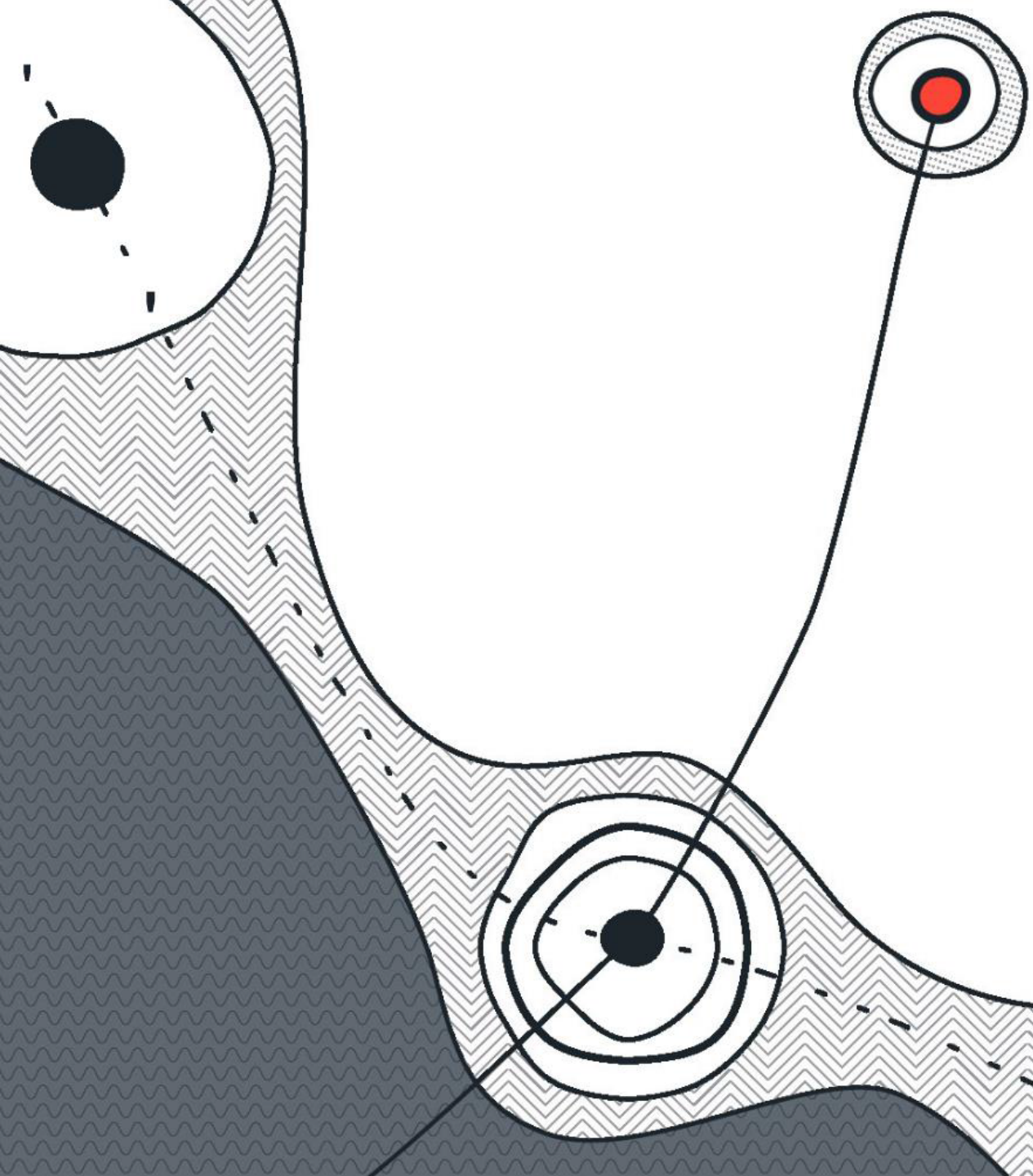
Lighting Strategy

Explorer Street Eveleigh

Prepared for DPIE
Final Issue
August 2023



We acknowledge the traditional owners of the lands where our projects take place, throughout Australia, and their continuing connection to culture, community, land, sea and sky.
We pay our respect to Elders past, present and future.

Contents

Introduction

This Lighting Strategy document has been prepared by WSP on behalf of the Department of Planning and the Environment (DPIE) for the Explorer Street Eveleigh Project.

The strategy document covers the exterior lighting at South Sydney Rotary Park including soft and hard landscape features, internal pedestrian pathways and cycleways, and public street lighting at Explorer Street and Aurora Place.

The lighting for the Project will be designed in accordance relevant Australian Standards and the City of Sydney design guidelines to enhance the landscape and architectural vision and provide a safe and inviting public space at night.

The strategy addresses the exterior lighting design intent, specific lighting technical parameters, operational controls and obtrusive light considerations. The lighting design aims to enhance the appreciation and enjoyment of Rotary Park and to assist in night-time connection between the proposed residential development and adjacent neighbourhoods. The new street lighting will form part of the landscape and architectural design, with consistent language across the site.

