



## BEECHLANDS ROAD, MEDSTEAD

Outline Application - Lighting Rev B

25 April 2024

# PROJECT OVERVIEW - INTRODUCTION

1040.CRPT.01 REV B

## INTRODUCTION

This document provides an overview for the lighting considerations to support the Outline Application for the new residential development at Beechlands Road, Medstead. Key points for consideration throughout the design process include, but are not limited to:

- Functionality
- Maintenance
- Safety
- Aesthetics
- Ecology
- Dark Sky Considerations

The principal objective is to ensure the lighting scheme complies and aligns itself to the surrounding area.

The lighting strategy will need to be mindful of the ecology of the area and take into account the considered principles of Responsible Outdoor Lighting At Night (ROLAN).

## ROLAN PRINCIPLES

ROLAN (Responsible Outdoor Lighting at Night) sets out the following core principles for external illumination:



### Useful

- All lighting should have a clear purpose. Before installing or replacing a light, determine if the light is needed. Consider how the use of light will impact the area, including wildlife and the environment



### Targeted

- Lighting should be directed only to where needed. Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.



### Low Light Levels

- Light should be no brighter than necessary. Use the lowest light level required. Be mindful of surface conditions as some surfaces may reflect more light into the night sky than intended.



### Controlled

- Light should only be used when it is useful. Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.



### Colour

- Use warmer colour temperature lights where possible. Limit the amount of short wavelength (blue-violet) to the least amount needed.



# EXISTING SITE OVERVIEW - PERIMETER

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**SITE ENTRY**



**ADJACENT ROADWAY**



**ADJACENT ROADWAY**



**REAR EDGE OF SITE**

# EXISTING SITE OVERVIEW - INTERIOR



# ANALYSIS OF SURROUNDING AREAS

## ADJACENT NEIGHBOURHOOD LIGHTING

Lighting to the site shall blend in to the existing surrounding neighbourhood, applying the same lighting principles as the adjacent development. Lighting to this area is minimal, as noted in the below images:



### ROADWAY LIGHTING

No roadway lighting exists in the adjacent residential development.



### EXTERIOR HOME LIGHTING

Very little exterior lighting exists on the front facade of existing homes in the adjacent development. Where lighting exists, it is mostly contained to beneath entry overhangs.

## PROXIMITY TO SOUTH DOWNS NATIONAL PARK DARK SKY RESERVE

While the site does not sit within the boundaries of the South Downs National Park Dark Sky Reserve, the lighting for a dark sky compliant scheme that adheres to ROLAN principles should be implemented due to close proximity to this zone. Best practice principles should be followed to ensure good lighting that reduces light pollution and its impact on dark skies.

