ELECTRICAL CONSULTING SERVICES LTD

18 July 2019

Zomac Planning Solutions Ltd
PO Box 103
Whangaparaoa
Auckland
0943

Attention: Mr Mike Foster

Dear Sir,

COUNTDOWN LINCOLN - LIGHTING COMPLIANCE

We refer to the proposed Resource Consent Application, in relation to the customer carpark and exterior yard area lighting for the new proposed Countdown Supermarket at 555 Birchs Road, Lincoln, Christchurch.

We have reviewed the proposed Masterplan – Stage 12 (Flemington Development) showing the position of the proposed Countdown Supermarket, adjacent to Birchs Road and Makybe Terrace, and the relation of the supermarket site to the adjoining residential sites on the eastern and northern boundaries. As the northern boundary of the site has an existing house surrounded by vacant land, we have assumed this to be a future residential development.

The Selwyn District Plan as shown in 22.5 Activities and Light Spill, notes:

Permitted Activities – Activities and Light Spill

- 22.5.1. The following activities shall be permitted activities:
  22.5.1.1 Any fixed, exterior lighting if it is directed away from adjacent properties and roads
  22.5.1.2 Any other lighting if it does not exceed:
  - 3 lux spill (horizontal and vertical) on to any part of any adjoining property in a Living Zone or within the notional boundary of any dwelling within an Rural Zone
  - 10 lux spill (horizontal or vertical) on to any part of any property within the same Business Zone.

Discretionary Activities – Activities and Light Spill

- 22.5.2 Any activity which does not comply with Rules 22.5.1 shall be a discretionary activity.

As noted above, the northern boundary would be considered a Residential Zone with a spill lighting restriction of 3 lux on to any part of this property. This is the worst case restriction under the Selwyn District Plan (Activities and Light Spill – 22.5.1.2), with lighting fixtures and equipment along this boundary being restricted to low level LED bollard lighting (1m mounted height) in the carpark areas, and low level wall mounted (full cut-off distribution) LED fittings (3m mounting height) along the delivery truck route from the carpark area to the delivery yard area.

The delivery and loading area towards the rear of the supermarket is bordered by the residential sites numbered 715 and 716. These are critical areas where strict spill lighting compliance is required, with a spill lighting value of 3 lux or less. The artificial lighting is this area must be limited to the delivery canopy and one (1x) wall mounted LED fitting, mainly for the illumination of the area at the delivery

gate. Mounting heights in this area are restricted to the canopy height and 5m height for the wall mounted LED light fitting.

The proposed LED light fittings (Cree CPY and XSP) have a downward lighting distribution (flat glass, full cut-off), mounted in a horizontal position (0 deg tilt). The way these light fittings are mounted will ensure no visibility of the LED chips from the residential boundaries, hence glare is eliminated. A physical metal shield can be used in situations where canopy lights are mounted on angled canopy structures, again eliminating the direct view of LED light sources from the residential properties directly opposite this loading area canopy.

All of the project site lighting LED fittings (CREE XSP (pole mounted), XSPW (wall mounted) and Holophane Denver (bollards) are available in a DALI control protocol to be able to adjust / reduce the driver outputs to lower values should there be any issues with the site and yard area lighting levels. Through this control measure, the entire lighting installation can be controlled and enable scene setting for different hours of operation, in summary: lighting can be dimmed after trading hours or turned off.

Please find the lux values (lux plot) of the illumination levels (Lighting Performance Predictions):

- LED Option – Spill / Obtrusive Light Revision 1, dated 10/07/19
- LED Option – Maintained Revision 1, dated 10/07/19

We confirm the proposed design complies with the following:

- **Selwyn District Council – C22 BZ Activities**
  (22.5 Activities and Light Spill – 22.5.1.2 (a) and (b))

As per our previous correspondence, we have researched the Selwyn District Plan Review compiled by MWH Consultants (Review of District Plan Lighting and Glare Provisions and Best Practice, dated September 2017). We consider the LED carpark and delivery area lighting for the proposed Countdown Supermarket to be in-line with the findings of this report, light sources are shielded by being horizontally mounted with flat glass (full cut-off distribution) providing beneficial performance to limit glare and night sky glow.