Appreciation of public art and indigenous interpretation elements are integrated within the lighting strategy creating a unique identity for Rotary Park during night-time hours.

The details within this document are based on the information available at the time.

Image 1 - Project site

Introduction

This Lighting Strategy takes into consideration the following objectives, outcomes and lighting design parameters for the Explorer Street Eveleigh Project:

- Create a unique visual identity for the Project at night. Provide welcoming spaces with restrained and elegant lighting
- Layering of light to suit the function of each space
- Discrete integration to minimise the visibility of fixtures, integrating lighting into landscape architecture elements, where possible and consistent with City of Sydney guidelines
- Coordination of lighting with wayfinding to enable intuitive orientation
- The interplay of light with heritage interpretation and public art elements
- Consideration of ambient lighting in the surrounding public domain including the heritage precinct of Erskineville
- Functionality and Safety: lighting design for safe movement, exceeding or meeting Australian Standard AS 1158.3.1: 2020 and City of Sydney guidelines Sydney Street Lights
- Utilise intelligent lighting control systems, providing energy efficiency and activation functions to create the appropriate night-time environment in line with the landscape design

SITE ANAYSIS

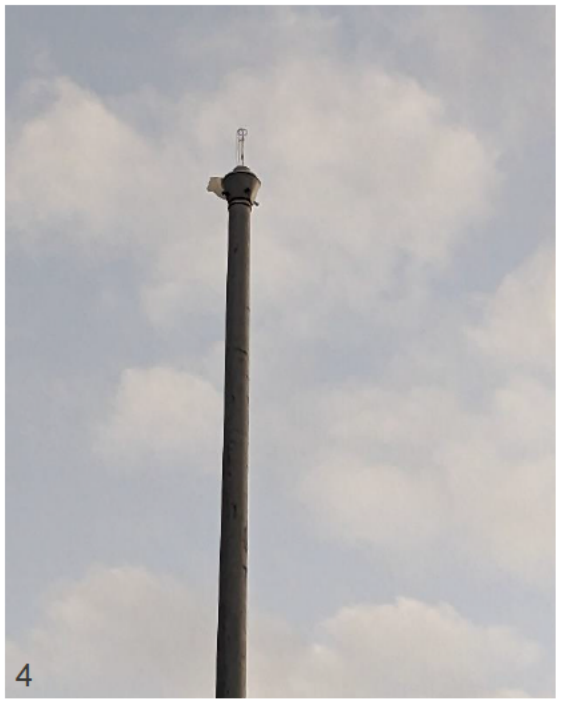
two

Site Analysis : light poles

WSP conducted a day-time and night-time site inspection of the existing exterior lighting on the 24th of May, 2023. The following three pages describe the lighting conditions on site with supporting images for reference.

The existing lighting at South Sydney Rotary Park and the adjacent public street lighting appears dated. Some pole mounted luminaires were not functional or required repair / maintenance at the time of inspection.

A variety of luminaire styles, pole types and heights are utilised. These include LED and High Intensity Discharge (likely high-pressure sodium) light sources for street, pedestrian and area mast lighting.