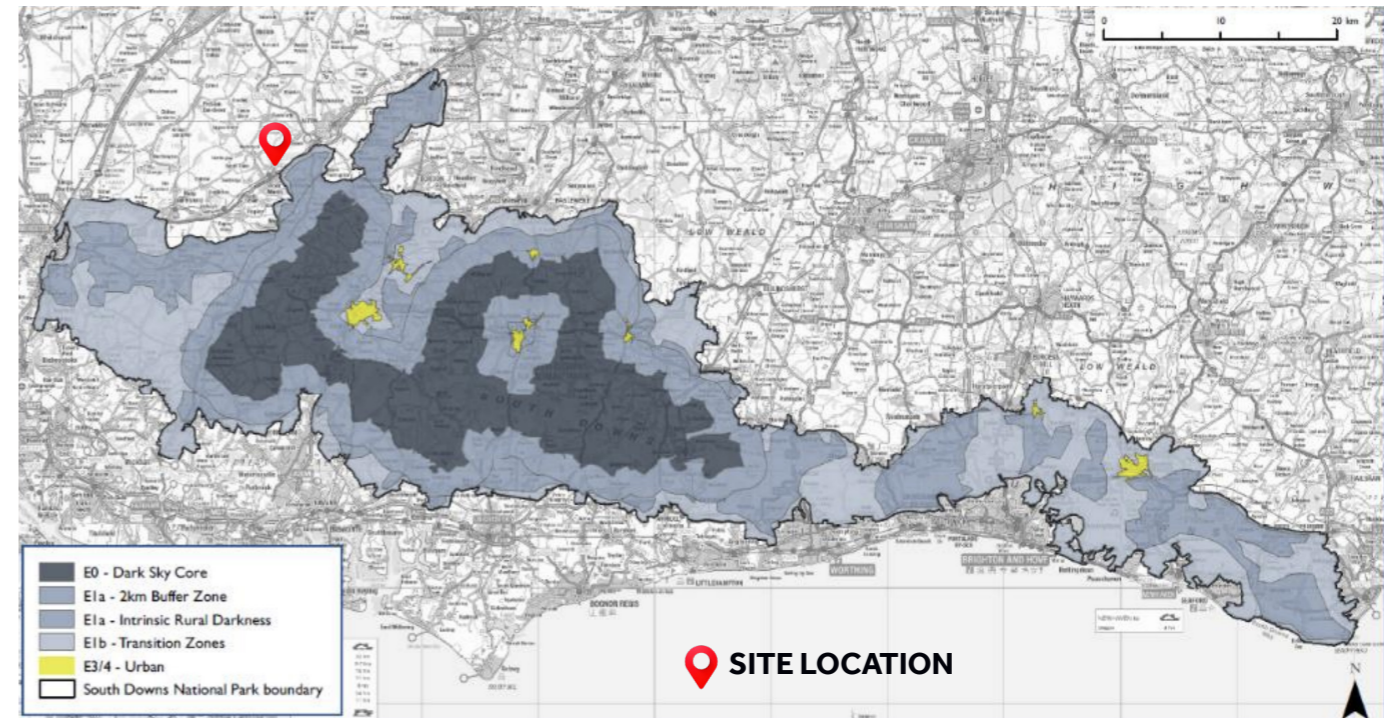


Image from "South Downs National Park Dark Skies Technical Advice Note 2018"

## ECOLOGY

If not correctly designed, artificial lighting can have a negative impact on the ecology of a site. This is usually caused by light spill from a site into the surrounding area.

Ecological issues will be a key consideration for the lighting of this site, in particular as this site is adjacent to the South Downs National Park Dark Sky Reserve.

All lighting shall be designed to minimise light pollution with particular attention to the sensitive nature of the site ecology. By minimising light spill, the impact on surrounding wildlife is mitigated.

Review of the area by the ecology consultant has identified the highlighted boundaries of greatest importance for bat foraging and commuting activity. Particular attention shall be paid to the southern H1 / H2 hedge junction due to records of a rare bat species.:



## LIGHTING FOR BATS

Due to the decline of bat numbers and the importance of roost requirements and commuting corridors in their nocturnal feeding activity, their roost sites are fully protected under international and domestic legislation, under the Conservation of Habitats and Species Regulations 2017. It is therefore illegal to cause disturbances that affects populations of bats. They are further protected under the Wildlife and Countryside Act 1981.

## NEGATIVE IMPACTS OF LIGHTS

- Roosts - Lighting in the vicinity of a bat roost can cause disturbance and potential abandonments of the roost, constituting an offence to a bat population or individual. Light falling on the roost access point can delay their emerging and shorten their feeding time.
- Insects - artificial sources in a dark environment, especially emitting a UV component, can attract insects such further afield drawing them from bat feeding areas reducing numbers in those areas.
- Bat Predators - Avian predators usually active at daytime, such as kestrels have been reported hunting bats at night in artificial lighting conditions.
- Commuting - River corridors and woodland edges are often used by 'commuting' bats as feeding territories, so it benefits them hugely to leave these areas unlit.

## BAT CONSERVATION TRUST RECOMMENDATIONS

- Avoid lighting key habitats and features all together.
- No illumination on roost entrances, flight paths, associated features used by bats or rare species adverse to light.
- Mitigate lighting to a minimum, set dark habitat buffers and acceptable lux limits with ecologist guidance.
- Demonstrate compliance with lux limits and buffers, using lighting calculations and baseline surveys.
- Post completion bat monitoring.

