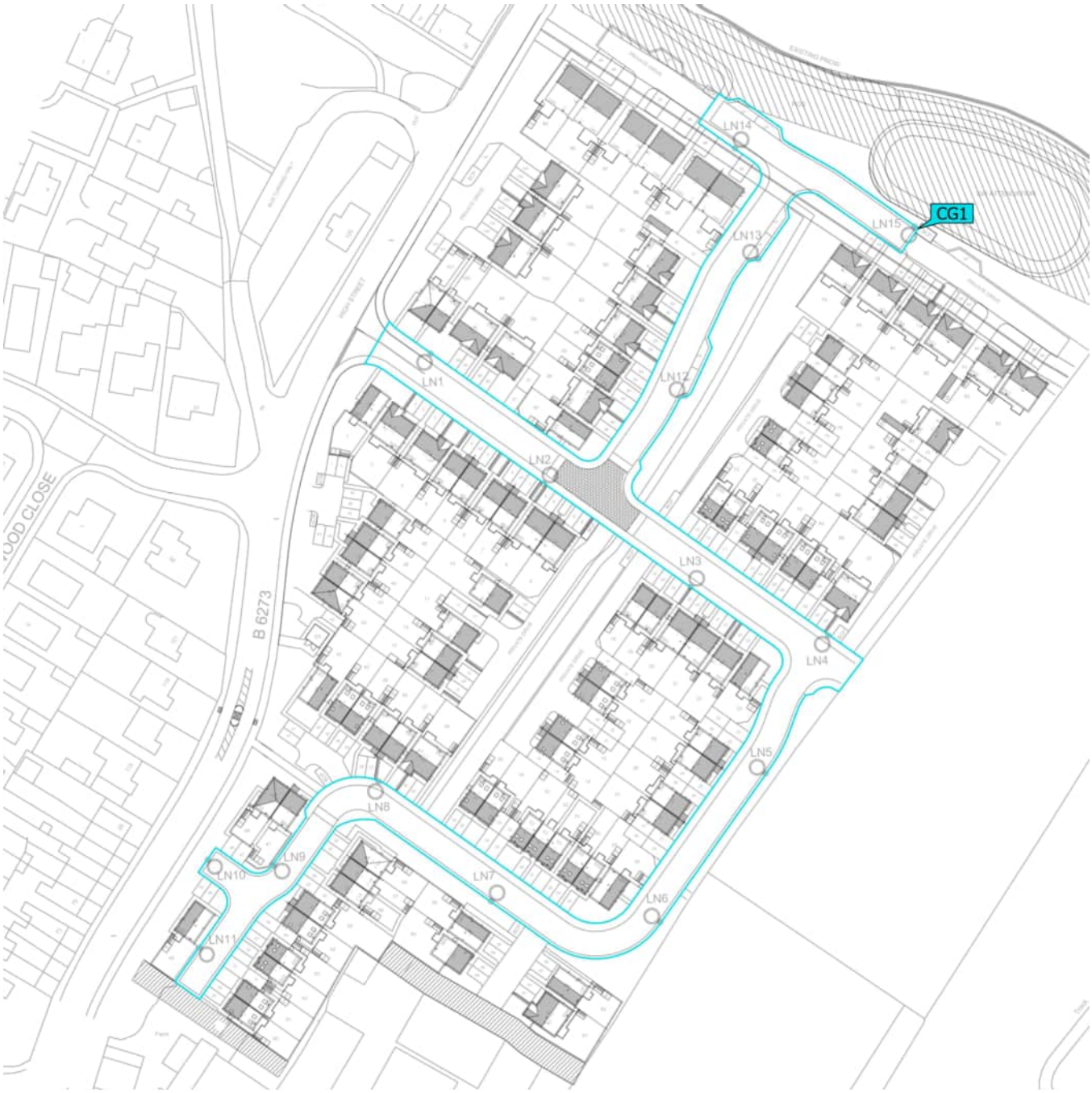
Luminaire list

Φ_{total}	P_{total}	Luminous efficacy
29768 lm	315.1 W	94.5 lm/W

pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy	Index
2	Schréder	487502	AXIA 3.1 5384 Integrated lenses 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487502	25.7 W	3135 lm	122.0 lm/W	L2
4	Schréder	487502	AXIA 3.1 5384 Integrated lenses 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487502	8.1 W	992 lm	122.5 lm/W	L3
9	Schréder	487532	AXIA 3.1 5384 Integrated lenses Back Light 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487532	25.7 W	2170 lm	84.5 lm/W	L1

Great Houghton (All Lights On 100%)

Calculation objects



Great Houghton (All Lights On 100%)

