3.4.6 The Public /Private Domain Interface

Private development lighting schemes often have implications on the public domain particularly proposals for:

- Building Façade Lighting
- Retail Frontages
- Roof Top illumination
- Illuminated advertising signage
- Through site links

Exterior lighting schemes for buildings will require Development consent. The City will welcome discussions at the early stage of design development in order to achieve the delivery of effective, safe and efficient exterior lighting schemes.

Illuminated Advertising and signage are subject to separate development assessment processes and are not considered in this Code.

Key planning controls to be referenced include:

- Sydney DCP 2012
- Central Sydney DCP

All private lighting related designs that interface with the public domain are to be submitted to the City of Sydney for review. Liaise with the City of Sydney to confirm project specific lighting requirements.

Key considerations

General

General key considerations for the public private interface include the following:

- AS4282 'Control of the Obtrusive Effects of Outdoor Lighting' addresses the minimisation of light spill and light pollution into the night sky
- All external lighting systems must be energy efficient and subject to appropriate times of operation unless they form part of the City's lighting strategy.
- LED downlighting is preferred over up lighting to minimise light pollution
- Extreme contrasts brightness is to be avoided
- Publicly accessible privately owned open spaces to adhere to AS/NZ 1158 to "P" levels directed by City staff.

Building Façade Lighting

It is generally not considered appropriate and it is discouraged to light all building facades, in order to avoid light pollution and the unnecessary consumption of energy and generation of greenhouse gas emissions. However, subtle and well-considered architectural façade lighting applications - where the building architecture is contributing to the overall strategy and legibility of the city fabric.

The following is to be considered:

- Over illumination of business premises especially for promotional purposes is to be avoided and discouraged
- Lighting is to be appropriate to highlight certain architectural features of a building. Floodlighting entire facades not supported.
- Ordinary buildings are to have low key approach to lighting so as not to compete with civic landmarks and distinctive accents.
- External lighting fixtures are to be integrated with the architecture of the building where possible and the daytime appearance of the luminaires is not to be visually imposing.
- Dark recesses in building facades affect the perception of safety within the streetscape of the public domain. Adequate lighting should be provided to these areas as an integrated part of the building façade lighting scheme.

3

Retail Frontages

The City encourages retail window displays to promote pedestrian and economic security. When lighting Retail frontages, the following is to be considered:

- Shopfronts provide additional light source on retail streets. This spill light is to be taken into consideration.
- Recesses in ground floor retail frontages are to be considered.
- Ground Floor Interiors have an impact on public domain lighting. Consult with the City of Sydney.
- Attractive retail frontages- The brightness of all light sources, luminous surfaces and lit surfaces that are visible from the street, including digital and internally lit signage and billboards, shall be limited to maximum 300 candelas/ square meters. Evidence shall be produced from a suitably qualified lighting designer or the manufacturer of the signage element; any deviations or areas of higher brightness need to be reviewed by the City of Sydney. (Steensen Varming to confirm wording)
- Where appropriate, consideration of night-time controls to reduce or turn off shopfront lighting after 2am.

Apple Store, George Street, Paul Patterson /City of Sydney

Through Site Links

Lighting to through site links should provide a seamless extension of adjacent street lighting improving legibility and providing continuity signifying public access. Lighting should also create an atmosphere that is safe and inviting for users. Appropriate light levels and quality is to be discussed with the City of Sydney.

For many development proposals the planning controls require the provision of through site links to limit the length and size of the street blocks to improve accessibility. The City usually requires that public access be maintained to the through-site link 24 hours a day, 7 days per week.

Lighting provision for through site links is to consider the following:

- Provide a seamless extension of adjacent street lighting.
- Lighting proposals to consider open sightlines which complement observation/lighting from adjacent buildings.

Through site link, Hay/Campbell Street, Haymarket, City of Sydney

3.5 Standard Lighting Palette

Introduction

This section of the Lights Code 2013 outlines the technical parameters of the lighting elements as defined in each toolkit. All luminaires implemented in an area under the control of the City of Sydney are to comply with the following technical parameters.

Installation Requirements

When works are undertaken on local streets and footpaths, the Sydney Streets Technical Specifications provide developers, consultants, service providers and City of Sydney staff with the standards and details for design and construction.

The Sydney Streets Technical Specifications sets out the requirements for the installation of street lighting under the direct control of the City.

The Specifications can be downloaded on: http://www.cityofsydney.nsw.gov.au/development/public-domain-works/da-associated-works/sydney-streets-technical-specifications

3.5.1 Smartpoles and Lumianires

Smartpoles are shared services street poles that support the following services and integrate the following accessories:

- RTA signals and signage
- Street Lighting
- Communications (such as mobile cellular net work providers)
- Council requirements (such as CCTV, signage and lighting)

(Source: Smartpole Product Manual)

The required services and accessories for each smart pole are to be reviewed in the context of each application in line with the Smartpole Product Manual.

Smartpole Types and Applications

The current Smartpole range applicable for use in the City of Sydney includes:

- S1 Smartpole range
- S2 Smartpole range
- S3 Smartpole range

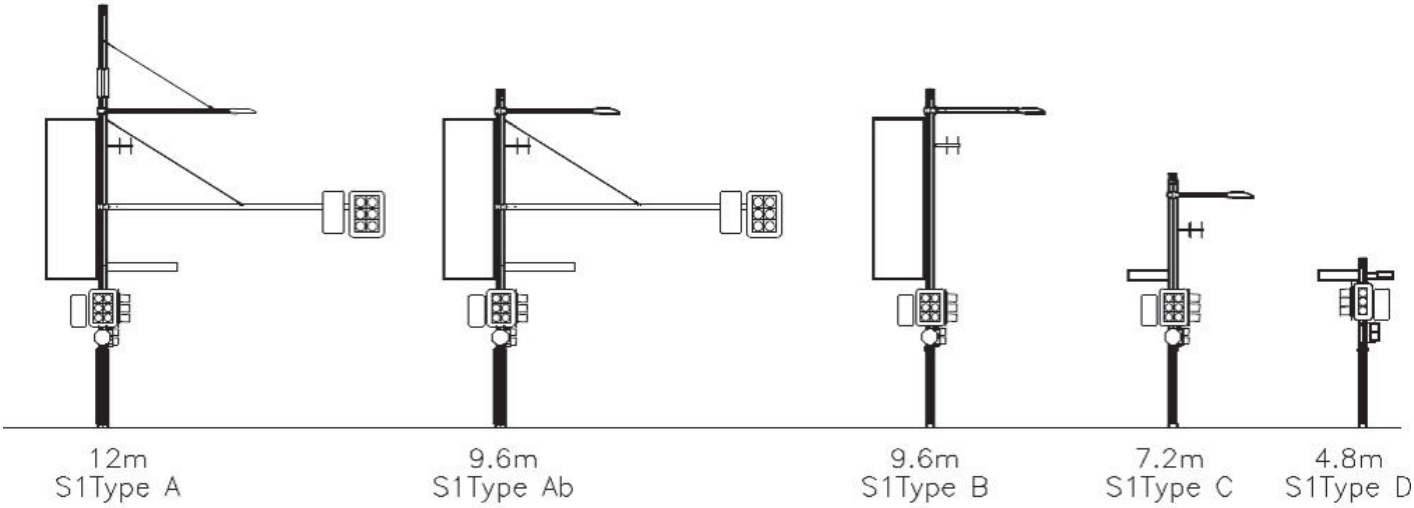
The combination of specific components in each Smartpole application must be investigated on a case-by-case basis to ensure structural and other design parameters are addressed. Each installation and design must be certified in accordance with the current version of the Smartpole Product Manual.

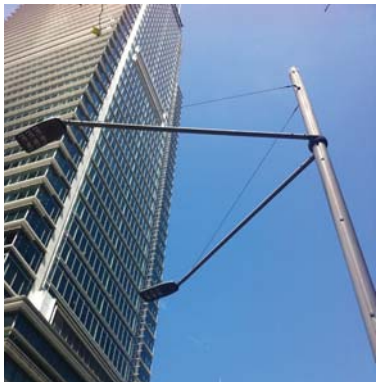
Smartpoles provided through developers' public domain works must comply with City requirements. Where required Smartpoles cannot be installed along a development frontage, they may be required to be installed on the opposite side of the street.

The following sections are intended to illustrate the range and general characteristics of the Smartpole range. Detailed design for each installation may vary, and is subject to specific site conditions and service requirements. Guidance should be sought from the City of Sydney and relevant authorities to confirm the specifications in each location.

S1 Smartpole

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
•								

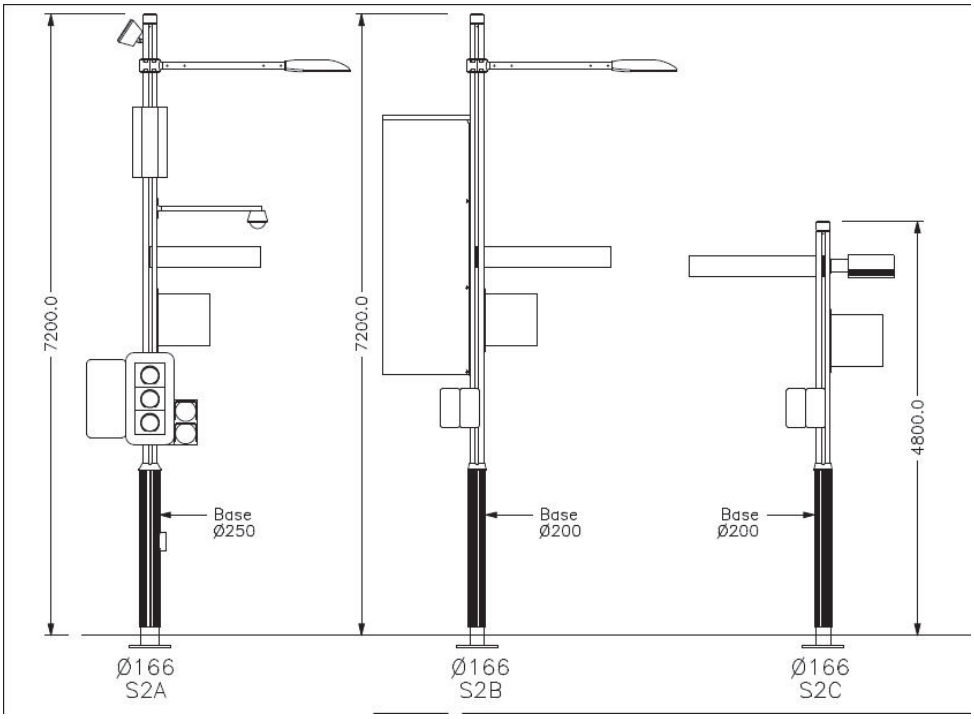




3

S2 Smartpole

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
	•		•					



Glebe Point Road, Glebe, Paul Patterson / City of Sydney

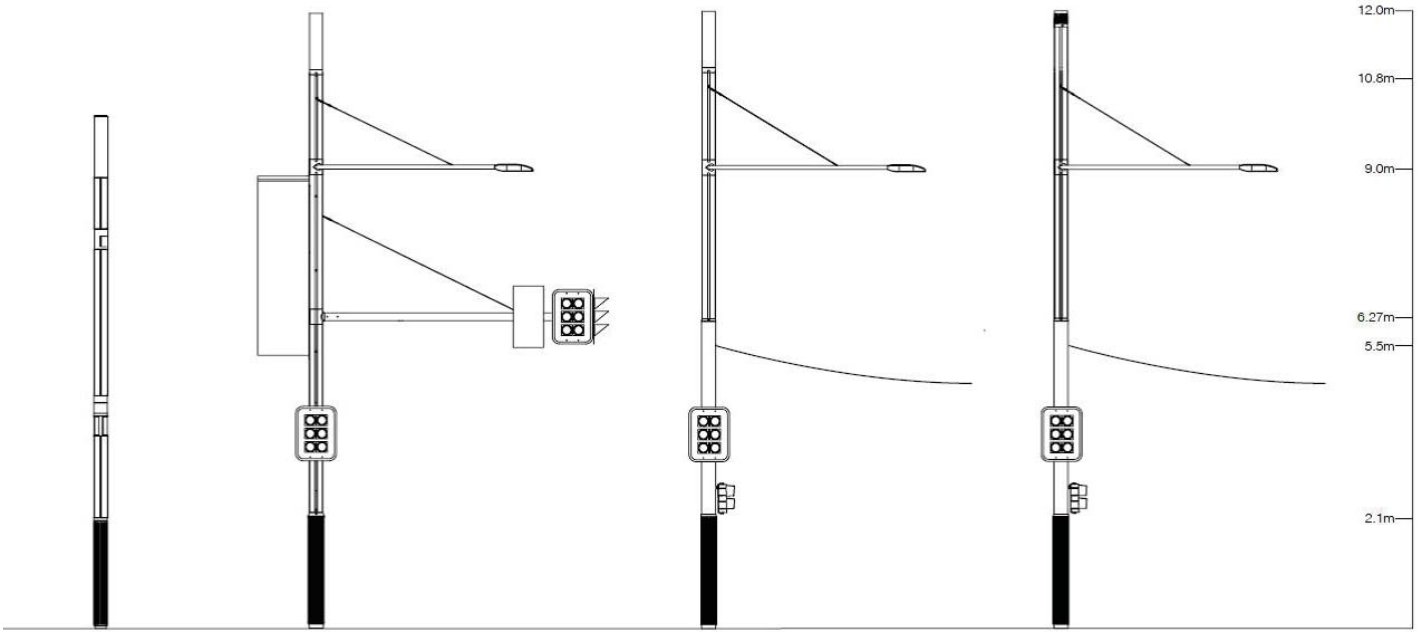
S3 Smartpole - Light Rail Range

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
								●

The City's existing Smartpoles are not capable of supporting the load of overhead light rail wires. To avoid the need for an intrusive second set of poles in the street, the City and HUB are developing a new, stronger pole which can carry lighting, overhead wires, signage and signalling.