# ENVIRONMENTAL CONSIDERATIONS

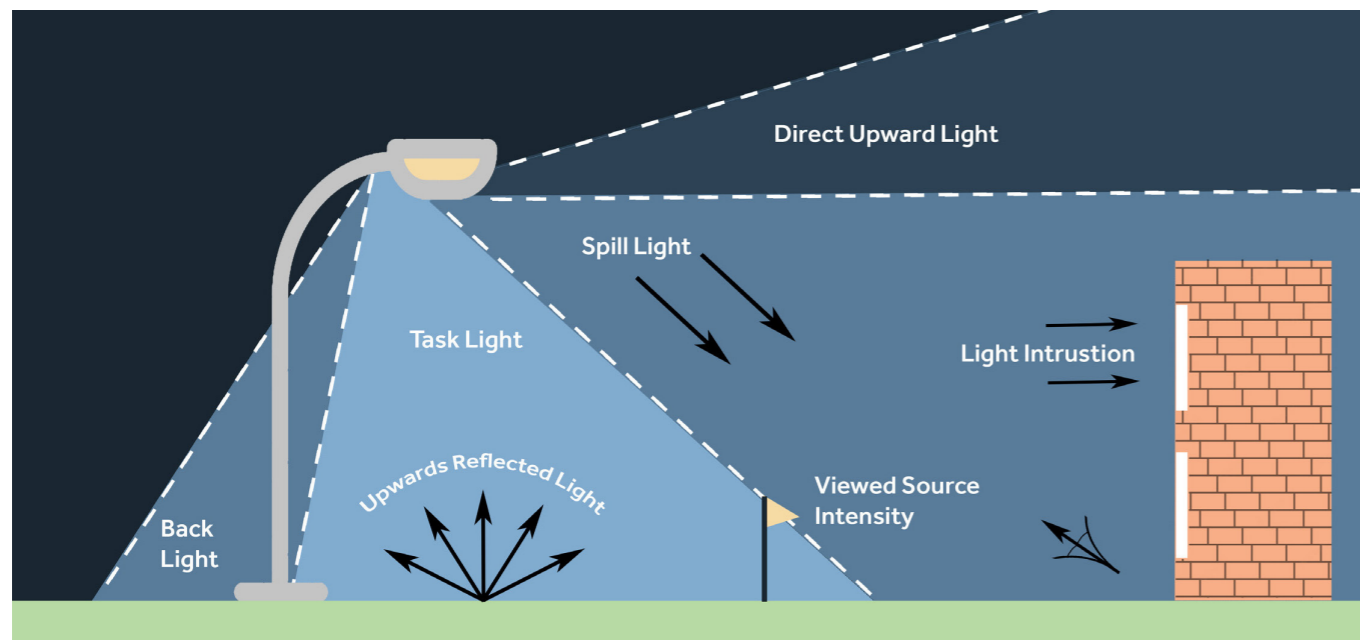
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## LIGHT POLLUTION

Light pollution is the inappropriate or excessive use of artificial light. This can have serious environmental consequences for humans, wildlife, and our climate. Components of light pollution include:

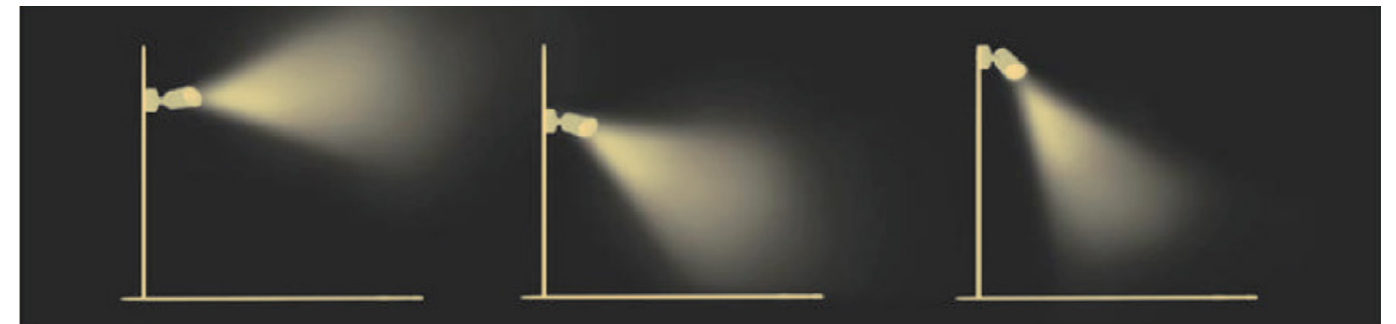
1. Spill light (back light, upwards reflected light, and direct upward light), which is light emitted by a lighting installation that falls outside the boundaries of the property or object for which the lighting is designed.
2. Sky glow, the brightening of the night sky; the uncomfortable brightness of a light source when viewed against a darker background (glare); the spilling of light beyond the boundary of the area being lit (light spill); and light intrusion are all forms of obtrusive light which may cause nuisance to others, or adversely affect fauna and flora as well as waste money and energy.
3. Light trespass / nuisance light, which is a special case of spill light when light spills onto surrounding properties. An additional form of light trespass is when the direct view of brights luminaires from normal viewing directions cause annoyance, distraction, or discomfort.

Obtrusive light is as nuisance to both humans and wildlife, it is a waste of energy, and contributes to greenhouse gas emissions. When specifying luminaires, the lighting designer should carefully consider minimising upward light and the use of optical units with precise light intensity distribution: thus ensuring that spill and glare are minimised.

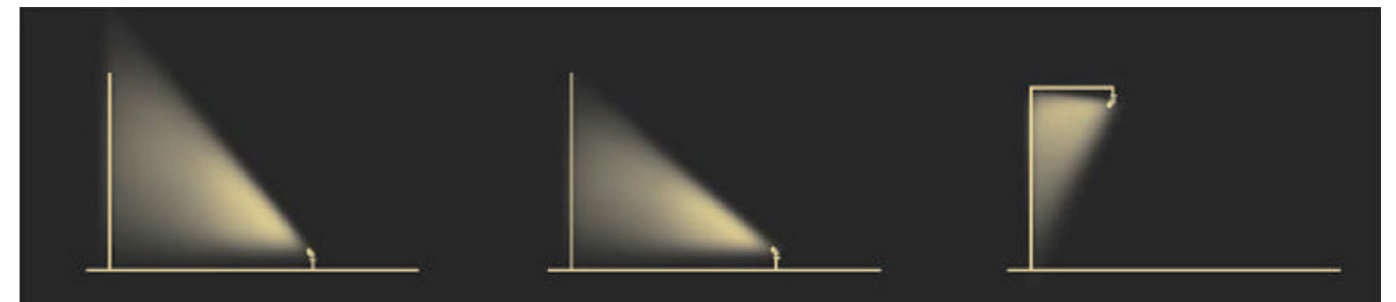


## LUMINAIRE POSITIONING AND DIRECTION

Luminaires are positioned to avoid uplighting where possible. Where practical directional luminaires are utilized to enable precise projection of light. Proper commissioning will ensure directional luminaires perform as intended. During the design phase of a lighting installation, over-lighting is avoided by conducting thorough calculations and carefully selecting the most appropriate lighting equipment and lamp types. Additionally, a lighting control performance specification is produced to ensure luminaires are only switched on when deemed necessary.



✗ POOR INSTALLATION    ✓ GOOD INSTALLATION    ✓ BEST INSTALLATION



✗ POOR INSTALLATION    ✓ GOOD INSTALLATIONS

# ENVIRONMENTAL CONSIDERATIONS

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## LIGHTING ACCORDING TO ENVIRONMENTAL ZONE

The Commission Internationale de l'Eclairage (CIE) has outlined four environmental zones to establish a basis for outdoor lighting regulations (CIE 1997). The environmental zoning rating can be used to help ensure that the lighting goals of an environment are appropriately defined and met, but not exceeded.

