

LAND EAST OF WESTERGATE

LIGHTING STRATEGY REPORT

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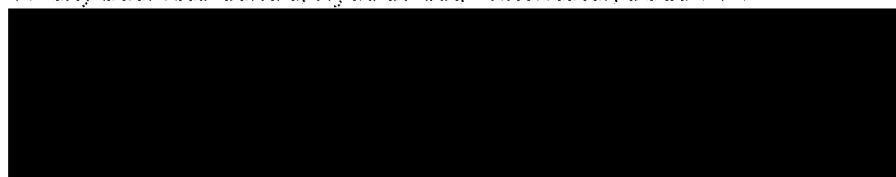


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1. Introduction

1.1. Executive Summary

- 1.1.1. This Lighting Strategy has been written by DFL (Designs for Lighting Ltd), a lighting design consultancy specialising in Lighting Impact Assessments, obtrusive light mitigation, and detailed lighting design.
- 1.1.2. The Lighting Strategy proposes good practice and outlines a suitable approach for the proposed lighting, aiming to set out a minimally obtrusive approach to the lighting, whilst ensuring it is necessary and considers the sensitivity of nearby human, environmental and ecological receptors.
- 1.1.3. The Application Site is Land East of Westergate, Burnham. The proposal includes over 2ha of amenity green space and 3.9ha of natural and semi-natural green space that has the potential to be integrated with the 'Linear Park' around the Rife that is proposed as part of the BEW strategic allocation. The proposal includes connections with existing rights of way and a new public footpath and cycleway link along the eastern boundary to form part of a wider network. Hedgerows would be reinforced to create landscape buffers to all boundaries.
- 1.1.4. The Proposed Development comprises of the proposal for 400 dwellings with associated open space, access, surface water drainage and landscaping. The Site Layout Plan is shown in **Figure 1 and Figure 2**.
- 1.1.5. Lighting associated with the Proposed Development will comply with relevant British Standards and Institution of Lighting Professionals (ILP) guidance to ensure obtrusive light is minimised in accordance with best practice.
- 1.1.6. This report outlines the following:
 - Relevant obtrusive light policies in direct relation to the Proposed Development;
 - Relevant National and Local Policies;
 - Why the Proposed Development requires artificial lighting; and
 - Details as to how lighting will be implemented for the Proposed Development.

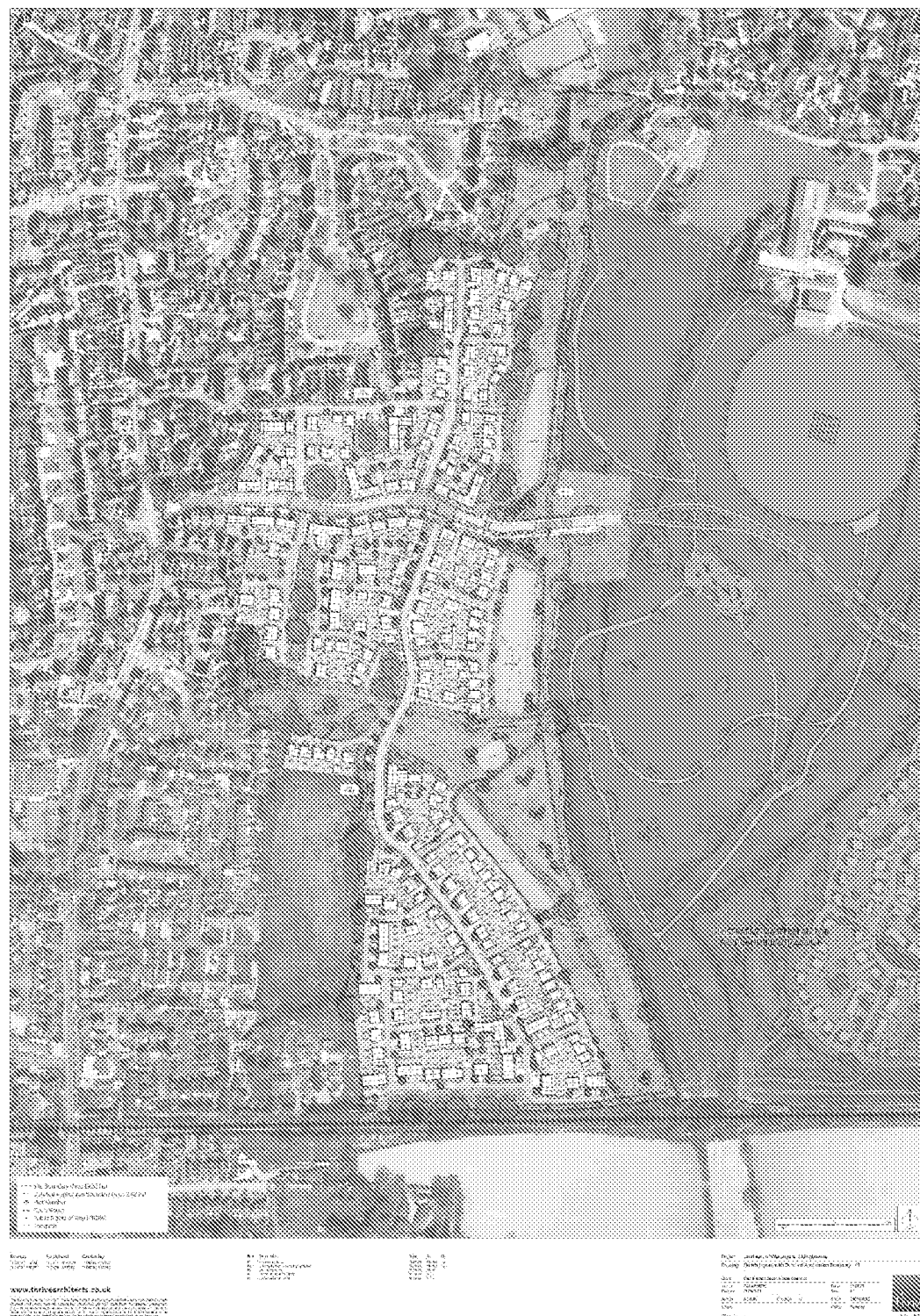


Figure 1: The Application Site location and boundary



Figure 2: Aerial view of site with redline boundary

2. Legislative Frameworks and Local Policies

2.1. National Policies

Environmental Protection Act 1990 / Clean Neighbourhoods and Environment Act 2005

