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Proposed McDonalds and Carwash Development

Cnr Canning Road and Heath Road
Kalamunda WA

Technical Report Addressing WA Planning Commission Dark Sky and Astrotourism Position Statement

Version	Author/Reviewer	Date	Description of changes
V1	Scott Forbes	28/11/24	Draft for Comment

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About Rubidium Light

Rubidium Light is a specialist lighting design consultancy that works with stakeholders across many areas of development from concept to final construction.

Rubidium Light has been operating since 2011 and brings together an in-depth knowledge of lighting and its application in technically difficult lighting solutions.

Rubidium Light prides itself on its ability to react quickly and in a cost-effective manner to provide outcomes both responsible and cost effective to its clients and the environment.

Technical Report
Addressing WA Planning Commission Dark Sky and Astrotourism Position Statement
Proposed McDonald's Development
Corner of Heath Road and Canning Road, Kalamunda WA

Scott Forbes, Rubidium Light

28 November 2024

Introduction

This report has been prepared by Rubidium Light to address the WA Planning Commission's *Dark Sky and Astrotourism Position Statement* in the context of the proposed McDonalds and Carwash development at the corner of Heath Road and Canning Road, Kalamunda WA. The lighting design for the development has been carefully evaluated to align with principles aimed at minimising light pollution and preserving the night sky, while ensuring functionality and safety for all users of the space.

The lighting plan adheres to the following key principles as outlined by the Position Statement:

Principle 1: Eliminate Spill Light

Spill light from the development has been minimised and is demonstrated to comply with the requirements of AS/NZS 4282:2023 - Control of Obtrusive Effects of Outdoor Lighting in an A3 *Environmental Zone* for both non-curfew and curfew operation.

- **Upward Waste Light Control:** All luminaires and illuminated signage have been carefully designed to minimise upward light spill, ensuring compliance with obtrusive light thresholds. Light fittings have been specified with full cutoff optics, preventing unnecessary light from escaping into the upper hemisphere.
- **Signage Adjustments:** The conventional McDonald's pylon sign has been replaced with smaller signs mounted at lower heights. This design choice not only reduces upward light but also ensures signage remains visible and effective within the immediate vicinity.
- **Site Layout Optimisation:** The site layout and placement of luminaires have been optimised to concentrate illumination where it is needed, such as pathways, entrances, and parking areas, while avoiding unnecessary spillage into natural or residential areas.

These measures collectively ensure that the development minimises its contribution to light pollution and supports the preservation of the night sky, consistent with the principles outlined in the Position Statement.

Principle 2: Avoid Over-Lighting

Car park and general area lighting have been carefully designed to comply with **AS/NZS 1158.3.1:2020 - Lighting for Roads and Public Spaces (Category P)**, specifically for subcategories PC1, PCD, and PCX. This ensures adequate lighting for safety while avoiding unnecessary brightness or energy use.

- **Lighting Levels:** The lighting design maintains the required uniformity and illuminance levels for pedestrian safety and visibility, but avoids exceeding the minimum thresholds, reducing light pollution and energy waste.
- **Adaptive Lighting Controls:** To further mitigate over-lighting, the project incorporates **adaptive lighting controls**. These controls enable dimming or step-down operation during off-peak hours, such as late at night, aligning with curfew requirements and reducing unnecessary illumination.
- **Luminaire Placement:** The placement of luminaires has been optimised to maximise coverage and minimise overlap, ensuring that light is concentrated only where it is needed. This approach prevents over-lighting in areas where lower illumination levels are sufficient.
- **Avoidance of Bright Glare:** The design carefully avoids the use of excessively bright fixtures that could create glare, which can reduce visibility and detract from the night-time ambiance of the area. Fixtures with appropriate cutoff angles and shielding are utilised to focus light downward and away from sensitive areas.
- **Illumination Prioritisation:** Key areas such as pedestrian pathways, vehicle circulation routes, and building entrances are prioritised, while secondary zones, such as peripheral landscaping, are lit to minimal necessary levels, if at all, in compliance with the Category P subcategories.

By adhering to these principles, the lighting design ensures that the site is functional, safe, and welcoming without contributing to unnecessary light pollution or detracting from the dark sky experience valued in the region.

Principle 3: Use Energy-Efficient Light Sources

Energy efficiency has been a central focus of the lighting design, with all luminaires selected being **LED-based**, ensuring the project adheres to modern sustainability and efficiency standards.