Calculation objects

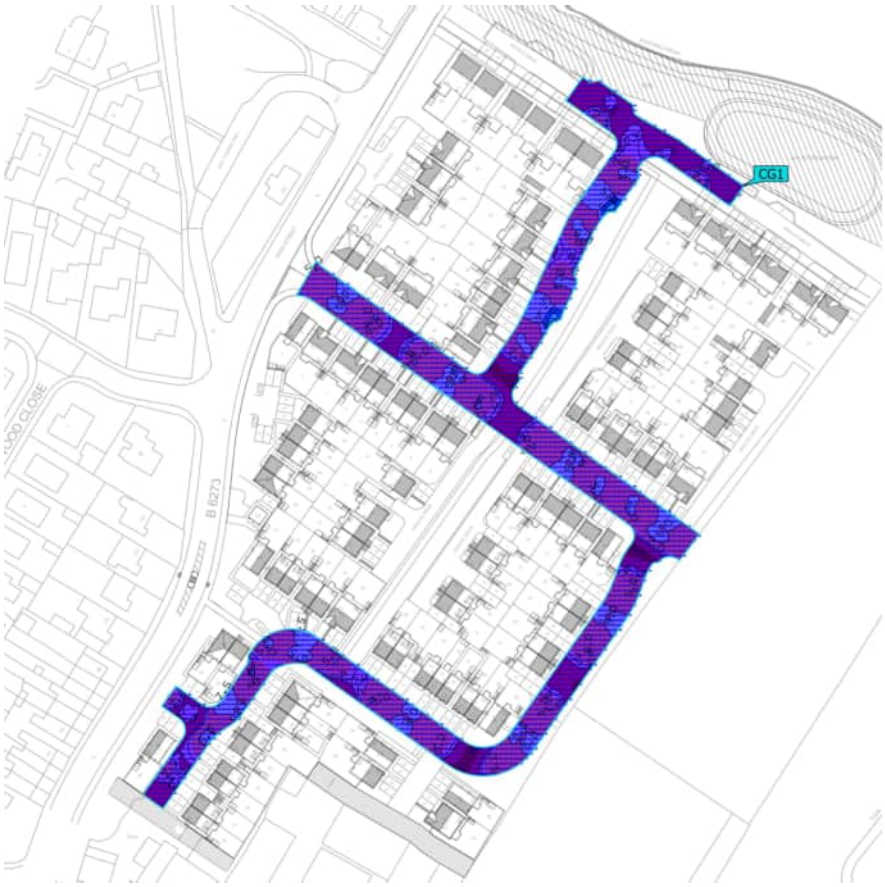
Calculation surfaces

Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Estate Road Perpendicular illuminance Height: 0.100 m	3.62 lx	0.65 lx	11.4 lx	0.18	0.057	CG1

Notes on planning:
Lighting Class P5 Average: 3 - 4.5 lux; Minimum: 0.6 lux

Great Houghton (All Lights On 100%)

Estate Road



Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Estate Road Perpendicular illuminance Height: 0.100 m	3.62 lx	0.65 lx	11.4 lx	0.18	0.057	CG1

Notes on planning:
Lighting Class P5
Average, Em: 3 - 4.5 lux; Minimum, Emin: 0.6 lux

Appendix C Impact Assessment

Lighting Design & Impact Assessment

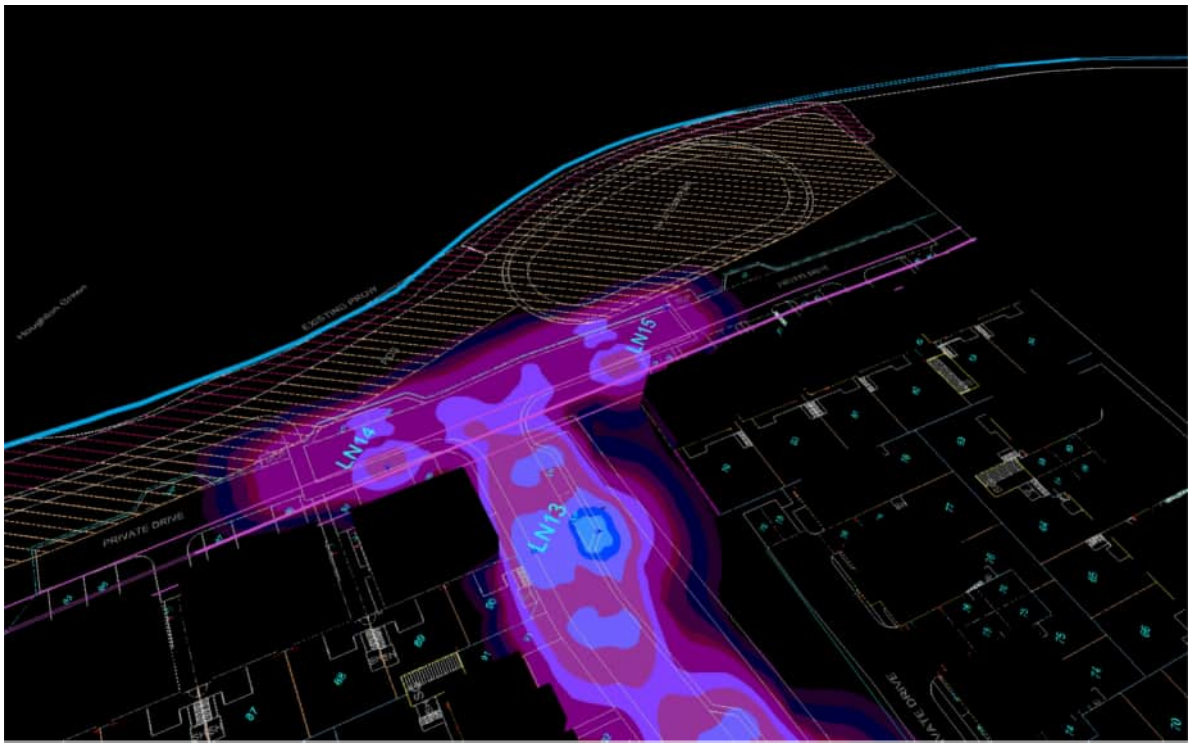
Great Houghton

Avant Homes

SLR Project No.: 410.066691.00002

27 October 2025

Date 27/10/2025



Great Houghton

Appendix C: Impact Assessment

Description

Project Number: 410.066691.00002
Based on:
"4206-200 Planning Layout Rev M" (Avant Homes) and,
"SL20-140-1300-01-REV A - High Street, Great Houghton - Section 38 Street Lighting Proposals" (Barnsley Metropolitan Borough Council)
Environmental Zone E2 (Suburban) - 'Sparsely inhabited rural areas, village or relatively dark outer suburban locations'
ILP GN01
Maintenance Factor: 1.00

Great Houghton (Obtrusive light scene)

Summary

Great Houghton (Obtrusive light scene)

Summary

General information on the obtrusive light calculation

Standard	EN 12464-2:2014
Zone	Environmental Zone E2
Period under review	Pre-curfew
Apply limits for	General lighting

General obtrusive light scene results

Symbol	Calculated	Threshold value	Check
R_{UL}	0.0 %	≤ 5.0 %	✓
R_{DLO}	67.9 %	–	
R_{ULO}	0.0 %	–	

Calculation points

Symbol	Calculated	Threshold value	Check	Index
E_{vmax}	0.038 lx	≤ 5.00 lx	✓	OP11
I_{max}	48.6 cd	≤ 7500 cd	✓	OP2

Flux ratios are also calculated using only luminaires in the obtrusive lighting scene.

