

LIGHTING STRATEGY

PROJECT: Bradley Mills Road

PREPARED FOR: Kirklees Council/Highways & Streetscene

December 2023

PROJECT NUMBER: 25/65449		DOCUMENT REF: Ecology Report 6618			
1st Issue	ECOLOGY	YA	JCR		14/12/2023
Revision	Purpose Description	Originated	Checked	Approved	Date

Contents

1. Introduction	3
1.1 General.....	3
2. Standards and Policies	3
2.1 Guidance	3
Guidance Notes for the Reduction of Obtrusive Light (GN01:2021)	3
GN08/23 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professional’s	4
2.2 Relevant British Standards.....	7
3. Lighting Strategy	7
3.1 Brief.....	7
3.2 Environmental Zone.....	7
3.3 Key Areas Requiring Lighting	7
3.4 Illustrative Lighting Zones	8
3.5 Bradley Mills Road	8
4. Conclusion.....	10
Appendix 1 – Proposed Site Plan	11
Appendix 2 – Indicative Light Spill Diagram – Full lighting levels (dusk – 22:00)	12
.....	12

1. Introduction

1.1 General

- 1.1.1 The lighting strategy proposes good practice and outlines a suitable approach to apply to the installation of the lighting required to support the planning Application. The aim of the strategy is to outline a minimally obtrusive approach to lighting, which is functional as well as ensuring sensitivity to the environment and sensitive ecology.
- 1.1.2 Lighting associated with the Proposed Development will comply with GN01:2021 - Guidance Notes for the Reduction of Obtrusive Light outlined by the Institution of Lighting Professionals (ILP).
- 1.1.3 The lighting strategy has been developed in line with recommendations outlined in industry standard guidance for sensitive ecology receptors. This seeks to ensure the lighting associated with the Proposed Development is minimally obtrusive.

2. Standards and Policies

2.1 Guidance

Guidance Notes for the Reduction of Obtrusive Light (GN01:2021)

- 2.1.1 The lighting strategy shall be informed by industry guidance notes which aim to reduce the potential for obtrusive light to occur, caused by poorly designed and installed exterior artificial lighting. The lighting strategy is informed by the most relevant sections of GN01/21 (published in January 2021) to reduce the potential for obtrusive light from a wide range of exterior lighting applications. Notably, the updated guidance has been specifically aimed at systems of flood lighting, as such some sections relating to luminaire source intensity are not applicable to this lighting strategy.
- 2.1.2 The environmental zone criteria detailed within **Tables 1** and **2** will form the basis for the lighting strategy.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5 +)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark (SQM 20 to 20.5)	Relatively 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 and urban settlements, Small town centres or suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

Table 1 Environmental Zone Descriptions

Notes:

1. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.
2. Rural zones under protected designations should use a higher standard of policy.
3. Zone E0 must always be surrounded by an E1 Zone.
4. Zoning should be agreed with the local planning authority and due to local requirements a more stringent zone classification may be applied to protect special/specific areas.
5. SQM (Sky Quality Measurements) referenced by the International Dark-Sky Association (IDA), the criteria for E0 being revised in mid-2019 but not retrospective.

6. Astronomical observable dark skies will offer clearer views of the Milky Way and of other objects such as the Andromeda galaxy and the Orion Nebula.

7. Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way, these skies will have their own relative intrinsic value in the UK.

Environmental Zones	Sky Glow ULR (Max %)	Light Trespass (into Windows) E_v (lux)		Building Luminance Average, Pre-curfew
		Pre- Curfew	Post-Curfew	Average L (cd/m ²)
E0	0	0	0	0
E1	0	2	0 (1*)	0
E2	2.5	5	1	5
E3	5	10	2	10
E4	15	25	5	25

Table 2 Obtrusive light criteria relating to each Environmental Zone

- **ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky;**
- **E_v is Vertical Illuminance in Lux;**
- **L is Luminance in Candelas per square metre; and**
- **Curfew refers to a time when the local planning authority has agreed that the lighting installation should be switched off; this typically refers to 23h00 – 07h00.**
- **(*) Permitted only from Public road lighting installations.**

GN08/23 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professional’s.