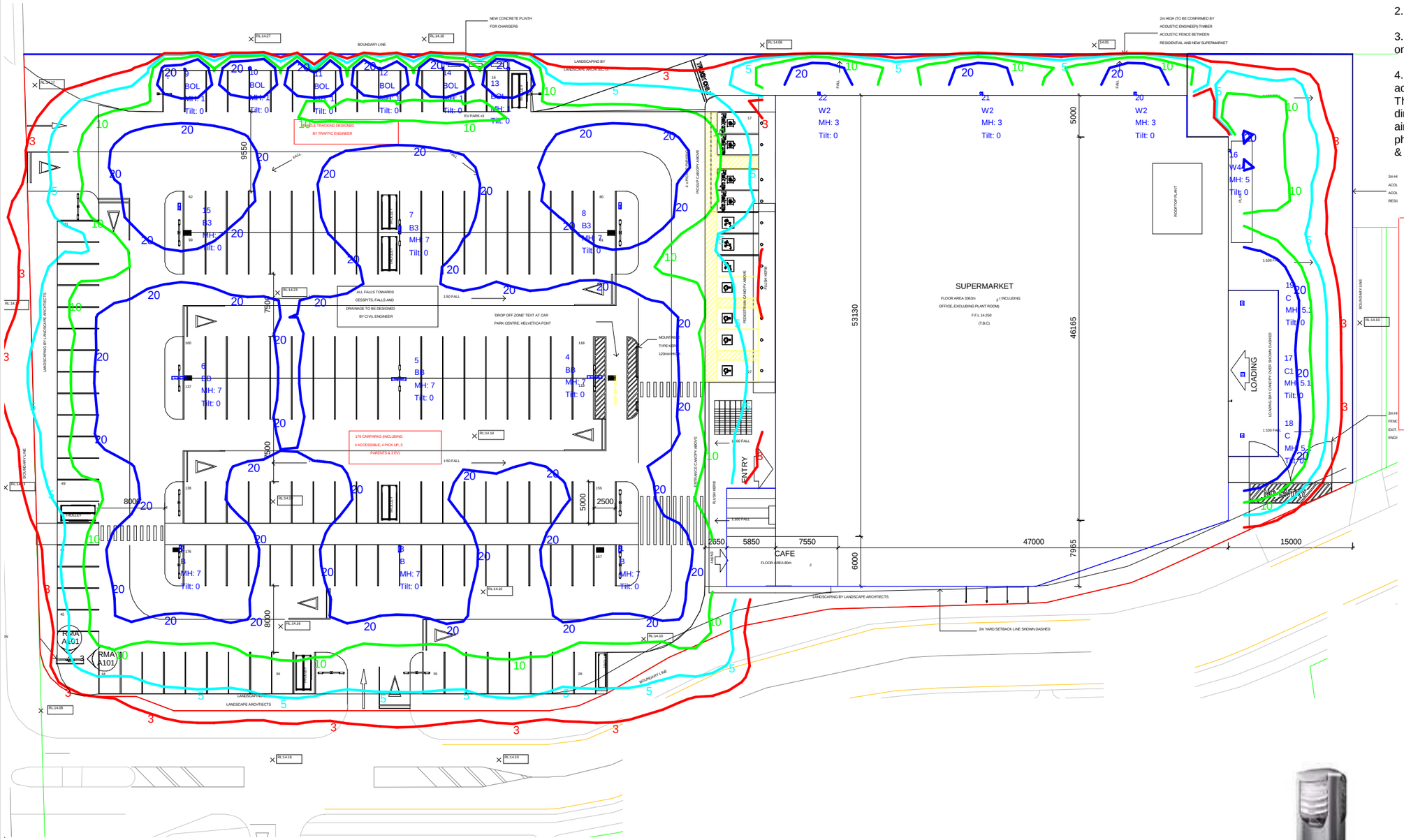
We have attached the two Lighting Performance Prediction lux plot drawings for information for the maintained and obtrusive results.

