

Mirvac Pty Ltd

LIGHTING IMPACT ASSESSMENT -

SOUTH EVELEIGH ENTRANCE SIGNAGE AT HENDERSON & DAVY ROAD, SOUTH EVELEIGH, NSW

15th June 2020
Ref: 2619.4

Lighting Impact Assessment

South Eveleigh Entrance Signage at Henderson & Davy Road, South Eveleigh, NSW

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1. INTRODUCTION

Electrolight have been appointed by Mirvac to undertake a Lighting Impact Assessment on the proposed “South Eveleigh” Entrance Marker signage at Henderson & Davy Road, South Eveleigh, NSW. The objective of the assessment is to report on compliance with the State Environmental Planning Policy No. 64 – Advertising & Signage (SEPP 64), NSW Transport Corridor Outdoor Advertising and Signage Guidelines, AS4282-2019 Control of the Obtrusive Effects of Outdoor Lighting, and the Sydney Development Control Plan (Signs and Advertisements) 2012.

2. DEFINITIONS

2.1 Illuminance

The physical measure of illumination is illuminance. It is the luminous flux arriving at a surface divided by the area of the illuminated surface. Unit: lux (lx); 1 lx = 1 lm/m².

(a) Horizontal illuminance (E_h) The value of illuminance on a designated horizontal plane

(b) Vertical illuminance (E_v) The value of illuminance on a designated vertical plane

Where the vertical illuminance is considered in the situation of potentially obtrusive light at a property boundary it is referred to as environmental vertical illuminance (E_{ve}).

2.2 Luminance

The physical quantity corresponding to the brightness of a surface (e.g. a lamp, luminaire or reflecting material such as the road surface) when viewed from a specified direction. SI Unit: candela per square metre (cd/m²) – also referred to as “nits”.

2.3 Luminous Intensity

The concentration of luminous flux emitted in a specified direction. Unit: candela (cd).

2.4 Obtrusive Light

Spill Light which, because of quantitative, directional or spectral attributes in a given context, gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information.

2.5 Threshold Increment

The measure of disability glare expressed as the percentage increase in contrast required between a standard object and its background (the carriageway) for it to be seen equally as well with the source of glare present as with it absent, derived in the specified manner. This metric is directly related to Veiling Luminance.

NOTE: The required value is a maximum for compliance of the lighting scheme.

2.6 AGI32 Light Simulation Software

AGI32 (by U.S. company Lighting Analysts) is an industry standard lighting simulation software package that can accurately model and predict the amount of light reaching a designated surface or workplane. AGI32 is a has been independently tested against the International Commission On Illumination (CIE) benchmark, CIE 171:2006, Test Cases to Assess the Accuracy of Lighting Computer Programs.

2.7 Upward Light Ratio (ULR)

The ratio between the luminous flux emitted above the horizontal plane to the total flux emitted by a light source. The ULR is used as a measure to limit direct spill light to the sky.

3. SITE DESCRIPTION AND SCOPE

The proposed South Eveleigh entrance marker signage is located at the intersection of Henderson Road and Mitchell Road, Eveleigh. The total active illuminated area of the signage is approximately 10.1 m². The signage is to be operated from night time until 11pm. However for the purpose of this assessment it has been assumed (as a worst case scenario) that the signage is operated all night. Refer Appendix A for proposed signage location plan and elevations.

The existing area has a medium level of illumination and associated pedestrian activity, with street lighting, illuminated signage and light from adjacent buildings contributing to the overall night time environment. Given the existing environment and the relatively small illuminated area of the signage, the impact on the environment should not be significant. A further detailed assessment of the lighting impact can be found in Sections 5 and 6 of this report.

The internally illuminated signage utilise white LEDs as the light source. The specification of the LED sources is not known, however, for the purpose of this report, the luminance of the signage is not to exceed the luminance values shown in this report. The light sources are to be dimmable to ensure compliance with this assessment.

4. DESIGN GUIDELINES AND STANDARDS

The Lighting Impact Assessment will review the proposed signage against the following Criteria, Design Guidelines and Standards.

- State Environmental Planning Policy No. 64 – Advertising & Signage SEPP 64 (Refer Appendix B).
- Transport Corridor Outdoor Advertising & Signage Guidelines 2017
- AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting.
- Sydney Development Control Plan (Signs and Advertisements) 2012.

