

LIGHT MANAGEMENT PLAN

River Murray Dark Sky Reserve

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INTRODUCTION

This Light Management Plan has been developed to ensure that the proposed "River Murray Dark Sky Reserve" satisfies the criteria set by the International Dark Sky Association and should be read in conjunction with the Dark Sky Policy adopted by the Mid Murray Council. The Plan is required to ensure that the already naturally dark sky in this region is not only protected, but also further enhanced, through various measures, including lighting education programs, a reduction in the number of lights and modifications to existing outdoor light fittings and globes. The "River Murray Dark Sky Reserve" is a community project, largely driven by Mid Murray Landcare SA Inc.

AIMS

The aims of this Light Management Plan are –

- 1) To raise community awareness of the "River Murray Dark Sky Reserve" and seek their assistance in maintaining the Dark Sky.
- 2) To ensure that Council, other Government bodies and private landholders within the "River Murray Dark Sky Reserve" understand how they can assist in preserving, enhancing and promoting the Dark Sky Reserve concept.
- 3) To ensure all new public lighting meets International Dark Sky Standards.
- 4) To retrofit existing outdoor public lighting to meet the International Dark Sky standards.

This Light Management Plan conforms to all local, regional and national legislation. It provides additional policy not mentioned in the following legislation:

1. The Development Act 1993 and Development Regulations 2008.
2. The Mid Murray Council Development Plan.
3. Australian Standards for public lighting AS 4282 (Control of the obtrusive effects of outdoor lighting), AS 1158 (Lighting for roads and public spaces) and AS 2560 (Sports lighting).

WHERE THIS DOCUMENT APPLIES

This document applies to the geographical area to be known as the "River Murray Dark Sky Reserve". As shown in figure 1, this area spans between the eastern and western borders of the Mid Murray Council area and includes the southern portion of the Council area (excluding Mannum). The northern boundary of the reserve includes the township of Blanchetown.