Should you require any further information, please do not hesitate to contact us.

Yours faithfully
ELECTRICAL CONSULTING SERVICES LTD

Dave McKenzie
Senior Electrical Engineer

CC Shane Kennedy — Lincoln Developments Ltd
Oliver Shaw — Woolworths New Zealand Ltd
Fiona Aston — Aston Consultants



GENERAL NOTES:

1. Lighting calculations are based upon initial lamp lumens with a maintenance factor derived in accordance with AS/NZS 1158 as shown below.

2. Isolux lines show illuminance values at grade.

3. Luminaires are mounted at the heights & tilts as indicated on the drawing.

4. Lighting calculations are subject to the accuracies & tolerances in accordance with AS/NZS 3827.1:1998 & AS/NZS 3827.2:1998. These accuracies & tolerances include variances in the building dimensions & obstructions, surface finishes, luminaire positioning & aiming, ambient temperature, atmospheric conditions, luminaire photometry, lamp output, lighting design software, electrical supply & instrument calibration.

MAINTENACE FACTOR (MF)

Lamp Lumen Maintenace Factor (LLMF)
*** LED lamp lumen depreciation after 50,00 hours of operation**
- Cree TD-13 data (in accordance with IESNA TM-21-11 & LM-80-08) utilised to obtain this value, 15degC average night time ambient

Luminaire Maintenance Factor (LMF)
*** IP6X Luminaire IP rating**
*** Medium pollution category**
*** Luminaire cleaning every 72 months**
- Value obtained from table B1 of BS5489-1:2013

Type W

Type C

Type BOL

Type B

Luminaire Schedule					
Label	**Qty**	**Arrangement**	**LLF**	**Symbol**	**Description**
W2	3	SINGLE	0.883		ADLT CREE XSPW Type 2ME 19W 4000K LED Wall Back
C1	1	SINGLE	0.874		ADLT CREE Canopy Flat Glass 65W 4000K LED Canopy Luminaire c/w Surface Mount Bracked (0 Tilt Critical)
W44	1	SINGLE	0.883		ADLT CREE XSPW Type 4ME 31W 4000K LED Wall Back
BOL	6	SINGLE	0.810		ADLT Holophane Denver Elite Double Optics 23W 2000lm 4000K LED Bollard 1.0m
C	2	SINGLE	0.874		ADLT CREE Canopy Flat Glass 94W 4000K LED Canopy Luminaire c/w Surface Mount Bracked (0 Tilt Critical)
B	3	SINGLE	0.883		ADLT CREE XSP Type 4ME Optics 116W 4000K LED Pole Top Luminaire on 7m CREE Square Pole
B3	3	SINGLE	0.883		ADLT CREE XSP Type 3ME Optics 116W 4000K LED Pole Top Luminaire on 7m CREE Square Pole
BB	3	BACK-BACK	0.883		ADLT CREE XSP Type 4ME Optics 116W 4000K LED Pole Top Luminaire on 7m CREE Square Pole

Calculation Summary					
Label	**CalcType**	**Avg**	**Max**	**Min**	**Units**
Canopy 100 Lux	Illuminance	91.60	162.8	43.4	Lux
Carparks 20 Lux	Illuminance	24.90	75.9	3.2	Lux
Carparks EV	Illuminance	23.53	58.7	8.4	Lux
Rear Yard 10 lux	Illuminance	23.69	162.8	0.0	Lux
Truck Path 10 lux	Illuminance	16.18	49.7	2.7	Lux