5. LUMINANCE ASSESSMENT

The maximum permissible night time luminance of the signage is determined by the existing lighting environment of its surroundings. AS4282 outlines maximum average luminances for different Environmental Zones as shown in Table 1 below:

TABLE 1 - MAXIMUM NIGHT TIME AVERAGE LUMINANCE FOR SIGNAGE		
Environmental Zone	Description	Max Average Luminance (cd/m2)
A4	High district brightness e.g. Town and city centres, commercial areas, and residential areas abutting commercial areas	350
A3	Medium district brightness e.g. suburban areas in towns and cities	250
A2	Low district brightness e.g. sparsely inhabited rural and semi-rural areas	150
A1	Dark e.g. relatively uninhabited rural areas. No Road Lighting	0.1
A0	Intrinsically Dark e.g. Major Optical Observatories. No Road Lighting	0.1

Note: Where the signage is viewed against a predominantly dark background (e.g. night sky) then the maximum applicable environmental zone is A2

Based on an assessment of the surrounding environment, the proposed signage is located within Environmental Zone A4 under AS4282, therefore the maximum night time luminance is 350 cd/m2.

The proposed internally illuminated signage is classified as being within Zone 3 under the The Transport Corridor Outdoor Advertising & Signage Guidelines. The night time luminance for internally illuminated signs within Zone 3, with an illuminated area between above 10m2, is limited to 200 cd/m2.

The Sydney Development Control Plan (DCP) 2012 also outlines maximum permissible night time luminance limit for internally illuminated signs of 300 cd/m2.

Table 2 outlines the maximum luminance levels to comply with AS4282, the Transport Corridor Outdoor Advertising & Signage Guidelines, and the Sydney DCP 2012 for the lighting conditions listed below:

TABLE 2 - LUMINANCE LEVELS FOR INTERNALLY ILLUMINATED SIGN		
Lighting Condition	Max Permissible Luminance (cd/m2) #	Compliant
Day time	N/A (OFF)	✓
Night time	100**	✓

The signage is to be dimmed on site to ensure the maximum average luminance nominated above is not exceeded.

** The maximum permissible luminance allowable under the Transport Corridor Outdoor Advertising & Signage Guidelines, and the Sydney Development Control Plan 2012 is actually 200 cd/m2. The luminance limit shown above was derived as a result of the calculation and assessment in Section 5 and 6, to ensure compliance with other criteria of AS4282 and any additional lighting requirements as described in this report.

It is our opinion that signage that is illuminated to the maximum luminances outlined above would be visually consistent with the existing ambient lighting and suitable for the local area. A more detailed night time lighting assessment is provided in Section 6.0.

6. AS4282 AND SYDNEY DEVELOPMENT CONTROL PLAN ASSESSMENT

The proposed signage has been assessed against AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting and the Sydney Development Control Plan (DCP) as outlined in Section 4.

AS4282 provides limits for different obtrusive factors associated with dark hours (night time) operation of outdoor lighting systems. Two sets of limiting values for spill light are given based on whether the lighting is operating before a curfew (known as “pre-curfew” operation) or operating after a curfew (known as post-curfew or curfewed operation). Pre-curfew spill lighting limits are higher than post-curfew values, on the understanding that spill light is more obtrusive late at night when residents are trying to sleep. Under AS4282, the post-curfew period is taken to be between 11pm and 6am daily. As it is assumed that the signage be illuminated all night, the assessment will review the proposed signage under the more stringent post-curfew limits.

Illuminance Assessment (AS4282)

The AS4282 assessment includes a review of nearby residential dwellings and calculation of the amount of illuminance (measured in Lux) that the properties are likely to receive from the signage during night time operation.

