

**Before the Hearing Commissioner appointed by West Coast Regional
Council**

In the matter of the Resource Management Act
1991 (**the Act**)

And in the matter

Statement of evidence of Paul Kimble Wilson

25 September 2023

INTRODUCTION

Qualifications and experience

- 1 My full name is Paul Kimble Wilson. I am a Director of Xyst Limited which is a consultancy and independent lighting design company based in Christchurch.
- 2 My experience and qualifications are ten years practicing as an independent lighting designer specialising in outdoor lighting. I have had 35 years' experience as a parks and recreation planner with the Department of Conservation, Auckland City Council, Queenstown Lakes District Council and in private practice. This includes 20 years' experience with lighting policy in local government and private practice. I am the recipient of a Dark Sky Award from the Royal Astronomical Society of New Zealand.
- 3 I have provided planning advice specific to the area of lighting including drafting lighting rules for Selwyn District Council, Timaru District Council and Southland District Council.
- 4 I hold the qualification of Diploma of Parks, Recreation and Tourism Management from Lincoln University and Post Graduate Certificate of Applied Science (Lighting Design) Massey University. I am a member of the Illuminating Engineering Society of Australia and New Zealand Ltd and hold the status of Lighting Technician (TechIES).
- 5 I have a wide range of independent lighting design experience including sports lighting, road lighting design for residential and commercial areas and car park lighting design for commercial precincts. I provide design and light spill assessment services for sports fields, parks and commercial developments and provide policy advice on the control of light pollution.

Code of Conduct

- 6 I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. I have read and agreed to comply with that Code. This evidence is within my area

of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

7 I am not aware of any knowledge gaps, or any uncertainties in scientific information and analysis that I rely on in my evidence.

8 I note that an individual's response to "bright light" varies with some people being very sensitive to light and other less sensitive depending on the adaptive state of the eye, age or other medical conditions. The proposed rules avoid subjective terms such as 'brightness'.

9 The proposed rules rely on the unit of illumination (lux) to prescribe limits which can be readily quantified by either direct measurement with a calibrated illuminance meter or modelled using computer calculations with an accuracy typically of +/- 10%.

Conflict of interest

10 To the best of my knowledge, I have no real or perceived conflict of interest.

PURPOSE AND SCOPE OF EVIDENCE

10 In August 2023 I was engaged by the West Coast Regional Council to provide expert evidence relating to submissions received on the Proposed Light – Ngā Rama.

11 The purpose of this evidence is to provide my opinion as an independent lighting designer on above matters that were raised in submissions.

RESPONSE TO MATTERS RAISED BY SUBMITTERS

Dark Sky Criteria

- 12 The West Coast Penguin Trust (S275.016/S275.009), Westland District Council (FS79.4) and Suzzanne Hills (S443.034) support in part or seek amendments to Key Issue 1: General Submissions to provide greater protection for West Coast dark skies and provide for the requirements of the Dark Skies Park Designation in specific areas.
- 13 DarkSky International (formally known as The International Dark-Sky Association, Inc or IDA) is an advocacy group whose mission is to “To preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting.”
- 14 DarkSky International operates an International Dark Sky Places (IDSP) program that certifies communities, parks, and protected areas around the world that preserve and protect dark sites through responsible lighting policies and public education.
- 15 A “Dark Sky Park” is one of several designations under the programme. Other designations include Dark Sky Sanctuaries (Aotea-Great Barrier Island and Rakiura – Stewart Island), Dark Sky Reserves (Aoraki-Mackenzie and Wairarapa). There is currently one Dark Sky Park in New Zealand located in Wai-it, Tasman.
- 16 To meet DarkSky’s definition of dark skies, the core must demonstrate that the Milky Way is visible on a typical night. These conditions correspond approximately to a visual-band zenith luminance of 21.2 magnitudes per square arcsecond or greater and a naked eye limiting magnitude (NELM) of +6.
- 17 A Dark Sky Sanctuary must provide an exceptional dark sky resource where the night sky brightness at the zenith is routinely equal to or darker than (greater than) 21.5 magnitudes per square arc second in the visual band and

where significant light domes are not present toward the local horizon in any direction.