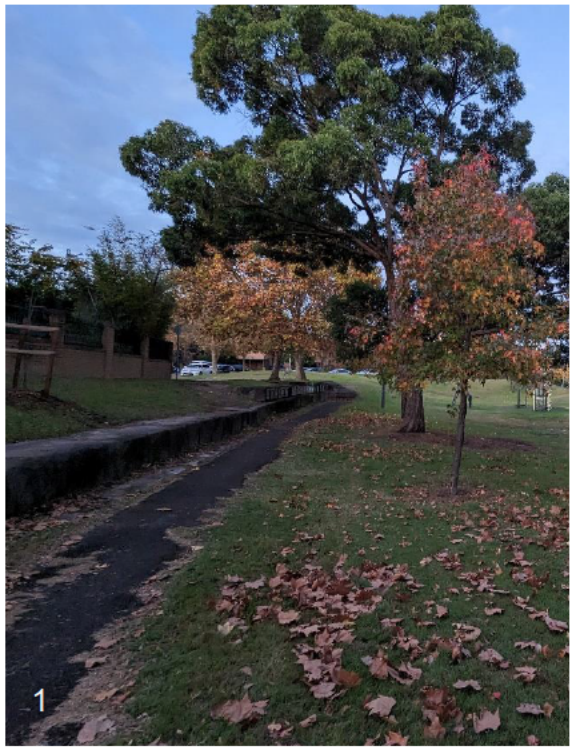


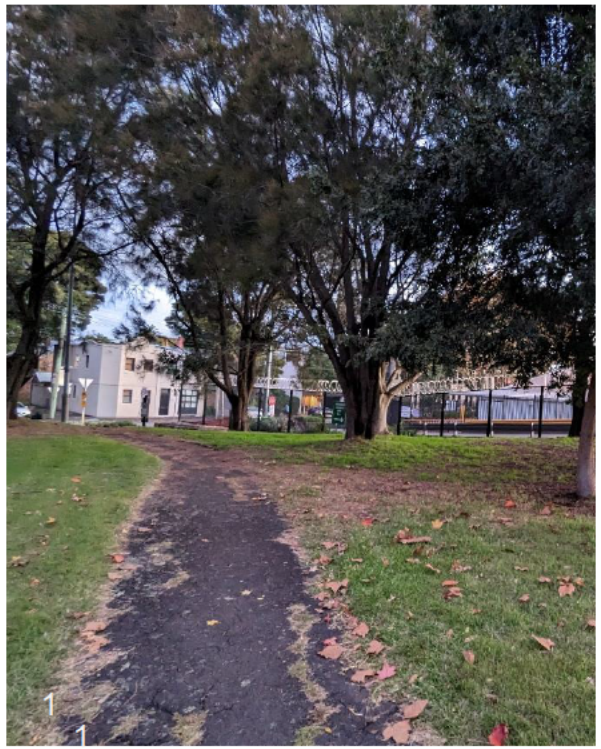
Site images: 1) Area light mast; 2) Timber pole mounted lighting; 3) Galvanised steel pole mounted lighting; 4) Bare lamp at top of a light mast; 5) Signage with no integrated / dedicated lighting

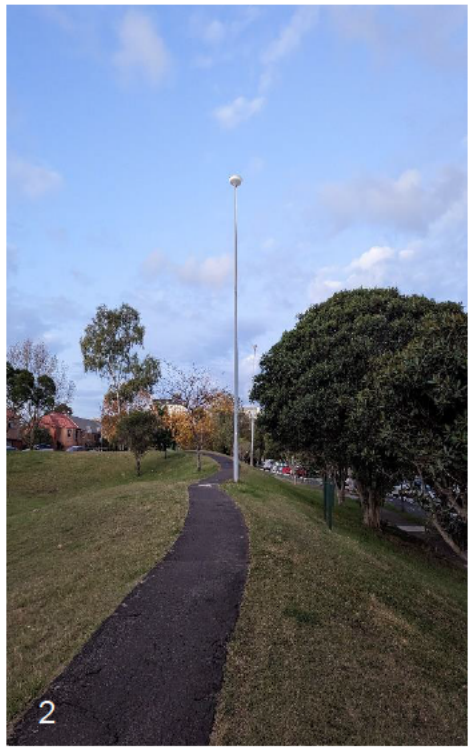
Site Analysis : pathways

Existing street and pedestrian lighting is primarily located along Henderson Street, Explorer Street and Station Place. High area mast lighting is installed in South Sydney Rotary Park.

There is no consistent or dedicated lighting for the pedestrian pathways in South Sydney Rotary Park , nor is there any landscape lighting to provide context. The high mast area lighting creates pockets of light and shadow and does not assist pedestrians with way-finding through the park creating the perception of an unwelcoming and unsafe environment.







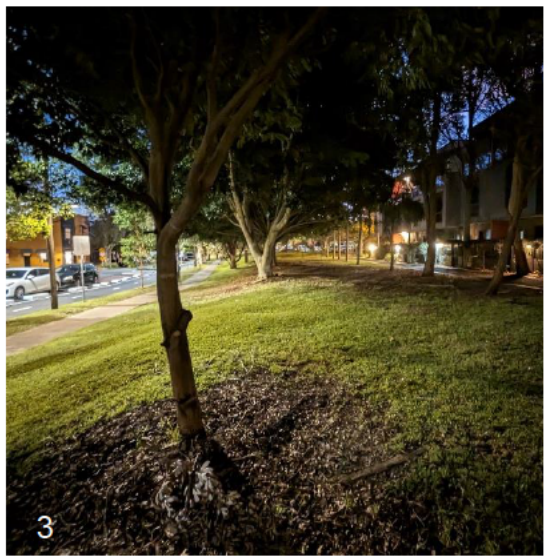
Site images: 1) Pedestrian pathways with no dedicated lighting; 2) High mast area lighting

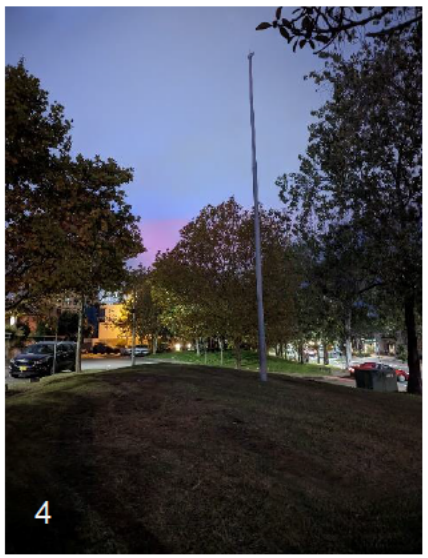
Site Analysis : night-time

There is considerable variation in lighting levels across the project site with many dark spots. This creates significant contrast and negatively impacts the perception of safety at night. It was observed that pedestrians tended to stay close to the perimeter streets and edges of the park, rather than walk through the park at night.

