

SELWYN DISTRICT PLAN REVIEW
REVIEW OF DISTRICT PLAN LIGHTING AND
GLARE PROVISIONS AND BEST PRACTICE

PREPARED FOR SELWYN DISTRICT COUNCIL

September 2017

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QUALITY STATEMENT

PROJECT MANAGER

Andrew Cumberpatch

PROJECT TECHNICAL LEAD

Paul Flint

PREPARED BY

Frances Lojkine



14/09/2017

CHECKED BY

.....

...../...../.....

REVIEWED BY

Richard Peterson



14/09/2017

APPROVED FOR ISSUE BY

Andrew Cumberpatch



14/09/2017

CHRISTCHURCH

Hazeldean Business Park, 6 Hazeldean Road, Addington, Christchurch 8024
 PO Box 13-052, Armagh, Christchurch 8141
 TEL +64 3 366 7449, FAX +64 3 366 7780

REVISION SCHEDULE

Rev No.	Date	Description	Signature or Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by

Selwyn District Council

Review of District Plan Lighting and Glare Provisions and Best Practice

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Appendix A Adjacent district plan provisions

1. Introduction

The purpose of this report is to review the provisions relevant to lighting and glare in:

- the Operative Selwyn District Plan
- the District Plans of the four adjacent territorial authorities – Ashburton District Council, Hurunui District Council, Waimakariri District Council and Christchurch City Council
- the Mahaanui Iwi Management Plan 2013

and, in conjunction with the outputs of the separate Stantec report Obtrusive Lighting Effects of Outdoor Lighting identify issues, gaps and opportunities in relation to the operative plan provisions and recommend an approach to the management of lighting effects in the Selwyn District. As part of the preparation of this report, examples of consent decisions that included consideration of the management of lighting effects have also been reviewed.

2. Existing provisions

2.1 Operative Selwyn District Plan

Provisions relating to lighting and glare are spread throughout the Operative Selwyn District Plan, in both the Township Volume and the Rural Volume. In the Township volume, provisions can be classified into one of four subject matter areas – street lighting, light spill/glare/nightglow, signage and West Melton Observatory. The cascade of provisions is outlined in Table 2-1.

Table 2-1: Operative Selwyn District Plan Township Volume provisions

Chapter	Provision number	Summary of Provisions
B2: Physical Resources		
B2.1 Transport Networks	Issue 4	Explanation of the issue notes the effects of glare from roads, railway lines or airfields on adjoining residents, and the potential for reverse sensitivity effects
	Policy B2.1.11	Relates to roading design, construction, maintenance and upgrading. Explanation notes that improved lighting may form part of upgrades.
	Policy B2.2.6	Relates to the effects of utilities on amenity and environmental values. Explanation to the policy notes that utilities can have nuisance effects such as glare
B2.3 Community Facilities	Issue 2	Relates to effects of community facilities. Explanation notes that 'Noise and lighting from functions at night can disturb sleeping residents'.
	Objective B2.3.2	Community facilities do not adversely affect residential amenity values or other parts of the environment Implemented by: <ul style="list-style-type: none"> - Policy B2.3.1: encouraging co-ordination - Policy B2.3.2: encouraging accessibility, provided adverse effects are avoided, remedied or mitigated - Policy B2.3.3: designing with regard to personal safety, with night lighting noted as contributing to safety - Policy B2.3.6/B2.3.7: co-locating and multiple use

Chapter	Provision number	Summary of Provisions
B3: People's health, safety and values		
B3.4 Quality of the environment	Overall	Focus of the section is on making townships or areas pleasant places to live and work
	Issues	Description note that levels of <i>inter alia</i> lighting affect environmental quality by affecting how 'busy' a place seems Zones are used to group similar areas, and then policies and rules used to manage effects
	Policy B3.4.4(b)	Defines rural residential living environments as areas where street lighting is avoided
	Policy B3.4.12	Specific 'glare' policy to avoid night lighting and glare from reflections shining directly into adjoining sites
	Policy B3.4.13	Specific 'glare' policy to reduce the potential nightglow from outdoor lighting around West Melton Observatory
	Policy B3.4.16	Relates to the operating hours for non-residential activities in Living zones – explanation notes light spill standards for Business zones adjoining a Living zone
	Policy B3.4.21	Ensure signs are designed and positioned to avoid nuisance effects from glare or reflectivity
	Policy B3.4.38	Addresses management of living and business zone boundary issues (which would include lighting)
B4: Growth of townships		
B4.1 Residential density	Objective B4.1.2	Notes that for the Living 2 and Living 3 zones design of lighting needs to be considered
Rules		
Outdoor signs rules	Not permitted if have flashing or revolving lights, so steady light permitted with no standards (Rules 7.1.1 and 19.1.1) Illumination of property sales signs (in Living zones – Rule 7.4.1)), and signs on listed strategic roads (in both Living and Business zones – Rules 7.5.1 and 19.2.1) are controlled by rule conditions Illuminated signs in Business zones (Rule 19.1.1) are required to comply with the light spill standards in Rule 22.5 (outlined below)	
Living Zone activities	Rule 10.7.1.1 – permits fixed exterior lighting provided it is directed away from adjacent properties and roads Rule 10.7.1.2 – permits any lighting provided spill (horizontal or vertical) on adjacent properties is no more than 3 lux Otherwise activities become discretionary Note that only very small scale non-residential activities are permitted in the Living Zones	
Subdivision	Restricted discretionary activity	

Chapter	Provision number	Summary of Provisions
		Matters of discretion: <ul style="list-style-type: none"> - in the Living WM Zone: whether street lighting options assist in mitigating adverse effects on the West Melton Observatory - provision of lighting
Business Zone activities		Rule 22.5.1.1 - permits fixed exterior lighting provided it is directed away from adjacent properties and roads Rule 22.5.1.2 – permits any lighting provided spill (horizontal or vertical) on adjacent properties is no more than: <ul style="list-style-type: none"> - 3 lux for Living Zone properties or dwellings in Rural Zones - 10 lux for Business Zone properties - 3 lux for Rural Zone properties in two specific locations in Rolleston and Lincoln

While there is a rule explanation of the effects of light spill from activities, no definitions are provided for any terms relevant to lighting and glare. Lighting does get mentioned in relation to design for workers' temporary accommodation, to ensure that effects are internalised to the sites. Subdivision design guidelines for Rolleston (Appendix 23) note that street lighting should maintain a constant colour and scale. Two Outline Development Plans for Lincoln (Appendix 37) note that roads edging open spaces need 'good lighting'.

The Rural volume contains fewer provisions relevant to lighting and glare. The provisions fall into one of four subject matter groups – glare and light spill, West Melton Observatory, Porters Ski Area and two Dairy Processing Management Areas. The cascade of provisions is outlined in Table 2-2.

Table 2-2: Operative Selwyn District Plan Rural volume provisions

Chapter	Provision number	Summary of Provisions
B2: Physical Resources LURP		
B2.1 Transport Networks	Issue 4	Explanation of the issue notes the effects of glare from roads, railway lines or airfields on adjoining residents, and the potential for reverse sensitivity effects
	Policy B2.1.11	Relates to roading design, construction, maintenance and upgrading. Explanation notes that improved lighting may form part of upgrades. Policy then flows to rules for subdivision, and roads and vehicle accessways
B2.3 Community Facilities and Recreational Areas	Issues	Explanation notes that 'Community facilities are not anticipated to cause nuisance effects to surrounding residents in the rural area, because of the lower levels of residential density and distance between neighbours.' While rules relating to glare still apply, the policies under B2.3 reflect the explanation of the issue, as they are focused primarily on the effects of camping grounds.
B3: Health safety values		
B3.4 Quality of the environment	Issues	Nightglow from houses erected close to West Melton Observatory is identified as an example of reverse sensitivity

Chapter	Provision number	Summary of Provisions
	Objective B3.4.1 B3.4.2	Explanation notes that policies and rules relating to <i>inter alia</i> glare help to achieve the objectives
	Policy B3.4.10	Seeks to ensure that signs and noticeboards avoid nuisance from glare and reflectivity
	Policy B3.4.11	Specific 'glare and nightglow' policy to avoid night lighting shining directly into houses
	Policy B3.4.12	Specific 'glare and nightglow' policy to reduce the potential nightglow from outdoor lighting around West Melton Observatory
		Explanation to the policies notes that there is no restriction on outdoor lighting at night, provided glare is avoided, and outlines how to reduce effects on West Melton Observatory
Rules		
Buildings and night lighting	Permits most activities associated with a building provided that Rules under 9.18 are met	
Signs	<p>Signs are permitted activities provided that they do not have revolving or flashing lights (Rule 6.1.1.3(a)) and that any illuminated sign does not result in spill of more than 3 lux onto any adjoining property or the road reserve (Rule 6.1.1.5)</p> <p>Illumination of signs on listed strategic roads (Rule 6.4.1) is controlled by rule conditions.</p>	
Outdoor signs and West Melton Observatory Area	<p>Rules under 6.3 generally require signs not to be illuminated between 10pm and 6am</p> <p>If consent required, matters of discretion generally relate to effects on the West Melton Observatory and mitigation to reduce lux spill</p>	
Activities and glare	<p>Rule 9.18.1 permits (outside the West Melton Observatory Lighting Area) any lighting provided spill on adjacent properties is no more than:</p> <ul style="list-style-type: none"> - 10 lux to any Business Zone property that does not contain a dwelling - 3 lux to any other property or road reserve <p>Rule 9.18.2 address activities inside the West Melton Observatory Lighting Area and permits:</p> <ul style="list-style-type: none"> - outdoor lighting that is shielded or does not operate between 10pm and 6am - activities provided that there is no light spill on any adjoining properties, or 3 lux spill between 10pm and 6am¹ <p>Notes underneath the rules provide a series of exemptions</p>	

¹ It is assumed as noted later in this report that there is an error in the e-plan in Rule 9.18.2.2 and that it should be written as an activity not operating between 10pm and 6am.