- E1: Intrinsically dark landscapes  
National Parks, Areas of Outstanding Natural Beauty
- E2: Low district brightness areas**  
**Rural, small village, or relatively dark urban locations**
- E3: Medium district brightness areas  
Small town centres or urban locations
- E4: High district brightness areas  
Town/city centres with high levels of night time activity

The CIE gives recommendations for pre-curfew and post-curfew light levels to limit light trespass. Pre-curfew is from dusk until 11:00 p.m. local time, when the area being illuminated is more likely to be in use. Post-curfew is from 11:00 p.m. to 7:00 a.m. local time. Curfew times may differ from location to location and should be cross checked with all local guidelines and responsible bodies to ensure compliance.

Environmental zone	Light on properties		Luminaire intensity		Upward light	Luminance	
	$E_v$		$I$		$ULR$	$L_b$	$L_s$
	lx		cd		%	cd·m <sup>-2</sup>	cd·m <sup>-2</sup>
	Pre curfew <sup>(4)</sup>	Post curfew	Pre curfew	Post curfew		Building	Signs
E1	2	0 <sup>(6)</sup>	2500	0	0	0	50
E2	5	1	7500	500	0.05	5	400
E3	10	2	10 000	1000	0.15	10	800
E4	25	5	25 000	2500	0.25	25	1000

<sup>(4)</sup> In case no curfew regulations are available, the higher values shall not be exceeded and the lower values should be taken as preferable limits.  
<sup>(6)</sup> If the luminaire is for public (road) lighting, then this value may be up to 1 lx.



## PERFORMANCE CRITERIA

For the new development at Beechland Road, a number of lighting design criteria and parameters shall be considered during the design process. These include but are not limited to:

- Environmental conditions
- Energy efficient and high quality light sources
- Illumination effect upon materials and surfaces
- Light spill and light pollution
- Lighting controls
- Longevity of design over time
- Initial capital costs (supply and install)
- Ease and cost of ongoing of maintenance

## PROFESSIONAL GUIDELINES

The following mandatory, legislative and regulatory requirements based upon British Standards, Codes of Practice and Best Practice professional guidance publications will form the parameters of the lighting installations.

- BS EN 60598-1:2015 Luminaires – general requirements and tests (BSI)
- LG06/16 Lighting Guide 06: The Exterior Environment - LG6 (CIBSE, 2016)
- Factfile 7 - Design and Assessment of Exterior Lighting (SLL/CIBSE, 2011)
- CIE 136-2000 - Guide to the Lighting of Urban Areas (CIE, 2000)
- CIE 126-1997 - Guidelines for Minimising Sky Glow (CIE, 1997)
- LGLOL SLL Guide to Limiting Obtrusive Light (CIBSE/SLL, 2012)
- CIE 150:2017 - Technical Report, Guide to the Limitation of the Effects of Obtrusive Light From Outdoor Lighting Installations (CIE, 2017)
- GN01:2011 - Guidance Notes for Reduction of Obtrusive Light (ILP, 2011)

