25th January 2025

Ibex Lighting

Level 1, The Precinct

40 Onehunga Mall

Auckland 1061

Ibex Lighting Project No: 9514

PROPOSED SUNFIELD MASTERPLANNED COMMUNITY

ARDMORE AIRPORT SAFEGURDING – LIGHTING and GLARE

F.o.a Simon Ash, Chief Operating Officer, Winton

Dear Simon

Further to your instruction, I provide the following commentary in relation to the proposed Sunfield Development adjacent to Ardmore Airport.

1. Introduction

Ibex Lighting was engaged by Sunfield Developments to provide lighting technical support and comment with reference to the requirements defined in the aviation safeguarding report prepared by Lambert & Rehbein (SEQ) Pty Ltd for the proposed development adjacent to Ardmore Airport.

Commentary is specific to Section 5.5 Lighting and Glare of the report and the requirements referenced for compliance with Australian National Airports Safeguarding Framework – Guideline E - Managing the Risk of Distraction to Pilots from Lighting in the Vicinity of Airports.

The comments made here relate to the effect all new lighting associated with the Sunfield Development covering both public and private as a potential risk of distraction to pilots with the Control Areas defined in Guideline E. In particular the comments relate to the provision of new street lighting infrastructure either on the existing Auckland Transport network or on roads to be vested within the proposed Sunfield Development.

2. Documentation Received/Referenced

There will be existing Street Lighting within the defined Zones, however within the Auckland Transport – Transport Design Manual Section 4 – Lighting Design, it outlines the requirements defined in the Auckland Transport Street Lighting

Luminaire specification in restricting Upward Waste Light Ratio (UWLR) on V Category designated roads and Maximum Luminous Intensity Limits on P Category designated roads. The assumption has been made that the existing street lighting assets meet this requirement.

The following documents were reviewed;

a) Proposed Sunfield Development – Ardmore Airport Safeguarding – prepared by Lambert & Rehbein (SEQ) Pty Ltd dated March 2024.

b) Australian National Airports Safeguarding Framework – Guideline E Managing the Risk of Distraction to Pilots from Lighting in the Vicinity of Airports.

c) Auckland Transport – Transport Design Manual (AT-TDM) Vol 4 Chapter 12 Street Lighting.

3. Review Proposed Sunfield Development – Ardmore Airport Safeguarding Section 5.5 Lighting and Glare

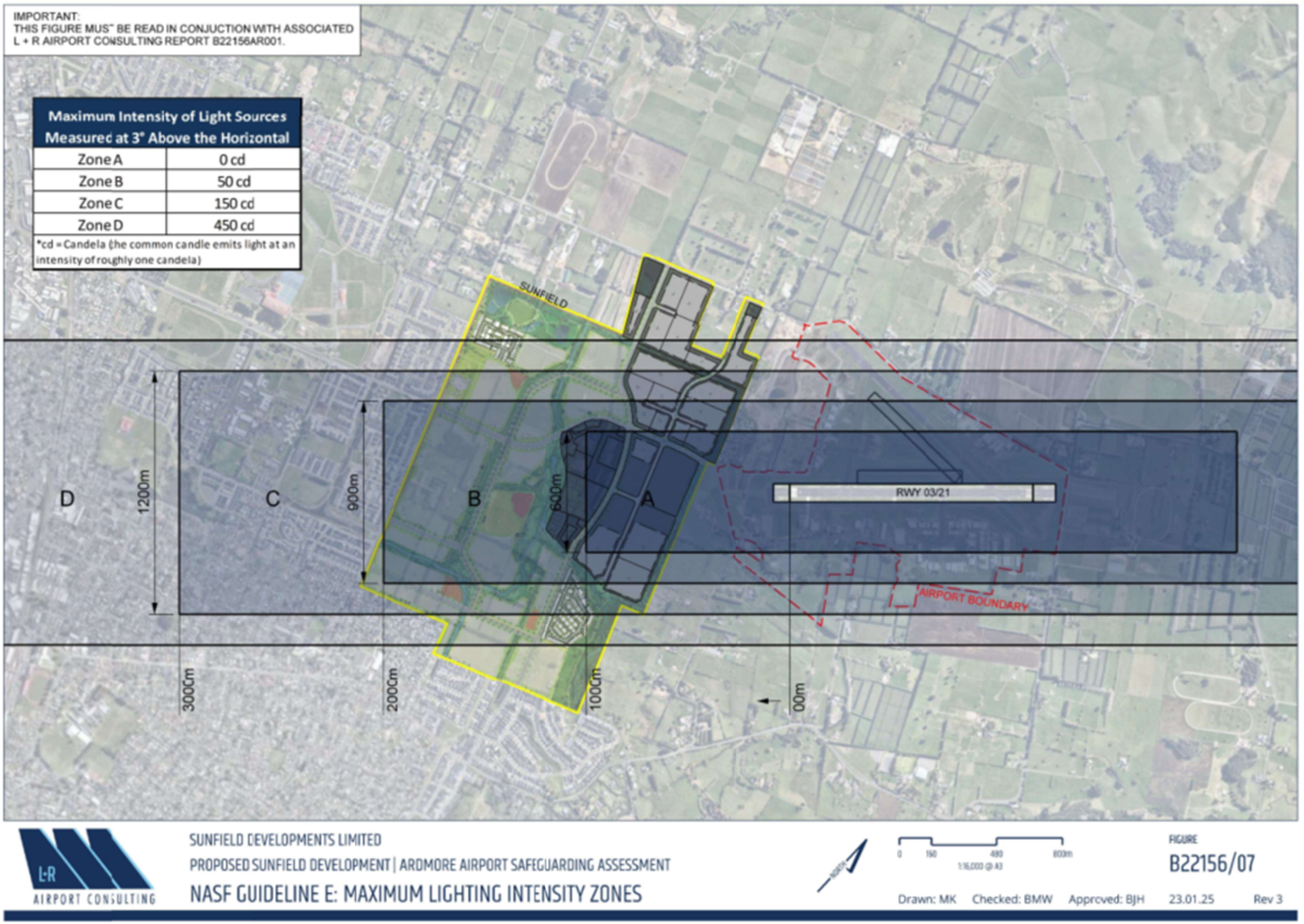
Section 5.5 of the Lambert & Rehbein Report references in Sub-Section 5.5.3 NASF Guideline E which provides guidelines to designers and installation contractors for situations where lights are to be installed within a 6km radius of an aerodrome.