Similar provisions to those included in the Township Volume in respect of workers' temporary accommodation are included in the Rural Volume.

Appendix E25 provides a series of provisions for the Porters Ski and Recreation Area, including permitted activity standards for lighting the Village Base Sub-Zone and a restricted discretionary activity for night-lighting for recreational activities and village lighting that is not permitted.

Appendix E26 provides a series of provisions for the Dairy Processing Management Area, which is defined to include the Synlait plant at Dunsandel and the Fonterra plant at Darfield. The lighting conditions for permitted activities are that:

- there shall be no more than 3 lux light spill onto adjoining properties
- exterior lighting shall be directed away from adjacent properties

The West Melton Observatory Lighting Area is included on the Planning Maps. It covers a largely rural zoned area of the District, but also includes the settlements of West Melton, Edendale, Yorktown and Halkett. Three designations also come within the Lighting Area – two for Environment Canterbury stopbanks and one for the Minister of Defence for the West Melton Rifle Range.

2.2 Adjacent District Plans

District Plans from the four adjacent territorial authorities were reviewed for lighting and glare provisions. The Ashburton and Christchurch District Plans became operative relatively recently (2014 and 2016 respectively) but the Waimakariri District Plan dates from 2005 and the Hurunui District Plan from 2003. A Proposed Hurunui District Plan was publicly notified in May 2015, with Council decisions released in October 2016. The proposed plan was therefore also reviewed as part of this project. The Waimakariri District Council has commenced a review of the Waimakariri District Plan but no provisions are available publicly.

An outline of the lighting and glare provisions for each district plan is contained in Appendix A.

Different approaches are taken across the five councils to provisions for lighting and glare. Selwyn, Ashburton and Hurunui Districts take a consistent approach of including policies relating to lighting and glare within the rural and urban (including business where specific policies are included) sections of the plans. Waimakariri District and Christchurch City include policies where relevant in specific sections of the plans (for example business policies in Waimakariri and open space policies in Christchurch) but have a separate lighting section of the District Plan. The same general approach is reflected in the approach to rules in each of the District Plans.

2.3 Mahaanui Iwi Management Plan 2013

The Mahaanui Iwi Management Plan 2013 includes some provisions relevant to lighting and glare. Section 5.2 *Ranginui* of Wāhi Tuarima – Ngā take ā-rohe me ngā kaupapa (Part 5 – Regional issues and policy) contains the following issue and policy:

Issue R2: Cultural amenity

Protection of cultural amenity values such as celestial darkness

Ngā Kaupapa/Policy R2.1

To support the use of light suppression or limitation measures to protect celestial darkness values in some areas.

The explanation to the provisions notes that increased lights from development activity such as subdivisions can affect celestial darkness, which is a cultural amenity value for tangata whenua associated with air. A specific issue is identified in relation to the tuna harvest at Te Roto o Wairewa (Lake Forsyth), and it should be noted that tangata whenua raised concerns about the effects of lighting on celestial darkness as part of their submission on Plan Change 43 (for the Synlait plant at Dunsandel).

3. Issues, gaps and opportunities

3.1 Clarification of spill light vs glare

The report *Selwyn District Plan Review: Obtrusive Lighting Effects of Outdoor Lighting* provides a description of the differences between spill light and glare, as illustrated in Figure 3-1.

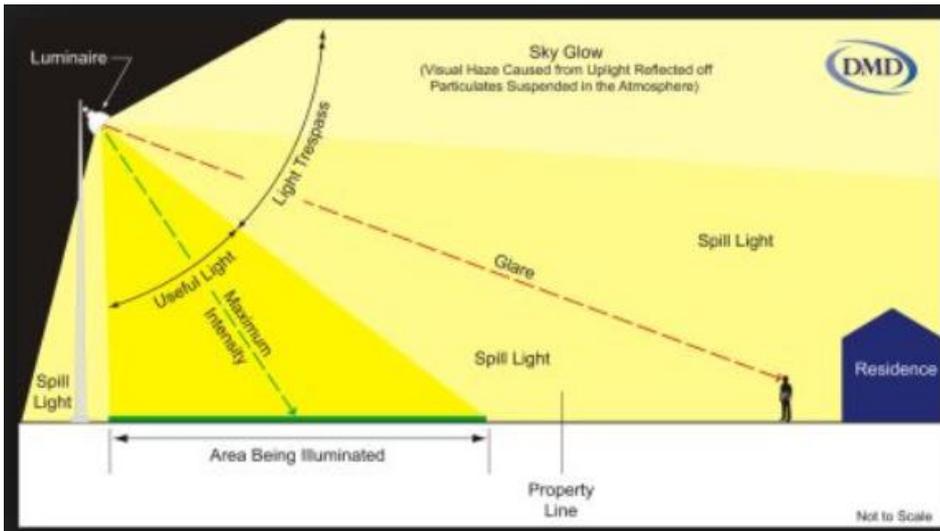


Figure 3-1: Types of obtrusive light

The difference is not, however, clearly defined in the Operative Selwyn District Plan. Policy B3.4.12 in the Township Volume and Policy B3.4.11 in the Rural Volume are entitled 'Glare' and relate specifically to light shining directly into adjoining sites. Spill light is therefore not addressed in the policies. Rules in the Township Volume are entitled 'Activities and Light Spill' but contain standards relevant to both glare (requiring that exterior lighting is directed away from adjacent properties) and spill light (lux spill standards). Rules in the Rural Volume are titled 'Activities and Glare' but only contain standards relevant to spill light. The policies in the Rural Volume are therefore not carried through to the rules, and the rules are not supported by policy guidance.

Policy B3.4.12 seeks to avoid the adverse effects of reflected light into sites. Advice from Stantec's Lighting Engineer is that reflection of this type is unlikely to occur regularly in Selwyn District or cause significant effects. There are also no controls in the rules relating to areas of reflective material. Reflected light is not subject to controls in any of the adjacent district plans.

Rule 22.5.1.2(c) in the Township Volume sets a more restrictive spill light standard for two areas of the Business Zone (one at the Rolleston iZone and one at Lincoln). The reasoning for this is not clear in either the rule or the explanation, but in terms of the Rolleston area may be because of the need to manage effects on the residence at 151 Hoskyns Road. Reasoning for the imposition of the standard in these areas should be confirmed.

Policies in both the Township Volume and the Rural Volume seek to ensure that nuisance effects of signs from glare or reflectivity are avoided. Rule standards however only relate to spill light, and are omitted entirely from rules relating to signs in Living zones. Issues of reflectivity and glare will be discussed with the signage topic lead to determine an appropriate approach. Illuminated signs may not be sufficiently bright as to cause problems of glare, and if this is the case, policies should be adjusted to address the main environmental effect of concern – spill light.

Provisions relating to lighting and glare would benefit from a consistent and clearly articulated approach. Both spill light and glare should be addressed in policies and rules, and this should be clear from both the provisions and their titles. Specifically therefore, policies should be updated to clearly address both spill light and glare, rule headings should be updated to make it clear that rule standards address both spill light and glare, and consideration should be given to including standards relating to glare in the permitted activities for Rural zones. The explanation to the rules relating to the Dairy Processing Management Areas could also be amended to more clearly identify the difference between spill light and glare.

There are also some drafting problems with the existing provisions, in particular Rule 22.5.1.3 in the Township Volume and Rule 9.18 in the Rural Volume:

- Rule 22.5.1.3(a) permits lighting in the Business 2A Zone, provided that '*All outdoor lighting is shielded from above outside of the Business 2A Zone*', which does not appear to be a practical requirement. The lighting assessment prepared for the consent application for the Lyttelton Inland Port identified that the error may have been introduced through amendments made to the Selwyn District Plan by the Land Use Recovery Plan, which deleted the original Rule 22.5.1.3 and replaced it with the current wording. The standard originally read '*All outdoor lighting is shielded from above in such a manner that*

the light source is not visible from the outside of the Business 2A Zone' which is more appropriate wording;

- There is also a significant degree of overlap between the standards included in Rule 22.5.1.3, both internally within that rule and with Rule 22.5.1.1;
- 'Notes' are included in Rule 9.18 that exempt various activities from the lighting and glare rules. In practical terms, it is assumed that the notes are implemented by Council staff, but in order to have legal weight, they should form part of the rule standards rather than appear as notes.

From the review of consent examples and a field trip undertaken by Stantec to major lit sites within the District, the existing policy approach in the District Plan is appropriate to the type and scale of effects experienced in Selwyn District from lighting and glare. It sets clear expectations with regard to the effects of lighting and glare beyond the boundary of any given site and recognises the difference between rural and township areas. The cascade of policy and rules for Transport Networks and Community Facilities and Reserves is clear and appropriately addresses the potential amenity effects from lighting and glare. The rule standards relating to lighting and glare applying at each of the Dairy Processing Management Area sites have been effective in ensuring that there are no spill light or glare issues.