- **High-Efficacy Luminaires:** The LED luminaires selected for the project achieve high luminous efficacy, providing more light per watt of energy consumed compared to traditional light sources. This significantly reduces energy demand while maintaining necessary illumination levels.
- **Smart Lighting Controls:** The inclusion of **smart lighting systems** allows for further energy savings by enabling features such as motion sensing, daylight harvesting, and automated dimming during periods of low activity. These systems adjust output dynamically to match actual usage patterns.
- **Longevity and Reduced Maintenance:** LEDs have a long operational lifespan, reducing the frequency of replacements and the environmental impact associated with manufacturing and disposing of lighting components.
- **Low-Power Signage Solutions:** Illuminated signage uses highly efficient LED modules, ensuring visibility with minimal energy use. The smaller, lower-mounted signs further reduce power requirements compared to traditional pylon signage.

These measures ensure that the lighting design not only meets the project's functional needs but also minimises its environmental footprint, contributing to energy conservation and supporting the principles of sustainable development.

Principle 4: Ensure Lights Are Not Directed Towards Reflective Surfaces

The lighting design avoids directing fixtures toward reflective surfaces that could exacerbate glare or contribute to sky glow.

- **Fixture Orientation:** Light fixtures have been oriented to focus illumination on target areas, such as pathways and parking zones, minimising reflections and light scatter.
 - **Non-Reflective Materials:** Where possible, non-reflective or matte-finished materials are used for surrounding surfaces in the design, further mitigating the potential for light reflection.
-

Principle 5: Use Warm White Colours

The lighting design exclusively employs 2700K warm white LEDs, a choice that prioritises minimising the impact of artificial lighting on both the environment and human health.

- **Reduced Blue Light Emission:** Warm white LEDs at 2700K emit significantly less blue light compared to higher colour temperatures, such as 4000K or 5000K. This helps reduce light pollution that can scatter in the atmosphere, thereby preserving the night sky visibility critical for astrotourism and astronomical observation.
- **Wildlife-Friendly Lighting:** The lower blue content is less disruptive to local wildlife, particularly nocturnal species, whose natural behaviours can be affected by cooler light temperatures. This aligns with environmental stewardship goals in the Kalamunda area.
- **Enhanced Visual Comfort:** Warm white lighting provides a more comfortable and visually appealing environment for pedestrians and patrons, reducing glare and visual fatigue while enhancing the ambiance of the site.
- **Consistent Application:** All luminaires across the site, including those for pathways and carparks, utilise warm white LEDs to maintain a cohesive and non-intrusive lighting scheme.
- **Astrotourism Alignment:** By using 2700K LEDs, the project supports the objectives of the Dark Sky and Astrotourism Position Statement, ensuring that the development contributes minimally to light pollution in a region that values its natural nightscape.

This commitment to warm white lighting underscores the project's dedication to preserving the natural character of the area, promoting sustainability, and supporting astrotourism initiatives.

Conclusion

The lighting design for the proposed McDonalds and Carwash development demonstrates a proactive approach to addressing the WA Planning Commission's *Dark Sky and Astrotourism Position Statement*. By incorporating best practices for spill light control, energy efficiency, and spectral management, the project aligns with the principles of sustainable lighting and environmental stewardship.

Rubidium Light remains committed to supporting dark sky preservation efforts while ensuring functional and compliant lighting solutions for this development.

Prepared by:
Scott Forbes
Rubidium Light





LOCALITY PLAN

Rb



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Illuminance

Maximum Allowable Value: 2 Lux

Calculations Tested (7):

Calculation Label	Test Results	Max. Illum.
REL BDY HEATH ROAD_III_Seg1	PASS	0
REL BDY HEATH ROAD_III_Seg2	PASS	0
REL BDY HEATH ROAD_III_Seg3	PASS	1
REL BDY HEATH ROAD_III_Seg4	PASS	1
REL BDY CANNING ROAD_III_Seg1	PASS	1
REL BDY CANNING ROAD_III_Seg2	PASS	1
REL BDY CANNING ROAD_III_Seg3	PASS	2

Luminous Intensity (Cd) At Vertical Planes

Maximum Allowable Value: 2500 Cd

Calculations Tested (7):