2.1.3 Guidance for artificial lighting and bats was updated in 2023, the guidance states the following:

“It is acknowledged that, especially for vertical calculation planes, very low levels of light (<0.5 lux) may occur even at considerable distances from the source if there is little intervening attenuation. It is therefore very difficult to demonstrate ‘complete darkness’ or a ‘complete absence of illumination’ on vertical planes where some form of lighting is proposed on site despite efforts to reduce them as far as possible and where horizontal plane illuminance levels are zero. Consequently, where ‘complete darkness’ on a feature or buffer is required, it may be appropriate to consider this to be where illuminance is below 0.2 lux on the horizontal plane and below 0.4 lux on the vertical plane. These figures are still lower than what may be expected on a moonlit night and are in line with research findings for the illuminance found at hedgerows used by lesser horseshoe bats, a species well known for its light averse behaviour (Stone, 2012).”

“Dark buffers, illuminance limits and zonation dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. Buffer zones rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided in-to zones of increasing illuminance limits radiating away from the feature” (see **Figure 2**).

Example of illuminance limit zonation

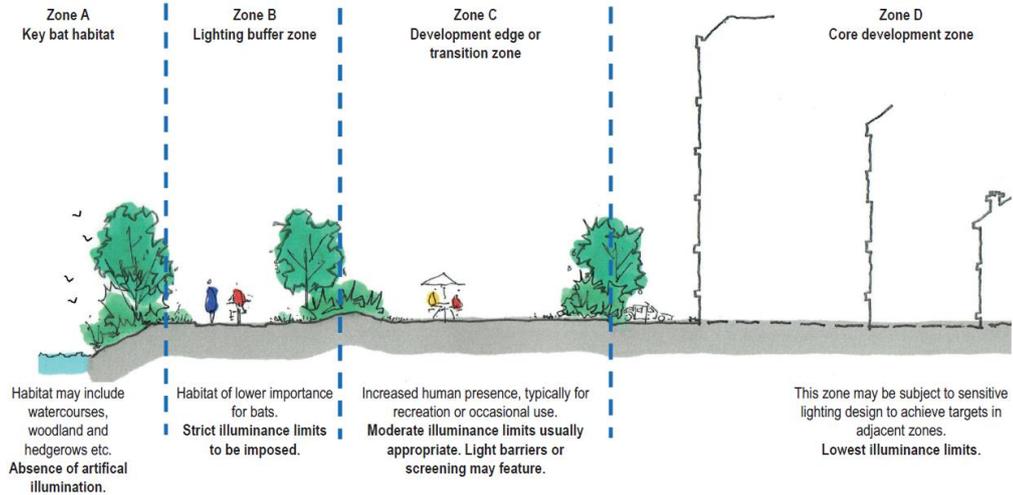


Figure 1 Example of lighting zonation near sensitive boundaries and known ecological habitats

2.1.4 Light Emitting Diodes (LEDs)

This is the light source of choice for most Local Authorities. The light emitted is more directional and better controlled than the single source luminaires they replace.

LED is available in a range of colour temperatures with 4000°K being most commonly used across Local Authorities.

LED typically features no ultra-violet (UV) component and research indicates that while lower UV attracts fewer invertebrates, warmer colour temperatures with peak wavelengths greater than 550nm cause less impact.