- 2.1.1. Since 2005, artificial light has been incorporated as a potential statutory nuisance. An amendment to section 79 of the Environmental Protection Act 1990, contained within the Clean Neighbourhoods and Environment Act 2005 states:

"Artificial light emitted from premises so as to be prejudicial to health and nuisance constitutes a 'Statutory Nuisance' and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint"

National Planning Policy Framework 2023

- 2.1.2. The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how they are expected to be applied and provides a framework for local plans. With regard to light pollution, the NPPF was updated in Sept 2023 and states that the following elements are to be considered:

"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:

- ✓ mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- > identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- > limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

Planning Practice Guidance

- 2.1.3. Guidance for assessing the effects of proposed artificial lighting is outlined in the planning practice guidance (PPG). The guidance states:

"Does an existing lighting installation make the proposed location for a development unsuitable, or suitable only with appropriate mitigation? For example, this might be because:

- > the artificial light has a significant effect on the locality; and/or*
- > users of the Proposed Development (e.g., a hospital) may be particularly sensitive to light intrusion from the existing light source.*

Where necessary, development proposed in the vicinity of existing activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme, reflecting the agent of change principle. Additional guidance on applying this principle is set out in the planning practice guidance on noise.

- > Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?*
- > Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration but will need to be considered in terms of both their severity and alongside the wider benefits of the development.*
- > Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?*
- > Would new lighting have any safety impacts, for example in creating a hazard for road users?*
- > Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.*
- > Does the Proposed Development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour.)"*

2.2. Relevant Local policies

2.2.1. *The relevant Local Planning Authority (LPA) for the Proposed Development is the Arun District Council, with policies detailed within the Arun Local Plan 2011-2031 (July 2018) applying to the lighting associated with the Proposed Development.*

The applicable policies are:

13.1 Design

- *The Policy objectives are to create and promote;*
- *development which is of high quality;*
- *locally distinctive sustainable and functional development that positively enrich the environment;*
- *a sense of identity through the form and pattern of new development;*
- *appropriate innovation and new technologies;*
- *pleasant spaces and a sense of welcome through improved lighting and signage;*
- *opportunities for ease of movement for pedestrians and cyclists while ensuring road users are equally designed for;*
- *good use of the natural and built environment conserving and improving it as required; and inclusive design for the lifetime of the development.*

2.2.2. Public realm

13.2.15 For places to work and foster sustainable communities it is important that the public realm is of high quality, feels safe, is inclusive to all social groups, and adaptable to the changing needs of the community. This is achievable through: The quality of hard landscaping (paving, kerbs, walls etc); Planting Green space and green corridors should be retained, enhanced and integrated into the design of a development scheme. Lighting needs to be integral to the design, so that it is designed in and not added at the end;

- *Secure cycle parking facilities, the quantity and location of which will be dependent on their potential usage;*
- *and Public amenity space. This should be of a high standard and an adequate size for the development and needs of the community.*

2.2.3. Crime and Security

To ensure cohesive and sustainable places it is important that a sense of personal and community safety is present within the built environment. Various measures can be designed into development schemes, that can assist in discouraging crime and anti-social behaviour. Such measures include:

- *Places with well defined interconnected routes and spaces;*

- *Public and private spaces that are clearly defined;*
- *Natural surveillance, by fronting buildings e.g. play areas onto the public realm;*
- *Ensuring places and buildings have necessary well designed security features, that are not offensive in appearance and integrate into the public realm;*
- *and strategically placed effective lighting.*

Policy QE DM2 Light Pollution

Planning permission for proposals which involve outdoor lighting must be accompanied by a lighting scheme prepared according to the latest national design guidance and relevant British Standards publications. Outdoor lighting schemes will be considered against the following criteria:

- a) No adverse impact on neighbouring uses or the wider landscape, particularly with regard the South Downs International Dark Sky Reserve designation;*
- b) Light levels being the minimum required for security and working purposes;*
- c) Minimising the potential glare and spillage;*
- d) The degree to which outdoor lighting can be powered by on-site renewable sources. Where appropriate, the Local Planning Authority will seek to control the times of illumination.*

21.3.1 Similar to noise pollution, light pollution can cause sleep disturbance and annoyance and is caused by the brightening of the night sky over inhabited areas and excessive brightness from light causing high levels of glare. Dark night skies are important for health and wellbeing, the conservation of natural habitats and for cultural heritage, especially the ability to observe the stars at night.

21.3.2 In addition to impacting upon human health and natural habitats, light pollution is a sign of wasted energy from excessive lighting from high energy bulbs. The Campaign to Protect Rural England (CPRE) produced maps of the night skies in the South East in 1993 and 2000. The maps show that only 1% of the region experienced truly dark night skies and that most of Arun experienced relatively bright night skies.

21.3.3 Lighting schemes must therefore be designed carefully as part of the overall development proposal to prevent light spillage and glare. Schemes will be considered against the latest national guidance and lighting standards.