The terms 'night lighting', 'glare', 'lux spill' and 'light spill' appear throughout the District Plan. While definitions of each term could be provided, if the provisions themselves are clear and consistent definitions would not be necessary, although the terms should be used consistently and as few terms as possible should be used. The Ministry for the Environment is currently consulting on National Planning Standards and has proposed that the terms 'light spill' and 'lux' be defined through national standards. If standard definitions are released prior to the notification of the Selwyn District Plan, consideration should be given to whether they should be included in the plan or not.

3.2 Light spill standards

Light spill standards of between 3 and 10 lux are contained in permitted activity conditions in the District Plan, depending on the zoning of the site that is emitting light, and the zoning of the site receiving the spill light. The most relevant light spill standards to consider the District Plan rule standards against are those contained in AS4282 (1997) (Control of the Obtrusive Effects of Outdoor Lighting). Other New Zealand standards, such as AS/NZS1158 (Lighting for Roads and Public Spaces) and AS/NZS1680 (Interior and Work Space Lighting), provide standards relevant to the lighting requirements of particular activities, but do not specifically consider the effects of that lighting on other sites, apart from providing some general guidance.

AS4282 recommends two limits for spill light, a limit during 'curfew' times (the hours of which are to be set by a local council, or if not specified, are taken as being between 11pm and 6am) and a non-curfew limit. Table 3-1 compares the spill light standards in the District Plan with those contained in AS4282.

Table 3-1: AS4282 and Operative Selwyn District Plan light spill standards (maximum lux levels)

Area ² AS 4282	Selwyn District Plan zone	AS4282 Non-curfew (at property boundary)	AS4282 Curfew (at the plane of windows in a habitable building)	Selwyn District Plan
Residential areas – dark surrounds	Rural	10	1	3 (either at the property boundary or at the notional boundary of a dwelling for spill light from most Business zones)
Residential areas – light surrounds	Living	10	2	3 (from adjacent Living zone properties and from Business zone properties)
In commercial areas or at boundary of commercial and residential areas	Business	25	4	10 (within Business zones or from a Rural zone to a Business zone that does not contain a dwelling) 3 (from Business zones to Living zone properties or at the notional boundary of a dwelling for most Rural zones)

² Note that the basis on which the areas in AS4282 have been defined is unknown. For the purposes of this assessment, Operative District Plan zones have been defined as falling within one of the areas in AS4282 on the basis of the broad description of the areas. There may be some areas of Living zones in Selwyn District that fall within the definition of 'dark surrounds', depending on the road lighting in the vicinity, but as the standards are the same for non-curfew hours and not significantly different for curfew hours, the comparison against AS4282 is still considered to be useful.

Comparing the Selwyn District Plan light standards with AS4282, in summary:

- in Living zones the District Plan standards are more stringent than AS4282 in non-curfew hours, and then slightly more lenient in curfew hours;
- in Business zones the District Plan standards are significantly more stringent than AS4282 in non-curfew hours for spill light onto other Business zone properties, and then slightly more stringent in curfew hours;
- in Rural Zones the District Plan standards are significantly more stringent than AS4282 in non-curfew hours, and then more lenient in curfew hours.

As the District Plan spill light standards apply in most cases at a property boundary, and the AS4282 standards during curfew hours apply to the vertical plane of any habitable buildings, spill light complying with the District Plan standards is likely to comply with the AS4282 standards as well.

A single light standard that applies throughout the hours of darkness will be simpler to administer than a two tier standard such as that contained in AS4282. In Living and Rural Zones the existing District Plan standards are not significantly higher than the standards contained in AS4282, which suggests that including a two-tier standard would introduce unnecessary complication to the District Plan. Advice from Stantec's Lighting Engineer is that lay people are also unlikely to be able to distinguish the difference between light spill of 1-2 lux and 3 lux, and the existing standards are therefore likely to be appropriate.

Spill light standards contained in the District Plans of adjacent territorial authorities are outlined in Appendix A. Standards in the Selwyn District Plan are consistent with those in the Ashburton District Plan, which became operative in 2014. Light standards in Waimakariri District are significantly more lenient, but are not consistent with the standards contained in AS4282³. Hurunui uses a universal standard of 8 lux light spill. Christchurch City contains a much more detailed breakdown of permitted light standards, reflecting the more complex development patterns within the metropolitan area. However, standards in residential and commercial zones are largely consistent with those in the operative Selwyn District Plan. Light standards in rural zones are consistent with the standards contained in AS4282.

3.2.1 Selwyn District Council Engineering Code of Practice

Selwyn District Council's Engineering Code of Practice (ECoP) includes references to spill lighting in relation to the lighting of parks and reserves. Where pathways in these areas are more than 4m wide, the ECoP recommends use of column mounted lights and notes that 'Consideration should be given to controlling...spill lighting'. Parks and reserves generally fall within the Living zones in the existing District Plan, which require that activities do not cause a lux spill of more than 3 onto adjoining properties. There is therefore an inconsistency between the two documents that should be resolved.

The ECoP outlines requirements for road lighting throughout the District. From review of the existing District Plan provisions, it appears that roads carry the same zoning as the adjacent properties. In the Living and Business zones, the spill light standards contained in the District Plan rules would also therefore apply to roads. As the spill light standards in the District Plan apply at the property boundary, there may be some instances where lighting roads as required by the ECoP would mean non-compliance with the standards in the plan. The issue may be addressed in the Rural zones by the exemption that is outlined for lighting activities that comply with other 'legislation' (if road lighting standards are considered to fall within the meaning of legislation in this context). The Council should consider the approach that it wants to take to managing road lighting within Living and Business zones and ensure that the District Plan reflects this.

In the Rural zones, the ECoP contains provisions about spill light only in relation to dairy crossings. The existing District Plan provisions exempt from the rural lighting rules any outdoor lighting that complies with other legislation, and there is therefore no conflict between the two documents.

3.2.2 Compliance Issues

The existing District Plan provisions were discussed with Selwyn District Council consents and compliance staff on 4 August 2017. Complaints about adverse effects from lighting are relatively rare (one every couple of years) and are nearly always from residential areas, but tend to be difficult to resolve. Issues were identified in particular with whether all spill light is a problem, for example light that is spilling from the back of a lighting fixture that is directed away from an adjacent property but is exceeding the 3 lux standard in an adjacent property but not in a residence. The existing rule standards could be reviewed to see whether they can be worded to address the issue of whether all spill light is problematic.

³ Although the Waimakariri District Plan became operative in 2005 and is therefore the oldest of the currently operative or proposed District Plans.

No issues were identified with measuring spill light in response to complaints. The current spill light standard applies at the property boundary, which is more stringent than AS4282 during curfew hours and could be adjusted to address the issue raised by Selwyn District Council staff (outlined above). Staff noted however that a number of the residential complaints that are received are from residents who expect, because they live in a more rural district, to experience lower ambient light levels. This would suggest that the existing standard, and its application at the property boundary, should be retained.

3.2.3 Summary

Without a clear indication that Selwyn District light standards are substantially out of alignment with those of adjacent territorial authorities, that significant adverse effects are occurring, or that significant numbers of consents are being required for non-compliance with the permitted activity conditions, no changes to the existing spill light standards are recommended. It should be noted that AS4282 is currently undergoing revision, and an updated AS/NZS4282 standard is expected to be released for public comment later in 2017. As this is likely to be before public notification of any updated lighting and glare provisions for Selwyn District the spill light standards in the draft revised standard will need to be checked.

3.3 Glare standards

The District Plan does not currently contain measurable standards to control glare, but instead relies on permitted activity conditions in Living and Business zones that require that fixed exterior lighting is directed away from adjacent properties and roads⁴. Discussions with Selwyn District Council staff identified issues with the rule condition, particularly in situations where there is screening (such as a fence) between the light source and the adjacent property which significantly reduces the potential for glare.

As noted in the report *Selwyn District Plan Review: Obtrusive Lighting Effects of Outdoor Lighting* glare can be categorised as either disability glare or discomfort glare. AS4282 contains standards to control disability glare,⁵ and discomfort glare.⁶

While glare standards are available, for the purposes of district plan provisions they are complex to calculate and as a result would not be suitable for inclusion as permitted activity conditions. The existing condition relating to the positioning of light sources is a simpler way of addressing the issue, and is largely effective.

Amending the condition to address the issue raised by Selwyn District Council staff could be considered however. Permanent obstructions between a light source and a receiver can reduce effects, based on the light transmission characteristics of the obstruction, and it may be possible to develop rule standards to provide for this. None of the adjacent territorial authorities have seen it as necessary to address obstructions in rule conditions. Further discussion with Selwyn District Council staff to determine the significance of the issue should occur during drafting of new provisions for lighting and glare.

Selwyn District Council's Engineering Code of Practice (ECoP) includes references to glare only in relation to the lighting of parks and reserves. Where pathways in these areas are more than 4m wide, the ECoP recommends use of column mounted lights and notes that 'Consideration should be given to controlling glare...'. Parks and reserves generally fall within the Living zones in the existing District Plan, which require that fixed exterior lighting is to be directed away from adjoining properties. There is therefore a potential inconsistency between the two documents that should be resolved.

In the Rural zones, the ECoP contains provisions about glare only in relation to dairy crossings. The existing District Plan provisions exempt from the rural lighting rules any outdoor lighting that complies with other legislation, and there is therefore no conflict between the two documents.