COUNTDOWN - LINCOLN - CHRISTCHURCH

LIGHTING PERFORMANCE PREDICTIONS - LED OPTION - MAINTAINED

Designed By:	Nathan Gilchrist
Checked By:	G.C
Date:	27-08-18
Scale:	NOT TO SCALE

Revisions

#	Date	Comments
1	27-08-2018	General Revision
1	10-07-2019	Spill / Obtrusive Light Revision

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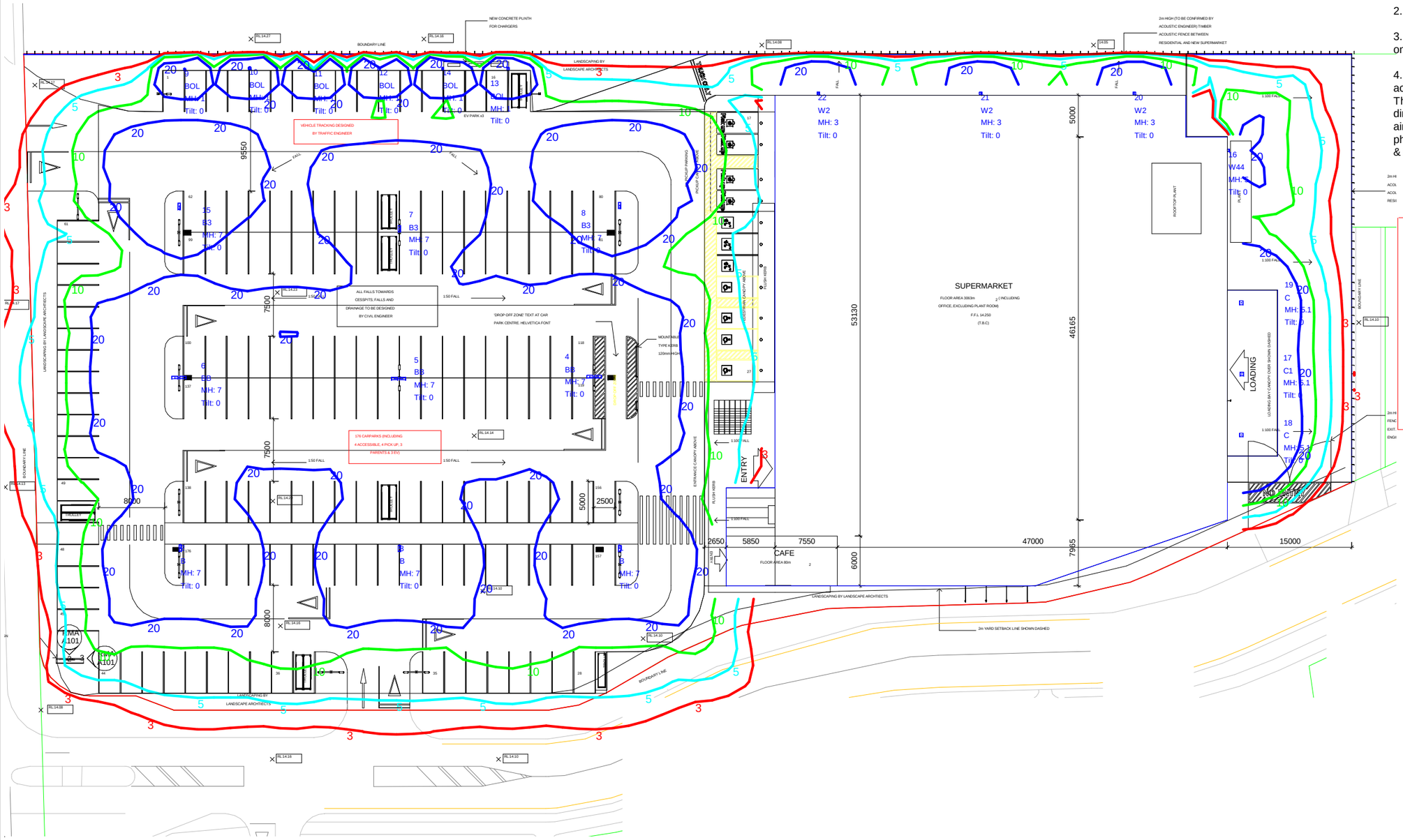

GENERAL NOTES:

1. Lighting calculations are based upon initial lamp lumens with a maintenance factor derived in accordance with AS/NZS 1158 as shown below.