There is a visible difference in the lighting quality of the installed LED street lighting and high mast park lighting. The newer LED lighting is a neutral white colour temperature with good colour rendering, while the HID park lighting is very warm white with poor colour rendering with visible colour shift.

Based on WSP's site inspection and review of available documentation, the existing installed lighting at the Exploerer Street Eveleigh project lighting does not align with the City of Sydney guidelines, the Australian Standards , nor with expectations for contemporary lighting in public spaces.





Site images: Warm and cool light sources; Poor colour rendering; Bright and dark spots - patchy lighting; Poor vertical illumination

Site Analysis : conclusion

WSP recommend replacing the currently installed light fixtures due to the following issues:

- Utilises outdated lighting technology with low colour rendering (CRI) and inconsistent colour temperature (CCT)
- Creates visible contrast with poor uniformity and dark shadows
- Does not form a connected suite of fixture styles and are not part of the City of Sydney standard suite of luminaires
- Does not fulfill current best practise lighting recommendations regarding energy efficiency and glare control
- Does not relate to the landscape or define features or pathways for way-finding
- Creates an unwelcoming environment at night with a negative perception of safety

Reference image: Uniform and appropriate pathway lighting

LIGHTING STRATEGY

three

Lighting Strategy: defining place

Light plan

Lighting elements

1. Dedicated and consistent pedestrian pathway lighting via light poles to improve vertical illumination and the perception of safety at night.

2. Accent lighting to gathering points for way-finding.

   Gathering points = seating, selected decision points and pause points.

3. Task lighting to suit functionality. such as seating integrated amphitheatre lighting.

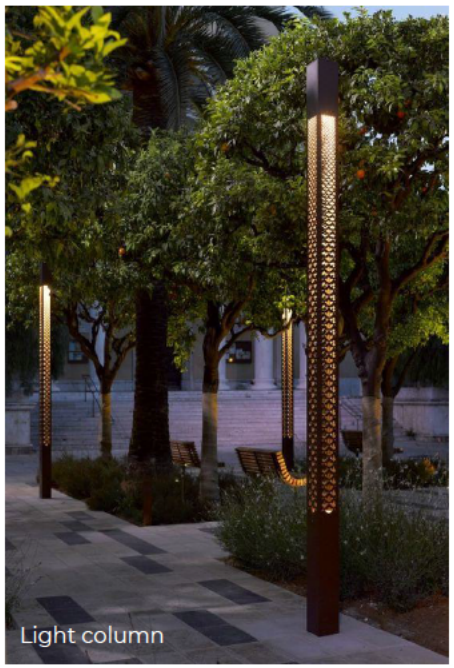
4. Feature lighting incorporating decorative elements for place-making

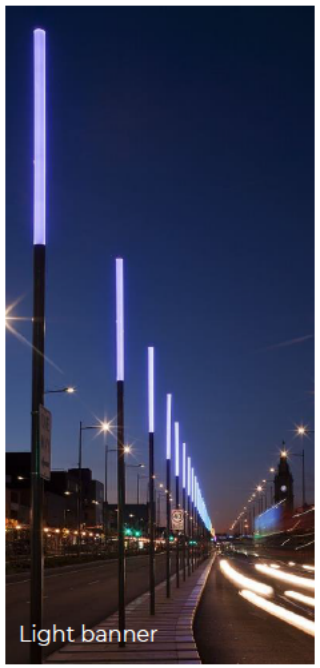
5. Interplay of light with heritage interpretation and public art elements

Lighting Strategy : defining place

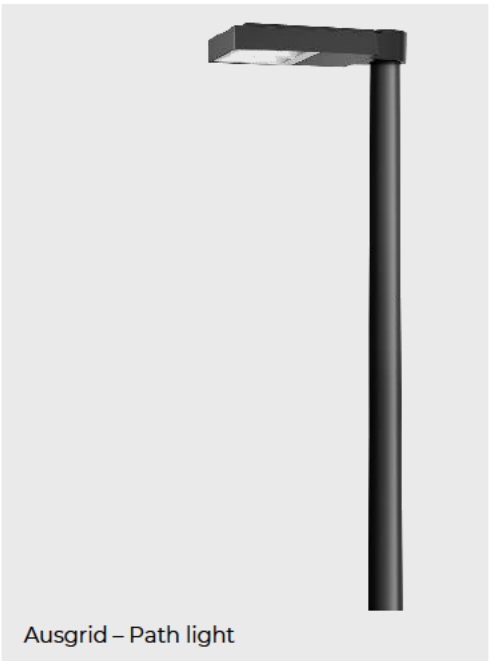
Light poles for pedestrian pathways at South Sydney Rotary Park

- Recommended pole height is 4-5 metres for human scale
- Custom poles provide the opportunity for placemaking with heritage / indigenous interpretation
- Coordinate finishes with landscape architecture for one language