3.4 Consistency with adjacent councils

Comparison of the spill light standards between the District Plan and the four adjacent territorial authorities is outlined in section 3.2 above. The District Plans of the four adjacent territorial authorities have also been reviewed in terms of objectives and policies and other rule standards. In undertaking this review, it has been recognised that the Christchurch District Plan is significantly more complex than would be necessary for Selwyn District, due to its need to manage activities in a large metropolitan area.

⁴ For example, see Rule 10.7.1.1 in the current Township Volume of the District Plan.

⁵ Defined by using the term 'threshold increment' ('The measure of disability glare expressed as the percentage increase in contrast required between an object and its background for it to be seen equally well with a source of glare present').

⁶ By specifying maximum luminous intensities per luminaire.

With the exception of the boundary with Christchurch City, Selwyn District's boundaries with the other three territorial authorities are across rural zones. The review has therefore focused primarily on those zones. The following observations have been made:

- a consistent approach is taken across Ashburton, Hurunui, Christchurch and Selwyn to recognise the needs of rural activities, but to manage adverse effects from lighting and glare. Policies in the Waimakariri District Plan are more focused on amenity values (because they apply to all zones, rather than just rural zones);
- Ashburton and Waimakariri Districts both address night glow in rural areas by requiring that either fixed exterior lighting is angled below the horizontal (Ashburton) or artificial exterior lighting is directed away from the sky;
- Ashburton requires for permitted activities in rural zones that there be no lighting of retail or commercial sales activities from external light sources at night;
- the rule cascades through all of the plans are similar. Lighting and glare tends to be an effect that is wrapped into the principal activity, rather than a determinant on its own of a particular rule classification;
- Ashburton and Hurunui contain assessment criteria for some of the rules, but this is more a function of the overall structure of the plan than being related specifically to the rules for lighting and glare;
- consistent with the approach in the Operative District Plan, most of the adjacent territorial authorities include policies recognising the need for safe lighting of transport networks.

In summary, the District Plans of the four adjacent territorial authorities take a similar approach to managing lighting and glare overall, subject to minor differences relating to the structure of the plans themselves or, in the case of Christchurch City, the complexity of the urban environment that the District Plan manages.

The field trip of lit sites in Selwyn District undertaken by Stantec demonstrated that the most noticeable effect of lighting was night glow, although this will have been exacerbated by the low cloud present at the time. There is a tension between safety and functional requirements for lighting sites (both recreational and commercial sites) and reducing night glow, but Council could consider whether to strengthen the provisions in the District Plan in relation to managing night glow in rural areas, to be consistent with Ashburton and Waimakariri.

3.5 Signage

Provisions in the Township Volume of the District Plan permit outdoor signs, provided that they do not have flashing or revolving lights. Illuminated signs in Business and Rural zones are required to comply with the spill light standards⁷. Advice from Stantec's Lighting Engineer is that internally illuminated signs are likely to be able to comply with the existing rule standards, and should result in relatively little spill light. Discussion with Planz suggests that because the purpose of external illumination of a sign is to light the sign, spill light and glare effects should not be a significant issue.

The Planz Consultants report *District Plan Review Selwyn District Council DW008 Signage* includes the following recommendations with respect to illuminated signage:

- *As a general approach, the light spill effects from illuminated signage are no different from light spill from any other source and therefore are considered best addressed via the standard District-wide provisions on glare and light spill. The inclusion of cross-reference to these provisions included in the signage rules would help to alert Plan users to the need to also refer to the District wide light spill rules when lit signage is contemplated;*

⁷ Either by their inclusion in the relevant signage rule, or by the inclusion of a condition that references the lighting and glare rules. Note that illuminated signage is required to comply with the more stringent of the spill light standards in the Rural zone.

- *Separate from light spill effects, illuminated signage can also have an effect on amenity and character. It is therefore recommended that signage in Living and Rural zones should not include LED displays. Where the site is either within a Rural or Living zone, or is directly opposite these zones, signage illumination should be turned off when the premises is closed for business;*
- *Retain the Operative Selwyn District Plan controls on flashing and moving signage;*
- *LED signs should be limited to commercial and industrial zones due to their greater visibility. As with illuminated signage, LED signs should be turned off when the premises is not open for business, where the site is directly opposite a Rural or Living zone. The Plan should also be explicit that changing images on a LED sign does not constitute a 'moving part', however displaying TV style footage would.*

These recommendations are consistent with those contained in this report concerning the management of spill light and glare.

3.6 Ease of measurement and monitoring

Compliance with the rule standards in relation to spill light can be demonstrated in one of two ways – by design and by direct measurement. The existing glare standards do not have a quantifiable limit that can be measured or monitored, but this is an appropriate way to manage the issue.

Compliance with spill light standards by design involves demonstrating through the use of lighting calculations that the standards can be complied with beyond the boundary of a site. Calculations are undertaken using standard photometric files that have been calibrated for particular luminaires and are therefore sufficiently accurate that compliance can be assumed. An example of this is the work that was done for the Lyttelton Inland Port at Rolleston where both a lighting report and then a lighting plan were provided as part of the consent application and compliance with conditions respectively. The field trip of lit sites undertaken by Stantec showed that relatively little light was spilling beyond the boundary of the property.

Direct measurement of spill light is undertaken using a lux meter. Measurement is standardised and simple to perform. The existing rule standards reference to horizontal and vertical effects in township areas is considered to be best practice and easy to achieve with a lux meter. Selwyn District consents and compliance staff report no issues with measuring spill light in response to complaints in residential areas.

3.7 West Melton Observatory provisions

Provisions relevant to the West Melton Observatory are contained in the Township Volume, the Rural Volume and the Planning Maps.

In the Township volume, Policy B3.4.13 seeks to reduce the potential night glow from outdoor lighting in the area around the West Melton Observatory. Matters of discretion in the Subdivision rules, which would apply to new residential developments in the West Melton settlement, include whether street lighting options assist in mitigating adverse effects on the observatory. Rules in C10 Living Zone Activities do not however include any standards relevant to the observatory. The reference in the explanation to Policy B3.4.13 to lighting of vehicular accessways also does not appear to be supported by any provisions in the rules sections of the District Plan.

In the Rural volume, Policy B3.4.12 is identical to Policy B3.4.13 in the Township volume. Specific rules are contained in sections C6 (signs) and C9 (rural activities) to control activities involving lighting within the West Melton Observatory Lighting Area, generally requiring activities involving outdoor lighting not to operate between 10pm and 6am. Conditions on the permitted activities relating to lighting and glare require that lights are shielded so that light spill is directed below an angle of 90 degrees from vertical (a requirement that is repeated in the Selwyn District Engineering Code of Practice).

The Planning Maps identify the West Melton Observatory Lighting Area (within which the rules apply) as a circular area centred on the observatory at Bells Road, with a radius of 5000m. The size of the area was defined through the hearing process for the District Plan, based on expert evidence provided by a lighting engineer, and in response to submissions from the Canterbury Astronomical Society.

Two matters have been considered in relation to the West Melton Observatory provisions – the necessity for the provisions and their effectiveness if they are found to be necessary.

The observatory has operated from its Bells Road site since 1968 and the Lighting Area defined on the District Plan planning maps has been in place since at least the public notification of the current District

Plan in 2000 (Rural Volume) and 2001 (Township Volume). No consent applications have been triggered solely as a result of the provisions, but they have provided a useful prompt to consent applicants for other activities. The International Commission on Illumination (CIE) has published guidelines for managing night glow in the vicinity of observatories. A review of the latest version of these guidelines could be undertaken to check that the extent of the Lighting Area remains appropriate.

Assuming that the provisions relating to the Lighting Area are retained there are a number of amendments that may be appropriate for them to be as effective as possible:

- consideration should be given as to whether the shielding requirements contained in the rules in the Rural Volume should also be included in the Township Volume, so that they apply to fix exterior lighting in West Melton. These provisions were not included in the operative District Plan when it was notified, as the Lighting Area at that time did not extend to cover West Melton. The extension of the Lighting Area as a result of submissions included a recommendation from the Hearing Commissioners that equivalent rule standards apply in the Living Zones, but this does not seem to have been carried through to the final Council decisions;
- consideration should be given as to whether subdivision in the immediate vicinity of the observatory should have as a matter of discretion the location of accessways in relation to the observatory. This is forecast by the current policies, but has not been carried through to the rules;
- Rule 9.18.2.2 appears to contain an error that should be corrected. The rule requires that there is either no light spill from activities operating within the Lighting Area, or that a light standard of 3 lux light spill be complied with for activities that operate only between 10pm and 6am. The exact wording is (emphasis added):

*'There is no light spill from any activity on to any adjoining property or the road reserve; or alternatively, the illumination of the activity complies with [Rule 9.18.1.2](#) and the activity for which outdoor night lighting is required **shall operate only between the hours of 10.00 pm and 6.00 am except to conclude a specific recreation or sporting event or similar activity which was in progress prior to 10.00 pm.***

The exception for concluding a specific event which was in progress prior to 10pm suggests that the 3 lux standard was supposed to apply outside of the hours of 10pm to 6am, which would make sense in terms of the protection of night time astronomical viewing practices;

- If consent is required, one of the matters of discretion is 'effectiveness of any proposed mitigation measures to reduce lux spill'. It is not clear what mitigation measures could be employed to mitigate lux spill that would be any different than those included in the permitted activity rule, other than not having the sign in place.

