

# Light

## Introduction

Artificial outdoor lighting allows people to undertake a range of activities beyond daylight hours, as well as being used for safety and security purposes. However, if not carefully designed, artificial lighting can be a nuisance to the occupiers and users of adjoining sites and cause adverse safety effects on the transport network.

Outdoor lighting can also adversely affect the ability to view the night sky. Mackenzie District is home to the Aoraki Mackenzie International Dark Sky Reserve, one of the world's premiere accredited International Dark Sky Reserves. It attracts local, national and international visitors who come to view the dark night sky. The Reserve is also the site of Mt John Observatory, operated for research in astronomy by the University of Canterbury. The maintenance of dark sky is essential for the accreditation of the Reserve to continue, for the continuation of this tourist attraction and for research activities to continue.

Whilst astronomy, considered a scientific discipline, and astrology, considered to be folklore, are two different things in Western thought, they are often intertwined and interdependent in Māori culture. Ngāi Tahu and local rūnanga believe mountains, lakes and sky (the landscape) are interwoven, binding the earth and sky together not just in the physical sense but also in a spiritual sense. In order to remember, make sense of, and pass on precise astronomical knowledge, it was often woven into stories which adopted the mythical nature of astrology.

Māori used astronomy in everyday practices such as food gathering and planting, and it was believed the stars governed their good or bad fortune. Early Māori navigators made use of their understanding of the changing night sky patterns, along with familiarity of natural patterns of clouds, winds, waves, tides and bird movements to navigate their way across the seas and through the land. For Ngāi Tahu and local rūnanga, the stars were an integral part of the journey to Takapō / Lake Tekapo as the patterns resembled specific constellations full of meaning. When Matariki is seen, then game is preserved, for it marked the season when such food supplies were to be procured and preserved in fat for the colder winter months. Therefore, from a Ngāi Tahu and rūnanga perspective, the night sky is an integral part of the natural and cultural landscape.

The provisions for lighting seek to provide for adequate lighting to support activities and provide a safe environment, while protecting the values of the night sky and minimising potential adverse effects beyond the site.

## Objectives and Policies

<b>Objectives</b>	
<b>LIGHT-O1</b>	<b>Outdoor Lighting</b>
Outdoor lighting allows activities to occur beyond daylight hours and provides safety and security for activities, while: <ol style="list-style-type: none"> <li>1. protecting views of the night sky; and</li> <li>2. managing light spill to maintain amenity values and the safe operation of the transport network.</li> </ol>	
<b>Policies</b>	
<b>LIGHT-P1</b>	<b>Managing Outdoor Lighting</b>
Manage the location, design and operation of outdoor lighting to ensure:	

1. it does not distract or interfere with traffic; and
2. it is compatible with the zone in which any light spill or glare is received.

**LIGHT-P2****Night Sky Darkness**

Require outdoor lighting to minimise, as far as practicable, the potential for upward light spill that would adversely affect the ability to view the night sky.

**Rules**

<b>LIGHT-R1</b>	<b>Outdoor Lighting</b>	
<b>All Zones</b>	<p><b>Activity Status: PER</b></p> <p><b>Where:</b></p> <ol style="list-style-type: none"> <li>1. The following outdoor lighting may not be used between 10.00pm and 6.00am:             <ol style="list-style-type: none"> <li>a. searchlights</li> <li>b. floodlighting of an area that is not in use or of an activity that is not in operation.</li> <li>c. outdoor illumination of any public recreational facility</li> <li>d. outside illumination of any building for aesthetic purposes by floodlight</li> <li>e. any outdoor illumination in which light is produced by metal halide, mercury vapour or fluorescent lighting, unless these lamps were installed prior to 1 January 1979 in any Commercial or Residential Zone in Takapō / Lake Tekapo or 1 March 1986 in all other zones.</li> </ol> </li> </ol> <p><b>And the activity complies with the following standards:</b>            LIGHT-S1 Direction            LIGHT-S2 Shielding            LIGHT-S3 Colour Temperature            LIGHT-S4 Lamp Types            LIGHT-S5 Horizontal and Vertical Illuminance</p>	<p><b>Activity status when compliance is not achieved: RDIS</b></p> <p><b>Matters of discretion are restricted to:</b>            LIGHT-MD1</p> <p><b>Activity status when compliance with standard(s) is not achieved:</b> Refer to relevant standard(s).</p>
<b>LIGHT-R2</b>	<b>Security Lights</b>	
<b>All Zones</b>	<p><b>Activity Status: PER</b></p> <p><b>Where:</b></p> <ol style="list-style-type: none"> <li>1. Security lights must be fitted and controlled with a motion sensor.</li> </ol> <p><b>And the activity complies with the following standards:</b></p>	<p><b>Activity status when compliance is not achieved: RDIS</b></p> <p><b>Matters of discretion are restricted to:</b>            LIGHT-MD1</p>