The Lighting on this site will:

- Use Narrow spectrum light sources to lower the range of species affected by lighting
- Use light sources that emit minimal ultra-violet light (UV)
- Avoid white and blue wavelengths of the light spectrum to reduce insect attraction and where white light sources are required, in order to manage the blue shortwave length content, they should be of a warm/neutral colour temperature <4,200 kelvin

2.1.5 The following must apply when choosing luminaires **unless otherwise specified within the lighting performance** criteria within this lighting strategy:

- *All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.*
- *LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.*
- *Where possible a warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.*
- *Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).*
- *Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill. (See figure overleaf.)*
- *The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered.*
- *However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and*
- *their use should only be as directed by the lighting professional.*
- *Column heights should be carefully considered to minimise light spill.*
- *Only luminaires with an upward light ratio of 0% and with good optical control should be used – See ILP Guidance for the Reduction of Obtrusive Light.*
- *Luminaires should always be mounted on the horizontal, i.e. no upward tilt.*
- *Any external security lighting should be set on motion-sensors and short (1min) timers.*

- *As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.”*

2.2 Relevant British Standards

- 2.2.1 Lighting design criteria outlined within *BS 5489-1:2020 – Code of Practice for the Design of Road Lighting – Lighting of Roads and Public Amenity Areas* is applicable to the proposed development.

3. Lighting Strategy

3.1 Brief

- 3.1.1 The lighting strategy has been developed in conjunction with the guidance outlined in ILP GN08/23 – Bats and Artificial Lighting in the UK, which outlines the considerations required for species that are significantly affected by lighting. Therefore, the lighting strategy is sensitive to ecology through the technical parameters such as colour temperature, which has a correlation with spectral power distribution. With this in mind, it is important that these factors are duly considered when evaluating light spill, as the technical properties of the light spill have also been designed to have less ecological impacts through the wavelengths of light contained within it.

- 3.1.2 The ECIA undertaken for Bradley Mills Road noted that;

The site was deemed suitable to support minor bat foraging and commuting grounds within and immediately outside the site. No suitable roosting features were recorded within the site. Provided the current levels of artificial lighting for the road are not exceeded within the newly proposed redevelopment of the road, no impacts are predicted on bat populations within the local area.

The habitats within the site offer suitable habitat for badger to utilise, however, no field signs to suggest badger presence was recorded within the site during the survey.

- 3.1.3 The section of Bradley Mills Road which runs up the back of the stadium is an important route which requires lighting for safety, amenity and security during the hours of darkness. This section outlines the requirements and performance criteria to be applied to the lighting design, ensuring that it is fit for purpose and environmentally sensitive. This will be achieved through compliance with British Standards and lighting industry guidance as outlined in **Section 2**.

3.2 Environmental Zone

- 3.2.1 The Application Site is situated within the Kirklees Metropolitan Council district. In reference to **Table 1**, the Application Site is located within a ‘*Well- inhabited urban settlement*’ where background ambient light levels are expected to be of ‘*medium district brightness*.’

3.3 Key Areas Requiring Lighting

- 3.3.1 The route is currently lit with 8m street lighting columns utilising LED lanterns. The relevant section for the purposes of this report is from existing columns 27 to 37. A number of these street lighting columns are sited on the northern side of Bradley Mills Road where there has been weathering of the cliff edge. The proposal is to replace nine (9) of these vulnerable columns on the opposite (south) side of Bradley Mills Road into the constructed footway.

- 3.3.2 The ECIA recommended mitigation measures stated that ‘*Artificial light overspill from the proposed development should be avoided on the northern site boundary*’

The resighting of these street lighting columns from the northern side to the southern side comply with the recommendations of the ECIA and will also facilitate the proposed works to stabilise the road and deteriorating cliff edge.