On the basis of the effects outlined in the Stantec report *Selwyn District Plan Review: Obtrusive Lighting Effects of Outdoor Lighting* the rule standard requiring that lights be shielded so that light spill is directed below an angle of 90 degrees from vertical was reviewed. While the Stantec report suggests that the 'best' angle for reducing night glow is well below 90 degrees, some outdoor lighting requirements require angles approaching 90 degrees. As road lighting is the predominant lighting source in the West Melton Observatory Lighting Area, controlling property lighting to a greater degree would not be equitable and would have little overall effect.

4. Stakeholder Engagement

A draft of this report was sent to the following stakeholders primarily for their information and any comment:

- Mahaanui Kurataio Ltd
- NZTA
- Fonterra
- Synlait Milk

- Federated Farmers
- Canterbury Astronomical Society

Feedback was received from all parties except the Canterbury Astronomical Society, and some minor adjustments have been made to the report as a result of the feedback. Overall, the stakeholders were comfortable with the conclusions of the report and wish to remain involved in the process of drafting provisions for lighting and glare for the District Plan. Fonterra in particular noted the safety requirements applying to lighting at its Darfield site in relation to the discussion contained in this report relating to night glow in rural areas, and has a particular ongoing interest in this matter. Synlait Milk expressed similar reservations about any changes being made to provisions relating to night glow in rural areas.

5. Recommendations

The following approach to lighting and glare provisions is recommended for the review of the District Plan:

- include a consistent and clearly articulated approach to managing spill light and glare that recognises the difference between the two effects – if both effects are to be managed then policies should be amended to address spill light and rule headings should be corrected;
- if standard definitions of the terms 'light spill' and 'lux' are released by the Ministry for the Environment prior to the notification of the Selwyn District Plan, consider whether they should be included in the District Plan or not;
- retain existing spill light standards specified for zones in the District Plan, unless the update to AS4282 (anticipated to be released publicly in late 2017, prior to public notification of the District Plan) shows that the existing spill light standards are no longer appropriate;
- retain existing rule condition to manage glare, but consider amending in order to address situations where sources of glare are significantly obstructed and effects are consequently reduced;
- consider how to resolve the inconsistency between District Plan provisions and the Selwyn District Engineering Code of Practice in relation to the lighting of parks and reserves;
- confirm how road lighting is to be addressed in the District Plan and develop suitable provisions to ensure road and pedestrian safety, while avoiding overlaps or inconsistency with the Selwyn District Engineering Code of Practice and minimising adverse lighting and glare effects;
- acknowledging functional and safety requirements for lit sites, consider whether to strengthen the provisions in the District Plan in relation to managing night glow in rural areas, consistent with the approach taken in Ashburton and Waimakariri;
- consistent with the approach recommended in the signage report, spill light effects from illuminated signage should be managed consistent with the approach taken to other light sources. Inclusion of a cross-reference from the signage rules to the lighting and glare rules would assist with this;
- review guidelines from the International Commission on Illumination with respect to managing the effects of sky glow on observatories to determine whether the extent of the West Melton Observatory Lighting Area remains appropriate;
- update provisions applying to West Melton Observatory Lighting Area to ensure they are as effective as possible;
- correct identified drafting errors in a number of the provisions relating to lighting and glare.

A nighttime photograph of a modern campus walkway. The scene is illuminated by a series of tall, curved streetlights that create a rhythmic pattern of light and shadow. The walkway is paved with light-colored tiles and is bordered by a low, dark metal railing on the left. In the background, a large, multi-story building is visible, with a prominent tower section illuminated in a vibrant blue light. The overall atmosphere is serene and contemporary.

Appendices

Appendix A Adjacent district plan provisions

Table 5-1: Objectives and Policies

Zone	Ashburton District Plan	Waimakariri District Plan	Operative Hurunui District Plan	Proposed Hurunui District Plan as Amended by Decisions 2016	Christchurch District Plan	Comment
Rural	Policy 3.5D Aims to protect visual qualities of the environment from night lighting of recreational and business activities.	The policies are contained in the general standards section.	This plan contains a Rural Lifestyle Zone in the planning maps, however does not contain a specific policy section for this type of zone.	Policy 3.5 To enable a variety of activities to occur within rural areas while managing adverse effects on character and amenity values by seeking that the scale and siting of development: 3. Protects access to light for sensitive activities and primary production; 5. Avoids unduly affecting the amenity of existing sensitive activities being exposed to adverse light emissions at night;	17.2.2.12 Policy - Location and management of quarrying activity and aggregates-processing activity Aims to manage lighting effects.	
Residential/urban				Policy 4.6 To control site-specific environmental effects, such as light spill to levels appropriate to the zone.		
Business/commercial	Policy 5.3A Aims to protect residential and rural environments by preventing the unacceptable spill of light onto residential sites from business activities.	Policy 16.1.1.3 Provide for development and activities within the Business 1 Zones of Kaiapoi, Rangiora, Pegasus and Woodend where the following characteristics of the Zone are observed: — Lighting, taking into account Crime Prevention Through Environmental Design (CPTED) principles. Policy 16.1.1.6 Provide for a variety of industrial, and discrete commercial activities within the Business 2 Zones, including comprehensive business developments, while avoiding or remedying any adverse effects on surrounding zones and where the following characteristics of the zone are observed. Dominant presence of security measures affecting amenity values and visual appearance – lighting/fences/dogs.	This plan contains a Business Zone and Business 1 (Retail and Civic Core) in the planning maps, however does not contain a specific policy section for this type of zone.	This plan contains a variety of Business Zones in the planning maps, however does not contain a specific policy section for this type of zone.		

		Policy 16.1.1.9 Provide for trade supplier and large floor plate office business activities in the Kaiapoi Business 5 Zone in a way that: lighting in accordance with Crime Prevention Through Environmental Design (CPTED) principles.				
Open Space	Policy 6.2E The level of lighting is appropriate for activities on public recreational areas and the effects on the surrounding environment.	Doesn't have an open space zone.	This plan contains an Open Space Zone in the planning maps, however does not contain a specific policy section for this type of zone.	This plan contains an Open Space Zone in the planning maps, however does not contain a specific policy section for this type of zone.	18.2.2.3 Policy - Safety Design open spaces and recreational areas to ensure sufficient lighting to enhance safety and visibility of public areas. 18.2.2.5 Policy - Environmental effects Mitigating glare effects on the surrounding environment from activities within open spaces.	
Subdivision		Policy 18.1.1.3 This is a general policy about avoiding, mitigating and remedying adverse effects on the environment with relation to existing activities for a plan change application. However, in the explanation for this policy it refers to the glare effects of the existing activities could be unreasonable for the proposed new adjacent zone.				
Transport	Policy 10.3B To ensure roads are safe by avoiding or mitigating visual distractions e.g. lighting.	Policy 11.1.1.1 A utility should contribute to a safe environment. In the explanation to this zone it describes that street lighting should be provided in a manner that ensures the safety of vehicles, cyclists and pedestrians.			7.2.1.8 Policy - Effects from transport infrastructure Avoid or mitigate adverse effects and promote positive effects from new infrastructure on the environment including glare.	
Utilities		Policy 11.1.2.6 Parking facilities shall ensure visibility through natural lighting or illumination.				
Lighting and glare		Objective 12.1.1 Maintain the amenity values appropriate for different parts of the District which protects the health, safety and wellbeing of people and ensure any potential effects from glare are avoided or mitigated. Policy 12.1.1.8			6.3.2.1 Objective - Artificial outdoor lighting and glare Outdoor lighting enables night-time work, rural productive activities, recreational activities, sport, entertainment activities, transportation and public health and safety while managing adverse effects	

		<p>Control artificial light at a level that is appropriate to the zone.</p> <p>Policy 12.1.1.9 Avoid glare from lighting affecting the amenity values, health and safety of people on neighbouring properties and roads.</p> <p>Explanation Glare can arise from lighting fields, security lighting, signs and reflective glare from some structures. The impact of proposed lighting on safety will be affected by the level of background light and surrounding land uses.</p>			<p>and avoiding interface with the safe operation of transport and infrastructure.</p> <p>6.3.2.1.1 Policy - Enabling night-time activity while managing the adverse effects of artificial outdoor lighting Recognise and provide for artificial outdoor lighting for night-time activities and safety while managing its scale, duration, design and direction in a way that avoids, remedies or mitigates adverse effects, does not interfere with the safe operation of the transport network or aircraft, and minimises unnecessary light spill into the sky.</p>	
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Table 5-2: Rules