Light column


Light banner


Ausgrid - Road light


Ausgrid – Path light

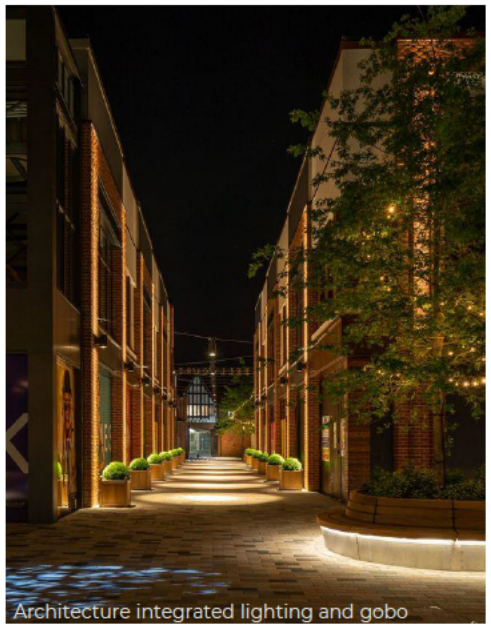

Area & pedestrian adjustable light

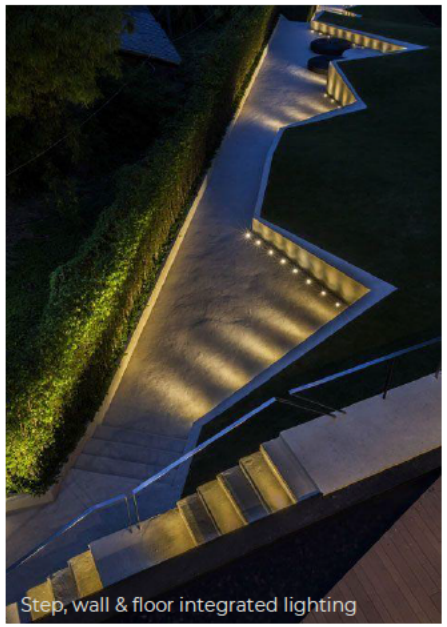
Reference images: Decorative and functional light poles

Lighting Strategy : pause and rest

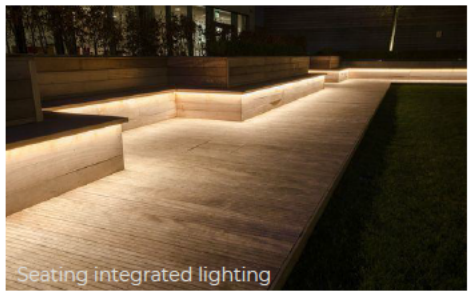
Lighting integrated with landscape architecture

- Good vertical illumination to trees and landscape structures improves the perception of safety
- Accent highlights to seating invites gathering
- Lighting integrated to connecting elements such as steps assists with way-finding


Architecture integrated lighting and gobo


Step, wall & floor integrated lighting


Planter integrated lighting


Seating integrated lighting


In-ground up-lights


Hand-rail recessed lighting

Reference images

LIGHTING STANDARDS

four

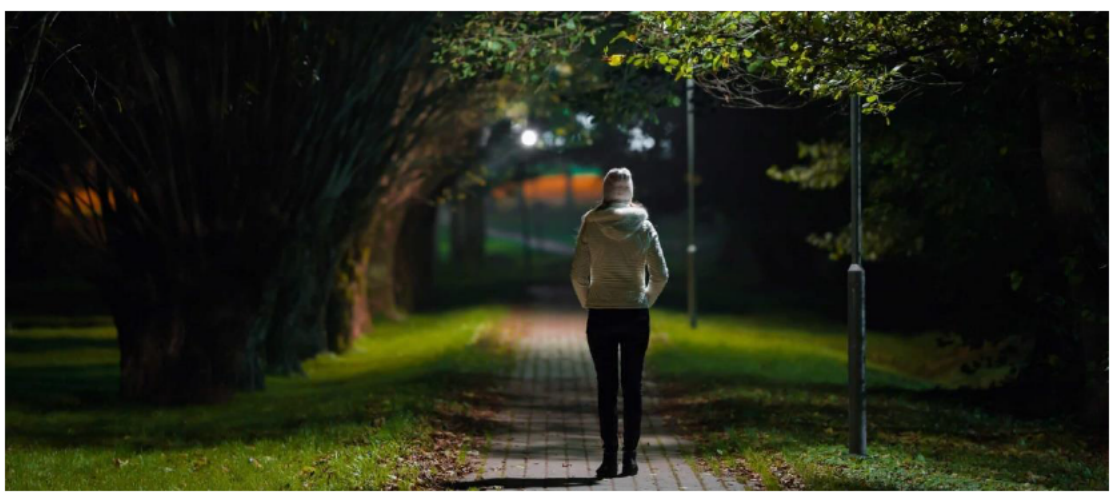
Lighting standards :

P Category lighting is applied to areas where the pedestrian is the primary focus and is used for local and collector roads, pedestrian and cycle pathways, public realms such as plazas and transport hubs.