3.4 Illustrative Lighting Zones

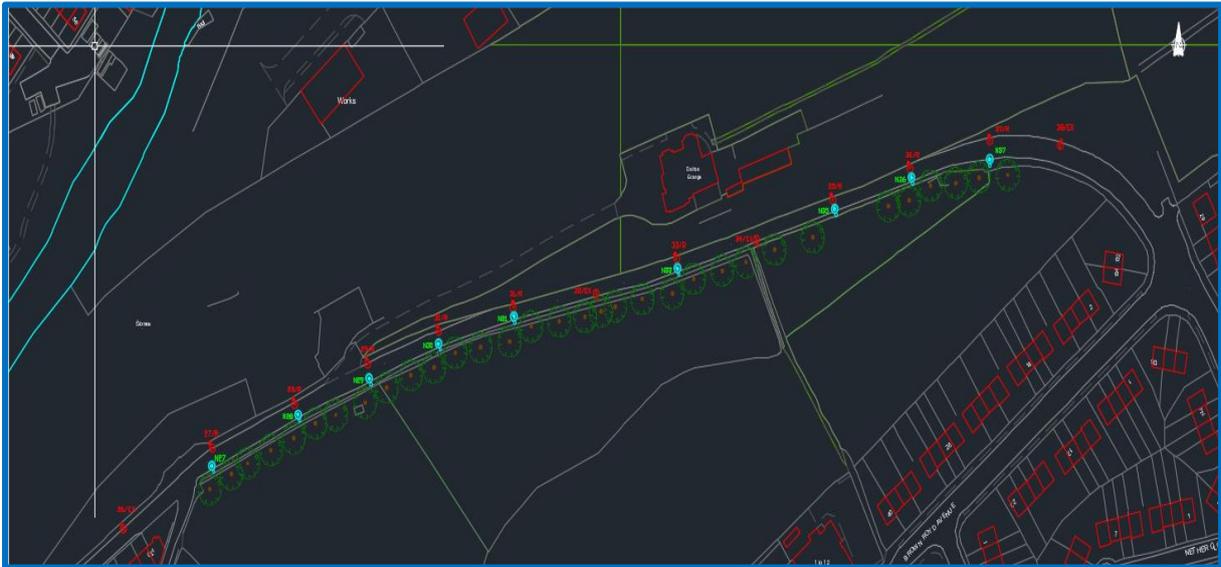


Figure 2 Illustrative Lighting Zone Plan (N.T.S.)

3.5 Bradley Mills Road

- 3.5.1 Lighting will be required on Bradley Mills Road for the safety and amenity of pedestrians, cyclists and vehicular traffic. It is proposed that the existing LED lanterns be refitted onto the replacement columns thus retaining the existing lighting which was previously designed to be compliant with the requirements of BS 5489-1:2020.
- 3.5.2 Lighting on Bradley Mills Road will be compliant with the British Standards and Obtrusive Light Guidance outlined in **Section 2**.
- 3.5.3 Suitable lighting levels for Bradley Mills Road are deduced from British Standard BS 4589-1:2020 (Table A.4 Lighting Classes for traffic routes with a typical speed of main user $v \leq 40$ mph). A comparable lighting class of P3 has been used to calculate the lighting levels as Table A.1.
- 3.5.4 Lighting for Bradley Mills Road will be designed to ensure safety during peak traffic flow in the winter months. As such, the lighting levels selected for the road reflect this. For energy efficiency purposes, it is possible for lighting levels to be dimmed in accordance with curfew hours.
- 3.5.5 Traffic flow at peak hours is determined as '*normal*'. The area is assessed as having a moderate level of ambient luminance, so a P3 lighting class (comparable to M5_Table A.1) is deemed appropriate. Further details on the lighting performance parameters are provided in **Table 2**.
- 3.5.6 Bradley Mills Road will be illuminated using column mounted luminaires not exceeding 8.0 metres in height above ground level (AGL).
- 3.5.7 At 22:00pm, in line with lighting curfew hours noted in ILP GN01 – Guidance Notes for the Reduction of Obtrusive Light, lighting levels on Bradley Mills Road will be reduced.

- 3.5.8 Luminaire correlated colour temperature (CCT) will not exceed 4000 Kelvin, which is considered neutral white and appropriate for the location of this development.
- 3.5.9 Luminaire performance parameters for Bradley Mills Road lighting is outlined in **Table 3**.