21.3.4 The Green Infrastructure Policy identifies a District wide network of green spaces and Green Infrastructure Corridors valued for their tranquillity. Tranquil spaces play a multifunctional role as part of the Green Infrastructure network. Light pollution intrudes upon intrinsically dark landscapes and nature conservation and can have an impact upon the tranquillity of a place. The Green Infrastructure policy has identified the importance of tranquil spaces which will be protected from light pollution to ensure that areas defined by their tranquillity are protected from the negative effects of light in development.

3. British Standards and Guidance

3.1. British Standards

3.1.1. The most applicable British Standards for lighting that relate to the development are:

BS EN 13201-2:2015 - *Road lighting. Performance requirements.*

BS 5489-1:2021 - Lighting of Roads and Public Amenity Areas - Code of practice.

West Sussex County Council Highways and Transport Street Lighting Specification (March 2023)

3.2. Guidance

3.2.1. **Guidance Notes for the Reduction of Obtrusive Light (Institution of Lighting Professionals GN01:2021)**

The Lighting Strategy is informed by industry guidance notes which aim to reduce the potential for obtrusive light to occur, which is typically caused by poorly designed and installed exterior artificial lighting. The Lighting Strategy is informed by the most relevant sections of GN01/21 that has recently been published to reduce the potential for obtrusive light from a wide range of exterior lighting applications.

3.2.2. **GN08:2023 Bats and Artificial Lighting in the UK – Bat Conservation Trust and Institution of Lighting Professionals.**

This document is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios. However, it is not meant to replace site-specific ecological and lighting assessments.

4. Desktop Study

4.1. Environmental Zone Classification

4.1.1. The Environmental Zone criteria detailed within **Table 1** and **Table 2** informs the basis of the Lighting Strategy. The Application Site is considered to be located within an **E2** Environmental Zone, because it is classed as sparsely inhabited rural areas, Village or relatively dark outer suburban locations. However, with the addition of the new development this may increase to an **E3**. Both aspects have been considered in this report.

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 18 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

- > 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 up to a maximum of 1.0 lux.

4.2. CPRE Night Blight Mapping

- 4.2.1. To further confirm the Environmental Zone classification, the CPRE Night Blight Mapping confirms the skyward radiance within the vicinity of the Application Site is between **1-2** Nano Watts/cm²/sr. As shown in **Figure 3**, the likely levels of skyglow within the vicinity of the Application Site are similar to those expected within an **E2** zone.

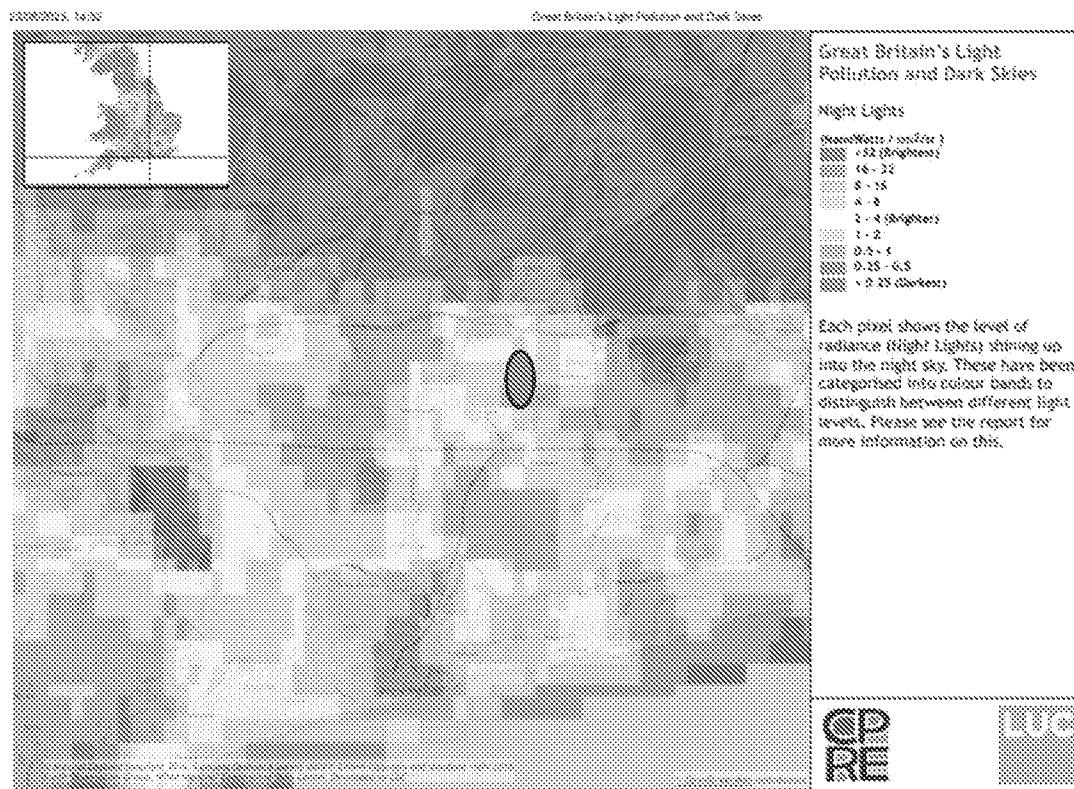


Figure 3: CPRE Night Blight Map with Westergate located by the red marker.

- 4.2.2. The CPRE Mapping data is satellite-based information and indicates upward light spill based on sky glow.
- 4.2.3. The Nightlight Map is a visual representation of light pollution as a view from above the earth's atmosphere.
- 4.2.4. CPRE Mapping data is not used in isolation and is only used to assist in concluding the environmental zone.