The acceptable level of illuminance will in part be determined by the night time lighting environment around the dwellings. AS4282 categorises the night time environment into different zones with maximum lighting limits as shown in Table 3 below:

TABLE 3 - MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS			
Environmental Zone	Max Vertical Illuminance (lx)		Description
	Pre-curfew	Post-curfew	
A0	0	0	Intrinsically Dark e.g. Major Optical Observatories. No Road Lighting
A1	2	0.1	Dark e.g. relatively uninhabited rural areas. No Road Lighting
A2	5	1	Low district brightness e.g. sparsely inhabited rural and semi-rural areas
A3	10	2	Medium district brightness e.g. suburban areas in towns and cities
A4	25	5	High district brightness e.g. Town and city centres, commercial areas, and residential areas abutting commercial areas

Based on an assessment of the surrounding areas, the nearest dwellings with potential views to the signage are at the following locations:

Address	Zone	Address	Zone
2A - 2C Phillip Street	A4	7 Mitchell Road	A4
5 Phillips Street	A4	11 Mitchell Road	A3
7 - 13 Phillips Street	A3		

As such, the dwelling above will form the focus of the illuminance assessment.

The proposed signage (and surrounding environment) was modelled in lighting calculation program AGI32 to determine the effect (if any) of the light spill from the proposed signage. Photometric data for the signage was based on a diffused light source (approximating a lambertian emitter) with luminances corresponding to the night time limits outlined in Section 5. Appendix C shows the lighting model and the results of the calculations.

It should be noted that some of the houses are shielded by mature vegetation which effectively obstructs the spill light of the signage. However calculations were undertaken assuming there was no vegetation present.

It can be seen from the lighting model that the maximum illuminance to dwellings is 0 lux. The illuminance level above complies with the maximum AS4282 limit of 5 lux as outlined in Table 3.

Threshold Increment Assessment

The Threshold Increment was also calculated for the eastbound and westbound traffic on Henderson Road, the traffic on Henderson Road turning onto Davy Road, the northbound traffic on Mitchell Street, the traffic on Mitchell Street approaching Davy Road, the traffic on Mitchell Street turning onto Henderson Road, and the traffic on Davy Road. The calculation grids were located at 1.5m above ground level with a viewing distance of between 10 m to 200 m from the sign. The calculation results show that the Threshold Increment does not exceed 14.0% for any traffic approach to the illuminated signage (the allowable maximum under the standard is 20%).

Luminous Intensity

The luminous intensity limits nominated in the AS4282 standard are not applicable for internally illuminated signage

Summary:

It can therefore be seen that the signage complies with all relevant requirements of AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting and Sydney Development Control Plan (Signs and Advertisements) 2012.

7. SUMMARY

- The proposed signage at Henderson & Davy Road, South Eveleigh, shall be commissioned on site to yield the following maximum luminances:

LUMINANCE LEVELS FOR INTERNALLY ILLUMINATED LETTERS		
Lighting Condition	Max Permissible Luminance (cd/m2)	Compliant
Day time	N/A (OFF)	✓
Night time	100	✓

- The manufacturer is to ensure that the signage includes baffles or any other upward light mitigation technology to ensure compliance with AS4282.
- The proposed South Eveleigh Entrance Marker signage has been found to comply with all relevant requirements of AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting and the Sydney Development Control Plan (Signs and Advertisements) 2012.
- In complying with the above requirements, the proposed Henderson Road Entrance Marker signage should not result in unacceptable glare nor should it adversely impact the safety of pedestrians, residents or vehicular traffic. Additionally, the proposed signage should not cause any reduction in visual amenity to nearby residences or accommodation.