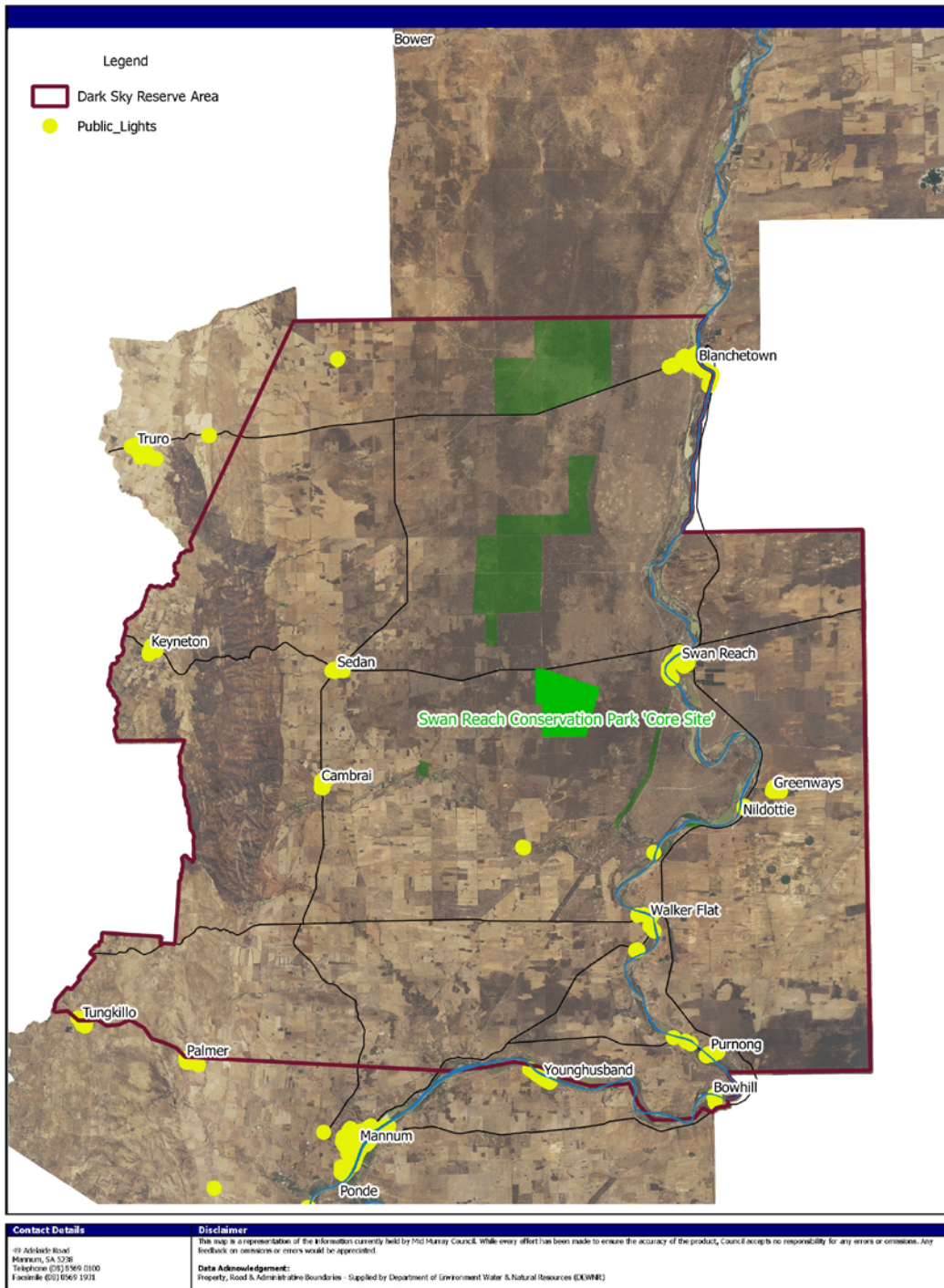


Figure 1: Map of Mid Murray Dark Sky Reserve

WHY A DARK SKY?

Light pollution has a detrimental effect on the ability to view the night sky and poses a threat to the native fauna and flora. Excess lighting impacts on nocturnal animals and unnecessarily wastes energy. The Dark Sky Reserve aims to preserve, protect and enhance the night sky of the Mid Murray region.

WHAT IS GOOD LIGHTING?

Good lighting directs light where it is needed, does not cause glare and is only needed for its intended use. Good lighting does not shine above a horizontal plane and is appropriately contained so that it does not cause nuisance to neighbours.

EXISTING LIGHTING IN THE MID MURRAY DARK SKY RESERVE

There is a wide variety of existing outdoor lighting within the “River Murray Dark Sky Reserve”. A positive aspect of the location of this Reserve is that it is in an area which is not subject to large development pressures, and therefore it is unlikely any new substantial arrays of lighting will be developed in this area in the coming years.

Conservation Parks

There are five conservation parks within the Dark Sky Reserve area; Swan Reach Conservation Park, Marne Valley Conservation Park, Ridley Conservation Park, Brookfield Conservation Park and Ngaut Nguat Conservation Park. The Swan Reach Conservation Park is the core site of the reserve. Development is restricted in these sites for conservation purposes. There is no current outdoor lighting in the conservation parks.

Ferries

There are three ferries which operate within the Reserve area 24 hours a day. Ferries operate at Walker Flat, Purnong and Swan Reach. Due to safety requirements, the lighting on these ferries is required to be bright. These lights will be retrofitted to meet the International Dark Sky Standards for outdoor lighting within 10 years of Dark Sky Accreditation.

Shack areas and Townships

Street lights are located within some shack areas and townships in the Dark Sky Reserve. All street lighting in these areas will be retrofitted to meet the International Dark Sky Standards for outdoor lighting within 10 years of Dark Sky Accreditation.

Commercial properties

As the area contains some commercial operations, some level of commercial lighting will be required to be maintained, however Mid Murray Council and the Mid Murray Landcare SA Inc. will work with owners of commercial premises to ensure outdoor lighting and illuminated advertising signage meet the International Dark Sky Standards.

Rural areas

The Mid Murray Council has many rural farming properties. These areas are generally free of streetlights and outdoor lighting.

MANAGEMENT OF LIGHTS

Given the vast expanse of the proposed “River Murray Dark Sky Reserve”, and the complex land tenure arrangements (many hundreds of privately owned parcels of land), it is proposed that this matter be approached from a community education perspective, with all private landowners being encouraged to upgrade existing external lights to be compliant with the International Dark Sky standards.

Demonstration site- Cambrai

To raise awareness of the reserve and educate the Mid Murray community about good lighting, the main street of Cambrai will be established as a demonstration site which will display different types of lighting which are deemed to be compliant. With a population of under 300, Cambrai is home to Council offices, a general store, a hotel and local services including a school and swimming pool. Cambrai is a central destination in the Reserve.

Statutory requirements

The Mid Murray Council has a statutory role regarding new development in accordance with the Development Act 1993, Planning, Development and Infrastructure Act 2016, the Building Code of Australia and the Mid Murray Council Development Plan. The Mid Murray Council will liaise with the Department of Planning, Transport and Infrastructure to integrate lighting policy in the statutory development policies.