5. Identified Receptors

5.1. Ecological

5.1.1. The Southern and Eastern boundaries of the Application Site have been identified in ecology report *Ecological Mitigation and Enhancement Strategy, May 2017*. Therefore, this lighting strategy has been written in accordance with GN08.

5.2. Human Amenity / Safety

5.2.1. To the west of the site, Potentially Sensitive human Receptors have been identified. Therefore, this lighting strategy has been written in accordance with GN01, **Table 2 - Obtrusive Light Criteria**.



Figure 4: Potentially Sensitive Receptors Map



Figure 5: Typical Residential Lighting within the area



Figure 6: Main Road lighting near the Application Site

6.3. Baseline Survey

- 6.3.1. A baseline survey of the Application Site was undertaken during the evening of the 30th August 2023 by two lighting professionals experienced and qualified to undertake such surveys.
- 6.3.2. The conditions on the Application Site during the baseline survey were as follows:
- Astronomical Dusk: 21:10
 - Cloud Cover: Minimal
 - Moon Visibility: 100%
 - Moon Phase: Full Moon (as taken from <https://www.moonphases.co.uk/>)
 - Weather: Dry
- 6.3.3. The survey was undertaken following the onset of astronomical dusk (21:10 Hours). Weather conditions were clear and the moon was clearly visible.
- 6.3.4. Measurements were taken using a Konica Minolta T10 Illuminance Meter (serial number 36621008) which had a valid calibration certificate (certificate number: 145652) and is widely regarded as the standard instrument for providing a consistent level of accuracy at the low illuminance levels associated with site measurements in locations with typically low ambient luminance.
- 6.3.5. The results of the baseline survey show the Application site is predominantly dark and is typical of an **E2** Environmental Zone.
- 6.3.6. The results of the baseline survey are presented in **Appendix 2**.
- 6.3.7. The locations of the illuminance readings that were recorded are presented in **Appendix 3**.
- 6.3.8. Photography of the Application Site and the surrounding area was also taken during the baseline survey and is presented in **Appendix 4**. These photographs were taken with a 3 second exposure due to the dark nature of the area.
- 6.3.9. The highest vertical points measured (209 – 211) were due to a slight contribution from a nearby light, otherwise the main light contribution was from the full moon at the time the readings were taken.

7. Lighting Strategy

7.1. Areas to be lit

- 7.1.1. The Proposed Development will require lighting for safety and amenity at limited times during the hours of darkness. Lighting will be fit for purpose and sensitive to nearby human and ecological receptors.
- 7.1.2. Lighting will be of an appropriate specification and designed in accordance with British Standards.
- 7.1.3. Amenity lighting for the Proposed Development will be applied sensitively to account for the receptors identified bounding the Application Site and within the Proposed Development.
- 7.1.4. Luminaires will be used with integral LEDs and only where the luminaire photometry is available from the manufacturer. This is to safeguard the photometric footprint of the luminaires can be modelled to ensure the potential effects of light spill are minimised or mitigated.
- 7.1.5. The following criteria seeks to ensure that the lighting is not outside of the obtrusive light limits for the Environmental Zone in which the Application Site is located, is sensitive to the area, and provides a recognised standard level of lighting for all adoptable areas requiring illumination. Luminaires will distribute light downwards only to reduce the potential for light spill onto the boundaries surrounding the buildings and upwards towards the sky.
- 7.1.6. All lighting unless otherwise stated is to emit a warm white colour temperature light (3000 Kelvin or less) to reduce the potential for adverse effects onto potentially sensitive receptors. Where necessary this can be dropped to 2700 Kelvin in areas of particular sensitivity.
- 7.1.7. Lighting in adopted areas will be required in the following application areas:
 - East/West Spine Road – P2 (M4)
 - North/South Road – P3
 - Residential Roads – P4
- 7.1.8. Lighting in unadopted areas will be required in the following task areas:
 - Courtyards – P5

7.2. East/West Spine Road

7.2.1. The East/West Spine Road will be illuminated in accordance with BS 5489-1:2020 & BS EN 13201-2:2015 for amenity and safety purposes. The lowest possible lighting levels are proposed within this Lighting Strategy. The road is a single carriageway and can be considered as a moderate traffic flow. This results in a M4 lighting class which is equivalent to an P2 class for calculation purposes and to highlight pedestrian usage. **(Figure 7 and Figure 8).**

7.2.2. Lighting in this area will be designed in accordance with the West Sussex adoptable Street Lighting specification, as the intention is for this lighting to be owned and maintained by the Adopting Authority. Details of the policy relevant to this lighting strategy are set out in document West Sussex County Council Highways and Transport Street Lighting Specification Version 7.

Table A.3 --- Lighting classes for traffic routes (v s 40 mph)

Traffic flow	Lighting class		
	Dual carriageway		Single carriageway
	junction density: high	junction density: low	
High to very high ^{a)}	M2	M4	M3
Low to moderate ^{b)}	M3	M5	M4
Very low ^{c)}	M5	M6	M5

NOTE 1 High junction density would be junction centres spaced < 3 km apart. A risk assessment can determine whether some of the junctions constitute conflict areas (see A.3.2).

NOTE 2 Grey highlighting indicates situations that would not usually occur in the UK.

^{a)} High to very high traffic flow might be defined as either having an ADT of > 40 000, or where the flow exceeds 65% of the lane maximum capacity for dual or multi-lane carriageways or 45% for single carriageways.

^{b)} Low to moderate traffic flow might be defined as either having an ADT of between 7 000 and 40 000, or where the flow is between 35% and 65% for dual or multi-lane carriageways or between 15% and 45% for single carriageways.

^{c)} Very low traffic flow might be defined as either having an ADT of < 7 000, or where the flow is < 35% for dual or multi-lane carriageways or < 15% for single carriageways.