Zone	Ashburton District Plan	Waimakariri District Plan	Operative Hurunui District Plan	Proposed Hurunui District Plan as Amended by Decisions 2016	Christchurch District Plan	Comment
Rural	<p>3.9.10 Retail Sales and Commercial Activities There shall be no lighting from external light sources at night (between one hour after sunset and one hour before sunrise) of any retail sales or commercial activity.</p> <p>3.10.9 Lighting a) All fixed exterior lighting shall be directed away from adjacent properties, roads, and railways and angled below the horizontal. b) No lighting from any activity shall result in a greater than 3 lux spill (horizontal and vertical) of light onto any adjoining property within a Residential Zone, measured at any point more than 2m inside the boundary of the adjoining property.</p>	<p>This plan contains a Rural Zone in the planning maps, however does not contain a specific rule section for this type of zone but does contain a policy section for this zone.</p>	<p>This plan contains a Rural Zone in the planning maps, however does not contain a specific rule section for this type of zone.</p>	<p>3.4.3 Standards for permitted activities 8. Artificial light Light emissions from a site will not exceed a measurement of 8 lux (lumens per square metre) measured 1.5 m above the ground at the boundary.</p> <p>3.4.8 Assessment criteria for non-complying activities 3. Artificial light (a) The effect of the light on adjoining and other properties; (b) Whether a reduction in the size of the glare source is possible; and (c) Whether the direction in which the light is aimed and the duration and hours of operation of the activity requiring the</p>	<p>Has no rules that relate to lighting and glare however refers to it in the matters of discretion for restricted discretionary activities.</p> <p>17.11.2 Matters of discretion for activity specific standards</p> <p>17.11.2.1 Scale of activity d. The extent to which the site layout and building design will mitigate effects including lighting.</p> <p>17.11.1.7 Traffic generation and access a. The extent to which any additional traffic generation will: result in adverse effects from glare.</p> <p>17.11.1.9 Building reflectivity - Rural Banks Peninsula a. The extent to which the building will give rise to adverse glare, taking into account the size of the building and the area of the building that exceeds 40% reflectivity.</p> <p>17.11.2.13 Hours of operation a. The extent of any amenity impacts (including cumulative with other activities) on residents in adjoining zones which may result from lighting.</p>	

	<p>3.11.4 Setback from Neighbours h) The extent to which the use of the building will detract from the pleasantness or amenity of adjoining sites, in terms of matters such as glare.</p> <p>3.11.6 Home Occupations d) Has the same rule as above.</p> <p>3.11.9 Retail Sales and Commercial Activities e) Any adverse effects of the proposed activity in terms of:</p> <ul style="list-style-type: none"> • Night lighting on neighbouring residential properties, traffic safety and the visibility of the night sky for the surrounding areas. <p>g) Within the Mt Hutt policy area, the effect of night lighting on the visual qualities of the surrounding environment, the views of the mountain from the adjoining Plains area, and the visibility of the night sky from the</p>			<p>lighting can be changed to reduce adverse effects.</p> <p>10. Mineral extraction activities (a) The risk of adverse effects on neighbours such as lighting.</p>	
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	surrounding areas.					
Residential/ Urban	<p>4.10.4 Lighting</p> <p>a) All external lighting shall be directed away from adjacent properties, roads, and railways and shall not be projected above a horizontal line from the light source.</p> <p>b) No activity shall result in a greater than 3 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.</p> <p>4.11.4 Setback from Neighbours</p> <p>h) The extent to which the use of the proposed building will detract from the pleasantness or amenity of adjoining sites, in terms of such matters as glare.</p> <p>4.11.9 Home Occupations</p> <p>d) Has the same rule as above.</p>	This plan contains a variety of Residential Zones in the planning maps, however does not contain a specific rule section for this type of zone.	<p>B1.3 Discretionary activities (restricted)</p> <p>B1.3.3 Business activities adjoining residential areas</p> <p>B1.3.3 Business activities adjoining residential areas</p> <p>(ii) A concept plan is submitted to the Council for development of the site, which shows:</p> <ul style="list-style-type: none"> - Any proposed outdoor lighting. 	<p>4.6 Standards for permitted activities</p> <p>6. Light Spill</p> <p>Light emissions from a site shall not exceed a measurement of 8 lux (lumens per square metre) measured 1.5 m above the ground at the boundary.</p> <p>4.24 Assessment criteria</p> <p>4. Artificial light: (a) The effect of the light on adjoining and other properties;</p> <p>(b) Whether a reduction in the size of the glare source is possible; and</p> <p>(c) Whether the direction in which the light is aimed and the duration and hours of operation of the activity requiring the lighting can be changed to reduce adverse effects.</p> <p>13. Traffic generation</p> <p>(b) Any adverse effects in</p>	<p>Has no rules that relate to lighting and glare however refers to it in the matters of discretion for restricted discretionary activities.</p> <p>14.15.1 Residential design principles</p> <p>h. Safety</p> <p>ii. The relevant considerations are the extent to which the development: provides for good visibility with clear sightlines and effective lighting.</p> <p>14.15.6 Traffic generation and access safety</p> <p>a. Whether the traffic generated is appropriate to the residential character, amenity, safety and efficient functioning of the access and road network taking into account: any adverse effects in terms of glare from headlights of vehicles entering and leaving the site or adjoining road on residents or occupants of adjoining residential sites.</p> <p>14.15.9 Retirement villages</p> <p>a. Whether the developments, while bringing change to existing environments, is appropriate to its context taking into account: incorporation of Crime Prevention Through Environmental Design (CPTED) principles, including effective lighting, passive surveillance, management of common areas and clear demarcation of boundaries and legible entranceways.</p>	

				terms of glare from headlights of vehicles entering or leaving the site which is an intrusion for residents or occupants of adjoining residential sites;	
Business/ commercial	<p>5.10.0 Lighting</p> <p>a) All exterior lighting shall be directed away from adjacent properties, roads, and railways.</p> <p>b) No activity shall result in greater than a 10 lux spill (horizontal and vertical) of light on to any adjoining property within the zone, measured 2m inside the boundary of any adjoining property.</p> <p>c) No activity shall result in greater than 3 lux spill (horizontal or vertical) of light onto any adjoining property which is zoned Residential measured at any point more than 2m inside the boundary of the adjoining property.</p> <p>d) The above standards shall not apply to light associated</p>	This plan contains a variety of Business Zones in the planning maps, however does not contain a specific rule section for this type of zone.		<p>4.11 Permitted activities</p> <p>4. Light Spill</p> <p>Light emissions from a site shall not exceed a measurement of 8 lux (lumens per square metre) measured 1.5 m above the ground at the boundary of a site not zoned Business or Industrial.</p>	<p>Has no rules that relate to lighting and glare however refers to it in the matters of discretion for restricted discretionary activities.</p> <p>15.13.1 Urban Design</p> <p>a. The extent to which the development:</p> <p>v. Is designed to incorporate Crime Prevention Through Environmental Design (CPTED) principles, including encouraging effective lighting.</p> <p>15.13.2.5 Nuisance</p> <p>a. Whether the scale, character and intensity of an activity is compatible with the amenity values of the centre and adjoining properties in terms of lighting.</p> <p>15.13.2.7 Commercial Central City Business Zone urban design</p> <p>a. The extent to which the building or use:</p> <p>This has the same rule as the Urban Design rule above relating to CPTED.</p> <p>15.13.2.12 Urban Design in the Commercial Central City (South Frame) Mixed Use Zone</p> <p>c. This has the same rule as the Urban Design rule above relating to CPTED.</p> <p>15.13.2.15 Retirement villages</p> <p>a. The following matters shall apply to retirement villages. Where a Built form standard addresses the same matter (e.g. sunlight by recession plane controls), listed below there shall be no discretion to consider this matter where development complies with the relevant standard.</p> <p>i. Whether the development, while bringing change to existing environments, is appropriate to its context taking into account:</p> <p>E This has the same rule as the Urban Design rule above relating to CPTED.</p> <p>15.13.3.12 Drive-through services</p> <p>a. The extent to which the activity and development is consistent with the following criteria:</p> <p>vii. Where adjoining a residential zone, whether the scale, character and intensity of an activity is compatible with</p>