8. DESIGN CERTIFICATION

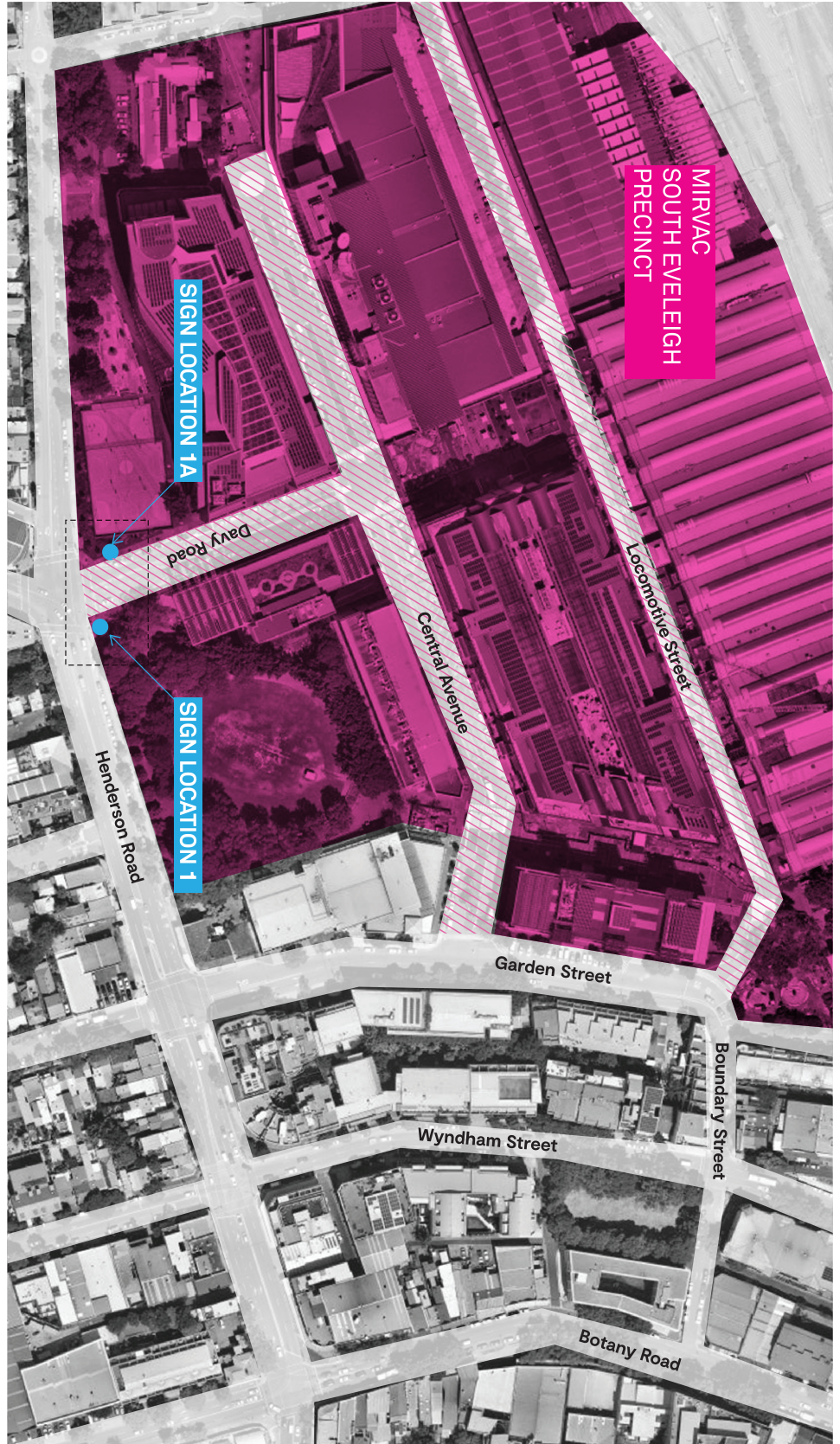
The South Eveleigh Entrance Marker signage proposed to be installed at Henderson & Davy Road, South Eveleigh, NSW, if commissioned according to this report, complies with the following criteria, guidelines and standards:

- State Environmental Planning Policy No. 64 – Advertising & Signage SEPP 64 (Refer Appendix B).
- Transport Corridor Outdoor Advertising & Signage Guidelines 2017.
- AS 4282-2019 Control of the Obtrusive Effects of Outdoor Lighting.
- Sydney Development Control Plan (Signs and Advertisements) 2012.