Figure 7: Performance requirements

Table A.1 — Lighting classes of comparable level

M class	E class	F class
---	C0	---
M1	C1	---
M2	C2	---
M3	C3	F1
M4	C4	F2
M5	C5	F3
M6	---	F4
---	---	F5
---	---	F6

NOTE: The data in this table are extrapolated from PD CEN/TR 11261-1:2014.

Figure 8: Equivalence Table

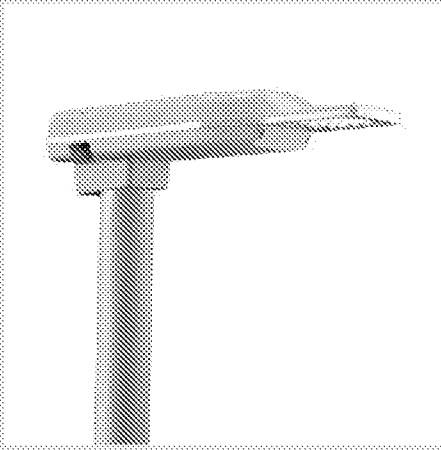
Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	3000 Kelvin
Luminaire Manufacturer	Urbis Schreder
Luminaire Model	Axia 3.1 (or similar approved luminaire)
Light Source	LED
Height	8m (maximum)
Mounting Arrangement	Post Top
Luminaire Tilt	0 Degrees
Upward Light Output Ratio (ULOR)	0%
Example Luminaire Image	
Design Class	P2 (M4)
Controls	Telensa Central Management System

Table 3: Installation and Performance Requirements

7.3. North/South Road

7.3.1. The North/South Road will be illuminated in accordance with BS 5489-1:2020 & BS EN 13201-2:2015 for amenity and safety purposes. The lowest possible lighting levels are proposed within this Lighting Strategy and is taken to be a P4 lighting class. However, when the risks assessment has been checked this has been increased to a P3 lighting class due to the traffic composition and this road is a link between the East-West Spine road and the residential roads.

7.3.2. Performance requirements for the housing estate access road (North-South) are outlined in **Figure 9**.

Lighting classes for subsidiary roads

Traffic flow	Lighting class		
	E1 to E4 ⁽¹⁾	E1 to E2 ⁽²⁾	E3 to E4 ⁽³⁾
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy ⁽⁴⁾	P5	P4	P3
Normal ⁽⁵⁾	P5	P5	P4
Quiet ⁽⁶⁾	P6	P5	P4

NOTE 1 Table A.5 assumes no parked vehicles; see risk assessment in A.3.3.2

NOTE 2 An EV lighting class using vertical illuminance, from BS EN 13201-2:2015, Table 6, can be specified in addition to the general lighting class when there are particular concerns about crime and personal safety. EV is calculated at the typical height of a human face (1.5 m) and in relevant viewing orientations.

NOTE 3 To ensure adequate uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 The actual overall uniformity of illuminance, U_o , needs to be as high as reasonably practicable (see Z.2.6).

NOTE 5 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP GN01 [N2].

NOTE 6 The illuminance classes are suggested minimum levels. A risk assessment needs to be carried out to ensure that the light levels are adequate, particularly for pedestrians and cyclists.

⁽¹⁾ Environmental zone, as given in ILP GN01 [N2].

⁽²⁾ Busy traffic flow refers to areas where the traffic usage is high and can be associated with local amenities such as clubs, shopping facilities, public houses, etc.

⁽³⁾ Normal traffic flow refers to areas where the traffic usage is of a level equivalent to a housing estate access road.

⁽⁴⁾ Quiet traffic flow refers to areas where the traffic usage is of a level equivalent to a residential road, and is mainly associated with the adjacent properties or properties on other equivalent roads accessed from this road.

Figure 9: Performance Requirements

- 7.3.3. Lighting in this area will be designed in accordance with the West Sussex adoptable Street Lighting specification, as the intention is for this lighting to be owned and maintained by the Adopting Authority. Details of the policy relevant to this lighting strategy are set out in document West Sussex County Council Highways and Transport Street Lighting Specification Version 7.

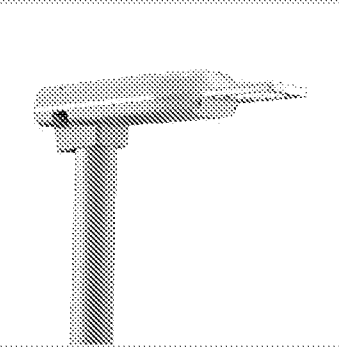
Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	3000 Kelvin
Luminaire Manufacturer	Urbis Schreder
Luminaire Model	Axia 3.1 (or similar approved luminaire)
Light Source	LED
Height	6m / 8m
Mounting Arrangement	Post Top
Luminaire Tilt	0 Degrees
Upward Light Output Ratio (ULOR)	0%
Example Luminaire Image	
Design Class	P3
Controls	Telensa Central Management System

Table 4: Installation and Performance Requirements

7.4. Residential Road(s)

7.4.1. The residential roads will be illuminated in accordance with BS 5489-1:2020 & BS EN 13201-2:2015 for amenity and safety purposes. The lowest possible lighting levels are proposed within this Lighting Strategy. Although the area is currently an **E2** zone the new development may increase this to **E3**. Therefore, the lighting level has been chosen for an **E3** as this can be dimmed initially and increased when necessary.

7.4.2. Performance requirements for the courtyard(s) are outlined in **Figure 10**.

Table A.5 — Lighting classes for subsidiary roads

Traffic flow	Lighting class		
	E1 to E4 ⁽¹⁾	E1 to E2 ⁽²⁾	E3 to E4 ⁽²⁾
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy ⁽³⁾	P5	P4	P3
Normal ⁽³⁾	P5	P5	P4
Quiet ⁽³⁾	P6	P5	P4

NOTE 1 Table A.5 assumes no parked vehicles; see risk assessment in A.3.3.2.