Lighting Standards and Guidelines in the Mid Murray Dark Sky Reserve

Installation of all outdoor public lighting on Council owned land and public street lighting shall be ‘Dark Sky friendly’. Outdoor lighting needs to meet the following criteria to be considered ‘Dark Sky friendly’.

- Lights with greater than 500 lumens must be fully shielded to prevent any light being emitted at or above the horizontal plane.
- Be fitted with motion sensors or timers where possible.
- Have a coordinated colour temperature (CCT) less than 3000 K.
- Be switched off when not needed.
- Not emit light on white or other reflective surfaces.

The following principles are adopted for all outdoor lighting within the Reserve:

Principle 1: Only use light when needed

Outdoor public lighting should only be installed when deemed necessary and should only be activated when needed. Motion sensors and timers should be installed, where practical, to ensure that outdoor lighting is only used when needed. If there are no motion sensors and timers installed, lights should be switched off when not in use.

Principle 2: Use energy efficient globes

Lighting should be energy efficient to reduce carbon footprint. Lighting should have a maximum correlated colour temperature (CCT) limit of 3000k to be considered 'dark sky friendly'. It is recommended that the CCT value does not exceed 2000K. 'Warm' lighting has a lower CCT value, causes fewer disturbances to wildlife and reduces sky glow.

Principle 3: Avoid light spill

All outdoor lighting should be directed downwards so that spill light is avoided. Spill light is light that falls outside the area that is intended to be lit. Light which is directed above the horizontal plane creates artificial sky glow and wastes energy. Light should be directed downwards and in any case less than a horizontal plane, preferably up to 30 degrees below the horizontal. Lighting used for night operations and industry should be directed downwards, be a warm light and be shielded.

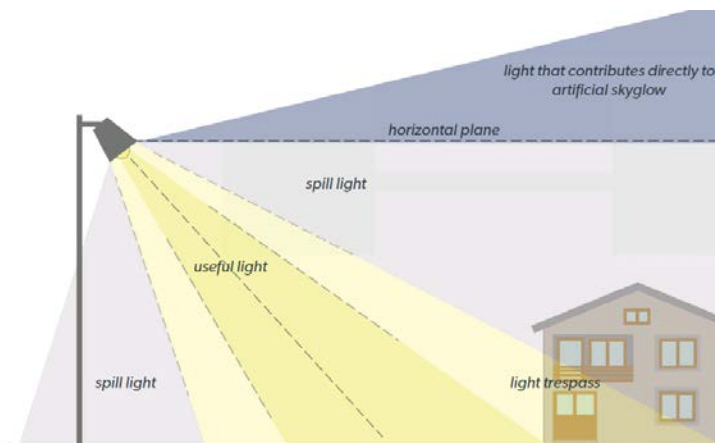


Figure 1: Light spill¹

Light spill can be avoided by:

- Installing light fittings with an opaque cover and flat glass, mounted horizontally on both axes, or
- Mounting the light under part of a building, verandah or roof so light is blocked from shining above the horizontal plane.

Principle 4: Shield lights.

Shielded lights do not allow any light above the horizontal plane. Non-shielded light bulbs exposes light to shine in all directions and should be avoided. Fittings which shield light so that it is directed downwards is preferred. Figure 2 and 3 shows appropriate shielding of light.

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Figure 2: Shielding of light



Figure 3: Floodlights fitted with different shielding design.

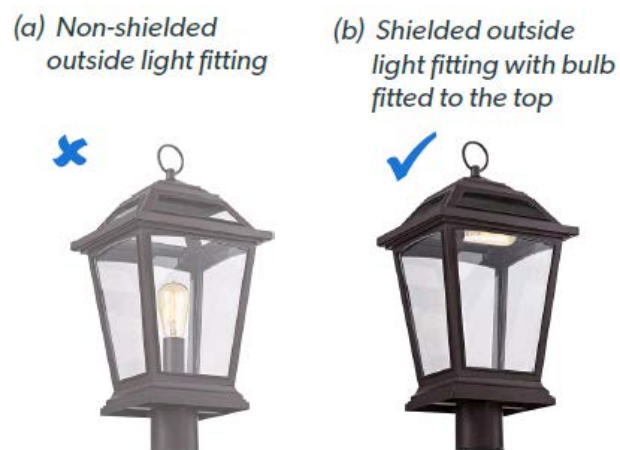


Figure 4: Exposed bulb that allows light to shine in all directions and a fitting designed to minimise light spill by only allowing downward projection of light. ²

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Principle 5: Avoid over lighting

Lighting should be installed to be appropriate for the activity taking place. The amount of light produced (lumen) is the most important consideration to ensure an area is not over lit.