Range includes:

- George Street Light Rail Smartpole Range - George Street as a distinctive street will have its own custom designed S3 Smartpoles
- a General Use Catenary S3 smartpole for streets other than George Street



George St Pedestrian Smartpole
260 Dia Upper Pole
260 Dia Base Cladding

S3B

George St Corner Block Smartpole
260 Dia Upper Pole
300 Dia Base Cladding

S3A

George St Catenary Smartpole
260 Dia Upper Pole
273 Dia Structural Core
300 Dia Base Cladding

S3A

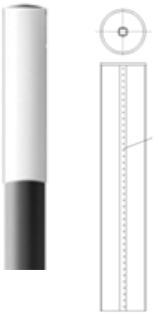
General Use Catenary Smartpole
(Used on Streets that Support Light Rail Other than George St)
260 Dia Upper Pole
273 Dia Structural Core
300 Dia Base Cladding

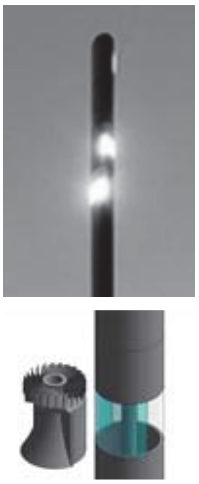
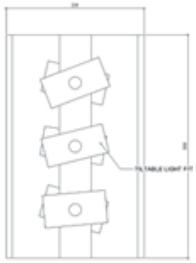
S3C

Concept designs for S3 Smartpole – verify final design and specification with the City of Sydney

3

Smartpole Luminaire Palette

Luminaire	Luminaire Image	Pole	Application	Lighting Distribution	Light Source
Luminaire: GE Evolve Modulare Roadway R250; Manufacturer: GE Lighting		S1, S2, S3 General Use (Catenary)	City Centre, Village Centre and Activity Strips, Light Rail, Shared and Pedestrian Priority Zones, Cycleway Application, Pedestrian crossings, Plazas	Asymmetric Medium or Wide Beam light distribution. Selection to be based on application requirements.	LED lamp life L80 @ 50,000 hours, light source efficacy 85lumens/W, CRI 70
1 Module Fitting					**1 Module Available Packages in 4300K:** 39W medium distribution = 3020lm 39W wide distribution = 2960lm 59W medium distribution = 4560lm 59W wide distribution = 4440lm
2 Module Fitting					**2 Module Available Packages in 4300K:** 78W medium distribution = 6040lm 78W wide distribution = 5920lm 98W medium distribution = 7580lm 98W wide distribution = 7410lm 118W medium distribution = 9120lm 118W wide distribution = 8890lm
3 Module Fitting					**3 Module Available Packages in 4300K:** 138W medium distribution = 10,600lm 138W wide distribution = 10,370lm 158W medium distribution = 12,140lmlm 158W wide distribution = 11,850lm 178W medium distribution = 13,680lm 178W wide distribution =13,330lm
4 Module Fitting					**4 Module Available Packages in 4300K:** 197W medium distribution = 15,160lm 197W wide distribution = 14,820lm 217W medium distribution = 16,700lm 217W wide distribution = 16,300lm 237W medium distribution = 18,240lm 237W wide distribution = 17,780lm
Luminaire: George Street Beacon Component Manufacturer: TBC		S3 George Street Pedestrian Smartpole	George Street	Diffused even lighting with colour changing possibility	LED module within diffused (UV resistant) cylinder. LED with RGBA/RGBW ability.

Luminaire	Luminaire Image	Pole	Application	Lighting Distribution	Light Source
Luminaire: George Street Area Lighting Component Manufac-turer: TBC		S3 George Street Pedestrian Smartpole	George Street	180 degree sweep asymmetric reflector integrated into pole	LED module, 1050mA, 3000-3200K CCT, LED L70 @ 50,000hrs, Colour Consistency C3 @50,000hrs Luminous Efficacy: 73lumens/W, CRI≥80, 2 step MacAdam Ellipse, IP66 rated module **2 Module Package (max 12m spacing)** 82.8W @ 6,000lm (lumen package of modules excluding reflector losses) **3 Module Package (max 15m spacing)** 124.2W = 9,000lm (lumen package of modules excluding reflector losses)
Luminaire: George Street Pedestrian Lighting Component Manufac-turer: TBC		S3 George Street Pedestrian Smartpole	George Street	360 degree sweep asymmetric reflector integrated into pole	24 x 2.3W LED modules, Cree, 700mA housed in integrated enclosure 2600-3200K CCT LED L70 @ 60,500hrs Luminous efficacy: 80lumens/W, CRI≥85
Luminaire: George Street Tree Lighting Component Manufac-turer: TBC		S3 George Street Pedestrian Smartpole	George Street	Narrow or Medium beam light distribution (pending final pole and tree locations)	1 x LED module, 700mA, 3000K-3200K, LED L80 @ 50,000hrs, Colour Consistency C3 @50,000hrs, Luminous efficacy: 82lumens/W, CRI≥85 6 housings @ 11.3W per luminaire (Details of housings to be confirmed)

3.5.2 Ausgrid Lighting Poles

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
		•	•					

Generally in locations not designated for Smartpoles the street and footpath lighting in the City of Sydney is owned and maintained by the energy supply authority (Ausgrid).

For new streets or streetscape upgrades involving the installation of new poles, the pole, luminaire and lamp types to be used shall be supported by the energy supply authority (Ausgrid), and comply with this Code.

Impact on Street Trees

Where possible, upgraded lighting designs should use existing serviceable poles, and avoid trimming of tree canopies.
New pole installations and lighting designs shall be co-ordinated with street tree locations and other streetscape elements to avoid conflict.

Where power is not to be undergrounded, aerial bundling of cables to minimise impact on street trees is required.

Ausgrid Lighting Poles Palette

Luminaire	Luminaire Image	Pole	Application	Lighting Distribution	Light Source
Refer to Ausgrid Standard Luminaire Suite		Ausgrid Galvansied Steel Pole for streets with under-ground power supply. Range includes poles of various heights and outreach arm lengths	Local Streets, Urban Renewal Areas	Refer to Ausgrid Standard Luminaire Suite	Refer to Ausgrid Standard Luminaire Suite
Refer to Ausgrid Standard Luminaire Suite		Ausgrid Wooden pole con-sists of lighting outreach arm attached to timber electricity transmission pole. Range includes various outreach arm lengths in response to street width and tree canopy cover.	Local Streets, Urban Renewal Areas	Refer to Ausgrid Standard Luminaire Suite	Refer to Ausgrid Standard Luminaire Suite

Refer to Ausgrid Standard Luminaire Suite for further information. http://www.ausgrid.com.au/

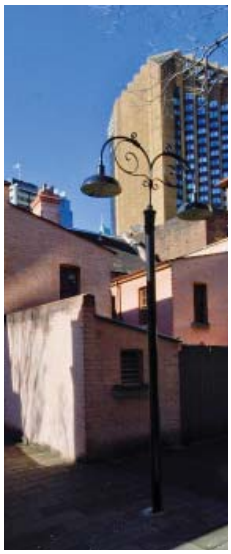
3.5.3 Heritage poles and luminaires

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
				●				

The Rocks/ Harbour Village North Precinct of the City of Sydney is an area of heritage character and importance. These lighting poles are used in this area to suit the architectural aesthetic and heritage streetscape and may only be used in rare occaisions outside of the Rocks area.

Consult with the City of Sydney for applicable locations.

Heritage Lighting Poles Palette

Luminaire	Luminaire Image	Pole	Application	Lighting Distribution	Light Source
Luminaire: Rocks Style Column		Rocks Column	Heritage Areas	CoS to confirm	CoS to confirm

3.5.4 Wall Mounted luminaires

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
● (laneways only)	● (laneways only)		● (laneways only)					

Wall mounted light installations are most commonly used for laneways or narrow streets for both street and pedestrian lighting where poles cannot be installed. This is usually a result of the absence of adequate footpaths for safe pole installation, the location of major in-ground services that prevent installation of poles and footings, or as a strategy to reduce clutter of pole elements in the public domain.

Application of wall mounted luminaires should consider the urban design impact on the streetscape and mounting surface (including heritage considerations)

All instances of wall-mounted lighting installations are to be determined by the City of Sydney.

Wall Mounted Lighting Palette

Luminaire	**Luminaire Image**	**Pole**	**Application**	**Lighting Distribution**	**Light Source**
Luminaire: Evolve LED Area Light Manufacturer: GE Lighting Small (single) Module Medium (Double) Module	 	n/a outreach arm may be applicable	laneways / narrow streets	Asymmetric Forward or wide light distribution	Small (single) Module Available packages for 4000K: 50W = 3130lm 63W = 4050lm 76W = 4970lm 89W = 5890lm 101W = 6810lm General: Lamp Life L85 at 50,000H, CRI70, light source efficacy 67lumens/W

3.5.5 Pedestrian Pole Top Luminaires

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
		●	●		●	●	●	●

The provision of pedestrian pole top lighting is mainly used to provide required lighting levels to public spaces such as plazas and parks.

These lighting elements also have street based applications for situations where additional illumination is required for pedestrian and cycle priority use as well as publicly accessible privately owned spaces that have a similar requirement for provision of adequate pedestrian lighting.

Pedestrian Pole Top Lighting Palette

Luminaire	Luminaire Image	Pole	Application	Lighting Distribution	Light Source
Luminaire: Evolve LED Post Top Twin Contemporary, Tiered Circular Manufacturer: GE Lighting		City Standard tapered steel pole. Micaceous Iron Oxide Grey/ Metropolis Bronze Pearl/ Black colour finish* Pole Height: 4.5m-6m	Parks, Plazas, Local Streets. Often used for retrofitting purposes	Asymmetric or symmetric	LED, 4100K Min. light source efficiency 65 lumens/watt LED lamp lifeL85 at 50,000H CRI 65 4,630lm @ 86W 2,380lm @ 49W
Luminaire: Evolve LED Post Top Twin Contemporary, Tiered Cone Manufacturer: GE Lighting		City Standard tapered steel pole. Micaceous Iron Oxide Grey/ Metropolis Bronze Pearl/ Black colour finish* Pole Height: 4.5m-6m	Parks, Plazas, Local Streets. Often used for retrofitting purposes This is the City preferred luminaire.	Asymmetric or symmetric	LED, 4100K Min. light source efficiency 65 lumens/watt LED lamp lifeL85 at 50,000H CRI 65 4,630lm @ 86W 2,380lm @ 49W
Luminaire: Evolve Duna Manufacturer: GE Lighting		City Standard tapered steel pole. Micaceous Iron Oxide Grey/ Metropolis Bronze Pearl/ Black colour finish* Pole Height: 4.5m-6m	Parks, Plazas, Local Streets. Often used for retrofitting purposes	Asymmetric Wide/ Asymmetric Forward/ Symmetric	LED 4100K Min. light source efficiency 65 lumens/watt LED lamp life L85 @ 50,000H
Luminaire: Odyssey LED Manufacturer: GE Lighting		City Standard tapered steel pole. Micaceous Iron Oxide Grey/ Metropolis Bronze Pearl/ Black colour finish* Pole Height: 4.5m-6m	Laneway/ Narrow Local Streets.	TBC	TBC

Note: Selection of Luminaire made based on required light distribution / performance and to match existing elements, CoS to confirm.
* Selection of pole colour made based to match existing elements / CoS palette, CoS to confirm.