- 18 One of the fundamental criteria for Dark Sky certification is the preparation of the Light Management Plan that includes written policy that meets or exceeds applicable agency or departmental policies regarding outdoor lighting and conforms to all local, regional, and national laws (such as the pTTPP).
- 19 The policy and rules of the pTTPP therefore set the benchmark should a community wish to apply for international recognition of a Dark Sky place.
- 20 A Light Management Plan for a Dark Sky Place must use “Dark Sky friendly” light fixtures. These are defined as:
- a. fixtures that are fully shielded irrespective of purpose or the number of lumens of light it emits, and make appropriate use of timers and motion sensors. Lighting controlled with motion-activated switches limiting the duration of illumination to less than five (5) minutes after activation is exempt from the other requirements of this section.
 - b. Lighting must be chosen to minimise the amount of short-wavelength light emitted into the nighttime environment. The LMP must restrict lighting in this respect according to one of the following prescriptions:
 - i. The correlated color temperature (CCT) of lamps must not exceed 3000 Kelvins; or
 - ii. Allowed lighting must not emit more than 25% of its total spectral power at wavelengths < 550 nanometers; or
 - iii. The scotopic-to-photopic (S/P) ratio of allowed lighting must not exceed 1.3.
- 21 The LIGHT polices, objectives and rules contained within the pTTPP will in my opinion support the development of DarkSky place designations should

communities wish to advance these. In my opinion the objectives, policies and rules are sufficient as drafted and in accordance with best practice.

LIGHT-04 Light Policies

- 22 Silver Fern Farms Limited (S441.031) seek to amend LIGHT-P3 to provide for artificial lighting associated with industrial activities within the Industrial Zone. Federated Farmers (S524.127) seek to amend LIGHT-P3 to provide for rural production activities.
- 23 In my opinion, uncontrolled lighting within the industrial zone or when applied to rural production activities could have a significant impact on the quality of the night sky within the wider region. Light pollution is a cumulative effect such that a few poorly designed or controlled installations can have a significant effect over a very wide area. Uncontrolled changes in the quantity of light and type of light (direction, luminance, spectral power and colour temperature) can have negative effect on the quality of the night sky.
- 24 Equipment selection, design solutions and the use time or motion activated controls can all assist in the protection of the night sky including in industrial settings and for rural production activities.
- 25 I would support amendments to LIGHT-P3 to recognise the nature of the Industrial Zone and rural production activities. In my opinion, exemptions for these activities are not appropriate. The policies do not otherwise prevent lighting in Industrial Zones or for rural production activities, rather they seek to minimise the impact of lighting on the environment through the control of light.
- 26 Where operational lighting requirements in an industrial or rural production setting cannot fully comply with the proposed rules, I would contend that the preparation and approval of a Light Management Plan through the resource consent process to address the management of light where rules cannot be complied with in all circumstances would be a practical solution.

- 27 I refer to the [Proposed Timaru District Plan](#) which used a Light Management Plan at PrimePort as a means for specific industrial sites to propose bespoke rules that meet operational requirements but mitigate the effects of lighting.

Reflectivity

- 28 The Buller Conservation Group (S552.143) and Firda Inta (S553.143) seek to include a new policy to manage the effects of light reflecting of paved areas.
- 29 I agree that reflective surfaces such as a concrete hardstand can increase “sky glow” however the decision requested by the submitters does not address the issue of reflectivity from hard surfaces. In my opinion Light-P3 provides sufficient policy direction to minimise adverse effects.

Laser Light

- 30 The Westland District Council (S181.050) has raised concerns regarding laser light use within the Hokitika aircraft flight path. The International Civil Aviation Organization has produced a [working paper](#) addressing the addressing the aviation safety concerns affecting flight safety involving laser emitters. The working paper discussed the establishment of laser free zones around aerodromes.
- 31 The use of lasers are covered in the Summary Offences Act (1981), section 13B which details fines, imprisonment or forfeiture rules for possession of high-power laser pointers, and the Aviation Crimes Act 1972 section 5(c) authorises Police to prosecute individuals using lasers to target aircraft.
- 32 I consider that the use of laser light in relation to airports is addressed in legislation and that the management of laser light displays could be addressed via alternative means such as a Bylaw or a code of conduct for operators. In my opinion that the lighting provisions do not require amendment.