Ryan Shamier
Senior Lighting Designer
Electrolight Sydney
15/06/2020

Location 1 - Henderson & Davy Road



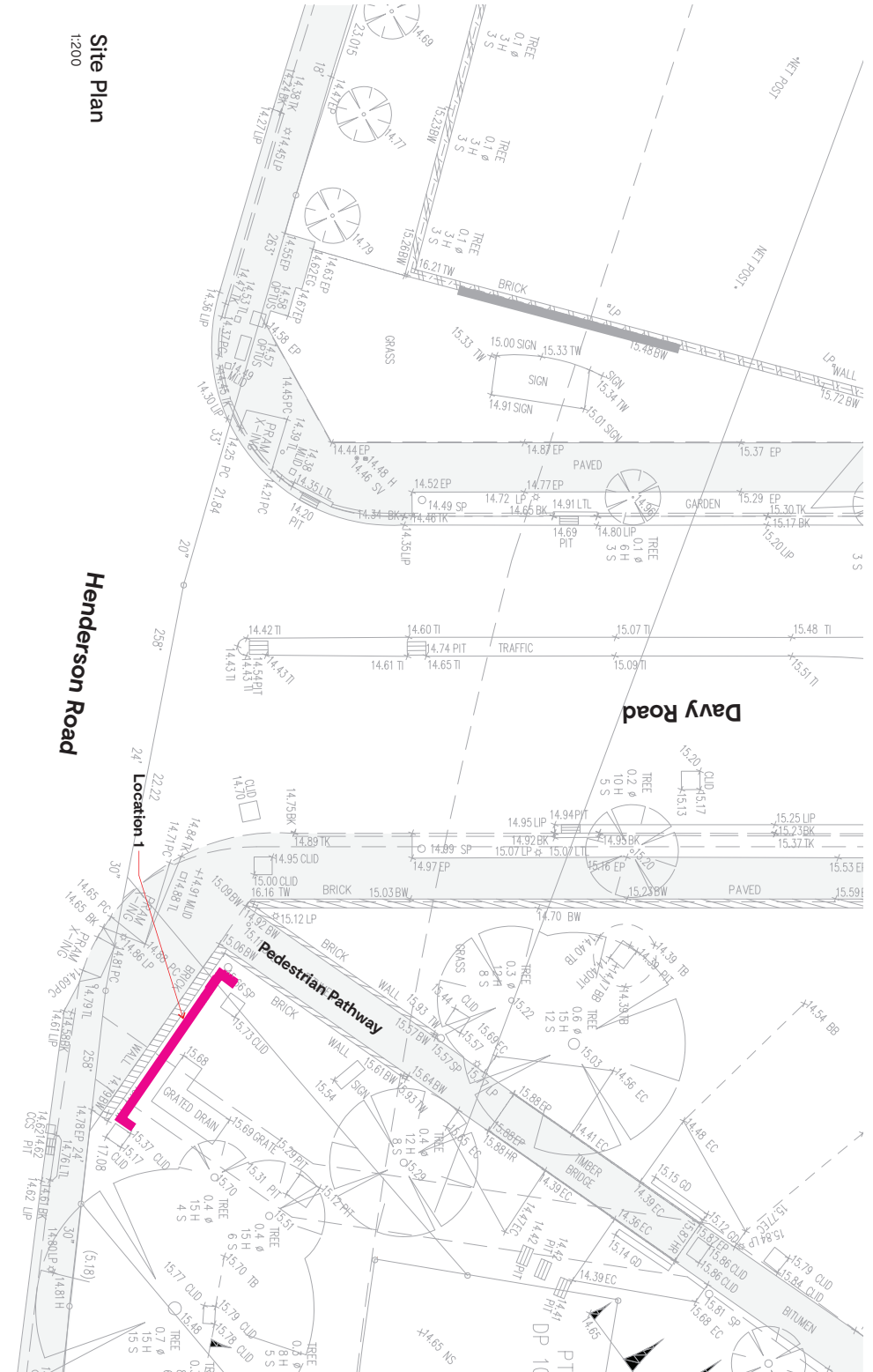
diadem BUCHAN

South Eveleigh - Precinct Signage Strategy Addendum 1
SSD 7317 MOD 19

APPENDIX A
SIGN LOCATION AND MOCKUP IMAGE

Location 1 - Henderson & Davy Road

Location Plan



APPENDIX A SIGN LOCATION AND MOCKUP IMAGE



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South Eveleigh - Precinct Signage Strategy Addendum 1
SSD 7317 MOD 19

APPENDIX A
SIGN LOCATION AND MOCKUP IMAGE



Elevation
1:40
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Existing brick wall to remain with sign to sit behind wall and not impact or alter it. Dimensions normal, confirm on site before manufacture.

4mm stainless steel, corrosion resistant with cables for climbing plants

Custom perforated pattern cut into corten cladding

Landscaping to base

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SSD 7317 MOD 19



Location 1 - Henderson & Davy Road



APPENDIX A
SIGN LOCATION AND MOCKUP IMAGE



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South Eveleigh - Precinct Signage Strategy Addendum 1
SSD 7317 MOD 19

APPENDIX B

State Environmental Planning Policy No. 64 - Advertising and Signage

Schedule 1 Assessment criteria

(Clauses 8, 13 and 17)

1. Character of the area

- Is the proposal compatible with the existing or desired future character of the area or locality in which it is proposed to be located?
- Is the proposal consistent with a particular theme for outdoor advertising in the area or locality?