3

Luminaire: City of Sydney Custom Pole Light* Manufacturer: GE Lighting	 	Custom Pole Design	City Centre This fitting is to be used in high profile/ high activity areas as directed by the City. Consult with the City of Sydney for application confirmation.	TBC by CoS	TBC by CoS

*** Currently under development**

3.5.6 Pedestrain Connecting Spaces Luminaires

City Centre and Gateways	Village Centres / Activity Strips	Local Streets	Urban Renewal Areas	Heritage Areas	Pedestrian Connections	Parks	Plazas	Light Rail Streets
					•			

In certain instances, pole lighting may not be a viable lighting solution. In this instance a catenary floodlight option may be viable. Consult with the City for application.

Pedestrian Connecting Spaces Lighting Palette

Luminaire	Luminaire Image	Pole	Application	Lighting Distribution	Light Source
TBC by CoS (Sylvania)		TBC by CoS	Pedestrian Crossings	TBC by CoS	TBC by CoS- To provide datasheet for technical input

Sydney Lights Part Four

Creative Lighting Masterplan

city of villages

Paddington Reservoir Gardens, Eric Sierins/City of Sydney

4

Creative Lighting Masterplan

4.1 Introduction

In addition to fulfilling functional lighting requirements this Code recognises the importance of lighting to reinforce a sense of place, influence the appearance and character of streetscapes, buildings, and public spaces, and contribute to a lively engaging city experience for people to enjoy.

Proposals for creative lighting applications are assessed by the City of Sydney on a case-by-case basis, taking into consideration the overall design, the site context, and compliance with the requirements of this Code.

4.2 Strategic Approach

To be energy efficient and visually effective the Code advocates a targeted use of creative lighting applications with the city's fabric appearing as a backdrop to selected highlighted places, precincts and elements. The Creative lighting applications comprise of three components:

City Structure and Precincts
- lighting applications to reinforce the legibility of the city structure or highlight key city precincts;

Distinctive accents
– lighting applications to individual elements across the city such as monuments, trees and landmark buildings

Special Lighting Elements
– use of special non- standard lighting elements for functional lighting applications as a means to reinforce a distinctive sense of place and character;

4.3 City Structure and Precincts

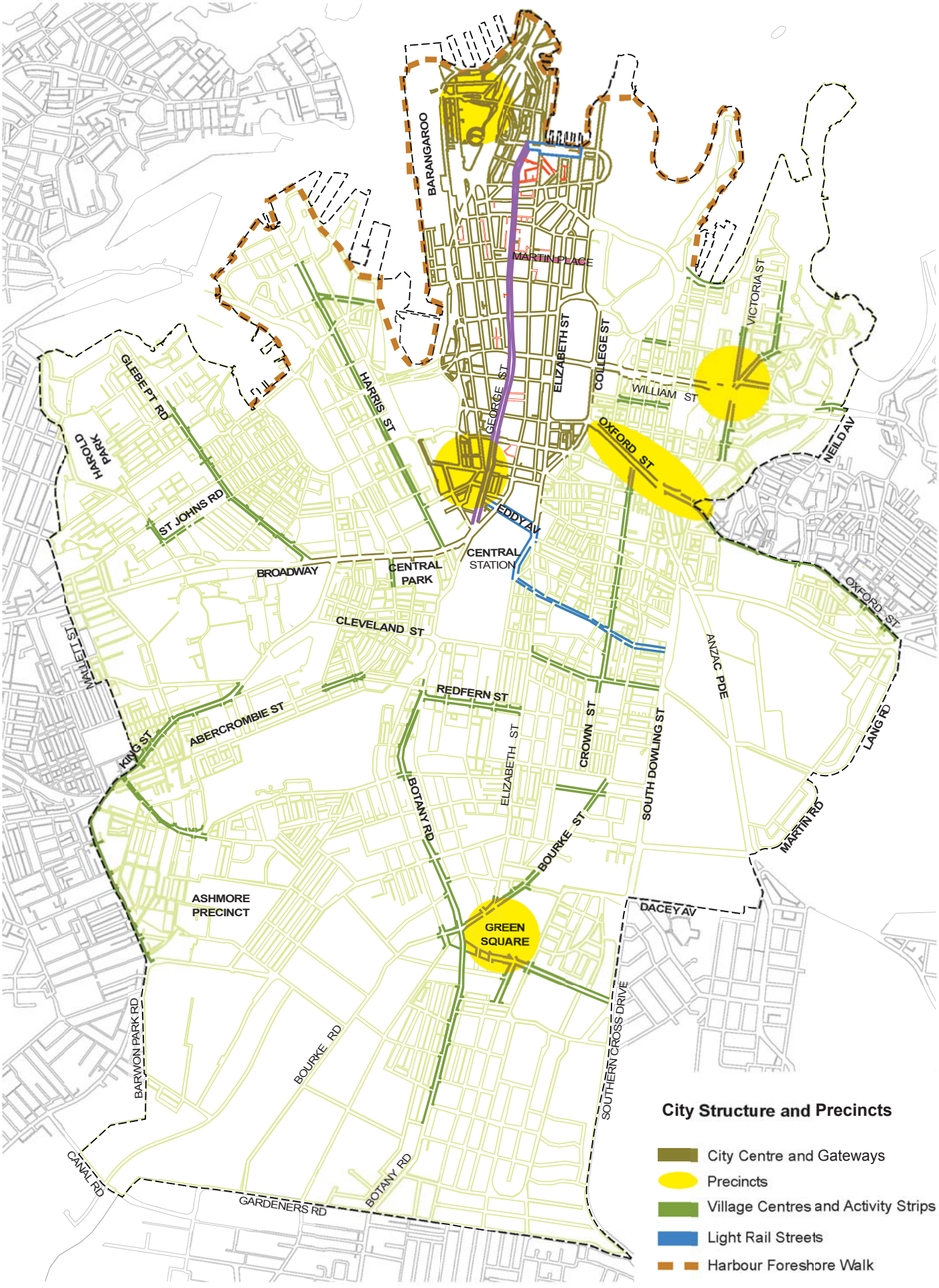
The overarching lighting strategy considers the pedestrian experience within the context of the night time environment. The following elements collectively facilitate the legibility of the city through illumination and navigation which can be read from afar, looking in, as well as at a pedestrian level.

4.3.1 City Centre Skyline

Major towers in the City Centre contribute to the identity of the City by providing a unique profile and expression of the skyline. Attention to building capitals and capping buildings with light has the most impact on the development of a strong night time skyline. The relationship between functional lighting applications, creative lighting applications and lighting for private developments needs to be considered and balanced to re-enforce the overall legibility of the city structure.

Roof Top Illumination

- Care is to be taken in the methods of illumination to ensure that the City does not become over illuminated. The illumination of City buildings must be rationalised to effect a stronger, tidier appearance and in doing so create striking long-distance vistas of the City.
- Close attention is to be paid to building capitals, as 'capping' the building with light creates a strong night-time skyline.
- Techniques and fixtures that minimise upward spill light and energy consumption are to be employed.
- Development Applications are to demonstrate, by photomontage, the effect in the field of view from distant vantage points.
- Where uplighting is proposed evidence must be provided to demonstrate that no waste spill light or obtrusive effects will result and that downlighting is not possible in the circumstances.


BARANGAROO
MARTIN PLACE
ELIZABETH ST
COLLEGE ST
GEORGE ST
VICTORIA ST
WILLIAM ST
OXFORD ST
NEILD AV
HARRIS ST
GLEBE PT RD
HAROLD PARK
ST JOHNS RD
EDDY AV
CENTRAL STATION
CENTRAL PARK
BROADWAY
CLEVELAND ST
MALLETT ST
ABERCROMBIE ST
KING ST
REDFERN ST
ELIZABETH ST
CROWN ST
SOUTH DOWLING ST
ANZAC PDE
LANG RD
MARTIN RD
BOTANY RD
BOURKE ST
DACEY AV
ASHMORE PRECINCT
GREEN SQUARE
BARWON PARK RD
BOURKE RD
SOUTHERN CROSS DRIVE
CANAL RD
GARDENERS RD
BOTANY RD
City Structure and Precincts
City Centre and Gateways
Precincts
Village Centres and Activity Strips
Light Rail Streets
Harbour Foreshore Walk

4.3.2 Harbour Foreshore

Approach

Sydney's beauty is often defined by its harbour and foreshore. Lighting applications can reinforce important aspects of the city's relationship to the Harbour edge as well as promote the foreshore walk which acts as a linking element between existing and growing destinations such as Pyrmont, Darling Harbour, Barangaroo, Walsh Bay, The Rocks/Harbour Village North and Circular Quay.

Direction

The lighting strategy to the Foreshore walk should create an overall and consistent experience. Lighting should allow for experiencing the harbour at night-time in a safe and guided way, whilst allowing view across and to the water. Considerations shall be given to the use of low level pedestrian or furniture lighting to mark the water's edge whilst maintaining vistas.

The lighting scheme must acknowledge that the Foreshore walk land is not solely owned by the City of Sydney. The City of Sydney encourages the lighting strategy in this area to be adopted by other landowners to create consistency in the public domain.

4.3.3 Precincts & Village Main Streets

Primarily, the 'Lighting Overlay' strategy recognises Sydney as a network of distinctive precincts; each with their own unique program and identity. Together they provide a diverse range of attractions across the City.

These precincts are known as:

- Chinatown
- Harbour Village North
- Oxford Street
- Kings Cross
- Greensquare Town Centre

The lighting strategy in each precinct should be tailored to express the identity of the area. The full project scope and lighting applications will be subject to the preparation of individual lighting master plans for each distinctive City precinct.

Circular Quay Panorama, Vivid 2010, Paul Patterson / City of Sydney

Chinatown

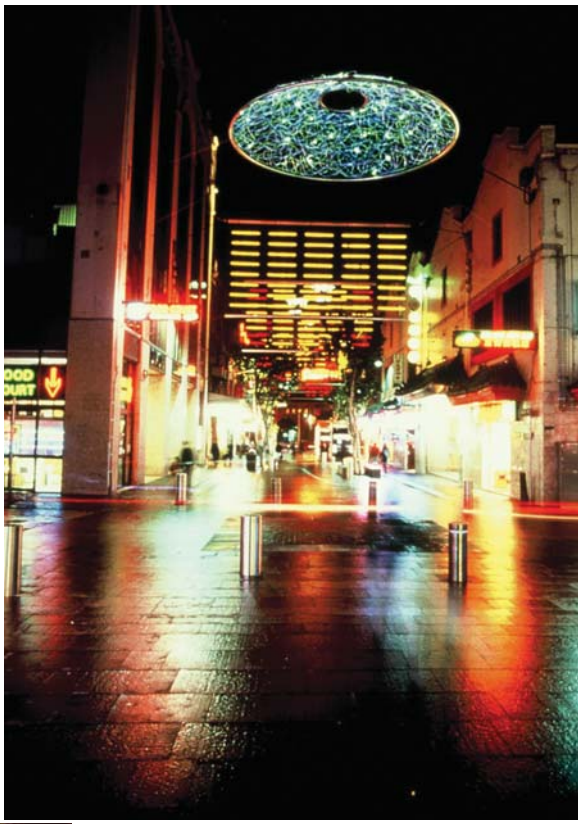
Approach

Chinatown has a unique identity expressing the vibrancy of Asian Culture and street life in Sydney. Focused on the pedestrianised Dixon Street, small businesses from all over Asia owners populate the area in restaurants, food halls, stores, karaoke venues, bars and markets. This vibrant destination appeals to all age groups, residents and visitors during the day and in the evening.