Equipment Specification	Description
Location	Bradley Mills Road
Correlated Colour Temperature (K)	4000K (maximum)
Luminaire Manufacturer	Urbis
Luminaire Model	Axia (existing lanterns to be refit to replacement columns)
Luminaire Style	Column Mounted
Light Source	LED [Light Emitting Diode]
Height	8.0 metres (maximum) (AGL)
Luminaire Tilt	0°
Design Guidance	
Luminous Intensity Class	G** (minimum)
Lighting Class	BS 5489-1: 2020 - Code of practice for the design of road lighting P3 (Ē Average: 7.5 – 11.25 Lux / E Min: 1.5 Lux) (BS5489 -1 :2020 Table A.5)
Mounting Arrangement	Post Top (Column Mounted) / Side Entry (Wall Mounted)
Control	Luminaires to be controlled by 20/20 lux photocell to ensure switch on at dusk and switch off at dawn. Luminaires to be dimmed between 22:00pm and 05:00am as per the following pre-programmed regime: 100% Dusk to 22:00 75% 22:00 to 00:00 50% 00:00 to 05:00 100% 05:00 to Dawn

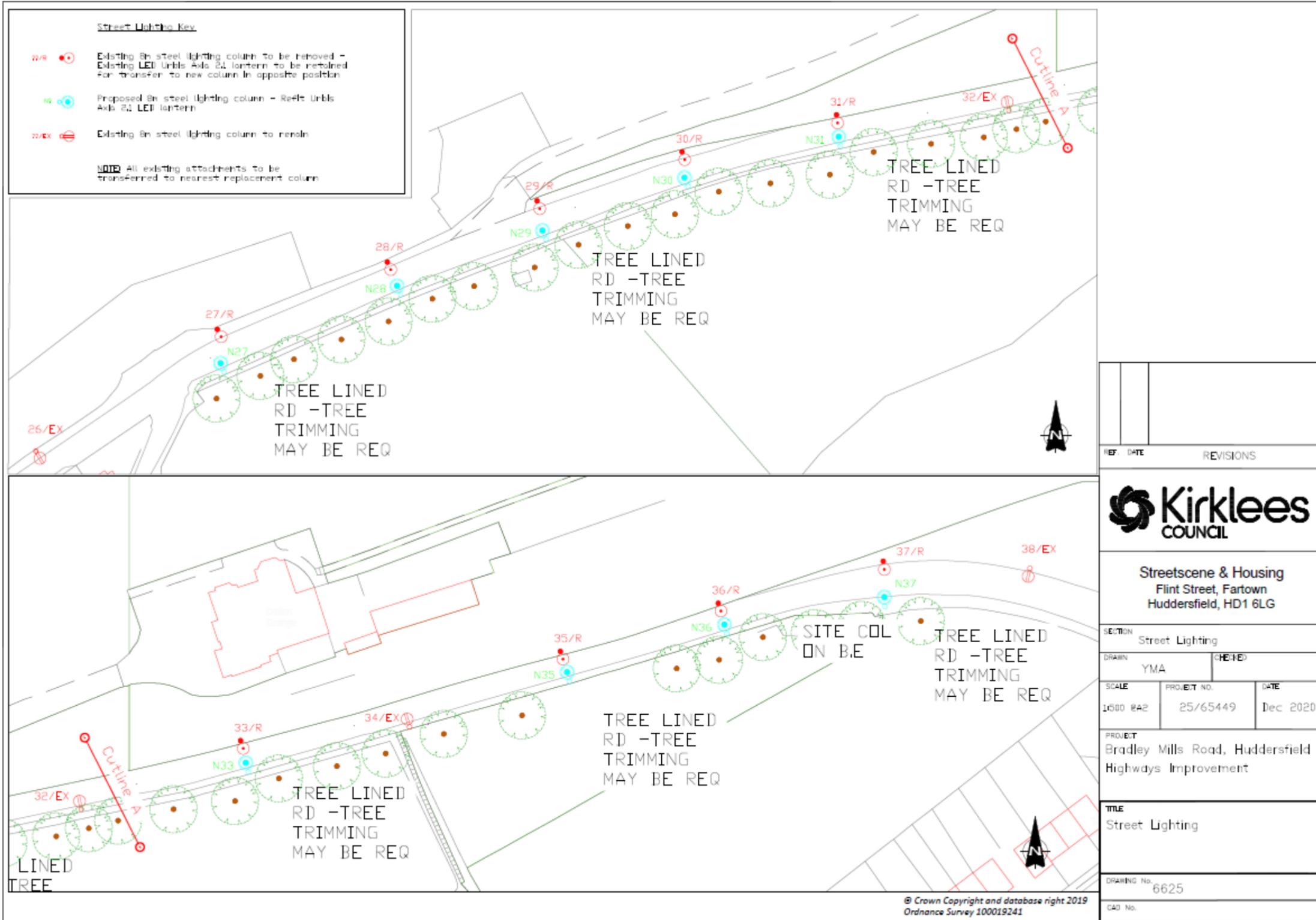
Table 3 Bradley Mills Road - Luminaire Performance Requirements.