NASF Guideline E defines four light control areas namely A, B, C and D, with increasing light intensity outputs the further the control area is away from the centre point of the runaway.

The light intensity (measured in Candelas – cd) for each respective control area has a maximum allowable value measured at 3 degrees above the horizontal as defined below;

- Zone A – 0 cd
- Zone B – 50 cd
- Zone C – 150 cd
- Zone D – 450 cd

The Lambert & Rehbein Report Figure B22156/07 Rev 3 in Appendix A sets out these control zones relative to the Ardmore Airport runaway and identifies that the proposed Sunfield Development impacts all four zones. The plan has been extracted from the report and inserted below for ease of reference.


IMPORTANT:
THIS FIGURE MUS" BE READ IN CONJUCTION WITH ASSOCIATED L + R AIRPORT CONSULTING REPORT B22156AR001.
Maximum Intensity of Light Sources Measured at 3° Above the Horizontal
Zone A 0 cd
Zone B 50 cd
Zone C 150 cd
Zone D 450 cd
*cd = Candela (he common candle emits light at an intensity of roughly one candela)
SUNFIELD
D
C
B
A
1200m
900m
600m
300Cm
200Cm
100Cm
00m
RWY 03/21
AIRPORT BOUNDARY
SUNFIELD DEVELOPMENTS LIMITED
PROPOSED SUNFIELD DEVELOPMENT | ARDMORE AIRPORT SAFEGUARDING ASSESSMENT
NASF GUIDELINE E: MAXIMUM LIGHTING INTENSITY ZONES
L:R AIRPORT CONSULTING
0 150 480 800m
1:16,000 @ A3
FIGURE
B22156/07
Drawn: MK Checked: BMW Apprcved: BJH 23.01.25 Rev 3

Section 5.5.3 also states that the lighting designer should ensure that all lighting within the development, both public i.e. street lighting and private (associated with the development buildings) will meet this requirement.

4. Lighting Design

Auckland Transport Street Lighting Luminaire Specification in Appendix B1 and B2 of the AT-TDM sets out the technical requirements for restricting both Upward Waste Light Ratio (UWLR) on V Category designated roads and Maximum Luminous Intensity Limits on P Category designated roads. These requirements are very restrictive to ensure good optical distribution control of the light emanating from the Luminaire thereby minimising the impact of obtrusive effects of street lighting. These limits are the benchmark on Street Lighting Luminaire Specifications which have been adopted by many Local Authorities in New Zealand.