Direction

The significance of this dense community in the City provides the opportunity to allow for the layered growth of the illuminated advertising which has become a hallmark of the contemporary Asian metropolis.

The area will offer a lighting destination, distinct in that it is not controlled design but ordered chaos. This allows the community and businesses to help define the development of their own unique precinct. The Hong Kong or Shibuja experience being brought to Sydney.



Chinatown, google search, photographer unknown

Chinatown, artist's impression, McGregor Coxall

4

Harbour Village North

Approach

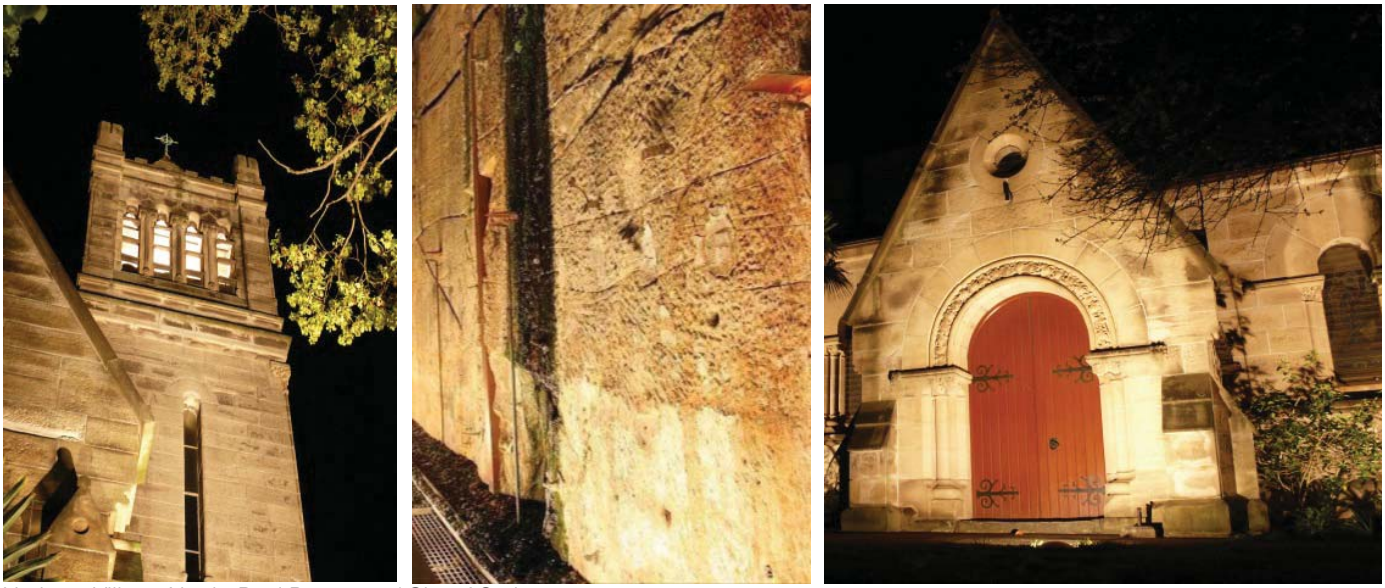
The Harbour Village North and surrounding areas, offer a precinct rich with architectural history, typologies closely weaved in together expressing the city's past in a dense, reminiscent spatial environment unlike any other in Sydney. The
opulence of history witnessed in this built environment is prevalent in buildings,
ground treatment and even immense infrastructural feats. Coupled with its harbour side location and the precincts role as portal for international visitors, the Harbour Village North has a purely distinct character. This area provides an unparalleled opportunity to celebrate heritage through lighting in a means that can tell a story and enhance Sydney's historical narrative from the very origin point of its development. Curated by the City and characterised by the warmth of illuminated Australian sandstone, this controlled environment provides a place in the urban strategy, which can become an evening destination appealing to a variety of age groups.

Direction

The lighting strategy in this area is focussing on subtle and warm building façade lighting to enhance heritage features of the built and landscaped environment. The façade lighting needs to consider and respect the heritage fabric of the buildings, and will be supplemented by street and pathway lighting.

Non heritage buildings may be lit from within to distinguish these from heritage buildings.

The lighting in this area must consider SHFA guidelines for the adjacent Rocks area.



Harbour Village North, Paul Patterson / City of Sydney

Oxford Street

Approach

Oxford Street describes the rich development of culture capable within a progressive and active city. This distinct night oriented corridor is home to a highly expressive and celebrated gay community who alongside the many other locals generate a hive of evening activity. The mood of this region is distinct within Australian nightlife populated by a huge diversity of characters growing particularly towards later hours of the evening. This segment of the urban strategy looks at a curated, controlled yet highly expressive and changeable lighting environment. The environment would be distinct, channelling the vibrancy and uniqueness inherent in the local community. The dynamic nature of this region would be further expressed though changing curatorial roles and a lighting scheme which is able to respond to the mood of streetscape across different times of the day/ year.

Direction

The lighting strategy in this area is to consider and include the following elements

- Ability to change lighting scheme or certain features of scheme on a regular (yearly) basis
- Use of catenary lighting which includes a curated light art element
- Consideration of lighting projections if suitable to the curated installation

Oxford Street, artist's impression, McGregor Coxall

Claire Scoville *Dancer.Jordan*, 2010,NYC, google search, photographer unknown

Karim Rashid *Dnarim, 2010, Milan,* google search, photographer unknown

4

Kings Cross

Approach

Kings cross is Sydney's home of illuminated icons. From known landmarks such as the CocaCola Sign and the El Alamein Fountain to neon signage, exaggeration dominates the senses. This highly accessible, night oriented area while being known as Sydney's Red light districts is also the location of countless of evening destinations which provide an attraction for locals all over Sydney.

Direction

The lighting strategy for Kings Cross is to respond to the tone of the night's activity cycle, helping facilitate active hours and soften the mood of the area outside these periods.

The lighting strategy in this area is to combine various lighting elements into a holistic strategy, and should consider and integrate the use of catenary lighting installations in specific circumstances, façade lighting and coloured illuminated signage. The focus of the overlay should be concentrated along Darlinghurst Road / Bayswater Road entertainment precincts.

Peter McGregor *Llankelly Place Lights,* 2001, Kings Cross

Kings Cross, artist's impression, McGregor Coxall 2001, Kings Cross

Newell Harry *Circles in the Round,* 2010, Temperance Lane

Green Square Town Centre

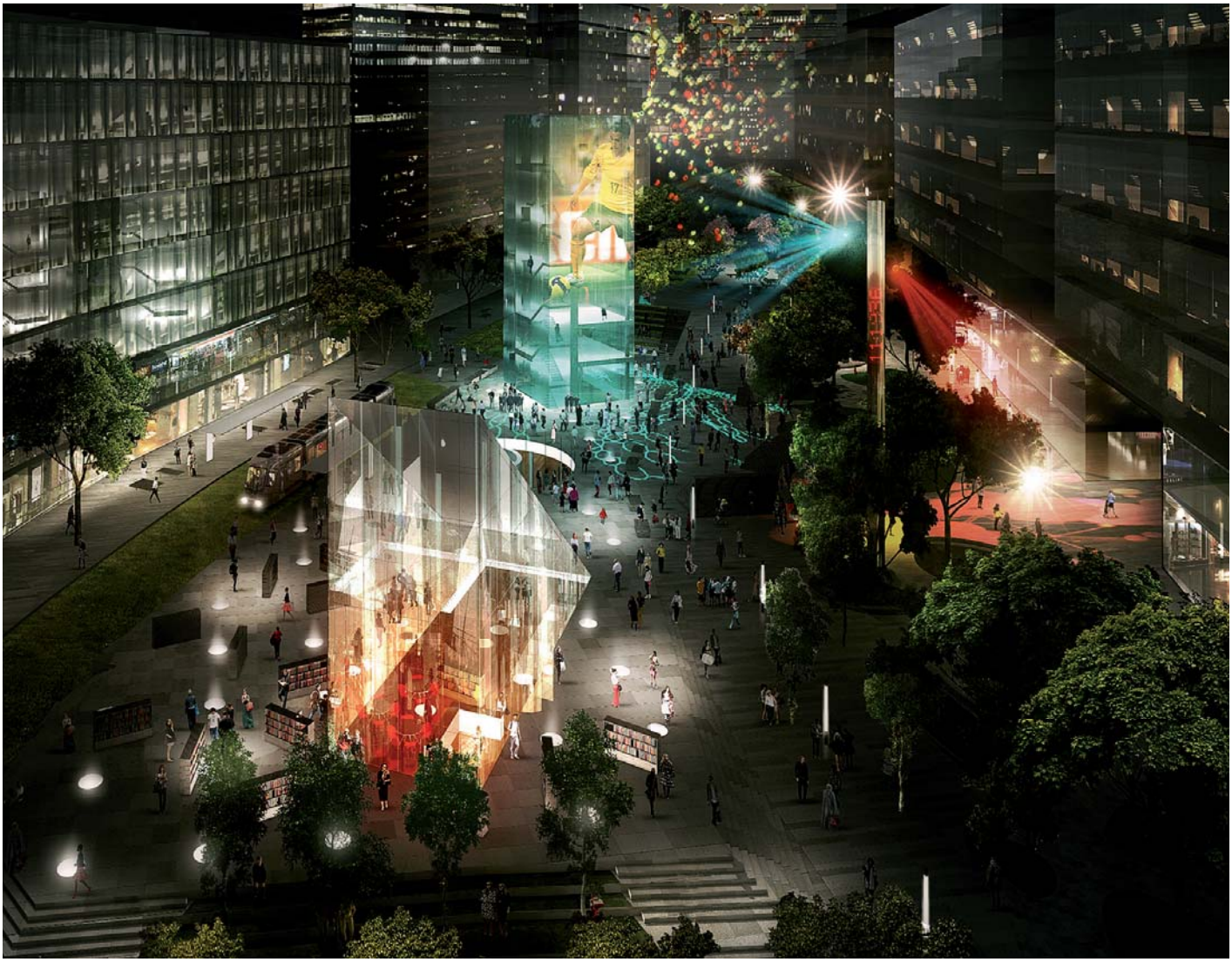
Approach

Green Centre Town Centre will be the focal point of the Green Square Urban Renewal area.

The Civic Place (Green Square Plaza) will form the heart of the Green Square Town Centre. It will provide a grand civic space offering as the location of the library, communal space for play, learning, and cultural events. Surrounding the civic place is an offer of retail and restaurants.

Direction

The Green Square Town Centre public domain strategy provides directions to creative a distinctive character and memorable place that will be achieved through elements such as iconic built form features, landscape, special street feature and creative lighting applications that could include use of catenary as well as special pole elements.



Green Square photomontage, Stewart Hollenstein, City of Sydney

4

Village Main Streets

Approach

Creative lighting applications may also be limited to a Village Main street context rather than a broader precinct approach. These streets include:

- King Street, Newtown;
- Crown Street, Surry Hills;
- Glebe Point Road, Glebe;
- Redfern Street, Redfern;
- Darlinghurst Road, Kings Cross
- Oxford Street, Darlinghurst
- Harris Street, Pyrmont
- Bontany Road

Village Main Street creative lighting applications will further reinforce street hierarchy and contribute to an enhanced retail and night time experience.

Strategic Direction

- The functional lighting, in line with the functional lighting palette of this code, is to be supplemented and enhanced with an additional layer of engaging, and pedestrian focussed lighting.
- Lighting is to respond to the unique character of the street.
- Lighting should be appropriate for human scale and human activity, and focus on pedestrian movement through the area.
- The lighting strategies in these areas should utilise lighting treatments such as tree lighting, façade lighting, relevant sculpture/feature lighting and/or integrated furniture lighting.
- To achieve the above directions, special lighting elements and luminaires outside the standard functional lighting palette can be used.