Aiming of Light

- 33 The Department of Conservation (S602.176) seeks to amend Rule LIGHT-R1 to include a standard to require that light is directed away from any adjoining and adjacent overlay areas.
- 34 The aiming of light fixtures is one of the most significant influences of light pollution, disability glare and light trespass. The proposed Light Objectives LIGHT – 02 considers the *location* of artificial lighting to be important in the control of light. LIGHT – R1 rules 1. and 2. provide the necessary controls in my opinion.
- 35 What these rules aim to prevent is a light being directed outside of a site directly towards an adjacent or adjoining property causing nuisance or disability glare to drivers. Given the high values generally adopted in the proposed rules, a light directed towards an adjacent or adjoining site that resulted in less than 25 lux vertical near the boundary could still have a significant negative effect in my opinion.
- 36 There is, in my opinion, a need to retain rules to control the aiming of light including in the Natural Character overlay.
- 37 LED lighting (which is now common) is a very intense light source and can be a significant cause of light pollution and disability glare when aimed above the horizontal.
- 38 Silver Fern Farms Limited by its authorised agents Mitchell Daysh Limited (S441.033) seeks an amendment to LIGHT R1- 3 to recognise existing essential operations which occur at the Plant (including artificial outdoor lighting) and submits that it cannot be realistically achieved at the boundary with the proposed adjoining zones GRUZ and surrounding GRZ.
- 39 In my opinion LIGHT R1- 3 is unnecessary. If light is directed towards areas within the site then the relevant zone standards for the site (not the adjoining zone) provide sufficient control.
- 40 I recommend that LIGHT – R1 1 to 3 be amended to read:

All exterior lighting shall be directed towards the area within the site that is intended to be illuminated.

41 I recommend that LIGHT – R3 2 be amended to read:

2. Where the artificial outdoor lighting is located within the Outstanding Coastal Natural Character Overlay it must:

- a. Be fully shielded and mounted in a horizontal position ~~or use a controlled optic~~;**
- b. Have a colour corrected temperature of no greater than 3000K (warm white); and**
- c. Be installed in a manner that precludes operation between 10pm and 7am the following day.**

Assessment method

42 Silver Fern Farms Limited by its authorised agents Mitchell Daysh Limited (S441.033) seeks to amend LIGHT R2 clause d. to “measure light spill at the notional boundary of any dwelling or building accommodation sensitive activity.”

43 The Buller Conservation Group (S552.151) and Frida Inta (S553.151) seeks to measure intensity at the boundary, not inside the boundary.

44 AS/NZS 4282 Control of the Obtrusive Effects of Outdoor Lighting sets out a comprehensive method for assessment of conformance including where illuminance calculations are to be made for a variety of sites (Appendix 1) These methods are different to the methods set out in the pTTPP.

45 I note that LIGHT - R2 (d) and LIGHT - R4 (c) provides a different location for the measurement of illuminance than that prescribed in AS/NZS 4282 and is therefore at odds with Light - R1 Advice Note 1. Which states "Lighting limits must be measured and assessed in accordance with AS/NZS 4282 Control of the Obtrusive Effects of Outdoor Lighting."

46 The methodology for the assessment of conformance detailed in AS/NZS 4282 only considers vertical light levels which I consider to be appropriate. The assessment of horizontal levels is more appropriate to determining if

sufficient light will fall on a horizontal surface (such as a road or path) rather than determining if too much light will fall on the vertical surface of an adjoining properties (such as a window).

47 The proposed rules Light R2 (d) measures illuminance “2m inside the boundary of any adjoining site or the closest window in the adjoining property, whichever is the closest to the light source”.

48 As stated above, AS/NZS4282 provides a comprehensive assessment methodology for a range of circumstances and recommend that rather than provide bespoke rules without rationale, that the methodology set out in AS/NZS4282 is adopted.

49 I recommend that LIGHT R1, R2 and R3 be amended to remove the assessment of horizontal light levels as these do not form part of the methodology prescribed in AS/NZS4282 where only vertical illuminance is considered. This will have the effect of changing the measurement or calculation of illuminance to vertical illuminance only and increasing the measurement distance to between 0 and 10m depending on the situation.