Street and pathway lighting for the Project will be designed in accordance with the following specific Australian Standards and relevant guidelines:

- Australian Standard AS/NZS 1158.3.1:2020 Lighting for roads and public spaces (Category P)
- Australian Standard AS/NZS 4282 Control of the obtrusive effects of outdoor lighting
- The City of Sydney Public Domain Design Code , Sydney Lights

All lighting, including the landscape lighting shall be in line with the DPIE specific requirements and briefing, for safe movement and night-time visibility and connection with the adjacent parklands and neighbourhoods. It will be essential for the lighting to be integrated into the overall landscape architecture design, indigenous interpretation elements and the public art strategy.



Reference images

Lighting Standards : AS/NZS 1158.3.1:2020 Lighting for roads and public spaces (Category P)

TABLE 2.6

VALUES OF LIGHT TECHNICAL PARAMETERS AND PERMISSIBLE LUMINAIRE TYPES FOR ROADS IN LOCAL AREAS AND FOR PATHWAYS

1	2	3	4	5	6
Lighting subcategory	Light technical parameters: Average horizontal illuminance [a,b] ($\overline{E}_h$) lux	Point horizontal illuminance [a,b] (E_{Ph}) lux	Illuminance (horizontal) uniformity [c] Cat. P (U_{E2})	Point vertical illuminance [a,b] (E_{Pv}) lux	Permissible luminaire type (see Table 2.10)
P1	7	2	10	2	Type 4 where part of a road reserve or Types 2, 3, 4 or 6 elsewhere
P2	3.5	0.7	10	0.7	
P3 [e]	1.75	0.3	10	0.3 [d]	
P4 [e]	0.85	0.14	10	N/A	
P5 [e]	0.5	0.07	10	N/A	

Local Street / Major paths

Minor paths

Path edges

A1

TABLE 2.7

VALUES OF LIGHT TECHNICAL PARAMETERS AND PERMISSIBLE LUMINAIRE TYPES FOR PUBLIC ACTIVITY AREAS (EXCLUDING CAR PARKS)

1	2	3	4	5	6
Lighting subcategory	Light technical parameters: Average horizontal illuminance [a,b] ($\overline{E}_h$) lux	Point horizontal illuminance [a,b] (E_{Ph}) lux	Illuminance (horizontal) uniformity [c] Cat. P (U_{E2})	Point vertical illuminance [a,b] (E_{Pv}) lux	Permissible luminaire type (see Table 2.10)
P6	21	7	10	7	Types 2, 3, 4, 5 or 6
P7	14	4	10	4	
P8	7	2	10	2	

Activity areas

a) These values are maintained.

b) Compliance is achieved by being greater than or equal to the applicable table value.

c) Compliance is achieved by being less than or equal to the applicable value.

NOTE: See Section 3 for the design methods and requirements for use in assessing compliance with the specified light technical parameters.

KEY CONSIDERATIONS & LIGHTING REQUIREMENTS

Based on the appropriate categories identified, the maintained illuminance levels are established from Tables 2.6 and 2.7 of AS1158.3.1:2015 for both Roads, Pathways and Public spaces:

Roads in Local Areas – subcategory P2

- Typically, average horizontal illuminance will be in the order of 3.5lx depending on functionality
- Point horizontal and point vertical illuminance of between 0.07lx and 0.7lx
- Horizontal uniformity is 10

Pedestrian Pathways – subcategory P2 to P3 and P5

- Typically, average horizontal illuminance will be in the order of 0.5lx to 7lx depending on functionality
- Point horizontal and point vertical illuminance of between 0.07lx and 0.7lx
- Horizontal uniformity is 10

Public Spaces (if applicable) – subcategory P8

- Average horizontal illuminance of 7lx
- Point horizontal and point vertical illuminance of 2lx
- Horizontal uniformity of 10

Lighting Standards : Sydney Lights Public Domain Design Code 2015

In addition to the Australian Standards technical criteria, the City of Sydney's design code 'Sydney Lights' communicates essential principles for effective illumination of public spaces at night. It is important to consider these principles and ensure they are integrated in the lighting design for the exterior parkland and public spaces which form part of the project.

Lighting Principles

- Principle 1: Promote Safety and Inclusive Design
- Principle 2: Enhance Public Spaces, Public Life
- Principle 3: Promote Sustainability
- Principle 4: Promote Active Transport
- Principle 5: Respect Distinctiveness and Place

Design Criteria & Requirements

The design code provides a classification system to inform the design team and identify appropriate lighting categories for various elements.

The applicable categories for classification are:

- 3.4.1 Streets and footways
- 3.4.3 Pedestrian Connections
- 3.4.4 Public Space Lighting