Great Houghton (All Lights On 100%)

Calculation objects

Great Houghton (All Lights On 100%)

Calculation objects

Calculation surfaces

Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
VMP1 Perpendicular illuminance Height: 4.000 m	0.016 lx	0.002 lx	0.070 lx	0.13	0.029	CG1
VMP2 Perpendicular illuminance Height: 4.000 m	0.048 lx	0.012 lx	0.10 lx	0.25	0.12	CG2
VMP3 Perpendicular illuminance Height: 4.000 m	0.11 lx	0.031 lx	0.24 lx	0.28	0.13	CG3
VMP4 Perpendicular illuminance Height: 4.000 m	0.048 lx	0.007 lx	0.18 lx	0.15	0.039	CG4
VMP5 Perpendicular illuminance Height: 4.000 m	0.015 lx	0.004 lx	0.051 lx	0.27	0.078	CG5

Calculation points

Properties	Calculated	Index
Calculation point 1 Semi-cylindrical illuminance Rotation: 315.8°, Height: 1.500 m	0.005 lx	CP1
Calculation point 10 Semi-cylindrical illuminance Rotation: 327.9°, Height: 4.000 m	0.010 lx	CP10
Calculation point 11 Semi-cylindrical illuminance Rotation: 327.9°, Height: 4.000 m	0.027 lx	CP11
Calculation point 12 Semi-cylindrical illuminance Rotation: 327.9°, Height: 4.000 m	0.019 lx	CP12
Calculation point 2 Semi-cylindrical illuminance Rotation: 328.8°, Height: 1.500 m	0.008 lx	CP2

Great Houghton (All Lights On 100%)

Calculation objects

Properties	Calculated	Index
Calculation point 3 Semi-cylindrical illuminance Rotation: 278.5°, Height: 4.000 m	0.003 lx	CP3
Calculation point 4 Semi-cylindrical illuminance Rotation: 329.8°, Height: 4.000 m	0.008 lx	CP4
Calculation point 5 Semi-cylindrical illuminance Rotation: 350.7°, Height: 1.500 m	0.003 lx	CP5
Calculation point 6 Semi-cylindrical illuminance Rotation: 21.7°, Height: 4.000 m	0.003 lx	CP6
Calculation point 7 Semi-cylindrical illuminance Rotation: 327.9°, Height: 4.000 m	0.005 lx	CP7
Calculation point 8 Semi-cylindrical illuminance Rotation: 327.9°, Height: 4.000 m	0.013 lx	CP8
Calculation point 9 Semi-cylindrical illuminance Rotation: 327.9°, Height: 4.000 m	0.014 lx	CP9

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Notes on planning:
Ground Floor Window: 1.5m CP Height; First Floor Window: 4m CP Height

Great Houghton (Obtrusive light scene)

Calculation objects

Great Houghton (Obtrusive light scene)

Calculation objects

Calculation points

Properties	Calculated	Index
Obtrusive light calculation point 1 Luminous intensity Height: 1.500 m	35.2 cd (≤ 7500 cd) ✓	OP1
Obtrusive light calculation point 1 Vertical illuminance Rotation: 0.0°, Height: 1.500 m	0.005 lx (≤ 5.00 lx) ✓	OP1
Obtrusive light calculation point 10 Vertical illuminance Rotation: 325.9°, Height: 4.000 m	0.015 lx (≤ 5.00 lx) ✓	OP10
Obtrusive light calculation point 10 Luminous intensity Height: 4.000 m	1.95 cd (≤ 7500 cd) ✓	OP10
Obtrusive light calculation point 11 Vertical illuminance Rotation: 327.2°, Height: 4.000 m	0.038 lx (≤ 5.00 lx) ✓	OP11
Obtrusive light calculation point 11 Luminous intensity Height: 4.000 m	5.72 cd (≤ 7500 cd) ✓	OP11
Obtrusive light calculation point 12 Vertical illuminance Rotation: 327.7°, Height: 4.000 m	0.026 lx (≤ 5.00 lx) ✓	OP12
Obtrusive light calculation point 12 Luminous intensity Height: 4.000 m	9.02 cd (≤ 7500 cd) ✓	OP12
Obtrusive light calculation point 2 Luminous intensity Height: 1.500 m	48.6 cd (≤ 7500 cd) ✓	OP2
Obtrusive light calculation point 2 Vertical illuminance Rotation: 0.0°, Height: 1.500 m	0.009 lx (≤ 5.00 lx) ✓	OP2
Obtrusive light calculation point 3 Luminous intensity Height: 4.000 m	32.6 cd (≤ 7500 cd) ✓	OP3

Great Houghton (Obtrusive light scene)