## COLOUR CONSISTENCY

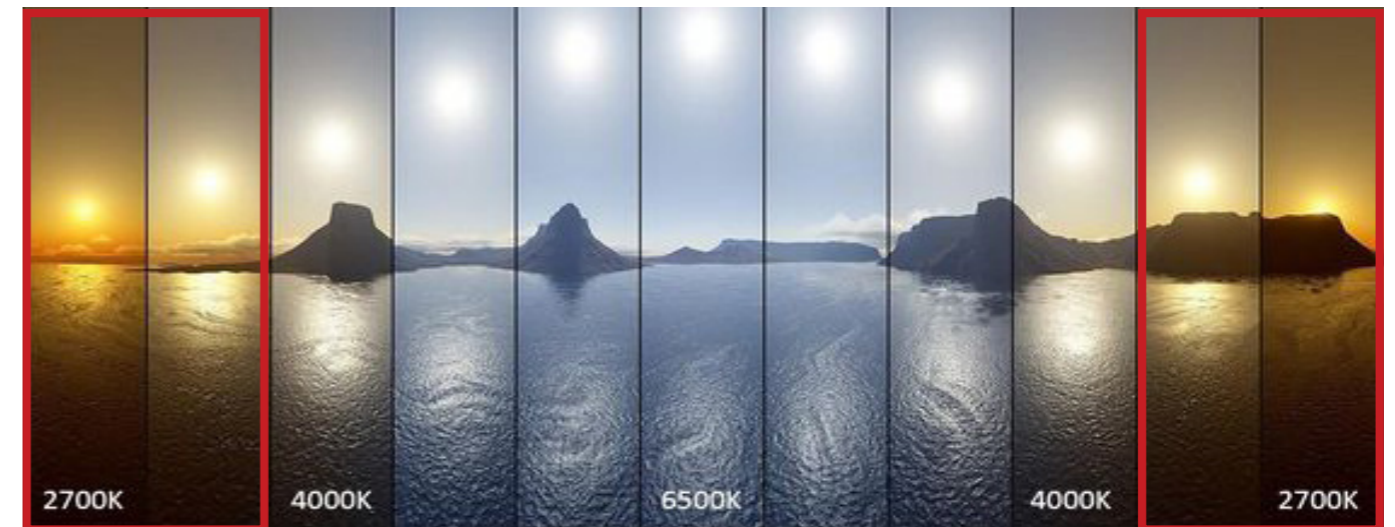
Colour properties of lamps may change over the life of the lamp. Colour stability describes the ability of a light source to maintain its colour properties over time. One MacAdam ellipse (SDCM) describes the colour space within which the human eye cannot perceive a colour difference. In practice, colour differences from light sources with two or fewer SDCM steps are barely visible.

Good quality LED chips have limited colour shift over the life of the product and, if the development is to maintain its aesthetic quality, it is important that such colour consistency is considered.

## COLOUR TEMPERATURE

The colour temperature of a light source is conventionally stated in the unit of absolute temperature, Kelvin, having the unit symbol 'K'. Temperatures above 4000K are cool in colour, with bluish white light, while colour temperatures around 3000K are more neutral white in tone, providing a modern feel. Colour temperatures in the 2400K-2700K range have a warmer effect, creating a traditional atmosphere.

For the purpose of this report, any lighting deemed necessary for the new development at Beechlands Road will consider a warm colour temperature range (2400K-3000K).



Colour temperature throughout the day

## COLOUR RENDERING

CRI (Colour Rendering Index) measures the ability of a light to truly reveal the colours of various objects faithfully in comparison with an ideal or natural light source.

CRI of different light sources can vary greatly, with lamp sources such as low-pressure sodium (used in streetlights) being particularly poor (CRI40). Fluorescent lamp sources are of an average rating (CRI70-90) and metal halide and incandescent lamps have an excellent rating (CRI95-100). LEDs, the primary source on the project, generally have a very good rating (CRI80-97).



Higher colour rendition.....Lower colour rendition

## GENERAL GUIDELINES

Lighting placed within the new development shall adhere the following guidelines:

### Overall Development:

- No street lighting to be allowed within development in order to reflect the surrounding environment as outlined.
- Adhere to ROLAN (Responsible Outdoor Lighting at Night) principles.