NOTE 2 An EV lighting class, using vertical illuminance, from BS EN 13201-2:2015, Table 6, can be specified in addition to the general lighting class when there are particular concerns about crime and personal safety. EV is calculated at the typical height of a human face (1.5 m) and in relevant viewing orientations.

NOTE 3 To ensure minimum uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 The actual overall uniformity of illuminance, U_{a} , needs to be as high as reasonably practicable (see Z.2.6).

NOTE 5 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP CEN1 (N2).

NOTE 6 The illuminance classes are suggested minimum levels. A risk assessment needs to be carried out to ensure that the light levels are adequate, particularly for pedestrians and cyclists.

Figure 10: Performance Requirements

Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	3000 Kelvin
Luminaire Manufacturer	Urbis Schreder
Luminaire Model	Axia 3.1 (or similar approved luminaire)
Light Source	LED
Height	6m (maximum)
Mounting Arrangement	Post Top
Luminaire Tilt	0 Degrees
Upward Light Output Ratio (ULOR)	0%

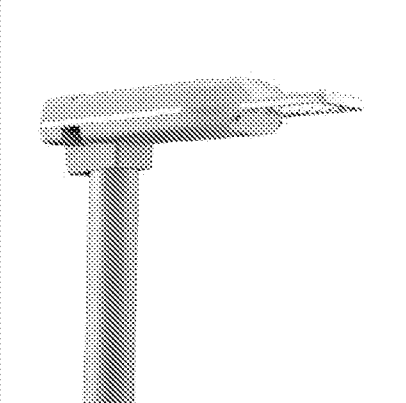
Example Luminaire Image	
Design Class	P4
Controls	Telensa Central Management System

Table 5: Installation and Performance Requirements

7.5. Courtyard(s)

7.5.1. The Courtyards will be illuminated in accordance with BS 5489-1:2020 & BS EN 13201-2:2015 for amenity and safety purposes. The lowest possible lighting levels are proposed within this Lighting Strategy. This results in a P4 however when the area is risk assessed this can be dropped to a P5 lighting class as the task complexity is very low.

7.5.2. Performance requirements for the courtyard(s) are outlined in **Figure 12**.

Table A.5 — Lighting classes for subsidiary roads

Traffic flow	Lighting class		
	E1 to E4 ⁽¹⁾	E1 to E2 ⁽²⁾	E3 to E4 ⁽³⁾
	Pedestrian and cyclists only	Speed limit $v \leq 30$ mph	Speed limit $v \leq 30$ mph
Busy ⁽⁴⁾	P5	P4	P3
Normal ⁽⁵⁾	P5	P5	P4
Quiet ⁽⁶⁾	P5	P5	P4

NOTE 1 Table A.5 assumes no parked vehicles; see risk assessment in A.3.3.2.

NOTE 2 An EV lighting class, using vertical illuminance, from BS EN 13201-2:2015, Table 6, can be specified in addition to the general lighting class when there are particular concerns about crime and personal safety. EV is calculated at the typical height of a human face (1.5 m) and in relevant viewing orientations.

NOTE 3 To ensure adequate uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 The actual overall uniformity of illuminance, U_0 , needs to be as high as reasonably practicable (see 2.2.6).

NOTE 5 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP GN01 (N2).

NOTE 6 The illuminance classes are suggested minimum levels. A risk assessment needs to be carried out to ensure that the light levels are adequate, particularly for pedestrians and cyclists.

Figure 11: Performance Requirements

Equipment Specification	Description
Correlated Colour Temperature (Kelvin)	3000 Kelvin
Luminaire Manufacturer	Urbis Schreder
Luminaire Model	Axia 3.1 (or similar approved luminaire)
Light Source	LED
Height	5m (maximum)
Mounting Arrangement	Post Top
Luminaire Tilt	0 Degrees
Upward Light Output Ratio (ULOR)	0%

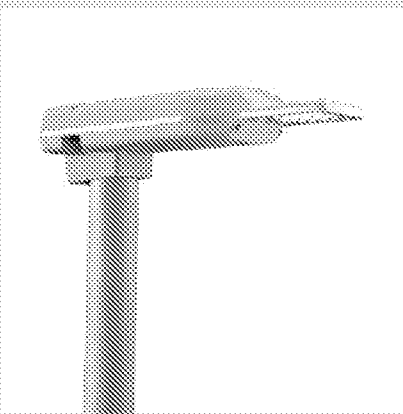
Example Luminaire Image	
Design Class	P5
Controls	PECU if not adopted)

Table 6: Installation and Performance Requirements

8. Summary of Results

8.1. Light Spill Diagram

- 8.1.1. The Light Spill Diagram shown in **Appendix 1** demonstrates that the Light Spill Levels associated with the proposed lighting would comply with the obtrusive light guidance set out in ILP GN01, at sensitive receptors.
- 8.1.2. To ensure the worst-case scenario has been modelled, the highest potential light levels have been modelled / presented in the light spill diagram, with the project maintenance factors set at MF = 1.0. This demonstrates the light levels at their highest (initial light levels at the start of luminaire life).
- 8.1.3. The proposed lighting within the task area(s) is compliant to the relevant policies, standards, and guidance.