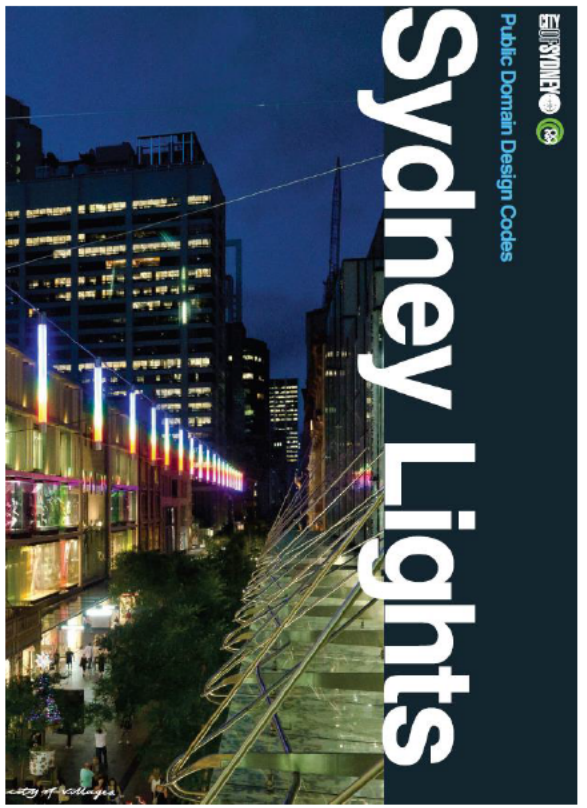


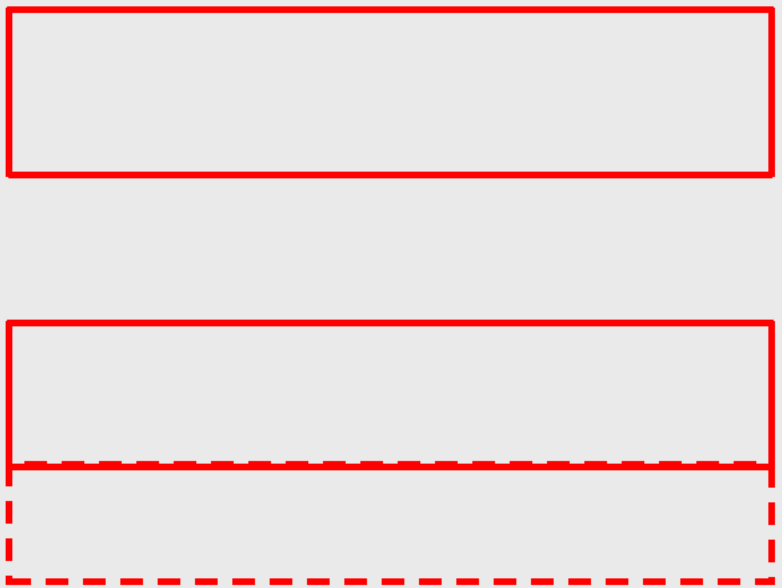
Image 2 – City of Sydney Public Domain Design Code

City of Sydney City Lights

The Sydney Lights Public Domain Design Code provides Toolkits to identify the most relevant to each project space.

The elements applicable to the Project include

- Local Street Medium to High Activity
- Local Shared and Pedestrian Priority Zones
- Village Centre and Local Area Park
- Cycleway Applications



Toolkit Lighting Palette - Parks

	Street Type		Lighting Type*	Recommended Lighting Level**	Light Quality
	City Centre Park 	Usually experience high pedestrian activity over a longer span of hours. Pathway networks usually provide direct connections to city streets. Park may include activity areas that accommodate night time use.	City Standard Pedestrian Pole Top Lighting Range	Major Pathways: P1-P2 Minor Pathways: P3 Path Edges†: P5 Activity Area: P8	Pedestrian pathways and Activity Areas: 3000K-4000K Min Ra85
	Village Centre and Local Area Park 	Usually surrounded by residential zones, they provide through site access to local streets or village centre streets and often include programmed activity areas. Larger parks may have distinct/recreational amenities with use by those from a wide catchment area.	City Standard Pedestrian Pole Top Lighting Range	Major Pathways: P2 Minor Pathways: P3 Path Edges†: P5 Activity Area: P8	Pedestrian pathways and Activity Areas: 3000K-4000K Min Ra85
	Small Local Parks (No through Site Access) 	Usually surrounded by residential zones and do not provide any through site access. In many instances they are adequately lit by street lighting and additional lighting is not required.	City Standard Pedestrian Pole Top Lighting Range If sufficient light levels are provided by existing surrounding street lighting then further lighting types may not be required. Consult with the City of Sydney	Pathways: P3 Path Edges†: P5	Pedestrian: 3000K-4000K Min Ra85
	Small Local Parks (Through Site Access Pathway) 		City Standard Pedestrian Pole Top Lighting Range	Pathways: P3 Path Edges†: P5	Pedestrian: 3000K-4000K Min Ra85

*For Luminaire Type Performance Specifications and Information, refer to Part 3. Section 3.5 Standard Lighting Palette
** Refer to AS1158 for lighting category requirements. Specific lighting levels are subject to evaluation of specific site conditions, risk of crime and can be confirmed by advice from the City of Sydney. In all locations lighting levels are subject to consideration of the surrounding lighting levels. In areas of CCTV locations, 4 lux vertical illumination is to be provided. Consult with the City of Sydney for the latest requirements.
†Path edges are defined as the area on either side of a major or minor pathway that is the same width as the path itself.