Calculation objects

Properties	Calculated	Index
Obtrusive light calculation point 4 Vertical illuminance Rotation: 328.5°, Height: 4.000 m	0.010 lx (≤ 5.00 lx) ✓	OP4
Obtrusive light calculation point 4 Luminous intensity Height: 4.000 m	7.44 cd (≤ 7500 cd) ✓	OP4
Obtrusive light calculation point 5 Vertical illuminance Rotation: 358.3°, Height: 1.500 m	0.005 lx (≤ 5.00 lx) ✓	OP5
Obtrusive light calculation point 5 Luminous intensity Height: 1.500 m	12.4 cd (≤ 7500 cd) ✓	OP5
Obtrusive light calculation point 6 Vertical illuminance Rotation: 0.0°, Height: 4.000 m	0.001 lx (≤ 5.00 lx) ✓	OP6
Obtrusive light calculation point 6 Luminous intensity Height: 4.000 m	3.98 cd (≤ 7500 cd) ✓	OP6
Obtrusive light calculation point 7 Vertical illuminance Rotation: 330.8°, Height: 4.000 m	0.009 lx (≤ 5.00 lx) ✓	OP7
Obtrusive light calculation point 7 Luminous intensity Height: 4.000 m	9.04 cd (≤ 7500 cd) ✓	OP7
Obtrusive light calculation point 8 Vertical illuminance Rotation: 327.3°, Height: 4.000 m	0.018 lx (≤ 5.00 lx) ✓	OP8
Obtrusive light calculation point 8 Luminous intensity Height: 4.000 m	16.6 cd (≤ 7500 cd) ✓	OP8
Obtrusive light calculation point 9 Vertical illuminance Rotation: 328.1°, Height: 4.000 m	0.024 lx (≤ 5.00 lx) ✓	OP9
Obtrusive light calculation point 9 Luminous intensity Height: 4.000 m	29.2 cd (≤ 7500 cd) ✓	OP9

Great Houghton (Obtrusive light scene)

Calculation objects

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Notes on planning:
All values take the initial flux (MF = 1) into account. The k_S value was calculated by limiting the spatial angle to 10e-6.
Ground Floor Window: 1.5m CP Height; First Floor Window: 4m CP Height

Great Houghton (All Lights On 100%)

VMP1

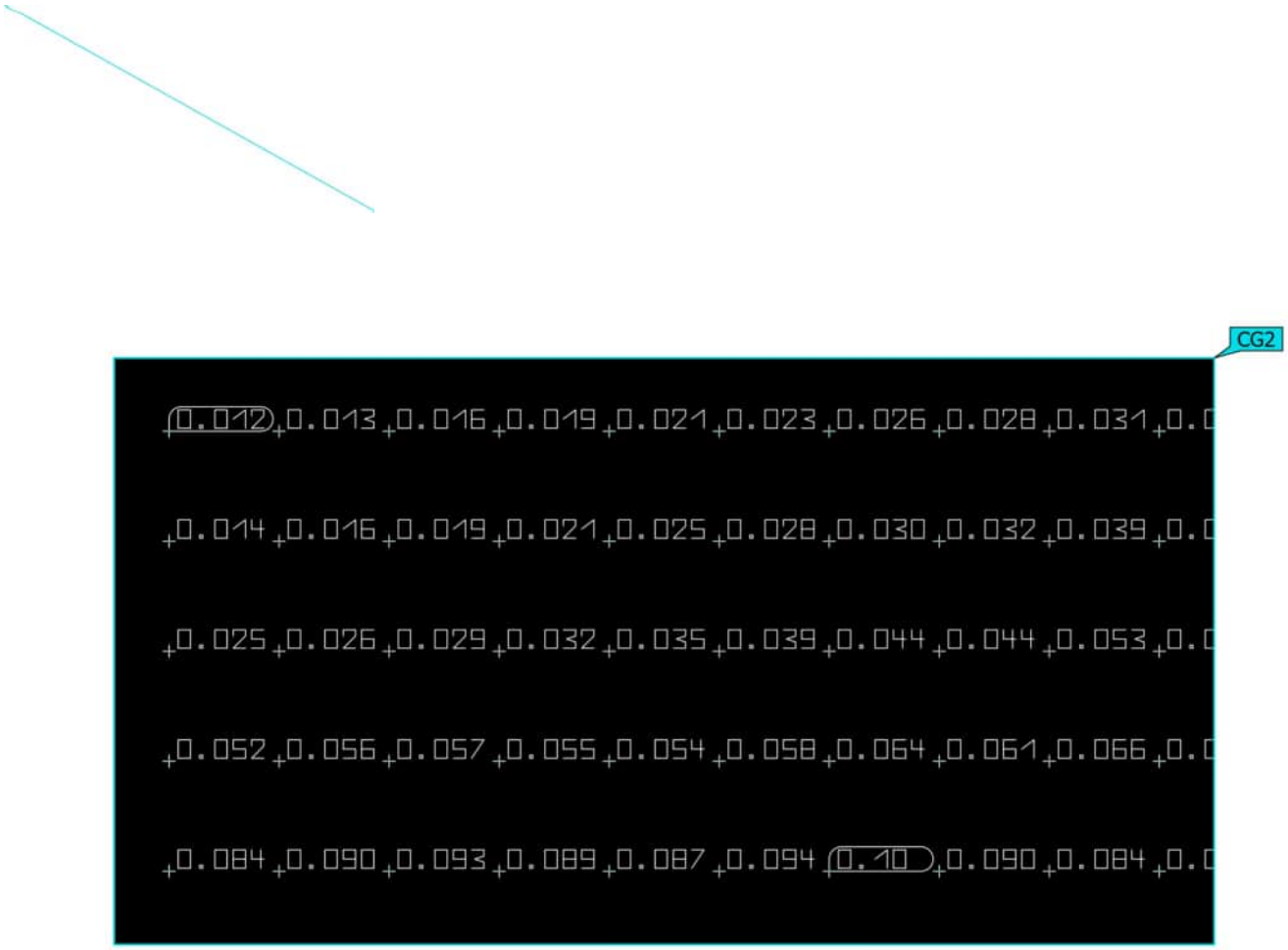
0.10 [lx]

Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
VMP1 Perpendicular illuminance Height: 4.000 m	0.016 lx	0.002 lx	0.070 lx	0.13	0.029	CG1

Notes on planning:
ILP GN08, Paragraph 4.54
0.4 lux Maximum (Emax =<0.4 lux)

Great Houghton (All Lights On 100%)

VMP2

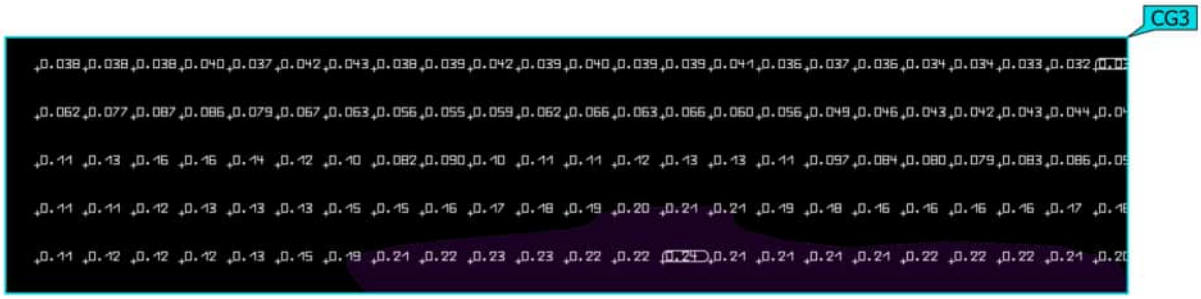


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
VMP2 Perpendicular illuminance Height: 4.000 m	0.048 lx	0.012 lx	0.10 lx	0.25	0.12	CG2

Notes on planning:
ILP GN08, Paragraph 4.54
0.4 lux Maximum (Emax =<0.4 lux)

Great Houghton (All Lights On 100%)

VMP3



Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
VMP3 Perpendicular illuminance Height: 4.000 m	0.11 lx	0.031 lx	0.24 lx	0.28	0.13	CG3

Notes on planning:
ILP GN08, Paragraph 4.54
0.4 lux Maximum (Emax =<0.4 lux)

Great Houghton (All Lights On 100%)

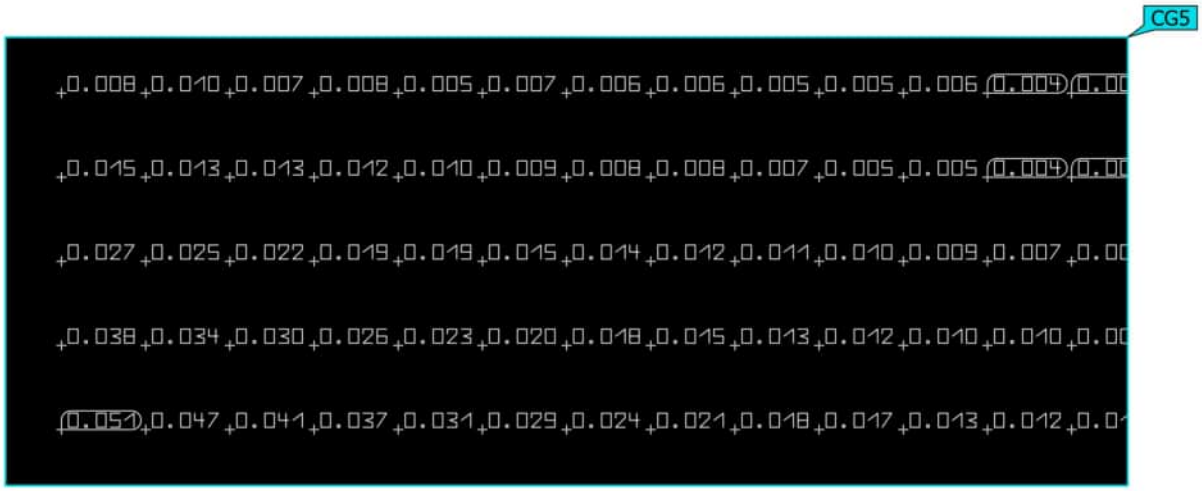
VMP4

Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
VMP4 Perpendicular illuminance Height: 4.000 m	0.048 lx	0.007 lx	0.18 lx	0.15	0.039	CG4

Notes on planning:
ILP GN08, Paragraph 4.54
0.4 lux Maximum (Emax =<0.4 lux)

Great Houghton (All Lights On 100%)

VMP5



Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
VMP5 Perpendicular illuminance Height: 4.000 m	0.015 lx	0.004 lx	0.051 lx	0.27	0.078	CG5

Notes on planning:
ILP GN08, Paragraph 4.54
0.4 lux Maximum (Emax =<0.4 lux)