- 3.5.10 Lighting for the proposed development will be controlled by photocells which will switch lighting on when daylight has fallen to below 20 lux. This generally occurs during the civil twilight phase (30 minutes after sunset). So lighting during the months between April and September will only be in use during the later period of the evening.

4. Conclusion

- 4.1.1 The lighting strategy outlines the criteria for the lighting design of the Proposed Development to ensure that the lighting is fit for purpose, whilst maintaining sensitivity towards the environment through compliance with relevant British Standards and Guidance.
- 4.1.2 To ensure that the potential for obtrusive light is minimised, it is necessary to restrict the mounting heights of the luminaires, tilt angle, colour temperature and lumen output of exterior light sources to those specified in **Section 3**.
- 4.1.3 The exterior lighting outlined in the lighting strategy shall comply with the requirements for an E3 Environmental Zone as per **Table 1**.
- 4.1.4 Compliance with the lighting strategy will allow a safe and sensitive level of light for way finding and guidance at night, whilst limiting obtrusive light to a negligible level and in compliance with ILP GN01:2021 and GN08/23, which seeks to reduce light spill onto sensitive boundaries.
- 4.1.5 The lighting strategy has been developed in conjunction with the guidance outlined in ILP GN08/23 – Bats and Artificial Lighting in the UK, which outlines the considerations required for species that are significantly affected by lighting. Therefore, the lighting strategy is sensitive to ecology through the technical parameters such as colour temperature, which has a correlation with spectral power distribution. With this in mind, it is important that these factors are duly considered when evaluating light spill, as the technical properties of the light spill have also been designed to have less ecological impacts through the wavelengths of light contained within it.