Calculation Label	Test Results
REL BDY HEATH ROAD_Cd_Seg1	PASS
REL BDY HEATH ROAD_Cd_Seg2	PASS
REL BDY HEATH ROAD_Cd_Seg3	PASS
REL BDY HEATH ROAD_Cd_Seg4	PASS
REL BDY CANNING ROAD_Cd_Seg1	PASS
REL BDY CANNING ROAD_Cd_Seg2	PASS
REL BDY CANNING ROAD_Cd_Seg3	PASS

Upward Waste Light Ratio (UWLR) - LUMINAIRES

Maximum Allowable Value: 2.0 %

Calculated UWLR: 0.0 %

Test Results: PASS

Upward Waste Light Ratio (UWLR) - SIGNS

Maximum Allowable Value: 2.0 %

Calculated UWLR: 9.8 %

Test Results: PASS

Rev.	Date	Drn.	Description	Chkd.

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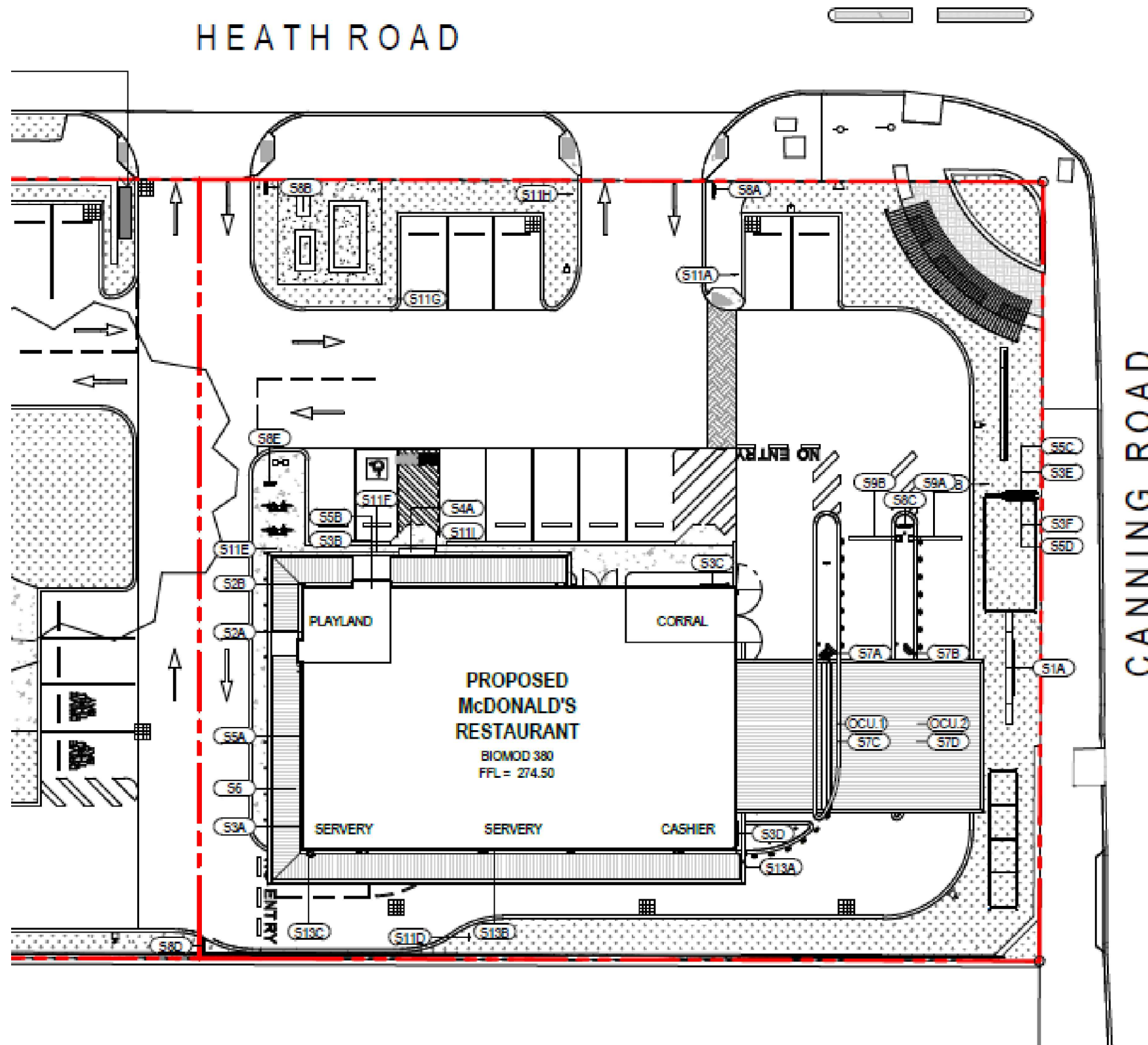
Project:
PROPOSED McDONALDS AND CARWASH
CANNING ROAD AND HEATH ROAD
KALAMUNDA WA