50 I recommend that LIGHT R1 be amended to read:

- 1. Lighting limits must be measured and assessed in accordance with AS/NZS 4282 Control of the effects of obtrusive lighting.**
- 2. For measurement of light levels in NOSZ - Natural Open Space Zone, SETZ - PREC 2 - Settlement Zone - Coastal Settlement Precinct, and in All Zones where the site falls within the Outstanding Coastal Natural Character Overlay, the calculation plane shall be taken at the property boundary**
- 3. Where conformance with the limits set out in the Rules in this chapter is to be determined by calculation, the calculation must be undertaken by a person who is professionally qualified and competent in the discipline of illuminating engineering.**

- 51 This change would, in part, address the submissions of Silver Fern Farms Limited by its authorised agents Mitchell Daysh Limited (S441.033), The Buller Conservation Group (S552.151) and Frida Inta (S553.151) as in some circumstances illuminance would be measured at the building line of an existing building, while in the NOSZ - Natural Open Space Zone, SETZ - PREC 2 - Settlement Zone - Coastal Settlement Precinct, and in All Zones where the site falls within the Outstanding Coastal Natural Character Overlay, illuminance would be measured at the boundary.
- 52 This change would also remove Advice Note 3 from Light-R1 being “Any calculation for the purposes of these Rules must be based on a maintenance factor of 1.0 (i.e. no depreciation shall be taken into account for reduction in light levels over time).” This is unnecessary as AS/NZS4282 clause 4.3 states “All calculations for conformance shall be based on initial photometric values of the luminaires” which has the same effect.

Light Rules for Mineral Extraction

- 53 Rocky Mining Limited (S474.049) and Papahaua Resources Limited (S500.033) seek amendments to rules so that appropriate Lux limits are applied to Mineral Extraction, Open Space and Rural Zones.
- 54 TiGa Minerals and Metals Limited (S493.087), WMS Group (HQ) Limited and WMS Land Co. Limited (S599.093), Birchfield Coal Mines Ltd (S601.073), BRM Developments Limited (S603.051), Birchfield Ross Mining Limited (S604.066), Phoenix Minerals Limited (S606.052), Whyte Gold Limited (S607.050) seek an amendment to Light-R4 to provide lux limits which are consistent with current limits (10 lux).
- 55 AS/NZS 4282 sets maximum values for vertical illuminance in various lighting zones. (AS/NZS 4282 Table 3.1 and 3.2).
- 56 The proposed rules LIGHT – R2 uses the values of 25 lux (non-curfew) and 10/5 lux (curfew) for the zones which would be considered Zone A4 – High District brightness (AS/NZS 4282 Table 3.1). I would note that this would be the same “district brightness” as a city environment like Auckland City.

- 57 The proposed rules LIGHT – R3 uses the values of 2 lux (non-curfew) and 1 lux (curfew) for the zones which would be considered between Zone A1 – Dark and Zone A2 Low district brightness (AS/NZS 4282 Table 3.1).
- 58 The proposed rules LIGHT – R4 uses the values of 10 lux (non-curfew) and 2 lux (curfew) for the zones which would be considered between Zone A3 – Medium district brightness (AS/NZS 4282 Table 3.1).
- 59 I have reviewed the existing District Plans and presented the current rules in Table 1.

Table 1 Existing West Coast Council Lighting Rules

Plan	Zone	Rule (Permitted Activity)
Grey	Residential/Township/Rural Residential/Rural/Utilities	(i) No activity shall result in a greater than 2.5 lux spill (horizontal and vertical) of light onto any adjoining property, measured at any point more than 2m inside the boundary of the adjoining property or the closest window to the adjoining property, whichever is the closest.
	Commercial and Industrial	(i) All exterior lighting shall be directed away from adjacent properties and roads so as to avoid any adverse effects on the neighbourhood and on traffic safety. and (ii) No activity shall result in greater than a 10 lux spill (horizontal and vertical) of light on to any adjoining property within the Commercial Environmental Area, measured 2m inside the boundary of any adjoining property. and (iii) For sites adjoining a Residential Environmental Area, no activity shall result in greater than a 2.5 lux spill (horizontal and vertical) of light, measured 2m inside the boundary of any adjoining residential property or the closest window in the adjoining property, whichever is the closest.