Jubilee Square, Glebe Point Road, Paul Patterson / City of Sydney

4.3.4 City Centre

4

George Street

Approach

George Street is the City's central spine, with priority for public transport and pedestrians. This central boulevard connects the major city squares and is to provide a unique experience, differing to the other areas within the city centre.

Direction

A specific lighting strategy and masterplan has been developed in 2013. Key aspects include:

- Consistent lighting techniques along the length of the street, incorporating a custom and unique lighting structure to create a strong and recognisable identity
- Curated architectural lighting/ façade lighting as background for the night- time environment and as a contributor to perceived brightness
- Tree lighting to enhance landscaped elements and the streetscape
- A dynamic lighting layer the follows the movement of the light rail, contributing to safety and creating a dimensions of spectacle and engagement

Refer to the George Street Lighting Master Plan 2013 for further information.

George Street Lighting Concept by Stensen Varming for George Street Lighting master plan

Martin Place

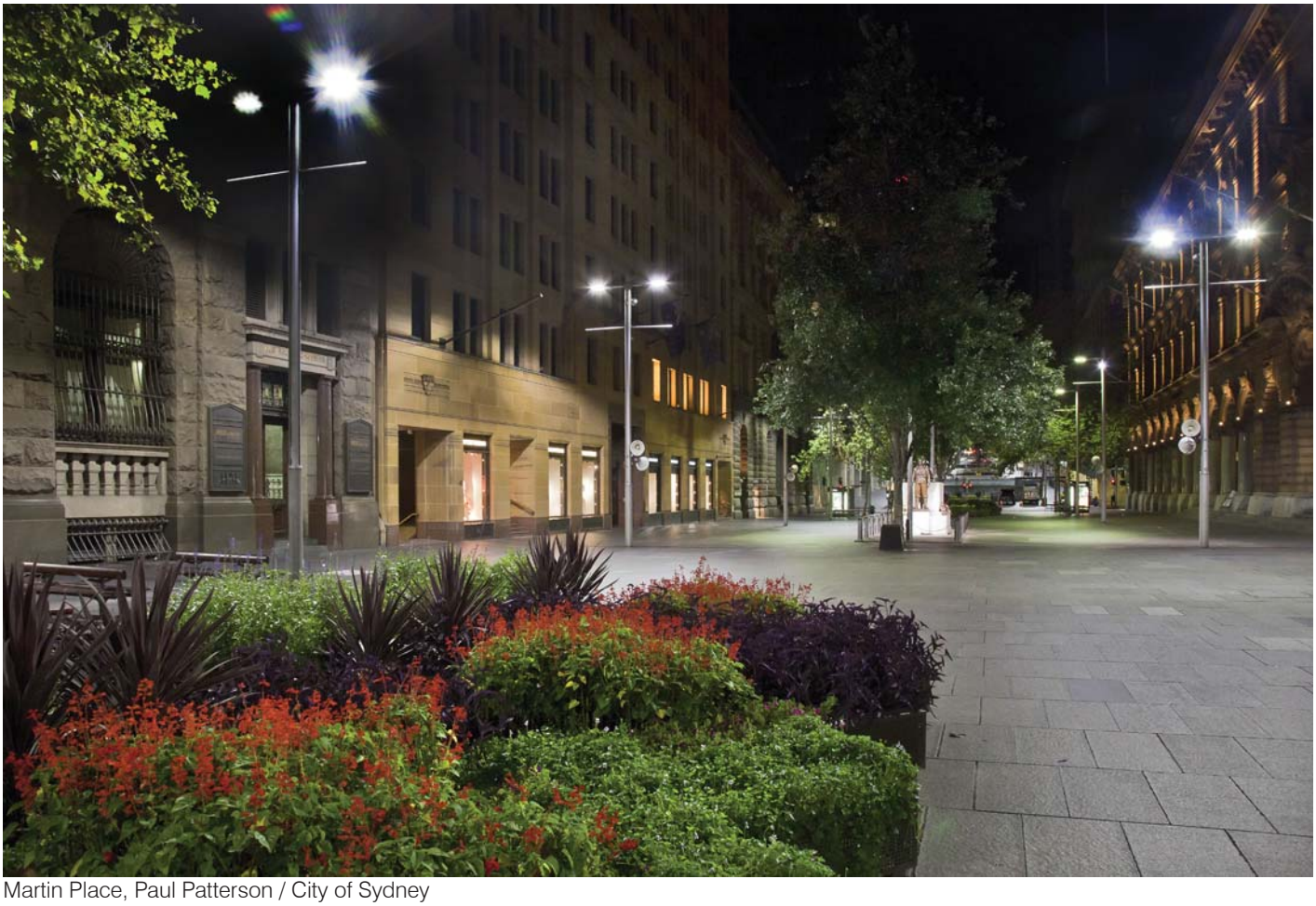
Approach

Martin Place is a key City Centre Plaza and shared zone for pedestrians and cyclists. The Martin Place Lighting Masterplan is currently being developed to provide lighting principles to inform future lighting renovations and development in the precinct. These principles are to act as benchmark project for future city centre plaza/square lighting masterplans.

Strategic Direction

In order to create the conditions for unique and specific responses within a harmonious context, the following design strategies have been developed:

- Enhancement of the continuity of the pedestrian zones spanning the length of the precinct
- Conceptualising of the precinct as a collage of 'moments'
- Specification of unique lighting treatments, appropriate to the style and scale, to individual buildings and objects
- Establishment of a luminance hierarchy to promote way-finding and legibility, and avoid visual fatigue
- Use of lighting features such as façade lighting and lighting of monuments and also different light levels to articulate that the character of Martin Place is different from the vehicular cross streets in lighting ambiance.



Martin Place, Paul Patterson / City of Sydney

4

City Centre East West Connections

Approach

East-West Pedestrian Connections: Six key city centre east-west connectors have been identified as playing a significant role in the pedestrian experience and wayfinding ability. These include:

- Hay Street
- Park Street- Druitt Street
- Market Street
- King Street
- Hunter Street- Curtin Place- Margaret Street- Wynyard Walk
- Bridge Street- Grosvenor Street- Kent Street Underpass

Strategic Direction

In order to create the conditions for unique and specific responses within a harmonious context, the following design strategies have been developed:

- Enhancement of the continuity of the pedestrian zones spanning the length of the precinct
- Conceptualising of the precinct as a collage of 'moments'
- Specification of unique lighting treatments, appropriate to the style and scale, to individual buildings and objects
- Establishment of a luminance hierarchy to promote way-finding and legibility, and avoid visual fatigue
- Use of lighting features such as façade lighting and lighting of monuments and also different light levels to articulate that the character of Martin Place is different from the vehicular cross streets in lighting ambiance.

Laneways

Approach

The City Centre laneway revitalisation program provides the opportunity for special lighting applications to reinforce legibility of the city and create laneways as a destination.

Strategic Direction

- Lighting is to respond to the unique character, history and features of each laneway.
- The lighting strategy in these areas should utilise light art, catenary lighting, façade lighting and/or integrated furniture lighting to revitalise these underused spaces and create a 'laneway' culture.
- Lighting should be appropriate for human scale and human activity.
- Lighting should engage the public and activate the space.
- Lighting is to provide minimum requirements for both pedestrians and vehicles. If light art is used for functional lighting requirements, the installation is to be approved by a lighting designer to ensure minimum requirements have been met.
- Lighting design may utilise a range of different colour temperatures as long as the base lighting requirements are met. Coloured lighting is to be devised in consultation with the City of Sydney.

Lighting not considered appropriate:

- Street Lighting types
- General floodlight applications
- Festoon type lighting

Light Breezes, ARUP, VIVID installation 2012, Cambridge Street, The Rocks, City of Sydney

Sydney Forgotten Songs, Michael Thomas Hill, Angel Place, Sydney, City of Sydney

4.4 Distinctive Accents

4.4.1 Approach

Distinctive Accents are considered as unique elements within the city, which do not qualify as precincts themselves but are integral to the overall legibility of the city and enhance the perception of urban form.

Distinctive Accents work to provide an active lighting environment across the city without disrupting the dominant impact and key identities of the precincts. Distinctive Accents hold their own unique identity and may take on varied roles though such as artistic interventions and landmarks.

The classification and application of Distinctive Accents will be assessed individually on a case by case basis by the City of Sydney and can include the following:

- Civic buildings
- Monuments
- Civil Infrastructure including underpasses and pedestrian tunnels
- Parks
- Plazas
- Tree lighting
- Temporary Events
- Public Art

Distinctive accents can be temporary, permanent or dynamic and can include a variety of lighting techniques such as:

- Strategically selected façade lighting, using colour and media façade techniques where appropriate only;
- Concealed and integrated architectural lighting (e.g. lighting of heritage buildings or features)
- Lighting of public art, or creation of decorative lighting sculptures to enhance streetscapes and laneways;
- Projected images, which are capable of being choreographed to create changing effects;
- Temporary decorative lighting, associated with special events, cultural and civic festivities.

If applied selectively, distinctive accent lighting responsibly addresses energy consumption, sky glow and other environmental impacts.

Civic Buildings

Lighting applications can call attention to distinctive civic buildings and other landmarks that are worthy of accentuation to help create reference points and aid in way-finding, particularly in areas outside the city centre.

Strategic Directions

- Buildings with distinctive lighting applications are to be chosen selectively and in consultation with the City of Sydney. Most of the city should appear as a backdrop to a few special buildings and places that have distinctive lighting.
- Timer controls are to be used to limit the duration of distinctive lighting applications. All distinctive lighting is to be non-operable after 2am to reduce energy consumption and excessive light pollution.
- Light sources to light heritage building are to be incandescent in appearance with a colour temperature range of 2500K – 3200K to give a warm glow to historic architecture. Refer to C.1.1.5 Heritage Areas for further information. All other light source colour temperatures are to be selected to enhance the architectural quality, colour and texture of the building.

Lighting not considered appropriate:

- Lighting on buildings which can detract from the architectural qualities (e.g. festoon lighting on architecturally expressive façade)
- Broad indiscriminate floodlighting of facades from large light sources located remotely from the building. These significantly impact on glare and sky glow. Floodlighting should be directed to enhance building architecture and detailing.
- Coloured lighting is only to be used in specific circumstances in consultation with the City of Sydney.

Queen Victoria Building, George Street, Paul Patterson / City of Sydney

Monuments

Lighting of selected public monuments within the City of Sydney can create a sense of prominence and express the history of an area.

Strategic Directions

- Monuments are to be selected for significant public merit and to establish recognisable night time landmarks.
- Timer controls are to be used to limit the duration of distinctive lighting applications. All distinctive lighting is to be non-operable after 2am to reduce energy consumption and excessive light pollution.
- Light sources are to be of appropriate colour temperature to enhance the natural colour, materiality and texture of the monument. Consult with the City of Sydney for specific requirements.
- The lighting design is to accentuate specific features of interest and is not to floodlight.
- Luminaires should be located so they do not visually interfere with viewing the monument.

Lighting not considered appropriate:

- Broad indiscriminate floodlighting of monuments from large light sources located remotely from the building.
- Coloured lighting is only to be used in specific circumstances in consultation with the City of Sydney.

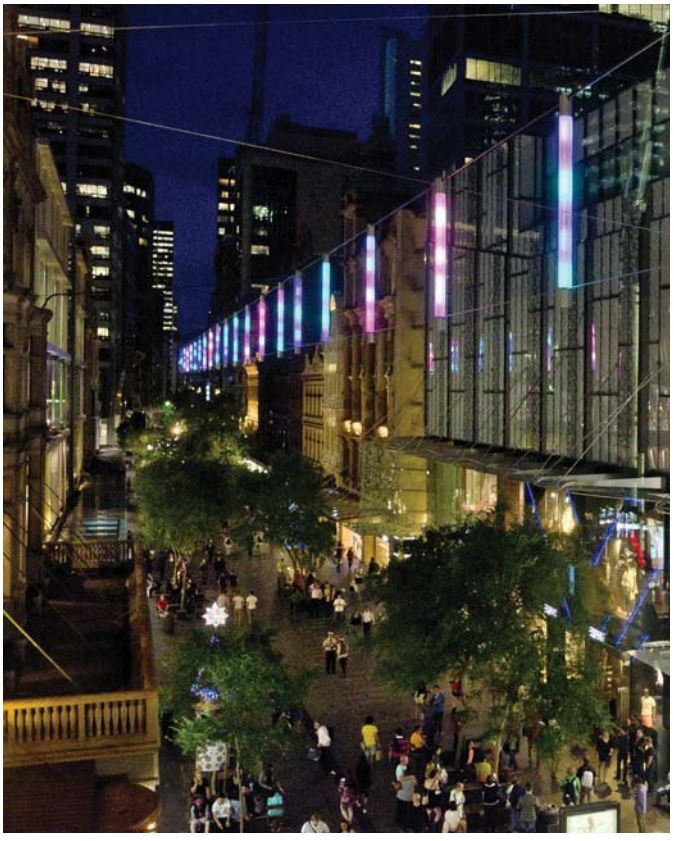
Glebe War Memorial, Paul Patterson / City of Sydney

4

Plazas

City Centre public plazas and squares, act as recognisable meeting places and spaces to sit and relax within the urban context of the City. Plazas provide opportunity for community activities, voicing opinions, sitting areas and meeting areas. They provide a pocket of space allowing reprieve from the busy main city streets. Lighting should therefore reflect a more subtle, integrated approach, with pedestrian focus.