The intensity of outdoor lighting should be appropriate for its intended use. Unshielded lights should be limited to 500 lumens.

Table 1: Intensity of lighting for various activities ³

| Activity type | Lumens emitted |
|---|----------------------------|
| Dwelling | 1800-7200 |
| Single porch light | 900 |
| Tennis court (domestic) | 100 000 |
| Farm building | 1800-7200 |
| Single security light | 900-4000 |
| Swimming pool | 1200 |
| Public open space/small car park | 1200 |
| Small sports oval (single field) | 1 000 000 |
| Road lighting | Refer to AS/NZS 1158 |
| Rural Industries | <1 000 000 |
| Stockyards (commercial) | <1 000 000 |
| Mining and extractive industries | >5 000 000 |
| Advertising signage (externally lit) | 1800-7200 |
| Small motel or commercial building | 12 000 |
| Recreational, decorative, promotional and special events lighting | No greater than necessary. |

Principle 6: Use asymmetric beams for floodlighting

Floodlights are required for sporting facilities and commercial stock yards. Where floodlights are proposed, the light fittings with asymmetric beams should be used. The fittings should direct light down toward the surface being lit to prevent light spill.

Flat glass fittings should be installed with the glass horizontal to make efficient use of the brightest part of the beam and to eliminate light spill.

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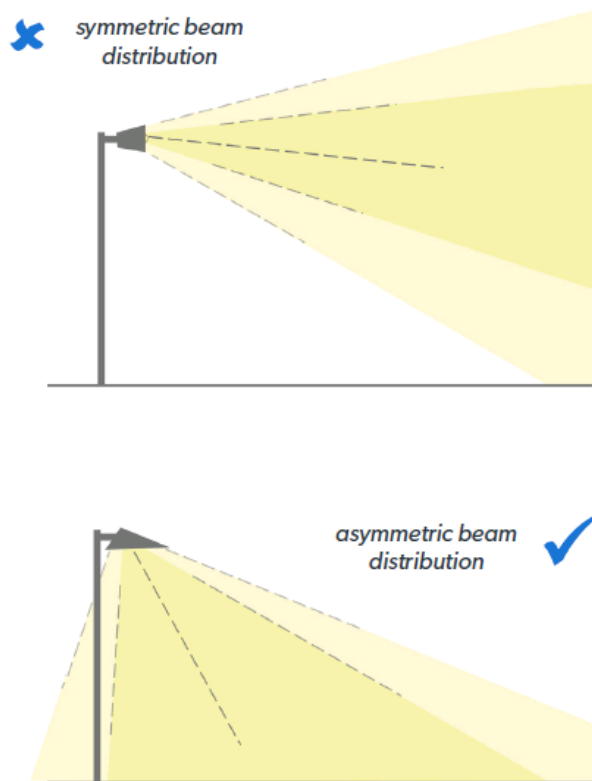


Figure 6: Appropriate light fixtures for floodlighting. ⁴

Restricted lighting

Lighting on advertisement signage is prohibited, except where it can be demonstrated that it meets the principles of 'Dark Sky Friendly Lighting'.

The use of searchlights is prohibited within the Swan Reach Conservation Park, except when used by emergency personnel.

COMPLIANCE

To ensure compliance with the Light Management Plan and the overarching guidelines of the International Dark Sky Association, the following is required to occur -

- A commitment from Mid Murray Council and South Australian Power Networks when renewing/replacing public outdoor lighting in the "River Murray Dark Sky Reserve" that meet the principles of 'Dark Sky friendly lighting'.
- All outdoor public lighting which is non-compliant and needs replacing must be fitted with compliant fixtures. If a light can be made complying by replacing the light bulb, this must be done when the lamp dies.

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By 2024, (or 5 years after designation), 90% of outdoor lighting within the Mid Murray Reserve will be compliant with this Light Management Plan.

By 2029, (or 10 years of designation), 100% of outdoor lighting within the Mid Murray Reserve will be compliant with this Light Management Plan.

REPORTING

An annual report will be submitted to the International Dark Sky Association, detailing the progress done to achieve the IDA goals and provide monitoring of dark sky measurements within the Reserve. This annual report will be undertaken by the Mid Murray Landcare Group Inc. with assistance as required from Mid Murray Council.