Sydney Lights Public Domain Design Code 2015 – 3.4 Tool kit – Standard Lighting Palette and Levels

Lighting Standards : AS/NZS 4282: 2019 Control of the obtrusive effects of outdoor lighting

Consideration of the obtrusive lighting impacts in the lighting design and defining appropriate mitigation measures is critical to address the obtrusive lighting effects from proposed external lighting on neighbouring sensitive receivers, flora and fauna.

Australian Standard 4282 – Control of the obtrusive effects of outdoor lighting - sets out guidelines for outdoor lighting pollution, light trespass and excessive glare. Key considerations are:

- Lighting design which is sensitive to the surrounding environment when selecting equipment to be used
- Full cut-off pole luminaires with zero upward spill lighting
- In ground lighting to be carefully positioned to light the tree trunk and underside of the tree canopy reducing upward spill light
- Use of shields and louvers to minimise direct views of light sources

Lighting control can aid this by

- Dim lighting during agreed curfew hours for energy efficiency
- Control lighting to deciduous trees via a seasonal timer to turn lights off when the tree is bare

LIGHTING CONTROLS

five

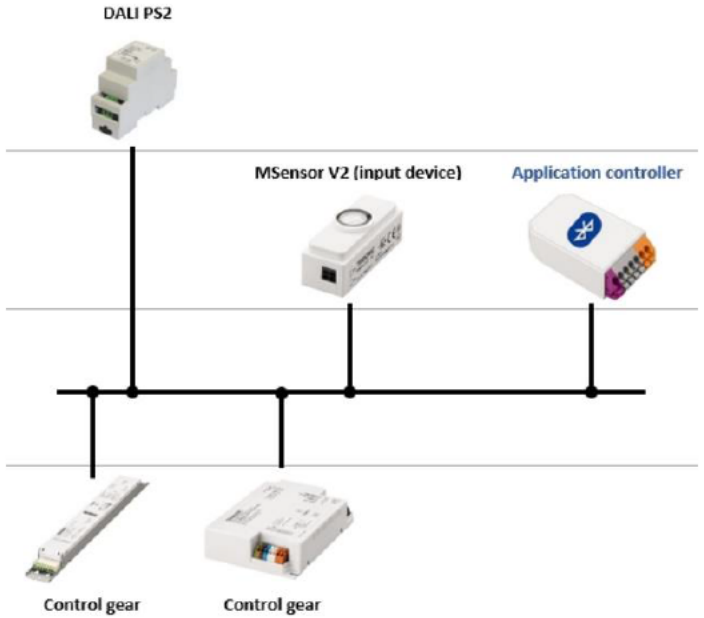
Lighting Controls :

To minimise energy consumption and create an appropriate night-time environment lintelligent and dimmable lighting controls near recommended. Utilising an intelligent lighting control system can provide much more flexibility than simple “dusk till dawn” On/Off control.

Intelligent lighting control systems can provide extended functionality

- Occupancy sensors automatically control pathway lighting levels and dim up or down based on pedestrian or cycle traffic flow
- Decorative elements and gathering points could be dimmed down (or switched off) late at night or during the early hours of the morning to reduce the impact on flora and fauna, night sky and reduce energy consumption
- Uplighting to deciduous trees could be controlled via a seasonal timer to turn lights off when the tree is bare

It is important to note that the lighting levels are designed to comply with relevant standards when at reduced levels and should not be reduced further.



CONCLUSION

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Conclusion

The Exterior Lighting Strategy provides the Department of Planning and the Environment with an overview of the existing lighting conditions and recommendations for the proposed exterior lighting to complement the architectural and landscape architectural vision for the Explorer Street Eveleigh Project.

As described in this strategy, the anticipated lighting design for the Project will incorporate the following philosophies:

A strong focus on CPTED lighting criteria to achieve results in well lit, safe spaces with high vertical illuminance also assisting those with poor vision	—	Safety and Inclusivity
Welcoming public lighting to extend the usability of the park spaces, gathering points and other elements	—	Enhanced Spaces and Life
Utilise current lighting technology including lighting controls combined with Dark skies and obtrusive lighting design principles	—	Sustainability
Promote physically active movement and transport within the park with pathways, cycleways and open green spaces for general fitness and leisure	—	Active Transport
Human scale, consistent language fixtures and lighting landscape elements and artwork contribute to a feeling of ownership and community	—	Distinctiveness and Place

Conclusion

The lighting will be designed to meet specific standards and requirements for the Project enhancing the architectural and landscape vision. Key design considerations are:

- Provide welcoming ambient and functional lighting for safe movement and to compliment the new urban design and landscape architecture for the Project
- Light connection with wayfinding and signage to support intuitive orientation
- Lighting that works in harmony between the buildings and natural environment
- Light sources to be shielded to reduce glare and upward light spill. Conceal light sources from direct view wherever possible
- Selection of pedestrian pathway poles and luminaires at human scale for good vertical illumination and visual harmony
- Lighting equipment selection to suit design life and maintenance cycle, resource management and sustainability
- Utilise LED light sources for energy savings with a warm colour temperature (CCT) of 3000K to support the natural environment
- Minimise obtrusive light impacts on the natural and surrounding environment

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