Buller	District Wide	<p>7.9.4.1. All exterior lighting shall be designed, installed and maintained so that:</p> <p>7.9.4.1.1. Light emitted does not cause a distraction or glare which could create a traffic hazard on any road, or interfere with the correct operation of navigational aids;</p> <p>7.9.4.1.2. There is no adverse effect on residents or activities adjacent to the area being illuminated.</p> <p>7.9.4.2. Any activity shall ensure that no greater than a 10 lux spill (horizontal or vertical) of light shall enter any adjoining property, measured 2.0 metres inside the boundary of the adjoining site.</p>
	Scenically Sensitive Commercial Zone	<p>7.9.4.3.1. Lights will be hooded/shrouded so as to direct light spill downwards;</p> <p>7.9.4.3.2. The lights will be mounted 900mm above ground (except where placed above doorway entrances) and will be located above areas of low reflectivity. Typically this means locations within landscaped areas or above gravelled paths. In all cases, lights will be sited a minimum of 300mm from any hard standing or paved areas.</p>
	Solid Energy Centre, Westport	<p>Light spill on adjacent residential properties from outdoor lighting on the designated site is not to exceed 10 lux (horizontal or vertical), measured 2.0 metres inside the boundary of the adjacent site. Prior to operation of the lights, certification shall be provided to the Regulatory Manager of the Buller District Council that design and mitigation measures have been implemented to ensure that compliance will be achieved on all such sites.</p>
Westland	Residential Mixed Zone, Commercial Zone, Industrial/Commercial Zone, Tourist, Residential Zone, Coastal Settlement Zone	10 lux maximum spill to residential property

- 60 The pTTPP introduces the different illuminance levels for pre-curfew and post curfew as adopted in AS4282. In Table 2, I have compared the changes between the existing District Plans and the pTTPP.
- 61 The permitted level of light spill onto adjacent properties between 7AM and 10 PM (Pre-curfew) will increase significantly in all zones other than the Natural Open Space Zone, SETZ - PREC 2 - Settlement Zone - Coastal Settlement Precinct, and in All Zones where the site falls within the Outstanding Coastal Natural Character Overlay.
- 62 The permitted level of light spill onto adjacent properties between 10PM and 7 AM (curfew) will increase in the Grey District Township zone and decrease in all other zones.

Table 2 Comparison of current lux limits versus proposed

Zone	Current Max Lux	Proposed Pre-Curfew Max Lux	Proposed Curfew Max Lux
R2 - TCZ - Town Centre, MUZ - Mixed Use, COMZ - Commercial, PORTZ - Port, HOSZ - Hospital, STADZ - Stadium, AIRPZ- Airport and all INZ - Industrial Zones	10 ¹	25	5
R2 -PORTZ - Port	10	25	10
R3 - NOSZ - Natural Open Space Zone, SETZ - PREC 2 - Settlement Zone - Coastal Settlement Precinct, and in All Zones where the site falls within the Outstanding Coastal Natural Character Overlay	10 ¹	2	1
R4 - locations not provided for in Rule LIGHT - R2 or LIGHT - R3	10	10	2

¹ 2.5 Lux (Grey Residential/Township/Rural Residential/Rural/Utilities Zones)

- 63 I consider the proposed pre-curfew lux limits to be “high” when compared to other territorial areas in New Zealand. I consider the curfew lux limits to be “average” and appropriate given the intrinsically dark environment of the West Coast.
- 64 The proposed light values in the industrial zone are in my opinion responsive to the needs of commercial users, enabling higher levels of light spill to occur up to the late evening and to be reduced after 10PM thereby reducing the impacts on adjacent residents thereby providing improved opportunities for astro-tourism and star watching.
- 65 The proposed pTTPP light rules provide for an increased post-curfew lux limit of 10 lux in the Port Zone where the post curfew limit in Industrial zones is proposed to be 5 Lux. Consideration could be given to increasing the limit in Industrial zones to 10 lux from 10PM to 7AM which would be consistent with the Port Zone and provide greater flexibility for 24-hour operations that may occur in such zones.
- 66 I consider the postposed limits to be readily achieved when using modern lighting equipment and design techniques unless there is a need to place high mast luminaires directly against a boundary.
- 67 I understand that mining operations are most likely to occur in the Mineral Extraction and Rural Zones where dwellings may be located some distance away from the site boundary. The amendments I have recommended in Paragraph 41 will increase the distance at which spill light is measured thereby making it easier to comply with the proposed rules. (Lux decreases as the area is increased).
- 68 The CIE 128-1998 International Commission on Illumination “Guide to the Lighting for Open-Cast Mines” notes that Open-cast mines cover a large area and continually change their shape as mining proceeds. Effective illumination is required to achieve production and safe operation of various machinery at different work areas.” CIE 128-1998 provides recommended illuminance levels for open-cast mines. These range from average horizontal values of

30 lux for haul roads, 200 lux for general lighting in the loading area and 500 lux on the vertical mine face.