Appendix D Lighting Layout

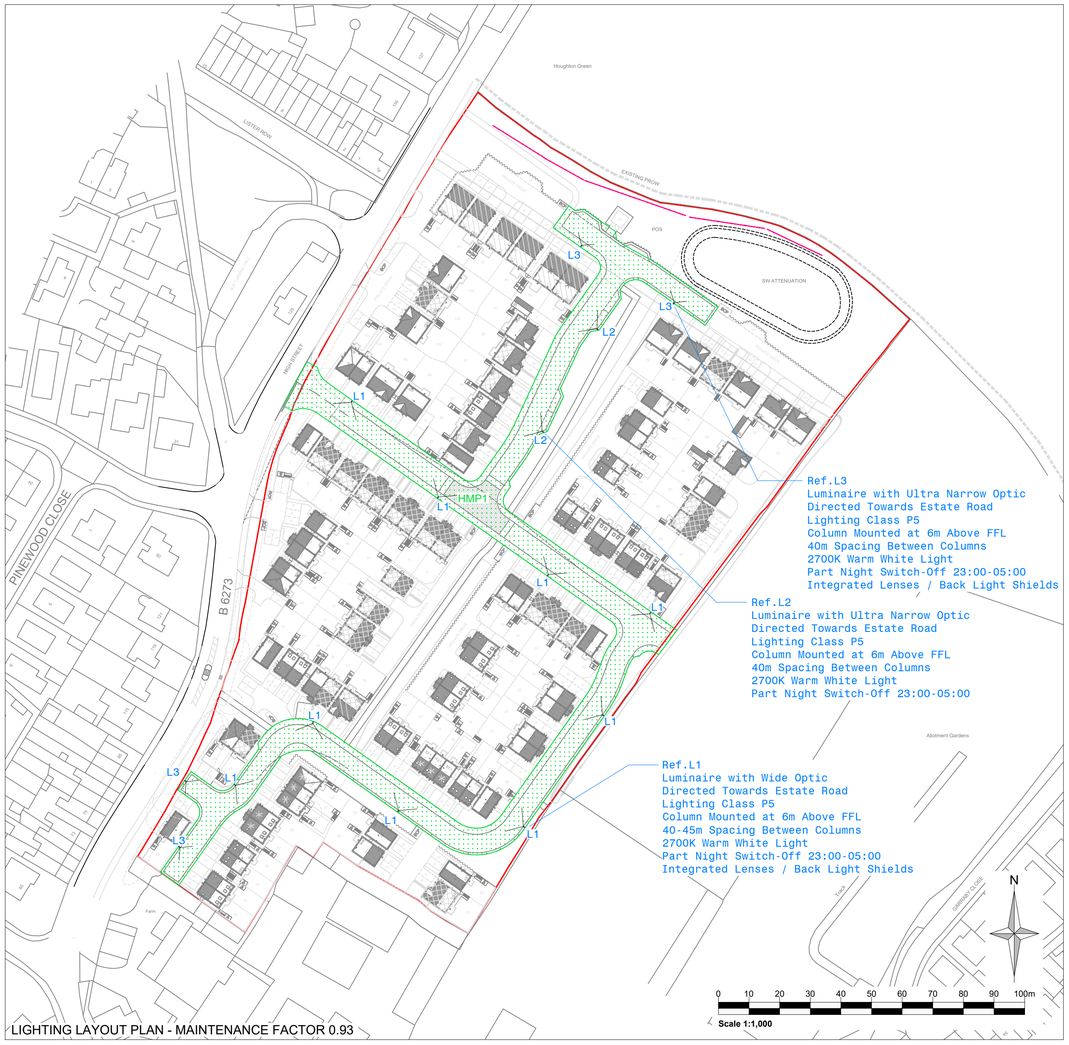
Lighting Design & Impact Assessment

Great Houghton

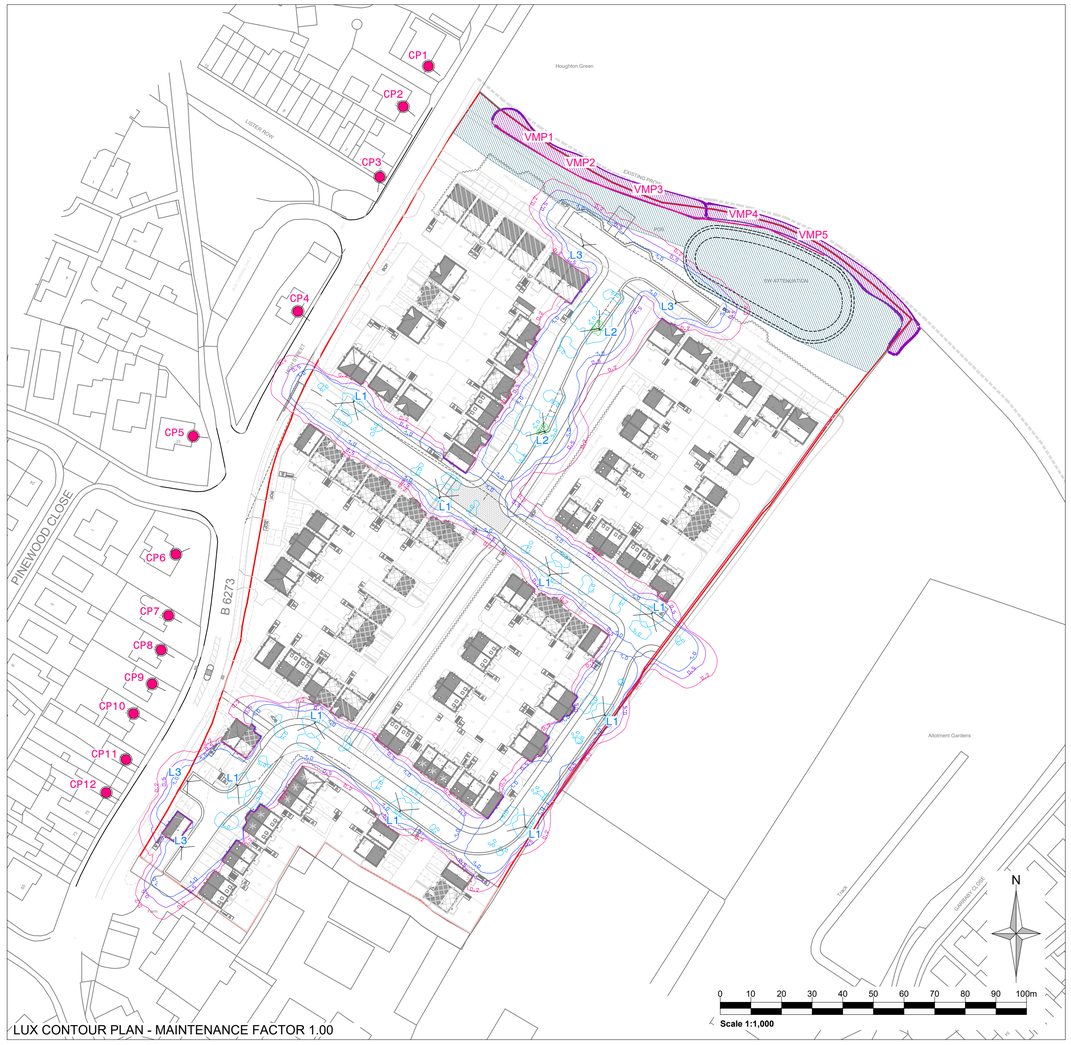
Avant Homes

SLR Project No.: 410.066691.00002

27 October 2025



LIGHTING LAYOUT PLAN - MAINTENANCE FACTOR 0.93



LUX CONTOUR PLAN - MAINTENANCE FACTOR 1.00

CIE GUIDANCE ON OPERATIONAL REQUIREMENTS FOR ROADWAYS

HORIZONTAL ILLUMINANCE Pre Curfew Normal Operation MF = 0.93 (E2 / <6m / 5 years)	LIGHTING CLASS	AVERAGE ILLUMINANCE		MINIMUM ILLUMINANCE		TARGET
AREA / USAGE		**REQUIREMENT**	**RESULT**	**REQUIREMENT**	**RESULT**	**PASS/FAIL**
HMP1 - Estate Road	P5	3 - 4.5	3.62	0.60	0.65	PASS

ILP GUIDANCE ON THE REDUCTION OF OBTRUSIVE LIGHT

CURFEW: 23:00	UPWARDS LIGHT RATIO, ULR [MAX %]	MAXIMUM ILLUMINANCE IN THE VERTICAL PLANE [LUX] (MAX)		TARGET
MAINTENANCE FACTOR (MF) = 1.0, (0 hrs / 0 yrs)		PRE CURFEW [VMP]	POST CURFEW [VMP]	PASS / FAIL
ENVIRONMENTAL ZONE E2	2.50	**5.00**	**1.00**	
ULR	0.00			PASS
RECEPTOR ASSESSMENT				
VMP1 [20M WIDTH x 8M HEIGHT]		0.07	0.00	PASS
VMP2 [15M WIDTH x 8M HEIGHT]		0.10	0.00	PASS
VMP3 [35M WIDTH x 8M HEIGHT]		0.22	0.00	PASS
VMP4 [25M WIDTH x 8M HEIGHT]		0.17	0.00	PASS
VMP5 [20M WIDTH x 8M HEIGHT]		0.05	0.00	PASS

ILP GUIDANCE ON THE REDUCTION OF OBTRUSIVE LIGHT

CURFEW: 23:00	TOTAL ILLUMINANCE IN THE VERTICAL PLANE [LUX] (in lux)		MAXIMUM LUMINOUS INTENSITY EMITTED BY LUMINAIRES [CD] (in cd)		TARGET
MAINTENANCE FACTOR (MF) = 1.0, (0 hrs / 0 yrs)	PRE CURFEW [CP]	POST CURFEW [CP]	PRE CURFEW [CP]	POST CURFEW [CP]	PASS / FAIL
ENVIRONMENTAL ZONE E3	**10.00**	**2.00**	**10000**	**1000**	
RECEPTOR ASSESSMENT					