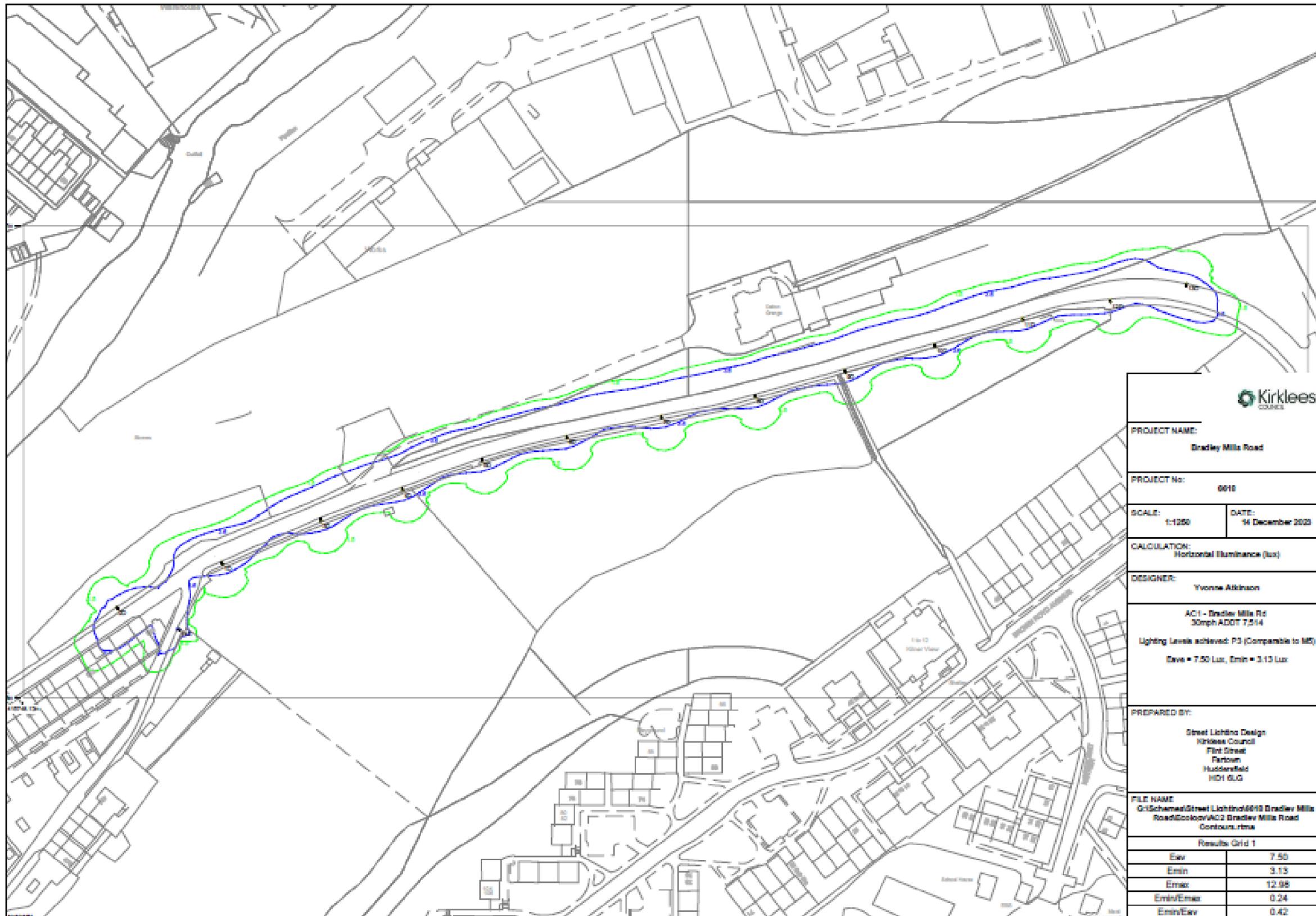
Appendix 1 – Proposed Site Plan



REF.	DATE	REVISIONS
Streetscene & Housing Flint Street, Fartown Huddersfield, HD1 6LG		
SECTION: Street Lighting		
DRAWN: YMA	CHECKED:	
SCALE: 1:500 (BA2)	PROJECT NO: 25/65449	DATE: Dec 2020
PROJECT: Bradley Mills Road, Huddersfield Highways Improvement		
TITLE: Street Lighting		
DRAWING No. 6625		
CAD No.		

© Crown Copyright and database right 2019
 Ordnance Survey 100019241

Appendix 2 – Indicative Light Spill Diagram – Full lighting levels (dusk – 22:00)



PROJECT NAME: Bradley Mills Road	
PROJECT No: 6618	
SCALE: 1:1250	DATE: 14 December 2023
CALCULATION: Horizontal Illuminance (lux)	
DESIGNER: Yvonne Atkinson	
AC1 - Bradley Mills Rd 30mph AADT 7,514	
Lighting Levels achieved: P3 (Compatible to M5) Eav = 7.50 Lux, Emin = 3.13 Lux	
PREPARED BY: Street Lighting Design Kirklees Council First Street Parkson Huddersfield HD1 5LQ	
FILE NAME: G:\Schemes\Street Lighting\6618 Bradley Mills Road\Ecology\AC2 Bradley Mills Road Contours.rtm	
Results Grid 1	
Eav	7.50
Emin	3.13
Emax	12.98
Emin/Emax	0.24
Emin/Eav	0.42