- 69 The illuminance limits in the proposed pTTPP light rules control how much light can be emitted outside of a site and with considered use of light will still enable very high levels of illumination to be achieved within a mining site unless operations are lit very close to the site boundary. For example many modern sports fields are lit to an average of 100lux horizontal on the playing surface yet achieve less than 3 lux at the boundary of the site.
- 70 The Mineral Extraction and Rural Zones are likely to be located in intrinsically dark environments, and the effects of artificial light will be more pronounced than that experienced in brighter urban settings such as in the Port on Industrial Zones. I consider the proposed lux limits to be appropriate.
- 71 Where these limits cannot be complied with, the preparation of a Light Management Plan will likely result in a more bespoke solution and mitigation of effects which would be appropriate in my opinion.

Rural Production

- 72 Horticulture New Zealand (S486.054) and Federated Farmers (S524.099) seek an amendment to LIGHT – R4 1b to 5 lux.
- 73 For the reasons stated in Paragraph 67 and 70 I consider the proposed lux limits to be appropriate.
- 74 It is assumed that the activity of nighttime harvesting would involve vehicle mounted lights for which lighting rules would not typically apply to. Permanent lighting installed for loading of produce can be readily located, aimed and controlled to prevent light spill onto dwellings on adjoining properties.

Colour Temperature

- 75 Buller Conservation Group (S552.150) and Frida Inta (S553.150) seek amendments to LIGHT-R3 to ensure that lighting with a Colour Corrected Temperature (CCT) of no greater than 2,200K lighting be adhered to in light sensitive areas.
- 76 No rationale has been provided by the submitter as to why they are seeking 2,200K lighting in light sensitive areas. It is presumed that the intention of the submitter is to protect biota from the effects of artificial light.
- 77 I disagree with the submitter that 2,200K is a “standard”. It is not specified within any accepted lighting standards used in New Zealand and Australia.
- 78 AS/NZS 4282 Appendix C provides some guidance on the impact of external lighting on biota. It notes that “two light sources may have the approximate equivalent colour temperature but it does not mean that they have the approximate equivalent light spectrum. Light spectrum can make a difference depending on the sensitivity of the biota.
- 79 AS/NZS 4282 notes that different species may have different sensitivity to radiation and that different life stages of the same species may also have greater sensitivity.
- 80 I note that DarkSky international recommends that best practice in light sensitive areas is to limit the amount of shorter wavelength (blue-violet light) to the least amount needed. Currently DarkSky international recommends 3000K (warm white) as the maximum colour temperature for light sensitive areas and allowed lighting must not emit more than 25% of its total spectral power at wavelengths < 550 nanometers.
- 81 The proposed rule as written does not prevent the use of warmer temperatures such as 2,200K if desired. AS/NZS 4282 recommends techniques such as dimming or switching of lighting during breeding/hatching season.
- 82 The vast majority of light sources used today are Light emitting diodes (LED) due to the energy efficiency of the light source. High Intensity Discharge

(HID) lamps such as Sodium based lamps are becoming increasingly difficult to source as overseas jurisdictions are implementing bans on production of such lamps for environmental and energy efficiency reasons. The United Kingdom has recently proposed changes to minimum energy efficiency standards that would effectively ban all fluorescent and HID lamps.

- 83 Early LED fixtures were available in cool white only (5000K). As LED technology has matured, the availability of warmer light sources has improved such the neutral white (4000K) is now widely available including in some high-powered flood light fixtures used in industrial settings.
- 84 While LED luminaires with a colour temperature of 2,200K may be available via specialist commercial suppliers they are not widely available to a typical consumer.
- 85 3000K has in recent years become more widely available in both the retail and commercial environment for low power applications (including street and area lighting).
- 86 Outdoor lighting with a CCT <2,200K is in my experience difficult to source for a lighting professional other than via specialist suppliers and I would suggest a consumer or electrician would have considerable difficulty sourcing compliant product without sourcing it off-shore from a specialist supplier.
- 87 For these reasons I do not support a change in LIGHT – R3 2b from 3000K to 2,200K.

Paul Wilson

22 September 2023