A distinctive and creative approach may be taken for specific plazas in consultation with the City of Sydney



Strategic Direction

- Plaza lighting should be designed and integrated into the urban fabric and landscape design of the space.
- Lighting should respond to and highlight the uniqueness and character of each plaza.
- Luminaires should be concealed from view wherever possible and the day- time view of the fittings should be considered and minimised.
- Lighting should not be uniform across the site but should utilise shadow and light to create focal points and engage the users.
- Sculptures or public art within the plaza may be highlighted.
- Vertical façade lighting unique and appropriate to the style and scale of individual buildings and objects. In some instances façade lighting to contribute to pedestrian pathway lighting, if controlled and maintained by CoS.
- Street level lighting to be relative to façade brightness rather than uniform throughout.
- Tree lighting to enhance landscaped elements amongst the paved experience
- Lighting to provide a series of pedestrian ‘moments’ throughout the site.

Lighting not considered appropriate:

- Flood-lit spaces with uniform brightness across the entire park
- Use of solely pole lighting applications.
- Lighting that focusses on ground illumination only

Parks

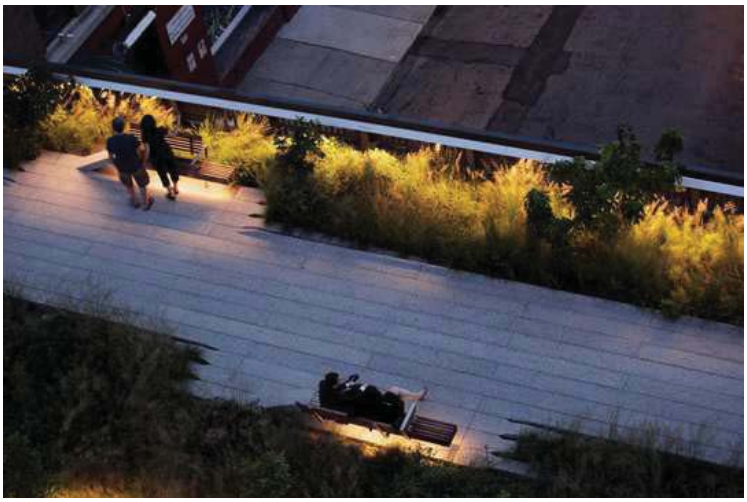
Parks that have a unique character or are a night time destination have potential to include a creative lighting overlay. Parks provide an important social function within the City both during the day and in enhancing the night time economy. These areas require an individual lighting strategy that is to be developed to align with the parameters set out for general parks.

Strategic Direction

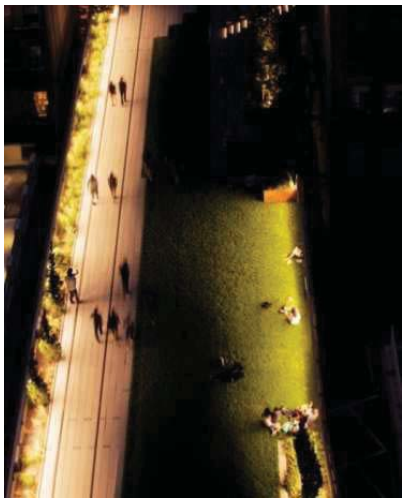
- Meet the basic lighting requirements as defined in the functional lighting palette for a general park. The lighting types used to achieve these levels are open to the designer in conjunction with CoS. Luminaires must comply with the technical requirements outlined in Section Two.
- A creative lighting overlay is encouraged through use of tree lighting, catenary lighting or furniture lighting.
- The design of up-light for trees and landscaping should consider existing site conditions to ensure limited impact on tree root zones.
- Provision should be made to implement a holistic lighting strategy for both general use and 'event' use. This may be the case for a park used for monthly markets. The 'creative' lighting overlay may be turned on for a specific period each month.
- The lighting scheme for all parks should consider lighting of the following elements; Main park entries, park perimeter, main pedestrian and cycle through pathways and surrounding areas, selected landscaped areas i.e. trees, furniture or public art/architectural elements.
- The lighting strategy should utilise both shadow and light to distinguish the park from the general streetscape and to provide direction and focus at night-time.

Lighting not considered appropriate

- Flood-lit spaces with uniform brightness across the entire park
- Lighting limited to the main pathways only, with dark trees or bushes surrounding the pathway, without extending the light into the surrounding areas.
- Fairy / Festoon type lighting



The Highline New York, google web search, photographer unknown



The Highline New York, google web search, photographer unknown

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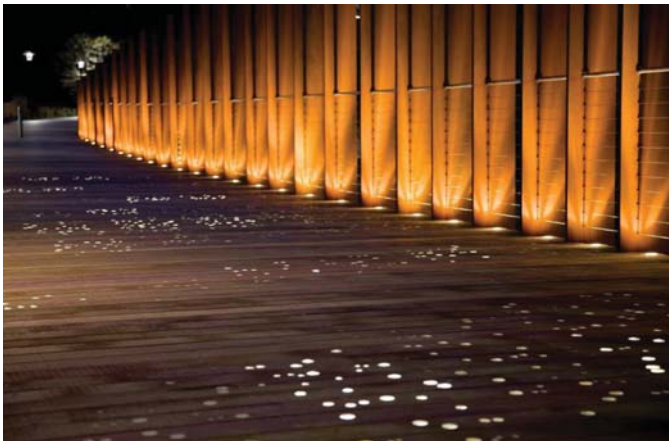
Civil Infrastructure- Underpasses and Pedestrian Tunnels

Within the City of Sydney there is an opportunity for the mundane and often non- attractive civil infrastructure, such as road viaducts, underpasses and pedestrian tunnels, to be subject to distinctive lighting interventions to create unexpected delight not evident during the day without impacting on the strength and identity of the distinctive precinct lighting schemes.



University of Sydney Public Domain, Lighting Design Steensen Varming, Cavanagh Photography

Strategic Directions

- General lighting to utilise wall mount, catenary, furniture and light art lighting typologies rather than pole mounted luminaires.
- Light Art installations must meet functional lighting requirements as outlined in the Standard Lighting Palette.
- Lighting should be create a feeling of safety and enhance the night time pedestrian experience.
- Minimum lighting requirements are to be sustained from dusk until dawn. If distinctive lighting is used in conjunction with general lighting, then timer controls are to be used to limit the duration of distinctive lighting elements. All distinctive lighting is to be non-operable after 2am to reduce energy consumption and excessive light pollution.
- Lighting elements should provide guidance to pedestrian users.
- General lighting is to be provided for vehicular use if required.
- Consideration of transition and visual adaptation between daytime environment and underpass/ tunnel lighting is required. Surface brightness is encouraged.

Lighting not considered appropriate:

- Strobe or flickering lighting
- Glare sources or visible luminous surfaces

Warren Langley, *Aspire*, 2009, Harris Street, Ultimo

Tree Lighting

Tree lighting is to be utilised in particular parks and along priority pedestrian routes to enhance pedestrian amenity, the perception of safety and overall feel of brightness. Tree lighting can facilitate and contribute to way finding and important vistas, and where appropriate, can add a more dramatic effect or background.

Strategic Direction

- Use of white light, with a colour temperature suitable to the tree type.
- Luminaires are generally to be located on adjacent poles or in ground. In ground lighting should be directed towards the tree trunk and underside of the canopy to minimise upward spill light.
- Consultation with arborist where lighting positioning affects tree roots or branches.
- Lighting to deciduous trees must be controlled via a seasonal timer to turn lights off when the tree is bare.
- Tree lighting is not to contribute to overall lighting levels. Surrounding

lighting must comply with relevant standards when tree lighting is turned off.

Control timers to turn off late at night for energy efficiency, adjust to any seasonal variation of foliage and avoid disruption to fauna;

Lighting not considered appropriate:

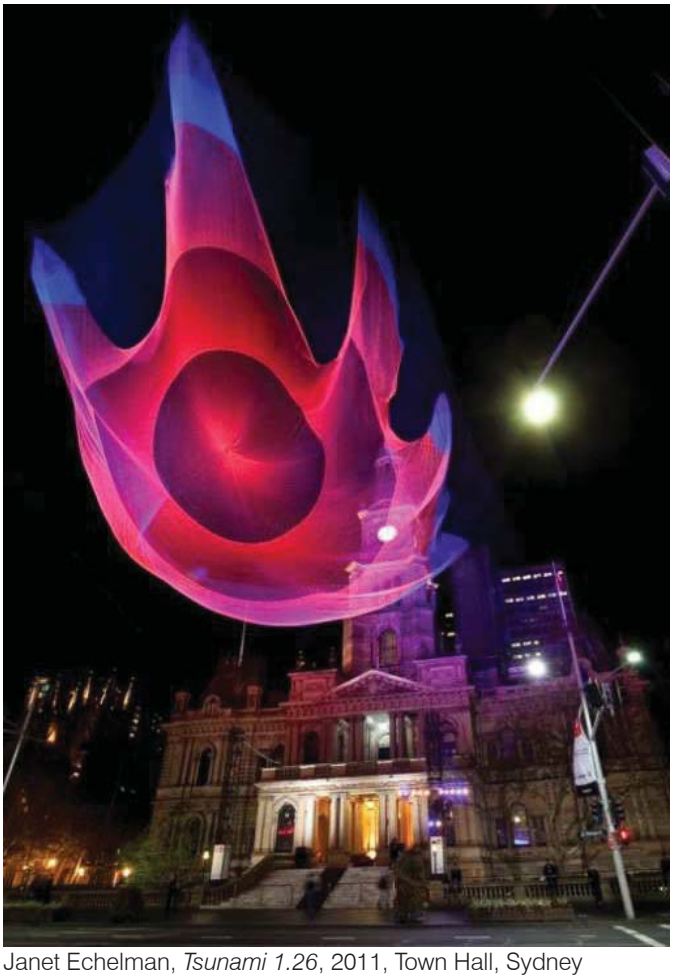
- Coloured lighting (unless specifically agreed with the City of Sydney or provided for a temporary event only)
- Fairy / Festoon type lighting

Glebe Foreshore, Paul Patterson / City of Sydney

4

Public Art

Public Art provides distinctive elements within the city. In some instances these are accentuated by lighting and in other instances, they are lighting elements in their own right. The City's Public Art Strategy, 2011 and the following Green Square Public Art Strategy 2012, provide further strategic directions for both temporary and permanent public art installations.



Janet Echelman, *Tsunami 1.26*, 2011, Town Hall, Sydney

Strategic Direction

- Light art is to be used in specific areas as designated by the CoS to activate a space such as a laneway and create a unique atmosphere.
- Where possible light art should provide sufficient lighting to comply with the recommended AS1158 lighting levels as designated in the above character areas and pallets. This should be confirmed by a lighting designer. If compliance is not achieved other lighting elements must be considered as part of the overall lighting scheme.
- Lighting Art will be reviewed on a case by case basis for specific locations in line with the specific intent of the artist
- Minimisation of glare and glare sources are paramount; lighting is not to distract but enhance the artwork.
- Mounting of luminaires is not to affect viewing of the artwork during the daytime or the night time.
- Collaboration and dialogue with the artist is encouraged to ensure the lighting design is appropriate to the artwork and artist's intent
- Light art to comply with OH&S issues of public safety

Lighting not considered appropriate:

- General floodlighting without focus
- Artwork mounted luminaires, unless luminaires form part of or form the artwork
- Strobing or flashing light art

Temporary Events

Permanent lighting installations can be complemented by temporary lighting events. Temporary lighting events can create theatrical displays for cultural and civic festivities such as Art and About and Sydney Vivid Festival.

