

**BEFORE INDEPENDENT HEARING COMMISSIONERS
APPOINTED BY THE HAMILTON CITY COUNCIL**

IN THE MATTER of the Resource Management Act 1991 (**Act**)
AND

IN THE MATTER of an application for subdivision and land use
consent for the Amberfield development
pursuant to the Act.

APPLICANT Weston Lea Limited

CONSENT AUTHORITY Hamilton City Council

**EVIDENCE-IN-CHIEF OF MARK KESSNER
FOR WESTON LEA LIMITED**

Dated: 24 May 2019

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INTRODUCTION

1. My name is Mark Alexander Kessner.
2. I am a director at eCubed and eCubed Light. I am a Member of DINZ - Designers Institute of New Zealand and of EEA – Electrical Engineers Association. I am also a registered Producer Statement Author.
3. I have over 30 years' experience in the electrical and specialist lighting design industry with particular emphasis on the Commercial, Public Health Sectors, Education and Specialist Lighting.
4. I have achieved many personal IESANZ (Illumination Engineers Society of New Zealand) awards for specialist lighting designs and luminaire design. I have completed designs on many national and internationally recognised award-winning projects including:
 - (a) Wynyard Quarter, Christchurch Avon River Precinct, and numerous other Christchurch rebuild projects for Otakaro and Christchurch City Council;
 - (b) Waitomo Caves (NZ Institute of Architects Gold Medal Award);
 - (c) Viaduct Event Centre for Auckland Council, Iona College Auditorium, The Centre – District of Franklin, Auckland, and two recent World Architecture Awards for Jellicoe Street/Wynyard Quarter (Auckland Council); and
 - (d) Recently, the Geyser Building in Parnell and a Dark Sky national award for Wynyard Quarter.
5. I was the specialist lighting consultant for the launch of the Electricity Commission - Right Light Programme and I am a lecturer for Lighting Design as part of the UNITEC Architectural Degree programme.
6. I have been retained by Weston Lea Limited (**Weston Lea**) to prepare a statement of evidence on its application for land use and subdivision consent from the Hamilton City Council for the Amberfield development.

7. I am familiar with the application site and surrounding environment. I am aware of the site's location and its proximity to the Waikato River and Hammond Bush, including the general topography of the area.
8. My evidence covers the following:
 - (a) Ambient light, including common sources of ambient light in residential setting and how is it measured; and
 - (b) Ways in which ambient light can be controlled, including external lighting design for residential properties and street lighting design.

CODE OF CONDUCT

3. I have read the Environment Court Code of Conduct for expert witnesses and agree to comply with it.
4. I confirm that the topics and opinions addressed in this statement are within my area of expertise except where I state that I have relied on the evidence of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

AMBIENT LIGHT AND HOW IT IS MEASURED

9. Ambient light is the light that is already present in a scene, before any additional lighting is added. It usually refers to natural light, either outdoors or coming through windows etc. It can also mean artificial lights such as normal room lights and wall lights. Ambient light, often referred to as light pollution, increases when outdoor lighting is misdirected, misplaced, unshielded, excessive or unnecessary. In the city environment, the main culprits of ambient light are misdirected streetlights and internal office lighting left on by mistake late into the night.
10. In the residential and rural environments streetlights play a large role. However, the main additional light comes from external feature lights, security lights and access wall lights. While spill from internal lighting of residential buildings is consistent in the early hours of darkness, this generally diminishes by around 10pm.

11. Ambient light is very difficult to measure as the values of light are very low. Ambient light is measured in units referred to as Lux. For example, a full moon at night would provide approximately 0.1 - 0.5 lux with deep twilight 0.5 to 1 lux. Outside a laboratory environment, light meters are accurate to +/- 1 lux spot and attempting to measure illumination at levels of 0.5 and 1 lux can be quite troublesome. Some scientific research has been completed to measure 'sky glow', which is the level of ambient light obscuring the viewing of the night sky when looking directly towards the stars. While this is often used to categorise a city's amount of sky glow, it is a very wide area generalisation and not directly applicable to close monitoring situations such as animal habitat areas.