2. Special areas

- Does the proposal detract from the amenity or visual quality of any environmentally sensitive areas, heritage areas, natural or other conservation areas, open space areas, waterways, rural landscapes or residential areas?

3. Views and vistas

- Does the proposal obscure or compromise important views?
- Does the proposal dominate the skyline and reduce the quality of vistas?
- Does the proposal respect the viewing rights of other advertisers?
-

4. Streetscape, setting or landscape

- Is the scale, proportion and form of the proposal appropriate for the streetscape, setting or landscape?
- Does the proposal contribute to the visual interest of the streetscape, setting or landscape?
- Does the proposal reduce clutter by rationalising and simplifying existing advertising?
- Does the proposal screen unsightliness?
- Does the proposal protrude above buildings, structures or tree canopies in the area or locality?
- Does the proposal require ongoing vegetation management?

5. Site and building

- Is the proposal compatible with the scale, proportion and other characteristics of the site or building, or both, on which the proposed signage is to be located?
- Does the proposal respect important features of the site or building, or both?
- Does the proposal show innovation and imagination in its relationship to the site or building, or both?

6. Associated devices and logos with advertisements and advertising structures

- Have any safety devices, platforms, lighting devices or logos been designed as an integral part of the signage or structure on which it is to be displayed?

7. Illumination

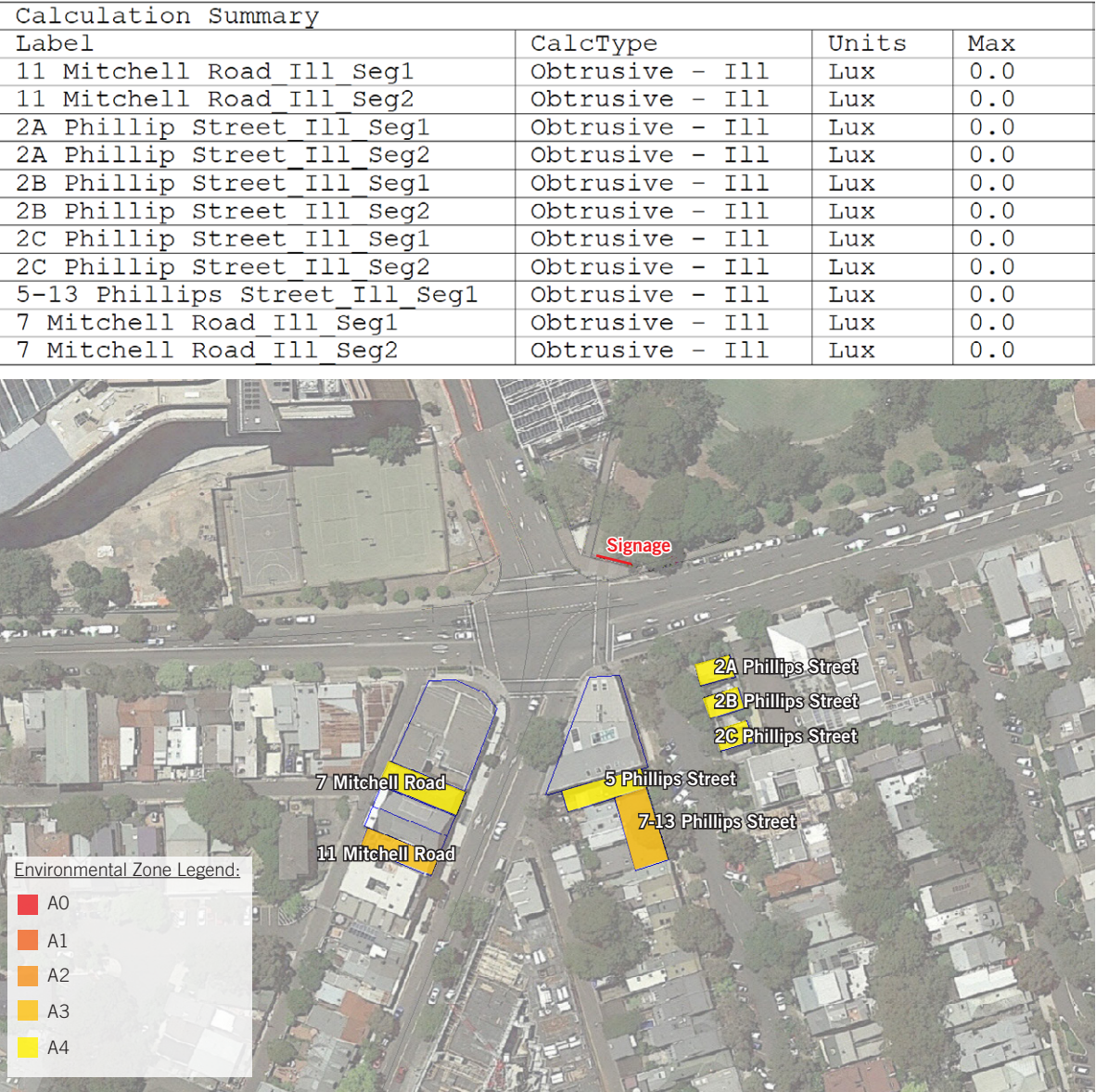
- Would illumination result in unacceptable glare?
- Would illumination affect safety for pedestrians, vehicles or aircraft?
- Would illumination detract from the amenity of any residence or other form of accommodation?
- Can the intensity of the illumination be adjusted, if necessary?
- Is the illumination subject to a curfew?