### Front of Home:

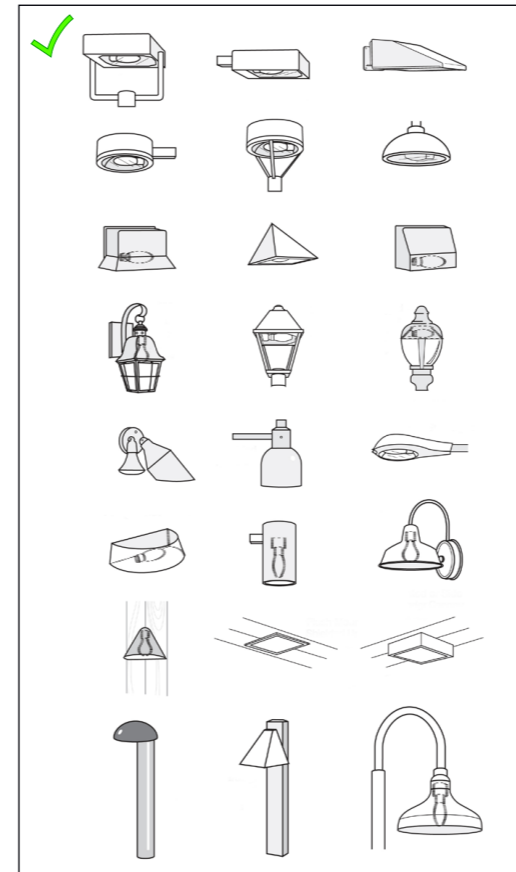
- Minimal use of light fittings only where needed, for example at the front door or garage.
- Indicative lux levels to be no more than 5 lux and not spill beyond the property line.
- Light fittings must be fully shielded and positioned downward to reduce the amount of upward light spill.
- Consideration shall be given to internal lighting with respect to light spill, i.e. the use of window treatments at night to block interior lighting.
- Use proximity sensors or timers to allow lighting to only come on when movement is sensed or during certain hours.
- Adhere to ROLAN (Responsible Outdoor Lighting at Night) principles.

### Back Gardens:

- Indicative lux levels to be no more than 5 lux and not spill beyond the property line.
- Light fittings must be fully shielded and positioned downward to reduce the amount of upward light spill.
- Garden lighting to be low powered and below the eye level.
- Adhere to ROLAN (Responsible Outdoor Lighting at Night) principles.

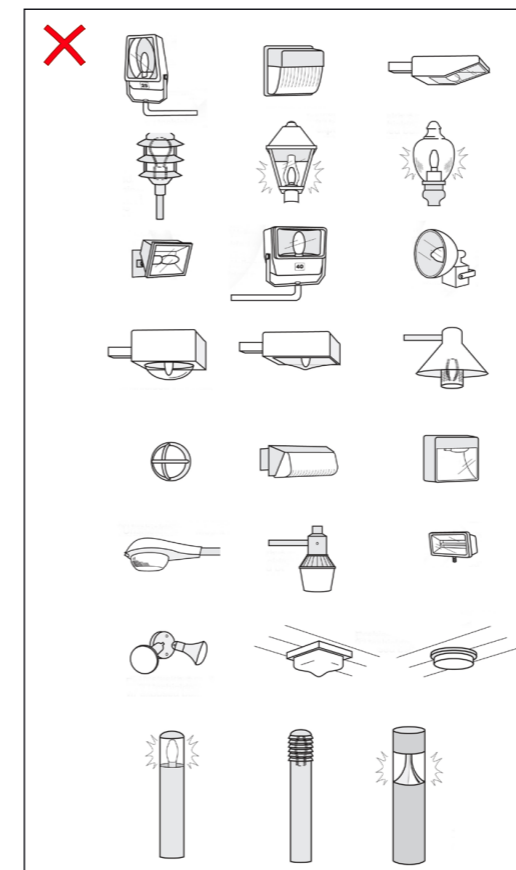
## CONCLUSION

If the guidelines and recommendations within this report are followed then there will not be an adverse impact from artificial lighting to the ecology of the area, the surrounding nightscape, or neighbouring Dark Sky Reserve.



Acceptable luminaires for avoiding light pollution, sky glow and light trespass include:

- Fully shielded wall mounted fixtures
- Fully shielded pole mounted fixtures with controlled beams
- Full cut-off street lights with asymmetric light distribution
- Flush mounted or side shielded under-canopy fixtures
- Shielded and properly focused PAR floodlights
- Fully shielded barn lights
- Fully shielded/ directional walkway bollards



Examples of unacceptable luminaires are:

- Unshielded/ poorly-shielded floodlights with no beam control
- Unshielded wall lights
- Drop lens or sag lens fixtures
- Luminaires with exposed bulbs/ refractor lens
- Louvered marine style fixtures
- Drop lens canopy fixtures
- Unshielded barn lights
- Unshielded walkway bollards

**THANK YOU**

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