Strategic Direction

- Lighting is to be designed specifically for an event and to be temporary in nature
- OH&S and safety requirements are to be considered and included in the design, despite the temporary nature of the installation
- Integrated into lighting structures where practical to do so
- Consideration and planning of power cable runs and access points is required
- Use of permanent infrastructure (for mounting etc) is encouraged, but is to be coordinated with the City of Sydney.

Lighting not considered appropriate:

- Lasers

Richard Goodwin, Russell Lowe, Adrian McGregor, *Seven Metre Bar,* 2009, Underwood Street, Sydney, Jamie Williams / City of Sydney

4.5 Special Lighting Elements

This section outlines basic outlines technical parameters for use of special lighting elements, providing benchmarked examples and project references.

4.5.1 Non Standard Poles and Fixtures

Use of special non-standard poles and lighting fixtures to provide functional lighting provision may be appropriate in certain contexts to reinforce sense of place or character.

The use of these special non- standard elements is subject to approval by the City of Sydney. Unless a specific project warrants a custom designed luminaire element, the general preference and direction is the use of an existing and available product with local support, to reduce maintenance costs and streamline City lighting assets management procedures. Both instances offer the opportunity for a custom designed pole or lighting structure.

The luminaire in both instances outlined above must comply with the requirements below:

- Luminaire should shield light source to prevent upward spill light and direct all light downwards. If otherwise, consult with the City of Sydney.
- Light source to be LED 3000K/4000K, min 65 lumens/watt with lamp LED life min 80% at 50,000H
- Light distribution to be rotationally symmetrical, asymmetric forward throwing or longitudinal (side throwing), dependant on site location and lighting requirements. Above 0° horizontal, the light output ratio is to be ≤ 3% of lamp lumens.
- Luminaire to have min IP65 rating and min IK04 rating
- For mounting detail information refer to the City of Sydney Streets Code 2013

4.5.2 Catenary Lighting

Catenary lighting is a high tension suspended cable lighting system that is to be used in plazas, laneways, underpasses, pedestrian tunnels and pedestrian priority areas in order to differentiate the space from the surrounding environment and create a more intimate and informal atmosphere. This lighting application is generally not supported by CoS, but may be approved in certain circumstances.

- Light source to be LED, min 65 lumens/watt with lamp LED life min 80% at 50,000H. LED CCT may be selected for sight specific applications. Consult with the City of Sydney for approval.
- Light Distribution is to be asymmetric or symmetric. Above 0° horizontal, the light output ratio is to be ≤ 10% of lamp lumens (TBC).
- Catenary luminaire to have min IP65 rating, and min IK04 rating
- Mounting to be concealed and respective of building fabric. Refer to Streets Code.

Prince Alfred Park, Paul Patterson / City of Sydney

Pitt Street Mall, Paul Patterson / City of Sydney

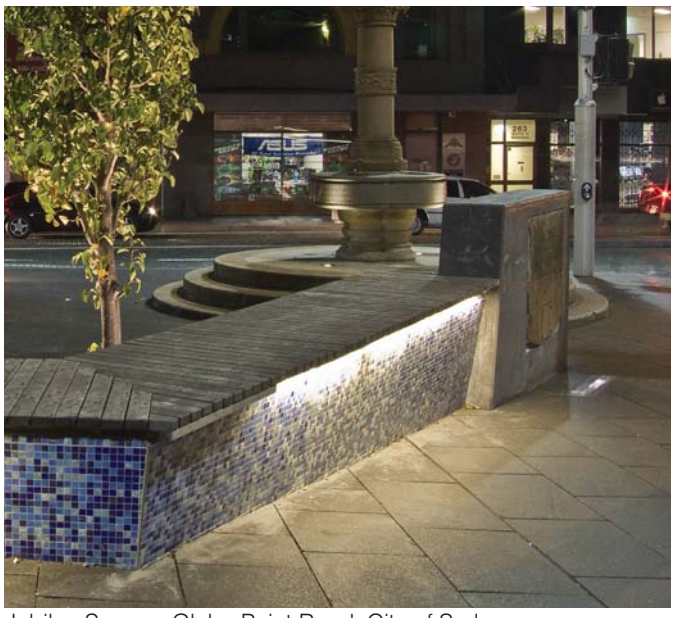
4.5.3 Bollards

Bollard lighting is generally not supported by the City for use in the public domain. In some cases a bollard may be considered, where a particular effect is required or where views and certain proportions need to be maintained. The use is subject to City of Sydney approval.

4.5.4 Furniture Lighting

Integrated lighting in furniture is to be used in parks, plazas, pedestrian priority areas and village centre and activity strips. Integrated furniture lighting provides an informal, playful lighting element within a community area.

- Lighting integration is to be seamless
- Light source to be LED, min 65 lumens/watt with lamp life min 80% at 50,000H. LED CCT may be selected for site specific application. Consult with the City of Sydney for approval.
- Light distribution to be appropriate for context and installation so as to not cause glare or upward spill light.
- Luminaires to have min IP65 rating and min IK04 rating.



Jubilee Square, Glebe Point Road, City of Sydney

4.6 Creative Lighting – Implementation

Priority Implementation Plan

It is recommended that a stage approach to implementation be undertaken. Staging and timing will involve identifying project priorities based on:

- Available resources allocated in the City's capital works program.
- Strategic opportunities to link with other existing public domain projects and programs such as George Street light rail. In general it will be more cost effective to implement lighting masterplans in conjunction with other projects to achieve efficiencies by co-ordinating with other civil works.
- Contribution a creative lighting application can make to achieve City's strategic objectives in Open Sydney, Retail Action Plan, and Tourism Action Plan.
- Private sector interest to contribute and partner with the City to deliver a creative lighting application.
- Capacity to maintain the system to a high level quality over time.

Creative Lighting Masterplans

For each identified precinct the preparation of a creative lighting masterplan that fully scopes the opportunities and proposed lighting scheme is vital to ensure co- ordination with broader public domain proposals for an area.

A masterplan will also allow the private sector to progress the development of a lighting scheme for their buildings in a consistent and co-ordinated manner.

Ideally the lighting masterplan should be considered as part of an overall Public Domain Plan for a precinct / place.

The lighting masterplan should include:

- Specific creative lighting masterplan objectives
- Co-ordination with required functional lighting requirements and public domain proposals
- Guidelines for recommended colour temperature, and approach and directions for fixtures on buildings and public domain
- Implementation strategy
- Energy efficiency considerations

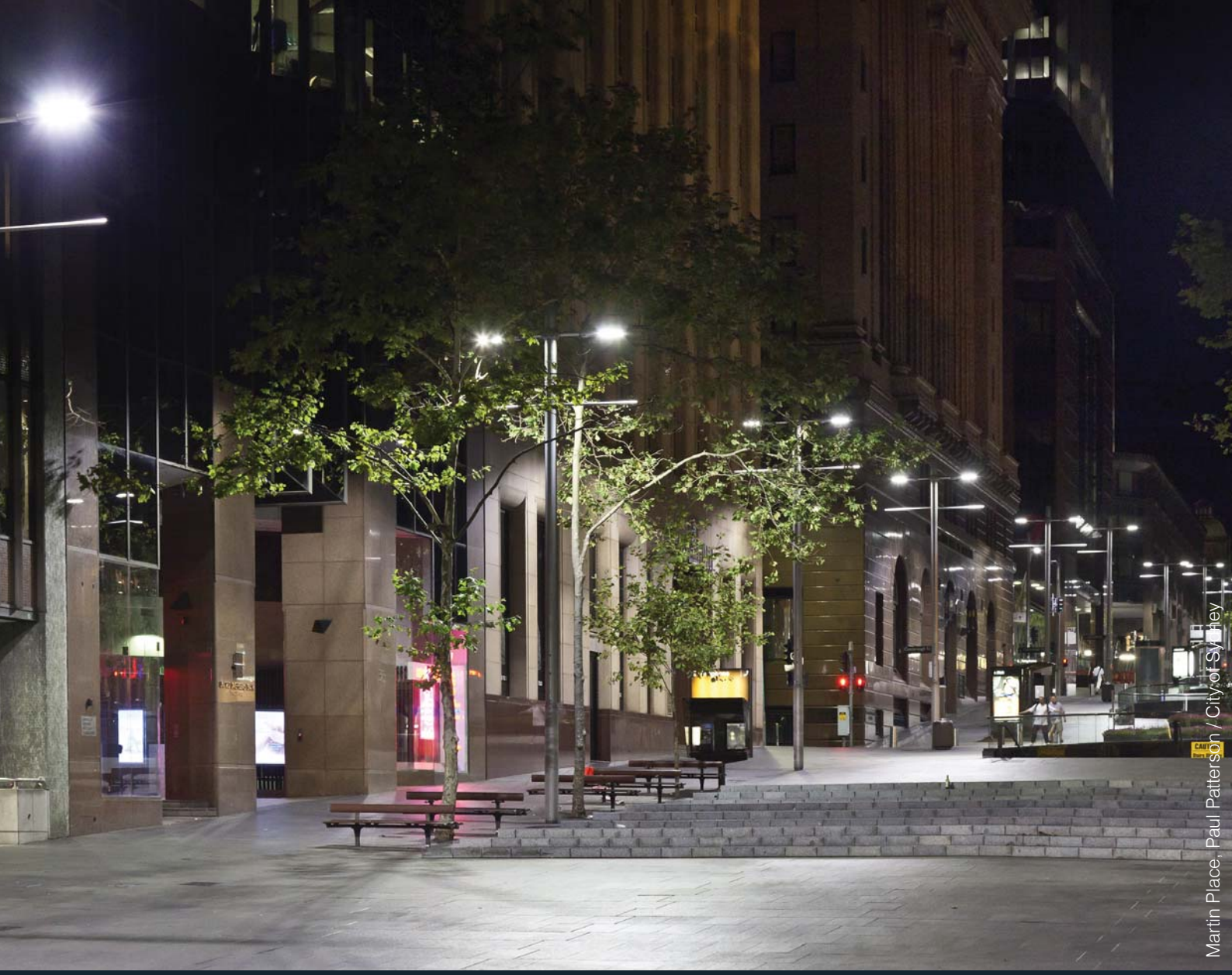
Creative Lighting Masterplans will form the basis for developing detailed lighting designs and specifications to allow scheme implementation.

Wynyard Park

Sydney Lights Part Five

Maintenance and Asset Management

city of villages



Martin Place, Paul Patterson / City of Sydney

5

5.0 Maintenance and Asset Management Procedures

5.1 Asset Management

The City's Asset Management Policy is to ensure that the City has information knowledge and understanding about the long-term and the cumulative consequences of being the custodian of public infrastructure.

Public lighting asset management is based on the following principles to guide sustainable management of infrastructure assets. They are:

- Take a lifecycle approach – apply a whole of life methodology for managing infrastructure assets including planning, acquisition, operation, maintenance, renewal and disposal
- A manageable portfolio of lighting technologies to minimise lighting maintenance response times
- Sustainable environmental performance
- Best value – balance financial, environmental and social aspects to achieve best value
- Decision support systems and knowledge such as GIS mapping of lighting assets– core systems will include up to date infrastructure asset information to inform decisions
- Service levels – infrastructure asset service levels will be clearly defined
- Long-term financial plans – asset practices, plans and systems will enable the development of long term financial plans for asset classes
- Manage risks associated with infrastructure assets; and
- Continuous improvement of asset management practices

5.2 Maintenance

Properly maintained equipment is an essential prerequisite of all approved lighting installations. It not only is important from a civic appearance aspect but in many cases from public safety and security aspects.

All installations will decrease in effectiveness over time due to aging lamps and the soiling of the exterior of luminaires and reflectors. Aiming suffers due to factors such as vibration and poor adjustment after lamp replacement. These characteristics not only spoil the designed appearance but also waste energy.