Appendix 1 – Light Spill Diagram

2976-DFL-ELG-XX-LD-EO-13001-S3-P01.pdf

Appendix 2 – Results of Baseline Survey

Point number	Eh	Ev North	Ev East	Ev South	Ev West
	Ground				
	Horizontal		Vertical Levels		
148	0.02	0.00	0.03	0.02	0.00
149	0.02	0.00	0.04	0.02	0.01
150	0.00	0.01	0.02	0.01	0.01
151	0.01	0.01	0.02	0.01	0.01
152	0.01	0.00	0.02	0.02	0.01
154	0.02	0.01	0.01	0.02	0.01
155	0.06	0.02	0.00	0.41	0.18
156	0.00	0.01	0.05	0.02	0.00
157	0.02	0.02	0.09	0.07	0.01
158	0.02	0.02	0.15	0.05	0.01
159	0.03	0.01	0.13	0.05	0.01
160	0.03	0.02	0.11	0.05	0.02
161	0.02	0.01	0.03	0.03	0.02
162	0.04	0.02	0.14	0.06	0.06
163	0.05	0.04	0.13	0.07	0.03
164	0.02	0.11	0.02	0.02	0.06
165	0.06	0.01	0.15	0.11	0.01
166	0.06	0.02	0.12	0.12	0.06
167	0.06	0.02	0.14	0.11	0.02
168	0.07	0.02	0.13	0.13	0.02
169	0.08	0.02	0.13	0.13	0.01
170	0.08	0.02	0.12	0.11	0.02
171	0.07	0.02	0.15	0.11	0.02
172	0.09	0.01	0.15	0.13	0.02
173	0.08	0.01	0.15	0.13	0.01
174	0.02	0.01	0.12	0.12	0.02
175	0.02	0.01	0.05	0.04	0.02
176	0.01	0.00	0.00	0.00	0.02
177	0.03	0.01	0.09	0.09	0.01
178	0.01	0.01	0.01	0.01	0.01
179	0.07	0.01	0.15	0.11	0.03
180	0.08	0.01	0.10	0.15	0.01
181	0.05	0.01	0.03	0.07	0.01
182	0.02	0.20	0.16	0.02	0.01
183	0.04	0.24	0.56	0.19	0.02
184	0.07	0.02	0.13	0.13	0.06
185	0.07	0.02	0.13	0.11	0.02

186	0.07	0.02	0.16	0.12	0.02
187	0.06	0.02	0.13	0.12	0.02
188	0.07	0.02	0.15	0.12	0.02
189	0.03	0.02	0.04	0.03	0.02
190	0.11	0.00	0.10	0.20	0.02
191	0.08	0.02	0.15	0.16	0.02
192	0.07	0.03	0.10	0.18	0.03
193	0.06	0.02	0.08	0.16	0.01
194	0.08	0.02	0.09	0.15	0.02
195	0.07	0.02	0.10	0.17	0.01
196	0.07	0.02	0.13	0.16	0.02
197	0.02	0.01	0.03	0.04	0.00
198	0.01	0.02	0.07	0.21	0.02
199	0.04	0.02	0.07	0.08	0.00
200	0.00	0.02	0.00	0.00	0.01
201	0.02	0.02	0.02	0.05	0.01
202	0.09	0.02	0.09	0.21	0.02
203	0.11	0.02	0.14	0.23	0.00
204	0.10	0.02	0.13	0.18	0.02
205	0.12	0.02	0.13	0.19	0.02
206	0.10	0.01	0.17	0.16	0.01
207	0.12	0.01	0.20	0.19	0.01
208	0.10	0.02	0.02	0.21	0.03
209	0.13	0.03	0.07	0.24	0.04
210	0.12	0.03	0.16	0.23	0.04
211	0.09	0.03	0.12	0.27	0.18
212	0.09	0.02	0.11	0.12	0.00
213	0.09	0.03	0.12	0.21	0.03
214	0.13	0.02	0.11	0.18	0.03
215	0.13	0.03	0.09	0.19	0.03
216	0.09	0.02	0.09	0.16	0.00
217	0.04	0.02	0.02	0.00	0.01
218	0.08	0.02	0.06	0.11	0.01
219	0.08	0.02	0.06	0.12	0.01
220	0.07	0.02	0.04	0.13	0.02
221	0.09	0.02	0.04	0.15	0.02
222	0.10	0.05	0.13	0.14	0.04
Maximum		0.56			
Minimum		0.00			
Average		0.07			