Title:
ELECTRICAL SERVICES
LIGHTING
OBTRUSIVE LIGHT ANALYSIS

Drawn: SAF Chk TD
Scale:
Drawing No. HA012265-E01-3
Date: 28/11/2024
Rev Size
A3

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SIGNAGE SCHEDULE		
Tag	Description	Illuminated
S1A	"McDonald's" Wordmark Wall Sign	
S2A	Play Place Wall Sign	Yes
S2B	Play Place Wall Sign	Yes
S3A	"Golden Arches" Wall Sign	Yes
S3B	"Golden Arches" Wall Sign	Yes
S3C	"Golden Arches" Wall Sign	Yes
S3D	"Golden Arches" Wall Sign	Yes
S3E	"Golden Arches" Wall Sign	Yes
S3F	"Golden Arches" Wall Sign	Yes
S5A	"McCafe" Button Sign Ø1200mm	
S5B	"McCafe" Wall Sign	
S5C	"McCafe" Wall Sign	
S5D	"McCafe" Wall Sign	
S6	McDelivery Wall Sign (Double Sided)	Yes
S7A	Outdoor Menuboard Single 55"	Yes
S7B	Outdoor Menuboard Single 55"	Yes
S7C	Outdoor Menuboard Double 55"	Yes
S7D	Outdoor Menuboard Double 55"	Yes
S8A	Directional Sign 0.7x2.3m High - Drive Thru - Right Arrow	Yes
S8A Side 2	Directional Sign 0.7x2.3m High - Drive Thru - Left Arrow	Yes
S8B	Directional Sign 0.7x2.3m High - Entry - Right Arrow	Yes
S8B Side 2	Directional Sign 0.7x2.3m High - Entry - Left Arrow	Yes
S8C	Directional Sign 0.7x2.3m High - Drive Thru - Double Arrow - Any Lane Any Time	Yes
S8C Side 2	Directional Sign 0.7x2.3m High - Blank	Yes
S8D	Directional Sign 0.7x2.3m High - No Entry	Yes
S8D Side 2	Directional Sign 0.7x2.3m High - Thank You	Yes
S8E	Directional Sign 0.7x2.3m High - Drive Thru - Left Arrow	Yes
S8E Side 2	Directional Sign 0.7x2.3m High - Thank You	Yes
S9A	Height Clearance Gantry Sign	Yes
S9B	Height Clearance Gantry Sign	Yes
S11A	Speed Sign (10km/hr)	No
S11B	No Pedestrian Access	No
S11C	No Pedestrian Access	No
S11D	No Pedestrian Access	No
S11E	Bike Rack Sign	No
S11F	Accessible Parking Sign	No
S11G	Pedestrian Crossing Sign	No
S11H	Stop Sign	No
S11I	Pedestrian Caution Sign	No
S13A	Drive-Thru Information Sign "2. PAY HERE"	No
S13B	Drive-Thru Information Sign "3. PICK UP HERE"	No
S13C	Drive-Thru Information Sign "4. PICK UP HERE"	No

Table 3.4 — Maximum average luminance of surfaces (cd/m²)

Application conditions	Environmental zones				
	A0	A1	A2	A3	A4
See Clause 3.3.3	0.1	50	150	250	350

ALL ILLUMINATED SIGNAGE WILL BE LIMITED TO 250cd/m² by the sign manufacturer/supplier to comply with Table 3.3 AS/NZS4282:2019 Environmental zone A3

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Project:
PROPOSED McDONALDS AND CARWASH
CANNING ROAD AND HEATH ROAD
KALAMUNDA WA

Title:
ELECTRICAL SERVICES
LIGHTING
SIGNAGE DETAILS

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