<p>with emergency service call outs.</p> <p>5.11.9 Amenity e) The potential for the development to affect the amenity of the adjoining environment in terms of such matters as glare.</p> <p>5.11.13 Hours of Operation d) The extent to which lighting associated with the activity may adversely affect adjoining sites and the likely success of measures to mitigate any adverse effect. e) The volume and type of traffic which may be generated to the site and the ability of the site to accommodate parking, loading, manoeuvring and access requirements, including the extent to which the frequency and timing of vehicle movements and the impact these may have on the surrounding environment in terms of glare from headlights.</p>					<p>the amenity values of the centre and adjoining residential properties in terms of lighting.</p>	
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<p>Open Space</p>	<p>6.8.3 Restricted Discretionary Activities The following activities shall be Restricted Discretionary Activities, provided that they comply with all of the relevant zone standards: a) Retail activities limited to those selling only food and beverages, in both the Open Space A and B Zones. The exercise of the Council's discretion being restricted to effects associated with lighting.</p> <p>6.10.3 Zone Standards – Lighting a) All fixed exterior lighting shall be directed away from adjacent properties, roads, and railways. b) No activity shall result in greater than 2.5 lux spill (horizontal and vertical) of light onto any property within a Residential Zone, measured at any point more than 2m inside the boundary of the property.</p>				<p>18.4 Rules – Open Space Community Parks Zone P24 The following activities at 466-482 Yaldhurst Road (Yaldhurst Recreation and Sports Facility) identified on the Development Plan in Appendix 18.11.4(a) and (b): a. <u>Major sports facilities</u>; b. <u>Gymnasium</u>, excluding <u>health care facility</u>; c. <u>Accessory sports and fitness health care services</u>; and d. Activities listed in Rule 18.4.1.1 P1 - P7, P9 - P12 and P16. f. All flood lighting shall be controlled by an automated system and shall not be used outside of the hours of 16:00 to 22:00.</p> <p>18.5 Rules – Open Space Metropolitan Facilities Zones 18.5.4.1.1 Permitted activities P1 Sporting and non-sporting events not requiring the use of floodlights and excluding concerts c. Lighting shall not exceed an illuminance level of 100 lux when measured both vertically and horizontally at the <u>boundary</u> and 40 lux when measured both vertically and horizontally at the <u>window</u> of any <u>residential unit</u>. P2 Night sporting events and non-sporting events requiring the use of flood lights and excluding concerts d. Use of stadium floodlighting for events is limited to no more than two nights in any week starting Monday. e. Lighting shall not exceed an illuminance level of 100 lux when measured both vertically and horizontally at the boundary and 40 lux when measured both vertically and horizontally at the window of any residential unit. P4 Concerts e. Use of stadium floodlighting for events is limited to no more than two nights in any week starting Monday. f. Lighting shall not exceed an illuminance level of 100 lux when measured both vertically and horizontally at the <u>boundary</u> and 40 lux when measured both vertically and horizontally at the <u>window</u> of any <u>residential unit</u>; g. Use stadium floodlights for concerts at full illumination level shall be finished by 22:00 hrs, Sunday to Thursday and by 23:00 hrs. Friday and Saturday or any public holiday with the floodlights switched to an average level no higher than 100 lux on the field after an event is finished and lasting not longer than 30 minutes thereafter to allow for safe crowd movement from the <u>site</u>. Thereafter the lights shall be reduced to 50 lux on the field to enable cleaning. Within 90 minutes from the finish of the event the lights shall be turned off; h. Stadium floodlights shall be directed towards the pitch. P5 Feature and directional lighting for use on an event night. a. Lighting shall not exceed an illuminance level of 100 lux when measured both vertically and horizontally at the boundary and 40 lux when measured both vertically and horizontally at the window of any residential unit.</p> <p>18.5.4.1.2 Controlled activities</p>	
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					<p>C1 Creation of new vehicle and pedestrian <u>access</u> points not generally in accordance with the Development Plan in Appendix 18.11.2c.</p> <p>b. The provision of adequate lighting and the effects on the neighbouring residential properties.</p> <p>C3 Use of artificial lighting in excess of 100 lux measured at the <u>boundary</u> of the Open Space Metropolitan Facilities Zone (Temporary Christchurch Stadium) and 40 lux at the <u>window</u> of any <u>residential unit</u>.</p> <p>e. Relevant standards and guidelines for lighting effects.</p> <p>18.10 Rules – Matters of Discretion</p> <p>18.10.2 Scale of activity, displacement, multifunctional, non-recreational, community and cultural facilities</p> <p>b. Whether the activity/facility and/or its scale will:</p> <p>v. Adversely impact on the amenity values of adjoining open space and residents including glare.</p> <p>18.10.3 Traffic generating and access</p> <p>c. Any adverse effects in terms of glare that are incompatible with the amenity of the open space and/or adjoining residents.</p> <p>18.10.4 Hours of operation</p> <p>a. The extent to which the hours of operation:</p> <p>i. will result in adverse effects on the <u>amenity values</u> of open space and/or residents, including, glare.</p>	
Subdivision	<p>9.7.3 Controlled Activities</p> <p>a) Any subdivision in the open Space Zones, Business Zones or for utilities. Control is reserved over the following matters:</p> <ul style="list-style-type: none"> Street lighting. 	<p>32.1.3 Matters Over Which Control is Exercised</p> <p>iii. Subdivision design</p> <ul style="list-style-type: none"> Standard for street lighting. 		<p>5.7 Assessment matters</p> <p>2. For the assessment of multiple-lot or rural subdivision creating one or more undersized allotments, the following matters will also be considered where relevant:</p> <p>(f) The design of the subdivision avoids urban characteristics such as street lights.</p>		
Transport		<p>Table 30.1: Road Design Attributes by Zone</p>		<p>8.5 Discretionary criteria</p>	<p>7.4.2.1 Permitted activities</p> <p>P13 New <u>transport infrastructure</u> and additions to existing <u>transport infrastructure</u> in the Transport Zone</p>	

	Strategic		Arterial		Collector. Urban collector		Local		Cul-de-sac	
	Rural	Res & Bus	Rural	Res & Bus	Rural	Res & Bus	Rural	Res & Bus	Rural	Res & Bus
Street lighting		AS/NZS 1158 V3 lighting	No	AS/NZS 1158 V4 lighting	No	AS/NZS 1158 V4 lighting	No	NZS 6701 lighting	No	NZS 6701 lighting

Table 30.2: Road Design Attributes for Residential 7 Zone West Kaiapoi

This rule requires street lighting for collector/ urban collector, local cul-de-sac local, cul-de-sac neighbourhood, and neighbourhood to be AS/NZS 1158 lighting.

30.6.1.45 Cycle parking required by Rule 30.6.1.34 shall be constructed:

- d. For short term parking, be located:
- v. under lighting if designed to be used at night.

(a) Traffic generation
(ii) Any adverse effects in terms of glare from headlights of vehicles entering or leaving the site which is an intrusion for residents or occupants of adjoining residential sites.

(excluding activities or structures listed in Rule 7.4.2.1 P15) and new freight handling activities.
a. The maximum height for any building (excluding street lighting, poles, traffic signals, safety cameras and fences) shall be as follows:

Distance of the closest point of the <u>building</u> from the boundary of a Residential, Commercial (excluding Commercial Retail Park), Specific Purpose Hospital Zone or Open Space Community Park Zone:	Maximum <u>height</u> - within a <u>road reserve</u> :	Maximum <u>height</u> - not within a <u>road reserve</u> :#:
i. Less than 15 metres	5 metres*	8 metres
ii. 15-50 metres	5 metres*	10 metres
iii. More than 50 metres	10 metres	15 metres

P14 Public transport facilities (including any office or retail activity ancillary to a public transport facility), public amenities and landscaping in the Transport Zone.

b. Buildings (excluding lighting poles) shall be less than 3m in height in the South Frame Pedestrian Precinct shown on the Planning Maps.

7.4.3.6 Design of parking and loading areas

Applicable to:	Standard	The Council's discretion shall be limited to the following matters:
All non-residential activities with parking areas and/or loading areas used during hours of darkness.	Lighting of parking areas and loading areas shall be maintained at a minimum level of two lux, with high uniformity, during the hours of operation.	Rule 7.4.4.8 - Illumination of parking areas and loading areas

7.4.4.8 Illumination of parking and loading areas

a. The following are matters of discretion for Rule 7.4.3.6 a.:

					<ul style="list-style-type: none"> i. Whether the facility is often used during the hours of darkness. ii. Whether other light sources in the area give adequate light to provide security for users of the area. iii. Whether glare from the light source will adversely affect the safety of surrounding roads and/or the rail corridor. 	
Utilities	<p>14.7 Rules – Utilities 14.7.1 Permitted Activities k) Pole-mounted street lighting.</p> <p>14.8.7 Lighting a) No activity shall create a spill (horizontal and vertical) of light onto any adjoining property within a Residential Zone and within the Residential Area of the Aquatic Park Zone.</p> <p>14.9 Assessment Matters k) the degree to which glare may affect the enjoyment, character or amenity of the surrounding environment or the safety of adjoining roadways and the effect of measures to mitigate any such adverse effect</p> <p>14.10.4.3 Waste Management Site, Rakaia (off West Town Belt near Rakaia Terrace) – Designation Number 96</p>			<p>9.4.3 Permitted activities 2. Above ground utility buildings and structures in the Rural Zone, where the following standards are met: (e) The following provisions for the zone in which the utility is located shall be met: (i) Light emissions;</p>	<p>11.4.1 Permitted activities – General P8 Utility structures for street lighting</p> <p>P13 An increase in the carrying or operating capacity, efficiency or security of electricity transmission or electricity distribution lines, or telecommunication lines, by the following activities: e. the addition of earth wires (which may contain telecommunication lines, earthpeaks and lighting rods). a. If the <u>utility</u> is replaced, the replacement <u>utility</u> must be of a similar scale and character to the structure that is replaced.</p> <p>11.10.5 Electricity generation – matters of discretion i. The extent of and effect on <u>adjoining</u> land uses of glint/glare, and shadow flicker; l. For solar cells, in addition to the above: i. the time of day, year, and time per day when <u>adjoining</u> or adjacent properties would be affected by reflected solar glare and the degree of luminance; iii. whether there is any glare hazard.</p>	