	LIGHT-S1 Direction LIGHT-S2 Shielding LIGHT-S3 Colour Temperature LIGHT-S4 Lamp Types LIGHT-S5 Horizontal and Vertical Illuminance	<b>Activity status when compliance with standard(s) is not achieved:</b> Refer to relevant standard(s).
<b>LIGHT-R3</b>	<b>Skylights</b>	
<b>All Zones</b>	<p><b>Activity Status: PER</b></p> <p><b>Where:</b></p> <ol style="list-style-type: none"> <li>There is no spill of light through the skylight after 10pm.</li> </ol> <p><i>Note: Compliance with this rule may be achieved through use of a blind or other light covering; or by use of glass that does not emit internal light.</i></p>	<p><b>Activity status when compliance is not achieved: RDIS</b></p> <p><b>Matters of discretion are restricted to:</b> LIGHT-MD1</p>

### Standards

<b>LIGHT-S1</b>	<b>Direction</b>	<b>Activity Status where compliance not achieved:</b>
<b>All Zones</b>	<ol style="list-style-type: none"> <li>All fixed exterior lighting shall be directed away any adjacent roads, residential properties and lakes.</li> </ol>	<p><b>RDIS</b></p> <p><b>Matters of discretion are restricted to:</b> LIGHT-MD2</p>
<b>LIGHT-S2</b>	<b>Shielding</b>	<b>Activity Status where compliance not achieved:</b>
<b>All Zones</b>	<ol style="list-style-type: none"> <li>All outdoor lighting shall be shielded from above in such a manner that the edge of the shield shall be below the whole of the light source, so that all the light shines below the horizontal.</li> </ol>	<p><b>RDIS</b></p> <p><b>Matters of discretion are restricted to:</b> LIGHT-MD1</p>
<b>LIGHT-S3</b>	<b>Colour Temperature</b>	<b>Activity Status where compliance not achieved:</b>
<b>All Zones</b>	<ol style="list-style-type: none"> <li>The correlated colour temperature of outdoor lighting shall not exceed 2500 K.</li> </ol>	<p><b>RDIS</b></p> <p><b>Matters of discretion are restricted to:</b> LIGHT-MD1</p>
<b>LIGHT-S4</b>	<b>Lamp Types</b>	<b>Activity Status where compliance not achieved:</b>
<b>All Zones</b>	<ol style="list-style-type: none"> <li>Only light-emitting diode, low pressure sodium and high pressure sodium lamps shall be used.</li> </ol>	<p><b>RDIS</b></p> <p><b>Matters of discretion are restricted to:</b></p>

		LIGHT-MD1
<b>LIGHT-S5</b>	<b>Horizontal and Vertical Illuminance</b>	<b>Activity Status where compliance not achieved:</b>
<b>All Zones</b>	1. The maximum level of light spill from outdoor lighting shall not exceed the horizontal or vertical illuminance levels measured on any adjoining site in the receiving zone set out in LIGHT - TABLE 1, excluding roads.	<b>RDIS</b> <b>Matters of discretion are restricted to:</b> LIGHT-MD2

**LIGHT-TABLE 1**

<b>Receiving Zone</b>	<b>2200 to 0600</b>	<b>0600 to 2200</b>
<b>Any Rural or Rural-Residential Zone</b>	<b>1 lux</b>	<b>5 lux</b>
<b>Any Residential, Recreation, Open Space or Special Purpose Zone</b>	<b>2 lux</b>	<b>10 lux</b>
<b>Any Commercial and Mixed Use or Industrial Zone</b>	<b>5 lux</b>	<b>25 lux</b>

**MATTERS OF DISCRETION****LIGHT-MD1**

- a. The individual and cumulative effects on the ability to view the night sky.
- b. The effectiveness and practicality of any measures proposed to mitigate the effects of light spill.
- c. Whether the lighting is necessary for operational or functional purposes.

**LIGHT-MD2**

- a. Whether the lighting is necessary for operational or functional purposes.
- b. Adverse effects on:
  - i. the amenity anticipated in the receiving zone;
  - ii. the well-being, health and safety of people; and
  - iii. traffic safety.
- c. The extent to which light spill or glare may impact on activities occurring on an adjoining property.