Table 7: Illuminance Readings Results

Appendix 3 – Locations of Readings

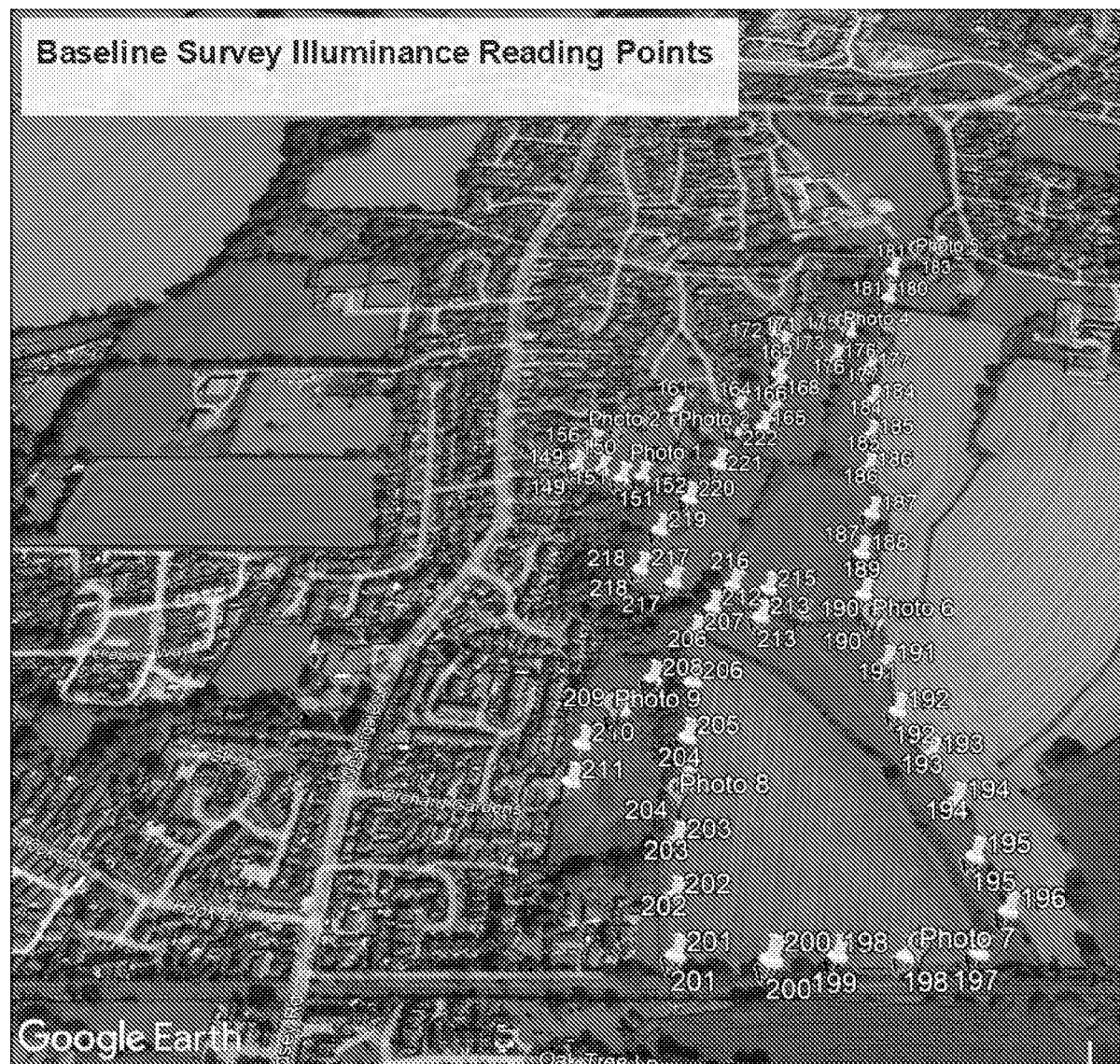


Figure 12: Location Points

Appendix 4 – Photographs of Application Site

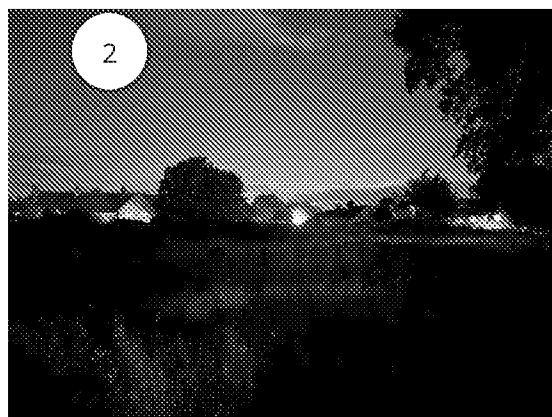


Figure 13: Photos 1 and 2 of North and East View

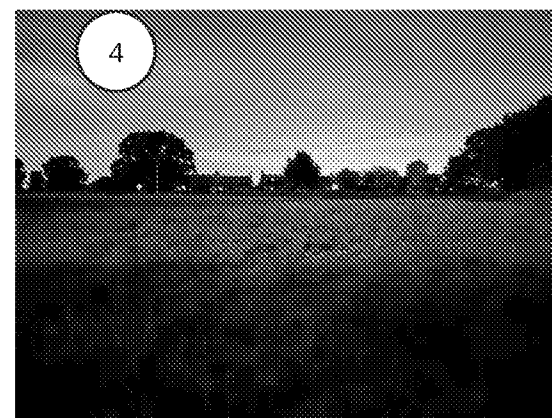
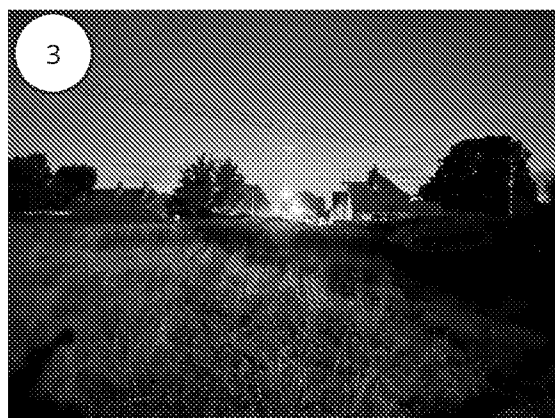


Figure 14: Photo 3 North, Photo 4 Southwest



Figure 15: Photo 5 North East Photo 6 West



Figure 16: Photo 7 Northwest Photo 8 East

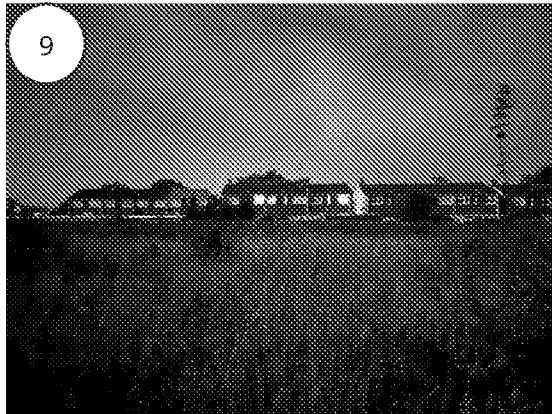


Figure 17: Photo 9 West