	<p>o) There shall be no night lighting of the recycling and refuse collection area.</p> <p>14.11.6 Lighting a) All exterior lighting shall be directed away from adjacent properties and roads.</p>					
Lighting and glare	<p>For this plan the lighting and glare rules are within each zone, as shown above.</p>	<p>31.10 Permitted Activities 31.10.1 Conditions 31.10.1.1 In any Rural Zone, any artificial exterior lighting within a site shall: a. be directed away from the sky; b. except for any street light, be directed away from the site boundary and roads so as to avoid light spill, or in the case of a road boundary, avoid a distraction or glare which would create a traffic hazard; and c. be placed so as to avoid causing an air or sea navigation hazard. 31.10.1.2 In any Residential or Business Zone, artificial lighting, (except any street light, navigational light or traffic signal), shall not: a. emit light exceeding 20 lux (horizontal and vertical) measured at or within the boundary of any other site zoned Residential, or the notional boundary of any dwelling house in a Rural Zone; b. spill onto any road in a way which might distract traffic or interfere with any traffic aids and signals; c. spill into the sky or over the sea in a way which might distract or interfere with any air or sea navigation lights; or d. imitate traffic signals. 31.10.2 Exemptions 31.10.2.1 Any land use associated with farming or any agricultural activity, other than a land use where light emanates from a structure, is exempt from complying with Rule 31. 10.1.1 Providing that it does not create a road traffic, air or sea navigation hazard. 31.11 Discretionary Activities (Restricted) 31.11.1 Any land use which does not comply with one or more of Rules 31.10.1.1 and 31.10.1.2 is a discretionary activity (restricted), except where exempted under Rule 31.10.2.1. In considering any application for a resource consent under Rule 31.11.1, the Council shall, in deciding whether to grant or refuse consent, and in deciding whether to impose conditions, restrict the exercise of its discretion to the following matters: i. conditions for permitted activities (Rule 31.10.1); ii. effects on the efficient and effective functioning of any road, and the safety of road users; iii. effects on the amenity of the site, and adjoining sites, or surrounding area; iv. effects on the characteristics of the zone as set out in Objective 14.1.1 and Policies 15.1.1.1, 16.1.1.1, 16.1.1.3, 16.1.1.5, 16.1.1.8, 17.1.1.2 and 17.1.1.3; v. effects of light colour, flashes, strength, siting and hours of operation; and vi. effects on the needs of aviators, navigators and astronomers.</p>	<p>A1.2.8 Artificial light Light emissions from a site shall not exceed a measurement of 8 lux (lumens per square metre) measured 1.5 metres above the ground at the boundary. Note: There is no sunlight access rules in the District other than in urban areas – refer to Rule B1.2.4</p>	<p>The lighting and glare rules are throughout the plan in all zones. However they generally say; light emissions from a site will not exceed a measurement of 8 lux (lumens per square metre) measured 1.5m above the ground at the boundary.</p>	<p>6.3.4 Rules - Activity status tables - Control of glare 6.3.4.1 Permitted activities P1 Any activity involving artificial outdoor lighting, other than activities specified in Rule 6.3.4.5 NC1 or NC2. a. All fixed exterior lighting shall, as far as practicable, be aimed, adjusted and/or screened to direct lighting away from the <u>windows</u> of <u>habitable spaces</u> of <u>sensitive activities</u>, other than <u>residential units</u> located in industrial zones, so that the obtrusive effects of glare on occupants are minimised. b. Artificial outdoor lighting shall not result in a greater than 2.5 lux spill (horizontal or vertical) into any part of a <u>major arterial road</u> or <u>minor arterial road</u> or arterial route identified in <u>Appendix 7.5.12</u> where this would cause driver distraction. Advice note: See <u>Appendix 6.11.13</u> for guidance on lighting design to reduce light spill and glare. 6.3.4.3 Restricted discretionary activities RD1 Any activity listed in <u>Rule 6.3.4.1 P1</u> that does not meet activity specific standard a. Council's discretion shall be limited to Amenity – rule 6.3.7.1. RD2 Any activity listed in <u>Rule 6.3.4.1 P1</u> that does not meet activity specific standard b. Any application arising from this rule shall not be publicly notified and shall be limited notified only to the road-controlling authority (absent its written approval). Council's discretion shall be limited to Transport safety – Rule 6.3.7.2. 6.3.4.5 Non-complying activities NC1 Any activity that results in a greater than 2.5 lux spill (horizontal or vertical) into any land outside the Specific Purpose (Airport) Zone that is within 500 metres of the threshold of a runway at Christchurch International Airport. NC2 Any non-aeronautical ground lights in the areas shown in Appendix 6.11.7.4 that shine above the horizontal. 6.3.5 Rules - Activity status tables - Control of Light Spill 6.3.5.1 Permitted activities P1 Any activity involving outdoor artificial lighting.</p>	

a. Any outdoor artificial lighting shall comply:
 i. with the light spill standards in Rule 6.3.6 as relevant to the zone in which it is located, and;
 b. where the light from an activity spills onto another site in a zone with a more restrictive standard, the more restrictive standard shall apply to any light spill received at that site.
 Advice Note:
 See Appendix 6.11.13 for guidance on lighting design to reduce light spill and glare.

6.3.5.3 Restricted discretionary activities
RD1 Any activity listed in Rule 6.3.5.1 P1 that does not meet the activity specific standard.
 Council's discretion will be limited to Amenity – Rule 6.3.7.1.

6.3.6 Rules – Light Spill Standards by Zone
Table 6.3.6.1: Light Spill Standards by Zone

Zone or scheduled activity	Permitted lux spill (horizontal and vertical)
Open Space Coastal Zone	4.0
Commercial Central City Business Zone	20.0
Commercial zones, all other	10.0
Residential Guest Accommodation Zone	5.0
Industrial Park Zone; Industrial General Zone	10.0
Industrial Zone; all other	20.0
Open Space Community Parks Zone; Open Space Natural Zone; Open Space Water and Margins Zone and Avon River Precinct/Te Papa Ōtākaro Zone	4.0
Open Space Zones; all other	10.0
Papakāinga / Kāinga Nohoanga Zone	4.0
Residential zones, all other	4.0
Rural Quarry Zone	10.0
Rural Zone; all other	10.0

					<table border="1"> <tr> <td>Scheduled activities (taverns; service stations)</td> <td>10.0</td> </tr> <tr> <td>Scheduled activities, all other</td> <td>4.0</td> </tr> <tr> <td>Specific Purpose (Cemetery) Zone; Specific Purpose (Hospital) Zone other than Christchurch Hospital; Specific Purpose (School) Zone; Specific Purpose (Tertiary Education) Zone; Specific Purpose (Flat Land Recovery) Zone</td> <td>4.0</td> </tr> <tr> <td>Specific Purpose (Hospital) Zone - Christchurch Hospital; Specific Purpose (Golf Resort) Zone; Specific Purpose (Ruapuna Motorsport) Zone; Specific Purpose (Styx Mill Road Transfer Station) Zone; Specific Purpose (Defence Wigram) Zone</td> <td>10.0</td> </tr> <tr> <td>Specific Purpose (Airport) Zone</td> <td>20.0</td> </tr> <tr> <td>Transport Zone Advice note: Exemptions from this standard can be found in 6.3.3.</td> <td>Activities in the Transport Zone must meet the standards for the zones in which the adjacent sites are located.</td> </tr> </table>	Scheduled activities (taverns; service stations)	10.0	Scheduled activities, all other	4.0	Specific Purpose (Cemetery) Zone; Specific Purpose (Hospital) Zone other than Christchurch Hospital; Specific Purpose (School) Zone; Specific Purpose (Tertiary Education) Zone; Specific Purpose (Flat Land Recovery) Zone	4.0	Specific Purpose (Hospital) Zone - Christchurch Hospital; Specific Purpose (Golf Resort) Zone; Specific Purpose (Ruapuna Motorsport) Zone; Specific Purpose (Styx Mill Road Transfer Station) Zone; Specific Purpose (Defence Wigram) Zone	10.0	Specific Purpose (Airport) Zone	20.0	Transport Zone Advice note: Exemptions from this standard can be found in 6.3.3 .	Activities in the Transport Zone must meet the standards for the zones in which the adjacent sites are located.
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Transport Zone Advice note: Exemptions from this standard can be found in 6.3.3 .	Activities in the Transport Zone must meet the standards for the zones in which the adjacent sites are located.																
					<p>6.3.7 Rules - Matters of discretion</p> <p>6.3.7.1 Amenity</p> <p>a. The extent to which the timing, duration, direction, intensity, focus, design, height or type of lighting (e.g. moving or intermittent) create adverse effects on local amenity values, particularly where any of the above is likely to result in sleep disturbance or to restrict the reasonable use of outdoor living or recreation areas;</p> <p>i. Reference shall be made where appropriate to Australian Standards AS 4282 – 1997 (Control of the Obtrusive Effects of Outdoor Lighting) to determine degrees of glare or discomfort and appropriate mitigation measures.</p> <p>b. Any measures taken to mitigate the effects in a.;</p> <p>c. Whether the artificial lighting is necessary for public safety or security;</p>												

					<p>d. The consistency of the proposal with permitted background levels of artificial outdoor lighting in the receiving environment and the purpose, function and anticipated activities of affected zones;</p> <p>e. The likelihood of additional lighting contributing to cumulative adverse effects on residential, commercial, rural or open space amenity values;</p> <p>f. Whether the timing, direction or design of the lighting contributes to avoidable or unnecessary light spill into the night sky, except in the Central City.</p> <p>g. The proximity of the proposed artificial lighting to, and any potential adverse effects on:</p> <p>i. any Site of Ecological Significance listed in Schedule A of Appendix 9.1.6.1;</p> <p>ii. any heritage item or heritage setting listed in Appendix 9.3.7.2;</p> <p>iii. any Wāhi Tapu/Wāhi Taonga site of Ngāi Tahu Cultural Significance identified in Schedule 9.5.6.1;</p> <p>iv. any Outstanding Natural Landscape identified in Appendix 9.2.9.2.2;</p> <p>v. any Outstanding Natural Feature identified in Appendix 9.2.9.2.1;</p> <p>vi. any Significant Feature identified in Appendix 9.2.9.2.3; and</p> <p>vii. any Area of Outstanding, or High and Very High, Natural Character in the Coastal Environment identified in Appendices 9.2.9.2.7 and 9.2.9.2.8.</p> <p>6.3.7.2 Transport safety</p> <p>a. The risk of any artificial lighting or glare creating a distraction or other impediment to the safe operation of the transport network, ships or aircraft.</p>	
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Christchurch

Hazeldean Business Park, 6 Hazeldean Road
Addington, Christchurch 8024
PO Box 13-052, Armagh
Christchurch 8141
Tel +64 3 366 7449
Fax +64 3 366 7780

www.mwhglobal.com/nz

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