The proposed practice for the maintenance of public lighting is to carry out a bulk replacement of lamps at the end of the effective lamp lifetime, taking into account the economic and operational characteristics of the lamps. Alternatively the preference is to replace defective lamps upon notification of faults.

It is recommended to initiate a new maintenance regime for City owned lights. To control total lighting maintenance costs, the City will adopt a preventive and predictive maintenance regime for all City owned lights. The City will conduct or contract to have conducted a regular inspection, cleaning and maintenance (including bulk lamp replacement as appropriate) of all decorative lights.

The inspection, cleaning and maintenance cycle should be driven primarily by the bulk lamp replacement and cleaning requirements for the installations (24 or 36 months depending on lamp technology and location). The tasks should include the following:

1. Verification of existing inventory data and corrections as needed
2. External visual condition assessment of luminaire and pole/bracket
    - Missing, damaged or defective components
    - Tree or other interference
    - Verify night-time operation
3. Replace any readily replaceable defective or broken components
4. Determine if current/imminent major repair or replacement is required and record
5. Cleaning of luminaire lens and refl ectors and, bulk lamp replacement
6. Coat visible corrosion with rust protection and tough-up paint as required
7. Re-coat base of pole with rust protection or paint as appropriate
8. Return recovered components for recycle or appropriate disposal. Failed lamps should be sent to an appropriate recycling facility

The City may also pursue night patrols 3-4 times per year in areas where there are no natural reporting parties

(eg park safe city staff or security personnel). Lamp replacements could then be conducted in bulk following a patrol.

In addition, development applications that cover the illumination of of the public domain must include maintenance plans for approval.

In regard to lamp/ light source maintenance it is recommended that bulk lamp replacement be carried out within sections of the precinct according to the lamp type. Most luminaires will use LED sources: LED's generally have a service life in excess of 50,000 hours at which point the luminous flux drops below 70% of its original output. The LEDs will then slowly continue to degrade and need replacement.

It is recommended that a luminaire maintenance and lamp replacement schedule be incorporated within documentation provided by the lighting designer for each specific project.

Education of staff plays an important part in a well maintained lighting installation. Not only to fully understand the technical aspects but to also be informed of the lighting design principles and objectives.

5.3 Waste Management Plan and Recycling

Public lighting produces a number of waste and recyclable streams.

Waste management planning involves recycling of as many materials and components as possible and responsible disposal of the balance.

Systematic maintenance using bulk replacement of lamps at end of design life rather than failure allows for better and more effective management of lamp waste and maintenance of luminaire performance.

Sydney Lights Part Six

Appendices

city of villages

Chinatown Precinct , Paul Patterson / City of Sydney

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6.0 Appendices

6.1 Appendix 1: Glossary

Accent	Where light is used to emphasise or highlight objects.
Candela (CD)	Unit of luminous intensity equal to one candle power.
Colour rendering	The effect of a light source on the colour appearance of an object.
Correlated colour temperature	The absolute temperature of a black body radiator whose chromaticity most nearly resembles that of the light source being considered. Unit: Kelvin.
Efficacy	A factor which quantifies the effectiveness of a luminaire in converting electrical power to light.
Glare	The discomfort or impairment of vision experienced when parts of the field of view are excessively bright.
Illuminance	The luminous flux arriving at a surface divided by the area of the illuminated surface. Unit: lux
Lamp	Complete light source unit.
Light	Electromagnetic radiation with a wavelength between 380nm to 720nm.
Luminaire	Complete lighting units consisting of lamp, control gear (if required), reflector and housing.
Lumen	Unit of luminous flux used to describe a quantity of light emitted by a source orreceived by a surface. Unit: lumens
Luminance	The physical quantity corresponding to the brightness of a surface in a specified direction. Unit: cd/m2
Sky Glow	Sky glow is the brightening of the night sky that results from the reflection of radiation (visible and non-visible), scattered from the constituents of the atmosphere (gaseous, molecules, aerosols, land particulate matter), in the direction of observation. It comprises two separate components. Natural sky glow – that part of the sky glow which is attributable to radiation from celestial sources and luminescent processes in the Earth's upper atmosphere. Artificial sky glow – that part of the sky glow which is attributable to manmade sources of radiation (e.g. outdoor electric lighting), including radiation that is emitted directly upwards and radiation that is reflected from the surface of the Earth.
Traffic deterred	As defined under AS/NZS 1158.3.1:2005 Clause 3.2.6.3. "When the purpose of the road is such that the intention of traffic management devices is generally to slow and deter traffic other than vehicles with their origin or destination in that road, the devices shall be identified to drivers using one of two technologies as follows:" (a) Using reflectors (Refer to standard for details) (b) Using roadlighting luminaires including roundabouts and the intended effect of a traffic management device on a vehicle passing through it is to cause the driver to reduce speed and maintain a reduced speed while travelling through the device. (Refer to standard for further details.)
Traffic slowed	As defined under AS/NZS 1158.3.1:2005 Clause 3.2.6.2. "Where the purpose of the road is such that the intention of traffic management devices is generally to slow traffic and regulate its flow at conflict points but not to deter or reduce the volume of through traffic, the intended effect of a traffic management device on a vehicle passing through it is to cause the driver to reduce speed and maintain a reduced speed while travelling through the device." Refer to standard for further details.
Watt	Unit of electrical power

6.2 Appendix 2: Background- City of Sydney Initiatives

The Sydney Lights Design Code fits under a broader policy and strategic planning directions prepared by City of Sydney. This includes the following:

6.2.1 Sustainable Sydney 2030

Sustainable 2030 Targets that public domain lighting can contribute to include:

Target 1

By 2030, the City will reduce greenhouse gas emissions by 50 per cent compared to the 1990 levels, and by 70 per cent compared to 1990 levels by 2050
'A 10 per cent overall reduction in emissions is possible by phasing out incandescent light bulbs with progressively more efficient lighting technologies.'

Direction 4

A City for pedestrians and cyclists
Objective: 'Develop a network of safe, linked pedestrian and cycle paths integrated with green spaces throughout both the City and Inner Sydney.'

Direction 5

A lively, engaging City Centre
Objective: 'Strengthen the City's public domain, identify and create more places for meeting, rest and leisure.'
Objective: 'Support the development of diverse, new bars and restaurants in the
City Centre'

Direction 9

Sustainable development renewal and design
Objective: 'Define and improve the City's streets, squares, parks and open space, and enhance their role for pedestrians and in public life.'

6.2.2 City Public Domain Plans

The City Centre has been divided into precincts for which detailed feasibility and public domain plans will be developed. To date Plans have been prepared for Chinatown, Harbour Village North and George Street. These Plans analyse and recommend the scope, location and extent of public domain improvements including lighting over the short, medium and long term. Recommendations for creative lighting overlays will be further scoped and developed by individual Lighting Masterplans for each precinct.

6.2.3 Open Sydney

Open Sydney provides a vision for the night time economy of the City of Sydney and is a guiding factor in the development of the lighting master plan. Lighting activates the night and is crucial in allowing and supporting night time activities.

The night time vision is based on five goals all of which relate to lighting.

A Global Sydney where Sydney is an internationally recognised night-time city, based on our design, diversity, safety, innovation, creativity, strong economic growth and leadership; where we govern our city well through coordinated action.

A Connected Sydney where businesses connect to events, to each other and to residents, workers and visitors; with hubs that activate different city precincts; where transport links to outer suburbs; where digital access is fast and free.

A Diverse Sydney with later opening hours, and where more no-alcohol activities attract families and older people; where new venues and activities emerge in underused spaces, and where traditional spaces by day take on new uses at night.

An Inviting and Safe Sydney with beautiful design, including lighting, where spaces for pedestrians encourage strolling and exploring; where streets are safe and free of violence, and where there is respect between visitors and residents.

A Responsive Sydney where innovation is encouraged by reducing red tape, and where proactive, problem-solving teamwork with government and industry is the norm, and local solutions reflect local character

6.2.4 Liveable Green Network

The Liveable Green Network is a is a key project idea in Sustainable Sydney 2030 to deliver a pedestrian and cycling network that connects people to the City Centre, Village Centres and neighbourhoods, as well as to public transport, education and cultural precincts and major parks and recreation facilities.

The Liveable Green Network Strategy and Masterplan report 2010 found that to encourage use of pedestrian network will depend on improvements to infrastructure such as footpaths and crossings, wayfinding information and improved public lighting to encourage pedestrian activity at night.

The Liveable Green Network Masterplan provides the means to identify key pedestrian links and destinations across the LGA that may require a review to ascertain if additional lighting provision should be provided.

6.2.5 City Environment Management Plan

The City of Sydney Environmental Management Plan establishes the City's environmental vision, goals, targets and actions for the next ten years and beyond. It addresses the themes of energy and emissions, water, waste, plants and animals.

Targets that public lighting provision needs to consider include:

- 100 per cent offset of greenhouse gas emissions from Council operations and services by 2008. This includes a minimum15 per cent reduction of Council emissions by 2012 based on 2006 levels through energy savings measures.
- 70 per cent reduction and offset of greenhouse gas emissions from our local government area by 2050 based on 1990 levels. This includes:
- Accurate annual emissions data by 2008.
- Slowed rate of emissions increase by 2010.
- Stabilisation by 2012.
- 30 per cent reduction by 2020.
- 25 per cent of electricity used in our local government area to come from renewable energy by 2020

6.2.6 Safe City

Safe City is a multi-faceted program to address the safety and security issues of people who live work and visit the City.

The City's Safe City Strategy stresses the importance of adequate lighting levels as a key crime prevention measure, contributing to the reduction in crime and the increase in the public's perception of safety. Part of the Safe City program is the undertaking of safety audits in collaboration with police Local Area Commands to identify safety issues and develop rectification plans that may include a review and update of public lighting provision.

6.2.7 Public Art Masterplans

In May 2011, Council endorsed a new Public Art Policy and a new City Art Public Art Strategy as a key action of Sustainable Sydney 2030 in line with its key directions to create a "lively and engaging city" and "a cultural and creative City".

Part of the Strategy directions is the preparation of Public Art Masterplans that will guide the creation of high quality public art projects, including projects by the City of Sydney, projects created in partnership with cultural organisations and other projects created by the private sector.

To date public art masterplans have been developed for the City Centre, Green Square, and Chinatown.

In collaboration with the City's public art curatorial advisors lighting could be a key component of a public art proposal that contributes to the distinctiveness of a location.

6.3 Appendix 3: International Benchmarking and Positioning Study

A benchmarking study of a number of recently completed master plans from different countries and of different scales assisted in the positioning of this masterplan within other cities and similar projects, and indicates the following key principles as best practice design.

Sustainability

A key goal of recent lighting masterplans is to achieve a target of specific sustainable objectives, focussing on a reduction of CO2 emissions, a decrease of energy use, energy costs and minimisation of light pollution. Advancements in technology, including LED colour quality and consistency, efficiency, optics and accessibility provides a viable alternative for City lighting in future upgrades.

The role of lighting in a sustainable city development need to embrace wider aspects of ‘urban life’, ‘identity’, ‘ideas’, ‘aesthetics’, ‘function’ and ‘technology’.

Safety and wayfinding

A sense of safety for people at night is a vital and needs to be recognised by the lighting masterplan. Most lighting strategies for public spaces emphasise way finding to main streets and key destinations, to encourage greater public use and feeling of safety.

To guide movement and assist in wayfinding, light can be used for defining and outlining edges and site boundaries, as marker or beacon and with increased focus on pedestrian scale and traffic. Visual links can be created and areas of darkness removed by indicating pedestrian underpasses and passages through lighting.

Identity

As an intrinsic part of a city’s day and night-scape, lighting is used to shape life, place and identity in a city.

Used in the right way, lighting can facilitate a unique identity and recognisable night time environment by providing a clear and structured nightscape, emphasising landmarks, defining spatial boundaries and increasing the legibility of the urban night scape.

Whilst a coherent solution will enhance the overall city identity, recent masterplanning recognises and embraces the diversity and local character of individual precincts and allows for natural and individual developments to enhance specific precinct identities.

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6.4 Appendix 4: Pedestrian Lighting Improvement Plan

Liveable Green Network - Pedestrian Lighting Improvement Plan