WAYS IN WHICH AMBIENT LIGHT CAN BE CONTROLLED

12. The lighting control and glare control of modern street lighting is substantially improved with modern technology. Current codes and standards all include restrictions on spill light and glare control.
13. I have previously provided advice to the Weston Lea ecologists regarding a lighting regime for the streetlights in bat sensitive areas. I understand it is intended that a detailed design of the bat sensitive street lighting regime will be prepared and submitted to Hamilton City Council for certification prior to implementation of the consent. The current lighting design calculations for the perimeter roads around the development show the light spill being very well controlled. In particular, light spill reduces to zero lux at 12.2 meters from the back edge of the footpath (this does not rely on any further screening from buffer planting), well before the river and a significant distance from the Hammond Bush environment.
14. In addition, simplistic control of residential external lighting can prevent upward and outward light in line with the street lighting design.
15. It has been best practice external lighting design, for some years, to implement a simplistic design for 'zero upward light'. Instead of using traditional luminaires that have a 'glowing' element, zero upward light luminaires simply direct their light downwards onto a surface.

16. I understand Weston Lea are proposing restrictions on the residential lots directly adjacent to the river corridor to ensure that any security / spotlights and access wall lights need to conform to best practice specifications for zero upward light spill. In my opinion, this will also restrict any lighting from impacting on Hammond Bush.
17. There are societies such as the International Dark Sky Association (Dark Sky 2000) and locally the New Zealand Green Building Council that positively promote the control of outdoor light to prevent ambient light (sky glow, to which it is often referred). The main contributor to ambient night light is where light spills unnecessarily upward and outward, causing glare, light trespass, and a night-time urban “sky glow” overhead, indicating wasted energy and obscuring the stars overhead. The simple answer is to control the lighting so that it does not spill upwards or outwards.
18. Light controls are regularly employed by Councils throughout New Zealand to limit upward light and sky glow. Examples of council light controls include:

**Hamilton City Council’s District Plan - 25.6.2 Objectives and Policies:
City-wide - Lighting and Glare**

Objective 25.6.2.1 An environment free from the adverse effects of intrusive lighting.

Policies.25.6.2.1a Ensure that light spill and glare do not detract from the amenity values of other properties, compromise traffic safety, or have a negative effect on people's health and general welfare.

Hamilton City Council Explanation

Intrusive lighting may include light from floodlights, security lights and activities such as welding. Light spill and glare have the potential to disturb people's sleep, which could adversely affect their health and general welfare. Unlike other adverse effects of activities, like smoke or noise, which are difficult to contain completely, light spill is reasonably simple to avoid by correct aiming or baffling (shading) of the light source.

Auckland Council Transport Design Manual – Street Lighting provides guidance to designers to limit upward light: Part of Auckland Transport’s role is to ensure that the public lighting network is attractive, of good quality, easy to maintain, and cost effective. Public lighting is there to provide a safe

environment for pedestrians and vehicles and to discourage illegal acts. At the same time, care must be taken to minimise spill light onto neighbouring properties and upward light (sky glow).

Queenstown Lakes District Council - Southern Light document directs designers to: While achieving safe and compliant lighting also minimising any negative impacts such as obtrusive (spill) light, glare and light pollution (upward waste light contributing to sky glow)

19. While the above policies and directives are not mandatory in stipulating there shall be no upward light, it is my view that lighting controls are all moving in that direction. The proposed Queenstown Lakes District Council - **Plan Change 17 Cardrona Village Rural Zone**, for example, provides that external lighting shall not cause glare on the night sky. In effect, the plan stipulates that there shall be no upward lights within the Cardrona Village Rural Zone.

6.3.1 Objective - The District contains and values Outstanding Natural Features, Outstanding Natural Landscapes, and Rural Landscapes that require protection from inappropriate subdivision and development.

6.3.1.8 Ensure that the location and direction of lights does not cause glare to other properties, roads, and public places or the night sky.

21.2.1.5 Have regard to the location and direction of lights so they do not cause glare to other properties, roads, public places or the night sky

Dated this 24th day of May 2019



Mark Kessner