2. Isolux lines show illuminance values at grade.

3. Luminaires are mounted at the heights & tilts as indicated on the drawing.

4. Lighting calculations are subject to the accuracies & tolerances in accordance with AS/NZS 3827.1:1998 & AS/NZS 3827.2:1998. These accuracies & tolerances include variances in the building dimensions & obstructions, surface finishes, luminaire positioning & aiming, ambient temperature, atmospheric conditions, luminaire photometry, lamp output, lighting design software, electrical supply & instrument calibration.

MAINTENACE FACTOR (MF)

Lamp Lumen Maintenace Factor (LLMF)
*** LED lamp lumen depreciation after 50,00 hours of operation**
- Cree TD-13 data (in accordance with IESNA TM-21-11 & LM-80-08) utilised to obtain this value, 15degC average night time ambient

Luminaire Maintenance Factor (LMF)
*** IP6X Luminaire IP rating**
*** Medium pollution category**
*** Luminaire cleaning every 72 months**
- Value obtained from table B1 of BS5489-1:2013

Luminaire Schedule

Label	Qty	Arrangement	LLF	Symbol	Description
W2	3	SINGLE	1.000		ADLT CREE XSPW Type 2ME 19W 4000K LED Wall Back
C1	1	SINGLE	1.000		ADLT CREE Canopy Flat Glass 65W 4000K LED Canopy Luminaire c/w Surface Mount Bracked (0 Tilt Critical)
W44	1	SINGLE	1.000		ADLT CREE XSPW Type 4ME 31W 4000K LED Wall Back
BOL	6	SINGLE	1.000		ADLT Holophane Denver Elite Double Optics 23W 2000lm 4000K LED Bollard 1.0m
C	2	SINGLE	1.000		ADLT CREE Canopy Flat Glass 94W 4000K LED Canopy Luminaire c/w Surface Mount Bracked (0 Tilt Critical)
B	3	SINGLE	1.000		ADLT CREE XSP Type 4ME Optics 116W 4000K LED Pole Top Luminaire on 7m CREE Square Pole
B3	3	SINGLE	1.000		ADLT CREE XSP Type 3ME Optics 116W 4000K LED Pole Top Luminaire on 7m CREE Square Pole
BB	3	BACK-BACK	1.000		ADLT CREE XSP Type 4ME Optics 116W 4000K LED Pole Top Luminaire on 7m CREE Square Pole

Calculation Summary

Label	CalcType	Avg	Max	Min	Units
ObtrusiveLight_Boundary 3 lux_Cd	Obtrusive Light - Cd	75.18	620	0	N.A.
ObtrusiveLight_Boundary 3 lux_Cd	Obtrusive Light - Cd	115.16	949	0	N.A.
ObtrusiveLight_Boundary 3 lux_II	Obtrusive Light - III	0.42	3.0	0.0	Lux
ObtrusiveLight_Boundary 3 lux_II	Obtrusive Light - III	0.27	2.2	0.0	Lux
Canopy 100 Lux	Illuminance	104.79	186.2	49.7	Lux
Carparks 20 Lux	Illuminance	28.27	86.0	3.6	Lux
Carparks EV	Illuminance	28.60	72.1	9.9	Lux
Rear Yard 10 lux	Illuminance	27.07	186.2	0.0	Lux
Truck Path 10 lux	Illuminance	18.32	56.2	3.1	Lux

COUNTDOWN - LINCOLN - CHRISTCHURCH

LIGHTING PERFORMANCE PREDICTIONS - LED OPTION - OBTRUSIVE

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