The limitations around Glare Control are further enhanced by the requirement to have 'flat glass visors' that will ensure zero upward light. This is demonstrated in the images below.

Luminaires that comply with all specifications including those specifically related to the limitation of Glare identified above, can only be utilised on the Auckland Transport network or in submissions for new development areas to be vested to Council.

In conjunction with the technical performance requirements of the Luminaire, the Lighting Designer needs to comply with the design guidelines within the AT-TDM which states within Section 12.3.2 Design Criteria - Light Spill - that the Luminaire must be installed with zero degrees tilt relative to the road surface.

The industry leading Luminaire specifications developed by Auckland Transport provide a degree of Glare Control more restrictive than that of the NASF Guideline E where compliance is referenced to 3 degrees above the horizontal. In order to gain Engineering Plan Approval (EPA) for Lighting from Auckland Transport, the Lighting Design must demonstrate Glare Control compliance and include that outcome on the design drawings.

Because of the higher specification requirements required by Auckland Transport compared to those in the NASF Guideline E, compliance with the latter will be relatively straightforward to achieve.

As identified above, the existing Street Lighting Luminaires within the control zones have been replaced by Auckland Transport over the past seven (7) years through a network wide LED Luminaire Retrofit Programme replacing the older High Pressure Sodium (HPS) models with energy efficient LED ones. The Luminaires within that programme would have been subject to the same performance requirements so it can be assumed that these Luminaires would meet the NASF Guidelines. Analysis of the Auckland Transport RAMM database would identify existing Street Lighting assets within the Control Areas.. It should be noted that the number of assets within these areas will be small due to the rural location.

As noted, the Lambert & Rehbein Report in Section 5.5.3 states that the provision of lighting associated with the development buildings (private lighting) shall also meet the NASF Guideline E requirement.

To achieve that, the Lighting Designer shall apply the same performance and glare controls to any exterior lighting, both pole or building mounted, as those imposed in the Auckland Transport Street Lighting Specification.

Application of these same performance and design requirements to the exterior lighting associated with the buildings within the Sunfield Development area, will also ensure that the NASF Guideline E will be met. Similar to the compliance for the provision of Street Lighting, that compliance will be comparatively straightforward to achieve due directly to the high performance criteria to limit Glare resulting from Street Lighting installed on the Auckland Transport network.

5. Conclusion

The combination of the Luminaire optical performance and the design requirements outlined above will ensure that the Control Areas A to D within NASF Guideline E can be easily achieved for the street lighting design associated with the proposed Sunfield Development.

Auckland Transport's requirements are reference to zero degrees to the horizontal for the Luminaire tilt used in the design submission whereas compliance with the NASF Guideline E is referenced to 3 degrees above the horizontal. The industry leading Luminaire specification employed by Auckland Transport provides a degree of Glare Control above that of the NASF Guideline E.

Application of these same performance and design requirements to the private exterior lighting associated with the buildings within the Sunfield Development area will also ensure that the NASF Guideline E will be met.

6. Credentials – Lighting Specialist

Engaged by Winton to provide lighting technical support I am a professional, qualified Road Lighting Specialist, with over 32 years' experience in the sector.

Before moving to New Zealand in 2002, I worked for Lancashire County Council (UK) for 11 years in the Street Lighting Department responsible for the design, maintenance and energy management of a network in excess of 160,000 street lights.

Joining OPUS in 2010 based in the Auckland Office, my primary role was the provision of Professional Services on all matters relating to Street Lighting for Auckland Transport whose inventory of 125,000 street lights represents a third of all those in New Zealand, covering design, policies, strategies, specifications, Design Briefs and Peer Reviews. I also provided professional advice to NZ Transport Agency Head Office Wellington, the Auckland Motorway Alliance and subsequently Auckland System Management, covering the strategic transport corridors through the greater Auckland Region and to several Local Authorities across New Zealand.

Now with Ibex Lighting in their Auckland Office since March 2023, I fulfil a similar technical support role through the network of Ibex Lighting clients and projects. Within Ibex Lighting I undertake an independent consultancy role to ensure designs meet all technical and quality compliance requirements.

I co-authored both the Auckland Transport - Transport Design Manual (AT-TDM) for Street Lighting and the NZ Transport Agency M30:2014 – Specification and Guidelines for Road Lighting Design. I was also one of only 5 NZ Transport Agency Independent Professional Advisors (IPA) for Highway Lighting from 2014 until 2021 when the structure was disbanded.

Regards

Andy Collins

Technical Principal Lighting Design

Ibex Lighting