CP1 - 137 Moor Lane	0.004	0.00	35.20	0.00	PASS
CP2 - 135 High Street	0.007	0.00	48.60	0.00	PASS
CP3 - 1 Lister Row	0.002	0.00	32.60	0.00	PASS
CP4 - 125 High Street	0.006	0.00	7.44	0.00	PASS
CP5 - 31 Crabtree Drive	0.005	0.00	12.40	0.00	PASS
CP6 - 26 Crabtree Drive	0.001	0.00	3.98	0.00	PASS
CP7 - 121 High Street	0.005	0.00	9.04	0.00	PASS
CP8 - 119 High Street	0.009	0.00	16.60	0.00	PASS
CP9 - 117 High Street	0.014	0.00	29.20	0.00	PASS
CP10 - 115 High Street	0.018	0.00	1.95	0.00	PASS
CP11 - 113 High Street	0.021	0.00	5.72	0.00	PASS
CP12 - 111 High Street	0.021	0.00	9.02	0.00	PASS

LUMINAIRE REF	QTY	LOAD (WATTS)	TOTAL LOAD (Watts)
L1 Mounting Height: 6 metres On Lighting Column Column Spacing: 40-45 metres 1.8m from Road Edge (Back of Pavement) Schreder AXIA 3.1 - 5384 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487502 Integrated Lenses / Rear Louvres Ultra Narrow Throw Optic Delivered Lumens: 3135 lm Warm White Light (2700K) / CRI>70	9	25.7 W	231.3 W @ 100%
L2 Mounting Height: 6 metres On Lighting Column Column Spacing: 40-45 metres 1.8m from Road Edge (Back of Pavement) Schreder AXIA 3.1 - 5384 16 OSLON SQUARE GIANT@500mA WW 727 230V 01-11-814 487502 Integrated Lenses Ultra Narrow Throw Optic Delivered Lumens: 3135 lm Warm White Light (2700K) / CRI>70	2	25.7 W	51.4 W @ 100%
L3 Mounting Height: 6 metres On Lighting Column 0.6m from Road Edge (Back of Pavement) Schreder AXIA 3.1 - 5384 8 OSLON SQUARE GIANT@300mA WW 727 230V 01-11-802 487532 Integrated Lenses / Rear Louvres Ultra Narrow Throw Optic Delivered Lumens: 687 lm Warm White Light (2700K) / CRI>70	4	8.1 W	32.4 W @ 100%