8. Safety

- Would the proposal reduce the safety for any public road?
- Would the proposal reduce the safety for pedestrians or bicyclists?
- Would the proposal reduce the safety for pedestrians, particularly children, by obscuring sightlines from public areas?

APPENDIX C

THRESHOLD INCREMENT & OBTRUSIVE LIGHTING CALCULATIONS



APPENDIX D

THRESHOLD INCREMENT & OBTRUSIVE LIGHTING CALCULATIONS

Calculation Summary			
Label	CalcType	Units	Max
Davy Road	Obtrusive - TI	%	0.0
Henderson Road Eastbound	Obtrusive - TI	%	0.3
Henderson Road to Davy Road_1	Obtrusive - TI	%	0.0
Henderson Road Westbound	Obtrusive - TI	%	0.0
Mitchell Road Northbound	Obtrusive - TI	%	0.0
Mitchell Road to Davy Road	Obtrusive - TI	%	0.0
Mitchell Road to Henderson Road	Obtrusive - TI	%	14.00



- = Threshold Increment less than 20% PASS
- = Threshold Increment more than 20% FAIL

APPENDIX D

VEILING LUMINANCE & OBTRUSIVE LIGHTING CALCULATIONS

Obtrusive Light - Compliance Report

AS/NZS 4282:2019, A3 - Medium District Brightness, Non-Curfew L1
Filename: 2619.4 Henderson Road Entrance Markers rev A
6/15/2020 4:26:00 PM

Illuminance

Maximum Allowable Value: 10 Lux

Calculations Tested (11):

Calculation Label	Test Results	Max. Illum.
2A Phillip Street_III_Seg1	PASS	0.0
2A Phillip Street_III_Seg2	PASS	0.0
2B Phillip Street_III_Seg1	PASS	0.0
2B Phillip Street_III_Seg2	PASS	0.0
2C Phillip Street_III_Seg1	PASS	0.0
2C Phillip Street_III_Seg2	PASS	0.0
5-13 Phillips Street_III_Seg1	PASS	0.0
7 Mitchell Road_III_Seg1	PASS	0.0
7 Mitchell Road_III_Seg2	PASS	0.0
11 Mitchell Road_III_Seg1	PASS	0.0
11 Mitchell Road_III_Seg2	PASS	0.0

Threshold Increment (TI)

Maximum Allowable Value: 20 %

Calculations Tested (7):

Calculation Label	Adaptation Luminance	Test Results
Mitchell Road to Davy Road	5	PASS
Henderson Road Eastbound	5	PASS
Mitchell Road to Henderson Road	5	PASS
Mitchell Road Northbound	5	PASS
Henderson Road to Davy Road_1	5	PASS
Davy Road	5	PASS
Henderson Road Westbound	5	PASS