ISOLINES

- 0.2 lx
- 0.5 lx
- 1.0 lx
- 5.0 lx
- 10.0 lx

LIGHTING PARAMETERS

Lighting Transition / Buffer Zone
Minimum 10m from Dark Habitat Zone
No Lighting to be Installed in this Area
No Illuminance Limits Apply

Dark Habitat Zone
Areas marked by the ecologist as habitat for light sensitive species.
- Maximum Illuminance of <0.4 lux in the Vertical Plane from Developer Installed Lighting
- Maximum Illuminance of <0.2 lux in the Horizontal Plane from Developer Installed Exterior Lighting

Rev	Amendments	Date	By	Chk	Auth
01	First Issue	27.10.25	RD	ND	ND

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Drawing Purpose: **FOR PLANNING** | Suitability Code: **S1**

Client: Avant Homes

Project: Great Houghton

Drawing Title: Lighting Layout & Lux Contour plan

Scale	SLR Project No.
1:1000 @ A1	410.066691.00002

Designed	Drawn	Checked	Authorised
RD	RD	ND	ND
Date: 27.10.2025	Date: 27.10.2025	Date: 27.10.2025	Date: 27.10.2025

Drawing Number: **410.066691.00002-LLP+LCP** | Rev. **01**

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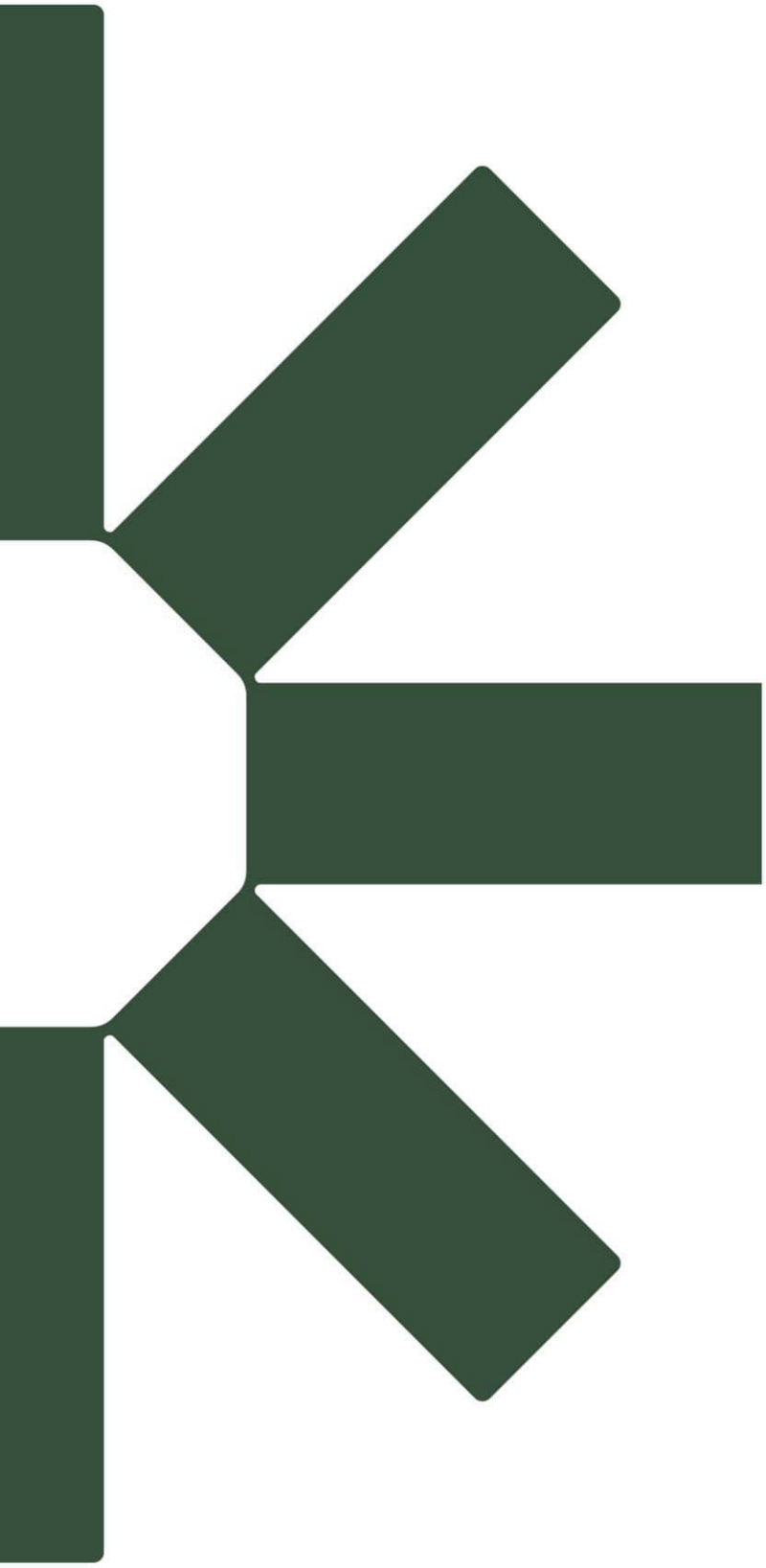

Making Sustainability Happen